



# SIDS Handbook for Public Health Professionals



CALIFORNIA  
SIDS  
PROGRAM  
SUDDEN INFANT  
DEATH SYNDROME  
CALIFORNIA DEPARTMENT  
OF PUBLIC HEALTH MCAH

California SIDS Program is funded by  
Federal Title V Block Grant through the  
California Department of Public Health  
Maternal, Child and Adolescent Health Division, 2014



# SIDS Handbook for Public Health Professionals

## Table of Contents

### Section One ~ Introduction

- California Department of Public Health MCAH SIDS Program Fact Sheet
- California Department of Public Health MCAH Program Policy Alert
- California Department of Public Health SIDS Program Website Information
- California SIDS Program Mission Statement
- California SIDS ~ State and Council Contacts
- SIDS Program Mentors
- Federal and California SIDS Legislation Summary

### Section Two ~ Facts About SIDS

- Definitions: SUID, SIDS, SUDC, Fetal Death, Infant Mortality, Stillbirth, & Miscarriage
- CDPH MCAH Bulletin California ~ SIDS in California, 2012
- Number of Live Births/SIDS Deaths, SIDS Death Rates by Year and Race/Ethnicity~ 2008-2012
- Number of SIDS Deaths/Live Births, SIDS Death Rate by County ~ 2010-2012
- Number of SIDS Deaths/Live Births, SIDS Death Rate by County ~ 2001-2012
- SIDS Rate: California 1992-2012 and United States 1999-2010 Graph
- *When SIDS Happens*

### Section Three ~ Local Health Department Responsibilities

- *When SIDS Happens* ~ Health Department Responsibilities
- Diagnosing the Cause of Death for Infants Dying Suddenly & Unexpectedly – Council Recommendation August 14, 2012
- CDPH MCAH Sudden Unexpected Infant Death Referrals & Grief Support – December 17, 2012
- SIDS Public Health Professionals Frequently Asked Questions
- Public Health Services Report Form/Report of Contact/Instructions
- Public Health Services Reporting Guidelines
- Public Health Services Report Form/Report of Contact ~ Completed Samples
- SIDS Informational Portfolio ~ Overview
- Contra Costa County SIDS Program PHN/CHS Case Tracking Form ~ Sample
- Contra Costa County SIDS PHN/SW Chart Review Guide ~ Sample
- *A Practical Guide to the SIDS Home Visit* ~ Overview
- *A Practical Guide to the SIDS Home Visit* ~ Compact Disk
  - *Standards for Public Health Nurses*
  - *Standards for Social Workers*

### Section Four ~ Coroner Responsibilities

- *When SIDS Happens* ~ Coroner Responsibilities
- *Information for Coroners and Coroner Investigators in California: Available at this link:* <http://californiasids.cdph.ca.gov/UploadedFiles/Forms/Coroners.pdf>
- *Public Health Nurse and Coroner Teaming*
- *Why Is a Postmortem Examination Important When a Child Dies Suddenly?*
- California SIDS Program Coroner Notification Card ~ Sample
- MCAH Policy Letter ~ Sudden Infant Death Syndrome (SIDS) Protocols/Instructions
- California Death Scene and Deputy Coroner Investigation Protocol
- California Standardized Autopsy Protocol

## Section Five ~ Reducing the Risk of SIDS

- Assembly Bill 757 ~ Overview
- California Department of Public Health SIDS Risk Reduction Letter to Hospitals
- Safe Sleep Environments for Infants: Reducing the Risk of SIDS and Other Sleep-Related Infant Deaths
- *SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment ~ Policy Statement*
- *SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment ~ Technical Report*
- NICHD Safe to Sleep Public Education Campaign
- *What Does a Safe Sleep Environment Look Like?/Safe Sleep For Your Baby*
- *Infant Sleep Position and SIDS: Questions and Answers for Health Care Providers*
- NICHD Talking Points
- NICHD Safe to Sleep Campaign Materials Order Form
- CJ Foundation for SIDS Request for Educational Materials

## Section Six ~ Resources

- SIDS/SUID State and National Resources
- SIDS Advisory Council, Regional SIDS Advisory Councils
- The National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Centers
- California Local Health Departments SIDS Coordinators
- Mortuary Professional Liaison/Referral Services
- Grief and Bereavement Resources
- California Department of Social Services Child Care Advocate Program
- California Department of Social Services Community Care Licensing Division Child Care Offices
- CCHP Safe Sleep Policy for Infants in Child Care Programs
- SIDS/SUID Peer Grief Support Services in California
- SIDS Peer Contact Volunteers ~ Overview
- Active SIDS/SUID Peer Contact List by County

## Section Seven ~Research, Resources and Articles:

- Resource Page with Links to Articles:
  - *Are Autopsies of Help to the Parents of SIDS Victims?*
  - *Sudden Infant Death Syndrome ~ Medical Progress*
  - *Abnormalities of the Brainstem Serotonergic System in the Sudden Infant Death Syndrome: A Review by Henry Krous, MD*
  - *Brainstem Serotonergic Deficiency in Sudden Infant Death Syndrome ~ Commentary Review*
  - *Sudden Infant Death Syndrome (SIDS) and Child Care Centres (CCC)*
  - *Infant Sleep Positioning by Nursery Staff and Mothers in Newborn Hospital Nurseries*
  - *Maternal Bedsharing Practices, Experiences, and Awareness of Risks*

## Section Eight ~ Miscellaneous Information

- *Responding to a Sudden Unexpected Infant Death: The Professional's Role*
- *The Grief of the Parents: A Lifetime Journey*
- *Helping Children Cope When An Infant Dies*
- *A Loving Goodbye*
- *Lactation After Loss*

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California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division.  
<http://californiasids.cdph.ca.gov>

# Section One

## **Introduction**



# California Sudden Infant Death Syndrome (SIDS) Program

## Fact Sheet

### Goals:

- Reduce the number of deaths due to Sudden Infant Death Syndrome (SIDS).
- Help families and others deal with the tragedy of SIDS.

### Problems:

- In 2012, SIDS was one of the top five leading causes of infant death (birth to one year of age) in California.
- In California in 2012, the African American (non-Hispanic) SIDS rate was almost five times that of both the White (non-Hispanic) and Hispanic SIDS rate.

### Program Activities:

- Outreach campaign to educate parents, families, and child care providers on how to reduce the risk of SIDS. (e.g. place baby on back to sleep, on a firm flat surface and without soft objects, toys or loose bedding for all naps and at night, no smoking around baby, avoid over bundling--baby needs to be kept warm not hot, baby needs regular check-ups and immunizations, and breastfeed your baby.)
- Targeted outreach campaign for African-American families.
- Trainings for SIDS families so that they can help other SIDS families in dealing with grief.
- Trainings for hospital staff, public health nurses, emergency responders, coroners, childcare providers, foster parents, and the general public on SIDS facts and dealing with the emotional impact of SIDS deaths.
- Information to the public on risk reduction and the latest research concerning SIDS and its potential causes.

### Who Benefits?

- All parents of infants benefit by knowing they can actually do something to reduce the risk of SIDS. The SIDS risk reduction campaign known as “Back to Sleep” or “Safe to Sleep” has reduced the rate of SIDS deaths in California by 29 % from 1999 to 2012.

### Who Provides Services?

- Parent volunteers, public health professionals, Local MCAH SIDS Coordinators, and Staff at California Sudden Infant Death Syndrome Program. The current SIDS Contractor is Regents of the University of California, San Francisco, School of Nursing. To locate assistance in your area, please see our [MCAH Directors and Local Toll Free Numbers Listing](#).

### Funding:

- Federal Title V MCH Block Grant Funds. California Department of Public Health, Maternal, Child and Adolescent Health (MCAH) Division administers the SIDS Program. Please see the [SIDS Program](#) for more information.





MARK B HORTON, MD, MSPH  
Director

State of California—Health and Human Services Agency  
California Department of Public Health



ARNOLD SCHWARZENEGGER  
Governor

September 17, 2009

TO: MCAH DIRECTORS

SUBJECT: SIDS ALLOCATION AND STATE MANDATES OVERVIEW

This letter is in reference to the annual SIDS allocation you receive from the MCAH Division, California Department of Public Health (CDPH). The SIDS allocation monies that local health jurisdictions (LHJs) receive are from the Title V MCH Block Grant funds and are designated to be used for SIDS activities. This letter provides guidance on how best to utilize the SIDS allocation, and also provides background information on the suspension of State Mandates regarding SIDS.

As you know, GC §17581 excuses local agencies from performing state mandated programs if funding is not provided in the Budget Act. Beginning with Fiscal Year 2003-2004, State Mandates related to the SIDS program as listed below have been suspended by the Legislature in the Budget Act, and as a result, LHJs are no longer required to provide the services and/or duties listed within those State Mandates. For more information on SIDS laws, refer to the following web site: <http://www.californiasids.com/Universal/MainPage.cfm?p=46>.

1. SIDS Training for Firefighters (Stats 1989, c.1111): HSC §1797.193, requiring firefighters to complete a course on SIDS;
2. SIDS Contacts by Local Health Officers (Stats 1991, c.268): HSC §123740, requiring local health officers to contact persons having custody and control of the infant to provide information and support services;
3. SIDS Autopsies (Stats 1989, c.955): GC §27491.41, requiring coroners to follow prescribed SIDS autopsy protocols; and
4. SIDS Notices (Stats 1974, c.453): HSC §102865, requiring coroners to notify the local health officers within 24 hours of a SIDS autopsy.

As a result of the SIDS State Mandates continual suspension, LHJs were allocated Title V MCH Block Grant Funds for local SIDS activities through the SIDS Program Allocation per MCAH Program Policy Alert #2004/05-07 dated May 3, 2005. This allocation to LHJs from Title V funding is to be used to support SIDS services and activities. The MCAH Program Policy Alert letter provides suggested interventions on how to use the local SIDS allocation. With the current budget crisis, we understand the importance of being flexible and prioritizing activities to meet the needs of the MCAH population. MCAH Division has prioritized SIDS objectives as follows:

1. Contact all parents/caregivers who experience a presumed SIDS death to provide grief and bereavement support services

2. At least one public health professional to attend the State SIDS Annual Conference and/or other SIDS training(s)

It is also strongly recommend that a local SIDS objective be developed to promote SIDS risk reduction activities by providing risk reduction education and materials to the community.

While local SIDS State Mandates have been suspended, state level SIDS Mandates are still in effect.

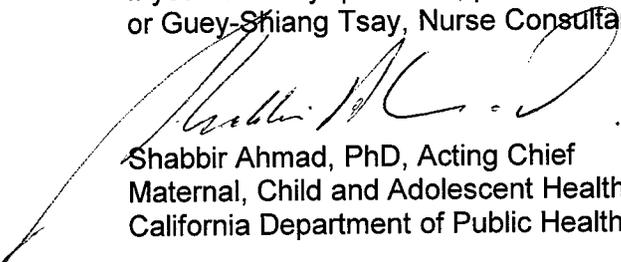
1. MCAH is required by HSC §123745 to monitor compliance by county health officers with HSC §123740, even though MCAH is only monitoring their voluntary compliance. Duties noted under HSC §123740 (currently voluntary) include:
  - Upon being notified by the coroner of a presumed SIDS death, consulting with the infant's physician, when possible; and then
  - Immediately contacting the persons having custody and control of the infant (e.g., family, caregivers, and/or foster parents) to provide information, support, referral, and follow-up services.
2. MCAH is also required by HSC §123730 to keep each county officer advised of the most current knowledge relating to the nature and causes of SIDS.

The MCAH Division, through the California SIDS Program Contractor, provides two SIDS trainings yearly for public health professionals at no cost, except for travel expenses. The California SIDS Program Contractor also provides free consultation and technical assistance to LHJs, as well as free SIDS specific literature, resources, and materials. LHJs can use part of their SIDS allocation to support costs for staff to attend SIDS training(s) and/or the Annual SIDS Conference each year.

It is very important for LHJs to continue to disseminate SIDS risk reduction messages to their local community. Many LHJs have successfully integrated this information into existing programs. You can locate the SIDS materials and resources from California SIDS Program at <http://www.californiasids.com/Universal/MainPage.cfm?p=10>. SIDS risk reduction materials are available at no cost from the Back to Sleep Campaign at: [http://www.nichd.nih.gov/publications/pubs/upload/bts\\_order\\_form\\_2006.pdf](http://www.nichd.nih.gov/publications/pubs/upload/bts_order_form_2006.pdf). Other SIDS materials and training, available at no cost, can also be obtained from the National SIDS Resource Center at: <http://www.sidscenter.org/>.

We acknowledge you and your staff for your hard work during this difficult time. Your efforts help contribute to the continuing decline in SIDS rates.

If you have any questions, please feel free to contact your Nurse Consultant, Contract Manager, or Guey-Shiang Tsay, Nurse Consultant for the SIDS Program, at 916-650-0374.



Shabbir Ahmad, PhD, Acting Chief  
Maternal, Child and Adolescent Health Division  
California Department of Public Health

cc: See next page

MCAH Directors  
Page 3  
September 17, 2009

cc: Karen C. Ramstrom, DO, MSPH, Chief  
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Maternal, Child and Adolescent Health Division

Anita Mitchell, MD, Chief  
Program Standards Branch  
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CDPH MCAH Nurse Consultants

CDPH MCAH Contract Managers



# Sudden Infant Death Syndrome (SIDS) Program

MO-07-0031 SIDS

SIDS is the sudden unexplained death of an infant under one year of age. A SIDS diagnosis requires a complete autopsy, a thorough death scene investigation, and review of the clinical history. The SIDS Program focuses on providing education about SIDS, grief counseling, and what can be done to reduce the risk of SIDS, like placing babies on their back to sleep. SIDS Program is supported by Title V Funds.

## News, Hot Topics, & Updates

[MCAH Program Policy Alerts](#)

[CDPH Director's letter supports October as SIDS Awareness Month \(PDF\)](#)

[A Letter to California Hospitals Regarding Providing SIDS Risk Reduction Information to Parents of Newborns \(PDF\)](#)

[American Academy of Pediatrics \(AAP\) SIDS and Risk Reduction Recommendations, Policy Statement, 2011](#)

[American Academy of Pediatrics \(AAP\) SIDS and Risk Reduction Recommendations, Technical Report, 2011](#)

[American Academy of Pediatrics' \(AAP\) Reducing the Risk of SIDS in Child Care Free Course \(PDF\)](#)

[Annual California SIDS Program Conference on October 17, 2014](#)

[California State and Local Infant Mortality Rate Data \(PDF\)](#)

[Continuing Education Program on SIDS Risk Reduction: Curriculum for Nurses](#)

[SIDS Allocation and State Mandates Overview \(PDF\)](#)

[Sudden Unexpected Infant Death Referrals and Grief Support \(PDF\)](#)

[Northern California SIDS Training for Emergency Personnel and Public Health Professionals on March 20, 2014 \(PDF\)](#)

[Southern California SIDS Training for Emergency Personnel and Public Health Professionals on April 9, 2014 \(PDF\)](#)

## Policies & Procedures

[MCAH Program Policies and Procedures for Local Health Jurisdictions \(PDF\)](#)

## Resources

[California SIDS Program](#)

[California Tobacco Control Program](#)

[Conference and Training](#)

[Fetal and Infant Mortality Review \(FIMR\) Program](#)

[NICHD Safe to Sleep Campaign](#)

Formerly known as the Back to Sleep Campaign

[MCH Library](#)

SIDS/SUID Gateway to find resources to reduce SIDS/SUID, promote healthy outcomes, and cope with grief when losses occur.

[Project IMPACT, February E-Newsletter 2010 \(PDF\)](#)

[A Safe Sleep for All Babies: National Education Campaign on Crib Safety for New and Expectant Parents](#)

## Data & Statistics

[SIDS Bulletin 2012 \(PDF\)](#)

[SIDS by County, 2010-2012 \(PDF\)](#)

[SIDS by Race/Ethnicity, 2008-2012 \(PDF\)](#)

[SIDS by County, 2009-11 and 2010-12 \(PDF\)](#)

[SIDS Rolling Averages 2001-2012 \(PDF\)](#)

[SIDS California and US Rates Graph \(PDF\)](#)

## Program Information

[Contact Us](#)

[SIDS Program Fact Sheet](#)

[SIDS Mandates](#)

[SIDS Protocol](#)

[SIDS Risk Reduction](#)

[Grief and Bereavement](#)

[SIDS Coordinator Directory \(PDF\)](#) New

[MCAH Program](#)

## For Local Business Partners

[MCAH Business Partners](#)

## Publications & Reports

[A Report of SIDS Support Services Among California MCAH Local Health Jurisdictions \(PDF\)](#)

## Frequently Asked Questions

[CA SIDS Answers](#)



## CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM

The California Sudden Infant Death Syndrome (SIDS) Program is under the direction of the California Department of Public Health, Maternal, Child and Adolescent Health Division and was developed to help the many individuals affected by and involved with a SIDS death.

### MISSION

- Help reduce the emotional suffering of SIDS families and caregivers
- Improve the knowledge and skills of people who interact with SIDS families
- Increase public awareness and knowledge of SIDS
- Promote infant care practices to reduce the risk of SIDS

### SERVICES

- **Support Services:** We respond to the needs of grieving parents and family members by providing:
  - Crisis intervention, grief counseling and bereavement support
  - Referral to local bereavement support services
  - SIDS informational materials and grief/bereavement resources
- **Public Awareness and Education:** We promote awareness among the general public, expectant parents, families of newborns, SIDS professionals and other health care professionals involved with SIDS by:
  - Making available and accessible an array of grief, bereavement, risk reduction, safe sleep and other up-to-date SIDS related informational/educational materials
  - Assisting with speakers for informational/educational presentations
  - Conducting an Annual SIDS Conference each October
  - Maintaining the California SIDS Program website, [www.californiasids.cdph.ca.gov](http://www.californiasids.cdph.ca.gov)
- **Training and Consultation:** We offer to professionals and para-professionals involved with SIDS:
  - Educational trainings which enhance one's counseling skills and knowledge About sudden unexpected infant deaths and SIDS to effectively support those impacted by the loss of an infant.
  - Technical consultation and assistance to better understand and cope with The issues surrounding an infant's death.
- **Information Sharing:** We provide information by:
  - Promoting the exchange of current evidence-based information related to SIDS.
  - Participating in state and regional SIDS Council meetings/teleconferences
  - Collecting and sharing SIDS data and statistics

### CONTACT INFORMATION

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**CA SUDDEN INFANT DEATH SYNDROME ADVISORY COUNCIL  
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## CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM SIDS PROGRAM MENTORS

The following is a list of SIDS Coordinators throughout the State who have years of experience and expertise serving the SIDS community and promoting risk reduction at the local level. We encourage you to contact one of the mentors in your region for technical assistance and guidance as you assume the responsibilities of SIDS Coordinator for your health jurisdiction.

Name	Agency and Address	Phone	FAX
<b>Northern California Region</b>			
Dawn Dailey, RN, PHN, PhD	Contra Costa County Health Department 597 Center Avenue, Suite 365 Martinez, CA 94553-4675 <a href="mailto:Dawn.Dailey@hsd.cccounty.us">Dawn.Dailey@hsd.cccounty.us</a>	925.313.6325	925.313.6910
Michelle Scott, PHN	San Joaquin County Public Health Nursing 420 South Wilson Way Stockton, CA 95205 <a href="mailto:msscott@sjcphs.org">msscott@sjcphs.org</a>	209.468.3004 (general information) 209.468.3050 (direct)	209.468.2072
Sue Seaters, PHN	Placer County Health/Human Services 11484 "B" Avenue Auburn, CA 95603 <a href="mailto:sseaters@placer.ca.gov">sseaters@placer.ca.gov</a>	530.889.7155	530.889.7198
<b>Central California Region</b>			
Erica Alexander PHN	Fresno County Department of Community Health 142 E. California Fresno, CA 93706 <a href="mailto:ealexander@co.fresno.ca.us">ealexander@co.fresno.ca.us</a>		559.600.1132
<b>Southern California Region</b>			
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Karen Jackson, RN, BSN	Orange County Health Care Agency 1200 North Main Street, Ste. 525 PO Box 344, Bldg. 1F (street) Santa Ana, CA 92701 (mailing) <a href="mailto:KJackson@ochca.com">KJackson@ochca.com</a>	714.480.4601 (Office) 949.337.5490 (Cell)	949.472.2916
Kitty Roche, PHN, BSN, MSW	San Diego County Health/Human Services 606 E. Valley Parkway Escondido, CA 92025 <a href="mailto:kitty.roche@sdcounty.ca.gov">kitty.roche@sdcounty.ca.gov</a>	760.740.4020	760.740.4003



California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division.

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## **California Sudden Infant Death Syndrome Program**

### **FEDERAL AND CALIFORNIA SIDS LEGISLATION**

As early as the 1950s some researchers were interested in the phenomenon of “crib death,” but it was not until the 1960s that an organized effort began to address Sudden Infant Death Syndrome (SIDS). SIDS was first defined as a distinct medical entity in 1969. Federal hearings were held during 1972 and 1973 regarding SIDS.

In the United States, the Sudden Infant Death Syndrome Act of 1974 (Public Health Law 93-270) authorized the disbursement of federal grant dollars and set the conditions for the development of information and counseling services in each state. When separate SIDS grant monies were discontinued, the SIDS project was incorporated into the Maternal and Child Health (MCH) Block Grant.

In many states, including California, there was a growing public and legislative concern about the impact of SIDS on parents, caregivers and emergency medical personnel as well as first responders experiencing a SIDS death. SIDS parents and community groups throughout the State expressed the need for better communication and coordination between public health professionals, emergency and law enforcement personnel, and other persons who interact with SIDS families in California.

In response to these concerns, Governor George Deukemejian signed the first of four bills into law in 1989, which increased funding for expansion of the SIDS Program to include education, support services, training of professionals and paraprofessionals and appropriate counseling for SIDS parents and caregivers.

- **Chapter 1111, Statutes of 1989 (SB 1067)** mandates Sudden Infant Death Syndrome (SIDS) training for certification of emergency first responders (emergency medical technicians/paramedics and authorized registered nurses, firefighters and peace officers).
- **Chapter 1118, Statutes of 1989 (SB 1068)** mandates the State to provide regular and ongoing educational and training programs as well as produce, update and distribute literature on SIDS for specific target populations of persons who interact with parents and caregivers following a SIDS death. This statute also requires monitoring to determine whether the county health officer is performing the duties required under the existing law and within the time frames specified in Section 462.1 of the Health and Safety Code.
- **Chapter 955, Statutes of 1989 (SB 1069)** mandates the California Department of Public Health to establish procedures and protocols for researchers to access tissue, other materials, and data. This statute also requires that a standardized protocol be developed for coroners when conducting an autopsy on suspected SIDS cases and indemnifies coroners/medical examiners complying with the protocol. When findings are consistent with SIDS, this must be stated on the death certificate. Legislation also provides for reimbursement of expenses associated with these statutory procedures.\*

- **Chapter 1112, Statutes of 1989 (SB 1070)** established a State SIDS Advisory Council to provide guidance to the California Department of Public Health in the development of training, educational, and research programs regarding SIDS and to provide ongoing guidance to the Governor and the Legislature on SIDS Program needs for specific target groups. A statewide annual conference is to be convened to provide SIDS education.
- **Statute of 1991 (SB362)** amended the Health and Safety Code to state that the designated agent of the health officer shall be a “public health nurse or social worker who is knowledgeable about the incidence of Sudden Infant Death Syndrome, and the care and support of persons who have experienced a death of this nature and who has basic counseling skills.” This legislation also requires contact with the person or persons who had custody and control of the child, including foster parents and childcare providers, within three working days of notification by the coroner or other reporting agent. In April, 1993 legislation was passed (Chapter 268) resulting in reimbursement by County Health Departments for costs associated with fulfilling these mandates.\*
- **Health and Safety Code, Sections 1254.6 and 1596.846 (AB 757)** amended current legislation to require hospitals or midwives as of July 1, 1998 to provide SIDS risk reduction information as approved by the California Department of Public Health to parents/guardians of newborns. The State Department of Social Services is further mandated to provide information/instructional materials concerning SIDS and reducing the risk of SIDS to licensed child care facilities caring for children under two years of age upon licensure and at the time of a site visit.
- **Assembly Bill 1225 (Chapter 457)** effective January 1, 1999, amends existing law, which requires a mandatory autopsy in any case where an infant has died suddenly and unexpectedly, except when the physician of record certifies the cause of death is SIDS and the parents object to autopsy on religious or ethical grounds. AB 1225 revises this exception, and provides that an autopsy may be performed at the discretion of the coroner, even if the attending physician wants to certify the cause of death as SIDS.

*\* Note: In Fiscal Year 2002/2003, the Legislature suspended funding for mandate reimbursement of SIDS services provided by local coroners/medical examiners and health departments. Since then suspension of funding has continued as part of the State’s annual budget bill; however the SIDS mandates requiring duty performance remain in effect.*



The California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division

California Sudden Infant Death Syndrome Program  
800-369-SIDS(7437) <http://californiasids.cdph.ca.gov>

# Section Two

## **Facts about SIDS**



**Search the Databases**

**Advanced Search**

**Find Services**

**Resource Guides**

- All Guides by Topic
- Family Resources
- Knowledge Paths
- MCH Professional Education
- Multimedia Resources
- Non-English Languages
- Professional Resources
- School Resources

**MCH Alert Newsletter**

**MCH Links**

**Toolkits**

**Special Projects**

- AIM Partners
- Bright Futures for Women
- Healthy Start Gateway
- MCH History
- MCH Thesaurus
- MCHB Final Reports
- MCHB-Funded Projects
- MCHB Resource Centers
- State MCH-Medicaid Tools
- SUID/SIDS Gateway

**Site Tools**

- [About | How to Use | FAQ](#)
- [Contact Us](#)
- [Feedback and Questions](#)
- [Library Fact Sheet \(PDF\)](#)
- [Library Awards](#)
- [Social Media](#)

**Partner Projects**

- [Bright Futures](#)
- [Distance Learning](#)
- [MCH Navigator](#)
- [Oral Health](#)

**MCH Social Media**

- See what the states are saying on Twitter



**Sudden Unexpected Infant Death (SUID) & Sudden Infant Death Syndrome (SIDS) Gateway**

**Definitions: SUID, SIDS, SUDC, Fetal Death, Infant Mortality, Stillbirth, & Miscarriage**

**What is sudden infant death syndrome (SIDS)?**

Sudden infant death syndrome (SIDS) is the sudden death of an infant under age 1 that cannot be explained after a thorough investigation has been conducted, including a complete autopsy, an examination of the death scene, and a review of the clinical history.

See [Centers for Disease Control and Prevention \(CDC\), Sudden Infant Death Syndrome \(SIDS\) and Sudden Unexpected Infant Death \(SUID\): Home](#) for expanded information on terminology.

**What is sudden unexpected infant death (SUID)?**

SUID is the sudden and unexpected death of an infant in which the manner and cause of death are not immediately obvious prior to investigation.

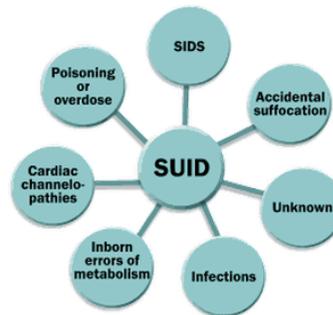
How are SUID and SIDS different? SUID can be caused by metabolic disorders, hypothermia or hyperthermia, neglect or homicide, poisoning, or accidental suffocation. Some SUIDs are attributed to SIDS. Sometimes the cause is unknown. In 2004, about 4,600 U.S. infants died suddenly of no immediately obvious cause, and nearly half of these SUID deaths were attributed to SIDS.

The SIDS rate has been declining significantly since the early 1990s. However, CDC research has found that the decline in SIDS since 1999 corresponds to an increase in SUID rates (e.g., deaths attributed to overlaying, suffocation, and wedging) during the same period.

This change in the classification of SUID can be explained by changes in how investigations are conducted and how SUID is diagnosed. ([Centers for Disease Control and Prevention, Sudden Unexpected Infant Death \(SUID\) Initiative.](#))

**Table of Contents**

- [What is sudden infant death syndrome \(SIDS\)?](#)
- [What is sudden unexpected infant death \(SUID\)?](#)
- [What is sudden unexplained death in childhood \(SUDC\)?](#)
- [What is fetal death?](#)
- [What is the difference between stillbirth and miscarriage?](#)
- [Definitions of other common terms](#)
  - » [Child death review](#)
  - » [Fetal mortality](#)
  - » [Infant mortality](#)
  - » [Fetal and infant mortality review](#)
  - » [Neonatal mortality](#)
  - » [Perinatal mortality](#)
  - » [Postneonatal mortality](#)



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What is sudden unexplained death in childhood (SUDC)?

SUDC is the sudden and unexpected death of a child over the age of twelve months, which remains unexplained after a thorough case investigation is conducted. This must include: examination of the death scene, performance of a complete autopsy, and a review of the child and family's medical history. SUDC is a diagnosis of exclusion - given when all known and possible causes of death have been ruled out. (The CJ Foundation for SIDS and the SUDC Program)

#### **What is fetal death?**

Fetal death is defined as the loss of a fetus at any time during pregnancy, not including induced abortions. ([Emedicine, WebMD](#)).

Also see the American Academy of Pediatrics' [Standard Terminology for Fetal, Infant, and Perinatal Deaths](#) (2011) which discusses terminology and reporting requirements.

#### **What is the difference between stillbirth and miscarriage?**

Both "miscarriage" (also known as spontaneous abortion) and "stillbirth" are terms describing fetal death, but they refer to losses that occur at different times during pregnancy.

Although there is no universally accepted definition of when a fetal death is called a stillbirth vs. a miscarriage, in the United States "stillbirth" refers to a fetal death that occurs after 20 weeks of completed gestation, and "miscarriage" usually refers to a fetal death that occurs at 20 weeks of completed gestation or earlier.

Stillbirth is more common than many people realize. Each year, about 25,000 infants are stillborn in the United States—almost 10 times the number of deaths that occur from SIDS.

Because of tremendous advances in medical technology over the last 30 years, prenatal care has improved, and the occurrence of late and term stillbirths has dropped dramatically. However, the rate of early stillbirth (fetal death occurring between 20 and 27 weeks of completed gestation) has remained essentially unchanged.

Common causes of fetal death include problems with the infant (birth defects or genetic abnormalities), problems with the placenta or umbilical cord, and certain conditions in the mother (e.g., uncontrolled diabetes, hypertension). ([First Candle](#))

#### **Overview of stillbirth**

March of Dimes. [Stillbirth. Quick reference: Fact sheet.](#)

#### **Overview of miscarriage**

March of Dimes. [Miscarriage. Quick reference: Fact sheet.](#)

Mayo Clinic. [Miscarriage.](#)

#### **Definitions of other common terms**

##### » **[Child death review](#)**

A comprehensive, multidisciplinary review of child deaths, to better understand how and why children die, and use the findings to take action that can prevent other deaths and improve the health and safety of children. For more information see the [National Center for the Review and Prevention of Child Deaths](#), which is a technical assistance program of the Michigan Public Health Institute partly funded by the Maternal and Child Health Bureau.

##### » **Fetal mortality**

The number of fetal deaths. Although the vast majority of fetal deaths occur early in pregnancy, most states in the United States report only fetal deaths occurring at 20 weeks or more of completed gestation. CDC notes that this definition of fetal death avoids the confusion arising from the use of terms such as "stillbirth" and "miscarriage." Centers for Disease Control and Prevention. 2009. [Fetal and perinatal mortality, United States, 2005](#). National Vital Statistics Reports 57(8).

##### » **Infant mortality**

The number of deaths among liveborn infants from birth to under age 1.

- » **Fetal and infant mortality review** A process that brings together key members of the community to review information from individual cases of fetal and infant death in order to identify factors associated with those deaths, establish if they represent system problems that require change, develop recommendations for change, assist in the implementation of change, and determine community effects. National Fetal and Infant Mortality Review Program. 2008. [Fetal and infant mortality review manual: A guide for communities. 2nd edition.](#) For more information see the [National Fetal and Infant Mortality Review Program \(NFIMR\)](#), which is a national technical assistance organization for Fetal and Infant Mortality Review (FIMR) programs. It is a collaborative effort between the American College of Obstetricians and Gynecologists (ACOG) and the federal Maternal and Child Health Bureau (MCHB).
- » **Neonatal mortality**  
The number of deaths from birth to under age 28 days.
- » **Perinatal mortality**  
There are two definitions of perinatal mortality:
  - » The number of deaths of infants under age 7 days, plus fetal deaths that occur at 28 weeks or more of completed gestation. (This definition is preferred for international comparisons.)
  - » The number of deaths of infants under age 28 days, plus fetal deaths that occur at 20 weeks or more of completed gestation. (This more inclusive definition is generally used in the United States).
- » **Postneonatal mortality**  
The number of deaths from age 28 days to under age 1. Centers for Disease Control and Prevention. 2008. [Infant mortality statistics from the 2005 period linked birth/infant death data set.](#) National Vital Statistics Reports 57(2).



## Sudden Infant Death Syndrome California, 2012

Sudden Infant Death Syndrome (SIDS) is the sudden death of an infant under one year of age which remains unexplained after a complete postmortem investigation, including autopsy, examination of the death scene, and review of the clinical history.

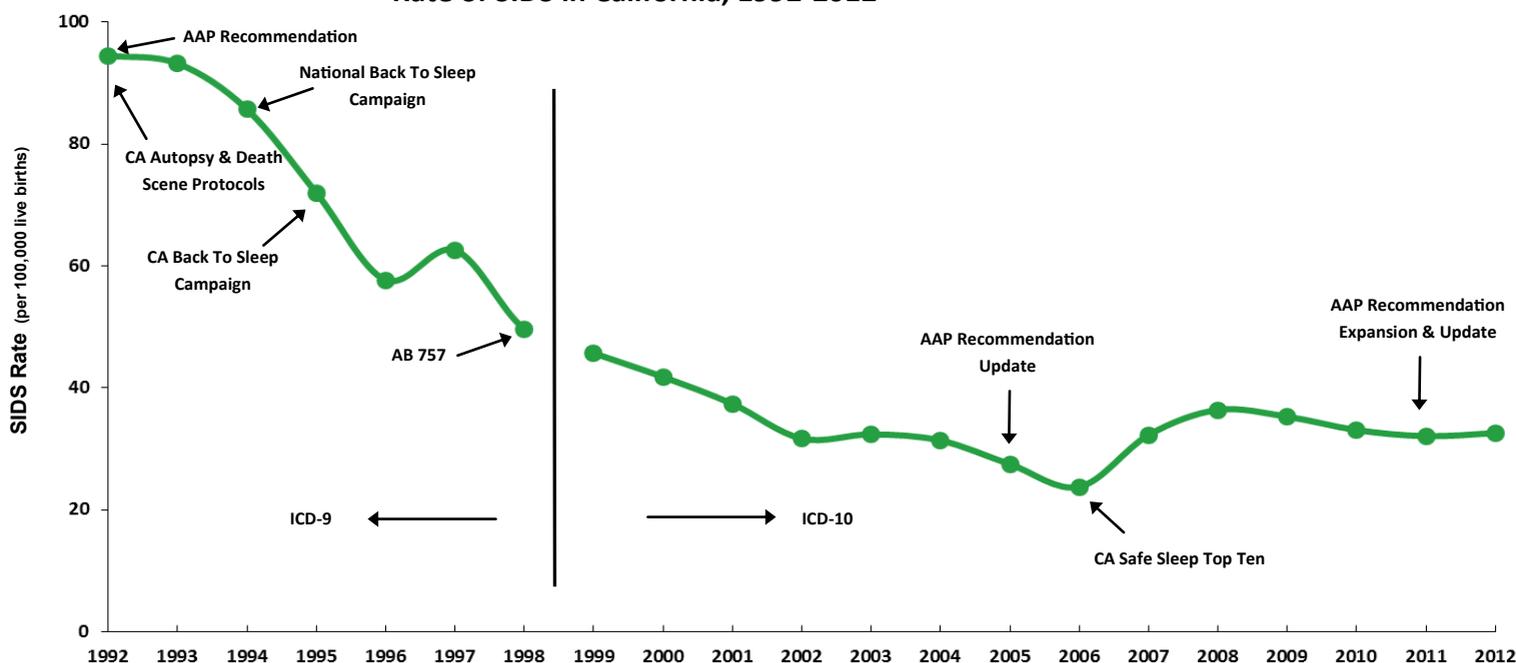
### SIDS Data in California in 2012

In 2012, 164 infants died from SIDS in California, representing a rate of 32.6 (per 100,000 live births). While this is an increase of 1.6 percent from 2011, it represents a decrease of 29 percent since 1999 when the rate was 45.7 (per 100,000 live births). Compared to the most recent national data, the California SIDS rate of 33.1 in 2010 was lower than the 2010 United States SIDS rate of 51.6<sup>1</sup> (per 100,00 live births).

The figure below shows California SIDS rates from 1992 to 2012. The rise in SIDS rates beginning in 2007 may be related to a change in diagnostic methodology, such as variance in death scene investigations and application of underlying cause of death diagnoses.

Beginning in 1999, SIDS rates cannot be compared to previous years because rules classifying SIDS as the underlying cause of death changed with the introduction of the 1999 update to the International Classification of Diseases, 10th Revision (ICD-10).

Rate of SIDS in California, 1992-2012



Data Source: California Department of Public Health, Birth Statistical and Death Statistical Master Files, 1992-2012.



### Highlights

- ▶ SIDS was the fourth leading cause of infant death (birth to one year of age) in 2012.
- ▶ For all postneonatal infants (aged one month to one year), SIDS was the second leading cause of death.
- ▶ The African-American/non-Hispanic SIDS rate was almost five times that of both the White/non-Hispanic rate and Hispanic SIDS rate.

## ► SIDS and Gender

Male infants continue to be more likely to die from SIDS than female infants. In 2012, California data show male infants accounted for more than half, 54 percent, of all SIDS deaths.

## ► Age at Death

There is a distinctive age pattern for SIDS. In California in 2012, the highest percentage of SIDS occurred when the infant was between 1 and 4 months, with 68 percent of deaths due to SIDS occurring before the age of 5 months.

## ► Seasonality of SIDS

An increased SIDS risk has been linked to the cold, winter months. Parents often place extra blankets or clothes on infants for extra warmth, possibly increasing the risk for SIDS. In the past, SIDS deaths have been more common during the winter season; however, data for 2012 did not show a seasonal pattern for SIDS in California.

## SIDS Risk Reduction

In 1989, the Governor of California signed the first of four SIDS bills into law. These laws launched California SIDS services, education, and research. In 1998, California passed Assembly Bill 757 requiring hospitals to provide parents of newborns with SIDS risk reduction information, furthering California's effort at reducing infant deaths due to SIDS.

In 1992, the American Academy of Pediatrics (AAP) recommended changing an infant's sleep position from stomach to back/side to reduce their risk of SIDS. In 1994, the national campaign promoting "Back to Sleep" was launched, and in 1995 California launched a statewide risk reduction campaign including "Back to Sleep". Between 1992 and 1998, SIDS rates in California declined 47 percent. In 2005, the AAP updated the "Back to Sleep" recommendations to further reduce the risk of SIDS, and in 2006 California launched the "Safe Sleep Top Ten<sup>2</sup>" messages including the updated AAP recommendations.

On October 18, 2011, the AAP released the policy statement, "SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment." These recommendations updated the 2005 AAP recommendations related to SIDS risk reduction, including recommendations on a safe sleep environment that can reduce the risk of all sleep-related infant deaths, including SIDS. The 2011 AAP recommendations and other SIDS risk reduction resources can be accessed at the Maternal, Child and Adolescent Health SIDS Program website<sup>3</sup>.

### For more information

- SIDS by County, 2010-2012: [www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSByCounty2010-12.pdf](http://www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSByCounty2010-12.pdf)
- SIDS by Race/Ethnicity, 2008-2012: [www.cdph.ca.gov/SIDS/Documents/MO-SIDS-SIDSByRace-Eth2008-12.pdf](http://www.cdph.ca.gov/SIDS/Documents/MO-SIDS-SIDSByRace-Eth2008-12.pdf)
- SIDS by County, 2009-11 and 2010-12: [www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSByCounty2009-11and2010-12.pdf](http://www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSByCounty2009-11and2010-12.pdf)
- SIDS Rolling Averages 2001-2012: [www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSRollingAverages2001-12.pdf](http://www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-SIDSRollingAverages2001-12.pdf)
- SIDS California & US Rates Graph: [www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-California-USRatesGraph.pdf](http://www.cdph.ca.gov/programs/SIDS/Documents/MO-SIDS-California-USRatesGraph.pdf)
- <sup>1</sup>National SIDS Data: [http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61\\_04.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr61/nvsr61_04.pdf)
- <sup>2</sup>California SIDS Program: <http://californiasids.cdph.ca.gov>
- <sup>3</sup>Maternal, Child and Adolescent Health SIDS Program Website: [www.cdph.ca.gov/programs/SIDS/Pages/default.aspx](http://www.cdph.ca.gov/programs/SIDS/Pages/default.aspx)





**California Department of Public Health**  
**Number of Live Births, Number of SIDS Deaths, SIDS Death Rates, and Annual Percent Change**  
**by Year and Race/Ethnicity, California Residents, 2008-2012**



		White (non-Hispanic)	African American (non-Hispanic)	American Indian/Aleut/ Eskimo (non-Hispanic)	Asian/Pacific Islander (non-Hispanic)	Hispanic	Multiple Race (non-Hispanic)	Totals <sup>1</sup> / Rate
<b>2008</b>	Births	146,309	29,428	2,032	67,306	287,323	9,878	551,567
	SIDS Deaths	48	36	2	12	90	13	201
	SIDS Death Rate (per 100,000 live births)	32.8	122.3	*	17.8*	31.3	131.6*	36.4

		White (non-Hispanic)	African American (non-Hispanic)	American Indian/Aleut/ Eskimo (non-Hispanic)	Asian/Pacific Islander (non-Hispanic)	Hispanic	Multiple Race (non-Hispanic)	Totals <sup>1</sup> / Rate
<b>2009</b>	Births	141,193	28,611	1,987	65,251	269,953	9,828	526,774
	SIDS Deaths	46	33	3	12	79	13	186
	SIDS Death Rate (per 100,000 live births)	32.6	115.3	*	18.4*	29.3	132.3*	35.3
	Percent Change in Rate from Previous Year	-0.6	-5.7	-	3.4	-6.4	0.5	-3.0

		White (non-Hispanic)	African American (non-Hispanic)	American Indian/Aleut/ Eskimo (non-Hispanic)	Asian/Pacific Islander (non-Hispanic)	Hispanic	Multiple Race (non-Hispanic)	Totals <sup>1</sup> / Rate
<b>2010</b>	Births	140,670	27,704	1,910	62,889	257,269	10,285	509,979
	SIDS Deaths	32	37	1	9	81	9	169
	SIDS Death Rate (per 100,000 live births)	22.7	133.6	*	*	31.5	*	33.1
	Percent Change in Rate from Previous Year	-30.4	15.9	-	-	7.5	-	-6.2
	Percent Change from 2008	-30.8	9.2	-	-	0.6	-	-9.1

		White (non-Hispanic)	African American (non-Hispanic)	American Indian/Aleut/ Eskimo (non-Hispanic)	Asian/Pacific Islander (non-Hispanic)	Hispanic	Multiple Race (non-Hispanic)	Totals <sup>1</sup> / Rate
<b>2011</b>	Births	139,273	27,082	1,804	64,060	249,675	10,598	502,023
	SIDS Deaths	46	30	1	12	62	8	161
	SIDS Death Rate (per 100,000 live births)	33.0	110.8	*	18.7*	24.8	*	32.1
	Percent Change in Rate from Previous Year	45.4	-17.1	-	-	-21.3	-	-3.0
	Percent Change from 2008	0.6	-9.4	-	-	-20.8	-	-11.8

		White (non-Hispanic)	African American (non-Hispanic)	American Indian/Aleut/ Eskimo (non-Hispanic)	Asian/Pacific Islander (non-Hispanic)	Hispanic	Multiple Race (non-Hispanic)	Totals <sup>1</sup> / Rate
<b>2012</b>	Births	137,227	26,533	1,763	70,584	244,616	10,932	503,788
	SIDS Deaths	40	36	1	2	71	14	164
	SIDS Death Rate (per 100,000 live births)	29.1	135.7	*	*	29.0	128.1*	32.6
	Percent Change in Rate from Previous Year	-11.8	22.5	-	-	16.9	-	1.6
	Percent Change from 2008	-11.3	11.0	-	-	-7.3	-2.7	-10.4

<sup>1</sup>Births and/or deaths with a race of "Other" or "Unknown" are not shown, however, they are included in the "Totals". "Other/Unknown" births represented 1.7% in 2008, 1.9% in 2009, 1.8% in 2010, 1.9% in 2011, and 2.4% in 2012. In 2012, there were no "Other/Unknown" SIDS deaths.

\*Rates based on fewer than 20 events are considered unstable and should be interpreted with caution. Rates not computed for fewer than 10 events.

Number of live births were derived from the California Birth Statistical Master Files, 2008-2012. Number of SIDS deaths were derived from the California Death Statistical Master Files, 2008-2012. SIDS deaths were identified by ICD-10 code R95.



**California Department of Public Health**  
**Number of SIDS Deaths<sup>1</sup>, Total Number of Live Births<sup>2</sup>, and SIDS Death Rate<sup>3</sup> by County**  
**California Residents, 2010-2012**



County	Number of SIDS Deaths 2010	Number of SIDS Deaths 2011	Number of SIDS Deaths 2012	Total Number of SIDS Deaths 2010-2012	Total Number of Births 2010-2012	SIDS Death Rate (per 100,000 live births) 2010-2012	95% Confidence Interval	
							Lower	Upper
Alameda	7	10	9	26	57,854	44.9	(29.4 - 65.8)	
Alpine					18			
Amador					826			
Butte	1	6	2	9	7,243	*		
Calaveras			1	1	1,019	*		
Colusa	1			1	954	*		
Contra Costa	2	6	4	12	36,470	32.9*	(17.0 - 57.5)	
Del Norte			1	1	1,011	*		
El Dorado					4,760			
Fresno	5	8	2	15	48,391	31.0*	(17.3 - 51.1)	
Glenn					1,193			
Humboldt	1	1	1	3	4,510	*		
Imperial		1		1	9,188	*		
Inyo					624			
Kern	10	7	9	26	43,261	60.1	(39.3 - 88.1)	
Kings		1	1	2	7,429	*		
Lake		2		2	2,175	*		
Lassen					920			
Los Angeles	60	43	45	148	395,169	37.5	(31.4 - 43.5)	
Madera	1			1	7,093	*		
Marin					7,059			
Mariposa					438			
Mendocino					3,273			
Merced					12,840			
Modoc					282			
Mono					438			
Monterey			4	4	20,230	*		
Napa		1		1	4,528	*		
Nevada					2,364			
Orange	2		2	4	114,523	*		
Placer		1	1	2	11,304	*		
Plumas					486			
Riverside	8	9	11	28	91,585	30.6	(20.3 - 44.2)	
Sacramento	11	10	15	36	59,671	60.3	(42.3 - 83.5)	
San Benito			1	1	2,208	*		
San Bernardino	12	15	15	42	92,631	45.3	(32.7 - 61.3)	
San Diego	26	13	19	58	132,850	43.7	(33.2 - 56.4)	
San Francisco			3	3	26,683	*		
San Joaquin	3	3	2	8	31,050	*		
San Luis Obispo			1	1	7,948	*		
San Mateo	1	2	2	5	27,422	*		
Santa Barbara	3	1		4	17,206	*		
Santa Clara	1		1	2	71,896	*		
Santa Cruz					9,506			
Shasta	2	3		5	6,267	*		
Sierra					65			
Siskiyou		1	1	2	1,407	*		
Solano	4	8	3	15	15,266	98.3*	(55.0 - 162.1)	
Sonoma		2	1	3	15,685	*		
Stanislaus	1	1	1	3	23,133	*		
Sutter		1	1	2	3,944	*		
Tehama	2		1	3	2,262	*		
Trinity					355			
Tulare	2	2	2	6	24,121	*		
Tuolumne					1,376			
Ventura	1	2	2	5	32,444	*		
Yolo	2			2	7,218	*		
Yuba		1		1	3,718	*		
California Rate	169 33.1	161 32.1	164 32.6	494	1,515,790	32.6	(29.7 - 35.5)	

\*Rates based on fewer than 20 events are considered unstable and should be interpreted with caution. Rates not computed for fewer than 10 events.

Blank cells indicate counties with no infant deaths due to SIDS.

<sup>1</sup>Number of SIDS deaths were derived from the California Death Statistical Master Files, 2010-2012.

<sup>2</sup>Number of live births derived from the California Birth Statistical Master Files 2010-2012.

<sup>3</sup>Rates are based on three successive years of data (deaths and births) to calculate stable rates. 95% confidence intervals are included to show stability of rates.

Wider confidence intervals represent unstable rates while narrow confidence intervals represent relatively stable rates.



California Department of Public Health  
 Three-Year SIDS Death Rates<sup>1</sup> by County  
 California Residents, 2001-2012



County	SIDS Death Rate (per 100,000 live births) 2001-2003	SIDS Death Rate (per 100,000 live births) 2002-2004	SIDS Death Rate (per 100,000 live births) 2003-2005	SIDS Death Rate (per 100,000 live births) 2004-2006	SIDS Death Rate (per 100,000 live births) 2005-2007	SIDS Death Rate (per 100,000 live births) 2006-2008	SIDS Death Rate (per 100,000 live births) 2007-2009	SIDS Death Rate (per 100,000 live births) 2008-2010	SIDS Death Rate (per 100,000 live births) 2009-2011	SIDS Death Rate (per 100,000 live births) 2010-2012
Alameda	65.7	59.1	63.1	65.2	47.3	39.3	33.4	39.6	39.2	44.9
Alpine										
Amador		*	*	*	*	*	*	*	*	*
Butte	*	*	*	*	*	*	*	*	137.3*	*
Calaveras	*	*	*	*	*	*	*	*	*	*
Colusa								*	*	*
Contra Costa	32.8*	37.7*	50.5	40.0*	42.3*	27.4*	35.6*	*	32.4*	32.9*
Del Norte	*	*	*	*	*	*	*	*	*	*
El Dorado	*	*	*	*	*	*	*	*	*	*
Fresno	45.0	43.4*	38.1*	26.7*	24.0*	23.6*	33.8*	36.5*	43.1	31.0*
Glenn	*	*	*	*	*	*	*	*	*	*
Humboldt	*	*	*	*	*	*	*	*	*	*
Imperial									*	*
Inyo	*	*	*	*	*	*	*	*	*	*
Kern	40.7*	33.7*	*	*	*	*	26.4*	49.4	62.0	60.1
Kings	*	*	*	*	*	*	*	*	*	*
Lake	*	*	*	*	*	*	*	*	*	*
Lassen	*	*	*	*	*	*	*	*	*	*
Los Angeles	10.3	8.4	6.8	7.3	12.6	25.7	36.9	43.8	40.7	37.5
Madera	*	*	*	*	*	*	*	*	*	*
Marin	*	*	*	*	*	*	*	*	*	*
Mariposa	*	*	*	*	*	*	*	*	*	*
Mendocino	*	*	*	*	*	*	*	*	*	*
Merced	*	*	92.0*	88.8*	101.0*	86.9*	*	*	*	*
Modoc	*	*	*	*	*	*	*	*	*	*
Mono	*	*	*	*	*	*	*	*	*	*
Monterey	64.5*	86.6*	71.7*	*	*	*	*	*	*	*
Napa	*	*	*	*	*	*	*	*	*	*
Nevada										
Orange	15.5	15.5	16.4	13.5*	9.8*	9.9*	*	*	*	*
Placer	*	*	*	*	*	*	*	*	*	*
Plumas	*	*	*	*	*	*	*	*	*	*
Riverside	25.0	23.7	18.0*	14.8*	13.0*	16.8*	20.2	22.1	26.9	30.6
Sacramento	68.3	44.6	35.2	39.1	58.2	73.3	76.7	69.5	54.6	60.3
San Benito	*	*	*	*	*	*	*	*	*	*
San Bernardino	61.3	59.5	67.8	52.2	50.5	38.6	44.6	40.1	45.8	45.3
San Diego	49.6	60.0	56.2	51.3	49.9	60.2	63.9	61.5	47.2	43.7
San Francisco	47.5*	*	*	*	*	*	*	*	*	*
San Joaquin	75.6	75.9	75.8	70.0	63.1	61.0	47.8*	36.9*	31.5*	*
San Luis Obispo	*	*	*	*	*	*	*	*	*	*
San Mateo	36.0*	*	39.7*	*	37.1*	*	*	*	*	*
Santa Barbara	*	*	*	*	*	*	*	*	*	*
Santa Clara	14.8*	*	*	*	*	*	*	*	*	*
Santa Cruz	*	*	*	*	*	*	*	*	*	*
Shasta	167.6*	*	*	*	152.8*	*	*	*	*	*
Sierra										
Siskiyou	*	*	*	*	*	*	*	*	*	*
Solano	86.0*	69.1*	*	*	*	*	65.3*	74.8*	102.6*	98.3*
Sonoma	*	*	*	*	*	*	*	*	*	*
Stanislaus	*	*	*	39.6*	38.5*	*	*	*	*	*
Sutter	*	*	*	*	*	*	*	*	*	*
Tehama	*	*	*	*	*	*	*	*	*	*
Trinity	*	*	*	*	*	*	*	*	*	*
Tulare	71.6*	*	*	*	*	*	*	*	*	*
Tuolumne	*	*	*	*	*	*	*	*	*	*
Ventura	*	45.0*	58.1	62.9	43.5*	49.0*	39.3*	34.7*	*	*
Yolo	*	*	*	*	*	*	*	*	*	*
Yuba	*	*	*	*	*	*	*	*	*	*
California Rate	33.8	31.8	30.4	27.5	27.9	30.8	34.7	35.0	33.5	32.6

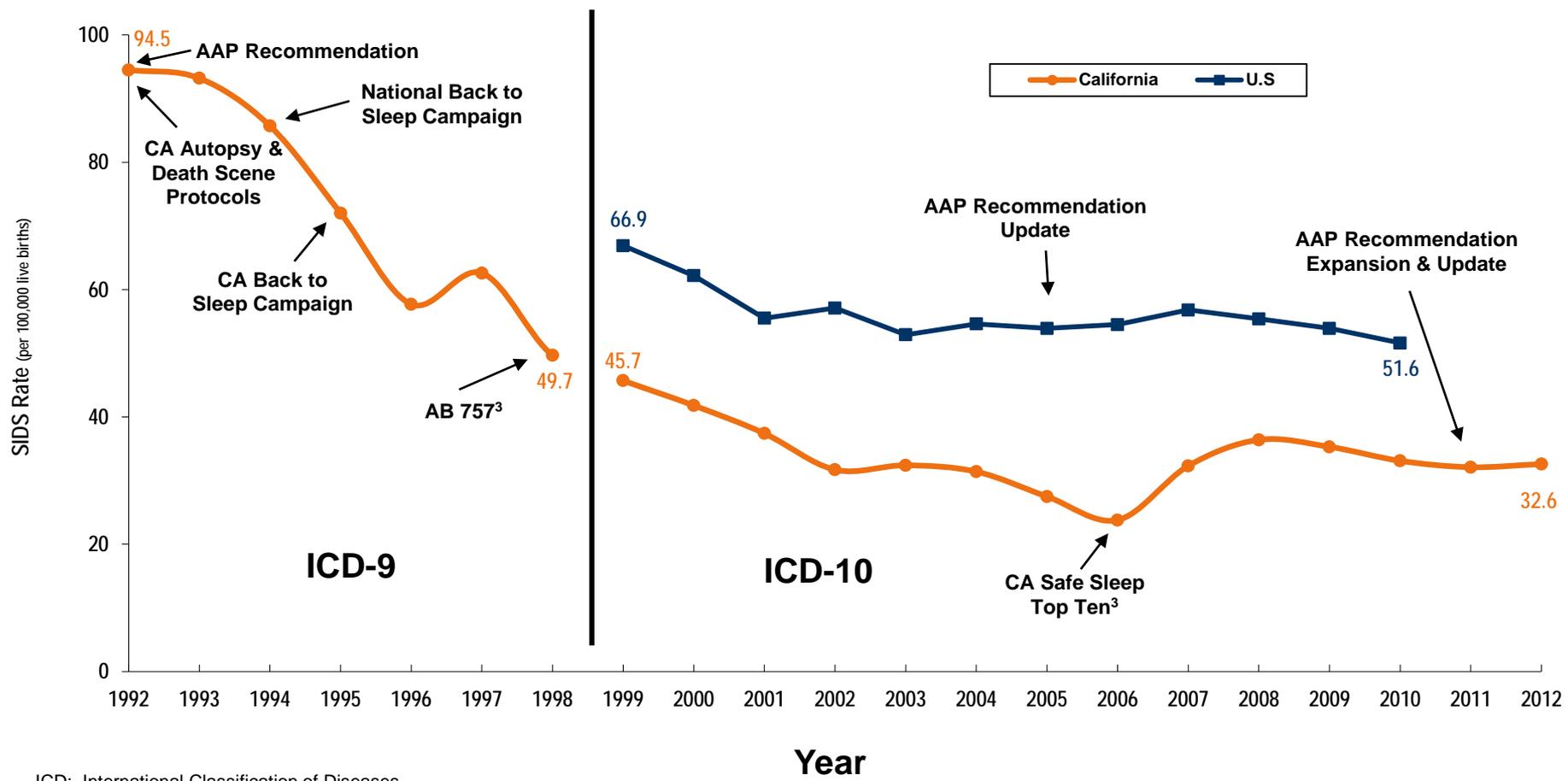
\*Rates based on fewer than 20 events are considered unstable and should be interpreted with caution. Rates not computed for fewer than 10 events.

Blank cells indicate counties with no infant deaths due to SIDS.

Number of SIDS deaths were derived from the California Death Statistical Master Files, 2001-2012. Number of live births derived from the California Birth Statistical Master Files 2001-2012.

<sup>1</sup>Rates are based on three successive years of data (deaths and births) to calculate stable rates.

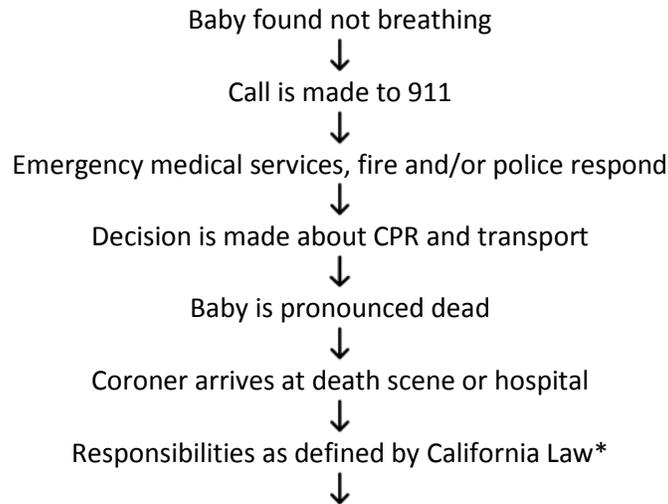
# Rate of Sudden Infant Death Syndrome (SIDS), California Residents<sup>1</sup> 1992-2012 and United States<sup>2</sup> 1999-2010



ICD: International Classification of Diseases

SOURCES: <sup>1</sup> California Department of Public Health, Birth Statistical and Death Statistical Master Files, years 1992-2012. For years 1992-1998, SIDS deaths are identified by ICD code, '798.0' and years 1999-2012, SIDS deaths are identified by ICD code 'R95'. <sup>2</sup> National Vital Statistics Reports, <http://www.cdc.gov/nchs/products/nvsr.htm> <sup>3</sup>Assembly Bill 757 requires hospitals to provide parents of newborns with California approved 'Back to Sleep' materials. <sup>3</sup> In 2006, California launched the "Safe Sleep Top Ten" messages, endorsing the 2005 recommendation update from the American Academy of Pediatrics.

## When SIDS Happens



### Local Health Department

↓  
Within three working days, contacts the family, childcare provider, and/or foster parents after receipt of notice from the coroner

Contact may be a face-to-face visit, group visit or telephone call

Provides support services:

Assessment of the family, childcare provider or both

Crisis intervention and counseling

Referral to community services

Follows up to assess progress

Consults with infant's physician of record

Submits documentation of services to the California SIDS Program

Maintains coordination with the California Department of Public Health and the California SIDS Program

### Coroner

↓  
Investigates death scene

Obtains complete medical history

Has autopsy performed

Notifies the local health department within 24 hours

Notifies the parents of the apparent cause of death.

Informs the California SIDS Program

Signs the death certificate

\*Note: Reimbursable State Mandated Programs are subject to the annual Budget Act.

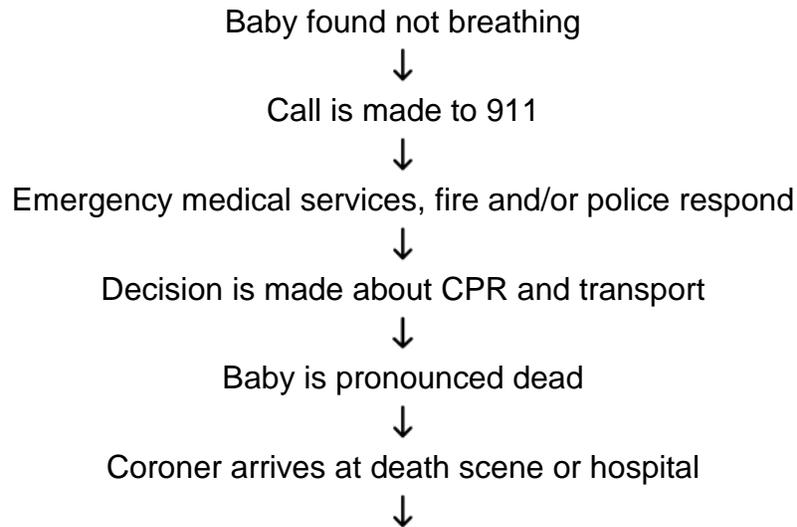


# Section Three

**Local Health Department Responsibilities**



# ***When SIDS Happens***



## ***Responsibilities as defined by California Law\****

↓  
**Local Health  
Department**

- ↓
- **Within three working days**, contacts the family, childcare provider, and/or foster parents after receipt of notice from the coroner
  - Contact may be a face-to-face visit, group visit or telephone call
  - Provides support services:
    - Assessment of the family, childcare provider or both
    - Crisis intervention and counseling
    - Referral to community services
    - Follow-up care to assess the progress of the family, childcare provider or both
  - Consults with infant's physician of record
  - Submits documentation of services to the *California SIDS Program*
  - Maintains coordination with the *California Department of Public Health* and the *California SIDS Program*

\***Note:** Reimbursable State Mandated Programs are subject to the annual Budget Act.





# California Sudden Infant Death Syndrome Advisory Council

## Members of the Council

**Thomas G. Keens, M.D.,**  
*Chair, Physician member.*

**Lorie Gehrke,** *Vice Chair,*  
*SIDS Parent.*

**Kathleen Beichley,**  
*Secretary, SIDS Parent*

**Dawn Dailey, R.N., P.H.N.,**  
**Ph.D.,** *Public Health*  
*Nurse.*

**Yolanda DeMello,** *SIDS*  
*Parent*

**Steven Durfor,** *Police/Fire*  
*First Responder.*

**James K. Ribe, M.D.,**  
*Medical Examiner.*

**Kitty Roche, R.N., P.H.N.,**  
**B.S.N., M.S.W,** *Public*  
*Health Nurse.*

**Dennis H. Watt,** *Coroner.*

**Karen Jackson, P.H.N.,**  
*President, Southern Calif.*  
*Regional SIDS Council.*

**Aline Armstrong, P.H.N.,**  
*President, Northern Calif.*  
*Regional SIDS Council.*

## Council Chairperson:

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## Diagnosing the Cause of Death for Infants Dying Suddenly and Unexpectedly

Diagnosing the cause of death for infants who die suddenly and unexpectedly has become increasingly difficult. In California, and in much of the rest of the world, there is a disparity in the way the causes of death for these infants are determined. In some jurisdictions, such infants may have a cause of death listed as "SIDS", in some "Undetermined", in still others "Sudden Unexplained Infant Death". This has resulted in confusion in the California SIDS community. Are coroners trying to suggest that babies in these diagnostic groups are fundamentally different? Should parents of a baby who died from "SIDS" be more reassured than a parent whose baby was listed as "undetermined"? Should parents be treated differently, or offered different resources, depending on the diagnosis used?

The *California Sudden Infant Death Syndrome Advisory Council* has spent considerable time and effort investigating these issues, and it has come to consensus for the State of California. The *Council* has determined the following:

- Coroners and medical examiners in California face considerable challenges in determining the cause and manner of death for infants who died suddenly and unexpectedly. These deaths were not witnessed, so Coroners must attempt to reconstruct the possible cause of death by investigating circumstantial evidence from the death scene and autopsy. Most deaths are associated with one or more potential risks or potentially unsafe sleeping environments, which complicate interpretation of the cause of death. While coroners are doing their best to accurately determine the cause of death, certainty is rarely possible. Thus, some disparity in how these babies are diagnosed is inevitable. It is not likely, or perhaps even desirable, that complete consensus is achieved by all California coroners to diagnose these babies the same.
- Coroners may have differing philosophies and/or practices which will influence them to make certain diagnoses more commonly than others. However, in the absence of a clear-cut finding indicating a specific cause of death, it is clear that the terms "SIDS", "undetermined", "sudden unexpected death of infancy", and "sudden unexpected infant death", are being used interchangeably. To coroners, these all mean that the death was sudden and unexpected, and that it was unexplained (that is, we do

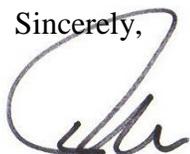
not know the cause). Therefore, the California SIDS community, public health departments, and everyone interacting with these families should view these diagnoses as being equivalent and meaning the same thing.

- Coroners in keeping with the SIDS legislative mandates (California Government Code 27491.41) should refer all sudden unexpected infant deaths to their local health jurisdiction's SIDS Program Coordinator within 24-hours of completing the autopsy. This trained Public Health Nurse/Social Worker in accordance with California Health and Safety Code 123740 within three working days should make contact with the family to provide counseling, support and bereavement assistance. This should include families where the baby is diagnosed as dying from "SIDS", as well as families with diagnoses such as "undetermined", "sudden unexpected death in infancy", "sudden unexpected infant death", etc.
- Contact by the local health jurisdiction should be a face-to-face visit, a group visit or a telephone call. However, a home visit is recommended whenever possible. Those who experience a sudden unexpected infant death, regardless of the diagnosed cause, should not be treated differently. A home visit is the preferred supportive intervention as this provides an opportunity for the bereaved to express their feelings, gain an in depth understanding of the circumstances of their infant's death, and ask questions. For many, the home visit is the foundation of their support.

The Council is aware that for some parents, receiving a diagnosis of "undetermined" has been interpreted as somehow tainting the death as suspicious, compared to a diagnosis of "SIDS". It is clear from discussions with coroners and medical examiners that this is not their intent. Rather, in the minds of California coroners and medical examiners, these diagnoses are essentially interchangeable, and they imply only that the death was sudden and unexpected on the one hand, and unexplained on the other. It is now the responsibility of public health departments, coroners, and SIDS experts not to perpetuate the above view, but to emphasize that these deaths are similar in the eyes of those making the diagnoses, and that parents of all of these babies are entitled to the same support, education, empathy, and respect.

The *California Sudden Infant Death Syndrome Advisory Council* officially and unanimously approved this recommendation at its meeting on August 14, 2012.

Sincerely,



Thomas G. Keens, M.D.  
Chair, California SIDS Advisory Council.

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RON CHAPMAN, MD, MPH  
Director & State Health Officer

State of California—Health and Human Services Agency  
California Department of Public Health



EDMUND G. BROWN JR.  
Governor

DATE: DECEMBER 17, 2012

TO: COUNTY CORONERS, SHERIFF CORONERS AND MEDICAL EXAMINERS  
SUDDEN INFANT DEATH SYNDROME (SIDS) COORDINATORS  
MATERNAL, CHILD AND ADOLESCENT HEALTH (MCAH) DIRECTORS

SUBJECT: SUDDEN, UNEXPECTED INFANT DEATH TIMELY REFERRALS AND PROVIDING  
GRIEF/BEREAVEMENT SUPPORT SERVICE TO PARENTS/CAREGIVERS WHO  
EXPERIENCE A SUDDEN, UNEXPECTED INFANT DEATH

This letter is in reference to the current MCAH Scope of Work (SOW). Within the SOW, each Local Health Jurisdiction (LHJ) MCAH program is required to contact all parents/caregivers who experience a presumed SIDS death to provide grief and bereavement support services. California HSC §123740, requires local health officers to contact persons having custody and control of the infant to provide information and support services. It is very critical that the LHJ receives the timely referral from the coroner/medical examiner's office in order for SIDS Coordinators/Public Health Professionals to provide grief/bereavement support services to all parents/caregivers who experience a presumed SIDS death.

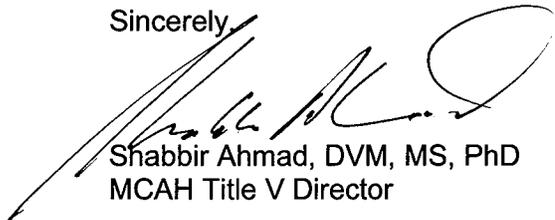
With the introduction of the International Classifications of Disease, 10<sup>th</sup> Revision (ICD-10) in 1999, causes of death listed on the death certificate that will be classified to SIDS (R95) in California include Crib Death, SDII (sudden death in infancy), SIDS, SUD (sudden unexplained death), SUID (sudden unexplained infant death), SUDI (sudden unexplained death, infant) and SID (sudden infant death). It is very important for the coroner/medical examiner's office to voluntarily refer all sudden and unexpected infant deaths to the local MCAH program, including deaths with an "undetermined" diagnosis. The California SIDS Advisory Council recommends that any person interacting with families who may receive one of these diagnoses be provided the same grief/bereavement support and SIDS education as a family who receives a SIDS diagnosis.

We are very grateful for the continued support of coroners/medical examiners referrals of sudden, unexpected infant deaths even with the continued suspension of the state mandates due to state budget constraints. We also appreciate local MCAH SIDS Coordinators/Public Health Professionals for providing grief/bereavement support services to all parents/caregivers who experience a presumed SIDS death that are referred to their offices. The collaboration between the coroner/medical examiner office and local MCAH Program is essential when an infant dies suddenly and unexpectedly. It is difficult for the parents of the infant to deal with such a tragic loss and the availability of support services to help them work through their loss could be critical and beneficial.

CORONERS-AND MEDICAL EXAMINERS  
SIDS COORDINATORS  
MCAH DIRECTORS  
Page 2  
December 17, 2012

We look forward to continuing to work with all of you together. If you have questions, please feel free to contact Guey-Shiang Tsay, Nurse Consultant for the SIDS Program, at [Guey-Shiang.Tsay@CDPH.ca.gov](mailto:Guey-Shiang.Tsay@CDPH.ca.gov), or Carrie Florez, Research Scientist for Epidemiology Evaluation and Data Operations, at [Carrie.Florez@cdph.ca.gov](mailto:Carrie.Florez@cdph.ca.gov).

Sincerely,



Shabbir Ahmad, DVM, MS, PhD  
MCAH Title V Director

## FAQs: SIDS and Professionals

The following Frequently Asked Questions (FAQs) are common questions coroners, public health nurses, doctors, emergency medical technicians and other professionals ask about SIDS.

### 1. What is my role as a professional in the case of sudden unexpected infant death?

When you are involved in a case of sudden unexpected infant death, remember to:

- Make no assumptions about the cause of death.
- Be compassionate with parents and caregivers.
- Ask open-ended, non-judgmental questions to gather information about the death.
- Explain what will happen next.

### 2. Who should contact the local health department?

Within 24 hours or as soon as a gross autopsy is completed indicating the "possibility" of SIDS, the local health department must be notified by the coroner.

### 3. How is a determination made that SIDS is the cause of death?

Following a complete postmortem investigation, including an autopsy, an examination of the scene of death, and review of the case history, SIDS may be determined to be the cause of death if:

- No other cause of death is identified from the autopsy.
- No other cause of death is identified by the death scene investigation.
- Based on the baby's medical history, there is no reason the death would have been expected.

### 4. What is the mandated role for a coroner in a presumptive SIDS death?

- Obtain the case history and death scene information needed by the pathologist using the mandated protocol. (Government Code Section 27491)
- Sign the death certificate "SIDS" when appropriate. (Government Code Section 27491)
- Give the parents a presumptive diagnosis of SIDS after the gross autopsy. (Health and Safety Code 462 and Government Code Section 27491.41)
- Notify the local health department within 24 hours or as soon as possible after the gross autopsy. (Health and Safety Code 10253)
- Notify the Department of Health Services California SIDS Program within 24 hours or as soon as possible after the gross autopsy. Complete and submit to the California SIDS Program a self-addressed, postage paid Coroner's Notification Card. (Department of Health Services 4411 8/05)
- Complete and submit to the Department of Health Services, the Death Scene and Deputy Coroner Investigation Protocol form for the evaluation of all sudden and unexpected infant deaths. (Department of Health Services 4439 1/06). See [Protocols](#) for more information.

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*California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division.*

### **5. How can I be supportive during the investigation?**

Treat the baby with kindness and respect, explain the purpose of your investigation and tell the parents what they need to do. Also let them know that a public health nurse will be contacting them. Make sure both you and the parents know how to contact each other.

### **6. What function does the public health nurse (PHN) perform?**

The PHN is the case manager who provides coordination of any services following a presumed SIDS death. Within three (3) working days of receiving notification from the coroner's office, a PHN is required to contact the parents or caregiver. Contact can be a face-to-face visit, group visit or telephone call. Whenever possible, the PHN should schedule a home visit to provide the parents or caregiver with SIDS information and offer bereavement support such as: referral to local SIDS support groups; counseling; or assistance with funeral arrangements.

### **7. How can I find out what PHN services are mandated by California law in a SIDS case?**

- Within three working days the PHN contacts the family, childcare provider, and/or foster parents after receipt of notice from the coroner.
- Contact may be a face-to-face visit, group visit, or telephone call.
- Provides support services:
  - Assessment of the family, childcare provider, or both.
  - Crisis intervention and counseling.
  - Referral to community services.
  - Follow-up care to assess the progress of the family, childcare provider, or both.
- Consults with the infant's physician of record.
- Submits documentation of services to the California SIDS Program. See the [Protocols](#) section for more information.
- Maintains coordination with the California Department of Health Services and the California SIDS Program.

### **8. What function does the social worker perform?**

A social worker competent and trained for services to SIDS families and caregivers may be assigned to a SIDS case. Social workers provide services in a variety of settings including emergency rooms, county health facilities, social services departments, schools, community agencies, childcare or foster care homes, or a private practice venue. Services provided by the social worker will vary widely depending on the setting.

### **9. How can I find out what is expected of a social worker or public health nurse in a presumed Sudden Infant Death Syndrome case?**

California SIDS has published "[Standards for Social Work](#)" and "[Standards for Public Health Nurses](#)" to better clarify the roles of these health care professionals.

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*California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division.*

CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
**PUBLIC HEALTH SERVICES REPORT**

**Return to:** California Sudden Infant Death Syndrome (SIDS) Program  
UCSF School of Nursing, 2 Koret Way Box 0606, San Francisco CA  
94143-0606 or Fax: 415-753-2161

CA SIDS Program # _____
Coroner # _____
County SIDS # _____

Name of Infant: \_\_\_\_\_ M: F:  
LAST FIRST MIDDLE

DOB: \_\_\_\_\_ DOD: \_\_\_\_\_ Race/Ethnicity: Hispanic

Name of Mother: \_\_\_\_\_ Age: \_\_\_\_\_ Race/Ethnicity: \_\_\_\_\_

Name of Father \_\_\_\_\_ Age: \_\_\_\_\_ Race/Ethnicity: \_\_\_\_\_

Address: \_\_\_\_\_  
STREET

\_\_\_\_\_  
CITY ZIP CODE COUNTY DISTRICT

Telephone: \_\_\_\_\_ Message: Y \_\_\_\_\_ N \_\_\_\_\_

**Caretaker of Infant at Time of Death:** \_\_\_\_\_ Relationship: \_\_\_\_\_

Address: \_\_\_\_\_ Telephone: (\_\_\_\_\_) \_\_\_\_\_  
STREET

\_\_\_\_\_  
CITY ZIP CODE COUNTY

**Health Dept. Notified of Death:** By Coroner: Vital Records Certificate \_\_\_\_\_ Other: Date: \_\_\_\_\_  
SPECIFY

How Notified: Telephone: (\_\_\_\_\_) \_\_\_\_\_ Letter/Report/Fax: \_\_\_\_\_ Other: \_\_\_\_\_

County of Occurrence: Same as Residence: \_\_\_\_\_ Other: \_\_\_\_\_ Date Notified: \_\_\_\_\_

**Household Composition:** Natural Parent(s): \_\_\_\_\_ Adoptive Parent(s): \_\_\_\_\_ Foster Parent(s): \_\_\_\_\_

Guardian: \_\_\_\_\_ Extended Family: \_\_\_\_\_ Significant Other: \_\_\_\_\_ Friend: \_\_\_\_\_

Sibling(s): \_\_\_\_\_ Ages: \_\_\_\_\_ Other (Specify): \_\_\_\_\_

Family's Primary Language \_\_\_\_\_ Interpreter Needed: Y \_\_\_ N \_\_\_

**Primary Caretaker Contact:** Date of Initial Contact: \_\_\_\_\_ Date of First Service(s): \_\_\_\_\_

Type of Contact for Service(s): Telephone: \_\_\_\_\_ Face-to-Face: \_\_\_\_\_ Group: \_\_\_\_\_

Length of Contact: \_\_\_\_\_ minutes

Service Given: Assessment: \_\_\_\_\_ Crisis Intervention: \_\_\_\_\_ Referral/Resources: \_\_\_\_\_

Counseling: \_\_\_\_\_ Education: \_\_\_\_\_

Service Refused: \_\_\_\_\_ Reason: \_\_\_\_\_

Contact Not Established: \_\_\_\_\_ Reason: \_\_\_\_\_

Follow-Up: Further Service(s) Planned? Y \_\_\_ N \_\_\_

**Childcare Provider Contact:** Date of Initial Contact: \_\_\_\_\_ Date of First Service(s): \_\_\_\_\_

Type of Contact for Service(s): Telephone: \_\_\_\_\_ Face-to-Face: \_\_\_\_\_ Group: \_\_\_\_\_

Length of Contact: \_\_\_\_\_ minutes

Service Given: Assessment: \_\_\_\_\_ Crisis Intervention: \_\_\_\_\_ Referral/Resources: \_\_\_\_\_

Counseling: \_\_\_\_\_ Education: \_\_\_\_\_

Service Refused: \_\_\_\_\_ Reason: \_\_\_\_\_

Contact Not Established: \_\_\_\_\_ Reason: \_\_\_\_\_

Follow-Up: Further Service(s) Planned? Y \_\_\_ N \_\_\_

CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
**REPORT OF CONTACT**

CA SIDS Program # _____
Coroner # _____
County SIDS # _____

Signature: \_\_\_\_\_

Name of Infant: \_\_\_\_\_ DOB \_\_\_\_\_ DOD: \_\_\_\_\_  
LAST FIRST MIDDLE

Person(s) Contacted: Natural Parent(s): \_\_\_\_\_ Adoptive Parent(s): \_\_\_\_\_ Foster Parent(s): \_\_\_\_\_

Guardian: \_\_\_\_\_ Extended Family: \_\_\_\_\_ Childcare Provider: \_\_\_\_\_

Other (Specify): \_\_\_\_\_  
(RELATIONSHIP)

Name(s): \_\_\_\_\_

Date of First Attempted Contact: \_\_\_\_\_

---

**History (prenatal, infant, circumstances of death):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Assessment of Family (coping status, environment):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Intervention:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Plan (referrals):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

---

**Infant's Primary Care Provider Contacted? Y \_\_\_\_\_ N \_\_\_\_\_ None: \_\_\_\_\_ Date: \_\_\_\_\_**

Name: \_\_\_\_\_  
LAST FIRST

Address: \_\_\_\_\_

Telephone: ( \_\_\_\_\_ ) \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
**PUBLIC HEALTH SERVICES REPORT**

**INSTRUCTIONS: Page 1 of 2**

<b>Name of Infant</b>	Write full legal name of infant. Indicate gender.
<b>Date of Birth / Date of Death</b>	Write the month, day, and year of events.
<b>Race/Ethnicity</b>	Designate race/ethnicity.
<b>Name of Mother</b>	Write first and last name of mother or current legal parent or guardian.
<b>Name of Father</b>	Write first and last name of father or current legal parent or guardian.
<b>Age/Race/Ethnicity</b>	Write age in years. Designate race/ethnicity.
<b>Address</b>	Indicate place or residence of infant. Include street address and city and zip code. Include census tract and district if known or applicable.
<b>Telephone Message</b>	Indicate residence telephone number. If this is a message phone number, so indicate.
<b>Caretaker of Infant</b>	Indicate name of the person who was taking care of the infant at the time of death if different from the primary caretaker. Indicate the relationship to the infant if applicable.
<b>Address/Telephone</b>	Indicate the address and telephone number of the person who was taking care of the infant at the time of death. Include the city, zip, and county.
<b>Health Department Notification</b>	Indicate whether or not the coroner notified the health department of a possible SIDS death or some other person or entity. Enter date when the Health Department was notified of a possible SIDS death by any means. Indicate how this notification was received by the Health Department.
<b>County of Occurrence/ Date</b>	Indicate whether or not the county in which the death occurred was the same as the county of residence. Indicate the date the county of residence was notified of the death, if applicable.
<b>Household Composition</b>	Indicate all that apply to the members of the immediate household where the infant resided. "Other" members may include children other than siblings, or boarders in the home.
<b>Primary Language &amp; Interpreter</b>	Write what is the primary language of the family that is used in the home. Indicate if an interpreter is needed by the service provider to communicate with the family.

CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
**PUBLIC HEALTH SERVICES REPORT**

**INSTRUCTIONS: Page 2 of 2**

**Primary Caretaker  
Contact**

**Date:** Enter the date(s) of the initial contact and first service contact with the primary caretaker(s). They may or may not be one and the same.

**Type of Contact:** Enter how the contact was made for the first service to the family.

**Length of Contact:** Enter the length of the contact in minutes. Add the time of both the initial contact and the first service contact if they were not one and the same.

**Service(s) given:** Indicate all services given during both the initial and first service contact(s).

**Service(s) Refused:** Indicate if no services were wanted. Explain the reason the caretaker does not feel services are needed.

**No Contact:** Indicate if no contact was made with the family. Explain the reason why you were not able to establish contact.

**Follow-Up:** Indicate if there are plans for further service.

**Childcare Provider  
Contact**

**Date:** Enter the date(s) of the initial contact and first service contact with the childcare provider. They may or may not be one and the same.

**Type of Contact:** Enter how the contact was made for the first service to the childcare provider.

**Length of Contact:** Enter the length of the contact in minutes. Add the time of both the initial contact and the first service contact if they were not one and the same.

**Service(s) given:** Indicate all services given during both the initial and first service contact(s).

**Service(s) Refused:** Indicate if no services were wanted. Explain the reason the childcare provider does not feel services are needed.

**No Contact:** Indicate if no contact was made with the childcare provider. Explain the reason why you were not able to establish contact.

**Follow-Up:** Indicate if there are plans for further service.

**Signature/Date:** Write the name of the person making the contact and filling out this report. Include the date the report was completed.

CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
**PUBLIC HEALTH SERVICES REPORT**

**DEFINITIONS**

<b>Initial Contact</b>		Contact established with the primary caretaker or childcare provider for the purpose of delivering service(s) or planning for services.
<b>First Service</b>		Contact with the primary caretaker or childcare provider for the purpose of delivering service(s).
<b>Type of Contact</b>	Phone:	Service(s) given over the telephone.
	Face-to-Face:	A visit with primary caretaker or childcare provider at home or other place.
	Group:	Face-to-face visit with primary caretaker or childcare provider, <u>plus</u> any other individual, other adults, relatives, children, etc.
<b>Services</b>	Assessment:	Includes but is not limited to psychosocial, physical, or emotional assessments that are family centered and culturally appropriate.
	Referral:	Determination of the need for referral to counseling, peer support group, etc.
	Crisis Intervention:	Intervention given to alleviate or avoid a critical or troubling situation.
	Education:	Includes information about SIDS and other issues for the purpose of increasing knowledge of the primary caretaker, childcare provider, or others.
	Counseling:	Therapeutic counseling including but not limited to grief, death and dying issues, and family coping.



CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM  
PUBLIC HEALTH SERVICES REPORTING GUIDELINES

- The California SIDS Program is responsible for a monthly Epidemiology Log of all reported SIDS cases.
- All Public Health Services Report (PHSR) forms and Coroner Notification Cards received by the California SIDS Program on or before the tenth of each month are given a State File number and placed on the Epidemiology Log.
- **Within thirty days of the date of the presumed SIDS death**, the PHSR form documenting contact or attempted contact must be submitted to the California SIDS Program. If the SIDS case is to receive continued support services, upon closure of the case, submit any additional information for data abstraction purposes.
- It is required that the California SIDS Program notifies each county quarterly when a PHSR form or Coroner Notification Card is not received. If a PHSR form or Coroner Notification Card has not been received and it has been on month for the date of death, a quarterly compliance letter will be sent.
- Letters are sent to non-compliant counties (PHNs and/or coroners) on a quarterly basis usually after the fifteenth day of March, June, September and December. It is the responsibility of the SIDS Coordinator upon receipt of a compliance letter to ensure the mandated documents are submitted.
- A PHSR form and Coroner Notification Card must be filed by December 31<sup>st</sup> of the following calendar year after the date of death. (For example, if the DOD is January 27<sup>th</sup> 2014 then the PHSR form and CNC are due by December 31, 2015.)
- Important information to include on the PHSR form is the accurate first and last name of the infant, ethnicity, date of birth, date of death, County of Residence, and County of Occurrence. (Note: The State File Number is issued to correspond with the County of Residence.)
- For purposes of data collection, it is helpful if the following accompanied the PHSR form: the contact or assessment page of the PHSR form, a copy of the birth certificate and, a copy of the death certificate.
- The **County of Occurrence** (infant dying in a county other than county where the parents reside) notifies the **County of Residence** of the presumed SIDS death. The County of Residence completes the PHSR form and documents the notification of the death including the date, how notified, county of occurrence, and the support services provided.
- Please complete the PHSR form with as much information as possible and mail to California SIDS Program, c/o UCSF School of Nursing, 2 Koret Way, Box 0606, San Francisco CA, 94143-0606.

# California Sudden Infant Death Syndrome Program

## SIDS Informational Portfolio Overview

The *SIDS Informational Portfolio* contains general information to educate newly bereaved families, childcare providers, foster parents and grandparents about Sudden Infant Death Syndrome. Based on the individual situation of each household, a needs assessment of the family and the outcome of the initial contact, the portfolio can easily be modified to include other materials. This packet of resources is available in English and Spanish. It is intended for all presumed SIDS cases and should be provided at the time of the home visit or can be sent via mail prior to the home visit. The basic portfolio can be modified to include educational/informational materials to meet the special needs of each SIDS case. For example there are handouts, booklets and/or website links for SIDS siblings, fathers, single parents, teen parents, twins and foster parents. Access the California SIDS Program website ([www.californiasids.com](http://www.californiasids.com)) SIDS Coordinators section, Resources link for the contents of the basic *SIDS Informational Portfolios* and special needs modifications.

A *SIDS Informational Portfolio* is also available for the infant's health care provider and is entitled, *Information for Health Care Professionals Whose Patient Has Died of SIDS*. This resource packet is intended to comply with the legislative mandates which require that the infant's physician of record for all presumed SIDS cases is "consulted" by the PHN/Social Worker (SB362, Section 462). It provides essential information about SIDS and is designed to notify the physician of record of the death of his/her patient. The PHN/Social Worker should encourage the infant's health care provider to support the family by serving as a medical expert to answer any questions pertaining to the infant's cause of death and /or autopsy results.

It is the responsibility of the SIDS Coordinator to ensure the materials for the portfolios are up to date by reviewing the California SIDS Program website on a regular basis. It is suggested that each local health jurisdiction have a procedure for updating/maintaining a supply of the portfolios, handouts and modifications so when a sudden unexpected infant death occurs these materials are readily accessible. In addition, it is important to customize the packets with information specific to your health department such as the public health professional's business card, listing of local grief support groups, etc.

After providing the *SIDS Informational Portfolio* to those affected by the infant's death, the PHN/Social Worker can determine if other educational/informational materials would be helpful. These resources could include research articles, grief/bereavement materials, specific handouts and/or booklets to meet their individual needs and unique circumstances. Refer to *A Practical Guide to the SIDS Home Visit* for a complete listing of the portfolio contents, modifications available and instructions on documenting/reporting support services provided. This guide is posted on the Program's website in the SIDS Coordinator's section as a professional resource. For additional questions or further information, please contact the California SIDS Program via email at [info@californiasids.com](mailto:info@californiasids.com) or call us at 800-369-SIDS (7437).



California SIDS Program is funded by Title V Block Grant through the California Department of Public Health Maternal, Child and Adolescent Health Division

California Sudden Infant Death Syndrome Program  
800-369-SIDS (7437) ✦ <http://californiasids.cdph.ca.gov>

**Contra Costa SIDS Program \***  
**PHN/CHS Case Tracking Form**

PHN/CHS \_\_\_\_\_

Date Referral Received \_\_\_\_\_

<b>Infant Information</b>	
Baby's Name	Sex
Date of Birth	Date of Death
Place of Death	If hospital, which one?
Siblings	Primary Health Provider
Was child at Daycare at time of death?	Daycare Provider

<b>Parent Information</b>	
Mother	
Father	
Street	
City, State, Zip Code	
Phone #'s	

<b>Tracking Log</b>	<b>Yes</b>	<b>No</b>	<b>Date</b>
PHN/CHS Visit to Parent/Primary Care Giver			
Provider Notification Letter/Packet Sent			
Referred to Peer Contact/Crisis Center			
Informed of Support Group			
State Study Form Completed			
Coroner's Report Received			
3 Month Follow-Up			
6 Month Follow-Up			
12 Month Follow-Up			
FIMR Interview Completed			

Case Name \_\_\_\_\_ PHN/CHS Signature \_\_\_\_\_

\* Note: This form is used by Contra Costa County to ensure compliance with the legislative mandates requiring support services for families and childcare providers experiencing a presumed SIDS death. This tracking tool supplements case notes, and you can modify it to ensure your agency meets SIDS services and support mandates.

## Contra Costa SIDS Program \* SIDS PHN/SW Chart Review Guide

PHN/SW: \_\_\_\_\_ Case \_\_\_\_\_ DOD \_\_\_\_\_

	Yes	No	N/A
1. Adherers to 72 hour initial contact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Standard:</b> PHN/SW will initiate first contact with family/caregiver within 72 hours of receipt of referral.			

Comments: \_\_\_\_\_

2. Home visit provided to family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If No, Reason Documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Standard:</b> Primary caregiver will receive comprehensive home visit to provide crisis intervention, grief support, grief education, resources, referrals, and follow-up.			

Comments: \_\_\_\_\_

3. Minimum number of contacts completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If No, Reason Documented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Standard:</b> Primary caregiver will receive a minimum of 4 contacts at initial time of death, 3 month, 6 month, and 12 month anniversary.			

Comments: \_\_\_\_\_

4. Timely completion of state study form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Standard:</b> PHN/SW will complete state study form within 30 days of case assignment and forward to FMCH/SIDS Administrative office.			

Comments: \_\_\_\_\_

5. Maintains appropriate documentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Standard:</b> PHN/SW will maintain case file for one year and return completed case record with appropriate documentation to FMCH/SIDS Administrative office.			

Comments: \_\_\_\_\_

Program Manager Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**\* Note:** This form is used by Contra Costa County SIDS Coordinator as a quality review tool to ensure compliance with the legislative mandates requiring support services for families and childcare providers experiencing a presumed SIDS death. It is a case review tool you can modify to ensure your agency meets the SIDS services and support mandates.

## CALIFORNIA SUDDEN INFANT DEATH SYNDROME PROGRAM

### A Practical Guide to the SIDS Home Visit

Sudden Infant Death Syndrome (SIDS) is a medical and psychological crisis for which no one can really prepare. Public health nurses and /or other health professionals who provide early intervention, support, grief counseling and comfort to the family, play a critical role in assisting them through the SIDS experience. The health professional can help alleviate guilt, pain and suffering by providing information about SIDS in a sensitive manner, explaining autopsy results, providing community bereavement resources, and offering guidance on caring for other surviving children and coping with loss. For many families the home visit is the cornerstone of their support.

The purpose of this guide is to prepare health professionals for their role in the SIDS home visit. It provides information about the essential skills that are required for the effective support of the family, identifies ways the professional may be personally affected, and contains helpful suggestions on how to cope with the emotional impact of SIDS. Health and Safety Code mandates, which require contact within three working days following notification by the reporting agent of a possible SIDS death, are also outlined. Instructions for the mandated reporting of support services and the PHN Report Worksheet and Contact Form are included as well. This easy-to-use manual which has been divided into five sections, is a handy reference tool for PHNs new to SIDS. For public health professionals who have made numerous home visits, the guide provides a quick review of the essentials.

- **Introduction** (pdf 1.4mb) Look over the table of contents to get a quick overview of the various topics covered in this guide as you assume a vital role in assisting those impacted by a sudden unexpected infant death.
- **Background Information** (pdf 720kb) Section One contains a summary of SIDS statutes and their requirements, an extensive SIDS article written by Dr. Thomas Keens with numerous graphs/charts, and a schematic outlining mandated coroner and local health department responsibilities.
- **Preparation for the Home Visit** (pdf 931kb) Section Two includes step-by-step instructions to equip the professional with essential skills, knowledge, resources, tools and information for the provision of bereavement support services. Assessment guidelines, case management and counseling suggestions, practical solutions for various issues/concerns, grief and bereavement tools to help grieving families and children, and mandated State reporting forms are also included.
- **The Home Visit** (pdf 563kb) Section Three offers interviewing tips, summarizes cultural/ethnic considerations in counseling the bereaved including how to work with interpreters, and outlines the tasks of grieving, common concerns and grief reactions following the sudden death of an infant.
- **After the Home Visit** (pdf 625kb) Section Four provides important information to help the professional understand their feelings and reactions and know how to cope with the emotional impact of a SIDS event.

**Standards for Public Health Nurses** (pdf 1.9 mb) is a 20-page booklet of professional guidelines endorsed by the California Nurses Association to assure similar nursing practice and care for SIDS families/caregivers in California.

**Standards for Social Work** (pdf 856 kb) is an 18-page booklet approved by the National Association of Social Workers, California Chapter, to be used as guidelines and serve as a model for social workers who interact with individuals involved with SIDS.

Note: A Practical Guide to the SIDs Home Visit, Standards for Public Health Nurses and Standards for Social Work are available on the California SIDS Program website at <http://californiasids.cdph.ca.gov>



California SIDS Program is funded by Federal Title V block grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division  
1-800-369-7437 <http://californiasids.cdph.ca.gov>

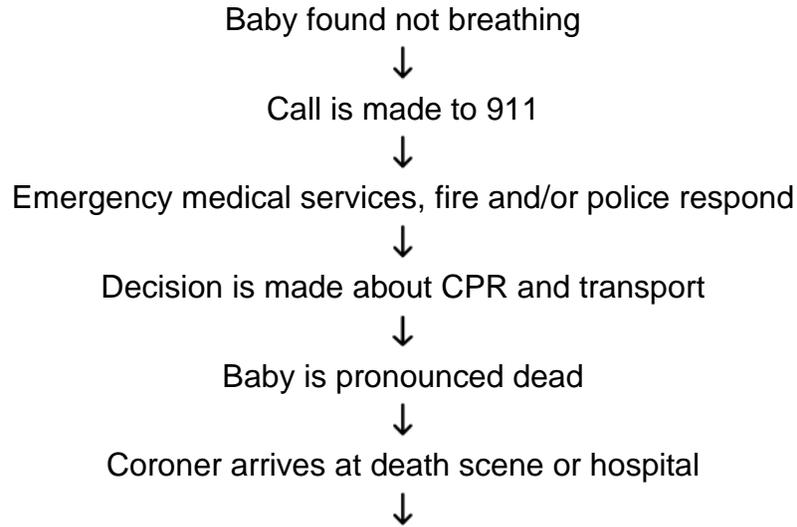


# Section Four

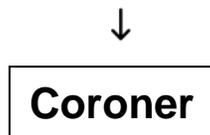
## **Coroner Responsibilities**



## ***When SIDS Happens***



### ***Responsibilities as defined by California Law\****



- Investigates death scene
- Obtains complete medical history
- Has autopsy performed
- Notifies local health department within 24 hours
- Notifies parents of apparent cause of death
- Informs *California SIDS Program*
- Signs death certificate

**\*Note:** Reimbursable State Mandated Programs shall be subject to the annual Budget Act.

# Public Health Nurse and Coroner Teaming

by Penny Stastny, PHN

As the Public Health Nurse (PHN) in Orange County, I have found that the home visit to the SIDS parents can be more effective if I talk to the coroner or coroner's investigator prior to the visit. In addition to gathering important information about the family and the death of the baby, there are numerous other benefits to this interaction. For example, it provides an opportunity for me to get to know the coroner's investigator. It also allows us to develop an understanding of each other's role, and share resources and information and to work as a team. I have found that this has helped the coroner's investigators develop a better understanding of the nature of the home visit, its powerful value and the role of the PHN. This has created a more effective team approach that has benefited the coroner's investigator, the PHN and SIDS families.

Here are some samples of the type of questions I ask my contact at the coroner's office prior to a home visit:

- What were the circumstances surrounding the death?
- Was the death pronounced at the hospital or home?
- What is the family structure? Are there two parents, single mother, boyfriend, day care provider, etc.?
- Is there a support system? (family, friends, etc.)
- Are there other children? How were the parent(s) coping when you left?
- Did the death occur in a day care setting? (If so, ask for the address, phone number, and if the caretaker is aware of the possible SIDS diagnosis.)
- What information is available on the family - i.e. prenatal history, baby's birth date, etc.?
- Was the baby sick or on medication?
- Was the baby's pediatrician informed yet? Do you know the pediatrician's name and phone number?
- What is the obstetrician's name and number?
- Was the child abuse registry checked? (routine procedure in many counties)
- What language is spoken by the parent(s)?
- What information was given to the parent(s)?
- Did you inform the parent(s) that the County PHN would call and visit the home?
- Were there any unusual circumstances?
- Was an autopsy performed? What kind? What are the results?
- Was SIDS as a possible cause of death discussed?
- What, if any, educational materials were given to the parent(s)?

I have found that obtaining the answers to these questions prior to the home visit has helped me to be more effective in my support of the SIDS families and to better address their individual needs. It also helps the parents by reducing their burden of repeatedly answering the same questions and describing the details of the SIDS incident over and over again. In addition, it has left me with more time for answering the parents' questions and helping the parents, siblings and other members of the family through the grieving process.

I make it a habit to call the coroner's office back to thank them for their support and assistance and to exchange information and share findings. It also provides an opportunity to: discuss any needed changes in the approach and assessment of families, share materials and resources, and clarify SIDS information. This ongoing contact has improved communications between the coroner's office and our County Health Care Agency. As a team, we are more effective in helping SIDS families recover from their grief and cope with the loss of their infant.



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# **Why is a Post Mortem Examination Important When a Child Dies Suddenly?**

*By Henry F. Krous, MD*

*Director of Pathology, Children's Hospital – San Diego  
Professor of Pathology & Pediatrics, University of California, San Diego School of  
Medicine  
Director, San Diego SIDS/SUDC Research Project*

Stricken with grief, parents experiencing the sudden death of their child are often and understandably reluctant to have a post mortem examination performed on their son or daughter. And yet, sudden deaths of individuals of any age and without apparent explanation are under the legal jurisdiction of the medical examiner who must determine the cause and manner of death. In order to do this, the medical examiner must perform a post mortem examination as well as be knowledgeable of the medical history and circumstances of death.

Perhaps it will help to begin with a basic description of the post mortem examination. It begins with a review of the medical history of the infant or child who has died. Secondly, it also involves a careful evaluation of the circumstances of death, including a reconstruction of the site where the infant or child was found apparently lifeless. The post mortem examination itself is the evaluation of the external appearance of the body and internal organs. It is undertaken much like an operation, but by a pathologist rather than a surgeon. In addition to the anatomic studies, ancillary studies are typically done as well. They may include post mortem X-rays, microbiology, toxicology, metabolic screening and chemistry evaluations. The dignity of the body is always maintained and disfigurement does not occur, therefore, funerals of choice can be performed.

With this background, what advantages accrue to the parents and other survivors of these children when a post mortem examination is performed? There are many and they have long term implications. First, when supplemented by the medical history and circumstances of death, the post mortem examination is the best way of determining the cause of death. Without the examination, the medical examiner does not always have enough information to make this determination unless there is something lethal about the scene, such as a toxic environment, where the child died.

Secondly, some of these parents may experience unwarranted guilt as they wonder if they may have caused the sudden unexpected death of their infants and children especially when they lack an understanding of the cause of death. Therefore, knowing why one's child died as the result of the post mortem examination can facilitate healthier grieving over their loss by allowing parents to focus on the wonderful memories of his or her life rather than agonizing over the unknown. When parents do not know what caused their child's death, they may imagine terrible, but unrealistic scenarios, such as "did my child suffer great pain before dying?"

Third, the knowledge gained from post mortem examinations of every infant and child is vitally important for every pathologist who performs them. It is not only through experience, as well as continuous study that we as physicians and pathologists improve our personal knowledge and expertise in complex areas of medicine, and that includes especially the topic of sudden unexpected death in childhood and infancy.

Aside from the valuable experience and expertise accruing to pathologists and other physicians, diagnoses derived by post mortem examinations are critical to the accuracy of vital statistics. Vital statistics are the basis for the allocation of health care resources by governmental agencies, such as the National Institutes of Health, and private sources, such as the CJ Foundation for SIDS. In this regard, the CJ Foundation is the only organization that funds research directed towards sudden unexplained death in childhood (SUDC).

Fourth, scene investigations and post mortem examinations are critical to research into SUDC. In comparison, for example, risk factors for SIDS were identified long before the underlying mechanisms involved in the cause of death have been clarified. Public education campaigns using epidemiologic data about these risk factors have led to dramatic reductions in SIDS rates with many fewer infants dying today compared to just a few years ago. We have no reason to doubt that the same thing will not happen with respect to SUDC.

With this in mind, the value of communication between families of SIDS infants and SUDC children and the medical examiners and coroners who investigate these children's deaths can not be overestimated. Face to face meetings are encouraged for several reasons. The autopsy report will never answer every question that a family will inevitably have. And, these reports will nearly always include medical terminology that may not be understood by the families. In contrast to telephone conversations, face to face conversations allow the medical examiner to "read" the nonverbal conversation of the families, thus providing the opportunity for clarification of confusing issues. The medical examiner's concerns for the family as they grieve the loss of their children are better expressed as well. In this regard, the medical examiners are fulfilling a role similar to clinical physicians in their interactions with their patients and their families.

Let me conclude with my personal experience regarding the attitudes of families whose infants and children have died during the past 30 years. During the time frame surrounding the infant or child's death, some parents have been very reluctant to have a post mortem examination performed on their child. This is understandable. At times, these objections may center on religious or cultural beliefs. Other parents may simply object to having the procedure performed for aesthetic reasons. Many of these objections can be mitigated by a careful explanation of what an autopsy is and what is to be gained will hopefully mitigate some of these objections. It is particularly important for parents to understand that a cause of death cannot be reached without performance of a post mortem examination, which in some cases may involve only ancillary studies.

Parental attitudes and healthy, successful grieving six months or more after the child's death have always favored performance of the post mortem examination. That is to say, I have never met a parent whose child died some months before my conversation with them that regretted having the autopsy performed. Conversely, in those cases where the examination was not undertaken, the parents are left with an irresolvable uncertainty regarding the cause of their child's death and have invariably regretted that the post mortem examination was not performed.

Those parents, whom I have met throughout my professional career whose child was examined were extremely grateful and rewarded that it had been undertaken. They have been able to reach closure in a more satisfactory fashion with knowing why their child died.

In selected cases, genetic disorders were discovered only during the post mortem examination. This information is vital to families planning future pregnancies and better protects surviving family members.

It should be noted that a post mortem examination does not always identify a cause of death. Nevertheless, the parents can be comforted to know that the effort was made. But it also must be remembered that these cases also provide information and materials that are important to vital statistics, education and research. There are many examples of this, perhaps the most obvious being the identification of risk factors for SIDS. Even though the exact cause of SIDS remains unknown even today, education of the public about what infant care practices should be avoided has resulted in dramatically lower SIDS rates throughout all developed countries of the world. Parents can share in this success by knowing that the post mortem examination of their children facilitated this progress.





California  
Department of  
Health Services

**SANDRA SHEWRY**  
Director

State of California—Health and Human Services Agency  
**Department of Health Services**



**ARNOLD SCHWARZENEGGER**  
Governor

December 27, 2005

**TO:** County Coroners, Sheriff Coroners, & Medical Examiners  
Sudden Infant Death Syndrome Coordinators  
Maternal, Child, and Adolescent Health Directors and Coordinators

**SUBJECT:** Sudden Infant Death Syndrome (SIDS) Protocols

We are pleased to present you with copies of two new protocols related to the identification of SIDS deaths. Both protocols will be implemented January 1, 2006.

The first is a new *Death Scene and Deputy Coroner Investigation Protocol*. This combines the original California Protocol and the Centers for Disease Control and Prevention (CDC) Protocol. It was developed to collect more specific information surrounding the infant's death to aid pathologists in determining a cause of death.

The second is a revision to the *International Standardized Autopsy Protocol*. We have attempted to improve the format and make it easier to complete. It is used during an autopsy to assist coroners, pathologists and medical examiners to determine the cause of infant death that is sudden and unexpected.

Both protocols were developed for ease of completion and data collection and entry. They can be completed electronically or manually. Previously, we were unable to share data with reporting counties. The format of these new protocols will assist us in this regard.

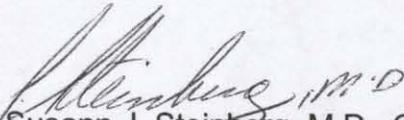
As you know, the mandate to do an autopsy in all sudden, unexpected infant deaths has been suspended for the last two fiscal years due to State budget constraints. Nevertheless, we are grateful for your continued completion of the *SIDS Death Scene and Deputy Coroner Investigation and Autopsy Protocols* as they assist us to maintain data regarding the circumstances in sudden, unexplained infant deaths.

We look forward to continuing to work together in the New Year.

TO:  
Page 2  
December 27, 2005

If you have any questions, please contact Carrie Florez, Research Specialist, in the Epidemiology and Evaluation Section. She can be reached by phone at (916) 650-0323 or email at [cflroez@dhs.ca.gov](mailto:cflroez@dhs.ca.gov).

Sincerely,



Susann J. Steinberg, M.D., Chief  
Maternal, Child and Adolescent Health/  
Office of Family Planning Branch

Attachments

cc: Anita Mitchell, M.D., Chief  
Programs and Policy Section  
Maternal, Child and Adolescent Health/  
Office of Family Planning Branch

Shabbir Ahmad, D.V.M., M.S., Ph.D., Chief  
Epidemiology and Evaluation Section  
Maternal, Child and Adolescent Health/  
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Leona Shields, PHN, MN, NP  
Program and Policy Section  
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Office of Family Planning Branch

Carrie Florez, Research Specialist  
Epidemiology and Evaluation Section  
Maternal, Child and Adolescent Health/  
Office of Family Planning Branch



# DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL



## For the Evaluation of Sudden Unexpected Infant Death

This *Death Scene and Deputy Coroner Investigation Protocol* (DHS 4439), for the evaluation of sudden, unexpected infant death, has been approved by the California Department of Health Services (CDHS) pursuant to Government Code, Section 27491.41. Beginning January 1, 2006, this Protocol is available for use throughout California to assist medical examiners and coroners to establish the mode, manner, and cause of death for all infants one year of age or younger who die suddenly and unexpectedly and in whom the causes of death are not obvious.

The coroner shall state on the Death Certificate that Sudden Infant Death Syndrome (SIDS) was the cause of death when the coroner's findings are consistent with the following definition:

**The sudden death of an infant one year of age or younger which is unexpected by the infant's history and where a thorough postmortem examination including an autopsy, death scene investigation and review of infant's medical history fails to demonstrate an adequate cause of death.**

If this Protocol is used and completed for the investigation of a sudden, unexplained infant death, the CDHS would appreciate a copy of this Protocol, as well as the *Standardized Autopsy Protocol* (DHS 4437), to be sent to:

**California Department of Health Services  
Maternal, Child, & Adolescent Health/Office of Family Planning Branch  
Epidemiology and Evaluation Section  
P.O. Box 997420, MS 8304  
Sacramento, CA 95899-7420  
(916) 650-0323 (phone) [cflorez@dhs.ca.gov](mailto:cflorez@dhs.ca.gov) (email)**

Additional copies of the Protocol can be obtained from the CDHS at the contact information listed above or by accessing the CDHS website at [www.mch.dhs.ca.gov/epidemiology](http://www.mch.dhs.ca.gov/epidemiology) or on the California SIDS Program website at [www.californiasids.com](http://www.californiasids.com)

# DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

## I. DEMOGRAPHICS

Decedent's Name										Investigating Agency's Case No.					Coroner's Case No.				
Last			First			MI													
Date of Birth					Date of Death					Sex					Decedent's Race/Ethnicity				
Mo		Day		Yr	Mo		Day		Yr	<input type="checkbox"/> Male		<input type="checkbox"/> Female							
Home Address (Number, Street)										Time of Death									
										<input type="checkbox"/> Found <input type="checkbox"/> Pronounced									
City					State					Zip Code					County				
Primary Language Spoken in Home										Social Security No. of Decedent									
<input type="checkbox"/> English		<input type="checkbox"/> Spanish		<input type="checkbox"/> Other _____		<input type="checkbox"/> Interpreter Needed													
Mother's Name					Relationship					Race/Ethnicity					Marital Status				
Last		First			MI		<input type="checkbox"/> Natural <input type="checkbox"/> Adoptive <input type="checkbox"/> Step							<input type="checkbox"/> Married <input type="checkbox"/> Separated <input type="checkbox"/> Divorced		<input type="checkbox"/> Not Married <input type="checkbox"/> Widowed			
							<input type="checkbox"/> Other (Specify: _____)												
Date of Birth				Age		Yrs. of Education		CDL #			Telephone No.				On Public Assistance?				
Mo		Day		Yr								( )		<input type="checkbox"/> Yes <input type="checkbox"/> No					
Address (If Different from Infant)							City					State					Zip Code		
Father's Name					Relationship					Race/Ethnicity									
Last		First			MI		<input type="checkbox"/> Adoptive <input type="checkbox"/> Other							<input type="checkbox"/> Natural <input type="checkbox"/> Step					
							<input type="checkbox"/> Natural <input type="checkbox"/> Step												
Date of Birth				Age		Yrs. of Ed.		CDL #			Telephone No.								
Mo		Day		Yr								( )							
Address (If Different from Infant)							City					State					Zip Code		
Other Caregiver's Names					Date of Birth					Address									
Last		First			Mo		Day		Yr	Number, Street									
Siblings					Date of Birth			Age		Sex									
		Mo		Day	Yr					<input type="checkbox"/> Male <input type="checkbox"/> Female									
										<input type="checkbox"/> Male <input type="checkbox"/> Female									
										<input type="checkbox"/> Male <input type="checkbox"/> Female									
										<input type="checkbox"/> Male <input type="checkbox"/> Female									
Other Adults in Residence					Date of Birth			Age		Relationship									
		Mo		Day	Yr														
Other Children in Residence (Non-Siblings)					Date of Birth			Age		Relationship									
		Mo		Day	Yr														

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

II. SCENE EXAMINATION

1. EMS/Police/Fire/Coroner Scene Response

911 Call: Date: Mo Day Year Time: \_\_\_\_\_

EMS Arrival: Date: Mo Day Year Time: \_\_\_\_\_

Police Arrival: Date: Mo Day Year Time: \_\_\_\_\_

Coroner Arrival: Date: Mo Day Year Time: \_\_\_\_\_

Transport:

Ambulance Company: Telephone: Private Vehicle Type: Owned By: Not Taken to a Medical Facility (Skip to Question 3)

2. Place Where Death Pronounced

Hospital Name: En Route or DOA E.R. In-patient Address: Street City State Zip Other Site: Address: Street City State Zip By Whom: Date: Mo Day Year Time: \_\_\_\_\_

3. Location Where Infant Found

Residence: Apartment Rooming House Single Detached Condo Multi-Family Occupancy Mobile Home Public Housing Project Other (Specify: ) Address: Street City State Zip County Phone Child Care Facility: Licensed? Yes No License #: Relative of Decedent? Yes No Relationship: Mobile Vehicle: Type: Where Parked: Street Off Road Vehicle Location When Infant Found: Address: Street City State Zip County Other (Specify: )

**DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL**

Please Type or Print

**4. Clothing on Body at Time Found Unresponsive**

Intact     Partially Clothed     Unclothed     Clothing Inventory (List: \_\_\_\_\_)

**5. Clothing Soiled By (Check all that apply)**

Blood     Urine     Feces     Vomitus     Mucus     Food     None  
 Other (Specify: \_\_\_\_\_)

**6. Diaper**

a. Type:     Cloth     Disposable     None     Unknown  
b. Diaper Contents:     Dry     Blood     Feces     Urine     Foreign Material     Unknown  
c. Removed After Death?     Yes     No     Unknown     Other (Specify: \_\_\_\_\_)

**7. Postmortem Changes When Found**

a. Rigor Mortis     Yes     No  
b. Blanching     Yes     No  
c. Lividity     Yes     No     Consistent with Infant's Position When Found     Fixed

**8. Body Warm to Touch?**

Yes     No

**9. Body Temperature**

Date Taken: \_\_\_\_\_    Time Taken: \_\_\_\_\_    By Whom: \_\_\_\_\_  
                  Mo    Day    Year  
Temperature: \_\_\_\_\_ °F     Rectal     Other Site: \_\_\_\_\_     Unknown

**10. Mouth and Nostrils**

Occluded     Secretions     Vomitus     Blood     Foreign Objects     Other (Specify: \_\_\_\_\_)

**11. Hydration**

Mucus Membranes Dry?     Yes (Describe: \_\_\_\_\_)     No  
Skin Tenting Present?     Yes     No  
Eyes Sunken?     Yes     No

**12. Evidence of Trauma? (Provide Photographic Documentation & Completed Diagrams at the End of this Protocol)**

a. **Abrasions:**  
 Yes (Where: \_\_\_\_\_)  
 No  
 Unknown

b. **Bruises:**  
 Yes (Where: \_\_\_\_\_)  
 No  
 Unknown

c. **Lacerations:**  
 Yes (Where: \_\_\_\_\_)  
 No  
 Unknown

d. **Other Injuries:**  
 Yes (Specify: \_\_\_\_\_)  
 No  
 Unknown

**13. Postmortem or Perimortem Injuries?**

Yes (Describe: \_\_\_\_\_)     No     Unknown  
\_\_\_\_\_

If Yes, Were Injuries Related to Resuscitation?     Yes     No     Unknown

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

III. DEATH SCENE/CIRCUMSTANCES OF DEATH

14. Room Where Infant Found

- Decedent's Bedroom, Parent's Bedroom, Other (Specify: \_\_\_\_\_)

Photographs Taken? Yes No By Whom: \_\_\_\_\_ Agency: \_\_\_\_\_

15. Sleeping Site Where Infant Found

- Adult Bed, Conventional Mattress, Water Mattress, Crib, Other, Floor, Bassinet, Couch, Car Bed/Seat, Chair, Bean Bag, Drawer, Playpen

16. Co-Sleeping

Infant sleeping in "Bed" with someone else? Yes No

If Yes, describe others in "Bed":

- Mother, Father, Other Adult, Other Children (Total Num: \_\_\_\_\_) Age Est. weight Est. height

Describe relative position of Infant (Also use diagram in Section VII):

- Between 1 individual and edge of bed, Between 1 individual and wall, Between 2 individuals

17. Objects in Bed With Infant When Found Unresponsive (Check all that apply)

- Blanket(s) Over or Around Infant, Blanket(s) Over the Head, Blanket(s) Under Infant, Pacifier, Toys, None, Pillows, Bumper Pads, Plastic Bags, Other (Specify: \_\_\_\_\_)

18. Bedding (Check all that apply)

a. Was Bedding Over Baby Soiled By:

- Blood, Feces, Other, Vomitus, None, Urine, Not Applicable

b. Was Bedding Under Baby Soiled By:

- Blood, Feces, Other, Vomitus, None, Urine, Not Applicable

19. Infant Placed

On Back, On Side, On Stomach, Date: Mo Day Year Time: \_\_\_\_\_ By Whom: \_\_\_\_\_

20. Infant's State Immediately Prior To Being Found Unresponsive

- Awake, Asleep, Unknown, Body Position of Infant When Last Seen Alive: On Back, On Side, On Stomach

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

21. Infant Found Unresponsive

Date: Mo Day Year

Time:

By Whom:

a. Body Position:

- On Back
On Side
On Stomach

b. Face Position:

- Face Down
Face to Side
Face Up

c. Head Position:

- Neutral
Tilted Left
Tilted Right

d. Neck Position:

- Extended Backwards
Flexed Forward
Neutral
Unknown

e. Baby Sweaty When Found:

- Yes
No

f. Material in Nose or Mouth When Found:

- No
Bloody
Other (Specify: )

22. Environmental Factors at Location Where Infant Found

a. Temperature: Outside: F Inside: F Estimate

b. General Quality of Housing:

- Below Standard Standard Above Standard

c. General Quality of Neighborhood:

- Good Poor

d. Heating:

- On Off

Type: Electric Fireplace Forced Air Gas Kerosene Oven Propane Wood Stove Other (Specify: ) None

e. Air Conditioning:

- On Off

Type: Central Fan Swamp Cooler None Other (Specify: )

f. Room Ventilation: (Check all that apply)

- Fan On Open Windows None Unknown Other (Specify: )

g. Bedside Humidifier/Vaporizer:

- On Off None

h. Floor in Room Where Baby Found:

- Carpet Concrete Dirt Linoleum Wood Other (Specify: )

i. Housekeeping:

- Neat and Clean Cluttered but Clean Filthy and Cluttered Other (Specify: )

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

23. If Residence or Child Care Facility

Number of Adults: \_\_\_\_\_

Number of Children: \_\_\_\_\_

24. Physical Items Collected - Mandatory When Available (Check all that apply)

Collected by: \_\_\_\_\_

- Checkboxes for: Clothes, Diapers, Drug Paraphernalia, Other, Feeding Formulas, Over the Counter Drugs, Folk Remedies, Medications, Trace Evidence, Unwashed or Partially Consumed Bottles, None.

25. Discretionary Items Collected If Relevant (Check all that apply)

- Checkboxes for: Bedding, None, Toys, Other, Honey, if fed within 30 Days of Death.

IV. HISTORY OF ATTEMPTED RESUSCITATION

26. Attempted Resuscitation

a. Mouth-to-Mouth Ventilation?

- Yes/No checkboxes

b. Bag and Mask Ventilation?

- Yes/No checkboxes

c. Oral Airway Placement?

- Yes/No/Attempted checkboxes

d. Intubation?

- Yes/No/Attempted checkboxes

e. Cardiac Compression?

- Yes/No checkboxes

f. Intravenous Fluids?

- Yes/No checkboxes

g. Intracardiac Medications?

- Yes/No checkboxes

h. Intraosseous Lines? (catheter in shinbone)

- Yes/No checkboxes

i. Placed on Life Support?

- Yes/No checkboxes, Duration: \_\_\_\_\_

j. Body Temperature Taken Near Time of Resuscitation: \_\_\_\_\_ °F [Rectal/Other Site checkboxes]

k. Initial Cardiac Rhythm Recorded?

- Yes/No checkboxes, If yes: A systole/Other \_\_\_\_\_

l. Normal Cardiac Rhythm Restored?

- Yes/No checkboxes, Duration of CPR: \_\_\_\_\_ minutes

m. Duration of Survival after Resuscitation \_\_\_\_\_ [Minutes/Hours checkboxes]

n. Location(s) of Resuscitation(s): \_\_\_\_\_

By Whom: \_\_\_\_\_

Agency/ID#: \_\_\_\_\_

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

V. MEDICAL HISTORY

27. Infant Ill Within 48 Hours Before Death

a. Runny Nose?

- Yes
- No

b. Vomiting?

- Yes (How Many Times: \_\_\_\_\_)
- No

c. Diarrhea?

- Yes (How Many BM's: \_\_\_\_\_)
- No

d. Pneumonia?

- Yes
- No

e. Body Temperature?

- Yes (Temperature: \_\_\_\_\_ °F)
- If yes:  Rectal  Other site: \_\_\_\_\_
- No

f. Seizure/Convulsion?

- Yes (Date: \_\_\_\_\_ Mo \_\_\_\_\_ Day \_\_\_\_\_ Year)
- No

g. Cough?

- Yes If yes:  Productive
- No

h. Respiratory Distress?

- Yes (Date: \_\_\_\_\_ Mo \_\_\_\_\_ Day \_\_\_\_\_ Year)
- No

i. Constipation?

- Yes
- No

j. Poor Feeding?

- Yes
- No

k. Poor Appetite?

- Yes
- No

l. Colic (Abdominal Cramps)?

- Yes
- No

m. Other (Specify: \_\_\_\_\_)

28. Infant Ill 48 Hours to 2 Weeks Before Death

a. Runny Nose?

- Yes
- No

b. Vomiting?

- Yes (How Many Times: \_\_\_\_\_)
- No

c. Diarrhea?

- Yes (How Many BM's: \_\_\_\_\_)
- No

d. Pneumonia?

- Yes
- No

e. Body Temperature?

- Yes (Temperature: \_\_\_\_\_ °F)
- If yes:  Rectal  Other site: \_\_\_\_\_
- No

f. Seizure/Convulsion?

- Yes (Date: \_\_\_\_\_ Mo \_\_\_\_\_ Day \_\_\_\_\_ Year)
- No

g. Cough?

- Yes If yes:  Productive
- No

h. Respiratory Distress?

- Yes (Date: \_\_\_\_\_ Mo \_\_\_\_\_ Day \_\_\_\_\_ Year)
- No

i. Constipation?

- Yes
- No

j. Poor Feeding?

- Yes
- No

k. Poor Appetite?

- Yes
- No

l. Colic (Abdominal Cramps)?

- Yes
- No

m. Other (Specify: \_\_\_\_\_)

29. Medications Within 48 Hours Prior to Death

a. Antibiotics?

- Yes (Name: \_\_\_\_\_)
- No

b. Anticonvulsants?

- Yes (Name: \_\_\_\_\_)
- No

c. Aspirin?

- Yes
- No

d. Acetaminophen (Tylenol)?

- Yes
- No

e. Ibuprofen (Motrin/Advil)?

- Yes
- No

f. Cold Remedies?

- Yes (Name: \_\_\_\_\_)
- No

g. Folk Remedies?

- Yes (Type: \_\_\_\_\_)
- No

h. Other (Specify): \_\_\_\_\_  
\_\_\_\_\_

**DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL**

Please Type or Print

**30. Exposure History**

a. Was the decedent recently exposed to an ill person?

Yes Relationship to Infant: \_\_\_\_\_  No  Unknown  
 Nature of Illness: \_\_\_\_\_

b. Was decedent recently exposed to an ill animal?

Yes Type: \_\_\_\_\_  No  Unknown

**31. Recent Behavior Change?**

Yes (Describe: \_\_\_\_\_)  No

**32. Recent Change in Sleep Pattern?**

Yes (Describe: \_\_\_\_\_)  No

**33. Usual Sleep Position?**

On his/her side  On his/her back  On his/her stomach

**34. Pacifier Used?**

Yes  No

**35. Tobacco Smoke Exposure?**

Yes  No

**Other Smoke Exposure?**

Yes Type: \_\_\_\_\_  No

**36. Feeding History**

a. Food Intolerance?

Yes  
 No  
 Unknown

b. Breast Milk in Diet when Infant Died?

Yes  
 No

c. Formula?

Yes (Type: \_\_\_\_\_)  
 No

d. Time of Last Feeding Before Death: \_\_\_\_\_

e. Amount of Food Taken (oz.): \_\_\_\_\_

Unknown

f. Diet (Other than Formula): \_\_\_\_\_

g. Honey Within 30 Days of Death?

Yes  No  Unknown

**37. Recent History of Infant Traveling**

Yes Where: \_\_\_\_\_  No

From: \_\_\_\_\_ to \_\_\_\_\_  
 Mo Day Year Mo Day Year

**38. Was the Infant Cared for by Someone Other Than Parents?**

Yes  No

a. If yes, for how long? \_\_\_\_\_

b. Child Care Provider?

Yes License Number: \_\_\_\_\_  No

c. Relative of Decedent?

Yes Relationship: \_\_\_\_\_  No

d. Foster Care?

Yes  No

e. Name of Person Caring for Infant: \_\_\_\_\_

Address: \_\_\_\_\_  
 Street City State Zip  
 \_\_\_\_\_  
 County ( ) Phone

**DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL**

Please Type or Print

**39. History of Injuries or Trauma**

- a. **Head Injury?**  Yes (Specify: \_\_\_\_\_)  No
- b. **Loss of Consciousness?**  Yes When: \_\_\_\_\_  No  
 Mo Day Year
- c. **Lethargy?**  Yes  No  No
- d. **Seizure?**  Yes When: \_\_\_\_\_ Type: \_\_\_\_\_  No  
 Mo Day Year
- e. **Fractures?**  Yes (Specify: \_\_\_\_\_)  No
- f. **Suspected Child Abuse?**  Yes  No  
 Access the Child Abuse Central Index (CACI) \*(Obtain directly from index, not from parents. See instructions.)
- g. **Was there documented history of child abuse?**  Yes  No

**40. Previous Illness (May need to contact Mother, Obstetrics, Delivery Records)**

- a. **Respiratory Disease?**  Yes (Describe: \_\_\_\_\_)  No
- b. **Heart Disease?**  Yes (Describe: \_\_\_\_\_)  No
- c. **Apnea (Stopped Breathing)?**  Yes Date: \_\_\_\_\_ How Often: \_\_\_\_\_  No  
 Mo Day Year
- d. **Seizure?**  Yes Date: \_\_\_\_\_ How Often: \_\_\_\_\_  No  
 Mo Day Year
- e. **Other (Specify):** \_\_\_\_\_

**41. Aside From that Used in Resuscitation, Did Infant Previously Require? (Answer Every Question)**

- a. **Oxygen?**  Never  Yes, Within Last Week  Yes, But Not Within Last Week
- b. **Apnea Monitor?**  Never  Yes, Within Last Week  Yes, But Not Within Last Week
- c. **Antibiotics?**  Never  Yes, Within Last Week  Yes, But Not Within Last Week
- d. **Anticonvulsants?**  Never  Yes, Within Last Week  Yes, But Not Within Last Week
- e. **Other (Specify):** \_\_\_\_\_

**42. Last Seen By Doctor or Health Professional**

- Date Last Seen:** \_\_\_\_\_ Medications prescribed:  Yes  No Type: \_\_\_\_\_  
 Mo Day Year
- a. **Routine Well Baby Exam**  Yes  No  
 If Not Routine Exam, Specify Reason: \_\_\_\_\_
  - b. **Weight:** \_\_\_\_\_ lbs.      c. **Height:** \_\_\_\_\_ inches      d. **Temperature:** \_\_\_\_\_ °F
  - e. **Name of Health Care Provider:** \_\_\_\_\_
- Address:** \_\_\_\_\_  
 Street City State Zip  
 \_\_\_\_\_  
 County Phone

**43. Immunizations**

- Yes  No
- a. **Most Recent Immunization:** Date: \_\_\_\_\_ Type: \_\_\_\_\_  
 Mo Day Year
  - b. **Total Number of Immunizations Since Birth:**  
 Polio \_\_\_\_\_ Meningitis Varicella (Chickenpox) \_\_\_\_\_ Haemophilus HIB \_\_\_\_\_  
 DTaP \_\_\_\_\_ Measles, Mumps Rubella (MMR) \_\_\_\_\_ Hepatitis B \_\_\_\_\_

DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

Please Type or Print

44. Hospitalizations

Hospitalized Other Than at Birth?

Yes  No

Reason: \_\_\_\_\_

Date: \_\_\_\_\_  
Mo Day Year

Hospital: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_

Address: \_\_\_\_\_  
Street City State Zip

45. Surgeries (Not Previously Noted)

Did Infant Ever Have Surgery?

Yes  No

Reason: \_\_\_\_\_

Date: \_\_\_\_\_  
Mo Day Year

Hospital: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_

Address: \_\_\_\_\_  
Street City State Zip

46. Birth History

a. Place of Birth?

Home  Hospital

Other (Specify: \_\_\_\_\_) \_\_\_\_\_  
County

Address: \_\_\_\_\_  
Street City State Zip

b. Are Decedent's Mother and Father Blood Related?

Yes  No

c. Birth Weight: \_\_\_\_\_ lbs. \_\_\_\_\_ ozs.  Unknown

d. Multiple Birth?  Yes (Specify: Twin, Triplet, etc.: \_\_\_\_\_)  No

e. Infant Delivered:  Vaginally  Breech  C-Section

47. Prenatal Care

Did the Decedent's Mother Receive Prenatal Care?

Yes  No

a. Physician/Health Care Provider: \_\_\_\_\_

b. Month of Gestation When Care Began: \_\_\_\_\_

c. Estimated Number of Prenatal Visits: \_\_\_\_\_

48. Illnesses During First Week of Life

a. Prematurity?  Yes (# wks gestation: \_\_\_\_\_)  No

b. Resuscitation in Delivery Room?  Yes  No

c. Neonatal Intensive Care Unit?  Yes  No

d. Apnea?  Yes  No

e. Neonatal Lung Disorder?  Yes  No

f. Seizure?  Yes  No

g. Jaundice Requiring Treatment?  Yes  No

h. Meconium Aspiration?  Yes  No

i. Other (Specify: \_\_\_\_\_)

49. Mother's Pregnancy History

Number of Previous Pregnancies: \_\_\_\_\_ Number of Live Births: \_\_\_\_\_

Number of Miscarriages/Abortions (spontaneous and/or induced): \_\_\_\_\_

**DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL**

Please Type or Print

**50. History of Fertility Treatment?**

Yes  No

**51. Maternal Health Problems During Pregnancy**

- |                                    |                              |                             |
|------------------------------------|------------------------------|-----------------------------|
| a. Anemia?                         | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| b. Diabetes Mellitus?              | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| c. Required Insulin?               | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| d. High Blood Pressure?            | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| e. Infections?                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| f. Physical Trauma?                | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| g. Sexually Transmitted Infection? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| h. Other (Specify: _____)          |                              |                             |

**52. Maternal Medications During Pregnancy**

- |  |   |   |
|--|---|---|
| a. Antibiotics?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No   | b. Anticonvulsants?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No              | c. Pain Medications?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No                 |
| d. Thyroid?<br><input type="checkbox"/> Yes<br><input type="checkbox"/> No                     | e. Hormones?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No                     | f. Other Prescription Drugs?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No         |
| d. Cold Remedies?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No | e. Other Over-the-Counter Drugs?<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No | f. Other Medications? (Incl. Herbal)<br><input type="checkbox"/> Yes (Name: _____)<br><input type="checkbox"/> No |

**53. Alcohol Use**

**Maternal Alcohol Use During Pregnancy?**  Yes  No Greatest # of Drinks at One Time: \_\_\_\_\_

**54. Controlled Substances/Drugs**

**Maternal Use of Controlled Substances/Drugs During Pregnancy?**  Yes (Type: \_\_\_\_\_)  No

**55. Tobacco**

**Maternal Use of Tobacco During Pregnancy?**  Yes  No # of Cigarettes per Day: \_\_\_\_\_

**56. Family History**

- |  |   |                             |                                  |
|--|---|-----------------------------|----------------------------------|
| a. Congenital Anomalies?                 | <input type="checkbox"/> Yes (Describe: _____)                                | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| b. Infant/Childhood Death?               | <input type="checkbox"/> Yes How Many: _____ Relationship(s) to Infant: _____ | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| Cause of Death: _____                    |   |                             |                                  |
| <b>Relationship to Infant</b>            |   |                             |                                  |
| c. SIDS?                                 | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| d. Sudden Unexpected Death of an Infant? | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| e. Prematurity?                          | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| f. Chronic or Recurrent Infections?      | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| g. Pneumonia?                            | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| h. Trauma (Life Threatening)?            | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| i. Alcohol Abuse?                        | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| j. Drug Abuse?                           | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| k. Serious Physical Mental Illness?      | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| l. Police Called to Home in Past?        | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |
| m. Prior Contact with Social Services?   | <input type="checkbox"/> Yes _____  | <input type="checkbox"/> No | <input type="checkbox"/> Unknown |





**DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL**

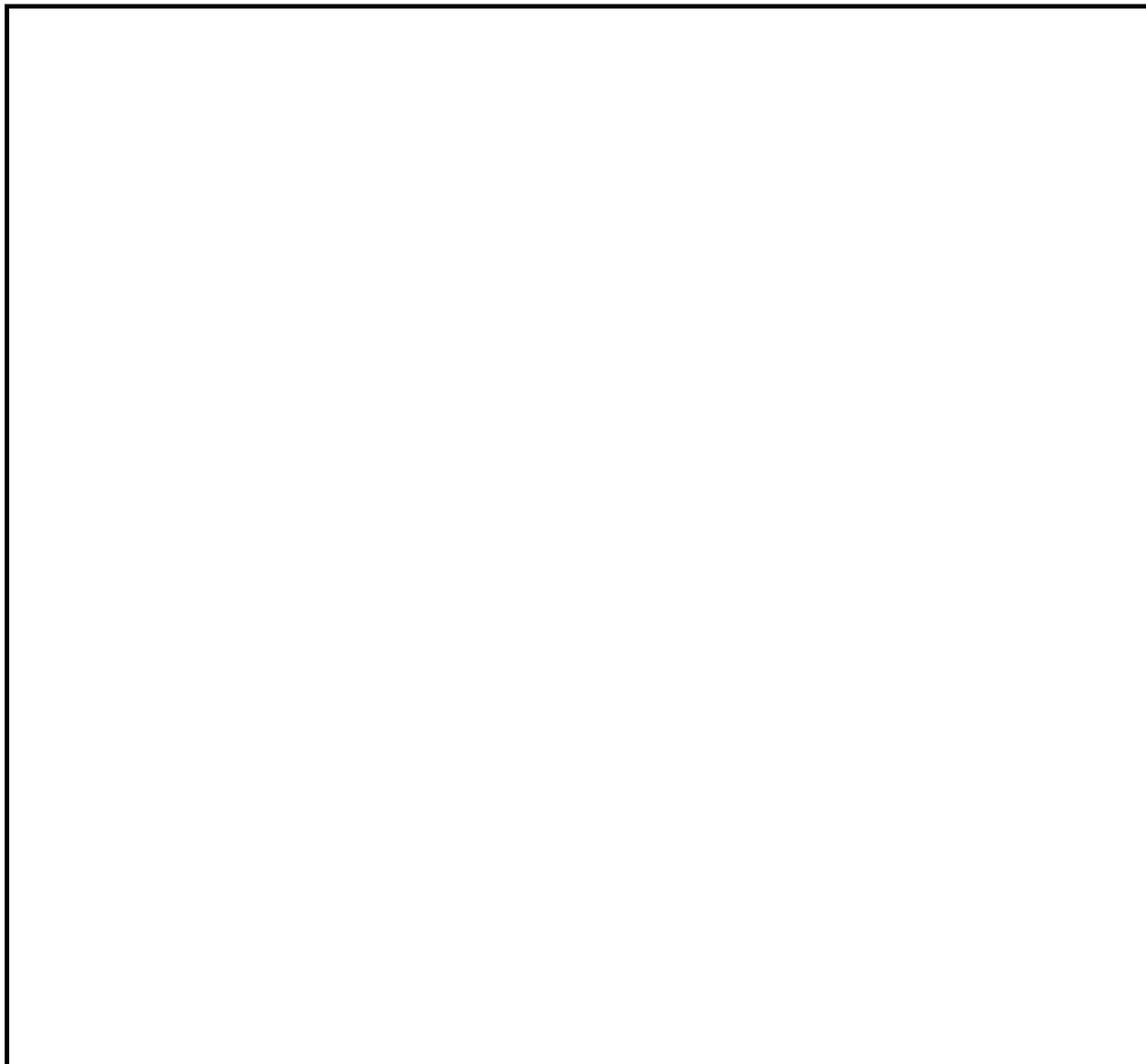
Please Type or Print

**VII. ROOM DIAGRAM**

**62. Use figure to indicate the characteristics of the room where infant was found unresponsive.**

Indicate the following on the diagram (check when done):

- North Direction
- Windows and doors
- Wall Lengths
- Ceiling height \_\_\_\_\_
- Location of furniture
- Location of crib, bed or other sleep surface
- Location of infant when found
- Location of other items and individuals in bed
- Location of other objects in room
- Location of heating and cooling supplies and returns



DEATH SCENE AND DEPUTY CORONER INVESTIGATION PROTOCOL

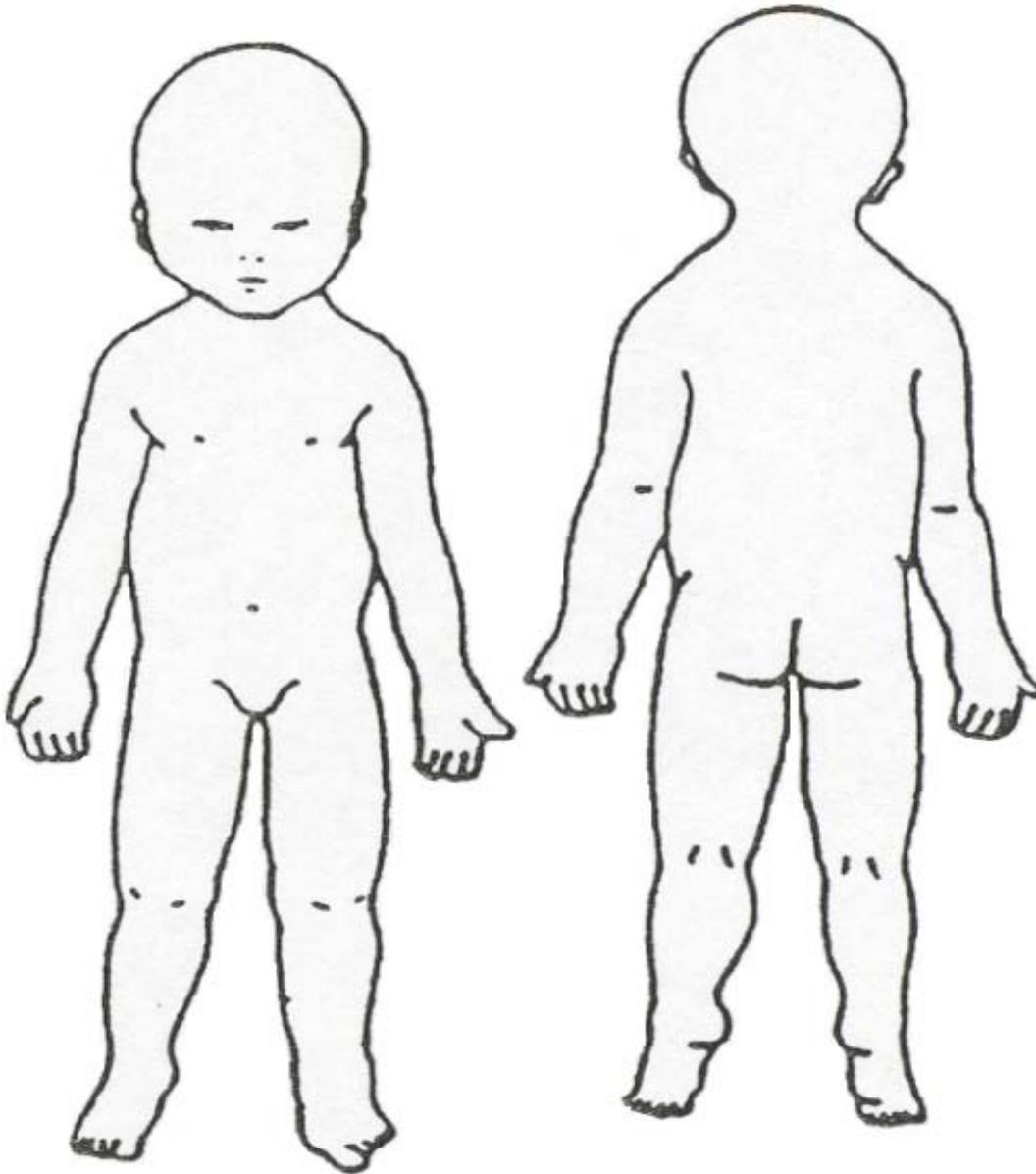
Please Type or Print

VIII. BODY DIAGRAM

63. Use diagram below to indicate any of the checked items.

Check all that apply and indicate on the diagram:

- Drainage or discharge from body or orifices
- Marks or bruises
- Location of diagnostic or therapeutic devices
- Pale pressure mark areas
- Predominate areas of lividity



**IX. SUPPLEMENT**

Empty space for supplement content.





# STANDARDIZED AUTOPSY PROTOCOL



## For the Evaluation of Sudden Unexpected Infant Death

This *Standardized Autopsy Protocol* (DHS 4437), for the evaluation of sudden unexpected infant death, has been approved by the California Department of Health Services (CDHS) pursuant to Government Code, Section 27491.41. Beginning January 1, 2006, this Protocol is available for use throughout California to assist medical examiners and coroners to establish the mode, manner, and cause of death for all infants one year of age or younger who die suddenly and unexpectedly and in whom the causes of death are not obvious.

The coroner shall state on the Death Certificate that Sudden Infant Death Syndrome (SIDS) was the cause of death when the coroner's findings are consistent with the following definition:

**The sudden death of an infant one year of age or younger which is unexpected by the infant's history and where a thorough postmortem examination including an autopsy, death scene investigation and review of the infant's medical history fails to demonstrate an adequate cause of death.**

Gross autopsy findings should be recorded by completing the checklist on the left-hand side of the page and a narrative description added as needed on the right-hand side of the page. Any reports of ancillary studies, including microscopic findings, toxicology, analyses, microbiologic cultures, and other studies can be attached to and submitted with this document.

If this Protocol is used and completed for the investigation of a sudden, unexplained infant death, the CDHS would appreciate a copy of this Protocol, as well as the *Death Scene and Deputy Coroner Investigation Protocol* (DHS 4439), to be sent to:

**California Department of Health Services  
Maternal, Child, and Adolescent Health/Office of Family Planning Branch  
Epidemiology and Evaluation Section  
P.O. Box 997420, MS 8304  
Sacramento, CA 95899-7420  
(916) 650-0323 (phone)    [cflorez@dhs.ca.gov](mailto:cflorez@dhs.ca.gov) (email)**

Additional copies of this Protocol can be obtained from the CDHS at the contact information listed above or by accessing the CDHS website at [www.mch.dhs.ca.gov/epidemiology](http://www.mch.dhs.ca.gov/epidemiology) or on the California SIDS Program website at [www.californiasids.com](http://www.californiasids.com)

# STATE OF CALIFORNIA STANDARDIZED AUTOPSY PROTOCOL

Please Type or Print

<b>Decedent's Name (Last, First, Middle)</b>						<b>Sex</b>	
						<input type="checkbox"/> MALE <input type="checkbox"/> FEMALE	
<b>Date of Birth</b>			<b>Age</b>	<b>Date of Death</b>			<b>Time of Death</b>
Mo	Day	Yr		Mo	Day	Yr	
<b>Race/Ethnicity</b>				<b>Date of Autopsy</b>			<b>Time of Autopsy</b>
				Mo	Day	Yr	
<b>Pathologist</b>				<b>County</b>			

## FINAL ANATOMIC DIAGNOSES

MICROBIOLOGY RESULTS

TOXICOLOGY RESULTS

CHEMISTRY RESULTS

PATHOLOGIST \_\_\_\_\_

<b>Decedent's Name</b>		<b>County</b>		
<b>Accession Number</b>		<b>Pathologist</b>		
<b>I. RECOMMENDED AS INDICATED</b>				<b>Comments</b>
1. Viruses, trachea, stool	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
2. Bacteria, blood, CSF, fluids	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
3. Fungi, discretionary	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
4. Mycobacteria, discretionary	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
5. Bacteria, liver, lung, and myocardium	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
6. Viruses, liver, lung, and myocardium	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
7. PHOTOGRAPHS, INCLUDE				
a. Name, case number, county, country, date	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Measuring device, color reference	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Consider front and back	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Gross abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
8. RADIOGRAPHIC STUDIES				
a. Whole body	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Thorax and specific lesions	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
<b>II. WEIGHTS AND MEASURES</b>				
9. Body weight		_____	gm	
10. Crown-heel length		_____	cm	
11. Crown-rump length		_____	cm	
12. Occipitofrontal circumference		_____	cm	
13. Chest circumference at nipples		_____	cm	
14. Abdominal circumference at umbilicus		_____	cm	
<b>III. GENERAL APPEARANCE/DEVELOPMENT</b>				
15. Development normal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
16. Nutritional status	<input type="checkbox"/> NORMAL	<input type="checkbox"/> POOR	<input type="checkbox"/> OBESE	<input type="checkbox"/> NO EXAM
17. Hydration	<input type="checkbox"/> NORMAL	<input type="checkbox"/> DEHYDRATED	<input type="checkbox"/> EDEMATOUS	<input type="checkbox"/> NO EXAM
18. Pallor	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
19. HEAD				
a. Configuration normal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Scalp and hair normal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Bone consistency normal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
III. GENERAL APPEARANCE/DEVELOPMENT				Comments
20. TRAUMA EVIDENCE				
a. Bruises	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Lacerations	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Abrasions	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Burns	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
21. PAST SURGICAL INTERVENTION				
a. Scars	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
22. RESUSCITATION EVIDENCE				
a. Facial mask marks	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Lip abrasions	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Chest ecchymoses	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. EKG monitor pads	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Defibrillator marks	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Venipunctures	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
IV. EXTERNAL EXAMINATIONS				
23. Congenital anomalies, external				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
24. INTEGUMENT				
a. Jaundice	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Petechiae	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Rashes	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Birthmark	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
25. EYES				
a. Color (check)	<input type="checkbox"/> BROWN	<input type="checkbox"/> BLUE	<input type="checkbox"/> GREEN	<input type="checkbox"/> HAZEL
b. Cataracts	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Position abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Jaundice	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Conjunctiva abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Petechiae	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County	
Accession Number		Pathologist	
IV. EXTERNAL EXAMINATIONS			Comments
26. EARS			
a. Low set	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Rotation abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
27. NOSE			
a. Discharge	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Describe if present _____			
b. Configuration abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Septal deviation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
d. Right choanal atresia	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
e. Left choanal atresia	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
f. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
28. MOUTH			
a. Discharge	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Describe if present _____			
b. Labial frenulum abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Specify _____			
c. Teeth present	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Number of upper _____			
Number of lower _____			
29. TONGUE			
a. Abnormally large	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Frenulum abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
30. PALATE			
a. Cleft	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. High arched	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
31. MANDIBLE			
a. Micrognathia	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
32. Neck abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
33. Chest abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM

Decedent's Name		County		
Accession Number		Pathologist		
IV. EXTERNAL EXAMINATIONS				Comments
34. ABDOMEN				
a. Distended	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Umbilicus abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Hernias	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Other abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
35. External genitalia abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
36. Anus abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
37. Extremities abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
VI. INTERNAL EXAMINATION				
38. Subcutis thickness 1 cm below umbilicus				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
39. Subcutaneous emphysema				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
40. Situs inversus				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
41. PLEURAL CAVITIES abnormal				
a. Fluid (describe if present) _____	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Right _____ ml				
Left _____ ml				
42. PERICARDIAL CAVITY abnormal				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Fluid (describe if present) _____			ml	
43. Retroperitoneum abnormal				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
44. PETECHIAE				
a. Parietal pleura right	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes	<input type="checkbox"/> Dorsal	<input type="checkbox"/> Ventral	<input type="checkbox"/> Dorsal & Ventral	
b. Parietal pleura left	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes	<input type="checkbox"/> Dorsal	<input type="checkbox"/> Ventral	<input type="checkbox"/> Dorsal & Ventral	
c. Visceral pleura right	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes	<input type="checkbox"/> Dorsal	<input type="checkbox"/> Ventral	<input type="checkbox"/> Dorsal & Ventral	
d. Visceral pleura left	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes	<input type="checkbox"/> Dorsal	<input type="checkbox"/> Ventral	<input type="checkbox"/> Dorsal & Ventral	
45. UPPER AIRWAY OBSTRUCTION				
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Foreign body	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Mucus plug	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
VI. INTERNAL EXAMINATION				Comments
46. Neck Soft Tissue Hemorrhage	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
47. Hyoid Bone abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
48. THYMUS				
a. Weight			_____ gm	
b. Atrophy	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
49. Epiglottis abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
50. LARYNX abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Narrowed lumen	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
51. TRACHEA abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Stenosis	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Obstructive exudates	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Aspirated gastric contents	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. ET tube tip location	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
52. MAINSTEM BRONCHI abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Edema Fluid	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Mucus plugs	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Gastric contents	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Inflammation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
53. LUNGS				
a. Total Weight			_____ gm	
Right			_____ gm	
Left			_____ gm	
b. Abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Congestion	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes, describe location	_____			
Severity	<input type="checkbox"/> Slight/Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Heavy/Marked <input type="checkbox"/> Diffuse	
d. Hemorrhage	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes, describe location	_____			
Severity	<input type="checkbox"/> Slight/Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Heavy/Marked <input type="checkbox"/> Diffuse	
e. Edema	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
If yes, describe location	_____			
Severity	<input type="checkbox"/> Slight/Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Heavy/Marked <input type="checkbox"/> Diffuse	

Decedent's Name		County	
Accession Number		Pathologist	
			Comments
f. Consolidation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
If yes, describe location _____			
Severity	<input type="checkbox"/> Slight/Mild	<input type="checkbox"/> Moderate	<input type="checkbox"/> Heavy/Marked <input type="checkbox"/> Diffuse
VI. INTERNAL EXAMINATION			
g. Anomalies	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
h. Pulmonary artery thromboembolization	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
54. Pleura abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
55. RIBS abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Fractures with hemorrhages	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Callus formation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Configuration abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
56. DIAPHRAGM abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
57. CARDIOVASCULAR SYSTEM	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Heart weight		_____ gm	
b. Left ventricular thickness		_____ mm	
c. Right ventricular thickness		_____ mm	
d. Septal thickness maximum		_____ mm	
e. Mitral valve circumference		_____ cm	
f. Aortic valve circumference		_____ cm	
g. Tricuspid valve circumference		_____ cm	
h. Pulmonary valve circumference		_____ cm	
i. Myocardium abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
j. Ventricular inflow/out flow tracts narrow	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
k. Valvular vegetations/thromboses	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
l. Aortic coarctation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
m. Patent ductus arteriosus	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
n. Chamber blood (check)		<input type="checkbox"/> fluid <input type="checkbox"/> dotted	
o. Congenital heart disease	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
p. Atrial septal defect	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
q. Ventricular septal defect	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
r. Abnormal pulmonary venous connection	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
s. Other	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
t. Location of vascular catheter tips _____				
u. Occlusive vascular thrombosis		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
If yes, location(s) _____				
v. Other abnormalities		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
58. Esophagus abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
59. STOMACH abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Describe contents and volume _____				
60. SMALL INTESTINE abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Hemorrhage		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Volvulus		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Describe contents _____				
61. COLON abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Congestion		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Hemorrhage		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
c. Describe contents _____				
62. Appendix abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
63. Mesentery abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Hemorrhage		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
b. Possible scar tissues		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
64. LIVER abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Weight _____ gm				
65. Gallbladder abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
66. Pancreas abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
67. SPLEEN abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
Weight _____ gm				
68. KIDNEYS abnormal		<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM
a. Weight, right			_____ gm	
b. Weight, left			_____ gm	
c. Total weight			_____ gm	

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
69. Ureters abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
70. Bladder abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Contents, volume	_____		ml	
71. Prostate abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
72. Uterus, fallopian tubes, and ovaries abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
73. Thyroid abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
74. ADRENALS abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Right		_____ gm		
b. Left		_____ gm		
c. Combined		_____ gm		
75. Pituitary abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
76. Congenital anomalies, internal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
77. Central nervous system	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Whole brain weight				
Fresh		_____ gm		
Fixed		_____ gm		
b. Combined cerebellum/brainstem weight				
Fresh		_____ gm		
Fixed		_____ gm		
c. Evidence of trauma	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Scalp abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Galea abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Fractures	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Anterior fontanelle abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Dimensions		_____		
h. Calvarium abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
i. Cranial sutures abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Closed (fused)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Overriding	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Widened	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
j. Base of skull abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Configuration abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
k. Middle ears abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
I. Foramen magnum abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
m. Hemorrhage, estimate volumes (ml)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Epidural _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Dural _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Subdural _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Subarachnoid _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Intracerebral _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Cerebellum _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Brainstem _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Spinal cord _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Intraventricular _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Other _____ ml	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
n. Dural lacerations	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
o. Dural sinus thrombosis	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
78. BRAIN (if externally abnormal, fix before cutting)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Configuration abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Hydrocephalus	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Gyral pattern abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Cerebral edema	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Herniation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Uncal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
Tonsillar	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Tonsillar necrosis	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Leptomeningeal exudates (culture)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
h. Cerebral contusions	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
i. Malformations	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
j. Cranial nerves abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
k. Circle of Willis/basilar arteries abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
l. Ventricular contours abnormal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
m. Cerebral infarction	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
n. Contusional tears	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
o. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
79. SPINAL CORD				
a. Inflammation	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Contusion(s)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Anomalies	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Other abnormalities	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
80. MANDATORY SECTIONS TAKEN				
a. Skin, if lesions	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Thymus	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Lymph node	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Epiglottis, vertical	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Larynx, glottic, transverse	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Trachea and thyroid, transverse	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Trachea at carina, transverse	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
h. Lungs, all lobes	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
i. Diaphragm	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
j. Heart, septum, and ventricles	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
k. Gastroesophageal junction	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
l. Terminal ileum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
m. Rectum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
n. Liver	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
o. Mesentery	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
p. Pancreas with duodenum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
q. Spleen	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
r. Kidney with capsule	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
s. Adrenal	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
t. Rib with costochondral junction	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
u. Pontomedullary junction	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
v. Pons	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
w. Midbrain	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
x. Hippocampus	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
y. Frontal lobe	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
z. Cerebellum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
aa. Choroid plexus	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
81. OIL RED O STAINED SECTIONS, IF INDICATED	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Heart	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Liver	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Muscle	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
82. DISCRETIONARY MICROSCOPIC SECTIONS	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Supraglottic soft tissue	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Lung hilum	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Pancreatic tail	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Submandibular gland	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Cervical spinal cord	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Mesentery	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
g. Stomach	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
h. Colon	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
i. Appendix	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
j. Testes or ovaries	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
k. Urinary bladder	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
l. Psoas muscle	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
m. Palatine tonsils	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
n. Basal ganglia	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
<b>VII. METABOLIC DISORDERS</b>				
87. Retain on filter paper in all cases	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Whole blood (take large enough sample)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Urine (1 drop)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Hair (taped down)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
<b>VIII. TOXICOLOGY AND ELECTROLYTES</b>				
88. Fluid and tissues saved for one year	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Whole blood and serum save at - 70°C & +4°C	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Liver, save 100 gms at - 70°C	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Urine, save at - 70°C	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Bile	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Vitreous humor	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
f. Gastric contents	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	

Decedent's Name		County		
Accession Number		Pathologist		
				Comments
89. Analyses performed, but not limited to:	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Cocaine and metabolites	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Morphine and metabolites	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Amphetamine and metabolites	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Volatiles (ethanol, acetone, etc.)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
e. Other indicated by history and exam	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
90. FROZEN TISSUES, save at - 70°C	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
a. Lung	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
b. Heart	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
c. Liver	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
d. Lymph node	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> NO EXAM	
<p>It is suggested that upon completion of the autopsy that tissues samples be returned to the family if requested due to cultural beliefs. For example, in the Native American population all of the decedent's possessions and body tissues are desirable for a proper burial.</p> <p>If the brain is not cut until after it is fixed, you need the fixed total weigh to compare with the fixed brainstem-cerebellum weight because the brainstem should not be cut off until the time of the examination, which may be after fixation. Keep the rib section or some bone section as mandatory because it allows for examination of the bone marrow.</p>				

# Section Five

## **Reducing the Risk of SIDS**



## Assembly Bill (AB) 757 ~ Overview

Assembly Bill (AB) 757 was implemented on July 1, 1998 and was added to the California Health and Safety Code Sections 1254.6 and 1596.847 relating to infant safety. The following is a summary of the requirements of this legislation.

- ❖ This mandate requires that informational and instructional materials relating to Sudden Infant Death Syndrome be provided to parents or guardians of newborns upon discharge from the hospital. The free materials provided by hospitals must explain *“the medical effects of SIDS upon infants and young children”* and emphasize *“measures that may reduce its risk.”*
- ❖ In the event of home births attended by a licensed midwife, the midwife is responsible for providing the information and instructional materials to the parents or guardians of the newborn. These materials must be free of charge, *“explain the medical effects of SIDS upon infants and young children”* and emphasize *“measures that may reduce its risk.”*
- ❖ The mandate also requires the State Department of Social Services (DSS) to make available to any child care facility licensed to provide care to children under the age of two with information and instructional materials regarding SIDS. These materials must *“explain the medical effects of SIDS upon infants and young children”* and *“emphasize measures which may reduce the risk.”* This requirement is the responsibility of DSS upon licensure and, on a one-time basis only, at the time of a regularly scheduled site visit.
- ❖ SIDS risk reduction materials distributed by hospitals, midwives and licensed child care facilities must be those approved by the California Department of Health Services (renamed California Department of Public Health). The California SIDS Program collaborated with the State to develop SIDS risk reduction materials including brochures, and handouts to meet this mandate. Samples of these materials and a copy of the legislation were distributed to California hospitals on June 10, 1998. Hospitals are responsible for reproducing materials and/or obtaining approved resources through their local SIDS program or California SIDS Program. Refer to the California SIDS Program website at [www.californiasids.com](http://www.californiasids.com) for approved risk reduction materials developed by the Program and/or the National Back to Sleep Campaign
- ❖ Public health professionals are encouraged to work with their local birthing hospitals to ensure compliance with AB 757 by providing them with approved SIDS risk reduction resources and collaborating with hospital administrators to develop/implement model safe sleeping protocols for their institutions.
- ❖ The California DSS is responsible for dissemination of approved SIDS risk reduction materials to licensed child care facilities caring for children under two years of age. The California SIDS Program has worked with DSS to make available approved materials and to incorporate model safe sleep practices into the agency's best practices. A supply of risk reduction materials designed for licensed child care facilities was provided to the regional DSS offices in Fiscal Year 2004/2005. Public health professionals are encouraged to collaborate with their local child care facilities to ensure compliance with the mandate and assist them to obtain up-to-date approved SIDS risk reduction materials for their facility.
- ❖ Refer to the California SIDS Program website, [www.californiasids.cdph.ca.gov](http://www.californiasids.cdph.ca.gov), SIDS Coordinators Section for a complete copy of Assembly Bill 757.



The California SIDS Program is funded by the Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division

California Sudden Infant Death (SIDS) Program,  
800-369-SIDS (7437) • <http://californiasids.cdph.ca.gov>





RON CHAPMAN, MD, MPH  
Director & State Health Officer

State of California—Health and Human Services Agency  
California Department of Public Health



EDMUND G. BROWN JR.  
Governor

DATE AUGUST 5, 2014

TO: CALIFORNIA HOSPITALS

SUBJECT: PROVIDING SIDS RISK REDUCTION INFORMATION TO PARENTS OF NEWBORNS: UPDATED

The California Department of Public Health and the California State Sudden Infant Death Syndrome (SIDS) Advisory Council are writing to all California hospitals to provide you the most current infant safe sleep and SIDS risk reduction information. To help reduce sudden unexpected deaths in infancy, the California Department of Public Health launched the “Back to Sleep” Campaign in 1994 to inform parents of infants about ways to reduce the risk of an infant dying from SIDS. This Campaign has dramatically decreased the number of babies dying from SIDS.

Enacted on July 1, 1998, Assembly Bill (AB) 757 requires all hospitals in California to provide SIDS risk reduction information to all parents of newborns. A copy of AB 757 (California Health and Safety Code Sections 1254.6 and 1596.847), is enclosed. Since the implementation of AB 757, the efforts of many health professionals providing SIDS risk reduction information to parents of newborns on how to reduce the baby’s risk of SIDS, the number and rate of SIDS deaths has declined. Between 1999 and 2012, SIDS rates have declined 29 percent in California.

To meet the requirements of AB 757, each hospital may use existing materials, or they may develop their own materials as long as the information is consistent with the 2011 American Academy of Pediatrics (AAP) “SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment” messages, endorsed by the California Department of Public Health. Every hospital is responsible for the reproduction of any items they choose to distribute. The 2011 AAP recommendations and other appropriate SIDS risk reduction materials and resources can be accessed and downloaded at the following websites:

- California Department of Public Health, Maternal Child and Adolescent Health SIDS Program website: [www.cdph.ca.gov/programs/SIDS/Pages/default.aspx](http://www.cdph.ca.gov/programs/SIDS/Pages/default.aspx)
- The California SIDS Program website: <http://californiasids.cdph.ca.gov/Universal/HomePage.html?p=10>

- The National Institute of Child Health and Human Development Safe to Sleep Campaign website: <http://www.nichd.nih.gov/sts/Pages/default.aspx>
- The MCH Library website: <http://www.mchlibrary.org/suid-sids/index.html>

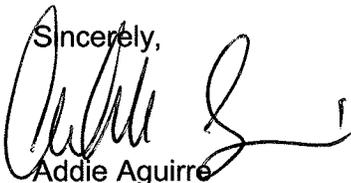
An infant safe sleep and SIDS risk reduction handout developed by the Safe to Sleep Campaign and a free materials order form are enclosed for your reference.

In addition to the distribution of risk reduction information, the California Department of Public Health encourages hospitals to continue policies that require their personnel to model safe to sleep practices to encourage parents to adopt these practices at home. Sample hospital safe sleep policies and procedures, referencing 2005 AAP recommendations regarding safe sleep, are available from the First Candle/SIDS Alliance website:  
<http://www.firstcandle.org/?s=model+behavior+sample+policy>.

If you would like additional information or need assistance in obtaining infant safe sleep and SIDS risk reduction materials or professional training resources, please contact the California SIDS Program at (800) 369-SIDS (7437). If you have any other questions, please contact Guey-Shiang Tsay, California Department of Public Health, Maternal Child and Adolescent Health Nurse Consultant for the SIDS Program, at [Guey-Shiang.Tsay@cdph.ca.gov](mailto:Guey-Shiang.Tsay@cdph.ca.gov).

Thank you very much for providing SIDS risk reduction information to parents of newborns. Your efforts help contribute to the decline in SIDS rates.

Sincerely,



Addie Aguirre  
Acting Division Chief

Enclosures

## **Safe Sleep Environments for Infants: Reducing the Risk of SIDS and Other Sleep-Related Infant Deaths**

Sudden Infant Death Syndrome (SIDS) is the unexplained death of a seemingly healthy infant who is younger than one year. It is one of the top leading causes of deaths in California for infants aged one month to one year. Since the national campaign promoting “*Back-to-Sleep*” took effect in 1994, the SIDS rate has notably decreased. But in recent years, other causes of sleep-related infant deaths including suffocation, asphyxia and entrapment have increased. Sudden Unexpected Infant Death (SUID) is a term used to describe any sudden and unexpected death, whether explained or unexplained, that happens during the first 12 months of life.

The American Academy of Pediatrics (AAP) released a Policy Statement, *SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment* and an accompanying Technical Report on October 18, 2011. The AAP in these new guidelines expanded its previous risk reduction recommendations by focusing on a safe sleep environment that can reduce the risk of all sleep-related infant deaths including SIDS. The 2011 AAP recommendations largely reinforce those originally published in 2005; but they add a number of important guidelines and also clarify others such as the recommendation regarding room sharing without bed sharing.

The California State SIDS Advisory Council on October 27, 2011, reviewed and unanimously endorsed the use of the 2011 AAP Recommendations for all educational activities in California. The updated and expanded 2011 AAP recommendations for safe sleep and the sleep environment supported by scientific studies, for infants up to one year of age, are summarized below: <sup>1, 2</sup>

***Always place infants on their backs to sleep for every sleep.***

Parents and caregivers are advised to place infants on their backs for every sleep until they are 12 months old. Once an infant can turn from their back to front (supine to prone) and from front to back (prone to supine), place the infant to sleep on their back, but allow the infant to sleep in the position he or she assumes.

***Use a firm sleep surface for infants. A firm crib mattress covered by a fitted sheet is the recommended sleeping surface.***

A crib, bassinet, or portable crib/play yard that meets the current Consumer Product Safety Commission standards is recommended. Do not allow infants to sleep on a couch, chair, cushion, bed, pillow, beanbag, or in a car seat, stroller, swing, infant carrier or bouncy chair. If an infant falls asleep any place that is not a safe sleep environment, move the infant to a firm sleep surface right away. Infant sling carriers are not recommended for babies younger than four months of age because of the risk of suffocation.

***Keep soft objects and loose bedding out of the crib.***

No toys, soft objects, stuffed animals, pillows, positioning devices or extra bedding should be in, attached to, or draped over the side of the crib. Bumper pads or similar products that attach to the cribs slats are not recommended. Instead of blankets, a one piece sleeper or wearable blanket can be used to keep a baby warm.

***Keep your baby's sleep area separate but in the same room where you are sleeping.***

Room sharing without bed sharing is recommended. A crib, bassinet, portable crib or play yard should be placed close to the parents' bed. Infants can be brought into bed for feeding or comforting but should be returned to their own crib/bassinet when they fall asleep. Babies should **not** sleep alone in an adult bed or with adults, other babies or children.

***Do not let a baby get too hot or cover the infant's head when sleeping.***

The area where the baby sleeps should be well ventilated and at a temperature that is comfortable for a lightly clothed adult. Bibs and clothing with ties or hoods should be removed and the infant's head should not be covered. An infant is too hot if they are sweaty or their chest is hot to the touch. Infants should be dressed in no more than one layer more than an adult is wearing.

***Do not allow smoking around a baby.***

There should be no smoking near pregnant women or infants. No one should ever smoke around a baby especially in the same room, in a car or in the room where an infant sleeps. Infants who are exposed to smoke have a higher risk of dying from SIDS. Mothers should not smoke during pregnancy or after the baby is born.

***Breastfeeding is recommended and is protective against SIDS.***

If possible, mothers should exclusively breastfeed or feed their infant expressed human milk, for the first six months. (No formula or non-human milk-based supplements.) Any breastfeeding, however, even for a short time, has been shown to be protective against SIDS.

***Offer a pacifier at naptime and bedtime.***

Use a pacifier when placing an infant for sleep, unless the baby refuses it. Do not attach a pacifier by a string around the infant's neck or to their clothing or other object. Once the infant is asleep, it is not necessary to reinsert the pacifier. For breastfed babies, wait until the infant is about one month old or is used to breastfeeding, before offering a pacifier.

***Pregnant women should receive regular prenatal care.***

Research studies show that regular medical care during pregnancy is associated with a lower risk of SIDS. Regular medical checkups are the best way to make sure a baby is growing properly and that there are no problems that will affect their health.

***Avoid alcohol and the use of illicit drugs during pregnancy and after birth.***

Mothers should not use alcohol or illicit drugs during pregnancy and after the baby is born. Infants are placed at high risk for SIDS when sharing a bed with adults who are using alcohol and/or illegal drugs.

***Infants should have immunizations and regular check-ups.***

Recent evidence suggests that immunizations might protect against SIDS. Infants should be immunized as recommended by the American Academy of Pediatrics (AAP) and the Centers for Disease Control and Prevention. It is also important that babies have regular well-child checks as recommended by the AAP.

***Home monitors and devices that claim to reduce the risk of SIDS should not be used.***

Home monitors that check a baby's breathing and/or heart rate are not advised as a way to prevent SIDS. Commercial devices such as wedges, positioners, special mattresses or other types of sleeping products should be avoided. There is no evidence that these devices or products protect against SIDS or suffocation or that they are safe.

***Provide supervised "Tummy Time" when infants are awake.***

Tummy time is important for infant growth and development. It builds muscles and coordination in the head, neck, shoulders, abdomen and back that are needed to reach important developmental milestones (such as rolling over, sitting up, and crawling). Supervised tummy time when an infant is awake takes pressure off the back of the baby's head so it is less likely to be flat.

***Health care professionals, staff in newborn nurseries and neonatal intensive care (NIC) nurseries and child care providers should endorse the SIDS risk reduction recommendations from birth.***

Hospital NICU/newborn nursery staff should model SIDS risk reduction recommendations and implement these guidelines from the time the baby is born through discharge. Childcare providers should receive education about safe sleep practices and develop written policies to reinforce the guidelines. Health care professionals, physicians and nurses should receive education about infant safe sleep measures.

**Media and manufactures should follow safe-sleep guidelines in their messaging and advertising.**

Be aware of media and advertising messages that provide misinformation about the best and safest ways for a baby to sleep. Educate parents about how they can make their infant's sleep area cozy, cute and comfortable but as safe as possible.

**The National Campaign should be expanded to include a major focus on the safe sleep environment and ways to reduce the risks of SIDS and all sleep-related infant deaths.**

Pediatricians, family physicians and other primary care providers should be educated about the AAP recommendations and discuss safe sleep practices and the importance of SIDS and SUID prevention with expectant parents and families of newborns. Room sharing without bed sharing, breastfeeding and no smoking around infants should be promoted. Everyone caring for a baby including grandparents, foster parents and babysitters should know how to protect a baby from suffocation, SIDS and other sleep-related infant deaths. Education efforts should be undertaken to outreach special populations at higher risk for SIDS such as African Americans and American Indians.

**Research and surveillance should continue to have a special focus on the risk factors, causes and pathophysiological mechanisms of SIDS and other sleep-related infant deaths.**

Education campaigns and interventions need to be evaluated, encouraged and funded. Investigative standards and reporting are needed to provide accurate data along with ongoing training courses.

**References**

1. American Academy of Pediatrics (AAP) Policy Statement ~ SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment; *Pediatrics*, 128: 1030-1039, 2011.

This published statement released in October 2011 by the AAP replaces the 2005 SIDS risk reduction recommendations and expands the guidelines to address other sleep-related infant deaths including suffocation, asphyxia and entrapment.

Link to: <http://pediatrics.aappublications.org/content/early/2011/10/12/peds.2011-2284.full.pdf+html>

2. American Academy of Pediatrics (AAP) Technical Report ~ SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment; *Pediatrics*, 128:e000, 2011.

This technical report by the AAP released in October 2011 describes the scientific rationale for updating and expanding the 2005 SIDS risk reduction recommendations.

Link to: <http://pediatrics.aappublications.org/content/early/2011/10/12/peds.2011-2285.full.pdf+html>



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## **SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment**

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

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## TECHNICAL REPORT

# SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment

## TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

**KEY WORDS**

SIDS, sudden infant death, infant mortality, sleep position, bed-sharing, tobacco, pacifier, immunization, bedding, sleep surface

**ABBREVIATIONS**

CPSC—Consumer Product Safety Commission

AAP—American Academy of Pediatrics

SIDS—sudden infant death syndrome

SUID—sudden unexpected infant death

ICD—*International Classification of Diseases*

ASSB—accidental suffocation and strangulation in bed

5-HT—5-hydroxytryptamine

OR—odds ratio

CI—confidence interval

The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

[www.pediatrics.org/cgi/doi/10.1542/peds.2011-2285](http://www.pediatrics.org/cgi/doi/10.1542/peds.2011-2285)

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**COMPANION PAPER:** A companion to this article can be found on page ●●● and online at [www.pediatrics.org/cgi/doi/10.1542/peds.2011-2220](http://www.pediatrics.org/cgi/doi/10.1542/peds.2011-2220).

## abstract

Despite a major decrease in the incidence of sudden infant death syndrome (SIDS) since the American Academy of Pediatrics (AAP) released its recommendation in 1992 that infants be placed for sleep in a non-prone position, this decline has plateaued in recent years. Concurrently, other causes of sudden unexpected infant death occurring during sleep (sleep-related deaths), including suffocation, asphyxia, and entrapment, and ill-defined or unspecified causes of death have increased in incidence, particularly since the AAP published its last statement on SIDS in 2005. It has become increasingly important to address these other causes of sleep-related infant death. Many of the modifiable and nonmodifiable risk factors for SIDS and suffocation are strikingly similar. The AAP, therefore, is expanding its recommendations from being only SIDS-focused to focusing on a safe sleep environment that can reduce the risk of all sleep-related infant deaths including SIDS. The recommendations described in this report include supine positioning, use of a firm sleep surface, breastfeeding, room-sharing without bed-sharing, routine immunization, consideration of a pacifier, and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs. The rationale for these recommendations is discussed in detail in this technical report. The recommendations are published in the accompanying “Policy Statement—Sudden Infant Death Syndrome and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment,” which is included in this issue ([www.pediatrics.org/cgi/doi/10.1542/peds.2011-2220](http://www.pediatrics.org/cgi/doi/10.1542/peds.2011-2220)). *Pediatrics* 2011;128:e000

**METHODOLOGY**

Literature searches using PubMed were conducted for each of the topics in this technical report and concentrated on articles published since 2005 (when the last policy statement<sup>1</sup> was published). In addition, to provide additional information regarding sleep-environment hazards, a white paper was solicited from the US Consumer Product Safety Commission (CPSC).<sup>2</sup> Strength of evidence for recommendations<sup>3</sup> was determined by the task force members. Draft versions of the policy statement<sup>4</sup> and technical report were submitted to relevant committees and sections of the American Academy of Pediatrics (AAP) for review and comment. After the appropriate revisions were made, a

final version was submitted to the AAP Executive Committee and Board of Directors for final approval.

## **SUDDEN INFANT DEATH SYNDROME AND SUDDEN UNEXPECTED INFANT DEATH: DEFINITIONS AND DIAGNOSTIC ISSUES**

### **Sudden Infant Death Syndrome and Sudden Unexpected Infant Death**

Sudden infant death syndrome (SIDS) is a cause assigned to infant deaths that cannot be explained after a thorough case investigation that includes a scene investigation, autopsy, and review of the clinical history.<sup>5</sup> Sudden unexpected infant death (SUID), also known as sudden unexpected death in infancy (SUDI), is a term used to describe any sudden and unexpected death, whether explained or unexplained (including SIDS), that occurs during infancy. After case investigation, SUIDs can be attributed to suffocation, asphyxia, entrapment, infection, ingestions, metabolic diseases, and trauma (accidental or nonaccidental). The distinction between SIDS and other SUIDs, particularly those that occur during an observed or unobserved sleep period (sleep-related infant deaths), such as accidental suffocation, is challenging and cannot usually be determined by autopsy alone. Scene investigation and review of the clinical history are also required. A few deaths that are diagnosed as SIDS are found, after further specialized investigations, to be attributable to metabolic disorders or arrhythmia-associated cardiac channelopathies.

Although standardized guidelines for conducting thorough case investigations have been developed,<sup>6</sup> these guidelines have not been uniformly adopted across the more than 2000 US medical examiner and coroner jurisdictions.<sup>7</sup> Information from emergency responders, scene investigators, and

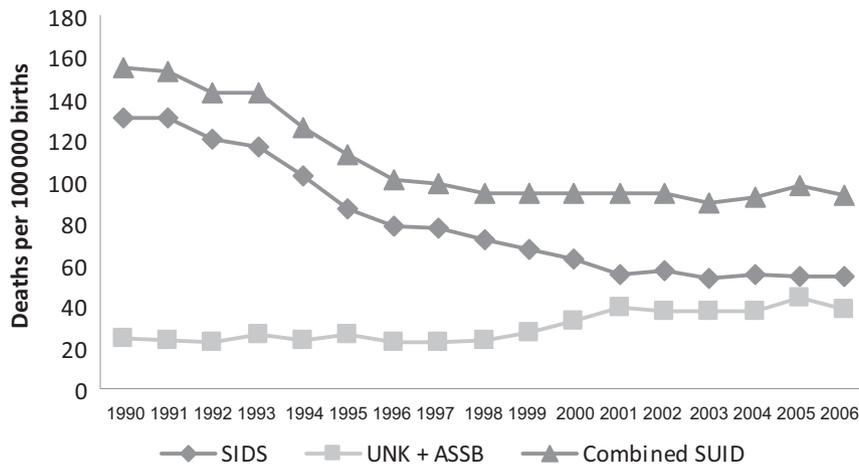
caregiver interviews can provide additional evidence to assist death certifiers (ie, medical examiners and coroners) in accurately determining the cause of death. However, death certifiers represent a diverse group with varying levels of skills and education as well as diagnostic preferences. Recently, much attention has been focused on reporting differences among death certifiers. At one extreme, some certifiers have abandoned using SIDS as a cause-of-death explanation.<sup>7</sup> At the other extreme, some certifiers will not classify a death as suffocation in the absence of a pathologic marker of asphyxia at autopsy (ie, pathologic findings diagnostic of oronasal occlusion or chest compression<sup>8</sup>), even with strong evidence from the scene investigation that suggests a probable accidental suffocation.

### **US Trends in SIDS, Other SUIDs, and Postneonatal Mortality**

To monitor trends in SIDS and other SUIDs nationally, the United States classifies diseases and injuries according to the *International Classification of Diseases* (ICD) diagnostic codes. This classification system is designed to promote national and international comparability in the assignment of cause-of-death determinations; however, this system might not provide the optimal precision in classification desired by clinicians and researchers. In the United States, the National Center for Health Statistics assigns a SIDS diagnostic code (ICD-10 R95) if the death is classified with terminology such as SIDS (including presumed, probable, or consistent with SIDS), sudden infant death, sudden unexplained death in infancy, sudden unexpected death in infancy, or sudden unexplained infant death on the certified death certificate. A death will be coded as “other ill-defined and unspecified causes of mortality” (ICD-10 R99) if the cause of the death is reported as

unknown or unspecified. A death is coded as “accidental suffocation and strangulation in bed” (ASSB) (ICD-10 W75) when the terms “asphyxia,” “asphyxiated,” “asphyxiation,” “strangled,” “strangulated,” “strangulation,” “suffocated,” or “suffocation” are reported, along with the terms “bed” or “crib.” This code also includes deaths while sleeping on couches and armchairs.

Although SIDS was defined somewhat loosely until the mid-1980s, there was minimal change in the incidence of SIDS in the United States until the early 1990s. In 1992, in response to epidemiologic reports from Europe and Australia, the AAP recommended that infants be placed for sleep in a nonprone position as a strategy for reducing the risk of SIDS.<sup>9</sup> The “Back to Sleep” campaign was initiated in 1994 under the leadership of the National Institute of Child Health and Human Development as a joint effort of the Maternal and Child Health Bureau of the Health Resources and Services Administration, the AAP, the SIDS Alliance (now First Candle), and the Association of SIDS and Infant Mortality Programs.<sup>10</sup> The Eunice Kennedy Shriver National Institute of Child Health and Human Development began conducting national surveys of infant care practices to evaluate the implementation of the AAP recommendation. Between 1992 and 2001, the SIDS rate declined, and the most dramatic declines occurred in the years immediately after the first nonprone recommendations, consistent with the steady increase in the prevalence of supine sleeping (Fig 1).<sup>11</sup> The US SIDS rate declined from 120 deaths per 100 000 live births in 1992 to 56 deaths per 100 000 live births in 2001, representing a decrease of 53% over 10 years. However, from 2001 to 2006 (the latest year from which data are available), the rate has remained constant (Fig 1). In 2006, 2327 infants



**FIGURE 1**

Trends in SIDS and other SUID mortality: United States 1990–2006. UNK indicates ill-defined or unspecified deaths.

died from SIDS. Although SIDS rates have declined by more than 50% since the early 1990s, SIDS remains the third-leading cause of infant mortality and the leading cause of postneonatal mortality (28 days to 1 year of age).

The all-cause postneonatal death rate has followed a trend similar to the SIDS rate: there was a 29% decline from 1992 to 2001 (from 314 to 231 per 100 000 live births). From 2001 until 2006, postneonatal mortality rates have also remained fairly unchanged (from 231 to 224 per 100 000 live births); the average decline is 3%.<sup>12</sup>

Several recent studies have revealed that some deaths previously classified as SIDS are now being classified as other causes of infant death (eg, accidental suffocation and other ill-defined or unspecified causes).<sup>13,14</sup> Since 1999, much of the decline in SIDS rates might be explained by increasing rates of these other causes of SUID, particularly over the years 1999–2001.<sup>13,15</sup> A notable change is in deaths attributable to ASSB. Between 1984 and 2004, ASSB infant mortality rates more than quadrupled, from 2.8 to 12.5 deaths per 100 000 live births,<sup>15</sup> which represents 513 infant deaths attributed to ASSB in 2004 compared with 103 in 1984.

### Sleep Position

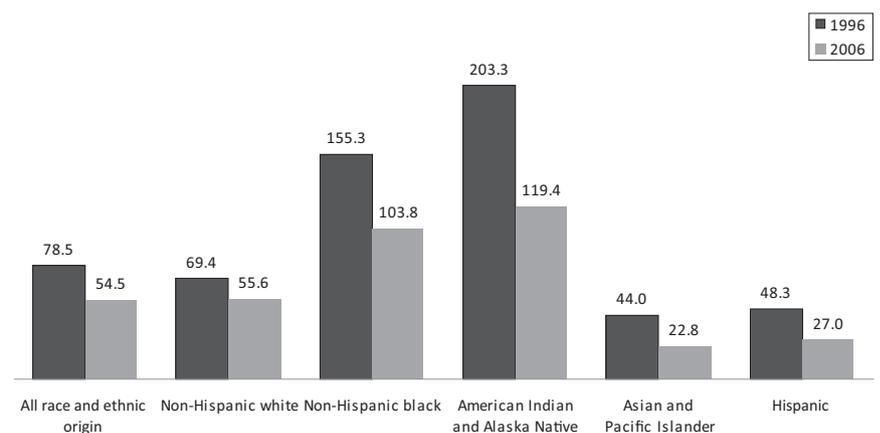
The apparent leveling of the previously declining SIDS rate is occurring coincident with a slowing in the reduction of the prevalence of prone positioning. The prevalence of supine sleep positioning, as assessed from an ongoing national sampling, increased from 13% in 1992 to 72% in 2001. From 2001 until 2010, the prevalence of supine sleep positioning has been fairly stagnant (prevalence in 2010: 75%).<sup>11</sup>

The 1998 and 2005 AAP policy statements and the Back to Sleep campaign not only addressed the importance of back sleeping but also provided recommendations for other infant care

practices that may reduce the risk of SIDS and other sleep-related infant deaths.<sup>1,9</sup> Unfortunately, the ability to measure the prevalence of these other risk factors is limited by lack of data. Death certificates are useful for monitoring trends in SIDS mortality, but the circumstances and events that lead to death are not captured in vital statistics data.<sup>16</sup> The Centers for Disease Control and Prevention recently began to pilot a SUID case registry that will provide supplemental surveillance information about the sleep environment at the time of death, infant health history, and the comprehensiveness of the death scene investigation and autopsy. These factors will better describe the circumstances surrounding SIDS and other sleep-related infant deaths and assist researchers in determining the similarities and differences between these deaths.

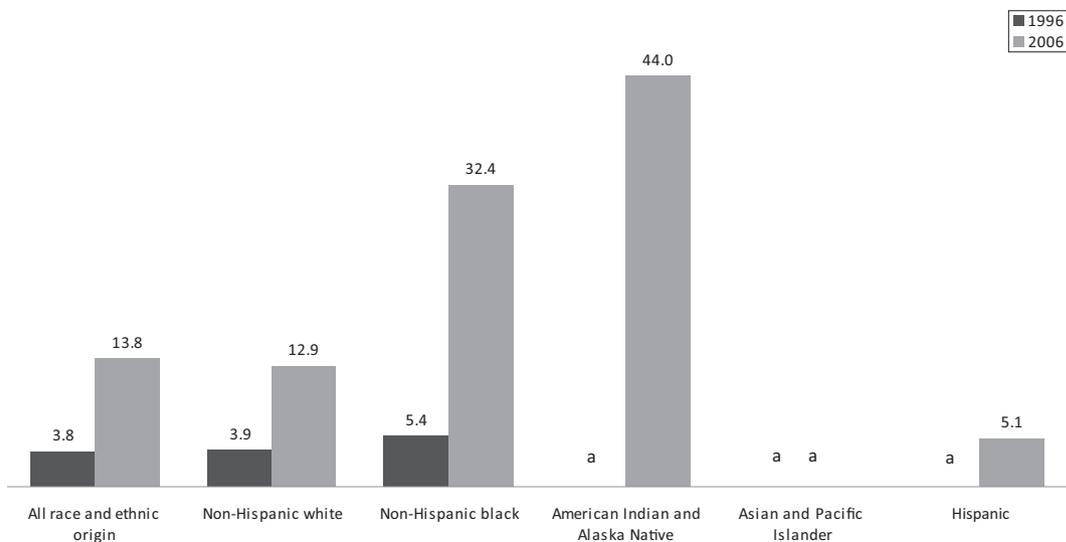
### Racial and Ethnic Disparities

SIDS mortality rates, similar to other causes of infant mortality, have notable racial and ethnic disparities (Fig 2).<sup>17</sup> Despite the decline in SIDS in all races and ethnicities, the rate of SIDS in non-Hispanic black (99 per 100 000 live births) and American Indian/Alaska Native (112 per 100 000 live births) infants was double that of non-Hispanic white infants (55 per 100 000 live births) in 2006.

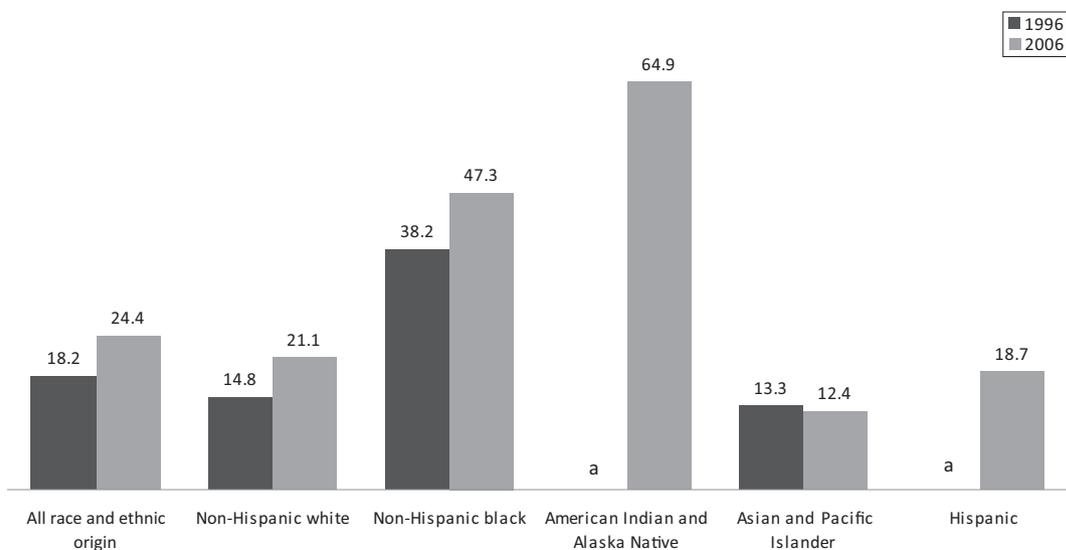


**FIGURE 2**

Comparison of US rates of SIDS according to maternal race and ethnic origin in 1996 and 2006.



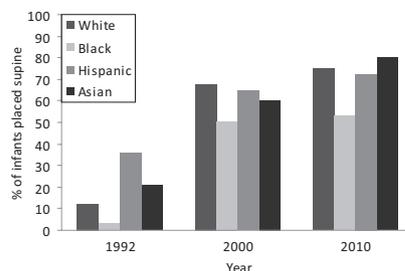
**FIGURE 3** Comparison of US rates of death resulting from ASSB according to maternal race and ethnic origin in 1996 and 2006. <sup>a</sup> The figure does not meet standards of reliability or precision on the basis of fewer than 20 deaths in the numerator.



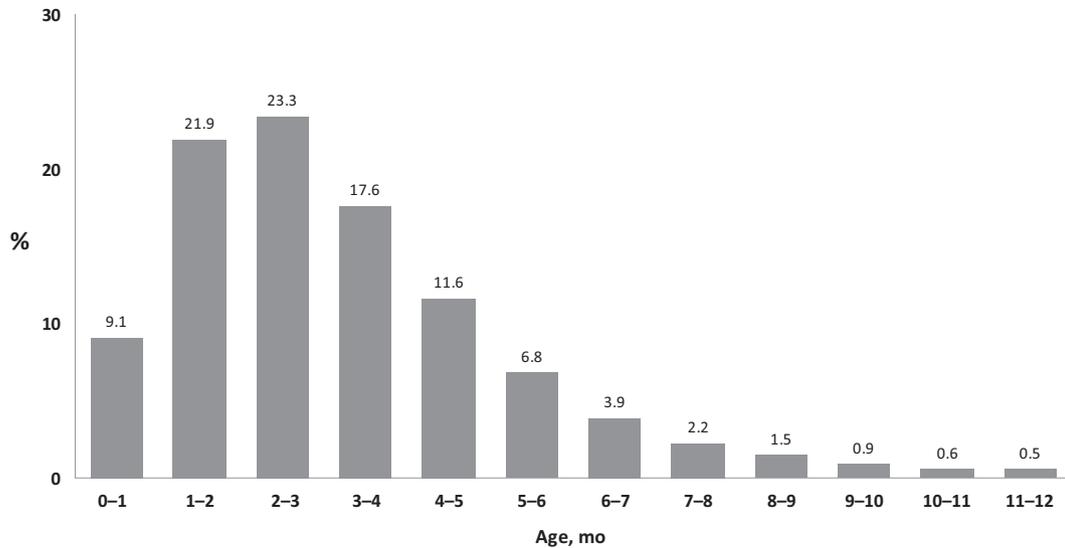
**FIGURE 4** Comparison of US rates of cause ill-defined or unspecified death according to maternal race and ethnic origin in 1996 and 2006. <sup>a</sup> The figure does not meet standards of reliability or precision on the basis of fewer than 20 deaths in the numerator.

live births) in 2005 (Fig 2). SIDS rates for Asian/Pacific Islander and Hispanic infants were nearly half the rate for non-Hispanic white infants. Furthermore, similar racial and ethnic disparities have been seen with deaths attributed to both ASSB (Fig 3) and ill-defined or unspecified deaths (Fig 4). Differences in the prevalence of supine positioning and other sleep-environment conditions among ra-

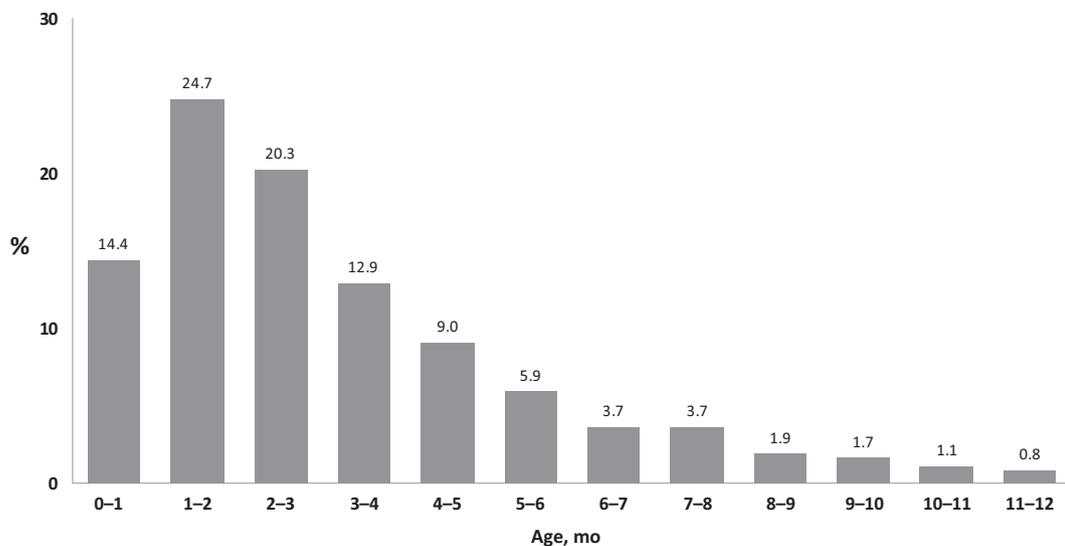
cial and ethnic populations might contribute to these disparities.<sup>17</sup> The prevalence of supine positioning in 2010 among white infants was 75%, compared with 53% among black infants (Fig 5). The prevalence of supine sleep positioning among Hispanic and Asian infants was 73% and 80%, respectively.<sup>11</sup> Parent-infant bed-sharing<sup>18–20</sup> and use of soft bedding are also more common among black families



**FIGURE 5** Prevalence of supine sleep positioning according to maternal race and ethnic origin, 1992–2010. Data source: National Infant Sleep Position Study.<sup>11</sup>



**FIGURE 6**  
Percent distribution of SIDS deaths according to age at death: United States, 2004–2006.



**FIGURE 7**  
Percent distribution of deaths caused by ASSB according to age at death: United States, 2004–2006.

than among other racial/ethnic groups.<sup>21,22</sup> Additional work in promoting appropriate infant sleep position and sleep-environment conditions is necessary to resume the previous rate of decline (observed during the 1990s) for SIDS and all-cause postneonatal mortality.

#### Age at Death

Ninety percent of SIDS cases occur before an infant reaches the age of 6 months. The rate of SIDS peaks be-

tween 1 and 4 months of age. Although SIDS was once considered a rare event during the first month of life, in 2004–2006, nearly 10% of cases coded as SIDS occurred during the first month. SIDS is uncommon after 8 months of age (Fig 6).<sup>14</sup> A similar age distribution is seen for ASSB (Fig 7).

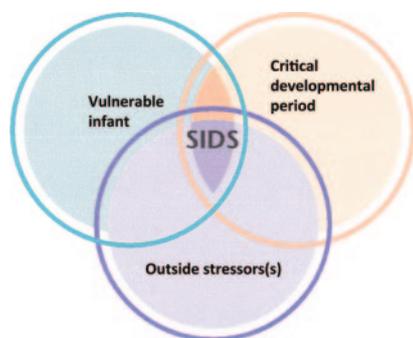
#### Seasonality of SIDS

A pattern in seasonality of SIDS is no longer apparent. SIDS deaths have historically been observed more fre-

quently in the colder months, and the fewest SIDS deaths occurred in the warmest months.<sup>23</sup> In 1992, SIDS rates had an average seasonal change of 16.3%, compared with only 7.6% in 1999,<sup>24</sup> which is consistent with reports from other countries.<sup>25</sup>

#### PATHOPHYSIOLOGY AND GENETICS OF SIDS

A working model of SIDS pathogenesis includes a convergence of exogenous triggers or “stressors” (eg, prone



**FIGURE 8**  
Triple-risk model for SIDS.<sup>26</sup>

sleep position, overbundling, airway obstruction), a critical period of development, and dysfunctional and/or immature cardiorespiratory and/or arousal systems (intrinsic vulnerability) that lead to a failure of protective responses (see Fig 8).<sup>26</sup> Convergence of these factors ultimately results in a combination of progressive asphyxia, bradycardia, hypotension, metabolic acidosis, and ineffectual gasping, leading to death.<sup>27</sup> The mechanisms responsible for dysfunctional cardiorespiratory and/or arousal protective responses remain unclear but might be the result of in utero environmental conditions and/or genetically determined maldevelopment or delay in maturation. Infants who die from SIDS are more likely to be born at low birth weight or growth restricted, which suggests an adverse intrauterine environment. Other adverse in utero environmental conditions include exposure to nicotine or other components of cigarette smoke and alcohol.

Recent studies have explored how prenatal exposure to cigarette smoke may result in an increased risk of SIDS. In animal models, exposure to cigarette smoke or nicotine during fetal development alters the expression of the nicotinic acetylcholine receptor in areas of the brainstem important for autonomic function,<sup>28</sup> alters the neuronal excitability of neurons in the nucleus tractus solitarius (a brainstem region

important for sensory integration),<sup>29</sup> and alters fetal autonomic activity and medullary neurotransmitter receptors.<sup>30</sup> In human infants, there are strong associations between nicotinic acetylcholine receptor and serotonin receptors in the brainstem during development.<sup>31</sup> Prenatal exposure to tobacco smoke attenuates recovery from hypoxia in preterm infants,<sup>32</sup> decreases heart rate variability in preterm<sup>33</sup> and term<sup>34</sup> infants, and abolishes the normal relationship between heart rate and gestational age at birth.<sup>35</sup> Moreover, infants of smoking mothers exhibit impaired arousal patterns to trigeminal stimulation in proportion to urinary cotinine levels.<sup>35</sup> It is important to note also that prenatal exposure to tobacco smoke alters the normal programming of cardiovascular reflexes such that there is a greater-than-expected increase in blood pressure and heart rate in response to breathing 4% carbon dioxide or a 60° head-up tilt.<sup>36</sup> These changes in autonomic function, arousal, and cardiovascular reflexes might all increase an infant's vulnerability to SIDS. Brainstem abnormalities that involve the medullary serotonergic (5-hydroxytryptamine [5-HT]) system in up to 70% of infants who die from SIDS are the most robust and specific neuropathologic findings associated with SIDS and have been confirmed in several independent data sets and laboratories.<sup>37–40</sup> This area of the brainstem plays a key role in coordinating many respiratory, arousal, and autonomic functions and, when dysfunctional, might prevent normal protective responses to stressors that commonly occur during sleep. Since the Task Force on Sudden Infant Death Syndrome report in 2005, more specific abnormalities have been described, including decreased 5-HT<sub>1A</sub> receptor binding, a relative decrease in binding to the serotonin transporter, and in-

creased numbers of immature 5-HT neurons in regions of the brainstem that are important for autonomic function.<sup>41</sup> These findings are not confined to nuclei containing 5-HT neurons but also include relevant projection sites. The most recent study report described in these same regions decreased tissue levels of 5-HT and tryptophan hydroxylase, the synthesizing enzyme for serotonin, and no evidence of excessive serotonin degradation as assessed by levels of 5-hydroxyindoleacetic acid (the main metabolite of serotonin) or ratios of 5-hydroxyindoleacetic acid to serotonin.<sup>30</sup> A recent article described a significant association between a decrease in medullary 5-HT<sub>1A</sub> receptor immunoreactivity and specific SIDS risk factors, including tobacco smoking.<sup>40</sup> These data confirm results from earlier studies in humans<sup>39,41</sup> and are also consistent with studies in piglets that revealed that postnatal exposure to nicotine decreases medullary 5-HT<sub>1A</sub> receptor immunoreactivity.<sup>42</sup> Animal studies have revealed that serotonergic neurons located in the medullary raphe and adjacent paragigantocellularis lateralis play important roles in many autonomic functions including the control of respiration, blood pressure, heart rate, thermoregulation, sleep and arousal, and upper airway patency. Engineered mice with decreased numbers of 5-HT neurons and rats or piglets with decreased activity secondary to 5-HT<sub>1A</sub> autoreceptor stimulation have diminished ventilator responses to carbon dioxide, dysfunctional heat production and heat-loss mechanisms, and altered sleep architecture.<sup>43</sup> These studies linked SIDS risk factors with possible pathophysiology.

There is no evidence of a strong heritable contribution for SIDS. However, genetic alterations have been observed that may increase the vulnera-

bility to SIDS. Genetic variation can take the form of common base changes (polymorphisms) that alter gene function or rare base changes (mutations) that often have highly deleterious effects. Several categories of physiologic functions relevant to SIDS have been examined for altered genetic makeup. Genes related to the serotonin transporter, cardiac channelopathies, and the development of the autonomic nervous system are the subject of current investigation.<sup>44</sup> The serotonin transporter recovers serotonin from the extracellular space and largely serves to regulate overall serotonin neuronal activity. Results of a recent study support those in previous reports that polymorphisms in the promoter region that enhance the efficacy of the transporter (L) allele seem to be more prevalent in infants who die from SIDS compared with those reducing efficacy (S)<sup>45</sup>; however, at least 1 study did not confirm this association.<sup>46</sup> It has also been reported that a polymorphism (12-repeat intron 2) of the promoter region of the serotonin transporter, which also enhances serotonin transporter efficiency, was increased in black infants who died from SIDS<sup>44</sup> but not in a Norwegian population.<sup>45</sup>

It has been estimated that 5% to 10% of infants who die from SIDS have novel mutations in the cardiac sodium or potassium channel genes that result in long QT syndrome as well as in other genes that regulate channel function.<sup>44</sup> A recent report described important new molecular and functional evidence that implicates specific *SCN5A* (sodium channel gene)  $\beta$  subunits in SIDS pathogenesis.<sup>47</sup> The identification of polymorphisms in genes pertinent to the embryologic origin of the autonomic nervous system in SIDS cases also lends support to the hypothesis that a genetic predisposition contributes to the etiology of SIDS. There have

also been a number of reports of polymorphisms or mutations in genes that regulate inflammation,<sup>48,49</sup> energy production,<sup>50–52</sup> and hypoglycemia<sup>53</sup> in infants who died from SIDS, but these associations require more study to determine their importance.

## ISSUES RELATED TO SLEEP POSITION

### The Supine Sleep Position Is Recommended for Infants to Reduce the Risk of SIDS; Side Sleeping Is Not Safe and Is Not Advised

The prone or side sleep position can increase the risk of rebreathing expired gases, resulting in hypercapnia and hypoxia.<sup>54–57</sup> The prone position also increases the risk of overheating by decreasing the rate of heat loss and increasing body temperature compared with infants sleeping supine.<sup>58,59</sup> Recent evidence suggests that prone sleeping alters the autonomic control of the infant cardiovascular system during sleep, particularly at 2 to 3 months of age,<sup>60</sup> and can result in decreased cerebral oxygenation.<sup>61</sup> The prone position places infants at high risk of SIDS (odds ratio [OR]: 2.3–13.1).<sup>62–66</sup> However, recent studies have demonstrated that the SIDS risks associated with side and prone position are similar in magnitude (OR: 2.0 and 2.6, respectively)<sup>63</sup> and that the population-attributable risk reported for side sleep position is higher than that for prone position.<sup>65,67</sup> Furthermore, the risk of SIDS is exceptionally high for infants who are placed on their side and found on their stomach (OR: 8.7).<sup>63</sup> The side sleep position is inherently unstable, and the probability of an infant rolling to the prone position from the side sleep position is significantly greater than rolling prone from the back.<sup>65,68</sup> Infants who are unaccustomed to the prone position and are placed prone for sleep are also at

greater risk than those usually placed prone (adjusted OR: 8.7–45.4).<sup>63,69,70</sup> Therefore, it is critically important that every caregiver use the supine sleep position for every sleep period.

Despite these recommendations, the prevalence of supine positioning has remained stagnant for the last decade.<sup>71</sup> One of the most common reasons that parents and caregivers cite for not placing infants supine is fear of choking or aspiration in the supine position.<sup>72–80</sup> Parents often misconstrue coughing or gagging, which is evidence of a normal protective gag reflex, for choking or aspiration. Multiple studies in different countries have not found an increased incidence of aspiration since the change to supine sleeping.<sup>81–83</sup> There is often particular concern for aspiration when the infant has been diagnosed with gastroesophageal reflux. The AAP supports the recommendations of the North American Society for Pediatric Gastroenterology and Nutrition, which state that infants with gastroesophageal reflux should be placed for sleep in the supine position, with the rare exception of infants for whom the risk of death from gastroesophageal reflux is greater than the risk of SIDS<sup>84</sup>—specifically, infants with upper airway disorders for whom airway protective mechanisms are impaired, which may include infants with anatomic abnormalities, such as type 3 or 4 laryngeal clefts, who have not undergone antireflux surgery. Elevating the head of the infant's crib while the infant is supine is not effective in reducing gastroesophageal reflux<sup>85,86</sup>; in addition, this elevation can result in the infant sliding to the foot of the crib into a position that might compromise respiration and, therefore, is not recommended.

The other reason often cited by parents for not using the supine sleep position is the perception that the infant is uncomfortable or does not sleep

well.<sup>72–80</sup> An infant who wakes frequently is normal and should not be perceived as a poor sleeper. Physiologic studies have found that infants are less likely to arouse when they are sleeping in the prone position.<sup>87–95</sup> The ability to arouse from sleep is an important protective physiologic response to stressors during sleep,<sup>96–100</sup> and the infant's ability to sleep for sustained periods might not be physiologically advantageous.

### **Preterm Infants Should Be Placed Supine as Soon as Possible**

Infants born prematurely have an increased risk of SIDS,<sup>101,102</sup> and the association between prone sleep position and SIDS among low birth weight infants is equal to, or perhaps even stronger than, the association among those born at term.<sup>69</sup> Therefore, preterm infants should be placed supine for sleep as soon as their clinical status has stabilized. The task force supports the recommendations of the AAP Committee on Fetus and Newborn, which state that hospitalized preterm infants should be placed in the supine position for sleep by 32 weeks' postmenstrual age to allow them to become accustomed to sleeping in that position before hospital discharge.<sup>103</sup> Unfortunately, preterm and very low birth weight infants continue to be more likely to be placed prone for sleep after hospital discharge.<sup>104,105</sup> Preterm infants are placed prone initially to improve respiratory mechanics<sup>106,107</sup>; although respiratory parameters are no different in the supine or prone positions in preterm infants who are close to discharge,<sup>108</sup> both infants and their caregivers likely become accustomed to using the prone position, which makes it more difficult to change. One study of NICU nurses found that only 50% of nurses place preterm infants supine during the transition to an open crib,

and more than 20% never place preterm infants supine or will only place them supine 1 to 2 days before discharge.<sup>109</sup> Moreover, very prematurely born infants studied before hospital discharge have longer sleep duration, fewer arousals from sleep, and increased central apneas while in the prone position.<sup>88</sup> The task force believes that neonatologists, neonatal nurses, and other health care professionals responsible for organizing the hospital discharge of infants from NICUs should be vigilant about endorsing SIDS risk-reduction recommendations from birth. They should model the recommendations as soon as the infant is medically stable and significantly before the infant's anticipated discharge. In addition, NICUs are encouraged to develop and implement policies to ensure that supine sleeping and other safe sleep practices are modeled for parents before discharge from the hospital.

### **Newborn Infants Should Be Placed Supine Within the First Few Hours After Birth**

Practitioners who place infants on their sides after birth in newborn nurseries continue to be a concern. The practice likely occurs because nursery staff believe that newborn infants need to clear their airways of amniotic fluid and may be less likely to aspirate while on their sides. No evidence that such fluid will be cleared more readily while in the side position exists. Finally, and perhaps most importantly, if parents observe health care professionals placing infants in the side or prone position, they are likely to infer that supine positioning is not important<sup>110</sup> and, therefore, might be more likely to copy this practice and use the side or prone position at home.<sup>77,80,111</sup> The AAP recommends that infants be placed on their backs as

soon as they are ready to be placed in a bassinet.

### **Once an Infant Can Roll From the Supine to Prone and From the Prone to Supine Position, the Infant Can Be Allowed to Remain in the Sleep Position That He or She Assumes**

Parents and caregivers are frequently concerned about the appropriate strategy for infants who have learned to roll over, which generally occurs at 4 to 6 months of age. As infants mature, it is more likely that they will roll. In 1 study, 6% and 12% of 16- to 23-week-old infants placed on their backs or sides, respectively, were found in the prone position; among infants aged 24 weeks or older, 14% of those placed on their backs and 18% of those placed on their sides were found in the prone position.<sup>112</sup> Repositioning the sleeping infant to the supine position can be disruptive and might discourage the use of supine position altogether. Although data to make specific recommendations as to when it is safe for infants to sleep in the prone position are lacking, the AAP recommends that these infants continue to be placed supine until 1 year of age. If the infant can roll from supine to prone and from prone to supine, the infant can then be allowed to remain in the sleep position that he or she assumes. To prevent suffocation or entrapment if the infant rolls, soft or loose bedding should continue to be removed from the infant's sleep environment. Some caregivers use such bedding to prevent an infant from rolling, but this bedding could cause suffocation and entrapment. Parents can be reassured by the information that the incidence of SIDS begins to decline after 4 months of age (Fig 6).

### **Supervised, Awake Tummy Time on a Daily Basis Can Promote Motor Development and Minimize the Risk of Positional Plagiocephaly**

Positional plagiocephaly, or plagiocephaly without synostosis (PWS), can be associated with supine sleeping position (OR: 2.5).<sup>113</sup> It is most likely to result if the infant's head position is not varied when placed for sleep, if the infant spends little or no time in awake, supervised tummy time, and if the infant is not held in the upright position when not sleeping.<sup>113–115</sup> Children with developmental delay and/or neurologic injury have increased rates of PWS, although a causal relationship has not been demonstrated.<sup>113,116–119</sup> In healthy normal children, the incidence of PWS decreases spontaneously from 20% at 8 months to 3% at 24 months of age.<sup>114</sup> Although data to make specific recommendations as to how often and how long tummy time should be undertaken are lacking, supervised tummy time while the infant is awake is recommended on a daily basis. Tummy time should begin as early as possible to promote motor development, facilitate development of the upper body muscles, and minimize the risk of positional plagiocephaly. The AAP clinical report on positional skull deformities<sup>120</sup> provides additional detail on the prevention, diagnosis, and management of positional plagiocephaly.

### **SLEEP SURFACES**

#### **Infants Should Sleep in a Safety-Approved Crib, Portable Crib, Play Yard, or Bassinet**

Cribs should meet safety standards of the CPSC, Juvenile Product Manufacturers Association, and the ASTM International (formerly the American Society for Testing and Materials), including those for slat spacing, snugly fitting and firm mattresses, and no drop sides.<sup>121</sup> The AAP recommends the use of new cribs, because older

cribs might no longer meet current safety standards, might have missing parts, or might be incorrectly assembled. If an older crib is to be used, care must be taken to ensure that there have been no recalls on the crib model, that all of the hardware is intact, and that the assembly instructions are available.

For some families, use of a crib might not be possible for financial reasons or space considerations. In addition, parents might be reluctant to place the infant in the crib because of concerns that the crib is too large for the infant or that “crib death” (ie, SIDS) only occurs in cribs. Alternate sleep surfaces, such as portable cribs/play yards and bassinets might be more acceptable for some families, because they are smaller and more portable. Local organizations throughout the United States can help to provide low-cost or free cribs or play yards. If a portable crib/play yard or bassinet is to be used, it should meet the following CPSC guidelines: (1) sturdy bottom and wide base; (2) smooth surfaces without protruding hardware; (3) legs with locks to prevent folding while in use; and (4) firm, snugly fitting mattress.<sup>121</sup> In addition, other AAP guidelines for safe sleep, including supine positioning and avoidance of soft objects and loose bedding, should be followed. Mattresses should be firm and should maintain their shape even when the fitted sheet designated for that model is used, such that there are no gaps between the mattress and the side of the bassinet, playpen, portable crib, or play yard. Only mattresses designed for the specific product should be used. Pillows or cushions should not be used as substitutes for mattresses or in addition to a mattress. Any fabric on the sides or a canopy should be taut and firmly attached to the frame so as not to create a suffocation risk for the infant. Portable cribs, play yards, and

bassinets with vertical sides made of air-permeable material may be preferable to those with air-impermeable sides.<sup>122</sup> Finally, parents and caregivers should adhere to the manufacturer's guidelines regarding maximum weight of infants using these products.<sup>122,123</sup> If the product is a combination product (eg, crib/toddler bed), the manual should be consulted when the mode of use is changed.

There are no data regarding the safety of sleepers that attach to the side of an adult bed. However, there are potential safety concerns if the sleeper is not attached properly to the side of the adult bed or if the infant moves into the adult bed. Therefore, the task force cannot make a recommendation for or against the use of bedside sleepers. In addition, infants should not be placed for sleep on adult-sized beds because of the risk of entrapment and suffocation.<sup>124</sup> Portable bed rails (railings installed on the side of the bed that are intended to prevent a child from falling off of the bed) should not be used with infants because of the risk of entrapment and strangulation.<sup>125</sup>

#### **Car Seats and Other Sitting Devices Are not Recommended for Routine Sleep at Home or in the Hospital, Particularly for Young Infants**

Some parents let their infants sleep in a car seat or other sitting device. Sitting devices include but are not restricted to car seats, strollers, swings, infant carriers, and infant slings. Parents and caregivers often use these devices, even when not traveling, because they are convenient. One study found that the average young infant spends 5.7 hours/day in a car seat or similar sitting device.<sup>126</sup> However, there are multiple concerns about using sitting devices as a usual infant sleep location. Placing an infant in such devices can potentiate gastro-

esophageal reflux<sup>127</sup> and positional plagiocephaly. Because they still have poor head control and often experience flexion of the head while in a sitting position, infants younger than 1 month in sitting devices might be at increased risk of upper airway obstruction and oxygen desaturation.<sup>128–132</sup> In addition, there is increasing concern about injuries from falls resulting from car seats being placed on elevated surfaces.<sup>133–137</sup> An analysis of CPSC data revealed 15 suffocation deaths between 1990 and 1997 resulting from car seats overturning after being placed on a bed, mattress, or couch.<sup>136</sup> The CPSC also warns about the suffocation hazard to infants, particularly those who are younger than 4 months, who are carried in infant sling carriers.<sup>138</sup> When infant slings are used for carrying, it is important to ensure that the infant's head is up and above the fabric, the face is visible, and that the nose and mouth are clear of obstructions. After nursing, the infant should be repositioned in the sling so that the head is up and is clear of fabric and the adult's body.

## **BED-SHARING**

### **Room-Sharing Without Bed-Sharing Is Recommended**

The terms “bed-sharing” and “cosleeping” are often used interchangeably, but they are not synonymous. Cosleeping is when parent and infant sleep in close proximity (on the same surface or different surfaces) so as to be able to see, hear, and/or touch each other.<sup>139,140</sup> Cosleeping arrangements can include bed-sharing or sleeping in the same room in close proximity.<sup>140,141</sup> Bed-sharing refers to a specific type of cosleeping when the infant is sleeping on the same surface with another person.<sup>140</sup> Because the term cosleeping can be misconstrued and does not precisely describe sleep arrangements,

the AAP recommends use of the terms “room-sharing” and “bed-sharing.”

The AAP recommends the arrangement of room-sharing without bed-sharing, or having the infant sleep in the parents' room but on a separate sleep surface (crib or similar surface) close to the parents' bed. There is evidence that this arrangement decreases the risk of SIDS by as much as 50%.<sup>64,66,142,143</sup> and is safer than bed-sharing<sup>64,66,142,143</sup> or solitary sleeping (when the infant is in a separate room).<sup>53,64</sup> In addition, this arrangement is most likely to prevent suffocation, strangulation, and entrapment, which may occur when the infant is sleeping in the adult bed. Furthermore, room-sharing without bed-sharing allows close proximity to the infant, which facilitates feeding, comforting, and monitoring of the infant.

Parent-infant bed-sharing is common. In 1 national survey, 45% of parents responded that they had shared a bed with their infant (8 months of age or younger) at some point in the preceding 2 weeks.<sup>19</sup> In some racial/ethnic groups, the rate of routine bed-sharing might be higher.<sup>18–20</sup> There are often cultural and personal reasons why parents choose to bed-share, including convenience for feeding (breast-feeding or with formula) and bonding. In addition, many parents might believe that their own vigilance is the only way that they can keep their infant safe and that the close proximity of bed-sharing allows them to maintain vigilance, even while sleeping.<sup>144</sup> Some parents will use bed-sharing specifically as a safety strategy if the infant sleeps in the prone position<sup>21,144</sup> or if there is concern about environmental dangers such as vermin and stray gunfire.<sup>144</sup>

Parent-infant bed-sharing continues to be highly controversial. Although electrophysiologic and behavioral studies have offered a strong case for its effect

in facilitating breastfeeding<sup>145,146</sup> and although many parents believe that they can maintain vigilance of the infant while they are asleep and bed-sharing,<sup>144</sup> epidemiologic studies have shown that bed-sharing can be hazardous under certain conditions.<sup>147–150</sup> Bed-sharing might increase the risk of overheating,<sup>151</sup> rebreathing<sup>152</sup> or airway obstruction,<sup>153</sup> head covering,<sup>152,154–156</sup> and exposure to tobacco smoke,<sup>157</sup> which are all risk factors for SIDS. A recent meta-analysis of 11 studies that investigated the association of bed-sharing and SIDS revealed a summary OR of 2.88 (95% confidence interval [CI]: 1.99–4.18) with bed-sharing.<sup>158</sup> Furthermore, bed-sharing in an adult bed not designed for infant safety exposes the infant to additional risks for accidental injury and death, such as suffocation, asphyxia, entrapment, falls, and strangulation.<sup>159,160</sup> Infants, particularly those in the first 3 months of life and those born prematurely and/or with low birth weight, are at highest risk,<sup>161</sup> possibly because immature motor skills and muscle strength make it difficult to escape potential threats.<sup>158</sup> In recent years, the concern among public health officials about bed-sharing has increased, because there have been increased reports of SUIDs occurring in high-risk sleep environments, particularly bed-sharing and/or sleeping on a couch or armchair.<sup>162–165</sup>

### **There Is Insufficient Evidence to Recommend Any Bed-Sharing Situation in the Hospital or at Home as Safe; Devices Promoted to Make Bed-Sharing “Safe” Are Not Recommended**

Epidemiologic studies have not found bed-sharing to be protective against SIDS and accidental suffocation for any subgroups of the population. It is acknowledged that there are some cultures for which bed-sharing is the norm and SIDS rates are low, but there

are other cultures for which bed-sharing is the norm and SIDS rates are high. In general, the bed-sharing practiced in cultures with low SIDS rates is often different from that in the United States and other Western countries (eg, with firm mats on the floor, separate mat for the infant, and/or absence of soft bedding). It is statistically much more difficult to demonstrate safety (ie, no risk) in small subgroups. Breastfeeding mothers who do not smoke and have not consumed alcohol or arousal-altering medications or drugs are 1 such subgroup. Furthermore, not all risks associated with bed-sharing (eg, parental fatigue) can be controlled. The task force, therefore, believes that there is insufficient evidence to recommend any bed-sharing situation in the hospital or at home as safe. In addition, there is no evidence that devices marketed to make bed-sharing “safe” (eg, in-bed cosleepers) reduce the risk of SIDS or suffocation or are safe. Such devices, therefore, are not recommended.

**There Are Specific Circumstances in Which Bed-Sharing Is Particularly Hazardous, and It Should Be Stressed to Parents That They Avoid the Following Situations at All Times**

The task force emphasizes that certain circumstances greatly increase the risk with bed-sharing. Bed-sharing is especially dangerous when 1 or both parents are smokers (OR: 2.3–17.7)<sup>64,65,158,166,167</sup>; when the infant is younger than 3 months (OR: 4.7–10.4), regardless of parental smoking status<sup>64,66,143,158,168,169</sup>; when the infant is placed on excessively soft surfaces such as waterbeds, sofas, and armchairs (OR: 5.1–66.9)<sup>62,64,65,143,169</sup>; when soft bedding accessories such as pillows or blankets are used (OR: 2.8–4.1)<sup>62,170</sup>; when there are multiple bed-sharers (OR: 5.4)<sup>62</sup>; and when the parent has consumed alcohol (OR:

1.66)<sup>66,171</sup> There is also a higher risk of SIDS when the infant is bed-sharing with someone who is not a parent (OR: 5.4).<sup>62</sup>

A retrospective series of SIDS cases indicated that mean maternal body weight was higher for bed-sharing mothers than for non-bed-sharing mothers.<sup>172</sup> The only case-control study to investigate the relationship between maternal body weight and bed-sharing did not find an increased risk of bed-sharing with increased maternal weight.<sup>173</sup>

**Infants May Be Brought Into the Bed for Feeding or Comforting but Should Be Returned to Their Own Crib or Bassinet When the Parent Is Ready to Return to Sleep**

The risk of bed-sharing is higher the longer the duration of bed-sharing during the night.<sup>64,65,167,169</sup> Returning the infant to the crib after bringing him or her into the bed for a short period of time is not associated with increased risk.<sup>65,169</sup> Therefore, if the infant is brought into the bed for feeding, comforting, and bonding, the infant should be returned to the crib when the parent is ready for sleep. Because of the extremely high risk of SIDS, accidental suffocation, and entrapment on couches and armchairs,<sup>62,64,65,143,169</sup> infants should not be fed on a couch or armchair when there is high risk that the parent may fall asleep.

**It Is Prudent to Provide Separate Sleep Areas and Avoid Cobedding for Twins and Higher-Order Multiples in the Hospital and at Home**

Cobedding of twins and other infants of multiple gestation is a frequent practice, both in the hospital setting and at home.<sup>174</sup> However, the benefits of cobedding twins and higher-order multiples have not been established.<sup>175–177</sup> Twins and higher-order

multiples are often born prematurely and with low birth weight, so they are at increased risk of SIDS.<sup>101,102</sup> Furthermore, there is increased potential for overheating and rebreathing while cobedding, and size discordance might increase the risk of accidental suffocation.<sup>176</sup> Most cobedded twins are placed on their sides rather than supine.<sup>174</sup> Finally, cobedding of twins and higher-order multiples in the hospital setting might encourage parents to continue this practice at home.<sup>176</sup> Because the evidence for the benefits of cobedding twins and higher-order multiples is not compelling and because of the increased risk of SIDS and suffocation, the AAP believes that it is prudent to provide separate sleep areas for these infants to decrease the risk of SIDS and accidental suffocation.

**BEDDING**

**Pillows, Quilts, Comforters, Sheepskins, and Other Soft Surfaces Are Hazardous When Placed Under the Infant or Loose in the Sleep Environment**

Bedding is used in infant sleep environments for comfort and safety.<sup>178</sup> Parents and caregivers who perceive that infants are uncomfortable on firm surfaces will often attempt to soften the surface with blankets and pillows. Parents and caregivers will also use pillows and blankets to create barriers to prevent the infant from falling off the sleep surface (usually an adult bed or couch) or to prevent injury if the infant hits the crib side. However, such soft bedding can increase the potential of suffocation and rebreathing.<sup>54,56,57,179–181</sup> Pillows, quilts, comforters, sheepskins, and other soft surfaces are hazardous when placed under the infant<sup>62,147,182–187</sup> or left loose in the infant’s sleep area<sup>62,65,184,185,188–191</sup> and can increase SIDS risk up to fivefold independent of sleep position.<sup>62,147</sup> Several reports have also described that

in many SIDS cases, the heads of the infants, including some infants who slept supine, were covered by loose bedding.<sup>65,186,187,191</sup> It should be noted that the risk of SIDS increases 21-fold when the infant is placed prone with soft bedding.<sup>62</sup> In addition, soft and loose bedding have both been associated with accidental suffocation deaths.<sup>149</sup> The CPSC has reported that the majority of sleep-related infant deaths in its database are attributable to suffocation involving pillows, quilts, and extra bedding.<sup>192,193</sup> The AAP recommends that infants sleep on a firm surface without any soft or loose bedding. Pillows, quilts, and comforters should never be in the infant's sleep environment. Specifically, these items should not be placed loose near the infant, between the mattress and the sheet, or under the infant. Infant sleep clothing that is designed to keep the infant warm without the possible hazard of head covering or entrapment can be used in place of blankets; however, care must be taken to select appropriately sized clothing and to avoid overheating. If a blanket is used, it should be thin and tucked under the mattress so as to avoid head or face covering. These practices should also be modeled in hospital settings.

### **Wedges and Positioning Devices Are not Recommended**

Wedges and positioning devices are often used by parents to maintain the infant in the side or supine position because of claims that these products reduce the risk for SIDS, suffocation, or gastroesophageal reflux. However, these products are frequently made with soft, compressible materials, which might increase the risk of suffocation. The CPSC has reports of deaths attributable to suffocation and entrapment associated with wedges and positioning devices. Most of these deaths occurred when infants were placed in the prone or side position with these

devices; other incidents have occurred when infants have slipped out of the restraints or rolled into a prone position while using the device.<sup>2,194</sup> Because of the lack of evidence that they are effective against SIDS, suffocation, or gastroesophageal reflux and because there is potential for suffocation and entrapment, the AAP concurs with the CPSC and the US Food and Drug Administration in warning against the use of these products. If positioning devices are used in the hospital as part of physical therapy, they should be removed from the infant sleep area well before discharge from the hospital.

### **Bumper Pads and Similar Products Are not Recommended**

Bumper pads and similar products that attach to crib slats or sides are frequently used with the thought of protecting infants from injury. Initially, bumper pads were developed to prevent head entrapment between crib slats.<sup>195</sup> However, newer crib standards that require crib slat spacing to be less than 2<sup>5</sup>/<sub>8</sub> inches have obviated the need for crib bumpers. In addition, infant deaths have occurred because of bumper pads. A recent report by Thach et al,<sup>196</sup> who used CPSC data, found that deaths attributed to bumper pads were from 3 mechanisms: (1) suffocation against soft, pillow-like bumper pads; (2) entrapment between the mattress or crib and firm bumper pads; and (3) strangulation from bumper pad ties. However, the CPSC believes that there were other confounding factors, such as the presence of pillows and/or blankets, that might have contributed to many of the deaths in this report.<sup>2</sup> Thach et al<sup>196</sup> also analyzed crib injuries that might have been prevented by bumper pad use and concluded that the use of bumper pads only prevents minor injuries. A more recent study of crib injuries that used data from the CPSC National Electronic Injury Surveillance System con-

cluded that the potential benefits of preventing minor injury with bumper pad use were far outweighed by the risk of serious injury such as suffocation or strangulation.<sup>197</sup> In addition, most bumper pads obscure infant and parent visibility, which might increase parental anxiety.<sup>195</sup> There are other products that attach to crib sides or crib slats that claim to protect infants from injury. However, there are no published data that support these claims. Because of the potential for suffocation, entrapment, and strangulation and lack of evidence to support that bumper pads or similar products that attach to crib slats or sides prevent injury in young infants, the AAP does not recommend their use.

### **PRENATAL AND POSTNATAL EXPOSURES (INCLUDING SMOKING AND ALCOHOL)**

#### **Pregnant Women Should Seek and Obtain Regular Prenatal Care**

There is substantial epidemiologic evidence that links a lower risk of SIDS for infants whose mothers obtain regular prenatal care.<sup>198–200</sup> Women should seek prenatal care early in the pregnancy and continue to obtain regular prenatal care during the entire pregnancy.

#### **Smoking During Pregnancy, in the Pregnant Woman's Environment, and in the Infant's Environment Should Be Avoided**

Maternal smoking during pregnancy is a major risk factor in almost every epidemiologic study of SIDS.<sup>201–204</sup> Smoke in the infant's environment after birth is a separate major risk factor in a few studies,<sup>202,205</sup> although separating this variable from maternal smoking before birth is problematic. Thirdhand smoke refers to residual contamination from tobacco smoke after the cigarette has been extinguished<sup>206</sup>; there is no research to date on the signifi-

cance of thirdhand smoke with regards to SIDS risk. Smoke exposure adversely affects infant arousal<sup>207–213</sup>; in addition, smoke exposure increases risk of preterm birth and low birth weight, both of which are risk factors for SIDS. The effect of tobacco smoke exposure on SIDS risk is dose-dependent. Aside from sleep position, smoke exposure is the largest contributing risk factor for SIDS.<sup>149</sup> It is estimated that one-third of SIDS deaths could be prevented if all maternal smoking during pregnancy were eliminated.<sup>214,215</sup> The AAP supports the elimination of all tobacco smoke exposure, both prenatally and environmentally.<sup>216,217</sup>

### **Avoid Alcohol and Illicit Drug Use During Pregnancy and After the Infant's Birth**

Several studies have specifically investigated the association of SIDS with prenatal and postnatal exposure to alcohol or illicit drug use, although substance abuse often involves more than 1 substance and it is difficult to separate these variables from each other and from smoking. However, 1 study of Northern Plains American Indians found that periconceptional maternal alcohol use (adjusted OR: 6.2 [95% CI: 1.6–23.3]) and maternal first-trimester binge drinking (adjusted OR: 8.2 [95% CI: 1.9–35.3])<sup>218</sup> were associated with increased SIDS risk independent of prenatal cigarette smoking exposure. Another study from Denmark, which was based on prospective data about maternal alcohol use, also found a significant relationship between maternal binge drinking and postneonatal infant mortality, including SIDS.<sup>219</sup>

Postmortem studies of Northern Plains American Indian infants revealed that prenatal cigarette smoking was significantly associated with decreased serotonin receptor binding in the brainstem. In this study, the asso-

ciation of maternal alcohol drinking in the 3 months before or during pregnancy was of borderline significance on univariate analysis but was not significant when prenatal smoking and case-versus-control status were in the model.<sup>39</sup> However, this study had limited power for multivariate analysis because of its small sample size. One study found an association of SIDS with heavy alcohol consumption in the 2 days before the death.<sup>220</sup> Although some studies have found a particularly strong association when alcohol consumption occurs in combination with bed-sharing,<sup>64–66,221</sup> other studies have not found interaction between bed-sharing and alcohol to be significant.<sup>167,222</sup>

Studies investigating the relationship of illicit drug use and SIDS have focused on specific drugs or illicit drug use in general. In utero exposure to opiates (primarily methadone and heroin) has been shown in retrospective studies to be associated with an increased risk of SIDS.<sup>223,224</sup> With the exception of 1 study that did not show increased risk,<sup>225</sup> population-based studies have generally shown an increased risk with in utero cocaine exposure.<sup>226–228</sup> However, these studies did not control for confounding factors. A prospective cohort study found the SIDS rate to be significantly increased for infants exposed in utero to methadone (OR: 3.6 [95% CI: 2.5–5.1]), heroin (OR: 2.3 [95% CI: 1.3–4.0]), methadone and heroin (OR: 3.2 [95% CI: 1.2–8.6]), and cocaine (OR: 1.6 [95% CI: 1.2–2.2]), even after controlling for race/ethnicity, maternal age, parity, birth weight, year of birth, and maternal smoking.<sup>229</sup> In addition, a meta-analysis of studies that investigated an association between in utero cocaine exposure and SIDS found an increased risk of SIDS to be associated with prenatal exposure to cocaine and illicit drugs in general.<sup>230</sup>

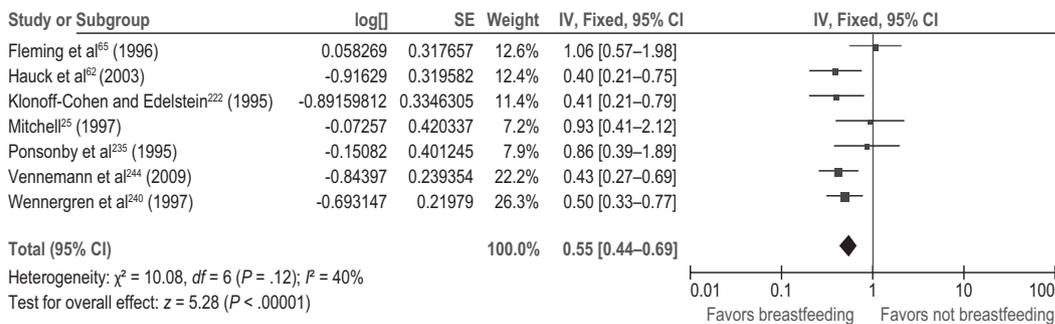
## **BREASTFEEDING**

### **Breastfeeding Is Recommended**

Earlier epidemiologic studies were not consistent in demonstrating a protective effect of breastfeeding on SIDS\*<sup>†</sup>; some studies found a protective effect,<sup>67,239,240</sup> and others did not.<sup>†</sup> Because many of the case-control studies demonstrated a protective effect of breastfeeding against SIDS in univariate analysis but not when confounding factors were taken into account,<sup>62,184,198,251,258</sup> these results suggested that factors associated with breastfeeding, rather than breastfeeding itself, are protective. However, newer published reports support the protective role of breastfeeding on SIDS when taking into account potential confounding factors.<sup>243–245</sup> Studies do not distinguish between nursing and expressed human milk. In the Agency for Healthcare Research and Quality's "Evidence Report on Breastfeeding in Developed Countries,"<sup>243</sup> multiple outcomes, including SIDS, were examined. Six studies were included in the SIDS-breastfeeding meta-analysis, and in both unadjusted and adjusted analysis, ever breastfeeding was associated with a lower risk of SIDS (summary OR: 0.41 [95% CI: 0.28–0.58]; adjusted summary OR: 0.64 [95% CI: 0.51–0.81]). The German Study of Sudden Infant Death, the largest and most recent case-control study of SIDS, found that exclusive breastfeeding at 1 month of age halved the risk of SIDS (adjusted OR: 0.48 [95% CI: 0.28–0.82]). At all ages, control infants were breastfed at higher rates than SIDS victims, and the protective effect of partial or exclusive breastfeeding remained statistically significant after adjustment for confounders.<sup>244</sup> A recent meta-analysis that included 18 case-control studies revealed an unadjusted summary OR for any breast-

\*Refs 62, 65, 67, 184, 198, and 231–239.

†Refs 62, 184, 198, 231, 238, 241, and 242.



**FIGURE 9**

Multivariable analysis of any breastfeeding versus no breastfeeding. log[] indicates logarithm of the OR; weight, weighting that the study contributed to the meta-analysis (according to sample size); IV, fixed, 95% CI: fixed-effect OR with 95% CI.<sup>245</sup>

feeding of 0.40 (95% CI: 0.35–0.44). Seven of these studies provided adjusted ORs, and on the basis of these studies, the pooled adjusted OR remained statistically significant at 0.55 (95% CI: 0.44–0.69) (Fig 9).<sup>245</sup> The protective effect of breastfeeding increased with exclusivity, with a univariable summary OR of 0.27 (95% CI: 0.24–0.31) for exclusive breastfeeding of any duration.<sup>245</sup>

Currently in the United States, 73% of mothers initiate breastfeeding, and 42% and 21% are still breastfeeding at 6 and 12 months, respectively.<sup>246</sup> Non-Hispanic black mothers are least likely to initiate or to still be breastfeeding at 6 and 12 months (54%, 27%, and 12%, respectively), whereas Asian/Pacific Islander mothers initiate and continue breastfeeding more than other groups (81%, 52%, and 30%, respectively). Rates for initiating and continuing breastfeeding at 6 and 12 months for non-Hispanic white mothers are 74%, 43%, and 21%; rates for Hispanic mothers are 80%, 45%, and 24%; and rates for American Indian/Alaskan Native mothers are 70%, 37%, and 19%, respectively.

Physiologic sleep studies have found that breastfed infants are more easily aroused from sleep than their formula-fed counterparts.<sup>247,248</sup> In addition, breastfeeding results in a decreased incidence of diarrhea, upper and lower respiratory infections, and

other infectious diseases<sup>249</sup> that are associated with an increased vulnerability to SIDS and provides overall immune system benefits from maternal antibodies and micronutrients in human milk.<sup>250,251</sup> Exclusive breastfeeding for 6 months has been found to be more protective against infectious diseases compared with exclusive breastfeeding to 4 months of age and partial breastfeeding thereafter.<sup>249</sup>

### If a Breastfeeding Mother Brings the Infant Into the Adult Bed for Nursing, the Infant Should Be Returned to a Separate Sleep Surface When the Mother Is Ready for Sleep

Several organizations promote the practice of mother-infant bed-sharing (ie, sleeping in the same bed) as a way of facilitating breastfeeding.<sup>142,252,253</sup> Breastfeeding is a common reason given by mothers for bed-sharing with their infants.<sup>254</sup> Studies have found an association between bed-sharing and longer duration of breastfeeding, but their data cannot determine a temporal relationship (ie, it is not known whether bed-sharing promotes breastfeeding or if breastfeeding promotes bed-sharing, or if women who prefer 1 practice are also likely to prefer the other).<sup>255</sup> Although bed-sharing may facilitate breastfeeding, it is not essential for successful breastfeeding.<sup>256,257</sup> Furthermore, 1 case-control

study found that the risk of SIDS while bed-sharing was similar regardless of breastfeeding status, which indicates that the benefits of breastfeeding do not outweigh the increased risk associated with bed-sharing.<sup>258</sup>

## PACIFIER USE

### Consider Offering a Pacifier at Nap Time And Bedtime

Several studies<sup>62,66,167,251,259–262</sup> have found a protective effect of pacifiers on the incidence of SIDS, particularly when used at the time of last sleep. Two meta-analyses revealed that pacifier use decreased the risk of SIDS by 50% to 60% (summary adjusted OR: 0.39 [95% CI: 0.31–0.50]<sup>265</sup>; summary unadjusted OR: 0.48 [95% CI: 0.43–0.54]<sup>264</sup>). Two later studies not included in these meta-analyses reported equivalent or even larger protective associations.<sup>265,266</sup> The mechanism for this apparent strong protective effect is still unclear, but lowered arousal thresholds, favorable modification of autonomic control during sleep, and maintaining airway patency during sleep have been proposed.<sup>247,267–270</sup> It is common for the pacifier to fall from the mouth soon after the infant falls asleep; even so, the protective effect persists throughout that sleep period.<sup>247,271</sup> Two studies have shown that pacifier use is most protective when used for all sleep periods.<sup>169,266</sup> However, these studies also

showed increased risk of SIDS when the pacifier was usually used but not used the last time the infant was placed for sleep; the significance of these findings is yet unclear.

Although some SIDS experts and policy-makers endorse pacifier use recommendations that are similar to those of the AAP,<sup>272,273</sup> concerns about possible deleterious effects of pacifier use have prevented others from making a recommendation for pacifier use as a risk reduction strategy.<sup>274</sup> Although several observational studies<sup>275–277</sup> have found a correlation between pacifiers and reduced breastfeeding duration, the results of well-designed randomized clinical trials indicated that pacifiers do not seem to cause shortened breastfeeding duration for term and preterm infants.<sup>278,279</sup> The authors of 1 study reported a small deleterious effect of early pacifier introduction (2–5 days after birth) on exclusive breastfeeding at 1 month of age and on overall breastfeeding duration (defined as any breastfeeding), but early pacifier use did not adversely affect exclusive breastfeeding duration. In addition, there was no effect on breastfeeding duration when the pacifier was introduced at 1 month of age.<sup>280</sup> A more recent systematic review found that the highest level of evidence (ie, from clinical trials) does not support an adverse relationship between pacifier use and breastfeeding duration or exclusivity.<sup>281</sup> The association between shortened duration of breastfeeding and pacifier use in observational studies likely reflects a number of complex factors such as breastfeeding difficulties or intent to wean.<sup>281</sup> A large multicenter, randomized controlled trial of 1021 mothers who were highly motivated to breastfeed were assigned to 2 groups: mothers advised to offer a pacifier after 15 days and mothers advised not to offer a pacifier. At 3

months, there were no differences in breastfeeding rates between the 2 groups; 85.8% of infants in the offer-pacifier group were exclusively breastfed compared with 86.2% in the not-offered group.<sup>282</sup> The AAP policy statement on breastfeeding and the use of human milk includes a recommendation that pacifiers can be used during breastfeeding, but implementation should be delayed until breastfeeding is well established.<sup>283</sup>

Some dental malocclusions have been found more commonly among pacifier users than nonusers, but the differences generally disappeared after pacifier cessation.<sup>284</sup> In its policy statement on oral habits, the American Academy of Pediatric Dentistry states that nonnutritive sucking behaviors (ie, fingers or pacifiers) are considered normal for infants and young children and that, in general, sucking habits in children to the age of 3 years are unlikely to cause any long-term problems.<sup>285</sup> There is an approximate 1.2- to 2-fold increased risk of otitis media associated with pacifier use, particularly between 2 and 3 years of age.<sup>286,287</sup> The incidence of otitis media is generally lower in the first year of life, especially the first 6 months, when the risk of SIDS is the highest.<sup>288–293</sup> However, pacifier use, once established, may persist beyond 6 months, thus increasing the risk of otitis media. Gastrointestinal infections and oral colonization with *Candida* species were also found to be more common among pacifier users than nonusers.<sup>289–291</sup>

The literature on infant digit-sucking and SIDS is extremely limited. Only 1 case-control study from the Netherlands has reported results.<sup>262</sup> This study did not find an association between usual digit-sucking (reported as “thumb-sucking”) and SIDS risk (OR: 1.38 [95% CI: 0.35–1.51]), but the wide CI suggests that there was insufficient

power to detect a significant association.

## OVERHEATING, FANS, AND ROOM VENTILATION

### Avoid Overheating and Head Covering in Infants

There is clear evidence that the risk of SIDS is associated with the amount of clothing or blankets on an infant and the room temperature.<sup>182,218,294,295</sup> Infants who sleep in the prone position have a higher risk of overheating than do supine sleeping infants.<sup>182</sup> It is unclear whether the relationship to overheating is an independent factor or merely a reflection of the increased risk of SIDS and suffocation with blankets and other potentially asphyxiating objects in the sleeping environment. Head covering during sleep is of particular concern. In a recent systematic review, the pooled mean prevalence of head covering among SIDS victims was 24.6% compared with 3.2% among control infants.<sup>154</sup> It is not known whether the risk associated with head covering is attributable to overheating, hypoxia, or rebreathing.

There has been some suggestion that room ventilation may be important. One study found that bedroom heating, compared with no bedroom heating, increases SIDS risk (OR: 4.5),<sup>235</sup> and another study has also demonstrated a decreased risk of SIDS in a well-ventilated bedroom (windows and doors open) (OR: 0.4).<sup>296</sup> In 1 study, the use of a fan seemed to reduce the risk of SIDS (adjusted OR: 0.28 [95% CI: 0.10–0.77]).<sup>297</sup> However, because of the possibility of recall bias, the small sample size of controls using fans ( $n = 36$ ), a lack of detail about the location and types of fans used, and the weak link to a mechanism, this study's results should be interpreted with caution. On the basis of available data, the task force cannot make a recommendation on the use

of a fan as a SIDS risk-reduction strategy.

## SWADDLING

### **Although Swaddling May Be Used as a Strategy to Calm the Infant and Encourage Use of Supine Position, There Is Not Enough Evidence to Recommend It as a Strategy for Reducing the Risk of SIDS**

Many cultures and newborn nurseries have traditionally used swaddling, or wrapping the infant in a light blanket, as a strategy to soothe infants and, in some cases, encourage sleep in the supine position. Swaddling, when done correctly, can be an effective technique to help calm infants and promote sleep.<sup>298</sup> Some have argued that swaddling can alter certain risk factors for SIDS, thus reducing the risk of SIDS. For instance, it has been suggested that the physical restraint associated with swaddling may prevent infants placed supine from rolling to the prone position.<sup>299</sup> One study's results suggested a decrease in SIDS rate with swaddling if the infant was supine,<sup>182</sup> but it was notable that there was an increased risk of SIDS if the infant was swaddled and placed in the prone position.<sup>182</sup> Although a recent study found a 31-fold increase in SIDS risk with swaddling, the analysis was not stratified according to sleep position.<sup>171</sup> Although it may be more likely that parents will initially place a swaddled infant supine, this protective effect may be offset by the 12-fold increased risk of SIDS if the infant is either placed or rolls to the prone position when swaddled.<sup>182,300</sup> Moreover, there is no evidence that swaddling reduces bed-sharing or use of unsafe sleep surfaces, promotes breastfeeding, or reduces maternal cigarette smoking.

There is some evidence that swaddling might cause detrimental physiologic

consequences. For example, it can cause an increase in respiratory rate,<sup>301</sup> and tight swaddling can reduce the infant's functional residual lung capacity.<sup>299,302,303</sup> Tight swaddling can also exacerbate hip dysplasia if the hips are kept in extension and adduction.<sup>304–307</sup> This is particularly important, because some have advocated that the calming effects of swaddling are related to the "tightness" of the swaddling. In contrast, "loose" or incorrectly applied swaddling could result in head covering and, in some cases, strangulation if the blankets become loose in the bed. Swaddling may also possibly increase the risk of overheating in some situations, especially when the head is covered or the infant has an infection.<sup>308,309</sup> However, a recent study found no increase in abdominal skin temperature when infants were swaddled in a light cotton blanket from the shoulders down.<sup>302</sup>

Impaired arousal has often been postulated as a mechanism that contributes to SIDS, and several studies have investigated the relationship between swaddling, arousal, and sleep patterns in infants. Physiologic studies have demonstrated that, in general, swaddling decreases startling,<sup>301</sup> increases sleep duration, and decreases spontaneous awakenings.<sup>310</sup> Swaddling also decreases arousability (ie, increases cortical arousal thresholds) to a nasal pulsatile air-jet stimulus, especially in infants who are easily arousable when not swaddled but less so in infants who have high arousal thresholds when not swaddled.<sup>301</sup> One study found decreased arousability in infants at 3 months of age who were not usually swaddled and then were swaddled but found no effect on arousability in routinely swaddled infants.<sup>301</sup> In contrast, another group of investigators showed decreased arousal thresholds<sup>310</sup> and increases in autonomic (subcortical) responses<sup>311</sup> to an auditory stimulus

when swaddled. Thus, although swaddling clearly promotes sleep and decreases the number of awakenings, the effects on arousability to an external stimulus remain unclear. There is accumulating evidence, however, that there are only minimal effects of routine swaddling on arousal. In addition, there have been no studies investigating the effects of swaddling on arousal to more relevant stimuli such as hypoxia or hypercapnia.

In summary, it is recognized that swaddling is one of many child care practices that can be used to calm infants and promote sleep. However, there is insufficient evidence to recommend routine swaddling as a strategy for reducing the incidence of SIDS. Moreover, as many have advocated, swaddling must be correctly applied to avoid possible hazards such as hip dysplasia, head covering, and strangulation. It is important to note that swaddling does not reduce the necessity to follow recommended safe sleep practices.

## IMMUNIZATIONS AND SIDS

### **Infants Should Be Immunized in Accordance With Recommendations of the AAP and Centers for Disease Control and Prevention**

The incidence of SIDS peaks at a time when infants are receiving numerous immunizations. Case reports of a cluster of deaths shortly after immunization with diphtheria-tetanus-pertussis in the late 1970s created concern of a possible causal relationship between vaccinations and SIDS.<sup>312–315</sup> Case-control studies were performed to evaluate this temporal association. Four of the 6 studies found no relationship between diphtheria-tetanus-pertussis vaccination and subsequent SIDS,<sup>316–319</sup> and results of the other 2 studies suggested a temporal relationship but only in specific subgroup anal-

ysis.<sup>320,321</sup> In 2003, the Institute of Medicine of the National Academy of Sciences reviewed available data and concluded that “[t]he evidence favors rejection of a causal relationship between exposure to multiple vaccinations and SIDS.”<sup>322</sup> Additional subsequent large population case-control trials consistently have found vaccines to be protective against SIDS<sup>323–325</sup>; however, confounding factors (social, maternal, birth, and infant medical history) might account for this protective effect.<sup>326</sup> It also has been theorized that the decreased SIDS rate immediately after vaccination was attributable to infants being healthier at time of immunization, or “the healthy vaccinee effect.”<sup>327</sup> Recent illness would both place infants at higher risk of SIDS and make them more likely to have immunizations deferred.<sup>328</sup>

Recent studies have attempted to control for confounding by social, maternal, birth, and infant medical history.<sup>323,325,328</sup> In a meta-analysis, Vennemann et al<sup>328</sup> found a multivariate summary OR for immunizations and SIDS to be 0.54 (95% CI: 0.39–0.76), which indicates that the risk of SIDS is halved by immunization. The evidence continues to show no causal relationship between immunizations and SIDS and suggests that vaccination may have a protective effect against SIDS.

## HOME MONITORS, SIDS, AND APPARENT LIFE-THREATENING EVENTS

### There Is no Evidence That Apparent Life-Threatening Events Are Precursors to SIDS, and Infant Home Monitors Should Not Be Used as a Strategy for Preventing SIDS

For many years it was believed that apparent life-threatening events were the predecessors of SIDS, and home apnea monitors were used as a strat-

egy for preventing SIDS.<sup>329</sup> However, there is no evidence that home monitors are effective for this purpose.<sup>330–333</sup> The task force concurs with the AAP Committee on Fetus and Newborn, which has recommended that infant home monitoring not be used as a strategy to prevent SIDS, although it can be useful for some infants who have had an apparent life-threatening event.<sup>334</sup>

## POTENTIAL TOXICANTS AND SIDS

### There Is no Evidence Linking Various Toxicants to SIDS

Many theories link various toxicants and SIDS. Currently, no studies have substantiated a causal relationship between metals, such as silver, cadmium, cobalt, lead, or mercury, and SIDS.<sup>335–337</sup> Although an ecological study found correlation of the maximal recorded nitrate levels of drinking water with local SIDS rates in Sweden,<sup>338</sup> no case-control study has demonstrated a relationship between nitrates in drinking water and SIDS. Furthermore, an expert group in the United Kingdom analyzed data pertaining to a hypothesis that SIDS is related to toxic gases, such as antimony, phosphorus, or arsenic, being released from mattresses<sup>339,340</sup> and found the toxic-gas hypothesis to be unsubstantiated.<sup>341</sup> Finally, 2 case-control studies found that wrapping mattresses in plastic to reduce toxic gas emission did not protect against SIDS.<sup>191,342</sup>

## HEARING SCREENS

### Newborn Hearing Screens Should Not Be Used as a Screening Test for SIDS

A single, small, retrospective case-control study examined the use of newborn transient evoked otoacoustic emission hearing screening tests as a tool for identifying infants at subsequent risk of SIDS.<sup>343</sup> Infants who sub-

sequently died from SIDS did not fail their hearing tests but, compared with controls, showed a decreased signal-to-noise ratio score in the right ear only (at frequencies of 2000, 3000, and 4000 Hz). Methodologic concerns have been raised about the validity of the study methods used in this study,<sup>344,345</sup> and these results have not been substantiated by others. A larger but non-peer-reviewed report of hearing screening data in Michigan revealed no relationship between hearing screening test results and SIDS cases.<sup>346</sup> Until additional data are available, hearing screening should not be considered as a valid screening tool for determining which infants might be at subsequent risk of SIDS. Furthermore, an increased risk of SIDS should not be inferred from an abnormal hearing screen result.

## EDUCATIONAL INTERVENTIONS

### Educational and Intervention Campaigns Are Often Effective in Altering Practice

Intervention campaigns for SIDS have been extremely effective, especially with regard to avoidance of prone positioning.<sup>347</sup> Furthermore, there is evidence that primary care-based educational interventions, particularly those that address caregiver concerns and misconceptions about safe sleep recommendations, can be effective in altering practice. For instance, addressing concerns about infant comfort, choking, and aspiration while the infant is sleeping prone is helpful.<sup>348,349</sup> Similar interventions for improving behavior of medical and nursing staff and child care providers have shown that these professionals have similar concerns about the supine sleep position.<sup>350–353</sup> Primary care providers should be encouraged to develop quality improvement initiatives to improve

adherence with safe sleep recommendations among their patients.

## MEDIA MESSAGES

### Media and Manufacturers Should Follow Safe Sleep Guidelines in Their Messaging and Advertising

A recent study found that, in magazines targeted toward childbearing women, more than one-third of pictures of sleeping infants and two-thirds of pictures of infant sleep environments portrayed unsafe sleep positions and sleep environments.<sup>354</sup> Media exposures (including movie, television, magazines, newspapers, and Web sites), manufacturer advertisements, and store displays affect individual behavior by influencing beliefs and attitudes. Frequent exposure to health-related media messages can affect individual health decisions,<sup>355,356</sup>

and media messages have been quite influential in decisions regarding sleep position.<sup>77,80</sup> Media and advertising messages contrary to safe sleep recommendations may create misinformation about safe sleep practices. Safe sleep messages should be reviewed, revised, and reissued at least every 5 years to address the next generation of new parents and products on the market.

## RECOMMENDATIONS

The AAP's recommendations for a safe infant sleeping environment to reduce the risk of both SIDS and other sleep-related infant deaths are specified in the accompanying policy statement.<sup>4</sup>

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## REFERENCES

1. Kattwinkel J, Hauck FR, Keenan ME, Malloy MH, Moon RY; American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. The changing concept of sudden infant death syndrome: diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics*. 2005;116(5):1245–1255
2. Wanna-Nakamura S. *White Paper: Unsafe Sleep Settings—Hazards Associated With the Infant Sleep Environment and Unsafe Practices Used by Caregivers: A CPSC Staff Perspective*. Bethesda, MD: US Consumer Product Safety Commission; 2010
3. US Preventive Services Task Force. Grade definitions. Available at: [www.uspreventiveservicestaskforce.org/uspstf/grades.htm](http://www.uspreventiveservicestaskforce.org/uspstf/grades.htm). Accessed March 22, 2011
4. Moon RY; American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. Policy statement: SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics*. 2011; 128(5):●●
5. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol*. 1991; 11(5):677–684
6. Centers for Disease Control and Prevention. Sudden unexplained infant death investigation reporting form (SUIDIRF). Available at: [www.cdc.gov/SIDS/SUIDRF.htm](http://www.cdc.gov/SIDS/SUIDRF.htm). Accessed September 20, 2011
7. Camperlengo LT, Shapiro-Mendoza CK, Kim SY. Sudden infant death syndrome: diagnostic practices and investigative policies, 2004. *Am J Forensic Med Pathol*. 2011; In press
8. Krous HF, Chadwick AE, Haas EA, Stanley C. Pulmonary intra-alveolar hemorrhage in SIDS and suffocation. *J Forensic Leg Med*. 2007;14(8):461–470
9. Kattwinkel J, Brooks J, Myerberg D; American Academy of Pediatrics, Task Force on Infant Positioning and SIDS. Positioning and SIDS [published correction appears in *Pediatrics*. 1992;90(2 pt 1):264]. *Pediatrics*. 1992;89(6 pt 1):1120–1126
10. Eunice Kennedy Shriver National Institute of Child Health and Human Development/ National Institutes of Health. Back to Sleep public education campaign. Available at: [www.nichd.nih.gov/sids/sids.cfm](http://www.nichd.nih.gov/sids/sids.cfm). Accessed July 7, 2010
11. National Infant Sleep Position Study [home page]. Available at: [http://dccwww.bumc.bu.edu/ChimeNisp/Main\\_Nisp.asp](http://dccwww.bumc.bu.edu/ChimeNisp/Main_Nisp.asp). Accessed April 5, 2011
12. US Department of Health and Human Services, Centers of Disease Control and Prevention, National Center for Health Statistics, Office of Analysis and Epidemiology, Division of Vital Statistics. Compressed mortality data: underlying cause-of-death—mortality for 1979–1998 with ICD 9 codes; and Mortality for 1999–2007 with ICD 10 codes. Available at: <http://wonder.cdc.gov/mortSQL.html>. Accessed July 8, 2010
13. Malloy MH, MacDorman M. Changes in the classification of sudden unexpected infant deaths: United States, 1992–2001. *Pediatrics*. 2005;115(5):1247–1253
14. Shapiro-Mendoza CK, Tomashek KM, Anderson RN, Wingo J. Recent national trends in sudden, unexpected infant deaths: more evidence supporting a change in classification or reporting. *Am J Epidemiol*. 2006;163(8):762–769
15. Shapiro-Mendoza CK, Kimball M, Tomashek KM, Anderson RN, Blanding S. US infant mortality trends attributable to accidental suffocation and strangulation in bed from 1984 through 2004: are rates increasing? *Pediatrics*. 2009;123(2):533
16. Shapiro-Mendoza CK, Kim SY, Chu SY, Kahn

- E, Anderson RN. Using death certificates to characterize sudden infant death syndrome (SIDS): opportunities and limitations. *J Pediatr*. 2010;156(1):38–43
17. Hauck FR, Moore CM, Herman SM, et al. The contribution of prone sleeping position to the racial disparity in sudden infant death syndrome: the Chicago Infant Mortality Study. *Pediatrics*. 2002;110(4):772–780
  18. Lahr MB, Rosenberg KD, Lapidus JA. Maternal-infant bedsharing: risk factors for bedsharing in a population-based survey of new mothers and implications for SIDS risk reduction. *Matern Child Health J*. 2007;11(3):277–286
  19. Willinger M, Ko CW, Hoffman HJ, Kessler RC, Corwin MJ. Trends in infant bed sharing in the United States, 1993–2000: the National Infant Sleep Position study. *Arch Pediatr Adolesc Med*. 2003;157(1):43–49
  20. Fu LY, Colson ER, Corwin MJ, Moon RY. Infant sleep location: associated maternal and infant characteristics with sudden infant death syndrome prevention recommendations. *J Pediatr*. 2008;153(4):503–508
  21. Flick L, White DK, Vemulapalli C, Stulac BB, Kemp JS. Sleep position and the use of soft bedding during bed sharing among African American infants at increased risk for sudden infant death syndrome. *J Pediatr*. 2001;138(3):338–343
  22. Rasinski KA, Kuby A, Bzdusek SA, Silvestri JM, Weese-Mayer DE. Effect of a sudden infant death syndrome risk reduction education program on risk factor compliance and information sources in primarily black urban communities. *Pediatrics*. 2003;111(4 pt 1). Available at: [www.pediatrics.org/cgi/content/full/111/4/e347](http://www.pediatrics.org/cgi/content/full/111/4/e347)
  23. Osmond C, Murphy M. Seasonality in the sudden infant death syndrome. *Paediatr Perinat Epidemiol*. 1988;2(4):337–345
  24. Malloy MH, Freeman DH. Age at death, season, and day of death as indicators of the effect of the back to sleep program on sudden infant death syndrome in the United States, 1992–1999. *Arch Pediatr Adolesc Med*. 2004;158(4):359–365
  25. Mitchell EA. The changing epidemiology of SIDS following the national risk reduction campaigns. *Pediatr Pulmonol Suppl*. 1997;(16):117–119
  26. Filiano JJ, Kinney HC. A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biol Neonate*. 1994;65(3–4):194–197
  27. Kinney HC. Brainstem mechanisms underlying the sudden infant death syndrome: evidence from human pathologic studies. *Dev Psychobiol*. 2009;51(3):223–233
  28. Browne CJ, Sharma N, Waters KA, Machaalani R. The effects of nicotine on the alpha-7 and beta-2 nicotinic acetylcholine receptor subunits in the developing piglet brainstem. *Int J Dev Neurosci*. 2010;28(1):1–7
  29. Sekizawa S, Joad JP, Pinkerton KE, Bonham AC. Secondhand smoke exposure alters K<sup>+</sup> channel function and intrinsic cell excitability in a subset of second-order airway neurons in the nucleus tractus solitarius of young guinea pigs. *Eur J Neurosci*. 2010;31(4):673–684
  30. Duncan JR, Paterson DS, Hoffman JM, et al. Brainstem serotonergic deficiency in sudden infant death syndrome. *JAMA*. 2010;303(5):430–437
  31. Duncan JR, Paterson DS, Kinney HC. The development of nicotinic receptors in the human medulla oblongata: interrelationship with the serotonergic system. *Auton Neurosci*. 2008;144(1–2):61–75
  32. Schneider J, Mitchell I, Singhal N, Kirk V, Hasan SU. Prenatal cigarette smoke exposure attenuates recovery from hypoxemic challenge in preterm infants. *Am J Respir Crit Care Med*. 2008;178(5):520–526
  33. Thiriez G, Bouhaddi M, Mourot L, et al. Heart rate variability in preterm infants and maternal smoking during pregnancy. *Clin Auton Res*. 2009;19(3):149–156
  34. Fifer WP, Fingers ST, Youngman M, Gomez-Gribben E, Myers MM. Effects of alcohol and smoking during pregnancy on infant autonomic control. *Dev Psychobiol*. 2009;51(3):234–242
  35. Richardson HL, Walker AM, Horne RS. Maternal smoking impairs arousal patterns in sleeping infants. *Sleep*. 2009;32(4):515–521
  36. Cohen G, Vella S, Jeffery H, Lagercrantz H, Katz-Salamon M. Cardiovascular stress hyperreactivity in babies of smokers and in babies born preterm. *Circulation*. 2008;118(18):1848–1853
  37. Panigrahy A, Filiano J, Sleeper LA, et al. Decreased serotonergic receptor binding in rhombic lip-derived regions of the medulla oblongata in the sudden infant death syndrome. *J Neuropathol Exp Neurol*. 2000;59(5):377–384
  38. Ozawa Y, Takashima S. Developmental neurotransmitter pathology in the brainstem of sudden infant death syndrome: a review and sleep position. *Forensic Sci Int*. 2002;130(suppl):S53–S59
  39. Kinney HC, Randall LL, Sleeper LA, et al. Serotonergic brainstem abnormalities in Northern Plains Indians with the sudden infant death syndrome. *J Neuropathol Exp Neurol*. 2003;62(11):1178–1191
  40. Machaalani R, Say M, Waters KA. Serotonergic receptor 1A in the sudden infant death syndrome brainstem medulla and associations with clinical risk factors. *Acta Neuropathol (Berl)*. 2009;117(3):257–265
  41. Paterson DS, Trachtenberg FL, Thompson EG, et al. Multiple serotonergic brainstem abnormalities in sudden infant death syndrome. *JAMA*. 2006;296(17):2124–2132
  42. Say M, Machaalani R, Waters KA. Changes in serotonergic receptors 1A and 2A in the piglet brainstem after intermittent hypercapnic hypoxia (IHH) and nicotine. *Brain Res*. 2007;1152:17–26
  43. Kinney HC, Richerson GB, Dymecki SM, Darnall RA, Nattie EE. The brainstem and serotonin in the sudden infant death syndrome. *Annu Rev Pathol*. 2009;4:517–550
  44. Weese-Mayer DE, Ackerman MJ, Marazita ML, Berry-Kravis EM. Sudden infant death syndrome: review of implicated genetic factors. *Am J Med Genet A*. 2007;143A(8):771–788
  45. Opdal SH, Vege A, Rognum TO. Serotonin transporter gene variation in sudden infant death syndrome. *Acta Paediatr*. 2008;97(7):861–865
  46. Paterson DS, Rivera KD, Broadbelt KG, et al. Lack of association of the serotonin transporter polymorphism with the sudden infant death syndrome in the San Diego dataset. *Pediatr Res*. 2010;68(5):409–413
  47. Tan BH, Pundi KN, Van Norstrand DW, et al. Sudden infant death syndrome-associated mutations in the sodium channel beta subunits. *Heart Rhythm*. 2010;7(6):771–778
  48. Ferrante L, Opdal SH, Vege A, Rognum T. Cytokine gene polymorphisms and sudden infant death syndrome. *Acta Paediatr*. 2010;99(3):384–388
  49. Ferrante L, Opdal SH, Vege A, Rognum TO. IL-1 gene cluster polymorphisms and sudden infant death syndrome. *Hum Immunol*. 2010;71(4):402–406
  50. Opdal SH, Rognum TO, Vege A, Stave AK, Dupuy BM, Egeland T. Increased number of substitutions in the D-loop of mitochondrial DNA in the sudden infant death syndrome. *Acta Paediatr*. 1998;87(10):1039–1044
  51. Opdal SH, Rognum TO, Torgersen H, Vege A. Mitochondrial DNA point mutations detected in four cases of sudden infant death syndrome. *Acta Paediatr*. 1999;88(9):957–960
  52. Santorelli FM, Schlessel JS, Slonim AE, Di-

- Mauro S. Novel mutation in the mitochondrial DNA tRNA glycine gene associated with sudden unexpected death. *Pediatr Neurol.* 1996;15(2):145–149
53. Forsyth L, Hume R, Howatson A, Busuttill A, Burchell A. Identification of novel polymorphisms in the glucokinase and glucose-6-phosphatase genes in infants who died suddenly and unexpectedly. *J Mol Med.* 2005;83(8):610–618
  54. Kanetake J, Aoki Y, Funayama M. Evaluation of rebreathing potential on bedding for infant use. *Pediatr Int.* 2003;45(3):284–289
  55. Kemp JS, Thach BT. Quantifying the potential of infant bedding to limit CO<sub>2</sub> dispersal and factors affecting rebreathing in bedding. *J Appl Physiol.* 1995;78(2):740–745
  56. Kemp JS, Livne M, White DK, Arfken CL. Softness and potential to cause rebreathing: differences in bedding used by infants at high and low risk for sudden infant death syndrome. *J Pediatr.* 1998;132(2):234–239
  57. Patel AL, Harris K, Thach BT. Inspired CO<sub>2</sub> and O<sub>2</sub> in sleeping infants rebreathing from bedding: relevance for sudden infant death syndrome. *J Appl Physiol.* 2001;91(6):2537–2545
  58. Tuffnell CS, Petersen SA, Wailoo MP. Prone sleeping infants have a reduced ability to lose heat. *Early Hum Dev.* 1995;43(2):109–116
  59. Ammari A, Schulze KF, Ohira-Kist K, et al. Effects of body position on thermal, cardiorespiratory and metabolic activity in low birth weight infants. *Early Hum Dev.* 2009;85(8):497–501
  60. Yiallourou SR, Walker AM, Horne RS. Prone sleeping impairs circulatory control during sleep in healthy term infants: implications for SIDS. *Sleep.* 2008;31(8):1139–1146
  61. Wong FY, Witcombe NB, Yiallourou SR, et al. Cerebral oxygenation is depressed during sleep in healthy term infants when they sleep prone. *Pediatrics.* 2011;127(3). Available at: [www.pediatrics.org/cgi/content/full/127/3/e558](http://www.pediatrics.org/cgi/content/full/127/3/e558)
  62. Hauck FR, Herman SM, Donovan M, et al. Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics.* 2003;111(5 pt 2):1207–1214
  63. Li DK, Petitti DB, Willinger M, et al. Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *Am J Epidemiol.* 2003;157(5):446–455
  64. Blair PS, Fleming PJ, Smith IJ, et al. Babies sleeping with parents: case-control study of factors influencing the risk of the sudden infant death syndrome. CESDI SUDI Research Group. *BMJ.* 1999;319(7223):1457–1462
  65. Fleming PJ, Blair PS, Bacon C, et al. Environment of infants during sleep and risk of the sudden infant death syndrome: results of 1993–5 case-control study for confidential inquiry into stillbirths and deaths in infancy. Confidential Enquiry Into Stillbirths and Deaths Regional Coordinators and Researchers. *BMJ.* 1996;313(7051):191–195
  66. Carpenter RG, Irgens LM, Blair PS, et al. Sudden unexplained infant death in 20 regions in Europe: case control study. *Lancet.* 2004;363(9404):185–191
  67. Mitchell EA, Tuohy PG, Brunt JM, et al. Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. *Pediatrics.* 1997;100(5):835–840
  68. Waters KA, Gonzalez A, Jean C, Morielle A, Brouillette RT. Face-straight-down and face-near-straight-down positions in healthy, prone-sleeping infants. *J Pediatr.* 1996;128(5 pt 1):616–625
  69. Oyen N, Markestad T, Skjaerven R, et al. Combined effects of sleeping position and prenatal risk factors in sudden infant death syndrome: the Nordic Epidemiological SIDS Study. *Pediatrics.* 1997;100(4):613–621
  70. Mitchell EA, Thach BT, Thompson JMD, Williams S. Changing infants' sleep position increases risk of sudden infant death syndrome. *Arch Pediatr Adolesc Med.* 1999;153(11):1136–1141
  71. National Infant Sleep Position survey database. Available at: [http://dccwww.bumc.bu.edu/ChimeNisp/NISP\\_Data.asp](http://dccwww.bumc.bu.edu/ChimeNisp/NISP_Data.asp). Accessed September 7, 2010
  72. Oden R, Joyner BL, Ajao TI, Moon R. Factors influencing African American mothers' decisions about sleep position: a qualitative study. *J Natl Med Assoc.* 2010;102(10):870–872, 875–880
  73. Colson ER, McCabe LK, Fox K, et al. Barriers to following the Back-to-Sleep recommendations: insights from focus groups with inner-city caregivers. *Ambul Pediatr.* 2005;5(6):349–354
  74. Mosley JM, Stokes SD, Ulmer A. Infant sleep position: discerning knowledge from practice. *Am J Health Behav.* 2007;31(6):573–582
  75. Moon RY, Omon R. Determinants of infant sleep position in an urban population. *Clin Pediatr (Phila).* 2002;41(8):569–573
  76. Ottolini MC, Davis BE, Patel K, Sachs HC, Gershon NB, Moon RY. Prone infant sleeping despite the "Back to Sleep" campaign. *Arch Pediatr Adolesc Med.* 1999;153(5):512–517
  77. Willinger M, Ko CW, Hoffman HJ, Kessler RC, Corwin MJ. Factors associated with caregivers' choice of infant sleep position, 1994–1998: the National Infant Sleep Position Study. *JAMA.* 2000;283(16):2135–2142
  78. Moon RY, Bilitier WM. Infant sleep position policies in licensed child care centers after Back to Sleep campaign. *Pediatrics.* 2000;106(3):576–580
  79. Moon RY, Weese-Mayer DE, Silvestri JM. Nighttime child care: inadequate sudden infant death syndrome risk factor knowledge, practice, and policies. *Pediatrics.* 2003;111(4 pt 1):795–799
  80. Von Kohorn I, Corwin MJ, Rybin DV, Heeren TC, Lister G, Colson ER. Influence of prior advice and beliefs of mothers on infant sleep position. *Arch Pediatr Adolesc Med.* 2010;164(4):363–369
  81. Byard RW, Beal S. Gastric aspiration and sleeping position in infancy and early childhood. *J Paediatr Child Health.* 2000;36(4):403–405
  82. Malloy MH. Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: impact of the "Back to Sleep" program. *Pediatrics.* 2002;109(4):661–665
  83. Tablizo MA, Jacinto P, Parsley D, Chen ML, Ramanathan R, Keens TG. Supine sleeping position does not cause clinical aspiration in neonates in hospital newborn nurseries. *Arch Pediatr Adolesc Med.* 2007;161(5):507–510
  84. Vandenplas Y, Rudolph CD, Di Lorenzo C, et al. Pediatric gastroesophageal reflux clinical practice guidelines: joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *J Pediatr Gastroenterol Nutr.* 2009;49(4):498–547
  85. Meyers WF, Herbst JJ. Effectiveness of positioning therapy for gastroesophageal reflux. *Pediatrics.* 1982;69(6):768–772
  86. Tobin JM, McCloud P, Cameron DJ. Posture and gastro-oesophageal reflux: a case for left lateral positioning. *Arch Dis Child.* 1997;76(3):254–258
  87. Kahn A, Groswasser J, Sottiaux M, Rebuffat E, Franco P, Dramaix M. Prone or supine body position and sleep characteristics in infants. *Pediatrics.* 1993;91(6):1112–1115

88. Bhat RY, Hannam S, Pressler R, Rafferty GF, Peacock JL, Greenough A. Effect of prone and supine position on sleep, apneas, and arousal in preterm infants. *Pediatrics*. 2006;118(1):101–107
89. Ariagno RL, van Liempt S, Mirmiran M. Fewer spontaneous arousals during prone sleep in preterm infants at 1 and 3 months corrected age. *J Perinatol*. 2006;26(5):306–312
90. Franco P, Groswasser J, Sottiaux M, Broadfield E, Kahn A. Decreased cardiac responses to auditory stimulation during prone sleep. *Pediatrics*. 1996;97(2):174–178
91. Galland BC, Reeves G, Taylor BJ, Bolton DP. Sleep position, autonomic function, and arousal. *Arch Dis Child Fetal Neonatal Ed*. 1998;78(3):F189–F194
92. Galland BC, Hayman RM, Taylor BJ, Bolton DP, Sayers RM, Williams SM. Factors affecting heart rate variability and heart rate responses to tilting in infants aged 1 and 3 months. *Pediatr Res*. 2000;48(3):360–368
93. Horne RS, Ferens D, Watts AM, et al. The prone sleeping position impairs arousability in term infants. *J Pediatr*. 2001;138(6):811–816
94. Horne RS, Bandopadhyay P, Vitkovic J, Cranage SM, Adamson TM. Effects of age and sleeping position on arousal from sleep in preterm infants. *Sleep*. 2002;25(7):746–750
95. Kato I, Scaillet S, Groswasser J, et al. Spontaneous arousability in prone and supine position in healthy infants. *Sleep*. 2006;29(6):785–790
96. Phillipson EA, Sullivan CC. Arousal: the forgotten response to respiratory stimuli. *Am Rev Respir Dis*. 1978;118(5):807–809
97. Kahn A, Groswasser J, Rebuffat E, et al. Sleep and cardiorespiratory characteristics of infant victims of sudden death: a prospective case-control study. *Sleep*. 1992;15(4):287–292
98. Schechtman VL, Harper RM, Wilson AJ, Southall DP. Sleep state organization in normal infants and victims of the sudden infant death syndrome. *Pediatrics*. 1992;89(5 pt 1):865–870
99. Harper RM. State-related physiological changes and risk for the sudden infant death syndrome. *Aust Paediatr J*. 1986;22(suppl 1):55–58
100. Kato I, Franco P, Groswasser J, et al. Incomplete arousal processes in infants who were victims of sudden death. *Am J Respir Crit Care Med*. 2003;168(11):1298–1303
101. Malloy MH, Hoffman HJ. Prematurity, sudden infant death syndrome, and age of death. *Pediatrics*. 1995;96(3 pt 1):464–471
102. Sowter B, Doyle LW, Morley CJ, Altmann A, Halliday J. Is sudden infant death syndrome still more common in very low birthweight infants in the 1990s? *Med J Aust*. 1999;171(8):411–413
103. American Academy of Pediatric, Committee on Fetus and Newborn. Hospital discharge of the high-risk neonate. *Pediatrics*. 2008;122(5):1119–1126
104. Vernacchio L, Corwin MJ, Lesko SM, et al. Sleep position of low birth weight infants. *Pediatrics*. 2003;111(3):633–640
105. Pollack HA, Frohna JG. Infant sleep placement after the Back to Sleep campaign. *Pediatrics*. 2002;109(4):608–614
106. Baird TM, Paton JB, Fisher DE. Improved oxygenation with prone positioning in neonates: stability of increased transcutaneous  $P_{O_2}$ . *J Perinatol*. 1991;11(4):315–317
107. Martin RJ, DiFiore JM, Korenke CB, Randal H, Miller MJ, Brooks LJ. Vulnerability of respiratory control in healthy preterm infants placed supine. *J Pediatr*. 1995;127(4):609–614
108. Levy J, Habib RH, Liptsen E, et al. Prone versus supine positioning in the well preterm infant: Effects on work of breathing and breathing patterns. *Pediatr Pulmonol*. 2006;41(8):754–758
109. Grazel R, Phalen AG, Polomano RC. Implementation of the American Academy of Pediatrics recommendations to reduce sudden infant death syndrome risk in neonatal intensive care units: an evaluation of nursing knowledge and practice. *Adv Neonatal Care*. 2010;10(6):332–342
110. Moon RY, Oden RP, Joyner BL, Ajao TI. Qualitative analysis of beliefs and perceptions about sudden infant death syndrome (SIDS) among African-American mothers: implications for safe sleep recommendations. *J Pediatr*. 2010;157(1):92–97.e2
111. Brenner R, Simons-Morton BG, Bhaskar B, et al. Prevalence and predictors of the prone sleep position among inner-city infants. *JAMA*. 1998;280(4):341–346
112. Willinger M, Hoffman HJ, Wu KT, et al. Factors associated with the transition to non-prone sleep positions of infants in the United States: the National Infant Sleep Position Study. *JAMA*. 1998;280(4):329–335
113. Hutchison BL, Thompson JM, Mitchell EA. Determinants of nonsynostotic plagiocephaly: a case-control study. *Pediatrics*. 2003;112(4). Available at: [www.pediatrics.org/cgi/content/full/112/4/e316](http://www.pediatrics.org/cgi/content/full/112/4/e316)
114. Hutchison BL, Hutchison LA, Thompson JM, Mitchell EA. Plagiocephaly and brachycephaly in the first two years of life: a prospective cohort study. *Pediatrics*. 2004;114(4):970–980
115. van Vlimmeren LA, van der Graaf Y, Boere-Boonekamp MM, L'Hoir MP, Helders PJ, Engelbert RH. Risk factors for deformational plagiocephaly at birth and at 7 weeks of age: a prospective cohort study. *Pediatrics*. 2007;119(2). Available at: [www.pediatrics.org/cgi/content/full/119/2/e408](http://www.pediatrics.org/cgi/content/full/119/2/e408)
116. Miller RI, Clarren SK. Long-term developmental outcomes in patients with deformational plagiocephaly. *Pediatrics*. 2000;105(2). Available at: [www.pediatrics.org/cgi/content/full/105/2/e26](http://www.pediatrics.org/cgi/content/full/105/2/e26)
117. Panchal J, Amirshaybani H, Gurwitsch R, et al. Neurodevelopment in children with single-suture craniosynostosis and plagiocephaly without synostosis. *Plast Reconstr Surg*. 2001;108(6):1492–1498; discussion 1499–1500
118. Balan P, Kushnerenko E, Sahlin P, Huotilainen M, Naatanen R, Hukki J. Auditory ER: Ps reveal brain dysfunction in infants with plagiocephaly. *J Craniofac Surg*. 2002;13(4):520–525; discussion 526
119. Chaddock WM, Kast J, Donahue DJ. The enigma of lambdoid positional molding. *Pediatr Neurosurg*. 1997;26(6):304–311
120. Laughlin J, Luerssen TG, Dias MS; American Academy of Pediatrics, Committee on Practice and Ambulatory Medicine, Section on Neurological Surgery. Clinical report—prevention and management of positional skull deformities in infants. *Pediatrics*. 2011;128(5):●●
121. US Consumer Product Safety Commission. Crib Safety Tips: Use Your Crib Safely. Washington, DC: US Consumer Product Safety Commission. CPSC document 5030
122. Pike J, Moon RY. Bassinet use and sudden unexpected death in infancy. *J Pediatr*. 2008;153(4):509–512
123. Jackson A, Moon RY. An analysis of deaths in portable cribs and playpens: what can be learned? *Clin Pediatr (Phila)*. 2008;47(3):261–266
124. Nakamura S, Wind M, Danello MA. Review of hazards associated with children placed in adult beds. *Arch Pediatr Adolesc Med*. 1999;153(10):1019–1023
125. US Consumer Product Safety Commission. Staff Briefing Package, Draft Proposed Rule for Portable Bed Rails (CPSIA Section 104). Bethesda, MD: US Consumer Product Safety Commission; 2011
126. Callahan CW, Sisler C. Use of seating devices in infants too young to sit. *Arch Pediatr Adolesc Med*. 1997;151(3):233–235
127. Orenstein SR, Whittington PF, Orenstein DM.

- The infant seat as treatment for gastroesophageal reflux. *N Engl J Med*. 1983;309(13):760–763
128. Bass JL, Bull M. Oxygen desaturation in term infants in car safety seats. *Pediatrics*. 2002;110(2 pt 1):401–402
  129. Cerar LK, Scirica CV, Stucin Gantar I, Osredkar D, Neubauer D, Kinane TB. A comparison of respiratory patterns in healthy term infants placed in car safety seats and beds. *Pediatrics*. 2009;124(3). Available at: [www.pediatrics.org/cgi/content/full/124/3/e396](http://www.pediatrics.org/cgi/content/full/124/3/e396)
  130. Côté A, Bairam A, Deschenes M, Hatzakis G. Sudden infant deaths in sitting devices. *Arch Dis Child*. 2008;93(5):384–389
  131. Merchant JR, Worwa C, Porter S, Coleman JM, deRegnier RA. Respiratory instability of term and near-term healthy newborn infants in car safety seats. *Pediatrics*. 2001;108(3):647–652
  132. Willett LD, Leuschen MP, Nelson LS, Nelson RM Jr. Risk of hypoventilation in premature infants in car seats. *J Pediatr*. 1986;109(2):245–248
  133. Desapriya EB, Joshi P, Subzwari S, Nolan M. Infant injuries from child restraint safety seat misuse at British Columbia Children's Hospital. *Pediatr Int*. 2008;50(5):674–678
  134. Graham CJ, Kittredge D, Stuemky JH. Injuries associated with child safety seat misuse. *Pediatr Emerg Care*. 1992;8(6):351–353
  135. Parikh SN, Wilson L. Hazardous use of car seats outside the car in the United States, 2003–2007. *Pediatrics*. 2010;126(2):352–357
  136. Pollack-Nelson C. Fall and suffocation injuries associated with in-home use of car seats and baby carriers. *Pediatr Emerg Care*. 2000;16(2):77–79
  137. Wickham T, Abrahamson E. Head injuries in infants: the risks of bouncy chairs and car seats. *Arch Dis Child*. 2002;86(3):168–169
  138. US Consumer Product Safety Commission. *Infant Deaths Prompt CPSC Warning About Sling Carriers for Babies*. Washington, DC: US Consumer Product Safety Commission; 2010
  139. McKenna JJ, Thoman EB, Anders TF, Sadeh A, Schechtman VL, Glotzbach SF. Infant-parent co-sleeping in an evolutionary perspective: implications for understanding infant sleep development and the sudden infant death syndrome. *Sleep*. 1993;16(3):263–282
  140. McKenna JJ, Ball HL, Gettler LT. Mother-infant cosleeping, breastfeeding and sudden infant death syndrome: what biological anthropology has discovered about normal infant sleep and pediatric sleep medicine. *Am J Phys Anthropol*. 2007;(suppl 45):133–161
  141. McKenna J. *Sleeping With Your Baby: A Parent's Guide to Cosleeping*. Washington, DC: Platyus Media, LLC; 2007
  142. Mitchell EA, Thompson JMD. Co-sleeping increases the risk of SIDS, but sleeping in the parents' bedroom lowers it. In: Rognum TO, ed. *Sudden Infant Death Syndrome: New Trends in the Nineties*. Oslo, Norway: Scandinavian University Press; 1995:266–269
  143. Tappin D, Ecob R, Brooke H. Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case control study. *J Pediatr*. 2005;147(1):32–37
  144. Joyner BL, Oden R, Ajao TI, Moon R. Where should my baby sleep? A qualitative study of African-American infant sleep location decisions. *J Natl Med Assoc*. 2010;102(10):881–889
  145. Mosko S, Richard C, McKenna J. Infant arousals during mother-infant bed sharing: implications for infant sleep and sudden infant death syndrome research. *Pediatrics*. 1997;100(5):841–849
  146. McKenna JJ, Mosko S, Richard CA. Bed-sharing promotes breastfeeding. *Pediatrics*. 1997;100(2 pt 1):214–219
  147. Scheers NJ, Dayton CM, Kemp JS. Sudden infant death with external airways covered: case-comparison study of 206 deaths in the United States. *Arch Pediatr Adolesc Med*. 1998;152(6):540–547
  148. Unger B, Kemp JS, Wilkins D, et al. Racial disparity and modifiable risk factors among infants dying suddenly and unexpectedly. *Pediatrics*. 2003;111(2). Available at: [www.pediatrics.org/cgi/content/full/111/2/e127](http://www.pediatrics.org/cgi/content/full/111/2/e127)
  149. Kemp JS, Unger B, Wilkins D, et al. Unsafe sleep practices and an analysis of bed-sharing among infants dying suddenly and unexpectedly: results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics*. 2000;106(3). Available at: [www.pediatrics.org/cgi/content/full/106/3/e41](http://www.pediatrics.org/cgi/content/full/106/3/e41)
  150. Drago DA, Dannenberg AL. Infant mechanical suffocation deaths in the United States, 1980–1997. *Pediatrics*. 1999;103(5). Available at: [www.pediatrics.org/cgi/content/full/103/5/e59](http://www.pediatrics.org/cgi/content/full/103/5/e59)
  151. Baddock SA, Galland BC, Beckers MG, et al. Bed-sharing and the infant's thermal environment in the home setting. *Arch Dis Child*. 2004;89(12):1111–1116
  152. Baddock SA, Galland BC, Bolton DP, Williams SM, Taylor BJ. Differences in infant and parent behaviors during routine bed sharing compared with cot sleeping in the home setting. *Pediatrics*. 2006;117(5):1599–1607
  153. McIntosh CG, Tonkin SL, Gunn AJ. What is the mechanism of sudden infant deaths associated with co-sleeping? *N Z Med J*. 2009;122(1307):69–75
  154. Blair PS, Mitchell EA, Heckstall-Smith EM, Fleming PJ. Head covering: a major modifiable risk factor for sudden infant death syndrome—a systematic review. *Arch Dis Child*. 2008;93(9):778–783
  155. Baddock SA, Galland BC, Taylor BJ, Bolton DP. Sleep arrangements and behavior of bed-sharing families in the home setting. *Pediatrics*. 2007;119(1). Available at: [www.pediatrics.org/cgi/content/full/119/1/e200](http://www.pediatrics.org/cgi/content/full/119/1/e200)
  156. Ball H. Airway covering during bed-sharing. *Child Care Health Dev*. 2009;35(5):728–737
  157. American Academy of Pediatrics, Task Force on Infant Sleep Position and Sudden Infant Death Syndrome. Changing concepts of sudden infant death syndrome: implications for infant sleeping environment and sleep position. *Pediatrics*. 2000;105(3 pt 1):650–656
  158. Vennemann M, Hense HW, Bajanowski T, et al. Bed sharing and the risk of SIDS: can we resolve the debate? *J Pediatr*. 2011; In press
  159. Ostfeld BM, Perl H, Esposito L, et al. Sleep environment, positional, lifestyle, and demographic characteristics associated with bed sharing in sudden infant death syndrome cases: a population-based study. *Pediatrics*. 2006;118(5):2051–2059
  160. Scheers NJ, Rutherford GW, Kemp JS. Where should infants sleep? A comparison of risk for suffocation of infants sleeping in cribs, adult beds, and other sleeping locations. *Pediatrics*. 2003;112(4):883–889
  161. Blair P, Ward Platt MP, Smith IJ, Fleming PJ. Sudden infant death syndrome and sleeping position in pre-term and low birthweight infants: an opportunity for targeted intervention. *Arch Dis Child*. 2006;91(2):101–106
  162. Lin RG. Infant deaths prompt warning. *Los Angeles Times*. April 24, 2008. Available at: <http://articles.latimes.com/2008/apr/24/local/me-deaths24>. Accessed September 6, 2011
  163. Cambria N. Officials issue warning to prevent infant death. *St Louis Post-Dispatch*. January 24, 2009. Available at: [www.stltoday.com/news/article\\_738ffce-5343-534c-bf89-0582e440adf5.html](http://www.stltoday.com/news/article_738ffce-5343-534c-bf89-0582e440adf5.html). Accessed September 20, 2011

164. Department of Human Services. *DHS and Health Department Launch New Campaign Warning to Parents* [press release]. Philadelphia, PA: Department of Human Services; 2007. Available at: [www.phila.gov/dhs/news\\_sleepingSafely.html](http://www.phila.gov/dhs/news_sleepingSafely.html). Accessed September 6, 2011
165. Brewington K. Don't share the bed with infant, parents told. *Baltimore Sun*. January 26, 2009
166. Arnestad M, Andersen M, Vege A, Rognum TO. Changes in the epidemiological pattern of sudden infant death syndrome in south-east Norway, 1984–1998: implications for future prevention and research. *Arch Dis Child*. 2001;85(2):108–115
167. Scragg R, Mitchell EA, Taylor BJ, et al. Bed sharing, smoking, and alcohol in the sudden infant death syndrome. New Zealand Cot Death Study Group. *BMJ*. 1993;307(6915):1312–1318
168. McGarvey C, McDonnell M, Hamilton K, O'Regan M, Matthews T. An 8 year study of risk factors for SIDS: bed-sharing vs. non bed-sharing. *Arch Dis Child*. 2006;91(4):318–323
169. McGarvey C, McDonnell M, Chong A, O'Regan M, Matthews T. Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Arch Dis Child*. 2003;88(12):1058–1064
170. Fu LY, Moon R, Hauck FR. Bed sharing among black infants and sudden infant death syndrome: interactions with other known risk factors. *Acad Pediatr*. 2010;10(6):376–382
171. Blair PS, Sidebotham P, Evason-Coombe C, Edmonds M, Heckstall-Smith EM, Fleming P. Hazardous cosleeping environments and risk factors amenable to change: case-control study of SIDS in south west England. *BMJ*. 2009;339:b3666
172. Carroll-Pankhurst C, Mortimer EAJ. Sudden infant death syndrome, bedsharing, parental weight, and age at death. *Pediatrics*. 2001;107(3):530–536
173. Mitchell E, Thompson J. Who cosleeps? Does high maternal body weight and duvet use increase the risk of sudden infant death syndrome when bed sharing? *Paediatr Child Health*. 2006;11(suppl):14A–15A
174. Hutchison BL, Stewart AW, Mitchell EA. The prevalence of cobedding and SIDS-related child care practices in twins. *Eur J Pediatr*. 2010;169(12):1477–1485
175. Hayward K. Cobedding of twins: a natural extension of the socialization process? *MCN Am J Matern Child Nurs*. 2003;28(4):260–263
176. Tomashek KM, Wallman C; American Academy of Pediatrics, Committee on Fetus and Newborn. Cobedding twins and higher-order multiples in a hospital setting [published correction appears in *Pediatrics*. 2008;121(1):227]. *Pediatrics*. 2007;120(6):1359–1366
177. National Association of Neonatal Nurses Board of Directors. NANN position statement 3045: cobedding of twins or higher-order multiples. *Adv Neonatal Care*. 2009;9(6):307–313
178. Moon RY, Oden RP, Joyner BL, Ajao TI. Reasons that African-American parents use soft bedding and soft sleep surfaces for their infants [abstract]. *J Paediatr Child Health*. 2010;16(suppl 3):43
179. Chiodini BA, Thach BT. Impaired ventilation in infants sleeping facedown: potential significance for sudden infant death syndrome. *J Pediatr*. 1993;123(5):686–692
180. Kemp JS, Nelson VE, Thach BT. Physical properties of bedding that may increase risk of sudden infant death syndrome in prone-sleeping infants. *Pediatr Res*. 1994;36(1 pt 1):7–11
181. Sakai J, Kanetake J, Takahashi S, Kanawaku Y, Funayama M. Gas dispersal potential of bedding as a cause for sudden infant death. *Forensic Sci Int*. 2008;180(2–3):93–97
182. Ponsonby AL, Dwyer T, Gibbons LE, Cochrane JA, Wang YG. Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *N Engl J Med*. 1993;329(6):377–382
183. Mitchell EA, Thompson JMD, Ford RPK, Taylor BJ. Sheepskin bedding and the sudden infant death syndrome. New Zealand Cot Death Study Group. *J Pediatr*. 1998;133(5):701–704
184. Brooke H, Gibson A, Tappin D, Brown H. Case-control study of sudden infant death syndrome in Scotland, 1992–5. *BMJ*. 1997;314(7093):1516–1520
185. Kemp JS, Kowalski RM, Burch PM, Graham MA, Thach BT. Unintentional suffocation by rebreathing: a death scene and physiologic investigation of a possible cause of sudden infant death. *J Pediatr*. 1993;122(6):874–880
186. Ponsonby AL, Dwyer T, Couper D, Cochrane J. Association between use of a quilt and sudden infant death syndrome: case-control study. *BMJ*. 1998;316(7126):195–196
187. Mitchell EA, Scragg L, Clements M. Soft cot mattresses and the sudden infant death syndrome. *N Z Med J*. 1996;109(1023):206–207
188. L'Hoir MP, Engelberts AC, van Well GTJ, et al. Risk and preventive factors for cot death in the Netherlands, a low-incidence country. *Eur J Pediatr*. 1998;157(8):681–688
189. Markestad T, Skadberg B, Hordvik E, Morrild I, Irgens L. Sleeping position and sudden infant death syndrome (SIDS): effect of an intervention programme to avoid prone sleeping. *Acta Paediatr*. 1995;84(4):375–378
190. Beal SM, Byard RW. Accidental death or sudden infant death syndrome? *J Paediatr Child Health*. 1995;31(4):269–271
191. Wilson CA, Taylor BJ, Laing RM, Williams SM, Mitchell EA. Clothing and bedding and its relevance to sudden infant death syndrome: further results from the New Zealand Cot Death Study. *J Paediatr Child Health*. 1994;30(6):506–512
192. Chowdhury RT. *Nursery Product-Related Injuries and Deaths Among Children Under Age Five*. Washington, DC: US Consumer Product Safety Commission; 2009
193. Chowdhury RT. *Nursery Product-Related Injuries and Deaths Among Children Under Age Five*. Washington, DC: US Consumer Product Safety Commission; 2010
194. US Food and Drug Administration. CPSC and FDA warn against using infant sleep positioners because of suffocation risk: initial communication. Available at: [www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm227301.htm](http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm227301.htm). Accessed September 6, 2011
195. Moon RY. "And things that go bump in the night": nothing to fear? *J Pediatr*. 2007;151(3):237–238
196. Thach BT, Rutherford GW, Harris K. Deaths and injuries attributed to infant crib bumper pads. *J Pediatr*. 2007;151(3):271–274
197. Yeh ES, Rochette LM, McKenzie LB, Smith GA. Injuries associated with cribs, playpens, and bassinets among young children in the US, 1990–2008. *Pediatrics*. 2011;127(3):479–486
198. Kraus JF, Greenland S, Bulterys M. Risk factors for sudden infant death syndrome in the US Collaborative Perinatal Project. *Int J Epidemiol*. 1989;18(1):113–120
199. Paris C, Remler R, Daling JR. Risk factors for sudden infant death syndrome: changes associated with sleep position recommendations. *J Pediatr*. 2001;139(6):771–777
200. Stewart A, Williams S, Mitchell E, Taylor BJ, Ford R, Allen EM. Antenatal and intrapartum factors associated with sudden infant death syndrome in the New Zealand Cot Death Study. *J Paediatr Child Health*. 1995;31(5):473–478

201. MacDorman MF, Cnattingius S, Hoffman HJ, Kramer MS, Haglund B. Sudden infant death syndrome and smoking in the United States and Sweden. *Am J Epidemiol*. 1997; 146(3):249–257
202. Schoendorf KC, Kiely JL. Relationship of sudden infant death syndrome to maternal smoking during and after pregnancy. *Pediatrics*. 1992;90(6):905–908
203. Malloy MH, Kleinman JC, Land GH, Schramm WF. The association of maternal smoking with age and cause of infant death. *Am J Epidemiol*. 1988;128(1):46–55
204. Haglund B, Cnattingius S. Cigarette smoking as a risk factor for sudden infant death syndrome: a population-based study. *Am J Public Health*. 1990;80(1):29–32
205. Mitchell EA, Ford RP, Stewart AW, et al. Smoking and the sudden infant death syndrome. *Pediatrics*. 1993;91(5):893–896
206. Winickoff JP, Friebely J, Tanski SE, et al. Beliefs about the health effects of “third-hand” smoke and home smoking bans. *Pediatrics*. 2009;123(1). Available at: www.pediatrics.org/cgi/content/full/123/1/e74
207. Tirosh E, Libon D, Bader D. The effect of maternal smoking during pregnancy on sleep respiratory and arousal patterns in neonates. *J Perinatol*. 1996;16(6):435–438
208. Franco P, Groswasser J, Hassid S, Lanquart JP, Scaillet S, Kahn A. Prenatal exposure to cigarette smoking is associated with a decrease in arousal in infants. *J Pediatr*. 1999;135(1):34–38
209. Horne RS, Ferens D, Watts AM, et al. Effects of maternal tobacco smoking, sleeping position, and sleep state on arousal in healthy term infants. *Arch Dis Child Fetal Neonatal Ed*. 2002;87(2):F100–F105
210. Sawhani H, Jackson T, Murphy T, Beckerman R, Simakajornboon N. The effect of maternal smoking on respiratory and arousal patterns in preterm infants during sleep. *Am J Respir Crit Care Med*. 2004; 169(6):733–738
211. Lewis KW, Bosque EM. Deficient hypoxia awakening response in infants of smoking mothers: possible relationship to sudden infant death syndrome. *J Pediatr*. 1995; 127(5):691–699
212. Chang AB, Wilson SJ, Masters IB, et al. Altered arousal response in infants exposed to cigarette smoke. *Arch Dis Child*. 2003; 88(1):30–33
213. Parsiow PM, Cranage SM, Adamson TM, Harding R, Horne RS. Arousal and ventilatory responses to hypoxia in sleeping infants: effects of maternal smoking. *Respir Physiol Neurobiol*. 2004;140(1):77–87
214. Mitchell EA, Milerad J. Smoking and the sudden infant death syndrome. *Rev Environ Health*. 2006;21(2):81–103
215. Dietz PM, England LJ, Shapiro-Mendoza CK, Tong VT, Farr SL, Callaghan WM. Infant morbidity and mortality attributable to prenatal smoking in the U.S. *Am J Prev Med*. 2010;39(1):45–52
216. American Academy of Pediatrics, Committee on Environmental Health; Committee on Substance Abuse; Committee on Adolescence; Committee on Native American Child. Policy statement—tobacco use: a pediatric disease [published correction appears in *Pediatrics*. 2010;125(4):861]. *Pediatrics*. 2009;124(5):1474–1487
217. Best D; Committee on Environmental Health; Committee on Native American Child Health; Committee on Adolescence. Technical report—secondhand and prenatal tobacco smoke exposure. *Pediatrics*. 2009;124(5). Available at: www.pediatrics.org/cgi/content/full/124/5/e1017
218. Iyasu S, Randall LL, Welty TK, et al. Risk factors for sudden infant death syndrome among Northern Plains Indians. *JAMA*. 2002;288(21):2717–2723
219. Strandberg-Larsen K, Gronboek M, Andersen AM, Andersen PK, Olsen J. Alcohol drinking pattern during pregnancy and risk of infant mortality. *Epidemiology*. 2009;20(6):884–891
220. Alm B, Wennergren G, Norvenius G, et al. Caffeine and alcohol as risk factors for sudden infant death syndrome. Nordic Epidemiological SIDS Study. *Arch Dis Child*. 1999;81(2):107–111
221. James C, Klenka H, Manning D. Sudden infant death syndrome: bed sharing with mothers who smoke. *Arch Dis Child*. 2003; 88(2):112–113
222. Klonoff-Cohen H, Edelstein SL. Bed sharing and the sudden infant death syndrome. *BMJ*. 1995;311(7015):1269–1272
223. Rajegowda BK, Kandall SR, Falciglia H. Sudden unexpected death in infants of narcotic-dependent mothers. *Early Hum Dev*. 1978;2(3):219–225
224. Chavez CJ, Ostrea EM Jr, Stryker JC, Smialek Z. Sudden infant death syndrome among infants of drug-dependent mothers. *J Pediatr*. 1979;95(3):407–409
225. Bauchner H, Zuckerman B, McClain M, Frank D, Fried LE, Kayne H. Risk of sudden infant death syndrome among infants with in utero exposure to cocaine. *J Pediatr*. 1988;113(5):831–834
226. Durand DJ, Espinoza AM, Nickerson BG. Association between prenatal cocaine exposure and sudden infant death syndrome. *J Pediatr*. 1990;117(6):909–911
227. Ward SL, Bautista D, Chan L, et al. Sudden infant death syndrome in infants of substance-abusing mothers. *J Pediatr*. 1990;117(6):876–881
228. Rosen TS, Johnson HL. Drug-addicted mothers, their infants, and SIDS. *Ann NY Acad Sci*. 1988;533:89–95
229. Kandall SR, Gaines J, Habel L, Davidson G, Jessop D. Relationship of maternal substance abuse to subsequent sudden infant death syndrome in offspring. *J Pediatr*. 1993;123(1):120–126
230. Fares I, McCulloch KM, Raju TN. Intrauterine cocaine exposure and the risk for sudden infant death syndrome: a meta-analysis. *J Perinatol*. 1997;17(3):179–182
231. Tappin D, Brooke H, Ecob R, Gibson A. Used infant mattresses and sudden infant death syndrome in Scotland: case-control study. *BMJ*. 2002;325(7371):1007–1012
232. Ford RP, Taylor BJ, Mitchell EA, et al. Breastfeeding and the risk of sudden infant death syndrome. *Int J Epidemiol*. 1993; 22(5):885–890
233. Hoffman HJ, Damus K, Hillman L, Krongrad E. Risk factors for SIDS: results of the National Institute of Child Health and Human Development SIDS Cooperative Epidemiological Study. *Ann NY Acad Sci*. 1988;533: 13–30
234. Henderson-Smart DJ, Ponsonby AL, Murphy E. Reducing the risk of sudden infant death syndrome: a review of the scientific literature. *J Paediatr Child Health*. 1998; 34(3):213–219
235. Ponsonby AL, Dwyer T, Kasl SV, Cochrane JA. The Tasmanian SIDS Case-Control Study: univariable and multivariable risk factor analysis. *Paediatr Perinat Epidemiol*. 1995;9(3):256–272
236. Alm B, Wennergren G, Norvenius SG, et al. Breast feeding and the sudden infant death syndrome in Scandinavia, 1992–95. *Arch Dis Child*. 2002;86(6):400–402
237. McVea KLSP, Turner PD, Peppler DK. The role of breastfeeding in sudden infant death syndrome. *J Hum Lact*. 2000;16(1): 13–20
238. Gilbert RE, Wighfield RE, Fleming PJ, Berry PJ, Rudd PT. Bottle feeding and the sudden infant death syndrome. *BMJ*. 1995; 310(6972):88–90
239. l’Hoir MP, Engelberts AC, van Well GTJ, et al. Case-control study of current validity of previously described risk factors for SIDS in the Netherlands. *Arch Dis Child*. 1998; 79(5):386–393
240. Wennergren G, Alm B, Oyen N, et al. The decline in the incidence of SIDS in Scandinavia and its relation to risk-intervention

- campaigns. Nordic Epidemiological SIDS Study. *Acta Paediatr*. 1997;86(9):963–968
241. Biering-Sørensen F, Jørgensen T, Hilden J. Sudden infant death in Copenhagen 1956–1971: I. Infant feeding. *Acta Paediatr Scand*. 1978;67(2):129–137
242. Watson E, Gardner A, Carpenter RG. An epidemiological and sociological study of unexpected death in infancy in nine areas of southern England. I: Epidemiology. *Med Sci Law*. 1981;21(2):78–88
243. Ip S, Chung M, Raman G, Trikalinos TA, Lau J. A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. *Breastfeed Med*. 2009;4(suppl 1):S17–S30
244. Vennemann MM, Bajanowski T, Brinkmann B, et al; GeSID Study Group. Does breastfeeding reduce the risk of sudden infant death syndrome? *Pediatrics*. 2009;123. Available at: [www.pediatrics.org/cgi/content/full/123/3/e406](http://www.pediatrics.org/cgi/content/full/123/3/e406)
245. Hauck FR, Thompson J, Tanabe KO, Moon RY, Vennemann M. Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. *Pediatrics*. 2011;128(1):103–110
246. Centers for Disease Control and Prevention. Racial and ethnic differences in breastfeeding initiation and duration, by state: National Immunization Survey, United States, 2004–2008. *MMWR Morb Mortal Wkly Rep*. 2010;59(11):327–334
247. Franco P, Scaillet S, Wermenbol V, Valente F, Groswasser J, Kahn A. The influence of a pacifier on infants' arousals from sleep. *J Pediatr*. 2000;136(6):775–779
248. Horne RS, Parslow PM, Ferens D, Watts AM, Adamson TM. Comparison of evoked arousability in breast and formula fed infants. *Arch Dis Child*. 2004;89(1):22–25
249. Duijts L, Jaddoe VW, Hofman A, Moll HA. Prolonged and exclusive breastfeeding reduces the risk of infectious diseases in infancy. *Pediatrics*. 2010;126(1). Available at: [www.pediatrics.org/cgi/content/full/126/1/e18](http://www.pediatrics.org/cgi/content/full/126/1/e18)
250. Heinig MJ. Host defense benefits of breastfeeding for the infant: effect of breastfeeding duration and exclusivity. *Pediatr Clin North Am*. 2001;48(1):105–123, ix
251. Kramer MS, Guo T, Platt RW, et al. Infant growth and health outcomes associated with 3 compared with 6 mo of exclusive breastfeeding. *Am J Clin Nutr*. 2003;78(2):291–295
252. Academy of Breastfeeding Medicine Protocol Committee. ABM clinical protocol #6: guideline on co-sleeping and breastfeed-  
ing. Revision, March 2008. *Breastfeed Med*. 2008;3(1):38–43
253. McKenna J. Sleeping with your baby. *New Beginnings (La Leche League International)*. 2009;26(1):4–9
254. Hauck FR, Signore C, Fein SB, Raju TN. Infant sleeping arrangements and practices during the first year of life. *Pediatrics*. 2008;122(suppl 2):S113–S120
255. Horsley T, Clifford T, Barrowman N, et al. Benefits and harms associated with the practice of bed sharing: a systematic review. *Arch Pediatr Adolesc Med*. 2007;161(3):237–245
256. Hauck FR, Signore C, Fein SB, Raju TN. Infant feeding practices and mother-infant bed sharing: is there an association? Results from the Infant Feeding Practices Study II [abstract]. Presented at: American Public Health Association annual meeting; October 25, 2007; Washington, DC
257. Vogel A, Hutchison BL, Mitchell EA. Factors associated with the duration of breastfeeding. *Acta Paediatr*. 1999;88(12):1320–1326
258. Ruys JH, de Jonge GA, Brand R, Engelberts AC, Semmekrot BA. Bed-sharing in the first four months of life: a risk factor for sudden infant death. *Acta Paediatr*. 2007;96(10):1399–1403
259. Arnestad M, Andersen M, Rognum TO. Is the use of dummy or carry-cot of importance for sudden infant death? *Eur J Pediatr*. 1997;156(12):968–970
260. Mitchell EA, Taylor BJ, Ford RPK, et al. Dummies and the sudden infant death syndrome. *Arch Dis Child*. 1993;68(4):501–504
261. Fleming PJ, Blair PS, Pollard K, et al. Pacifier use and sudden infant death syndrome: results from the CESDI/SUDI case control study. CESDI SUDI Research Team. *Arch Dis Child*. 1999;81(2):112–116
262. L'Hoir MP, Engleberts AC, van Well GTJ, et al. Dummy use, thumb sucking, mouth breathing and cot death. *Eur J Pediatr*. 1999;158(11):896–901
263. Hauck FR, Omojokun OO, Siadaty MS. Do pacifiers reduce the risk of sudden infant death syndrome? A meta-analysis. *Pediatrics*. 2005;116(5). Available at: [www.pediatrics.org/cgi/content/full/116/5/e716](http://www.pediatrics.org/cgi/content/full/116/5/e716)
264. Mitchell EA, Blair PS, L'Hoir MP. Should pacifiers be recommended to prevent SIDS? *Pediatrics*. 2006;117(5):1755–1758
265. Li DK, Willinger M, Petitti DB, Odouli R, Liu L, Hoffman HJ. Use of a dummy (pacifier) during sleep and risk of sudden infant death syndrome (SIDS): population based case-control study. *BMJ*. 2006;332(7532):18–22
266. Vennemann MM, Bajanowski T, Brinkmann B, Jorch G, Sauerland C, Mitchell EA; GeSID Study Group. Sleep environment risk factors for sudden infant death syndrome: the German Sudden Infant Death Syndrome Study. *Pediatrics*. 2009;123(4):1162–1170
267. Kahn A, Sawaguchi T, Sawaguchi A, et al. Sudden infant deaths: from epidemiology to physiology. *Forensic Sci Int*. 2002;130(suppl):S8–S20
268. Franco P, Chabanski S, Scaillet S, Groswasser J, Kahn A. Pacifier use modifies infant's cardiac autonomic controls during sleep. *Early Hum Dev*. 2004;77(1–2):99–108
269. Tonkin SL, Lui D, McIntosh CG, Rowley S, Knight DB, Gunn AJ. Effect of pacifier use on mandibular position in preterm infants. *Acta Paediatr*. 2007;96(10):1433–1436
270. Horne RS, Witcombe NB, Yiallourou SR, Richardson HL. Sudden infant death syndrome: implications of altered physiological control during sleep. *Curr Pediatr Rev*. 2010;6(1):30–38
271. Weiss P, Kerbl R. The relatively short duration that a child retains a pacifier in the mouth during sleep: implications for sudden infant death syndrome. *Eur J Pediatr*. 2001;160(1):60–70
272. Foundation for the Study and Prevention of Infant Mortality (Cot Death Foundation). Safe sleeping for your baby. Available at: [www.wiegedood.nl/files/download\\_vs\\_engels.pdf](http://www.wiegedood.nl/files/download_vs_engels.pdf). Accessed September 21, 2011
273. Foundation for the Study of Infant Deaths. Factfile 2: research background to the Reduce the Risk of Cot Death advice by the Foundation for the Study of Infant Deaths. Foundation for the Study of Infant Deaths. Available at: <http://fsid.org.uk/Document.Doc?id=42>. Accessed September 21, 2011
274. SIDS and Kids. National Scientific Advisory Group. *Information Statement: Pacifier/Dummy Use*. Melbourne, Australia: National SIDS Council of Australia; 2009. Available at: [www.sidsandkids.org/wp-content/uploads/Pacifier\\_Dummy\\_Use.pdf](http://www.sidsandkids.org/wp-content/uploads/Pacifier_Dummy_Use.pdf). Accessed September 11, 2011
275. Aarts C, Hörnell A, Kylberg E, Hofvander Y, Gebre-Medhin M. Breastfeeding patterns in relation to thumb sucking and pacifier use. *Pediatrics*. 1999;104(4). Available at: [www.pediatrics.org/cgi/content/full/104/4/e50](http://www.pediatrics.org/cgi/content/full/104/4/e50)
276. Benis MM. Are pacifiers associated with early weaning from breastfeeding? *Adv Neonatal Care*. 2002;2(5):259–266
277. Scott JA, Binns CW, Oddy WH, Graham KI. Predictors of breastfeeding duration: evidence from a cohort study. *Pediatrics*.

- 2006;117(4). Available at: [www.pediatrics.org/cgi/content/full/117/4/e646](http://www.pediatrics.org/cgi/content/full/117/4/e646)
278. Kramer MS, Barr RG, Dagenais S, et al. Pacifier use, early weaning, and cry/fuss behavior. *JAMA*. 2001;286(3):322–326
  279. Collins CT, Ryan P, Crowther CA, McPhee AJ, Paterson S, Hiller JE. Effect of bottles, cups, and dummies on breast feeding in preterm infants: a randomised controlled trial. *BMJ*. 2004;329(7459):193–198
  280. Howard CR, Howard FM, Lanphear B, et al. Randomized clinical trial of pacifier use and bottle-feeding or cupfeeding and their effect on breastfeeding. *Pediatrics*. 2003; 111(3):511–518
  281. O'Connor NR, Tanabe KO, Siadaty MS, Hauck FR. Pacifiers and breastfeeding: a systematic review. *Arch Pediatr Adolesc Med*. 2009;163(4):378–382
  282. Jenik AG, Vain NE, Gorestein AN, Jacobi NE; Pacifier and Breastfeeding Trial Group. Does the recommendation to use a pacifier influence the prevalence of breastfeeding? *J Pediatr*. 2009;155(3): 350–354.e1
  283. Gartner LM, Morton J, Lawrence RA, et al; American Academy of Pediatrics, Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2005; 115(2):496–506
  284. Larsson E. The effect of dummy-sucking on the occlusion: a review. *Eur J Orthod*. 1986; 8(2):127–130
  285. American Academy of Pediatric Dentistry, Council on Clinical Affairs. Policy on oral habits. Available at: [www.aapd.org/media/Policies\\_Guidelines/P\\_OralHabits.pdf](http://www.aapd.org/media/Policies_Guidelines/P_OralHabits.pdf). Accessed April 15, 2011
  286. Niemelä M, Uhari M, Möttönen M. A pacifier increases the risk of recurrent acute otitis media in children in day care centers. *Pediatrics*. 1995;96(5 pt 1):884–888
  287. Niemelä M, Pihakari O, Pokka T, Uhari M. Pacifier as a risk factor for acute otitis media: a randomized, controlled trial of parental counseling. *Pediatrics*. 2000; 106(3):483–488
  288. Jackson JM, Mourino AP. Pacifier use and otitis media in infants twelve months of age or younger. *Pediatr Dent*. 1999;21(4): 255–260
  289. Daly KA, Giebink GS. Clinical epidemiology of otitis media. *Pediatr Infect Dis J*. 2000; 19(5 suppl):S31–S36
  290. Darwazeh AM, al-Bashir A. Oral candidal flora in healthy infants. *J Oral Pathol Med*. 1995;24(8):361–364
  291. North K, Fleming PJ, Golding J. Pacifier use and morbidity in the first six months of life. *Pediatrics*. 1999;103(3). Available at: [www.pediatrics.org/cgi/content/full/103/3/e34](http://www.pediatrics.org/cgi/content/full/103/3/e34)
  292. Niemelä M, Uhari M, Hannuksela A. Pacifiers and dental structure as risk factors for otitis media. *Int J Pediatr Otorhinolaryngol*. 1994;29(2):121–127
  293. Uhari M, Mantysaari K, Niemelä M. A meta-analytic review of the risk factors for acute otitis media. *Clin Infect Dis*. 1996;22(6): 1079–1083
  294. Fleming P, Gilbert R, Azaz Y, et al. Interaction between bedding and sleeping position in the sudden infant death syndrome: a population based case-control study. *BMJ*. 1990;301(6743):85–89
  295. Ponsonby AL, Dwyer T, Gibbons LE, Cochrane JA, Jones ME, McCall MJ. Thermal environment and sudden infant death syndrome: case-control study. *BMJ*. 1992; 304(6822):277–282
  296. McGlashan ND. Sudden infant deaths in Tasmania, 1980–1986: a seven year prospective study. *Soc Sci Med*. 1989;29(8): 1015–1026
  297. Coleman-Phox K, Odouli R, Li DK. Use of a fan during sleep and the risk of sudden infant death syndrome. *Arch Pediatr Adolesc Med*. 2008;162(10):963–968
  298. Chisholm JS. Swaddling, cradleboards and the development of children. *Early Hum Dev*. 1978;2(3):255–275
  299. Gerard CM, Harris KA, Thach BT. Physiologic studies on swaddling: an ancient child care practice, which may promote the supine position for infant sleep. *J Pediatr*. 2002;141(3):398–403
  300. van Sleuwen BE, Engelberts AC, Boere-Boonekamp MM, Kuis W, Schulpen TW, L'Hoir MP. Swaddling: a systematic review. *Pediatrics*. 2007;120(4). Available at: [www.pediatrics.org/cgi/content/full/120/4/e1097](http://www.pediatrics.org/cgi/content/full/120/4/e1097)
  301. Richardson HL, Walker AM, Horne RS. Influence of swaddling experience on spontaneous arousal patterns and autonomic control in sleeping infants. *J Pediatr*. 2010; 157(1):85–91
  302. Richardson HL, Walker AM, Horne RS. Minimizing the risks of sudden infant death syndrome: to swaddle or not to swaddle? *J Pediatr*. 2009;155(4):475–481
  303. Narangerel G, Pollock J, Manaseki-Holland S, Henderson J. The effects of swaddling on oxygen saturation and respiratory rate of healthy infants in Mongolia. *Acta Paediatr*. 2007;96(2):261–265
  304. Kutlu A, Memik R, Mutlu M, Kutlu R, Arslan A. Congenital dislocation of the hip and its relation to swaddling used in Turkey. *J Pediatr Orthop*. 1992;12(5):598–602
  305. Chaarani MW, Al Mahmeid MS, Salman AM. Developmental dysplasia of the hip before and after increasing community awareness of the harmful effects of swaddling. *Qatar Med J*. 2002;11(1):40–43
  306. Yamamuro T, Ishida K. Recent advances in the prevention, early diagnosis, and treatment of congenital dislocation of the hip in Japan. *Clin Orthop Relat Res*. 1984;(184): 34–40
  307. Coleman SS. Congenital dysplasia of the hip in the Navajo infant. *Clin Orthop Relat Res*. 1968;56:179–193
  308. Tronick EZ, Thomas RB, Daltabuit M. The Quechua manta pouch: a caretaking practice for buffering the Peruvian infant against the multiple stressors of high altitude. *Child Dev*. 1994;65(4):1005–1013
  309. Manaseki S. Mongolia: a health system in transition. *BMJ*. 1993;307(6919):1609–1611
  310. Franco P, Seret N, Van Hees JN, Scaillet S, Groswasser J, Kahn A. Influence of swaddling on sleep and arousal characteristics of healthy infants. *Pediatrics*. 2005;115(5): 1307–1311
  311. Franco P, Scaillet S, Groswasser J, Kahn A. Increased cardiac autonomic responses to auditory challenges in swaddled infants. *Sleep*. 2004;27(8):1527–1532
  312. Hutcheson R. DTP vaccination and sudden infant deaths: Tennessee. *MMWR Morb Mortal Wkly Rep*. 1979;28:131–132
  313. Hutcheson R. Follow-up on DTP vaccination and sudden infant deaths: Tennessee. *MMWR*. 1979;28:134–135
  314. Bernier RH, Frank JA Jr, Dondero TJ Jr, Turner P. Diphtheria-tetanus toxoids-pertussis vaccination and sudden infant deaths in Tennessee. *J Pediatr*. 1982; 101(3):419–421
  315. Baraff LJ, Ablon WJ, Weiss RC. Possible temporal association between diphtheria-tetanus toxoid-pertussis vaccination and sudden infant death syndrome. *Pediatr Infect Dis*. 1983;2(1):7–11
  316. Griffin MR, Ray WA, Livengood JR, Schaffner W. Risk of sudden infant death syndrome after immunization with the diphtheria-tetanus-pertussis vaccine. *N Engl J Med*. 1988;319(10):618–623
  317. Hoffman JJ, Hunter J, Damus K, et al. Diphtheria-tetanus-pertussis immunization and sudden infant death: results of the National Institute of Child Health and Human Development Cooperative Epidemiological Study of Sudden Infant Death Syndrome Risk Factors. *Pediatrics*. 1987; 79(4):598–611
  318. Taylor EM, Emergy JL. Immunization and cot deaths. *Lancet*. 1982;2(8300):721
  319. Flahault A, Messiah A, Jouglu E, Bouvet E,

- Perin J, Hatton F. Sudden infant death syndrome and diphtheria/tetanus toxoid/pertussis/poliomyelitis immunisation. *Lancet*. 1988;1(8585):582–583
320. Walker AM, Jick H, Perera DR, Thompson RS, Knauss TA. Diphtheria-tetanus-pertussis immunization and sudden infant death syndrome. *Am J Public Health*. 1987;77(8):945–951
321. Jonville-Bera AP, Autret E, Laugier J. Sudden infant death syndrome and diphtheria-tetanus-pertussis-poliomyelitis vaccination status. *Fundam Clin Pharmacol*. 1995;9(3):263–270
322. Immunization Safety Review Committee. In: Stratton K, Almario DA, Wizemann TM, McCormick MC, eds. *Immunization Safety Review: Vaccinations and Sudden Unexpected Death in Infancy*. Washington, DC: National Academies Press; 2003
323. Mitchell EA, Stewart AW, Clements M, Ford RPK. Immunisation and the sudden infant death syndrome. New Zealand Cot Death Study Group. *Arch Dis Child*. 1995;73(6):498–501
324. Jonville-Béra AP, Autret-Leca E, Barbeillon F, Paris-Llado J; French Reference Centers for SIDS. Sudden unexpected death in infants under 3 months of age and vaccination status: a case-control study. *Br J Clin Pharmacol*. 2001;51(3):271–276
325. Fleming PJ, Blair PS, Platt MW, Tripp J, Smith IJ, Golding J. The UK accelerated immunisation programme and sudden unexpected death in infancy: case-control study. *BMJ*. 2001;322(7290):822
326. Fine PEM, Chen RT. Confounding in studies of adverse reactions to vaccines. *Am J Epidemiol*. 1992;136(2):121–135
327. Virtanen M, Peltola H, Paunio M, Heinonen OP. Day-to-day reactogenicity and the healthy vaccinee effect of measles-mumps-rubella vaccination. *Pediatrics*. 2000;106(5). Available at: [www.pediatrics.org/cgi/content/full/106/5/e62](http://www.pediatrics.org/cgi/content/full/106/5/e62)
328. Vennemann MM, Höffgen M, Bajanowski T, Hense HW, Mitchell EA. Do immunisations reduce the risk for SIDS? A meta-analysis. *Vaccine*. 2007;25(26):4875–4879
329. Steinschneider A. Prolonged apnea and the sudden infant death syndrome: clinical and laboratory observations. *Pediatrics*. 1972;50(4):646–654
330. Hodgman JE, Hoppenbrouwers T. Home monitoring for the sudden infant death syndrome: the case against. *Ann NY Acad Sci*. 1988;533:164–175
331. Ward SL, Keens TG, Chan LS, et al. Sudden infant death syndrome in infants evaluated by apnea programs in California. *Pediatrics*. 1986;77(4):451–458
332. Monod N, Plouin P, Sternberg B, et al. Are polygraphic and cardiopneumographic respiratory patterns useful tools for predicting the risk for sudden infant death syndrome? A 10-year study. *Biol Neonate*. 1986;50(3):147–153
333. Ramanathan R, Corwin MJ, Hunt CE, et al. Cardiorespiratory events recorded on home monitors: comparison of healthy infants with those at increased risk for SIDS. *JAMA*. 2001;285(17):2199–2207
334. American Academy of Pediatrics, Committee on Fetus and Newborn. Apnea, sudden infant death syndrome, and home monitoring. *Pediatrics*. 2003;111(4 pt 1):914–917
335. Patriarca M, Lyon TD, Delves HT, Howatson AG, Fell GS. Determination of low concentrations of potentially toxic elements in human liver from newborns and infants. *Analyst*. 1999;124(9):1337–1343
336. Kleemann WJ, Weller JP, Wolf M, Troger HD, Bluthgen A, Heeschen W. Heavy metals, chlorinated pesticides and polychlorinated biphenyls in sudden infant death syndrome (SIDS). *Int J Legal Med*. 1991;104(2):71–75
337. Erickson MM, Poklis A, Gantner GE, Dickinson AW, Hillman LS. Tissue mineral levels in victims of sudden infant death syndrome I. Toxic metals: lead and cadmium. *Pediatr Res*. 1983;17(10):779–784
338. George M, Wiklund L, Aastrup M, et al. Incidence and geographical distribution of sudden infant death syndrome in relation to content of nitrate in drinking water and groundwater levels. *Eur J Clin Invest*. 2001;31(12):1083–1094
339. Richardson BA. Sudden infant death syndrome: a possible primary cause. *J Forensic Sci Soc*. 1994;34(3):199–204
340. Sprott TJ. Cot death: cause and prevention—experiences in New Zealand 1995–2004. *J Nutr Environ Med*. 2004;14(3):221–232
341. Department of Health. *Expert Group to Investigate Cot Death Theories*. London, United Kingdom: Her Majesty's Stationary Office; 1998. Available at: [http://sids-network.org/experts/expert\\_group\\_to\\_investigate\\_cot\\_.htm](http://sids-network.org/experts/expert_group_to_investigate_cot_.htm). Accessed September 6, 2011
342. Blair P, Fleming P, Bensley D, Smith I, Bacon C, Taylor E. Plastic mattresses and sudden infant death syndrome. *Lancet*. 1995;345(8951):720
343. Rubens DD, Vohr BR, Tucker R, O'Neil C A, Chung W. Newborn oto-acoustic emission hearing screening tests: preliminary evidence for a marker of susceptibility to SIDS. *Early Hum Dev*. 2008;84(4):225–229
344. Hamill T, Lim G. Otoacoustic emissions does not currently have ability to detect SIDS. *Early Hum Dev*. 2008;84(6):373
345. Krous HF, Byard RW. Newborn hearing screens and SIDS. *Early Hum Dev*. 2008;84(6):371
346. Farquhar LJ, Jennings P. Newborn hearing screen results for infants that died of SIDS in Michigan 2004–2006. *Early Hum Dev*. 2008;84(10):699
347. Hauck FR, Tanabe KO. SIDS. *Clin Evid (Online)*. 2009; pii: 0315
348. Moon RY, Oden RP, Grady KC. Back to Sleep: educational intervention with Women, Infants, and Children program clients. *Pediatrics*. 2004;113(3 pt 1):542–547
349. Colson ER, Joslin SC. Changing nursery practice gets inner-city infants in the supine position for sleep. *Arch Pediatr Adolesc Med*. 2002;156(7):717–720
350. Moon RY, Calabrese T, Aird L. Reducing the risk of sudden infant death syndrome in child care and changing provider practices: lessons learned from a demonstration project. *Pediatrics*. 2008;122(4):788–798
351. Moon RY, Oden RP. Back to sleep: can we influence child care providers? *Pediatrics*. 2003;112(4):878–882
352. Lerner H, McClain M, Vance JC. SIDS education in nursing and medical schools in the United States. *J Nurs Educ*. 2002;41(8):353–356
353. Price SK, Gardner P, Hillman L, Schenk K, Warren C. Changing hospital newborn nursery practice: results from a statewide “Back to Sleep” nurses training program. *Matern Child Health J*. 2008;12(3):363–371
354. Joyner BL, Gill-Bailey C, Moon RY. Infant sleep environments depicted in magazines targeted to women of childbearing age. *Pediatrics*. 2009;124(3). Available at: [www.pediatrics.org/cgi/content/full/124/3/e416](http://www.pediatrics.org/cgi/content/full/124/3/e416)
355. Yanovitzky I, Blitz CL. Effect of media coverage and physician advice on utilization of breast cancer screening by women 40 years and older. *J Health Commun*. 2000;5(2):117–134
356. Marketing Evolution. *Measuring Media Effectiveness: Comparing Media Contribution Throughout the Purchase Funnel*. New York, NY: Magazine Publishers of America; 2006. Available at: [www.magazine.org/content/Files/MEFullStudy2006.pdf](http://www.magazine.org/content/Files/MEFullStudy2006.pdf). Accessed September 6, 2011

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for a Safe Infant Sleeping Environment**

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

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## **SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment**

Task Force on Sudden Infant Death Syndrome

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## POLICY STATEMENT

# SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment

## abstract

FREE

Despite a major decrease in the incidence of sudden infant death syndrome (SIDS) since the American Academy of Pediatrics (AAP) released its recommendation in 1992 that infants be placed for sleep in a non-prone position, this decline has plateaued in recent years. Concurrently, other causes of sudden unexpected infant death that occur during sleep (sleep-related deaths), including suffocation, asphyxia, and entrapment, and ill-defined or unspecified causes of death have increased in incidence, particularly since the AAP published its last statement on SIDS in 2005. It has become increasingly important to address these other causes of sleep-related infant death. Many of the modifiable and nonmodifiable risk factors for SIDS and suffocation are strikingly similar. The AAP, therefore, is expanding its recommendations from focusing only on SIDS to focusing on a safe sleep environment that can reduce the risk of all sleep-related infant deaths, including SIDS. The recommendations described in this policy statement include supine positioning, use of a firm sleep surface, breastfeeding, room-sharing without bed-sharing, routine immunizations, consideration of using a pacifier, and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs. The rationale for these recommendations is discussed in detail in the accompanying “Technical Report—SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment,” which is included in this issue of *Pediatrics* ([www.pediatrics.org/cgi/content/full/128/5/e1341](http://www.pediatrics.org/cgi/content/full/128/5/e1341)). *Pediatrics* 2011;128:1030–1039

### INTRODUCTION

Sudden infant death syndrome (SIDS) is a cause assigned to infant deaths that cannot be explained after a thorough case investigation, including a scene investigation, autopsy, and review of the clinical history.<sup>1</sup> Sudden unexpected infant death (SUID), also known as sudden unexpected death in infancy, is a term used to describe any sudden and unexpected death, whether explained or unexplained (including SIDS), that occurs during infancy. After case investigation, SUIDs can be attributed to suffocation, asphyxia, entrapment, infection, ingestions, metabolic diseases, arrhythmia-associated cardiac channelopathies, and trauma (accidental or nonaccidental). The distinction between SIDS and other SUIDs, particularly those that occur during an observed or unobserved sleep period (sleep-related infant deaths), such as ac-

### TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

#### KEY WORDS

SIDS, sudden infant death, infant mortality, sleep position, bed-sharing, tobacco, pacifier, immunization, bedding, sleep surface

#### ABBREVIATIONS

SIDS—sudden infant death syndrome  
SUID—sudden unexpected infant death  
AAP—American Academy of Pediatrics

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**TABLE 1** Summary and Strength of Recommendations

Level A recommendations
Back to sleep for every sleep
Use a firm sleep surface
Room-sharing without bed-sharing is recommended
Keep soft objects and loose bedding out of the crib
Pregnant women should receive regular prenatal care
Avoid smoke exposure during pregnancy and after birth
Avoid alcohol and illicit drug use during pregnancy and after birth
Breastfeeding is recommended
Consider offering a pacifier at nap time and bedtime
Avoid overheating
Do not use home cardiorespiratory monitors as a strategy for reducing the risk of SIDS
Expand the national campaign to reduce the risks of SIDS to include a major focus on the safe sleep environment and ways to reduce the risks of all sleep-related infant deaths, including SIDS, suffocation, and other accidental deaths; pediatricians, family physicians, and other primary care providers should actively participate in this campaign
Level B recommendations
Infants should be immunized in accordance with recommendations of the AAP and Centers for Disease Control and Prevention
Avoid commercial devices marketed to reduce the risk of SIDS
Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly
Level C recommendations
Health care professionals, staff in newborn nurseries and NICUs, and child care providers should endorse the SIDS risk-reduction recommendations from birth
Media and manufacturers should follow safe-sleep guidelines in their messaging and advertising
Continue research and surveillance on the risk factors, causes, and pathophysiological mechanisms of SIDS and other sleep-related infant deaths, with the ultimate goal of eliminating these deaths entirely

These recommendations are based on the US Preventive Services Task Force levels of recommendation ([www.uspreventiveservicestaskforce.org/uspstf/grades.htm](http://www.uspreventiveservicestaskforce.org/uspstf/grades.htm)).

Level A: Recommendations are based on good and consistent scientific evidence (ie, there are consistent findings from at least 2 well-designed, well-conducted case-control studies, a systematic review, or a meta-analysis). There is high certainty that the net benefit is substantial, and the conclusion is unlikely to be strongly affected by the results of future studies.

Level B: Recommendations are based on limited or inconsistent scientific evidence. The available evidence is sufficient to determine the effects of the recommendations on health outcomes, but confidence in the estimate is constrained by such factors as the number, size, or quality of individual studies or inconsistent findings across individual studies. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.

Level C: Recommendations are based primarily on consensus and expert opinion.

cidental suffocation, is challenging and cannot be determined by autopsy alone. Scene investigation and review of the clinical history are also required. Many of the modifiable and nonmodifiable risk factors for SIDS and suffocation are strikingly similar. This document focuses on the subset of SUIDs that occurs during sleep.

The recommendations outlined herein were developed to reduce the risk of SIDS and sleep-related suffocation, asphyxia, and entrapment among infants in the general population. As defined by epidemiologists, risk refers to the probability that an outcome will occur given the presence of a particular factor or set of factors. Although all of the 18 recommendations cited below are intended for parents, health care providers, and others who care for infants, the last 4 recommendations are also directed toward health policy

makers, researchers, and professionals who care for or work on behalf of infants. In addition, because certain behaviors, such as smoking, can increase risk for the infant, some recommendations are directed toward women who are pregnant or may become pregnant in the near future.

Table 1 summarizes the major recommendations, along with the strength of each recommendation. It should be noted that there have been no randomized controlled trials with regards to SIDS and other sleep-related deaths; instead, case-control studies are the standard.

Because most of the epidemiologic studies that established the risk factors and on which these recommendations are based include infants up to 1 year of age, these recommendations for sleep position and the sleep envi-

ronment should be used consistently for infants up to 1 year of age. Individual medical conditions might warrant that a physician recommend otherwise after weighing the relative risks and benefits.

For the background literature review and data analyses on which this policy statement and recommendations are based, please refer to the accompanying "Technical Report—SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment," available in the online version of this issue of *Pediatrics*.<sup>2</sup>

## RECOMMENDATIONS

1. Back to sleep for every sleep—To reduce the risk of SIDS, infants should be placed for sleep in a supine position (wholly on the back) for every

sleep by every caregiver until 1 year of life.<sup>3-7</sup> Side sleeping is not safe and is not advised.<sup>4,6</sup>

a. The supine sleep position does not increase the risk of choking and aspiration in infants, even those with gastroesophageal reflux, because they have protective airway mechanisms.<sup>8,9</sup> Infants with gastroesophageal reflux should be placed for sleep in the supine position for every sleep, with the rare exception of infants for whom the risk of death from complications of gastroesophageal reflux is greater than the risk of SIDS (ie, those with upper airway disorders, for whom airway protective mechanisms are impaired),<sup>10</sup> including infants with anatomic abnormalities such as type 3 or 4 laryngeal clefts who have not undergone antireflux surgery. Elevating the head of the infant's crib while the infant is supine is not recommended.<sup>11</sup> It is ineffective in reducing gastroesophageal reflux; in addition, it might result in the infant sliding to the foot of the crib into a position that might compromise respiration.

b. Preterm infants are at increased risk of SIDS,<sup>12,13</sup> and the association between prone sleep position and SIDS among low birth weight infants is equal to, or perhaps even stronger than, the association among those born at term.<sup>14</sup> Preterm infants and other infants in the NICU should be placed in the supine position for sleep as soon as the infant is medically stable and significantly before the infant's antici-

pated discharge, by 32 weeks' postmenstrual age.<sup>15</sup> NICU personnel should endorse safe-sleeping guidelines with parents of infants from the time of admission to the NICU.

c. There is no evidence that placing infants on the side during the first few hours of life promotes clearance of amniotic fluid and decreases the risk of aspiration. Infants in the newborn nursery and infants who are rooming in with their parents should be placed in the supine position as soon as they are ready to be placed in the bassinet.

d. Although data to make specific recommendations as to when it is safe for infants to sleep in the prone or side position are lacking, studies that have established prone and side sleeping as risk factors for SIDS include infants up to 1 year of age. Therefore, infants should continue to be placed supine until 1 year of age. Once an infant can roll from supine to prone and from prone to supine, the infant can be allowed to remain in the sleep position that he or she assumes.

2. Use a firm sleep surface—A firm crib mattress, covered by a fitted sheet, is the recommended sleeping surface to reduce the risk of SIDS and suffocation.

a. A crib, bassinet, or portable crib/play yard that conforms to the safety standards of the Consumer Product Safety Commission and ASTM International (formerly the American Society for Testing and Materials) is recommended.<sup>16</sup> In addition, parents and providers should

check to make sure that the product has not been recalled. Cribs with missing hardware should not be used, and the parent or provider should not attempt to fix broken components of a crib, because many deaths are associated with cribs that are broken or have missing parts (including those that have presumably been fixed). Local organizations throughout the United States can help to provide low-cost or free cribs or play yards for families with financial constraints.

b. Only mattresses designed for the specific product should be used. Mattresses should be firm and maintain their shape even when the fitted sheet designated for that model is used, such that there are no gaps between the mattress and the side of the crib, bassinet, portable crib, or play yard. Pillows or cushions should not be used as substitutes for mattresses or in addition to a mattress. Soft materials or objects such as pillows, quilts, comforters, or sheepskins, even if covered by a sheet, should not be placed under a sleeping infant. If a mattress cover to protect against wetness is used, it should be tightly fitting and thin.

c. Infants should not be placed for sleep on beds because of the risk of entrapment and suffocation.<sup>17,18</sup> In addition, portable bed rails should not be used with infants because of the risk of entrapment and strangulation.

d. The infant should sleep in an area free of hazards, such

as dangling cords, electric wires, and window-covering cords, because they might present a strangulation risk.

- e. Sitting devices, such as car safety seats, strollers, swings, infant carriers, and infant slings, are not recommended for routine sleep in the hospital or at home.<sup>19–23</sup> Infants who are younger than 4 months are particularly at risk, because they might assume positions that can create risk of suffocation or airway obstruction. When infant slings and cloth carriers are used for carrying, it is important to ensure that the infant's head is up and above the fabric, the face is visible, and that the nose and mouth are clear of obstructions.<sup>24</sup> After nursing, the infant should be repositioned in the sling so that the head is up, is clear of fabric, and is not against the adult's body or the sling. If an infant falls asleep in a sitting device, he or she should be removed from the product and moved to a crib or other appropriate flat surface as soon as is practical. Car safety seats and similar products are not stable on a crib mattress or other elevated surfaces.<sup>25–29</sup>
3. Room-sharing without bed-sharing is recommended—There is evidence that this arrangement decreases the risk of SIDS by as much as 50%.<sup>5,7,30,31</sup> In addition, this arrangement is most likely to prevent suffocation, strangulation, and entrapment that might occur when the infant is sleeping in an adult bed.
  - a. The infant's crib, portable crib, play yard, or bassinet should be placed in the parents' bedroom close to the parents' bed. This arrangement reduces SIDS risk and removes the possibility of suffocation, strangulation, and entrapment that might occur when the infant is sleeping in the adults' bed. It also allows close parental proximity to the infant and facilitates feeding, comforting, and monitoring of the infant.
  - b. Devices promoted to make bed-sharing "safe" (eg, in-bed co-sleepers) are not recommended.
  - c. Infants may be brought into the bed for feeding or comforting but should be returned to their own crib or bassinet when the parent is ready to return to sleep.<sup>6,32</sup> Because of the extremely high risk of SIDS and suffocation on couches and armchairs,<sup>3,5,6,31,32</sup> infants should not be fed on a couch or armchair when there is a high risk that the parent might fall asleep.
  - d. Epidemiologic studies have not demonstrated any bed-sharing situations that are protective against SIDS or suffocation. Furthermore, not all risks associated with bed-sharing, such as parental fatigue, can be controlled. Therefore, the American Academy of Pediatrics (AAP) does not recommend any specific bed-sharing situations as safe. Moreover, there are specific circumstances that, in epidemiologic studies, substantially increase the risk of SIDS or suffocation while bed-sharing. In particular, it should be stressed to parents that they avoid the following situations at all times:
    - i. Bed-sharing when the infant is younger than 3 months, regardless of whether the parents are smokers or not.<sup>5,7,31–34</sup>
    - ii. Bed-sharing with a current smoker (even if he or she does not smoke in bed) or if the mother smoked during pregnancy.<sup>5,6,34–36</sup>
    - iii. Bed-sharing with someone who is excessively tired.
    - iv. Bed-sharing with someone who has or is using medications (eg, certain antidepressants, pain medications) or substances (eg, alcohol, illicit drugs) that could impair his or her alertness or ability to arouse.<sup>7,37</sup>
    - v. Bed-sharing with anyone who is not a parent, including other children.<sup>3</sup>
    - vi. Bed-sharing with multiple persons.<sup>3</sup>
    - vii. Bed-sharing on a soft surface such as a waterbed, old mattress, sofa, couch, or armchair.<sup>3,5,6,31,32</sup>
    - viii. Bed-sharing on a surface with soft bedding, including pillows, heavy blankets, quilts, and comforters.<sup>3,38</sup>
  - e. It is prudent to provide separate sleep areas and avoid co-bedding for twins and higher-order multiples in the hospital and at home.<sup>39</sup>
4. Keep soft objects and loose bedding out of the crib to reduce the risk of SIDS, suffocation, entrapment, and strangulation.
  - a. Soft objects, such as pillows and pillow-like toys, quilts, comfort-

- ers, and sheepskins, should be kept out of an infant's sleeping environment.<sup>40–45</sup>
- b. Loose bedding, such as blankets and sheets, might be hazardous and should not be used in the infant's sleeping environment.<sup>3,6,46–51</sup>
  - c. Because there is no evidence that bumper pads or similar products that attach to crib slats or sides prevent injury in young infants and because there is the potential for suffocation, entrapment, and strangulation, these products are not recommended.<sup>52,53</sup>
  - d. Infant sleep clothing that is designed to keep the infant warm without the possible hazard of head covering or entrapment can be used.
5. Pregnant women should receive regular prenatal care—There is substantial epidemiologic evidence linking a lower risk of SIDS for infants whose mothers obtain regular prenatal care.<sup>54–57</sup>
  6. Avoid smoke exposure during pregnancy and after birth—Both maternal smoking during pregnancy and smoke in the infant's environment after birth are major risk factors for SIDS.
    - a. Mothers should not smoke during pregnancy or after the infant's birth.<sup>1,58–61</sup>
    - b. There should be no smoking near pregnant women or infants. Encourage families to set strict rules for smoke-free homes and cars and to eliminate secondhand tobacco smoke from all places in which children and other nonsmokers spend time.<sup>62,63</sup>
    - c. The risk of SIDS is particularly high when the infant bed-
  7. Avoid alcohol and illicit drug use during pregnancy and after birth—There is an increased risk of SIDS with prenatal and postnatal exposure to alcohol or illicit drug use.
    - a. Mothers should avoid alcohol and illicit drugs periconceptionally and during pregnancy.<sup>64–70</sup>
    - b. Parental alcohol and/or illicit drug use in combination with bed-sharing places the infant at particularly high risk of SIDS.<sup>7,37</sup>
  8. Breastfeeding is recommended.
    - a. Breastfeeding is associated with a reduced risk of SIDS.<sup>71–73</sup> If possible, mothers should exclusively breastfeed or feed with expressed human milk (ie, not offer any formula or other non-human milk-based supplements) for 6 months, in alignment with recommendations of the AAP.<sup>74</sup>
    - b. The protective effect of breastfeeding increases with exclusivity.<sup>73</sup> However, any breastfeeding has been shown to be more protective against SIDS than no breastfeeding.<sup>73</sup>
  9. Consider offering a pacifier at nap time and bedtime—Although the mechanism is yet unclear, studies have reported a protective effect of pacifiers on the incidence of SIDS.<sup>3,7,32</sup> The protective effect persists throughout the sleep period, even if the pacifier falls out of the infant's mouth.
    - a. The pacifier should be used when placing the infant for sleep. It does not need to be reinserted once the infant falls asleep. If the infant refuses the pacifier, he or she should not be forced to take it. In those cases, parents can try to offer the pacifier again when the infant is a little older.
  - b. Because of the risk of strangulation, pacifiers should not be hung around the infant's neck. Pacifiers that attach to infant clothing should not be used with sleeping infants.
  - c. Objects such as stuffed toys, which might present a suffocation or choking risk, should not be attached to pacifiers.
  - d. For breastfed infants, delay pacifier introduction until breastfeeding has been firmly established,<sup>74</sup> usually by 3 to 4 weeks of age.
  - e. There is insufficient evidence that finger-sucking is protective against SIDS.
10. Avoid overheating—Although studies have revealed an increased risk of SIDS with overheating,<sup>75–78</sup> the definition of overheating in these studies varied. Therefore, it is difficult to provide specific room-temperature guidelines for avoiding overheating.
    - a. In general, infants should be dressed appropriately for the environment, with no more than 1 layer more than an adult would wear to be comfortable in that environment.
    - b. Parents and caregivers should evaluate the infant for signs of overheating, such as sweating or the infant's chest feeling hot to the touch.
    - c. Overbundling and covering of the face and head should be avoided.<sup>79</sup>

- d. There is currently insufficient evidence to recommend the use of a fan as a SIDS risk-reduction strategy.
11. Infants should be immunized in accordance with recommendations of the AAP and the Centers for Disease Control and Prevention—There is no evidence that there is a causal relationship between immunizations and SIDS.<sup>80</sup> Indeed, recent evidence suggests that immunization might have a protective effect against SIDS.<sup>81–85</sup> Infants should also be seen for regular well-child checks in accordance with AAP recommendations.
  12. Avoid commercial devices marketed to reduce the risk of SIDS—These devices include wedges, positioners, special mattresses, and special sleep surfaces. There is no evidence that these devices reduce the risk of SIDS or suffocation or that they are safe.
    - a. The AAP concurs with the US Food and Drug Administration and Consumer Product Safety Commission that manufacturers should not claim that a product or device protects against SIDS unless there is scientific evidence to that effect.
  13. Do not use home cardiorespiratory monitors as a strategy to reduce the risk of SIDS—Although cardiorespiratory monitors can be used at home to detect apnea, bradycardia, and, when pulse oximetry is used, decreases in oxyhemoglobin saturation, there is no evidence that use of such devices decreases the incidence of SIDS.<sup>84–87</sup> They might be of value for selected infants but should not be used routinely.
 

There is also no evidence that routine in-hospital cardiorespiratory monitoring before discharge from the hospital can identify newborn infants at risk of SIDS.
  14. Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly.
    - a. Although there are no data to make specific recommendations as to how often and how long it should be undertaken, supervised, awake tummy time is recommended on a daily basis, beginning as early as possible, to promote motor development, facilitate development of the upper body muscles, and minimize the risk of positional plagiocephaly.<sup>88</sup>
    - b. Diagnosis, management, and other prevention strategies for positional plagiocephaly, such as avoidance of excessive time in car safety seats and changing the infant's orientation in the crib, are discussed in detail in the recent AAP clinical report on positional skull deformities.<sup>88</sup>
  15. Health care professionals, staff in newborn nurseries and neonatal intensive care nurseries, and child care providers should endorse the SIDS risk-reduction recommendations from birth.<sup>89–91</sup>
    - a. Staff in NICUs should model and implement all SIDS risk-reduction recommendations as soon as the infant is clinically stable and significantly before anticipated discharge.
    - b. Staff in newborn nurseries should model and implement these recommendations beginning at birth and well before anticipated discharge.
  16. Media and manufacturers should follow safe-sleep guidelines in their messaging and advertising.
 

Media exposures (including movie, television, magazines, newspapers, and Web sites), manufacturer advertisements, and store displays affect individual behavior by influencing beliefs and attitudes.<sup>89,91</sup> Media and advertising messages contrary to safe-sleep recommendations might create misinformation about safe sleep practices.<sup>92</sup>
  17. Expand the national campaign to reduce the risks of SIDS to include a major focus on the safe sleep environment and ways to reduce the risks of all sleep-related infant deaths, including SIDS, suffocation, and other accidental deaths. Pediatricians, family physicians, and other primary care providers should actively participate in this campaign.
    - a. Public education should continue for all who care for infants, including parents, child care providers, grandparents, foster parents, and babysitters, and should include strategies for overcoming barriers to behavior change.
    - b. The campaign should continue to have a special focus

on the black and American Indian/Alaskan Native populations because of the higher incidence of SIDS and other sleep-related infant deaths in these groups.

- c. The campaign should specifically include strategies for increasing breastfeeding while decreasing bed-sharing and eliminating tobacco smoke exposure.
  - d. These recommendations should be introduced before pregnancy and ideally in secondary school curricula for both boys and girls. The importance of maternal pre-conceptional health and avoidance of substance use (including alcohol and smoking) should be included in this training.
  - e. Safe-sleep messages should be reviewed, revised, and re-issued at least every 5 years to address the next generation of new parents and products on the market.
18. Continue research and surveillance on the risk factors, causes, and pathophysiological mechanisms of SIDS and other sleep-related infant deaths, with the ul-

timinate goal of eliminating these deaths entirely.

and other primary care providers, should be supported and funded.

- d. Improved and widespread surveillance of SIDS and SUID cases should be implemented and funded.
- e. Federal and private funding agencies should remain committed to all aspects of the aforementioned research.

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#### REFERENCES

1. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol*. 1991; 11(5):677–684
2. Moon RY, American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. Technical report—SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics*. 2011;128(5). Available at: [www.pediatrics.org/cgi/content/full/128/5/e1341](http://www.pediatrics.org/cgi/content/full/128/5/e1341)
3. Hauck FR, Herman SM, Donovan M, et al. Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics*. 2003;111(5 pt 2): 1207–1214
4. Li DK, Petitti DB, Willinger M, et al. Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *Am J Epidemiol*. 2003;157(5):446–455
5. Blair PS, Fleming PJ, Smith IJ, et al. Babies sleeping with parents: case-control study of factors influencing the risk of the sudden infant death syndrome. CESDI SUDI Research Group. *BMJ*. 1999;319(7223):1457–1462
6. Fleming PJ, Blair PS, Bacon C, et al. Environment of infants during sleep and risk of the sudden infant death syndrome: results of 1993–5 case-control study for confidential inquiry into stillbirths and deaths in infancy. Confidential Enquiry Into Stillbirths and Deaths Regional Coordinators and Researchers. *BMJ*. 1996; 313(7051):191–195
7. Carpenter RG, Irgens LM, Blair PS, et al. Sudden unexplained infant death in 20 regions in Europe: case control study. *Lancet*. 2004; 363(9404):185–191
8. Malloy MH. Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: impact of the “Back to Sleep” program. *Pediatrics*. 2002;109(4): 661–665

9. Tablizo MA, Jacinto P, Parsley D, Chen ML, Ramanathan R, Keens TG. Supine sleeping position does not cause clinical aspiration in neonates in hospital newborn nurseries. *Arch Pediatr Adolesc Med.* 2007;161(5):507–510
10. Vandenplas Y, Rudolph CD, Di Lorenzo C, et al. Pediatric gastroesophageal reflux clinical practice guidelines: joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *J Pediatr Gastroenterol Nutr.* 2009;49(4):498–547
11. Tobin JM, McCloud P, Cameron DJ. Posture and gastro-oesophageal reflux: a case for left lateral positioning. *Arch Dis Child.* 1997;76(3):254–258
12. Malloy MH, Hoffman HJ. Prematurity, sudden infant death syndrome, and age of death. *Pediatrics.* 1995;96(3 pt 1):464–471
13. Sowter B, Doyle LW, Morley CJ, Altmann A, Halliday J. Is sudden infant death syndrome still more common in very low birthweight infants in the 1990s? *Med J Aust.* 1999;171(8):411–413
14. Oyen N, Markestad T, Skjaerven R, et al. Combined effects of sleeping position and prenatal risk factors in sudden infant death syndrome: the Nordic epidemiological SIDS study. *Pediatrics.* 1997;100(4):613–621
15. American Academy of Pediatrics, Committee on Fetus and Newborn. Hospital discharge of the high-risk neonate. *Pediatrics.* 2008;122(5):1119–1126
16. US Consumer Product Safety Commission. *Crib safety tips: use your crib safely.* Washington, DC: US Consumer Product Safety Commission. CPSC Document No. 5030. Available at: <http://www.cpsc.gov/cpscpub/pubs/5030.html>. Accessed September 30, 2011
17. Ostfeld BM, Perl H, Esposito L, et al. Sleep environment, positional, lifestyle, and demographic characteristics associated with bed sharing in sudden infant death syndrome cases: a population-based study. *Pediatrics.* 2006;118(5):2051–2059
18. Scheers NJ, Rutherford GW, Kemp JS. Where should infants sleep? A comparison of risk for suffocation of infants sleeping in cribs, adult beds, and other sleeping locations. *Pediatrics.* 2003;112(4):883–889
19. Bass JL, Bull M. Oxygen desaturation in term infants in car safety seats. *Pediatrics.* 2002;110(2 pt 1):401–402
20. Kornhauser Cerar L, Scirica CV, Štucin Gantar I, Osredkar D, Neubauer D, Kinane TB. A comparison of respiratory patterns in healthy term infants placed in car safety seats and beds. *Pediatrics.* 2009;124(3). Available at: [www.pediatrics.org/cgi/content/full/124/3/e396](http://www.pediatrics.org/cgi/content/full/124/3/e396)
21. Côté A, Bairam A, Deschesne M, Hatzakis G. Sudden infant deaths in sitting devices. *Arch Dis Child.* 2008;93(5):384–389
22. Merchant JR, Worwa C, Porter S, Coleman JM, deRegnier RA. Respiratory instability of term and near-term healthy newborn infants in car safety seats. *Pediatrics.* 2001;108(3):647–652
23. Willett LD, Leuschen MP, Nelson LS, Nelson RM Jr. Risk of hypoventilation in premature infants in car seats. *J Pediatr.* 1986;109(2):245–248
24. US Consumer Product Safety Commission. *Infant Deaths Prompt CPSC Warning About Sling Carriers for Babies* [press release]. Washington, DC: US Consumer Product Safety Commission; 2010. Available at: [www.cpsc.gov/cpscpub/prerel/prhtml10/10165.html](http://www.cpsc.gov/cpscpub/prerel/prhtml10/10165.html). Accessed August 27, 2011
25. Desapriya EB, Joshi P, Subzwari S, Nolan M. Infant injuries from child restraint safety seat misuse at British Columbia Children's Hospital. *Pediatr Int.* 2008;50(5):674–678
26. Graham CJ, Kittredge D, Stuemky JH. Injuries associated with child safety seat misuse. *Pediatr Emerg Care.* 1992;8(6):351–353
27. Parikh SN, Wilson L. Hazardous use of car seats outside the car in the United States, 2003–2007. *Pediatrics.* 2010;126(2):352–357
28. Pollack-Nelson C. Fall and suffocation injuries associated with in-home use of car seats and baby carriers. *Pediatr Emerg Care.* 2000;16(2):77–79
29. Wickham T, Abrahamson E. Head injuries in infants: the risks of bouncy chairs and car seats. *Arch Dis Child.* 2002;86(3):168–169
30. Mitchell EA, Thompson JMD. Co-sleeping increases the risk of SIDS, but sleeping in the parents' bedroom lowers it. In: Rognum TO, ed. *Sudden Infant Death Syndrome: New Trends in the Nineties.* Oslo, Norway: Scandinavian University Press; 1995:266–269
31. Tappin D, Ecob R, Brooke H. Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case control study. *J Pediatr.* 2005;147(1):32–37
32. McGarvey C, McDonnell M, Chong A, O'Regan M, Matthews T. Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Arch Dis Child.* 2003;88(12):1058–1064
33. McGarvey C, McDonnell M, Hamilton K, O'Regan M, Matthews T. An 8 year study of risk factors for SIDS: bed-sharing vs. non bed-sharing. *Arch Dis Child.* 2006;91(4):318–323
34. Vennemann M, Hense HW, Bajnowski T, et al. Bed sharing and the risk of SIDS: can we resolve the debate? *J Pediatr.* In press; ePub ahead of print August 21, 2011
35. Arnestad M, Andersen M, Vege A, Rognum TO. Changes in the epidemiological pattern of sudden infant death syndrome in south-east Norway, 1984–1998: implications for future prevention and research. *Arch Dis Child.* 2001;85(2):108–115
36. Scragg R, Mitchell EA, Taylor BJ, et al. Bed sharing, smoking, and alcohol in the sudden infant death syndrome. New Zealand Cot Death Study Group. *BMJ.* 1993;307(6915):1312–1318
37. Blair PS, Sidebotham P, Evason-Coombe C, Edmonds M, Heckstall-Smith EM, Fleming P. Hazardous cosleeping environments and risk factors amenable to change: case-control study of SIDS in south west England. *BMJ.* 2009;339:b3666
38. Fu LY, Hauck FR, Moon R. Bed sharing among black infants and sudden infant death syndrome: interactions with other known risk factors. *Acad Pediatr.* 2010;10(6):376–382
39. Tomashek KM, Wallman C; American Academy of Pediatrics, Committee on Fetus and Newborn. Cobedding twins and higher-order multiples in a hospital setting [published correction appears in *Pediatrics.* 2008;121(1):227]. *Pediatrics.* 2007;120(6):1359–1366
40. Chiodini BA, Thach BT. Impaired ventilation in infants sleeping facedown: potential significance for sudden infant death syndrome. *J Pediatr.* 1993;123(5):686–692
41. Kanetake J, Aoki Y, Funayama M. Evaluation of rebreathing potential on bedding for infant use. *Pediatr Int.* 2003;45(3):284–289
42. Kemp JS, Livne M, White DK, Arfken CL. Softness and potential to cause rebreathing: differences in bedding used by infants at high and low risk for sudden infant death syndrome. *J Pediatr.* 1998;132(2):234–239
43. Kemp JS, Nelson VE, Thach BT. Physical properties of bedding that may increase risk of sudden infant death syndrome in prone-sleeping infants. *Pediatr Res.* 1994;36(1 pt 1):7–11
44. Patel AL, Harris K, Thach BT. Inspired CO<sub>2</sub> and O<sub>2</sub> in sleeping infants rebreathing from bedding: relevance for sudden infant death syndrome. *J Appl Physiol.* 2001;91(6):2537–2545
45. Sakai J, Kanetake J, Takahashi S, Kanawaku Y, Funayama M. Gas dispersal potential of bedding as a cause for sudden infant death. *Forensic Sci Int.* 2008;180(2–3):93–97
46. Brooke H, Gibson A, Tappin D, Brown H. Case-control study of sudden infant death syn-

- drome in Scotland, 1992–5. *BMJ*. 1997;314(7093):1516–1520
47. L'Hoir MP, Engelberts AC, van Well GTJ, et al. Risk and preventive factors for cot death in the Netherlands, a low-incidence country. *Eur J Pediatr*. 1998;157(8):681–688
  48. Markestad T, Skadberg B, Hordvik E, Morild I, Irgens L. Sleeping position and sudden infant death syndrome (SIDS): effect of an intervention programme to avoid prone sleeping. *Acta Paediatr*. 1995;84(4):375–378
  49. Ponsonby AL, Dwyer T, Couper D, Cochrane J. Association between use of a quilt and sudden infant death syndrome: case-control study. *BMJ*. 1998;316(7126):195–196
  50. Beal SM, Byard RW. Accidental death or sudden infant death syndrome? *J Paediatr Child Health*. 1995;31(4):269–271
  51. Wilson CA, Taylor BJ, Laing RM, Williams SM, Mitchell EA. Clothing and bedding and its relevance to sudden infant death syndrome: further results from the New Zealand Cot Death Study. *J Paediatr Child Health*. 1994;30(6):506–512
  52. Thach BT, Rutherford GW, Harris K. Deaths and injuries attributed to infant crib bumper pads. *J Pediatr*. 2007;151(3):271–274
  53. Yeh ES, Rochette LM, McKenzie LB, Smith GA. Injuries associated with cribs, playpens, and bassinets among young children in the US, 1990–2008. *Pediatrics*. 2011;127(3):479–486
  54. Getahun D, Amre D, Rhoads GG, Demissie K. Maternal and obstetric risk factors for sudden infant death syndrome in the United States. *Obstet Gynecol*. 2004;103(4):646–652
  55. Kraus JF, Greenland S, Bulterys M. Risk factors for sudden infant death syndrome in the US Collaborative Perinatal Project. *Int J Epidemiol*. 1989;18(1):113–120
  56. Paris C, Remler R, Daling JR. Risk factors for sudden infant death syndrome: changes associated with sleep position recommendations. *J Pediatr*. 2001;139(6):771–777
  57. Stewart A, Williams S, Mitchell E, Taylor BJ, Ford R, Allen EM. Antenatal and intrapartum factors associated with sudden infant death syndrome in the New Zealand Cot Death study. *J Paediatr Child Health*. 1995;31(5):473–478
  58. MacDorman MF, Cnattingius S, Hoffman HJ, Kramer MS, Haglund B. Sudden infant death syndrome and smoking in the United States and Sweden. *Am J Epidemiol*. 1997;146(3):249–257
  59. Schoendorf KC, Kiely JL. Relationship of sudden infant death syndrome to maternal smoking during and after pregnancy. *Pediatrics*. 1992;90(6):905–908
  60. Malloy MH, Kleinman JC, Land GH, Schramm WF. The association of maternal smoking with age and cause of infant death. *Am J Epidemiol*. 1988;128(1):46–55
  61. Haglund B, Cnattingius S. Cigarette smoking as a risk factor for sudden infant death syndrome: a population-based study. *Am J Public Health*. 1990;80(1):29–32
  62. American Academy of Pediatrics, Committee on Environmental Health; Committee on Substance Abuse; Committee on Adolescence; Committee on Native American Child. Policy statement—tobacco use: a pediatric disease [published correction appears in *Pediatrics*. 2010;125(4):861]. *Pediatrics*. 2009;124(5):1474–1487
  63. Best D; American Academy of Pediatrics, Committee on Environmental Health; Committee on Native American Child Health; Committee on Adolescence. Technical report—secondhand and prenatal tobacco smoke exposure. *Pediatrics*. 2009;124(5). Available at: [www.pediatrics.org/cgi/content/full/124/5/e1017](http://www.pediatrics.org/cgi/content/full/124/5/e1017)
  64. Rajegowda BK, Kandall SR, Falciglia H. Sudden unexpected death in infants of narcotic-dependent mothers. *Early Hum Dev*. 1978;2(3):219–225
  65. Chavez CJ, Ostrea EM Jr, Stryker JC, Smialek Z. Sudden infant death syndrome among infants of drug-dependent mothers. *J Pediatr*. 1979;95(3):407–409
  66. Durand DJ, Espinoza AM, Nickerson BG. Association between prenatal cocaine exposure and sudden infant death syndrome. *J Pediatr*. 1990;117(6):909–911
  67. Ward SL, Bautista D, Chan L, et al. Sudden infant death syndrome in infants of substance-abusing mothers. *J Pediatr*. 1990;117(6):876–881
  68. Rosen TS, Johnson HL. Drug-addicted mothers, their infants, and SIDS. *Ann NY Acad Sci*. 1988;533:89–95
  69. Kandall SR, Gaines J, Habel L, Davidson G, Jessop D. Relationship of maternal substance abuse to subsequent sudden infant death syndrome in offspring. *J Pediatr*. 1993;123(1):120–126
  70. Fares I, McCulloch KM, Raju TN. Intrauterine cocaine exposure and the risk for sudden infant death syndrome: a meta-analysis. *J Perinatol*. 1997;17(3):179–182
  71. Ip S, Chung M, Raman G, Trikalinos TA, Lau J. A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. *Breastfeed Med*. 2009;4(suppl 1):S17–S30
  72. Vennemann MM, Bajanowski T, Brinkmann B, et al; GeSID Study Group. Does breastfeeding reduce the risk of sudden infant death syndrome? *Pediatrics*. 2009;123. Available at: [www.pediatrics.org/cgi/content/full/123/3/e406](http://www.pediatrics.org/cgi/content/full/123/3/e406)
  73. Hauck FR, Thompson J, Tanabe KO, Moon RY, Vennemann M. Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. *Pediatrics*. 2011;128(1):103–110
  74. American Academy of Pediatrics, Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 2005;115(2):496–506
  75. Fleming P, Gilbert R, Azaz Y, et al. Interaction between bedding and sleeping position in the sudden infant death syndrome: a population based case-control study. *BMJ*. 1990;301(6743):85–89
  76. Ponsonby AL, Dwyer T, Gibbons LE, Cochrane JA, Jones ME, McCall MJ. Thermal environment and sudden infant death syndrome: case-control study. *BMJ*. 1992;304(6822):277–282
  77. Ponsonby AL, Dwyer T, Gibbons LE, Cochrane JA, Wang YG. Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *N Engl J Med*. 1993;329(6):377–382
  78. Iyasu S, Randall LL, Welty TK, et al. Risk factors for sudden infant death syndrome among northern plains Indians. *JAMA*. 2002;288(21):2717–2723
  79. Blair PS, Mitchell EA, Heckstall-Smith EM, Fleming PJ. Head covering: a major modifiable risk factor for sudden infant death syndrome: a systematic review. *Arch Dis Child*. 2008;93(9):778–783
  80. Stratton K, Almario DA, Wizemann TM, McCormick MC, eds; Immunization Safety Review Committee. *Immunization Safety Review: Vaccinations and Sudden Unexpected Death in Infancy*. Washington, DC: National Academies Press; 2003
  81. Mitchell EA, Stewart AW, Clements M, Ford RPK. Immunisation and the sudden infant death syndrome. New Zealand Cot Death Study Group. *Arch Dis Child*. 1995;73(6):498–501
  82. Jonville-Béra AP, Autret-Leca E, Barbeillon F, Paris-Llado J; French Reference Centers for SIDS. Sudden unexpected death in infants under 3 months of age and vaccination status: a case-control study. *Br J Clin Pharmacol*. 2001;51(3):271–276
  83. Fleming PJ, Blair PS, Platt MW, Tripp J, Smith IJ, Golding J. The UK accelerated immunisation programme and sudden unexpected death in infancy: case-control study. *BMJ*. 2001;322(7290):822
  84. Hodgman JE, Hoppenbrouwers T. Home monitoring for the sudden infant death

- syndrome: the case against. *Ann NY Acad Sci.* 1988;533:164–175
85. Ward SL, Keens TG, Chan LS, et al. Sudden infant death syndrome in infants evaluated by apnea programs in California. *Pediatrics.* 1986;77(4):451–458
  86. Monod N, Plouin P, Sternberg B, et al. Are polygraphic and cardiopneumographic respiratory patterns useful tools for predicting the risk for sudden infant death syndrome? A 10-year study. *Biol Neonate.* 1986; 50(3):147–153
  87. Ramanathan R, Corwin MJ, Hunt CE, et al. Cardiorespiratory events recorded on home monitors: comparison of healthy infants with those at increased risk for SIDS. *JAMA.* 2001;285(17):2199–2207
  88. Laughlin J, Luerssen TG, Dias MS; American Academy of Pediatrics, Committee on Practice and Ambulatory Medicine, Section on Neurological Surgery. Clinical report—prevention and management of positional skull deformities in infants. *Pediatrics.* 2011; In press
  89. Willinger M, Ko CW, Hoffman HJ, Kessler RC, Corwin MJ. Factors associated with caregivers' choice of infant sleep position, 1994–1998: the National Infant Sleep Position Study. *JAMA.* 2000;283(16):2135–2142
  90. Brenner R, Simons-Morton BG, Bhaskar B, et al. Prevalence and predictors of the prone sleep position among inner-city infants. *JAMA.* 1998;280(4):341–346
  91. Von Kohorn I, Corwin MJ, Rybin DV, Heeren TC, Lister G, Colson ER. Influence of prior advice and beliefs of mothers on infant sleep position. *Arch Pediatr Adolesc Med.* 2010;164(4):363–369
  92. Joyner BL, Gill-Bailey C, Moon RY. Infant sleep environments depicted in magazines targeted to women of childbearing age. *Pediatrics.* 2009;124(3). Available at: [www.pediatrics.org/cgi/content/full/124/3/e416](http://www.pediatrics.org/cgi/content/full/124/3/e416)

## SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment

Task Force on Sudden Infant Death Syndrome

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American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



# Help us to spread the word about safe infant sleep!

- Nearly 4,000 infants die suddenly and unexpectedly each year in the United States. Most of these deaths result from sudden infant death syndrome (SIDS) and other sleep-related causes of infant death, such as accidental suffocation.
- The mission of the national Safe to Sleep® campaign is to educate parents, caregivers, and health care providers about ways to reduce the risk of SIDS and other sleep-related causes of infant death.
- Key ways to reduce the risk of SIDS and other sleep-related causes of infant death include:
  - Always place your baby on his or her back to sleep, for naps and at night.
  - Use a firm sleep surface with a fitted sheet, free from soft objects such as pillows, toys, blankets, and crib bumpers.
  - Room share—keep baby's sleep area separate, but in the same room where parents sleep.
- Since the Safe to Sleep® campaign began in 1994 (then known as Back to Sleep) the overall U.S. SIDS rate has declined by 50% across all racial/ethnic groups!

Help us **spread the word about safe infant sleep** so that these rates continue to decline.

Please visit <http://safetosleep.nichd.nih.gov/> to order **free educational materials** developed by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD). If you have any questions or additional requests, please contact the NICHD Information Resource Center toll free at 1-800-505-CRIB (2742) or by email at [NICHDInformationResourceCenter@mail.nih.gov](mailto:NICHDInformationResourceCenter@mail.nih.gov).



*Eunice Kennedy Shriver* National Institute of Child Health and Human Development



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# What Does a Safe Sleep Environment Look Like?

*Reduce the Risk of Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Causes of Infant Death*



Use a firm sleep surface, such as a mattress in a safety-approved\* crib, covered by a fitted sheet.

Do not use pillows, blankets, sheepskins, or crib bumpers anywhere in your baby's sleep area.

Keep soft objects, toys, and loose bedding out of your baby's sleep area.

Do not smoke or let anyone smoke around your baby.



Make sure nothing covers the baby's head.

Always place your baby on his or her back to sleep, for naps and at night.

Dress your baby in sleep clothing, such as a one-piece sleeper, and do not use a blanket.

Baby's sleep area is next to where parents sleep.

Baby should not sleep in an adult bed, on a couch, or on a chair alone, with you, or with anyone else.

\*For more information on crib safety guidelines, contact the Consumer Product Safety Commission at 1-800-638-2772 or <http://www.cpsc.gov>.



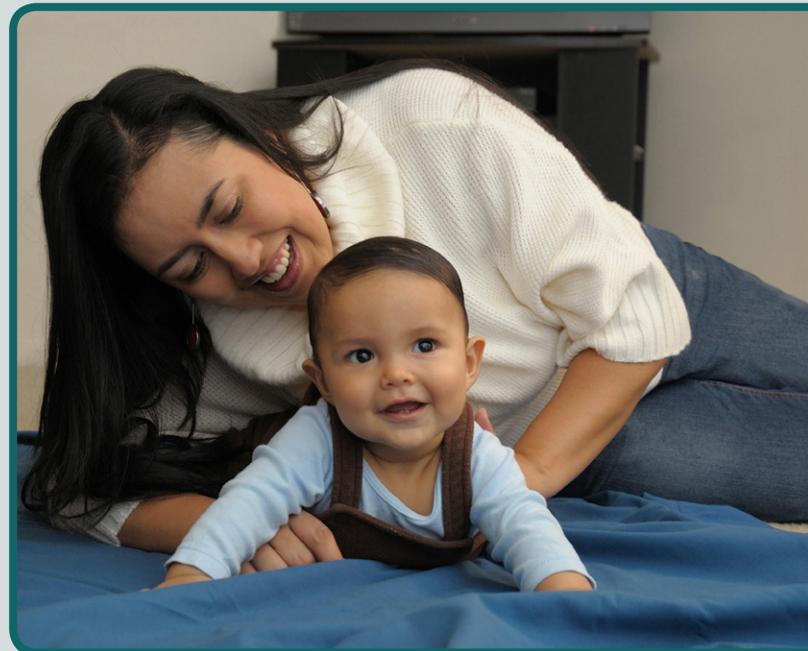
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# Safe Sleep For Your Baby



- Always place your baby on his or her back to sleep, for naps and at night, to reduce the risk of SIDS.
- Use a firm sleep surface, such as a mattress in a safety-approved\* crib, covered by a fitted sheet, to reduce the risk of SIDS and other sleep-related causes of infant death.
- Room sharing—keeping baby's sleep area in the same room where you sleep—reduces the risk of SIDS and other sleep-related causes of infant death.
- Keep soft objects, toys, crib bumpers, and loose bedding out of your baby's sleep area to reduce the risk of SIDS and other sleep-related causes of infant death.
- To reduce the risk of SIDS, women should:
  - Get regular health care during pregnancy, and
  - Not smoke, drink alcohol, or use illegal drugs during pregnancy or after the baby is born.
- To reduce the risk of SIDS, do not smoke during pregnancy, and do not smoke or allow smoking around your baby.
- Breastfeed your baby to reduce the risk of SIDS.
- Give your baby a dry pacifier that is not attached to a string for naps and at night to reduce the risk of SIDS.
- Do not let your baby get too hot during sleep.
- Follow health care provider guidance on your baby's vaccines and regular health checkups.
- Avoid products that claim to reduce the risk of SIDS and other sleep-related causes of infant death.
- Do not use home heart or breathing monitors to reduce the risk of SIDS.
- Give your baby plenty of Tummy Time when he or she is awake and when someone is watching.



## Remember Tummy Time!

Place babies on their stomachs when they are awake and when someone is watching. Tummy Time helps your baby's head, neck, and shoulder muscles get stronger and helps to prevent flat spots on the head.

\* For more information on crib safety guidelines, contact the Consumer Product Safety Commission at 1-800-638-2772 or <http://www.cpsc.gov>.

For more information about SIDS and the Safe to Sleep® campaign:

**Mail:** 31 Center Drive, 31/2A32, Bethesda, MD 20892-2425

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Eunice Kennedy Shriver National Institute  
of Child Health and Human Development



Sudden Infant Death  
Syndrome (SIDS) and  
Other Sleep-Related  
Causes of Infant Death:

## Questions and Answers for Health Care Providers



U.S. DEPARTMENT OF HEALTH AND  
HUMAN SERVICES

National Institutes of Health  
*Eunice Kennedy Shriver* National Institute  
of Child Health and Human Development

# Dear Colleague:

As Director of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), I am pleased to provide this updated version of *Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Causes of Infant Death: Questions and Answers for Health Care Providers*. This booklet lists the latest recommendations on reducing the risk of SIDS and other sleep-related causes of infant death from the American Academy of Pediatrics (AAP) Task Force on SIDS and briefly describes the supporting research.

This piece is among several items that we offer as part of the Safe to Sleep® campaign, an expansion of the Back to Sleep campaign that addresses SIDS as well as other sleep-related causes of infant death.

Why the expanded campaign? Because although we have made great progress in reducing SIDS rates—more than 50 percent since the original AAP recommendation about back sleeping in 1992—there is still much to do. Based on their proportion in the U.S. population, African American and American Indian/Alaska Native infants are at higher risk for SIDS than are white or Hispanic infants. Further, as the SIDS rate has decreased, the rates of other sleep-related causes of infant death—such as accidental suffocation—have increased. As long as our babies are dying, we will continue these efforts.

Your contribution to reducing the risk of these deaths by sharing safe infant sleep messages is critical. Research shows that advice from health care providers makes an impact on parent and caregiver choices with regard to infant sleep position and infant sleep environment.

With this booklet, we aim to capitalize on your influence by providing you with answers to common questions about SIDS and other sleep-related causes of infant death and the scientific rationale that supports these answers, so you can alleviate concerns parents and caregivers might have. I encourage you to read this booklet and to discuss these messages with your patients, with families, and with anyone who cares for infants younger than 1 year of age.

Thank you for all you do to care for infants and to educate parents and caregivers about ways to reduce the risk of SIDS and other sleep-related causes of infant death. Let us continue this important work together to help ensure that all children grow into healthy adults.

Sincerely yours,

Alan E. Guttmacher, M.D.  
Director, NICHD  
National Institutes of Health  
U.S. Department of Health and Human Services

# Research shows: Health care provider advice MATTERS!

Since its beginnings, the Safe to Sleep® campaign (formerly the Back to Sleep campaign) has relied on research evidence as its foundation:

- Research, some of it supported by the NICHD, led to the 1992 recommendation from the American Academy of Pediatrics (AAP) Task Force on SIDS that infants be placed on their backs or sides to sleep to reduce the risk of SIDS.
- Research on the need for widespread education about SIDS and SIDS risk reduction led the NICHD, the AAP, and other collaborators to launch the Back to Sleep campaign in 1994.
- Additional research from the NICHD and other organizations led the AAP Task Force to issue a revised recommendation in 1996 saying that infants should be placed wholly on their backs—the sleep position associated with the lowest risk of SIDS—to reduce the risk of SIDS.
- After research and statistics showed that safe sleep messages were not reaching all groups equally—specifically that they weren't getting into African American and American Indian/Alaska Native communities—the NICHD and its collaborators began tailored outreach efforts to spread risk-reduction messages in these communities.
- Research findings led the NICHD and its collaborators to expand Back to Sleep into the Safe to Sleep® campaign to formally address issues related not only to SIDS, but also to other sleep-related causes of infant death, a safe infant sleep environment, and other infant health issues.



**Now research confirms what we have known all along:** Advice from health care providers makes a difference in parent and caregiver decisions about sleep position and sleep environment.

Parents and caregivers who took part in the NICHD-supported National Infant Sleep Position (NISP) study and other large-scale research efforts reported that advice from a health care provider influenced their decisions to place babies on their backs to sleep and to avoid sharing an adult bed with their baby.<sup>1</sup> Health care provider counseling is also known to influence other kinds of health-risk and health-promoting behaviors as well. For example, a large-scale review and meta-analysis found that advice on weight loss from primary care physicians



had a significant impact on patient attempts to change behaviors related to their weight.<sup>2</sup>

This booklet provides answers to common questions about safe infant sleep recommendations, as well as some of the research evidence and scientific references that support those recommendations. By informing all health care providers about SIDS, other sleep-related causes of infant death, such as accidental suffocation, and ways to reduce the risks for these situations, these important and life-saving messages can better reach parents and communities.

## What advice should health care providers give to parents and caregivers about ways to reduce the risk of SIDS and other sleep-related causes of infant death?

Health care providers should encourage parents and other caregivers to reduce the risk of SIDS and other sleep-related causes of infant death in the following ways:

- **Always place baby on his or her back to sleep, for naps and at night, to reduce the risk of SIDS.** The back sleep position is always the safest position for all babies, including preterm babies. Keep in mind that every sleep time counts.
- **Use a firm sleep surface, such as a mattress in a safety-approved\* crib, covered by a fitted sheet, to reduce the risk of SIDS and other sleep-related causes of infant death.** Firm sleep surfaces can include mattresses in safety-approved\* cribs, bassinets, and portable play areas. Do not use a car seat, carrier, swing, or similar product as the baby's everyday sleep area. Never place babies to sleep on soft surfaces, such as on a couch or sofa, pillows, quilts, sheepskins, or blankets.

\* For more information on crib safety guidelines, call the Consumer Product Safety Commission at 1-800-638-2772 or visit its website at <http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/cribs/>.

■ **Room sharing—keeping the baby’s sleep area in the same room where you or others sleep—reduces the risk of SIDS.** Your baby should not sleep in an adult bed, on a couch, or on a chair alone, with you, or with anyone else. If you bring baby into your bed to feed, make sure to put him or her back in a separate sleep area, such as a safety-approved\* crib, bassinet, or portable play area, in your room next to where you sleep when you are finished.



■ **Keep soft objects, toys, crib bumpers, and loose bedding out of your baby’s sleep area to reduce the risk of SIDS and other sleep-related causes of infant death.** Don’t use pillows, blankets, quilts, sheepskins, or crib bumpers anywhere in your baby’s sleep area. Evidence does not support using crib bumpers to prevent injury. In fact, crib bumpers can cause serious injuries and even death. Keeping them out of baby’s sleep area is the best way to avoid these dangers.



■ **To reduce the risk of SIDS, women should:**

- » Get regular health care during pregnancy, and
- » Not smoke, drink alcohol, or use illegal drugs during pregnancy or after the baby is born.

■ **To reduce the risk of SIDS, do not smoke during pregnancy, and do not smoke or allow smoking around your baby.**

■ **Breastfeed your baby to reduce the risk of SIDS.** Breastfeeding has many health benefits for mother and infant. If you bring your baby into your bed to breastfeed, make sure to put him or her back in a separate sleep area, such as a safety-approved\* crib, bassinet, or portable play area, in your room next to where you sleep when you are finished.

■ **Give your baby a dry pacifier that is not attached to a string for naps and at night to reduce the risk of SIDS.** But don’t force the baby to use it. If the pacifier falls out of the baby’s mouth during sleep, there is no need to put the pacifier back in. Wait until the baby is used to breastfeeding before trying a pacifier.

- **Do not let your baby get too hot during sleep.** Dress your child in no more than one layer of clothing more than an adult would wear to be comfortable. Keep the room at a temperature that is comfortable for an adult.
- **Follow your health care provider's guidance on your baby's vaccines and regular health checkups.**
- **Avoid products that claim to reduce the risk of SIDS and other sleep-related causes of infant death.** These wedges, positioners, and other products have not been tested for safety or effectiveness.
- **Do not use home heart or breathing monitors to reduce the risk of SIDS.** If you have questions about using monitors for other health conditions, talk with your child's health care provider.
- **Give your infant plenty of Tummy Time when he or she is awake, and when someone is watching.** Supervised Tummy Time helps the baby's neck, shoulder, and arm muscles get stronger. It also helps to prevent flat spots on the back of your baby's head. Holding the baby upright and limiting time in carriers and bouncers can also help prevent flat spots on the back of the baby's head.

## What is SIDS?

SIDS is defined as the sudden death of an infant younger than 1 year of age that remains unexplained after a thorough case investigation, including performance of a complete autopsy, thorough examination of the death scene, and review of the infant's and family's clinical histories.<sup>3</sup>

SIDS is associated with a sleep period but is unpredictable. It is often referred to as a "diagnosis of exclusion" because it is determined only after ruling out other causes of death, including suffocation, infection, or other illnesses. A diagnosis of SIDS is made by collecting information and conducting forensic tests, and by talking with parents, other caregivers, and health care providers.<sup>4</sup> In the absence of an identifiable cause of death after this process, infant fatalities may be diagnosed as SIDS.<sup>5</sup>

# What are Sudden Unexpected Infant Death (SUID) and sleep-related causes of infant death?

SIDS is not the cause of every sudden infant death. Each year in the United States, thousands of infants die suddenly of no immediately obvious cause. These deaths are classified as **SUID**. SUID is the death of an infant younger than 1 year of age that occurs suddenly and unexpectedly.

SUID includes all unexpected deaths: Those without a clear cause, such as SIDS, and those from a known cause, such as accidental suffocation. Many unexpected infant deaths are accidents, but a disease or another external factor, such as poisoning or neglect, can also cause an infant to die unexpectedly. One-half of SUID cases are SIDS.<sup>6</sup>

**Sleep-related causes of infant death** are those linked to how or where a baby sleeps or slept. They are due to accidental causes, such as: Suffocation; entrapment, when baby gets trapped between two objects, such as a mattress and wall, and can't breathe; or strangulation, when something presses on or wraps around baby's neck, blocking baby's airway. These deaths are not SIDS.

## What sleep position is safest for term babies in hospital nurseries?

Healthy babies who are born at term **should be placed wholly on their backs to sleep in hospital nurseries.** Keep in mind that term includes early term (37 or 38 weeks) births, full-term (39 or 40 weeks) births, or late-term (41 or 42 weeks) births.<sup>7,8</sup> Research shows that mothers and caregivers often use the same sleep position for their babies at home that they see being used at the hospital.<sup>9,10</sup> Therefore, all hospital nursery personnel should place babies on their backs to sleep—for naps and at night.



Nursery staff sometimes believe that newborn infants need be on their sides to clear their airways of amniotic fluid. There is no evidence to suggest that such fluid is cleared more readily while in the side position. The AAP recommends

that infants be placed on their backs as soon as they are ready to be placed in a bassinet.<sup>11</sup>

Health care providers should also expressly tell parents and caregivers that babies should sleep on their backs for all sleep times, for naps and at night, once they go home to reduce the risk of SIDS.

## Should preterm infants be placed on their backs for sleep?



Yes. Research shows that preterm infants are at higher risk for SIDS simply because they were born preterm, defined as before 37 weeks' gestation; therefore, placing preterm infants on their backs for sleep is a critically important way to reduce the risk of SIDS.<sup>12, 13</sup>

Preterm infants who have active respiratory disease may have improved oxygenation if they are placed on their stomachs. Thus, the stomach sleep position during acute respiratory disease may be appropriate for infants in a highly monitored, inpatient setting. Because preterm babies often

remain in the hospital for several days to weeks before discharge, the AAP Task Force recommends that these infants be placed on their backs to sleep as soon as possible after the respiratory condition has stabilized.<sup>14</sup> This practice will allow parents and caregivers to become familiar with the position they should use at home.

In addition, providers should clearly state and strongly recommend that parents and caregivers be especially diligent about making sure their infants are placed in the back sleep position for every sleep time to reduce the risk of SIDS. Epidemiological studies have shown that, when placed on their stomachs to sleep at home, low birth weight or preterm babies may be at higher risk for SIDS than babies born at or after 37 weeks' gestational age.<sup>15</sup>

## Is the side position as effective as the back sleep position in reducing the risk of SIDS?

No, the side position is not considered a safe alternative to the back sleep position. Studies show that the side sleep position is unstable and increases the chance that infants will roll onto their stomachs—the sleep position associated with the highest SIDS risk.<sup>16</sup>

The AAP Task Force recommends that infants be placed **wholly on their backs** to sleep for naps and at night to reduce the risk of SIDS.

## Can infants be placed to sleep on their stomachs for naps or for short periods of rest?

This practice is not recommended. Studies show that babies who are used to sleeping on their backs, but who are then placed on their stomachs or sides to sleep, such as for a nap, are at *significantly* higher risk for SIDS.<sup>17</sup> This risk is actually greater—sometimes seven to eight times greater—than that of infants who are always placed on their stomachs or sides to sleep.<sup>18</sup>

Evidence suggests that secondary caregivers and child care providers are not always aware of the increased risk from unaccustomed sleep position.<sup>19,20</sup> Therefore, health care providers, parents, and caregivers need to be very clear in recommending that everyone who cares for baby—including grandparents, child care providers, and babysitters—knows that babies should be placed on their backs to sleep for naps and at night, and that every sleep time counts.

## Are there any circumstances when babies should be placed on their stomachs to sleep?

Healthy babies should always be placed on their backs to sleep for naps and at night.

Babies with certain upper-airway malformations (e.g., Robin syndrome) may have acute airway obstructive episodes that are relieved by prone positioning.<sup>21</sup> However, these cases are rare; health care providers should clearly state the reasons for the prone recommendation to the parents and caregivers in these cases.

There has been concern about aspiration among babies diagnosed with gastroesophageal reflux who are placed in the back position for sleep. Current evidence suggests that even infants with gastroesophageal reflex should be placed on their backs to sleep, with the rare exception of infants for whom the risk of death from gastroesophageal reflux is greater than the risk of SIDS.<sup>22</sup>

There may be other infants for whom the risk/benefit balance favors stomach sleeping. Health care providers should consider the potential benefit to the infant when recommending sleep position.

If medical personnel determine that the stomach sleep position is necessary because of a medical condition or other concern, health care providers should advise parents and caregivers to reduce the risk of SIDS in other ways, such as by avoiding soft bedding and ensuring that infants do not overheat during sleep. For most infants, however, stomach and side sleeping are not advised.<sup>23</sup>

## Will babies aspirate if they regurgitate while sleeping on their backs?

There is no evidence that aspiration is more common among healthy infants who sleep in the supine position than among healthy infants who sleep in the prone position.<sup>24, 25</sup> Furthermore, in countries (including the United States) that have seen a major change in infant sleep position—from mainly stomach sleeping to mostly back sleeping—the incidence of serious or fatal choking has not increased.<sup>26</sup>

In fact, babies may actually clear secretions better when placed on their backs. When babies are in the back sleep position, the trachea lies on top of the esophagus (see Figure 1). Anything regurgitated or refluxed from the esophagus must work against gravity to be aspirated into the trachea.

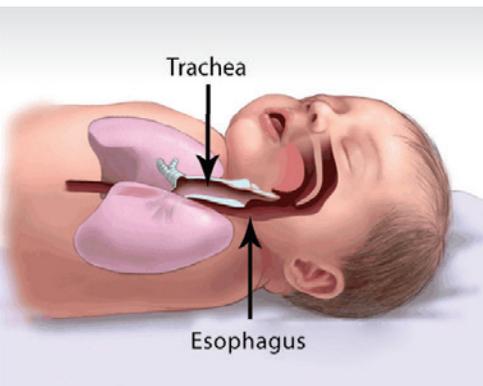


Figure 1

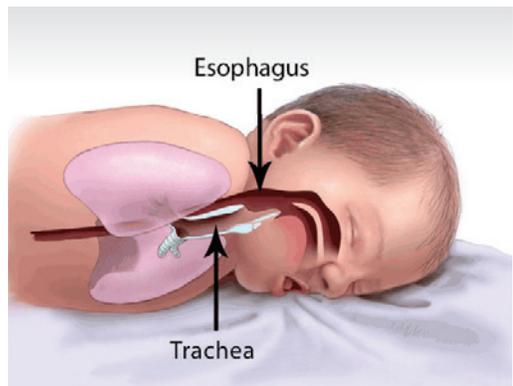


Figure 2

Conversely, when an infant is in the stomach sleep position, anything regurgitated or refluxed will pool at the opening of the trachea, making it easier for the infant to aspirate (see Figure 2). Also, chemosensitive tissue that initiates the reflex is more prominent on the posterior versus anterior pharyngeal wall, thus suggesting an even greater protection against aspiration when the baby is lying on his or her back.

Of the very few reported cases of death due to choking, most of the infants were in the stomach sleep position.

## **Should parents or caregivers be advised to reposition their infant if he or she rolls onto the stomach from the back position?**

Studies show that, during early infancy, it is unusual for a baby who is placed in the back sleep position to roll onto his or her stomach.<sup>27</sup> However, once infants are more developmentally advanced, they often roll over on their own. In this situation, when infants roll over on their own, there is no evidence that they need to be repositioned to reduce the risk of SIDS. It is most important that the infant starts sleep in the back sleep position for every sleep time. Keeping the sleep area clear of soft or loose bedding also increases safety for the infant if he or she rolls onto the stomach.

## **What is the best sleep surface for reducing the risk of SIDS and other sleep-related causes of infant death?**

A firm sleep surface, such as a mattress in a safety-approved\* crib, bassinet, or portable play area, covered by a fitted sheet, is associated with the lowest risk of SIDS and other sleep-related causes of infant death.

Sleeping on soft surfaces or soft bedding, such as quilts, duvets, and pillows, is associated with increased risk of SIDS. Sleeping under soft bedding, particularly pillows, quilts, and extra bedding, is also associated with increased risk of accidental suffocation.<sup>28</sup>

\* For more information on crib safety guidelines, call the Consumer Product Safety Commission at 1-800-638-2772 or visit its website at <http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/cribs/>.



In addition, infants should not be placed on adult mattresses, beds, sofas, or chairs for sleep. These surfaces are typically softer than mattresses in safety-approved\* cribs. Consequently, they pose additional risks for other sleep-related causes of infant death, such as entrapment (between the mattress and the wall) and accidental suffocation.

Car seats and other sitting devices, such as strollers, swings, infant carriers, and infant slings (for extended sleep periods), also are not recommended for routine sleep, but this recommendation is related more to sleep

position than to sleep surface. Infants younger than 1 month who are placed in sitting devices for sleep might be at increased risk of upper airway obstruction and oxygen desaturation.<sup>29</sup> Increased rates of injuries resulting from car seats being placed on elevated surfaces and then falling have also been reported; in some cases, this situation results in suffocation.

## Does bed sharing reduce the risk of SIDS?

**Current evidence does not support bed sharing as a protective strategy against SIDS.** On the contrary, evidence is growing that bed sharing increases the risk for SIDS and other sleep-related causes of infant death, such as accidental suffocation and entrapment, or injury.



A mother room sharing with her infant.

To communicate the risk of SIDS and other sleep-related causes of infant death to parents and caregivers effectively, it is important to understand the meanings of the terms—bed sharing, co-sleeping, and room sharing—defined below.

■ **Room sharing:** When an infant sleeps in the same room as parents, but in a separate sleep area, such as a crib, bassinet, or play yard next to an adult bed. **Room sharing is known to reduce the risk of SIDS and other sleep-related causes of infant death and is recommended by the AAP.**

- **Bed sharing:** When an infant sleeps on the same surface as another person. This surface can be a bed, couch, or chair. Sleeping with a baby in an adult bed increases the risk of accidental suffocation and other sleep-related causes of infant death.
- **Co-sleeping:** When a parent and infant sleep in close proximity to one another, either on the same surface or on different surfaces. This is done so that they are able to see, hear, and/or touch each other. Co-sleeping can refer to either room sharing or bed sharing.

Bed sharing and co-sleeping are often used interchangeably, but they mean different things. Room sharing is a fairly new term and is recommended by the AAP to aid in feeding, comforting, and monitoring the infant. Room sharing without bed sharing has also been shown to reduce the risk of SIDS by half.

Bed sharing among infants and family members, particularly among adults and infants, is common in many cultures.<sup>30</sup> Many mothers share a bed with their infants because it makes breastfeeding easier and enhances bonding. Even though some believe that bed sharing may reduce the risk of SIDS because the parent is nearby to monitor the baby, *studies do not support bed sharing as a protective strategy for SIDS.*<sup>31</sup>

Bed sharing is very risky when:

- The adult smokes cigarettes or has consumed alcohol or medication that causes drowsiness.<sup>32, 33, 34</sup>
- The baby shares a bed with other people or with more than one person.<sup>35, 36</sup>
- The sleep surface is a couch or sofa.<sup>37, 38, 39</sup>
- The baby is younger than 11 to 14 weeks of age.<sup>40, 41, 42</sup>
- The mattress on the shared adult bed is softer than a safety-approved\* crib mattress.<sup>43, 44</sup>

\* For more information on crib safety guidelines, call the Consumer Product Safety Commission at 1-800-638-2772 or visit its website at <http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/cribs/>.

## Does bed sharing reduce the risk of other sleep-related causes of infant death?

**No. Sleeping with a baby in an adult bed increases the chance for overlay or suffocation.**

Room sharing—having baby's sleep area in the same room where parents sleep—is less risky than bed sharing because it eliminates the possibility of an adult rolling on to the baby and other similar injuries. It is also recommended by the AAP. Sharing a room with baby allows for easy monitoring and offers many bonding opportunities. It also makes breastfeeding easier.

Mothers who bring baby into their bed to feed should return the infant to a separate sleep area, such as a safety-approved\* crib, in their room next to where they sleep.

## Can twins and multiples be placed in the same crib or bassinet to sleep?

Twins and higher-order multiples should have separate sleep areas. The potential for overheating and rebreathing is higher among infants who share a bed, increasing the chance of accidental suffocation. In addition, most twins who share a bed are placed on their sides to sleep rather than on the back, putting them at increased risk for SIDS.<sup>45</sup>

Co-bedding twins and higher-order multiples in the hospital setting might encourage parents to continue this practice at home. Therefore, infants should be placed in their own bassinets in the hospital nursery as soon as possible after birth. Parents and caregivers should also be advised to provide separate sleep areas in the home.

\* For more information on crib safety guidelines, call the Consumer Product Safety Commission at 1-800-638-2772 or visit its website at <http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/cribs/>.

## Should crib bumpers be used in the baby's sleep area?

No. Evidence does not support using crib bumpers (sometimes called bumper pads) or similar products that attach to the crib sides or slats to prevent injury. Statistics actually suggest the products may be harmful. A recent study of crib injuries concluded that the risk of suffocation or strangulation from using crib bumpers far outweighed the potential benefits of using them to prevent minor injuries.<sup>46</sup> In fact, crib bumpers can cause serious injuries and even death. Stricter crib safety standards requiring crib slat spacing to be less than 2 <sup>3</sup>/<sub>8</sub> inches eliminated the need to use the bumpers to prevent infants from falling through the slats.<sup>47</sup>

## Is it safe to put other items in the crib, such as blankets or stuffed toys?

Parents and caregivers should be advised to keep soft objects, toys, and loose bedding out of the infant's sleep area. Loose bedding and other items in the baby's sleep area could end up covering the baby's face. This puts the baby at higher risk for rebreathing air that is low in oxygen and for suffocation or strangulation.<sup>48</sup> Pillows, quilts, comforters, sheepskins, and other soft items are hazardous when placed under the infant or loose in the infant's sleep area. Research shows that they can increase the risk for SIDS up to fivefold, regardless of the sleep position.

## Can swaddling reduce the risk of SIDS?

Research on whether swaddling—wrapping the infant in a light blanket—might reduce the risk for SIDS is inconclusive. Many cultures and nurseries have traditionally used swaddling as a strategy to soothe infants, and in some cases, encourage sleep in the back position. However, statistics clearly show that incorrect swaddling can lead to injury and sometimes death. Studies have found that incorrect swaddling can cause hip and shoulder dysplasia, head covering, and strangulation.<sup>49</sup> Parents and caregivers should be advised to use caution if they decide to swaddle an infant. Swaddling also does not reduce the necessity to follow other recommended safe sleep practices. The AAP offers guidelines for safe swaddling at <http://www.healthychildren.org/English/ages-stages/baby/diapers-clothing/pages/Swaddling-Is-it-Safe.aspx>.

## Does prenatal care play a role in reducing the risk of SIDS?



There is evidence linking a lower risk of SIDS with obtaining regular prenatal care.<sup>50</sup> Risk of SIDS is particularly increased for women who seek prenatal care late in their pregnancy, that is, in the third trimester, or not at all.<sup>51</sup> Women should seek prenatal care early in the pregnancy and continue to obtain regular prenatal care during the entire pregnancy.

## How do smoking during pregnancy and second-hand smoke in the pregnant woman's and infant's environment affect the risk of SIDS?

Smoking during pregnancy and smoke in the infant's environment contribute to an increased SIDS risk.<sup>52, 53</sup> In fact:

- Infants whose mothers smoke during or after pregnancy are at an overall greater risk of SIDS.<sup>54</sup>
- Infants born to mothers who smoked during pregnancy are twice as likely to die of SIDS.<sup>55</sup>
- Exposure to passive smoke in the household doubles a baby's SIDS risk.<sup>56</sup>

Exactly how smoking during pregnancy and passive smoke in the environment increase SIDS risk is not clear, but smoking may negatively affect development of the fetal nervous system. Studies of the mechanisms underlying the association between smoking and SIDS have found that during the last half of pregnancy changes occur in nicotine-binding sites in the fetal brain stem, specifically in areas involved with arousal from sleep, heart and breathing functions, sleep, and body movement control.<sup>57</sup> Also, infants whose mothers smoked during pregnancy and who died from SIDS had a higher nicotine concentration in their lung tissue than do infants who did not die from SIDS.<sup>58</sup> This finding supports the statement that postnatal environmental tobacco smoke exposure plays a role in SIDS risk.<sup>59,60</sup> However, the mechanism for the association between thirdhand smoke and SIDS is unknown.

## Does maternal substance use—smoking, alcohol, and illicit drugs—during pregnancy or after delivery affect SIDS risk?

Evidence shows that women who smoke, drink alcohol, or use illegal drugs during pregnancy or after the baby is born put their infant at increased risk of SIDS. Maternal smoking during pregnancy is a major risk factor in almost every epidemiologic study of SIDS.<sup>61</sup> Similarly, an infant's exposure to alcohol and illicit drugs in the womb increases his or her risk of SIDS. One study of Northern Plains American Indians found that alcohol consumption (particularly binge drinking) during the periconceptional phase and the first trimester were associated with increased SIDS risk.<sup>62</sup> Another study showed infants were at increased risk for SIDS when their mother used cocaine or other illicit drugs while pregnant.<sup>63</sup> For these and other reasons, women should not smoke, drink, or use drugs during pregnancy or after delivery.

## Does breastfeeding reduce the risk of SIDS?

Studies show that babies who are breastfed are at lower risk of SIDS than are nonbreastfed babies.<sup>64, 65, 66</sup> The evidence in these published reports supports the protective role of breastfeeding on SIDS. In one of the cited reports, this protective effect was more pronounced with exclusive breastfeeding.

Physiologic studies show that breastfed infants are more easily aroused from sleep than their formula-fed counterparts, which might explain some of the protective effect of breastfeeding against SIDS.<sup>67</sup>

In addition, breastfeeding offers other health benefits, including decreased incidence of diarrhea, upper and lower respiratory infections, and other infectious diseases, which are associated with an increased susceptibility to SIDS.<sup>68</sup>

The AAP recommends that, unless contraindicated by health problems, women exclusively breastfeed their infants for at least the first 6 months after birth.<sup>69</sup>



## Do pacifiers reduce the risk of SIDS?



Yes. Several studies have found that infants who used pacifiers during their last sleep were at significantly lower risk of SIDS compared with infants who did not use pacifiers.<sup>70, 71</sup> A meta-analysis reinforced findings of the protective effect of pacifiers against SIDS.<sup>72</sup> The protective effect persists throughout the sleep period, even if the pacifier falls out of the infant's mouth. The exact mechanism for this protective effect is unclear, but lowered sleep arousal thresholds, favorable modification of autonomic control during sleep, and maintaining airway patency during sleep have been proposed.<sup>73</sup>

The AAP Task Force recommends the use of pacifiers within the following parameters:

- Parents and caregivers should offer the pacifier, but should not force the infant to take it if she or he refuses it.
- Pacifiers should be clean and dry and not coated with anything sweet or sticky.
- Pacifiers should not be attached to infant clothing by a string or tether.
- If the pacifier falls out of the infant's mouth during sleep, there is no need to reinsert it.
- Parents should wait until breastfeeding is well established before introducing a pacifier.

## If blankets and other items should not be used in the sleep area, how can parents and caregivers keep their baby warm during sleep?

Babies should be kept warm during sleep, but not too warm. Studies show that an overheated baby is more likely to go into a deep sleep from which it is difficult to arouse.<sup>74, 75, 76, 77, 78</sup> Some evidence indicates that increased SIDS risk is associated with excessive clothing or blankets and a higher room temperature.

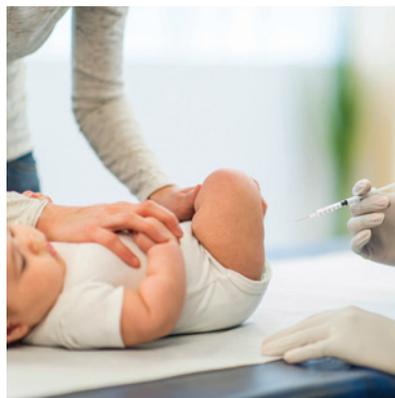
In general, if the room temperature is comfortable for an adult, then it is also warm enough for an infant.<sup>79</sup> Parents and caregivers should be advised to dress the baby in no more than one layer more of clothing than an adult would wear to be comfortable. Infant sleep clothing, such as a wearable blanket or one-piece sleeper, can be used to keep the baby warm during sleep without using a blanket in the sleep area.

The increased retention of body heat—through excessive insulation from bedding and clothing—can be dangerous for some infants and may contribute to SIDS.<sup>80, 81</sup> Head covering during sleep is a particular concern. One study found a sevenfold increase in the risk of SIDS associated with head covering.<sup>82</sup> Studies have also found that overheating may increase the risk of SIDS for a baby who has a cold or infection.<sup>83</sup>

## Do vaccinations have a protective effect against SIDS?

Receiving recommended vaccinations may have a protective effect against SIDS. Some research shows that immunizations reduce the risk of SIDS by 50 percent.<sup>84</sup> Additional research has shown no causal relationship between immunizations and SIDS.

Advising parents to follow the vaccination schedule and attend all well-baby visits will help ensure infants are immunized and monitored according to AAP and Centers for Disease Control and Prevention recommendations. See the immunization schedule published by the Advisory Committee on Immunization Practices at <http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html>.



## Can use of products such as wedges and positioners prevent SIDS?

Wedges, positioners, and other devices that claim to be able to prevent SIDS or correctly position infants for sleep are not recommended. These products have not been tested for safety or effectiveness. In fact, the Consumer Product Safety Commission (CPSC) has reports of deaths attributable to accidental suffocation and entrapment associated with wedges and positioning devices. Most of these deaths occurred when infants were placed in the prone or side-lying position with these devices. The infant can roll onto his or her stomach and become trapped and suffocate between the device and side of the crib or bassinet. Also, the infant's movement can cause the nose and mouth to press into or underneath the device, posing a risk for suffocation. This is particularly true for products made with foam rubber or Memory Foam™.

The U.S. Food and Drug Administration, the CPSC, and the AAP warn against using any of these products because of the dangers they pose to babies. To read the warning, visit <http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm227575.htm>.

## Does electronic cardiorespiratory monitoring prevent or detect SIDS?

No. Such monitors are not recommended as a strategy for preventing or detecting SIDS.

In the past, health care providers considered the use of cardiorespiratory monitors for reducing SIDS risk in certain groups, such as siblings in families that had previously lost a child from SIDS. However, no national consensus deems this practice as necessary or effective. The NICHD-funded Collaborative Home Infant Monitoring Evaluation (CHIME) study, which used specially designed electronic monitors in the home to detect cardiorespiratory events in infants, raised serious questions about the relationship between SIDS and events detected by home monitors.<sup>86</sup> For this reason, home monitors are not recommended as a way to reduce the risk of SIDS.

The AAP Task Force supports the conclusions from the CHIME study in recommending against using home monitors as a strategy to prevent SIDS.<sup>86, 87</sup>

There may still be circumstances in which clinicians will prescribe a home monitor for an infant who has already had a life-threatening event or for those considered at particularly high risk for airway obstruction, such as those with

persistent apnea of prematurity, those with congenital airway malformations, or those who are being positioned prone during sleep for specific medical or surgical reasons. These monitors are not prescribed to prevent or detect SIDS.

## Does back sleeping cause positional plagiocephaly or brachycephaly?

Plagiocephaly—a flattened or misshapen head—can occur for various reasons. Positional plagiocephaly results from an infant being placed in the same position (usually on the back) for long periods of time. Brachycephaly (flattening of the back of the skull) may occur along with positional plagiocephaly. The primary causes of positional plagiocephaly and brachycephaly are: Too little time spent upright; too little Tummy Time when the baby is awake and supervised; and too much time in car seats, carriers, and bouncers.

Positional plagiocephaly and brachycephaly are usually harmless and often disappear on their own within the months after babies start to sit up. There is no evidence to suggest that such flat spots are harmful to infants or that they are associated with any permanent effects on head shape.<sup>88, 89</sup>

Many cases of positional plagiocephaly can be prevented (and sometimes corrected) by repositioning, which relieves pressure from the back of an infant's head.<sup>90</sup> Techniques for repositioning include:

- Alternating the baby's head position when he or she is placed to sleep so that the baby is not always sleeping on the same side of the head
- Changing the direction the baby faces in the crib every week or so (feet at one end of the crib one week, at the other end of the crib the next week)
- Periodically moving the crib around the room so the infant has to turn his or her head in different directions to see what is going on
- Getting "cuddle time" with the baby by holding him or her upright over one shoulder often during the day
- Limiting the amount of time the baby spends in car seats, carriers, swings, and bouncy seats

In addition, getting ample supervised Tummy Time is also important for reducing the likelihood of positional plagiocephaly.

Positional plagiocephaly is very different from craniosynostosis (premature fusion of the sutures of the skull), congenital muscular torticollis (twisted

neck present at birth), and other types of plagiocephaly. These other types of plagiocephaly often require special molding helmets or surgery to correct.<sup>91</sup>

## Can babies ever be placed on their stomachs?



Yes. Infants need Tummy Time when they are awake and when someone is watching them. Supervised Tummy Time strengthens muscles in the shoulders and neck that help infants to achieve developmental milestones. It also helps to prevent flat spots on the infant's head.

Health care providers should advise parents and caregivers that a certain amount of Tummy Time is a very important and necessary part of an infant's development. Infants need two or three sessions of supervised Tummy Time every day. Older babies need even more Tummy

Time to help their bodies get ready to sit up, roll over, crawl, and walk. Tummy Time should begin as early as possible to promote motor development, facilitate development of the upper body muscles, and minimize the risk of positional plagiocephaly.<sup>92</sup>

## What advice should health care providers give to parents or caregivers whose infants have difficulty sleeping in the back position?

Although the baby's comfort is important, safety is more important. Parents and caregivers should be advised to place infants on their backs to sleep even if they seem less comfortable or sleep more lightly than when on their stomachs. It is helpful to understand that, compared with infants sleeping on their backs, infants who are placed on their stomachs sleep more deeply, are less reactive to noise, experience less movement, and are less able to arouse from sleep. It is theorized that these factors may put an infant at higher risk of SIDS.

It is true that some infants who lie on their backs do not sleep as deeply as those who lie on their stomachs. Similarly, infants who are placed on their backs to sleep may be fussy or cry. For information you can share with parents about how to help babies get to sleep while on their backs and sleep through the

night, visit <http://www.healthychildren.org/english/ages-stages/baby/sleep/Pages/default.aspx>.

Moreover, while some parents report that using swings or swaddling helps to calm babies, there are no large studies showing efficacy of these practices in reducing the risk of SIDS.<sup>93</sup> It also is important to note that swaddling does not reduce the necessity to follow other recommended safe infant sleep practices.



## For babies in child care, what advice should health care providers give to parents and caregivers about reducing the risk of SIDS?

Health care providers should strongly recommend that parents and caregivers be especially diligent about making sure infants are placed to sleep on their backs with nothing else in the sleep area, for every sleep time: For naps, at night, **and while in child care**. Consider the following:

- NICHD-supported research and other studies found that infants who are accustomed to sleeping on their backs but who are then placed to sleep on their stomachs or sides are at very high risk of SIDS.<sup>94</sup> This risk is actually greater than the increased SIDS risk experienced by infants who are always placed on their stomachs or sides to sleep.<sup>95</sup> If parents and caregivers place an infant to sleep on his or her back at home, but child care providers use a different sleep position, the infant is at significantly higher risk for SIDS.
- In the United States, approximately 20 percent of SIDS deaths occur while the infant is in the care of a child care provider.<sup>96</sup> This finding is significant, given that more than 61 percent of children younger than 5 years of age are in some type of child care at least some of the time.<sup>97</sup>
- Many child care deaths are associated with the stomach sleep position, especially when the infant is unaccustomed to being placed in that position for sleep.



- Despite the Safe to Sleep® campaign (formerly Back to Sleep) and other SIDS and safe infant sleep awareness campaigns, many child care providers continue to place infants to sleep on their stomachs. Surveys have documented that some secondary caregivers, even licensed child care center workers, are either unaware of or are misinformed about the dangers of placing infants to sleep on their stomachs.<sup>98</sup>
- Although child care providers are more likely to use the back sleep position when centers have written sleep policies, licensed child care centers seldom have such policies.<sup>99</sup> Studies have found that education programs for child care providers are effective both in increasing knowledge of safe infant sleep positioning and in promoting the development of written policies on sleep position.<sup>100</sup>

**Based on the evidence, consistency in sleep position is extremely important for reducing the risk of SIDS.** It is crucial that parents and caregivers tell everyone who cares for their baby—including grandparents, child care providers, and babysitters—that the infant be placed on his or her back for every sleep time, for naps and at night.

## **At what age can parents and caregivers stop placing infants on their backs to sleep to reduce the risk of SIDS?**

SIDS is defined as the sudden unexplained death of an infant younger than 1 year of age that remains unexplained after a thorough investigation.<sup>101</sup> Parents and caregivers should continue to place babies on their backs to sleep until their first birthday.

Statistics indicate that the first 6 months after birth, when infants are forming their sleeping habits, are probably the most important in terms of using the back sleep position to reduce SIDS risk.<sup>102</sup> Research shows that 90 percent of SIDS deaths occur in infants younger than 6 months of age, with a peak between 1 month and 4 months of age.<sup>103</sup>

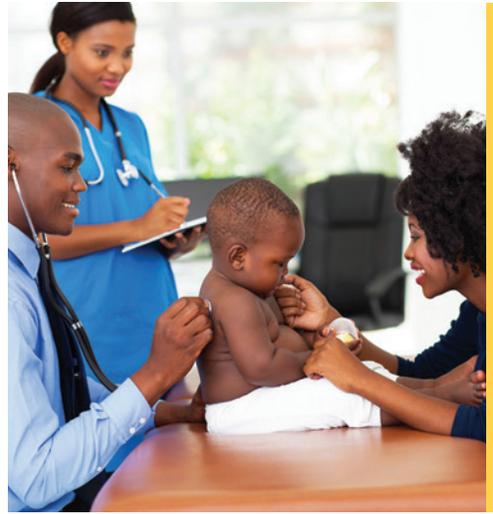
However, SIDS can occur at any time during an infant's first year, so parents and caregivers should continue to be advised to use back sleeping and other ways to reduce the risk of SIDS and other sleep-related causes of infant death until their baby's first birthday.

## Spread the word!

As a health care provider, you have multiple and unique opportunities to share safe infant sleep messages with parents and caregivers to help reduce the risk of SIDS and other sleep-related causes of infant death. Specifically:

- **Always place infants on their backs to sleep.** The back sleep position carries the lowest risk of SIDS.
- **Every sleep time counts.** Infants accustomed to sleeping on their back who are then placed on their stomachs to sleep are at significantly higher risk for SIDS.
- **Sleep surface matters.** Infants who sleep *on top of* an adult bed or *under* soft surfaces (such as blankets or quilts) are at higher risk for SIDS and other sleep-related causes of infant death.

Communities across the nation have made great progress in sharing safe infant sleep messages! With your help, we can spread these important messages to every community in the nation.



# References

- <sup>1</sup> Colson, E. R., Willinger, M., Rybin, D., Heeren, T., Smith, L. A., Lister, G., et al. (2013). Trends and factors associated with infant bed sharing, 1993-2010: The National Infant Sleep Position Study. *JAMA Pediatrics*, 167(11), 1032–1037.
- <sup>2</sup> Rose, S. A., Poynter, P. S., Anderson, J. Q., Noar, S. M., & Conigliaro, J. (2013). Physician weight loss advice and patient weight loss behavior change: A literature review and meta-analysis of survey data. *International Journal of Obesity*, 37(1), 118–128.
- <sup>3</sup> Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatric Pathology*, 11(5), 677–684.
- <sup>4</sup> Valdes-Dapera, M. (1995). The postmortem evaluation. *Pediatric Annals*, 24(7), 365-372.
- <sup>5</sup> Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatric Pathology*, 11(5), 677–684.
- <sup>6</sup> Centers for Disease Control and Prevention, HHS. (2012). Sudden infant death syndrome. Retrieved March 28, 2014, from <http://www.cdc.gov/sids>.
- <sup>7</sup> Spong, C. Y. (2013). Defining “term” pregnancy: Recommendations from the Defining “Term” Pregnancy Workgroup. *Journal of the American Medical Association*, 309(23) 2445–2446.
- <sup>8</sup> American College of Obstetricians and Gynecologists, Committee on Obstetric Practice, Society for Maternal-Fetal Medicine. (2013). Committee Opinion: Definition of Term Pregnancy. Retrieved May 16, 2014, from [http://www.acog.org/Resources\\_And\\_Publications/Committee\\_Opinions/Committee\\_on\\_Obstetric\\_Practice/Definition\\_of\\_Term\\_Pregnancy](http://www.acog.org/Resources_And_Publications/Committee_Opinions/Committee_on_Obstetric_Practice/Definition_of_Term_Pregnancy).
- <sup>9</sup> Pastore, G., Guala, A., Zaffaroni, M., & Bona, G. (2003). Back to Sleep: Risk factors for SIDS as targets for public health campaigns. *Pediatrics*, 109(4), 453–454.
- <sup>10</sup> Colson, E. R., & Joslin, S. C. (2002). Changing nursery practice gets inner-city infants in the supine position for sleep. *Archives of Pediatrics & Adolescent Medicine*, 156(7), 717–720.
- <sup>11</sup> American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128(5), 2011–2084.

- 12 Bhat, R. Y., Hannam, S., Pressler, R., Rafferty, G. F., Peacock, J. L., & Greenough, A. (2006). Effect of prone and supine position on sleep, apneas, and arousal in preterm infants. *Pediatrics*, *118*(1), 101–107.
- 13 Ariagno, R. L., van Liempt, S., & Mirmiran, M. (2006). Fewer spontaneous arousals during prone sleep in preterm infants at 1 and 3 months corrected age. *Journal of Perinatology*, *26*(5), 306–312.
- 14 Bhat, R. Y., Hannam, S., Pressler, R., Rafferty, G. F., Peacock, J. L., & Greenough, A. (2006). Effect of prone and supine position on sleep, apneas, and arousal in preterm infants. *Pediatrics*, *118*(1), 101–107.
- 15 Oyen, N., Markestad, T., Skjaerven, R., Irgens, L. M., Helweg-Larsen, K., Alm, B., et al. (1997). Combined effects of sleeping position and prenatal risk factors in sudden infant death syndrome: The Nordic Epidemiological SIDS Study. *Pediatrics*, *100*(4), 613–621.
- 16 Li, D. K., Petitti, D., Willinger, M., McMahon, R., Odouli, R., Vu, H., et al. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology*, *157*(5), 446–455.
- 17 Li, D. K., Petitti, D. B., Willinger, M., McMahon, R., Odouli, R., Vu, H., et al. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology*, *157*(5), 446–455.
- 18 Mitchell, E. A., Thach, B. T., Thompson, J. M., & Williams, S. (1999). Changing infants' sleep position increases risk of sudden infant death syndrome: New Zealand Cot Death Study. *Archives of Pediatrics & Adolescent Medicine*, *153*(11), 1136–1141.
- 19 Gershon, N. B., & Moon, R. Y. (1997). Infant sleep position in licensed child care centers. *Pediatrics*, *100*(1), 75–78.
- 20 Moon, R. Y., Weese-Mayer, D. E., & Silvestri, J. M. (2003). Nighttime child care: Inadequate sudden infant death syndrome risk factor knowledge, practice, and policies. *Pediatrics*, *111*(4 pt 1), 795–799.
- 21 Kattwinkel, J. (ed.) (2010). *Textbook of Neonatal Resuscitation*, 6th Edition. Elk Grove Village, IL: American Academy of Pediatrics and American Heart Association.
- 22 Vandenplas, Y., Rudolph, C. D., Di Lorenzo, C., Hassall, E., Liptak, G., Mazur, L., et al. (2009). Pediatric gastroesophageal reflux clinical practice guidelines: Joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *Journal of Pediatric Gastroenterology and Nutrition*, *49*(4), 498–547.
- 23 American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, *128*(5), 2011–2084.
- 24 Hunt, C. E., Lesko, S. M., Vezina, R. M., McCoy, R., Corwin, M. J., Mandell, F., et al. (2003). Infant sleep position and associated health outcomes. *Archives of Pediatrics & Adolescent Medicine*, *157*(5), 469–474.

- <sup>25</sup> Malloy, M. H. (2002). Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: Impact of the “Back to Sleep” program. *Pediatrics*, *109*(4), 661–665.
- <sup>26</sup> Malloy, M. H. (2002). Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: Impact of the “Back to Sleep” program. *Pediatrics*, *109*(4), 661–665.
- <sup>27</sup> Li, D. K., Petitti, D. B., Willinger, M., McMahon, R., Odouli, R., Vu, H., et al. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology*, *157*(5), 446–455.
- <sup>28</sup> Kemp, J. S., Unger, B., Wilkins, D., Psara, R. M., Ledbetter, T. L., Graham, M. A., et al. (2000). Unsafe sleep practices and an analysis of bed-sharing among infants dying suddenly and unexpectedly: Results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics*, *106*(3), E41.
- <sup>29</sup> Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Merrick Moore, C., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics*, *111*(5 pt 2), 1207–1214.
- <sup>30</sup> Colson, E. R., Willinger, M., Rybin, D., Heeren, T., Smith, L. A., Lister, G., et al. (2013). Trends and factors associated with infant bed sharing, 1993–2010: The National Infant Sleep Position Study. *JAMA Pediatrics*, *167*(11), 1032–1037.
- <sup>31</sup> Colson, E. R., Willinger, M., Rybin, D., Heeren, T., Smith, L. A., Lister, G., et al. (2013). Trends and factors associated with infant bed sharing, 1993–2010: The National Infant Sleep Position Study. *JAMA Pediatrics*, *167*(11), 1032–1037.
- <sup>32</sup> McGarvey, C., McDonnell, M., Hamilton, K., O’Regan, M., & Matthews, T. (2006). An 8-year study of risk factors for SIDS: Bed-sharing vs. non-bed-sharing. *Archives of Disease in Childhood*, *91*(4), 318–323.
- <sup>33</sup> Carpenter, R. G., Irgens, L. M., Blair, P. S., England, P. D., Fleming, P., Huber, J., et al. (2004). Sudden unexplained infant death in 20 regions in Europe: Case control study. *Lancet*, *363*(9404), 185–191.
- <sup>34</sup> Blair, P. S., Sidebotham, P., Evason-Coombe, C., Edmonds, M., Heckstall-Smith, E. M., & Fleming, P. (2009). Hazardous cosleeping environments and risk factors amenable to change: Case-control study of SIDS in south west England. *British Medical Journal*, *339*, b3666.
- <sup>35</sup> Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Merrick Moore, C., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics*, *111*(5 pt 2), 1207–1214.
- <sup>36</sup> Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Merrick Moore, C., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics*, *111*(5 pt 2), 1207–1214.

- <sup>37</sup> Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Merrick Moore, C., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics*, *111*(5 pt 2), 1207–1214.
- <sup>38</sup> Tappin, D., Ecob, R., & Brooke, H. (2005). Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: A case control study. *Journal of Pediatrics*, *147*, 32–37.
- <sup>39</sup> McGarvey, C., McDonnell, M., Chong, A., O'Regan, M., & Matthews, T. (2003). Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Archives of Disease in Childhood*, *88*, 1058–1064.
- <sup>40</sup> Tappin, D., Ecob, R., & Brooke, H. (2005). Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: A case control study. *Journal of Pediatrics*, *147*, 32–37.
- <sup>41</sup> McGarvey, C., McDonnell, M., Chong, A., O'Regan, M., & Matthews, T. (2003). Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Archives of Disease in Childhood*, *88*, 1058–1064.
- <sup>42</sup> McGarvey, C., McDonnell, M., Hamilton, K., O'Regan, M., & Matthews T. (2006). An 8-year study of risk factors for SIDS: Bed-sharing vs. non-bed-sharing. *Archives of Disease in Childhood*, *91*(4), 318–323.
- <sup>43</sup> Hauck, F. R., Herman, S. M., Donovan, M., Iyasu, S., Merrick Moore, C., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics*, *111*(5 pt 2), 1207–1214.
- <sup>44</sup> Fu, L. Y., Hauck, F. R., & Moon, R. (2010). Bed sharing among black infants and sudden infant death syndrome: Interactions with other known risk factors. *Academic Pediatrics*, *10*, 376–382.
- <sup>45</sup> Hutchison, B. L., Steward, A. W., & Mitchell, E. A. (2010). The prevalence of cobedding and SIDS-related child care practices in twins. *European Journal of Pediatrics*, *169*(12), 1477–1485.
- <sup>46</sup> Yeh, E. S., Rochette, L. M., McKenzie, L. B., & Smith, G. A. (2011). Injuries associated with cribs, playpens, and bassinets among young children in the U.S., 1990–2008. *Pediatrics*, *127*(3), 479–486.
- <sup>47</sup> Consumer Product Safety Commission. The safe nursery. Retrieved March 28, 2014, from <http://www.cpsc.gov/cpscpub/pubs/202.pdf>. (PDF – 604 KB)
- <sup>48</sup> Kemp, J. S., Unger, B., Wilkins, D., Psara, R. M., Ledbetter, T. L., Graham, M. A., et al. (2000). Unsafe sleep practices and an analysis of bed-sharing among infants dying suddenly and unexpectedly: Results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics*, *106*(3), E41.
- <sup>49</sup> Richardson, H. L., Walker, A. M., & Horne, R. S. (2010). Influence of swaddling experience on spontaneous arousal patterns and autonomic control in sleeping infants. *Journal of Pediatrics*, *157*(1), 85–91.

- <sup>50</sup> Getahun, D., Amre, D., Rhoads, G. G., & Demissie, K. (2004). Maternal and obstetric risk factors for sudden infant death syndrome in the United States. *Obstetrics & Gynecology*, *103*, 646–652.
- <sup>51</sup> Paris, C., Remler, R., & Daling, J. R. (2001). Risk factors for sudden infant death syndrome: Changes associated with sleep position recommendations. *Journal of Pediatrics*, *139*(6), 771–777.
- <sup>52</sup> Adgent, M. A. (2006). Environmental tobacco smoke and sudden infant death syndrome: A review. *Birth Defects Research Part B: Developmental and Reproductive Toxicology*, *77*(1), 69–85.
- <sup>53</sup> Wigle, D. T., Arbuckle, T. E., Turner, M. C., Berube, A., Yang, Q., Liu, S., et al. (2008). Epidemiological evidence of relationships between reproductive and child health outcomes and environmental chemical contaminants. *Journal of Toxicology and Environmental Health, Part B: Critical Reviews*, *11*(5-6), 373–517.
- <sup>54</sup> Zhanga, K., & Wang, X. (2013). Maternal smoking and increased risk of sudden infant death syndrome: A meta-analysis. *Legal Medicine*, *15*(3), 115–121.
- <sup>55</sup> Anderson, H. R., & Cook, D. G. (1997). Passive smoking and sudden infant death syndrome: Review of the epidemiological evidence. *Thorax*, *52*, 1003–1009.
- <sup>56</sup> Zhanga, K., & Wang, X. (2013). Maternal smoking and increased risk of sudden infant death syndrome: A meta-analysis. *Legal Medicine*, *15*(3), 115–121.
- <sup>57</sup> U.S. Department of Health and Human Services. (2006). *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. Retrieved March 28, 2014, from [http://www.cdc.gov/tobacco/data\\_statistics/sgr/2006/index.htm](http://www.cdc.gov/tobacco/data_statistics/sgr/2006/index.htm).
- <sup>58</sup> McMartin, K. I., Platt, M. S., Hackman, R., Klein, J., Smialek, J. E., Vigorito, R., et al. (2002). Lung tissue concentrations of nicotine in sudden infant death syndrome (SIDS). *Journal of Pediatrics*, *140*(2), 205–209.
- <sup>59</sup> McMartin, K. I., Platt, M. S., Hackman, R., Klein, J., Smialek, J. E., Vigorito, R., et al. (2002). Lung tissue concentrations of nicotine in sudden infant death syndrome (SIDS). *Journal of Pediatrics*, *140*(2), 205–209.
- <sup>60</sup> Anderson, H. R., & Cook, D. G. (1999). Passive smoking and sudden infant death syndrome: Review of the epidemiological evidence. *Thorax*, *54*, 365–366.
- <sup>61</sup> Zhanga, K., & Wang, X. (2013). Maternal smoking and increased risk of sudden infant death syndrome: A meta-analysis. *Legal Medicine*, *15*(3), 115–121.
- <sup>62</sup> Iyasu, S., Randall, L. L., Welty, T. K., Hsia, J., Kinney, H. C., Mandell, F., et al. (2002). Risk factors for sudden infant death syndrome among Northern Plains Indians. *Journal of the American Medical Association*, *288*, 2717–2723.

- <sup>63</sup> Fares, I., McCulloch, K. M., & Raju, T. N. (1997). Intrauterine cocaine exposure and the risk for sudden infant death syndrome: A meta-analysis. *Journal of Perinatology*, *17*(3), 179–182.
- <sup>64</sup> Ip, S., Chung, M., Raman, G., Trikalinos, T. A., & Lau, J. (2009). A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. *Breastfeeding Medicine*, *4*(Suppl. 1), S17–S30.
- <sup>65</sup> Vennemann, M. M., Bajanowski, T., Brinkmann, B., Yucesan, K., Sauerland, C., & Mitchell, E. A.; GeSID Study Group. (2009). Does breastfeeding reduce the risk of sudden infant death syndrome? *Pediatrics*, *123*(3), e406–e410.
- <sup>66</sup> Hauck, F. R., Thompson, J., Tanabe, K. O., Moon, R. Y., & Vennemann, M. M. (2011). Breastfeeding and reduced risk of sudden infant death syndrome: A meta-analysis. *Pediatrics*, *128*(1), 103–110.
- <sup>67</sup> Duijts, L., Jaddoe, V. W., Hofman, A., & Moll, H. A. (2010). Prolonged and exclusive breastfeeding reduces the risk of infectious diseases in infancy. *Pediatrics*, *126*(1), e18–e25.
- <sup>68</sup> Paris, C., Remler, R., & Daling, J. R. (2001). Risk factors for sudden infant death syndrome: Changes associated with sleep position recommendations. *Journal of Pediatrics*, *139*(6), 771–777.
- <sup>69</sup> American Academy of Pediatrics. (2012). Policy statement: Breastfeeding and the use of human milk. *Pediatrics*, *129*(3), e827–e841.
- <sup>70</sup> Moon, R. Y., Tanabe, K. O., Yang, D. C., Young, H. A., & Hauck, F. R. (2011). Pacifier use and SIDS: Evidence for a consistently reduced risk. *Maternal and Child Health Journal*, *16*(3), 609–614.
- <sup>71</sup> Hauck, F. R., Hauck, O. O., & Siadat, M. S. (2005). Do pacifiers reduce the risk of sudden infant death syndrome? A meta-analysis. *Pediatrics*, *116*(5), 716–723.
- <sup>72</sup> Franco, P., Scaillet, S., Wermenbol, V., Valente, F., Groswasser, J., & Kahn, A. (2000). The influence of a pacifier on infants' arousals from sleep. *Journal of Pediatrics*, *136*(6), 775–779.
- <sup>73</sup> Hunt, C. E., & Puczynski, M. S. (1996). Does supine sleeping cause asymmetric heads? *Pediatrics*, *98*(1), 127–129.
- <sup>74</sup> Fleming, P. J., Gilbert, R., & Azaz, Y. (1990). Interaction between bedding and sleeping position in the sudden infant death syndrome: A population-based case-control study. *British Medical Journal*, *301*, 85–89.
- <sup>75</sup> Gilbert, R., Rudd, P., & Berry, P. J. (1992). Combined effect of infection and heavy wrapping on the risk of sudden unexpected infant death. *Archives of Disease in Childhood*, *67*, 171–177.
- <sup>76</sup> Ponsonby, A. L., Dwyer, T., Gibbons, L., Cochrane, J. A., Jones, M. E., & McCall, M. J. (1992). Thermal environment and SIDS: Case-control study. *British Medical Journal*, *304*, 277–282.

- <sup>77</sup> Ponsonby, A. L., Dwyer, T., Gibbons, L. E., Cochrane, J. A., & Wang, Y. G. (1993). Factors potentiating the risk of sudden infant death syndrome associated with prone position. *New England Journal of Medicine*, 329, 377–382.
- <sup>78</sup> Williams, S. M., Taylor, B. J., & Mitchell, E. A. (1996). Sudden infant death syndrome: Insulation from bedding and clothing and its effect modifiers. *International Journal of Epidemiology*, 25, 277–282.
- <sup>79</sup> American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128(5), 2011–2084.
- <sup>80</sup> Ponsonby, A. L., Dwyer, T., Gibbons, L. E., Cochrane, J. A., & Wang, Y. G. (1993). Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *New England Journal of Medicine*, 329, 377–382.
- <sup>81</sup> Williams, S. M., Taylor, B. J., & Mitchell, E. A. (1996). Sudden infant death syndrome: Insulation from bedding and clothing and its effect modifiers. *International Journal of Epidemiology*, 25, 366–375.
- <sup>82</sup> Blair, P. S., Mitchell, E. A., Heckstall-Smith, E. M., & Fleming, P. J. (2008). Head covering—A major modifiable risk factor for sudden infant death syndrome: A systematic review. *Archives of Disease in Childhood*, 93(9), 778–783.
- <sup>83</sup> Williams, S. M., Taylor, B. J., & Mitchell, E. A. (1996). Sudden infant death syndrome: Insulation from bedding and clothing and its effect modifiers. *International Journal of Epidemiology*, 25, 366–375.
- <sup>84</sup> Vennemann, M. M., Höffgen, M., Bajanowski, T., Hense, H. W., & Mitchell, E. A. (2007). Do immunisations reduce the risk for SIDS? A meta-analysis. *Vaccine*, 25(26), 4875–4879.
- <sup>85</sup> Ramanathan, R., Corwin, M. J., Hunt, C. E., Lister, G., Tinsley, L. R., Baird, T., et al.; Collaborative Home Infant Monitoring Evaluation (CHIME) Study Group. (2001). Cardiorespiratory events recorded on home monitors: Comparison of healthy infants with those at increased risk for SIDS. *Journal of the American Medical Association*, 285(17), 2199–2207.
- <sup>86</sup> American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128(5), 2011–2084.
- <sup>87</sup> National Institutes of Health Consensus Development Conference on Infantile Apnea and Home Monitoring, Sept 29 to Oct 1, 1986. (1987). *Pediatrics*, 79(2), 292–299.
- <sup>88</sup> American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128(5), 2011–2084.
- <sup>89</sup> Laughlin, J., Luerssen, T. G., Dias, M. S.; Committee on Practice and Ambulatory Medicine, Section on Neurological Surgery, et al. (2011). Prevention and management of positional skull deformities in infants. *Pediatrics*, 128(6), 1236–1241.

- <sup>90</sup> Laughlin, J., Luerssen, T. G., Dias, M. S.; Committee on Practice and Ambulatory Medicine, Section on Neurological Surgery, et al. (2011). Prevention and management of positional skull deformities in infants. *Pediatrics*, 128(6), 1236–1241.
- <sup>91</sup> Laughlin, J., Luerssen, T. G., Dias, M. S.; Committee on Practice and Ambulatory Medicine, Section on Neurological Surgery, et al. (2011). Prevention and management of positional skull deformities in infants. *Pediatrics*, 128(6), 1236–1241.
- <sup>92</sup> American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128(5), 2011–2084.
- <sup>93</sup> Gerard, C. M., Harris, K. A., & Thach, B. T. (2002). Physiologic studies on swaddling: An ancient child care practice, which may promote the supine position for infant sleep. *Journal of Pediatrics*, 141(3), 398–404.
- <sup>94</sup> Harper, R. M., Kinney, H. C., Fleming, P. J., & Thach, B. T. (2000). Sleep influences on homeostatic functions: Implications for sudden infant death syndrome. *Respiration Physiology*, 119,(2–3), 123–132.
- <sup>95</sup> Li, D. K., Petitti, D., Willinger, M., McMahon, R., Odouli, R., Vu, H., et al. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology*, 157(5), 446–455.
- <sup>96</sup> Moon, R. Y., Kotch, L., & Aird, L. (2006). State child care regulations regarding infant sleep environment since the Healthy Child Care America—Back to Sleep campaign. *Pediatrics*, 118(1), 73–83.
- <sup>97</sup> Laughlin, L. (2013). *Who's minding the kids? Child care arrangements: Spring 2011*. Current Population Reports, P70–135. Washington, DC: U.S. Census Bureau. Retrieved May 16, 2014, from <http://www.census.gov/prod/2013pubs/p70-135.pdf>. (PDF – 635 KB)
- <sup>98</sup> Moon, R. Y., Kotch, L., & Aird, L. (2006). State child care regulations regarding infant sleep environment since the Healthy Child Care America—Back to Sleep campaign. *Pediatrics*, 118(1), 73–83.
- <sup>99</sup> Moon, R. Y., Kotch, L., & Aird, L. (2006). State child care regulations regarding infant sleep environment since the Healthy Child Care America—Back to Sleep campaign. *Pediatrics*, 118(1), 73–83.
- <sup>100</sup> Moon, R. Y., Kotch, L., & Aird, L. (2006). State child care regulations regarding infant sleep environment since the Healthy Child Care America—Back to Sleep campaign. *Pediatrics*, 118(1), 73–83.
- <sup>101</sup> Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatric Pathology*, 11, 677–684.

- <sup>102</sup> Trachtenberg, F. L., Haas, E. A., Kinney, H. C., Stanley, C., & Krous, H. F. (2012). Risk factor changes for sudden infant death syndrome after initiation of Back-to-Sleep campaign. *Pediatrics*, *129*(4), 630–638.
- <sup>103</sup> Trachtenberg, F. L., Haas, E. A., Kinney, H. C., Stanley, C., & Krous, H. F. (2012). Risk factor changes for sudden infant death syndrome after initiation of Back-to-Sleep campaign. *Pediatrics*, *129*(4), 630–638.

For more information, contact the  
Safe to Sleep<sup>®</sup> campaign:

**Phone:** 1-800-505-CRIB (2742)

**Email:** [NICHDInformationResourceCenter@mail.nih.gov](mailto:NICHDInformationResourceCenter@mail.nih.gov)

**Website:** <http://safetosleep.nichd.nih.gov>

**Fax:** 1-866-760-5947

**Mail:** P.O. Box 3006, Rockville, MD 20847



*Eunice Kennedy Shriver* National Institute  
of Child Health and Human Development

NIH Pub. No. 14-7202

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## Basic Talking Points for the Safe to Sleep® Campaign

### What is SIDS?

- Sudden Infant Death Syndrome (SIDS) is the sudden, unexpected death of a baby younger than 1 year of age that doesn't have a known cause even after a complete investigation.
- It is the leading cause of death among infants between 1 month and 1 year of age.
- African American and American Indian/Alaska Native babies are at a higher risk of SIDS than infants of other races and ethnicities.
- SIDS is just one type of Sudden Unexpected Infant Death or "SUID," which includes those from no clear reason, such as SIDS, and those from a known reason, such as suffocation, neglect, homicide, or other sleep-related causes.

### What is the Safe to Sleep® campaign?

- The Safe to Sleep® campaign is an initiative of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development. It is an expansion of the previous Back to Sleep campaign to reduce the risk of SIDS.
- Since the launch of the Back to Sleep campaign in 1994, the SIDS rate has dropped by more than 50 percent across all populations. However, the rate has plateaued in recent years.
- The new Safe to Sleep® campaign aims to expand upon the success of the previous Back to Sleep campaign by **reducing the risk of SIDS and other sleep-related causes of infant death.**
  - It incorporates the most up-to-date recommendations from the American Academy of Pediatrics on safe infant sleep practices.
  - It will educate parents and caregivers on ways to help reduce the risk of SIDS and other sleep-related causes of infant death.
  - It continues to spread the messages of safe infant sleep to all communities while also tailoring outreach to those communities most affected by SIDS.

### What are the key messages of the campaign on ways to reduce the risk of SIDS and other sleep-related causes of infant death?

- **Always place baby on his or her back to sleep, for naps and at night, to reduce the risk of SIDS.**
- **Put baby to sleep in a separate sleep area in the same room where you sleep.** If you bring baby into your bed to breastfeed, make sure to put him or her back into a separate sleep area, such as a safety-approved crib, bassinet, or portable play area when you are finished.
- **Use a firm sleep surface, covered by a fitted sheet, to reduce the risk of SIDS and other sleep-related causes of death.** Remove all loose bedding, crib bumpers, soft objects and toys.

For more information on the Safe to Sleep® campaign, go to:  
<http://safetosleep.nichd.nih.gov/>



# Safe to Sleep® Campaign Materials Order Form

## MATERIALS FOR ALL CAREGIVERS

QTY

### **Safe Sleep for Your Baby: Reduce the Risk of Sudden Infant Death Syndrome (SIDS) and Other Sleep-Related Causes of Infant Death Brochure**

Explains SIDS and describes ways to reduce the risk of SIDS and other sleep-related causes of infant death.



General Outreach 0481

African American Outreach 0483

American Indian/Alaska Native Outreach 0484

En Español 0485

### **What does a safe sleep environment look like? Single Sheet**

Shows a safe sleep environment and lists ways to reduce the risk of SIDS and other sleep-related causes of infant death. (In sets of 25 sheets)

English 0482

En Español 0486

### **Safe Sleep for Your Baby Door Hanger**

Designed to hang on a doorknob, shows a safe sleep environment and lists ways to reduce the risk of SIDS and other sleep-related causes of infant death.

General Outreach 0494

African American Outreach 0495

En Español 0496

### **Safe Sleep for Your Grandbaby Brochure**

Explains how grandparents can reduce the risk of SIDS and other sleep-related causes of infant death when caring for their grandchildren.

English 0497

En Español 0498

### **Safe Sleep for Your Baby DVD**

Explains SIDS risks and ways to reduce the risk of SIDS and other sleep-related causes of infant death. English and Spanish subtitles. Running time 9:55.

English 0487

En Español 0506

### **Honor the Past, Learn for the Future: Reduce the Risk of SIDS in Native Communities Flyer**

Lists ways to reduce the risk of SIDS and other sleep-related causes of infant death among American Indian/Alaska Native babies.

0434

### **Safe to Sleep® Campaign Materials Order Form**

0327

## MATERIALS FOR HEALTH CARE PROVIDERS, EDUCATORS, AND COMMUNITY HEALTH WORKERS

QTY

### **Continuing Education (CE) Program on SIDS Risk Reduction: Curriculum for Nurses (Workbook and Handouts)**

Approved for 1.1 CE credit hours, offers communication strategies for nurses on SIDS, SIDS risks, and risk-reduction recommendations. *Online module also available at <http://www.nichd.nih.gov/sidsnursesce>.*

0390

### **SIDS Risk Reduction: A Continuing Education (CE) Activity for Pharmacists (Online Only)**

Approved for 0.125 CE units, explains how pharmacists can communicate safe sleep messages to caregivers. *Available at <http://www.nichd.nih.gov/pharmacistce>.*

### **Babies Sleep Safest on Their Backs: A Resource Kit for Reducing the Risk of SIDS in African American Communities**

For leading community-based outreach sessions. Includes training modules for 15-, 30-, and 60-minute sessions and outreach materials.

0440

Limit 5

### **Infant Sleep Position and SIDS: Questions and Answers for Health Care Providers (Booklet)**

Answers to common questions about sleep position, sleep environment, and Sudden Infant Death Syndrome (SIDS) for health care providers.

0321

### **Healthy Native Babies Project Facilitator Packet (Facilitator's Guide, Cards, Chart, Flipchart)**

For leading training sessions for those who work with parents and caregivers in American Indian/Alaska Native communities. Includes training modules and materials for leading 2-hour or 1-day sessions.

0457

Limit 1

### **Healthy Native Babies Project Workbook Packet (Workbook, Handouts, and Toolkit Disk)**

For conducting outreach in American Indian/Alaska Native communities. Toolkit creates custom outreach materials that incorporate Tribal and regional photos, languages, and graphic elements.

0435

Limit 1

## TO ORDER MATERIALS, CONTACT US:

**Phone:** 1-800-505-CRIB (2742)

**TTY:** 1-888-320-6942

**Email:** [NICHDInformationResourceCenter@mail.nih.gov](mailto:NICHDInformationResourceCenter@mail.nih.gov)

**Fax:** 1-866-760-5947

**Mail:** P.O. Box 3006, Rockville, MD 20847

**Website:** <http://www.nichd.nih.gov/sts/Pages/default.aspx>

<b>Name/Title</b>			
<b>Organization/Business</b>			
<b>Street Address</b>			
<b>City, State, ZIP</b>			<input type="checkbox"/> Residential Address <input type="checkbox"/> Business Address
<b>Telephone</b>	<b>Email*</b>		

\*Optional: If you want confirmation that your order has been placed.

# CJ Foundation for SIDS

## Request for Educational Materials

**PLEASE PRINT NEATLY. FREE QTYs LIMITED TO MAX # PER ADDRESS PER CALENDAR YEAR.**

Name \_\_\_\_\_

Organization/Program \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Phone \_\_\_\_\_ Email \_\_\_\_\_

**Please circle amount requested or fill in other amount, not to exceed the maximum (max).**

**Additional quantities are available for a fee. Please contact the office for more info.**

<b>MATERIALS AVAILABLE</b>			<b>Max.</b>	<b>Other</b>
10 Steps (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Baby – version 1/Hispanic baby (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Baby – version 2/African American baby (8 ½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
9 Babies/Many Babies - English (8½ x 11)*	<b>5</b>	<b>10</b>	<b>20</b>	
9 Babies - Spanish (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Wrong/Right Stuffed Animal – English (8½ x 11)**	<b>5</b>	<b>10</b>	<b>20</b>	
Wrong/Right Stuffed Animal – Spanish (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Smoking During Pregnancy Graph (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Drinking During Pregnancy Graph (8½ x 11)	<b>5</b>	<b>10</b>	<b>20</b>	
Good Night, Sleep Right brochure – English	<b>5</b>	<b>10</b>	<b>20</b>	
Good Night, Sleep Right brochure - Spanish	<b>5</b>	<b>10</b>	<b>20</b>	
Good Night, Sleep Right poster – English (13 x 18)	<b>5</b>	<b>10</b>	<b>15</b>	
Good Night, Sleep Right poster – Spanish (13 x 18)	<b>5</b>	<b>10</b>	<b>15</b>	

\* Either 9 Babies or Many Babies will be sent based on availability.

\*\* Either W/R Chick or W/R Lamb will be sent based on availability.

**Return completed form to:** CJ Foundation for SIDS  
 Attn: Educational Materials  
 HUMC-Don Imus Pediatric Center  
 30 Prospect Avenue  
 Hackensack, NJ 07601

Fax: 551-996-5326  
 Email: [stephanie@cjsids.org](mailto:stephanie@cjsids.org)  
 Phone: 888-825-7437

To aid in the longevity of these resources, we ask that you consider laminating them before posting.

Additional forms and resource materials are available for download at [www.cjsids.org](http://www.cjsids.org).

**THANK YOU FOR YOUR REQUEST. PLEASE ALLOW UP TO 3 WEEKS FOR DELIVERY.**



# Section Six

## **Resources**



# Sudden Infant Death Syndrome/Sudden Unexpected Infant Death RESOURCES

## State of California

**California Sudden Infant Death Syndrome (SIDS) Program** (415) 502-2825  
c/o University of California San Francisco School of Nursing..... (800) 369-SIDS (7437)  
2 Koret Way, Box 0606, San Francisco, CA 94143-0606 (415) 753-2161 FAX  
E-mail: [casidsprogram@ucsf.edu](mailto:casidsprogram@ucsf.edu) Website: <http://californiasids.cdph.ca.gov>

**Department of Public Health, MCAH Division/Policy Development** ..... (916) 650-0374  
Guey-Shiang Tsay, RN, MSN, Nurse Consultant III (916) 650-0304 FAX  
1615 Capitol Avenue, P.O. Box 997420, MS 8306, Sacramento, CA 95899-7420  
E-mail: [Guey-Shiang.Tsay@cdph.ca.gov](mailto:Guey-Shiang.Tsay@cdph.ca.gov) Website: [www.cdph.ca.gov/programs/SIDS/Pages/default.aspx](http://www.cdph.ca.gov/programs/SIDS/Pages/default.aspx)

**Department of Public Health, MCAH Division/Epidemiology & Evaluation** (916) 650-0323  
Carrie.Florez, Research Scientist (916) 650-0308 FAX  
Epidemiology, Assessment and Program Development  
1615 Capitol Avenue, P.O. Box 997420, MS 8304, Sacramento, CA 95899-7420  
E-mail: [Carrie.Florez@cdph.ca.gov](mailto:Carrie.Florez@cdph.ca.gov) Website: [www.cdph.ca.gov/programs/SIDS/Pages/default.aspx](http://www.cdph.ca.gov/programs/SIDS/Pages/default.aspx)

## National

**American Academy of Pediatrics**..... (847) 434-4000  
141 Northwest Point Blvd., Elk Grove Village, IL 60007-1098 (847) 434-8000 FAX  
Website: [www.aap.org](http://www.aap.org)

**Association of SIDS and Infant Mortality Programs**..... (800) 930-SIDS (7437)  
612 W. Lake Lansing Road, Suite 800, East Lansing, MI 48823 (517) 485-0163 FAX  
Email: [asip@asip1.org](mailto:asip@asip1.org) Website: [www.asip1.org](http://www.asip1.org)

**Safe to Sleep Public Education Campaign**..... (800) 505-CRIB (2742)  
Eunice Kennedy Shriver National Institute of Child Health and Human Development (866) 760-5947 FAX  
PO Box 3006, Rockville, MD 20847  
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**Healthy Child Care America**..... (888) 227-5409  
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**SIDS COORDINATORS ~ November 2014**

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Website: <http://sti1.madera-county.com/publichealth/>

**Marin County Health and Human Services**

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Child and Family Services  
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San Rafael, CA 94901  
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(415) 473-7162 FAX  
E-mail: [lmmariscal@co.marin.ca.us](mailto:lmmariscal@co.marin.ca.us)  
Website: [www.co.marin.ca.us/depts/hh/main/index.cfm](http://www.co.marin.ca.us/depts/hh/main/index.cfm)

**Mariposa County Health Department**

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Email: [margaritaking@mariposacounty.org](mailto:margaritaking@mariposacounty.org)  
Website: [www.mariposacounty.org/index.aspx?nid=89](http://www.mariposacounty.org/index.aspx?nid=89)

**Mendocino County Department of Public Health**

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**Modoc County Public Health Department**

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(530) 233-6311  
(530) 233-5754 FAX  
(530) 233-6332 (confidential fax)  
E-mail: [tanyaschulz@co.modoc.ca.us](mailto:tanyaschulz@co.modoc.ca.us)  
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**Mono County Health Department**

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(760) 924-1830 (Pearce)  
(760) 924-1831 FAX  
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**Monterey County Health Department**

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**CALIFORNIA LOCAL HEALTH DEPARTMENTS**  
**SUDDEN INFANT DEATH SYNDROME**  
**SIDS COORDINATORS ~ November 2014**

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707.253.4955 (direct)  
(707) 253-4880 Fax  
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■ **Nevada County Community Health Department**

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Website:  
<http://www.mynevadacounty.com/nc/hhsa/ph/Pages/Home.aspx>

**Orange County Health Care Agency**

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(714) 480-4601 (Jackson)  
(949) 337-5490 (mobile)  
(714) 480-4616 FAX  
E-mail: [KJackson@ochca.com](mailto:KJackson@ochca.com)  
Website: [www.ochealthinfo.com/](http://www.ochealthinfo.com/)

**Pasadena City Public Health Department**

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(626) 744-6022 (Mendenhall)  
(626) 744-6115 FAX  
Email: [tmendenhall@cityofpasadena.net](mailto:tmendenhall@cityofpasadena.net)  
Website: [www.cityofpasadena.net/PublicHealth/](http://www.cityofpasadena.net/PublicHealth/)

**Placer County Health and Human Services –  
Community Health**

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(530) 889-7155 (Seaters)  
(530) 889-7198 FAX  
E-mail: [sseaters@placer.ca.gov](mailto:sseaters@placer.ca.gov)  
Website: [www.placer.ca.gov/Departments/hhs.aspx](http://www.placer.ca.gov/Departments/hhs.aspx)

**Plumas County Public Health Agency**

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Department of Public Health**

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(951) 210-1348 FAX  
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**Sacramento County Department of  
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(831) 637-9073 FAX  
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Website: [www.sanbenitoco.org](http://www.sanbenitoco.org)

**San Bernardino County Public Health Department**

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(909) 388-0111 FAX  
Email: [shernandez@dph.sbcounty.gov](mailto:shernandez@dph.sbcounty.gov)  
Website: [www.co.san-bernardino.ca.us/pubhlth/](http://www.co.san-bernardino.ca.us/pubhlth/)

**CALIFORNIA LOCAL HEALTH DEPARTMENTS**  
**SUDDEN INFANT DEATH SYNDROME**  
**SIDS COORDINATORS ~ November 2014**

**San Diego County Health and Human Services Agency**

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(760) 740-4020 (Roche)  
(760) 740-4003 FAX  
Email: [kitty.roche@sdcounty.ca.gov](mailto:kitty.roche@sdcounty.ca.gov)  
Website: <http://www.sdcounty.ca.gov/hhsa/programs/phs/>

**San Francisco County Health Department**

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(415) 575-5716 (Armstrong)  
(415) 575-5799 FAX  
Email: [Aline.Armstrong@sfdph.org/](mailto:Aline.Armstrong@sfdph.org/)  
Website: <http://www.sfdph.org/dph/default.asp>

**San Joaquin County Public Health Services**

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Stockton, CA 95201-2009  
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(209) 468-3050 (Scott)  
(209) 468-2072 FAX  
Email: [msscott@sjcphs.org](mailto:msscott@sjcphs.org)  
Website: [www.sjcphs.org/](http://www.sjcphs.org/)

**San Luis Obispo County Public Health Department**

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(805) 788-2188 (Wiest)  
(805) 781-1372 FAX  
Email: [cwiest@co.slo.ca.us](mailto:cwiest@co.slo.ca.us)  
Website: [www.slocounty.ca.gov/page8402.aspx](http://www.slocounty.ca.gov/page8402.aspx)

**San Mateo County Family Health Services**

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(650) 573-2540 FAX  
Email: [sflores@smcgov.org](mailto:sflores@smcgov.org)  
Website: [www.co.sanmateo.ca.us/portal/site/SMC](http://www.co.sanmateo.ca.us/portal/site/SMC)

**Santa Barbara County Public Health Department**

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**Santa Clara County Public Health Department**

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(408) 937-2254 (Chamberlin)  
(408) 937-2252 FAX  
Email: [Lynn.Chamberlin@phd.sccgov.org](mailto:Lynn.Chamberlin@phd.sccgov.org)  
Website: [www.sccgov.org/portal/site/phd/](http://www.sccgov.org/portal/site/phd/)

**Santa Cruz Health Services Agency**

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Santa Cruz, CA 95060  
(831) 454-4114 (general information)  
(831) 454-4331 (direct line)  
(831) 454-5049 FAX  
Email: [mcdanik@co.santa-cruz.ca.us](mailto:mcdanik@co.santa-cruz.ca.us)  
Website:  
[www.santacruzhealth.org/phealth/commission/3phcommission.htm](http://www.santacruzhealth.org/phealth/commission/3phcommission.htm)

**Shasta County Health and Human Services Agency**

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(530) 225-5851 (Biechman)  
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Email: [bbiechman@co.shasta.ca.us](mailto:bbiechman@co.shasta.ca.us)  
Website:  
[http://www.co.shasta.ca.us/index/hhsa\\_index/Public\\_health.aspx](http://www.co.shasta.ca.us/index/hhsa_index/Public_health.aspx)

**CALIFORNIA LOCAL HEALTH DEPARTMENTS**  
**SUDDEN INFANT DEATH SYNDROME**  
**SIDS COORDINATORS ~ November 2014**

**Sierra County Human Services Agency – Public Health**

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(530) 993-4845 FAX  
Email: [sanseth@sierracounty.ws](mailto:sanseth@sierracounty.ws)  
Website:  
[www.sierracounty.ws/index.php?module=pagemaster&PAGE\\_user\\_op=view\\_page&PAGE\\_id=5&MMN\\_position=31:28](http://www.sierracounty.ws/index.php?module=pagemaster&PAGE_user_op=view_page&PAGE_id=5&MMN_position=31:28)

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Email: [jlthomas@co.siskiyou.ca.us](mailto:jlthomas@co.siskiyou.ca.us)  
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<http://www.co.siskiyou.ca.us/PHS/pershealth/pershealth.asp>

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(209) 558-8315 FAX  
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Email: [KBeltz@co.sutter.ca.us](mailto:KBeltz@co.sutter.ca.us)  
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[www.co.sutter.ca.us/doc/government/depts/hs/ph/hs\\_public\\_health](http://www.co.sutter.ca.us/doc/government/depts/hs/ph/hs_public_health)

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**CALIFORNIA LOCAL HEALTH DEPARTMENTS**  
**SUDDEN INFANT DEATH SYNDROME**  
**SIDS COORDINATORS ~ November 2014**

**Tulare County Health & Human Services Agency**

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(559) 713-3700 FAX  
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**Tuolumne County Public Health Department**

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(800) 585-6606 (limited area)  
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Website:  
[http://portal.co.tuolumne.ca.us/ps/ps/TUP\\_PUBLIC\\_HEALTH/ENTP/h/?tab=DEFAULT](http://portal.co.tuolumne.ca.us/ps/ps/TUP_PUBLIC_HEALTH/ENTP/h/?tab=DEFAULT)

**Ventura County Public Health Department**

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**Yolo County Health Department**

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**Yuba County Health and Human Services Department**

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(530) 749-6773 (Hadley)  
(530) 749-6397 FAX  
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Website:  
[www.co.yuba.ca.us/Departments/HHSD/Public%20Health/](http://www.co.yuba.ca.us/Departments/HHSD/Public%20Health/)



# California Sudden Infant Death Syndrome Program

## Mortuary Professional Liaison and Referral Services

The following mortuary and interment professionals may be contacted to provide support for families needing financial assistance with funeral services and burial arrangements following a SIDS death. Please contact these resources **only** after you have exhausted resources in your local community. These professionals can assist by providing referrals to other morticians and interment professionals throughout the State who are members of the Funeral Director's Association and/or are business associates.

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### Mortuary – Funeral Arrangements

#### California Funeral Directors Association

Jack Jensen, SIDS Liaison  
Cypress Lawn Funeral Home  
1370 El Camino Real  
Colma, CA 94014  
(650) 550-8808  
(650) 550-8881 Direct  
(650) 755-4128 FAX  
Email: [jjensen@cypresslawn.com](mailto:jjensen@cypresslawn.com)

#### Northern California

Richard O'Hara  
McAvoy-O'Hara Company  
4545 Geary Boulevard  
San Francisco, CA 94118  
(415) 668-0077  
Email: [richard@mcavoyohara.com](mailto:richard@mcavoyohara.com)  
Counties served: San Francisco Bay Area

#### Southern California

Delaine Powers  
Westminster Memorial Park and Mortuary  
14801 Beach Boulevard  
Westminster, CA 92683  
(714) 893-2421  
(800) 877-1175  
County served: Orange

Mike Ross  
SCI Hispana California  
200 E. Duarte Road  
Monrovia, CA 91016  
(626) 358-8755  
(626) 305-0923 FAX  
Counties served: Los Angeles, Orange, San Bernardino and Ventura

### Interment - Burial Arrangements

#### Northern California

Valerie Rose  
East Lawn Memorial Park  
4300 Folsom Boulevard  
Sacramento, CA 95819  
(916) 732-2020  
Counties served: Alameda, El Dorado, Placer, Sacramento and Yolo

#### Southern California

Scott Drolet  
Senior Vice-President of Operations  
Forest Lawn Memorial Park  
1712 South Glendale Avenue  
Glendale, CA 91205  
(800) 204-3131 Ext. 4568  
(323) 254-8152 FAX  
Counties served: Los Angeles, Orange and Riverside



California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division

California Sudden Infant Death Syndrome Program  
800-369-SIDS (7437) • 415-753-2161 (FAX)  
[casidsprogram@ucsf.edu](mailto:casidsprogram@ucsf.edu) <http://californiasids@cdph.ca.gov>

Updated August 2014

# SIDS/SUID Peer Grief Support Services in California

Throughout California non-profit volunteer peer support groups offer an array of services for those experiencing an infant loss due to Sudden Infant Death Syndrome (SIDS) or other sudden unexpected infant death (SUID). Volunteers are trained SIDS/SUID parents, family members, foster parents and/or childcare providers who have received specialized grief training to assist other bereaved individuals. Services include bereavement support groups, individual peer counseling and/or online support. Please contact the local grief group directly to inquire about meeting times/location and to obtain further information about their support and services.

## Southern California

- A New Normal ~ Child Loss Support Group** ..... (951) 303-6789  
 Rachel Strickland  
 Rancho Community Church  
 31300 Rancho Community Way, Temecula, CA 92592  
 Email: rstrickland41@gmail.com Website: http://rcc.tv  
**County served: Riverside and areas surrounding Temecula**
- Guild for Infant Survival ~ Inland Empire** ..... San Bernardino County  
 Sharon Lang (909) 838-1536  
 Email: Sharon\_lang@redlands.edu or vso2012@yahoo.com (San Bernardino County)  
 Maureen Chavez Riverside County  
 Email: MCChavez42@gmail.com (Riverside County) (951) 571-6259  
**Counties served: Imperial/Riverside/San Bernardino including desert areas** (951) 295-9217 (Cell)  
**in surrounding cities** (951) 571-6262 (Fax)
- Guild for Infant Survival ~ Orange County** ..... (800) 247-4370  
 2130 E. Fourth Street, Suite 125, Santa Ana, CA 92705 (24hrs toll free in CA)  
 P.O. Box 148, Tustin, CA 92781 (714) 973-8417 (Office)  
 Email: gisoc@att.net Website: www.gisoc.org (714) 973-8429 (Fax)  
**County served: Orange**
- Guild for Infant Survival ~ San Diego County** ..... (619) 448-6874  
 Email: sandiegosids@cox.net (858) 569-COPE (2673)  
 Website: sandiegosids.org  
**County served: San Diego**
- Isabella's Giraffe Club ~ Giant Hearts** ..... (858) 449-6554 (IGC)  
 Angela Amoroso and Drew Skinner (858) 444-6464 (Angela)  
 9920 Scripps Lake Drive, Suite 104, San Diego, CA 92131 (858) 775-4042 (Drew)  
 Email: info@isabellasgiraffeclub.org  
 Email: angela@isabellasgiraffeclub.org (Angela) Email: Drewskinner014@yahoo.com (Drew)  
 Website: http://isabellasgiraffeclub.org  
**Counties served: San Diego/Riverside (Limited areas)**
- Grief Healing Peer-Parent Support Group** ..... (707) 849-5347 (Christina)  
 Christina Thiele  
 Los Angeles County Department of Public Health  
 600 S. Commonwealth Ave., Suite 800, Los Angeles, CA 90005  
 Email: christina23thiele@gmail.com Email: myslaughter84@gmail.com  
**Counties served: Los Angeles/Ventura/Orange**

Note: Asterisk (\*) designates social networking support options such as Facebook, blogs, and/or Online grief counseling.

## Northern California

**Center for Grief and Healing – Angel Babies** ..... (559) 248-8579.

Kathy Cromwell

2490 W. Shaw Ave., Fresno, CA 93711

Website: <http://www.hindshospice.org/angel-babies--bebitos-angelitos.html>

12-week groups and 1:1 and couples counseling. Registration required for groups.

**County served: Fresno**

**KIDS/SIDS ~ Support System for the Central Valley** ..... (209) 808-6680

John Mack

198 Northgate Drive, #101, Manteca, CA 95336

Email: badrat004@msn.com

**Counties served: Calaveras/Fresno/Inyo/Kern/Kings/Madera/Mariposa/Merced/  
San Joaquin/Stanslaus/Tulare/Tuolumne**

**SIDS Alliance of Northern California**

**First Candle/SIDS Alliance Affiliate**

1547 Palos Verde Mall, Box 301, Walnut Creek, CA 94597-2228

Email: info@sidsnc.org

Website: sidsnc.org

Facebook groups available. No in-person support groups.

**Counties served: Alameda/Butte/Colusa/Contra Costa/Del Norte/Glenn/Humboldt/  
Lake/Lassen/Marin/Mendocino/Modoc/Mono/Monterey/Napa/Plumas/San Benito/  
San Francisco/San Mateo/Santa Clara/Santa Cruz/Shasta/Sierra/Siskiyou/Solano/  
Sonoma/Tehama/Trinity**

**SIDS Foundation** ..... (707) 745-0105

Gayla Reiter

P.O. Box 2314, Benicia, CA 94510

Email: gayla@mindspring.com Website: <http://www.sidsinfo.us/>

**County served: Solano**

**SIDS Support of Sacramento** ..... (916) 427-6460

Laurie Mamola, Sacramento, CA 95831

Email: l.mamola@att.net

Website: <http://sidssupportofsacramento.com/>

**Counties served: Alpine/Amador/El Dorado/Nevada/Placer/Sacramento/Sutter/  
Yolo/Yuba**

## Online

**California SIDS Parent Support Group ~ Web Based\***

Colleen Ma, SIDS Parent (Online host)

Orange County, CA

This online web based support group is for California parents and family members experiencing a SIDS loss or other sudden unexplained infant death. Stay connected, share news, photos, videos and more in a private setting.

**To join go to:** <http://www.myfamily.com/group/127810754>

Note: Asterisk (\*) designates social networking support options such as Facebook, blogs, and/or Online grief counseling.



California SIDS Program is funded by Federal Title V Block Grant through the California Department of Public Health, Maternal, Child and Adolescent Health Division

California Sudden Infant Death Syndrome Program  
800-369-SIDS (7437) • 415-753-2161 (FAX)  
[casidsprogram@ucsf.edu](mailto:casidsprogram@ucsf.edu) <http://californiasids.cdph.ca.gov>

6/15/2014

## California Department of Social Services

### Community Care Licensing Division

#### Child Care Advocate Program

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The Child Care Advocate Program (CCAP) at Community Care Licensing, Department of Health and Human Services, promotes the delivery of quality child care in California. In 1984, the State Legislature created CCAP to provide a link between child care licensing and the community.

The CCAP tailors its activities to fit the needs of the local community. A Child Care Advocate provides information to parents, child care providers, employers, educators, and community groups.

The Child Care Advocate participates in many community activities and special projects in order to:

- Disseminate information on the State's licensing role.
- Provide information to the public and parents on child care licensing.
- Act as a liaison to child care resource and referral agencies.
- Serve as liaison to businesses, education groups, child care provider organizations, Resource and Referral Agencies, and other child care programs.
- Assist county government and community agencies in capacity building and quality improvement efforts to ensure the availability of quality child care.
- Assist in the coordination of complaints and concerns on behalf of children in child care.

#### *Northern California Child Care Advocate Program*

Jude Burden  
Community Care Licensing Division  
101 Golf Course Dr., Ste. A230  
Rohnert Park, CA 94928  
(661) 316-8088  
[Judith.burden@dss.ca.gov](mailto:Judith.burden@dss.ca.gov)

#### *Southern California Child Care Advocate Program*

Sharon Greene  
Community Care Licensing Division  
6167 Bristol Parkway Ste. 400  
Culver City, California 90230  
(310) 654-4655 Cell  
[Sharon.greene1@dss.ca.gov](mailto:Sharon.greene1@dss.ca.gov)

August, 2014



CDSS

WILL LIGHTBOURNE  
DIRECTOR

STATE OF CALIFORNIA—HEALTH AND HUMAN SERVICES AGENCY  
**DEPARTMENT OF SOCIAL SERVICES**  
744 P Street • Sacramento, CA 95814 • [www.cdss.ca.gov](http://www.cdss.ca.gov)



EDMUND G. BROWN JR.  
GOVERNOR

## COMMUNITY CARE LICENSING DIVISION CHILD CARE OFFICES

### Program Administrator, Paula d'Albenas

744 P Street, MS: 9-14-48  
Sacramento, CA 95814  
(916) 651-6040 FAX (916) 651-0531

#### NORTHERN CHILD CARE AREA OFFICE

*Assistant Program Administrator, Colleen Young*  
744 P Street, MS 9-14-48  
Sacramento, CA 95814  
(916) 651-6040 FAX (916) 651-0531

#### CHICO REGIONAL OFFICE

*Regional Manager, Linda Kryla*  
520 Cohasset Road, Suite 170, MS 29-05  
Chico, CA 95926  
(530) 895-5033 FAX (530) 895-5934  
**Counties:** Butte, Colusa, Del Norte, Glenn, Humboldt,  
Lassen, Modoc, Plumas, Shasta, Sierra, Siskiyou, Sutter,  
Tehama, Trinity, & Yuba

#### ROHNERT PARK LOCAL UNIT

*Local Unit Manager, Linda Walker*  
101 Golf Course Drive, Suite A-230, MS 29-11  
Rohnert Park, CA 94928  
(707) 588-5026 FAX (707) 588-5099  
**Counties:** Lake, Mendocino, Napa, Solano, & Sonoma

#### RIVER CITY REGIONAL OFFICE

*Regional Manager, Kathy Ertola*  
2525 Natomas Park Drive, Suite 250, MS 19-29  
Sacramento, CA 95833  
(916) 263-5744 FAX (916) 929-6371  
**Counties:** Alpine, Amador, Calaveras, El Dorado, Nevada,  
Placer, Sacramento, San Joaquin, Tuolumne, & Yolo

#### FRESNO REGIONAL OFFICE

*Regional Manager, Robert Garza*  
770 East Shaw Avenue, Suite 300, MS 29-01  
Fresno, CA 93710  
(559) 243-4588 FAX (559) 243-8070  
**Counties:** Fresno, Inyo, Kern, Kings, Madera, Mariposa,  
Merced, Mono, Stanislaus, & Tulare

#### BAY AREA REGIONAL OFFICE

*Regional Manager, Barbara Bobincheck*  
1515 Clay Street, Suite 1102, MS 29-04  
Oakland, CA 94612  
(510) 622-2602 FAX (510) 622-2641  
**Counties:** Alameda & Contra Costa

#### PENINSULA REGIONAL OFFICE

*Regional Manager, Sharon Howell*  
851 Traeger Avenue, Suite 360, MS 29-24  
San Bruno, CA 94066  
(650) 266-8843 FAX (650) 266-8847  
**Counties:** Marin, San Francisco, & San Mateo

#### SAN JOSE REGIONAL OFFICE

*Regional Manager, Carol Marcroft*  
2580 N. First Street, Suite 300, MS 29-08  
San Jose, CA 95131  
(408) 324-2148 FAX (408) 324-2160  
**Counties:** Monterey, San Benito, Santa Clara, & Santa Cruz

#### SOUTHERN CHILD CARE AREA OFFICE

*Assistant Program Administrator, Cagle Moore*  
6167 Bristol Parkway, #400, MS 29-13  
Culver City, CA 90230  
(310) 337-4333 FAX (310) 342-6849

#### MISSION VALLEY REGIONAL OFFICE

*Regional Manager, Shelley High*  
7575 Metropolitan Drive, Suite 110, MS 29-20  
San Diego, CA 92108-4421  
(619) 767-2200 FAX (619) 767-2203  
**Counties:** San Diego & Imperial

#### INLAND EMPIRE REGIONAL OFFICE

*Regional Manager, Reynauldo Pennywell*  
3737 Main Street, Suite 700, MS 29-12  
Riverside, CA 92501  
(951) 782-4200 FAX (951) 782-4985  
**Counties:** Riverside & San Bernardino

#### ORANGE COUNTY REGIONAL OFFICE

*Regional Manager, Mary Kaarmaa*  
750 The City Drive, Suite 250, MS 29-10  
Orange, CA 92868  
(714) 703-2800 FAX (714) 703-2831  
**County:** Orange

#### CENTRAL COAST REGIONAL OFFICE

*Regional Manager, Maria Valencia*  
6500 Hollister Avenue, Suite 200, MS 29-09  
Goleta, CA 93117  
(805) 562-0400 FAX (805) 685-1820  
**Counties:** San Luis Obispo, Santa Barbara, &  
Ventura

#### L.A. NORTHWEST REGIONAL OFFICE

*Regional Manager, Carla Caldwell*  
6167 Bristol Parkway, Suite 400, MS 29-13  
Culver City, CA 90230  
(310) 337-4333 FAX (310) 337-4360  
**Counties:** See attached zip code breakdown

#### L.A. EAST REGIONAL OFFICE

*Regional Manager, Maria Hendrix*  
1000 Corporate Center Dr., Suite 200B, MS 29-15  
Monterey Park, CA 91754  
(323) 981-3350 FAX (323) 981-3355  
**Counties:** See attached zip code breakdown

Los Angeles East Office  
 1000 Corporate Center Dr., Suite 200B  
 400 Monterey Park, CA 91754

Los Angeles Northwest Office  
 6167 Bristol Parkway, Suite  
 Culver City, CA 90230

90001	90280	90853	91504
90002	90601	91001	91505
90003	90602	91003	91506
90004	90603	91006	91521
90005	90604	91007	91523
90006	90605	91009	91602
90007	90606	91010	91604
90010	90608	91011	91608
90011	90631	91016	91702
90012	90638	91017	91706
90013	90639	91020	91711
90014	90640	91021	91722
90015	90650	91024	91723
90017	90660	91030	91724
90020	90661	91031	91731
90021	90670	91040	91732
90022	90701	91041	91733
90023	90703	91042	91740
90026	90706	91043	91741
90027	90712	91045	91744
90028	90713	91101	91745
90029	90714	91102	91746
90030	90715	91103	91747
90031	90716	91104	91748
90032	90723	91105	91750
90033	90745	91106	91752
90037	90746	91107	91754
90038	90747	91108	91755
90039	90749	91109	91765
90040	90755	91125	91766
90041	90801	91126	91767
90042	90802	91201	91768
90057	90803	91202	91769
90058	90804	91203	91770
90059	90805	91204	91771
90061	90806	91205	91772
90063	90807	91206	91773
90065	90808	91207	91775
90068	90809	91208	91776
90071	90810	91209	91780
90079	90813	91210	91789
90201	90814	91214	91790
90240	90815	91226	91791
90241	90822	91236	91792
90242	90831	91352	91801
90255	90832	91501	91802
90262	90840	91502	91803
90270	90846	91503	

90008	90254	90510	91404
90009	90260	90704	91405
90016	90261	90710	91406
90018	90263	90717	91408
90019	90265	90731	91409
90024	90266	90732	91411
90025	90272	90733	91412
90034	90274	90744	91413
90035	90275	91301	91423
90036	90277	91302	91436
90043	90278	91303	91601
90044	90290	91304	91605
90045	90291	91305	91606
90046	90292	91306	91607
90047	90293	91307	93510
90048	90294	91308	93523
90049	90295	91310	93532
90056	90296	91311	93534
90062	90301	91316	93535
90064	90302	91321	93536
90066	90303	91324	93543
90067	90304	91325	93544
90069	90305	91326	93550
90073	90306	91330	93551
90077	90307	91331	93552
90080	90308	91335	93553
90094	90309	91340	93563
90095	90310	91341	93591
90209	90401	91342	
90210	90402	91343	
90211	90403	91344	
90212	90404	91345	
90213	90405	91350	
90220	90406	91351	
90221	90407	91354	
90222	90408	91355	
90223	90409	91356	
90224	90410	91360	
90230	90411	91361	
90231	90501	91362	
90232	90502	91364	
90233	90503	91367	
90245	90504	91381	
90247	90505	91382	
90248	90506	91384	
90249	90507	91401	
90250	90508	91402	
90251	90509	91403	



## Model Health & Safety Policies

# Safe Sleep Policy for Infants in Child Care Programs

All childcare providers at \_\_\_\_\_ [program name] will follow safe sleep recommendations for infants to reduce the risk of Sudden Infant Death Syndrome (SIDS), Sudden Unexpected Infant Death (SUID), and the spread of contagious diseases:

1. Infants will always be put to sleep on their backs.
2. Infants will be placed on a firm mattress, with a fitted crib sheet, in a crib that meets the Consumer Product Safety Commission safety standards.
3. No toys, soft objects, stuffed animals, pillows, bumper pads, blankets, positioning devices or extra bedding will be in the crib or draped over the side of the crib.
4. Sleeping areas will be ventilated and at a temperature that is comfortable for a lightly clothed adult. Infants will not be dressed in more than one extra layer than an adult.
5. If additional warmth is needed, a one-piece blanket sleeper or sleep sack may be used.
6. The infant's head will remain uncovered for sleep. Bibs and hoods will be removed.
7. Sleeping infants will be actively observed by sight and sound.
8. Infants will not be allowed to sleep on a couch, chair cushion, bed, pillow, or in a car seat, swing or bouncy chair. If an infant falls asleep anywhere other than a crib, the infant will be moved to a crib right away.
9. An infant who arrives asleep in a car seat will be moved to a crib.
10. Infants will not share cribs, and cribs will be spaced 3 feet apart.
11. Infants may be offered a pacifier for sleep, if provided by the parent.
12. Pacifiers will not be attached by a string to the infant's clothing and will not be reinserted if they fall out after the infant is asleep.
13. When able to roll back and forth from back to front, the infant will be put to sleep on his back and allowed to assume a preferred sleep position.
14. In the rare case of a medical condition requiring a sleep position other than on the back, the parent must provide a signed waiver from the infant's physician.
15. Our child care program is a smoke-free environment.
16. Our child care program supports breastfeeding.
17. Awake infants will have supervised "Tummy Time".

\*This policy reflects the safe sleep research as of November, 2011.



Courtesy of the Back to Sleep Campaign, NICHD, NIH, DHHS

## Resources

Caring for Our Children, National Health and Safety Performance Standards, 3rd Edition.  
<http://nrckids.org/CFOC3/index.html>

SIDS and Other Sleep Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment, Pediatrics, AAP Policy. <http://pediatrics.aappublications.org/content/128/5/e1341.full>

CCHP Tummy Time. [http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/tummy\\_time\\_0209.pdf](http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/tummy_time_0209.pdf)

Safe Sleep for Infants in Child Care Programs: Reducing the Risk of SIDS and SUID Health and Safety Note.  
[http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/SIDS\\_EN\\_1111.pdf](http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/SIDS_EN_1111.pdf)

# Normas de seguridad durante el sueño del bebé en los programas de cuidado de niños

Todo el personal del programa de cuidado de niños en \_\_\_\_\_ (Nombre del programa) seguirá las recomendaciones de seguridad mientras el bebé duerme para reducir el riesgo de Síndrome de Muerte Súbita del Lactante (SMSL, por sus siglas en español o SIDS por sus siglas en inglés), Muerte Súbita e Inesperada del Lactante (MSIL, por sus siglas en español o SUID, por sus siglas en inglés) y la propagación de enfermedades contagiosas:

1. Siempre se pondrá a los bebés a dormir boca arriba.
2. Se pondrá a dormir a los bebés sobre un colchón firme, con sábanas ajustadas, en una cuna que cumpla las normas de seguridad de la Comisión para la Seguridad de Productos de Consumo.
3. En la cuna no habrá juguetes, objetos blandos, animales de peluche, almohadas, protectores de cuna, mantas, aparatos para acomodar la posición o ropa de cama adicional colgando del lado de la cuna.
4. Las áreas donde dormirán los bebés permanecerán ventiladas y a una temperatura cómoda para un adulto vestido con ropa liviana. No se abrigará a los bebés más que con una capa de abrigo más que los adultos.
5. Si se necesita abrigo adicional, se podrá colocar una sola manta o bolsa para dormir especial para bebés.
6. La cabecita del bebé permanecerá descubierta cuando duerma. Se le sacarán los baberos y las capuchas al bebé para dormir.
7. Se observará visualmente y activamente a los bebés que estén durmiendo y se les escuchará la respiración.
8. No se permitirá que los bebés duerman en un sofá, almohadón, cama, almohada o en el asiento de auto, hamaca o sillita de rebotes. Si el bebé se queda dormido en algún lugar que no sea un ambiente seguro para dormir, se lo pasará a una cuna inmediatamente.
9. Se pasará a una cuna a todo bebé que llegue al programa dormido en un asiento de auto.
10. Los bebés no compartirán cunas y se colocarán las cunas a 3 pies de distancia entre sí.
11. Se le puede ofrecer al bebé un chupón (chupete) para dormir, si los padres trajeron uno.
12. No se atarán los chupones (chupetes) a una cinta o a la ropa del bebé y si el chupón (chupete) se le cae de la boca cuando el bebé esté dormido no se lo volverá a poner en la boca del bebé.
13. Cuando el bebé pueda girar con facilidad de boca arriba a boca abajo, se pondrá al bebé a dormir boca arriba, pero se le permitirá que se ponga en su posición preferida para dormir.
14. En el raro caso que haya una afección de salud que requiera que el bebé duerma en una posición diferente (no boca arriba), los padres deben traer una nota expresa y firmada por el médico.
15. Nuestro programa de cuidado de niños es un ambiente libre de humo de cigarrillo.
16. Nuestro programa de cuidado de niños respalda que se alimente al bebé con leche materna.
17. Los bebés que estén despiertos pasarán tiempo "boca abajo" con supervisión.



Courtesy of the Back to Sleep Campaign, NICHD, NIH, DHHS

\*Esta norma refleja las conclusiones de los estudios de investigación para mantener la seguridad durante el sueño del bebé publicadas en noviembre de 2011.

## Fuentes de consulta en inglés y español

Caring for Our Children, National Health and Safety Performance Standards, 3rd Edition

<http://nrckids.org/CFOC3/index.html>

SIDS and Other Sleep Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment, Pediatrics, AAP Policy, <http://pediatrics.aappublications.org/content/128/5/e1341.full>

Boca abajo de CCHP [http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/tummy\\_time\\_0209.pdf](http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/tummy_time_0209.pdf)

Nota de Salud y Seguridad: Seguridad durante el Sueño de Bebés en los Programas de Cuidado de Niños:

[http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/SIDS\\_EN\\_1111.pdf](http://www.ucsfchildcarehealth.org/pdfs/healthandsafety/SIDS_EN_1111.pdf)

# SIDS/SUID Peer Grief Support Services in California

Throughout California non-profit volunteer peer support groups offer an array of services for those experiencing an infant loss due to Sudden Infant Death Syndrome (SIDS) or other sudden unexpected infant death (SUID). Volunteers are trained SIDS/SUID parents, family members, foster parents and/or childcare providers who have received specialized grief training to assist other bereaved individuals. Services include bereavement support groups, individual peer counseling and/or online support. Please contact the local grief group directly to inquire about meeting times/location and to obtain further information about their support and services.

## Southern California

- A New Normal ~ Child Loss Support Group** ..... (951) 303-6789  
 Rachel Strickland  
 Rancho Community Church  
 31300 Rancho Community Way, Temecula, CA 92592  
 Email: rstrickland41@gmail.com Website: http://rcc.tv  
**County served: Riverside and areas surrounding Temecula**
- Guild for Infant Survival ~ Inland Empire** ..... San Bernardino County  
 Sharon Lang (909) 838-1536  
 Email: Sharon\_lang@redlands.edu or vso2012@yahoo.com (San Bernardino County)  
 Maureen Chavez Riverside County  
 Email: MCChavez42@gmail.com (Riverside County) (951) 571-6259  
**Counties served: Imperial/Riverside/San Bernardino including desert areas** (951) 295-9217 (Cell)  
**in surrounding cities** (951) 571-6262 (Fax)
- Guild for Infant Survival ~ Orange County** ..... (800) 247-4370  
 2130 E. Fourth Street, Suite 125, Santa Ana, CA 92705 (24hrs toll free in CA)  
 P.O. Box 148, Tustin, CA 92781 (714) 973-8417 (Office)  
 Email: gisoc@att.net Website: www.gisoc.org (714) 973-8429 (Fax)  
**County served: Orange**
- Guild for Infant Survival ~ San Diego County** ..... (619) 448-6874  
 Email: sandigosids@cox.net (858) 569-COPE (2673)  
 Website: sandigosids.org  
**County served: San Diego**
- Isabella's Giraffe Club ~ Giant Hearts** ..... (858) 449-6554 (IGC)  
 Angela Amoroso and Drew Skinner (858) 444-6464 (Angela)  
 9920 Scripps Lake Drive, Suite 104, San Diego, CA 92131 (858) 775-4042 (Drew)  
 Email: info@isabellasingiraffeclub.org  
 Email: angela@isabellasingiraffeclub.org (Angela) Email: Drewskinner014@yahoo.com (Drew)  
 Website: http://isabellasingiraffeclub.org  
**Counties served: San Diego/Riverside (Limited areas)**
- Grief Healing Peer-Parent Support Group** ..... (707) 849-5347 (Christina)  
 Christina Thiele  
 Los Angeles County Department of Public Health  
 600 S. Commonwealth Ave., Suite 800, Los Angeles, CA 90005  
 Email: christina23thiele@gmail.com Email: myslaughter84@gmail.com  
**Counties served: Los Angeles/Ventura/Orange**

Note: Asterisk (\*) designates social networking support options such as Facebook, blogs, and/or Online grief counseling.

## Northern California

**Center for Grief and Healing – Angel Babies** ..... (559) 248-8579.

Kathy Cromwell

2490 W. Shaw Ave., Fresno, CA 93711

Website: <http://www.hindshospice.org/angel-babies--bebitos-angelitos.html>

12-week groups and 1:1 and couples counseling. Registration required for groups.

**County served: Fresno**

**KIDS/SIDS ~ Support System for the Central Valley** ..... (209) 808-6680

John Mack

198 Northgate Drive, #101, Manteca, CA 95336

Email: badrat004@msn.com

**Counties served: Calaveras/Fresno/Inyo/Kern/Kings/Madera/Mariposa/Merced/  
San Joaquin/Stanslaus/Tulare/Tuolumne**

**SIDS Alliance of Northern California**

**First Candle/SIDS Alliance Affiliate**

1547 Palos Verde Mall, Box 301, Walnut Creek, CA 94597-2228

Email: info@sidsnc.org

Website: sidsnc.org

Facebook groups available. No in-person support groups.

**Counties served: Alameda/Butte/Colusa/Contra Costa/Del Norte/Glenn/Humboldt/  
Lake/Lassen/Marin/Mendocino/Modoc/Mono/Monterey/Napa/Plumas/San Benito/  
San Francisco/San Mateo/Santa Clara/Santa Cruz/Shasta/Sierra/Siskiyou/Solano/  
Sonoma/Tehama/Trinity**

**SIDS Foundation** ..... (707) 745-0105

Gayla Reiter

P.O. Box 2314, Benicia, CA 94510

Email: gayla@mindspring.com Website: <http://www.sidsinfo.us/>

**County served: Solano**

**SIDS Support of Sacramento** ..... (916) 427-6460

Laurie Mamola, Sacramento, CA 95831

Email: l.mamola@att.net

Website: <http://sidssupportofsacramento.com/>

**Counties served: Alpine/Amador/El Dorado/Nevada/Placer/Sacramento/Sutter/  
Yolo/Yuba**

## Online

**California SIDS Parent Support Group ~ Web Based\***

Colleen Ma, SIDS Parent (Online host)

Orange County, CA

This online web based support group is for California parents and family members experiencing a SIDS loss or other sudden unexplained infant death. Stay connected, share news, photos, videos and more in a private setting.

**To join go to:** <http://www.myfamily.com/group/127810754>

Note: Asterisk (\*) designates social networking support options such as Facebook, blogs, and/or Online grief counseling.



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California Sudden Infant Death Syndrome Program  
800-369-SIDS (7437) • 415-753-2161 (FAX)  
[casidsprogram@ucsf.edu](mailto:casidsprogram@ucsf.edu) <http://californiasids.cdph.ca.gov>

6/15/2014

# California Sudden Infant Death Syndrome Program

## Peer Contact Volunteers - Overview

A peer contact is a parent, sibling, grandparent (or other relative), child care provider or foster parent who has experienced the death of an infant due to SIDS or other sudden unexpected infant death (SUID), and who assists grieving individuals by offering bereavement support.

Volunteers interested in serving as peer contacts are referred to the California SIDS Program for specialized bereavement training. It is recommended that interested individuals have experienced their loss at least one year before the training.

In California, a peer contact has received specialized grief training by a professional bereavement instructor. This intensive training equips peer volunteers with the necessary skills for providing appropriate support, guidance and comfort to other newly bereaved SIDS/SUID individuals and family members.

Some peer contacts received their specialized grief training through First Candle/National SIDS Alliance. This national non-profit parent support organization's training curriculum serves as the foundation for California's volunteer peer program.

Usually the bereaved are introduced to a peer contact at a support group session. An individual meeting or telephone call however, can be arranged at the discretion of the peer contact, if requested.

The California SIDS Program maintains a roster of volunteers who have been trained as peer contacts. When the Program receives a request for peer support services, trained peer volunteers are "matched" to the newly bereaved, taking into consideration the circumstances surrounding the death, ethnic/language differences and geographic location.

SIDS Coordinators and public health professionals can connect with a peer contact with the assistance of the California SIDS Program or by calling their local SIDS Parent Support Organization directly. To obtain a current list of *S/OS/SUID Peer Grief Support Services* please contact the California SIDS Program at 1-800-369-SIDS (7437).

SIDS Coordinators may also connect directly with a peer contact by selecting a SIDS/SUID volunteer counselor from the active listing provided by the California SIDS Program. Although a peer may not reside within the Coordinator's local health jurisdiction, they are willing to provide grief support on a case by case basis as needed. Before referring the bereaved for personalized grief support, please contact the peer directly via email and/or phone so they are equipped to address any special grief issues or other immediate concerns.

Public health professionals are encouraged to refer individuals interested in being trained as peer contacts to the California SIDS Program.

12.12.2014



Active SIDS/SUID Peer Contact List by County

County	Name	Email	Phone	Languages
Contra Costa	Lorie Gehrke	<a href="mailto:lsg@ix.netcom.com">lsg@ix.netcom.com</a> (professionals) <a href="mailto:info@sidsnc.org">info@sidsnc.org</a> (parents)	email only	
Contra Costa	Vicki McGuire	<a href="mailto:vickimcguire@yahoo.com">vickimcguire@yahoo.com</a>	925-813-1394	
Los Angeles	Jeanette Connor (grandparent)	none	323-839-8895	
Los Angeles	Olivia Garcia	<a href="mailto:liv4sum04@yahoo.com">liv4sum04@yahoo.com</a>	818-567-0984 818-212-3506 (cell)	Spanish
Los Angeles	Elizabeth Ramirez	<a href="mailto:ramirez_kiara@lcoe.edu">ramirez_kiara@lcoe.edu</a>	562-233-7864	Spanish
Los Angeles	Christina Thiele	<a href="mailto:christina23thiele@gmail.com">christina23thiele@gmail.com</a>	707-849-5347 (cell)	Facebook Group; Website grief support info: <a href="http://www.thechristinathiele.com">www.thechristinathiele.com</a>
Monterey	Dane and Lusanne Fox	<a href="mailto:lusannemarie@aol.com">lusannemarie@aol.com</a>	831-905-8442	
Napa	Jane Graves	<a href="mailto:jgianegraves@gmail.com">jgianegraves@gmail.com</a>	925-395-4561 (work) 707-337-6176	
Orange	Arlene Barela	<a href="mailto:abarela@ymail.com">abarela@ymail.com</a>	520-252-7660	
Orange	Carole Guttilla (Grandparent)	<a href="mailto:joyfulone@luckymail.com">joyfulone@luckymail.com</a>	714-524-7647	
Orange	Jordy Jahn	<a href="mailto:jjahn@ggusd.us">jjahn@ggusd.us</a>	714-501-3646	
Orange	Colleen Ma	<a href="mailto:markandcolma@gmail.com">markandcolma@gmail.com</a>	714-312-5410 (home) 714-315-4605 (cell)	
Placer	Candace Jones	<a href="mailto:cjones@lincolnxing.org">cjones@lincolnxing.org</a>	916-396-2460	
Placer	Jaymie Pond	<a href="mailto:Jaymie_pond@yahoo.com">Jaymie_pond@yahoo.com</a>	916-532-7794	
Placer	Frank Wandell	<a href="mailto:fhwandell@gmail.com">fhwandell@gmail.com</a>	916-771-8216	
Riverside	Maureen Chavez	<a href="mailto:Mcchavez42@gmail.com">Mcchavez42@gmail.com</a>	951-571-6259 (work) 951-295-9217 (cell)	
Riverside	Rachel Strickland	<a href="mailto:Rstrickland41@gmail.com">Rstrickland41@gmail.com</a>	951-240-7736 (home) 714-305-0421 (cell)	
Sacramento	Laurie Mamola	<a href="mailto:l.mamola@att.net">l.mamola@att.net</a>	916-427-6460 916-505-0349 (cell)	
San Bernardino	Irene Holguin Lopez	<a href="mailto:riverrun2136@yahoo.com">riverrun2136@yahoo.com</a>	909-219-5572	Spanish
San Bernardino	Sharon Lang	<a href="mailto:Sharon_lang@redlands.edu">Sharon_lang@redlands.edu</a> <a href="mailto:vso2012@yahoo.com">vso2012@yahoo.com</a>	909-838-1536	
San Diego	Angela Amoroso	<a href="mailto:angela@isabellasgiraffeclub.org">angela@isabellasgiraffeclub.org</a>	858-444-6464	

Active SIDS/SUID Peer Contact List by County

San Diego	Valerie Lindgren RN	<a href="mailto:valerielindgren@att.net">valerielindgren@att.net</a>	858-693-0982 (home) 858-735-9925 (cell)	
San Diego	Drew Skinner	<a href="mailto:drewskinner014@yahoo.com">drewskinner014@yahoo.com</a>	858-775-4042	
San Diego	Jeri Wilson MSW	<a href="mailto:jeriellen3@cox.net">jeriellen3@cox.net</a>	619-448-6874	
San Francisco	Angela Siharath (child care provider)	<a href="mailto:landandpradit@yahoo.com">landandpradit@yahoo.com</a>	415-467-5856	Mandarin, Cantonese Lao, Thai
San Joaquin	John Mack	<a href="mailto:Badrat004@msn.com">Badrat004@msn.com</a>	209-808-6680 (home) 209-740-6104 (cell)	
	Darci and Robert Torres	<a href="mailto:rtores66@yahoo.com">rtores66@yahoo.com</a>	209-943-0786	
San Mateo	Magali Leialoha	<a href="mailto:magalileialoha@gmail.com">magalileialoha@gmail.com</a>	650-548-1203	
Solano	Gayla Reiter	<a href="mailto:gayla@mindspring.com">gayla@mindspring.com</a>	707-745-0105	
Trinity	Kathie Thompson	<a href="mailto:kthompson@trinitycounty.org">kthompson@trinitycounty.org</a>	530-356-1483 530-623-8216 (work)	
Ventura	Keith and Susanne Cooper	<a href="mailto:scooper@jdcivil.com">scooper@jdcivil.com</a>	805-340-2337	
Yolo	Kristin Gaffney-Roca (child care provider)	<a href="mailto:kristinroca@aol.com">kristinroca@aol.com</a>	916-375-0549	

Note: The volunteers on this list are parents, family members and child care providers trained to provide peer grief support to newly bereaved individuals after the sudden and unexpected death of an infant. Peer volunteers may provide grief support by phone or email as needed. Referrals do not need to live in the same county. Please contact peer volunteers by phone or email before making a referral so that they can be prepared and be aware of any special concerns or needs. Feel free to contact the California SIDS Program with questions or concerns: [casidsprogram@ucsf.edu](mailto:casidsprogram@ucsf.edu) or 800-369-SIDS (7437).

# Section Seven

**Research and Articles:**

**Resource Page with Links to Articles**



M. M. T. Vennemann · C. Rentsch · T. Bajanowski ·  
G. Zimmer

## Are autopsies of help to the parents of SIDS victims?

### A follow-up on SIDS families

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**Abstract** Little is known about what bereaved parents feel about the autopsy performed on their child. A multi-centre case control study of sudden infant death syndrome (SIDS) victims was carried out in Germany between 1998 and 2001, in which all infants had been autopsied. We performed a follow-up study 4–7 years after the parents had lost their child. A total of 141 parents filled in the questionnaire, which were sent to them by the study centre. Of these, 71% had had another child after the SIDS/sudden unexpected death in infancy. The majority (83%) of the participating parents found the autopsy helped them to cope better with the death. A large proportion (46%) did not want any professional help after the death, and 55% did not wish to have any contact with a self-help group. We conclude that the autopsy is helpful to the majority of bereaved parents. Professional help and self-help groups should be offered to the parents even if the majority in our study did not want to use either.

**Keywords** SIDS · Autopsy · Parental follow-up

A number of studies were undertaken on the acute reactions of parents after the loss of their infants due to sudden infant death syndrome (SIDS) [1]. However, few studies were conducted into how parents of SIDS victims cope several years after the sudden death of their infants [2, 3]. Moreover, little is known about the feelings of the parents with hindsight regarding the autopsy.

#### Materials and methods

We conducted a case control study on SIDS in Germany between 1998 and 2001. The study area was half of Germany, comprising 11 states in the vicinity of 18 institutes of legal medicine. Data was collected from October 1998 to September 2001. The study comprised 455 infants who had died suddenly and unexpectedly. Of the 455 parents, 373 (82%) agreed to an interview shortly after the death. All cases were autopsied by a forensic pathologist in accordance with a standardised autopsy protocol. The methods and results are described in detail elsewhere. After all the information regarding the infants had been collected, the cases were classified by a multi-disciplinary panel into one of four categories, whereby categories 1–3 are SIDS and borderline SIDS cases and category 4 comprised death due to explained causes, mainly infection (sudden unexpected death in infancy, SUDI) [4, 5].

In January 2005, we contacted all the 373 parents previously interviewed. A letter was sent to them thanking them again for their participation in the study and presenting the most important findings of the study. A short questionnaire was included, consisting of 11 questions, which asked if they had subsequently had any children, how important the autopsy was to them with hindsight, and whether they had had any professional help or contact with self-help groups after the death of their baby. If no response was received within 4 weeks, we sent a reminder. The data collected in the first interviews was used to assess their socioeconomic status.

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**Table 1** Parental socioeconomic status (SES) and maternal age of the original parents and the follow-up parents

Parental SES	Cases <i>n</i> =373 <i>N</i> (%)	Follow-up <i>n</i> =141 <i>n</i> (%)
Lower SES	181 (48.79)	48 (34.04)
Middle SES	148 (39.89)	66 (46.81)
Upper SES	42 (11.32)	27 (19.15)
Maternal age <25 years	158 (47.45)	37 (27.21)

**Table 2** Characteristics of the original cases and the follow-up parents

Characteristics	Cases <i>n</i> =373 <i>n</i> (%)	Follow-up <i>n</i> =141 <i>n</i> (%)
Gender		
Male	221 (59.25)	87 (61.70)
Female	152 (40.75)	54 (38.30)
<i>p</i> -cat		
<i>p</i> -cat1	30 (8.04)	9 (6.38)
<i>p</i> -cat2	225 (60.32)	89 (63.12)
<i>p</i> -cat3	78 (20.91)	28 (19.86)
<i>p</i> -cat4	40 (10.72)	15 (10.64)

*p*-cat1–3 SIDS, *p*-cat4 explained death

**Table 3** Percentage of parents with a live birth after the SIDS/SUDI

Did you have another baby	Number (percentage)
Yes	100 (70.92)
No	41 (29.08)

## Results

Of the 373 parents previously interviewed, 141 (38%) responded, 83 letters were returned undelivered, and 148 did not respond at all. One refused expressly.

Comparing this group of respondents with the original group of parents, the former has a slightly better socioeconomic background (socioeconomic status, SES) (Table 1). No differences were noted between respondents and non-respondents with regard to the sex of the deceased

**Table 4** Assessment of the parents about the autopsy

How did you judge the autopsy after that time?	Number (percentage)
Autopsy was beneficial for the bereavement.	93 (65.96)
I found the autopsy right at the time, but not anymore.	4 (2.84)
I found the autopsy wrong at the time, but right today.	24 (17.02)
The autopsy was wrong for me at the time and still is.	13 (9.22)

**Table 5** Percentage of parents using professional help after the death

Did you use professional help after the death of your baby?	Number (percentage)
Yes. I talked to a psychologist/psychiatrist.	51 (36.17)
Yes. I visited a therapeutic/medical facility.	7 (4.96)
Yes. I talked several times with my family doctor.	17 (12.06)
No. I didn't use professional help because I couldn't find any.	12 (8.51)
No. I didn't use professional help because I didn't want to.	65 (46.10)

Multiple answers were possible

baby nor the disease classification (SIDS and non-SIDS) (Table 2).

One hundred families (71%) had one or more children after the death of the index case, 18 (13%) didn't not want any more children and 16% wanted more children but were unable to attain pregnancy (Table 3).

Responding to the question concerning the autopsy, 66% (93) said the autopsy had been helpful in the bereavement period. Twenty-four parents (17%) stated that they thought the autopsy was wrong at the time of the death but they now think it was right. Four (3%) parents thought it was right at the time of the death but think it was wrong now. And for 9% (13), the autopsy was and is still wrong (Table 4).

Fifty-one parents (36%) had consulted a psychologist or psychiatrist after the death, and seven were admitted to a therapeutic facility. Seventeen talked with their family doctor about the death and the biggest group, 46% (65), did not want any professional help. Twelve of the parents wanted help but could not find anybody to consult (Table 5). Twenty-three (16%) parents had been in contact with the GEPS (Gemeinsame Elterninitiative Plötzlicher Säuglingstod), a German SIDS self-help group, whilst 13% had contacted the other major parental self-help group in Germany, Verwaiste Eltern ('orphaned parents'). Ten (7%) parents had been in contact with other self-help groups, 15% wanted contact but couldn't find any and 55% did not want contact with any self-help groups (Table 6).

**Table 6** Percentage of parents using self-help groups after the death

Did you contact a self-help group after the death of your baby?	Number (percentage)
Yes. I was in contact with GEPS.	23 (16.31)
Yes. I had contact with "verwaiste Eltern" (orphaned parents).	18 (12.77)
Yes. I had contact with other self-help groups.	10 (7.09)
No. I didn't have any contact, because I didn't find anybody.	21 (14.89)
No. I didn't have contact because I didn't want to.	77 (54.61)

Multiple answers were possible

## Discussion

In our original study, which was carried out in 1998–2001, the study centre in Münster maintained intensive contact with those parents who wished it. We telephoned each family, often several times over a period of weeks, and organised local meetings with them if there was a demand.

However, after some weeks, parents mostly talked with family and friends about their grief, and we only had contact with a few families for a period of more than 6 months. Sometimes they called us for information, when they were expecting another child and needed addresses of specialist paediatricians.

The questionnaire we sent out was short enough to be completed within 5–10 min. The response rate of 38% is high considering that these are young and mobile families. In 22% of cases, we were unable to locate the new address, 40% did not respond and one refused to participate. We can only speculate why parents did not respond to our questionnaire. The non-respondents come from lower social classes and the mothers are younger. It is known that the response rate is better amongst those from a better socioeconomic background, so the group with older parents and better education are more likely to answer questionnaires [6].

In our study between 1998 and 2001, we attempted to communicate the autopsy results to all the parents. In the first instance, this was done by the forensic pathologist, and if wished for, a more detailed explanation was provided by one of the doctors from the study centre.

The role of the autopsy in the bereavement process was judged positively by the majority of the parents (83%) who responded to our questionnaire. Seventy-nine percent of them had the opinion that it was the right thing to do after the death, and they had not changed their minds subsequently, whilst the other 21% needed time to realise that the autopsy was the right instrument for finding out what it was that caused the death of the baby. Only 11% considered the autopsy not right for them. This is a high approval rate and shows that it is important for parents to know about the cause of death. We think that one reason for the high consent rate of the parents is that, during the study period, the parents were given the results of the autopsy. Not only did parents often feel guilty that their infant had died in their care, but also friends and family questioned their ability to be good parents [7]. Helmerich and Saternus [8] reported about defamation of some bereaved parents by family and neighbours, which is consistent with our experience in our cot death study. Therefore, the results of the autopsy prove not only to the parents, but also to their environment, that they are not guilty for the death of their child.

The high rate of agreement amongst parents regarding the autopsy is also reassuring for criminal investigators and forensic pathologists. A lot of parents fear that they have overlooked an illness in their child and therefore need proof that this was not the case. All major self-help groups

in the world approve explicitly of the autopsy in cases of sudden and unexpected child deaths, also because it relieves the parents of their guilt. In Germany, only about half of the children who die suddenly and unexpectedly are autopsied, but 70% of those parents whose children were not investigated regretted it afterwards [9]. Therefore, it is not only necessary to investigate sudden infant deaths to detect infanticides, but also to help parents in their bereavement.

A high proportion (36%) of the parents in our study talked to a psychologist or psychiatrist, so there is obviously a need for professional care after the death of an infant. However, nearly half of the parents did not want to talk to any healthcare professional about their deceased child. When asked about self-help groups, the percentage of parents not wanting any contact was even higher.

In conclusion, the majority of parents in our study viewed the autopsy favourably. Some of them needed the help of health professionals or self-help groups. Such services should be made available to them, but the majority coped with their bereavement with their own family and friends.

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## References

- Vance JC, Boyle FM, Najman JM, Thearle MJ (2002) Couple distress after sudden infant or perinatal death: a 30-month follow up. *J Paediatr Child Health* 38(4):368–372
- Fleming PJ, Blair PS, Sidebotham PD, Hayler T (2004) Investigating sudden unexpected deaths in infancy and childhood and caring for bereaved families: an integrated multi-agency approach. *BMJ* 328(7435):331–334
- Dyregrov K (2004) Bereaved parents' experience of research participation. *Soc Sci Med* 58(2):391–400
- Findeisen M, Vennemann M, Brinkmann B, Ortman C, Rose I, Köpcke W, Jorch G, Bajanowski T (2004) German study on sudden infant death (GeSID): design, epidemiological and pathological profile. *Int J Legal Med* 118(3):163–169
- Vennemann MM, Findeisen M, Butterfass-Bahloul T, Jorch G, Brinkmann B, Köpcke W, Bajanowski T, Mitchell EA (2005) Modifiable risk factors for SIDS in Germany: results of GeSID. *Acta Paediatr* 94(6):655–660
- Stang A, Ahrens W, Jockel KH (1999) Control response proportions in population-based case-control studies in Germany. *Epidemiology* 10(2):181–183
- Helmerichs J, Saternus KS (1995) SIDS-Folgeschwangerschaft. Lübeck: Schmidt-Römhild. (Rechtsmedizinische Forschungsergebnisse, vol 11)
- Helmerichs J, Saternus KS (2000) Psychosocial management of a new pregnancy after Sudden Infant Death (SID)—results of a long-term study of 115 families. *Z Geburtshilfe Neonatol* 204(3):99–105
- Paditz E, Mosshammer A (2006) Prävention des plötzlichen Säuglingstodes in Sachsen. Hilfen für betroffene Familien. Internationaler Kenntnisstand (kritische Metaanalyse und Handlungsempfehlungen) Hille, CH

## REVIEW ARTICLE

## MEDICAL PROGRESS

## The Sudden Infant Death Syndrome

Hannah C. Kinney, M.D., and Bradley T. Thach, M.D.

THE SUDDEN INFANT DEATH SYNDROME (SIDS), WHICH IS CHARACTERIZED by the sudden death of a seemingly healthy infant during a sleep period, has long been considered one of the most mysterious disorders in medicine.<sup>1,2</sup> However, in recent years, SIDS has been substantially demystified by major advances in our understanding of its relationship to sleep and homeostasis, environmental and genetic risk factors, and biochemical and molecular abnormalities. The most important advance has been the discovery that the prone sleep position more than triples the risk of SIDS,<sup>3</sup> which in the early 1990s led to national and international campaigns advocating a supine sleep position for infants. Since then, it has been estimated that rates of SIDS have declined by more than 50%, and thousands of infant lives have been saved.<sup>3-6</sup> However, SIDS still remains the leading cause of post-neonatal infant death in the United States and is the third leading cause of infant mortality overall.<sup>7</sup> This review highlights the major advances in our understanding of SIDS.

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## DEFINITION AND INCIDENCE OF SIDS

In 1969, a National Institutes of Health consensus conference led to the first standardized definition of sudden infant death as the “sudden death of an infant or young child, which is unexpected by history, and in which a thorough post mortem examination fails to demonstrate an adequate cause of death.”<sup>8</sup> The definition mandated an autopsy for infants who died from a condition diagnosed as SIDS, which would demarcate a set of infants with similar characteristics for whom vital statistics, research, and family counseling were needed. Although SIDS was defined as a syndrome and thus potentially the result of more than one disease, many observers still viewed SIDS as a single entity because of its distinctive features, which included a peak incidence at 2 to 4 months of age, male predominance, and the presence of intrathoracic petechiae. Subsequent modifications of the definition restricted its application to infants under the age of 12 months,<sup>9</sup> added the requirement of a death-scene investigation,<sup>9</sup> or linked the death to a sleep period (i.e., the time when the majority of deaths occurred<sup>10</sup>). Of note, it is unclear whether SIDS occurs during sleep itself or during the many transitions between sleep and arousal that occur during the night, since such deaths are typically not witnessed. No single definition of SIDS is universally accepted, and contradictions among SIDS studies are due in part to the use of various definitions of the syndrome around the world.<sup>11</sup>

Among the industrialized nations, Japan has the lowest reported SIDS rate (0.09 case per 1000 infants), New Zealand has the highest rate (0.80 per 1000), and the United States has an intermediate rate (0.57 per 1000).<sup>6</sup> A striking discrepancy exists among racial and ethnic groups that have been studied, with SIDS rates that are two to seven times the national averages among Native Americans<sup>12</sup> and blacks<sup>13</sup> in the United States; among persons of mixed ancestry in Cape Town, South Africa<sup>14</sup>;

among Maoris in New Zealand<sup>4,15</sup>; and among aboriginal Australians.<sup>15</sup> In a recent review of SIDS data from 13 predominantly industrialized countries,<sup>16</sup> the majority of countries had a major decrease in SIDS rates from 1990 to 2005 (the most recent year for which data were available), with the largest decreases occurring before 2000.<sup>16</sup> These decreases ranged from 40% in Argentina to 83% in Ireland. The true incidence of SIDS may be masked by a so-called diagnostic shift, or the use of diagnoses other than SIDS on death certificates (e.g., accidental suffocation, positional accidental asphyxia, and indeterminate cause). Diagnostic shift may explain, in part, why postneonatal death rates for both SIDS and non-SIDS have remained static since approximately 2000.<sup>16-18</sup>

#### CAUSES OF SUDDEN AND UNEXPECTED INFANT DEATH

The term “sudden and unexpected infant death” (SUID) is used to describe all such deaths, regardless of cause. Cases of SUID that remain unexplained after a complete autopsy and review of the circumstances of death and clinical history are classified as SIDS. Thus, SIDS is one of the causes of SUID and accounts for 80% of such deaths. Approximately 20% of SUID cases have a clear cause, including severe, unequivocal infection.<sup>19</sup> In the past 25 years, two causes of death have been defined in a small but important percentage of the SUID population. These are inherited disorders of fatty acid oxidation, particularly mutations in the medium-chain acyl-coenzyme A dehydrogenase (MCAD) gene<sup>20,21</sup> (accounting for approximately 1% of SUID cases), and genetic cardiac channelopathies (accounting for 5 to 10% of SUID cases).<sup>22-24</sup> In these disorders, metabolic or molecular testing in combination with autopsy provides the specific diagnosis. Some investigators have suggested that once a specific cause is identified, such cases should no longer be classified as either SIDS or SUID but, rather, as explained deaths.<sup>20</sup>

It is estimated that among cases of sudden infant death, the incidence of infanticide due to intentional suffocation is less than 5%.<sup>25,26</sup> Although intentional suffocation with a soft object (e.g., a pillow) is virtually impossible to distinguish from SIDS at autopsy, the likelihood of such a cause may be suggested by the death of an infant over the age of 6 months, a history of recurrent life-threatening events in the infant un-

der the care of the same person, and a history of a previous death of an infant with the same caretaker.<sup>26</sup>

A causal role for mild infection in sudden infant death is suggested by reports that in approximately half of SIDS cases, the infants have a seemingly trivial infection around the time of death, as well as mild tracheobronchial inflammation and altered serum immunoglobulin or cytokine levels and the presence of microbial isolates at autopsy.<sup>27,28</sup> In infants who die unexpectedly of infection, the given organism may precipitate a lethal cytokine cascade or toxic response.<sup>27</sup> If all specific causes of infant death are delineated, the designations SUID and SIDS will no longer be needed.

#### NEWER MODELS FOR SIDS

After the recognition that sleeping in the prone position was associated with SIDS, attention turned to factors that might trigger infant death in this position. Such factors include asphyxia due to airway compression or rebreathing of exhaled gases in the face-down position, impaired heat loss with subsequent hyperthermia when the face is pressed against bedding, impaired cardiorespiratory regulation related to heat stress, and compromised arousal in response to asphyxia generated in the prone position.

One way of conceptualizing the emerging multidisciplinary data is with the Triple-Risk Model, proposed in 1994.<sup>29</sup> Like other models, it emphasizes the interaction of multiple factors in the pathogenesis of SIDS.<sup>27,30</sup> According to this model, SIDS occurs when three factors are present simultaneously. The first factor is an underlying vulnerability in the infant; the second, a critical developmental period; and the third, an exogenous stressor (Table 1). Exogenous stressors are considered to be homeostatic stressors, such as asphyxia. During the first year of life, rapid changes in the maturation of cardiorespiratory control and in cycling between sleeping and waking occur, first as the fetus transitions to extrauterine life and subsequently as the infant adjusts to postnatal life.<sup>29</sup> According to the Triple-Risk Model, SIDS does not cause death in normal infants but, rather, only in vulnerable infants with an underlying abnormality. Therefore, the change to a supine sleep position is effective because once the exogenous stressor (e.g., face-down position) is

removed, the vulnerable infant passes through the critical period unharmed.

However, otherwise normal infants without innate vulnerability may also die if they are caught in situations from which they cannot escape — for example, if they become wedged between the mattress and the crib railing.<sup>31</sup> Bed sharing may involve compromise of an infant's upper airway due to close bodily contact with another person or suffocation by adult bedding, such as pillows.<sup>31</sup> In a recent study, 85% of 209 sudden infant deaths were associated with circumstances “consistent with asphyxia,” which included a prone position and bed sharing, suggesting a major role of asphyxia in the pathogenesis of sudden infant death overall.<sup>32</sup> Careful investigation after the occurrence of sudden infant deaths has indicated that approximately 13% or more of such unexplained deaths are attributable to accidental or intentional suffocation.<sup>33</sup> Nevertheless, the diagnosis of asphyxia as the cause of death is subjective, since terminal blood gas levels are obviously unknown. There are no biomarkers that can be obtained posthumously that distinguish between asphyxia-related deaths in normal infants and those in vulnerable infants.

#### RISK FACTORS FOR SIDS

Risk factors for SIDS can be divided into extrinsic and intrinsic categories.<sup>34</sup> Extrinsic risk factors are physical stressors that would place a vulnerable infant at risk for asphyxia or other homeostatic derangement. Such extrinsic factors include prone and side-sleeping positions, bedclothes that cover the head, sleeping on sofas or other soft furniture in which the infant could become wedged, a high ambient temperature in the sleeping environment, soft bedding, and bed sharing.<sup>3,4,12,13,35,36</sup> Although the incidence of a prone sleep position is currently 20% or less,<sup>16,37</sup> 30 to 50% of infants with SIDS are still found in the prone position.<sup>38</sup> Approximately 50% of sudden infant deaths occur when infants are sharing a bed, sofa, or sofa chair with another person.<sup>13</sup> The prone sleep position and a soft mattress are associated with an increase by a factor of 20 in the risk of SIDS, suggesting additive risk for these two factors.<sup>36</sup> However, there are arguments in favor of bed sharing, which include facilitation of breastfeeding and nighttime bonding, behaviors that are beneficial to an infant's well-being.<sup>39</sup> Approx-

**Table 1. Components of the Triple-Risk Model of the Sudden Infant Death Syndrome.**

<b>Intrinsic risk factors</b>	
Genetic	
Male sex	
Polymorphism in the gene encoding the promoter region of the serotonin transporter	
Black or Native American race or ethnic group	
Developmental	
Prematurity	
Environmental	
Perinatal exposure to smoking	
Parental smoking, ethanol intake, or drug use	
Socioeconomic disadvantage	
<b>Extrinsic risk factors</b>	
Sleeping on the side or in prone position	
Soft bedding	
Bed sharing	
Mild infections, including colds	

imately 10% of SIDS cases occur in infants who sleep in a supine position and do not share a bed and whose face is not covered by bedclothes.<sup>5</sup> This finding reinforces the points that such risk factors are not causative and that the causes of SIDS are multifactorial.

In addition to extrinsic risk factors related to external events around the time of death, intrinsic factors are postulated to affect the underlying vulnerability of the infant and thus increase the risk of SIDS. Intrinsic risk factors can be subdivided into developmental factors, such as prematurity,<sup>40</sup> and putative genetic factors, such as familial SIDS (i.e., a recurrence of SIDS in subsequent siblings),<sup>25,41</sup> male sex (by a 2:1 ratio), and race or ethnic group.<sup>13</sup>

Certain genetic polymorphisms have been associated with SIDS.<sup>20,25,42,43</sup> During the past two decades, the search for SIDS susceptibility genes has focused on the hypothesis that SIDS is a homeostatic disorder, and polymorphisms associated with SIDS have been reported in a variety of genes involved in autonomic function, neurotransmission, energy metabolism, and response to infection.<sup>25,42,43</sup> In addition, the vulnerable infant's response to environmental factors may actually reflect aberrant intrinsic responses. For that reason, events and environmental conditions extrinsic to the infant, such as poverty,<sup>5,15,44,45</sup> adverse prenatal exposures to certain substances (e.g., cigarette smoke and alcohol or illicit drugs),<sup>6,12,46,47</sup>

and postnatal exposure to cigarette smoke, may trigger intrinsic responses in the vulnerable infant. For example, prenatal exposures to alcohol and cigarette smoke have a direct effect on neurotransmitter systems that are critical to homeostatic control in the developing human brain.<sup>48</sup>

Given the change in the demographic characteristics associated with SIDS, infants who die of SIDS in the present era may differ from those who died in previous eras. In the United Kingdom, for example, the proportion of SIDS deaths occurring in term infants has decreased, whereas the proportion in preterm infants has increased from 12% to 34% ( $P < 0.001$ ).<sup>46</sup> Furthermore, the proportion of SIDS deaths occurring in families living in poverty has increased from 47% to 74% ( $P = 0.003$ ), and the proportion of SIDS deaths in infants of mothers who smoked during pregnancy has increased from 57% to 87% ( $P = 0.004$ ).<sup>46</sup>

The delineation of risk factors has been crucial for establishing the biologic basis of disparities in the incidence of SIDS among racial and ethnic groups.<sup>12,13,49</sup> Although high SIDS rates among American blacks and Native Americans, Maoris, and aboriginal Australians may reflect factors that are independent of economic levels, poverty is associated with higher rates of maternal alcohol use and smoking during pregnancy, of prematurity, and of bed sharing (due to a lack of space and funds for cribs).<sup>12,16,49</sup> Adding to the concern is evidence that recommendations for preventing SIDS are not reaching high-risk communities.<sup>13,15,37</sup> Efforts are under way to understand the barriers to the promulgation of prevention messages and to optimize such recommendations in high-risk populations.<sup>6,13,50</sup>

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#### PUTATIVE TERMINAL PATHWAYS FOR SIDS

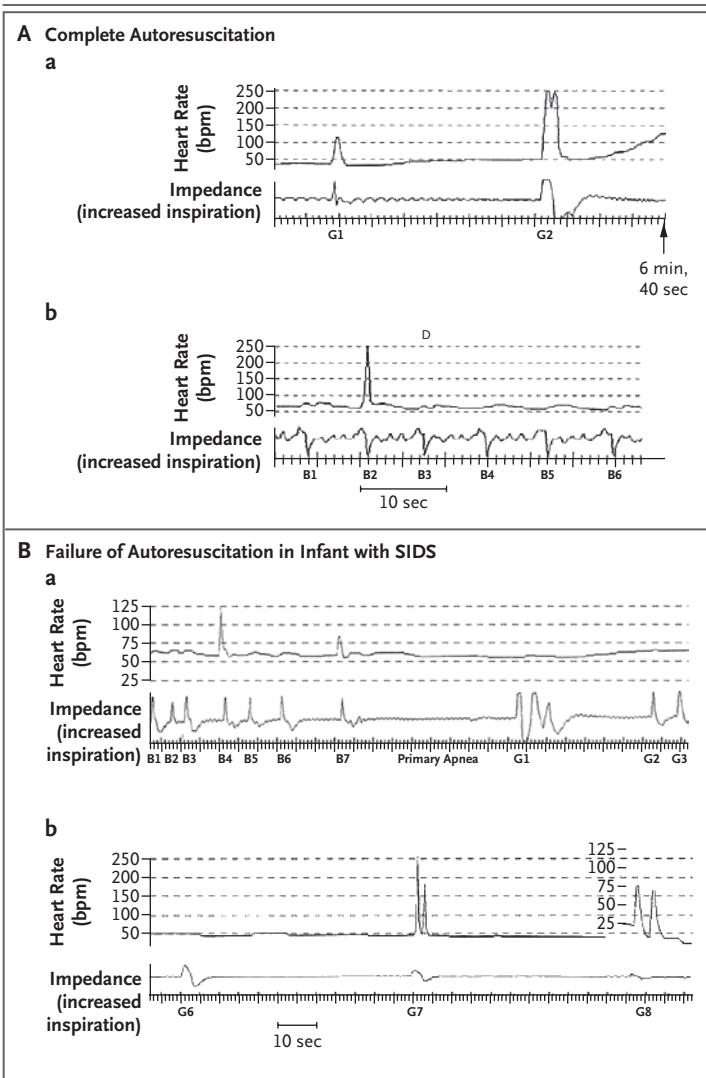
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A key question in SIDS research remains: How do infants die of SIDS? Although multiple theories have been advanced about the mechanism of death in SIDS, the cardiorespiratory-control hypothesis has dominated the research. In a 1982 review, Shannon and Kelly stated that “sudden death without an obvious cause implies the cessation of autonomic regulation of cardiovascular or respiratory activity or both.”<sup>2</sup> In the ensuing years, all SIDS hypotheses essentially invoked defective respiratory or autonomic mechanisms.<sup>27,30,51-58</sup> The roles of respiratory and autonomic pathways in SIDS

are not mutually exclusive, given that infants who subsequently died of SIDS have frequently been found to have subclinical deficits in both respiratory and autonomic function.<sup>59-61</sup> Ultimately, SIDS appears to involve failed defense mechanisms, with sleep in some important way unmasking the underlying vulnerability.

Clinical observations in infants, analysis of heart-rate and respiration recordings in infants who subsequently died of SIDS, and physiological studies in animal models provide compelling evidence for a respiratory pathway in the majority of SIDS deaths (Fig. 1). For purposes of clarity, the respiratory pathway to SIDS can be divided into five steps. First, a life-threatening event (which may occur in any infant during sleep) causes severe asphyxia, brain hypoperfusion, or both. Such life-threatening events include rebreathing of exhaled gases in the face-down position<sup>62</sup> or in the face-covered (supine) position,<sup>63</sup> reflex apnea originating from the laryngeal chemoreflex,<sup>64</sup> and obstructive apnea due to gastric regurgitation. The laryngeal chemoreflex consists of reflex apnea and swallowing in response to the activation of receptors in the laryngeal lumen by water or gastric contents; it occurs early in life and disappears thereafter, although the precise time in infancy is unknown.<sup>64,65</sup> Second, the vulnerable infant does not wake up and turn his or her head in response to asphyxia (combined hypoxia and hypercapnia), resulting in rebreathing or an inability to recover from apnea. Third, progressive asphyxia leads to a loss of consciousness and areflexia, a so-called hypoxic coma, a step that is hypothesized to occur on the basis of extrapolations from studies in animals that indicate the rapid development of coma when a critical level of the partial pressure of arterial oxygen is reached (approximately 10 mm Hg) or when hypoperfusion results in extreme brain hypoxia.<sup>66</sup> Fourth, extreme bradycardia and hypoxic gasping ensue, changes that are evident in the terminal-event recordings in infants who were being monitored at home at the time of death from SIDS<sup>67,68</sup> (Fig. 2). Fifth, in the vulnerable infant, autoresuscitation is impaired — a second defense failure — because of ineffectual gasping, which results in uninterrupted apnea and death.<sup>67,68</sup> Recordings in the same infants over time indicate that SIDS is not always a “sudden” disorder; rather, death may be preceded by a vicious cycle of episodic tachycardia, bradycardia, or apnea hours





**Figure 2. Cardiorespiratory Recordings in Infants, Showing the Results of Successful and Unsuccessful Autoresuscitation.**

Complete autoresuscitation (Panel A) is compared with ineffectual gasping (Panel B) in cardiorespiratory recordings from infants who died suddenly while being monitored at home.<sup>68</sup> In Panel A, the tracing starts with a gasp (G1), which is followed by a gradual increase in the heart rate (subpanel a). (The spikes in heart rate that are simultaneous with gasps are probably recording artifacts.) The second gasp (G2) results in an increased heart rate, at more than 100 beats per minute. After an interruption of 6 minutes 40 seconds, eupneic breaths are noted (subpanel b). Each large breath (B1–B6) is preceded and followed by smaller breaths. Larger breaths may be sighs. In Panel B, hyperpneic breaths (B1–B7) are followed by 35 seconds of primary (hypoxic) apnea (subpanel a). Gasps (G1–G3) follow this apnea. G1 is an abnormally complex, triple gasp. A period of terminal gasps (G6–G8) occurs about 10 minutes after the onset of primary apnea, with decreasing amplitude and altered configuration (subpanel b). SIDS denotes sudden infant death syndrome.

tory activity.<sup>81–83</sup> Tracings from infants who subsequently died of SIDS have indicated that their gasping was ineffectual, with large-amplitude breaths, abnormally complex gasps, and an inability to increase the heart rate (Fig. 2).<sup>68</sup> Some infants with acute life-threatening events (characterized by apnea and unresponsiveness that is interrupted by resuscitation, with no underlying disorder diagnosed) may represent potential SIDS cases in which the failure in gasping is averted by successful intervention. The incidence of acute, life-threatening events is significantly increased in infants with SIDS (12%, vs. 3% in control infants).<sup>84</sup>

Cardiorespiratory recordings from infants who subsequently died of SIDS have shown episodes of tachycardia and bradycardia hours or days before death,<sup>68,85</sup> suggesting a primary failure of autonomic mechanisms. Thus, one pathway for SIDS may involve inadequate compensatory autonomic responses to a hypotensive challenge that results from a cardiac arrhythmia, a “shock-like” sequence,<sup>52</sup> or respiratory perturbation with secondary hypotension. Although a role for abnormal thermoregulation in SIDS is controversial,<sup>58</sup> such a mechanism is suggested by reports of increased risk associated with heavy wrapping and elevated room temperatures at the time of death.<sup>55</sup> Since the face is an important source of heat elimination in infants,<sup>55,86</sup> SIDS infants who are found face-down in bedclothing may have died from heat stress, which causes lethal respiratory inhibition or bradycardia without necessarily elevating the body temperature.

The biologic role of SIDS risk factors becomes comprehensible in light of the above-mentioned pathways, since many risk factors can trigger asphyxia or other homeostatic stressors and exacerbate the underlying vulnerability. An increased risk of SIDS in the first 6 months of life probably reflects a convergence of immature homeostatic systems.<sup>87–89</sup> Premature infants may be at greater risk than term infants because they appear to have fewer and shorter arousal episodes and immature cardiorespiratory patterning.<sup>88,89</sup> The prone sleep position increases the likelihood of re-breathing in the face-down position, upper-airway obstruction, and hyperthermia.<sup>36,90</sup> Developmental motor mechanisms also may underlie the risk associated with a prone sleep position, since

all newborns obviously lack experience in sleeping in this position. Furthermore, infants have not fully learned the efficient protective strategies of head lifting and turning.<sup>58,91</sup> Conceivably, developmental deficits in neural pathways that support reflexive motor learning may increase the risk associated with sleeping in the prone position. In addition, the prone sleep position is associated with impaired arousal from sleep, reduced vasomotor tone, and diminished laryngeal chemoreflexes and baroreceptor reflexes.<sup>92-95</sup> Infants who were exposed to maternal smoking during gestation have reductions in the frequency of arousal from sleep.<sup>96</sup>

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#### ASPHYXIA-RELATED SUDDEN DEATHS

The search for the underlying vulnerability in SIDS infants has led to intense analysis of peripheral and central sites critical to protective responses to asphyxia and hypoxia. The major focus of SIDS research has been on the brain stem because it contains critical neural networks that mediate respiration, chemosensitivity, autonomic function, sleep, and arousal<sup>53,57</sup> (Fig. 3). Abnormalities in various neurotransmitters or their receptors have now been reported in relevant brainstem regions in infants with SIDS.<sup>97</sup> To date, the most robust evidence for a neurochemical abnormality comes from research on the medullary 5-hydroxytryptamine system, in that approximately 50 to 75% of infants with SIDS appear to have abnormalities in this system.<sup>34,98-100</sup> The medullary 5-hydroxytryptamine system, which is considered critical for the modulation and integration of diverse homeostatic functions, according to the level of arousal,<sup>101</sup> is involved in ventilation and gasping,<sup>82,83,102</sup> thermoregulation, autonomic control,<sup>103</sup> responses to carbon dioxide<sup>104</sup> and oxygen,<sup>105</sup> arousal from sleep,<sup>106</sup> and hypoxia-induced plasticity.<sup>107</sup> Abnormalities in 5-hydroxytryptamine neuronal number and differentiation, receptors, or transporter have been reported in the medulla of infants with SIDS, as compared with control infants, in four independent data sets.<sup>34,98-100</sup> Given the wide array of homeostatic functions modulated by the medullary 5-hydroxytryptamine system, sudden death may result from a convergence of defects in protective responses to homeostatic stressors during sleep that are

modulated by 5-hydroxytryptamine, probably in conjunction with related neurotransmitters.

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#### RECOMMENDATIONS FOR RISK REDUCTION AND COUNSELING

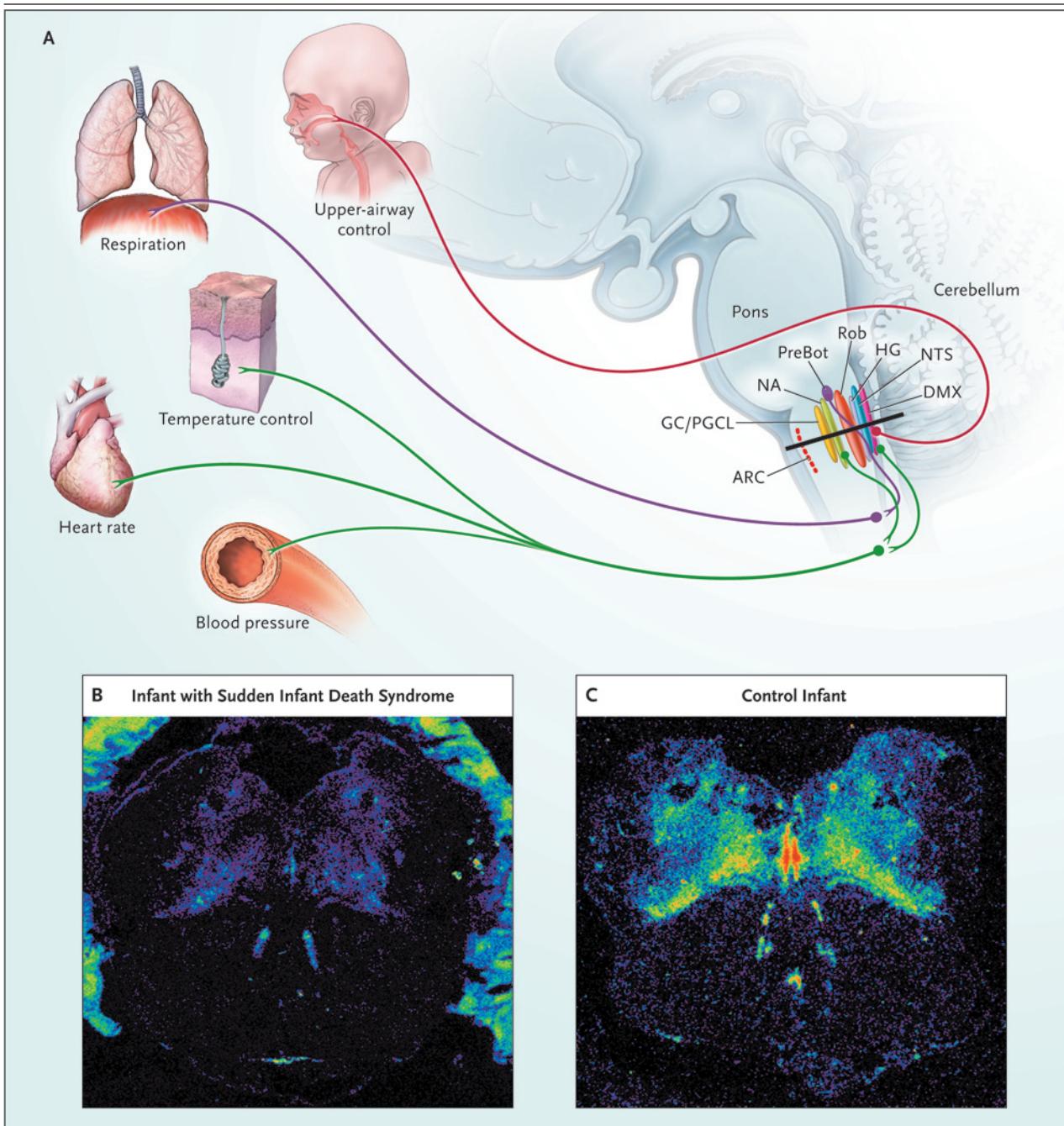
Risk-reduction recommendations include putting infants to bed in the supine position on a firm mattress, preferably with a pacifier (mechanism unknown) and in a shared room (but in a separate bed).<sup>6,108</sup> Prone and side sleeping, overheating, bed sharing, soft bedding, and smoking by mothers during pregnancy or around infants should be avoided.<sup>6,108</sup> Home cardiorespiratory monitoring of apnea and bradycardia is not recommended because it has not been shown to prevent SIDS.<sup>87,109</sup> However, efforts are under way to develop more sophisticated and sensitive measures of the putative subclinical cardiorespiratory deficits in infants who are at risk for SIDS.<sup>56,59</sup>

Grief counseling for families that have lost an infant to SIDS is especially challenging in light of the sudden and unwitnessed nature of the infant's death, the lack of a universally accepted biologic explanation for the death, and possible suspicion by others of foul play. However, important counseling strategies for families with infants who have died of SIDS have been devised.<sup>110</sup> Of major concern in such families is the risk of SIDS in subsequent siblings. Although in such cases there is an increase in risk, it is minimal. For example, with an assumed incidence of 0.7 case per 1000 for the first infant and a relative risk of recurrence in a sibling of 5, it would be estimated that 99.6% of subsequent siblings would survive infancy.<sup>25</sup>

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#### CONCLUSIONS

Current evidence suggests that SIDS involves a convergence of stressors that probably results in the asphyxia of a vulnerable infant who has defective cardiorespiratory or arousal defense systems during a critical developmental period when immature defense mechanisms are not fully integrated. Thus, our current understanding of the pathogenesis of SIDS reflects the simultaneous juxtaposition of multiple events that, when taken individually, are far less powerful than the result of their chance combination. SIDS remains a ma-



**Figure 3. The Serotonergic System and Possible Effects on Homeostatic Function.**

The serotonergic system is considered to be critical for the modulation and integration of diverse homeostatic functions. The medullary level of the brain stem (black line in Panel A) includes regions involved in the regulation of upper-airway control, respiration, temperature, autonomic function, and the sympathetic nervous system. In the medulla of an infant with the sudden infant death syndrome (SIDS), tissue autoradiography that was performed with the use of a specific radioligand shows a generalized reduction in binding to the 5-hydroxytryptamine type 1A receptor (Panel B), as compared with that in a control infant at the same postconceptional age (Panel C). ARC denotes arcuate nucleus, DMX dorsal motor nucleus of the vagus nerve, GC ganglion cells, HG hypoglossal nucleus, NA noradrenaline, NTS nucleus tractus solitarius, PGCL paragigantocellularis lateralis, PreBot pre-Bötzinger complexes, and Rob raphe obscurus. Modified from a figure in Paterson et al.<sup>34</sup>

## major problem that mandates continued interdisciplinary efforts for its ultimate resolution.

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## REFERENCES

- Shannon DC, Kelly DH. SIDS and near-SIDS (second of two parts). *N Engl J Med* 1982;306:1022-8.
- Idem*. SIDS and near-SIDS (first of two parts). *N Engl J Med* 1982;306:959-65.
- Willinger M, Hoffman HJ, Hartford RB. Infant sleep position and risk for sudden infant death syndrome: report of meeting held January 13 and 14, 1994, National Institutes of Health, Bethesda, MD. *Pediatrics* 1994;93:814-9.
- Mitchell EA, Brunt JM, Everard C. Reduction in mortality from sudden infant death syndrome in New Zealand: 1986-92. *Arch Dis Child* 1994;70:291-4.
- Beal SM. Sudden infant death syndrome in South Australia 1968-97. Part I: changes over time. *J Paediatr Child Health* 2000;36:540-7.
- Moon RY, Horne RS, Hauck FR. Sudden infant death syndrome. *Lancet* 2007;370:1578-87.
- Hoyert DL. Mortality associated with birth defects: influence of successive disease classification revisions. *Birth Defects Res A Clin Mol Teratol* 2003;67:651-5.
- Beckwith JB. Discussion of the terminology and definition of the sudden infant death syndrome. In: Bergman AB, Beckwith JB, Ray CG, eds. *Proceedings of the Second International Conference on Causes of Sudden Death in Infants*. Seattle: University of Washington Press, 1970:14-22.
- Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol* 1991;11:677-84.
- Krous HF, Beckwith JB, Byard RW, et al. Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach. *Pediatrics* 2004;114:234-8.
- Byard RW, Marshall D. An audit of the use of definitions of sudden infant death syndrome (SIDS). *J Forensic Leg Med* 2007;14:453-5.
- Iyasu S, Randall LL, Welty TK, et al. Risk factors for sudden infant death syndrome among Northern Plains Indians. *JAMA* 2002;288:2717-23. [Erratum, *JAMA* 2003;289:303.]
- Hauck FR, Herman SM, Donovan M, et al. Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics* 2003;111:1207-14.
- Molteno CD, Ress E, Kibel MA. Early childhood mortality in Cape Town. *S Afr Med J* 1989;75:570-4.
- Ford RP, Nelson KP. Higher rates of SIDS persist in low income groups. *J Paediatr Child Health* 1995;31:408-11.
- Hauck FR, Tanabe KO. International trends in sudden infant death syndrome: stabilization of rates requires further action. *Pediatrics* 2008;122:660-6.
- Shapiro-Mendoza CK, Tomashek KM, Anderson RN, Wingo J. Recent national trends in sudden, unexpected infant deaths: more evidence supporting a change in classification or reporting. *Am J Epidemiol* 2006;163:762-9.
- Malloy MH, MacDorman M. Changes in the classification of sudden unexpected infant deaths: United States, 1992-2001. *Pediatrics* 2005;115:1247-53.
- Vennemann M, Bajanowski T, Butterfass-Bahloul T, et al. Do risk factors differ between explained sudden unexpected death in infancy and sudden infant death syndrome? *Arch Dis Child* 2007;92:133-6.
- Opdal SH, Rognum TO. The sudden infant death syndrome gene: does it exist? *Pediatrics* 2004;114(4):e506-e512.
- Bennett MJ, Powell S. Metabolic disease and sudden, unexpected death in infancy. *Hum Pathol* 1994;25:742-6.
- Schwartz PJ, Stramba-Badiale M, Segantini A, et al. Prolongation of the QT interval and the sudden infant death syndrome. *N Engl J Med* 1998;338:1709-14.
- Ackerman MJ, Siu BL, Sturmer WQ, et al. Postmortem molecular analysis of SCN5A defects in sudden infant death syndrome. *JAMA* 2001;286:2264-9.
- Arnestad M, Crotti L, Rognum TO, et al. Prevalence of long-QT syndrome gene variants in sudden infant death syndrome. *Circulation* 2007;115:361-7.
- Hunt CE. Sudden infant death syndrome and other causes of infant mortality: diagnosis, mechanisms, and risk for recurrence in siblings. *Am J Respir Crit Care Med* 2001;164:346-57.
- American Academy of Pediatrics, Hymel KP, Committee on Child Abuse and Neglect, National Association of Medical Examiners. Distinguishing sudden infant death syndrome from child abuse fatalities. *Pediatrics* 2006;118:421-7.
- Vege A, Ole Rognum T. Sudden infant death syndrome, infection and inflammatory responses. *FEMS Immunol Med Microbiol* 2004;42:3-10.
- Weber MA, Klein NJ, Hartley JC, Lock PE, Malone M, Sebire NJ. Infection and sudden unexpected death in infancy: a systematic retrospective case review. *Lancet* 2008;371:1848-53.
- Filiano JJ, Kinney HC. A perspective on neuropathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biol Neonate* 1994;65:194-7.
- Guntheroth WG, Spiers PS. The triple risk hypotheses in sudden infant death syndrome. *Pediatrics* 2002;110(5):e64.
- Byard RW. Hazardous infant and early childhood sleeping environments and death scene examination. *J Clin Forensic Med* 1996;3:115-22.
- Pasquale-Styles MA, Tackitt PL, Schmidt CJ. Infant death scene investigation and the assessment of potential risk factors for asphyxia: a review of 209 sudden unexpected infant deaths. *J Forensic Sci* 2007;52:924-9.
- Moore BM, Fernbach KL, Finkelstein MJ, Carolan PL. Impact of changes in infant death classification on the diagnosis of sudden infant death syndrome. *Clin Pediatr (Phila)* 2008;47:770-6.
- Paterson DS, Trachtenberg FL, Thompson EG, et al. Multiple serotonergic brainstem abnormalities in sudden infant death syndrome. *JAMA* 2006;296:2124-32.
- Kemp JS, Unger B, Wilkins D, et al. Unsafe sleep practices and an analysis of bedsharing among infants dying suddenly and unexpectedly: results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Pediatrics* 2000;106(3):E41.
- Ponsonby AL, Dwyer T, Gibbons LE, Cochrane JA, Wang YG. Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *N Engl J Med* 1993;329:377-82.
- Corwin MJ, Lesko SM, Heeren T, et al. Secular changes in sleep position during infancy: 1995-1998. *Pediatrics* 2003;111:52-60.
- Mitchell EA, Bajanowski T, Brinkmann B, Jorch G, Stewart AW, Vennemann MM. Prone sleeping position increases the risk of SIDS in the day more than at night. *Acta Paediatr* 2008;97:584-9.

39. McKenna JJ, Ball HL, Gettler LT. Mother-infant cosleeping, breastfeeding and sudden infant death syndrome: what biological anthropology has discovered about normal infant sleep and pediatric sleep medicine. *Am J Phys Anthropol* 2007;Suppl 45:133-61.
40. Horne RS. Effects of prematurity on heart rate control: implications for sudden infant death syndrome. *Expert Rev Cardiovasc Ther* 2006;4:335-43.
41. Oyen N, Skjaerven R, Irgens LM. Population-based recurrence risk of sudden infant death syndrome compared with other infant and fetal deaths. *Am J Epidemiol* 1996;144:300-5.
42. Weese-Mayer DE, Ackerman MJ, Marazita ML, Berry-Kravis EM. Sudden infant death syndrome: review of implicated genetic factors. *Am J Med Genet A* 2007;143:771-88.
43. Hunt CE. Gene-environment interactions: implications for sudden unexpected deaths in infancy. *Arch Dis Child* 2005;90:48-53.
44. Blair PS, Platt MW, Smith IJ, Fleming PJ. Sudden infant death syndrome and sleeping position in pre-term and low birth weight infants: an opportunity for targeted intervention. *Arch Dis Child* 2006;91:101-6.
45. Malloy MH, Hoffman HJ. Prematurity, sudden infant death syndrome, and age of death. *Pediatrics* 1995;96:464-71.
46. Blair PS, Sidebotham P, Berry PJ, Evans M, Fleming PJ. Major epidemiological changes in sudden infant death syndrome: a 20-year population-based death study in the UK. *Lancet* 2006;367:314-9.
47. Blair PS, Fleming PJ, Bensley D, et al. Smoking and the sudden infant death syndrome: results from 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *BMJ* 1996;313:195-8.
48. Duncan JR, Randall LL, Belliveau RA, et al. The effect of maternal smoking and drinking during pregnancy upon (3)H-nicotinic receptor brainstem binding in infants dying of the sudden infant death syndrome: initial observations in a high risk population. *Brain Pathol* 2008;18:21-31.
49. Mitchell EA, Thompson JM, Stewart AW, et al. Postnatal depression and SIDS: a prospective study. *J Paediatr Child Health* 1992;28:Suppl 1:S13-S16.
50. Colson ER, Levenson S, Rybin D, et al. Barriers to following the supine sleep recommendation among mothers at four centers for the Women, Infants, and Children Program. *Pediatrics* 2006;118:e243-50.
51. Leiter JC, Bohm I. Mechanisms of pathogenesis in the sudden infant death syndrome. *Respir Physiol Neurobiol* 2007;159:127-38.
52. Harper RM. Autonomic control during sleep and risk for sudden death in infancy. *Arch Ital Biol* 2001;139:185-94.
53. Hunt CE, Brouillette RT. Sudden infant death syndrome: 1987 perspective. *J Pediatr* 1987;110:669-78.
54. Raza MW, Blackwell CC. Sudden infant death syndrome, virus infections and cytokines. *FEMS Immunol Med Microbiol* 1999;25:85-96.
55. Fleming PJ, Azaz Y, Wigfield R. Development of thermoregulation in infancy: possible implications for SIDS. *J Clin Pathol* 1992;45:Suppl:17-9.
56. Sahni R, Fifer WP, Myers MM. Identifying infants at risk for sudden infant death syndrome. *Curr Opin Pediatr* 2007;19:145-9.
57. Kinney HC, Filiano JJ, White WF. Medullary serotonergic network deficiency in the sudden infant death syndrome: review of a 15-year study of a single dataset. *J Neuropathol Exp Neurol* 2001;60:228-47.
58. Thach B. Tragic and sudden death: potential and proven mechanisms causing sudden infant death syndrome. *EMBO Rep* 2008;9:114-8.
59. Kinney HC, Myers MM, Belliveau RA, et al. Subtle autonomic and respiratory dysfunction in sudden infant death syndrome associated with serotonergic brainstem abnormalities: a case report. *J Neuropathol Exp Neurol* 2005;64:689-94.
60. Schechtman VL, Lee MY, Wilson AJ, Harper RM. Dynamics of respiratory patterning in normal infants and infants who subsequently died of the sudden infant death syndrome. *Pediatr Res* 1996;40:571-7.
61. Southall DP, Stevens V, Franks CI, Newcombe RG, Shinebourne EA, Wilson AJ. Sinus tachycardia in term infants preceding sudden infant death. *Eur J Pediatr* 1988;147:74-8.
62. Kemp JS, Thach BT. Sudden death in infants sleeping on polystyrene-filled cushions. *N Engl J Med* 1991;324:1858-64.
63. Skadberg BT, Markestad T. Consequences of getting the head covered during sleep in infancy. *Pediatrics* 1997;100(2):E6.
64. Downing SE, Lee JC. Laryngeal chemosensitivity: a possible mechanism for sudden infant death. *Pediatrics* 1975;55:640-9.
65. Thach BT. Sudden infant death syndrome: can gastroesophageal reflux cause sudden infant death? *Am J Med* 2000;108:Suppl 4a:144S-148S.
66. Thach BT, Lijowska A. Arousals in infants. *Sleep* 1996;19:Suppl:S271-S273.
67. Poets CF. Apparent life-threatening events and sudden infant death on a monitor. *Paediatr Respir Rev* 2004;5 Suppl A: S383-S386.
68. Sridhar R, Thach BT, Kelly DH, Henslee JA. Characterization of successful and failed autoresuscitation in human infants, including those dying of SIDS. *Pediatr Pulmonol* 2003;36:113-22.
69. Cutz E, Perrin DG, Pan J, Haas EA, Krous HF. Pulmonary neuroendocrine cells and neuroepithelial bodies in sudden infant death syndrome: potential markers of airway chemoreceptor dysfunction. *Pediatr Dev Pathol* 2007;10:106-16.
70. Vege A, Chen Y, Opdal SH, Saugstad OD, Rognum TO. Vitreous humor hypoxanthine levels in SIDS and infectious death. *Acta Paediatr* 1994;83:634-9.
71. Jones KL, Krous HF, Nadeau J, Blackbourne B, Zielke HR, Gozal D. Vascular endothelial growth factor in the cerebrospinal fluid of infants who died of sudden infant death syndrome: evidence for antecedent hypoxia. *Pediatrics* 2003;111:358-63.
72. Kinney HC, Burger PC, Harrell FE Jr, Hudson RP Jr. 'Reactive gliosis' in the medulla oblongata of victims of the sudden infant death syndrome. *Pediatrics* 1983;72:181-7.
73. Naeye RL. Brain-stem and adrenal abnormalities in the sudden-infant-death syndrome. *Am J Clin Pathol* 1976;66:526-30.
74. Machaalani R, Waters KA. Neuronal cell death in the sudden infant death syndrome brainstem and associations with risk factors. *Brain* 2008;131:218-28.
75. Patel AL, Harris K, Thach BT. Inspired CO(2) and O(2) in sleeping infants re-breathing from bedding: relevance for sudden infant death syndrome. *J Appl Physiol* 2001;91:2537-45.
76. Sinton CM, McCarley RW. Neurophysiological mechanisms of sleep and wakefulness: a question of balance. *Semin Neurol* 2004;24:211-23.
77. Lijowska AS, Reed NW, Chiodini BA, Thach BT. Sequential arousal and airway-defensive behavior of infants in asphyxial sleep environments. *J Appl Physiol* 1997;83:219-28.
78. Kato I, Franco P, Groswasser J, et al. Incomplete arousal processes in infants who were victims of sudden death. *Am J Respir Crit Care Med* 2003;168:1298-303.
79. Schechtman VL, Harper RM, Wilson AJ, Southall DP. Sleep state organization in normal infants and victims of the sudden infant death syndrome. *Pediatrics* 1992;89:865-70.
80. Kahn A, Groswasser J, Rebuffat E, et al. Sleep and cardiorespiratory characteristics of infant victim of sudden death: a prospective case-control study. *Sleep* 1992;15:287-92.
81. Paton JF, Abdala AP, Koizumi H, Smith JC, St-John WM. Respiratory rhythm generation during gasping depends on persistent sodium current. *Nat Neurosci* 2006;9:311-3.
82. Tryba AK, Peña F, Ramirez JM. Gasping activity in vitro: a rhythm dependent on 5-HT2A receptors. *J Neurosci* 2006;26:2623-34.
83. St-John WM, Leiter JC. Maintenance of gasping and restoration of eupnea after hypoxia is impaired following blockers of alpha1-adrenergic receptors and serotonin 5-HT2 receptors. *J Appl Physiol* 2008;104:665-73.

84. Platt MW, Blair PS, Fleming PJ, et al. A clinical comparison of SIDS and explained sudden infant deaths: how healthy and how normal? *Arch Dis Child* 2000;82:98-106.
85. Poets CF, Meny RG, Chobanian MR, Bonofiglio RE. Gasping and other cardiorespiratory patterns during sudden infant deaths. *Pediatr Res* 1999;45:350-4.
86. Jardine DS, Haschke RH. An animal model of life-threatening hyperthermia during infancy. *J Appl Physiol* 1992;73:340-5.
87. Ramanathan R, Corwin MJ, Hunt CE, et al. Cardiorespiratory events recorded on home monitors: comparison of healthy infants with those at increased risk for SIDS. *JAMA* 2001;285:2199-207.
88. Scher MS, Steppe DA, Dokianakis SG, Sun M, Guthrie RD, Sclabassi RJ. Cardiorespiratory behavior during sleep in full-term and preterm neonates at comparable postconceptional term ages. *Pediatr Res* 1994;36:738-44.
89. Fifer WP, Myers MM, Sahni R, et al. Interactions between sleeping position and feeding on cardiorespiratory activity in preterm infants. *Dev Psychobiol* 2005;47:288-96.
90. Fleming PJ, Gilbert R, Azaz Y, et al. Interaction between bedding and sleeping position in the sudden infant death syndrome: a population based case-control study. *BMJ* 1990;301:85-9.
91. Thach WT. Combination, complementarity and automatic control: a role for the cerebellum in learning movement coordination. *Novartis Found Symp* 1998;218:219-28.
92. Horne RS, Ferens D, Watts AM, et al. The prone sleeping position impairs arousability in term infants. *J Pediatr* 2001;138:811-6.
93. Ariagno RL, van Liempst S, Mirmiran M. Fewer spontaneous arousals during prone sleep in preterm infants at 1 and 3 months corrected age. *J Perinatol* 2006;26:306-12.
94. Chong A, Murphy N, Matthews T. Effect of prone sleeping on circulatory control in infants. *Arch Dis Child* 2000;82:253-6.
95. Galland BC, Taylor BJ, Bolton DP. Prone versus supine sleep position: a review of the physiological studies in SIDS research. *J Paediatr Child Health* 2002;38:332-8.
96. Horne RS, Ferens D, Watts AM, et al. Effects of maternal tobacco smoking, sleeping position, and sleep state on arousal in healthy term infants. *Arch Dis Child Fetal Neonatal Ed* 2002;87:F100-F105.
97. Kinney H, Paterson DS. The sudden infant death syndrome. In: Golden JA, Harding BN, eds. *Pathology and genetics: acquired and inherited diseases of the developing nervous system*. Basel, Switzerland: ISN Neuropathology Press, 2004:194-203.
98. Panigrahy A, Filiano J, Sleeper LA, et al. Decreased serotonergic receptor binding in rhombic lip-derived regions of the medulla oblongata in the sudden infant death syndrome. *J Neuropathol Exp Neurol* 2000;59:377-84.
99. Kinney HC, Randall LL, Sleeper LA, et al. Serotonergic brainstem abnormalities in Northern Plains Indians with the sudden infant death syndrome. *J Neuropathol Exp Neurol* 2003;62:1178-91.
100. Ozawa Y, Okado N. Alteration of serotonergic receptors in the brain stems of human patients with respiratory disorders. *Neuropediatrics* 2002;33:142-9.
101. Lovick TA. The medullary raphe nuclei: a system for integration and gain control in autonomic and somatomotor responsiveness? *Exp Physiol* 1997;82:31-41.
102. Hilaire G, Morin D, Lajard AM, Monteau R. Changes in serotonin metabolism may elicit obstructive apnoea in the newborn rat. *J Physiol* 1993;466:367-81.
103. Audero E, Coppi E, Mlinar B, et al. Sporadic autonomic dysregulation and death associated with excessive serotonin autoinhibition. *Science* 2008;321:130-3.
104. Bradley SR, Pieribone VA, Wang W, Severson CA, Jacobs RA, Richerson GB. Chemosensitive serotonergic neurons are closely associated with large medullary arteries. *Nat Neurosci* 2002;5:401-2.
105. Penatti EM, Berniker AV, Kereshi B, et al. Ventilatory response to hypercapnia and hypoxia after extensive lesion of medullary serotonergic neurons in newborn conscious piglets. *J Appl Physiol* 2006;101:1177-88.
106. Darnall RA, Harris MB, Gill WH, Hoffman JM, Brown JW, Niblock MM. Inhibition of serotonergic neurons in the nucleus paragigantocellularis lateralis fragments sleep and decreases rapid eye movement sleep in the piglet: implications for sudden infant death syndrome. *J Neurosci* 2005;25:8322-32.
107. Feldman JL, Mitchell GS, Nattie EE. Breathing: rhythmicity, plasticity, chemosensitivity. *Annu Rev Neurosci* 2003;26:239-66.
108. American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. The changing concept of sudden infant death syndrome: diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics* 2005;116:1245-55.
109. Committee on Fetus and Newborn, American Academy of Pediatrics. Apnea, sudden infant death syndrome, and home monitoring. *Pediatrics* 2003;111:914-7.
110. Mandell F, McClain M. Supporting the SIDS family. *Pediatrician* 1988;15:179-82.

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## Brainstem Serotonergic Deficiency in Sudden Infant Death Syndrome

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### Abstract

**Context**—Sudden infant death syndrome (SIDS) is postulated to result from abnormalities in brainstem control of autonomic function and breathing during a critical developmental period. Abnormalities of serotonin (5-hydroxytryptamine [5-HT]) receptor binding in regions of the medulla oblongata involved in this control have been reported in infants dying from SIDS.

**Objective**—To test the hypothesis that 5-HT receptor abnormalities in infants dying from SIDS are associated with decreased tissue levels of 5-HT, its key biosynthetic enzyme (tryptophan hydroxylase [TPH2]), or both.

**Design, Setting, and Participants**—Autopsy study conducted to analyze levels of 5-HT and its metabolite, 5-hydroxyindoleacetic acid (5-HIAA); levels of TPH2; and 5-HT<sub>1A</sub> receptor binding. The data set was accrued between 2004 and 2008 and consisted of 41 infants dying from

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## **Brainstem Serotonergic Deficiency in Sudden Infant Death Syndrome**

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San Diego SIDS/SUDC Research Project

*~ February 11, 2010 ~*

SIDS is defined as the sudden unexpected death of an infant <1 year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history.<sup>1</sup> Our current working “triple-risk” hypothesis posits that SIDS results from the simultaneous occurrence of an underlying vulnerability in the infant, a critical developmental period during infancy, and exposure of an infant to an exogenous stressor.<sup>2</sup> An underlying vulnerability is a pathologic abnormality that in itself is not necessarily fatal, but when interacting with other factors can act as the tipping point leading to a lethal event. In the case of SIDS, the critical developmental period is the first half of infancy when physiologic and anatomic growth and development are very rapid and thus inherently unstable, especially during sleep. Exogenous stressors are risk factors for SIDS, especially those that pose a risk of asphyxia to the sleeping infant. Prone sleep position, sleeping on a soft surface, having the head covered, and/or exposure to cigarette smoke are particularly important risk factors. Exogenous risk factors have been identified and confirmed through numerous epidemiologic studies of large numbers of infants.

Our team of investigators, led by Dr. Hannah Kinney, has been pursuing for many years what makes an infant vulnerable to SIDS by concentrating on the medullary serotonergic system. This system plays a crucial role in the control and homeostasis of the respiratory, cardiovascular, and autonomic systems.

Our recent report that brainstem serotonin (5-HT) and tryptophan hydroxylase (TPH2) levels were lower in SIDS cases than in age-adjusted controls provides further evidence that defects in the medullary serotonergic system are important in SIDS.<sup>3</sup> 5-HT and TPH2 levels critical to respiration were 26% and 22% lower, respectively, in brainstems from SIDS cases compared to controls. This finding indicates that 5-HT levels were low as a result of decreased synthesis rather than increased degradation. Serotonin receptor (5-HT<sub>1A</sub>) binding was also reduced, thus confirming earlier observations.

How do our reported abnormalities in the serotonin metabolism relate to our “triple risk” hypothesis for SIDS? Remember that the typical case of SIDS usually involves an apparently healthy infant between one and six months of age who has been sleeping and is later discovered lifeless. Even though one or more of the above-mentioned SIDS risk factors that threatens the sleeping infant with asphyxia, hypercarbia, and/or hypoxia are usually present, evaluation of both the circumstances of death after death scene investigation as well as the postmortem examination does not reveal a definitive cause of death. Therefore, the diagnosis defaults to SIDS. In this scenario, the developmental period and the exogenous SIDS risk factors are present, but according to our hypothesis, infant vulnerability must also be present for death to occur. We have found that a high percentage of infants we studied have abnormalities in the medullary serotonergic system that unmask or exposes the danger posed by the combination of sleep during the critical developmental period while sleeping in a potentially asphyxial environment. Thus, when medullary serotonergic system abnormalities are present, the infant may not be able to rescue itself from an asphyxial environment, i.e., compared to an infant without these abnormalities, an affected infant may not raise or turn its head to remove its nose and mouth from a face down position on a soft sleep surface.

Much work remains to be done to expand our understanding of the interaction of infant development, exogenous risk factors, and the medullary serotonergic system. But it is hoped through this understanding that it will be possible to predict which infants are at risk of SIDS and thereby intervene somehow before death occurs. This is several years away, however.

This work was undertaken by investigators from Harvard, UCSD/Rady Children's Hospital-San Diego (Dr. Henry Krous, Elisabeth Haas), the San Diego Medical Examiner's Office (Dr. Christina Stanley), University of New England College of Osteopathic Medicine, Dartmouth, and the New England Research Institutes. The study cases were obtained from the San Diego SIDS/SUDC Research Project after undergoing postmortem examination at the San Diego Medical Examiner's Office and Children's Hospital Boston. This work could not have been carried out without California law and the generous support of many parent and family survivors of infants dying of SIDS.

1. Krous HF, Beckwith JB, Byard RW, et al. Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach. *Pediatrics*. 2004; 114:234-238.
2. Kinney HC, Richerson GB, Dymecki SM, Darnall RA, Nattie EE. The brainstem and serotonin in the sudden infant death syndrome. *Annu Rev Pathol*. 2009; 4:517-550.
3. Duncan JR, Paterson DS, Hoffman JM, et al. Brainstem serotonergic deficiency in sudden infant death syndrome. *JAMA*. 2010; 303:430-437. \*

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SIDS (cases), 7 infants with acute death from known causes (controls), and 5 hospitalized infants with chronic hypoxia-ischemia.

**Main Outcome Measures**—Serotonin and metabolite tissue levels in the raphé obscurus and paragigantocellularis lateralis (PGCL); TPH2 levels in the raphé obscurus; and 5-HT<sub>1A</sub> binding density in 5 medullary nuclei that contain 5-HT neurons and 5 medullary nuclei that receive 5-HT projections.

**Results**—Serotonin levels were 26% lower in SIDS cases (n = 35) compared with age-adjusted controls (n = 5) in the raphé obscurus (55.4 [95% confidence interval {CI}, 47.2–63.6] vs 75.5 [95% CI, 54.2–96.8] pmol/mg protein, *P* = .05) and the PGCL (31.4 [95% CI, 23.7–39.0] vs 40.0 [95% CI, 20.1–60.0] pmol/mg protein, *P* = .04). There was no evidence of excessive 5-HT degradation assessed by 5-HIAA levels, 5-HIAA:5-HT ratio, or both. In the raphé obscurus, TPH2 levels were 22% lower in the SIDS cases (n = 34) compared with controls (n = 5) (151.2% of standard [95% CI, 137.5%–165.0%] vs 193.9% [95% CI, 158.6%–229.2%], *P* = .03). 5-HT<sub>1A</sub> receptor binding was 29% to 55% lower in 3 medullary nuclei that receive 5-HT projections. In 4 nuclei, 3 of which contain 5-HT neurons, there was a decrease with age in 5-HT<sub>1A</sub> receptor binding in the SIDS cases but no change in the controls (age × diagnosis interaction). The profile of 5-HT and TPH2 abnormalities differed significantly between the SIDS and hospitalized groups (5-HT in the raphé obscurus: 55.4 [95% CI, 47.2–63.6] vs 85.6 [95% CI, 61.8–109.4] pmol/mg protein, *P* = .02; 5-HT in the PGCL: 31.4 [95% CI, 23.7–39.0] vs 71.1 [95% CI, 49.0–93.2] pmol/mg protein, *P* = .002; TPH2 in the raphé obscurus: 151.2% [95% CI, 137.5%–165.0%] vs 102.6% [95% CI, 58.7%–146.4%], *P* = .04).

**Conclusion**—Compared with controls, SIDS was associated with lower 5-HT and TPH2 levels, consistent with a disorder of medullary 5-HT deficiency.

Sudden infant death syndrome (SIDS) is the sudden death of an infant younger than 1 year that remains unexplained after a complete autopsy and death scene investigation.<sup>1</sup> Typically, an apparently healthy infant is found dead after a sleep period,<sup>2</sup> with death presumably occurring during sleep or one of the many transitions between sleep and waking.<sup>3,4</sup> The recognition that prone sleep position increases the risk for SIDS led to national campaigns,<sup>5</sup> but despite initial success, the overall SIDS rate has plateaued over the last decade.<sup>3,4</sup> SIDS remains the leading cause of postneonatal infant mortality in the United States, with an overall rate of 0.54 per 1000 live births.<sup>6,7</sup>

One model underlying SIDS research is the triple-risk model, which posits that SIDS results from the simultaneous occurrence in the infant of an underlying vulnerability, a critical developmental period, and an exogenous stressor.<sup>8</sup> In 3 independent data sets assessing infants with SIDS, our laboratory has consistently reported serotonin (5-hydroxytryptamine [5-HT]) receptor binding abnormalities in regions of the medulla oblongata critical to state-dependent homeostatic regulation,<sup>9–11</sup> ie, the medullary 5-HT system.<sup>3,12</sup> In the third data set, we also found increased 5-HT neuronal densities as well as decreased 5-HT transporter binding relative to 5-HT neuronal number.<sup>11</sup> Thus, we propose that SIDS results from an abnormality of the medullary 5-HT system that causes an inability to restore homeostasis following life-threatening challenges, eg, asphyxia, during a sleep period and leads to sudden death in the critical first year of life, when homeostatic systems are still maturing.<sup>12</sup>

The question remains as to whether underproduction or overproduction of 5-HT is associated with abnormal 5-HT receptor binding in SIDS. In this study we tested the main hypothesis that SIDS is associated with reductions in tissue levels of 5-HT, its key biosynthetic enzyme (tryptophan hydroxylase [TPH2]), or both, thereby representing a 5-HT deficiency disorder.

The 3 other study objectives were (1) to compare infants dying from SIDS with hospitalized infants who had chronic hypoxia-ischemia prior to death to evaluate the putative effects of impaired oxygenation on 5-HT tissue markers, given that some infants with SIDS experience repetitive apnea and agonal impaired gasping prior to death<sup>4,12-15</sup>; (2) to analyze 5-HT<sub>1A</sub> receptor binding to verify that this data set displays the same alterations we observed previously<sup>9-11</sup>; and (3) to examine levels of norepinephrine and dopamine and the metabolite 3,4-dihydroxyphenylacetic acid to address whether medullary abnormalities in SIDS involve the catecholamine system.

## METHODS

### Tissue Database

Tissue samples were obtained from autopsies in infants with and without SIDS between 2004 and 2008 for whom a study technician was available, obtained under the auspices of the San Diego County Medical Examiner's Office, San Diego, California,<sup>16</sup> and the San Diego Research Project. Samples from other infants who experienced chronic hypoxic-ischemic injury and died in the hospital were collected from the autopsy service of the Department of Pathology, Children's Hospital Boston, Boston, Massachusetts. None of the infants with SIDS or hospitalized infants in this data set (referred to as the 2010 data set) were included in the 2006 data set or previous data sets published by us in 2000<sup>9</sup> or 2003.<sup>10</sup> Five of the 7 controls in the current data set were not included in the previous data sets; however, 2 of the 7 controls from the 2006 data set<sup>11</sup> were used because they had remaining available tissue. Their use was considered appropriate, owing to the difficulty in accruing control tissues from infants with acute deaths from known causes in a timely fashion (time frame <5 years). Tissue samples from the SIDS and control groups were obtained under California law that does not require parental consent for research involving sudden and unexpected infant death.<sup>16</sup> Permission for autopsy research of the hospitalized infants was given by the parents. Because of tissue limitations for the multiple parameters under examination, not all analyses could be performed in all cases. Analyses were performed blinded by the investigator to diagnosis, age, and all other recorded clinicopathological variables. The study was approved by the institutional review boards at Children's Hospital Boston, Boston, Massachusetts, and at the University of California at San Diego.

The 3 study groups were defined as (1) infants dying from SIDS<sup>1,9-11</sup> (cases) (n = 41); (2) infants who died acutely and in whom a definitive cause of death was established, as previously defined<sup>9,11,17</sup> (controls) (n = 7); and (3) hospitalized infants with chronic oxygenation disorders, as previously defined,<sup>9,17</sup> prior to death (n = 5). The SIDS cases and controls were classified without knowledge of any biochemical data generated by this study. The controls included (1) clinically unsuspected congenital heart disease and sudden death with origin of the left coronary artery from the pulmonary artery, endocardial fibrosis, and cardiomegaly at autopsy; (2) clinically unsuspected congenital heart disease and sudden death with truncus arteriosus at autopsy; (3) sudden cardiopulmonary arrest with clinical diagnosis of hypoplastic left heart, immediate surgical repair, and immediate postoperative death (all within 48 hours); (4) acute pneumonia; (5) emergency cesarean delivery for traumatic placental abruption resulting from motor vehicle collision; (6) accidental asphyxia due to wedging of the head and airway between the wall and bed; and (7) accidental death due to drowning in a bucket. The hospitalized group included severe congenital heart disease and respiratory failure requiring chronic mechanical ventilation (n = 2),  $\alpha$ -thalassemia, Potter syndrome with pulmonary insufficiency, and twin-twin transfusion with respiratory failure.

Clinicopathological features for the SIDS and control groups and risk factors for the SIDS group were obtained from parental interviews around the time of death, medical records, and

the autopsy and death scene examination as reported by the medical examiner. Race/ethnicity was determined by the pathologist at autopsy, in conjunction with family interviews and infant medical records. Race/ethnicity was assessed because certain races/ethnicities (eg, African American, American Indian) are known risk factors for SIDS.<sup>3,4</sup>

At autopsy, fresh brainstem tissue was collected and stored at  $-80^{\circ}\text{C}$ . From each brainstem, 2 blocks of medullary tissue (3 mm) were collected: 1 from the mid-medulla, at the level of the nucleus of Roller (corresponding to Plate X in the atlas of Olszewski and Baxter<sup>18</sup>) and 1 from the rostral medulla, at the level of the nucleus praepositus (corresponding to Plate XII in that atlas) (Figure 1). Using a 2-mm micropunch (Harris Uni-core; EMS, Hatfield, Pennsylvania), tissue was collected from 2 major components of the medullary 5-HT system, the raphé obscurus and paragigantocellularis lateralis (PGCL), according to the atlas of Paxinos and Huang,<sup>19</sup> and standardized protein samples were obtained for Western blot analysis in each SIDS case and control.<sup>20</sup> Twenty-micrometer tissue sections were collected from the remaining blocks in a standardized manner for tissue receptor autoradiography. Because of limited available tissue, samples could not be run in duplicate.

### High-Performance Liquid Chromatography

High-performance liquid chromatography (HPLC) was used to measure levels of 5-HT and its metabolite, 5-hydroxyindoleacetic acid (5-HIAA), on micropunched samples from the raphé obscurus and PGCL. Tissue samples were homogenized on ice (Branson Sonifier 200, 1 minute) in 1 mL of perchloric acid solution (0.1 M  $\text{HClO}_4$ , 1 mM EDTA, 1 mM  $\text{Na}_2\text{SO}_3$ ) and centrifuged at 9500g and  $4^{\circ}\text{C}$  for 15 minutes (Sorvall RC-5B centrifuge; Du-Pont Instruments, Wilmington, Delaware). The supernatant was filtered through sterile 0.45- $\mu\text{m}$  and 0.2- $\mu\text{m}$  syringe filters and used immediately for analytical procedures to prevent degradation. The protein pellet was resuspended in 1 M NaOH, and the protein concentration as determined by the Lowry method<sup>20</sup> was read at 660 nm. Analysis of 5-HT, 5-HIAA, norepinephrine, dopamine, and 3,4-dihydroxyphenylacetic acid levels was performed using an HPLC system with electrochemical detection (HPLC-EC; ESA Coulochem II; Bedford, Massachusetts) equipped with a C-18 reverse-phase column (3  $\mu\text{m}$ , 4.6 mm  $\times$  100 mm,  $36^{\circ}\text{C}$ ; Microsorb MV; Varian, Walnut Creek, California). The mobile phase consisted of 90 mM  $\text{NaH}_2\text{PO}_4$ , 50 mM citric acid, 50  $\mu\text{M}$  EDTA, 1.7 mM 1-octane sulfonic acid, and 3% acetonitrile, pH = 3.0, pumped through the column at 1.0 mL/min (pressure, 270 bar). To equate for sensitivity, 25  $\mu\text{L}$  run at 10 nA of sample and 5  $\mu\text{L}$  run at 20 nA were used for determination of levels of 5-HT and all other compounds, respectively. This allowed for the measurement of the eluents with a sensitivity of 0.5 fmol. Serotonin, 5-HIAA, norepinephrine, dopamine, and 3,4-dihydroxyphenylacetic acid eluted from the column at 40, 8.6, 3.6, 4.6, and 11.7 minutes, respectively. Dilutions of stock standards ( $5 \times 10^{-7}$ ,  $1 \times 10^{-7}$ ,  $5 \times 10^{-8}$ , and  $1 \times 10^{-8}$  M; Sigma Chemical, St Louis, Missouri) were analyzed daily to establish a standard curve, and eluent concentrations were determined by comparing peak areas from samples with those of standards. The use of Justice Innovations ChromPerfect (Palo Alto, California) software allowed determination of regression (minimum correlation coefficient, 0.99) for the standard. Values were corrected for protein concentrations in pmol/mg protein.<sup>20</sup> The samples were run immediately following prepping without freeze-thawing.

### Western Blot Analysis of TPH2 Levels

Western blot analysis was used to measure levels of TPH2 on micropunched samples from the raphé obscurus. Tissue samples were homogenized to a final concentration of 10% weight per volume, and a modified Lowry method was used for protein quantification.<sup>20</sup> After separation with SDS-PAGE, proteins were transferred electrophoretically to an Immobilon-P membrane (Millipore, Bedford, Massachusetts) overnight and incubated with a

mouse monoclonal anti-TPH2 antibody (1: 500; Sigma-Aldrich, Saint Louis, Missouri). TPH2 (55 KDa) was detected using a goat anti-mouse IgG horseradish peroxidase-conjugated secondary antibody (1:10 000; Bio-RAD, Hercules, California) followed by Chemiluminescence ECL (PerkinElmer, Waltham, Massachusetts) and quantified from densitometry bands (MCID Elite 6; Imaging Research Inc, Ontario, California) standardized to human adult raphé obscurus run on the same gel. Values were expressed as a percentage of this standard.

### Tissue Autoradiography for 5-HT<sub>1A</sub> Receptor Binding

The procedure for <sup>3</sup>H-8-OH DPAT (PerkinElmer) binding to 5-HT<sub>1A</sub> receptors was based on previously described methods.<sup>11</sup> Radiolabeled sections were exposed to BAS-TR2025 phosphoimaging plates (Fujifilm Medical Systems USA, Stamford, Connecticut) for 4 weeks, along with a set of <sup>3</sup>H standards (Amersham; GE Healthcare, Piscataway, New Jersey) for conversion of optical density of silver grains in nuclei of interest to fmol/mg of tissue using an MCID Elite digital system.<sup>9–11,17</sup>

### Statistical Analysis

These studies had 80% power to detect a large effect size (1.4-SD difference between SIDS cases and controls). *t* Tests, analysis of variance, and Fisher exact tests were used to compare age, postmortem interval, sex, and race between groups. Analysis of covariance was used to test for differences between SIDS cases and controls while controlling for potential effects of postconceptional age on levels of 5-HT, catecholamine, metabolites, and TPH2, as well as 5-HT<sub>1A</sub> receptor binding. Postmortem interval and interactions between diagnosis and age were included as covariates in these models when significant. The interaction term was tested, because the effect of age on these outcomes is unknown and could potentially be different in infants with SIDS. Analysis of covariance with post hoc comparison tested differences among the 3 groups, and *t* tests were used to consider differences by risk factors. All analyses were performed on observed data only, and adjustment for multiple testing was not performed owing to the relatively small sample size. All statistical tests were 2-sided, performed at an  $\alpha$  level of .05, and conducted using SAS version 9.2 (SAS Institute Inc, Cary, North Carolina).

## RESULTS

There was no significant difference in postconceptional age (gestational plus postnatal age) between SIDS cases (53.3 [SD, 8.0] weeks) and controls (53.5 [SD, 19.5] weeks) ( $P = .98$ ) (Table 1); however, postconceptional age in the hospitalized group was significantly lower (38.3 [SD, 3.4] weeks) ( $P = .008$ ), requiring adjustment for age in all analyses (Table 1). All study groups had a postmortem interval of less than 30 hours.

### 5-HT, Catecholamine, and Metabolite Levels

Samples were available from 35 SIDS cases, 5 controls, and 5 hospitalized infants. Age-adjusted mean levels of 5-HT in SIDS cases were 26% lower than in controls in both the PGCL (31.4 pmol/mg protein [95% confidence interval {CI}, 23.7 to 39.0] vs 40.0 pmol/mg protein [95% CI, 20.1 to 60.0],  $P = .04$ ) and the raphé obscurus (55.4 pmol/mg protein [95% CI, 47.2 to 63.6] vs 75.5 pmol/mg protein [95% CI, 54.2 to 96.8],  $P = .05$ ) (Table 2). However, 5-HIAA levels and 5-HIAA: 5-HT ratio did not indicate excessive degradation of 5-HT in SIDS cases. There were no significant differences in catecholamine levels between SIDS cases and controls. Dopamine levels, however, were 640% higher in the raphé obscurus in the hospitalized group compared with the SIDS group (81.7 pmol/mg protein [95% CI, 37.6 to 125.8] vs 11.1 pmol/mg protein [95% CI, -3.6 to 25.8],  $P = .006$ ). Moreover, 5-HT levels were 55% higher in the raphé obscurus (85.6 pmol/mg protein [95%

CI, 61.8 to 109.4] vs 55.4 pmol/mg protein [95% CI, 47.2 to 63.6],  $P = .02$ ) and 126% higher in the PGCL (71.1 pmol/mg protein [95% CI, 49.0 to 93.2] vs 31.4 pmol/mg protein [95% CI, 23.7 to 39.0],  $P = .002$ ) in the hospitalized group compared with the SIDS group (Table 2).

### TPH2 Levels

Samples were available from 34 SIDS cases, 5 controls, and 4 hospitalized infants. Levels of TPH2 were 22% lower in the raphé obscurus in SIDS cases compared with controls (151.2% of standard [95% CI, 137.5% to 165.0%] vs 193.9% [95% CI, 158.6% to 229.2%],  $P = .03$ ) (Table 2). The ratio of TPH2 to 5-HT, however, did not differ. Levels of TPH2 and TPH2:5-HT ratio were lower in the hospitalized group compared with the SIDS group (102.6% [95% CI, 58.7% to 146.4%] vs 151.2% [95% CI, 137.5% to 165.0%],  $P = .04$  and 0.9 [95% CI, -0.6 to 2.4] vs 3.1 [95% CI, 2.6 to 3.6],  $P = .01$ , respectively) (Table 2).

### 5-HT<sub>1A</sub> Receptor Binding

We measured 5-HT<sub>1A</sub> receptor binding in 10 medullary nuclei from 35 SIDS cases and 5 controls. Analysis of the hospitalized group was not possible owing to the lack of available tissue ( $n = 3$ ). There were significant alterations in SIDS cases compared with controls occurring in 2 patterns (Table 3). There was a significant absolute reduction in binding in regions that receive projections from medullary 5-HT neurons but do not contain 5-HT neurons, ie, the hypoglossal nucleus (upper airway patency) (38% reduction), the nucleus of the solitary tract (visceral sensory input) (29% reduction), and the dorsal motor nucleus of the vagus (preganglionic parasympathetic outflow) (55% reduction). Second, in components of the medullary 5-HT system that contain 5-HT cell bodies (ie, PGCL, gigantocellularis, and intermediate reticular zone), there was a significant age  $\times$  diagnosis interaction with decreased receptor binding with increasing age in SIDS cases but no change in controls (Figure 2A).

We compared 5-HT<sub>1A</sub> receptor binding data between the 2006 data set<sup>11</sup> and current (2010) data set, because measurements were obtained by identical methods. Abnormal binding patterns for each nucleus were similar between the 2 data sets; the exception was reduced binding in the arcuate nucleus, raphé obscurus, and medial accessory nucleus in the 2006 but not the 2010 data set (Table 3). For further analysis with a larger sample size, we combined the 2006 and 2010 data sets ( $n = 51$  SIDS cases and  $n = 11$  controls) (eTable 1, available at <http://www.jama.com>) and found that the significant age  $\times$  diagnosis interactions persisted, including when identical age groups were considered (Figure 2B). Lastly, we tested the hypothesis that interrelationships exist between different medullary 5-HT-related nuclei. In SIDS cases as well as controls, altered 5-HT<sub>1A</sub> receptor binding in 1 nucleus correlated with similar alterations in other components of the 5-HT system in the same cases (Figure 3 and eFigure).

### Risk Factors in the SIDS Cases

To determine if known risk factors for SIDS were associated with abnormalities in 1 or more 5-HT parameters in the medulla, an analysis of risk factors relative to the 5-HT parameters was undertaken. Risk factors for SIDS (Table 1, eTable 2, and eTable 3) were subdivided into “extrinsic” and “intrinsic” categories.<sup>11</sup> Extrinsic factors, eg, prone sleep position,<sup>3,4,6,7</sup> are physical stressors that place a vulnerable infant at risk for homeostatic derangements around the time of death; intrinsic factors, eg, prematurity and male sex,<sup>3,4,6,7,21,22</sup> are postulated to affect the underlying vulnerability in the infant. Ninety-five percent (39/41) of SIDS cases had 1 or more risk factor, and 88% (36/41) had 2 or more. Ninety-three percent had at least 1 extrinsic risk factor, ie, prone (49%) and side (14%) sleep position, face down (37%), bed sharing (20%), and trivial illness prior to death (44%) (eTable 2). We found no

associations between risk factors and 5-HT tissue levels (eTable 3). Significant differences were found, however, for 5-HT<sub>1A</sub> receptor binding in the raphé obscurus if the infant with SIDS was found dead in a risky sleep position (47.32 fmol/mg tissue [95% CI, 38.23 to 56.38] for prone or side sleep position vs 26.76 fmol/mg tissue [95% CI, 15.64 to 37.88] for supine position) or in an adult bed (49.06 fmol/mg tissue [95% CI, 34.20 to 63.92] vs 32.76 fmol/mg tissue [95% CI, 21.38 to 44.14] in a crib) (eTable 3). Binding levels were significantly lower if the infant with SIDS did not have the risk factor. In addition, TPH2 levels were lower in the infants with SIDS and with recent illness (165.7% [95% CI, 143.3% to 188.0%]) than those without recent illness (138.0% [95% CI, 126.6% to 149.4%]). In this data set we found no effect for male sex (eTable 3).

## COMMENT

In this article we report the presence of lower levels of medullary 5-HT and TPH2 in infants dying from SIDS, pointing to a deficiency, as opposed to an excess, of 5-HT in the pathogenesis of the disorder. The absence of changes in 5-HIAA levels or neurotransmitter turnover (5-HIAA:5-HT ratio) excludes the possibility of substantial 5-HT degradation and supports reduced 5-HT synthesis. In this data set, we also confirmed 5-HT<sub>1A</sub> receptor binding alterations, although not in the arcuate nucleus, raphé obscurus, or medial accessory olive.<sup>9</sup> There were no differences in SIDS risk factors between the 2006<sup>11</sup> and current data sets that explained this difference, nor were there any obvious differences in the controls to explain the variation in control levels between data sets. While these inconsistencies warrant further analysis, binding differences are remarkably similar in all other nuclei across our data sets and are associated with abnormalities in different parameters of 5-HT function, ie, 5-HT cell density<sup>11</sup> and 5-HT and TPH2 levels.

We also report that 5-HT<sub>1A</sub> binding alterations correlate among components of the medullary 5-HT system in the SIDS cases (and controls), substantiating our concept that the medullary 5-HT system is an interrelated network that modulates respiratory and autonomic functions<sup>3</sup>—a concept likewise increasingly supported by animal data.<sup>3,23–25</sup> We now postulate that SIDS can be viewed as a disorder caused by a defect in 1 or more components of the medullary 5-HT system and that any single case need not express defects in all 5-HT markers simultaneously.

With regard to 5-HT<sub>1A</sub> receptor binding, the consistent finding over 4 data sets of several significant interactions between age and diagnosis warrants mention. Although interpretation is impossible without longitudinal study, the reduced binding in older SIDS cases may reflect a progressive decrease with age in those infants with the “SIDS abnormality.” Alternatively, it may reflect the possibility that infants with a stronger abnormality take longer to outgrow the risk period for SIDS and continue to die at older ages.

In this study, we also asked whether 5-HT abnormalities in infants with SIDS could be explained by hypoxia-ischemia. We did not observe, however, a similar pattern of abnormalities between the SIDS and hospitalized (hypoxia-ischemia) group, suggesting that the primary mechanisms underlying 5-HT abnormalities in SIDS are not mediated by chronic hypoxia-ischemia. A striking difference between the SIDS and hospitalized groups was the association of reduced TPH2 levels with reduced 5-HT levels in the SIDS group compared with unaltered 5-HT levels in the hospitalized group. These findings indicate that the SIDS cases demonstrate a different TPH2: 5-HT ratio and that the SIDS profile does not mimic that of the hospitalized group; the basis of this discrepancy is currently unknown.

Catecholaminergic abnormalities in the brainstems of infants with SIDS are controversial, with reports of positive and negative findings using immunocytochemistry and tissue autoradiography.<sup>26–29</sup> Our study does not support a major abnormality in SIDS cases in medullary 5-HT nuclei that receive projections from rostral catecholaminergic cell bodies in the pons and midbrain.

The finding of at least 1 risk factor in 95% of SIDS cases underscores the importance of risk factors in the pathogenesis of SIDS, even in the era of the recommendation for supine sleep position. The finding of 2 or more risk factors in 88% of SIDS cases further underscores that SIDS results from the simultaneous occurrence of multiple events.<sup>3</sup> Infants with SIDS but without known extrinsic risk factors had significantly lower 5-HT<sub>1A</sub> receptor binding, suggesting that additional risk factors are necessary to precipitate death when the medullary 5-HT system is less compromised.

Three concerns in this study warrant consideration. The first is the possibility of compromised neurotransmitter measurements using HPLC, attributable to prolonged postmortem intervals. Animal models, however, suggest that 5-HT degradation is not significant, at least over a 27-hour postmortem delay, in cerebral cortical sites that receive 5-HT projections.<sup>30</sup> In addition, we made adjustments in this study for postmortem interval in all statistical analyses as warranted. Furthermore, we analyzed brainstem tissues only in infants with relatively short postmortem intervals (<30 hours) and avoided any freeze-thaw procedures. Second, we were unable to measure neurotransmitter levels at the synapse in postmortem tissues. Our data therefore represent combined intracellular and extracellular stores without precise cellular localization. The final concern is the small sample size of the control group, which is an unavoidable reflection of the extraordinary rareness of death as well as autopsies in infants without SIDS who die unexpectedly. Our response was to study all cases in greater depth with different modalities, to compare data from different data sets, and to combine these data when possible.<sup>9–11</sup> Independent investigators have now also reported 5-HT<sub>1A</sub> receptor deficits confirmed in SIDS cases using a different technique, ie, immunocytochemistry, thereby confirming our receptor results.<sup>31,32</sup>

These findings raise the question as to how reduced 5-HT and TPH2 levels are related to the increased 5-HT cell density,<sup>11</sup> morphologic 5-HT neuronal immaturity,<sup>11</sup> reduced 5-HT transporter binding relative to 5-HT cell number,<sup>11</sup> and altered 5-HT receptor binding<sup>9–11</sup> in the SIDS cases. We hypothesize that TPH2 levels are reduced in the medullary 5-HT system for as-yet unknown developmental, genetic, and/or environmental reasons, with a secondary reduction in 5-HT levels and impaired 5-HT neurotransmission.<sup>33</sup> We further propose that insufficient 5-HT levels early in development, potentially as early as the first or second trimester, result in a compensatory increase in immature 5-HT neurons with immature (decreased) 5-HT<sub>1A</sub> binding and 5-HT transporter levels.<sup>34</sup> That the defect is partial rather than total could explain why medullary 5-HT-mediated pathways function reasonably well at baseline or during waking but are unable to respond to homeostatic stressors during sleep when the partial deficit is potentially unmasked, thereby resulting in sudden death. Our data suggest that future animal models mimicking the 5-HT abnormalities of SIDS should focus on underproduction, rather than overproduction, of 5-HT and TPH2.

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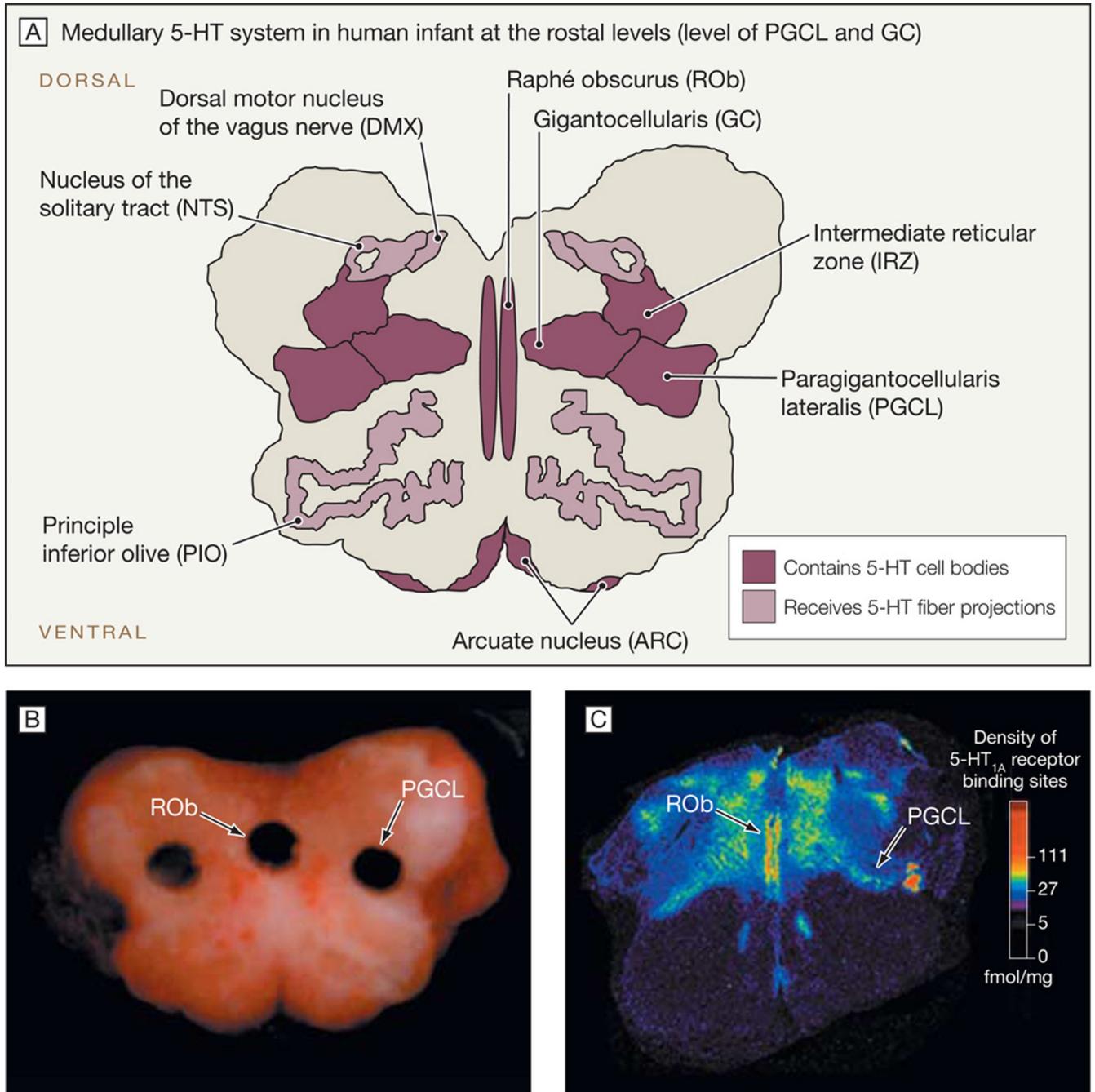
**Role of the Sponsors:** The role of the funding organizations was solely to provide funding for support of the project for peer review; these organizations had no role in the design or conduct of the study; the collection, management, analysis, or interpretation of the data; or the preparation, review, or approval of the manuscript.

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## REFERENCES

1. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol.* 1991; 11(5):677–684. [PubMed: 1745639]
2. Krous HF, Beckwith JB, Byard RW, et al. Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach. *Pediatrics.* 2004; 114(1):234–238. [PubMed: 15231934]
3. Kinney HC, Richerson GB, Dymecki SM, Darnall RA, Nattie EE. The brainstem and serotonin in the sudden infant death syndrome. *Annu Rev Pathol.* 2009; 4:517–550. [PubMed: 19400695]
4. Kinney HC, Thach BT. The sudden infant death syndrome. *N Engl J Med.* 2009; 361(8):795–805. [PubMed: 19692691]
5. Willinger M, Hoffman HJ, Hartford RB. Infant sleep position and risk for sudden infant death syndrome: report of meeting held January 13 and 14, 1994, National Institutes of Health, Bethesda, MD. *Pediatrics.* 1994; 93(5):814–819. [PubMed: 8165085]
6. Moon RY, Horne RS, Hauck FR. Sudden infant death syndrome. *Lancet.* 2007; 370(9598):1578–1587. [PubMed: 17980736]
7. Hauck FR, Tanabe KO. International trends in sudden infant death syndrome: stabilization of rates requires further action. *Pediatrics.* 2008; 122(3):660–666. [PubMed: 18762537]
8. Filiano JJ, Kinney HC. A perspective on neuro-pathologic findings in victims of the sudden infant death syndrome: the triple-risk model. *Biol Neonate.* 1994; 65(3–4):194–197. [PubMed: 8038282]
9. Panigrahy A, Filiano J, Sleeper LA, et al. Decreased serotonergic receptor binding in rhombic lip-derived regions of the medulla oblongata in the sudden infant death syndrome. *J Neuropathol Exp Neurol.* 2000; 59(5):377–384. [PubMed: 10888367]
10. Kinney HC, Randall LL, Sleeper LA, et al. Serotonergic brainstem abnormalities in Northern Plains Indians with the sudden infant death syndrome. *J Neuropathol Exp Neurol.* 2003; 62(11):1178–1191. [PubMed: 14656075]
11. Paterson DS, Trachtenberg FL, Thompson EG, et al. Multiple serotonergic brainstem abnormalities in sudden infant death syndrome. *JAMA.* 2006; 296(17):2124–2132. [PubMed: 17077377]
12. Kinney HC, Belliveau RA, Trachtenberg FL, Rava LA, Paterson DS. The development of the medullary serotonergic system in early human life. *Auton Neurosci.* 2007; 132(1–2):81–102. [PubMed: 17236817]
13. Sridhar R, Thach BT, Kelly DH, Henslee JA. Characterization of successful and failed autoresuscitation in human infants, including those dying of SIDS. *Pediatr Pulmonol.* 2003; 36(2):113–122. [PubMed: 12833490]
14. Poets CF. Apparent life-threatening events and sudden infant death on a monitor. *Paediatr Respir Rev.* 2004; 5 suppl A:S383–S386. [PubMed: 14980301]
15. Thach B. Tragic and sudden death: potential and proven mechanisms causing sudden infant death syndrome. *EMBO Rep.* 2008; 9(2):114–118. [PubMed: 18246101]
16. Law C. Chapter 955, Statutes of 1989 (SB1069).
17. Kinney HC, Filiano JJ, White WF. Medullary serotonergic network deficiency in the sudden infant death syndrome: review of a 15-year study of a single dataset. *J Neuropathol Exp Neurol.* 2001; 60(3):228–247. [PubMed: 11245208]
18. Olszewski, J.; Baxter, D. *Cytoarchitecture of the Human Brain Stem.* 2nd ed.. Basel, Switzerland: Karger; 1982.
19. Paxinos, G.; Huang, X-F. *Atlas of the Human Brainstem.* New York, NY: Academic Press; 1995.

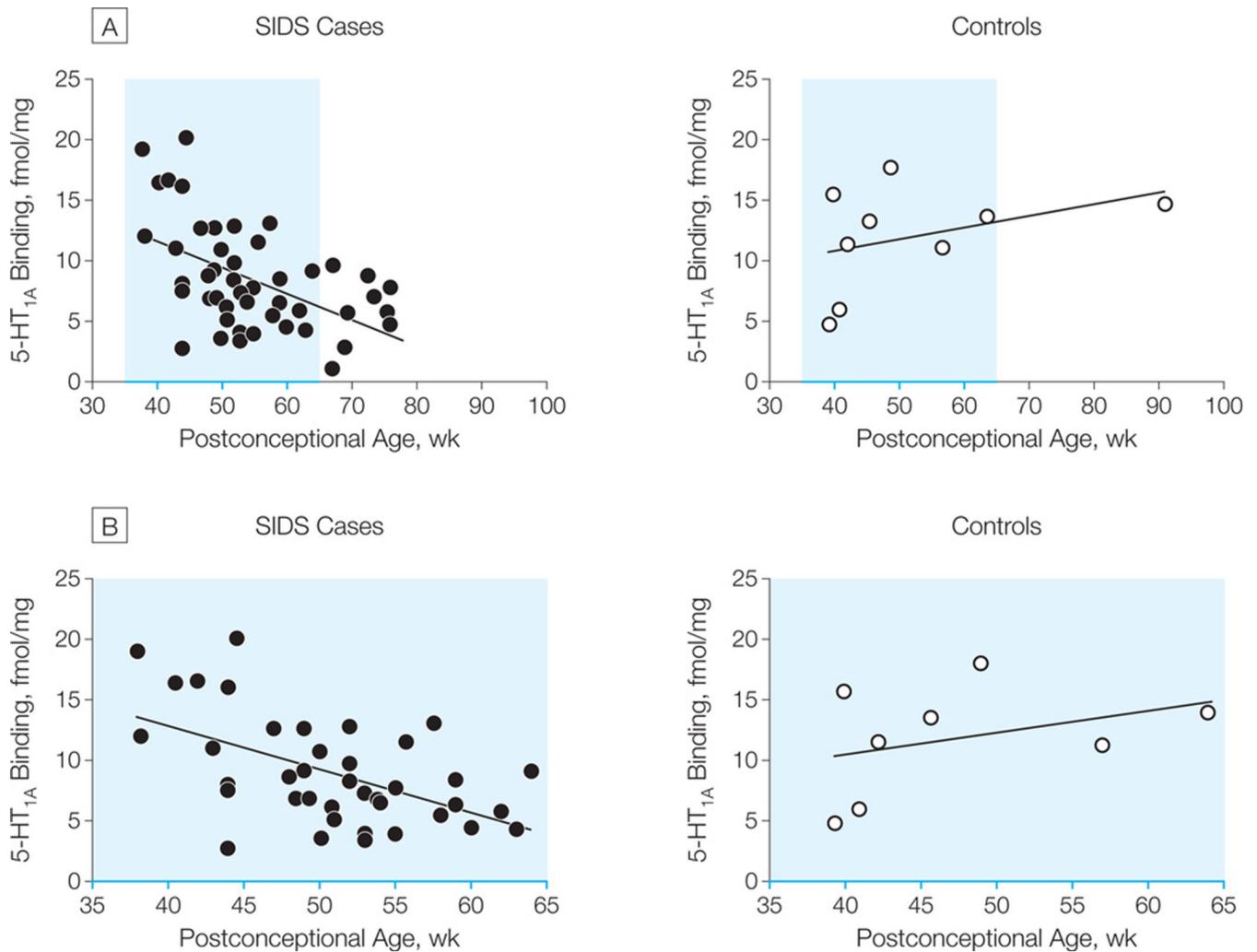
20. Lowry OH, Rosebrough NJ, Farr AL, Randall RJ. Protein measurement with the Folin phenol reagent. *J Biol Chem.* 1951; 193(1):265–275. [PubMed: 14907713]
21. Weese-Mayer DE, Ackerman MJ, Marazita ML, Berry-Kravis EM. Sudden Infant Death Syndrome: review of implicated genetic factors. *Am J Med Genet.* 2007; 143(8):771–788. [PubMed: 17340630]
22. Hunt CE. Gene-environment interactions: implications for sudden unexpected deaths in infancy. *Arch Dis Child.* 2005; 90(1):48–53. [PubMed: 15613511]
23. Hodges MR, Wehner M, Aungst J, Smith JC, Richerson GB. Transgenic mice lacking serotonin neurons have severe apnea and high mortality during development. *J Neurosci.* 2009; 29(33): 10341–10349. [PubMed: 19692608]
24. Nattie E. Sudden infant death syndrome and serotonin: animal models. *Bioessays.* 2009; 31(2): 130–133. [PubMed: 19204984]
25. Cummings KJ, Commons KG, Fan KC, Li A, Nattie EE. Severe spontaneous bradycardia associated with respiratory disruptions in rat pups with fewer brain stem 5-HT neurons. *Am J Physiol Regul Integr Comp Physiol.* 2009; 296(6):R1783–R1796. [PubMed: 19369586]
26. Takashima S, Becker LE. Delayed dendritic development of catecholaminergic neurons in the ventrolateral medulla of children who died of sudden infant death syndrome. *Neuropediatrics.* 1991; 22(2):97–99. [PubMed: 1677455]
27. Kopp N, Chigr F, Denoroy L, Gilly R, Jordan D. Absence of adrenergic neurons in nucleus tractus solitarius in sudden infant death syndrome. *Neuropediatrics.* 1993; 24(1):25–29. [PubMed: 8097300]
28. Obonai T, Yasuhara M, Nakamura T, Takashima S. Catecholamine neurons alteration in the brainstem of sudden infant death syndrome victims. *Pediatrics.* 1998; 101(2):285–288. [PubMed: 9445505]
29. Mansouri J, Panigrahy A, Filiano JJ, Sleeper LA, St John WM, Kinney HC. Alpha2 receptor binding in the medulla oblongata in the sudden infant death syndrome. *J Neuropathol Exp Neurol.* 2001; 60(2):141–146. [PubMed: 11273002]
30. Kontur PJ, al-Tikriti M, Innis RB, Roth RH. Postmortem stability of monoamines, their metabolites, and receptor binding in rat brain regions. *J Neurochem.* 1994; 62(1):282–290. [PubMed: 7505313]
31. Ozawa Y, Okado N. Alteration of serotonergic receptors in the brain stems of human patients with respiratory disorders. *Neuropediatrics.* 2002; 33(3):142–149. [PubMed: 12200744]
32. Machaalani R, Say M, Waters KA. Serotonergic receptor 1A in the sudden infant death syndrome brainstem medulla and associations with clinical risk factors. *Acta Neuropathol.* 2009; 117(3):257–265. [PubMed: 19052756]
33. Alenina N, Kikic D, Todiras M, et al. Growth retardation and altered autonomic control in mice lacking brain serotonin. *Proc Natl Acad Sci U S A.* 2009; 106(25):10332–10337. [PubMed: 19520831]
34. Eaton MJ, Staley JK, Globus MY, Whittemore SR. Developmental regulation of early serotonergic neuronal differentiation: the role of brain-derived neurotrophic factor and membrane depolarization. *Dev Biol.* 1995; 170(1):169–182. [PubMed: 7601307]



**Figure 1. Medullary Serotonin (5-Hydroxytryptamine [5-HT]) System in the Human Infant**

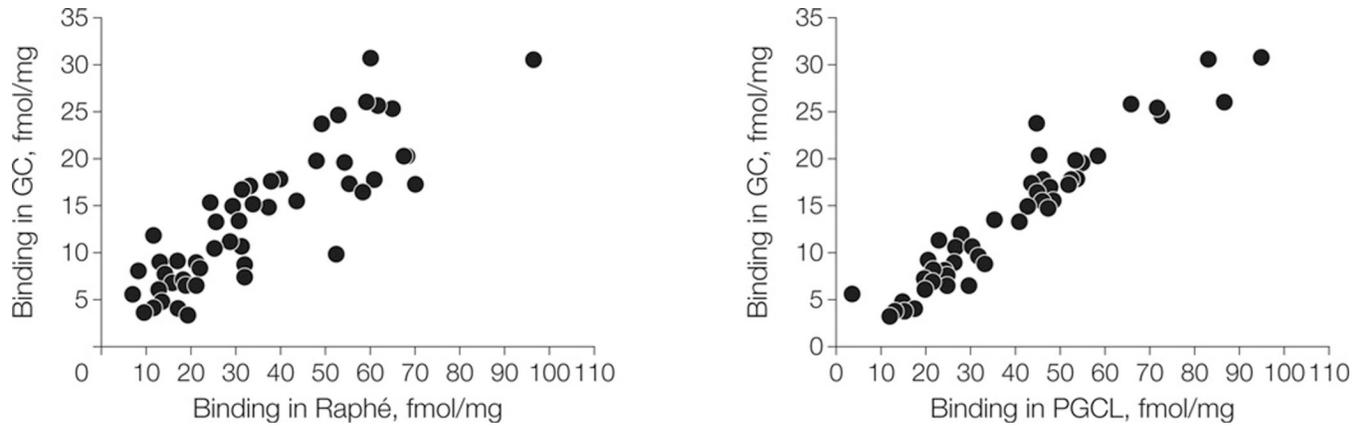
A, Medullary 5-HT system in the human infant at the rostral levels (level of the PGCL and GC) for neuroanatomical reference. The medullary 5-HT system is divided into 3 components based on the location of the nuclei containing 5-HT cell bodies: (1) raphé (midline), including the ROb; (2) extraraphé (lateral), including the PGCL, GC, and IRZ; and (3) ventral surface, including 5-HT neurons embedded within the ARC.<sup>3,12</sup> B, Example of micropunched regions at the rostral medulla level for high-performance liquid chromatography and Western blot analysis in SIDS cases and controls. The regions for chromatographic analysis were the ROb and PGCL and for Western blotting was the ROb. C, Representative autoradiogram (pseudocolored computer-based image) of 5-HT<sub>1A</sub>

receptor binding in a control infant at the same rostral medullary level. High binding (red) is noted in the ROb, intermediate binding (green) in the PGCL, and negligible binding (blue-black) in the PIO.



**Figure 2. Age × Diagnosis Interaction in the Intermediate Reticular Zone of Sudden Infant Death Syndrome (SIDS) Cases and Controls**

The intermediate reticular zone is a key extraraphé component of the medullary serotonin (5-hydroxytryptamine [5-HT]) system that contains 5-HT cell bodies. In this nucleus, 5-HT<sub>1A</sub> receptor binding decreases with age in the SIDS cases but does not change with age in the controls. A, There is a significant difference in the slopes of binding with age in the 2006<sup>11</sup> and 2010 data sets combined for all SIDS cases and controls (37–90 postconceptional weeks) ( $P = .002$ ). Sloped solid lines indicate linear regression fit. B, The significant difference between the SIDS cases and controls persists when the analysis is restricted to cases and controls that overlap in age (37–64 weeks' postconceptional age) ( $P = .004$ ). Sloped solid lines indicate linear regression fit.



**Figure 3.** Positive Correlation of 5-HT<sub>1A</sub> Receptor Binding Levels in the Gigantocellularis (GC) vs the Raphé Obscurus and Paragigantocellularis Lateralis (PGCL) in Sudden Infant Death Syndrome (SIDS) Cases (N = 40)

**Table 1**

Comparison of Clinicopathologic Features Between Sudden Infant Death Syndrome (SIDS) Cases, Controls, and Hospitalized Infants With Hypoxia-Ischemia

Variable	SIDS Cases (n = 41)	Controls (n = 7)	Hospitalized (n = 5)	P Value <sup>d</sup>	
				3-Way	SIDS Cases vs Controls
Age, mean (SD), wk					
Postconceptional	53.3 (8.0)	53.5 (19.5)	38.3 (3.4)	.008 <sup>b</sup>	.98
Gestational	37.9 (3.4)	39.6 (1.3)	37.3 (1.9)	.36	.03
Postnatal	15.4 (8.5)	13.9 (19.0)	1.0 (1.7)	.02 <sup>b</sup>	.85
Postmortem interval, mean (SD), h	18.6 (5.4)	14.9 (4.3)	13.6 (8.4)	.07 <sup>c</sup>	.09 <sup>c</sup>
Male sex, No./total (%)	23/41 (56)	4/7 (56)	2/5 (40)	.89	>.99
Race/ethnicity, No./total (%)					
White	15/39 (39)	3/5 (60)	1/2 (50)	.26	>.99
African American	5/39 (13)	0/5 (0)	0/2 (0)		
Hispanic	15/39 (39)	2/5 (40)	0/2 (0)		
Other	4/30 (10)	0/5 (0)	1/2 (50)		

<sup>a</sup>Determined using *t* test for age and postmortem interval and Fisher exact test for sex and race.

<sup>b</sup>Hospitalized infants were significantly younger than SIDS cases and controls.

<sup>c</sup>SIDS with marginally significant higher postmortem interval.

**Table 2**  
 High-Performance Liquid Chromatography Measurements for Markers of the Serotonin and Catecholamine Systems and Western Blot Measurements for TPH2 Levels in Sudden Infant Death Syndrome (SIDS), Control, and Hospitalized (Hypoxic-Ischemic) Groups in the Medullary 5-HT System

Variable	Region	Age-Adjusted Mean (95% CI), pmol/mg Protein				P Value <sup>d</sup>	
		SIDS Cases (n = 35)	Controls (n = 5)	Hospitalized <sup>b</sup> (n = 5)	Hospitalized <sup>b</sup> vs Controls	Hospitalized <sup>b</sup> vs SIDS Cases	Controls vs SIDS Cases
5-HT	Raphé obscurus	55.4 (47.2 to 63.6)	75.5 (54.2 to 96.8)	85.6 (61.8 to 109.4)	.52	.02	.05
	PGCL <sup>c</sup>	31.4 (23.7 to 39.0)	40.0 (20.1 to 60.0)	71.1 (49.0 to 93.2)	.04	.002	.04
5-HIAA	Raphé obscurus	294.5 (248.4 to 340.6)	323.3 (204.0 to 442.7)	363.0 (229.2 to 496.8)	.62	.62	.60
	PGCL	191.5 (141.6 to 241.3)	222.4 (93.2 to 351.6)	381.3 (236.5 to 526.2)	.06	.06	.43
5-HIAA:5-HT ratio	Raphé obscurus	5.6 (5.0 to 6.3)	4.4 (2.7 to 6.0)	3.5 (1.7 to 5.4)	.08	.08	.14
	PGCL <sup>c</sup>	6.4 (5.7 to 7.1)	5.4 (3.7 to 7.1)	6.0 (4.0 to 7.9)	.29	.57	.18
Norepinephrine	Raphé obscurus	28.0 (22.1 to 34.0)	17.1 (1.7 to 32.6)	19.1 (1.7 to 36.4)	.33	.33	.19
	PGCL	22.7 (13.3 to 32.2)	12.0 (-12.5 to 36.5)	49.8 (22.3 to 77.3)	.11	.11	.05
Dopamine	Raphé obscurus	11.1 (-3.6 to 25.8)	14.5 (-33.2 to 62.1)	81.7 (37.6 to 125.8)	.04	.006	.72
	PGCL	7.7 (-14.0 to 29.5)	11.3 (-46.7 to 69.3)	82.0 (24.0 to 140.1)	.08	.08	.36
DOPAC	Raphé obscurus	24.7 (12.3 to 37.1)	37.0 (-10.5 to 84.4)	24.8 (-19.2 to 68.7)	.88	.88	.62
	PGCL	16.4 (10.0 to 22.7)	27.2 (7.7 to 46.7)	7.4 (-14.8 to 29.5)	.40	.40	.29
DOPAC/dopamine	Raphé obscurus	10.4 (-1.5 to 22.3)	0.3 (-54.7 to 55.3)	0.0 (-45.3 to 38.6)	.79	.79	.72
	PGCL	4.0 (1.3 to 6.7)	3.1 (-4.0 to 10.1)	10.2 (2.2 to 18.1)	.32	.32	.67
TPH2 <sup>d</sup>	Raphé obscurus	151.2 (137.5 to 165.0) (n = 34)	193.9 (158.6 to 229.2) (n = 5)	102.6 (58.7 to 146.4) (n = 4)	.002	.04	.03
TPH2:5-HT ratio	Raphé obscurus	3.1 (2.6 to 3.6)	2.9 (1.7 to 4.1)	0.9 (-0.6 to 2.4)	.05	.01	.71

Abbreviations: CI, confidence interval; DOPAC, 3,4-dihydroxyphenylacetic acid; PGCL, paragigantocellularis lateralis; TPH2, tryptophan hydroxylase; 5-HIAA, 5-hydroxyindoleacetic acid; 5-HT, 5-hydroxytryptamine (serotonin).

<sup>a</sup> Analysis of covariance controlling for postconceptional age; model 1: SIDS vs controls (gives *P* value for SIDS vs controls, the primary comparison); model 2: hospitalized vs SIDS vs controls (3-way comparison with post hoc tests after overall significance to give *P* values for hospitalized vs control and hospitalized vs SIDS).

<sup>b</sup> Hospitalized infants with chronic hypoxia-ischemia.

<sup>c</sup> Data adjusted for significant effects of postmortem interval.

<sup>d</sup> Values for TPH2 levels are the percentage of adult human standards.

Table 3

5-HT<sub>1A</sub> Receptor Binding in the Medullary Serotonin System in Sudden Infant Death Syndrome (SIDS) Cases Compared With Controls in the Current (2010) and 2006 Data Sets

	2010			2006 <sup>11</sup>		
	Age-Adjusted Mean (CI), fmol/mg Tissue	P Value	Age-Adjusted Mean (CI), fmol/mg Tissue	Age-Adjusted Mean (CI), fmol/mg Tissue	P Value	P Value
	SIDS Cases (n = 35)	Controls (n = 5)	Diagnosis	SIDS Cases (n = 16)	Controls (n = 6)	Age-Diagnosis Interaction <sup>a</sup>
HG	6.87 (5.81–7.92)	11.15 (7.77–14.54)	.02			.36
DMX	7.82 (6.58–9.05)	14.26 (10.22–18.30)	.004	NA	NA	NA
NTS	8.88 (7.86–9.90)	12.46 (9.13–15.79)	.04	7.09 (5.07–9.11)	14.67 (11.45–17.89)	<.001
MAO	11.77 (10.05–13.49)	10.14 (4.62–15.66)	.57	9.64 (5.65–13.63)	28.85 (22.70–35.01)	<.001
Raphé obscurus	39.97 (33.06–46.89)	29.21 (11.23–47.19)	.27	24.28 (15.68–32.88)	54.68 (40.51–68.84)	.001
Gigantocellularis						.05
PGCL						.003
IRZ				7.78 (6.20–9.37)	13.38 (10.77–15.99)	.001
DAO				NA	NA	NA
ARC	4.66 (3.64–5.67)	3.68 (1.30–6.06)	.45	4.13 (2.47–5.79)	9.33 (6.86–11.79)	.002
PIO	NA	NA	NA	4.86 (3.23–6.49)	4.63 (2.52–6.75)	.86

Abbreviations: ARC, arcuate nucleus; CI, confidence interval; DAO, dorsal accessory nucleus; DMX, dorsal motor nucleus of the vagus; HG, hypoglossal nucleus; IRZ, intermediate reticular zone; MAO, medial accessory nucleus; NA, not available; NTS, nucleus of the solitary tract; PGCL, paragigantocellularis lateralis; PIO, principal inferior olive.

<sup>a</sup>With a significant age × diagnosis interaction, no means are given because the difference in means between SIDS cases and controls varies by age. When the age × diagnosis interaction was not significant, it was dropped from the final model.

## **Brainstem Serotonergic Deficiency in Sudden Infant Death Syndrome**

Henry F. Krous, MD  
San Diego SIDS/SUDC Research Project

*~ February 11, 2010 ~*

SIDS is defined as the sudden unexpected death of an infant <1 year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history.<sup>1</sup> Our current working “triple-risk” hypothesis posits that SIDS results from the simultaneous occurrence of an underlying vulnerability in the infant, a critical developmental period during infancy, and exposure of an infant to an exogenous stressor.<sup>2</sup> An underlying vulnerability is a pathologic abnormality that in itself is not necessarily fatal, but when interacting with other factors can act as the tipping point leading to a lethal event. In the case of SIDS, the critical developmental period is the first half of infancy when physiologic and anatomic growth and development are very rapid and thus inherently unstable, especially during sleep. Exogenous stressors are risk factors for SIDS, especially those that pose a risk of asphyxia to the sleeping infant. Prone sleep position, sleeping on a soft surface, having the head covered, and/or exposure to cigarette smoke are particularly important risk factors. Exogenous risk factors have been identified and confirmed through numerous epidemiologic studies of large numbers of infants.

Our team of investigators, led by Dr. Hannah Kinney, has been pursuing for many years what makes an infant vulnerable to SIDS by concentrating on the medullary serotonergic system. This system plays a crucial role in the control and homeostasis of the respiratory, cardiovascular, and autonomic systems.

Our recent report that brainstem serotonin (5-HT) and tryptophan hydroxylase (TPH2) levels were lower in SIDS cases than in age-adjusted controls provides further evidence that defects in the medullary serotonergic system are important in SIDS.<sup>3</sup> 5-HT and TPH2 levels critical to respiration were 26% and 22% lower, respectively, in brainstems from SIDS cases compared to controls. This finding indicates that 5-HT levels were low as a result of decreased synthesis rather than increased degradation. Serotonin receptor (5-HT<sub>1A</sub>) binding was also reduced, thus confirming earlier observations.

How do our reported abnormalities in the serotonin metabolism relate to our “triple risk” hypothesis for SIDS? Remember that the typical case of SIDS usually involves an apparently healthy infant between one and six months of age who has been sleeping and is later discovered lifeless. Even though one or more of the above-mentioned SIDS risk factors that threatens the sleeping infant with asphyxia, hypercarbia, and/or hypoxia are usually present, evaluation of both the circumstances of death after death scene investigation as well as the postmortem examination does not reveal a definitive cause of death. Therefore, the diagnosis defaults to SIDS. In this scenario, the developmental period and the exogenous SIDS risk factors are present, but according to our hypothesis, infant vulnerability must also be present for death to occur. We have found that a high percentage of infants we studied have abnormalities in the medullary serotonergic system that unmask or exposes the danger posed by the combination of sleep during the critical developmental period while sleeping in a potentially asphyxial environment. Thus, when medullary serotonergic system abnormalities are present, the infant may not be able to rescue itself from an asphyxial environment, i.e., compared to an infant without these abnormalities, an affected infant may not raise or turn its head to remove its nose and mouth from a face down position on a soft sleep surface.

Much work remains to be done to expand our understanding of the interaction of infant development, exogenous risk factors, and the medullary serotonergic system. But it is hoped through this understanding that it will be possible to predict which infants are at risk of SIDS and thereby intervene somehow before death occurs. This is several years away, however.

This work was undertaken by investigators from Harvard, UCSD/Rady Children's Hospital-San Diego (Dr. Henry Krous, Elisabeth Haas), the San Diego Medical Examiner's Office (Dr. Christina Stanley), University of New England College of Osteopathic Medicine, Dartmouth, and the New England Research Institutes. The study cases were obtained from the San Diego SIDS/SUDC Research Project after undergoing postmortem examination at the San Diego Medical Examiner's Office and Children's Hospital Boston. This work could not have been carried out without California law and the generous support of many parent and family survivors of infants dying of SIDS.

1. Krous HF, Beckwith JB, Byard RW, et al. Sudden infant death syndrome and unclassified sudden infant deaths: a definitional and diagnostic approach. *Pediatrics*. 2004; 114:234-238.
2. Kinney HC, Richerson GB, Dymecki SM, Darnall RA, Nattie EE. The brainstem and serotonin in the sudden infant death syndrome. *Annu Rev Pathol*. 2009; 4:517-550.
3. Duncan JR, Paterson DS, Hoffman JM, et al. Brainstem serotonergic deficiency in sudden infant death syndrome. *JAMA*. 2010; 303:430-437. \*

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## Infant Sleep Positioning by Nursery Staff and Mothers in Newborn Hospital Nurseries

Penny F. Stastny ▼ Travers Y. Ichinose ▼ Sharon D. Thayer ▼ Robert J. Olson ▼ Thomas G. Keens

- ▶ **Background:** Although advice from healthcare professionals may influence parental infant placement choice to reduce sudden infant death syndrome risk, literature on nursery staff infant placement behaviors and the degree to which they influence maternal infant sleep positioning is limited.
- ▶ **Objective:** To assess newborn placement practices of the mother and nursery staff and their interrelationship in the hospital setting.
- ▶ **Methods:** A cross-sectional survey-based study was conducted among hospital newborn nursery staff ( $n = 96$ ) and mothers of newborns ( $n = 579$ ) at eight perinatal hospitals in Orange County, California.
- ▶ **Results:** Although a majority of sampled nursery staff (72%) identified the supine position as the placement that most lowers sudden infant death syndrome risk, only 30% reported most often placing infants to sleep in that position, with most staff (91%) citing fear of aspiration as the motivation for supine position avoidance. Only 34% of staff reported advising exclusive supine infant positioning to mothers. Approximately 36% of mothers reported using supine infant placement exclusively. Maternal infant placement choice varied by both the advice ( $p < .01$ ) and the placement modeling ( $p < .01$ ) provided by staff, with the highest proportion of usual supine infant placement found among mothers who reported receiving both. A mother's race/ethnicity also affected the reception of exclusive supine placement recommendations ( $p < .01$ ).
- ▶ **Conclusions:** Exclusive supine infant placement appears to be underused by both nursery staff and mothers of newborn infants. Culturally grounded educational intervention with nursery staff regarding infant positioning and placement in the hospital setting is indicated.
- ▶ **Key Words:** infant sleeping position • sudden infant death syndrome • SIDS

**S**udden infant death syndrome (SIDS), the sudden unexpected death of an infant younger than 1 year, remains unexplained after a thorough postmortem investigation (Willinger, James, & Catz, 1991). The typical clinical history consists of an apparently healthy baby put down to sleep for a daytime nap or overnight and found deceased by caregivers. Generally, SIDS babies are not sick before death, and there is no warning. As the second most common cause of death among infants 1 to 12 months old, SIDS has a devastating impact on surviving family members, yet its etiology remains largely unknown.

Through epidemiologic study, a number of factors associated with SIDS have been identified (Sullivan & Barlow, 2001). The most important modifiable infant care SIDS risk factor appears to be prone sleeping (Dwyer, Ponsoby, Newman, & Gibbons, 1991; Irgens, 1995; Sullivan & Barlow, 2001), which has been estimated to account for 40% to 80% of SIDS cases (Sullivan & Barlow, 2001). Dramatic decreases in SIDS rates (reaching 50%) have been observed in countries that actively discourage prone sleeping and emphasize the supine (back) sleeping position (Markestad, Skadberg, Hordvik, Lorild, & Irgens 1995; Wigfield & Fleming, 1995). However, many parents fail precisely to follow infant back-sleeping recommendations, such as those given by the American Academy of Pediatrics (AAP) (Brenner et al., 1998; Lesko et al., 1998; Willinger et al., 1998). Side positioning, rather than the ideal exclu-

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# Maternal Bedsharing Practices, Experiences, and Awareness of Risks

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## Keywords

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## ABSTRACT

**Objectives:** The objectives of this study were to determine mothers' practices and experiences of bedsharing with their infants and also to determine their knowledge of the risks.

**Design:** A self-report questionnaire was mailed to 1,122 mothers of infants.

**Setting:** Manitoba, Canada.

**Participants:** The participants in this study were the mothers of infants aged 3 months whose contact information was obtained through the Manitoba Health Information Privacy Committee.

**Main Outcome Measure:** Maternal-infant bedsharing practices and maternal knowledge of risks.

**Results:** There were 293 completed questionnaires received (26% return rate). Key findings suggest that although 89% of participants agreed that sleeping with one's baby has some risks associated with it, 72% reported that they bedshared with their baby on either a regular or an occasional basis. Mothers who breastfed were twice as likely to have bedshared. Approximately 13% of respondents who had bedshared reported an experience(s) with bedsharing in which they had rolled onto or partway onto their infant.

**Conclusions:** Although the majority of participants agreed that bedsharing had risks for infants, almost three quarters of respondents reported bedsharing on a regular or an occasional basis. Reports by respondents of rolling onto or partway onto their infants support the conclusion that health care professionals should promote safe sleeping environments that include a separate sleep surface for infants.

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Bedsharing, co-bedding, and co-sleeping are terms that have been used to describe the practice of caregivers sharing beds with infants, which is a relatively common practice around the world. Increasingly, the term co-sleeping is being used to refer to parents (usually mothers) and infants sharing the same room but on different sleep surfaces (McKenna & McDade, 2005). The distinction between bedsharing and co-sleeping is important, and this article focuses on the issue of bedsharing or other sleep surface sharing (e.g., couch).

## Benefits of Bedsharing

Both psychological and physiological benefits have been associated with bedsharing, primarily associated with the facilitation of breastfeeding (McKenna, Mosko, & Richard, 1997) and positive physiological changes in infants (Ball, 2002). In addition, bedsharing has been described as a natural caregiving practice with a long-standing history of both socioeconomic (e.g., cost of cribs)

and cultural factors. In 1999 Nakamura, Wind, and Danello reviewed and analyzed data collected by the US Consumer Product Safety Commission on deaths of children less than 2 years of age that occurred in adult beds over an eight year period and which involved 515 deaths. These authors declared that cribs were the safest place for infant sleep due to the risks associated with bedsharing (Nakamura et al., 1999). Since then there have been many articles, editorials and discussions among professional and laypersons debating the practice. In some cases, the position has been put forward that the practice of bedsharing has been wrongly maligned, even concluding that crib sleeping may be the more dangerous practice (Morgan, Groer, & Smith, 2006).

## Risks of Bedsharing

The primary concern regarding bedsharing is that asphyxia of the infant can occur when an adult rolls over onto the infant or if the infant's head is wedged between the sleeping surface

and an adjoining surface such as a wall (Nakamura et al., 1999). Drago and Dannenberg (1999) reviewed 2,178 case summaries of infant deaths due to mechanical suffocation between 1980 and 1997, which supported concern about bedsharing. The most frequent cause of suffocation was wedging between a bed or mattress and a wall. Researchers have pointed out that risks for the infant during bedsharing increase when the adult is a smoker, is extremely fatigued, is under the effects of alcohol or sedating medications; when the bedsharing location is a sofa, waterbed, or very soft mattress; when the infant is overheated (e.g., use of heavy covers); or if the infant's head is covered during sleep (Canadian Paediatric Society, 2004; Donohue-Carey, 2002).

### Bedsharing and Risks of Sudden Infant Death Syndrome

Sudden Infant Death Syndrome (SIDS) has been defined as the "sudden death of an infant under one year of age, which remains unexplained after thorough case investigation, including the performance of a complete autopsy, examination of the death scene, and review of the clinical history" (Willinger, James, & Catz, 1991, p. 681). This definition is used by the American Academy of Pediatrics (2005) and the Canadian Paediatric Society (2004). In addition, SIDS is generally considered to take place during sleep (Canadian Paediatric Society). However, there has been a lack of clarity related to classification of SIDS versus asphyxia since the autopsy findings of SIDS and proven asphyxia are often indistinguishable.

In some jurisdictions, bedsharing deaths may be considered as "undetermined cause" rather than either SIDS or asphyxiation. Kemp et al. (2000) conducted a retrospective study of death scenes of infants younger than 2 years with diagnoses of SIDS, accidental suffocation, or undetermined cause ( $N = 119$ ) and concluded that there were similar unsafe sleeping practices that occurred in all three diagnoses, and therefore, there was a likelihood of diagnosis overlap. Further, they found that close to half (47.1%) of the infant deaths occurred on a shared sleep surface and subsequently recommended that campaigns were needed regarding the dangers of bedsharing.

Researchers in Scotland (Williams, Lang, & Mage, 2001) and Norway (Arnestad, Andersen, Vege, & Rognum, 2001) concluded that bedsharing was a risk factor for SIDS. Leguien and Carpentier (2000) reported an increased risk for

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## Bedsharing has benefits, but the risks of serious injury to infants are concerning to health care professionals who care for infants and their families.

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SIDS when bedsharing is associated with maternal alcohol consumption and smoking, and Carroll-Pankhurst and Mortimer (2001) concluded that bedsharing was related to some SIDS-like deaths, particularly if the adult was of large size. Although a systematic review examining the benefits and harms of bedsharing (Horsley et al., 2007) concluded that current data could not establish causality, these authors also noted that the data do suggest an association between bedsharing and SIDS when mothers are smokers or when bedsharing involves younger infants (younger than 3 months).

A recent Canadian study on sleep environment risk factors for sudden infant death included the review of medical records; medical examiner and autopsy reports; and police and child welfare reports for all infant deaths with a cause of death of SIDS, Sudden Unexplained Infant Death, or suffocation over the period 2003 to 2005 in a province with a population of 1.2 million (Warda & Blakley, 2007). Of the 24 deaths reviewed, sleep locations identified were adult beds (11), cribs (5), couches (4), playpens (2), car seat (1), and coffee table (1). Six of the deaths that occurred in adult beds were during bedsharing, and all the infant deaths on couches (four) involved the infant sleeping with an adult (Warda & Blakley).

### Recommendations for Practice

A review of the research and expert opinion on the potential risks of bedsharing have resulted in professional organizations and institutions, expressing caution regarding this practice. For example, both the American Academy of Pediatrics (2005) and the Canadian Paediatric Society (2004) recommend that infants sleep on a separate sleep surface (e.g., crib) that meets nationally approved standards and, ideally, in the same room as caregivers. Although the debate is ongoing, recent literature on this topic appears to present a developing consensus perspective that co-sleeping, in the form of room sharing and separate sleep surfaces, is beneficial for both infant and breastfeeding mothers (Casey, 2007; McKenna & McDade, 2005) and provides some of the benefits associated with bedsharing without the risks.

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**Parents should be encouraged to place their infants to sleep on their backs in a crib in the same room as caregiver(s).**

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### Bedsharing Rates

Bedsharing among mothers and infants, especially newborns, appears to be a relatively common and supported practice. Findings by Ramos (2002) indicated that 63% of mothers surveyed were supportive of this practice. Nelson et al. (2001) determined from an international study that rates and methods of bedsharing differed cross-culturally. A British study by Hooker, Ball, and Kelly (2001) reported a bedsharing rate of 65%, and a recent American study (Lahr, Rosenberg, & Lapidus, 2007) found that more than 76% of respondents reported bedsharing at least sometimes.

More needs to be known about bedsharing in general, and additionally, there are no Canadian provincial or national statistics on the practice of caregiver and infant bedsharing. Therefore, the objective of this research was to determine current parental practices, knowledge levels, and experiences regarding parent-infant bedsharing in a Canadian (province of Manitoba) sample. To determine if parents in a region of Canada require additional education on the risks of bedsharing, it is important to understand the extent of the practice and parents' knowledge and understanding of the issue. To elicit this information, the following two research questions guided this study. First, what are current attitudes, rates, and contexts of bedsharing of parents of infants in Manitoba? Second, what is the knowledge level of parents related to risks of bedsharing? Findings from this study can provide baseline data regarding this practice, serve as a basis from which comparisons can be made with other provinces and jurisdictions, and provide a foundation for further research and the planning and implementation of public health education on safe infant sleep practices.

### Study Design and Methods

A descriptive, cross-sectional research design was used to investigate the practices of bedsharing and the knowledge level of parents concerning its risks. Data collection was started after approval was received from the University of Manitoba Human Ethics Review Committee. The letter of invitation outlined the purpose of the study and that return of the completed questionnaire was considered indication of informed consent.

### Sample and Setting

A self-report questionnaire was distributed to all mothers whose infants were born in Manitoba during a specific 1-month period ( $N = 1,122$ ) and whose infants would be 3 to 4 months of age at the time of data collection. There were no exclusion criteria. This age of infant was selected because bedsharing is most likely to be occurring or have already occurred by this age. An invitation to participate along with the questionnaire was sent to the 1,122 mothers who were identified as being eligible for this study through the Manitoba Health Information Privacy Committee. Follow-up reminder letters were sent 1 week later to encourage return of outstanding questionnaires.

### Questionnaire

A questionnaire was developed to obtain demographic data and respondents' experiences with and opinions regarding bedsharing. The questions were written in a straightforward manner for easy interpretation by respondents. Following the questions on demographic information, respondents were asked about their agreement/disagreement (6-point Likert-type scale: *strongly disagree* to *strongly agree*) on three items: (a) sleeping with one's baby in bed (bedsharing) is natural for the mother and the baby, (b) bedsharing should be encouraged for breastfeeding mothers and infants, and (c) bedsharing has some risks associated with it. The responses were collapsed into two categories: agree and disagree. The questionnaire also included questions on whether respondents slept with their baby in the same bed on a regular basis (at least three times a week), on an occasional basis only (two or less times a week), or never. Open-ended questions were included asking respondents to identify/discuss situations during bedsharing, such as being woken up by their baby. The questionnaire concluded with an open-ended opportunity for respondents to discuss anything else related to their thoughts and experiences regarding parent and infant bedsharing. The questionnaire was piloted with four parents for ease of reading and to determine approximate time for completion. Minor wording changes resulted.

### Statistical Analysis

Descriptive statistics were used to identify the frequencies and distributions of attitudes, knowledge, and practices of parent-infant bedsharing. The Mann-Whitney  $U$  test, chi-square test, and  $t$  test were used to determine the differences in respondents' demographics and other factors regarding the practice of bedsharing.

## Results

### Sample Characteristics

**Mothers.** Two hundred and ninety-three completed questionnaires were received (26% response rate). The age range of mothers who participated was 16 to 46 years, with a mean age of 29.9 years. Respondents were generally highly educated: Less than 10% of mothers reported having less than a high school education, a quarter indicated that their highest level of education was completion of grade 12, and two thirds (66.2%) indicated the completion of a college/professional diploma or a university degree (undergraduate or graduate). Only 8.2% of respondents were working outside the home, and more than two thirds were on maternity leave (68%). A large majority (91.8%) of mothers indicated that they were currently in a married or common law relationship. Respondents were asked to report their total family income for the previous year; more than half indicated an annual income of over \$40,000. More than two thirds of respondents reported breastfeeding their infant either exclusively or along with bottle-feedings, while about 30% reported bottle-feeding exclusively (Table 1).

**Infants.** A large majority (85%) of respondents completed the questionnaire when their infants were 3 to 4 months of age. Most of the remaining respondents completed the questionnaire when their infants were 5 months old (range 3-7 months). The gender of infants was equally distributed between female (49.8%) and male (47.1%). When asked if their infant had any health problems, 92.8% indicated none and 6.5% of respondents indicated that their infant did have a health problem. Infants with health problems were equally divided between those of a relatively minor nature (e.g., eczema) and those of a more serious/chronic nature but not immediately life threatening (e.g., Down syndrome; Table 2).

### Research Question 1

What are the current attitudes, rates, experiences, and contexts of bedsharing of parents of infants in Manitoba? Most of the respondents (70.4%) agreed that it was natural for mother and baby to sleep in the same bed. Respondents were fairly equally distributed between agreement (49.1%) and disagreement (48.5%) with the statement that bedsharing should be encouraged for breastfeeding mothers. The comments made by respondents to support the "naturalness of bedsharing" reflected their feelings of comfort, convenience,

**Table 1: Maternal Demographics (N = 293)**

Characteristic	Bedsharing (n = 212)		Nonbedsharing (n = 81)	
	n	%	n	%
<b>Maternal age (year)</b>				
16-26	55	25.9	16	19.7
27-36	131	61.8	58	71.6
37-46	25	11.8	7	8.6
Missing	1	0.5		
<b>Education</b>				
Less than grade 12	20	9.4	5	6.2
High school diploma	51	24.1	23	28.4
College diploma	77	36.3	22	27.2
University degree(s)	64	30.2	31	38.3
<b>Marital status</b>				
Married	165	77.8	61	75.3
Common law	28	13.2	15	18.5
Single	17	8.0	5	6.2
Other/missing	2	0.9		
<b>Yearly family income (\$)</b>				
Up to 20,000	29	13.7	4	4.9
20,001-40,000	31	14.6	14	17.3
40,001-75,000	60	28.3	23	28.4
More than 75,000	53	25.0	27	33.3
Missing	39	18.4	13	16.0
<b>Breastfeeding<sup>a</sup></b>				
Yes	158	74.5	43	53.1
No	53	25.0	37	45.7
Missing	1	0.5	1	1.2

<sup>a</sup>OR = 1.94,  $\chi^2 = 12.58$ ,  $p < .001$ .

and closeness/bonding. Some examples of these comments are as follows:

- "It makes me feel comfortable knowing she's right beside me and everything's OK."
- "It's handy for breast feeding . . . at night you get more sleep than if you have to get up to feed."
- "There is a bond between mother and baby and both want to be together."

Respondents were asked to indicate whether they sleep with their infants in the same bed on a regular basis (at least three times a week), on an occasional basis (two or less times a week), or never. Of respondents, 42.7% reported that they slept with their infants on a regular basis, and 29.7% reported that they slept with their infant on an occasional basis. Combining these categories, almost three quarters (72.4%) of respondents reported bedsharing with their infants on a regular or an occasional basis. Respondents who indicated that they bedshared with their infant were asked to

**Table 2: Infants' Demographics (N = 293)**

Characteristic	Bedsharing (n = 212)		Nonbedsharing (n = 81)	
	n	%	n	%
Gender				
Female	105	49.5	41	50.6
Male	101	47.6	37	45.7
Missing	6	2.8	3	3.7
Health problems				
No	200	94.3	72	88.9
Yes	11	5.2	8	9.9
Missing	1	0.5	1	1.2

indicate the length of time that they usually did so. Thirteen percent of respondents indicated that the length of time of bedsharing was the duration of a feed (20 minutes to 1 hour), 42.5% indicated 2 to 3 hours, while almost one third (30.7%) responded most or all the night. A number of women gave examples of the kinds of situations (contexts) in which they were bringing their infants to bed, and these were primarily examples related to convenience of night or early morning feedings. Sample responses included the following:

- "For the first and second months the baby sleeps with me because it makes frequent night time feeds easier . . ."
- "Almost every morning I bring my daughter into bed, mostly for the convenience of feeding her."
- "Baby usually starts out in the crib until he wakes to feed and then I bring him into our bed for the remainder of the night—spends first 3-4 hours in crib, then our bed."

*Group Differences.* To determine if there were differences between those who bedshared with their infants and those who did not, the demographic and breastfeeding status data were analyzed to determine group differences. Bedsharing data were collapsed into two categories: mothers who indicated that they bedshared with their infant on an occasional or a regular basis (72.4%) and those who indicated that they had never bedshared with their infant (27.6%). There were no differences between mothers who bedshared and those who did not with respect to maternal age, education, family income, or marital status. There were also no differences between mothers who reported bedsharing and those who did not in regard to infant gender or presence of health problems. The only difference identified between mothers who bedshared and those who did not was in relation to breastfeeding. Mothers who

were breastfeeding were almost twice as likely to report bedsharing than those who were not (OR = 1.94,  $\chi^2 = 12.58$ ,  $p < .001$ ).

More than one quarter (27.6%) of respondents indicated that they had never bedshared with their infants, and these mothers were asked why. The responses were fairly evenly balanced between those indicating some safety concerns and those indicating need of own space or a belief that transitioning for infants to their own space at a later time may prove difficult. Some examples of these responses are as follows:

- "I was worried about my husband rolling over on to her."
- "I would worry about him getting injured."
- "Fear of rolling on top of my baby or other situations whereby baby may be hurt."
- "I like my own space for me and my husband . . ."
- "Because I don't want my baby to get used to sleeping with me . . ."

### Research Question 2

What was the knowledge level of parents related to risks of bedsharing? The vast majority of respondents in this study (88.7%) agreed with the statement that sleeping with your baby had some risks. Most respondents identified the risk of rolling onto their infants. Other concerns were related to the infant falling out of the bed or subsequently not being able to sleep alone. Statements regarding risks of bedsharing included the following:

- "Soft beds, extra pillows, blankets, etc.—smothering. If either parent is a heavy sleeper or abuses drugs and alcohol—easy to roll on top of baby."
- "Accidentally suffocating baby (blankets), rolling over onto baby."
- "You could roll over the baby, baby could fall off the bed, baby gets too dependent on the parents."
- "Suffocation by parents, parents bed clothes, the bedding. Getting caught somewhere in the bed or against the wall, falling off the bed."

A large majority of respondents (88.8%) agreed that there were risks, compared to less than 10% who disagreed that there were risks. There was a difference in respondents' stated beliefs related to the risks of bedsharing between those who had bedshared and those who had not (OR = 5.9,  $\chi^2 = 7.19$ ,  $p < .007$ ). Mothers who disagreed that

there were risks were almost six times more likely to have bedshared with their infant than those who agreed that there were risks associated with bedsharing. In other words, although the majority of respondents acknowledged that there are risks associated with bedsharing, and the majority of respondents reported bedsharing, those respondents who viewed bedsharing as having risks were less likely to bedshare with their infants.

Respondents were asked about any bedsharing situations with their infant, in the same bed or other location (e.g., couch), where they had experienced rolling onto or partway onto their infants and their infants had woken them with crying or moving. Of 212 respondents who bedshared with their infants on a regular or an occasional basis, 13% reported such an occurrence. These occurrences included experiences of either the mother or the partner rolling onto or partway onto the infant. Some of the situations were described, which are as follows:

- “Yes, I’ve rolled onto my baby in my sleep. I woke myself up when I felt her. She didn’t move or cry. Thank goodness I’m a very light sleeper.”
- “Have found that my hand was partly covering the [baby’s] face as my initial intention was just to help hold pacifier in mouth . . . .”
- “With my second child, I woke up on top of her and the scary thing was that she wasn’t crying.”
- “Once I had him not on my arm, beside me. And I wasn’t aware and fell asleep hard and almost rolled on him but [someone else] woke me up.”
- “I have not rolled onto my baby but my husband has. We had noticed a few times when she was less than 1 month old, when we woke she was under the covers and very hot.”
- “I have slept with my baby maybe twice and both times he would wake me when he moves. Once I turned over to find that he had rolled slightly and a pillow was on top of him. No more co-sleeping after that.”
- “Yes, being a new mom is very exhausting, and I will occasionally fall asleep during feedings, she will move or fuss if I am ‘squishing’ her.”

## Discussion

Almost three quarters (72.4%) of respondents in this study reported bedsharing with their infants

### Of respondents who reported bedsharing, 13% reported at least one incident where they rolled onto their infant.

on either a regular or an occasional basis. This rate of bedsharing is similar to that of 76% found in a recent American study (Lahr et al., 2007) and a British study of 65% (Hooker et al., 2001). Although knowledge of the risks related to bedsharing resulted in group differences between mothers who shared a bed with their infants and those who did not, high levels of bedsharing were reported. However, mothers who agreed that there were risks associated with bedsharing and still chose to bedshare were less likely to do so than those who disagreed that there were risks.

The Winnipeg Regional Health Authority (WRHA) in Winnipeg, Canada (WRHA, 2005), has adopted a policy that states that infants and mothers will not be allowed to share a bed in the hospital setting. At the same time, the WRHA has developed and distributed a pamphlet outlining the risks of bedsharing and recommending that infants should also have their own sleeping surfaces at home. Although the WRHA has been distributing the Safe Sleeping pamphlet since 2005, it is unknown how many of the parents who responded to the survey had received this information. Some mothers will likely have delivered their infants in regional facilities and not WRHA facilities or they may not have received or read the information on safe sleeping. Therefore, this study is not an evaluation of the current educational program or awareness.

Although there appears to be awareness of some level of risk associated with bedsharing, this risk seems to be outweighed by the perceived benefits and convenience. However, the examples provided by mothers of their experiences of rolling onto their infant provide strong evidence of the reality of the risks involved with bedsharing and the need for education and support for new parents.

In order for new parents to make an informed choice, information on the risks of bedsharing needs to be presented in an objective manner and reinforced with expectant and new parents. Health care professionals should promote safe sleeping practices and co-sleeping in the same room on separate sleeping surfaces to ensure infant safety while encouraging breastfeeding and parental responsiveness. Since breastfeeding mothers were almost twice as likely to report bedsharing in this study and since it is essential to continue to promote breastfeeding, breastfeeding mothers need

**Table 3: Clinical Implications of Bedsharing**

- The practice of placing infants to sleep on their back in a crib meeting government safety standards and ideally in the same room as their caregiver(s) for infants' first 6 months should be promoted.
- Co-sleeping in the same room with the crib in close proximity to the primary caregiver is ideal, particularly for the breastfeeding mother; this practice has associated benefits without the risks of a shared sleeping surface.
- Since not all risk factors associated with bedsharing can be controlled, such as the level of caregiver exhaustion and infant overheating, recommendations for safe bedsharing cannot be provided.
- Parents should be informed about the risks and risk factors' association with bedsharing and provided with recommendations developed by the American Academy of Pediatrics and the Canadian Pediatric Society for safe sleeping environments for infants.
- Wide-scale public education initiatives on safe sleeping environments should be implemented to increase the general knowledge level surrounding the risks of bedsharing and promoting the benefits of co-sleeping (bringing the infant's crib into the parents' room).

particular support and education on safe sleeping environments. Safe sleeping information should be incorporated into prenatal education programs and also be discussed and distributed by physicians, nurse practitioners, midwives, hospital and public health nurses, and other health professionals who care for women in the pre- and postnatal period. See Table 3 for a summary of clinical implications and Table 4 for Web sites providing information for parents on safe sleeping environments.

### Limitations

Although the questionnaires were sent to a large sample that had potential to be representative of the province of Manitoba, clearly the process of self-selection occurred, and it is unknown how those who chose to respond differ from those who chose not to respond. However, it is interesting to note that although reasons for bedsharing may be in part due to socioeconomic or financial factors (e.g., unable to afford a separate sleep surface for baby), most of the sample had higher socioeconomic and education levels. In addition, it would have been helpful to have asked participants if they had delivered their baby at one of the WRHA hospitals that has incorporated the Safe Sleeping campaign and if they had ever received information on the risks of bedsharing.

It is likely that most participants were able to read and write English, although it is possible that non-English-speaking respondents could have

had help in completing the questionnaire. Survey data do not provide evidence on what the role of cultural influence might be in the practice of bedsharing. Although the vast majority of respondents indicated that they had lived in Canada all their lives, the role of cultural influence on parenting practices is important.

### Conclusions

Despite the concern regarding risks to infants posed by infant and caregiver bedsharing, the findings from this study indicate that the practice remains common. Data from this study support the position that the risks of bedsharing are real and the practice may put infants in danger of overlay, compression, or overheating, or all. Although it is acknowledged that the experience of caregiver and infant bedsharing has tangible benefits for both parent and infant, particularly in relation to breastfeeding, these benefits must be considered in relation to potential risks to infants. The proponents of bedsharing emphasize that this is a choice that belongs to the caregivers. However, it is the role of health professionals who care for parents and their infants to ensure that this choice is informed and that infants are not being placed at risk.

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### REFERENCES

- American Academy of Pediatrics. (2005). The changing concept of Sudden Infant Death Syndrome: Diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics*, *116*, 1245-1255.
- Arnestad, M., Andersen, M., Vege, A., & Rognum, T. O. (2001). Changes in the epidemiological pattern of sudden infant death syndrome in southeast Norway, 1984-1998: Implications for future prevention and research. *Archives of Disease in Childhood*, *2*, 108-115.
- Ball, H. L. (2002). Reasons to bedshare: Why parents sleep with their infants. *Journal of Reproductive and Infant Psychology*, *20*, 207-222.
- Canadian Paediatric Society (2004). Recommendations for safe sleeping environments for infants and children. *Paediatrics & Child Health*, *9*, 659-663.
- Carroll-Pankhurst, C., & Mortimer, E. A. (2001). Sudden infant death syndrome, bedsharing, parental weight, and age at death. *Paediatrics*, *107*, 530-536.
- Casey, T. C. (2007). Separate sleeping environment for infants. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *36*(4), 362-363.

**Table 4: Internet Resources for Parents on Safe Sleeping Environments**

<http://www.healthychildcare.org/pdf/SIDsparentsafesleep.pdf>  
<http://www.caringforkids.cps.ca/babies/SafeSleepForBaby.htm>

- Donohue-Carey, P. (2002). Solitary or shared sleep what's safe? *Mothering, 114*, 39-47.
- Drago, D. A., & Dannenberg, A. L. (1999). Infant mechanical suffocation deaths in the United States, 1980-1997. *Paediatrics, 103*, e59.
- Hooker, E., Ball, H. G., & Kelly, P. J. (2001). Sleeping like a baby: Attitudes and experiences of bedsharing in northeast England. *Medical Anthropology, 19*, 203-222.
- Horsley, T., Clifford, T., Barrowman, N., Bennett, S., Yaxdi, F., Sampson, M., et al. (2007). Benefits and harms associated with practice of bedsharing. *Archives of Paediatric and Adolescent Medicine, 167*, 237-245.
- Kemp, J. S., Unger, B., Wilkins, D., Psara, R. M., Ledbetter, T. L., Graham, M. A., et al. (2000). Unsafe sleep practices and an analysis of bedsharing among infants dying suddenly and unexpectedly: Results of a four-year, population-based, death-scene investigation study of sudden infant death syndrome and related deaths. *Paediatrics, 106*, e41.
- Leguien, P., & Carpentier, C. (2000). Bedsharing and sudden infant death syndrome. *Archives of Paediatrics, 7*, 680-683.
- Lahr, M. B., Rosenberg, K. D., & Lapidus, J. A. (2007). Maternal-infant bedsharing: Risk factors for bedsharing in a population-based survey of new mothers and implications for SIDS risk reduction. *Maternal Child Health Journal, 11*, 277-286.
- McKenna, J. J., & McDade, T. (2005). Why babies should never sleep alone: A review of the co-sleeping controversy in relation to SIDS, bedsharing and breast feeding. *Paediatric Respiratory Reviews, 6*, 134-152.
- McKenna, J. J., Mosko, S. S., & Richard, C. A. (1997). Bedsharing promotes breastfeeding. *Paediatrics, 100*, 214-219.
- Morgan, K. H., Groer, M. W., & Smith, L. J. (2006). The controversy about what constitutes safe and nurturant infant sleep environments. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 35*, 684-691.
- Nakamura, S., Wind, M., & Danello, M. A. (1999). Review of hazards associated with children placed in adult beds. *Archives of Paediatric and Adolescent Medicine, 153*, 1019-1026.
- Nelson, E. A., Taylor, B. J., Jenik, A., Vance, J., Walmsley, K., Pollard, K., et al. (2001). International child care practices study: Infant sleeping environment. *Early Human Development, 62*, 43-55.
- Ramos, K. D. (2002). The complexity of parent-child cosleeping: Researching cultural beliefs. *Mothering, 114*, 48-51.
- Warda, L., & Blakley, J. (2007, May). *Prevalence of sleep environment risk factors for sudden infant death: A population-based study*. Pediatric Academic Societies Annual Meeting, Toronto, Ontario. E-PAS2007:616309.14.
- Williams, F. L., Lang, G. A., & Mage, D. T. (2001). Sudden unexplained infant deaths in Dundee, 1882-1891: Overlying or SIDS? *Scottish Medical Journal, 46*(2), 43-47.
- Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Paediatric Pathology, 11*, 677-684.
- Winnipeg Regional Health Authority. (2005). *Safe sleeping for your baby*. Winnipeg, Manitoba (MB), Canada: Pamphlet.

sive supine placement, is the most common parental practice identified (Colson, Stille, Payton, Berstein, & Dworkin 2000). It has been suggested that this resistance to exclusive supine infant placement among parents could be due to fear of aspiration with the supine position (Adams, Kugener, Mirmiran, & Ariagno 1998; Colson et al., 2000). However, infants placed to sleep in the side position are more likely to roll into the prone position (Markestad et al., 1995; Mitchell & Scragg, 1994; Scragg & Mitchell, 1998). Perhaps partly because of this instability, infants placed to sleep on their side have a higher risk of SIDS than those put to sleep in the supine position (L'Hoir et al., 1998; Mitchell & Scragg, 1994; Scragg & Mitchell, 1998). Mitchell et al. (1997) found that infants placed to sleep in the side position were more than 6.5 times more likely to die of SIDS than those placed to sleep in the supine position.

Healthcare providers may play an important role in promoting supine infant sleeping among parents (Colson, Bergman, Shapiro, & Leventhal, 2001; Colson & Joslin, 2002; Moon & Omron, 2002; Willinger, Ko, Hoffman, Kessler, & Corwin, 2000). However, studies of hospital nursery head nurses have shown that most hospital newborn nursery staff did not place infants to sleep exclusively in the supine position (Delzell, Phillips, Schnitzer, & Ewigan, 2001; Hein & Pettit, 2001). Such findings have been corroborated by studies in which mothers (Colson & Joslin, 2002; Colson et al., 2001) and researchers (Peeke, Hershberger, Kuehn, & Levett, 1999) commonly observed nursery staff placing infants to sleep in nonsupine positions.

Many nursery staff fail to recommend exclusive supine infant placement to parents (Colson et al., 2001; Delzell et al., 2001; Hein & Pettit, 2001). A study of staff was indicated because surveys of nursery staff have focused on head nurses, and the literature contained insufficient information on infant sleep positioning recommendations that nursery staff reportedly provided to mothers. Therefore, a survey-based observational study was conducted to investigate infant sleeping position in hospital newborn nurseries among groups of nursery staff and mothers of newborns. The goals of the study were to elucidate the motivations, behaviors, recommendations, and knowledge of nursery staff regarding infant placement, to characterize the infant placement behaviors of mothers of newborns, and to define how nursery staff influence the positioning choice of these mothers.

## Methods

A cross-sectional, questionnaire-based study among hospital newborn nurseries in Orange County, California, was conducted. In the year 2000, Orange County had a population exceeding 2.8 million (U.S. Census, 2000) and approximately 46,980 resident live births (California Department of Health Services, 2000). Of these births, approximately 49% were Latino, 35% were White non-Hispanic, 14% were Asian Pacific Islander, 1% were African American, and less than 1% were American Indian (California Department of Health Services, 2000). Of the 23 hospitals delivering newborn infants in Orange County,

California during the year 2000, eight (35%) agreed to participate in the study. These eight hospitals accounted for approximately 49% of the live births in Orange County during 2000 (RAND California, 2002) and reflected the socioeconomic and ethnic diversity of the county, including Latino and Vietnamese populations.

The study protocols were approved by the Human Subjects Review Board of the Orange County Health Care Agency and by the institutional review boards of the participating hospitals that elected to have organizational review. Research assistants obtained verbal consent from nursery staff and mothers, informed participants of the research study, communicated the voluntary nature of their participation, and clarified that no personal identifying information was to be collected. Waiver of written informed consent was approved by Orange County's Human Subjects Review Board and the hospital institutional review boards.

Sample size calculation predicted that 546 newborn infant-mother pairs were required to detect a back-sleep position prevalence of 35% with a precision of 4%. The minimum number of infants to be studied at each hospital was designated according to sample size requirements and their respective proportional contribution to the annual total number of Orange County deliveries. Convenience sampling methods were used to accrue both nursery staff and mother samples. The investigators visited all participating hospitals over a 7-week period. During this period, the timing of visits was randomized within a time frame of 10:00 a.m. through 8:00 p.m. 7 days per week to minimize time-dependent biases. Each hospital was visited as many times as necessary for the designated number to be acquired, but not more frequently than once every 3 days to allow time for mother discharge.

During investigator visits, researchers identified all nursery staff present in the normal newborn nursery and invited them to participate if they had not previously done so. Participants answered an anonymous one-page questionnaire, estimated to require no more than 5 minutes for completion. The questionnaire contained items on nursery staff infant sleep positioning in the hospital, hospital infant placement recommendations made to mothers, knowledge about infant sleep positioning and SIDS, and some demographic information.

During investigator visits, researchers also identified all the mothers in the normal newborn nursery and invited them to participate in the study if they had not previously done so. Recruitment involved a brief explanation of the study's principal aims and an introduction to the questionnaire, including the estimated time required for its completion (3 minutes). The questionnaire was available in English, Spanish, and Vietnamese. The mother was asked to report the infant placement position or positions advised to her by nursery staff, the infant positioning observed among nursery staff, and the infant sleep position or positions she usually used. The mother also was asked about other factors associated with adherence to AAP "Back to Sleep" recommendations including her age, education level, race/ethnicity, marital status, and number of children (Brenner et al., 1998; Lesko et al., 1998; Willinger et al., 1998; Willinger et al., 2000).

**Results**

Hospital newborn nursery staff ( $n = 96$ ) completed the anonymous staff questionnaire. The average age of the responding nursery staff was  $40.3 \pm 9.8$  years ( $r = 22-61$ ). Additional demographic characteristics of the nursery staff surveyed are illustrated in Table 1. Approximately 55.6% of the nursery staff were of White non-Hispanic race/ethnicity, and the vast majority (89.0%) reported completion of at least a Bachelor's degree.

The results from nursery staff infant placement behavior and recommendation items are shown in Table 2. A large number of nursery staff ( $n = 65, 68.4%$ ) reported that they had most often placed infants on their side over the preceding month, and 65.3% of the nursery staff ( $n = 63$ ) reported advising new mothers to place infants on their "side" or their "side or back."

Nursery staff also were asked to state their motivations for infant sleeping position preference (Table 3). Most of the nursery staff (90.8%) who preferred the side sleeping position cited fear of aspiration in the supine position as

the reason for their preference. More than half (55%) of the nursery staff with a preference for supine infant placement cited personal knowledge of its benefits, and fewer than half (41%) cited nursery policy or instruction as a motivational factor. Most of the nursery staff (72%) correctly identified supine placement as the position associated with the lowest SIDS risk.

As shown in Table 4, 579 mothers of newborns completed an anonymous questionnaire. Table 5 shows the preferred infant sleep positioning choices of mothers, the recommendations they reported receiving from nursery staff, and their observations of nursery staff positioning behavior. Slightly more than half of the mothers (50.4%) reported placing infants on their side normally, whereas a small percentage (12%) reported "side or back" positioning. Many mothers (44%) reported not receiving a recommendation for infant placement from nursery staff. There were no statistically significant differences between mothers who received and those who did not receive an infant placement recommendation in terms of demographic or infant positioning characteristics. Of those who reported receiving a nursery staff recommendation for hospital infant placement, 56.5% described "side" or "side or back" as the advised infant positioning. Of the mothers who reported not receiving a hospital exclusive supine placement recommendation, a small number (13%) reported usually preferring the supine position, whereas most (75%) of those who received proper AAP recommendations reported usually placing their infant in the supine position, a statistically significant difference ( $p < .01$ ) (Table 6).

Overall, most mothers (63%) observed their infant placed in nonsupine positions by nursery staff. A small number of the mothers (19.6%) who reported observing nursery staff placing their infants in nonsupine positions reported usually using the supine position, whereas more than two thirds (66.3%) of those receiving supine recommendations reported preferring that position, a statistically significant difference ( $p < .01$ ).

The interaction of nursery staff recommendations and modeling in influencing the positioning choice of mothers is illustrated in Figure 1. Among those who both observed and received recommendations for exclusive supine infant placement, 80.2% reported usually placing their infants in the supine position, whereas among those who received exclusive supine placement recommendations but observed nonsupine infant placement by nursery staff, 60.5% reported preferring the supine position. Among those who received exclusive nonsupine recommendations but observed supine placement, 55.0% reported usually choosing supine infant positioning, whereas among those who received nonsupine exclusive recommendations and observed nonsupine sleep positioning, 7.3% reported preferring the supine position.

Mothers with previous children (31.4%) were less likely to report supine infant sleep positioning as their usual practice than those without previous children (45%) (Table 6). Mothers with previous children were less likely to report supine positioning as their usual practice after receiving a recommendation to do so (70.3% vs. 80.3%) or after receiving proper infant placement modeling

**TABLE 1. Demographic Characteristics of Nursery Staff (N = 96)<sup>a</sup>**

Demographic Characteristic	N	%
<b>Race/ethnicity</b>		
White, non-Hispanic	50	55.6
Hispanic	7	7.8
Black, non-Hispanic	1	1.1
Asian/Pacific Islander	30	33.3
Other	2	2.2
Missing	6	—
<b>Education</b>		
High school graduate	2	2.2
Some college	8	8.8
College graduate	79	86.8
Graduate school	2	2.2
Missing	5	—
<b>Nursing education</b>		
Licensed Vocational Nurse	5	5.6
Registered Nurse	58	65.2
Bachelor of Science in Nursing	23	25.8
Master of Science in Nursing	2	2.2
Certified Nursing Assistant	1	1.1
Missing	7	—
<b>Have children</b>		
Yes	73	81.1
No	17	18.9
Missing	6	—

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data.

**TABLE 2. Frequency and Percentage<sup>a</sup> of Self-Reported Nursery Staff Infant Sleeping Position Placement Practices and Recommendations (N = 95)**

Question	Prone		Side Only		Side or Supine		Supine Only		Total	
	n	%	n	%	n	%	n	%	N	%
Infant sleep position most often used	1	1.0	65	68.4	—	—	29	30.5	95	100
Infant sleep position most often advised to mothers	1	1.0	22	23.1	40	42.1	32	33.7	95	100

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data.

(61.0% vs. 74.1%) than those without previous children. Education level also appeared to influence infant placement choice (Table 6).

Table 7 shows the differences in the recommendations that mothers reported receiving from nursery staff according to the mothers' demographic characteristics. Latina and Asian Pacific Islander mothers were significantly less likely to receive exclusive supine infant placement recommendations from nursery staff in the hospital setting than White mothers ( $p < .01$ ). Asian Pacific Islander mothers also were significantly less likely than their White counterparts to have observed their infants placed for sleep in the supine position by nursery staff ( $p < .05$ ). All significant differences remained significant after stratification by education and language ( $p < .05$ ).

**Discussion**

Most hospital newborn nursery staff and mothers of newborns reported placing infants to sleep in nonsupine positions. The preponderance of nonsupine infant placement among nursery staff was reported by both staff themselves and mothers who had observed the placement of their newborn infants by such staff, a finding consistent with the finding of Hein and Petit (2001) among head nurses of newborn nurseries.

Fewer than half of the participants in the current study reported not receiving an infant placement recommendation from nursery staff, a figure similar to that found by Willinger et al. (2000) among hospital nurses and physicians. As with other research, the current study found statistically significant differences in the usual placement choice of new mothers depending on the type of nursery staff recommendations they had received (Colson et al., 2001; Willinger et al., 2000), and on the type of infant placement behavior modeled by nursery staff (Rose et al., 1998).

In the current study, mothers who both received exclusive supine positioning recommendations and observed nursery staff placing their infants exclusively in the supine position reported primarily using supine placement in their own infant positioning to a greater degree than those who received one but not the other. These findings are consistent with other research showing the importance of combining nursery staff recommendation with proper modeling in attempts to influence the infant sleep position choices of parents (Colson & Joslin, 2002).

Despite the fact that more than two thirds of nursery staff correctly identified supine placement as the preferred position for SIDS risk reduction, exclusive use and recommendation of the supine position was surprisingly low among nursery staff in the current study. One explanation

**TABLE 3. Frequency and Percentage<sup>a</sup> of Self-Reported Reasons for Infant Sleeping Position Preference Among Nursery Staff (N = 95)**

Response	Prone (n = 1)		Side (n = 65)		Supine (n = 29)	
	Frequency	%	Frequency	%	Frequency	%
Fear of aspiration	1	100.0	59	90.8	6	20.7
Personal knowledge	—	—	27	41.5	16	55.1
Verbal hospital or nursery policy	—	—	3	4.6	7	24.1
Written hospital or nursing policy	—	—	4	6.1	6	20.7
Physician instruction	—	—	2	3.1	1	3.4
Head nurse instruction	—	—	2	3.1	5	17.2

<sup>a</sup>Percentages do not add up to 100% because nursery staff could select more than one response.

**TABLE 4. Demographic Characteristics of Mothers of Newborn Infants (N = 579)<sup>a</sup>**

Demographic Characteristic	n	%
<b>Race/ethnicity</b>		
White, non-Hispanic	124	21.6
Hispanic	318	55.5
Black, non-Hispanic	6	1.0
Asian/Pacific Islander	120	20.9
Other	5	0.9
Missing	6	—
<b>Language of questionnaire</b>		
English	339	58.5
Spanish	180	31.1
Vietnamese	60	10.4
<b>Education</b>		
Less than high school	202	34.9
High school graduate or some college	248	42.8
College graduate or postgraduate education	127	21.9
Missing	2	—
<b>Mother's first child</b>		
Yes	219	37.8
No	356	61.5
Missing	4	—

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data.

leading staff to favor nonsupine positioning. As observed in other research, fear of aspiration was by far the primary motivation for nonsupine infant placement among nursery staff in the current study (Hein & Pettit, 2001; Willinger et al., 2000), despite a body of evidence suggesting that supine sleeping is not associated with respiratory symptoms, cyanosis, pallor, or aspiration among infants (Dwyer, Ponsonby, Couper, & Cochrane, 1999; Hunt, Fleming, & Golding, 1997).

Because of low AAP compliance and apparent misconceptions regarding infant placement positions among nursery staff, evidence-based educational interventions using scientific data to promote supine positioning should be implemented. These interventions should include information regarding the general benefits of supine infant sleep positioning and its safety with respect to aspiration. Also, to educate nursery staff on the full extent of the potential public health impact, results of past research on the efficacy of nursery staff health education campaigns in promoting AAP-consistent infant sleep position choices among parents (Colson & Joslin, 2002) should be disseminated.

In the current study, mothers of non-White race/ethnicity were less likely than mothers of White race/ethnicity to report receiving exclusive supine infant placement recommendations and to describe usually placing their infants in the supine position. There has been insufficient comparable study on infant sleep positioning instruction by nursery staff among mothers of minority race/ethnicity, but the existing research suggests that low-income ethnic minorities may be less likely to receive proper AAP recommendations from hospital personnel (Ray, Metcalf, Franco, & Mitchell, 1997). Studies on infant placement choice among Latinas and Asian Pacific Islander mothers are equivocal (Lesko et al., 1998; Willinger et al., 1998). The causes of racial/ethnic disparities in infant placement instruction observed in the current study are unknown. These disparities persisted when education and language of survey administration were held constant, suggesting that these factors may not account entirely for such differences.

is a lack of agreement with AAP recommendations observed among nursery staff in previous studies (Delzell et al., 2001; Peeke et al., 1999). This disagreement may be fueled by competing fears that supersede SIDS concerns,

**TABLE 5. Frequency and Percentage<sup>a</sup> of Self-Reported Infant Sleeping Position Placement Practices, Observations, and Recommendations Received Among Mothers of Newborn Infants (N = 579)**

Question to Mother	Prone <sup>b</sup>		Side Only		Side or Supine		Supine Only		Total	
	n	%	n	%	n	%	n	%	N	%
Preferred infant placement position	8	1.4	286	50.4	68	12.0	206	36.3	568	100
Infant placement position observed among nursery staff	4	0.7	267	48.5	76	13.8	204	36.9	551	100
Infant sleeping position recommended by nursery staff	0	0.0	127	40.1	52	16.4	138	43.5	317	100

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data. <sup>b</sup>Prone alone or in combination with another position.

**TABLE 6. Differences in the Usual Infant Placement Practice of Mothers According to Demographic and Positioning Characteristics (N = 579)<sup>a</sup>**

Characteristic of Mother	Usually Place Supine			
	n	%	$\chi^2$	p-value
Race/ethnicity <sup>b</sup>			21.7	< .01
White, non-Hispanic	66	53.7		
Hispanic	97	31.4		
Asian/Pacific Islander	35	29.4		
Received supine-exclusive recommendation from hospital staff			123.3	< .01
Yes	102	75.0		
No	23	13.0		
Observed nursery staff place infant supine			118.2	< .01
Yes	132	66.3		
No	67	19.6		
Education			25.2	< .01
Less than high school	48	24.4		
High school graduate or some college	93	38.3		
College graduate or postgraduate education	65	51.6		
Mother's first child			10.7	< .01
Yes	95	45.0		
No	111	31.4		

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data. <sup>b</sup>Race/ethnicity categories for African American and Other were excluded from analysis because of low numbers.

The current study had potential limitations. First, external validity may have been compromised by selection bias introduced with the use of convenience rather than randomized sampling methods. Only staff present in the nursery during researcher visits, from 10:00 a.m. to 8:00 p.m., were given the opportunity to participate. However, there is no reason to believe that nursery staff differed systematically in their infant placement behaviors and recommendations according to shifts worked. The current study did not measure the frequency with which mothers observed staff positioning, which possibly could have influenced study results. However, there is no reason to believe that nursery staff using nonsupine positioning would differ systematically from those using exclusive supine positioning in terms of the frequency with which mothers observed them, making any potential bias non-differential. The current study also failed to account for other potential sources of information that may influence parental infant placement choices, such as brochures, media campaigns, Internet resources, and friends and relatives. This study also relied on self-reported measures of placement behavior and recommendation, which made reporting bias possible if subjects provided idealized responses. Because individual newborn nurseries were

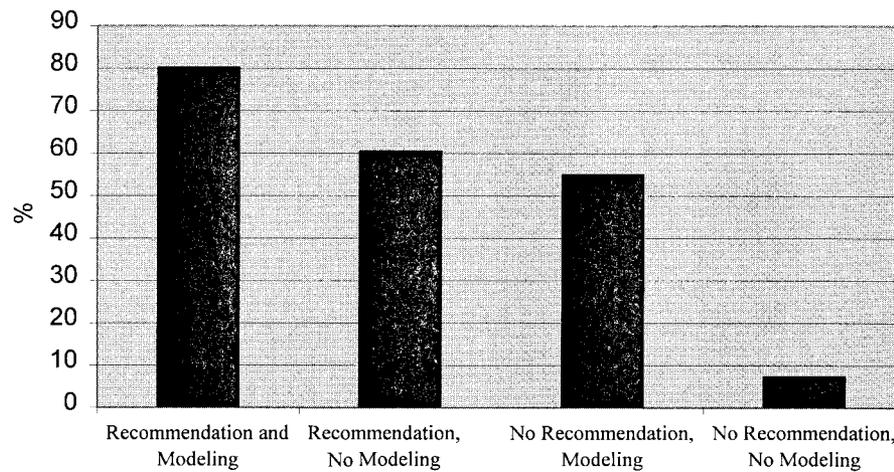
studied for as long as 1 month, the Hawthorne effect could have been introduced, with nursery staff changing behaviors or recommendations after knowing that they were being studied during this period. The effects of these latter two biases may have led to an overestimation of exclusive supine placement behaviors, but were likely lessened through the use of confidential surveys devoid of personal identifiers.

This study suggests that educating hospital newborn nursery staff to use supine infant sleep positioning exclusively and to recommend such exclusive supine placement to mothers may enhance a low prevalence of supine sleeping inside and outside the hospital setting by providing proper behavior modeling and infant placement education to new mothers. This training could emphasize scientific evidence supporting AAP recommendations, the safety of the supine position in terms of aspiration, the safety of the supine position in terms of SIDS, and the role that nursery personnel may play in promoting potentially lifesaving infant placement practices among parents. Finally, vigilance in communicating proper infant placement positioning to mothers of color as well as additional cultural competency and communication training among hospital nursery staff serving mothers of minority race/ethnicities is indicated.

**TABLE 7. Differences in Reception of Nursery Staff Supine-Exclusive Recommendation by Mothers According to Demographic and Positioning Characteristics (N = 579)<sup>a</sup>**

Characteristic of Mother	Received Supine-Exclusive Recommendation			
	n	%	$\chi^2$	p-value
Race/ethnicity <sup>b</sup>			32.4	< .01
White, non-Hispanic	49	71.0		
Hispanic	68	40.5		
Asian/Pacific Islander	17	24.3		
Language of questionnaire			25.4	< .01
English	104	54.2		
Spanish	29	31.9		
Vietnamese	5	14.7		
Observed infant placed supine			114.9	< .01
Yes	97	82.9		
No	39	20.4		
Education			16.8	< .01
Less than high school	29	27.6		
High school graduate or some college	69	51.9		
College graduate or postgraduate education	40	51.9		
Mother's first child			1.23	.27
Yes	48	40.0		
No	90	46.4		

<sup>a</sup>Percentages may not add up to 100% owing to rounding. Certain items may contain missing data. <sup>b</sup>Race/ethnicity categories for African American and Other were excluded from analysis because of low numbers.



**FIGURE 1.** Proportion of mothers who report usually placing their infant to sleep in the supine position among groups defined by the reception of supine exclusive recommendations and/or modeling from nursery staff.

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## References

- Adams, M. M., Kugener, B., Mirmiran, M., & Ariagno, R. L. (1998). Survey of sleeping position after hospital discharge in healthy preterm infants. *Journal of Perinatology*, 18(3), 168-172.
- Brenner, R. A., Simons-Morton, B. G., Bhaskar, B., Mehta, N., Melnick, V. L., Revenis, M., et al. (1998). Prevalence and predictors of the prone sleep position among inner-city infants. *Journal of the American Medical Association*, 280(4), 341-346.
- California Department of Health Services. (2000). *Live births by race/ethnicity, Orange County, 2000* [Data file]. Retrieved from the Center for Health Statistics, Vital Statistics Query System Web site: <http://www.applications.dhs.ca.gov/vsq/>
- Colson, E. R., Bergman, D. M., Shapiro, E., & Leventhal, J. H. (2001). Position for newborn sleep: Associations with parent's perceptions of their nursery experience. *Birth*, 28(4), 249-253.
- Colson, E. R., & Joslin, S. C. (2002). Changing nursery practice gets inner-city infants in the supine position for sleep. *Archives of Pediatric Adolescent Medicine*, 156(7), 717-720.
- Colson, E. R., Stille, C. J., Payton, J., Berstein, B., & Dworkin, P. (2000). Not yet "Back to Sleep": Sleep position for infants in two inner-city clinics. *Ambulatory Child Health*, 6(4), 269-275.
- Delzell, J. E., Jr., Phillips, R. L., Jr., Schnitzer, P. G., & Ewigman, B. (2001). Sleeping position: Change in practice, advice, and opinion in the newborn nursery. *Journal of Family Practice*, 50(5), 448.
- Dwyer, T., Ponsonby, A. L., Couper, D., & Cochrane, J. (1999). Short-term morbidity and infant mortality among infants who slept supine at 1 month of age: A follow-up report. *Paediatric and Perinatal Epidemiology*, 13(3), 302-315.
- Dwyer, T., Ponsonby, A. L., Newman, N. M., & Gibbons, L. E. (1991). Prospective cohort study of prone sleeping position and sudden infant death syndrome. *Lancet*, 337(8752), 1244-1247.
- Hein, H. A., & Pettit, S. F. (2001). Back to sleep: Good advice for parents but not for hospitals? *Pediatrics*, 107(3), 537-539.
- Hunt, L., Fleming, P., & Golding, J. (1997). Does the supine sleeping position have any adverse effects on the child? I. Health in the first six months. The ALSPAC Study Team. *Pediatrics*, 100(1), E11.
- Irgens, L. M. (1995). Risk factors for SIDS: Do they exist? In T. O. Rognum (Ed.), *Sudden infant death syndrome: New trends in the nineties* (pp. 99-105). Oslo, Norway: Scandinavian University Press.
- Lesko, S. M., Corwin, M. J., Vezina, R. M., Hunt, C. E., Mandell, F., McClain, M., et al. (1998). Changes in sleep position during infancy: A prospective longitudinal assessment. *Journal of the American Medical Association*, 280(4), 336-340.
- L'Hoir, M. P., Engelberts, A. C., van Well, G. T., McClelland, S., Westers, P., Dandachli, T., et al. (1998). Risk and preventive factors for cot death in The Netherlands, a low-incidence country. *European Journal of Pediatrics*, 157(8), 681-688.
- Markestad, T., Skadberg, B., Hordvik, E., Morild, I., & Irgens, L. M. (1995). Sleeping position and sudden infant death syndrome (SIDS): Effect of an intervention programme to avoid prone sleeping. *Acta Paediatrica*, 84(4), 375-378.
- Mitchell, E. A., & Scragg, R. (1994). Observations on ethnic differences in SIDS mortality in New Zealand. *Early Human Development*, 38(3), 151-157.
- Mitchell, E. A., Tuohy, P. G., Brunt, J. M., Thompson, J. M., Clements, M. S., Stewart, A. W., et al. (1997). Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: A prospective study. *Pediatrics*, 100(5), 835-840.
- Moon, R. Y., & Omron, R. (2002). Determinants of infant sleep position in an urban population. *Clinical Pediatrics (Philadelphia)*, 41(8), 569-573.
- Morgan, S. K., & Johnson, C. M. (2001). Infant sleep: Resident recommendations and socioeconomic status differences in patient practices. *Family Medicine*, 33(8), 614-620.
- Peeke, K., Hershberger, C. M., Kuehn, D., & Levett, J. (1999). Infant sleep position: Nursing practice and knowledge. *MCN: The American Journal of Maternal Child Nursing*, 24(6), 301-304.
- RAND California. (2002). *Total live births by city and facility, Orange County, 2000* [Data file]. Retrieved July 1, 2002 from RAND California Hospital Utilization Statistics Web site: <http://ca.rand.org/stats/health/hospitalutil.html>
- Ray, B. J., Metcalf S. C., Franco, S. M., & Mitchell, C. K. (1997). Infant sleep position instruction and parental practice: Comparison of a private pediatric office and an inner-city clinic. *Pediatrics*, 99(5), E12.
- Rose, M., Murphy, M., Macfarlane, J. A., Sefi, S., Shribman, S., & Hales, V. (1998). "Back to sleep": The position in Oxfordshire and Northampton. *Paediatric and Perinatal Epidemiology*, 12(2), 217-227.
- Scragg, R. K., & Mitchell, E. A. (1998). Side sleeping position and bed sharing in the sudden infant death syndrome. *Annals of Medicine*, 30(4), 345-349.
- Sullivan, F. M., & Barlow, S. M. (2001). Review of risk factors for sudden infant death syndrome. *Paediatric and Perinatal Epidemiology*, 15(2), 144-200.
- U.S. Census Bureau. (2000). Current Population Survey. Retrieved February 19, 2003, from the World Wide Web: <http://quickfacts.census.gov/qfd/states/06/06059.html>
- Wigfield, R., & Fleming, P. J. (1995). The prevalence of risk factors for SIDS: Impact of an intervention campaign. In T. O. Rognum (Ed.), *Sudden infant death syndrome: New trends in the nineties* (pp. 124-128). Oslo, Norway: Scandinavian University Press.
- Willinger, M., Hoffman, H. J., Wu, K. T., Hou, J. R., Kessler, R. C., Ward, S. L., et al. (1998). Factors associated with the transition to nonprone sleep positions of infants in the United States: The National Infant Sleep Position Study. *Journal of the American Medical Association*, 280(4), 329-335.
- Willinger, M., James, L. S., & Catz, C. (1991). Defining the sudden infant death syndrome (SIDS): Deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatric Pathology*, 11(5), 667-684.
- Willinger, M., Ko, C. W., Hoffman, H. J., Kessler, R. C., & Corwin, M. J. (2000). Factors associated with caregivers' choice of infant sleep position, 1994-1998: The National Infant Sleep Position Study. *Journal of the American Medical Association*, 283(16), 2135-2142.



## California Sudden Infant Death Syndrome Program

### Resources, Research and Articles

#### **SUID/SIDS Gateway Now Housed on the MCH Library**

SIDS/SUID materials are available on the MCH Library website. These materials on topics such as safe sleep, bereavement support, statistics, professional development, child care, first responders, and the 'What Works' page are now located at the new SUID/SIDS Gateway.

<http://www.mchlibrary.org/suid-sids/index.html>

#### **Join the Project IMPACT Listserv**

The Project IMPACT listserv is a communication tool to engage physicians, researchers, nurses, government workers and other SUID/IM stakeholders in discussions about infant mortality.

You can subscribe to the listserv by completing the subscription form linked to Project Impact webpage.

[http://www.suid-im-projectimpact.org/index.php?option=com\\_content&view=article&id=7&Itemid=36](http://www.suid-im-projectimpact.org/index.php?option=com_content&view=article&id=7&Itemid=36)

#### **Consumer Products Safety Commission (CPSC) Safety Rules for Play Yards**

Play yards (portable cribs) are sometimes used for infant sleep away from home or in a parent's room as an alternative to a full sized crib. For more information about the CPSC safety rules for play yards that went into effect in 2013.

<http://www.cpsc.gov/onsafety/2013/02/play-yards-new-safety-rule-to-take-effect/>

#### **United States Consumer Product Safety Commission, Crib Information Center**

New Federal Standards for crib safety as of June, 2011.

<http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/cribs/>

#### **Reduce the Risk of SIDS from Healthychildren.org**

American Academy of Pediatrics (AAP) Healthy Children.org is a pediatric health website that provides online advice and information for parents and caregivers. Here's a link to the webpage on reducing the risk of SIDS.

<http://www.healthychildren.org/English/ages-stages/baby/sleep/Pages/Preventing-SIDS.aspx>

#### **California Department of Public Health, Maternal Child and Adolescent Health, SIDS Webpage**

Find Information, Policies, Procedures, Data and Statistics and Resources about SIDS in

California from CDPH. <http://www.cdph.ca.gov/programs/SIDS/Pages/default.aspx>

#### **National Child Health and Human Development (NICHD) Safe to Sleep Campaign**

The Safe to Sleep<sup>®</sup> campaign has information and materials for many audiences, including parents, grandparents, and health care providers. Free educational materials are available.

<http://www.nichd.nih.gov/sts/Pages/default.aspx>

### **National Resource Center (NRC) for Health and Safety in Child Care and Early Education**

Best practices for health and safety in child care and early education programs is available from NRC The national health and safety standards in *Caring for Our Children 3<sup>rd</sup> edition* (AAP, APHA, NRC, 2011) can be accessed free of charge on the website. <http://nrckids.org/>

### **California Childcare Health Program (CCHP)**

User-friendly educational resources to help early care and education programs, trainers, Child Care Health Consultants, Child Care Health Advocates and the families they serve stay abreast of best practices for health and safety in California early care and education programs.

[www.ucsfchildcarehealth.org](http://www.ucsfchildcarehealth.org)

### **California Department of Social Services, Community Care Licensing, Child Care Licensing Website**

The Child Care Licensing Program licenses and monitors child care centers and family child care homes in an effort to ensure that they provide a safe and healthy environment for children in out-of-home care. <http://cclcd.ca.gov/PG411.htm>

### **National Center for Cultural Competence**

NCCC provides guidance and resources to increase the capacity of health care and mental health care programs to design, implement, and evaluate culturally and linguistically competent service delivery systems to address growing diversity, persistent disparities, and to promote health and mental health equity. <http://nccc.georgetown.edu>

### **National Center for Health Statistics**

Find data and statistics on topics of public health importance, including, diseases and conditions, injuries, life stages and populations, and health care and insurance.

<http://www.cdc.gov/nchs/>

### **California Smokers Helpline**

The California Smokers' Helpline is a telephone program to help smokers in California quit the habit. Helpline services are free. 1-800-NO-BUTTS.

<http://californiasmokershelpline.org/?3e3ea140>

### **Centers for Disease Control and Prevention**

The Centers for Disease Control and Prevention offers resources and information about reducing the risk of SIDS/SUID and the Sudden Unexpected Infant Death (SUID) Initiative. CDC and its partners have begun activities to improve the investigation and reporting practices of Sudden Infant Death Syndrome (SIDS) and other SUID. <http://www.cdc.gov/SIDS/index.htm>

### **National Center for Child Death Review**

The National Center for Child Death Review is a resource center for state and local CDR programs, funded by the Maternal and Child Health Bureau. It promotes, supports and enhances child death review methodology and activities at the state, community and national levels. <http://www.childdeathreview.org/>

### **California State Coroners Association (CSCA)**

CSCA is a non-profit organization founded in 1968 to represent the interests of all Coroner and Medical Examiner professionals throughout the state of California. <https://www.coroners.org/>

### **Grief Resources Catalog**

Grief Resources Catalog offers a wide variety of affordable booklets on grief and the grieving process. Booklets can be ordered by families. <https://griefresourcescatalog.com>

### **A Loving Goodbye: A Guide to Arranging Your Baby's Funeral**

An 18 page booklet with pictures and large print helping families make funeral choices for their baby. <http://californiasids.cdph.ca.gov/Universal/Bereavement%20Materials.html?p=36#1>  
Available in Spanish: <http://californiasids.cdph.ca.gov/UploadedFiles/Forms/LovGdbySp.pdf>

### **SIDS & Infant Death Survival Guide, by Joani Nelson Horchler & Robin Rice**

Now in its 4<sup>th</sup> edition, this book offers information and comfort to grieving family, friends and professionals. Available in English and Spanish, order online: <http://sidssurvivalguide.org/>

### **California Funeral Directors Association**

The purpose of the California Funeral Directors Association is to advocate and provide continuous professional development, and enhance the economic viability of member funeral service practitioners in order to provide services as desired by consumers. [www.cafda.org](http://www.cafda.org)

### **The Sudden Unexplained Death in Childhood Program (SUDC Program)**

SUDC is the sudden and unexpected death of a *child over the age of 12 months*, which remains unexplained after a thorough case investigation. This program is supported by the CJ Foundation to provide a centralized resource for information, support and advocacy serving families and professionals affected by SUDC. <http://www.sudc.org/Default.aspx>

## **Research Articles**

**The Physiological Determinants of Sudden Infant Death Syndrome (Garcia, Koschnitzky et al. 2013)** *Respir Physiol Neurobiol* 189(2): 288-300 Environmental and biological risk factors contribute to Sudden Infant Death Syndrome (SIDS). There is growing consensus that SIDS occurs at the intersection of multiple risk factors that result in the failure of an infant to overcome cardio-respiratory challenges. <http://www.ncbi.nlm.nih.gov/pubmed/23735486>

### **Sleep Environment Risks for Younger and Older Infants (Colvin, Collie-Akers et al. 2014)**

*Pediatrics* 134(2): e406-412. Risk factors for sleep-related infant deaths may be different for different age groups. The predominant risk factor for younger infants is bed-sharing, whereas rolling into objects in the sleep area is the predominant risk factor for older infants. Parents should be warned about the dangers of these specific risk factors appropriate to their infant's age.

**Infant Deaths and Injuries Associated with Wearable Blankets, Swaddle Wraps, and Swaddling (McDonnell and Moon 2014)** J Pediatr 164(5): 1152-1156.

Reports of sudden unexpected death in swaddled infants are rare. Risks can be reduced by placing infants supine and discontinuing swaddling as soon as an infant's earliest attempts to roll are observed. Risks can be further reduced by removing soft bedding and bumper pads from the sleep environment. When using commercial swaddle wraps, fasteners must be securely attached. <http://www.ncbi.nlm.nih.gov/pubmed/24507866>

**Classification System for the Sudden Unexpected Infant Death Case Registry and its Application (Shapiro-Mendoza, Camperlengo et al. 2014)** Pediatrics 134(1): e210-219. This report describes the classification system, including its definitions and decision-making algorithm, and applies the system to 436 US SUID cases that occurred in 2011 and were reported to the registry. These categories, although not replacing official cause-of-death determinations, allow local and state programs to track SUID subtypes, creating a valuable tool to identify gaps in investigation and inform SUID reduction strategies. <http://www.ncbi.nlm.nih.gov/pubmed/24913798>

**Risk Factor Changes for Sudden Infant Death Syndrome after Initiation of Back-to-Sleep Campaign (Trachtenberg, Haas et al. 2012)** Pediatrics 129(4): 630-638. Risk reduction campaigns emphasizing the importance of avoiding multiple and simultaneous SIDS risks are essential to prevent SIDS, including among infants who may already be vulnerable. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3356149/>

**Effect of Home Visiting by Nurses on Maternal and Child Mortality (Olds, Kitzman et al. 2014)** JAMA Pediatrics. Prenatal and infant/toddler home visitation by nurses is a promising means of reducing all-cause mortality among mothers and preventable-cause mortality in their first-born children living in highly disadvantaged settings. <http://www.ncbi.nlm.nih.gov/pubmed/17908740>

**Potential Asphyxia and Brainstem Abnormalities in Sudden and Unexpected Infant Deaths (Randall, Paterson et al. 2013)** Pediatrics 132(6): e1616-1625. Brainstem abnormalities were associated with both asphyxia-generating and non-asphyxia generating conditions. Heeding safe sleep messages is essential for all infants, especially given our current inability to detect underlying vulnerabilities. <http://www.ncbi.nlm.nih.gov/pubmed/24218471>

**Are Autopsies of Help to the Parents of SIDS Victims?**

**(Vennemann, Rentsch et al. 2006)** Int J Legal Med 120(6): 352-354. The majority (83%) of the participating parents found the autopsy helped them to cope better with the death. A large proportion (46%) did not want any professional help after the death, and 55% did not wish to have any contact with a self-help group. We conclude that the autopsy is helpful to the majority of bereaved parents.

Professional help and self-help groups should be offered to the parents even if the majority in our study did not want to use either. <http://www.ncbi.nlm.nih.gov/pubmed/16685560>

### **Sudden Infant Death Syndrome-Medical Progress (Kinney and Thach 2009)**

N Engl J Med 2009;361:795-805. Current evidence suggests that SIDS involves a convergence of stressors that probably results in the asphyxia of a vulnerable infant who has defective cardiorespiratory or arousal defense systems during a critical developmental period when immature defense mechanisms are not fully integrated. Thus, our current understanding of the pathogenesis of SIDS reflects the simultaneous juxtaposition of multiple events that, when taken individually, are far less powerful than the result of their chance combination. <http://www.nejm.org/doi/full/10.1056/NEJMra0803836>

### **Sudden Infant Death Syndrome (SIDS) and Child Care Centres**

**(Kiechl-Kohlendorfer and Moon 2008)** Sudden infant death syndrome (SIDS) and child care centres (CCC)." *Acta Paediatr* 97(7): 844-845. Efforts must continue to ensure safe sleeping practices in CC facilities. The possibility of other explanations for the increased prevalence of SIDS in CC settings, such as changes in infant care or stress, must be considered as well. <http://www.ncbi.nlm.nih.gov/pubmed/18462459>

### **Maternal Bedsharing Practices, Experiences, and Awareness of Risks**

**(Ateah and Hamelin 2008)** *J Obstet Gynecol Neonatal Nurs* 37(3): 274-281. Although the majority of participants agreed that bedsharing had risks for infants, almost three quarters of respondents reported bedsharing on a regular or an occasional basis. Reports by respondents of rolling onto or partway onto their infants support the conclusion that health care professionals should promote safe sleeping environments that include a separate sleep surface for infants. <http://www.ncbi.nlm.nih.gov/pubmed/18507598?dopt=AbstractPlus&tool=cdl&otool=cdlotool>

### **Infant Sleep Positioning by Nursery Staff and Mothers in Newborn Hospital Nurseries**

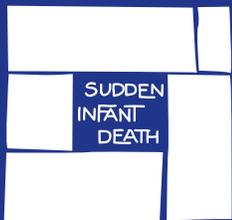
**(Stastny; Ichinose; Thayer; Olson; Keens, 2004)** *Nursing Research*, volume: 53, Issue 2, pages: 122-9 Exclusive supine infant placement appears to be underused by both nursery staff and mothers of newborn infants. Culturally grounded educational intervention with nursery staff regarding infant positioning and placement in the hospital setting is indicated.



# Section Eight

## **Miscellaneous Information**





# Responding to a Sudden, Unexpected Infant Death: The Professional's Role

## National Sudden Infant Death Syndrome/ Infant Death Resource Center

Parents and families who experience the sudden, unexpected, and unexplained death of an infant are faced with an enormous sense of loss, sorrow, and confusion. Immediately after the baby's death and in the weeks and months that follow, parents, other family members, and caregivers will interact with many health and social service professionals. Some of these individuals—police, fire, rescue squads, and emergency medical technicians—respond to the emergency call for help. Others—emergency room doctors and nurses, medical examiners, pathologists, and coroners—try to find out why the baby died. Still others—funeral directors, clergy, public health nurses, and bereavement counselors—are there to help the parents and other family members get through the sad and difficult days that follow the death of an infant. It is not surprising that at times, having to deal with these individuals can be quite overwhelming. This fact sheet provides a brief overview of the various professionals involved when a sudden infant death occurs, as well as their responsibilities and how these professionals can help.

### First on the Scene

When a parent or caregiver finds an unresponsive baby, he or she usually phones "911" for help. Most often, the first responder is a police officer, firefighter, or other emergency medical services personnel—sometimes all three. Whoever arrives first will examine the baby and may start cardiopulmonary resuscitation. They also examine the baby's surroundings and take notes that help in determining the cause of death. Bedding, potentially hazardous objects, medicines, formula, and other items may be collected. Depending on the community, the infant may be transported to the nearest hospital emergency department or remain at home until the medical examiner or coroner arrives.



## At the Hospital

When efforts to revive the infant are unsuccessful, emergency room staff (usually a doctor or nurse) is responsible for telling the parents and/or family members that the baby has died. Because the death is such a devastating event, nurses and/or special counselors at the hospital often provide emotional support and guidance.

## Autopsy

In many communities, the law requires an autopsy in cases of sudden and unexpected death. Although it may be emotionally difficult for parents, an autopsy may help answer questions

about what caused the baby's death. An autopsy is very important when a sudden infant death syndrome (SIDS) death is suspected because a final diagnosis cannot be made without a thorough postmortem examination.

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*Sudden Infant Death Syndrome is the sudden death of an infant under 1 year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history (Willinger et al., 1991).*

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Some ethnic and religious groups forbid autopsies. In these situations, the family may wish to talk with their clergy, spiritual leader, or a mental health counselor. These individuals may be able to help the parents and other family members reconcile the need for an autopsy with their cultural beliefs, values, and practices.

In most cases of sudden, unexpected infant death, the cause and manner of death are determined by the medical examiner or coroner for the county, district, or State where the death occurred. The autopsy is conducted or supervised by a specialist (pathologist) who reviews the medical aspects of the death. If possible, parents are notified of the preliminary autopsy results within 24 to 48 hours of the death. Once the autopsy report is available, the doctor should explain the results of the autopsy to the family, often reassuring them that the baby's death could not have been predicted.

## Death Scene Investigation

Staff from the medical examiner/coroner's office or law enforcement agency will collect information about the location and circumstances at the time of the infant's death. The investigator will try to learn as much as

possible about the events leading up to the death—even at the very moment the death occurred. The investigator will interview individuals who were caring for the baby. Some typical questions that are asked include, "What time was the baby put to bed?" "Had the baby been ill recently?" "When did the baby fall asleep?" "Were the covers over the baby's head?"

Answers to these questions will help investigators find out what happened when the baby died, hopefully shedding light on the cause of death. It is very important to remember that the investigator is not trying to blame anyone for the baby's death, but is simply trying to determine how the baby died.

## The Days Ahead

Sudden, unexpected death—especially the sudden, unexpected death of an infant—strikes at the heart of everyone's sense of order and security. The grief and

### Coroner

A coroner is an appointed or elected public official in a particular community, county, or region. The coroner is responsible for making inquiries into certain types of deaths but does not have to be a physician. The coroner verifies the cause of death and may employ physicians, pathologists, or forensic pathologists to perform autopsies.

### Medical Examiner

A medical examiner is the physician responsible for the investigation and examination of victims whose deaths are sudden, unexpected, or violent. The medical examiner is expected to use his or her medical training and expertise to evaluate the medical history, circumstances of the death, and autopsy examination.

### Pathologist

A pathologist is a physician specially trained in diagnosing disease and determining the cause of death by laboratory examination of body fluids, cell samples, and tissues. Usually, the pathologist (or forensic pathologist) conducts the autopsy.

### Forensic Pathologist

A forensic pathologist examines victims whose deaths are sudden, unexpected, or violent. The forensic pathologist is an expert in determining cause and manner of death.

sorrow felt by the parents, other family members, friends, and other caregivers are normal responses to the death. It can take a long time for the family to regain the desire and energy to move on.

Some communities have responded to these challenges by developing an outreach program for families whose baby has died suddenly and unexpectedly. These programs provide professional case management, counseling, referral, and support services. In some locales, a community health nurse, social worker, or trained community outreach worker visits the family in their home. In some States, the program works with the medical examiner or coroner, contacting the family immediately after the death. Families can contact their local health department about these types of services in their community.

During the grieving process, a mental health professional (psychiatrist, social worker, psychologist, or grief counselor) can help the parents and family express feelings that need to be released. These professionals can answer questions and help parents cope with the changes in their lives caused by the loss of their child. Some families may seek the help of their clergy, specially trained pastoral counselors, or other spiritual guidance.

## **For More Information, Please Contact**

**National SIDS/Infant Death Resource Center (NSIDRC)**  
2070 Chain Bridge Road  
Suite 450  
Vienna, VA 22182  
Phone: (866) 866-7437  
Phone: (703) 821-8955 (local)  
Fax: (703) 821-2098  
Email: [sids@circlesolutions.com](mailto:sids@circlesolutions.com)  
[www.sidscenter.org](http://www.sidscenter.org)

## **Other Resources**

**American Board of Medicolegal Death Investigators**  
Room 512  
1402 South Grand Boulevard  
St. Louis, MO 63104  
Phone: (314) 268-5970  
Fax: (314) 268-5695  
<http://www.slu.edu/organizations/abmdi>

## **Association of SIDS and Infant Mortality Programs (ASIP)**

c/o New York Center for SIDS  
School of Social Welfare, Stony Brook University  
Stony Brook, NY 11794-8232  
Phone: (631) 444-3690  
Fax: (631) 444-6475  
<http://www.ASIP1.org>

## **The Compassionate Friends**

PO Box 3696  
Oak Brook, IL 60522-3696  
Phone: (877) 969-0010  
<http://www.compassionatefriends.org>

## **First Candle/SIDS Alliance**

Suite 210  
1314 Bedford Avenue  
Baltimore, MD 21208  
Phone: (800) 221-7437  
[www.sidsalliance.org](http://www.sidsalliance.org)

## **MISS: Mothers in Sympathy and Support**

PO Box 5333  
Peoria, AZ 85385-5333  
<http://www.misschildren.org>

## **National Association of Emergency Medical Technicians**

PO Box 1400  
Clinton, MS 39060-1400  
Phone: (800) 34-NAEMT  
<http://www.naemt.org/>

## **National Association of Medical Examiners**

430 Pryor Street SW  
Atlanta, GA 30312  
Phone: (404) 730-4781  
Fax: (404) 730-4420  
<http://www.thename.org/>

## **National Funeral Directors Association**

13625 Bishop's Drive  
Brookfield, WI 53005  
Phone: (800) 228-6332  
<http://www.nfda.org/>

**National SIDS & Infant Death Program Support Center  
(NSIDPSC)**

Suite 210  
1314 Bedford Avenue  
Baltimore, MD 21208  
Phone: (800) 638-7437  
Fax: (410) 415-5093  
www.sids-id-psc.org

**National Fetal and Infant Mortality Review Program  
(NFIMR)**

PO Box 96920  
Washington, DC 20090-6920  
Phone: (202) 863-2587  
Fax: (202) 484-3917  
www.acog.org/goto/nfimr

**SHARE Pregnancy and Infant Loss Support, Inc  
National Share Office**

St. Joseph Health Center  
300 First Capitol Drive  
St. Charles, MO 63301-2893  
Phone: (800) 821-6819  
Fax: (636) 947-7486  
Email: share@nationalshareoffice.com  
www.nationalshareoffice.com

**References**

Association of SIDS and Infant Mortality Programs. (2001). *The Unexpected Death of an Infant or Child: Standards for Services to Families*. Minneapolis, MN: Association of SIDS and Infant Mortality Programs.

Arnold J, McClain ME, Shaefer SJM. (1997). "Reaching Out to the Family of a SIDS Baby." In: Woods, JR and Woods, J.L.E. (Eds), *Loss During Pregnancy or the Newborn Period*. Pitman, NJ: Jannetti Publications, Inc.

Centers for Disease Control and Prevention. "Guidelines for Death Scene Investigation of Sudden, Unexplained Infant Deaths: Recommendations of the Interagency Panel on Sudden Infant Death Syndrome." *Morbidity and Mortality Weekly Report*, 1996; 45 (No. RR-10).

Horchler J. (1994). *The SIDS Survival Guide: Information and Comfort for the Grieving Family and Friends & Professionals Who Seek to Help Them*. Hyattsville, MD: SIDS Educational Services.

National Association of Medical Examiners. "So, You Want to be a Medical Detective?" [http://www.thename.org/medical\\_detective.htm](http://www.thename.org/medical_detective.htm).

National Institute of Child Health and Human Development. (June 2001). *Targeting Sudden Infant Death Syndrome (SIDS): A Strategic Plan*. Rockville, MD: U.S. Department of Health and Human Services, National Institutes of Health.

Valdes-Dapena, M. "The Postmortem Examination." *Pediatric Annals*, July 1995; 24(7): 365-372.

Willinger M, James LS, and Catz, C. "Defining the Sudden Infant Death Syndrome (SIDS): Deliberations of an Expert Panel Convened by the National Institute of Child Health and Human Development." *Pediatric Pathology*, September-October 1991; 11(5): 677-84.

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# *The Death of a Child*

## THE GRIEF OF THE PARENTS: A LIFETIME JOURNEY

There is no more devastating loss than the death of a child. Losing a child is a disruption in the natural law and order of life. It is heartbreak like no other. Parental grief is different from other grief—it lasts longer and is more intense. Yet, for most grieving parents, the hope and desire that healing will come eventually persists.

“Children are not supposed to die. . . . Parents expect to see their children grow and mature. Ultimately, parents expect to die and leave their children behind. . . . This is the natural course of life events, the life cycle continuing as it should. The loss of a child is the loss of innocence, the death of the most vulnerable and dependent. The death of a child signifies the loss of the future, of hopes and dreams, of new strength, and of perfection.”<sup>1</sup>

Parents who lose a child seek ways to continue to love, honor, and value the life of that child and to make the child’s presence known and felt in the lives of family and friends. Bereaved parents often try to live their lives more fully and generously because of this painful experience.

### COMMON AND UNIQUE CHARACTERISTICS OF PARENTAL GRIEF

Bereavement specialists point to the shared characteristics of parental grief, which may include an overwhelming feeling that the pain will last forever. Two normal responses commonly experienced by bereaved parents are a baffling sense of disorientation and a deep conviction that they must never let go of their grief.

Grief may be experienced physically, emotionally, and socially. Many parents have difficulties with eating, sleeping, and exhaustion; many feel overwhelmed, off-balance, and depressed; and many feel lonely, abandoned, or isolated. These feelings, too, are normal.

As our understanding of grief has evolved, we have learned that bereaved parents express their grief in ways that are individual and unique—there are no set phases or stages, no rules, no timetable.

*Grief is a binding experience; its universality binds sufferers together. More is shared than is different.*<sup>2</sup>

Grieving, like healing, is a journey. Parents need to know that there are many paths they can follow. Grieving parents respond differently, learn to live with their grief separately, and express their sadness uniquely. Individual responses are influenced by many factors, including life experiences, coping skills, personality, age, gender, family and cultural background, support and/or belief systems, and even the type of death that occurred.

## UNDERSTANDING THE GRIEF PROCESS

One approach that may be helpful in understanding the grief process is to visualize it not as a succession of phases over which one has little or no control but as a fluid process, a series of “tasks” that can be revisited and reworked over time.<sup>3,4</sup>

*Accepting the reality of the child's death:* At first, parents usually experience a sense of disbelief or denial. After a child's death, grieving parents might say, “I can't believe this is happening to us,” or “how could my baby be dead? He seemed fine when I put him to bed.” The parents' first “task,” then, is to accept the reality that the child has died.

*Experiencing the pain of grief:* Initially, shock may numb the pain of loss. Parents may not experience the full range of feelings—which may include anger, fear, or guilt—until after they have accepted their loss and are trying to resume their daily lives. Experiencing these feelings is the next task. Unfortunately, around this time, parents generally stop receiving comforting calls and notes from friends and are expected to return to usual productivity at work or at home. Such a sudden absence of attention and increased (often unrealistic) expectations from others may lead parents to feel isolated and to suppress or avoid their pain.

*Adjusting to everyday life without the child:* Caring for a child takes an amazing amount of time and energy. Parents and other caregivers who were consumed with meeting their child's needs or preparing for their child's birth are suddenly faced with inactivity. Where once there was responsibility, now there is emptiness.

As the pain of grief is released and begins to subside, parents tackle the next task: finding ways to adapt to the changes in their lives. During this adaptation period, parents can work to prevent a sense of helplessness by gradually re-forming schedules and responsibilities. Creating meaningful rituals or keeping a journal or writing poetry may help.

*Moving on with life while staying connected with the child:* Grieving parents sometimes believe that if they let go of the emotional attachment to mourning their loss, they are somehow dishonoring the memory of their child. For many, the task of re-engaging is the most difficult. They may get “stuck” at this point and later realize that their life in some way stopped at the point of loss.

Some bereavement experts note that the parents' grieving process includes not only adapting to the loss and returning to functioning in their lives but also changing their relationship with their deceased child. “The task for bereaved parents is to evolve some ongoing relationship with the thoughts and memories that they associate with their child, but to do this in a way that would allow them to continue with their lives after such a loss.”<sup>5</sup>

## SIDS AND OTHER SUDDEN UNEXPECTED INFANT DEATHS

The sudden and unexpected death of a baby causes unique and profound grief and raises painful emotional issues for the parents and family as well as for those who love, care for, and counsel them. Parents must deal with a death so abrupt that it leaves no time to prepare or to say good-bye. Parents whose baby dies suddenly and unexpectedly are often plagued by “if only’s” that can never be resolved. They replay thoughts such as, “if only I hadn’t put my baby down for a nap when I did,” or “if only I had checked on the baby sooner,” or “if only I had not returned to work so soon.” If the death occurs in a child care setting, the parents may experience overwhelming guilt or anger, feeling that their baby might still be alive if they had been caring for the baby at home.

Feelings of shock and grief are compounded as parents struggle to cope with a loss for which there are more questions than answers. “Why did this happen?” “Is there anything I could have done to prevent my baby’s death?” “Can it happen again?”

*Need for Reliable Information.* Each year in the United States, about 4,500 babies die suddenly and unexpectedly. About half of these deaths are diagnosed as sudden infant death syndrome (SIDS), the sudden unexplained death of a baby younger than age 1. Many other infant deaths have been diagnosed as SUID—the sudden death of an infant under 1 year of age that when first discovered did not have an obvious cause. These include deaths that are later determined to be from explained (e.g., metabolic disorders; accidental suffocation) as well as unexplained causes. An infant or early childhood death forces adults to think about their own vulnerability, but a SIDS death also brings with it mystery and a frightening loss of control. The chaos surrounding a SIDS death leaves most parents feeling that nothing is predictable; the death throws everything off balance.

Grieving parents need reliable information as well as emotional support. In many sudden infant deaths, the autopsy findings may help to answer questions. Many parents are anxious to consult with the pathologist, who should explain the findings in language the parents can understand and take time to answer their questions.<sup>6</sup> But, frequently, the findings cannot provide parents with the information they seek. Parents whose baby dies as a result of SIDS are often denied the sense of closure that comes from knowing the exact cause of their baby’s death. Discussing the autopsy findings can help them begin to accept the death.

The sudden unexpected death of a baby often occurs in the home, where parents and sometimes their children witness a terrible tragedy and possibly scenes of intense confusion. If the parents themselves find their baby lifeless, they will always live with that memory. Parents and others feel helpless in trying to explain the unexplainable to children who may have been present at the time of the baby’s death.

*Showing Support.* When a baby dies, parents want their child’s brief life to matter not only to them, but to others. “All too frequently, the sudden unexpected death of a baby is not socially validated in the same way other deaths are.”<sup>7</sup>

Family members and friends can play a valuable role in sharing their concern and in helping parents honor their baby’s memory. Most parents feel reassured when friends and family members mention special things they noticed about the baby or remember the baby’s birthday or the anniversary of the death. By extending these sensitive gestures, loving and concerned relatives, friends, and caregivers can be a source of reassurance and comfort for grieving parents.



## WAYS TO COMFORT A GRIEVING PARENT

Bereaved parents need to know that their child will be remembered, not just by them but also by family and friends. They need to have the child acknowledged and referred to by name. There are many ways to honor parents and the child:

- Acknowledge the child's death by telling the parent(s) about your sadness.
- Allow the parent(s) to express feelings without imposing your views or feelings about what is appropriate.
- Avoid telling the parent(s) you know just how they feel.
- Allow the parent(s) to cry—it is appropriate to cry with them.
- Visit and talk with the parent(s) about the child who died; ask to see pictures or mementos the family may have.
- Refer to the child by name.
- Extend gestures of concern such as bringing flowers or writing a personal note expressing your feelings and support.
- Attend the child's funeral or memorial service.
- Offer to go with the parent(s) to the cemetery in the days and weeks after the funeral.
- Remember anniversaries and special days.
- Donate to a specific memorial in honor of the child.
- Provide practical help, such as offering to stop by at a convenient time, bringing a meal, purchasing a comforting book, offering to take the other children for a special outing, or treating the parent(s) to something special.
- Respect the dynamics of each person's grief. Grief is an ongoing and demanding process.
- Keep in mind that the parent(s) may not be able to ask for help or tell you what they need.

## FATHERS AND GRIEF

Mothers and fathers grieve differently. Traditionally, fathers are expected to be strong and to carry on. They are usually expected to attend to the practical but not the emotional aspects of their child's death. Fathers tend to feel that they must handle all the decisions at this time, but these decisions can have lasting effects on the family, so it is important for parents to make them together.

Each father grieves in his own way. Some may express their emotions openly; others may process their feelings internally. Each father must be allowed to process his grief in a way that is natural for him. Fathers often fear that if they release their emotions, they will erupt like volcanoes; for many men, anger is the predominant emotional reaction to the death of their child. Ignoring, denying, or running from anger and other intense feelings will not make them go away. Channeling the energy of overwhelming emotions through physical activity or other healthy activities can help ease the tension.

The loss of a child can also place tremendous stress on parents' relationship with each other. Grieving parents often feel alone, disconnected, and alienated. Parents can try to reach across the emptiness by asking how their partner is doing and by listening. It's helpful to set aside time every day to talk, share closeness and comfort, and express needs and feelings when partners are ready. This becomes even more important as parents return to work. If possible, parents should avoid becoming overly busy or exhausted with too many commitments; "grief work" is real work, and it takes time and energy.<sup>8</sup>

## FAMILIES THAT NEED ADDITIONAL SUPPORT

The tragedy of a child's death brings profound pain and can present difficult problems for grieving parents. For some, the effects of such a devastating tragedy can become even more intense when the family is already experiencing stresses such as economic difficulties, substance abuse, or domestic problems. A number of factors may interfere with the grief process. These include avoiding or suppressing emotions, overactivity leading to exhaustion, use of alcohol or other drugs, unrealistic promises made to the child who has died, unresolved grief from a previous loss, judgmental relationships, and resentment toward those who try to help.

Family structures and relationships are diverse; some parents have no extended family or community supports. Single or divorced parents, teen parents, gay and lesbian parents, and those living away from family or community may need support networks.

Each family's unique needs, beliefs, and preferences should be honored during the bereavement process. Additional supports for families include grief counseling via telephone help lines, grief support groups and organizations, faith-based bereavement support, state and local health departments, and an array of print and online resources. (See the link to the list of resources at the end of this publication.)

## WAYS PARENTS CAN HELP THEMSELVES HEAL

- Admit to yourself and others that your grief is overwhelming and exhausting and should not be diminished or ignored.
- Allow yourself to be angry, and recognize that you are vulnerable and disoriented.
- Begin to understand that to grieve is to heal and that integrating grief into your life is necessary.
- Acknowledge the need and desire to talk about your child who died, as well as about moments and events that will never be experienced.
- Honor the significance of your child's life, no matter how brief.
- Create memorial services and other rituals to commemorate your child's life.
- Draw strength and support from your spiritual beliefs or faith community.
- Express your feelings in journals, poetry, prayers, or reflective writings or through other creative activities such as art or music.
- Try to be patient and forgiving with yourself and others; avoid making hasty decisions.
- Trust and confide in those who care.
- Get more physical activity and eat healthy foods.
- Volunteer your services to organizations that support bereaved parents.
- Obtain help from traditional support systems such as family, friends, professionals or faith-based groups; join a parent support group; seek professional counseling if needed; or learn more about death and the grieving process.
- Recognize that you were, and still are, a loving parent.
- Let go of fear and guilt when the time seems right and the grief seems less.
- Give yourself permission to feel pleasure and continue with your life, knowing that your love for your child transcends death.

## COMPLICATED GRIEF

During the months immediately following a loss, the symptoms of normal grief are the same as those of complicated grief. Many newly bereaved parents feel that life without their child has lost its meaning and is not worth living. But, while normal grief begins to ease after a while, in complicated grief the symptoms remain or become more severe. After several months, if a parent still has problems accepting the reality of the child's death, cannot return to everyday functioning, feels detached or socially withdrawn, or feels that life has no purpose, these may be signs of complicated grief.<sup>9</sup> The intense and prolonged grief surrounding a child's death is unique in its challenges and may require attention from a trained grief counselor, family physician, mental health professional, or member of the clergy.

## FROM ONE BEREAVED PARENT TO ANOTHER

All newly bereaved parents must find ways to get through, not over, their grief—to go on with their lives. First Candle<sup>10</sup> offers the following suggestions to help grieving parents make it through difficult times:

- *Take care of yourself.* Eat well. Get plenty of rest.
- *Express yourself in a way that fits who you are.* Talk about your baby, your feelings, your fears, your grief. Keep a diary, write a journal, create a flower garden or another special project.
- *Explore available resources.* There are many books, articles, poems, videos, and websites that provide information, guidance, and support.
- *Build a support network.* This network may be your family, your friends, or your faith community. You may want to contact a support group for parents who have experienced a similar loss.
- *Try to be understanding of your partner's needs.* There may be times when it is difficult to comfort each other. Being sensitive to your partner's needs and finding others you can lean on during difficult times can help.

## JOURNEY TOWARD HEALING

Eventually, time ceases to stand still for grieving parents. Painful moments still occur—striking, poignant, but in some ways comforting reminders of the child who died. At some point, parents realize that there can be happy and beautiful moments, and it does not seem impossible or wrong to smile or laugh. One day, bereaved parents may come to be “surprised by joy.”<sup>11</sup>

When are parents ready to live again? There is no list of events or anniversaries to check off. In fact, parents are likely to begin living again before they realize they are doing it. They may catch themselves laughing. They may pick up a book to read for pleasure. They may start playing happier music. When they do make these steps forward, they are likely to feel guilty at first. And yet, they will feel as though they are being nudged in this positive direction. They may even have the sense that this nudge is from their child.<sup>12</sup>

## RESOURCES

For additional resources on bereavement, see the following:

- Bereavement support resource brief (<http://www.sidscenter.org/Bereavement/index.html>)
- *Helping Babies, Healing Families Program Manual*, bereavement support resources ([http://programmanual.info/chapter3/resources3\\_0.html](http://programmanual.info/chapter3/resources3_0.html))
- First Candle's bereavement hotline available 24 hours, 7 days a week: (800) 221-7437 (<http://www.firstcandle.org>)

## REFERENCES

1. Arnold JH, Gemma PB. 1994. *A Child Dies: A Portrait of Family Grief* (2nd ed., pp. iv, 9, 39). Philadelphia, PA: The Charles Press, Publishers.
2. Arnold JH, Gemma PB. 1991. In Corr CA, Fuller H, Barnickol CA, Corr DM, eds. *Sudden Infant Death Syndrome: Who Can Help and How* (p. 55). New York: Springer Publishing Company, Inc.
3. Worden JW. 2009. *Grief Counseling and Grief Therapy: A Handbook for the Mental Health Practitioner* (4th ed.). New York: Springer Publishing Company.
4. California SIDS Program. The Tasks of Grieving [under Crisis Support/Parents], available online at <http://www.californiasids.com/Universal/MainPage.cfm?p=34>; accessed September 30, 2010.
5. Worden JW. 2009. *Grief Counseling and Grief Therapy: A Handbook for the Mental Health Practitioner* (4th ed.). New York: Springer Publishing Company.
6. Valdes-Dapena M. July 1995. The Postmortem Examination. *Pediatric Annals* 24(7):365-372.
7. Rando TA, ed. 1986. *Parental Loss of a Child* (p. 167). Champaign, IL: Research Press Company.
8. First Candle. 2009. *Surviving Stillbirth for Fathers* [brochure]. Baltimore, MD: First Candle.
9. Mayo Clinic. Complicated Grief. Available online at <http://www.mayoclinic.com/health/complicated-grief/DS01023>; accessed September 21, 2010.
10. First Candle. 2009. Coping with Grief [fact sheet]. Available online at <http://www.firstcandle.org/grieving-families/sids-suid/coping-with-grief/>; accessed November 18, 2010.
11. Moffat M, ed. 1992. *In the Midst of Winter: Selections from the Literature of Mourning* (p. xxvii). New York: Random House.
12. Horchler JN, Morris RR. 1994. *The SIDS Survival Guide: Information and Comfort for Grieving Family and Friends and Professionals Who Seek to Help Them*. Hyattsville, MD: SIDS Educational Services.

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The federal Maternal and Child Health Bureau supports a consortium of four national centers that address issues surrounding sudden unexpected infant/child death and pregnancy loss:

- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Resource Center (<http://www.sidscenter.org>)
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Program Support Center (<http://www.firstcandle.org>)
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss – Project IMPACT (<http://www.suid-im-projectimpact.org>)
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Project at the National Center for Cultural Competence (<http://nccc.georgetown.edu/projects/sids/index.html>)

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# *The Grieving Child*

## HELPING CHILDREN COPE WHEN AN INFANT DIES

*“If a child is old enough to love, he or she is old enough to grieve.”*

—Linda Goldman, *Life & Loss*

Our lives consist of beginnings and endings. Many of them we share with our children: the beginning of a summer vacation and returning home, sunrise followed by sunset. Because death is a part of life, this, too, must be shared with our children. While our cultures or religions have different views about what happens after death, we all share an understanding that our bodies do not last forever. We can help our children accept the loss of a life by providing a clear explanation of death, combined with age-appropriate support, as they cope with the loss of a baby brother, sister, or other cherished infant.

Explaining the death of an infant sibling or loved one can be a difficult, sensitive, and painful process, especially when parents are also grieving. Because some adults have problems dealing with the reality of death themselves, they may find it difficult to explain death to a child. Children grieve the death and react to the emotions in the household, but they need reassurance that they are not to blame. The best approach is to be truthful. Answer any questions about the cause of death honestly, even if it means saying “I don’t know.” Be honest in your talks and use simple language that children can understand.

### SUDDEN UNEXPECTED INFANT DEATH

When a baby dies suddenly, there is often a great sadness, and every family member experiences the death and walks the path toward grief recovery in a different way. Children who are too young for complete explanations need love from their parents to feel secure.

Some young children may be frightened. They may cling to parents and develop behavior problems. Others may feel responsible and need assurance that they did nothing to cause the death.

Whether the loss is due to Sudden Unexpected Infant Death (SUID) (where the cause is eventually determined) or to Sudden Infant Death Syndrome (SIDS) (where the cause of death cannot be explained even after a thorough investigation), children need reassurance that this sometimes happens and that *they* will not suddenly die, too.

### *Helping Children Cope*

Talk to children about death using language they can understand.

Answer children’s questions honestly.

Allow children to express their feelings, and let them know there is no “right” or “wrong” way to feel.

Be willing to talk about the loss many times and in different ways.

Reassure children that the death was not their fault and that this will not happen to them.

Be comforting, provide attention, and show affection.

## WHAT TO EXPECT & HOW TO HELP



AGE	CHILD'S OR TEEN'S REACTIONS	HOW TO HELP
Birth to age 3	<ul style="list-style-type: none"> <li>• Affected most by the mood of their caregiver.</li> <li>• You may see changes in sleeping and eating patterns and mood.</li> <li>• Older infants and toddlers may demand more attention.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain routines and stay in familiar places.</li> <li>• Provide love, attention and reassurance.</li> <li>• Provide a caring substitute if parent is too distraught to respond.</li> </ul>
Ages 3 to 6	<ul style="list-style-type: none"> <li>• Does not understand that death is permanent.</li> <li>• Fears the dead person is cold or hungry.</li> <li>• Repeats questions, and fears that others and/or self will die.</li> <li>• Afraid to go to sleep; may have bad dreams.</li> <li>• May play-act events around the death.</li> <li>• May revert to earlier behaviors and/or exhibit physical symptoms.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain routines; provide affection and attention.</li> <li>• Answer questions as often as child asks.</li> <li>• Look into child's eyes; gently hold the child when speaking of death.</li> <li>• Allow expression of feelings—re-enacting events, drawing, reading.</li> <li>• Avoid words like <i>sleeping, resting, lost, passed away, God took him.</i></li> <li>• Use concrete terms like <i>the baby died, the baby isn't coming back, the baby doesn't eat or grow.</i></li> </ul>
Ages 6 to 9	<ul style="list-style-type: none"> <li>• Views death as mysterious—takes baby away or caught like a cold.</li> <li>• Some still think death is not permanent.</li> <li>• May be obsessed with cause of death, what happens to the body.</li> <li>• May feel responsible due to past actions, words, wishing sibling dead.</li> <li>• May be distressed, sad, or show no signs.</li> <li>• Fears loss or abandonment by family members.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain routines.</li> <li>• If leaving, tell child when you will return and how to reach you.</li> <li>• Listen to child express thoughts and feelings; provide a journal.</li> <li>• Answer questions honestly.</li> <li>• Reassure that the death was not child's fault.</li> <li>• Contact child's teachers.</li> </ul>
Ages 9 to 12	<ul style="list-style-type: none"> <li>• Understands that death is permanent.</li> <li>• May seem unaffected by death.</li> <li>• May see the death as punishment for bad deeds.</li> <li>• May show anger, guilt, grief.</li> <li>• Physical symptoms are common.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide time and affection.</li> <li>• Encourage child to express feelings.</li> <li>• Reassure that death was not child's fault.</li> <li>• Be honest about what you are feeling.</li> <li>• Contact child's teachers.</li> </ul>
Teens	<ul style="list-style-type: none"> <li>• May feel confused, sad, guilt, angry, lonely, afraid.</li> <li>• May experience physical symptoms.</li> <li>• May try to hide feelings to protect parents.</li> <li>• May assume responsibility for family well-being.</li> </ul>	<ul style="list-style-type: none"> <li>• Talk without criticizing or judging.</li> <li>• Be willing to talk in the teen's time frame.</li> <li>• Be honest about your feelings.</li> <li>• Allow the teen time alone and to grieve in his or her own way.</li> <li>• Discourage teen from assuming too much responsibility.</li> </ul>

Adapted with permission from The California Department of Public Health, Maternal, Child, and Adolescent Health Division and The California SIDS Program. 2005. *A Practical Guide to the SIDS Home Visit. How Children React to Death: Age-Specific Reactions and Help Guidelines* (Section 2, Table 10, pp. 20–21).

## SEEKING SUPPORT SERVICES

Each child reacts to the death of an infant in a different way. In the months after the infant's death, parents and caregivers should keep in touch with the child's teachers and health professional about how the child is coping. Mental health professionals can also provide support to parents and children. Additional resources for families include hospice organizations, local health departments, bereavement support programs, and community or religious leaders or healers.

## FUNERALS AND FAMILY RITUALS

Allow children to be included, if they wish to participate, in family mourning rituals such as funerals, memorial services, wakes, or shivas, following the family's culture. Rituals are part of life; they are a source of comfort, and they help build memories of the infant who died. It is important to explain to children beforehand what will take place during the ritual and that those attending may be sad, may cry, or may show strong emotions. Younger children should have a trusted person with them, as parents may be overwhelmed and therefore may have difficulty being supportive. It is important to help children understand that these rituals provide the grieving family and friends with a time, place, and occasion to cherish and remember the infant who died, and they create a way to say goodbye.

## SELECT RESOURCES

- American Academy of Child and Adolescent Psychiatrists. 2011. *Facts for Families: Children and Grief*. [http://aacap.org/cs/root/facts\\_for\\_families/children\\_and\\_grief](http://aacap.org/cs/root/facts_for_families/children_and_grief).
- Bonanno GA. 2009. *The Other Side of Sadness: What the New Science of Bereavement Tells Us About Life After Loss*. New York, NY: Bantam.
- Centers for Disease Control and Prevention. 2009. *Sudden Infant Death Syndrome (SIDS) and Sudden Unexpected Infant Death*. <http://www.cdc.gov/sids>.
- The Dougy Center: National Center for Grieving Children & Families. <http://www.dougy.org>.
- Emswiler MA, Emswiler JP. 2000. *Guiding Your Child Through Grief*. New York, NY: Bantam.
- Fernside Resources for Professionals and Families. <http://www.fernside.org>.
- First Candle. 2010. *Helping Babies, Healing Families Program Manual: Bereavement Support Resources*. [http://programmanual.info/chapter3/resources3\\_0.html](http://programmanual.info/chapter3/resources3_0.html).
- Goldman L. 2000. *Life & Loss: A Guide to Helping Grieving Children* (2<sup>nd</sup> ed.). Muncie: IN: Accelerated Development, Inc.
- Horchler JN, Rice R. 2003. *The SIDS and Infant Death Survival Guide: Information & Comfort for Grieving Family & Friends and Professionals Who Seek to Help Them*. Hyattsville, MD: SIDS Educational Services.
- Hospice. <http://www.hospicenet.org>.
- KidsAid. <http://www.kidsaid.com>.
- M.I.S.S. Foundation. <http://www.missfoundation.org/kids/index.html>.
- O'Connor J. 2004. *Children & Grief*. Grand Rapids, MI: Fleming H. Revell.
- Shaefer J. *When an Infant Dies: Cross-Cultural Expressions of Grief and Loss*. National Fetal and Infant Mortality Review Program & Association of SIDS and Infant Mortality Programs. Vols. I-III (1999-2003): [http://www.acog.org/departments/dept\\_notice.cfm?recno=108&bulletin=5055](http://www.acog.org/departments/dept_notice.cfm?recno=108&bulletin=5055); Vol. IV (2010): [http://www.nfimr.org/publications/When\\_an\\_Infant\\_Dies\\_Cross\\_Cultural\\_Expressions\\_of\\_Grief\\_and\\_Loss\\_IV](http://www.nfimr.org/publications/When_an_Infant_Dies_Cross_Cultural_Expressions_of_Grief_and_Loss_IV)
- SIDS Mid-Atlantic. 2006. *When SIDS Occurs in Child Care Settings*. [http://www.sidsma.org/bereaved\\_families/bereavement\\_packet/sids\\_in\\_childcare.html](http://www.sidsma.org/bereaved_families/bereavement_packet/sids_in_childcare.html).

For grief counseling (in English and Spanish), call First Candle's bereavement hotline at (800) 221-7437 (available 24 hours a day, 7 days a week).  
<http://www.firstcandle.org>.

For additional resources, see the resource guide *Bereavement Support*, National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Resource Center.  
<http://www.sidscenter.org/Bereavement>.

## FOR MORE INFORMATION

HRSA's Maternal and Child Health Bureau supports a consortium of four national centers that address issues surrounding sudden unexpected infant death:

- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss **Resource Center** (<http://www.sidscenter.org>).
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss **Program Support Center** (<http://www.firstcandle.org>).
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss **Project IMPACT** (<http://www.suid-im-projectimpact.org>).
- National Sudden and Unexpected Infant/Child Death and Pregnancy Loss Project at the **National Center for Cultural Competence** (<http://nccc.georgetown.edu/projects/sids/index.html>).

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## **If you have an established milk supply**

If you have been pumping for or nursing your baby before he or she died, you will probably want to continue to pump periodically to help your body adjust to the decreased demand and avoid engorgement, plugged ducts, and mastitis.

You can adjust your schedule so that, over time, you pump less and less. For example, if you have been pumping 6 times in 24 hours, for a few days you could drop to 5 times, and then to 4. You can continue this process until you are no longer pumping at all. In addition, you can follow the suggested protocol above to help your body to stop producing milk. If you have a supply of frozen milk, you can refer to the below suggestions for donating your breast milk.

## **Donating your breastmilk**

For some mothers, it can be very healing to pump their breast milk and donate it to another baby in need. Breastmilk donated to milk banks is provided to premature babies in NICUs and very ill infants. It can be lifesaving.

While the idea of pumping can feel much too difficult for many mothers, those who feel drawn to the idea usually take great comfort in their ability to put their baby's milk to use. If you have been pumping for your baby, it can be extremely difficult to think of discarding your milk.

To begin the donation process, visit the website of the Human Milk Banking Association of North America: [www.hmbana.org](http://www.hmbana.org). There you'll find a list of milk banks. If there isn't a milk bank in your area, contact milk banks outside your area. Milk banks are generally able to accept

donations from outside their areas using overnight shipping.

Becoming a milk donor involves a screening process. This includes a phone interview, a written questionnaire, blood testing, and a letter from your doctor. *When you start the process please be sure to indicate that you have experienced the loss of your baby.* If you are approved to donate, the milk bank will waive the minimum donation amount for you, and gratefully accept any amount of milk you are able to provide. If you aren't approved to donate, some milk banks will still accept your milk and use it for research or training.

### **Sources:**

"Weaning after infant loss" [Children's Hospitals and Clinics of Minnesota Patient/Family Education 2525](#)

Chicago Avenue South Minneapolis, MN 55404  
(612) 813-7654; (651) 220-7126, 2009

"Breast Feeding – Weaning After Infant Loss"  
Copyright © 2000-2010 The Children's Mercy Hospital; 2401 Gillham Road, Kansas City, MO 64108 (816) 234-3000

La Leche League International - [www.llli.org](http://www.llli.org)

## **Empty Arms Bereavement Support, Inc.**

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# Lactation after Loss



## *A Guide for Bereaved Mothers*

Empty Arms Bereavement  
Support

Your first days and weeks at home without your baby in your arms will be extremely difficult. One of the most challenging times for many bereaved mothers is when their milk comes in. In the past, many mothers have been unprepared for how to cope during this time. We hope that this brochure will help you to think through the different options that you have for helping your body and your emotions through this experience.

Throughout your pregnancy, your breasts have been growing and changing in preparation to feed your baby. When your baby dies, your body will not know that the milk is not needed. Hormones will signal your body to begin milk production. For the first few days, you will notice a thick, yellowish substance called colostrum, and you are unlikely to experience discomfort. It is usually on the second or third day that your mature milk will come in.

At this time, many mothers anguish over the sad fact that there is no baby to feed. The milk comes in when most mothers have left the hospital and the company of the caregivers who helped them through their labor and delivery. Facing the arrival of your milk when you're at home, without your baby, can be a very difficult experience.

When your milk comes in, your breasts will feel very full, and the pressure from the increasing amount of milk will become uncomfortable. As long as your breasts sense that there is a demand for milk, they will keep producing it. When there is no demand, they will eventually stop.

Some bereaved mothers find that the presence of milk is upsetting and want to eliminate it as quickly as possible, while other mothers find the milk to be a comforting reminder of their body's ability to care for the baby they so love and had wished to care for. There is no right or wrong way to feel. It is your choice to follow

whatever path feels best for you. The grief can be overwhelming, and we hope you will be very gentle with yourself as you begin to heal.

## **How you can help your body to stop making milk**

For most bereaved mothers, when their milk comes in, they begin the very difficult process of helping their body to stop producing milk. You may be surprised by the sudden engorgement you will feel when your milk comes in, and how quickly you may become physically uncomfortable.

In the past, mothers were told to wear a very tight bra, or bind their breasts to help to cease milk production. We do not recommend this practice, as it can be very painful, can lead to infection, and does not substantially affect the decrease in milk production. We recommend wearing a bra that is supportive but does not restrict your circulation.

When your breasts feel painful from the pressure of the milk, there are a number of things you can do:

- Stand in a hot shower and let the water run over your breasts. This can stimulate some milk release and help you to feel less full.

- Sit in a warm bath and lean into the water. This will allow some milk to leak out.

- Express just enough milk, by hand or with a breast pump, to make yourself feel more comfortable. To hand express, hold your breast with your fingers a few inches back from the areola. Push your hand back toward the chest wall, then roll your fingers forward toward the nipple, taking care not to slide your fingers over the skin.

- Wear a comfortable but supportive bra that does not restrict your circulation.

- A traditional remedy for engorgement is to place cabbage leaves inside their bras to slow milk production. Wash cold, raw, green cabbage leaves and crush the leaf veins to release the enzymes. Replace the leaves about every 2 hours as they wilt.

- Apply ice packs for 5-15 minutes at a time to your breasts to reduce swelling and pain.

- Take a pain reliever such as acetaminophen or ibuprofen.

- Drink sage tea, which is thought to reduce milk production.

Please note that, although you are allowing milk to flow, this will not increase your milk supply. Allowing some milk to flow will decrease the chance of plugged milk ducts, infections, and serious engorgement.

You should watch for blocked ducts, which will appear as tender and painful lumps in your breast, or a breast infection which would manifest itself in a tender, reddened area and would be accompanied by a fever or chills. Should either of these conditions present, contact your doctor, midwife or a lactation consultant for further assistance.

During this time, you may find that your emotional pain is aggravated by the physical pain of this weaning process. We encourage you to be very gentle with yourself and to follow the steps that bring you not just the most physical comfort, but also emotional comfort. Even if your goal is to dry your milk up, it is not unusual to be curious about the milk that would have nourished your baby. Many mothers want to see the milk and to taste it. If having milk in your breasts makes you feel connected to your baby, you are not alone. Take the time that you need to allow this weaning process to happen at a rate that feels comfortable for you.