California Department of Public Health
Division of Environmental and Occupational Disease Control
Occupational Health Branch

HAZARD EVALUATION SYSTEM

AND

INFORMATION SERVICE

Annual Report

December 2009 – November 2010

A report to the Legislature submitted to the Department of Industrial Relations for the Hazard Evaluation System and Information Service

HAZARD EVALUATION SYSTEM AND INFORMATION SERVICE (HESIS)

Executive Summary

This report is mandated in Labor Code Section 147.2. Herein is detailed the implementation and operation of a "repository of current data on toxic materials and harmful physical agents in use or potentially in use in places of employment in the state," as mandated by the above regulation, and includes:

- ✓ The amounts of and source of funds allocated and spent on repository activities;
- ✓ The toxic materials, harmful physical agents, and other workplace hazards investigated during the past year, and recommendations made concerning them;
- ✓ Actions taken to inform interested persons of possible hazards of exposure to toxic materials and harmful physical agents; and
- ✓ Any recommendations for legislative changes relating to the functions of the repository.

The mandates of the Labor Code have been implemented in the following fashion:

- ✓ Provision of technical support and consultation regarding occupational health to the Department of Industrial Relations (DIR), other programs within the California Department of Public Health (CDPH), and other agencies.
- ✓ Provision of a telephone information service to individuals seeking information about workplace hazards;
- ✓ Provision of educational materials and an education/outreach function;
- ✓ Provision of technical input and recommendations on standards-setting;
- ✓ Provision of a hazard assessment function; and
- ✓ Provision of an extensive information repository.

In 2009-2010, HESIS continued to implement its mandates to protect California workers from occupational illness and disease. HESIS identified, evaluated, and provided practical information on toxic chemicals and other workplace hazards; assisted the DIR Division of Occupational Safety and Health (Cal/OSHA) in determining whether illnesses and diseases were work-related and in promulgating protective occupational health standards; and initiated and worked collaboratively with others on targeted public health projects and activities. HESIS' accomplishments during this period included:

- Participated in a multi-agency investigation of a health care facility whose lapses in personal protective equipment, exposure assessment, and notification resulted in two workers becoming hospitalized following infection with a potentially life-threatening droplet-borne pathogen (*Neisseria meningitidis*).

- Provided technical support for Cal/OSHA's occupational standard for diacetyl exposure in flavoring formulation and food processing operations.

- Provided 11 medical consultations to Cal/OSHA enforcement staff concerning a total of 13 employees.

  Medical consultations, which often address the issue of work-relatedness of an injury, illness, or fatality, typically begin with a request from Cal/OSHA staff, followed by information gathering, data synthesis, medical literature and records review, and report writing. A typical medical consultation involves approximately 16 hours of time on the part of a HESIS Public Health Medical Officer.

- Responded to 83 calls to the Workplace Hazard Helpline (also referred to as the "Telephone Response System" or "TRS"). Three-quarters of these calls were initiated by workers, relatives of workers, employers, health care providers treating workers, or industrial hygiene / safety personnel serving workers.

  TRS responses generally involve 1-3 telephone interactions with the caller, as well as online technical data retrieval, determination of appropriate referral avenues, and provision of supporting documentation, either as online links or in hard copy. The average TRS response occupies approximately 40 minutes of technical staff (i.e., Industrial Hygienist, Toxicologist, or Public Health Medical Officer) time.

- Published the following **Hazard Alert**:

  ✓ *Shared Tagging Guns and Bloodborne Disease Risk*
  http://www.cdph.ca.gov/programs/hesis/Documents/TagGuns.pdf

HESIS continued to work with collaborators to expand the public health impact of the program. This year, HESIS participated in meetings and other activities of:

- Collaborative for Healthy Nail Salons
- Interagency Indoor Air Quality Working Group
- Western Occupational and Environmental Medicine Association (WOEMA)
- WorkSafe

HESIS continued to provide technical assistance to Cal/OSHA to help prevent workers from becoming ill or injured. HESIS served on and provided technical assistance to Cal/OSHA Advisory Committees to help develop policies and procedures to amend Permissible Exposure Limits (PELs) for workplace chemicals and other agents, and to develop standards for sensitizers (allergens). HESIS continued to serve as a referral source for inquiries received by Cal/OSHA on the health hazards of chemicals and other

workplace hazards, and to inform employers and workers about Cal/OSHA regulations and services through the HESIS Workplace Hazard Helpline and HESIS publications.

Other collaborative public health activities this year included:

- Received a final report on a project by the University of California, San Francisco, evaluating the accessibility and quality of spirometry provided by occupational health clinics involved in performing employer-based medical surveillance services for workers exposed to respiratory hazards.

- Participated in a project along with the University of California, Berkeley and San Francisco, to evaluate the feasibility of characterizing occupational exposures for a cohort of pregnant patients and identifying toxicants that pose risks of developmental toxicity using occupational codes on patient information forms.

- Collaborated with the University of California Ergonomics Program to develop a fact sheet regarding alternative methods for overhead drilling in multi-story building construction.

HESIS staff continued to assess the health hazards of specific work-related exposures and to provide technical assistance to agencies and groups. Surveillance of the occupational health literature, identification of new and unappreciated hazards, and expansion of the information repository are ongoing. The Occupational Health Branch (OHB) Web site:

http://www.cdph.ca.gov/programs/ohb/Pages/default.aspx

continues to showcase the publications developed by HESIS. HESIS also continued to provide support for OHB through active participation on the management team and serving on Branch-wide and Division-wide committees.

Specific Accomplishments :

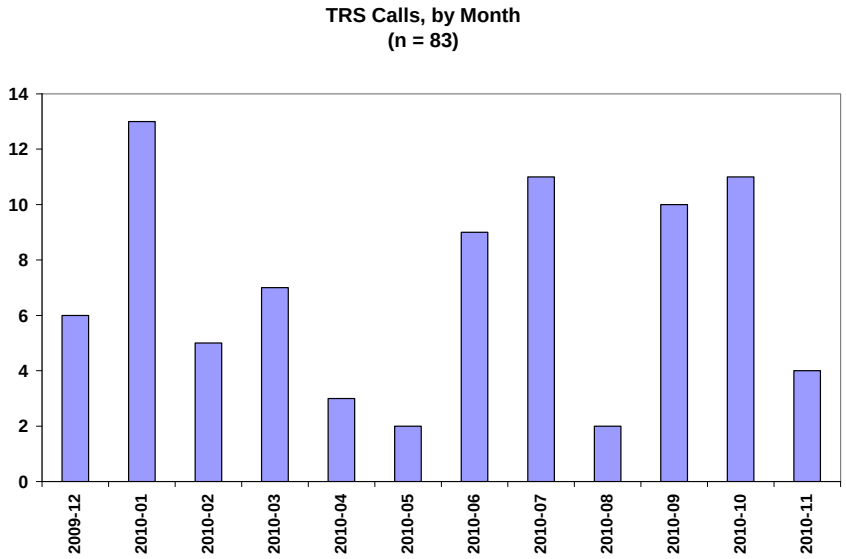
Labor Code Section 147.2 – Mandate 1

Provide reliable information of practical use to employers, employees and representatives of employees, and other governmental agencies on the possible hazards to employees of exposure to toxic materials or harmful physical agents.

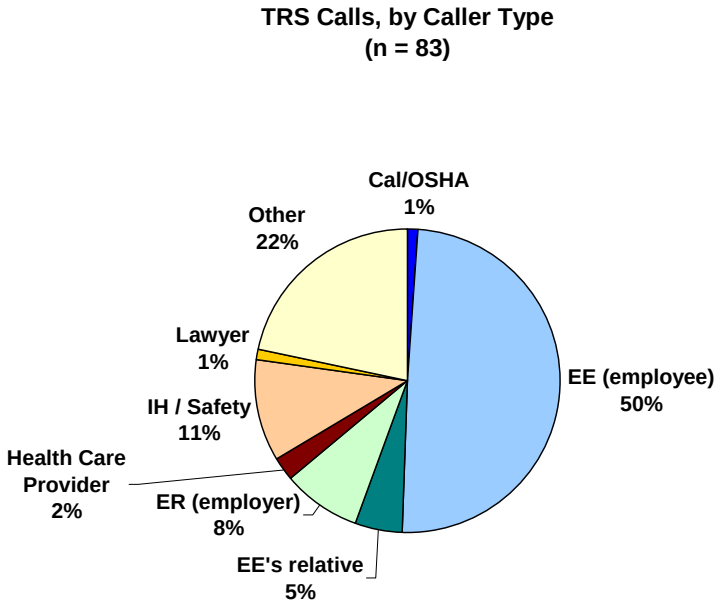
1. Workplace Hazard Helpline / Telephone Response System (TRS)

A total of 83 calls were logged between December 2009 and November 2010:

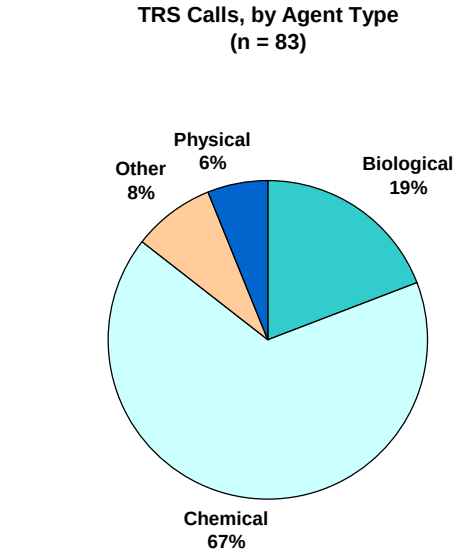
* Monthly calls ranged from 2 to 13, led by January, July, September, and October.



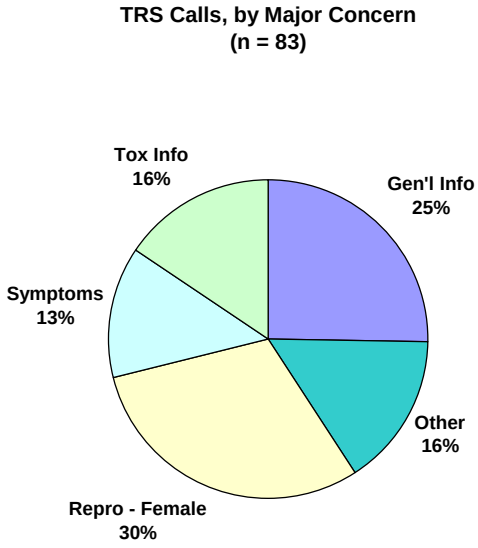
- Callers. Inquiries came from employees and their relatives, industrial hygiene / safety personnel, employers, health care providers, attorneys, and others.



* Agents of concern were principally chemical in nature, followed by biological and physical agents, and other work-related issues:



• Major Concern. The greatest numbers of calls related to the impact of work exposures on pregnancy outcome, followed in frequency by general workplace information, specific questions regarding the toxicity of chemicals, questions about the relationship of symptoms to work exposures, and "other."



- **Examples of 2009-2010 TRS calls include**:
  - ✓ The wife of a tank cleaner called to ask if her husband was at risk for long-term health complications after he lost consciousness inside a maritime waste diesel tank and was rescued. He was experiencing ongoing symptoms of headaches and dizziness several days after being treated in a hospital emergency department following the incident. The incident had not been reported by the employer, and was subsequently reported to Federal OSHA Region 9 (which has jurisdiction over maritime exposures).
  - ✓ A civilian helicopter pilot in her first trimester of pregnancy called to ask for information about adverse reproductive outcomes caused by the exposure to aviation fuel exhaust. She was advised that aviation fuel exhaust does contain compounds (benzene, toluene) that could be harmful to the fetus and informed of other potential hazards such as noise and vibration. She was considering purchasing a respirator to wear while refueling the helicopter, and it was recommended that she speak to her employer about a respiratory protection program.
  - ✓ A pool service contractor contacted HESIS about recurring, work activity-triggered health symptoms following a single exposure to concentrated muriatic acid mist while cleaning a pool vacuum. The caller was referred for medical evaluation to the nearest University of California occupational and environmental medicine clinic.
  - ✓ A hair stylist asked whether the hair straightening product Brazilian Blowout, which reportedly contains formaldehyde, is regulated or permitted for salon use. The caller was referred to HESIS by the California Board of Barbering and Cosmetology, and had already downloaded HESIS' formaldehyde fact sheet. She was given additional toxicologic information and was referred for further information to Cal/OSHA and the California Safe Cosmetics Program.
  - ✓ A construction management officer for a large city asked HESIS for advice on the proper response to moldy air conditioning cooling coils in a city building. HESIS recommended duct and coil cleaning followed by visual inspection. HESIS further recommended avoiding the use of volatile biocides that can contaminate indoor air.
  - ✓ A printing worker requested assistance in determining whether workplace chemicals could be a factor in her recent miscarriages. In response to her request for material safety data sheets, her employer was non-responsive. HESIS discussed the caller's right-to-know under Cal/OSHA's Hazard Communication Standard and her right to file a complaint with Cal/OSHA. Alternatively, HESIS advised obtaining product identity from labels, then contacting the manufacturer or distributor for the MSDS; provided HESIS' Guide to Solvent Safety, and discussed endocrine disruptor toxicity. The caller was encouraged to follow-up with her obstetrical provider and/or to re-contact HESIS once she had obtained product identity information.

- Electronic database of TRS calls. Our searchable database of TRS calls utilizing EpiInfo software now includes a data field of time spent per call. Utilizing this data, we estimate the median time spent per call (not including record-keeping) as 30 minutes and the mean time as 40 minutes (range: 15 - 300 minutes).

* TRS Intranet Site. Utilized CDPH Information Technology Services' Sharepoint utility to maintain an intranet site for use by TRS responders within OHB. Site includes commonly consulted documents, Web site URLs, agency contacts, and other information resources.

* Interface between TRS and Cal/OSHA field activities:

  - ✓ HESIS participated jointly with a Cal/OSHA compliance officer to document lapses in communicable disease control practices resulting in the infection of two health care / emergency response personnel by the bacterial organism, *Neisseria meningitidis*. This investigation involved three hospitals, two local health departments, a police department, and an emergency services provider. In addition to involving HESIS staff, the investigation included the efforts of two Epidemic Intelligence Officers from the CDC (one serving in CDPH's Immunization Branch), as well as an applied epidemiology fellow supported by CSTE (the Council of State and Territorial Epidemiologists). The investigation was summarized in the CDC publication "Occupational transmission of *Neisseria meningitidis* – California, 2009." *MMWR* 2010; 59(45):1480-1483.

2. Educational Materials Development

- A new hazard alert entitled *Shared Tagging Guns and Bloodborne Disease Risk* was created after completion of a collaborative field investigation by CAL/OSHA, HESIS, CDPH's Immunization Branch, and a local health department. The investigation involved a case of Hepatitis B in a retail worker who had suffered multiple needlesticks on-the-job using a device ("tagging gun") for inserting price tags into clothing materials using a hollow needle. The alert has been distributed to members of the California Retailers Association.

- A fact sheet entitled *Drilling Overhead: Ways to Make a Tough Job Easier* has been drafted in collaboration with the University of California, San Francisco, Ergnomics Laboratory. Feedback was obtained from CAL/OSHA's Research and Education Unit. The fact sheet documents an alternative method of overhead drilling (an inverted drill press), which reduces the musculoskeltal stresses on the operator compared with manual overhead drilling. Once the fact sheet is finalized and printed, distribution is planned to construction trade associations and trade unions.

3. Educational Materials Dissemination

- HESIS Outreach Activities / Publications Request Line. **Distributed 580 hardcopies of HESIS publications** through outreach activities and in response to direct requests during the report period.

  Continued to mail HESIS publications to the Cal/OSHA District and Area Offices for further dissemination by Enforcement and Consultation staff, and to serve as resource information for their telephone consultations.

  Organizations and groups that requested and disseminated HESIS publications included:

  - UCLA / Labor Occupational Safety and Health Program
  - Port of Oakland
  - Cal/OSHA
  - Cosmetology Colleges

- Conferences, Meetings, Presentations. Distributed HESIS publications at formal conferences and meetings, including:

  - Pacific Building Safety Expo
  - California Conference of Local Health Officers (CCLHO) annual meeting

- TRS Consultations. Disseminated appropriate HESIS publications to supplement and reinforce the information provided to callers.

- OHB Web Site. Continued to disseminate HESIS educational materials via the program's Web site:

  http://www.cdph.ca.gov/programs/hesis/Pages/Publications.aspx**.**

  Five new / revised documents were posted to the HESIS website in '09-'10:

  - ✓ Shared Tagging Guns and Bloodborne Disease Risk (New)
    http://www.cdph.ca.gov/programs/hesis/Documents/TagGuns.pdf
  - ✓ HESIS Current Chemicals of Concern – June 2010 (New)
    http://www.cdph.ca.gov/programs/hesis/Documents/ChemsConcern2010.pdf
  - ✓ Implementing safer alternatives to lithographic cleanup solvents to protect the health of workers and the environment. *Journal of Occupational and Environmental Hygiene 2009* (New)
    http://www.cdph.ca.gov/programs/hesis/Documents/lithoJOEH.pdf
  - ✓ Sewing Machine Operators: Feel Better! Work Better! (Revised)
    http://www.cdph.ca.gov/programs/hesis/Documents/sewing.pdf
  - ✓ Operadora y Operador de Máquinas de Coser: ¡Siéntese Mejor! ¡Trabaje Mejor! (Revised)
    http://www.cdph.ca.gov/programs/hesis/Documents/sewingsp.pdf

4. Education / Outreach

HESIS staff spoke regarding workplace hazards to a variety of audiences:

Dennis Shusterman, MD, MPH, HESIS Chief, spoke on the following topics:

- 2/28/10 – "Immunologic and non-immunologic health effects of cleaning agents" (Annual meeting of the American Academy of Allergy Asthma and Immunology)
- 4/21/10 – "Respiratory toxicology - Acute inhalational effects" (Medicine 180 – Industrial Toxicology course for UCSF Occupational Health Nursing Program).
- 7/13/10 – "HESIS: An overview" (UCSF Occupational and Environmental Medicine Fellows – Summer Didactics Program)
- 8/13/10 – "Upper airway disorders" & "Differential diagnosis of episodic dyspnea in the workplace" (UCSF Occupational and Environmental Medicine Fellows – Summer Didactics Program)

Kainne Dokubo, MD, MPH, UCSF Preventive Medicine Fellow, spoke on:

- 6/7/10 – "1-Bromopropane neurotoxicity: A case summary and review of the literature." (Council of State and Territorial Epidemiologists Annual Meeting, Portland, OR)

Labor Code Section 147.2 – Mandate 2

Collect and evaluate toxicologic and epidemiologic data and any other information that may be pertinent to establishing harmful effects on health of exposure to toxic materials or harmful physical agents.

1. Technical Assistance – Cal/OSHA Medical Unit Consultations

- HESIS provided a total of 11 medical consultations in 2009-2010 (involving 13 workers). The workplace hazards, by class, included:
  - Physical (heat) in 8 investigations involving 8 workers
  - Biological in 2 investigation involving 4 workers
  - Chemical in 1 investigation involving 2 workers (* dual exposure)
  - Traumatic in 1 investigations involving 2 workers (* dual exposure)

- Physical (heat):

  Of 8 suspected heat illness cases (8 investigations), 3 were medically confirmed as primarily heat-related. Three heat-related investigations involved fatalities.

- Chemical:

  Of 2 suspected chemical exposure cases (1 investigation), both were medically confirmed as chemically related, and one resulted in a fatality. The chemical involved was nitrogen dioxide gas from mine blasting.

- Biological:

  One infectious disease investigation involved *Neisseria meningitidis* exposure in health care / emergency response personnel (2 cases), and the other methicillin-resistant *Staphylococcus aureus* infection in food processing workers (2 cases). In the former investigation, work-relatedness was confirmed for both cases, and in the latter, causality was indeterminate.

- Traumatic:

  Of the 2 suspected trauma cases (1 investigation), the observed health effects were determined to be chemically related rather than traumatic in origin.

2. Support for Cal/OSHA Appeals Hearings

- Physicians from HESIS, the Occupational Health Surveillance and Epidemiology Program (OHSEP), and the Occupational Lead Poisoning Prevention Program (OLPPP) provided pre-hearing medical consultation in support of 6 citation appeal hearings, including cases pertaining to heat illness, bloodborne pathogen hazards in health care facilities, and construction hazards. During this reporting period 2 of these consultations resulted in the provision of sworn testimony.

3. Selected Hazard Assessments

Cal/OSHA Technical Assistance Requests

- Occupational transmission of *Neisseria meningitidis*. Participated, along with the CDPH Immunization Branch, in a collaborative investigation with Cal/OSHA of the events surrounding the occupational transmission of *Neisseria meningitidis* to a police officer and a respiratory therapist involved in the emergency response to, and hospital care of, a critically ill patient. This investigation resulted in a publication in CDC's publication, Morbidity and Mortality Weekly Report.
- Flavor Industry Safety and Health Evaluation Program (FISHEP). Ongoing investigation and associated activities:

  ✓ HESIS and other OHB and Cal/OSHA staff have worked directly with employers and health care providers to provide technical assistance and

oversight for the medical surveillance program for 26 flavor companies covered by FISHEP.

- ✓ HESIS and other OHB staff have met with Cal/OSHA headquarters and Consultation Service staff periodically to coordinate the medical surveillance activities with the industrial hygiene interventions.

- ✓ With assistance from the National Institute for Occupational Safety and Health (NIOSH), HESIS and other OHB and Cal/OSHA staff participated in the analysis of cross-sectional questionnaire and spirometry data to assess the health impact of diacetyl and other risk factors on flavor manufacturing workers in California, and prepared an article based on the findings for publication in a scientific journal, *Am J Ind Med* 2010; 53:857-865.

- ✓ OHB staff prepared written summaries to notify participating employers, workers, and health care providers regarding the findings of the cross-sectional analysis, translated the worker materials into Spanish, and distributed notification materials in March 2010.

- ✓ OHB and Cal/OSHA staff collaborated with NIOSH on a longitudinal analysis of all spirometry data collected under FISHEP, including an assessment of the quality of the spirometry data and the relationship between potential risk factors and impairment of lung function, and submitted a manuscript for publication in a scientific journal. Follow-up of workers with potential abnormal declines in lung function based on this analysis and notification of participants of these findings are two activities still being planned and executed in coordination with Cal/OSHA staff.

- ✓ Associated activities include:

  - Provision of specific technical input into the proposed medical surveillance and other requirements of the planned diacetyl regulation, and provision of CDPH written and verbal comments in support of the proposed standard at the September 16, 2010 Occupational Safety and Health Standards Board hearing at which the standard was adopted.

- Cal/OSHA Compliance. HESIS personnel provided technical consultation to a Cal/OSHA Compliance Officer who was investigating a fatal cerebral aneurysm in an employee of an electronics manufacturing facility. A literature search was conducted, but in this case, no credible chemical risk factors were identified.

- Heat Illness Surveillance**.** In collaboration with Cal/OSHA personnel, HESIS personnel resumed tabulation of serious heat illness cases, beginning with 2009 data. Examined trends in incidence, predisposing risk factors, and lethality across a five-year period. Prepared data for presentation at meeting of CDC's Epidemic Intelligence Service and for internal reporting within Cal/OSHA.

4. Technical Assistance – Selected Other Constituencies

State government

- HESIS personnel responded to a scientist from Cal/EPA's Office of Environmental Health Hazard Assessment (OEHHA), who requested guidance in locating statistics for the job tenure of California workers. The caller was preparing guidelines for emitters of certain chemical pollutants, to help them evaluate potential effects on nearby workers. After consulting the chief of the Occupational Health Surveillance and Epidemiology Program (OHSEP), HESIS referred the caller to the California Labor Market Information Service.
- HESIS assisted the CDPH Environmental Health Laboratory Branch in responding to an email inquiry regarding the health impact of indoor air from edible mushroom growing operations. A business tenant made the inquiry because an adjacent business within his building was growing mushrooms indoors. The landlord had not been able to block air and odors from traveling between the businesses. HESIS confirmed that mushrooms contain allergens, like any other fungus, and could have adverse health effects for susceptible individuals. HESIS recommended its *Molds in Indoor Workplaces* fact sheet.
- The HESIS Industrial Hygienist participated in an inter-agency interest group convened by the Department of Toxic Substances Control (DTSC) in November 2009, to share information about potentially toxic chemicals used in professional manicures, and concerning the California Healthy Nail Salon Collaborative, a non-governmental organization (NGO). As a result of contacts formed at the meeting, HESIS provided comments on a draft checklist for "Green Nail Salons" to the DTSC Green Business Manager in March 2010. Green Business checklists contain technical criteria for designating individual businesses as "green." They are used by local governments and other organizations in voluntary programs.
- The HESIS Industrial Hygienist provided technical assistance to the CDPH Richmond campus Facilities Management Section concerning emergency response preparedness in case of a toxic chemical release of ammonia by a facility adjacent to the Richmond campus. Helped develop shelter-in-place procedures including employee training, facility ventilation shutdown, drills, and post-drill evaluation.

Federal government

- HESIS provided assistance to a U.S. EPA scientist regarding the potential use of cyclo-siloxanes (D4 and D5) in dry cleaning. Although these chemicals are beginning to be used as substitutes for perchloroethylene (a known carcinogen), their toxicity is incompletely understood. Cal/EPA, the California Air Resources Board, and HESIS have each been involved in evaluating D4 and D5 toxicity studies and their relevance to human health. HESIS provided the caller links to

documents from these agencies, as well as contact information for state scientists with special expertise in the area.

Academia

- Protecting California Workers from Respiratory Disease: Assessing the Capacity of Local Health Care Clinics to Provide Spirometry-based Medical Surveillance Services to Employers (University of California) *COMPLETED*

  This spirometry assessment project involved an interagency agreement with the University of California and was designed to assess California health care providers' capacity to perform quality spirometry in order to meet the expectations of FISHEP, the Cal/OSHA diacetyl standard, or any other spirometry-based medical surveillance. During the past year, questionnaire results were analyzed and a final report prepared. The study surveyed members of WOEMA (the Western Occupational and Environmental Medicine Association) and four clinic networks. The results of this survey will be incorporated into a follow-up report on FISHEP.

- Evaluating Occupational Coding on Patient Information Forms to Identify At-Risk Exposure to Pregnant Workers

  This project is being implemented through an interagency agreement with the University of California, Berkeley (UCB). The goal of the project is to evaluate the feasibility of characterizing occupational exposures for a cohort of pregnant patients and identifying toxicants that pose risks of developmental toxicity using occupational codes on patient information forms. This information would help HESIS conduct industry and job-related education and outreach to workers, employers, and health care providers on reproductive and developmental toxicants, and on ways to protect against exposure. The project continues under a no-cost extension, with UCSF's Project on Reproductive Health and the Environment (PRHE) completing the project goals. PRHE has produced a draft questionnaire for incorporation into the prenatal screening process, and in the coming contract year plans to pilot test the questionnaire in the obstetrical clinic at San Francisco General Hospital.

Nongovernmental organizations

- California Healthy Nail Salon Collaborative: HESIS staff provided technical information in ongoing Collaborative meetings, and continued to participate in the development of a Cal/OSHA Consultation Service e-tool. The e-tool will cover safe work practices and ventilation in the nail salon industry.

5. Information Repository

HESIS Electronic Repository of Occupational Health Information (e-ROHI): HESIS staff, in collaboration with the UC Berkeley Public Health Library, continued electronic document delivery to Cal/OSHA Standards and Research Unit staff.

7. Chemical Watch List

The following are chemicals for which HESIS personnel are monitoring new developments:

- **Dimethyl carbonate (DMC)**

✓ *Background:* DMC is used as a chemical intermediate and has been proposed for use as a solvent in consumer products because of its lack of photo-reactivity. In 2009 it was classified by the U.S. EPA as exempt from volatile organic compound (VOC) regulations.

✓ *New developments:* Recent reports (*US EPA* 2009, *OEHHA* 2009, and *Kowa American* 2009) indicate that DMC is hydrolyzed to methanol, which is then oxidized to formaldehyde and formic acid. This metabolic pathway implicates DMC as a likely carcinogen as well as a reproductive and developmental toxicant in humans.

✓ *Current activities:* HESIS responded to an inquiry from the South Coast Air Quality Management District (SCAQMD) to provide the information about the potential hazards of DMC in the workplace. Based on the available toxicological data, HESIS informed SCAQMD that setting a scientifically based Permissible Exposure Limit is not currently practical and that expanded worker exposures resulting from an increased use of DMC due to VOC exemption of this chemical are not prudent.

- **Flavoring Chemicals – Diacetyl and diacetyl substitutes**

✓ *Background:* In light of documented severe lung disease (bronchiolitis obliterans) among exposed food production and flavoring workers, the California Occupational Safety and Health Standards Board recently adopted a workplace standard for diacetyl (2,3-butanedione). This standard also includes provision for reporting of potential health effects among diacetyl workers exposed to other, structurally similar, "diketone" compounds.

✓ *New developments:* Structure-activity relationships predict that various diketones (butane-, pentane-, hexane- and heptane-dione), as well as the diacetyl precursor, acetoin, may have similar biological effects. Consistent with this premise, recent inhalation toxicology studies in rodents showed that 2,3-pentanedione exposure produces identical respiratory pathology to that of diacetyl (*Proceedings of the Annual Meeting of the Society of Toxicology* 2010, Abstracts Nos. 1490, 1492, and 1506). Of note, a recent NIOSH Health Hazard Evaluation found 2,3-pentane-dione and other alpha-diketones in the air of a bakery products facility (DHHS/CDC/NIOSH – *Health Hazard Evaluation Report* - HETA 2008-0230-3096).

✓ *Current activities:* HESIS staff continues to monitor the emerging animal toxicology and industrial hygiene literatures with respect to flavoring agents structurally related to diacetyl. HESIS will also collaborate with Cal/OSHA should the new standard result in reporting of respiratory illness in workers exposed to these diacetyl-like compounds.

- **Bisphenol-A (BPA)**

✓ *Background:* BPA is widely used in both epoxies and other plastic resins. Animal studies suggest that BPA may be a human endocrine disruptor (*Toxicol Sci* 2009; 108:427).

✓ *New developments:* Li et al. released two studies documenting male sexual dysfunction among Chinese workers exposed to BPA in plastics manufacturing. One study is based on airborne occupational exposures (*Hum Reprod* 2010; 25:519); the other is based on a biological measurement of workers' urine BPA levels (*J Androl* 2010; 31:500).

✓ *Current activities:* HESIS will work with other OHB sections and with Cal/OSHA to identify segments of the California workforce with potentially significant BPA exposures, and to monitor the reproductive sciences literature relevant to potential BPA toxicity.

- **Diisocyanates**

✓ *Background:* Diisocyanates – components of polyurethane foams and automotive paints – are recognized as both skin and respiratory tract sensitizers. However, the mechanism(s) of sensitization in the skin and lung have, until recently, been thought to be distinct from one another.

- ✓ *New developments:* Animal studies have long demonstrated that in rodents, skin exposure to isocyanates can lead to respiratory sensitization (asthma). There is increasing evidence of a similar relationship between skin exposure and asthma in humans (*Proc Am Thorac Soc* 2010; 7:134).
- ✓ *Current activities:* HESIS staff has:
  - Reviewed the literature indicating that skin exposure leads to respiratory sensitivity.
  - Reviewed occupational exposure limits recommended and/or enforced by NIOSH, OSHA, ACGIH (American Conference of Governmental Industrial Hygienists), Cal/OSHA, the United Kingdom's HSE (Health and Safety Executive), and Australia's NOHSC (National Occupational Health and Safety Commission).
  - Determined that an update of Cal/OSHA PELs for isocyanates, including addition of a "skin" notation, is warranted.

- **Nanoparticles**

- ✓ *Background:* Although nanoparticles (particles measuring less than 100 nanometers in diameter) are contained in over 1,000 consumer products, little is known about how workers are exposed during the life cycle of these products. Evidence from experiments in animals and in vitro continues to suggest that some nanoparticles may cause adverse health effects.
- ✓ *New developments:* Given that their physical properties are similar to those of asbestos fibers, the effects of exposure to carbon nanotubes (CNT) are a prime concern. A recently published study demonstrated that laboratory workers may be exposed to airborne CNTs while handling nanomaterials in common scenarios (*Environ Health Perspect* 2010; 118:49).
- ✓ *Current activities:*
  - HESIS staff convened a working group within CDPH to discuss current issues in nanotoxicology, to invite subject area experts as guest speakers, and to propose future activities spanning multiple branches within CDPH and with the Department of Toxic Substances Control.
  - HESIS staff attended nanotoxicology sessions sponsored by both the American Academy of Allergy Asthma and Immunology and the California NanoSystems Institute.
  - Other Occupational Health Branch staff attended a NIOSH-sponsored conference on worker surveillance for health effects of nanomaterials, and submitted a manuscript for a peer-reviewed publication describing potential surveillance approaches.

- **Quaternary ammonium surface disinfectants**

- ✓ *Background:* The use of surface disinfectants is expanding in multiple sectors of society. In addition to their established use in health care and food service settings, they are increasingly being utilized in commercial, personal services, and school settings. Of those surface disinfectants used, quaternary ammonium compounds are a major subgroup.
- ✓ *New developments:* Through both the Workplace Hazard Helpline and clinical channels, HESIS / OHB personnel have learned of several cases of respiratory or skin allergy in which the suspected agent was a quaternary ammonium compound. In a recent multi-state study, quaternary ammonium compounds were the leading chemical class implicated in disinfectant-related illnesses in health care workers (*MMWR* 2010; 19:551).
- ✓ *Current activities:* HESIS staff reviewed the published literature for reports of occupational allergic disease ascribed to quaternary ammonium compounds. Several case reports were identified in which this class of agents was implicated in asthma and other allergic disorders (*J Allergy Clin Immunol* 1994; 94:257; *Int Arch Occup Environ Health* 2000; 73:423). Other OHB staff is engaged in both asthma surveillance and health education involving the use of cleaning products, many of which include disinfectant ingredients. HESIS staff recommends that both benefits *and risks* be considered when use of this class of surface disinfectant is contemplated.

Labor Code Section 147.2 – Mandate 3

Recommend to the Chief of the Division of Occupational Safety and Health that an occupational safety and health standard be developed whenever it has been determined that a substance in use or potentially in use in places of employment is potentially toxic at the concentrations or under the conditions used.

Standards Recommendations / Assistance

Cal/OSHA Development of Permissible Exposure Limits (PELs) in California Code of Regulations Title 8 Section 5155

- Standards Recommendations

  HESIS staff provided input on the scientific basis for exposure standards for the following air contaminants:

  - Arsine (AsH_3)
    * Provided assistance with calculation of reference inhalation concentration.
  - Gallium arsenide (GaAs)
    * Provided assistance with calculation of potential lung cancer risk.
  - Hydrogen chloride (HCl)
    * Provided assistance with interpreting upper airway health effects observed in animal studies.
  - Wood dust
    * Provided assistance with interpreting upper airway health effects observed in human studies.
  - Trichloroethylene
    * Provided assistance with calculation of potential renal (kidney) cancer risk.

- Health Effects Advisory Committee (HEAC)

  HESIS staff participated in quarterly meetings of HEAC, part of the 5155 standard-setting process. Two former HESIS staff members have served as HEAC members.

- Cal/OSHA Standards Advisory Committees (Other than Section 5155)

  HESIS (and OHB) staff provided input to Cal/OSHA committees developing standards for the following issues: diacetyl (artificial butter flavoring) and sensitizers (allergens).

Labor Code Section 147.2 – Mandate 4

Notify the Director of Food and Agriculture of any information developed by the Repository which is relevant to carrying out his or her responsibilities under Chapter 2 (commencing with Section 14001) of the Division of Food and Agriculture Code.

There were no activities under this mandate during the report period.

Labor Code Section 147.2 – Mandate 5

Assure the use of and non-duplication of resources of other governmental agencies.

Use of Other Governmental Agency Services / Resources

- Cal/OSHA. HESIS continued, on a routine basis, to meet with, consult with, and make referrals to Cal/OSHA, and to use and disseminate Cal/OSHA educational materials.

- CDPH. HESIS continued, routinely, to consult with, make referrals to, and use materials and Web site information developed by numerous other CDPH programs to evaluate and provide consultations regarding workplace hazards. In this report period, these programs included: the Environmental Health Laboratory Branch Indoor Air Quality Section, Environmental Management Branch, Vector-Borne Diseases Section, Communicable? Disease Investigations and Surveillance Branch, Radiological Health Branch, Environmental Health Investigations Branch, and the Immunization Branch.

- Cal/EPA - Office of Environmental Health Hazard Assessment. HESIS continued to consult with OEHHA staff and use risk assessment resources to identify occupational carcinogens and reproductive toxicants and to assist Cal/OSHA in developing Permissible Exposure Limits for workplace chemicals. Continued to share the resources of the Occupational and Environmental Health Library.

- Cal/EPA – Department of Toxic Substances Control Pollution Prevention and Technology Development. HESIS continued to consult with Cal/EPA staff and to use technical information and other resources to recommend pollution prevention

strategies to protect workers from the adverse health effects of organic solvents and other hazardous substances.

- National Institute for Occupational Safety and Health. HESIS continued to use and disseminate NIOSH educational materials and to use and refer callers to their Web site for information and publications. Continued to work with NIOSH staff to identify and protect workers who may be at risk for bronchiolitis obliterans in California's flavor manufacturing industry.

Labor Code Section 147.2 – Mandate 6

Recommend legislative changes related to the functions of HESIS.

There were no activities conducted under this mandate in the report period.

Authorized positions in HESIS for 2009-2010

Permanent positions

Public Health Medical Officer III	Dennis Shusterman, MD, MPH	100%
Staff Toxicologist (Specialist)	Kashyap Thakore, PhD	100%
Senior Industrial Hygienist	Elizabeth Katz, MPH, CIH	75%
Management Services Technician	Beverly Broadway	100%

Source of funding

HESIS is supported through an interagency agreement between the Department of Industrial Relations, Cal/OSHA, and the California Department of Public Health (formerly Department of Health Services), Occupational Health Branch.

Annual budget

$684,264 (2009-2010 fiscal year)