Vaccine-Preventable Disease Surveillance in California

2013 Annual Report

California Department of Public Health

Center for Infectious Diseases

Division of Communicable Disease Control

Immunization Branch

Vaccine-Preventable Diseases Epidemiology Section

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Table of Contents

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We are grateful to California local health jurisdiction (LHJ) staff for their continued support and tireless efforts in communicable disease surveillance and outbreak investigation. We also thank the healthcare providers and laboratorians who diligently reported case information to their LHJs.

PROGRAM OVERVIEW

The Immunization Branch of the California Department of Public Health (CDPH) is responsible for collecting surveillance data on vaccine-preventable diseases (VPDs) for the purposes of determining disease impact, assessing trends in disease occurrence, characterizing affected populations, prioritizing control efforts, and evaluating prevention strategies in California.

VACCINE-PREVENTABLE DISEASE SUMMARIES

Title 17 of the California Code of Regulations (CCR) (Sections 2500, 2505, 2593, 2641-2643, 2800-2812) requires healthcare providers and laboratories to report specified communicable diseases and conditions to the local health officer. Local health jurisdictions (LHJs) in turn report cases to CDPH and CDPH reports cases to the Centers for Disease Control and Prevention (CDC). Provisions of the Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule allow for the disclosure of patient health information without patient authorization for public health activities and purposes (e.g., routine disease reporting). Prompt reporting allows outbreaks to be recognized when control measures are most likely to be effective in preventing additional cases.

In this report, we describe the epidemiology of the following reportable VPDs in California: diphtheria, *Haemophilus influenza*e disease, hepatitis A, hepatitis B, measles, meningococcal disease, mumps, pertussis, poliovirus infection, rubella, tetanus, and varicella. Vaccine-preventable conditions such as zoster, rotavirus gastroenteritis, human papillomavirus (HPV) infection, and invasive pneumococcal disease (other than pneumococcal meningitis) are not currently reportable under State reporting regulations.

Unless otherwise noted, the data in this summary are final annual totals for reported cases of VPDs, as prepared by the CDPH Immunization Branch. Case rates were calculated using population estimates provided by the California Department of Finance (DOF) Demographic Research Unit. Surveillance case definitions were adapted from position statements published by the Council of State and Territorial Epidemiologists (CSTE).

Diphtheria

Background

Corynebacterium diphtheriae is an aerobic gram-positive bacillus. Only toxigenic strains can cause severe disease. Toxin production occurs only when the bacillus is itself infected by a specific virus carrying the genetic information for the toxin. The toxin inhibits cellular protein synthesis and is responsible for local tissue destruction and membrane formation. The toxin produced at the site of the membrane is absorbed into the bloodstream and then distributed to the tissues of the body. Respiratory tract diphtheria usually occurs as membranous nasopharyngitis or obstructive laryngotracheitis. The toxin is responsible for the major complications of myocarditis and neuritis.

C. *diphtheriae* is spread by respiratory tract droplets and by contact with discharges from skin lesions. Susceptible persons may acquire toxigenic diphtheria bacilli in the nasopharynx. The incubation period of diphtheria is 2–5 days (range, 1–10 days).

Epidemiology

In the 1920s in the United States, 100,000–200,000 cases of diphtheria and 13,000–15,000 deaths were reported each year. The number of cases gradually declined to about 19,000 cases in 1945 and declined more rapidly in the late 1940s with the widespread use of diphtheria toxoid. Diphtheria toxoid was developed around 1921 but was not widely used until the early 1930s. It was incorporated with tetanus toxoid and pertussis vaccine and became routinely used in the 1940s. After a primary series of three diphtheria toxoid doses in adults or four doses in infants, a protective level of antitoxin is reached in more than 95%. Booster doses are recommended every 10 years.

Respiratory diphtheria is now extraordinarily rare in the United States and most patients identified in the U.S. with diphtheria in recent years were exposed to C. *diphtheriae* in parts of the world where it is still endemic (Table 1). The last reported case in the U.S. was in New York State in 2012. The last case prior to that was in 2003 in a traveler returned to Pennsylvania from Haiti. However, C. *diphtheriae* may continue to circulate in areas of the U.S. with previously endemic diphtheria. In 1996, 10 isolates of C. *diphtheria,* eight of which were toxigenic, were obtained from persons in a Native American community in South Dakota. None of the infected persons had classic diphtheria disease, although five had either pharyngitis or tonsillitis.

Table 1. Countries with endemic diphtheria.

Africa	Algeria, Angola, Egypt, Eritrea, Ethiopia, Guinea, Niger, Nigeria, Sudan, Zambia, and other sub-Saharan countries
Americas	Bolivia, Brazil, Colombia, Dominican Republic, Ecuador, Haiti, and Paraguay
Asia/South Pacific	Bangladesh, Bhutan, Burma (Myanmar), Cambodia, China, India, Indonesia, Laos, Malaysia, Mongolia, Nepal, Pakistan, Papua New Guinea, Philippines, Thailand, and Vietnam
Middle East	Afghanistan, Iran, Iraq, Saudi Arabia, Syria, Turkey, and Yemen
Eastern Europe (including some countries in Asia)	Albania, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan

Surveillance Case Definition (2010)

California healthcare providers and laboratories are required to report cases of diphtheria to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all probable and confirmed diphtheria cases to CDPH using the following case definition:

Case Classification

Probable:
In the absence of a more likely diagnosis, an upper respiratory tract illness with:

- An adherent membrane of the nose, pharynx, tonsils, or larynx; AND
- Absence of laboratory confirmation; AND
- Lack of epidemiologic linkage to a laboratory-confirmed case of diphtheria.

Confirmed:
An upper respiratory tract illness with an adherent membrane of the nose, pharynx, tonsils, or larynx; and any of the following:

- Isolation of *Corynebacterium diphtheriae* from the nose or throat; OR
- Histopathologic diagnosis of diphtheria; OR
- Epidemiologic linkage to a laboratory-confirmed case of diphtheria.

Epidemiologic Summary

No cases of diphtheria were reported in California in 2013.

Only three cases of diphtheria have been reported in California since 1994. The most recent case was reported in 2002.

For more information about diphtheria, please visit the CDPH Diphtheria Webpage at:
http://www.cdph.ca.gov/HEALTHINFO/DISCOND/Pages/Diphtheria.aspx

Haemophilus influenzae Disease

Background

The bacterium *Haemophilus influenzae* can be isolated in six encapsulated forms (types a-f) and also in unencapsulated forms. Invasive *H. influenzae* disease includes pneumonia, bacteremia, meningitis, epiglottitis, and septic arthritis. Both type b and non-type b encapsulated strains (a, c-f) can cause similar disease, but only type b is vaccine-preventable. The polysaccharide capsule is an important virulence factor; unencapsulated or "nontypeable" strains typically do not cause invasive disease. Pharyngeal colonization with *H. influenzae* is relatively common, especially with unencapsulated strains and non-b capsular strains.

Epidemiology

Before effective *Haemophilus influenzae* type b (Hib) vaccines were introduced in 1987, one in 200 children developed invasive Hib disease by the age of 5 years. Sixty percent of these children had meningitis; 3%-6% died. Virtually all invasive disease in the prevaccine era was due to capsular type b and Hib was the most common cause of bacterial meningitis. Since the introduction of Hib conjugate vaccines in the U.S., the incidence of invasive Hib disease has declined by 99%. Invasive Hib disease in the U.S. today occurs primarily in underimmunized children and among infants too young to have completed the primary vaccination series. The majority of invasive *H. influenzae* cases reported in children in recent years have been caused by non-type b strains.

Surveillance Case Definition (2010)

California healthcare providers and laboratories are required to report cases of invasive *Haemophilus influenzae* disease caused by all serotypes in persons <15 years of age to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all probable and confirmed invasive *Haemophilus influenzae* cases <15 years of age to CDPH using the following case definition:

Clinical Description
Invasive disease may be manifest as pneumonia, bacteremia, meningitis, epiglottitis, septic arthritis, cellulitis, or purulent pericarditis; less common infections include endocarditis and osteomyelitis.

Case Classification

Probable:
Meningitis with detection of *Haemophilus influenzae* type b antigen in cerebrospinal fluid (CSF)

Confirmed:
Isolation of *Haemophilus influenzae* from a normally sterile body site (e.g., blood or CSF, or, less commonly, joint, pleural, or pericardial fluid)

Epidemiologic Summary

In 2013, a total of 46 invasive *Haemophilus influenzae* disease cases in persons <15 years of age were reported statewide (Table 2). Of 46 cases, 3 (7%) were fatal. The fatalities occurred in two infants <12 months of age and a 5-year-old child. Serotyping was attempted on 41 (89%) isolates and none were identified as Hib (Table 3).

Of the 41 isolates with known serotype, 8 (20%) were serotype a, 1 (2%) was serotype c, 1 (2%) was serotype e, 4 (10%) were serotype f, 2 (5%) were identified only as other [a, c-f (non-b)], and 25 (61%) were nontypeable. Two of the fatal cases were identified as serotype a and one was non-typeable. No cases of Hib in children <15 years of age have been reported in California since 2011.

Table 2. Invasive *Haemophilus influenzae* disease cases <15 years of age of all serotypes by year of onset and local health jurisdiction -- California, 2012–2013

	2012	2013
CALIFORNIA	32	46
Alameda*	3	1
City of Berkeley*	0	0
Alpine	0	0
Amador	0	0
Butte	0	0
Calaveras	0	0
Colusa	0	0
Contra Costa	0	0
Del Norte	0	0
El Dorado	0	0
Fresno	1	6
Glenn	0	0
Humboldt	0	0
Imperial	0	0
Inyo	0	0
Kern	1	1
Kings	0	0
Lake	0	0
Lassen	0	0
Los Angeles*	7	12
City of Long Beach*	0	0
City of Pasadena*	0	0
Madera	0	0
Marin	0	1
Mariposa	0	0
Mendocino	0	0
Merced	0	0
Modoc	0	0
Mono	0	0
Monterey	1	0
Napa	0	0
Nevada	0	0
Orange	1	0
Placer	0	0
Plumas	0	0
Riverside	2	5
Sacramento	1	5
San Benito	0	0
San Bernardino	2	2
San Diego	4	1
San Francisco	1	0
San Joaquin	2	1
San Luis Obispo	0	0
San Mateo	1	1
Santa Barbara	0	2
Santa Clara	1	2
Santa Cruz	0	0
Shasta	0	0
Sierra	0	0
Siskiyou	1	0
Solano	0	0
Sonoma	0	0
Stanislaus	0	2
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	2	1
Tuolumne	0	0
Ventura	1	2
Yolo	0	1
Yuba	0	0

*City health jurisdictions not included in county total.

Table 3. Number of reported invasive *Haemophilus influenzae* disease cases <15 years of age by serotype, sex and race/ethnicity -- California, 2013

All cases	46
Serotype	
a	8
b (Hib)	0
c	1
e	1
f	4
other [a, c-f (non-b)]	2
nontypeable	25
unknown	5
Age	
<12 mos	21
1-14 years	25
Race/Ethnicity‡	
Asian or Pacific Islander	0
Black, non-Hispanic	0
Hispanic, all races	21
Other/Multiple Race	1
White, non-Hispanic	9
Sex	
Male	31
Female	15

‡15 cases had unknown race/ethnicity

Race/ethnicity categories are mutually exclusive

For more information about *Haemophilus influenzae* type b (Hib), please visit the CDPH *Haemophilus Influenzae* type b (Hib) Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/HaemophilusInfluenzaetypeb(Hib).aspx

Hepatitis A Infection

Background

Hepatitis A virus, which can cause an acute viral infection of the liver, is a picornavirus in the family *Picornaviridae*, which are non-enveloped RNA viruses. Hepatitis A infection occurs world-wide but is most prevalent in developing areas with poor sanitary and hygienic conditions, such as parts of Africa, Asia, and Central/South America. Transmission of hepatitis A virus occurs through the fecal-oral route, usually via person-to-person contact or through consumption of contaminated food or water. The incubation period for hepatitis A ranges from 15 to 50 days and an infected individual will shed virus in his or her fecal matter 10 to 12 days after infection and up to three weeks after symptoms onset.

Characteristic symptoms of hepatitis A infection include general malaise, jaundice (yellowing of the skin and/or eyes), abdominal pain, loss of appetite, and dark urine. In rare cases hepatitis A can result in liver failure and/or death. In 2006, the hepatitis A vaccine was recommended routinely for all children at 1 year of age. Other persons recommended to receive hepatitis A vaccine include persons traveling to countries where hepatitis A is common, men who have sex with men, users of illegal injection and noninjection drugs, persons with chronic liver disease, persons with clotting disorders, persons who work with hepatitis A infected primates or with hepatitis A virus in a research laboratory, and household members and other close contacts of adopted children newly arriving from countries where hepatitis A is common.

The vaccine is highly effective, with two doses conferring protection in 95% of recipients for at least 15 years.

While hepatitis A infection rates have declined by 95% in the United States since licensure of the vaccine in 1995, cases among travelers are still fairly common. Also, clusters and outbreaks continue to occur from infected food handlers who do not use proper hygiene or through ingestion of imported contaminated food from endemic countries.

In 2003, the largest hepatitis A outbreak in U.S. history was caused by contaminated green onions served at a single restaurant in Pennsylvania. The outbreak sickened more than 600 individuals and killed 4 people.

Recently several outbreaks in North America and Europe have been associated with frozen berries and sun-dried tomatoes.

Surveillance Case Definition (2012)

California healthcare providers are required to report cases of hepatitis A infection to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all confirmed hepatitis A cases to CDPH using the following case definition:

Clinical Case Definition

An acute illness with a discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) or aspartate aminotransferase (AST) levels.

Laboratory Criteria for Diagnosis

Immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive

Case Classification

Confirmed:

- A case that meets the clinical case definition and is laboratory confirmed; OR
- A case that meets the clinical case definition and occurs in a person who has an epidemiologic link with a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms)

Epidemiologic Summary

In 2013, a total of 255 hepatitis A cases were reported statewide in 37 (61%) of 61 LHJs (Table 4).

The statewide incidence of reported hepatitis A infection in 2013 was 0.67 cases per 100,000 population. This was an increase from the previous year when 210 cases were reported in 34 (56%) LHJs at a rate of 0.55 cases per 100,000 population. The rise in cases from 2012 to 2013 is a result of a multi-state foodborne outbreak that occurred from March–August 2013. The outbreak sickened 165 persons across ten states who purchased and consumed a frozen berry mix that contained contaminated pomegranate arils imported from Turkey. California accounted for 80 (49%) of the outbreak cases. Cases occurred in 21 LHJs, with the majority (43; 54%) of cases in San Diego, Los Angeles, and Orange Counties.

Of the 255 cases with disease onset in 2013, 112 (44%) were hospitalized. One fatality was reported in 2013 in an unvaccinated adult male with pre-existing conditions who was homeless, which is a risk factor for hepatitis A. The median age of all cases in 2013 was 42 years (range: 1–91 years). Persons aged 30-39 years had the highest rate of hepatitis A infection (1.03 per 100,000 population), followed by persons aged 60 years and above (0.85 per 100,000 population) (Table 5). There were 14 cases in children under the age of 18 accounting for 5% of all confirmed cases. Of these, 8 (57%) were hospitalized and 1 (12%) had previously been vaccinated against hepatitis A.

Non-hispanic whites had the highest rate of hepatitis A infection in 2013 (0.80 per 100,000 population) which was an increase from 2012 when the rate was 0.61 per 100,000 population. The highest rate of infection in 2012 was among persons in the "Other race/ethnicity" group, which includes American Indians, Alaskan Natives, multi-racial and other race/ethnicities (Table 5).

In 2013 males and females became infected at similar rates (0.67 and 0.66 per 100,000 population, respectively), differing from previous years in which males became infected at a slightly higher rate than females (Table 5).

Among the 175 non-outbreak associated cases in 2013, foreign travel to endemic areas was the most common risk factor identified, with 70 (40%) of the cases reporting foreign travel during their exposure period (2-7 weeks prior to disease onset) [Figure 1]. Other risk factors during the exposure period included consuming raw or undercooked shellfish (26; 15%), being a close contact of a person with hepatitis A (7; 4%), illicit drug use (4; 2%) having more than one sexual partner (4; 2%), and being homeless (4; 2%). These categories are not mutually exclusive and some cases had more than one risk factor. In 81 (46%) of the 175 cases, no known reason for infection or risk factors were identified.

For more information about hepatitis A infection, please visit the CDPH Hepatitis A Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/HepatitisA.aspx

Table 4. Reported hepatitis A infection cases by local health jurisdiction-- California 2012-2013

	2012	2013
CALIFORNIA	210	255
Alameda*	2	6
City of Berkeley*	1	1
Alpine	0	0
Amador	0	0
Butte	0	0
Calaveras	0	0
Colusa	0	1
Contra Costa	5	10
Del Norte	0	0
El Dorado	1	5
Fresno	3	3
Glenn	0	0
Humboldt	1	3
Imperial	5	0
Inyo	0	0
Kern	5	4
Kings	1	0
Lake	1	1
Lassen	0	0
Los Angeles*	47	60
City of Long Beach*	1	6
City of Pasadena*	0	0
Madera	0	1
Marin	1	0
Mariposa	0	1
Mendocino	0	2
Merced	2	0
Modoc	0	1
Mono	0	0
Monterey	0	2
Napa	0	0
Nevada	1	2
Orange	25	24
Placer	1	0
Plumas	0	0
Riverside	10	9
Sacramento	7	5
San Benito	0	0
San Bernardino	5	10
San Diego	38	40
San Francisco	5	4
San Joaquin	4	3
San Luis Obispo	4	2
San Mateo	1	9
Santa Barbara	1	1
Santa Clara	9	7
Santa Cruz	2	7
Shasta	0	3
Sierra	0	0
Siskiyou	1	1
Solano	2	3
Sonoma	2	2
Stanislaus	2	4
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	0	4
Tuolumne	1	0
Ventura	13	7
Yolo	0	1
Yuba	0	0

*City health jurisdictions not included in county total.

Table 5. Reported hepatitis A infection cases by age, race/ethnicity, and sex -- California, 2013

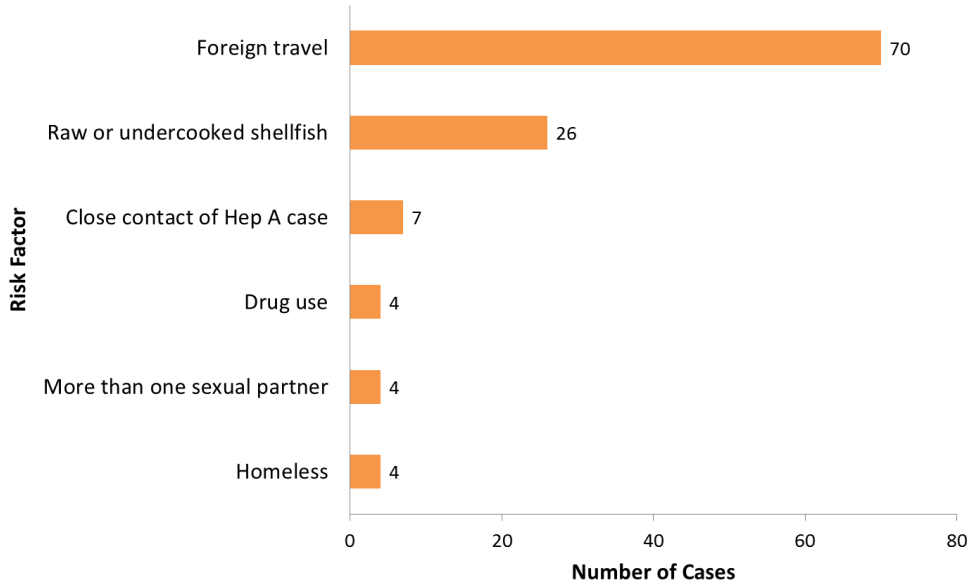
	Cases	Rate
Total		
California	255	0.67
Age‡		
0-9	5	0.10
10-19	14	0.27
20-29	43	0.77
30-39	54	1.03
40-49	41	0.79
50-59	41	0.81
60+	57	0.85
Race/Ethnicity*		
Asian or Pacific Islander	32	0.63
Black	5	0.23
Hispanic	56	0.38
Other¥	5	0.43
White	120	0.80
Sex		
Female	127	0.66
Male	128	0.67

‡Most persons 0-16 years old should have been vaccinated according to previous and current ACIP recommendations

*37 persons had unknown race/ethnicity

¥ Other includes American Indian/Native Alaskan, multiple race and other race/ethnicity

Figure 1. Reported risk factors of hepatitis A infection cases – California, 2013



*Categories are not mutually exclusive; some cases had more than one risk factor
Figure does not include cases linked to the 2013 frozen berry outbreak

Hepatitis B Infection, Acute

Background

Hepatitis B virus is transmitted through contact with infected blood or body fluids. Approximately 79% of newly acquired cases of hepatitis B infection in adults are associated with high-risk sexual activity or injection drug use. Infants born to mothers with hepatitis B infection can develop perinatal hepatitis B (see page 15). However, vaccination and prophylaxis of newborns prevents most instances of vertical transmission. Acute hepatitis B infection may be asymptomatic or symptomatic. The likelihood of developing symptomatic disease is age-dependent with infants and young children least likely to experience symptoms, which develop on average 90 days after infection. Presentation may vary from nonspecific illness (malaise or anorexia) to clinical hepatitis with jaundice. In rare instances, persons develop fulminant hepatitis requiring liver transplant.

Most people resolve acute infection, but some progress to chronic infection. The likelihood of developing chronic infection is age-dependent. Chronic infection develops in more than 90% of infected infants, but in only 5-10% of infected older children and adults. Approximately 25% of those who become chronically infected during childhood and 15% of those who become chronically infected after childhood die prematurely from cirrhosis or liver cancer, and the majority remain asymptomatic until onset of cirrhosis or end-stage liver disease.

Hepatitis B vaccine has been recommended for all infants since 1991and is also recommended for susceptible sex partners of infected persons, sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., >1 sex partner during the previous 6 months), persons seeking evaluation or treatment for a sexually transmitted disease, men who have sex with men, injection drug users, susceptible household contacts of infected persons, healthcare and public safety workers at risk for exposure to blood or blood-contaminated body fluids, persons with end-stage renal disease, including predialysis, hemodialysis, peritoneal dialysis, and home dialysis patients, residents and staff of facilities for developmentally disabled persons, travelers to regions where hepatitis B infection is common, persons with chronic liver disease, persons with HIV infection, unvaccinated adults with diabetes mellitus who are aged 19 through 59 years (discretion of clinicians for unvaccinated adults with diabetes mellitus who are aged ≥60 years), and all other persons seeking protection from HBV infection.

Therefore, all unimmunized adults should be vaccinated in settings where a high proportion of adults are likely to be at risk for hepatitis B infection (facilities for testing and treatment of sexually transmitted infections (STI) and human immunodeficiency virus (HIV), correctional facilities, drug treatment facilities, dialysis centers, etc.). Three doses of hepatitis B vaccine provide protection in 98-100% of infants and >90% of teens and adults ≤40 years of age. After 40 years of age, the proportion of persons who have a protective antibody response after a 3-dose vaccination regimen declines below 90%, and by 60 years of age, protective levels of antibody develop in only 75% of vaccinated persons.

The incidence of acute hepatitis B infection has declined dramatically in the United States from approximately 26,000 cases per year in the mid-1980s to 2,895 cases in 2012. Decreases during the 1980s and early 1990s were largely due to HIV education and prevention efforts that reduced high-risk sexual and injection drug use behaviors. During 1990-2004, acute hepatitis B infection cases among children and adolescents declined dramatically due to universal childhood vaccination.

Although the incidence of acute hepatitis B infection is decreasing, hepatitis B infection remains a major health issue in the United States; more than 700,000 persons have chronic hepatitis B infection and many persons with acute hepatitis B infection are asymptomatic and undiagnosed. Therefore, data on reported acute hepatitis B infection cases does not represent the complete burden nor the actual number of new hepatitis B infection cases.

Surveillance Case Definition (2012)

California healthcare providers are required to report cases of acute hepatitis B infection to the local health jurisdiction, in accordance with Title 17 of the California Code of Regulations.

Clinical Description

Acute illness with a discrete onset of acute viral hepatitis symptoms (e.g. fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either jaundice or serum alanine aminotransferase levels >100.

Laboratory Criteria

- Hepatitis B surface antigen (HBsAg) positive; AND
- Immunoglobulin M (IgM) antibody to hepatitis B virus positive (if done)

Case Classification

Confirmed:

- Case that meets the clinical case definition and is laboratory confirmed; OR
- Case with a negative HBsAg result within 6 months prior to a positive hepatitis B e antigen (HBeAg), hepatitis B virus DNA, or HBsAg result

Epidemiologic Summary

In 2013, 139 acute hepatitis B infection cases were reported for a rate of 0.36 per 100,000 population (Table 6). Compared to 2012, this is a 1% decrease in cases.

Males accounted for 71% of cases (Table 7). Hispanic and non-Hispanic white persons accounted for 32% and 30% of cases, respectively. The median age was 44 years and the most common age group was 30-49 years (57% of cases). There were no reported cases <18 years of age.

The most common risk behavior or exposure among acute HBV cases was sexual contact (43; 31%), including men who have sex with men (30; 22%) and persons with more than one sex partner during their possible exposure period (24; 17%) (Figure 2). Fifteen (11%) patients were injection-drug users, 9 (6%) received an accidental stick/puncture or other exposure to blood, and 2 (1%) had household contact with a suspected or confirmed hepatitis B patient. Additionally, 17 (12%) patients had one or more possible healthcare-related exposures, including fingersticks or blood draws (14; 10%), surgery (3; 2%) hemodialysis (1; 1%), or blood transfusion (1; 1%). Sixty-eight (49%) patients had no documented risk behaviors or exposures.

Of the cases in 2013, 73 (53%) were hospitalized and 2 (1%) died.

For more information about HBV infection, please visit the CDPH Hepatitis B Webpage at:
http://www.cdph.ca.gov/HealthInfo/discond/Pages/HepatitisB.aspx

Table 6. Reported acute hepatitis B infection cases by local health jurisdiction – California, 2012–2013

	2012	2013
CALIFORNIA	141	139
Alameda*	6	6
City of Berkeley*	0	0
Alpine	0	0
Amador	0	0
Butte	2	2
Calaveras	0	0
Colusa	0	0
Contra Costa	2	2
Del Norte	0	0
El Dorado	1	0
Fresno	2	4
Glenn	0	0
Humboldt	1	0
Imperial	0	2
Inyo	0	0
Kern	10	3
Kings	0	0
Lake	0	0
Lassen	0	0
Los Angeles*	39	54
City of Long Beach*	0	4
City of Pasadena*	1	3
Madera	0	2
Marin	1	0
Mariposa	0	0
Mendocino	0	0
Merced	0	0
Modoc	0	0
Mono	0	0
Monterey	4	0
Napa	0	1
Nevada	0	0
Orange	7	12
Placer	0	2
Plumas	0	0
Riverside	17	3
Sacramento	5	4
San Benito	0	0
San Bernardino	12	7
San Diego	14	9
San Francisco	2	4
San Joaquin	3	2
San Luis Obispo	1	0
San Mateo	1	2
Santa Barbara	1	1
Santa Clara	5	4
Santa Cruz	0	0
Shasta	0	1
Sierra	0	0
Siskiyou	0	0
Solano	0	0
Sonoma	0	0
Stanislaus	1	5
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	2	0
Tuolumne	0	0
Ventura	1	0
Yolo	0	0
Yuba	0	0

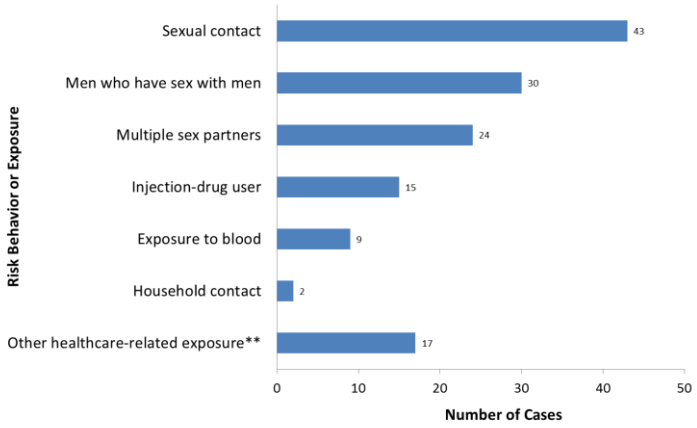
*City health jurisdictions not included in county total.

Table 7. Number and incidence rate of reported acute hepatitis B cases, by age, sex, and race/ethnicity – California, 2013

	Cases	Rate
Total		
California	139	0.36
Age*		
0-9	0	0.00
10-19	2	0.04
20-29	12	0.21
30-39	39	0.74
40-49	40	0.77
50-59	28	0.55
60+	18	0.27
Race/Ethnicity‡		
American Indian/Native Alaskan	0	0.00
Asian or Pacific Islander	13	0.26
Black	22	1.00
Hispanic	44	0.30
Other or Multiple Race	4	0.40
White	42	0.28
Sex		
Male	99	0.52
Female	39	0.20
Transgender	1	-

*Most persons 0-19 years old should have been vaccinated according to current and previous ACIP recommendations
‡14 cases had unknown race/ethnicity

Figure 2. Reported risk factors* for acute hepatitis B infection cases -- California, 2013



*Categories are not mutually exclusive; some cases had more than one risk behavior/exposure
** Includes hemodialysis, blood transfusion, and surgery

Perinatal Hepatitis B Infection

Background

Hepatitis B virus can be transmitted perinatally from mother to child during birth. It is important that all pregnant women receive prenatal testing for hepatitis B infection, i.e. hepatitis B surface antigen (HBsAg), and are reported to the LHJ if they test HBsAg-positive to ensure that their infants receive appropriate postexposure prophylaxis (PEP) at birth.

Infants who are born to HBsAg-positive women should receive hepatitis B immune globulin (HBIG) and hepatitis B vaccine within 12 hours of birth. The second and third doses of the hepatitis B vaccine series are administered at 1-2 months of age and at 6 months of age, respectively. Hepatitis B vaccine is 95% effective in preventing hepatitis B infection in infants born to HBsAg-positive women. Post-vaccination serologic testing for HBsAg and hepatitis B surface antibody (anti-HBs) to HBsAg is recommended for infants of infected women after the infant is 9 months of age, or from 3–6 months after completion of the vaccine series.

Unfortunately, even with appropriate PEP, some infants born to infected women become infected and eventually develop chronic hepatitis B infection. Infected infants are then reported to CDPH using the criteria as outlined below.

Surveillance Case Definition (1995)

California healthcare providers are required to report cases of perinatal hepatitis B infection to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all confirmed perinatal hepatitis B infection cases to CDPH using the following case definition:

Clinical Case Definition

- Infant has an HBsAg-positive laboratory test result
- Age of infant is 1 month to 24 months at time of testing
- Infant was born in the United States or in U.S. territories to an HBsAg-positive mother

Epidemiologic Summary

In 2013, 16 perinatal hepatitis B infection cases were reported statewide in Alameda (2), Fresno (1), Los Angeles (1), Orange (3), Sacramento (2), San Diego (4), San Joaquin (1), Santa Barbara (1), and Santa Clara (1) counties. Fifteen of the 16 children were born in 2012 and one was born in 2011. The range of ages for the cases at the time of post-vaccination serologic testing was 9 to 22 months of age. Fifteen of the 16 children had received appropriate PEP at birth; one infant received HBIG and HBV vaccine at approximately 14 hours after birth. All children completed the HBV vaccine series. Perinatal hepatitis B infection cases are typically reported as soon as the laboratory reports are received by the LHJ.

For more information about perinatal hepatitis B infection, please visit the CDPH Perinatal Hepatitis B Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/PerinatalHepatitisBPrevention.aspx

Measles

Background

Measles virus is an RNA virus in the *Paramyxoviridae* family and is considered one of the most contagious infectious agents. Endemic transmission of measles was declared eliminated in the United States in 2000. In 2002, measles was declared eliminated from the entire World Health Organization (WHO) Region of the Americas, which includes all of North America, and Central and South America. However, measles is still circulating in the rest of the world including Western Europe, Africa, and Asia. Measles continues to be imported into the U.S. by susceptible persons who travel or live in measles-endemic areas where they are infected before return to the U.S.

The Advisory Committee on Immunization Practices (ACIP) recommends two doses of measles containing vaccine as part of the routine childhood vaccination schedule: the first dose is recommended at 12-15 months and a second dose between 4-6 years. Infants living in or traveling to measles endemic areas can be vaccinated as early as 6 months of age. After one dose of vaccine approximately 95% of people will be protected against measles, and after two doses more than 99% will be protected against measles. A very high level (92%-95%) of population immunity is required to interrupt measles transmission.

Surveillance Case Definition (2013)

California healthcare providers are required to report cases of measles to the LHJ, in accordance with Title 17 of the California Code of Regulations using the following case definition:

Clinical Description

An acute illness characterized by:

- Generalized, maculopapular rash lasting ≥3 days; AND
- Temperature ≥101°F or 38.3°C; AND
- Cough, coryza, or conjunctivitis.

Case Classification

Probable:

In the absence of a more likely diagnosis, an illness that meets the clinical description with:

- No epidemiologic linkage to a laboratory-confirmed measles case; AND
- Noncontributory or no measles laboratory testing.

Confirmed:

An acute febrile rash illness† with:

- Isolation of measles virus‡ from a clinical specimen; OR
- Detection of measles-virus specific nucleic acid‡ from a clinical specimen using polymerase chain reaction; OR
- Immunoglobulin G (IgG) antibody seroconversion‡ or a significant rise in measles IgG antibody‡ using any evaluated and validated method; OR
- A positive serologic test for measles immunoglobulin M (IgM) antibody‡§; OR
- Direct epidemiologic linkage to a case confirmed by one of the methods above.

† Temperature does not need to reach ≥101°F/38.3°C and rash does not need to last ≥3 days.
‡ Not explained by MMR vaccination during the previous 6-45 days.
§ Not otherwise ruled out by other confirmatory testing or more specific measles testing in a public health laboratory.

Epidemiologic Summary

In 2013, a total of 18 measles cases were reported statewide from 10 of 61 LHJs (Table 8). This was an increase from the previous year, when 8 cases were reported by 3 LHJs. Dates of rash onset ranged from January 16 to December 29, 2013.

Of the 18 cases with disease onset in 2013, 6 were hospitalized, including three adults and three children, one of which was an infant <12 months (Table 9). The last fatal measles case in California was reported in 2003. The median age of 2013 cases was 24 years (range: 5 months - 61 years). Thirteen cases were confirmed by PCR, four by measles IgM only, and one by epi-link. Of the seven pediatric cases, all were unvaccinated (Table 10).

The majority of cases (72%) occurred in persons who reside in the United States. Among US resident measles cases 50% had international travel and 25% were exposed to infected travelers. Four (33%) had an unknown exposure. However, these four cases belonged to two clusters; presumably the two cases in each of these two clusters had a shared exposure to measles that was not identified or reported.

One outbreak occurred in 2013, which involved measles transmission on a flight from Europe. The index patient was an adult male who flew from Germany while infectious with measles and transmitted to three passengers on the flight.

Among the cases who acquired measles internationally, travel was reported to Western Europe, China, India, Russia, and Israel during the incubation period (Table 11).

For more information about measles, please visit the CDPH Measles Webpage at:
http://www.cdph.ca.gov/HealthInfo/discond/Pages/Measles.aspx

Table 8. Reported measles cases by local health jurisdiction[ǂ]
-- California, 2012–2013

	2012	2013
CALIFORNIA	8	18
Alameda*	0	0
City of Berkeley*	0	1
Alpine	0	0
Amador	0	0
Butte	0	0
Calaveras	0	0
Colusa	0	0
Contra Costa	0	0
Del Norte	0	0
El Dorado	0	0
Fresno	0	0
Glenn	0	0
Humboldt	0	0
Imperial	0	0
Inyo	0	0
Kern	0	0
Kings	0	0
Lake	0	0
Lassen	0	0
Los Angeles*	6	3
City of Long Beach*	0	0
City of Pasadena*	0	0
Madera	0	0
Marin	0	0
Mariposa	0	0
Mendocino	0	1
Merced	0	0
Modoc	0	0
Mono	0	0
Monterey	0	1
Napa	0	0
Nevada	0	0
Orange	0	2
Placer	0	0
Plumas	0	0
Riverside	1	1
Sacramento	0	0
San Benito	0	0
San Bernardino	0	0
San Diego	0	2
San Francisco	0	3
San Joaquin	0	0
San Luis Obispo	0	0
San Mateo	1	0
Santa Barbara	0	0
Santa Clara	0	0
Santa Cruz	0	3
Shasta	0	0
Sierra	0	0
Siskiyou	0	0
Solano	0	0
Sonoma	0	0
Stanislaus	0	0
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	0	0
Tuolumne	0	0
Ventura	0	1
Yolo	0	0
Yuba	0	0

ǂLocal health jurisdiction where case was identified.
*City health jurisdictions not included in county total.

Table 9. Characteristics of measles cases -- California, 2013 (N=18)

	Cases	Percent of Cases
Sex		
Male	10	56
Female	8	44
Age		
<12 months	2	11
1-4 years	1	6
5-19 years	4	22
≥ 20 years	11	61
Hospitalized		
Yes	6	33
No	12	67
MMR Status		
2 MMR	0	-
1 MMR	1	6
0 MMR	12	67
Unknown*	5	28
US Resident		
Yes	13	72
No	5	28
Source		
International	11	61
Indigenous	7	39
Among Indigenous Cases:		
Epidemiologic linkage to a case	3	43
No identified source	4	57
Genotype§		
D8	9	75
H1	1	8
D4	1	8
B3	1	8

*Includes self-reported vaccination status
§Viral specimens were available for 13 patients, specimens for one patient could not be genotyped

Over 170,000 confirmed cases of measles were reported globally in 2013 with notable outbreaks in Democratic Republic of Congo and the UK and ongoing transmission in the Indian sub-continent and South-east Asia.

Table 10. Measles cases by age and vaccination status -- California, 2013

Age	2 MMR	1 MMR	0 MMR	Unknown	Total Cases
0 -1 years	0	0	2	0	2
2 to 5 years	0	0	1	0	1
6 to 18 years	0	0	4	0	4
19 to 54 years	0	1	4	5	10
≥ 55 years	0	0	1	0	1

Table 11. Countries visited during incubation period reported by measles cases with international travel history -- California, 2013

Country	Number Reporting Travel
Germany	5
China	2
Belgium	1
India	1
Israel	1
Russia	1

Meningococcal Disease

Background

Invasive meningococcal disease (IMD) is caused by the bacterium *Neisseria meningitidis* and most commonly presents as meningitis and/or sepsis (bloodstream infection). IMD is a serious infection and the case-fatality rate is estimated to be 9% to 12%. Meningococcal bacteria are classified into 13 serogroups based on the structure of the outer polysaccharide capsule. Almost all IMD is caused by one of five serogroups: A, B, C, Y, and W. The meningococcal bacteria may be carried in the back of the throat without causing invasive disease, and as many as 10% of adolescents and adults are asymptomatic transient carriers of *N. meningitidis*. The incubation period of IMD is typically 3-7 days.

A quadrivalent conjugate vaccine (MenACWY) which provides protection against infection due to serogroups A, C, Y and W is routinely recommended for all adolescents and other high risk persons (military recruits, travelers to endemic areas, persons with asplenia or complement deficiency, etc.) in the United States.

Surveillance Case Definition (2010)

California healthcare providers and laboratories are required to report cases of meningococcal disease to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all suspect, probable, and confirmed meningococcal disease cases to CDPH using the following case definition:

Case Classification

Confirmed:

- Isolation of *Neisseria meningitidis*:
  - From a normally sterile body site (e.g., blood or cerebrospinal fluid, or, less commonly, synovial, pleural, or pericardial fluid); OR
  - From purpuric lesions.

Probable:

- Detection of *N. meningitidis*-specific nucleic acid in a specimen obtained from a normally sterile body site (e.g.,. blood or CSF), using a validated polymerase chain reaction (PCR) assay; OR
- Detection of *N. meningitidis* antigen:
  - in formalin-fixed tissue by immunohistochemistry (IHC); OR
  - in CSF by latex agglutination.

Suspected:

- Clinical purpura fulminans in the absence of a positive blood culture; OR
- Gram-negative diplococci, not yet identified, isolated from a normally sterile body site (e.g., blood or cerebrospinal fluid [CSF]).

Epidemiologic Summary

In 2013, 111 IMD cases were reported statewide, for an incidence rate of 0.29 cases per 100,000 population (Table 12). Of the 111 cases, 105 (95%) were serogrouped; serogroups B (39; 37%) and C (43; 41%) were most frequently identified (Figure 3). Sixteen (14.4%) fatalities were reported in 2013; 75% of fatalities were caused by serogroup C.

Twenty-four (22%) cases occurred in infants and children less than 18 years of age, including 1 fatality (Table 13). Among all serogroups, the highest incidence of disease occurred in infants less than 1 year of age (Figure 4). Of the pediatric cases, 8 (33%) were caused by a vaccine-preventable serogroup. Out of 34 patients with vaccine-preventable IMD with known vaccination status, only 1 (3%) had previously received any doses of meningococcal vaccine.

Three meningococcal disease clusters/outbreaks were reported in 2013. The first included 13 confirmed serogroup C cases occurring from October 2012 through April 2013 who all had epidemiologic linkages to Tijuana, Mexico. The second occurred among 2 high school sports teammates and was confirmed serogroup B. The third was confirmed serogroup B and occurred among college students residing at a large university in southern California. Five total cases were identified in this outbreak with disease onset occurring in May (1), November (3) and December (1). This outbreak prompted use of meningococcal serogroup B vaccine, licensed in Europe and Canada but not in the United States, among undergraduate students under a special investigational new drug authorization.

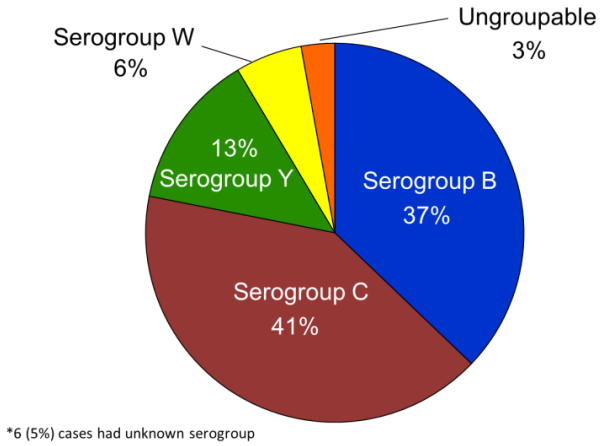
For more information about meningococcal disease, please visit the CDPH Meningococcal Disease Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/MeningococcalDisease.aspx

Table 12. Reported invasive meningococcal disease by year of onset and local health jurisdiction -- California, 2012–2013

	2012	2013
CALIFORNIA	88	111
Alameda*	8	5
City of Berkeley*	2	0
Alpine	0	0
Amador	0	0
Butte	1	0
Calaveras	0	0
Colusa	0	1
Contra Costa	2	4
Del Norte	0	0
El Dorado	0	0
Fresno	6	4
Glenn	0	0
Humboldt	0	0
Imperial	0	0
Inyo	0	0
Kern	9	1
Kings	0	0
Lake	1	0
Lassen	0	0
Los Angeles*	12	18
City of Long Beach*	0	1
City of Pasadena*	0	0
Madera	1	3
Marin	0	2
Mariposa	0	0
Mendocino	2	3
Merced	0	3
Modoc	0	0
Mono	0	0
Monterey	0	1
Napa	0	0
Nevada	0	0
Orange	4	5
Placer	0	0
Plumas	0	0
Riverside	2	3
Sacramento	6	4
San Benito	0	0
San Bernardino	2	9
San Diego	8	15
San Francisco	4	4
San Joaquin	2	1
San Luis Obispo	2	0
San Mateo	2	1
Santa Barbara	1	6
Santa Clara	3	3
Santa Cruz	0	2
Shasta	1	1
Sierra	0	0
Siskiyou	1	1
Solano	0	0
Sonoma	0	3
Stanislaus	1	0
Sutter	0	2
Tehama	1	0
Trinity	0	0
Tulare	1	3
Tuolumne	0	0
Ventura	3	1
Yolo	0	1
Yuba	0	0

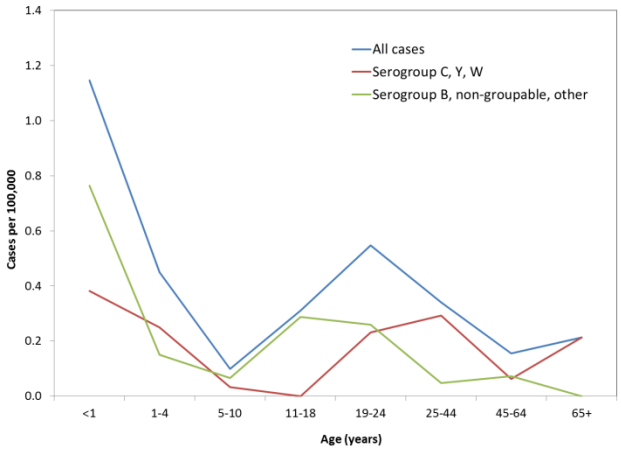
*City health jurisdictions not included in county total.

Figure 3. Invasive meningococcal disease cases with known serogroup by serogroup* – California, 2013 (n=105)



*6 (5%) cases had unknown serogroup

Figure 4. Invasive meningococcal disease cases by age and serogroup* -- California, 2013



*No serogroup A disease cases were identified

Table 13. Number and incidence rate* of reported invasive meningococcal disease cases by age, sex and race/ethnicity -- California, 2013

	All serogroups		Vaccine-preventable†	
	Cases	Rate	Cases	Rate
California	111	0.29	63	0.17
Age				
<1	6	1.15	2	0.38
1-4	9	0.45	5	0.25
5-10	3	0.10	1	0.03
11-18	13	0.31	0	0.00
19-24	19	0.55	8	0.23
25-44	36	0.34	31	0.29
45-64	15	0.16	6	0.06
65+	10	0.21	10	0.21
Race/Ethnicity‡				
Asian or Pacific Islander	1	0.02	0	0.00
Black	11	0.50	8	0.36
Hispanic	35	0.24	21	0.14
Other/Multiple Race	4	0.35	3	0.26
White	46	0.31	23	0.15
Sex				
Male	62	0.33	34	0.18
Female	49	0.26	29	0.15

* Incidence rate per 100,000 population
† Serogroups A, C, Y and W
‡ 14 cases had unknown race/ethnicity

Mumps

Background

Mumps virus, a paramyxovirus, causes an acute viral syndrome, and its most characteristic feature is swelling of one or more of the salivary glands (usually the parotids). Complications of mumps include orchitis, thrombocytopenia, encephalitis, and deafness, among others. Mumps virus is transmitted by contact with respiratory secretions or droplets from the respiratory tracts of infected persons. Approximately one-third of infections do not cause clinically apparent disease, which makes disease identification and prevention of spread difficult.

The ACIP recommends two doses of mumps containing vaccine as part of the routine childhood vaccination schedule: the first dose is recommended at 12-15 months and a second dose between 4-6 years. Mumps vaccine effectiveness after 2 doses is 88% however, protection may wane over time. In recent mumps outbreaks on college campuses, the majority of cases had received 2 doses of MMR vaccine.

Surveillance Case Definition (2012)

California healthcare providers are required to report cases of mumps to the LHJ, in accordance with Title 17 of the California Code of Regulations using the following case definition:

Case Classification

Suspected:

- Parotitis, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis, OR
- A positive lab result with no mumps clinical symptoms (with or without epidemiological-linkage to a confirmed or probable case).

Probable:

- Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in:
  - A person with a positive test for serum anti-mumps immunoglobulin M (IgM) antibody; OR
  - A person with epidemiologic linkage to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.

Confirmed:

- A positive mumps laboratory confirmation for mumps virus with reverse transcription polymerase chain reaction (RT-PCR) or culture in a patient with an acute illness characterized by any of the following:
  - Acute parotitis or other salivary gland swelling, lasting at least 2 days
  - Aseptic meningitis
  - Encephalitis
  - Hearing loss
  - Orchitis
  - Oophoritis
  - Mastitis
  - Pancreatitis

Epidemiologic Summary

In 2013, a total of 4 confirmed and 26 probable mumps cases were reported statewide (Table 14). Probable mumps cases are classified on the presence of clinical symptoms and mumps IgM positivity. The mumps case definition changed in 2012, such that only clinically compatible cases with virus detection by PCR could be considered confirmed. In the former case definition additional types of laboratory testing were considered confirmatory; therefore, fewer cases in 2012 met the confirmed case definition than in prior years. However, since mumps IgM detection has a high rate of false positivity generally, and persons who have received 2 MMR can have an attenuated IgM response upon mumps infection, viral detection by PCR should be considered more reliable at detecting real cases.

The 30 confirmed and probable cases from 2013 were reported from 17 of 61 LHJs (see appendix). Three of the four confirmed cases reported international travel while only two of the 26 probable cases reported international travel. Epidemiologic characteristics of probable and confirmed mumps cases appear in Table 15.

For more information about mumps, please visit the CDPH Mumps Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/Mumps.aspx

Table 14. Reported confirmed and probable mumps by year of onset and local health jurisdiction -- California, 2012–2013ǂ

	2012	2013
CALIFORNIA	34	30
Alameda*	1	1
City of Berkeley*	0	0
Alpine	0	0
Amador	0	0
Butte	1	0
Calaveras	0	1
Colusa	0	0
Contra Costa	0	2
Del Norte	0	0
El Dorado	0	0
Fresno	0	1
Glenn	0	0
Humboldt	1	0
Imperial	0	0
Inyo	0	0
Kern	0	0
Kings	0	0
Lake	0	0
Lassen	0	0
Los Angeles*	13	9
City of Long Beach*	1	0
City of Pasadena*	0	0
Madera	0	0
Marin	1	0
Mariposa	0	0
Mendocino	0	0
Merced	0	0
Modoc	0	0
Mono	0	0
Monterey	1	0
Napa	0	0
Nevada	0	0
Orange	3	2
Placer	1	1
Plumas	0	0
Riverside	1	2
Sacramento	2	0
San Benito	0	0
San Bernardino	0	1
San Diego	1	2
San Francisco	0	2
San Joaquin	0	1
San Luis Obispo	0	0
San Mateo	1	1
Santa Barbara	1	1
Santa Clara	3	0
Santa Cruz	0	0
Shasta	0	0
Sierra	0	0
Siskiyou	0	0
Solano	2	0
Sonoma	0	0
Stanislaus	0	1
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	0	0
Tuolumne	0	0
Ventura	0	1
Yolo	0	1
Yuba	0	0

ǂ In 2012, CSTE changed the mumps case definition.

* City health jurisdictions not included in county total.

Table 15. Characteristics of confirmed and probable mumps cases -- California, 2013

		Cases	Percent of Cases
Case status			
	Probable	26	87
	Confirmed	4	13
Sex			
	Male	21	70
	Female	9	30
Age			
	<12 months	0	-
	1-4 years	3	10
	5-19 years	7	23
	≥ 20 years	20	67
Hospitalized			
	Yes	6	20
	No	24	80
MMR Status			
	3 MMR	1	3
	2 MMR	4	13
	1 MMR	3	10
	0 MMR	2	7
	Unknown	20	67
Source*			
	International	5	18
	Indigenous	23	82

*2 patients had an unknown travel history

Pertussis

Background

Pertussis, also known as whooping cough, is a highly contagious respiratory disease caused by the bacterium *Bordetella pertussis*. People with pertussis can have severe coughing attacks that make it difficult to breathe, resulting in a characteristic "whooping" sound at the end of a series of coughs when a breath is taken. Transmission of pertussis most commonly occurs when a susceptible person inhales aerosolized droplets from the respiratory tract of an infected person. The incubation period of pertussis is typically 7 to 10 days. Infants too young for vaccination are at the greatest risk for serious complications and death from pertussis.

Pregnant women should receive a dose of Tdap vaccine during each pregnancy between 27 and 36 weeks gestation, regardless of vaccination history. Contacts and caregivers of infants too young for vaccination should be up-to-date with pertussis vaccination to surround the infants with a "cocoon" of protection. Infants can begin the primary DTaP vaccine series as early as six weeks of age. In addition, adolescents and adults should receive a single Tdap dose. Immunity to pertussis from both vaccine and natural infection wanes over time, so pertussis can affect persons of any age.

Since the 1980s, there has been an increase in pertussis incidence in the United States. Pertussis occurs cyclically, with peaks in disease every 3 to 5 years. In 2010, California experienced an epidemic of pertussis that caused over 9,000 cases, including 10 infant deaths. This was the highest number of pertussis cases reported in California in over 60 years.

Surveillance Case Definition (2014)

California healthcare providers are required to report cases of pertussis to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all suspect, probable, and confirmed pertussis cases to CDPH using the following case definition:

Clinical Case Definition

A cough illness lasting ≥2 weeks with at least one of the following: paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent cause (as reported by a health professional)

Case Classification

Confirmed:

- An acute cough illness of any duration with isolation of *B. pertussis* from a clinical specimen; OR
- A case that meets the clinical case definition and is confirmed by detection of *B. pertussis*-specific nucleic acid by polymerase chain reaction (PCR); OR
- An acute cough illness of any duration with detection of *B. pertussis* antigen in formalin-fixed tissue by appropriate immunohistochemistry (IHC) methods; OR
- A case that meets the clinical case definition and is epidemiologically-linked directly to a laboratory-confirmed case of pertussis.

Probable:

- A case that meets the clinical case definition and is not laboratory-confirmed with culture or PCR and is not epidemiologically-linked directly to a confirmed case.

Suspect (reportable in California, only):

- An acute cough illness of any duration with detection of *B. pertussis*-specific nucleic acid by PCR; OR
- An acute cough illness of any duration with at least one of the following: paroxysms of coughing, inspiratory "whoop", or post-tussive vomiting, that is epidemiologically-linked directly to a confirmed case.

Epidemiologic Summary

In 2013, a total of 2,537 pertussis cases were reported statewide in 50 (82%) of 61 LHJs. This was an increase from the previous year, when 1,023 cases were reported in 44 (72%) LHJs (Table 16). The statewide incidence of reported pertussis in 2013 was 6.64 cases per 100,000 population.

Of the 2,537 cases with disease onset in 2013, 168 (7%) were hospitalized; 120 (71%) of the hospitalized patients were younger than 6 months of age. Two fatalities were reported; both were infants ≤2 months of age at time of disease onset who died in 2014. The median age of all cases in 2013 was 11 years (range: 0-86 years). The majority of cases (2,107; 83%) occurred in children less than 18 years of age. Of the 2,107 pediatric cases, 256 (12%) were in infants less than 6 months of age, and 1,305 (62%) were in children and adolescents 7-16 years of age (Figure 5). Of the 1,829 pediatric cases aged 6 months – 18 years, 1,395 (76%) were known to have previously received at least one dose of pertussis vaccine prior to illness onset, 171 (9%) were unimmunized against pertussis, and 263 (14%) had unknown pertussis immunization status.

Rates by race/ethnicity were highest for Hispanic infants under one year of age and lower for non-Hispanic infants of all racial groups (Figure 6). Among children and adolescents, the highest rates were in non-Hispanic whites.

Of the 2,537 cases reported in 2013, 1,752 (69%) were classified as confirmed, 278 (11%) as probable, and 507 (20%) as suspect. Among cases with complete information, the most commonly reported symptoms were paroxysmal coughing (86%), post-tussive vomiting (46%), inspiratory "whoop" (37%) and apnea (22%).

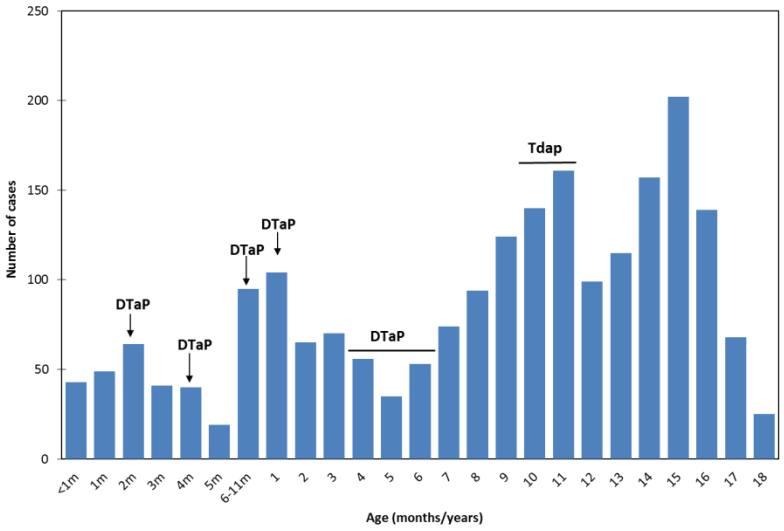
For more information about pertussis, please visit the CDPH Pertussis Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/Pertussis.aspx

Table 16. Reported pertussis cases by year of onset and local health jurisdiction -- California, 2012–2013

	2012	2013
CALIFORNIA	1023	2537
Alameda*	62	124
City of Berkeley*	6	13
Alpine	0	0
Amador	1	2
Butte	3	33
Calaveras	0	2
Colusa	0	0
Contra Costa	24	69
Del Norte	0	0
El Dorado	3	4
Fresno	16	44
Glenn	0	0
Humboldt	1	5
Imperial	8	3
Inyo	1	0
Kern	2	31
Kings	0	2
Lake	2	3
Lassen	0	0
Los Angeles*	209	342
City of Long Beach*	4	16
City of Pasadena*	1	2
Madera	0	10
Marin	5	184
Mariposa	0	0
Mendocino	0	6
Merced	0	1
Modoc	0	0
Mono	21	2
Monterey	17	49
Napa	6	13
Nevada	5	70
Orange	73	113
Placer	11	86
Plumas	0	1
Riverside	46	80
Sacramento	35	70
San Benito	1	1
San Bernardino	54	39
San Diego	162	408
San Francisco	30	59
San Joaquin	15	26
San Luis Obispo	14	17
San Mateo	23	104
Santa Barbara	11	28
Santa Clara	45	254
Santa Cruz	13	54
Shasta	2	7
Sierra	0	0
Siskiyou	2	5
Solano	10	15
Sonoma	18	51
Stanislaus	11	16
Sutter	0	2
Tehama	0	0
Trinity	0	0
Tulare	27	25
Tuolumne	1	2
Ventura	15	36
Yolo	6	4
Yuba	1	4

* City health jurisdictions not included in county total.

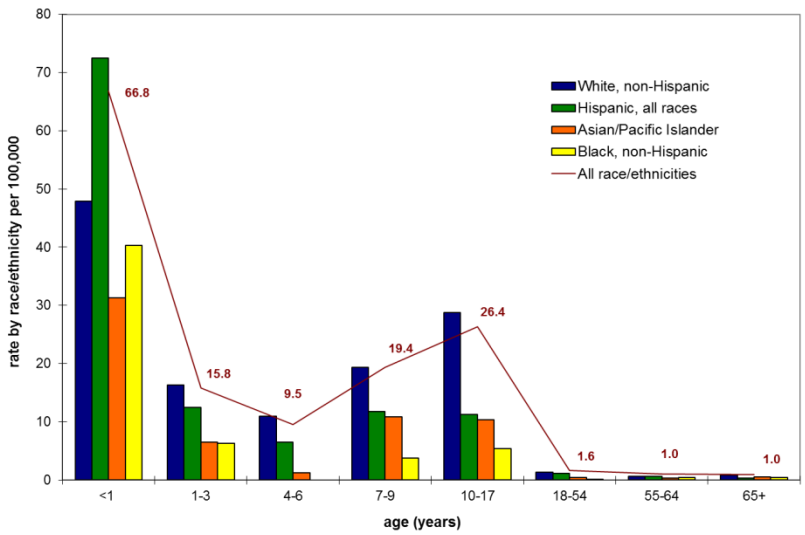
Figure 5. Pediatric pertussis cases by age -- California, 2013



Annotations indicate ages when vaccines are recommended
DTaP=Diphtheria, tetanus, and acellular pertussis vaccine
Tdap=Tetanus, diphtheria, and acellular pertussis vaccine

OVER 9,000 CASES OF PERTUSSIS WERE REPORTED IN CALIFORNIA IN 2010, THE MOST IN OVER 60 YEARS, INCLUDING 10 INFANT DEATHS.

Figure 6. Pertussis incidence rates* by age and race/ethnicity -- California, 2013



*Per 100,000 population.

Poliovirus Infection

Background

Poliovirus is a member of the enterovirus subgroup, family Picornaviridae. Enteroviruses are transient inhabitants of the gastrointestinal tract. Picornaviruses are small, ether-insensitive viruses with an RNA genome. There are three poliovirus serotypes (P1, P2, and P3). Immunity to one serotype does not produce significant immunity to the other serotypes.

Poliovirus is spread by the fecal-oral and respiratory routes. The response to poliovirus infection is highly variable and is categorized on the basis of the severity of clinical presentation. Up to 95% of all poliovirus infections are asymptomatic. Approximately 4%–8% of poliovirus infections consist of a minor, nonspecific illness without clinical or laboratory evidence of central nervous system invasion and fewer than 1% of all polio infections result in classic polio, which is characterized by acute flaccid paralysis. Estimates of the ratio of asymptomatic to paralytic illness vary from 50:1 to 1,000:1 (usually 200:1). Infected persons without symptoms shed virus from the respiratory tract and in stool and are able to transmit the virus to others. The incubation period for nonparalytic poliovirus infections is 3-6 days. For the onset of paralysis in paralytic cases, the incubation period is usually 7-21 days.

Epidemiology

Transmission of wild poliovirus was interrupted in the United States in 1979, or possibly earlier. A polio eradication program conducted by the Pan American Health Organization led to elimination of polio in the Western Hemisphere in 1991. The Global Polio Eradication Program has dramatically reduced poliovirus transmission throughout the world. In 2012, only 223 confirmed cases of polio were reported from three countries: Afghanistan, Nigeria, and Pakistan.

Inactivated poliovirus vaccine (IPV) was licensed in 1955 and was used extensively from that time until the early 1960s. In 1961, type 1 and 2 monovalent oral poliovirus vaccine (MOPV) was licensed, and in 1962, type 3 MOPV was licensed. In 1963, trivalent OPV was licensed and largely replaced IPV use. Trivalent OPV was the vaccine of choice in the United States and most other countries of the world after its introduction in 1963. OPV can cause vaccine-associated paralytic polio (VAPP) and from 1980-1999, an average of seven cases of VAPP occurred each year in the United States. To eliminate VAPP from the U.S., OPV was replaced by IPV in the United States in 2000.

Surveillance Case Definitions (2010)

California healthcare providers and laboratories are required to report cases of poliovirus infection to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all probable and confirmed poliovirus infection cases to CDPH using the following case definition:

Case Definition (Nonparalytic poliovirus infection)

Case Classification

Confirmed:
Any person without symptoms of paralytic poliomyelitis in whom a poliovirus isolate was identified in an appropriate clinical specimen, with confirmatory typing and sequencing performed by the CDC Poliovirus Laboratory, as needed.

Case Definition (Paralytic poliovirus infection)

Case Classification

Confirmed:

- Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss; AND in which the patient has a neurologic deficit 60 days after onset of initial symptoms; OR
- died; OR
- unknown follow-up status.

Probable:

Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss.

Epidemiologic Summary

No cases of poliovirus infection were reported in California in 2013. There has been no indigenous transmission of wild poliovirus in California since at least 1978. The last imported wild poliovirus case in California was in 1986 and the last indigenous VAPP case in California was in 1998.

For more information about poliovirus infection, please visit the CDPH Polio Webpage at: http://www.cdph.ca.gov/HealthInfo/discond/Pages/Polio.aspx

Rubella and Congenital Rubella Syndrome

Background

Rubella was declared no longer endemic in the U.S. in 2004. However outbreaks continue to occur in parts of the world where rubella immunization rates are low. Notably, large rubella outbreaks have occurred in Japan and Poland in 2013. In the first four months of 2013, over 21,000 cases of rubella were reported in Poland; 81% of cases were among 15-29 year old males. This outbreak reflects immunization policies in Poland where only adolescent girls were immunized from 1992-2003, leading to a large cohort of susceptible males. (http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20485)

The Advisory Committee on Immunization Practices (ACIP) recommends one dose of rubella containing vaccine, administered as MMR vaccine in the U.S., at 12-15 months as part of the routine childhood vaccination schedule. A second dose of rubella vaccine is typically administered at 4-6 years of age as part of MMR vaccine. After one dose of vaccine approximately 95% - 99% of people will be protected against rubella.

Symptoms of rubella are often mild and up to 50% of infections are subclinical. However, when rubella infection occurs during pregnancy, especially during the first trimester, serious consequences can result. These include miscarriages, fetal deaths/stillbirths, and a constellation of severe birth defects known as congenital rubella syndrome (CRS). The most common congenital defects are cataracts, heart defects, and hearing impairment.

Rubella Surveillance Case Definition (2013)

California healthcare providers are required to report cases of rubella to the LHJ, in accordance with Title 17 of the California Code of Regulations using the following case definition:

Case Classification

Confirmed:

- A case with or without symptoms who has laboratory evidence of rubella infection confirmed by one or more of the following laboratory tests:
  - Isolation of rubella virus; OR
  - Detection of rubella-virus specific nucleic acid by polymerase chain reaction; OR
  - Significant rise between acute- and convalescent-phase titers in serum rubella immunoglobulin G antibody level by any standard serologic assay; OR
  - Positive serologic test for rubella immunoglobulin M (IgM) antibody;

OR

- An illness characterized by all of the following:
  - Acute onset of generalized maculopapular rash; AND
  - Temperature greater than 99.0°F or 37.2°C; AND
  - Arthralgia, arthritis, lymphadenopathy, or conjunctivitis; AND
  - Epidemiologic linkage to a laboratory-confirmed case of rubella.

Probable:

In the absence of a more likely diagnosis, an illness characterized by all of the following:

- Acute onset of generalized maculopapular rash; AND
- Temperature greater than 99.0°F or 37.2°C, if measured; AND
- Arthralgia, arthritis, lymphadenopathy, or conjunctivitis; AND
- Lack of epidemiologic linkage to a laboratory-confirmed case of rubella; AND
- Noncontributory or no serologic or virologic testing.

Suspected:

Any generalized rash illness of acute onset that does not meet the criteria for probable or confirmed rubella or any other illness.

Congenital Rubella Syndrome Case Definition (2010)

Case Classification

Confirmed:

- An infant with at least one symptom (listed above) that is clinically consistent with congenital rubella syndrome; and laboratory evidence of congenital rubella infection as demonstrated by:
  - Isolation of rubella virus; OR
  - Detection of rubella-specific immunoglobulin M (IgM) antibody; OR
  - Infant rubella antibody level that persists at a higher level and for a longer period than expected from passive transfer of maternal antibody (i.e., rubella titer that does not drop at the expected rate of a twofold dilution per month); OR
  - A specimen that is PCR positive for rubella virus

Probable:

- An infant without an alternative etiology that does not have laboratory confirmation of rubella infection but has at least 2 of the following*:
  - Cataracts or congenital glaucoma*;
  - Congenital heart disease (most commonly patent ductus arteriosus or peripheral pulmonary artery stenosis);
  - Hearing impairment; OR
  - Pigmentary retinopathy; **OR**
- An infant without an alternative etiology that does not have laboratory confirmation of rubella infection but has at least one or more of the following:
  - Cataracts or congenital glaucoma*;
  - Congenital heart disease (most commonly patent ductus arteriosus or peripheral pulmonary artery stenosis);
  - Hearing impairment; OR
  - Pigmentary retinopathy; **AND one or more of the following:**
  - Purpura;
  - Hepatosplenomegaly;
  - Jaundice;
  - Microcephaly;
  - Developmental delay;
  - Meningoencephalitis; OR
  - Radiolucent bone disease

Suspected:

- An infant that does not meet the criteria for a probable or confirmed case but who has one or more of the following clinical findings:
  - Cataracts or congenital glaucoma;
  - Congenital heart disease (most commonly patent ductus arteriosus or peripheral pulmonary artery stenosis);
  - Hearing impairment;
  - Pigmentary retinopathy;
  - Purpura;
  - Hepatosplenomegaly;
  - Jaundice;
  - Microcephaly;
  - Developmental delay;
  - Meningoencephalitis; OR
  - Radiolucent bone disease

*In probable cases, either or both of the eye-related findings (cataracts and congenital glaucoma) count as a single complication. In cases classified as infection only, if any compatible signs or symptoms (e.g., hearing loss) are identified later, the case is reclassified as confirmed.

Epidemiologic Summary

In 2013, there were no reports of rubella or congenital rubella syndrome in California. The last report of a congenital rubella syndrome case in California occurred in 2008.

For more information about rubella, please visit the CDPH Rubella Webpage at:
http://www.cdph.ca.gov/HealthInfo/discond/Pages/Rubella.aspx

Tetanus

Background

Tetanus, commonly called "lockjaw", is caused by a toxin produced by the gram-positive spore-forming bacterium *Clostridium tetani*. People with tetanus infection experience severe muscle spasms and stiffness, leading to "locking" of the jaw. C. *tetani* are present worldwide and are commonly found in soil, dust, and manure. Infection primarily occurs when the bacteria enter the body through cuts or wounds. Tetanus is not transmitted from person-to-person. The incubation period for tetanus is typically 10 days (range: 3-21 days). In general, the further the wound or injury site is from the central nervous system, the longer the incubation period will be.

Everyone should receive tetanus toxoid vaccine. The DTaP (diphtheria, tetanus, and acellular pertussis), Td (tetanus, diphtheria), and Tdap (tetanus, diphtheria, and acellular pertussis) vaccines all protect against tetanus. Children need four doses of DTaP by 15 months and a Tdap booster at age 11 or 12. Adults need a booster every 10 years after the primary series has been completed. The Tdap vaccine is recommended for one of the booster doses in adults aged 18-64 years.

Since the introduction of tetanus vaccines in the 1930s and 1940s, the number of tetanus cases reported in the U.S. each year has declined significantly. However, sporadic cases continue to be reported in adults, especially in those who are not up to date on their tetanus booster vaccinations. In California, a total of 53 tetanus cases were reported from 2003 through 2013, with an average annual incidence rate of 0.01cases per 100,000 population.

Surveillance Case Definition (2010)

California healthcare providers are required to report cases of tetanus to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all probable tetanus cases to CDPH using the following case definition:

Case Classification

Probable:

- In the absence of a more likely diagnosis, an acute illness with muscle spasms or hypertonia AND diagnosis of tetanus by a healthcare provider; OR
- Death, with tetanus listed on the death certificate as the cause of death or a significant condition contributing to death

Epidemiologic Summary

Four tetanus cases were reported in California in 2013, in Merced, Los Angeles, Santa Clara, and Ventura counties. The patients ranged in age from 47 to 86 years; two (50%) were male. All four patients were hospitalized; one died.

Three (75%) patients reported an acute injury prior to illness onset. One patient was bitten by a dog, one received a splinter while gardening, and one received an abrasion while rafting. All three patients sought medical care for their injuries. Tetanus vaccination status was unknown for one of the patients; the remaining two patients were not up to date on their tetanus booster vaccinations.

For more information about tetanus, please visit the CDPH Tetanus Webpage at:
http://www.cdph.ca.gov/HealthInfo/discond/Pages/Tetanus.aspx

Varicella Hospitalizations and Deaths

Background

Varicella (chickenpox) is caused by varicella zoster virus (VZV), which is a DNA virus and a member of the herpes virus group. After primary infection, VZV persists in the sensory nerve ganglia and may reactivate later in life and cause herpes zoster (shingles). Primary varicella infection results in a generalized, pruritic, maculo-papulovesicular rash that typically presents first on the head, then the trunk and then the extremities. Lesions develop in successive crops over several days and eventually crust over. A mild prodrome of 1 to 2 days prior to the rash can also occur, especially in adults, and usually consists of fever and malaise. Herpes zoster is characterized by a painful rash of grouped vesicular lesions congregating within 1 to 3 dermatomes. Herpes zoster primarily occurs in older adults and is uncommon and usually milder in children.

Infection with VZV occurs when the virus comes into contact with the mucosa of the upper respiratory tract or conjunctiva of a susceptible person. VZV is transmitted via the airborne route from varicella and herpes zoster vesicles as well as from respiratory tract secretions. There is no evidence of VZV spread from fomites. The incubation period for varicella is 10 to 21 days with symptoms typically occurring 14 to 16 days after exposure.

Pregnant women who become infected with varicella are at risk for serious complications including pneumonia, and in some cases, may die as a result of varicella. If a pregnant woman is infected with varicella in her 1st or early 2nd trimester, her infant has a small risk (0.4 – 2.0 percent) of being born with congenital varicella syndrome and may have scarring on the skin, abnormalities in limbs, brain, and eyes, and low birth weight. If a woman develops varicella rash from 5 days before to 2 days after delivery, the newborn will be at risk for neonatal varicella. In the absence of treatment, up to 30% of these newborns may develop severe disease.

Varicella tends to be more severe in infants, teens, and adults than in young children. Immunocompromised persons have a high risk of disseminated disease. Complications of varicella include secondary bacterial infections, pneumonia, and central nervous system manifestations such as meningitis and encephalitis. Before the vaccine was introduced in the U.S. in 1995, an average of 103 persons died each year and approximately 11,000 persons were hospitalized due to varicella. The varicella hospitalization and death rate has decreased more than 90% since the vaccine was introduced.

Surveillance Case Definition (2010)

California healthcare providers are required to report varicella hospitalizations and deaths to the LHJ, in accordance with Title 17 of the California Code of Regulations. The LHJs report all confirmed and probable cases to CDPH using the following case definition:

Case Classification

Confirmed:

- An acute illness with diffuse (generalized) maculo-papulovesicular rash, AND epidemiologic linkage to another probable or confirmed case; OR
- An acute illness with diffuse (generalized) maculo-papulovesicular rash, AND laboratory confirmation by any of the following:
  - Isolation of varicella-zoster virus (VZV) from a clinical specimen; OR
  - Varicella antigen detected by direct fluorescent antibody test (DFA); OR
  - Varicella-specific nucleic acid detected by polymerase chain reaction (PCR); OR
  - Significant rise in serum anti-varicella immunoglobulin G (IgG) antibody level by any serologic assay.

Probable:

- An acute illness with diffuse (generalized) maculo-papulovesicular rash; AND
- Lack of laboratory confirmation; AND
- Lack of epidemiologic linkage to another probable or confirmed case.

Epidemiologic Summary

In 2013, a total of 31 probable and confirmed varicella-associated hospitalizations were reported statewide in 16 (26%) of 61 LHJs (Table 17). The statewide incidence of reported varicella hospitalizations in 2013 was 0.08 cases per 100,000 population. This was a decrease from 2012 when 37 cases were reported in 14 (23%) of 61 LHJs at a rate of 0.10 cases per 100,000 population. There were fewer outbreaks reported in the state in 2013 (7) than in 2012 (10). The average number of cases per outbreak increased in 2012 with an average of 9 cases per outbreak in 2013, compared to an average of 6 cases per outbreak in 2012 (Figure 7). Similar to previous years, the majority of outbreaks (5; 71%) occurred in schools. The 2 non-school outbreaks occurred in a correctional facility and a homeless shelter. There were no reported deaths in 2013 compared to 1 death in 2012.

Of the 31 hospitalized cases in 2013, 8 (26%) were in children under 18, 3 of whom were less than 1 year of age (Figure 8). The median age of all hospitalized cases in 2013 was 28 years (range:1 month– 77 years). Among 18 (58%) cases with known vaccination status, 15 (83%) were old enough to be vaccinated with at least one dose of varicella vaccine, however, only four had received varicella vaccine prior to becoming ill. Of these, two had only one dose of the vaccine.

The highest proportion of varicella hospitalizations was among Hispanic persons (14; 45%), followed by non-Hispanic whites (6; 20%), Asian or Pacific Islanders (5; 16%), Blacks (1; 3%) and other race/ethnicity (1; 3%). There were 4 (13%) persons with unknown race/ethnicity (Figure 9). More females (17; 55%) were hospitalized with varicella than males (14; 45%). Of the 29 cases with sufficient medical record information to assess immune status, 10 (35%) were immunocompromised.

For more information about varicella, please visit the CDPH Varicella Webpage at:
http://www.cdph.ca.gov/HealthInfo/discond/Pages/Varicella.aspx

Table 17. Number of reported varicella hospitalizations, by local health jurisdiction – California, 2012–2013

	2012ǂ	2013
CALIFORNIA	37	31
Alameda*	2	1
City of Berkeley*	0	0
Alpine	0	0
Amador	0	0
Butte	0	0
Calaveras	0	0
Colusa	0	0
Contra Costa	2	2
Del Norte	0	0
El Dorado	0	0
Fresno	0	2
Glenn	0	0
Humboldt	0	0
Imperial	1	0
Inyo	0	0
Kern	0	0
Kings	0	0
Lake	0	0
Lassen	0	0
Los Angeles*	11	8
City of Long Beach*	0	0
City of Pasadena*	1	1
Madera	0	0
Marin	0	0
Mariposa	0	0
Mendocino	0	0
Merced	1	0
Modoc	0	0
Mono	0	0
Monterey	0	0
Napa	0	0
Nevada	0	0
Orange	6	4
Placer	1	0
Plumas	0	0
Riverside	2	2
Sacramento	0	1
San Benito	0	0
San Bernardino	0	1
San Diego	5	2
San Francisco	1	2
San Joaquin	1	0
San Luis Obispo	0	0
San Mateo	2	1
Santa Barbara	0	1
Santa Clara	1	1
Santa Cruz	0	0
Shasta	0	0
Sierra	0	0
Siskiyou	0	0
Solano	0	1
Sonoma	0	0
Stanislaus	0	0
Sutter	0	0
Tehama	0	0
Trinity	0	0
Tulare	0	0
Tuolumne	0	1
Ventura	0	0
Yolo	0	0
Yuba	0	0

ǂ Includes one fatality

*City health jurisdictions not included in county total.

Figure 7. Varicella hospitalizations, deaths, and outbreaks -- California, 2011–2013

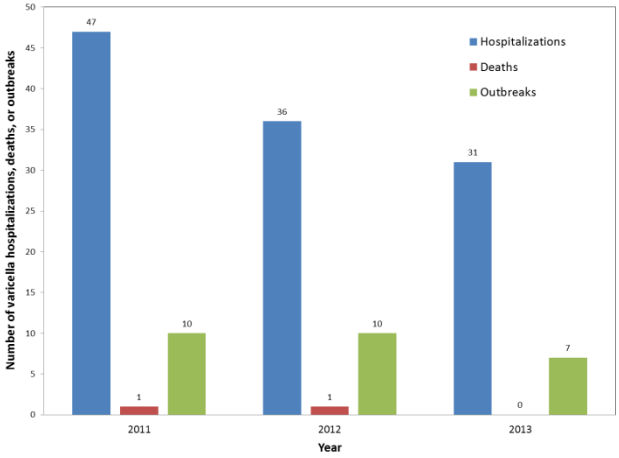


Figure 8. Varicella hospitalizations and deaths, by age group -- California, 2013

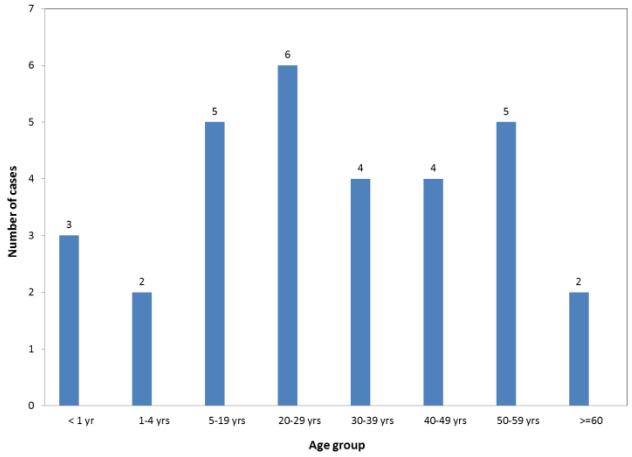
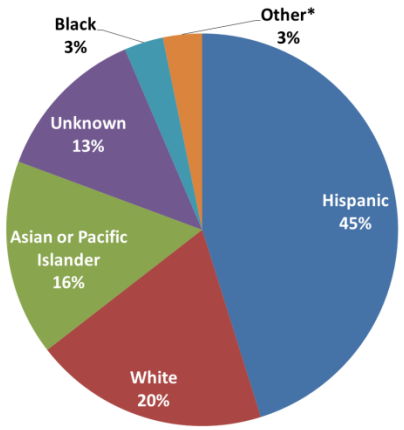


Figure 9. Varicella hospitalizations and deaths, by race/ethnicity -- California, 2013 (n=31)



* Other includes American Indian/Alaska Native, Multi-Race, and Other Race/Ethnicities

VACCINE-PREVENTABLE DISEASE SUMMARY TABLES

Table 18. Invasive *Haemophilus influenzae* infection cases <15 years of age, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	All types	Hib	All types	Hib	All types	Hib	All types	Hib	All types	Hib
CALIFORNIA	52	1	30	0	42	1	32	0	46	0
Alameda	2	0	0	0	3	0	3	0	1	0
Alpine	0	0	0	0	0	0	0	0	0	0
Amador	0	0	0	0	0	0	0	0	0	0
Butte	0	0	0	0	0	0	0	0	0	0
Calaveras	0	0	0	0	0	0	0	0	0	0
Colusa	0	0	0	0	0	0	0	0	0	0
Contra Costa	0	0	0	0	0	0	0	0	0	0
Del Norte	0	0	0	0	0	0	0	0	0	0
El Dorado	0	0	0	0	0	0	0	0	0	0
Fresno	4	1	2	0	1	0	1	0	6	0
Glenn	0	0	0	0	0	0	0	0	0	0
Humboldt	2	0	0	0	0	0	0	0	0	0
Imperial	0	0	0	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0	0	0	0
Kern	0	0	0	0	0	0	1	0	1	0
Kings	0	0	0	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0	0	0	0
Lassen	0	0	0	0	0	0	0	0	0	0
Los Angeles	12	0	6	0	14	0	7	0	12	0
Madera	0	0	1	0	0	0	0	0	0	0
Marin	1	0	0	0	0	0	0	0	1	0
Mariposa	0	0	0	0	0	0	0	0	0	0
Mendocino	0	0	0	0	2	0	0	0	0	0
Merced	0	0	1	0	0	0	0	0	0	0
Modoc	0	0	0	0	0	0	0	0	0	0
Mono	0	0	0	0	0	0	0	0	0	0
Monterey	0	0	1	0	2	0	1	0	0	0
Napa	1	0	0	0	1	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0
Orange	3	0	0	0	1	0	1	0	0	0
Placer	0	0	0	0	0	0	0	0	0	0
Plumas	1	0	0	0	0	0	0	0	0	0
Riverside	2	0	2	0	2	0	2	0	5	0
Sacramento	3	0	6	0	2	0	1	0	5	0
San Benito	0	0	1	0	0	0	0	0	0	0
San Bernardino	5	0	4	0	3	0	2	0	2	0
San Diego	9	0	2	0	3	1	4	0	1	0
San Francisco	0	0	0	0	0	0	1	0	0	0
San Joaquin	0	0	0	0	0	0	2	0	1	0
San Luis Obispo	0	0	0	0	0	0	0	0	0	0
San Mateo	1	0	0	0	2	0	1	0	1	0
Santa Barbara	0	0	0	0	1	0	0	0	2	0
Santa Clara	3	0	2	0	1	0	1	0	2	0
Santa Cruz	0	0	0	0	0	0	0	0	0	0
Shasta	1	0	0	0	0	0	0	0	0	0
Sierra	0	0	0	0	0	0	0	0	0	0
Siskiyou	0	0	1	0	0	0	1	0	0	0
Solano	0	0	0	0	0	0	0	0	0	0
Sonoma	0	0	0	0	0	0	0	0	0	0
Stanislaus	1	0	0	0	2	0	0	0	2	0
Sutter	0	0	0	0	0	0	0	0	0	0
Tehama	0	0	0	0	0	0	0	0	0	0
Trinity	0	0	0	0	0	0	0	0	0	0
Tulare	0	0	0	0	2	0	2	0	1	0
Tuolumne	0	0	0	0	0	0	0	0	0	0
Ventura	1	0	1	0	0	0	1	0	2	0
Yolo	0	0	0	0	0	0	0	0	1	0
Yuba	0	0	0	0	0	0	0	0	0	0

Table 19. Hepatitis A infection cases and incidence rates per 100,000 population, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates
CALIFORNIA	229	0.62	217	0.58	161	0.43	210	0.55	255	0.67
Alameda	5	0.33	8	0.53	6	0.39	3	0.19	7	0.45
Alpine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Amador	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Butte	0	0.00	1	0.45	1	0.45	0	0.00	0	0.00
Calaveras	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Colusa	0	0.00	0	0.00	0	0.00	0	0.00	1	4.63
Contra Costa	5	0.48	3	0.29	2	0.19	5	0.47	10	0.92
Del Norte	1	3.50	3	10.51	0	0.00	0	0.00	0	0.00
El Dorado	0	0.00	1	0.55	0	0.00	1	0.55	5	2.73
Fresno	3	0.32	7	0.75	1	0.11	3	0.32	3	0.31
Glenn	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Humboldt	2	1.50	1	0.74	0	0.00	1	0.74	3	2.23
Imperial	6	3.46	4	2.28	2	1.13	5	2.81	0	0.00
Inyo	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Kern	8	0.96	0	0.00	6	0.71	5	0.58	4	0.46
Kings	2	1.32	1	0.65	0	0.00	1	0.66	0	0.00
Lake	0	0.00	1	1.55	0	0.00	1	1.55	1	1.55
Lassen	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Los Angeles	52	0.53	56	0.57	44	0.45	48	0.48	66	0.66
Madera	0	0.00	3	1.98	0	0.00	0	0.00	1	0.65
Marin	1	0.40	0	0.00	2	0.79	1	0.39	0	0.00
Mariposa	0	0.00	0	0.00	0	0.00	0	0.00	1	5.41
Mendocino	0	0.00	2	2.27	1	1.14	0	0.00	2	2.26
Merced	0	0.00	0	0.00	1	0.39	2	0.77	0	0.00
Modoc	0	0.00	0	0.00	0	0.00	0	0.00	1	10.79
Mono	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Monterey	1	0.24	1	0.24	2	0.48	0	0.00	2	0.47
Napa	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Nevada	6	6.10	2	2.03	0	0.00	1	1.02	2	2.04
Orange	22	0.73	19	0.63	16	0.53	25	0.81	24	0.77
Placer	1	0.29	2	0.57	0	0.00	1	0.28	0	0.00
Plumas	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Riverside	14	0.65	17	0.78	4	0.18	10	0.44	9	0.40
Sacramento	4	0.28	2	0.14	4	0.28	7	0.49	5	0.35
San Benito	1	1.82	0	0.00	0	0.00	0	0.00	0	0.00
San Bernardino	9	0.45	4	0.20	8	0.39	5	0.24	10	0.48
San Diego	25	0.81	19	0.61	12	0.38	38	1.20	40	1.26
San Francisco	4	0.50	8	0.99	5	0.61	5	0.61	4	0.48
San Joaquin	4	0.59	6	0.87	4	0.58	4	0.57	3	0.43
San Luis Obispo	1	0.37	1	0.37	0	0.00	4	1.48	2	0.74
San Mateo	7	0.98	7	0.97	8	1.10	1	0.14	9	1.21
Santa Barbara	7	1.66	2	0.47	1	0.23	1	0.23	1	0.23
Santa Clara	12	0.68	14	0.78	12	0.66	9	0.49	7	0.38
Santa Cruz	2	0.76	0	0.00	3	1.13	2	0.74	7	2.58
Shasta	0	0.00	1	0.56	1	0.56	0	0.00	3	1.68
Sierra	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Siskiyou	0	0.00	0	0.00	1	2.23	1	2.20	1	2.21
Solano	10	2.42	12	2.90	2	0.48	2	0.48	3	0.71
Sonoma	0	0.00	3	0.62	1	0.21	2	0.41	2	0.41
Stanislaus	1	0.20	1	0.19	2	0.39	2	0.38	4	0.76
Sutter	2	2.12	3	3.17	1	1.06	0	0.00	0	0.00
Tehama	0	0.00	2	3.15	0	0.00	0	0.00	0	0.00
Trinity	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tulare	4	0.91	0	0.00	4	0.89	0	0.00	4	0.88
Tuolumne	0	0.00	0	0.00	0	0.00	1	1.85	0	0.00
Ventura	5	0.61	0	0.00	3	0.36	13	1.56	7	0.83
Yolo	1	0.50	0	0.00	1	0.49	0	0.00	1	0.48
Yuba	1	1.39	0	0.00	0	0.00	0	0.00	0	0.00

Table 20. Acute hepatitis B infection cases and incidence rates per 100,000 population, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates
CALIFORNIA	206	0.56	214	0.57	155	0.41	141	0.37	139	0.36
Alameda	7	0.47	3	0.20	5	0.33	6	0.39	6	0.41
Alpine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Amador	3	7.91	0	0.00	0	0.00	0	0.00	0	0.00
Butte	4	1.82	3	1.36	3	1.36	2	0.90	2	0.90
Calaveras	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Colusa	0	0.00	1	4.65	1	4.65	0	0.00	0	0.00
Contra Costa	4	0.38	1	0.10	0	0.00	2	0.19	2	0.18
Del Norte	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
El Dorado	1	0.56	1	0.55	0	0.00	1	0.55	0	0.00
Fresno	3	0.32	4	0.43	4	0.43	2	0.21	4	0.42
Glenn	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Humboldt	5	3.74	2	1.49	0	0.00	1	0.74	0	0.00
Imperial	3	1.73	0	0.00	0	0.00	0	0.00	2	1.12
Inyo	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Kern	19	2.29	10	1.19	2	0.24	10	1.17	3	0.35
Kings	3	1.98	2	1.31	1	0.66	0	0.00	0	0.00
Lake	1	1.55	2	3.10	1	1.55	0	0.00	0	0.00
Lassen	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Los Angeles	32	0.33	52	0.53	58	0.59	40	0.40	61	0.57
Madera	11	7.33	25	16.52	2	1.32	0	0.00	2	1.31
Marin	0	0.00	0	0.00	0	0.00	1	0.39	0	0.00
Mariposa	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mendocino	2	2.28	3	3.41	1	1.14	0	0.00	0	0.00
Merced	0	0.00	0	0.00	3	1.16	0	0.00	0	0.00
Modoc	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mono	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Monterey	0	0.00	0	0.00	0	0.00	4	0.95	0	0.00
Napa	1	0.74	0	0.00	0	0.00	0	0.00	1	0.72
Nevada	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Orange	17	0.57	9	0.30	12	0.39	7	0.23	12	0.39
Placer	1	0.29	2	0.57	1	0.28	0	0.00	2	0.55
Plumas	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Riverside	13	0.60	10	0.46	5	0.23	17	0.76	3	0.13
Sacramento	4	0.28	4	0.28	5	0.35	5	0.35	4	0.28
San Benito	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
San Bernardino	14	0.69	16	0.78	8	0.39	12	0.58	7	0.34
San Diego	1	0.03	10	0.32	19	0.61	14	0.44	9	0.28
San Francisco	12	1.50	8	0.99	7	0.86	2	0.24	4	0.48
San Joaquin	10	1.47	5	0.73	2	0.29	3	0.43	2	0.28
San Luis Obispo	0	0.00	0	0.00	0	0.00	1	0.37	0	0.00
San Mateo	5	0.70	2	0.28	3	0.41	1	0.14	2	0.27
Santa Barbara	0	0.00	0	0.00	2	0.47	1	0.23	1	0.23
Santa Clara	4	0.23	19	1.06	7	0.39	5	0.27	4	0.22
Santa Cruz	0	0.00	1	0.38	0	0.00	0	0.00	0	0.00
Shasta	1	0.57	4	2.25	0	0.00	0	0.00	1	0.56
Sierra	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Siskiyou	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Solano	0	0.00	1	0.24	0	0.00	0	0.00	0	0.00
Sonoma	2	0.42	1	0.21	0	0.00	0	0.00	0	0.00
Stanislaus	4	0.78	5	0.97	2	0.39	1	0.19	5	0.95
Sutter	1	1.06	0	0.00	0	0.00	0	0.00	0	0.00
Tehama	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Trinity	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tulare	4	0.91	0	0.00	0	0.00	2	0.44	0	0.00
Tuolumne	1	1.81	2	3.63	0	0.00	0	0.00	0	0.00
Ventura	7	0.86	5	0.61	0	0.00	1	0.12	0	0.00
Yolo	4	2.00	1	0.50	0	0.00	0	0.00	0	0.00
Yuba	2	2.79	0	0.00	1	1.38	0	0.00	0	0.00

Table 21. Confirmed measles cases, by county* and year of disease onset – California, 2009–2013

	2009	2010	2011	2012	2013
CALIFORNIA	9	27	31	8	18
Alameda	0	2	1	0	1
Alpine	0	0	0	0	0
Amador	0	1	0	0	0
Butte	0	0	0	0	0
Calaveras	0	0	0	0	0
Colusa	0	0	0	0	0
Contra Costa	0	1	0	0	0
Del Norte	0	0	0	0	0
El Dorado	0	0	0	0	0
Fresno	0	0	0	0	0
Glenn	0	0	0	0	0
Humboldt	0	0	1	0	0
Imperial	0	0	0	0	0
Inyo	0	0	0	0	0
Kern	0	0	0	0	0
Kings	0	0	0	0	0
Lake	0	0	0	0	0
Lassen	0	0	0	0	0
Los Angeles	1	8	8	6	3
Madera	0	0	0	0	0
Marin	0	0	0	0	0
Mariposa	0	0	0	0	0
Mendocino	0	0	3	0	1
Merced	0	0	2	0	0
Modoc	0	0	0	0	0
Mono	0	0	0	0	0
Monterey	0	0	0	0	1
Napa	3	0	0	0	0
Nevada	0	0	0	0	0
Orange	0	2	1	0	2
Placer	0	0	0	0	0
Plumas	0	0	0	0	0
Riverside	0	0	1	1	1
Sacramento	0	0	1	0	0
San Benito	0	0	1	0	0
San Bernardino	0	1	0	0	0
San Diego	1	5	4	0	2
San Francisco	4	2	0	0	3
San Joaquin	0	0	0	0	0
San Luis Obispo	0	0	1	0	0
San Mateo	0	0	1	1	0
Santa Barbara	0	0	0	0	0
Santa Clara	0	5	3	0	0
Santa Cruz	0	0	0	0	3
Shasta	0	0	0	0	0
Sierra	0	0	0	0	0
Siskiyou	0	0	0	0	0
Solano	0	0	0	0	0
Sonoma	0	0	1	0	0
Stanislaus	0	0	1	0	0
Sutter	0	0	0	0	0
Tehama	0	0	0	0	0
Trinity	0	0	0	0	0
Tulare	0	0	0	0	0
Tuolumne	0	0	0	0	0
Ventura	0	0	0	0	1
Yolo	0	0	0	0	0
Yuba	0	0	1	0	0

* County of residence or county where case was identified.

Table 22. Invasive meningococcal disease cases and incidence rates per 100,000 population, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates
CALIFORNIA	131	0.35	121	0.32	110	0.29	88	0.23	111	0.29
Alameda	4	0.27	2	0.13	4	0.26	10	0.65	5	0.32
Alpine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Amador	1	2.64	0	0.00	0	0.00	0	0.00	0	0.00
Butte	2	0.91	2	0.91	1	0.45	1	0.45	0	0.00
Calaveras	1	2.19	0	0.00	0	0.00	0	0.00	0	0.00
Colusa	0	0.00	0	0.00	0	0.00	0	0.00	1	4.63
Contra Costa	7	0.67	3	0.29	3	0.28	2	0.19	4	0.37
Del Norte	1	3.50	0	0.00	0	0.00	0	0.00	0	0.00
El Dorado	1	0.56	0	0.00	0	0.00	0	0.00	0	0.00
Fresno	7	0.76	6	0.64	2	0.21	6	0.63	4	0.42
Glenn	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Humboldt	3	2.24	4	2.97	0	0.00	0	0.00	0	0.00
Imperial	1	0.58	0	0.00	0	0.00	0	0.00	0	0.00
Inyo	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Kern	15	1.80	7	0.83	5	0.59	9	1.05	1	0.12
Kings	0	0.00	1	0.65	0	0.00	0	0.00	0	0.00
Lake	0	0.00	0	0.00	0	0.00	1	1.55	0	0.00
Lassen	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Los Angeles	24	0.24	27	0.27	37	0.38	12	0.12	19	0.19
Madera	1	0.67	1	0.66	1	0.66	1	0.66	3	1.96
Marin	1	0.40	1	0.40	0	0.00	0	0.00	2	0.78
Mariposa	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mendocino	3	3.43	0	0.00	0	0.00	2	2.26	3	3.38
Merced	0	0.00	0	0.00	0	0.00	0	0.00	3	1.14
Modoc	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mono	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Monterey	0	0.00	1	0.24	0	0.00	0	0.00	1	0.24
Napa	1	0.74	2	1.46	0	0.00	0	0.00	0	0.00
Nevada	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Orange	5	0.17	8	0.27	10	0.33	4	0.13	5	0.16
Placer	1	0.29	0	0.00	1	0.28	0	0.00	0	0.00
Plumas	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Riverside	2	0.09	2	0.09	7	0.32	2	0.09	3	0.13
Sacramento	7	0.50	7	0.49	3	0.21	6	0.42	4	0.28
San Benito	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
San Bernardino	4	0.20	4	0.20	3	0.15	2	0.10	9	0.43
San Diego	10	0.32	11	0.35	4	0.13	8	0.25	15	0.47
San Francisco	3	0.37	1	0.12	8	0.98	4	0.49	4	0.48
San Joaquin	3	0.44	2	0.29	2	0.29	2	0.29	1	0.14
San Luis Obispo	0	0.00	0	0.00	0	0.00	2	0.74	0	0.00
San Mateo	2	0.28	5	0.69	1	0.14	2	0.27	1	0.13
Santa Barbara	1	0.24	3	0.71	2	0.47	1	0.23	6	1.39
Santa Clara	5	0.28	4	0.22	5	0.28	3	0.16	3	0.16
Santa Cruz	1	0.38	1	0.38	0	0.00	0	0.00	2	0.74
Shasta	4	2.26	2	1.13	3	1.68	1	0.56	1	0.56
Sierra	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Siskiyou	0	0.00	0	0.00	1	2.23	1	2.20	1	2.21
Solano	0	0.00	2	0.48	1	0.24	0	0.00	0	0.00
Sonoma	1	0.21	3	0.62	1	0.21	0	0.00	3	0.61
Stanislaus	2	0.39	0	0.00	0	0.00	1	0.19	0	0.00
Sutter	0	0.00	0	0.00	0	0.00	0	0.00	2	2.06
Tehama	0	0.00	4	6.30	4	6.30	1	1.58	0	0.00
Trinity	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tulare	1	0.23	1	0.23	0	0.00	1	0.22	3	0.66
Tuolumne	1	1.81	0	0.00	0	0.00	0	0.00	0	0.00
Ventura	3	0.37	4	0.48	0	0.00	3	0.36	1	0.12
Yolo	2	1.00	0	0.00	1	0.49	0	0.00	1	0.48
Yuba	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Table 23. Confirmed and probable mumps cases, by county and year of disease onset – California, 2009–2013

	2009	2010	2011	2012†	2013
CALIFORNIA	15	29	43	34	30
Alameda	1	1	26	1	1
Alpine	0	0	0	0	0
Amador	0	0	0	0	0
Butte	0	0	0	1	0
Calaveras	0	0	0	0	1
Colusa	0	0	0	0	0
Contra Costa	1	0	2	0	2
Del Norte	0	0	0	0	0
El Dorado	0	0	0	0	0
Fresno	0	0	0	0	1
Glenn	0	0	0	0	0
Humboldt	0	0	0	1	0
Imperial	1	0	0	0	0
Inyo	0	0	0	0	0
Kern	1	1	0	0	0
Kings	0	0	0	0	0
Lake	0	0	0	0	0
Lassen	0	0	0	0	0
Los Angeles	7	20	5	14	9
Madera	0	0	0	0	0
Marin	0	0	0	1	0
Mariposa	0	0	0	0	0
Mendocino	0	0	0	0	0
Merced	0	0	0	0	0
Modoc	0	0	0	0	0
Mono	0	0	0	0	0
Monterey	0	0	0	1	0
Napa	0	0	0	0	0
Nevada	0	0	0	0	0
Orange	0	0	3	3	2
Placer	0	0	0	1	1
Plumas	0	0	0	0	0
Riverside	0	1	0	1	2
Sacramento	0	0	0	2	0
San Benito	0	0	0	0	0
San Bernardino	0	0	0	0	1
San Diego	1	0	1	1	2
San Francisco	0	0	3	0	2
San Joaquin	0	0	1	0	1
San Luis Obispo	1	0	0	0	0
San Mateo	0	0	0	1	1
Santa Barbara	0	0	1	1	1
Santa Clara	0	1	1	3	0
Santa Cruz	0	0	0	0	0
Shasta	0	0	0	0	0
Sierra	0	0	0	0	0
Siskiyou	0	0	0	0	0
Solano	0	0	0	2	0
Sonoma	0	0	0	0	0
Stanislaus	0	1	0	0	1
Sutter	0	0	0	0	0
Tehama	0	0	0	0	0
Trinity	0	0	0	0	0
Tulare	0	0	0	0	0
Tuolumne	0	1	0	0	0
Ventura	2	3	0	0	1
Yolo	0	0	0	0	1
Yuba	0	0	0	0	0

† In 2012, CSTE changed the mumps case definition.

Table 24. Pertussis disease cases and incidence rates per 100,000 population, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates	Cases	Rates
CALIFORNIA	998	2.69	9159	24.55	3016	8.03	1023	2.70	2537	6.64
Alameda	37	2.46	436	28.81	209	13.69	68	4.42	137	8.75
Alpine	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Amador	4	10.55	4	10.56	11	29.48	1	2.74	2	5.52
Butte	3	1.37	32	14.55	16	7.26	3	1.36	33	14.87
Calaveras	6	13.17	9	19.80	5	11.08	0	0.00	2	4.39
Colusa	1	4.70	11	51.20	1	4.65	0	0.00	0	0.00
Contra Costa	20	1.92	205	19.48	114	10.74	24	2.24	69	6.37
Del Norte	0	0.00	16	56.06	0	0.00	0	0.00	0	0.00
El Dorado	2	1.11	54	29.85	11	6.09	3	1.64	4	2.18
Fresno	34	3.68	550	58.99	58	6.17	16	1.69	44	4.59
Glenn	0	0.00	1	3.55	1	3.54	0	0.00	0	0.00
Humboldt	14	10.47	58	43.07	15	11.09	1	0.74	5	3.71
Imperial	0	0.00	9	5.13	3	1.69	8	4.49	3	1.68
Inyo	0	0.00	8	43.17	0	0.00	1	5.29	0	0.00
Kern	8	0.96	376	44.70	49	5.77	2	0.23	31	3.58
Kings	8	5.27	26	17.03	7	4.61	0	0.00	2	1.33
Lake	0	0.00	5	7.74	3	4.66	2	3.11	3	4.66
Lassen	0	0.00	1	2.85	0	0.00	0	0.00	0	0.00
Los Angeles	172	1.75	1395	14.20	644	6.53	214	2.15	360	3.59
Madera	8	5.33	120	79.30	8	5.26	0	0.00	10	6.53
Marin	14	5.57	351	138.90	26	10.22	5	1.97	184	71.91
Mariposa	0	0.00	10	54.96	1	5.56	0	0.00	0	0.00
Mendocino	5	5.71	27	30.71	3	3.41	0	0.00	6	6.77
Merced	7	2.75	131	51.19	27	10.42	0	0.00	1	0.38
Modoc	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mono	0	0.00	18	126.43	2	13.98	21	146.07	2	14.11
Monterey	15	3.63	132	31.71	38	9.05	17	4.03	49	11.54
Napa	14	10.32	25	18.28	11	7.99	6	4.35	13	9.35
Nevada	1	1.02	23	23.32	2	2.03	5	5.11	70	71.51
Orange	93	3.10	499	16.54	142	4.66	73	2.37	113	3.64
Placer	7	2.03	80	22.84	19	5.33	11	3.05	86	23.55
Plumas	0	0.00	2	10.05	4	20.06	0	0.00	1	5.19
Riverside	57	2.64	467	21.31	166	7.48	46	2.04	80	3.53
Sacramento	27	1.91	175	12.32	69	4.82	35	2.44	70	4.84
San Benito	4	7.26	7	12.65	3	5.36	1	1.76	1	1.75
San Bernardino	18	0.89	182	8.93	115	5.60	54	2.62	39	1.88
San Diego	163	5.30	1140	36.74	398	12.73	162	5.14	408	12.82
San Francisco	17	2.12	141	17.49	70	8.61	30	3.65	59	7.10
San Joaquin	6	0.88	84	12.23	27	3.90	15	2.15	26	3.69
San Luis Obispo	5	1.86	371	137.54	15	5.55	14	5.17	17	6.25
San Mateo	11	1.54	191	26.54	58	7.97	23	3.13	104	14.00
Santa Barbara	37	8.76	66	15.57	18	4.23	11	2.58	28	6.48
Santa Clara	34	1.92	478	26.76	176	9.74	45	2.46	254	13.70
Santa Cruz	39	14.89	87	33.05	22	8.28	13	4.84	54	19.89
Shasta	2	1.13	32	18.03	27	15.16	2	1.12	7	3.92
Sierra	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Siskiyou	0	0.00	10	22.27	0	0.00	2	4.41	5	11.05
Solano	8	1.94	40	9.68	12	2.90	10	2.38	15	3.54
Sonoma	18	3.75	246	50.82	116	23.83	18	3.68	51	10.36
Stanislaus	16	3.12	159	30.86	43	8.30	11	2.10	16	3.03
Sutter	1	1.06	5	5.28	1	1.06	0	0.00	2	2.06
Tehama	0	0.00	10	15.75	1	1.57	0	0.00	0	0.00
Trinity	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tulare	14	3.19	230	51.91	77	17.20	27	5.97	25	5.48
Tuolumne	1	1.81	32	58.03	4	7.27	1	1.85	2	3.68
Ventura	45	5.50	372	45.09	163	19.63	15	1.80	36	4.28
Yolo	2	1.00	17	8.44	5	2.47	6	2.93	4	1.94
Yuba	0	0.00	3	4.15	0	0.00	1	1.37	4	5.46

Table 25. Confirmed rubella and congenital rubella syndrome (CRS) cases, by county and year of disease onset – California, 2009–2013

	2009		2010		2011		2012		2013	
	Rubella	CRS	Rubella	CRS	Rubella	CRS	Rubella	CRS	Rubella	CRS
CALIFORNIA	1	0	1	0	0	0	1	0	0	0
Alameda	0	0	0	0	0	0	0	0	0	0
Alpine	0	0	0	0	0	0	0	0	0	0
Amador	0	0	0	0	0	0	0	0	0	0
Butte	0	0	0	0	0	0	0	0	0	0
Calaveras	0	0	0	0	0	0	0	0	0	0
Colusa	0	0	0	0	0	0	0	0	0	0
Contra Costa	0	0	0	0	0	0	0	0	0	0
Del Norte	0	0	0	0	0	0	0	0	0	0
El Dorado	0	0	0	0	0	0	0	0	0	0
Fresno	0	0	0	0	0	0	0	0	0	0
Glenn	0	0	0	0	0	0	0	0	0	0
Humboldt	0	0	0	0	0	0	0	0	0	0
Imperial	0	0	0	0	0	0	0	0	0	0
Inyo	0	0	0	0	0	0	0	0	0	0
Kern	0	0	0	0	0	0	0	0	0	0
Kings	0	0	0	0	0	0	0	0	0	0
Lake	0	0	0	0	0	0	0	0	0	0
Lassen	0	0	0	0	0	0	0	0	0	0
Los Angeles	0	0	0	0	0	0	0	0	0	0
Madera	0	0	0	0	0	0	0	0	0	0
Marin	0	0	0	0	0	0	0	0	0	0
Mariposa	0	0	0	0	0	0	0	0	0	0
Mendocino	0	0	0	0	0	0	0	0	0	0
Merced	0	0	0	0	0	0	0	0	0	0
Modoc	0	0	0	0	0	0	0	0	0	0
Mono	0	0	0	0	0	0	0	0	0	0
Monterey	0	0	0	0	0	0	0	0	0	0
Napa	0	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0
Orange	0	0	0	0	0	0	0	0	0	0
Placer	0	0	0	0	0	0	0	0	0	0
Plumas	0	0	0	0	0	0	0	0	0	0
Riverside	0	0	0	0	0	0	0	0	0	0
Sacramento	0	0	0	0	0	0	0	0	0	0
San Benito	0	0	0	0	0	0	0	0	0	0
San Bernardino	0	0	0	0	0	0	0	0	0	0
San Diego	0	0	0	0	0	0	0	0	0	0
San Francisco	0	0	1	0	0	0	0	0	0	0
San Joaquin	0	0	0	0	0	0	0	0	0	0
San Luis Obispo	0	0	0	0	0	0	0	0	0	0
San Mateo	0	0	0	0	0	0	0	0	0	0
Santa Barbara	0	0	0	0	0	0	0	0	0	0
Santa Clara	1	0	0	0	0	0	1	0	0	0
Santa Cruz	0	0	0	0	0	0	0	0	0	0
Shasta	0	0	0	0	0	0	0	0	0	0
Sierra	0	0	0	0	0	0	0	0	0	0
Siskiyou	0	0	0	0	0	0	0	0	0	0
Solano	0	0	0	0	0	0	0	0	0	0
Sonoma	0	0	0	0	0	0	0	0	0	0
Stanislaus	0	0	0	0	0	0	0	0	0	0
Sutter	0	0	0	0	0	0	0	0	0	0
Tehama	0	0	0	0	0	0	0	0	0	0
Trinity	0	0	0	0	0	0	0	0	0	0
Tulare	0	0	0	0	0	0	0	0	0	0
Tuolumne	0	0	0	0	0	0	0	0	0	0
Ventura	0	0	0	0	0	0	0	0	0	0
Yolo	0	0	0	0	0	0	0	0	0	0
Yuba	0	0	0	0	0	0	0	0	0	0

Table 26. Probable tetanus cases, by county and year of disease onset – California, 2009–2013

	2009	2010*	2011	2012	2013
CALIFORNIA	5	0	3	4	4
Alameda	0	0	0	0	0
Alpine	0	0	0	0	0
Amador	0	0	0	0	0
Butte	0	0	0	0	0
Calaveras	0	0	0	0	0
Colusa	0	0	0	0	0
Contra Costa	0	0	0	1	0
Del Norte	0	0	0	0	0
El Dorado	0	0	0	0	0
Fresno	1	0	0	0	0
Glenn	0	0	0	0	0
Humboldt	0	0	0	0	0
Imperial	1	0	0	0	0
Inyo	0	0	0	0	0
Kern	0	0	0	0	0
Kings	0	0	0	0	0
Lake	0	0	0	0	0
Lassen	0	0	0	0	0
Los Angeles	0	0	0	0	1
Madera	0	0	0	0	0
Marin	0	0	0	0	0
Mariposa	0	0	0	0	0
Mendocino	0	0	0	0	0
Merced	0	0	0	0	1
Modoc	0	0	0	0	0
Mono	0	0	0	0	0
Monterey	0	0	0	0	0
Napa	0	0	0	0	0
Nevada	0	0	0	0	0
Orange	0	0	1	1	0
Placer	0	0	0	0	0
Plumas	0	0	0	0	0
Riverside	0	0	0	0	0
Sacramento	0	0	0	1	0
San Benito	0	0	0	0	0
San Bernardino	1	0	0	1	0
San Diego	0	0	1	0	0
San Francisco	0	0	0	0	0
San Joaquin	0	0	0	0	0
San Luis Obispo	0	0	0	0	0
San Mateo	1	0	0	0	0
Santa Barbara	0	0	1	0	0
Santa Clara	0	0	0	0	1
Santa Cruz	0	0	0	0	0
Shasta	0	0	0	0	0
Sierra	0	0	0	0	0
Siskiyou	0	0	0	0	0
Solano	0	0	0	0	0
Sonoma	1	0	0	0	0
Stanislaus	0	0	0	0	0
Sutter	0	0	0	0	0
Tehama	0	0	0	0	0
Trinity	0	0	0	0	0
Tulare	0	0	0	0	0
Tuolumne	0	0	0	0	0
Ventura	0	0	0	0	1
Yolo	0	0	0	0	0
Yuba	0	0	0	0	0

* In 2010, CSTE removed the "confirmed" classification and defined all clinically compatible cases as probable cases.

Table 27. Confirmed and probable varicella hospitalizations and deaths, by county and year of disease onset – California, 2009–2013

	2009†	2010*	2011*	2012†	2013
CALIFORNIA	46	56	48	37	31
Alameda	0	2	0	2	1
Alpine	0	0	0	0	0
Amador	0	0	0	0	0
Butte	0	1	0	0	0
Calaveras	0	0	0	0	0
Colusa	0	0	0	0	0
Contra Costa	1	0	2	2	2
Del Norte	0	0	0	0	0
El Dorado	0	0	0	0	0
Fresno	0	2	2	0	2
Glenn	0	0	0	0	0
Humboldt	0	0	0	0	0
Imperial	0	1	0	1	0
Inyo	0	0	0	0	0
Kern	0	1	0	0	0
Kings	0	0	0	0	0
Lake	0	0	0	0	0
Lassen	0	0	0	0	0
Los Angeles	20	20	15	12	9
Madera	0	0	0	0	0
Marin	0	0	0	0	0
Mariposa	0	0	0	0	0
Mendocino	0	0	0	0	0
Merced	1	0	0	1	0
Modoc	0	0	0	0	0
Mono	0	0	0	0	0
Monterey	1	0	1	0	0
Napa	0	1	0	0	0
Nevada	0	0	0	0	0
Orange	3	9	1	6	4
Placer	0	0	0	1	0
Plumas	0	0	0	0	0
Riverside	5	0	2	2	2
Sacramento	0	1	3	0	1
San Benito	0	0	0	0	0
San Bernardino	0	2	7	0	1
San Diego	11	9	10	5	2
San Francisco	0	0	0	1	2
San Joaquin	0	0	1	1	0
San Luis Obispo	0	2	1	0	0
San Mateo	0	0	1	2	1
Santa Barbara	0	0	0	0	1
Santa Clara	1	1	0	1	1
Santa Cruz	2	1	0	0	0
Shasta	0	0	0	0	0
Sierra	0	0	0	0	0
Siskiyou	0	0	0	0	0
Solano	0	0	0	0	1
Sonoma	0	3	1	0	0
Stanislaus	1	0	0	0	0
Sutter	0	0	1	0	0
Tehama	0	0	0	0	0
Trinity	0	0	0	0	0
Tulare	0	0	0	0	0
Tuolumne	0	0	0	0	1
Ventura	0	0	0	0	0
Yolo	0	0	0	0	0
Yuba	0	0	0	0	0

* Includes two deaths
† Includes one death