ACUTE COMMUNICABLE DISEASE CONTROL PROGRAM

ANNUAL MORBIDITY REPORT

AND

SPECIAL STUDIES REPORT

2007

Los Angeles County
Department of Public Health

Public Health
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Acute Communicable Disease Control Program
Annual Morbidity Report
2007

● EXECUTIVE SUMMARY ●

In Los Angeles County (LAC), more than 80 diseases and conditions, as well as unusual disease occurrences and outbreaks, are reportable by law. Acute Communicable Disease Control Program (ACDC) is the lead program for the surveillance and investigation of most communicable diseases—responsibilities exclude tuberculosis, sexually transmitted diseases, and HIV/AIDS. Surveillance is primarily passive, with reports submitted via facsimile, mail, or telephone by providers and hospitals and electronically from several laboratories. Reporting urgency varies according to disease and ranges from immediate reporting by telephone to the LAC Department of Public Health (DPH) to reporting required within 7 days of identification.

In addition to disease surveillance and investigation, ACDC sets policy and procedures for DPH activities related to infectious and communicable disease prevention and control. Our program interprets and enforces state and federal laws and regulations, and interfaces with other jurisdictions, programs and agencies responsible for public health. ACDC frequently provides consultation to the medical community on issues of communicable and infectious diseases and education to medical professionals.

ACDC has several sections, units and special projects, each with unique goals and objectives for the surveillance and control of communicable disease:

- **Food Safety Unit** aims to decrease morbidity related to foodborne pathogens through surveillance of reported diseases and foodborne illness reports, to detect outbreaks and monitor trends. Pathogens of special interest include *Listeria*, norovirus and *Salmonella* and *E. coli*.

Los Angeles County: A Description of Our Community

LAC is one of the nation's largest counties, covering over 4,000 square miles. While LAC enjoys fairly temperate, year-round weather, it encompasses a wide variety of geographic areas including mountain ranges, arid deserts, and over 80 miles of ocean coastline. Accordingly, one challenge of disease surveillance, response and control is responding to its enormous size. LAC presently has the largest population (nearly 10 million) of any county in the US and is exceeded by only eight states. LAC is densely populated, with over one-fourth of the state's population. LAC is home to approximately 100 hospitals with 74 emergency departments, more than 30,000 licensed physicians, over 450 subacute healthcare facilities, and about 25 thousand retail food purveyors.

Another challenge is the extensive diversity of our population coupled with a high level of immigration. Nearly half of our residents are Hispanic (48%), around one-third white (30%), and around one in ten are Asian (13%) or black (9%). Residents report over 90 languages as their primary spoken language. There is also substantial economic diversity within our county; while LAC is world renowned for its areas of wealth and privilege, there is also considerable poverty. The 2000 US census recorded over 1.5 million residents (nearly 16% of LAC's population) living in poverty.

LAC is a major port of entry for immigrants to the US. According to the 2007 Los Angeles County Health Survey, 32% of respondents stated they were born outside of the US. According the the US Department of Homeland Security Yearbook of Immigration Statistics 2007, California remains to be the residence of the largest number of legal immigrants to the US. The population is also highly mobile. In terms of air travel alone, each year roughly 55 million travelers come through the Los Angeles International airport (over 40 million domestic and 14 million international flights yearly)—making it the nation's 3rd busiest airport.

- **Water and Subacute Healthcare Unit** performs surveillance of waterborne disease for trends and to detect outbreaks. The unit also acts as a liaison to non-hospital healthcare facilities in LAC to assist with infection prevention and control, and to provide consultation on outbreak investigations.

- **Vectorborne Diseases Unit** conducts surveillance and provides disease consultation for a variety of vectorborne and zoonotic diseases (e.g., West Nile virus, plague), meningococcal disease, and other causes of encephalitis and meningitis. The Varicella Surveillance Project, a special research project, is also part of this unit.

- **Bloodborne Pathogens and Antimicrobial Resistance Unit** assists hospitals with outbreak investigations, and consults on infection control issues. This unit conducts surveillance and investigations of the viral hepatidities, MRSA, and invasive disease caused by pneumococcus and group A streptococcus. The unit also addresses antibiotic resistance issues.

- **Hospital Outreach Unit** investigates healthcare associated outbreaks. It also enhances preparedness and response efforts among hospitals in LAC through strengthened communications, collaboration, and consolidation of resources. It strives to enhance communication with hospitals by interacting with infection preventionists, emergency departments, and laboratories.

- **Automated Disease Surveillance Section** aims to enhance surveillance and epidemiology capacity, and strengthen laboratory capacity to identify and respond to unusual occurrences and possible terrorist incidents. Activities include syndromic surveillance and electronic laboratory reporting.

- **Epidemiology and Data Support Section** provides epidemiologic consultation and support for all units within ACDC. Special projects, data maintenance, epidemiologic analysis, data presentation, and Geographic Information System (GIS) are provided.

- **Planning, Evaluation & Response Section** is responsible for activities related to cross-cutting ACDC and bioterrorism performance measures, communicable disease annual reports, strategic planning, health education, and consequential epidemiology (application of public health research and aims to improve health outcomes). This section also plans, evaluates, trains, and educates internal and external partners in response to a potential or actual biologic incident which may be the result of bioterrorism.

- **Immunization Program**'s mission is to improve immunization coverage levels to prevent the occurrence of vaccine-preventable diseases. Activities include surveillance for vaccine-preventable diseases, outbreak investigation and control, perinatal hepatitis B case management, immunization coverage assessments, professional education and training, community outreach and education, partnerships with child health advocates and organizations, vaccine management and distribution (especially influenza vaccines), assuring delivery of immunization services in DPH and community facilities, immunization registry development, health services research, and sponsorship of an Immunization Roundtable.

Additional information about ACDC is available at:
www.lapublichealth.org/acd/index.htm

Emerging and Re-Emerging Infectious Diseases—Los Angeles County, 2007

New diseases emerge, conditions once thought gone reemerge, and existing diseases acquire added prominence. West Nile virus (WNV) steadily declined until 2006. However, it has increased in 2007 with 43 reported human WNV infections, of which 65% presented with neuroinvasive disease – 12 encephalitis, 14 meningitis, and 2 acute flaccid paralysis. Five fatalities (12%) occurred in 2007, the first since 2004 when 14 deaths (5% of cases) were reported. Four of the deaths were diagnosed with encephalitis and one with WNV fever. WNV environmental surveillance in mosquitoes, dead birds, and sentinel chickens documented that WNV has become enzootic in Los Angeles

Emerging and Re-Emerging Diseases

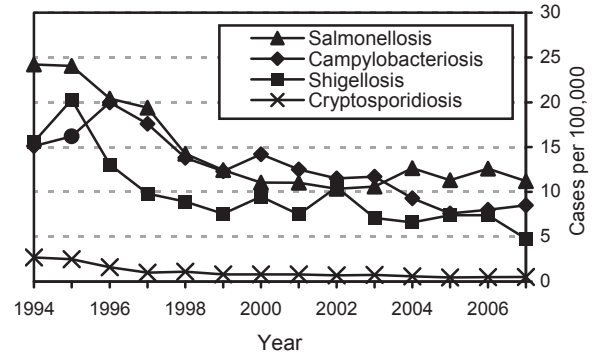
West Nile virus (WNV) steadily declined until 2006, however, it has increased in 2007 with 43 reported human WNV infections with 5 deaths. Aggressive mosquito abatement efforts as well as personal behaviors remain importance in prevention of human WNV infections.

County (LAC). Aggressive mosquito abatement efforts as well as personal behaviors, such as increased use of mosquito repellant and avoidance of risky areas at prime mosquito times remain importance in prevention of human WNV infections.

Food and Waterborne Diseases

Diseases spread by food and water sources make up much of the investigations and activities conducted by ACDC and CHS. Overall, food- and waterborne diseases declined since the mid-1990's and have stabilized at lower rates as in Figure 1 (see campylobacteriosis, cryptosporidiosis, listeriosis, salmonellosis, shigellosis, typhoid fever, and vibriosis individual chapters for more details). The declining trend in reported cases is most evident among the bacterial diseases campylobacteriosis and shigellosis. These findings mirror national trends depicting sustained decreases among many foodborne illnesses, particularly those of bacterial origin.[1,2,3] While the underlying causes for these local and national trends are not known, the implementation of many control measures are believed to be important factors in the reduction of food and water-related illnesses. On a national level, these include the expansion of federal food safety and inspection services as well as increased attention to fresh produce safety. Locally, a highly publicized restaurant grading system implemented in LAC in 1998 may have also advanced food safety through education for food handlers and the public regarding best practices to reduce foodborne disease.

Figure 1
Food and Waterborne Disease
Incidence Rates by Year
LAC and US, 1994–2007



In 2007, the salmonellosis crude rate for LAC decreased 11% when compared to 2006 (Figure 1) but has been a similar rate for the past five years. The crude rate has remained below the national rate since 1998 after an overall decrease of more than 100% since 1994. Nationally, the incidence of salmonellosis cases has also been decreasing, but at a much slower rate than it has for LAC in the previous ten years. Although many food items and both potable and recreational water sources have been implicated in the transmission of Salmonella, salmonellosis is most commonly associated with eggs, poultry, and fresh produce. Another prominent source is contact with reptiles, either directly or through surfaces or other people exposed to reptiles. In 2007, at least 113 (10.5%) of LAC salmonellosis cases had contact with turtles, lizards or snakes.

In 2007, ACDC investigated fewer foodborne disease outbreaks than in 2006, and fewer persons were affected. There were 21 foodborne disease outbreaks representing 385 individuals with illness. While the overall incidence of most these diseases has been decreasing, food- and waterborne diseases continue to account for considerable morbidity and mortality — thousands of preventable infections continue to occur yearly. The majority of people affected by these illnesses improve without complications; however,

[1] CDC. Preliminary FoodNet data on the incidence of foodborne illnesses--Selected sites, United States, 2001. MMWR 2002; 51(15):325-329. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5115a3.htm

[2] CDC. Preliminary FoodNet data on the incidence of foodborne illnesses--Selected sites, United States, 2002. MMWR 2003; 52(15):340-343. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5215a4.htm

[3] CDC, Preliminary FoodNet Data on the incidence of infection with pathogens transmitted commonly through food---Selected sites, United States, 2003. MMWR 2004; 53(16):338-343.

[4] Preliminary FoodNet data on the incidence of infection with pathogens transmitted commonly through food--10 States, 2007; 57(14):366-370. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5714a2.htm

some infections may cause invasive disease especially among children, the elderly and those with certain chronic medical conditions (e.g., the immunocompromised), leading to hospitalization and fatality. In LAC, food- or waterborne diseases were a contributing factor to at least 13 deaths during 2007. Accordingly, further efforts to improve food and water quality and to educate food industry and the public about proper food storage, handling, and preparation are needed.

Hepatitis, Antimicrobial Resistance, Invasive Bacteria and Respiratory Disease

The rate of acute hepatitis A in 2007 was the lowest ever recorded in LAC. This may be due to a combination of greater vaccination and increased natural immunity due to the community-wide outbreak of 2005-2006. Case definition change of acute viral hepatitis and how it affects epidemiologic understanding of populations with confirmed acute hepatitis A was presented at the California Association of Communicable Disease Controllers annual meeting. There has been a new epidemiology form developed by ACDC for acute hepatitis and was shared with LAC DPH Community Health Services along with reinforcement on knowledge of acute hepatitis. These were very well received by district nursing staff in CHS. The improved epidemiology forms will allow better identification of sources and risk factors for acute viral hepatitis in LAC.

Surveillance for influenza and other respiratory pathogens was expanded to include eight additional laboratories in LAC. A second year of syndromic surveillance program with the Los Angeles Unified School District was a success on expanding for influenza like illness (ILI). Collaboration with the ADSS team at ACDC to refine analysis of Emergency Department ILI data continues and a weekly “Influenza Watch” newsletter is issued for public updates of respiratory illness during the seasonal influenza season.

Standard surveillance for invasive pneumococcal disease (IPD) and invasive group A streptococcus is continued. The rate of pneumococcal disease increased in 2007 for the first time since 1999. A similar increase in the rate of invasive pneumococcal disease has been seen in the US and is thought to be due to an increase of a particular serotype of *Streptococcus pneumoniae* (19A) that is not currently covered by the childhood vaccine.

Vaccine Preventable Diseases

Despite the dramatic decrease in vaccine preventable disease (VPD) morbidity due to high vaccine coverage levels (over 80% in children since 2004 in the U.S. and since 2003 in LAC), national and international VPD outbreaks have increased in frequency in recent years. After the 2006 multi-state mumps outbreak in which more than 6,000 mumps cases were identified (a high proportion among college aged students), mumps outbreaks were also reported in 2007. The state of Maine reported several confirmed mumps cases, prompting some universities to exclude from classes students who were not up to date with their mumps vaccinations. The Maine outbreak was believed to be linked to outbreaks in select Canadian provinces. Due to this resurgence in mumps cases, vaccine efficacy was reevaluated, case definitions are still under revision, and laboratory test guidelines were changed. Recent changes in case classifications resulted in a large number of mumps cases that would have been classified as false prior to 2006 being classified as probable after 2006. Large measles outbreaks were also reported in 2007 in Japan, Canada, the United Kingdom, and Switzerland. In addition, susceptible United States residents of all ages traveling to measles endemic countries acquired the disease while abroad and exposed many persons upon their return to the United States. During 2007, pertussis school outbreaks also occurred in the Virgin Islands and South Carolina. LAC identified one pertussis-related death in 2007, marking the twelfth death within the last 10 years. A varicella-related death was also identified in a one year old in 2007, the fifth since hospitalized varicella cases became

Vaccine Preventable Diseases

- A national resurgence of vaccine preventable diseases has been occurring in recent years, primarily due to foreign travel.
- Efforts are underway to increase immunization coverage levels across the life span.

reportable in June 2003 in LAC. The deaths have ranged in age from a one year old to an 83 year old. Adolescents and adults comprised the majority of all LAC hospitalized varicella cases reported since 2003. These vaccine preventable disease (VPD) outbreaks and deaths illustrate key gaps in immunization coverage. A rising percentage of parents, who for personal reasons elect their children not to receive vaccine (personal beliefs exemptions rates in LAC kindergarten schools, have increased steadily over the last ten years and now comprise 1% of the population); increased number of cases among unvaccinated adolescents and adults; and global travel without appropriate vaccinations to countries where several VPDs are still endemic.

Increasing childhood immunization coverage levels is still a cornerstone approach in curbing VPD morbidity in the general community. The Advisory Committee on Immunization Practices updated its routine varicella recommendations to add a second dose of varicella vaccine for children 4-6 years of age. In addition, unvaccinated infants six months of age and older should be vaccinated with MMR if they are traveling out of the country. Recent efforts have also focused on appropriately vaccinating adolescents and adults especially prior to foreign travel. It is recommended that all foreign travelers who are not immune to measles should be vaccinated, ideally two weeks prior to travel. In addition, during varicella outbreaks, persons who have received only one dose of varicella vaccine should receive a second dose. In Spring 2005, two pertussis vaccines (i.e., Tdap) were also licensed for use in adolescents and adults. Additional work is required to increase the usage of these vaccines as a national telephone survey conducted from May to August 2007 among 7,055 adults 18-64 years of age showed that Tdap vaccine coverage levels were only 2.1%.

This multi-level plan of attack is best exemplified with the LAC enhanced perinatal hepatitis B case management system in which nearly 97% of infants exposed to hepatitis B in 2007 received hepatitis B vaccine and 96% received HBIG within 24 hours of birth. The efforts included identifying and referring household and sexual contacts for screening and vaccination, reminding and educating parents of the importance of completing the hepatitis B vaccination series, and notifying hospitals of expected deliveries. Despite the challenges with VPD resurgence internationally, rigorous efforts are already in place in LAC to curb VPD morbidity and increase immunization coverage levels across the life span for all ten vaccine preventable diseases and have thus far helped LAC keep its VPD morbidity levels low.

Hospital Outbreaks and Outreach

The Hospital Outreach Unit (HOU) is an integral component of the public health link to infection preventionists and other healthcare agencies. The unit incorporates five liaison public health nurses (LPHNs), two program specialist PHNs, an epidemiology analyst, and a medical epidemiologist who interface with infection preventionists at 102 licensed acute care hospitals educating them on disease reporting and promoting hospital implementation of web-based and emergency department surveillance to enhance early detection of potential critical situations. The team identifies and responds to potential risks and threats during hospital outbreaks and assists with investigations. Twenty-six hospitals have invited public health into their periodic infection control committee meetings demonstrating additional integration of public health goals into the hospital setting. The project has now expanded to include non-hospital healthcare settings, such as large clinics and jail medical services. Team members continue to strengthen communication and collaboration between public health and the medical community on a variety of pertinent topics.

Public health is entering a new era of transparency in healthcare. Healthcare associated infections (HAI) have generated a great deal of attention in the US within the past few years, especially regarding public reporting. In recent years, California has passed legislation, most notably senate bills 739, 1058, and 158, which impose reporting requirements and establish an HAI advisory committee to monitor and prevent these infections. The HOU is working with the California Department of Public Health as a part of the advisory committee to make recommendations related to reporting of HAI, use of national guidelines, and public reporting of process and outcome measures regarding HAI. Other important topics include the rise in multi-drug resistant organisms and the isolation of the new strain of *Clostridium difficile* (B1/NAP1) in LAC.

The HOU continues to work with governmental and specialty organizations regarding monitoring of facilities with limited licensing oversight. In 2007, multiple outbreaks fell into this category. The HOU investigated a multi-organism outbreak that implicated improper disinfection and cleaning practices of a reusable medical device in an outpatient provider's office. Another outbreak involved a procedure center with an increase in cases of endophthalmitis after cataract surgery. Lastly, the HOU investigated a prolonged scabies outbreak that involved both an acute care hospital and its associated outpatient clinic.

Automated Disease Surveillance

The achievements of ACDC automated disease surveillance in 2007 were the continued integration of early detection system activities into routine public health operations. Emergency department syndromic surveillance, which includes detecting major trends from baseline patterns of illness that may potentially identify bioterrorist-related activity or natural disease outbreaks, was continued with the addition of several local hospitals.

Automated Disease Surveillance

In 2007, integration of early detection system activities into routine public health operations continued. Syndromic surveillance proved capable of detecting patterns of illness and community outbreaks, complemented traditional disease surveillance activities and is one of the tools used for ILI surveillance.

Syndromic surveillance proved capable of detecting patterns of illness and community outbreaks, complemented traditional disease surveillance activities and is one of the tools used for influenza surveillance. In 2007, the near real-time syndromic surveillance data was also used to monitor heat related illness during the summer months as well as monitoring respiratory effects of poor air quality due to wildfires. Current hospital participation represents approximately 40% of all emergency department visits. Volume data from the ReddiNet® system for emergency department visits during influenza season strongly correlated with virologic test results. Nurse call line, coroner data, veterinary, and over-the-counter medications data also complement our early event detection system.

vCMR (Visual Confidential Morbidity Report) is an advanced electronic reporting system for all communicable diseases. It manages the life-cycle of a disease incident from the initial date of onset to the final resolution. The system has been fully operational since May 2000. It features a disease, outbreak, foodborne illness, and community reporting module used by infection control practitioners as well as an extensive electronic laboratory reporting module.

To align with CDC-sponsored initiatives such as the Public Health Information Network (PHIN) and National Electronic Disease Surveillance System (NEDSS), the vCMR custom development solution was scaled up to support broader integration of disease reporting and expansion of standards-based electronic data exchange capabilities. In September 2005, vCMR was converted to a full web-based application using Microsoft.NET technology.

The following program areas have access to the vCMR application: Acute Communicable Disease Control (ACDC) Program; Environmental Health Food and Milk; Immunization Program; LAC Eight (8) Service Planning Areas; Health Assessment and Epidemiology; Injury and Violence Prevention; STD (laboratory reports only). vCMR is also being used by the following counties in California: Monterey, Orange, San Diego, Sacramento, Stanislus, and Yolo. In 2007, the State of Wisconsin also began using vCMR for communicable disease reporting.

ELR (Electronic Laboratory Reporting): Automated electronic reporting of communicable diseases from laboratories to public health has been shown to yield more complete and rapid reporting of disease. Results are sent to public health as soon as they are available rather than days later. LAC began receiving ELR in 2002, and since early 2006 have pursued efforts to

recruit and implement many additional public and private laboratories. We currently have live feeds from six laboratories representing ten hospitals and two independent laboratories. We have six laboratories currently in testing and many more poised to begin testing in 2008. Establishing electronic laboratory reporting is a very time consuming process and on average takes roughly 8 to 12 months to implement.

Bioterrorism Preparedness and Response

Collaborative efforts continued between LAC DPH Programs and CHS, Emergency Medical Servies (EMS), and external response agencies and partners in the testing and exercising of plans for response to a positive Biohazard Detection System (BDS) signal at the United States Postal Service Processing and Distribution Centers (P&DC) in LAC. In 2007, LAC DPH participated in two BDS full-scale exercises which provided the opportunity to exercise, test and evaluate the readiness and preparedness of elements such as, the activation of the LAC DPH Department Operation Center (DOC), notification and deployment of public health staff to assume ICS roles and functions at the DOC, a simplified Point of Dispensing (POD) model, deployment of the mobile DPH Command Center, and real-time notification and response after regular work hours.

In April 2007, the DPH Technical Advisory Group (TAG), Public Health Emergency Response Team (PHERT), and several members of the Emergency Preparedness and Response Program, joined with several first responder agencies—the National Guard, law enforcement, fire department, and LAC Department of Coroner—to participate in Operation Vector (a 3-day mult-agency bioterrorism field exercise), involving real-time response activites to situations related to the intentional release and exposure of lethal agents to the public, such as plague, smallpox, ricin, and radiological material.

Special Project: Reptile-Associated Salmonellosis (RAS)

Nationally, reptile-associated salmonellosis accounts for 6% of total reported salmonellosis cases, yet in LAC, reptiles account for 10% of reported cases. Turtles, largely red-eared sliders, account for 80% of local RAS cases. Most reported cases occur in Hispanic families who are apartment tenants. These pets are openly purchased in popular swap meets, street markets, and small shops, and are common classroom pets—despite the ban on sales of turtles with carapaces under four inches and the risk management policies of the Los Angeles Unified School District, Head Start, and National Association for the Education of Young Children.

In August 2007, ACDC initiated collaboration with Veterinary Public Health and established the RAS Working Group and convened an interdisciplinary team of public health veterinarians, nurses, medical epidemiologist, physicians, public information officer, and health educators, to develop and implement strategies to increase community awareness, prevention, and control of RAS. The Working Group has expanded to include community stakeholders, advocates, and tenant organizers, and meets bimonthly.

Staff have identified, engaged, trained, and mobilized hundreds of community residents and stakeholders, targeting early childhood education providers throughout LAC; developed and distributed policy recommendations and health education materials; presented at meetings and conferences of lay health promoters, preschool teachers, and home-based care providers; and participated in networks of child care providers, including the LAC Child Care Planning Committee, promoting the message that small turtles are not suitable pets for families or classrooms with young children or immune compromised individuals.

The Working Group's approach has been to be pro-animal in all health promotion messaging, and to reach out to the community with new information (that indirect contact with salmonella can cause illness—encouraging people to disinfect exposed surfaces that reptiles or their habitat touched, sink, tub, etc. — that the more the animal is stressed, the more it sheds the bacteria, so feed it correct food, not just lettuce, etc.). Furthermore, hand washing has been and will continue to be the critical RAS prevention priority.

Acute Communicable Disease Control Program

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PURPOSE

The Acute Communicable Disease Control Program (ACDC) Annual Morbidity Report of the Los Angeles County Department of Public Health (DPH) is compiled to:

1. summarize annual morbidity from several acute communicable diseases occurring in Los Angeles County (LAC);
2. assess the effectiveness of established communicable disease control programs;
3. identify patterns of disease as a means of directing future disease prevention efforts;
4. identify limitations of the data used for the above purposes and to identify means of improving that data; and
5. serve as a resource for medical and public health authorities at county, state and national levels.

Note: The ACDC Annual Morbidity Report does not include information on tuberculosis, sexually transmitted diseases, or HIV and AIDS. Information regarding these diseases is available from their respective departments (see the LAC DPH website for more information at http://publichealth.lacounty.gov/index.htm).

LOS ANGELES COUNTY DEMOGRAPHIC DATA

Los Angeles County (LAC) population estimates used for this report are created by the Population Estimates and Projections System (PEPS) provided to the LAC Public Health by Urban Research. The LAC population is based on both estimates and projections that are adjusted when real relevant numbers become available (e.g., DMV records, voters' registry, school enrollment and immigration records, etc.).

National and California state counts of reportable diseases were obtained from the Centers for Disease Control and Prevention (CDC) Final 2007 Reports of Nationally Notifiable Infectious Diseases.[1] This report also includes United States (US) Census population estimates—these were used to calculate national and California rates of disease.

Cities of Long Beach and Pasadena are separate reporting jurisdictions, as recognized by the California Department of Health Services, and as such these two cities maintain their own disease reporting systems. Therefore, disease episodes occurring among residents of Long Beach and Pasadena have been excluded from LAC morbidity data, and their populations subtracted from LAC population data. Exceptions to this rule are noted in the text when they occur.

[1] CDC. Notice to Readers: Final 2007 reports of nationally notifiable infectious diseases. MMWR 2007; 57(33):901, 909-913. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5733a6.htm

DATA SOURCES

Data on occurrence of communicable diseases in LAC were obtained through passive and sometimes active surveillance. Every healthcare provider or administrator of a health facility or clinic, and anyone in charge of a public or private school, kindergarten, boarding school, or preschool knowing of a **case or suspected case** of a communicable disease is required to report it to the local health department as specified by the California Code of Regulations (Section 2500). Immediate reporting by telephone is also required for any **outbreak** or **unusual incidence** of infectious disease and any **unusual disease** not listed in Section 2500. Laboratories have separate requirements for reporting certain communicable diseases (Section 2505). Healthcare providers must also give detailed instructions to household members in regard to precautionary measures to be taken for preventing the spread of disease (Section 2514).

1. Passive surveillance relies on physicians, laboratories, and other healthcare providers to report diseases of their own accord to the DPH using the Confidential Morbidity Report (CMR) form, electronically, by telephone, or by facsimile.

2. Active surveillance entails ACDC staff regularly contacting hospitals, laboratories and physicians in an effort to identify all cases of a given disease.

DATA LIMITATIONS

This report should be interpreted in light of the following notable limitations:

1. Underreporting
   The proportion of cases that are not reported varies for each disease. Evidence indicates that for some diseases as many as 98% of cases are not reported.

2. Reliability of Rates
   All vital statistics rates, including morbidity rates, are subject to random variation. This variation is inversely related to the number of events (observations, cases) used to calculate the rate. The smaller the frequency of occurrence of an event, the less stable its occurrence from observation to observation. As a consequence, diseases with only a few cases reported per year can have highly unstable rates. The observation and enumeration of these “rare events” is beset with uncertainty. The observation of zero events is especially hazardous.

   To account for these instabilities, all rates in the ACDC Annual Morbidity Report based on less than 19 events are considered “unreliable”. This translates into a relative standard error of the rate of 23% or more, which is the cut-off for rate reliability used by the National Center for Health Statistics.

   In the Annual Morbidity Report, rates of disease for groups (e.g., Latino versus non-Latino) are said to differ significantly only when two criteria are met: 1) group rates are reliable and 2) the 95% confidence limits for these rates do not overlap. Confidence limits are calculated only those rates which are reliable.

3. Case Definitions
   To standardize surveillance, CDC case definition for infectious diseases under public surveillance[2] is used with some exceptions as noted in the text of the individual diseases. Since verification by a laboratory test is required for the diagnosis of some diseases, cases reported without such verification may not be true cases. Therefore, an association between a communicable disease and a death or an outbreak possibly may not be identified.

[2] CDC. Case definitions for infectious conditions under public health surveillance. MMWR 1997; 46(RR10):1-55. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00047449.htm

4. Onset Date versus Report Date
   Slight differences in the number of cases and rates of disease for the year may be observed in subsequent annual reports. Any such disparities are likely to be small.

5. Population Estimates
   Estimates of the LAC population are subject to many errors. Furthermore, the population of LAC is in constant flux. Though not accounted for in census data, visitors and other non-residents may have an effect on disease occurrences.

6. Place of Acquisition of Infections
   Some cases of diseases reported in LAC may have been acquired outside of the county. This may be especially true for many of the diseases common in Latino and Asian populations. Therefore, some disease rates more accurately reflect the place of diagnosis than the location where an infection was acquired.

7. Health Districts and Service Planning Areas
   Since 1999, Los Angeles County is divided into eight "Service Planning Areas" (SPAs) for purposes of healthcare planning and provision of health services: SPA 1 Antelope Valley, SPA 2 San Fernando, SPA 3 San Gabriel, SPA 4 Metro, SPA 5 West, SPA 6 South, SPA 7 East, and SPA 8 South Bay. Each SPA is organized further into health districts (HDs) (see SPA map in this report).

8. Race/Ethnicity Categories
   - **Asian** – person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.
   - **American Indian** – person having origins in any of the original peoples of North America and who maintain cultural identification through tribal affiliation or community recognition.
   - **Black** – person having origins in any of the black racial groups of Africa.
   - **Latino** – person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.
   - **White** – person having origins in any of the original peoples of Europe, North Africa, or the Middle East.

STANDARD REPORT FORMAT

1. Crude data
   - **Number of Cases**: For most diseases, this number reflects new cases of the disease with an onset in the year of the report. If the onset was unknown, the date of diagnosis was used.
   - **Annual Incidence Rates in LAC**: Number of new cases in the year of report divided by LAC census population (minus Long Beach and Pasadena) multiplied by 100,000.
   - **Annual Incidence Rates in the US and California**: Incidence rates for the US and California were taken from the previously cited CDC publication, Morbidity and Mortality Weekly Report (MMWR). The MMWR records diseases by date of report rather than date of onset.
   - **Mean Age at Onset**: Arithmetic average age of all cases.
   - **Median Age at Onset**: The age that represents the midpoint of the sequence of all case ages.
   - **Range of Ages at Onset**: Ages of the youngest and oldest cases in the year of the report. For cases under one year of age, less than one (<1) was used.

2. Etiology
   This includes the causative agent, mode of spread, common symptoms, potential severe outcomes, susceptible groups, and vaccine-preventability.

3. Disease Abstract
   This provides a synopsis or the highlights of disease activity in the year of the report.

4. Stratified Data
   - **Trends**: Any trends in case characteristics during recent years.
   - **Seasonality**: Number of cases that occurred during each month of the reporting year.
   - **Age**: Annual rate of disease for individual age groups. Race-adjusted rates are presented for some diseases.
   - **Sex**: Male-to-female rate ratio of cases.
   - **Race/Ethnicity**: Annual rate of disease for the five major racial groups. Cases of unknown race are excluded; thus, race-specific rates may be underestimates. Age-adjusted rates are presented for some diseases.
   - **Location**: Location presented most often is the health district or SPA of residence of cases. Note that "location" rarely refers to the site of disease acquisition. Age-adjusted rates by location are presented for some diseases.

5. Prevention
   If applicable, includes a description of county programs and other measures that address the disease.

6. Comments
   Describes miscellaneous information not fitting easily into above categories, as well as elaboration of some findings of interest.

7. Additional Resources
   Provides agencies, phone numbers, websites, and other resources on the subject.

Table A. Los Angles County* Population by Year, 2002–2007

Year	Population	% change
2002	9,253,109	
2003	9,398,128	1.6%
2004	9,535,937	1.5%
2005	9,582,956	0.5%
2006	9,644,738	0.6%
2007	9,689,462	0.5%

* Does not include cities of Pasadena and Long Beach.

Table B. Los Angles County* Population by Age Group, 2007

Age (in years)	Population	%
<1	147,882	1.5%
1–4	577,033	6.0%
5–14	1,432,441	14.8%
15–34	2,814,628	29.0%
35–44	1,499,615	15.5%
45–54	1,320,139	13.6%
55–64	887,265	9.2%
65+	1,010,459	10.4%
Total	**9,689,462**	**100.0%**

* Does not include cities of Pasadena and Long Beach.

Table C. Los Angles County* Population by Sex, 2007

Sex	Population	%
Male	4,800,201	49.5%
Female	4,889,261	50.5%
Total	**9,689,462**	**100.0%**

* Does not include cities of Pasadena and Long Beach.

Table D. Los Angles County* Population by Race, 2007

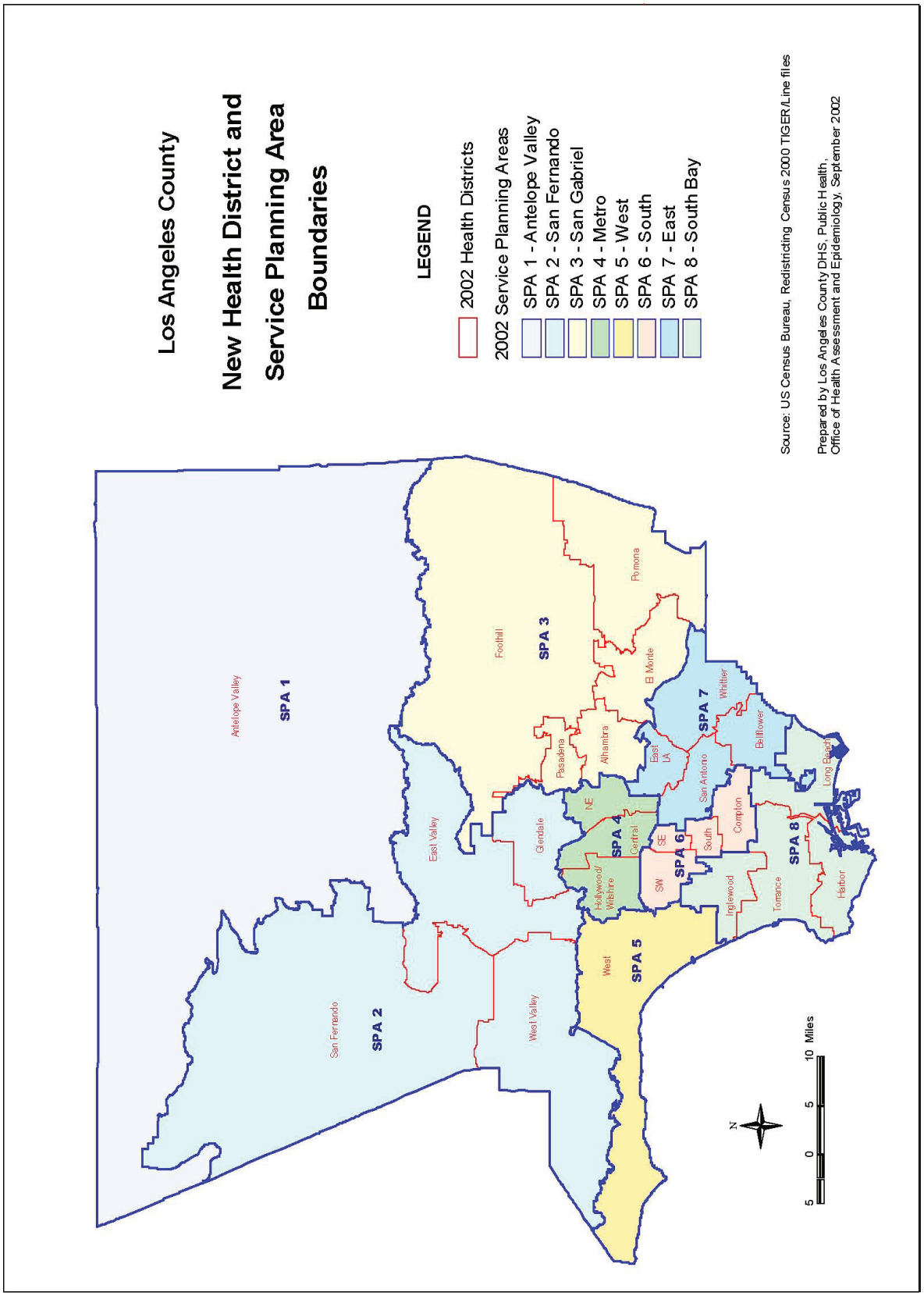
Race	Population	%
Asian	1,283,734	13.2%
Black	851,473	8.8%
Latino	4,630,950	47.8%
White	2,895,007	29.9%
Other**	28,298	0.3%
Total	**9,689,462**	**100.0%**

* Does not include cities of Pasadena and Long Beach.
** Includes American Indian, Alaskan Native, Eskimo and Aleut.

**Table E. Los Angles County*
Population by Health District and SPA, 2007**

Health District	Population
SPA1	**358,324**
Antelope valley	358,324
SPA 2	**2,159,023**
East Valley	457,287
Glendale	354,363
San Fernando	465,360
West Valley	882,013
SPA 3	**1,726,801**
Alhambra	359,641
El Monte	480,803
Foothill	314,893
Pomona	571,464
SPA 4	**1,262,029**
Central	369,318
Hollywood Wilshire	541,123
Northeast	351,588
SPA 5	**640,698**
West	640,698
SPA 6	**1,044,901**
Compton	293,041
South	186,708
Southeast	178,741
Southwest	386,411
SPA 7	**1,379,712**
Bellflower	370,013
East Los Angeles	222,523
San Antonio	451,415
Whittier	335,761
SPA 8	**1,117,974**
Inglewood	436,902
Harbor	212,008
Torrance	469,064
Total	**9,689,462**

* Pasadena and Long Beach are separate health jurisdictions and as such are excluded from this table.


Los Angeles County
New Health District and
Service Planning Area
Boundaries
LEGEND
2002 Health Districts
2002 Service Planning Areas
SPA 1 - Antelope Valley
SPA 2 - San Fernando
SPA 3 - San Gabriel
SPA 4 - Metro
SPA 5 - West
SPA 6 - South
SPA 7 - East
SPA 8 - South Bay
Source: US Census Bureau, Redistricting Census 2000 TIGER/Line files
Prepared by Los Angeles County DHS, Public Health,
Office of Health Assessment and Epidemiology, September 2002
SPA 1
Antelope Valley
SPA 2
San Fernando
East Valley
West Valley
SPA 3
Foothill
Pomona
El Monte
Pasadena
Alhambra
Glendale
SPA 4
NE
Central
Hollywood/
Wilshire
SPA 5
West
SPA 6
East
LA
SE
South
SW
SPA 7
Whittier
Bellflower
San Antonio
SPA 8
Compton
Long Beach
Inglewood
Torrance
Harbor
N
5 0 5 10 Miles

The following abbreviations and acronyms may be found throughout this report.

Table F. List of Acronyms

95%CI	95 percent confidence interval	**HCV**	Hepatitis C virus
ACDC	Acute Communicable Disease Control	**HD**	Health District
AIDS	Acquired immunodeficiency syndrome	**Hib**	*Haemophilus influenzae*, type b
ALT	Alanine aminotransferase	**HIV**	Human immunodeficiency virus
AR	Attack rate	**IFA**	Immunofluorescent Antibody
CA	California	**IgG**	Immunoglobulin G
CDC	Centers for Disease Control and Prevention	**IgM**	Immunoglobulin M
CDHS	California Department of Health Services	**LAC**	Los Angeles County
CMR	Confidential morbidity report	**MMR**	Mumps-Measles-Rubella vaccine
CSF	Cerebral spinal fluid	**MMWR**	Morbidity and Mortality Weekly Report
CSTE	Council of State and Territorial Epidemiologists	**MSM**	Men who have sex with men
DHS	Department of Health Services	**N/A**	Not available
DPH	Department of Public Health	**OR**	Odds ratio
DTaP	Diphtheria-tetanus-acellular pertussis	**PCP**	*Pneumocystis carinii pneumonia*
DTP	Diphtheria-tetanus-pertussis vaccine	**PCR**	Polymerase Chain Reaction
EHS	Environmental Health Services	**PFGE**	Pulsed Field Gel Electrophoresis
EIA	Enzyme Immunoassay	**PHBPP**	Perinatal Hepatitis B Prevention Program
GI	gastrointestinal	**RNA**	Ribonucleic Acid
GE	gastroenteritis	**RR**	Rate ratio or relative risk
HAART	Highly Active Antiretroviral Therapy	**SNF**	Skilled nursing facility
HAV	Hepatitis A virus	**sp. or spp.**	Species
HBIG	Hepatitis B Immunoglobulin	**SPA**	Service Planning Area
HBsAg	Hepatitis B surface antigen	**US**	United States
HBV	Hepatitis B virus	**VCMR**	Visual confidential morbidity report (software)

LOS ANGELES COUNTY HEALTH DISTRICTS

AH	Alhambra	**FH**	Foothill	**SE**	Southeast
AV	Antelope Valley	**GL**	Glendale	**SF**	San Fernando
BF	Bellflower	**HB**	Harbor	**SO**	South
CE	Central	**HW**	Hollywood/Wilshire	**SW**	Southwest
CN	Compton	**IW**	Inglewood	**TO**	Torrance
EL	East Los Angeles	**NE**	Northeast	**WE**	West
EV	East Valley	**PO**	Pomona	**WV**	West Valley
EM	El Monte	**SA**	San Antonio	**WH**	Whittier

TABLES OF NOTIFIABLE DISEASES

Table G. Reported Cases of Selected Notifiable Diseases by Year of Onset
Los Angeles County, 2002-2007

Disease	Year of Onset						Previous 5-year Average	5-Yr 95% Upper Limit
	2002	2003	2004	2005	2006	2007		
Amebiasis	102	121	114	114	94	122	109	128
Botulism	2	0	3	8	2	1	3	8
Brucellosis	11	7	4	8	5	3	7	12
Campylobacteriosis	1067	1100	884	725	775	827	910	1206
Cholera	0	1	0	0	0	0	0	1
Coccidioidomycosis	76	73	133	214	196	145	138	253
Cryptosporidiosis	62	71	56	45	48	50	56	75
Cysticercosis	18	12	8	15	11	7	13	20
Dengue	7	0	5	10	2	3	5	12
E. *coli* O157:H7	31	27	18	13	12	12	20	35
Encephalitis	61	38	133	72	46	65	70	136
Foodborne outbreaks	29	25	40	32	49	3	35	52
Giardiasis	441	401	320	313	376	441	370	465
Haemophilus influenzae type b	4	0	2	3	5	1	3	6
Hansen's Disease (Leprosy)	11	9	9	2	2	5	7	14
Hepatitis A	438	374	321	480	364	78	395	506
Hepatitis B	32	73	72	57	62	55	59	88
Hepatitis C	3	0	5	3	4	3	3	6
Hepatitis unspecified [b]	0	1	0	4	7	10	2	8
Kawasaki syndrome	34	35	42	56	75	53	48	79
Legionellosis [b]	25	21	15	31	24	40	23	33
Listeriosis, nonperinatal	14	17	21	25	25	21	20	29
Listeriosis, perinatal	7	3	6	3	12	6	6	13
Lyme disease	8	6	0	7	16	9	7	17
Malaria	38	60	51	45	33	26	45	64
Measles	0	0	1	0	1	0	0	1
Meningitis, viral	466	899	807	527	373	395	614	1012
Meningococcal infections	46	32	28	37	46	24	38	52
Mumps	16	10	5	10	10	5	10	17
Pertussis	172	130	156	439	150	69	209	436
Psittacosis	0	0	0	0	1	0	0	1
Q-fever	4	0	4	0	1	2	2	5
Relapsing fever	1	0	0	0	2	0	1	2
Rheumatic fever, acute	0	0	1	0	0	0	0	1
Rubella	0	0	0	1	0	0	0	1
Salmonellosis	956	995	1205	1085	1217	1081	1092	1300
Shigellosis	974	669	625	710	524	463	700	995
Strongyloidiasis	0	0	0	0	0	0	0	0
Tetanus	2	1	2	0	4	0	2	4
Trichinosis	0	0	0	0	1	0	0	1
Tularemia	0	1	0	0	0	0	0	1
Typhoid fever, case	33	16	13	12	17	17	18	33
Typhoid fever, carrier	6	2	3	4	3	1	4	6
Typhus fever [b]	11	12	8	9	10	17	10	13
Vibrio	14	13	26	14	18	13	17	26

[a] The normal distribution assumption may not apply to some rare diseases.

[b] 2007 data over 95% upper limit.

Table H. Annual Incidence Rates of Selected Notifiable Diseases by Year of Onset
Los Angeles County, 2002-2007

	Annual Incidence Rate (Cases per 100,000)[b]					
Disease	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Amebiasis	1.10	1.29	1.20	1.19	0.97	1.26
Botulism	0.02	-	0.03	0.08	0.02	0.01
Brucellosis	0.12	0.07	0.04	0.08	0.05	0.03
Campylobacteriosis	11.49	11.70	9.30	7.57	8.04	8.54
Cholera	-	0.01	-	-	-	-
Coccidioidomycosis	0.82	0.78	1.40	2.23	2.03	1.50
Cryptosporidiosis	0.67	0.76	0.59	0.47	0.50	0.52
Cysticercosis	0.19	0.13	0.08	0.16	0.11	0.07
Dengue	0.08	-	0.05	0.10	0.02	0.03
E. *coli* O157:H7	0.33	0.29	0.19	0.14	0.12	0.12
Encephalitis	0.66	0.40	1.40	0.75	0.48	0.67
Giardiasis	4.75	4.26	3.37	3.27	3.90	4.55
Haemophilus influenzae type b	0.04	-	0.02	0.03	0.05	0.01
Hansen's Disease (Leprosy)	0.12	0.10	0.09	0.02	0.02	0.05
Hepatitis A	4.72	3.98	3.38	5.01	3.77	0.80
Hepatitis B	0.34	0.78	0.76	0.59	0.64	0.57
Hepatitis C	0.03	-	0.05	0.03	0.04	0.03
Hepatitis unspecified	-	0.01	-	0.04	0.07	0.10
Kawasaki syndrome	0.37	0.37	0.44	0.58	0.78	0.55
Legionellosis	0.27	0.22	0.16	0.32	0.25	0.41
Listeriosis, nonperinatal	0.15	0.18	0.22	0.26	0.26	0.22
Listeriosis, perinatal[a]	4.96	2.12	4.25	2.14	8.47	4.23
Lyme disease	0.09	0.06	-	0.07	0.17	0.09
Malaria	0.41	0.64	0.54	0.47	0.34	0.27
Measles	-	-	0.01	-	0.01	-
Meningitis, viral	5.02	9.56	8.49	5.50	3.87	4.08
Meningococcal infections	0.50	0.34	0.29	0.39	0.48	0.25
Mumps	0.17	0.11	0.05	0.10	0.10	0.05
Pertussis	1.85	1.38	1.64	4.58	1.56	0.71
Psittacosis	-	-	-	-	0.01	-
Q-fever	0.04	-	0.04	-	0.01	0.02
Relapsing fever	0.01	-	-	-	0.02	-
Rheumatic fever, acute	-	-	0.01	-	-	-
Rubella	-	-	-	0.01	-	-
Salmonellosis	10.30	10.58	12.68	11.34	12.62	11.16
Shigellosis	10.49	7.12	6.57	7.41	5.43	4.78
Strongyloidiasis	-	-	-	-	-	-
Tetanus	0.02	0.01	0.02	-	0.04	-
Trichinosis	-	-	-	-	0.01	-
Tularemia	-	0.01	-	-	-	-
Typhoid fever, case	0.36	0.17	0.14	0.13	0.18	0.18
Typhoid fever, carrier	0.06	0.02	0.03	0.04	0.03	0.01
Typhus fever	0.12	0.13	0.08	0.09	0.10	0.18
Vibrio	0.15	0.14	0.27	0.15	0.19	0.13

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table I. Five –Year Average of Notifiable Diseases by Month of Onset
Los Angeles County, 2003-2007

Disease	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Amebiasis	5.8	7.0	7.0	7.0	8.4	8.2	9.4	10.0	8.0	6.2	8.4	9.2	112.8
Botulism	0.0	0.4	0.4	0.2	0.0	0.4	0.2	0.2	0.4	0.0	0.6	0.0	2.8
Brucellosis	0.2	0.4	0.6	0.4	0.2	0.6	1.0	0.8	0.2	0.4	0.4	0.2	5.4
Campylobacteriosis	69.8	51.6	55.0	69.8	78.8	89.8	103.6	90.2	78.0	64.6	65.8	40.8	862.2
Cholera	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2
Coccidioidomycosis	13.0	9.8	10.8	10.8	11.2	9.8	11.8	14.6	16.6	13.0	15.0	11.0	153.2
Cryptosporidiosis	4.6	3.4	3.6	4.2	3.6	3.8	4.8	8.4	6.6	3.6	3.4	2.4	54.0
Cysticercosis	1.0	0.8	1.8	1.0	1.4	0.8	1.2	0.2	0.8	0.6	0.0	0.4	10.6
Dengue	0.0	0.0	0.0	0.0	0.0	0.4	0.6	1.4	0.6	0.6	0.0	0.0	3.6
E. *coli* O157:H7	1.0	0.4	0.8	0.6	1.6	1.6	1.8	3.0	3.4	1.4	0.4	0.2	16.2
Encephalitis	3.6	3.2	5.8	4.2	4.2	4.6	8.2	13.6	10.2	3.6	4.2	3.8	71.2
Giardiasis	25.4	18.2	28.4	27.2	26.0	26.2	37.6	37.2	35.0	30.6	25.6	23.6	369.4
Haemophilus influenzae type b	0.6	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	2.2
Hansen's Disease (Leprosy) [a]	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis A	35.2	29.2	21.8	19.2	21.8	16.8	17.8	22.0	31.2	33.6	37.2	27.6	323.4
Hepatitis B	6.0	6.4	5.4	5.2	6.6	4.8	4.0	4.4	4.0	5.2	6.4	5.0	63.8
Hepatitis C	0.2	0.2	0.4	0.2	0.6	0.2	0.2	0.2	0.2	0.4	0.2	.0.0	3.0
Hepatitis unspecified	0.2	0.2	0.0	0.2	0.0	0.0	0.2	0.2	0.0	0.2	0.0	0.2	4.4
Kawasaki syndrome	4.8	5.2	4.8	4.0	3.8	3.8	2.2	2.6	2.8	2.8	3.2	4.6	44.6
Legionellosis	2.2	1.2	2.0	1.8	2.0	2.4	1.6	1.8	0.4	2.8	4.0	3.2	26.2
Listeriosis, nonperinatal	0.8	1.4	1.2	1.8	1.0	2.4	3.2	3.6	3.2	1.2	0.2	1.2	21.2
Listeriosis, perinatal	0.2	0.0	0.4	0.4	0.6	0.2	0.8	1.4	1.0	0.8	0.2	0.0	1.2
Lyme disease	0.2	0.4	0.0	0.2	0.2	1.6	3.0	0.8	0.4	0.4	0.0	0.0	7.2
Malaria[a]	-	-	-	-	-	-	-	-	-	-	-	-	-
Measles	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Meningitis, viral	23.0	21.0	19.8	27.6	30.4	44.6	85.4	112.8	84.2	50.2	37.4	27.0	600.4
Meningococcal infections	6.4	3.4	3.4	3.2	2.0	2.6	1.6	2.2	1.2	1.8	2.6	3.0	33.4
Mumps	0.4	1.4	0.4	0.8	0.8	0.2	1.2	1.0	0.6	0.4	0.2	0.6	8.0
Pertussis	13.2	11.6	11.8	13.0	17.0	14.0	19.8	23.6	18.4	17.8	12.2	16.4	188.8
Psittacosis	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Q-fever	0.2	0.2	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	1.4
Relapsing fever	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Rheumatic fever, acute	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Rubella	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Salmonellosis	71.0	56.2	63.6	74.4	90.6	99.4	139.4	137.6	119.0	95.4	77.6	60.8	1116.6
Shigellosis	44.0	23.6	26.4	21.4	25.4	36.8	76.8	100.8	94.4	72.6	40.4	31.2	598.2
Strongyloidiasis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetanus	0.4	0.2	0.0	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	1.4
Trichinosis	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Tularemia	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Typhoid fever, case	1.4	1.4	1.0	0.6	1.0	2.4	1.4	1.8	1.8	1.0	0.8	0.4	15.0
Typhoid fever, carrier	0.0	0.2	0.6	0.0	0.4	0.4	0.4	0.0	0.0	0.0	0.2	0.4	2.6
Typhus fever	0.8	0.2	0.0	0.2	1.0	1.2	2.4	1.2	0.8	1.4	1.0	0.4	10.6
Vibrio	0.2	0.6	1.2	0.6	0.8	1.6	4.2	2.4	1.2	2.0	1.4	0.4	16.8

[a] Not applicable.

Table J. Number of Cases of Selected Notifiable Diseases by Age Group
Los Angeles County, 2007

Disease	<1	1-4	5-14	15-34	35-44	45-54	55-64	65+	Total[a]
Amebiasis	0	6	11	30	30	22	13	9	122
Botulism	0	0	0	0	0	1	0	0	1
Brucellosis	0	1	0	1	0	0	1	0	3
Campylobacteriosis	25	108	109	237	78	100	69	101	827
Cholera	0	0	0	0	0	0	0	0	0
Coccidioidomycosis	0	1	4	27	30	37	26	20	145
Cryptosporidiosis	0	2	4	15	13	10	1	5	50
Cysticercosis	0	0	0	2	3	0	0	2	7
Dengue	0	0	0	0	2	1	0	0	3
E. *coli* O157:H7	0	6	3	0	1	1	0	1	12
Encephalitis	3	6	13	15	2	6	7	10	65
Giardiasis	3	61	66	126	76	62	30	17	441
Haemophilus influenzae type b	0	0	0	0	0	0	0	1	1
Hansen's Disease (Leprosy)	0	0	0	0	3	0	0	2	5
Hepatitis A	0	1	6	32	16	13	5	5	78
Hepatitis B	0	0	0	9	21	12	3	9	55
Hepatitis C	0	0	1	2	0	0	0	0	3
Hepatitis unspecified	0	0	0	1	1	0	3	4	10
Kawasaki syndrome	9	35	9	0	0	0	0	0	53
Legionellosis	0	0	0	2	4	10	5	19	40
Listeriosis, nonperinatal	0	0	0	0	0	6	6	9	21
Listeriosis, perinatal[b]	0	0	0	5	1	0	0	0	6
Lyme disease	0	0	2	4	0	2	0	1	9
Malaria	0	0	2	11	3	5	5	0	26
Measles	0	0	0	0	0	0	0	0	0
Meningitis, viral	75	11	45	120	58	42	14	29	395
Meningococcal infections	3	3	1	6	5	1	3	2	24
Mumps	0	0	1	1	1	2	0	0	5
Pertussis	31	4	13	14	4	1	2	0	69
Psittacosis	0	0	0	0	0	0	0	0	0
Q-fever	0	0	0	0	1	0	1	0	2
Relapsing fever	0	0	0	0	0	0	0	0	0
Rheumatic fever, acute	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	99	183	172	226	114	85	75	124	1081
Shigellosis	13	100	90	104	67	43	20	26	463
Strongyloidiasis	0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0	0	0	0
Trichinosis	0	0	0	0	0	0	0	0	0
Tularemia	0	0	0	0	0	0	0	0	0
Typhoid fever, case	0	0	1	10	0	2	3	1	17
Typhoid fever, carrier	0	0	0	0	0	1	0	0	1
Typhus fever	0	1	1	3	3	6	2	1	17
Vibrio	0	0	1	4	2	1	3	2	13

[a] Totals include cases with unknown age.

[b] Mother's age.

Table K. Incidence Rates of Selected Notifiable Diseases by Age Group
Los Angeles County, 2007

	Age-group Rates (Cases per 100,000)[b]							
Disease	**<1**	**1-4**	**5-14**	**15-34**	**35-44**	**45-54**	**55-64**	**65+**
Amebiasis	-	1.0	0.8	1.1	2.0	1.7	1.5	0.9
Botulism	-	-	-	-	-	0.1	-	-
Brucellosis	-	0.2	-	-	-	-	0.1	-
Campylobacteriosis	16.9	18.7	7.6	8.4	5.2	7.6	7.8	10.0
Cholera	-	-	-	-	-	-	-	-
Coccidioidomycosis	-	0.2	0.3	1.0	2.0	2.8	2.9	2.0
Cryptosporidiosis	-	0.3	0.3	0.5	0.9	0.8	0.1	0.5
Cysticercosis	-	-	-	0.1	0.2	-	-	0.2
Dengue	-	-	-	-	0.1	0.1	-	-
E. *coli* O157:H7	-	1.0	0.2	-	0.1	0.1	-	0.1
Encephalitis	2.0	1.0	0.9	0.5	0.1	0.5	0.8	1.0
Giardiasis	2.0	10.6	4.6	4.5	5.1	4.7	3.4	1.7
Haemophilus influenzae type b	-	-	-	-	-	-	-	0.1
Hansen's Disease (Leprosy)	-	-	-	-	0.2	-	-	0.2
Hepatitis A	-	0.2	0.4	1.1	1.1	1.0	0.6	0.5
Hepatitis B	-	-	-	0.3	1.4	0.9	0.3	0.9
Hepatitis C	-	-	0.1	0.1	-	-	-	-
Hepatitis unspecified	-	-	-	-	0.1	-	0.3	0.4
Kawasaki syndrome	6.1	6.1	0.6	-	-	-	-	-
Legionellosis	-	-	-	0.1	0.3	0.8	0.6	1.9
Listeriosis, nonperinatal	-	-	-	-	-	0.5	0.7	0.9
Listeriosis, perinatal[a]	0.0	0.0	0.0	4.3	3.9	0.0	0.0	0.0
Lyme disease	-	-	0.1	0.1	-	0.2	-	0.1
Malaria	-	-	0.1	0.4	0.2	0.4	0.6	-
Measles	-	-	-	-	-	-	-	-
Meningitis, viral	50.7	1.9	3.1	4.3	3.9	3.2	1.6	2.9
Meningococcal infections	2.0	0.5	0.1	0.2	0.3	0.1	0.3	0.2
Mumps	-	-	0.1	-	0.1	0.2	-	-
Pertussis	21.0	0.7	0.9	0.5	0.3	0.1	0.2	-
Psittacosis	-	-	-	-	-	-	-	-
Q-fever	-	-	-	-	0.1	-	0.1	-
Relapsing fever	-	-	-	-	-	-	-	-
Rheumatic fever, acute	-	-	-	-	-	-	-	-
Rubella	-	-	-	-	-	-	-	-
Salmonellosis	66.9	31.7	12.0	8.0	7.6	6.4	8.5	12.3
Shigellosis	8.8	17.3	6.3	3.7	4.5	3.3	2.3	2.6
Strongyloidiasis	-	-	-	-	-	-	-	-
Tetanus	-	-	-	-	-	-	-	-
Trichinosis	-	-	-	-	-	-	-	-
Tularemia	-	-	-	-	-	-	-	-
Typhoid fever, case	-	-	0.1	0.4	-	0.2	0.3	0.1
Typhoid fever, carrier	-	-	-	-	-	0.1	-	-
Typhus fever	-	0.2	0.1	0.1	0.2	0.5	0.2	0.1
Vibrio	-	-	0.1	0.1	0.1	0.1	0.3	0.2

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table L. Number of Cases of Selected Notifiable Diseases by Race/Ethnicity Los Angeles County, 2007

Disease	Asian	Black	Hispanic	White	Other[a]	Unknown
Amebiasis	8	10	44	50	8	1
Botulism	0	0	0	1	0	0
Brucellosis	0	0	3	0	0	0
Campylobacteriosis	86	39	364	314	3	14
Cholera	0	0	0	0	0	0
Coccidioidomycosis	10	22	52	56	1	1
Cryptosporidiosis	1	7	8	29	2	1
Cysticercosis	0	0	7	0	0	0
Dengue	1	0	0	0	0	0
E. *coli* O157:H7	0	3	5	4	0	0
Encephalitis	7	5	31	19	0	1
Giardiasis	33	24	133	195	13	26
Haemophilus influenzae type b	0	0	0	1	0	0
Hansen's Disease (Leprosy)	1	0	3	1	0	0
Hepatitis A	15	5	33	24	0	1
Hepatitis B	7	11	16	19	2	0
Hepatitis C	0	0	2	1	0	0
Hepatitis unspecified	2	0	0	1	0	2
Kawasaki syndrome	13	5	27	3	3	2
Legionellosis	0	6	12	22	0	0
Listeriosis, nonperinatal	3	0	11	7	0	0
Listeriosis, perinatal[b]	0	0	5	1	0	0
Lyme disease	1	0	1	4	0	1
Malaria	7	11	4	1	0	0
Measles	0	0	0	0	0	0
Meningitis, viral	30	28	179	108	6	14
Meningococcal infections	1	3	11	9	0	0
Mumps	3	0	2	0	0	0
Pertussis	8	1	42	18	0	0
Psittacosis	0	0	0	0	0	0
Q-fever	0	0	0	1	0	0
Relapsing fever	0	0	0	0	0	0
Rheumatic fever, acute	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Salmonellosis	114	64	539	339	10	6
Shigellosis	26	27	281	85	4	19
Strongyloidiasis	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0
Trichinosis	0	0	0	0	0	0
Tularemia	0	0	0	0	0	0
Typhoid fever, case	9	0	7	1	0	0
Typhoid fever, carrier	0	0	1	0	0	0
Typhus fever	1	0	1	12	0	1
Vibrio	2	0	6	2	0	1

[a] Other includes Native American and any additional racial group that cannot be categorized as Asian, Black, Hispanic, and White.
[b] Mother's race.

Table M. Incidence Rates of Selected Notifiable Diseases by Race/Ethnicity
Los Angeles County, 2007

	Race/Ethnicity Rates (Cases per 100,000)[b]			
Disease	**Asian**	**Black**	**Hispanic**	**White**
Amebiasis	0.6	1.2	1.0	1.7
Botulism	-	-	-	-
Brucellosis	-	-	0.1	-
Campylobacteriosis	6.7	4.6	7.9	10.8
Cholera	-	-	-	-
Coccidioidomycosis	0.8	2.6	1.1	1.9
Cryptosporidiosis	0.1	0.8	0.2	1.0
Cysticercosis	-	-	0.2	-
Dengue	0.1	-	-	-
E. *coli* O157:H7	-	0.4	0.1	0.1
Encephalitis	0.5	0.6	0.7	0.7
Giardiasis	2.6	2.8	2.9	6.7
Haemophilus influenzae type b	-	-	-	-
Hansen's Disease (Leprosy)	0.1	-	0.1	-
Hepatitis A	1.2	0.6	0.7	0.8
Hepatitis B	0.5	1.3	0.3	0.7
Hepatitis C	-	-	-	-
Hepatitis unspecified	0.2	-	-	-
Kawasaki syndrome	1.0	0.6	0.6	0.1
Legionellosis	-	0.7	0.3	0.8
Listeriosis, nonperinatal	0.2	-	0.2	0.2
Listeriosis, perinatal[a]	0.0	0.0	5.5	4.2
Lyme disease	0.1	-	-	0.1
Malaria	0.5	1.3	0.1	-
Measles	-	-	-	-
Meningitis, viral	2.3	3.3	3.9	3.7
Meningococcal infections	0.1	0.4	0.2	0.3
Mumps	0.2	-	-	-
Pertussis	0.6	0.1	0.9	0.6
Psittacosis	-	-	-	-
Q-fever	-	-	-	-
Relapsing fever	-	-	-	-
Rheumatic fever, acute	-	-	-	-
Rubella	-	-	-	-
Salmonellosis	8.9	7.5	11.6	11.7
Shigellosis	2.0	3.2	6.1	2.9
Strongyloidiasis	-	-	-	-
Tetanus	-	-	-	-
Trichinosis	-	-	-	-
Tularemia	-	-	-	-
Typhoid fever, case	0.7	-	0.2	-
Typhoid fever, carrier	-	-	-	-
Typhus fever	0.1	-	-	0.4
Vibrio	0.2	-	0.1	0.1

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table N. Number of Cases and Annual Incidence Rate of Selected Notifiable Diseases by Sex Los Angeles County, 2007

Disease	Male		Female	
	Cases	Rate (Cases per 100,000)[b]	Cases	Rate (Cases per 100,000)[b]
Amebiasis	68	1.4	54	1.1
Botulism	1	0.0	0	-
Brucellosis	1	0.0	2	0.0
Campylobacteriosis	461	9.6	364	7.4
Cholera	0	-	0	-
Coccidioidomycosis	94	2.0	51	1.0
Cryptosporidiosis	38	0.8	12	0.2
Cysticercosis	1	0.0	6	0.1
Dengue	2	0.0	1	0.0
E. *coli* O157:H7	9	0.2	3	0.1
Encephalitis	37	0.8	26	0.5
Giardiasis	296	6.2	142	2.9
Haemophilus influenzae type b	0	-	1	0.0
Hansen's Disease (Leprosy)	4	0.1	1	0.0
Hepatitis A	46	1.0	32	0.7
Hepatitis B	36	0.7	18	0.4
Hepatitis C	1	0.0	2	0.0
Hepatitis unspecified	4	0.1	5	0.1
Kawasaki syndrome	34	0.7	19	0.4
Legionellosis	27	0.6	13	0.3
Listeriosis, nonperinatal	13	0.3	8	0.2
Listeriosis, perinatal[a]	0	-	6	8.7
Lyme disease	3	0.1	6	0.1
Malaria	18	0.4	8	0.2
Measles	0	-	0	-
Meningitis, viral	194	4.0	198	4.0
Meningococcal infections	16	0.3	8	0.2
Mumps	3	0.1	2	0.0
Pertussis	29	0.6	40	0.8
Psittacosis	0	-	0	-
Q-fever	1	0.0	1	0.0
Relapsing fever	0	-	0	-
Rheumatic fever, acute	0	-	0	-
Rubella	0	-	0	-
Salmonellosis	496	10.3	584	11.9
Shigellosis	233	4.9	230	4.7
Strongyloidiasis	0	-	0	-
Tetanus	0	-	0	-
Trichinosis	0	-	0	-
Tularemia	0	-	0	-
Typhoid fever, case	8	0.2	9	0.2
Typhoid fever, carrier	0	-	1	0.0
Typhus fever	6	0.1	11	0.2
Vibrio	11	0.2	2	0.0

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-1. Selected Notifiable Diseases
SPA 1. Antelope Valley Area
Los Angeles County, 2007

Disease	Frequency	Rate (Cases per 100,000)[b]
Amebiasis	6	1.7
Botulism	1	0.3
Brucellosis	0	-
Campylobacteriosis	22	6.1
Cholera	0	-
Coccidioidomycosis	51	14.2
Cryptosporidiosis	3	0.8
Cysticercosis	1	0.3
Dengue	1	0.3
E. *coli* O157:H7	0	-
Encephalitis	3	0.8
Giardiasis	4	1.1
Haemophilus influenzae type b	0	-
Hansen's Disease (Leprosy)	0	-
Hepatitis A	5	1.4
Hepatitis B	1	0.3
Hepatitis C	0	-
Hepatitis unspecified	0	-
Kawasaki syndrome	1	0.3
Legionellosis	0	-
Listeriosis, nonperinatal	0	-
Listeriosis, perinatal[a]	0	-
Lyme disease	0	-
Malaria	0	-
Measles	0	-
Meningitis, viral	35	9.8
Meningococcal infections	1	0.3
Mumps	1	0.3
Pertussis	1	0.3
Psittacosis	0	-
Q-fever	0	-
Relapsing fever	0	-
Rheumatic fever, acute	0	-
Rubella	0	-
Salmonellosis	39	10.9
Shigellosis	10	2.8
Strongyloidiasis	0	-
Tetanus	0	-
Trichinosis	0	-
Tularemia	0	-
Typhoid fever, case	2	0.6
Typhoid fever, carrier	0	-
Typhus fever	0	-
Vibrio	0	-

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-2. Selected Notifiable Diseases
SPA 2. San Fernando Area
Los Angeles County, 2007

Disease	Frequency					Rate (Cases per 100,000)[b]				
	EV	GL	SF	WV	TOTAL	EV	GL	SF	WV	TOTAL
Amebiasis	4	33	2	12	51	0.9	9.3	0.4	1.4	2.4
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	0	0	0	0	0	-	-	-	-	-
Campylobacteriosis	32	35	50	92	209	7.0	9.9	10.7	10.4	9.7
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	6	5	28	8	47	1.3	1.4	6.0	0.9	2.2
Cryptosporidiosis	4	1	11	3	19	0.9	0.3	2.4	0.3	0.9
Cysticercosis	1	0	0	0	1	0.2	-	-	-	0.0
Dengue	0	0	0	0	0	-	-	-	-	-
E. *coli* O157:H7	0	1	0	2	3	-	0.3	-	0.2	0.1
Encephalitis	9	4	4	3	20	2.0	1.1	0.9	0.3	0.9
Giardiasis	18	83	33	36	170	3.9	23.4	7.1	4.1	7.9
Haemophilus influenzae type b	0	0	0	0	0	-	-	-	-	-
Hansen's Disease (Leprosy)	0	0	0	1	1	-	-	-	0.1	0.0
Hepatitis A	2	3	6	5	16	0.4	0.8	1.3	0.6	0.7
Hepatitis B	3	4	1	5	13	0.7	1.1	0.2	0.6	0.6
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	0	0	0	0	0	-	-	-	-	-
Kawasaki syndrome	1	1	1	5	8	0.2	0.3	0.2	0.6	0.4
Legionellosis	3	5	0	0	8	0.7	1.4	-	-	0.4
Listeriosis, nonperinatal	1	1	1	3	6	0.2	0.3	0.2	0.3	0.3
Listeriosis, perinatal[a]	0	0	1	0	1	-	-	0.2	-	0.0
Lyme disease	1	0	1	1	3	0.2	-	0.2	0.1	0.1
Malaria	3	0	3	2	8	0.7	-	0.6	0.2	0.4
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	23	7	23	31	84	5.0	2.0	4.9	3.5	3.9
Meningococcal infections	1	1	2	0	4	0.2	0.3	0.4	-	0.2
Mumps	0	1	0	0	1	-	0.3	-	-	0.0
Pertussis	7	1	3	5	16	1.5	0.3	0.6	0.6	0.7
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	0	1	0	1	2	-	0.3	-	0.1	0.1
Relapsing fever	0	0	0	0	0	-	-	-	-	-
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	32	41	66	104	243	7.0	11.6	14.2	11.8	11.3
Shigellosis	28	32	12	21	93	6.1	9.0	2.6	2.4	4.3
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	0	0	-	-	-	-	-
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	0	2	1	3	6	-	0.6	0.2	0.3	0.3
Typhoid fever, carrier	0	0	0	1	1	-	-	-	0.1	0.0
Typhus fever	0	2	0	0	2	-	0.6	-	-	0.1
VIbrio	0	0	1	0	1	-	-	0.2	-	0.0

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-3. Selected Notifiable Diseases
SPA 3. San Gabriel Area
Los Angeles County, 2007

Disease	Frequency					Rate (Cases per 100,000)[b]				
	AH	EM	FH	PO	TOTAL	AH	EM	FH	PO	TOTAL
Amebiasis	4	0	4	6	14	1.1	-	1.3	1.0	0.8
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	0	0	1	0	1	-	-	0.3	-	0.1
Campylobacteriosis	25	15	34	48	122	7.0	3.1	10.8	8.4	7.1
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	2	1	1	5	9	0.6	0.2	0.3	0.9	0.5
Cryptosporidiosis	1	0	2	0	3	0.3	-	0.6	-	0.2
Cysticercosis	0	0	0	0	0	-	-	-	-	-
Dengue	0	1	0	0	1	-	0.2	-	-	0.1
E. *coli* O157:H7	0	0	2	0	2	-	-	0.6	-	0.1
Encephalitis	0	0	5	2	7	-	-	1.6	0.3	0.4
Giardiasis	9	6	20	10	45	2.5	1.2	6.4	1.7	2.6
Haemophilus influenzae type b	0	0	0	0	0	-	-	-	-	-
Hansen's Disease (Leprosy)	0	0	0	0	0	-	-	-	-	-
Hepatitis A	2	4	6	5	17	0.6	0.8	1.9	0.9	1.0
Hepatitis B	1	0	1	2	4	0.3	-	0.3	0.3	0.2
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	0	1	2	1	4	-	0.2	0.6	0.2	0.2
Kawasaki syndrome	2	2	3	3	10	0.6	0.4	1.0	0.5	0.6
Legionellosis	1	1	2	2	6	0.3	0.2	0.6	0.3	0.3
Listeriosis, nonperinatal	1	1	0	2	4	0.3	0.2	-	0.3	0.2
Listeriosis, perinatal[a]	0	0	0	0	0	-	-	-	-	-
Lyme disease	0	0	1	0	1	-	-	0.3	-	0.1
Malaria	0	2	0	2	4	-	0.4	-	0.3	0.2
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	12	5	17	29	63	3.3	1.0	5.4	5.1	3.6
Meningococcal infections	0	0	1	0	1	-	-	0.3	-	0.1
Mumps	0	0	0	1	1	-	-	-	0.2	0.1
Pertussis	1	1	4	2	8	0.3	0.2	1.3	0.3	0.5
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	0	0	0	0	0	-	-	-	-	-
Relapsing fever	0	0	0	0	0	-	-	-	-	-
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	46	21	64	55	186	12.8	4.4	20.3	9.6	10.8
Shigellosis	11	3	38	20	72	3.1	0.6	12.1	3.5	4.2
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	0	0	-	-	-	-	-
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	1	1	1	1	4	0.3	0.2	0.3	0.2	0.2
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	4	0	4	0	8	1.1	-	1.3	-	0.5
Vibrio	0	0	0	1	1	-	-	-	0.2	0.1

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-4. Selected Notifiable Diseases
SPA 4. Metro Area
Los Angeles County, 2007

Disease	Frequency				Rate (Cases per 100,000)[b]			
	CE	HW	NE	TOTAL	CE	HW	NE	TOTAL
Amebiasis	2	10	4	16	0.5	1.8	1.1	1.3
Botulism	0	0	0	0	-	-	-	-
Brucellosis	0	0	0	0	-	-	-	-
Campylobacteriosis	27	33	26	86	7.3	6.1	7.4	6.8
Cholera	0	0	0	0	-	-	-	-
Coccidioidomycosis	3	2	3	8	0.8	0.4	0.9	0.6
Cryptosporidiosis	1	6	0	7	0.3	1.1	-	0.6
Cysticercosis	2	0	1	3	0.5	-	0.3	0.2
Dengue	0	0	0	0	-	-	-	-
E. *coli* O157:H7	0	0	0	0	-	-	-	-
Encephalitis	1	3	1	5	0.3	0.6	0.3	0.4
Giardiasis	17	37	9	63	4.6	6.8	2.6	5.0
Haemophilus influenzae type b	0	0	0	0	-	-	-	-
Hansen's Disease (Leprosy)	0	1	0	1	-	0.2	-	0.1
Hepatitis A	2	6	1	9	0.5	1.1	0.3	0.7
Hepatitis B	4	6	4	14	1.1	1.1	1.1	1.1
Hepatitis C	0	0	2	2	-	-	0.6	0.2
Hepatitis unspecified	1	0	0	1	0.3	-	-	0.1
Kawasaki syndrome	2	3	1	6	0.5	0.6	0.3	0.5
Legionellosis	0	6	1	7	-	1.1	0.3	0.6
Listeriosis, nonperinatal	0	1	0	1	-	0.2	-	0.1
Listeriosis, perinatal[a]	0	0	2	2	-	-	0.6	0.2
Lyme disease	0	0	0	0	-	-	-	-
Malaria	1	3	0	4	0.3	0.6	-	0.3
Measles	0	0	0	0	-	-	-	-
Meningitis, viral	11	3	2	16	3.0	0.6	0.6	1.3
Meningococcal infections	1	1	1	3	0.3	0.2	0.3	0.2
Mumps	0	0	0	0	-	-	-	-
Pertussis	4	2	3	9	1.1	0.4	0.9	0.7
Psittacosis	0	0	0	0	-	-	-	-
Q-fever	0	0	0	0	-	-	-	-
Relapsing fever	0	0	0	0	-	-	-	-
Rheumatic fever, acute	0	0	0	0	-	-	-	-
Rubella	0	0	0	0	-	-	-	-
Salmonellosis	41	71	36	148	11.1	13.1	10.2	11.7
Shigellosis	23	44	20	87	6.2	8.1	5.7	6.9
Strongyloidiasis	0	0	0	0	-	-	-	-
Tetanus	0	0	0	0	-	-	-	-
Trichinosis	0	0	0	0	-	-	-	-
Tularemia	0	0	0	0	-	-	-	-
Typhoid fever, case	1	0	0	1	0.3	-	-	0.1
Typhoid fever, carrier	0	0	0	0	-	-	-	-
Typhus fever	1	0	0	1	0.3	-	-	0.1
Vibrio	1	1	2	4	0.3	0.2	0.6	0.3

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-5. Selected Notifiable Diseases
SPA 5. West Area
Los Angeles County, 2007

Disease	Frequency	Rate (Cases per 100,000)[b]
Amebiasis	9	1.4
Botulism	0	-
Brucellosis	0	-
Campylobacteriosis	115	17.9
Cholera	0	-
Coccidioidomycosis	1	0.2
Cryptosporidiosis	7	1.1
Cysticercosis	0	-
Dengue	0	-
E. *coli* O157:H7	2	0.3
Encephalitis	1	0.2
Giardiasis	57	8.9
Haemophilus influenzae type b	0	-
Hansen's Disease (Leprosy)	0	-
Hepatitis A	5	0.8
Hepatitis B	5	0.8
Hepatitis C	0	-
Hepatitis unspecified	0	-
Kawasaki syndrome	3	0.5
Legionellosis	7	1.1
Listeriosis, nonperinatal	4	0.6
Listeriosis, perinatal[a]	0	-
Lyme disease	3	0.5
Malaria	2	0.3
Measles	0	-
Meningitis, viral	13	2.0
Meningococcal infections	1	0.2
Mumps	0	-
Pertussis	8	1.2
Psittacosis	0	-
Q-fever	0	-
Relapsing fever	0	-
Rheumatic fever, acute	0	-
Rubella	0	-
Salmonellosis	74	11.5
Shigellosis	29	4.5
Strongyloidiasis	0	-
Tetanus	0	-
Trichinosis	0	-
Tularemia	0	-
Typhoid fever, case	0	-
Typhoid fever, carrier	0	-
Typhus fever	4	0.6
Vibrio	1	0.2

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-6. Selected Notifiable Diseases
SPA 6. South Area
Los Angeles County, 2007

Disease	Frequency					Rate (Cases per 100,000) [b]				
	CN	SO	SE	SW	TOTAL	CN	SO	SE	SW	TOTAL
Amebiasis	1	2	2	3	8	0.3	1.1	1.1	0.8	0.8
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	0	0	0	0	0	-	-	-	-	-
Campylobacteriosis	18	16	10	24	68	6.1	8.6	5.6	6.2	6.5
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	6	1	1	1	9	2.0	0.5	0.6	0.3	0.9
Cryptosporidiosis	1	0	0	0	1	0.3	-	-	-	0.1
Cysticercosis	1	0	1	0	2	0.3	-	0.6	-	0.2
Dengue	0	0	0	0	0	-	-	-	-	-
E. *coli* O157:H7	0	0	0	2	2	-	-	-	0.5	0.2
Encephalitis	2	1	0	3	6	0.7	0.5	-	0.8	0.6
Giardiasis	7	5	4	10	26	2.4	2.7	2.2	2.6	2.5
Haemophilus influenzae type b	0	0	0	0	0	-	-	-	-	-
Hansen's Disease (Leprosy)	0	0	1	0	1	-	-	0.6	-	0.1
Hepatitis A	2	1	2	3	8	0.7	0.5	1.1	0.8	0.8
Hepatitis B	1	2	3	3	9	0.3	1.1	1.7	0.8	0.9
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	0	0	0	0	0	-	-	-	-	-
Kawasaki syndrome	2	0	2	2	6	0.7	-	1.1	0.5	0.6
Legionellosis	2	3	1	1	7	0.7	1.6	0.6	0.3	0.7
Listeriosis, nonperinatal	1	0	1	1	3	0.3	-	0.6	0.3	0.3
Listeriosis, perinatal [a]	1	0	0	0	1	0.3	-	-	-	0.1
Lyme disease	0	0	0	0	0	-	-	-	-	-
Malaria	1	1	1	0	3	0.3	0.5	0.6	-	0.3
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	21	9	2	10	42	7.2	4.8	1.1	2.6	4.0
Meningococcal infections	1	2	3	1	7	0.3	1.1	1.7	0.3	0.7
Mumps	0	0	0	1	1	-	-	-	0.3	0.1
Pertussis	2	2	0	5	9	0.7	1.1	-	1.3	0.9
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	0	0	0	0	0	-	-	-	-	-
Relapsing fever	0	0	0	0	0	-	-	-	-	-
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	30	31	22	49	132	10.2	16.6	12.3	12.7	12.6
Shigellosis	18	15	16	31	80	6.1	8.0	9.0	8.0	7.7
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	0	0	-	-	-	-	-
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	1	0	1	0	2	0.3	-	0.6	-	0.2
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	0	0	0	0	0	-	-	-	-	-
VIbrio	1	0	0	0	1	0.3	-	-	-	0.1

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-7. Selected Notifiable Diseases
SPA 7. East Area
Los Angeles County, 2007

Disease	Frequency					Rate (Cases per 100,000)[b]				
	BF	EL	SA	WH	TOTAL	BF	EL	SA	WH	TOTAL
Amebiasis	2	2	5	2	11	0.5	0.9	1.1	0.6	0.8
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	0	0	0	0	0	-	-	-	-	-
Campylobacteriosis	21	25	35	27	108	5.7	11.2	7.8	8.0	7.8
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	4	2	4	2	12	1.1	0.9	0.9	0.6	0.9
Cryptosporidiosis	2	0	1	0	3	0.5	-	0.2	-	0.2
Cysticercosis	0	0	0	0	0	-	-	-	-	-
Dengue	1	0	0	0	1	0.3	-	-	-	0.1
E. *coli* O157:H7	1	0	0	0	1	0.3	-	-	-	0.1
Encephalitis	0	2	3	1	6	-	0.9	0.7	0.3	0.4
Giardiasis	12	5	18	7	42	3.2	2.2	4.0	2.1	3.0
Haemophilus influenzae type b	0	0	1	0	1	-	-	0.2	-	0.1
Hansen's Disease (Leprosy)	0	1	0	0	1	-	0.4	-	-	0.1
Hepatitis A	7	1	2	2	12	1.9	0.4	0.4	0.6	0.9
Hepatitis B	3	0	0	1	4	0.8	-	-	0.3	0.3
Hepatitis C	0	0	0	1	1	-	-	-	0.3	0.1
Hepatitis unspecified	0	0	0	1	1	-	-	-	0.3	0.1
Kawasaki syndrome	4	1	5	0	10	1.1	0.4	1.1	-	0.7
Legionellosis	1	0	1	2	4	0.3	-	0.2	0.6	0.3
Listeriosis, nonperinatal	1	0	1	1	3	0.3	-	0.2	0.3	0.2
Listeriosis, perinatal[a]	0	0	0	1	1	-	-	-	0.3	0.1
Lyme disease	0	0	0	0	0	-	-	-	-	-
Malaria	1	0	0	0	1	0.3	-	-	-	0.1
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	22	7	26	18	73	5.9	3.1	5.8	5.4	5.3
Meningococcal infections	1	0	2	1	4	0.3	-	0.4	0.3	0.3
Mumps	0	0	1	0	1	-	-	0.2	-	0.1
Pertussis	1	3	3	1	8	0.3	1.3	0.7	0.3	0.6
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	0	0	0	0	0	-	-	-	-	-
Relapsing fever	0	0	0	0	0	-	-	-	-	-
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	40	24	50	32	146	10.8	10.8	11.1	9.5	10.6
Shigellosis	6	13	17	28	64	1.6	5.8	3.8	8.3	4.6
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	0	0	-	-	-	-	-
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	1	0	0	0	1	0.3	-	-	-	0.1
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	1	0	0	0	1	0.3	-	-	-	0.1
VIbrio	0	0	1	0	1	-	-	0.2	-	0.1

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especially hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

Table O-8. Selected Notifiable Diseases
SPA 8. South Bay Area
Los Angeles County, 2007

Disease	Frequency				Rate (Cases per 100,000)[b]			
	HB	IW	TO	TOTAL	HB	IW	TO	TOTAL
Amebiasis	1	3	2	6	0.5	0.7	0.4	0.5
Botulism	0	0	0	0	-	-	-	-
Brucellosis	0	0	0	0	-	-	-	-
Campylobacteriosis	31	34	30	95	14.6	7.8	6.4	8.5
Cholera	0	0	0	0	-	-	-	-
Coccidioidomycosis	0	6	2	8	-	1.4	0.4	0.7
Cryptosporidiosis	0	7	0	7	-	1.6	-	0.6
Cysticercosis	0	0	0	0	-	-	-	-
Dengue	0	0	0	0	-	-	-	-
E. *coli* O157:H7	1	1	0	2	0.5	0.2	-	0.2
Encephalitis	1	3	9	13	0.5	0.7	1.9	1.2
Giardiasis	7	11	14	32	3.3	2.5	3.0	2.9
Haemophilus influenzae type b	0	0	0	0	-	-	-	-
Hansen's Disease (Leprosy)	1	0	0	1	0.5	-	-	0.1
Hepatitis A	1	2	2	5	0.5	0.5	0.4	0.4
Hepatitis B	1	4	0	5	0.5	0.9	-	0.4
Hepatitis C	0	0	0	0	-	-	-	-
Hepatitis unspecified	0	0	1	1	-	-	0.2	0.1
Kawasaki syndrome	2	4	3	9	0.9	0.9	0.6	0.8
Legionellosis	0	1	0	1	-	0.2	-	0.1
Listeriosis, nonperinatal	0	0	0	0	-	-	-	-
Listeriosis, perinatal[a]	0	0	1	1	-	-	0.2	0.1
Lyme disease	0	0	0	0	-	-	-	-
Malaria	0	1	1	2	-	0.2	0.2	0.2
Measles	0	0	0	0	-	-	-	-
Meningitis, viral	19	12	32	63	9.0	2.7	6.8	5.6
Meningococcal infections	1	1	1	3	0.5	0.2	0.2	0.3
Mumps	0	0	0	0	-	-	-	-
Pertussis	4	5	1	10	1.9	1.1	0.2	0.9
Psittacosis	0	0	0	0	-	-	-	-
Q-fever	0	0	0	0	-	-	-	-
Relapsing fever	0	0	0	0	-	-	-	-
Rheumatic fever, acute	0	0	0	0	-	-	-	-
Rubella	0	0	0	0	-	-	-	-
Salmonellosis	36	42	35	113	17.0	9.6	7.5	10.1
Shigellosis	10	14	4	28	4.7	3.2	0.9	2.5
Strongyloidiasis	0	0	0	0	-	-	-	-
Tetanus	0	0	0	0	-	-	-	-
Trichinosis	0	0	0	0	-	-	-	-
Tularemia	0	0	0	0	-	-	-	-
Typhoid fever, case	0	1	0	1	-	0.2	-	0.1
Typhoid fever, carrier	0	0	0	0	-	-	-	-
Typhus fever	0	0	1	1	-	-	0.2	0.1
Vibrio	0	2	2	4	-	0.5	0.4	0.4

[a] Rates for perinatal listeriosis were calculated as cases per 100,000 women aged 15 to 44 years.

[b] Rates of disease based on less than 19 cases or events are considered "unreliable." A zero rate made from no events is especiallly hazardous and are not reported here, except with a dash ("-"). Conclusions drawn from unreliable rates should be made with caution, if they are to be made at all.

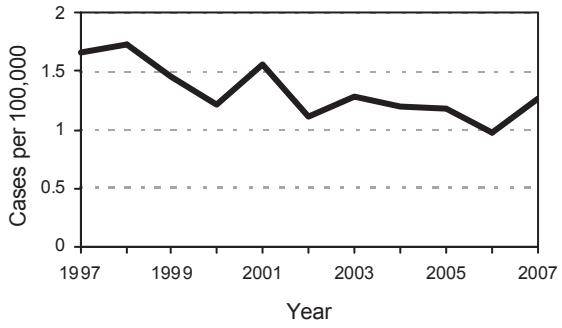
DISEASE SUMMARIES
2007

AMEBIASIS

CRUDE DATA	
Number of Cases	122
Annual Incidence[a]	
LA County	1.26
United States	N/A
Age at Diagnosis	
Mean	37
Median	40
Range	1-72 years

[a] Cases per 100,000 population.

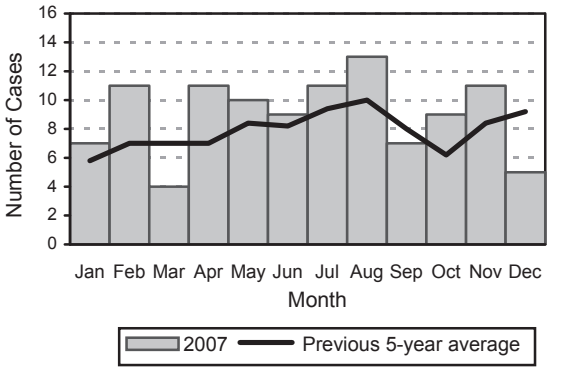
Figure 1
Amebiasis
Incidence Rates by Year
LAC, 1997–2007



DESCRIPTION

Amebiasis is caused by the protozoan parasite *Entamoeba histolytica*. Cysts shed in human feces may contaminate food or drinking water or be transferred sexually, on hands, or fomites. Incubation period is 1 to 4 weeks. Recreational waters, such as pools, may also serve as transmission vehicles, since cysts are relatively chlorine-resistant. While intestinal disease is often asymptomatic, symptoms may range from acute abdominal pain, fever, chills, and bloody diarrhea to mild abdominal discomfort with diarrhea alternating with constipation. Extraintestinal infection occurs when organisms become bloodborne, leading to amebic abscesses in the liver, lungs or brain. Complications include colonic perforation. There is no vaccine.

Figure 2
Amebiasis
Cases by Month of Onset
LAC, 2007 (N=122)



DISEASE ABSTRACT

- Amebiasis incidence had decreased substantially over the past several years. However, this year there was a 30% increase in the incidence rate, from 0.97 per 100,000 in 2006 to 1.26 per 100,000 in 2007.
- Increasing numbers of refugees and recent immigrants from endemic regions and an increase in testing may account for the increase in cases.

STRATIFIED DATA

Trends: The 2007 amebiasis incidence rate increased 30% to 1.26 per 100,000 (Figure 1).

Seasonality: Amebiasis incidence usually peaks in the summer months. In 2007, the incidence rate rose in the summer months and decreased through December (Figure 2).

Age: While amebiasis is ubiquitous, it is a disease more often diagnosed among adults (Figure 3). About half of the cases reported in LAC during 2007 were among those aged 15–44 (n=60, 49%).

Sex: Slightly more males (56%) were diagnosed with amebiasis than females, with a ratio of 1.3:1.

Race/Ethnicity: In 2007, whites had the highest rate (Figure 4). The rate for blacks increased six-fold from 0.2 per 100,000 in 2006 to 1.2 per 100,000 in 2007. The cause of this increase is unknown.

Location: The two SPAs with the highest incidence rates were SPA 2 (2.4 per 100,000), and SPA 1 (1.7 per 100,000).

Risk factors: Twelve cases did not have complete risk factor information documented. Of the cases who did have complete risk factor information, immigration into the US less than 6 months prior to diagnosis (n=52, 47%) was the most frequently reported risk factor. Foreign travel (n=33, 30%) and contact with animals (n=29, 26%) were two other frequently reported risk factors.

Figure 3
Amebiasis
Incidence Rates by Age Group
LAC, 2007

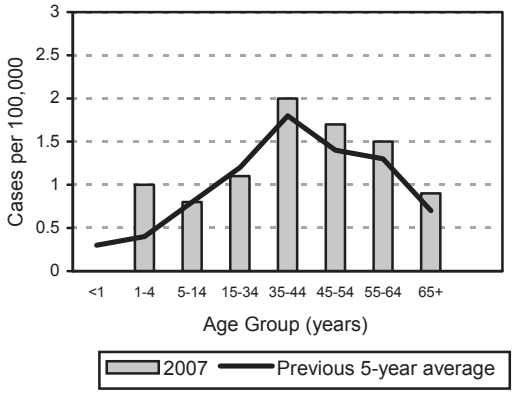
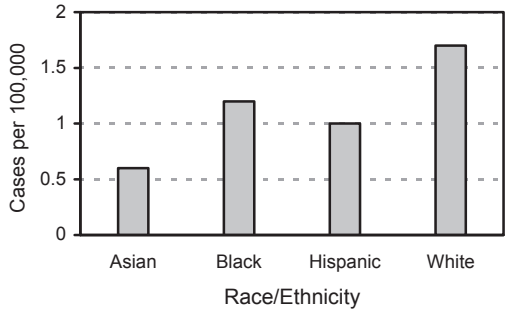


Figure 4
Amebiasis
Incidence Rates by Race/Ethnicity
LAC, 2007



Prevention: Proper hand hygiene before meals and after using the restroom is a major way to prevent infection and transmission of amebiasis. Persons who care for diapered/incontinent children and adults should ensure that they properly wash their hands. Individuals with diarrheal illness should avoid swimming in recreational waters for at least two weeks after symptoms have ceased.

COMMENTS

Amebiasis is no longer nationally reportable, so there are no current national rates for comparison. The disease remains reportable in California because a large proportion of the population travels to endemic countries in Asia and Central America. The impact of tests that distinguish the pathogenic organism *E. histolytica* from the non-pathogenic *E. dispar* is unknown since such tests are rarely ordered. It is believed that many reported amebiasis cases are actually not infected with pathogenic *E. histolytica*.

PREVENTION

Proper hand hygiene before meals and after using the restroom is a major way to prevent infection and transmission of amebiasis. Persons who care for diapered/incontinent children and adults should ensure

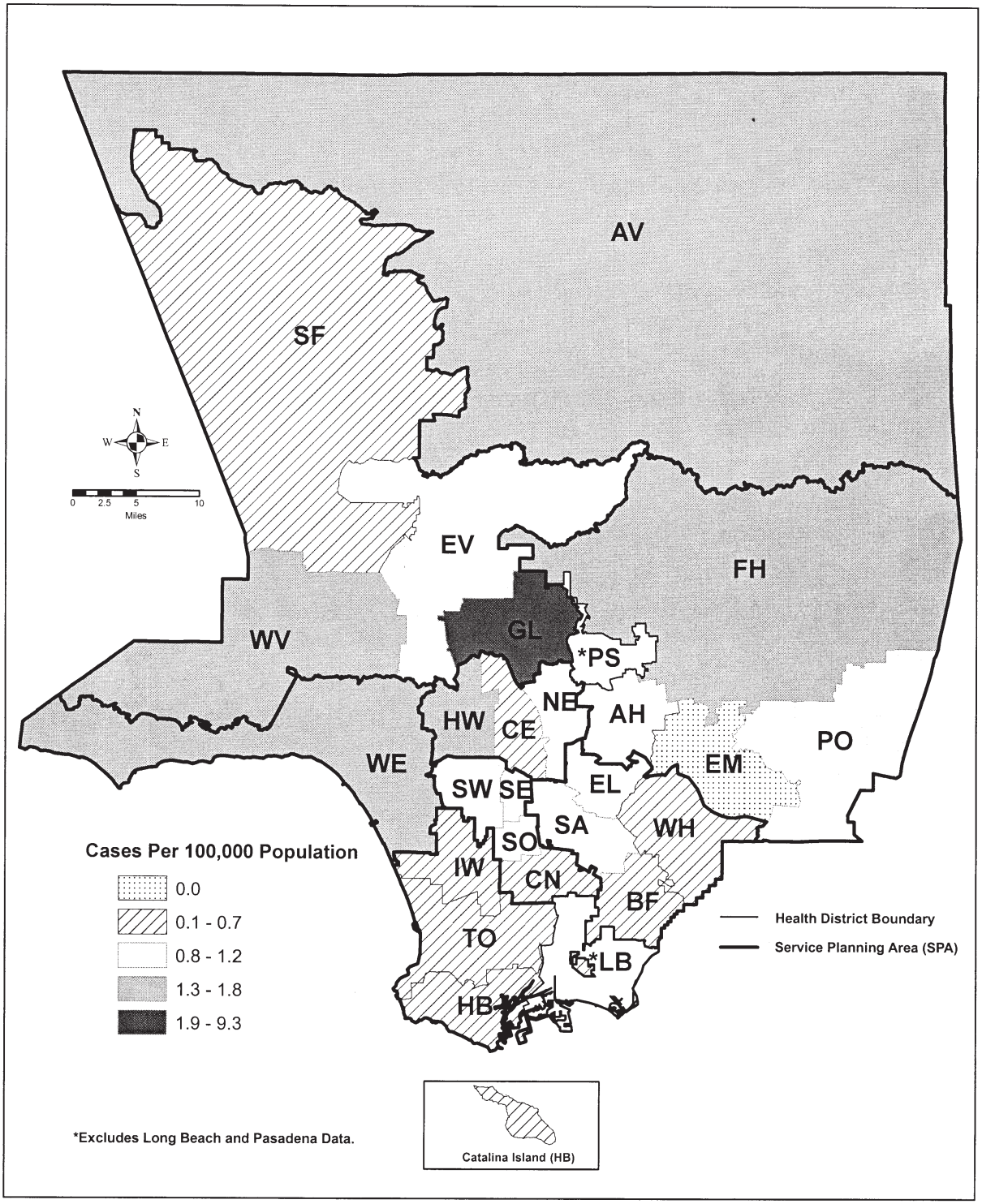
that they properly wash their hands. Individuals with diarrheal illness should avoid swimming in recreational waters for at least two weeks after symptoms have ceased.

RESOURCES

Centers for Disease Control and Prevention (2008). Amebiasis - Health Information for International Travel. Retrieved October 9, 2008, from the CDC Web site: http://wwwn.cdc.gov/travel/contentDiseases.aspx#ameb

Centers for Disease Control and Prevention (2008). Parasitic Disease Information: Amebiasis. Retrieved October 9, 2008, from the CDC Web site: www.cdc.gov/ncidod/dpd/parasites/amebiasis/default.htm

Map 1. Amebiasis
Rates by Health District, Los Angeles County, 2007*

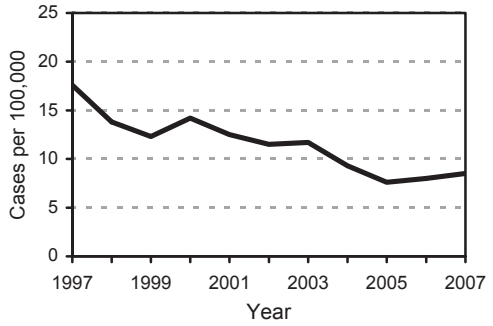


CAMPYLOBACTERIOSIS

CRUDE DATA	
Number of Cases	825
Annual Incidence[a]	
LA County	8.5
United States	N/A
Age at Diagnosis	
Mean	32.6
Median	30
Range	0–100

[a] Cases per 100,000 population.

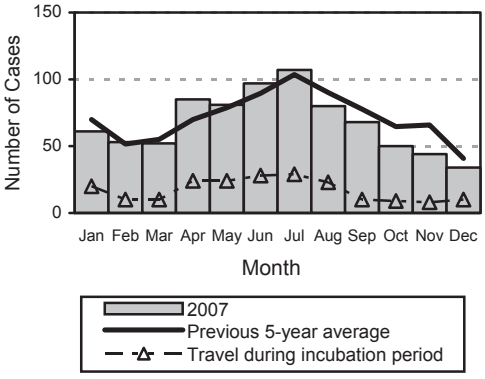
Figure 1
Campylobacteriosis
Incidence Rates by Year of Onset
LAC, 1997–2007



DESCRIPTION

Campylobacteriosis is a bacterial disease caused by Gram-negative bacilli transmitted through ingestion of organisms in undercooked poultry or other meat, contaminated food, water or raw milk, or contact with infected animals. The incubation period is 2–5 days. Common symptoms include watery or bloody diarrhea, fever, abdominal cramps, myalgia, and nausea. Species include *C. jejuni, C. upsaliensis, C. coli* and *C. fetus*. Sequelae include Guillain-Barré syndrome and Reiter syndrome, which occur in a limited number of cases.

Figure 2
Campylobacteriosis
Cases and Travel History by
Month of Onset
LAC, 2007



DISEASE ABSTRACT

- There was a 6.5% increase in the incidence of campylobacteriosis in 2007.
- Overall age-adjusted rates again were highest for whites.
- One outbreak of campylobacteriosis was investigated in 2007.

STRATIFIED DATA

Trends: The incidence of campylobacteriosis increased by 6.5% in 2007. In 2007, the rated increased to 8.51 cases per 100,000 population from 8.04 cases per 100,000 population in 2006 (Figure 1).

Seasonality: The incidence from April to July was slightly higher than the previous five-year. Increase in the spring and summer is typical. Peaks during these months may be associated with the increase in travel seen at this time (Figure 2). Travel is a risk factor for infection since it is most likely associated with an increase in eating at restaurants—which is a risk factor for this disease. Risk also increases when traveling to countries where food safety is uncertain. In 2007, 205 cases (24.8%) reported travel during the incubation period. Of these, 20% traveled within the US. Mexico was the most commonly named (37.6%) travel destination outside the US, although other locations in Central and South America and Europe were named frequently. In 2007, overall incidence as well as travel related incidence was elevated between April and July (Figure 2).

Age: The highest rates continued to be among infants aged <1 year and children aged 1–4 years (Figure 3). These age groups had significantly higher rates than any other age group but the rates were lower than the previous five-year average. In developed countries, children younger than five years and young adults have the highest incidence of this disease (Allos, 2001).

Sex: The male-to-female rate ratio was 1.3:1. The preponderance of male cases is typical and the reason for this is not known (Allos, 2001).

Race/Ethnicity: The highest overall age-adjusted rate was in whites (11.07 cases per 100,000 population); this was an increase from 2006 (9.96 per 100,000 population). In 2007, the age-adjusted rate for Hispanics was stable (7.6) although Hispanics had similar incidence to whites. Hispanic infants and children have the highest age adjusted rates when compared to other races by age group. Age-adjusted rates for Asians (7.5) and for blacks (4.5) remained stable (Figure 4).

Location: SPA 2 again had the highest number of cases at 208 (10.1 per 100,000 population), and SPA 5 had the highest rate with 17.9 per 100,000 population (n= 115). The higher rate in SPA 5 is consistent with previous years and is significantly higher than any other SPA.

Severity of Illness: Fifteen percent (n=126) of campylobacteriosis cases were hospitalized for at least two days. There were no reported deaths in 2007. Thirteen percent (n=109) of campylobacteriosis cases were immunocompromised. Reasons for immunosuppression included asthma, HIV, AIDS, diabetes, leukemia, kidney transplant, and recent diagnosis of cancer with treatment.

Figure 3
Campylobacteriosis
Incidence Rates by Age Group
LAC, 2007

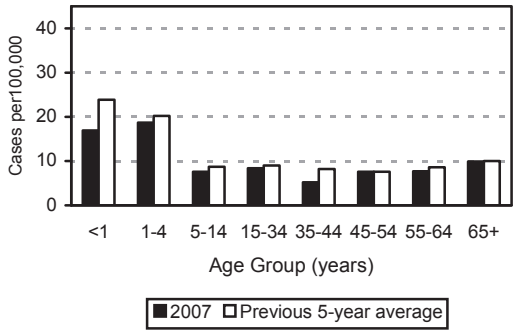
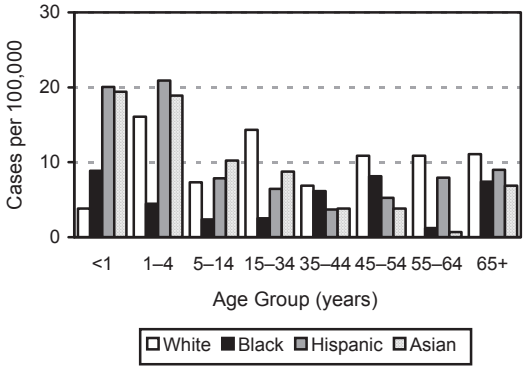


Figure 4
Campylobacteriosis Incidence Rates
by Age Group and Race/Ethnicity
LAC, 2007 (N=825)



COMMENTS

Consuming raw milk or raw milk products was a risk factor for sixteen sporadic cases; eleven of these cases consumed the milk or product while traveling outside the US, one case consumed the raw milk while traveling within the US, one consumed unpasteurized cheese brought back from Mexico, and three sporadic cases consumed milk purchased at their local market.

There was one campylobacteriosis outbreak investigated in 2007 involving a festival. There were four confirm cases in this outbreak. All Cases were interviewed however no source were identified.

PREVENTION

To reduce the likelihood of contracting campylobacteriosis, all food derived from animal sources should be thoroughly cooked, particularly poultry. Cross contamination may be avoided by making sure utensils, counter tops, cutting boards and sponges are cleaned or do not come in contact with raw poultry or meat or their juices. Hands should be thoroughly washed before, during and after food preparation. The fluids

from raw poultry or meat should not be allowed to drip on other foods in the refrigerator or in the shopping cart. It is especially important to wash hands and avoid cross contamination of infant foods, bottles and eating utensils. It is recommended to consume only pasteurized milk, milk products or juices. In addition, it is important to wash hands after coming in contact with any animal or its environment

REFERENCE

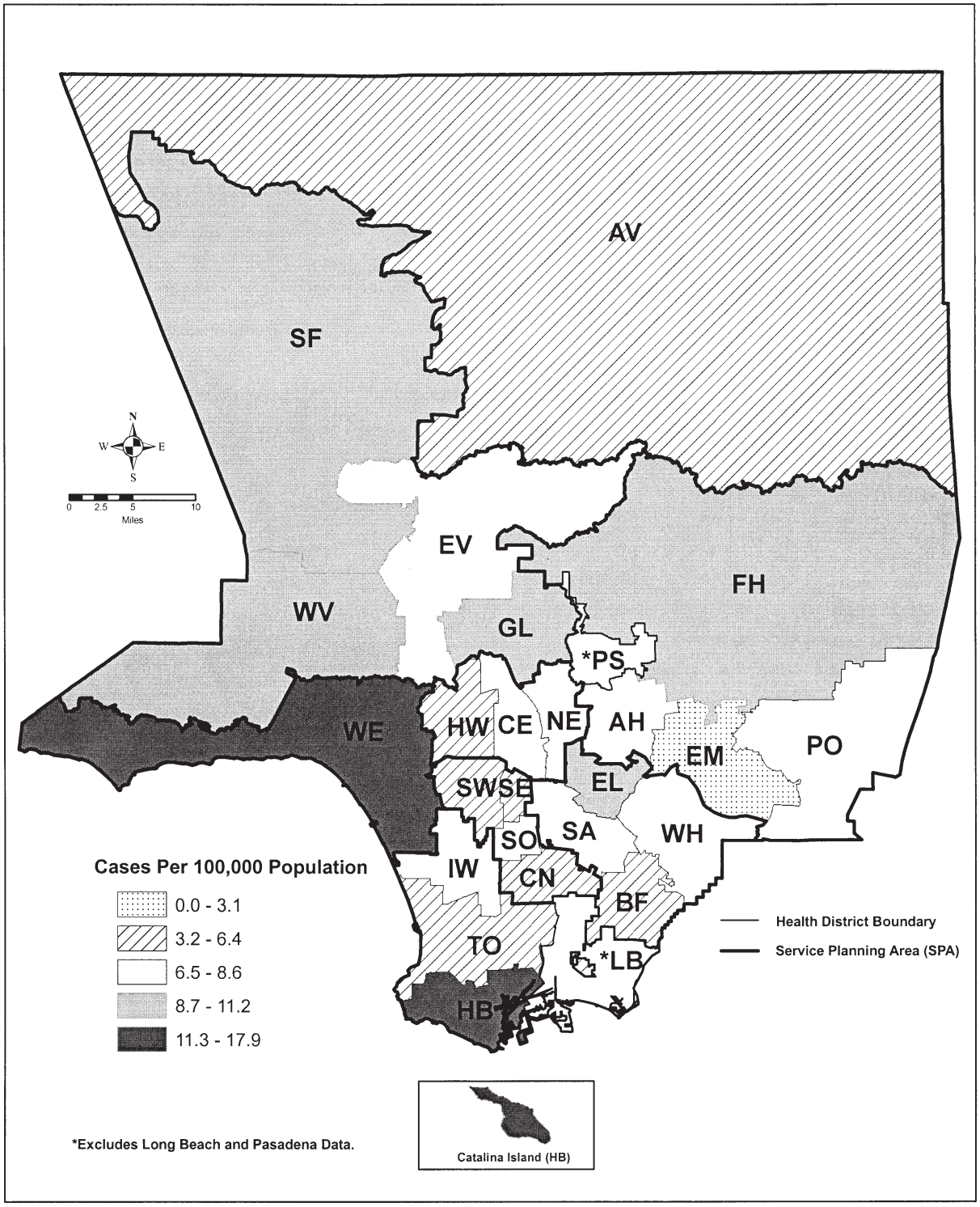
Allos, B.M. Campylobacter jejuni infections: update on emerging issues and trends. (2001) *Clinical Infectious Diseases*, 32(8), 1201–1206.

ADDITIONAL RESOURCES

CDC General Information – http://www.cdc.gov/nczved/dfbmd/disease_listing/campylobacter_gi.html

LAC General Information – http://publichealth.lacounty.gov/acd/Diseases/Campy.htm

Map 2. Campylobacteriosis
Rates by Health District, Los Angeles County, 2007*



COCCIDIOIDOMYCOSIS

CRUDE DATA	
Number of Cases	145
Annual Incidence[a]	
LA County	1.50
California	8.59
United States	2.98
Age at Diagnosis	
Mean	46.9
Median	46
Range	4-88 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

Figure 1
Coccidioidomycosis
Incidence Rates by Year of Onset
LAC, 1998–2007

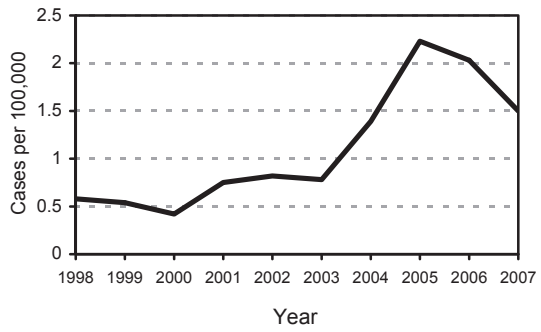
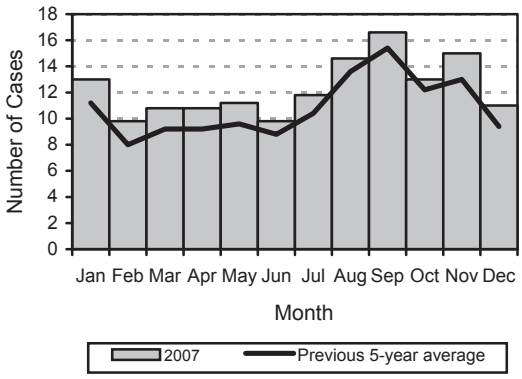


Figure 2
Coccidioidomycosis
by Month of Onset
LAC, 2007 (N=145)



DESCRIPTION

Coccidioidomycosis, or Valley Fever, is a common fungal disease transmitted through the inhalation of *Coccidioides immitis spores* that are carried in dust. Environmental conditions conducive to an increased occurrence of coccidioidomycosis are arid to semi-arid regions, dust storms, lower altitude, hotter summers, warmer winters, and sandy, alkaline soils. It is endemic in the southwestern U.S. and parts of Mexico and South America. Southern California is a known endemic area.

Most infected individuals exhibit no symptoms or have a mild respiratory illness, but a few individuals develop a severe illness such as pneumonia, meningitis, or dissemination when the fungus spreads to many parts of the body. Because of the wide range of clinical presentations, only the most severe cases are usually reported to the Health Department. Laboratory diagnosis is made by identifying the fungus through microscopic examination, culture, serologic testing, or DNA probe. The risk of dissemination is 175 times greater in Filipinos and 10 times greater in African Americans than in non-Hispanic whites. Some studies have suggested genetic bases of predisposition to dissemination, including a possible association with blood group type B (Cheung, 2006).

DISEASE ABSTRACT

- The incidence rate for coccidioidomycosis has decreased in the past two years after reaching its peak in 2005.
- Cost in terms of disease severity and hospitalization is substantial in the United States. An otherwise healthy individual diagnosed with symptomatic coccidioidomycosis may miss more than one month of school or work. Recent estimates of antifungal medication costs range from $5,000 to $20,000 per person per year of therapy for the disease (Cheung, 2006).
- Adults, males, blacks, and residents of the San Fernando and Antelope Valleys are at higher risk for disease.

STRATIFIED DATA

Trends: The incidence rate was 1.50 cases per 100,000 population, which decreased from last year's rate of 2.03 per 100,000 population (Figure 1).

Seasonality: The highest number of cases per month was observed in the 3rd and 4th quarters although the highest numbers of cases have typically been seen in the 3rd quarter. The number of cases per month through most of 2007 was above the five-year average (Figure 2). Cases commonly occur in the summer after a rainy winter or spring, especially after wind and dust storms.

Age: Cases were predominantly in the adult age groups. The greatest numbers of cases reported were in persons aged 35-44 and 45-54 years (Figure 3). The greatest incidence rate among males and females was in the 55-64 age group (2.9/100,000). The youngest case was 4 years old. The mean age for males was 47 years and for females 46 years (Figure 3).

Sex: Males had an incidence rate of 2.0 and females 1.0. Overall, males have higher incidence rates, which is consistent with previous years. The gender difference is likely due to occupational and recreational dust exposure of males, although this is not clearly evident from the information collected. No female cases reported being pregnant.

Race/Ethnicity: The highest incidence rate (2.6 cases per 100,000) was observed among blacks; whites had an incidence rate of 1.9 (n = 56), Hispanics 1.1 (n= 52), Asians 0.8 (n=10), and others (n=1). Race was unknown in one case (Figure 4).

Location: SPA 1 (Antelope Valley Health District) had the highest number of coccidioidomycosis cases (n=51) within SPA 2-San Fernando Valley Health District (HD) had 28 cases, and West Valley HD had 8 cases. SPA 1 and 2 cases combined comprise 60% of the total. The incidence rate per 100,000 in Antelope Valley HD is 14.2, San Fernando Valley HD 6.0, and West Valley HD 0.9. These districts are more arid than the rest of the county, thus have higher risk.

Travel: Travel history was available for 103 cases. Of these, 58% (n=60) reported travel within four weeks before onset of illness, while 42% (n=43) reported no travel. Of those traveling, many reported multiple travel destinations: 25% (n=15) traveled within California including San Fernando Valley, Central Valley, and adjacent counties of Bakersfield and Oxnard; 55% (n=33) traveled outside California to Las

Figure 3
Coccidioidomycosis
Incidence by Age and Sex
LAC, 2007 (N=145)

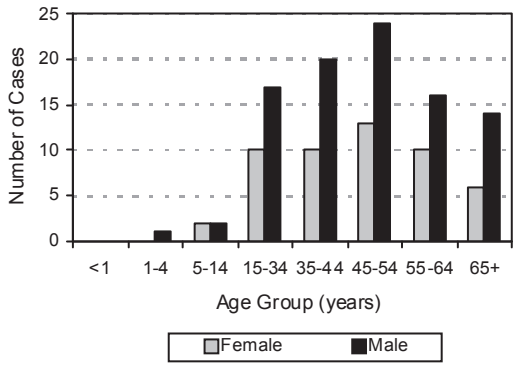


Figure 4
Coccidioidomycosis
Percent Cases by Race/Ethnicity
LAC, 2007

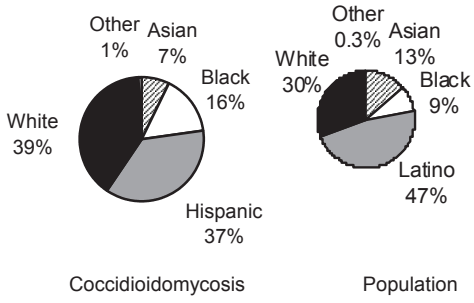
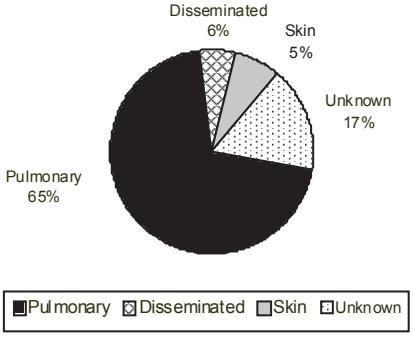


Figure 5
Coccidioidomycosis
by Infection Site
LAC, 2007 (N=145)



Vegas, Arizona; Texas, Mexico; and South America; and 20% (n=12) reported travel both within and outside of California to other locations. The fungus is known to be endemic in most of these areas.

Underlying Disease: Out of 145 total cases, 40 had unknown disease history, 41 had no disease history, and 64 cases reported having an underlying disease: 21 had diabetes, 14 malignancy, and 29 coded as other (e.g., asthma, kidney problems, IVDA, and other lung problems). Some cases had multiple underlying diseases.

Severity of Disease: Sites of infection were reported as primary pulmonary 67% (n=97), disseminated 6% (n=8), skin 8% (n=11); 20% (n=29) of the case infection sites were not indicated (Figure 5). Of the cases, 28 were culture-confirmed and 109 cases were diagnosed by serological, histopathological, or molecular testing. Some cases had multiple laboratory results available for diagnosis. Of the 124 cases for which information was available, 73% (n=90) were hospitalized.

COMMENTS

In LAC, the 2007 incidence for coccidioidomycosis was lower for the past two years. The dramatic increase began in the fall of 2003, and the wildfires in Southern California may have been a contributor by destroying vegetation and increasing dust exposure. This followed by seasonal warm temperatures, drought, and Santa Ana winds are ideal conditions for disseminating *Coccidioides immitis* spores. Although the number of cases reported is small compared to other diseases, the costs in terms of disease severity, hospitalization, and mortality are great. Also, more young adults and adults aged 45-64, especially males are affected instead of the very young and old, which may reflect a higher outdoor recreational or occupational exposure in these groups.

As in past years, residents of the Antelope Valley and West Valley are at higher risk for severe disease because these districts are more arid than the rest of the county. These areas of the county have seen a rapid growth in population. It is hypothesized that the influx of a naïve population living in areas of heavy construction greatly increased risk for disease in a coccidioidomycosis endemic area.

PREVENTION/INTERVENTION

Currently no safe and effective vaccine or drug to prevent coccidioidomycosis exists. Prevention lies mainly in dust control (e.g., planting grass in dusty areas, putting oil on roadways, wetting down soil, air conditioning homes, wearing masks or respirators). Other options may be to warn individuals who are at high risk for severe disease not to travel to endemic areas when conditions are most dangerous for exposure.

Recovery from the disease confers lifelong immunity to reinfection and is a rationale for the development and implementation of a vaccine for the prevention of symptomatic or serious forms of the disease. The combination of increasing incidence of disease, a growing population in the endemic area, and the lack of a highly effective drug treatment validates need for prevention efforts rather than treatment for this disease.

University of Arizona researchers are ready to launch a long-delayed human clinical trial on a drug they hope will cure valley fever.

“Nikkomycin Z, discovered in the 1970s, will be tested in Tucson on the people diagnosed with fresh cases of the valley fever to show the drug's safety and offer insights on its effectiveness,” said Dr. John Galgiani, Director of the Valley Fever Center for Excellence.

REFERENCES

Cheung, M.N. (2006). Coccidioidomycosis. *eMedicine*. Retrieved September 18, 2008, from the eMedicine Web site: http://www.emedicine.com/ped/topic423.htm

ADDITIONAL RESOURCES

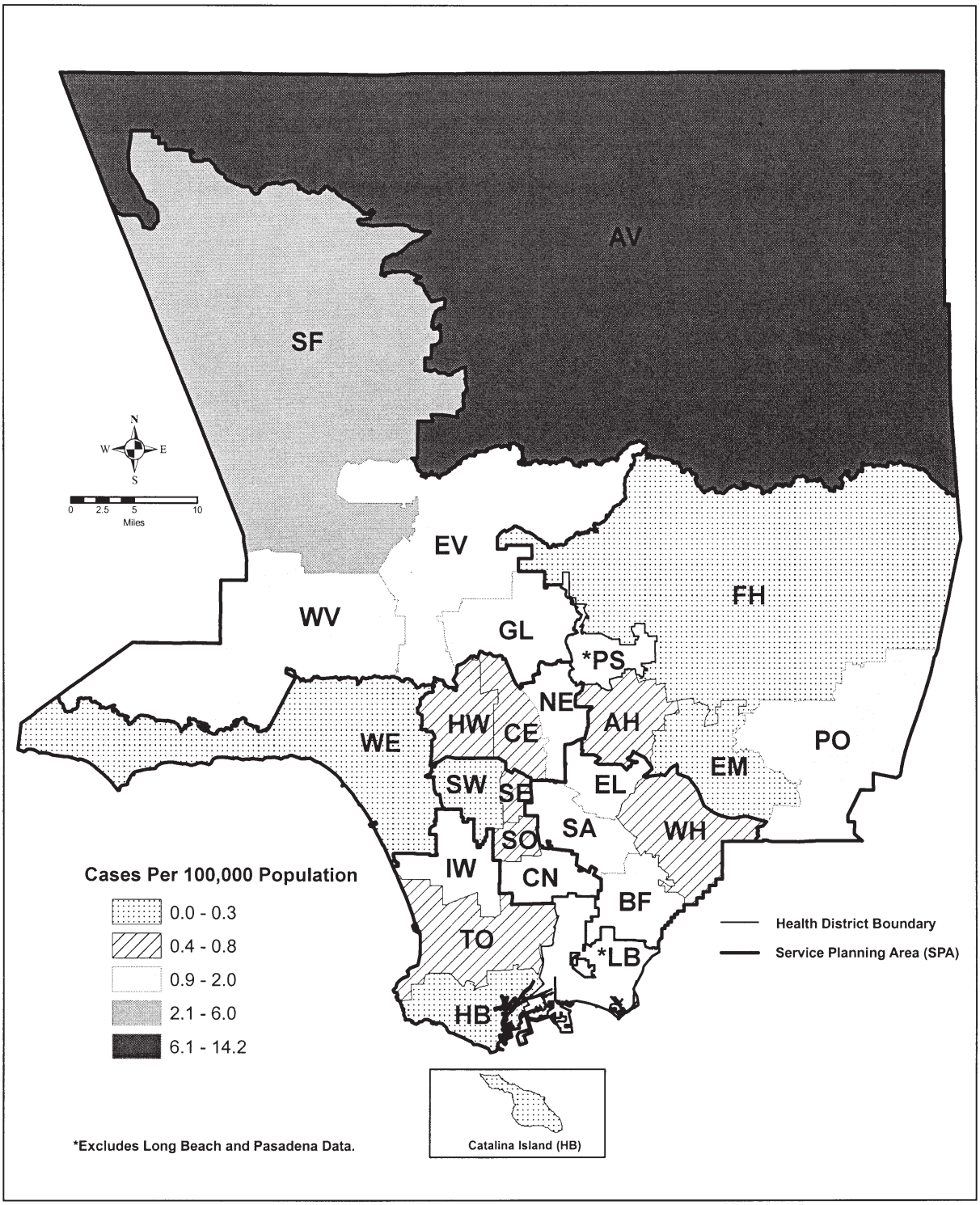
Bussum, L.V. (2003). National Fire Weather Report, 2003. Retrieved September 18, 2008, from the National Weather Service Web site: http://fire.boi.noaa.gov/FIREWX/AnnualReport/2003NationalReport.pdf

Centers for Disease Control and Prevention. Coccidioidomycosis. Retrieved September 18, 2008, from the CDC Web site: http://www.cdc.gov/nczved/dfbmd/disease_listing/coccidioidomycosis_gi.html

Kirkland, T.N. & Fierer, J. (1996). Coccidioidomycosis: a reemerging infectious disease. *Emerging Infectious Disease*, 2(3), 192–199.

University of Arizona. Valley Fever Center for Excellence. Retrieved September 19, 2008, University of Arizona Web site: http://www.vfce.arizona.edu/links.htm

Map 3. Coccidioidomycosis
Rates by Health District, Los Angeles County, 2007*



CRYPTOSPORIDIOSIS

CRUDE DATA	
Number of Cases	50
Annual Incidence[a]	
LA County	0.52
California	0.70[b]
United States	3.41[b]
Age at Diagnosis	
Mean	37
Median	40
Range	1-82

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

Figure 1
Cryptosporidiosis
Incidence Rates by Year of Onset
LAC, 1997–2007

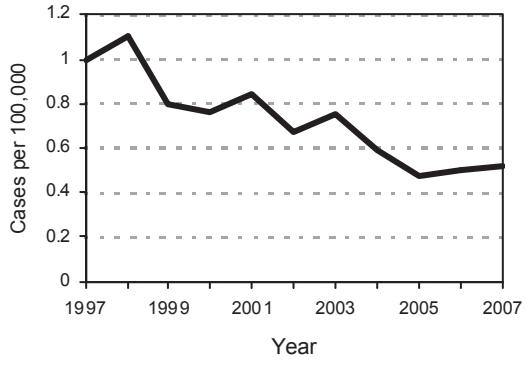
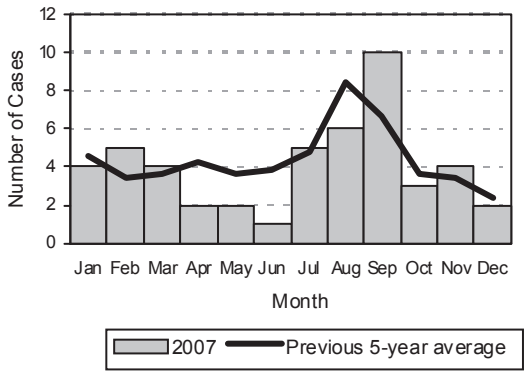


Figure 2
Cryptosporidiosis
Cases by Month of Onset
LAC, 2007 (N=50)



DESCRIPTION

Cryptosporidiosis is fecal-orally transmitted when cysts of the parasite *Cryptosporidium spp.* are ingested. Common causes include unprotected sexual contact, particularly among men who have sex with men (MSM), and ingestion of contaminated recreational or untreated water. The usual incubation period is 2–10 days with typical symptoms of watery diarrhea, abdominal cramps, and low-grade fever; however, asymptomatic infection is also common. Symptoms last up to 2 weeks in healthy individuals. Those who have a weakened immune system may experience prolonged illness. Immunocompromised individuals (e.g., HIV/AIDS patients, cancer patients, transplant patients), young children and pregnant women are at risk for more severe illness.

DISEASE ABSTRACT

- The incidence rate for cryptosporidiosis increased only slightly from 0.50 per 100,000 in 2006 to 0.52 per 100,000 in 2007. The incidence of this disease has remained relatively stable since 2004. The last outbreak of this disease occurred in 1988.
- HIV infection and AIDS are the most common identified risk factors for cryptosporidiosis. Cryptosporidiosis has been an AIDS-defining disease since 1983. The number of reported cases has decreased since the advent of highly active antiretroviral therapy.

STRATIFIED DATA

Trends: The rate of cryptosporidiosis (0.52 cases per 100,000) increased slightly in 2007 (Figure 1).

Seasonality: In 2007, there was a peak of cases reported in September, although the previous 5-year average peak was in August (Figure 2).

Age: The 35-44 age group had the highest incidence rate followed by the 45-54 age group (Figure 3).

Sex: The male-to-female ratio was 3.2:1 (12 females). This marks a noticeable decrease in the number of female cases from 2006 (n=18).

Race/Ethnicity: Whites had the highest incidence rate (Figure 4), followed by blacks. Race was unknown for 3 cases (6%). There was one case among Asians in 2007.

Location: Location information was available for all 50 cases. SPA 5 (West) had the highest incidence rate, 1.1 per 100,000, followed by SPA 2 (San Fernando), which had 0.9 per 100,000.

Risk Factors: Complete risk factor data was not available for all cases; 4 cases (9%) were either unable to be located or refused to be interviewed (Figure 5). Contact with animals was a reported risk factor in 46% of the cases. HIV infection/AIDS (33%) and outdoor activity (31%) were the other most common risk factors. Many cases had more than one risk factor.

Figure 3
Cryptosporidiosis
Incidence Rates by Age Group
LAC, 2007

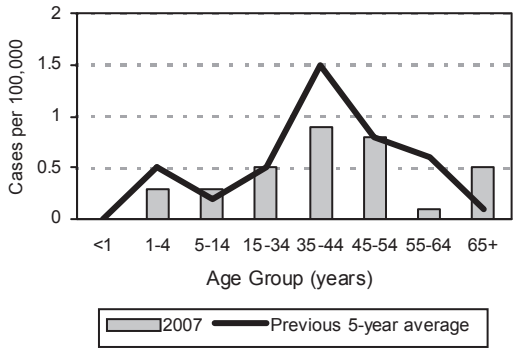
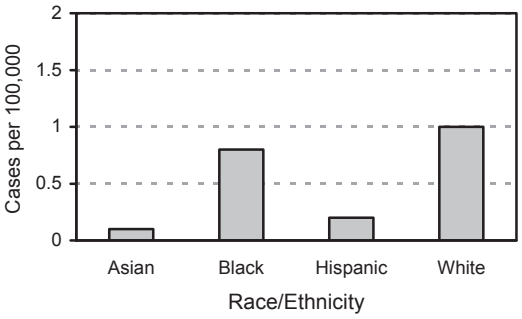


Figure 4
Cryptosporidiosis
Incidence Rate by Race/Ethnicity
LAC, 2007



COMMENTS

Risk factors were self-reported and were not proven to be the actual source of infection. 86% (n=12) of HIV-positive cryptosporidiosis cases were among males, 50% of whom were white (n=6), compared to 2006 where 50% of HIV-positive cases were Hispanic (n=11). However, these changes are not statistically significant due to the small number of cases.

Cryptosporidiosis can become a chronic infection among immunocompromised patients and cases are often reported multiple times; however, within this report, cases are counted only once.

Nationally, there has been a substantial increase in the number of reported non-outbreak-related cryptosporidiosis cases with an increase of 66% in 2007 compared with 2006. In addition, there has been an increase in reported cryptosporidiosis outbreaks in the US (CDC, 2008). In LAC, however, a similar trend has not been observed. There has not been an outbreak of cryptosporidiosis in LAC since 1988, which involved contaminated swimming pool water (Sorvillo, et al., 1992).

PREVENTION

Proper hand hygiene before meals and after using the restroom is a major way to prevent infection and transmission of cryptosporidiosis. It is also important for individuals who come in contact with

diapered/incontinent children and adults to ensure they are properly washing their hands. Persons with diarrhea should not go swimming in order to prevent transmission to others. Persons should avoid drinking untreated water that may be contaminated. Lastly, it is important to avoid fecal exposure during sexual activity.

REFERENCES

Centers for Disease Control and Prevention (CDC). Crypto alert for aquatics staff: increasing reports of crypto cases and outbreaks. Retrieved from the CDC Web site: http://www.cdc.gov/healthyswimming/pdf/Crypto_Alert_for_Aquatic_Staff.pdf

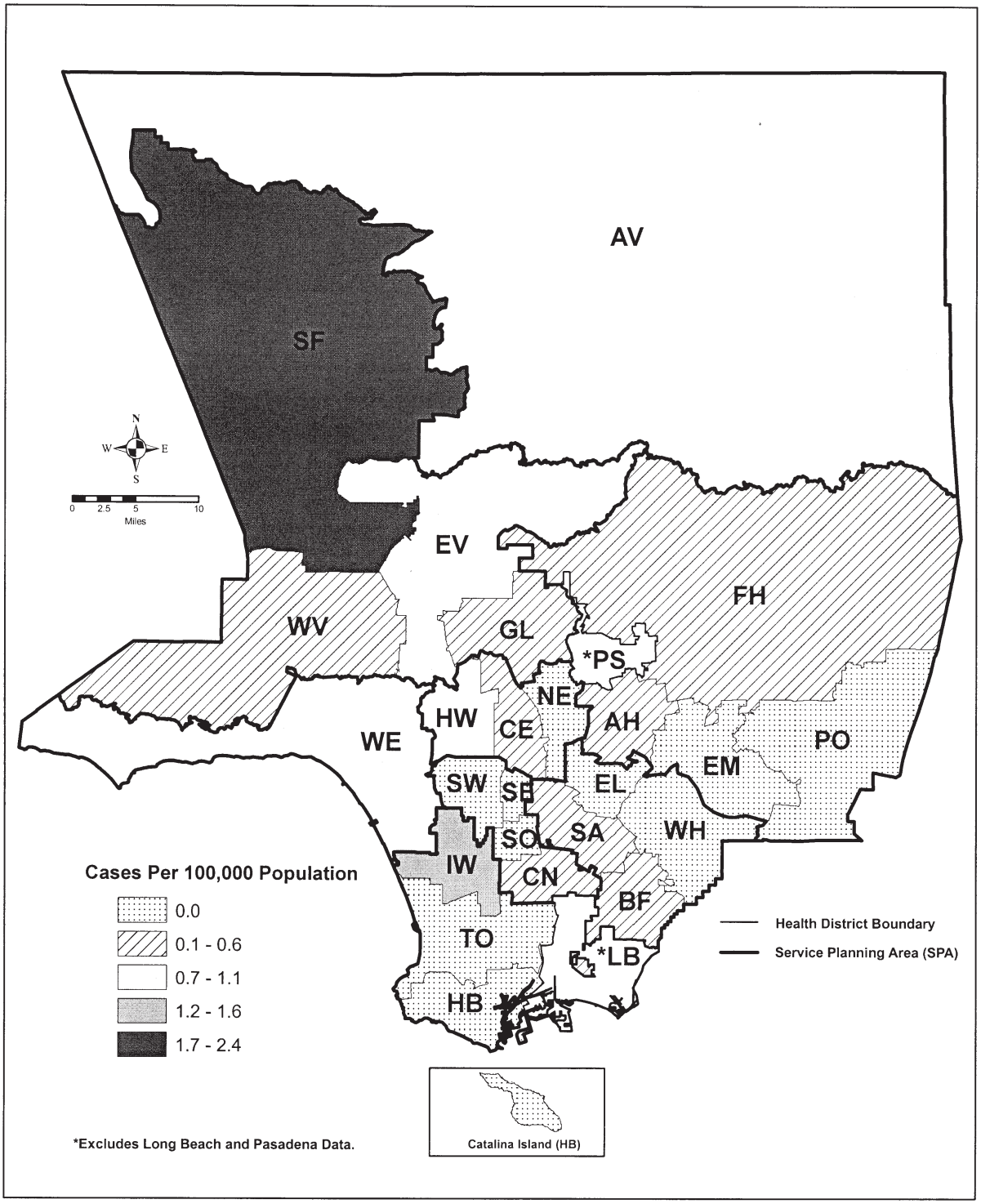
Sorvillo, F.J., Fujioka, K., Nahlen, B., Tormey, M.P., Kebabjian, R. & Mascola, L. (1992). Swimming-associated cryptosporidiosis. *American Journal of Public Health*, 82(5), 742-744.

ADDITIONAL RESOURCES

General disease information is available from the CDC at:
http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/default.htm

General information and reporting information about this and other waterborne diseases in LAC is available at: http://www.lapublichealth.org/acd/Water.htm

Map 4. Cryptosporidiosis
Rates by Health District, Los Angeles County, 2007*



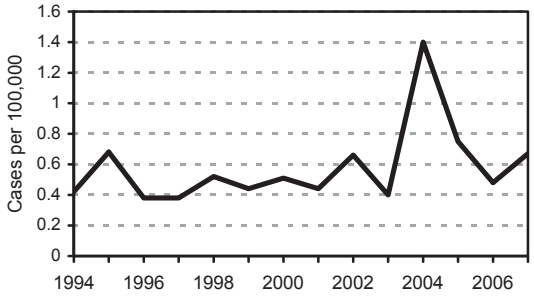
ENCEPHALITIS

CRUDE DATA	
Number of Cases[a]	65
Annual Incidence[b]	
LA County	0.67
California	N/A
United States	N/A
Age at Onset	
Mean	32.5
Median	21
Range	0–94 years

[a] Excludes AIDS encephalopathy cases.

[b] Cases per 100,000 population.

Figure 1
Encephalitis
Incidence Rates by Year of Onset
LAC 1994–2007



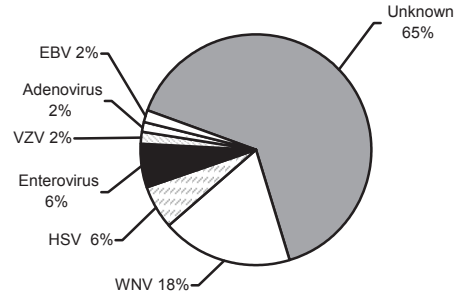
DESCRIPTION

Encephalitis, an inflammation of parts of the brain, spinal cord, and meninges, causes headache, stiff neck, fever, and altered mental status. It can result from infection with a number of different agents including viral, parasitic, fungal, rickettsial, bacterial and chemical. Public health surveillance is limited to cases of suspected or confirmed viral etiology, which includes primary and post-infectious encephalitis—but excludes individuals with underlying human immunodeficiency virus (HIV) infection. Of special concern is arboviral (mosquito-borne) encephalitis, which can be prevented by personal protection and mosquito control (See West Nile virus chapter of this report). Arthropod-borne viruses (i.e., arboviruses) are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood-feeding arthropods (mosquitoes, ticks, and certain mites and gnats). All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman vertebrate primary host and a primary arthropod vector. Arboviral encephalitides have a global distribution. There are five main viral agents of encephalitis in the US: West Nile virus (WNV), eastern equine encephalitis (EEE) virus, western equine encephalitis (WEE) virus, St. Louis encephalitis (SLE) virus, and La Crosse virus, all of which are transmitted by mosquitoes.

DISEASE ABSTRACT

- In 2007, 65 viral encephalitis cases were reported. The incidence of viral encephalitis increased from 0.48 cases per 100,000 population in 2006 to 0.67 cases per 100,000 population in 2007 (Figure 1).
- The number of reported encephalitis cases increased by 41% compared to 2006 when 46 cases were reported.
- One death was reported.
- The majority of encephalitis cases occurred in children <15 years old (n=22, 36%).
- Hispanics had the greatest number of encephalitis cases (n=31, 50%), followed by whites (n=19, 31%), Asians (n=7, 11%), and blacks (n=5, 8%).
- The number of reported encephalitis cases was highest in SPA 2 (n=20, 0.9 per 100,000), followed by

Figure 2
Encephalitis by Etiology
LAC, 2007 (N=65)



SPAs 6 and 7 (n=6 each, 0.6 and 0.4 per 100,000, respectively).

The annual incidence of acute encephalitis reported in the medical literature varies from 3.5-7.4 cases per 100,000 population. In 2007, the overall Los Angeles County (LAC) viral encephalitis incidence rate of 0.67 per 100,000 population increased from the 2006 incidence rate. The case fatality from encephalitis has ranged from a high of 38% in 1997 to a low of 0% in 2006. This year's case fatality was at 2%.

Of particular public health concern in LAC are the arthropod-borne viral (arboviral) encephalitides (endemic to California (CA)), SLE, WEE, and WNV encephalitis. Since 1985, sporadic cases of SLE have been reported following an outbreak of 16 cases in 1984. The last confirmed SLE case in LAC was in 1997. Ongoing identification of SLE virus in sentinel chicken populations indicate that the virus remains endemic in LAC. Beginning in 2001, arboviral disease surveillance has included WNV, in addition to SLE and WEE.

In 2007, 12 cases of WNV-assoicated encephalitis were confirmed. In 2007, more WNV-associated encephalitis cases were seen compared to 2006 when 5 were documented. Like SLE virus, WNV is transmitted principally by *Culex* species mosquitoes.

PREVENTION

Prevention measures for arboviral infections consist of personal protection, screens on windows, avoiding mosquito-infested areas, especially at dusk when most mosquitoes are active, wearing protective clothing and use of insect repellants containing DEET, oil of eucalyptus, and picaridin. Elimination of standing water and proper maintenance of ponds and swimming pools decrease the available sites for hatching and maturation of mosquito larvae. Five local mosquito abatement districts monitor and control populations of these insects, especially in areas used by the public (See WNV section).

COMMENTS

Surveillance for WNV infection in humans, mosquitoes, sentinel chickens, and dead birds will continue throughout CA and LAC. Research is underway to develop a WNV vaccine and treatment for humans. No human vaccine is available for SLE, WEE, and WNV. A human vaccine exists for Japanese encephalitis.

Licensed equine (horse) vaccines are available for WEE, EEE, and WN viruses.

ADDITIONAL RESOURCES

Chaudhuri, A. & Kennedy, P.G. (2002). Diagnosis and treatment of viral encephalitis. *Postgraduate Medical Journal*, 78(924), 575-583.

Glaser, C.A., Gilliam, S., Schnurr, D., Forghani, B., Honarmand, S., Khetsuriani, N., et al. (2003). In search of encephalitis etiologies: diagnostic challenges in the California Encephalitis Project, 1998–2000. *Clinical Infectious Diseases*, 36(6), 731-742.

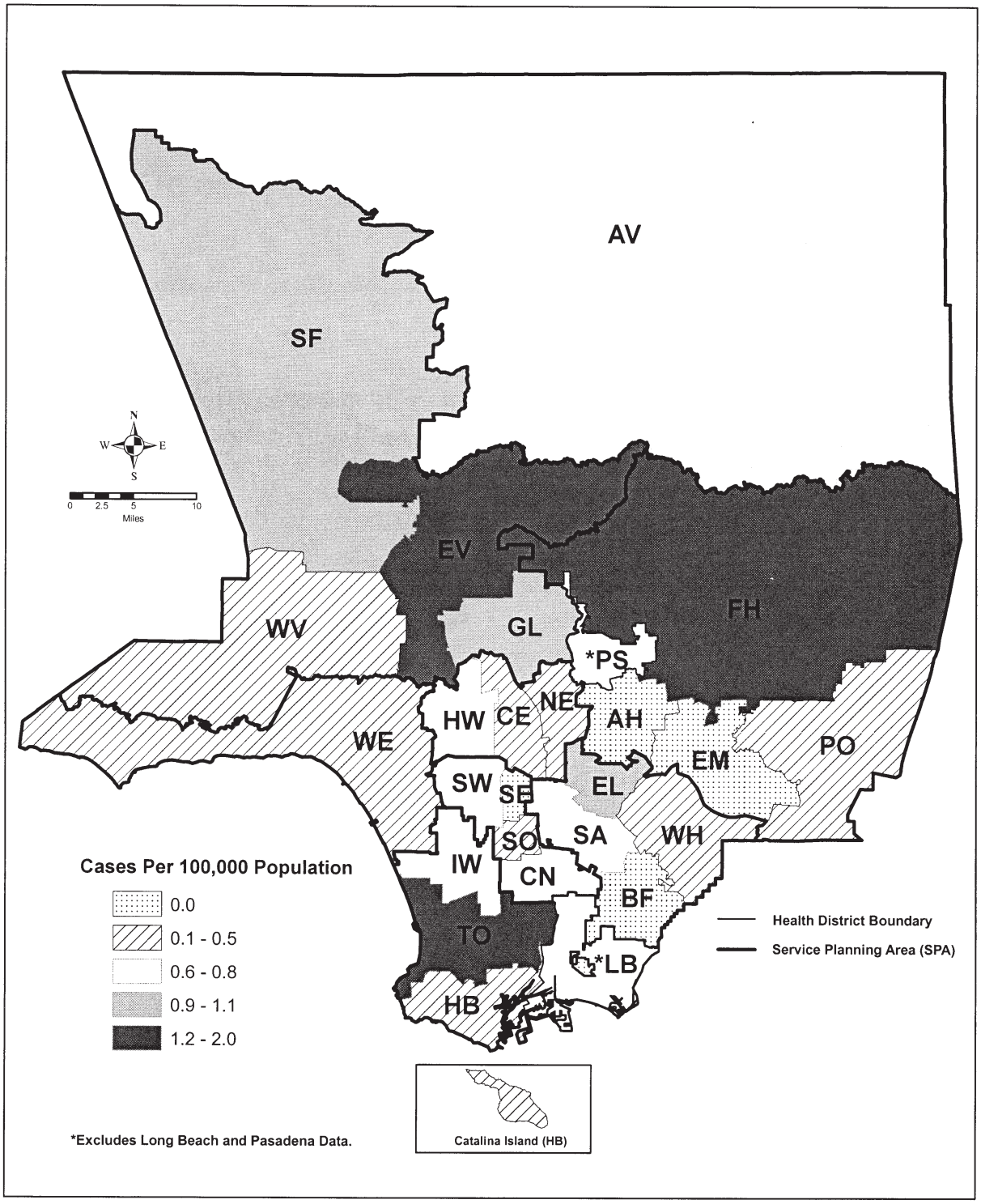
Trevejo, R.T. (2004). Acute encephalitis hospitalizations, California, 1990-1999: unrecognized arboviral encephalitis? *Emerging Infectious Diseases*, 10(8), 1442-1449.

For information on mosquito-borne encephalitis: http://www.cdc.gov/ncidod/dvbid/arbor/index.htm

For information for consumers: http://www.nlm.nih.gov/medlineplus/encephalitis.html

Information about case investigation of encephalitis in LAC is available at:
http://www.lapublichealth.org/acd/procs/b73/b73index.htm

Map 5. Encephalitis
Rates by Health District, Los Angeles County, 2007*

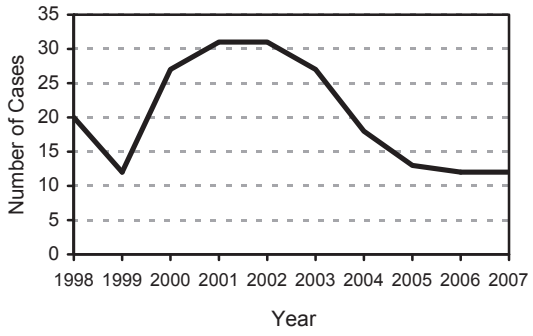


ESCHERICHIA COLI O157:H7 / HEMOLYTIC UREMIC SYNDROME

CRUDE DATA	
Number of Cases	12
Annual Incidence[a]	
LA County	0.12[b]
California	25
United States	
Age at Diagnosis	
Mean	16.67
Median	4.5
Range	1-65 years

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.

Figure 1
Escherichia coli O157:H7
Cases by Year of Onset
LAC 1998–2007



DESCRIPTION

Escherichia coli O157:H7, a Gram-negative bacillus, is a specific serotype of the Shiga toxin producing class of *E. coli* (STEC) and the most common such serotype in the US. Incubation period is 2-8 days. Shiga toxins cause abdominal cramps and watery diarrhea, often developing into bloody diarrhea; fever is uncommon. Likely modes of transmission include foodborne (e.g., undercooked ground beef, fresh produce, unpasteurized juice, and raw milk) and person-to-person (e.g., day-care settings). There also have been outbreaks associated with exposure to animals and their environments and recreational water exposure. All *E.coli* O157:H7 isolates are confirmed and fingerprinted by the Los Angeles County Public Health Laboratory and submitted to the national Pulse-Net database.

Hemolytic uremic syndrome (HUS) is a clinical diagnosis often associated with *E. coli* O157:H7. Children younger than five years of age are at highest risk for HUS, a clinical complication consisting of hemolytic anemia, thrombocytopenia, and kidney failure. Adults may develop thrombotic thrombocytopenic purpura after STEC infection.

DISEASE ABSTRACT

- The number of cases remained the same from 2006 to 2007.
- There were no reported cases of HUS and no Los Angeles County (LAC) outbreaks in 2007.

STRATIFIED DATA

Trends: After peaking in 2001 and 2002, rates of *E.coli* O157:H7 infection have been steadily decreasing and in 2007 leveled off. This is the fourth year since 1999 with fewer than twenty cases in LAC (Figure 1). There were no cases of HUS reported during 2007.

Seasonality: In 2007, 83% of confirmed cases occurred between May and September with a peak of 4 cases in September (Figure 2). This is consistent with the 5-year average.

Age: In 2007, there were more cases in children (n=9, 75%) than in adults. All cases were sporadic and not linked to a local outbreak.

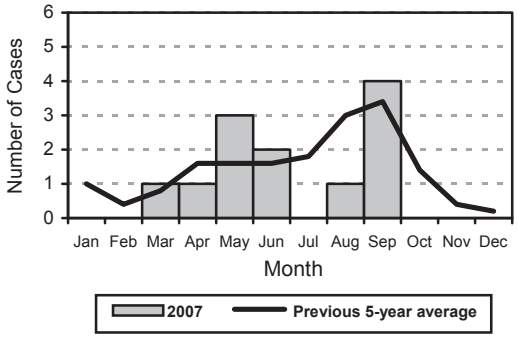
Sex: The male to female ratio was 3:1.

Severity of Illness: Most cases reported bloody diarrhea (n=9, 75%) and abdominal cramps (n=10, 83%). Only three cases reported having fever (mean temperature was 99.7^{0}F). Four cases (33%) required hospitalization. There were no reported deaths in confirmed cases.

Risk Factors: In the week prior to onset, cases with available information reported the consumption of ground beef (58%), steak (17%), apple juice/cider (25%), lettuce (50%), and fast food (58%). One confirmed case received antibiotic therapy, which increases the risk of HUS, but did not develop HUS.

HUS: In 2007, there were no reported HUS cases.

Figure 2
Escherichia coli O157:H7
Cases by Month of Onset
LAC, 2007



COMMENTS

There were 14 cases of other STEC (non-O157:H7) reported with different serotypes. There were no outbreaks related to *E. coli* O157:H7 in LAC during 2007.

Collaborative efforts among physicians, laboratories, and the health department are important for enhancement of surveillance. Physicians should request testing for *E. coli* O157:H7 or Shiga toxin on all bloody stools and consider *E. coli* O157:H7 in their diagnoses by asking about consumption of high-risk foods, attendance at day-care centers or farms, and exposure to other individuals with diarrhea. The collection of detailed food histories is important to understand underlying sources of infection. All cases of HUS should be reported immediately, and physicians should request stool testing for *E.coli* O157:H7 for these patients.

PREVENTION

Increased public education to prevent STEC infection is important. Information should focus on safe food handling practices, proper hygiene, and identifying high-risk foods and activities both in the home and while eating out. To avoid infection, beef products should be cooked thoroughly. Produce, including pre-washed products, should be thoroughly rinsed prior to eating. In addition, one should drink only treated water and avoid swallowing water during swimming or wading. Careful handwashing is essential, especially before eating and after handling raw beef products or coming in contact with or being around animals. The strengthening of national food processing regulations to decrease contamination is also important to reduce infection.

ADDITIONAL RESOURCES

General information about E.Coli – http://www.cdc.gov/ecoli/

FoodNet Foodborne disease active surveillance – http://www.cdc.gov/foodnet

Gateway to Government Food Safety – http://www.foodsafety.gov

OutbreakNet Team: national surveillance on foodborne infections and illnesses – http://www.cdc.gov/foodborneoutbreaks/index.htm

LAC general information and reporting information on foodborne infections and illnesses – http://www.lapublichealth.org/acd/food.htm

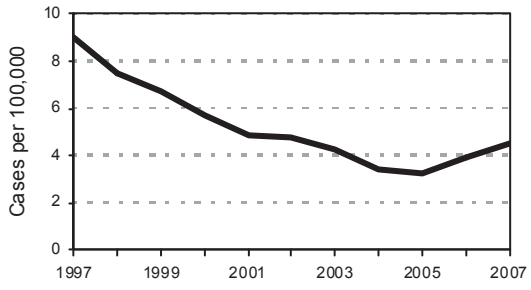
GIARDIASIS

CRUDE DATA	
Number of Cases	441
Annual Incidence[a]	
LA County	4.55
California	5.44[b]
United States	5.71[b]
Age at Diagnosis	
Mean	29
Median	28
Range	<1–84 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

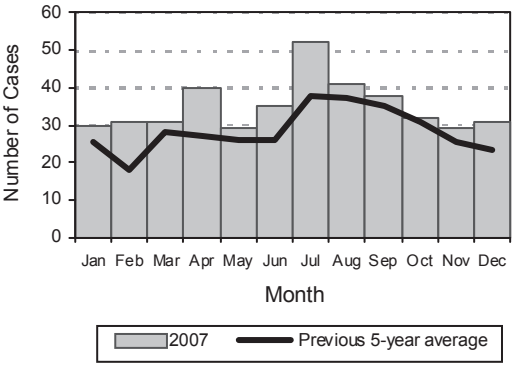
Figure 1
Giardiasis
Incidence Rates by Year of Onset
LAC, 1997–2007



DESCRIPTION

Giardiasis is an intestinal infection caused by the zoonotic protozoan parasite *Giardia intestinalis* (previously *G. lamblia*). *Giardia* cysts shed in animal or human feces may contaminate food or drinking water or be transferred on hands or fomites; recreational waters such as lakes and pools may also serve as vehicles of transmission. Incubation can range from 3-25 days or longer, but the median incubation time is 7-10 days. While often asymptomatic, symptoms can include sulfurous burps, chronic diarrhea, frequent loose and pale greasy stools, bloating, cramps, fatigue, and weight loss. Complications are rare but may include malabsorption of fats and fat-soluble vitamins. Children in day care represent a reservoir of disease in developed countries. There is no vaccine.

Figure 2
Giardiasis
Cases by Month of Onset
LAC, 2007



DISEASE ABSTRACT

- The incidence of reported giardiasis in Los Angeles County has increased steadily over two years, with a 17% increase from 2006 (3.9 per 100,000) to 2007 (4.55 per 100,000). This presents a reversal of the trend from the previous several years.
- Incidence tends to increase during summer months when high-risk activities such as recreational water exposure also increase.
- An increasing number of cases are immigrants and refugees from countries where giardiasis is endemic.

STRATIFIED DATA

Trends: Giardiasis incidence in LAC continues to increase in 2007, reversing the downward trend seen up to 2005 (Figure 1).

Seasonality: The number of cases typically increases during summer months when recreational exposure is more likely (i.e., swimming in infected pools, lakes, etc.) In 2007, the number of cases peaked in July (Figure 2).

Age: As in previous years, the highest age-specific incidence rate occurred among children aged 1-4 years (10.6 cases per 100,000) (Figure 3). Among adults, the incidence was highest in males aged 35-44 years (7.2 cases per 100,000); females aged 35-44 years had a much lower incidence (2.7 cases per 100,000).

Sex: Males are twice as likely to contract *Giardia* as females in 2007 (2.1:1). The incidence for men in 2007 (6.2 per 100,000) increased by 17% from 2006 (5.3 per 100,000), compared to the rate for women which increased by 21% (2.4 to 2.9 per 100,000).

Race/Ethnicity: Whites continue to have higher race/ethnicity specific incidence rates (6.7 per 100,000) than other races (Figure 4).

Location: SPA 5 (West Area) had the highest reported incidence rate (8.9 per 100,000) followed by SPA 2 (San Fernando Area, 7.9 per 100,000).

Risk Factors: Exposure and risk factor information was analyzed for an approximately 10% random sample of giardiasis cases in 2007 (n=48). The most frequently reported risk factors for this sample were having immigrated into the US in the previous six months (n=16, 33%), outdoor exposure (n=12, 26%), and travel outside the US (n=10, 21%). These risk factors are consistent with risk factor information for other waterborne parasitic diseases reported in LAC.

Figure 3
Giardiasis
Incidence Rates by Age Group
LAC 2007

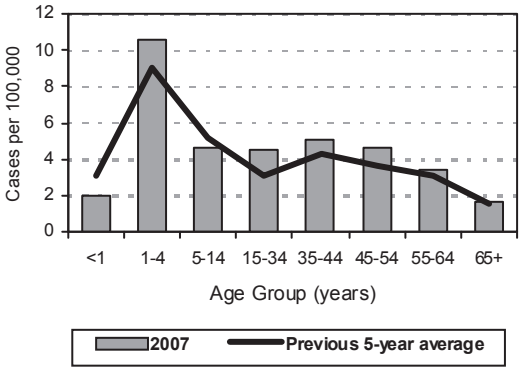
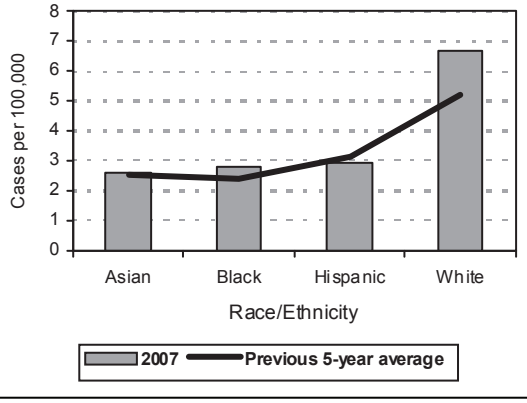


Figure 4
Giardiasis
Incidence Rates by Race/Ethnicity
LAC, 2007



COMMENTS

There has been a noteworthy increase in incidence of giardiasis over the past few years. While the specific reasons for this increase are unknown, several factors may have contributed, including increased exposure to recreational water (i.e., drinking lake and pool water, babies in diapers and individuals with diarrhea swimming in public facilities) as well an increase in travel outside the US. Another possible reason is the increase in electronic laboratory reporting. Also, there has been a noted increase in the number of cases that are immigrants or refugees from countries where giardiasis is endemic. A special studies report summarizing the analysis of the large increase in cases of giardiasis reported from one of the LAC health districts will be published in the annual report next year. There were no giardiasis outbreaks reported in 2007.

PREVENTION

To prevent transmission of giardiasis, individuals should wash their hands before eating, after using the toilet, and after changing diapers. Persons ill with diarrhea should avoid swimming. Fecal exposure during sexual activity should also be avoided.

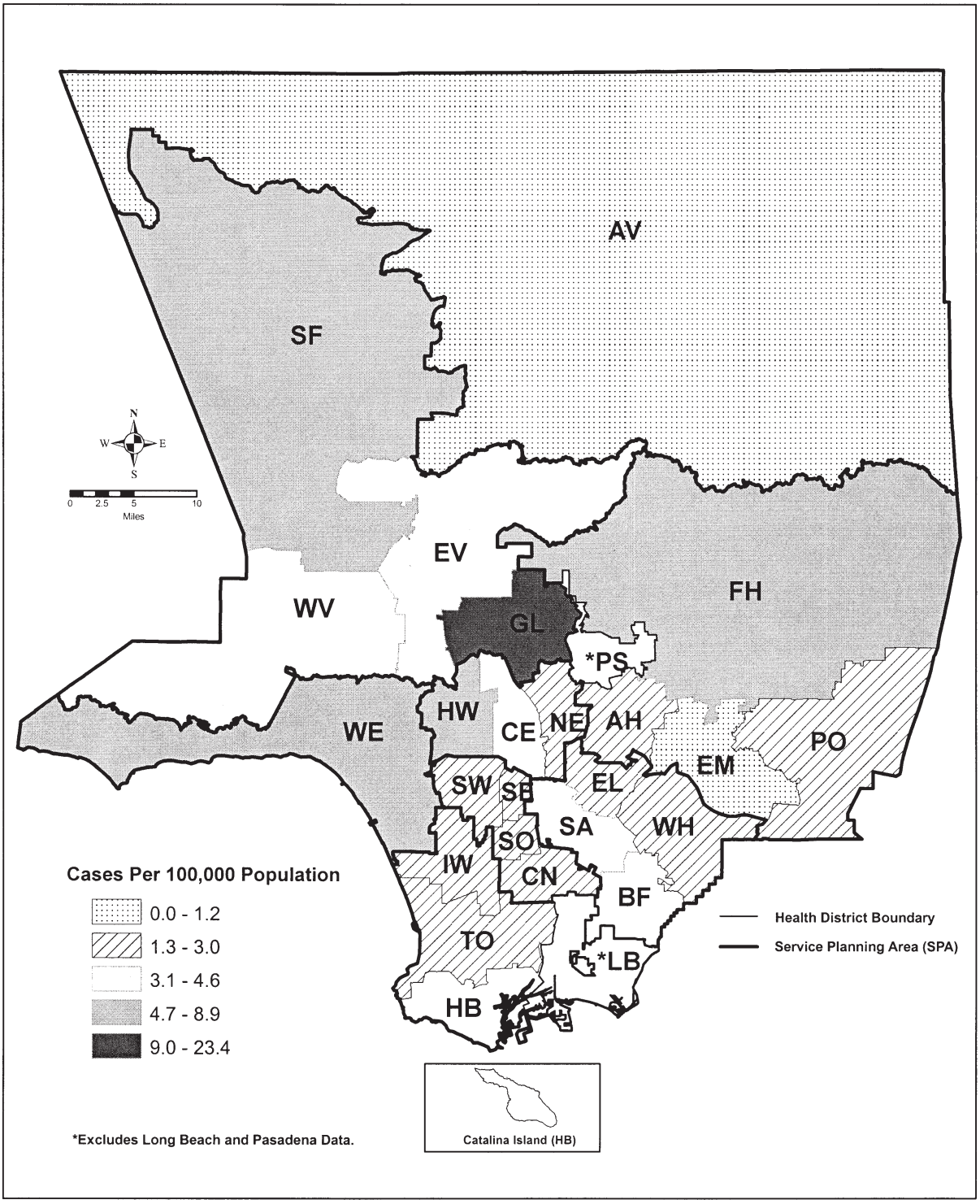
ADDITIONAL RESOURCES

Centers for Disease Control and Prevention (2000). Giardiasis surveillance--United States, 1992–1997. *Morbidity and Mortality Weekly Report*, 49(SS07), 1-13. Available at CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss4907a1.htm

Centers for Disease Control and Prevention (CDC). Parasitic Disease Information Fact Sheet—Giardiasis. Available at CDC Web site: http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardia.htm

Centers for Disease Control and Prevention (2006). Surveillance for foodborne-disease outbreaks—United States, 1998-2002. *Morbidity and Mortality Weekly Report*, 55(SS10), 1-34. Available at: CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a1.htm

Map 6. Giardiasis
Rates by Health District, Los Angeles County, 2007*

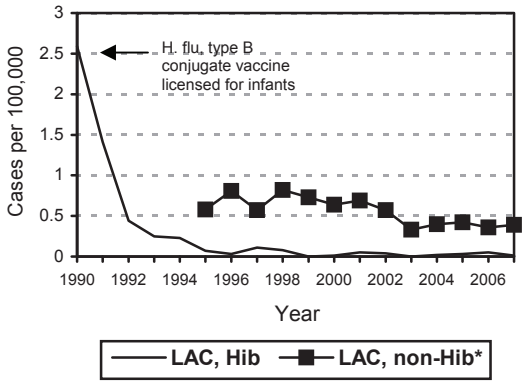


HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	63
Annual Incidence[a]	
LA County	0.65
California	0.13[b]
United States	0.85[c]
Age at Diagnosis	
Mean	50.8
Median	59.0
Range	<1 – 96.0

[a] Cases per 100,000 population.
[b] Cases per 100,000 persons, aged less than 15 years. In California, *H. influenzae* among persons > 14 years of age is not reportable.
[c] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

Figure 1
H. influenzae Invasive Disease
Incidence Rates by Year
LAC, 1990–2007

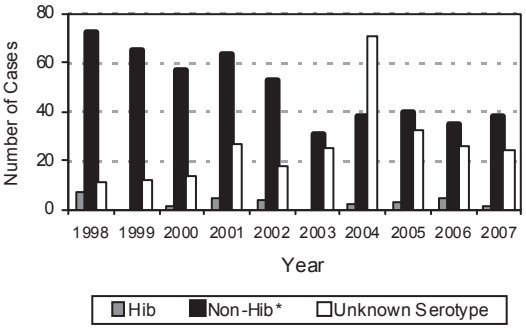


* Surveillance became mandated in 1995. Excludes unknown serotypes.

DESCRIPTION

Haemophilus influenzae is a Gram-negative coccobacillus that can cause both invasive and non-invasive disease. *H. influenzae* invasive disease includes meningitis, sepsis, pneumonia, cellulitis, and septic arthritis. Currently the disease primarily affects infants and the elderly as well as immunocompromised individuals and those who have abnormal splenic function. *H. influenzae* can be transmitted by respiratory secretions of individuals colonized in the oropharynx with the organism. There are six encapsulated, typeable strains (a–f) and unencapsulated, nontypeable strains of *H. influenzae*. Prior to the introduction of the *H. influenzae* type b (Hib) conjugate vaccine in 1990, most cases of invasive disease in children were caused by type b. *H. influenzae.* Type b is the only serotype that is vaccine-preventable and for which chemoprophylaxis is effective.

Figure 2
H. influenzae Invasive Disease
Cases by Year of Onset
LAC, 1998-2007



* Surveillance became mandated in 1995. Excludes unknown serotypes.

DISEASE ABSTRACT

- Only one Hib case was identified in 2007.
- The majority of reported *H. influenzae* invasive disease cases is among non-Hib (n=38) and unknown (n=24) serotypes. The mean age of unknown serotype cases is higher than the mean age for non-Hib cases (Table 1, Figure 2, Figure 3).
- As previous years, non-Hib incidence peaked during the months of February to April.

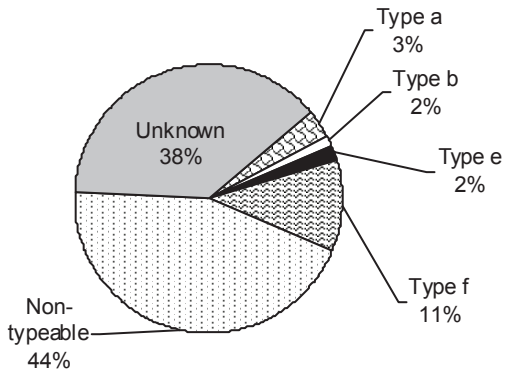
Table 1: *H. influenzae* Crude Data by Serotype, 2007 vs. Previous 5-Year Average

	B		Non-Hib		Unknown type	
	2007	Previous 5-Year Average	2007	Previous 5-Year Average	2007	Previous 5-Year Average
Number of Cases	1	2.8	38	39.6	24	35.6
Age at Onset						
Mean	71.0	22.2	40.1	43.7	66.8	63.7
Median	71.0	14.5	41.5	44.9	68.0	67.9
Range	71.0 – 71.0	1.0 – 58.5	<1 – 89.0	<1 – 91.8	<1 – 96.0	13.6 – 98.2
LAC Case Fatality	0%	14.3%	0%	6.3%	20.8%	7.7%

IMMUNIZATION RECOMMENDATIONS

- All infants, including those born prematurely, can receive a primary series of conjugate Hib vaccine beginning at 2 months of age. The number of doses in the series depends on the brand of vaccine used. A booster is recommended at 12-15 months of age regardless of which brand of vaccine is used for the primary series.
- Individuals older than 59 months of age do not need Hib vaccination unless they have a health condition that puts them at increased risk for invasive Hib disease.

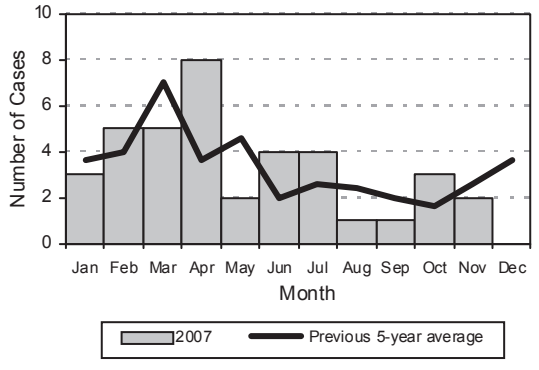
Figure 3
H. influenzae Invasive Disease
Percent Cases by Serotype
LAC, 2007 (N=63)



STRATIFIED DATA

Seasonality: The single Hib case had disease onset in November. Similar to previous years, a temporal pattern has been evidenced in LAC with a peak in non-Hib cases during the months of February to April. These three months accounted for 47.4% (n=18) of the non-Hib cases (Figure 4).

Figure 4
H. influenzae Invasive Disease
Cases Due to Non-Hib Serotype
by Month of Onset
LAC, 2007 (n=38)

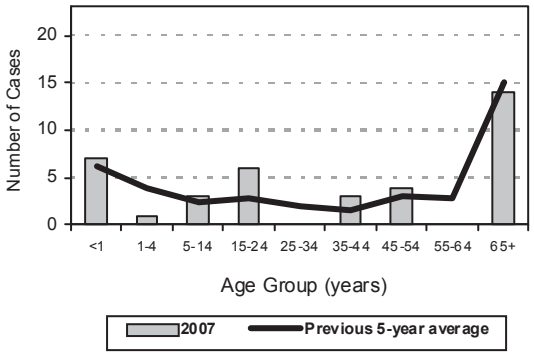


Age: The single Hib case was 71 years of age unlike previous years. Among non-Hib cases, the ≥65 age group accounted for the highest proportion of cases (37%, n=14) (Figure 5). However, the mean age of non-Hib cases was 40.1 years, which is similar to the mean age of the previous five years (Table 1). Approximately 21% (n=8) of non-Hib cases were under the age of 5. Of the 24 cases with unknown serotype, 96% (n=23) were over the age of 14 and were not actively investigated for serotype as detailed in LAC's priority investigation criteria. In addition, 54% (n=13) of these unknown serotype cases were in the ≥65 age group.

Race/Ethnicity: The single Hib case was white. Among the non-Hib cases which the race/ethnicity was known (n=19), Hispanics accounted for 42%

(n=8) of the cases, followed by whites (n=7; 37%), and blacks (n=4; 21%). Among the unknown serotype cases of whom race/ethnicity was identified (n=12), 42% were among whites (n=5) followed by blacks (n=4; 33%), Hispanics (n=2; 17%), and Asians (n=1; 8%) (Figure 6).

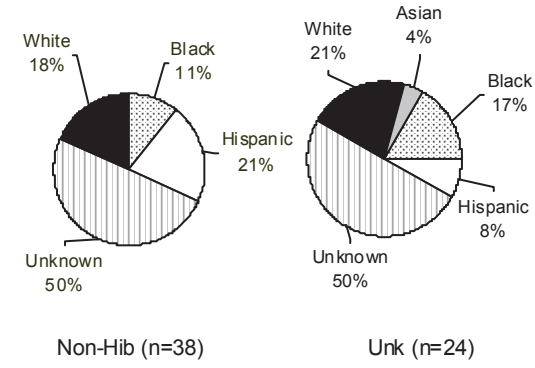
Figure 5
H. influenzae Invasive Disease
Serotype Non-Hib Cases by Age
Group, LAC, 2007 (n=38)



COMMENTS

Prior to 2007, the only cases of *H. influenzae* disease investigated in LAC were those in persons less than 30 years of age. However, since the reporting requirements changed in June 2007, the only *H. influenzae* cases investigated in LAC are those in persons less than 15 years of age. Contacts of these cases are investigated, and chemoprophylaxis is given when appropriate.

Figure 6
H. influenzae Invasive Disease
Percent Cases by Race/Ethnicity
LAC, 2007



On December 13, 2007, Merck & Co., Inc., issued a voluntary recall of 11 lots of PedvaxHIB [*Haemophilus* b Conjugate Vaccine (Meningococcal Protein Conjugate)] and 2 lots of COMVAX [*Haemophilus* b Conjugate (Meningococcal Protein Conjugate) and Hepatitis B (Recombinant) Vaccine]. The recall was issued due to the concern for potential contamination of the lots with the bacteria *Bacillus cereus*. Approximately 68 Los Angeles County public and nonprofit providers received the recalled vaccine, totaling 2,440 doses. Although Sanofi Pasteur also manufactures two Hib conjugate vaccines (ActHIB and TriHIBit), the recall has resulted in a short-term Hib vaccine shortage. In response, the CDC issued interim recommendations on the use of Hib vaccine. Prior to December, the recommended vaccine schedule for Hib vaccination included a primary series (2 or 3 doses) beginning at age 2 months and a booster dose at age 12-15 months. On December 19, the DC ssued interim guidelines that called for the temporary deferral of the routine booster dose of Hib vaccine except to children in special high-risk groups, such as those with asplenia, sickle cell disease, human immunodeficiency virus infection and certain other immunodeficiency syndromes, and malignant neoplasms (CDC, 2007).

A short-term deferral of vaccine is unlikely to result in increased levels of Hib disease since more than 95% of infants will develop protective antibody levels after a primary series of 2 or 3 doses. Furthermore, rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 63 *H. influenzae* cases reported in 2007, only one was a Hib case. The case had no known source of exposure and was hospitalized for 9 days with pneumonia. Since the Hib case was over 15 years of age, the case was not investigated further.

Case Fatalities: There were five fatalities among *H. influenzae* cases. All five fatalities were unknown serotypes. Three of the fatalities were male and two were female. Two were black, one was Hispanic, one was white, and one was of unknown race/ethnicity. One of the fatalities was a one-month old baby. The one-month-old case suffered acute bronchopneumonia and cardiac arrest, which ultimately led to her death. The other four fatalities (80%) ranged in age from 59 to 96 years so the cases were not investigated for further details. However, information on complications was provided for two of the cases.

The 59-year-old case suffered respiratory failure with cardiopulmonary arrest and severe hypoxic encephalopathy. The 64-year-old case had respiratory arrest. No information on complications was provided for the 92-year-old and 96-year-old cases.

REFERENCES

Centers for Disease Control and Prevention (2007). Interim recommendations for the use of *Haemophilus influenzae* type B (Hib) conjugate vaccines related to the recall of certain lots of Hib-containing vaccines (PedvaxHIB and Comvax). *Morbidity and Mortality Weekly Report*, 56 (Dispatch), 1-2.

ADDITIONAL RESOURCES

Additional information about *Haemophilus influenzae* invasive disease is available at:

- National Center for Immunization and Respiratory Diseases – http://www.cdc.gov/vaccines/
- Immunization Action Coalition – http://www.immunize.org/
- LAC Immunization Program – http://www.lapublichealth.org/ip/

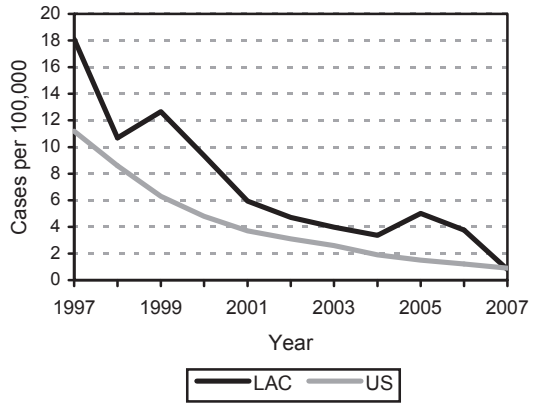
HEPATITIS A

CRUDE DATA	
Number of Cases	78
Annual Incidence[a]	
LA County	0.80
California	1.47[b]
United States	0.90[b]
Age at Diagnosis	
Mean	37
Median	35
Range	1-94 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

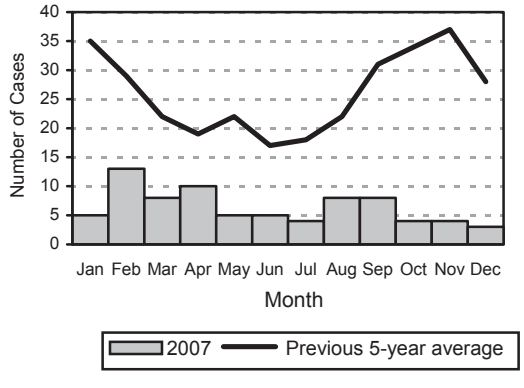
Figure 1
Hepatitis A
Incidence Rates by Year
LAC and US, 1997-2007



DESCRIPTION

Hepatitis A virus (HAV), a RNA-virus of the Picornaviridae family, is a vaccine-preventable disease transmitted fecal-orally, person-to-person, or through vehicles such as food. Signs and symptoms of acute hepatitis A include fever, malaise, dark urine, anorexia, nausea, and abdominal discomfort, followed by jaundice. Many cases, especially in children, are mild or asymptomatic. Sexual and household contacts of HAV-infected persons are at increased risk for getting the disease. The average incubation period is 28 days (range 15–50 days). Recovery usually occurs within one month. Infection confers life-long immunity.

Figure 2
Hepatitis A
Cases by Month of Onset
LAC, 2007



ACDC uses the CDC/CSTE criteria for acute hepatitis A to standardize surveillance of this infection. The criteria include: 1) an acute illness with discrete onset of symptoms and 2) jaundice or elevated aminotransferase levels, and 3) appropriate lab tests to confirm laboratory criteria for acute hepatitis A diagnosis. Confirmatory laboratory criteria include IgM anti-HAV positive, or a case meets the clinical case definition and has an epidemiologic link with a person who has laboratory confirmed hepatitis A (i.e., a household or sexual contact of an infected person during the 15-50 days before the onset of symptoms).

DISEASE ABSTRACT

- The incidence rate of acute hepatitis A has decreased from the previous year (3.77 to 0.80 per 100,000), and is now below the US incidence rate of 0.90 (Figure 1).
- The incidence rate is highest in those between the ages of 15-54 years.
- Recent travel outside of the US was the most commonly reported risk factor.

STRATIFIED DATA

Trends: The hepatitis A incidence rate was 0.80 cases per 100,000 in 2007 which was lower than last year (Figure 1).

Seasonality: Historically, there is an increase of hepatitis A cases in summer to early autumn, but in 2007 there was an increase in the winter and spring (Figure 2).

Age: The overall mean age for hepatitis A cases in 2007 was 37 years. The mean age differed significantly by race and ethnic groups. The mean age for Hispanics was 30 years while Asian, black, and white cases had mean ages of 33, 36, and 50 years, respectively. The incidence rate is highest in those between the ages of 15-54 years (Figure 3).

Sex: The hepatitis A cases male: female rate ratio was 1.0:0.7. The number of cases in males exceeded those in females in all ethnic groups.

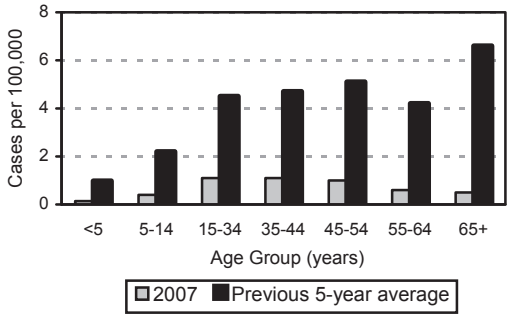
Race/Ethnicity: The incidence rate for Asians was higher than other races (1.2 per 100,000), followed by whites (0.8), Hispanics (0.7), and blacks (0.6), respectively (Figure 4).

Location: Of the eight SPAs across LAC, three had rates that were greater than the overall county mean rate for this disease: SPA 1 (1.4 per 100,000), SPA 3 (1.0 per 100,000) and SPA 7 (0.9 per 100,000) (Figure 5).

Severity of Illness: Twenty-nine percent (n=23) of hepatitis A cases were hospitalized. The age of those hospitalized ranged from 14 to 58 years, with a median age of 35.5 years.

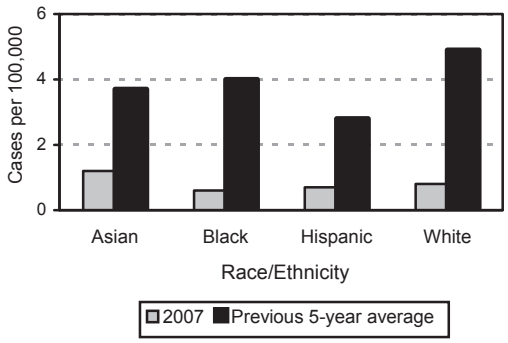
Risk Factors: Of the 78 confirmed cases, 95% were interviewed by public health nurses for risk factors. Risk factors were identified for 58% (n=45) of the cases (including some cases with multiple risk factors). Of those with identified risk factors, recent travel outside of the US (n=37, 82%) was the most common risk factor reported in 2007, followed by eating raw shellfish (n=19, 42%), and being in contact with another case (n=4, 9%). Among travelers, Mexico and Central American destinations (68%) were most frequently cited.

Figure 3
Hepatitis A Incidence Rates
by Age Group LAC, 2007 (N=78)



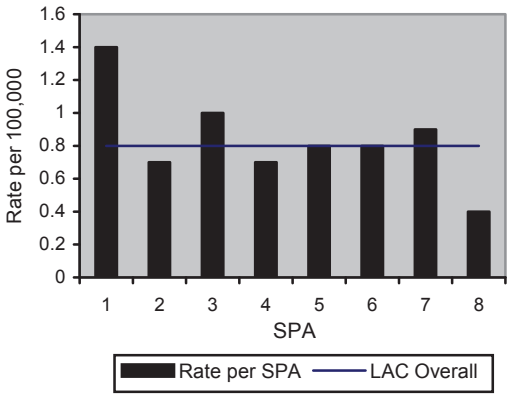
* Small numbers in these groups produced unstable rates.

Figure 4
Hepatitis A Incidence Rates
by Race/Ethnicity LAC, 2007



* Small numbers in these groups produced unstable rates.

Figure 5
Hepatitis A Incidence Rates by SPA
LAC, 2007



* Small numbers in these groups produced unstable rates.

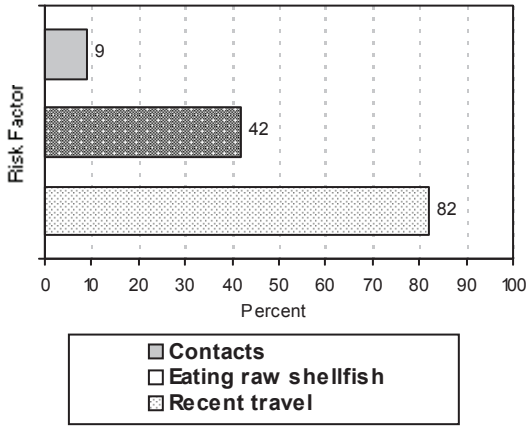
PREVENTION

Effective strategies for decreasing the number of hepatitis A cases in LAC include the addition of hepatitis A vaccine to the children's immunization program, public health nurses providing post exposure prophylaxis to close contacts of cases and providing education to clients and close contacts regarding the importance of hand hygiene in preventing the spread of infection.

Post-exposure prophylaxis with hepatitis A vaccine and/or IG is used to control outbreaks in LAC. Use of hepatitis A vaccine for post-exposure prophylaxis has the advantage of providing active immunity and longer protection.

International travel was the most common risk factor reported in 2007, followed by eating raw shellfish and contact with a household member or sexual partner who had HAV. Therefore, it is important to educate travelers, and consumers of raw shellfish about hepatitis A vaccinations.

Figure 6
Hepatitis A Reported Risk Factors
LAC, 2007 (n=45)



*Includes cases identifying multiple risks.

COMMENTS

This year the incidence rate of 0.80 cases per 100,000 was the lowest recorded in LAC and for the first time was lower than the US rate. Rates of acute hepatitis A in LAC have varied widely in the past several years, despite an overall decline of acute hepatitis A in the US. Variations in the rates of acute hepatitis A are partly due to the enhanced use of vaccine, consistently applying the CDC/CSTE case definition to all reported cases and a large outbreak which occurred in 2005-2006. See previous annual reports from 2005-2006 for a more complete explanation (http://publichealth.lacounty.gov/acd/Report.htm).

ADDITIONAL RESOURCES

Centers for Disease Control and Prevention, general information—
http://www.cdc.gov/hepatitis/index.htm

Publications:

Centers for Disease Control and Prevention (2003). Foodborne transmission of hepatitis A—Massachusetts, 2001. *Morbidity and Mortality Weekly Report*, 52(24), 565-567. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5224a2.htm

Centers for Disease Control and Prevention (2003). Hepatitis A outbreak associated with green onions at a restaurant--Monaca, Pennsylvania, 2003. *Morbidity and Mortality Weekly Report*, 52(47), 1155-1157. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm52d1121a1.htm

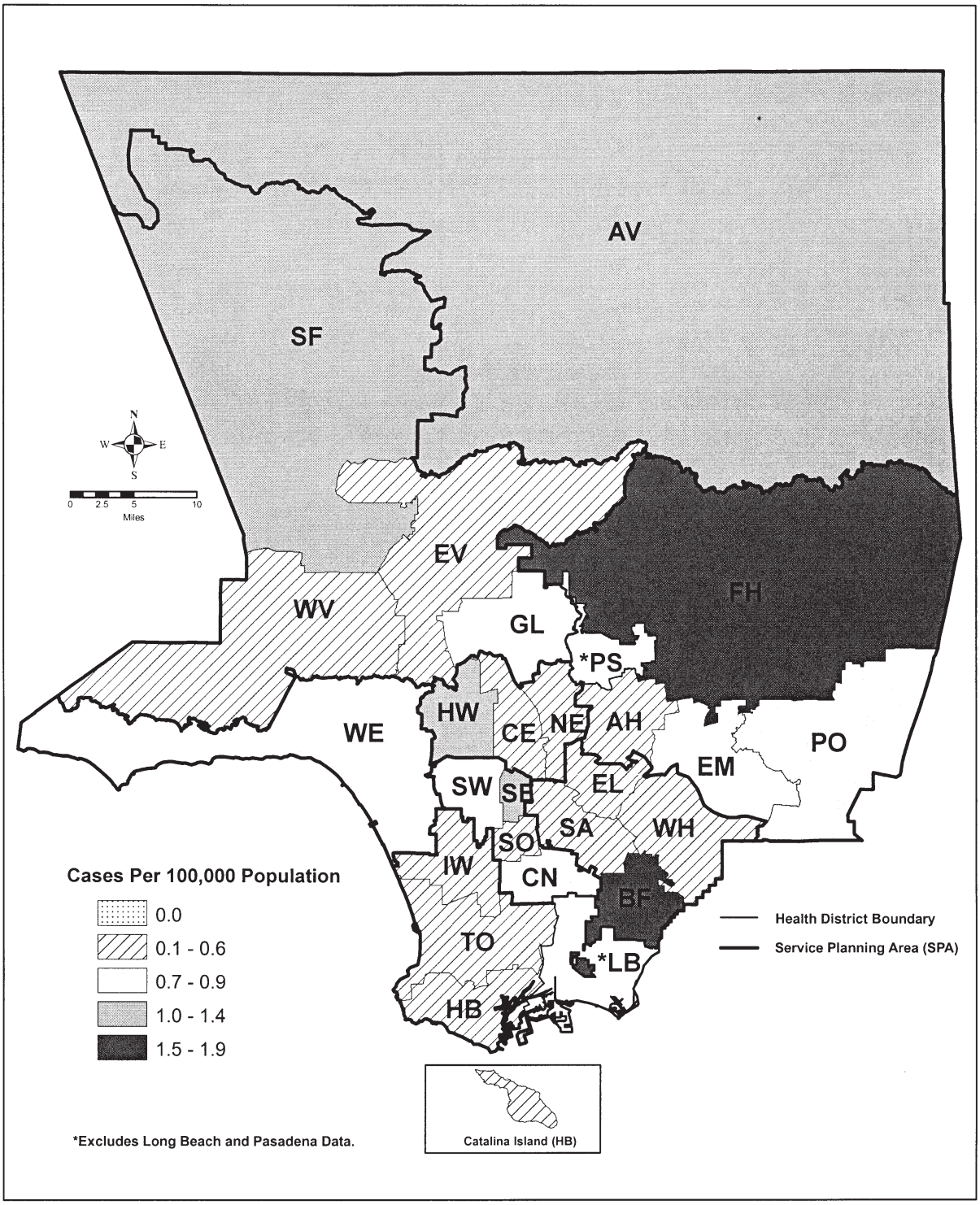
Centers for Disease Control and Prevention (2005). Positive test results for acute hepatitis A virus infection among persons with no recent history of acute hepatitis--United States, 2002-2004. *Morbidity and Mortality Weekly Report*, 54(18), 453-456. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5418a1.htm

Centers for Disease Control and Prevention (2007). Update: Prevention of Hepatitis A After Exposure to Hepatitis A Virus and in International Travelers. Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report*, 56(41), 1080-1084. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm

Centers for Disease Control and Prevention (2008). Surveillance for acute viral hepatitis--United States, 2006. *Morbidity and Mortality Weekly Report*, 57(SS02),1-24. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5702a1.htm

Fiore, A.E. (2004). Hepatitis A transmitted by food. *Clinical Infectious Diseases*, 38(5), 705–715. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/hepatitis/PDFs/fiore_ha_transmitted_by_food.pdf

Map 7. Hepatitis A
Rates by Health District, Los Angeles County, 2007*



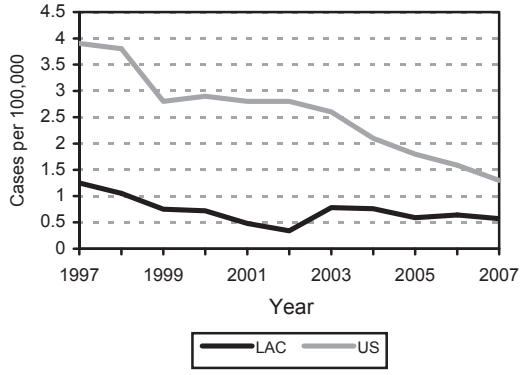
HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	55
Annual Incidence[a]	
Los Angeles	0.57
California	1.04[b]
United States	1.30[b]
Age at Diagnosis	
Mean	47
Median	42
Range	22-87 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issue of MMWR (57:901, 903-913).

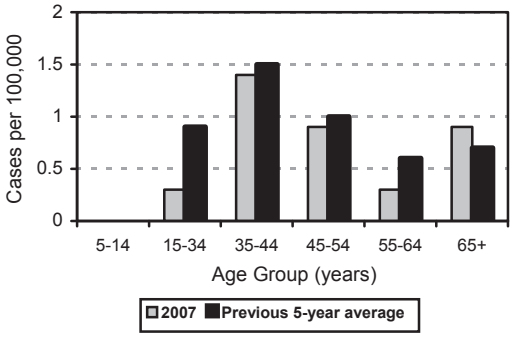
Figure 1
Hepatitis B
Incidence Rates by Year
LAC and US, 1997–2007



DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure (via sex or drugs) to the blood and other bodily fluids of individuals infected with the hepatitis B virus (HBV), a DNA-virus of the Hepadnaviridae family. It is also spread from mother to child at birth or soon after birth. Symptoms, which occur in less than half of those acutely infected, may be very mild and flu-like: anorexia, nausea, fatigue, abdominal pain, muscle or joint aches, jaundice, and mild fever. Approximately 2–10% of non-infants infected with HBV are unable to clear the virus within six months and become chronic carriers. Death from cirrhosis or liver cancer is estimated to occur in 15–25% of those with chronic infection. Overall, hepatitis B is more prevalent and infectious than HIV.

Figure 2
Acute Hepatitis B
Incidence Rate by Age Group
LAC, 2007 (n=55)



* Small numbers in these groups produced unstable rates.

For the purpose of surveillance, ACDC uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms, 2) jaundice or elevated aminotransferase levels, and 3) appropriate laboratory tests to confirm acute hepatitis B diagnosis (i.e., HBsAg positive or anti-HBc IgM positive, if done, and anti-HAV IgM negative, if done).

DISEASE ABSTRACT

- The incidence rate for acute hepatitis B decreased slightly from the previous year (0.64 to 0.57 per 100,000) (Figure 1).
- The highest incidence rate occurred in persons aged 35-54 years, and the majority of the cases were males.
- Contact with a person with a confirmed or suspected acute or chronic hepatitis B infection was the most frequently identified risk factor.
- No outbreaks were reported in 2007.

STRATIFIED DATA

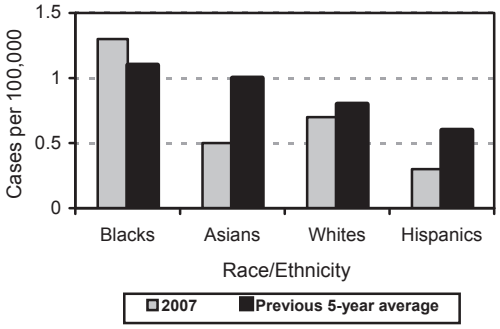
Seasonality: None.

Age: Cases ranged in age from 22 to 87 years (the median age was 42). The highest incidence rate occurred in persons aged 34-54 years (1.4 per 100,000). The incidence rate in the 65+ age group increased from the previous 5-year average (Figure 2).

Sex: The male-to-female rate ratio was 1.75:1.0. The number of cases in males exceeded those of females in all ethnic groups.

Race/Ethnicity: The highest incidence rate was seen in blacks (1.3 per 100,000) followed by whites (0.7 per 100,000), Asians (0.5 per 100,000), and Hispanics (0.3 per 100,000), respectively (Figure 3).

Figure 3
Acute Hepatitis B
Incidence Rates by Race/Ethnicity*
LAC, 2007



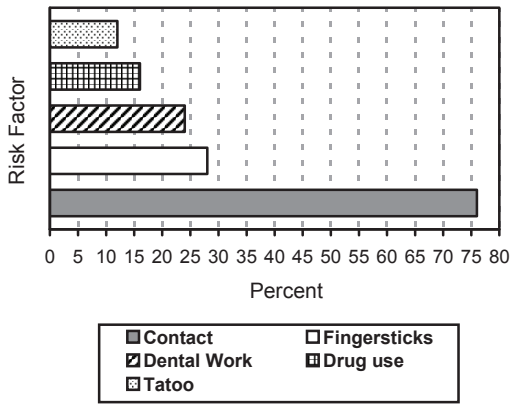
* Excludes perinatal cases.
* Small numbers in these groups produced unstable rates.

Location: Incidence rates by SPA ranged from 0.2 to 1.1 per 100,000. SPA 4 had the highest incidence rate (1.1 per 100,000) followed by SPA 6 (0.9 per 100,000) and SPA 5 (0.8 per 100,000). However, further stratification of cases by SPA produced small numbers and unstable incidence rates.

Severity of Illness: There was one reported hepatitis B related death in 2007. Fifty-seven percent of reported cases were hospitalized. The age range of those hospitalized was 22-87 years. The median age was 41 years.

Risk Factors: Risk factors were identified in 45% (n=25) of confirmed cases (including some cases with multiple risk factors). Of those with risk factors, contact with a person with a confirmed or suspected acute or chronic Hepatitis B infection (n=19, 76%) was the most common risk factor reported, followed by receiving fingersticks (n=7, 28%), recent dental work (n=6, 24%), drug use (n=4, 16%), and tattoo (n=3, 12%) (Figure 4).

Figure 4
Hepatitis B Reported Risk Factors*
LAC, 2007 (n=25)



* Includes cases identifying multiple risks.

COMMENTS

In LAC, there were 315 suspect cases in 2007 that were initially reported to have acute hepatitis B in comparison to the 403 suspects reported for 2006. In both years, the percentage of cases that met the CDC/CSTE criteria for confirmation ranged from 15-17%. Most cases that are not confirmed as meeting the CDC/CSTE criteria are missing documentation of clear evidence of liver involvement (e.g., the liver enzyme levels are normal or missing).

In 2007, all acute hepatitis B cases were aged 15 years or older. The incidence rate was highest in the 35-44 age group (1.4 per 100,000). In comparison to other age groups, the incidence rate increased in those over 65 years of age (0.9 per 100,000). Risk factors were identified in six (67%) out of the nine confirmed cases over 65 years of age (including some cases with multiple risk factors). Of those over 65 years of age with identified risk factors, 100% reported receiving fingersticks in the 6 months prior to the

onset of symptoms. In 2008, Los Angeles County Department of Public Health (LAC DPH) will use an enhanced questionnaire for investigation of persons aged ≥50 yrs confirmed with acute hepatitis B to gather additional risk factor data for these cases including possible health care exposures.

PREVENTION

The absence of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in LAC. This strategy includes: preventing perinatal HBV transmission by screening all pregnant women for HBsAg and providing immunoprophylaxis to infants of HBV-infected women, routine immunization of all infants, and catch-up vaccination of all previously unvaccinated children aged < 19 years. In addition, in LAC, hepatitis B vaccine is provided to high-risk groups at the Public Health Clinics at no charge.

New strategies are needed to reduce high-risk behaviors and provide resources for low-cost hepatitis B immunization, particularly for adults with the highest rates of transmission. Development and implementation of such strategies is possible through collaboration between public health, community-based organizations, and other agencies that serve target populations. Additionally, promoting hepatitis health education aims at eliminating, reducing, or mitigating high-risk behaviors in sexually active adults and increasing awareness and knowledge in the community.

ADDITIONAL RESOURCES

Centers for Disease Control and Prevention. Viral Hepatitis B - http://www.cdc.gov/hepatitis/

Hepatitis B Vaccine Information Infants, Children, and Adolescents - http://www.cdc.gov/hepatitis/HBV/VaccChildren.htm

Hepatitis B Vaccine Information Adults - http://www.cdc.gov/hepatitis/HBV/VaccAdults.htm

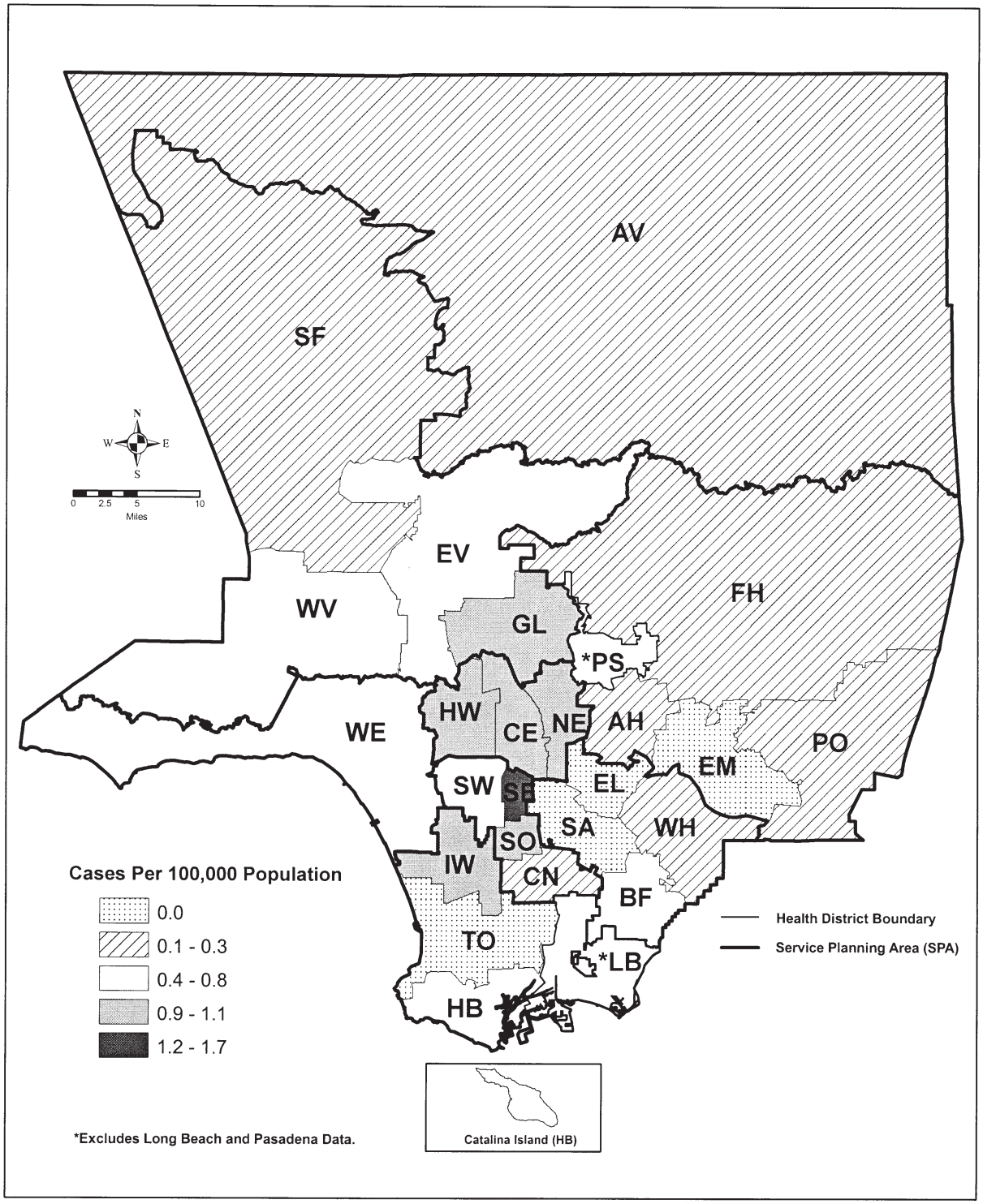
Publications:

Centers for Disease Control and Prevention (2003). Transmission of hepatitis B and C viruses in outpatient settings--New York, Oklahoma, and Nebraska, 2000-2002. *Morbidity and Mortality Weekly Report*, 52(38), 901-906. Retrieved October 31, 2008, from the CDC Web site: www.cdc.gov/mmwr/PDF/wk/mm5238.pdf

Centers for Disease Control and Prevention (2005). Transmission of hepatitis B virus among persons undergoing blood glucose monitoring in long-term care facilities--Mississippi, North Carolina, and Los Angeles County, California, 2003-2004. *Morbidity and Mortality Weekly Report*, 54(9), 220-223. Retrieved October 31, 2008, from the CDC Web site: www.cdc.gov/mmwr/preview/mmwrhtml/mm5409a2.htm

Centers for Disease Control and Prevention (2008). Surveillance for acute viral hepatitis--United States, 2006. *Morbidity and Mortality Weekly Report*, 57(SS02), 1-24. Retrieved October 31, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5702a1.htm

Map 8. Hepatitis B
Rates by Health District, Los Angeles County, 2007*

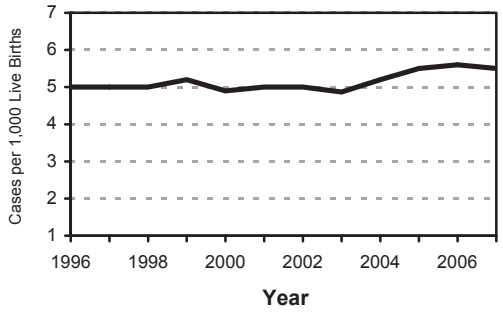


HEPATITIS B, PERINATAL

CRUDE DATA	
Number of Infants Born to HBsAg Positive Mothers	774
Incidence of Exposure[a]	
LA County	5.5
United States	N/A
Age at Diagnosis	
Mean	N/A
Median	N/A
Range	N/A

[a] Number of Infants born to HBsAg-positive mothers per 1,000 live births in 2006.

Figure 1
Perinatal Hepatitis B
Incidence Rates of Infants Born to
HBV-Positive Mothers by Year
LAC, 1996–2007



DESCRIPTION

Hepatitis B is a vaccine-preventable disease transmitted through parenteral or mucous membrane exposure to blood and other body fluids of individuals infected with the hepatitis B virus (HBV). It is also transmitted from mother to infant during birth. In Los Angeles County (LAC), it is estimated that over 40% of infants born to hepatitis B surface antigen (HBsAg) positive women will become infected without prophylaxis. An estimated 90% of infants who become infected by perinatal transmission develop chronic HBV infection by 6 months of age, and up to 25% will die from chronic liver disease as adults. Post-exposure prophylaxis with hepatitis B vaccine and hepatitis B immune globulin (HBIG) administered 12-24 hours after birth, followed by completion of a 3-dose vaccine series, has been demonstrated to be 85-95% effective in preventing acute and chronic HBV infection in infants born to mothers who are positive for both HBsAg and hepatitis B e-antigen. Post-vaccination serologic testing is recommended at age 9-18 months after completing immunoprophylaxis to verify vaccine success or failure. The LAC Immunization Program's Perinatal Hepatitis B Prevention Program (PHBPP) conducts enhanced case management of HBsAg-positive pregnant women, their newborns, household, and sexual contacts.

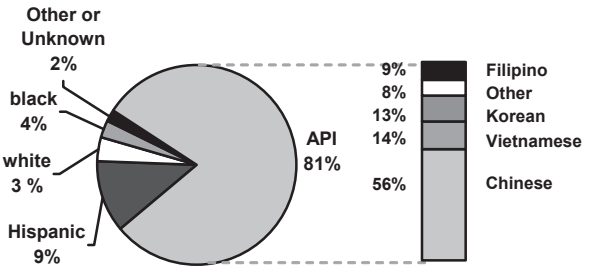
DISEASE ABSTRACT

- The majority of HBsAg-positive women giving birth were born in areas of the world with high or intermediate levels of endemic hepatitis B disease (e.g., Asia, Africa, Eastern Europe, Independent States of the former Soviet Union, Middle East, Pacific Islands, and several Central and South American countries).
- Of infants born to HBsAg-positive mothers, 97% received hepatitis B vaccine and 96% received HBIG within 24 hours of birth.
- Among those infants whose pediatric health care providers responded (n=193, 25%) to a survey after the completion of the full vaccination series, 89% of infants were protected against HBV, 10% were still susceptible, and 1% were infected with HBV.
- The incidence of exposure of infants born to HBsAg-positive mothers decreased by 2% from 5.6 to 5.5 per 1,000 infants born in 2007.

STRATIFIED DATA

Trends: In 2007, 774 infants (including 12 sets of twins) were born to 762 HBsAg-positive women. The incidence of exposure of infants born to HBsAg-positive mothers decreased by 2% from 5.6 to 5.5 per 1,000 infants born in 2007 (Figure 1).

Figure 2
Perinatal Hepatitis B
by Maternal Race/Ethnicity
LAC, 2007 (N=762)



Race/Ethnicity: The majority of the HBsAg-positive women (n=620, 81%) were Asian/Pacific Islanders (API). Other ethnic group identified were Hispanic (9%), white (4%), black (4%), and 2% were classified as other or unknown (Figure 2). Of API women, over half were Chinese (n=349, 56%). The remaining API women included: Vietnamese (n=91, 14%), Korean (n=80, 13%), Filipino (n=53, 9%), and others from various countries (e.g., Cambodia, Thailand, Samoa, Tonga, Japan, Burma, Indonesia; Laos and Mongolia) (n=47, 8%).

Age: The age range of mothers was 14-43 years of age with a median age of 31 years.

Location: The majority of the HBsAg-positive mothers (n=380, 50%) resided in SPA 3, which has a large Asian constituency. An additional 11% resided in SPA 4 (n=83), followed by SPA 2 (n=99, 13%), SPA 8 (n=63, 8%), SPA 7 (n=53, 7%), SPA 6 (n=31, 4%), SPA 5 (n=32, 4%), and SPA 1 (n=8, 1%). Thirteen cases (2%) resided in Pasadena.

Countries of Origin: The majority (n=704, 92%) of the HBsAg-positive women giving birth were born outside of the U.S. Of these women, 668 (95%) were known to be born in areas of the world with high or intermediate levels of endemic hepatitis B disease, such as Asia, Africa, Eastern Europe, Independent States of the former Soviet Union, Middle East, Pacific Islands, Caribbean Island, and several Central and South American countries.

ENHANCED CASE MANAGEMENT

In 2007, enhanced case management was completed for 732 HBsAg-positive mothers, their 744 newborns, and 1,205 household contacts. Case managers made numerous attempts to complete follow-up of mothers, infants, and household contacts. The majority (76%, n=556) of the HBsAg-positive mothers were reported in 2007. An additional 12% were reported in 2005 (n=90) followed by 2007 (n=85, 12%) with one case reported in 2003. One hundred thirty mothers were excluded for infant follow-up (86 mothers miscarried, terminated or had fetal demise, 9 transferred/moved out of LAC or were unable to be located before delivery, and 35 were retested and found to be HBsAg negative).

Enhanced case management protocol includes:

1. Providing education for HBsAg-positive pregnant women regarding HBV, liver disease, and possible transmission of the virus to household and sexual contacts,
2. Instructing HBsAg-positive pregnant women on the importance of protecting their infant against HBV by immunoprophylaxis and completion of the vaccination series,
3. Identifying and referring household and sexual contacts for screening and vaccination,
4. Notifying hospitals of expected deliveries and requesting hospitals return documentation after the infant's birth with specific dates and times post-exposure prophylaxis (HBIG and hepatitis B vaccine #1) was completed,
5. Advising the infant's health care provider regarding the need for hepatitis B vaccine #2 at 1 to 2 months and hepatitis B vaccine #3 at six months of age,

6. Reminding parents of the importance of completing the hepatitis B vaccination series, and
7. Consulting with pediatric health care providers to ensure post-vaccination serology testing for infants who completed their vaccination series.

Infant Immunoprophylaxis Completion Rates: Within the enhanced management, the majority of 744 eligible infants (including 12 sets of twins) born to 732 mothers received the hepatitis B vaccine #1 (n=720, 97%) and HBIG (n= 714, 96%) within 24 hours of birth. The majority of infants (n=686, 92%) received HBIG and a complete three-dose series of hepatitis B vaccine (Table 1).

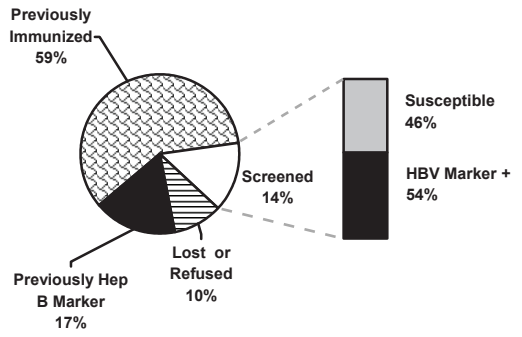
Table 1. Summary of Infant Hepatitis B Immunoprophylaxis, LAC—2007 (N=744)

Hepatitis B Immunoprophylaxis	# of Infants	Percent*
Received hepatitis B vaccine #1 ≤ 12 hours after birth	714	96%
Received hepatitis B vaccine #1 ≤ 24 hours after birth	720	97%
Received HBIG ≤ 12 hours after birth	702	94%
Received HBIG ≤ 24 hours after birth	714	96%
Completed HBIG/3-dose hepatitis B vaccine series	686	92%

* Percent of infants receiving hepatitis B immunoprophylaxis out of a total 744 infants born to 732 HBsAg+ mothers who completed follow-up in 2007.

Household and Sexual Contacts Completion Rates: A household contact was defined as an individual with anticipated continuous household exposure for greater than one year (often limited to nuclear family). Of 1,205 household and sexual contacts identified, 713 (59%) had already been vaccinated against hepatitis B, and 203 (17%) were known to have serologic evidence of hepatitis B infection. Of the remaining 289 (24%) contacts, 163 (14%) were screened for serologic evidence of hepatitis B infection or immunity, while 126 (10%) refused screening or vaccination, were lost to follow-up, or moved. Of the 163 (14%) household contacts that were serologically screened, 88 (54%) had positive markers for hepatitis B and therefore did not need vaccine. The remaining 75 (46%) household contacts were seronegative, and therefore, susceptible to hepatitis B infection (Figure 3). At the time of completion of case management for the HBsAg-positive mothers, 67 (89%) of these susceptible household contacts had completed all three doses of hepatitis B vaccine.

Figure 3
HBV Marker Status of Household Contacts to Cases Closed
LAC, 2007 (N=1,205)



Post-Vaccination Serology Results: Post-vaccination serology testing of infants born to HBsAg-positive mothers is recommended 3 to 18 months after completing immunoprophylaxis to verify efficacy of the hepatitis B immunoprophylaxis. Letters requesting post-vaccination serology results were mailed to pediatric health care providers of infants tracked by the PHBPP. Post-vaccination serology results were received for 193 infants screened in 2007. Of these, 171 (89%) had antibodies to hepatitis B surface antigen indicating protection against HBV, 2 (1%) were HBsAg-positive and infected, and 20 (10%) were negative for both markers and revaccination was recommended.

ADDITIONAL RESOURCES

Information from the CDC:

- General information – http://www.cdc.gov/vaccines/vpd-vac/hepb/; http://www.cdc.gov/hepatitis/index.htm
- Statistics and Surveillance – http://www.cdc.gov/hepatitis/Statistics.htm
- Perinatal hepatitis B vaccine recommendations - http://www.cdc.gov/mmwr/PDF/rr/rr5416.pdf

Additional information:

- Immunization Program's PHBPP website - http://lapublichealth.org/ip/perinatalhepB/
- Hepatitis B Foundation – http://www.hepb.org
- Asian Liver Center - http://liver.stanford.edu
- Immunization Action Coalition – http://www.immunize.org

HEPATITIS C, ACUTE

CRUDE DATA	
Number of Cases	2
Annual Incidence	
LA County	---[a]
California	0.20[b]
United States	0.24[b]

[a] Rates based on fewer than 20 cases are unreliable.

[b] Calculated from 2008 Summary of notifiable diseases issue of MMWR (561360-1371).

DESCRIPTION

The Hepatitis C virus (HCV) is the most common chronic bloodborne infection in the US. This RNA virus is predominantly transmitted through contact with contaminated blood and blood products via injection drug use. Sexual and perinatal transmission of HCV appears to occur less frequently. People at risk include: anyone who has had a blood transfusion prior to 1989, IV drug users, hemodialysis patients, infants born to infected mothers, those with multiple sexual partners, health care workers who suffer needle-stick accidents, and people with tattoos or body-piercing. However, an estimated 30% have no identifiable history of exposure to the virus. Household or familial contact is not considered a risk factor for the transmission of hepatitis C. There is no vaccine available for HCV, and vaccines for hepatitis A and B do not provide immunity against hepatitis C.

Symptoms of acute infections can include jaundice, fatigue, anorexia, nausea, or vomiting; however, up to 85% of acute infections have mild or no symptoms and usually go undetected. After acute infection, 15%-25% of persons appear to resolve their infection without sequelae as defined by sustained absence of HCV RNA in serum and normalization of ALT levels. Chronic HCV infection develops in most persons (75%-85%) with persistent or fluctuating ALT elevations indicating active liver diseases developing in 60%-70% of chronically infected persons. In the remaining 30%-40% of chronically infected persons, ALT levels are normal. No clinical or epidemiologic features among patients with acute infection have been found to be predictive of either persistent infection or chronic liver disease (CDC, 1998). Most studies have reported that medical complications occur decades after initial infection including cirrhosis, liver failure, and hepatic cancer.

ACDC uses the CDC/CSTE criteria for acute hepatitis C to standardize surveillance of this infection. The criteria include discrete onset of symptoms and:

- a positive HCV test (antibody test by EIA) confirmed by a more specific test (RIBA or detection of the HCV-RNA antigen by polymerase-chain reaction [PCR]) or an EIA signal to cutoff ratio of $\geq$3.8;
- serum alanine aminotransferase (ALT) greater than 400; and
- no evidence of either acute hepatitis A or B disease.

The purpose of standardizing surveillance is to more accurately monitor trends in hepatitis C, compare local data with state and national data, improve identification of risk groups, and develop and evaluate prevention programs.

DISEASE ABSTRACT

- There were 2 cases of confirmed acute hepatitis C in 2007, compare to 4 cases confirmed in 2006.
- The 2 acute cases were in a 21-year-old white female and a 31-year-old Hispanic female.
- One case reported multiple risk factors including contact with a known case, dental work, exposure to blood, accupuncture, tattoo, body piercing, drug use, and incarceration. The other case did not report any risk factors.

COMMENTS

There were 144 suspect cases initially reported to have acute hepatitis C in 2007 as compared to 158 suspects reported in 2006. Upon further investigation, only two, 1% met the acute hepatitis C surveillance criteria. The stringent criteria for acute hepatitis C illustrate the difficulty of confirming acute hepatitis C for surveillance purposes. It is likely that this data reflects an under-identification of acute hepatitis C in those cases reported to Public Health. Furthermore, since most people have no symptoms or limited, non-specific symptoms in the acute stage of hepatitis C and therefore are never diagnosed or reported to Public Health, there are likely many more new cases of acute hepatitis C in Los Angeles county each year.

There were limitations to the data collected. The data did not provide enough information for monitoring trends in transmission patterns.

Although the number of verified cases of acute hepatitis C has declined over the past 5 years, there is still a substantial burden of disease on the population from chronic hepatitis C. It is very important for improvements on monitoring changes in acute disease incidence and risk factors for infection be used to assess comprehensively the burden of disease caused by HCV infection in LA County. Public Health began to use a new risk factor form in 2007, and it is hoped that better identification of risk factors, to aid in prevention programs, will follow.

PREVENTION

Universal blood product screening in 1990 and heat-inactivation of other blood concentrates initiated in 1987 have dramatically reduced recipient-associated cases of hepatitis C. This leaves the reduction of high-risk behaviors as the primary recommendation for preventing transmission; especially, since there is no effective vaccine or post-exposure prophylaxis. Educational efforts aimed at reducing high-risk behaviors (e.g., sharing injection drug equipment, engaging in unprotected sex) may help to reduce new hepatitis C cases. Additional education provided to those who already have hepatitis C is important because alcohol consumption and co-infection with HIV can accelerate the progression of cirrhosis and hepatocellular carcinoma. Furthermore, patients with chronic hepatitis C should be encouraged to receive hepatitis A and B vaccine and evaluated for severity of their liver diseases and for possible treatment.

REFERENCES

Centers for Disease Control and Prevention (1998). Recommendation for prevention and control of hepatitis C virus (HCV) infection and HCV related chronic disease. *Morbidity and Mortality Weekly Report*, 47(RR19), 1-39. Retrieved October 31, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/00055154.htm

ADDITIONAL RESOURCES

General information about hepatitis is available from the CDC at:
http://www.cdc.gov/hepatitis/index.htm

Further information about hepatitis is available from:

- American Liver Foundation – http://www.liverfoundation.org
- Hepatitis Foundation International – http://www.hepfi.org/living/index.htm

Publications:

Centers for Disease Control and Prevention (2003). Guidelines for laboratory testing and result reporting of antibody to hepatitis C virus. *Morbidity and Mortality Weekly Report*, 52(RR03), 1-16. Retrieved October 31, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5203a1.htm

Centers for Disease Control and Prevention (2007). Use of enhanced surveillance for hepatitis C virus infection to detect a cluster among young injection-drug users—New York, November 2004—April 2007. *Morbidity and Mortality Weekly Report*, 57(19), 517-521.

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Centers for Disease Control and Prevention (2008). Surveillance for acute viral hepatitis—United States, 2006. *Morbidity and Mortality Weekly Report*, 57(SS02), 1-24. Retrieved October 31, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5702a1.htm

KAWASAKI SYNDROME

CRUDE DATA	
Number of Cases	52
Annual Incidence[a]	
LA County	0.54
United States	N/A
Age at Diagnosis	
Mean	2.44
Median	2
Range	3 mo – 12 y/o

[a] Cases per 100,000 population 2007 LAC Census Estimates.

Figure 1
Kawasaki Syndrome
Cases by Year of Onset
LAC, 2002–2007

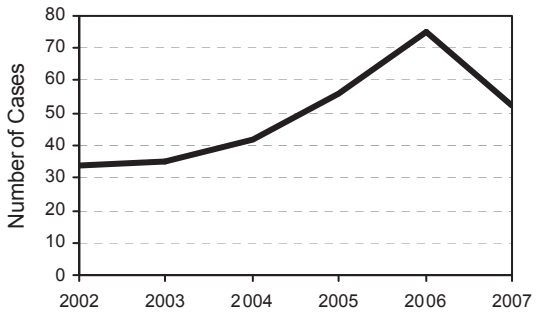
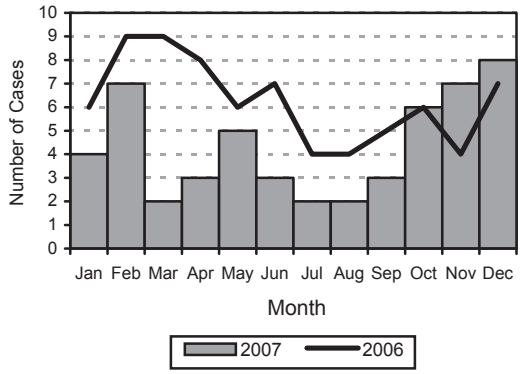


Figure 2
Kawasaki Syndrome
Cases by Month of Onset
LAC, 2006-2007



DESCRIPTION

Kawasaki Syndrome (KS), also called mucocutaneous lymph node syndrome (MLNS), was first described by Dr. Tomisaku Kawasaki in Japan in 1967 and emerged in the US in the 1970s. Several regional outbreaks have been reported since 1976. This is an illness that affects children usually under 5 years of age. It occurs more often in boys than girls (ratio of about 1.5:1). This is an acute febrile illness that causes an autoimmune inflammation of the blood vessels throughout the body, leading to vessel wall injury with potentially fatal complications affecting the heart and its larger arteries. In the US, it is a major cause of heart disease in children. The etiology is unknown and is considered a noncommunicable infection. In the US, the mortality rate is approximately 1%. The diagnosis is clinical, and by CDC case definition, a KS patient must have fever lasting 5 or more days without any other reasonable explanation and must satisfy at least four of the following criteria:

- bilateral conjunctival injection;
- oral mucosal changes (erythema of lips or oropharynx, strawberry tongue, or drying or fissuring of the lips);
- peripheral extremity changes (edema, erythema, generalized or periungual desquamation);
- rash and;
- cervical lymphadenopathy > 1.5 cm diameter.

Although laboratory findings are nonspecific for KS, they may assist in establishing the diagnosis (Taubert, 1999). Chest X-rays and a series of echocardiograms and electrocardiograms are additional important tests to follow up coronary aneurysm or arteritis. The course of KS can be divided into three clinical phases: acute febrile phase, subacute phase, and convalescent phase (Taubert, 1999). KS is usually treated with a combination of aspirin (typically, 80-100 mg/kg/day in four doses) and IVIG (intravenous immunoglobulin 2 gm/kg, a single infusion over 8 to 12 hours). Early treatment can prevent the processes that can lead to coronary artery disease.

DISEASE ABSTRACT

- The incidence of KS in LAC decreased 31% in 2007 (N=52) compared to 2006 (N=75).
- In 2007, coronary artery aneurysm was reported in 6% (n= 3) of cases with IVIG treatment (n=51).
- The incidence rate in Asians remains the highest compared to other race/ethnicity groups.

STRATIFIED DATA

Trends: In 2007, there was a total of 52 confirmed cases as compared to 75 in 2006, representing a 31% decrease from 2006.

Seasonality: No specifically seasonality is observed, however, more cases are reported in winter and spring (October, November, December, and February). (Figure 2).

Age: 85% (n=44) of confirmed cases (N=52) were reported in children under 5 years old. Mean age was 2.4 years old, median was 2 years old. The age range was from 3 months to 12 years old.

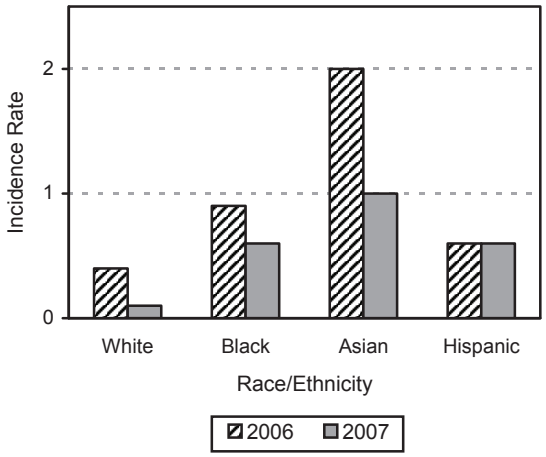
Gender: The male-to-female ratio was 1.9:1. More than half of the confirmed cases (65%, n=34) were male, while 35% (n=18) were female.

Race/Ethnicity: The incidence rate for Asians (1.0 per 100,000, n=13) was higher compared to other racial groups, as observed in past years. The incidence rate of other racial groups decreased in 2007 compared to 2006; black (0.6 per 100,000), white (0.1 per 100,000). The incidence rate among the Hispanic group remained the same in 2006 (0.6 per 100,000). (Figure 3).

Location: The highest rate was found in SPA 7 and 8 East and South Bay Area (0.7 per 100,000). The lowest rate was found in SPA 1 Antelope Valley.

Risk Factors: Unknown according to the CDC (CDC, 1993) and other research reports.

Figure 3
Kawasaki Syndrome
Incidence by Race/Ethnicity
LAC, 2006-2007



COMMENTS

There were no fatal cases in 2007. Additional studies on the etiology and pathogenesis of KS are needed to allow for improved diagnosis, treatment, and prevention. All confirmed cases were hospitalized from 1 to 9 days. ACDC uses documentation of admission, history and physical, discharge summary, and the result of the echocardiogram to determine KS cases.

Most patients with KS will recover completely, but about 1-2% die as a result of blood clots forming in the coronary arteries, or as a result of a heart attack, without proper treatment.

PREVENTION

There are no known measures that will prevent KS. However, early treatment with intravenous immunoglobulin (IVIG) and aspirin has been found to decrease the incidence of sequelae, the most serious of which is coronary artery aneurysm.

REFERENCES

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Taubert, K.A. and Shulman, S.T. (1999). Kawasaki disease. *American Family Physician*, 59(11), 3093-3102, 3107-3108.

ADDITIONAL RESOURCE

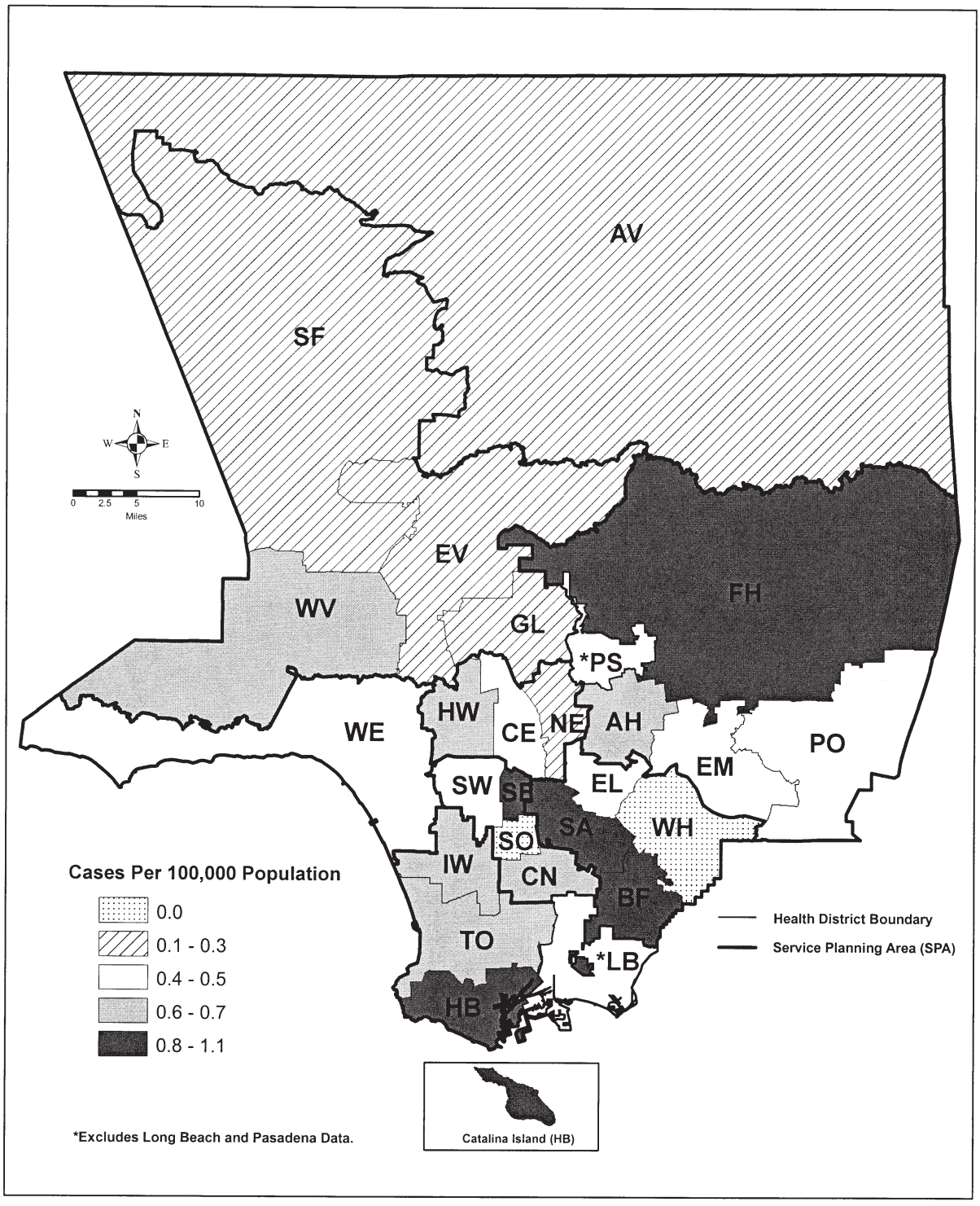
Baragona, S. (2006). *New study finds no link between Kawasaki disease and newly discovered coronavirus*. Retrieved September 18, 2008 from EurekAlert Web site: http://www.eurekalert.org/pub_releases/2006-11/idso-nsf112006.php

Burns, J.C. (2007). The riddle of Kawasaki disease. *New England Journal of Medicine*, 356(7), 659-661.

McCrindle, B.W., Li, J.S., Minich, L., Colan, S.D., Atz, A.M., Takahashi, M., et al. (2007). Coronary artery involvement in children with Kawasaki disease. *Circulation*, 116,174-179. Retrieved from American Heart Association Web site: http://circ.ahajournals.org/cgi/content/abstract/116/2/174?etoc

Pinna, G.P., Kafetzis, D.A., Orestis, I.T., & Skevaki, C.L. (2008). Kawasaki disease: an overview. *Current Opinion in Infectious Diseases*, 21, 263-270.

Map 9. Kawasaki Syndrome
Rates by Health District, Los Angeles County, 2007*



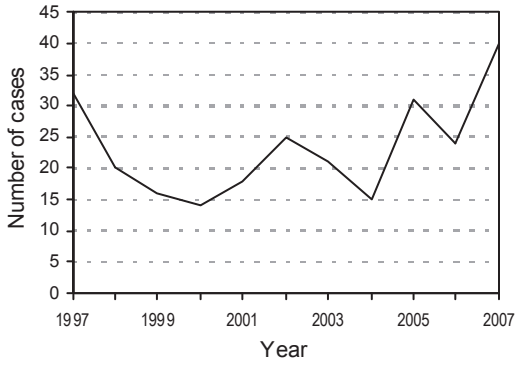
LEGIONELLOSIS

CRUDE DATA	
Number of Cases	40
Annual Incidence[b]	
LA County	0.41
California	0.29[a]
United States	0.91[a]
Age at Diagnosis	
Mean	61.7
Median	60
Range	33–93 years

[a] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issue of MMWR (57; 901, 903-913).

[b] Cases per 100,000 population.

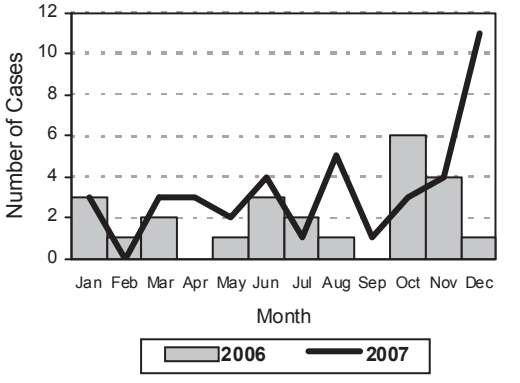
Figure 1
Legionellosis
Cases by Year of Onset
LAC, 1997–2007



DESCRIPTION

Legionellosis is a bacterial infection with two distinct clinical forms: 1) Legionnaires' disease (LD), the more severe form characterized by pneumonia, and 2) Pontiac fever, an acute-onset, self-limited flu-like illness without pneumonia. Legionella bacteria are common inhabitants of aquatic systems that thrive in warm environments. Ninety percent of cases of LD are caused by *Legionella pneumophila serogroup 1,* although at least 46 Legionella species and 70 serogroups have been identified. Transmission occurs through inhalation of aerosols containing the bacteria and by aspiration of contaminated water. Person-to-person transmission has not been demonstrated. The case fatality rate for LD ranges from 10%–15%, but can be higher in outbreaks occurring in a hospital setting. People of any age may get LD, but the disease most often affects middle-aged and older persons, particularly those who are heavy smokers, have chronic lung disease, or whose immune systems are suppressed by illness or medication.

Figure 2
Legionellosis
Cases by Month of Onset
LAC, 2006–2007



DISEASE ABSTRACT

- The incidence of legionellosis in LAC is increasing.
- Three unrelated nosocomial cases (1 definite and 2 possible) were reported in 2007.
- No cases of Pontiac fever were reported in 2007.

STRATIFIED DATA

Trends: A total of 40 reported cases met the CDC surveillance case definition for LD in 2007. This is higher than the peak incidence of 32 cases reported in 2005 and likewise in 1997, in which a community outbreak occurred (Figure 1).

Seasonality: Previous years consistently showed an increase in cases during summer and fall. In 2007, data showed a peak in December.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 61.7 years, the median age was 60 years, and the age range was 33-93 years.

Fatality: In 2007, the fatality rate increased to 12.5% (5/40) compared to 4% (1/24) in 2006. The average age of expired cases was 73.6 years (range 67-89).

Gender: There were 67.5% (n=27) male cases and 32.5% (n=13) female cases.

Race: More than half of cases 55% (n=22) occurred in whites, which is similar to the previous year. The next highest most reported race group were Hispanics 30% (n= 12), followed by blacks 15% (n=6).

Ethnicity: The majority of cases reported were among non-Hispanics 70% (n=28), as compared to Hispanics 30% (n= 12).

COMMENTS

A confirmed case of Legionella has a compatible clinical history of pneumonia and meets at least one of the following laboratory criteria:

- by culture: isolation of any Legionella organism from respiratory secretions, lung tissue, pleural fluid or other sterile fluid
- by detection of Legionella pneumophila serogroup 1 antigen in urine using validated reagents
- by seroconversion: fourfold or greater rise in specific serum antibody titer to Legionella pneumophila serogroup 1 using validated reagents

A definite nosocomial case occurs if a patient is hospitalized continuously for ≥ 10 days and a possibly nosocomial case occurs if a patient is hospitalized 2-9 days before onset of legionella infection. A confirmed travel-associated case meets at least one of the confirmatory laboratory criteria and a history of spending at least one night away from home, or travel to destinations outside their state residence or abroad, in the ten days before onset of illness.

In 2007, there were 40 reported cases, as compared to 24 cases in 2006, a 66% higher.There were two changes that may have been contributory to this increase, thereby increasing the number of laboratory reported cases in the winter months.

- In the fall of 2007, laboratories began reporting Legionella after a change in the California State reporting requirements
- In the winter months there was an increase in the number of Electronic Laboratory Reporting (ELR) system reporting laboratories.

In 2007, 82.5% (n=33) LD cases were diagnosed by Legionella urinary antigen, 10% (n=4) by bronchochoalveolar lavage (BAL)/sputum culture, 5% (n=2) by direct fluorescent antibody (DFA) staining, and 2.5% (n=1) by polymerase chain reaction (PCR). No LD cases were diagnosed by serologic antibody titers. The Legionella urinary antigen was the most frequently used method to diagnose LD due to the ease of its use and specificity. This test also facilitates diagnosis, thus, is useful for prompt initiation of treatment by clinicians. However, this test will only screen for Legionella pneumophila serogroup 1, thus it is recommended that a culture is performed to detect infection and improve legionellosis diagnosis. LAC

encourages all providers who suspect a case of nosocomial legionella to include culture for diagnosis so further testing of the isolate may be performed. Serological testing is not commonly used due to its low sensitivity and undetermined reliability and must be paired to fit the CDC definition of Legionellosis. This diagnostic method offers minimal impact to patients for their therapeutic management because seroconversion occurs during the latter course of the infection.

One definite nosocomial LD and two possible nosocomial LD cases were reported in LAC in 2007 by three different medical facilities. Each medical facility conducted eight weeks of prospective active surveillance and six months of retrospective review to detect other possible cases. No additional LD cases were found in either situation.

Outbreaks of LD continue to occur; thus, worldwide surveillance is in full force. The automated Centers for Disease Control and Prevention system that facilitates reporting was utilized in LAC to report six travel related cases this year. These cases were not found to be related to any outbreak.

A common trend towards empirical treatment of community acquired pneumonia upon clinical presentation without diagnostic testing of Legionella can lead to misdiagnosis and could delay appropriate treatment regimens. Most clinicians may understand how to treat Legionnaires disease findings have shown that 80% (n=31) meet the case definition, but do not list legionella as the final diagnosis. Of note, 23% (n=24) out of the 103 licensed acute care facilities in Los Angeles County reported cases and it is not known why one facility may report more frequently than others. Although cases reported is higher this year due to the implementation of automatic laboratory reporting, the speculation of underreporting, which may indicate poor understanding of the disease, still exists in the medical community. For surveillance to be more effective and to help identify future trends of the disease and possible changing epidemiology, clinicians should consider LD as a differential diagnosis in patients who present with atypical or nosocomial pneumonia.

PREVENTION

At the community level, there is very little that can be done to prevent sporadic cases of LD. While prevention of LD is impractical at the community level, much has been written about preventive measures in hospitals. Instituting a routine, periodic culturing of the water system, cleaning contaminated water sources such as cooling towers, water pipes. Application of biocides to limit the growth of organism, maintaining hot water system temperatures at 50 degrees centigrade or higher may reduce the risk of transmission. Using tap water in respiratory devices and procedures should be avoided as well. Surveillance of LD is vital in order to monitor disease incidence and to recognize outbreaks. Prevention of additional cases during outbreaks by early recognition and investigation is of high priority; in order for the control measures may be applied in a timely fashion.

ADDITIONAL RESOURCES

Guidelines:

Centers for Disease Control and Prevention (2003). Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *Morbidity and Mortality Weekly Report*, 52(RR10), 1-42. Retrieved September 17, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm

Centers for Disease Control and Prevention (2004). Guidelines for preventing health-care associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Practices Advisory Committee. *Morbidity and Mortality Weekly Report*, 53(RR3), 1-36. Retrieved September 17, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm

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Squier, C.L., Stout, J.E., & Krsytofiak, S. (2005). A proactive approach to prevention of health care-acquired Legionnaires' disease: the Allegheny County (Pittsburg) experience. *American Journal of Infection Control*, 33(6), 360-367.

State of Maryland, Department of Health and Mental Hygiene (June 2000). *Report of the Maryland scientific working group to study legionella in water systems in healthcare institutions.* Retrieved September 17, 2008, from the Department of Health and Mental Hygiene Web Site: http://www.dhmh.state.md.us/html/legionella.htm

Reviews:

Sabria, M. & Yu, V.L. (2002). Hospital-acquired legionellosis: solutions for a preventable infection. *Lancet Infectious Diseases*, 2(6), 368-373.

Stout, J.E., Yu, V.L. (2003). Hospital-acquired Legionnaires' disease: new developments. *Current Opinion in Infectious Diseases*, 16(4), 337-341.

Selected Articles:

Benin, A.L., Benson, R.F. & Besser, R.E. (2002). Trends in Legionnaires' disease, 1980- 1998: declining mortality and new patterns of diagnosis. *Clinical Infectious Diseases*, 35(9), 1039-1046.

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Fields, B.S., Benson, R.F. & Besser, R.E. (2002). Legionella and Legionnaires' disease: 25 years of investigation. *Clinical Microbiology Reviews*, 15(3), 506-526.

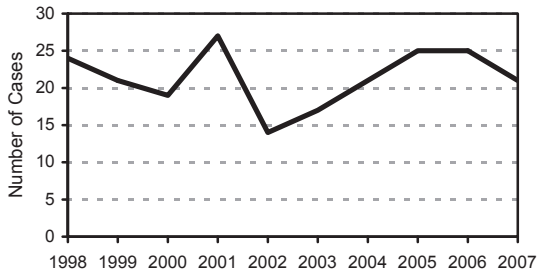
Franzin, L., Scolfaro, C., Cabodi, D., Valera, M. & Tovo, P.A. (2001). *Legionella pneumophila* pneumonia in a newborn after water birth: a new mode of transmission. *Clinical Infectious Diseases*, 33(9), e103-104.

LISTERIOSIS, NONPERINATAL

CRUDE DATA	
Number of Cases	21
Annual Incidence[a]	
LA County	0.22
United States	N/A
Age at Diagnosis	
Mean	66.43
Median	62
Range	47-95 years

[a] Cases per 100,000 population.

Figure 1
Nonperinatal Listeriosis
Cases by Year of Onset
LAC, 1998–2007



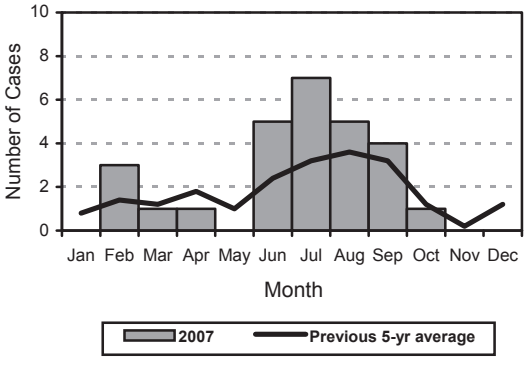
DESCRIPTION

Listeriosis is a disease transmitted primarily through consumption of food contaminated with *Listeria monocytogenes,* a Gram-positive bacterium. *L. monocytogenes* is found in soil and water, and can contaminate raw foods (e.g., uncooked meats and vegetables), as well as processed foods that become contaminated after processing (e.g., soft cheeses and cold cuts). Unpasteurized (raw) milk and foods made from unpasteurized milk may also contain the bacterium. Common symptoms of listeriosis include fever, muscle aches, headache, nausea, diarrhea, and neck stiffness. A case of nonperinatal listeriosis is one that occurs in persons other than pregnant women and/or their fetuses, neonates, or infants up to 42 days after birth. Historically, nonperinatal listeriosis presents as meningoencephalitis and/or septicemia, primarily affecting elderly and immunocompromised persons, such as those with cancer or HIV, and those on immunosuppressive therapy.

DISEASE ABSTRACT

- In 2007, 21 nonperinatal listeriosis cases were reported, slightly lower than the previous year (2006, n=25) (Figure 1).
- There were ten case fatalities in 2007 (47.6%), a noticeable increase from 2006 (n=2, 8%). As in years past, these fatalities were more likely due to severe underlying disease (i.e., cancer, liver disease) and advanced age.
- There were no clusters of nonperinatal listeriosis identified through PulseNet during 2007. Additionally, there were no confirmed foodborne listeriosis outbreaks during this year.

Figure 2
Nonperinatal Listeriosis
Cases by Month of Onset
LAC, 2007



STRATIFIED DATA

Trends: Since 2005 (N=25), the number of nonperinatal listeriosis cases has remained about the same (Figure 1).

Seasonality: Listeriosis typically follows a seasonal trend with most cases occurring during the summer months. This year's trend was similar to years past with the highest incidence of cases occurring in July (Figure 2).

Age: In 2007, 43% (n=9) of nonperinatal listeriosis cases were 65 years of age or older. The median age was 62 years. All of the cases in 2007 were over the age of 45 years.

Race/Ethnicity: In 2007, whites and Hispanics had the highest numbers of incident cases of nonperinatal listeriosis (n=7, 33%, and n=11, 52%, respectively) (Figure 4). In 2007, there was a slight increase in Hispanic cases.

Location: There was no significant clustering of cases by location.

Predisposing Conditions and Medical Risk Factors: In 2007, 43% (n=9) of the nonperinatal cases occurred in adults older than 65 years of age. In addition, 43% had cancer, 43% had kidney disease, 38% had diabetes, 38% had recent steroid use, and 29% had an autoimmune disorder. Seventeen (81%) of nonperinatal cases had two or more medical risk factors. One case had no known risk factors for listeriosis (Table 1).

High-risk Foods: For high-risk foods routinely investigated, 29% of the cases reported eating cold cuts or deli meats; 19% Mexican style cheese, 19% other cheese (non-Mexican-style cheese; non-soft cheese); 19% raw fruits and 19% raw vegetables (Table 2).

Figure 3
Nonperinatal Listeriosis Incidence by Age Group
LAC, 2007

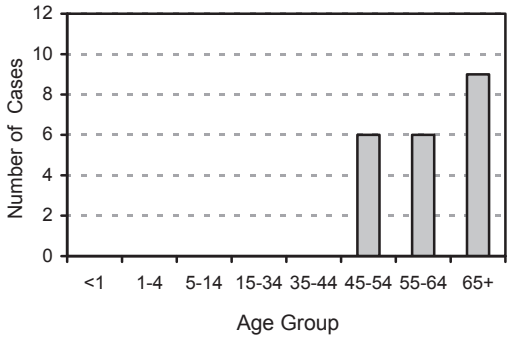
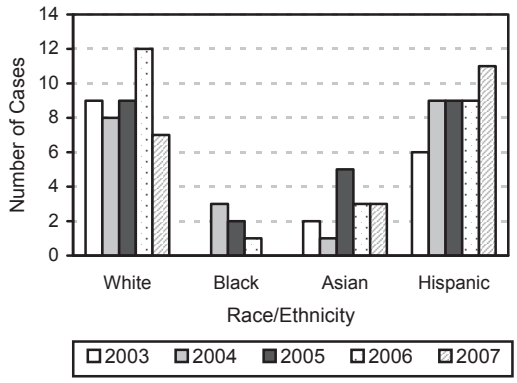


Figure 4
Nonperinatal Listeriosis Incidence by Race/Ethnicity
LAC, 2003-2007



Outcome: Ten (47.6%) of the 21 cases in 2007 died. These cases were severely immunocompromised with cancer and liver disease. Additionally, these ten cases had an average age of 68 years, significantly higher than the average for all nonperinatal cases.

Culture Sites: *L. monocytogenes* was isolated from blood only in 17 (81%) cases and CSF in four (19%) cases.

PFGE-Identified Clusters: All *L. monocytogenes* isolates are analyzed by pulsed field gel electrophoresis (PFGE). No cases matched a PulseNet pattern during 2007.

PREVENTION

In general, listeriosis may be prevented by thoroughly cooking raw food from animal sources, such as beef, pork, or poultry; washing raw fruits and vegetables thoroughly before eating; and keeping uncooked meats separate from raw produce and cooked foods. Avoiding unpasteurized milk or foods made from unpasteurized milk and washing hands, knives, and cutting boards after handling uncooked foods also may prevent listeriosis.

Table 1. Predisposing Factors in Cases of Nonperinatal Listeriosis—LAC, 2007

Medical Conditions	Number	Percent
Age >65 years	9	43
Cancer	9	43
Kidney Disease	9	43
Diabetes	8	38
Steroid Use	8	38
Autoimmune Disease	6	29
Gastrointestinal Disease	4	19
Liver Disease	4	19
Chemotherapy	3	14
Lung Disease	3	14
Antacid Use	2	10
Chronic Alcoholism	1	5
No Identified Risk Factors	1	5
Prior Antibiotic Use	1	5
Other Immunosuppressive Therapy	0	0
Radiation Therapy	0	0

Table 2. High-risk Foods among Cases of Nonperinatal Listeriosis—LAC, 2007

Risk foods	Number	Percent
Cold Cuts/Deli-Meats	6	29
Mexican Style Cheese	4	19
Other Cheese	4	19
Raw Fruit	4	19
Raw Vegetables	4	19
Soft Cheese	0	0

Persons at high risk for listeriosis include the elderly, those with cancer, HIV, diabetes, weakened immune systems, and those on immunosuppressive therapy. These individuals should follow additional recommendations: avoid soft cheeses such as feta, brie, camembert, blue-veined, and Mexican-style cheese. Hard cheeses, processed cheeses, cream cheese, cottage cheese, or yogurt need not be avoided all together; however, individuals with severely compromised immune systems and/or several disease risk factors should avoid them.

Leftover foods or ready-to-eat foods, such as hot dogs and deli meats, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, immunosuppressed persons should avoid these foods or thoroughly reheat cold cuts before eating.

ADDITIONAL RESOURCES

General listeriosis information – http://www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html

LAC General information and reporting information about this and other foodborne diseases – http://www.lapublichealth.org/acd/food.htm

PulseNet – http://www.cdc.gov/pulsenet/

LISTERIOSIS, PERINATAL

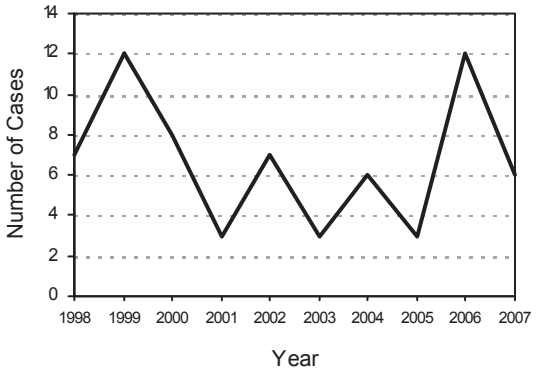
CRUDE DATA	
Number of Cases[a]	6
Annual Incidence[b]	
LA County	4.23[c]
United States	N/A
Age at Onset	
Maternal:	
Mean	26.83 years
Median	26 years
Range	17-39 years
Infant Gestational:	
Mean	32.67 weeks
Median	33.5 weeks
Range	25-38 weeks

[a] Cases are mother-infant pairs.

[b] Rates for perinatal listeriosis were calculated as cases per 100,000 live births.

[c] Rates based on less than 19 observations are unreliable.

Figure 1
Perinatal Listeriosis
Cases by Year of Onset
LAC, 1998–2007



DESCRIPTION

Perinatal listeriosis is a disease transmitted transplacentally from infected pregnant women; these women may experience only mild flu-like symptoms or may be asymptomatic. A perinatal listeriosis case is defined as a mother-infant pair in which one or both persons has a positive *Listeria monocytogenes* culture from a normally sterile site. Neonatal/infant listeriosis is often categorized into early onset (0-6 days after birth) and late onset (7-42 days after birth). Infection during pregnancy may lead to premature birth, stillbirth, or septicemia and/or meningitis in the neonate—even if the mother is asymptomatic. There is no vaccine to prevent listeriosis.

DISEASE ABSTRACT

- Perinatal listeriosis declined from 12 cases in 2006 to six cases in 2007 (Figure 1). The six cases were all single births.
- The six cases were born ill at varying lengths of gestation ranging from 25 to 38 weeks. There were no cases of fetal demise associated with listeriosis during 2007.

STRATIFIED DATA

Trends: Since 2002, the number of perinatal listeriosis has fluctuated, ranging from 3 to 12 cases. This year there was a noticeable decline in the number of cases from 12 in 2006 to six in 2007 (Figure 1).

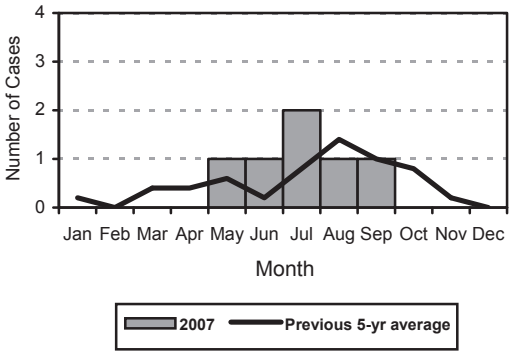
Seasonality: In 2007, the seasonality of perinatal listeriosis was slightly, though insignificantly, earlier than the average annual incidence of the previous five years. Perinatal listeriosis cases peaked in July during 2007 (Figure 2).

Age: During 2007, the average maternal age of perinatal cases at disease onset was slightly lower compared to those in 2006 although the overall five-year trend remains unchanged. The average gestational age of perinatal cases at disease onset was slightly higher than 2006.

Race/Ethnicity: In 2007, 83% (n=5) of the cases were Hispanic, which is noticeably higher than years past. There was a decrease in black cases from 3 cases in 2006 to 0 in 2007. The remaining case was white (n=1, 16.67%). However, due to small numbers of cases, it is difficult to draw conclusions from this information.

Type of Delivery: Four infants (67%) were delivered by caesarian section. The remaining two infants (33%) were delivered vaginally.

Figure 2
Perinatal Listeriosis
Cases by Month of Onset
LAC, 2007



Outcome: There were no maternal fatalities. All six infants were delivered sick at varying weeks of gestation ranging from 25-38 weeks. All of the infants recovered.

Culture Sites: Listeriosis was culture confirmed in one maternal and five neonatal isolates. Among culture-positive mothers, one (16.67%) mother had *L. monocytogenes* isolated from the placenta. Of the five neonatal isolates, all five had *L. monocytogenes* isolated from blood; one neonate had *L. monocytogenes* isolated from a wound culture as well.

Maternal Clinical Signs/Outcomes: In 2007, five mothers had fever (83%). Temperatures were recorded for five mothers with an average temperature of 101.4°F.

Onset: In 2007, six neonates/infants (100%) were categorized as early onset cases in which the disease onset is 0 to 6 days after birth.

High-risk Foods: Five cases (83%) reported eating at least one potentially high-risk food. Four ate Mexican-style cheese; the other risk foods included: soft cheeses (n=3), raw fruits (n=3), and cold cuts (n=3) (Table 1).

Risk factors: Three mothers (50%) had known predisposing medical risk factors other than pregnancy. Those factors included use of iron supplements and gestational diabetes.

PREVENTION

L. monocytogenes is found in soil and water. Animals can carry *Listeria* without appearing ill, which can result in contaminated foods of animal origin, such as meats and dairy products. In particular, studies have implicated unpasteurized milk or milk products; soft cheeses (Mexican-style, Brie, feta, blue-veined, Camembert); undercooked meat, such as beef, pork, poultry, and pâté; and cold cuts from deli counters. Pregnant women should avoid these foods. In particular, cheese sold by street vendors or obtained from relatives/friends in other countries, where food processing quality assurance is unknown, should be avoided by pregnant women. In addition, fruits and vegetables should be thoroughly washed. Uncooked

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2007

Risk foods	Number	Percent
Mexican-style Cheese	4	67
Cold Cuts/Deli Meats	3	50
Raw Fruit	3	50
Soft Cheese	3	50
Raw Vegetables	2	33
Other Cheese	1	16
Raw Milk	0	0
Yeast Products	0	0

meats should be stored separately from vegetables, cooked foods, and ready-to-eat foods. Hands, utensils, and cutting boards should be washed after handling uncooked foods. Leftover foods or ready-to-eat foods, such as hot dogs, should be cooked until steaming hot before eating. Finally, although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women may choose to avoid these foods or thoroughly reheat cold cuts before eating.

Prevention strategies for healthcare providers include education during prenatal checkups, outreach to Hispanic communities, and food safety notices at food and deli markets.

COMMENTS

All isolates of *L. monocytogenes* are typed by pulsed-field gel electrophoresis (PFGE), a technique to detect matching strains of various pathogenic agents. When matches between isolates from patients or foods are detected, an investigation may be initiated. In addition, a solitary case occurring locally can be linked by PFGE results to an outbreak occurring on a wider geographical scale. In 2007, there were two cases that matched locally; however, further investigation failed to identify the source of the infections. There were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner during 2007.

ADDITIONAL RESOURCES

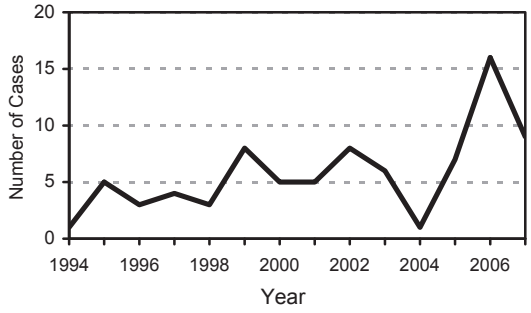
General disease information—http://www.cdc.gov/nczved/dfbmd/disease_listing/listeriosis_gi.html

General information and reporting information about this and other foodborne diseases in LAC—
http://www.lapublichealth.org/acd/food.htm

LYME DISEASE

CRUDE DATA	
Number of Cases	9
Annual Incidence[a]	
LA County	0.09[b]
California	0.20[c]
United States	8.24[c]
Age at Diagnosis	
Mean	35
Median	31
Range	11-76 years

Figure 1
Lyme Disease Cases
by Year of Onset
LAC, 1994–2007



[a] Cases per 100,000 population. Exposure may have occurred outside of indicated jurisdiction.

[b] Incidence rates based on counts less than 19 are unreliable.

[c] Rates taken from CDC Lyme Disease page (http://www.cdc.gov/ncidod/dvbid/lyme/index.htm).

DESCRIPTION

Lyme disease (LD) is caused by a bacterium, *Borrelia burgdorferi*, which is transmitted to humans by the bite of the western blacklegged tick (*Ixodes pacificus*). This disease is not common in Los Angeles County (LAC). From 1996 through 2005, the LAC incidence of LD was estimated at 0.05 per 100,000 persons—equivalent to one case for every 2 million residents per year. Most of these cases were acquired outside of LAC from known endemic regions in the United States (US); each year only 0 to 5 cases report possible tick exposure within LAC. Nevertheless, LD has been well documented to occur in counties throughout the state of California (CA) and has been a reportable disease in the state since 1989.

The reservoir is small rodents, with deer as a secondary reservoir. Ticks that feed from infected rodents or deer may then transmit the disease to humans, who are accidental hosts. The most common clinical presentation is a distinctive circular rash called erythema migrans (EM) that usually appears at the site of the bite within 3-32 days of a tick bite exposure. If untreated, patients may present with late stage symptoms such as aseptic meningitis, cranial neuritis, cardiac arrhythmias and arthritis of the large joints. Early disease is treated with a short course of oral antibiotics, while late symptom manifestations may require longer treatment with oral or intravenous antibiotics. Currently, there is no vaccine.

For purposes of surveillance, the Centers for Disease Control and Prevention (CDC) requires a confirmed case of LD to have documented EM diagnosed by a healthcare provider that is at least 5cm in diameter or at least one late manifestation of LD with supporting laboratory results. Laboratory criteria for case confirmation include the isolation of *B. burgdorferi* from a clinical specimen or demonstration of diagnostic IgM or IgG to *B. burgdorferi* in serum or cerebral spinal fluid. Currently available serological tests, however, are often not sensitive, specific or consistent; LD should primarily be diagnosed by a healthcare provider's consideration of the clinical presentation and history of tick exposure.

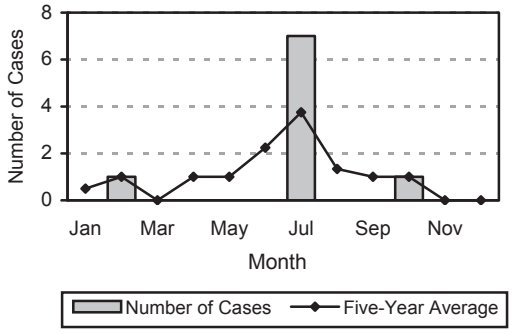
DISEASE ABSTRACT

- In 2007, the number of cases reported that met CDC surveillance criteria (n=9) dropped from an all-time high of 16 in 2006.
- The majority of cases (75%) reported exposure outside the county. The prevalence of probable LAC-acquired infection remains low and consistent with surveillance data from the previous 13 years.

Trends: In 2007, only 9 Lyme cases met the CDC case definition, resembling numbers reported in years past. In 2006, there was nearly a 129% increase in cases (n=16) from the previous year (Figure 1). The number of cases reported with a possible exposure within LAC (n=2) continues to be low (Figure 3). Since 1994, the number of cases with possible exposure within LAC has ranged from 0 to 5.

Seasonality: The peak number of cases occurred in July (n=7) (Figure 2). As seen in the five-year average, July is the most commonly reported month of onset. Ticks may be active at any time of the year but the highest risk of infection occurs from March through August. The seasonal peak may be a reflection of both tick activity and human outdoor activity.

Figure 2
Lyme Disease Cases
by Month of Onset
LAC, 2007



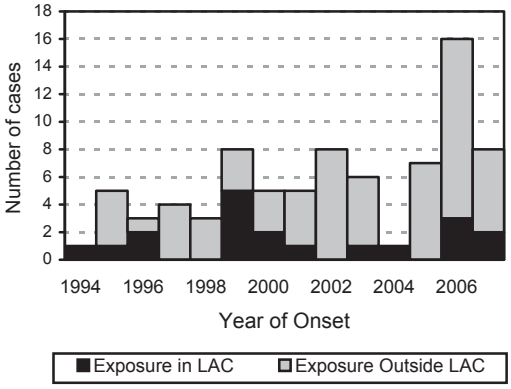
Age: The mean age of cases in 2007 was 35 (median = 31 years) with a range of 11-76 years old. Nationally, LD is most common among persons aged 5-19 years and 30 years and older.

Sex: The male to female ratio was 1:2. Nationally, LD occurs more frequently among males.

Race/Ethnicity: Of those cases in which race/ethnicity were known, most were white (n=4, 67%). There was one Hispanic (17%) and one Asian (17%). The remaining were unknown (n=3).

Location: LD does not commonly occur in ticks in LAC, most cases were likely exposed to infected ticks while outside of the county. However, two of eight cases with a known history (25%) reported no travel outside of LAC within three months of their onset of EM rash (Figure 3). These cases occurred among residents from SPAs 2 and 7.

Figure 3
Lyme Disease Cases
by Location of Exposure
LAC, 1994–2007



Disease Severity: Most cases (n=8, 89%) demonstrated EM. Rash sizes ranged from 5-14 cm, with a mean of 8.5 cm and median of 9.5 cm. Three cases (33%) also reported symptoms characteristic of late LD—one with swelling of joints, another with lymphocytic meningitis, and an additional with atrioventricular block.

Risk Factors: Only three cases of eight with a known history (38%) recalled a tick bite within three months of their onset. Six cases (75%) reported travel outside of LAC prior to their onset of symptoms (Figure 3). Of those, one (17%) recalled incurring the tick bite during their travels. All six traveled to parts of the eastern US, where LD is known to be highly endemic. Of the two that remained within LAC, one

hiked often in the Malibu canyon areas and the other camped in the Angeles National Forest; both recalled tick bites. One case could not be interviewed for epidemiological information.

COMMENTS

The number of suspected LD cases in LAC residents reported each year to LAC DPH by clinicians and laboratories has climbed from 20 to 30 in past years to over a hundred in 2007. The vast majority of these reports do not meet the CDC definition for a confirmed case because laboratory tests are often ordered for patients with vague symptoms not consistent with LD. Indeed, the number of cases eventually confirmed in LAC, with the exception of 2006, has ranged from none to nine cases a year.

Changes in reporting processes may have increased the number of suspected cases reported to LAC DPH in recent years. In 2005, Lyme disease became a laboratory reportable disease in California. As soon as March of that year, a commercial laboratory began reporting positive LD results to LAC through an automated electronic reporting system. A second commercial laboratory was added to the automated reporting system in February 2006. The magnitude at which laboratory and electronic reporting may have affected reporting and confirmation of LD in LAC is unknown and will require further study.

PREVENTION

Since GlaxoSmithKline Pharmaceuticals removed the LYMErix® vaccine off the market in February 2002, avoiding tick bite exposure is the primary means of preventing Lyme disease. The risk of acquiring infection with LD increases when the tick has attached to the body for at least 24 hours. Tips for preventing exposure from tick bites include checking the body regularly for prompt removal of attached ticks; wearing light-colored clothing so that ticks can be easily seen; wearing long pants and long-sleeved shirts and tucking pants into boots or socks, and tucking shirts into pants; using tick repellant and treating clothing with products containing permethrin; staying in the middle of trails when hiking to avoid contact with bushes and grasses where ticks are most common; and checking for and controlling ticks on pets.

RESOURCES

Centers for Disease Control and Prevention, general information—
http://www.cdc.gov/ncidod/dvbid/lyme/index.htm

Centers for Disease Control and Prevention, lyme disease statistics—
http://www.cdc.gov/ncidod/dvbid/lyme/ld_statistics.htm

Centers for Disease Control and Prevention (2007). Lyme disease—United States, 2003–2005. *Morbidity and Mortality Weekly Report*, 56(23), 573–576.

Shapiro, E.D. & Gerber, M.A. (2000). Lyme disease. *Clinical Infectious Diseases*, 31(2), 533-542.

Steere, A.C. (2001). Lyme disease. *New England Journal Medicine*, 345(2), 115–125.

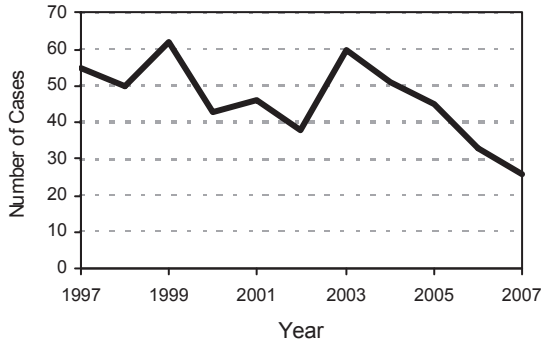
MALARIA

CRUDE DATA	
Number of Cases	26
Annual Incidence	
LA County	0.27
California	0.51[a]
United States	0.50[b]
Age at Onset	
Mean	37
Median	31
Age Range	14–63 years

[a] Calculated based on the number of cases reported in Malaria Surveillance - United States, 2006 issue of MMWR (57(SS05);24-39), and the state population estimate from the 2006 American Community Survey (www.census.gov).

[b] Malaria Surveillance - United States, 2006 issue of MMWR (57(SS05); 24-39),

Figure 1
Malaria
Cases by Year of Onset
LAC, 1997–2007



DESCRIPTION

Human malaria is an acute or subacute febrile illness caused by one or more protozoan parasites that infect humans: *Plasmodium vivax*, *P. falciparum, P. malariae,* and *P. ovale*. The disease is transmitted by the bite of an infected *Anopheles sp.* mosquito and is characterized by episodes of chills and fever every 2–3 days. *P. falciparum* is found primarily in tropical regions and poses the greatest risk of death because it invades red blood cells of all stages and is often drug-resistant. The more severe symptoms of *P. falciparum* include jaundice, shock, renal failure, and coma. For the purpose of surveillance, confirmation of malaria requires the demonstration of parasites in thick or thin blood smears, regardless of whether the person experienced previous episodes of malaria.

Before the 1950's malaria was endemic in the southeastern US. Now, it is usually acquired outside the continental US through travel and immigration and is rarely transmitted within the US. Although there is no recent documentation of malaria being transmitted locally, a particular mosquito, *A. hermsi*, exists here and is capable of transmitting the parasite. Malaria surveillance is maintained to detect locally acquired cases that could indicate the reintroduction of transmission and to monitor patterns of resistance to antimalarial drugs. The last occurrence of locally acquired malaria in California (CA) was in 1988–89, when thirty migrant workers were reported in San Diego with *P. vivax* infection. Since then, local transmission has not occurred in southern CA due to the inadequate number of people infected with the malaria parasite required to sustain disease transmission. Additionally, the mosquito capable of transmitting malaria is very rare.

DISEASE ABSTRACT

- The number of malaria cases in LAC has continued to decrease since its peak in 2003.
- The percentage of US residents who took some form of antimalarial chemoprophylaxis during travel to a malaria-endemic region has dropped to a low of 6%.

STRATIFIED DATA

Trends: In 2007, there were 26 reported cases compared to 33 reported the previous year — a 21% decrease. Over half of the cases (n=14, 54%) were infected with *P. falciparum* in 2007 (Figure 2), less than the proportion affected in 2006 (n=21, 64%).

Age: The median age of infection has decreased markedly from 40 years in 2006 to 31 years in 2007. The mean age was 37 years (range: 14–63 years). The largest number of cases (n=11, 42%) occurred in the 15–34 year age group (Figure 3). In 2006 the largest number occurred in the 45–54 year age group.

Sex: The ratio of male-to-female cases was three to one (2.25:1).

Race/Ethnicity: The majority of reported malaria cases occurred among blacks, which included African-Americans and African immigrants (n=11, 48%). Seven cases (30%) were reported among Asians and four (17%) among Hispanics. Only one case occurred in a white person. Three cases had unknown race and ethnicity. Since the early 1990s, blacks have had the highest proportion of reported malaria cases, with the exception of year 2003, where whites outnumbered blacks.

Disease Severity: There were no deaths from malarial infection in 2007. However, most (n=18, 75%) required hospitalization and several experienced severe complications, mainly with falciparum malaria, including two with renal failure and one with cerebral malaria. Two cases had unknown hospitalization status. The mean length of hospitalization for sixteen cases with known admission and discharge dates was 5.3 days and ranged from 1 to 28 days.

Figure 2
Malaria Cases by Species
LAC, 2007 (n=26)

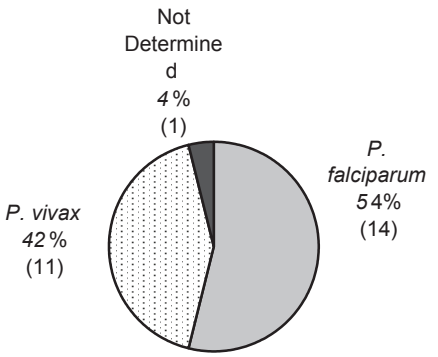
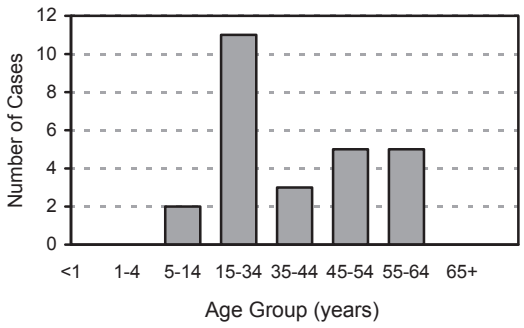


Figure 3
Malaria
Cases by Age Group
LAC, 2007 (n=26)



Transmission and Risk Factors: All twenty-three cases with known travel status reported recent travel to a foreign country. Africa remains the most common region visited (n=11, 48%). Reports of travel to Nigeria, usually the most frequently reported country by far, decreased from 16 in 2006 to 4 in 2007, the same number who travelled to India (Table 1). Among cases with a known reason for travel (n=16), the most commonly reported reason was visiting friends and relatives (n=9, 56%). Refugees and immigrants made up 13% (n=2) of cases with known travel reasons. Purpose of travel was reported for only 62% of cases.

Among the 18 cases with reported US residence and known prophylaxis usage, only one individual (6%) took prophylaxis (Table 2). This is the lowest rate of usage recorded in recent years. Information on antimalarial prophylaxis usage was available for 21 cases (81%), of which a total of three cases (14%) took some form of prophylaxis. None of those who took prophylaxis reported taking their medication correctly as prescribed (one unknown).

Table 1. Malaria Cases by Country of Acquisition and *Plasmodium* Species, 2007

Country of Acquisition	*P. falciparum*	*P. vivax*	Not Determined	Total
Africa	**10**	**0**	**1**	**11**
Congo	1	0	0	1
Ghana	0	0	1*	1
Liberia	1**	0	0	1
Nigeria	4	0	0	4
Sierra Leone	3	0	0	3
Uganda	1	0	0	1
Asia/Oceania	**1**	**6**	**0**	**7**
India	1	3	0	4
Pakistan	0	2	0	2
Papua New Guinea	0	1	0	1
Latin America	**1**	**4**	**0**	**5**
Dominican Republic	1	0	0	1
Guatemala	0	3	0	3
Peru	0	1	0	1
Unknown	**2**	**1**	**0**	**3**
Overall Total	**14**	**11**	**1**	**26**

* Case also traveled to Benin and Togo
** Case also traveled to Ghana

Table 2. Prophylaxis Use Among US Residents with Malaria, 2007

Reason for Travel	Total Cases (n)	Prophylaxis Use (n)	(%)
Pleasure	11	1	6
Work	2	0	0
Other/Unknown	5	0	0
Total	**18**	**1**	**6**

No cases reported a history of prior malaria infection within the past twelve months. No cases were reported as being acquired through blood transfusion or transplantation.

COMMENTS

The number of cases reported in recent years is far below the number of cases seen throughout the late 1970s through 1986 (an average of 133 malaria cases reported annually from 1979-1986). The reasons for the overall decrease in malaria cases are unknown but it can be partially attributed to a decrease of incoming refugees from malaria endemic countries. Prior to the 1990s, refugees and immigrants from Central America and Southeast Asia made up the majority of all malaria cases seen in LAC. In contrast in 2007, refugees and immigrants made up only 13%.

Information on travel and prophylaxis is obtained by interviewing patients. The data are limited by the patients' ability to recall this information. It is also limited by the small size of the case population, particularly when stratified by multiple variables.

PREVENTION

Prevention methods for malaria include avoiding mosquito bites or, once already infected, preventing the development of disease by using antimalarial drugs as prophylaxis. Travelers to countries where malaria is endemic should take precautions by taking the appropriate antimalarial prophylaxis as prescribed; using mosquito repellants, utilizing bednets, and wearing protective clothing as well as avoiding outdoor activities between dusk and dawn when mosquito activity is at its peak.

ADDITIONAL RESOURCES

Centers for Disease Control and Prevention. Available at: http://www.cdc.gov/malaria

Centers for Disease Control and Prevention (1990). Transmission of *Plasmodium vivax* malaria—San Diego County, California, 1988 and 1989. *Morbidity and Mortality Weekly Report*, 39(6), 91-94. Retrieved October 15, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/00001559.htm

Centers for Disease Control and Prevention (2006). Malaria surveillance—United States, 2004. *Morbidity and Mortality Weekly Report*, 55(SS04), 23-37. Retrieved October 15, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5504a2.htm?s_cid=ss5504a2_e

MEASLES

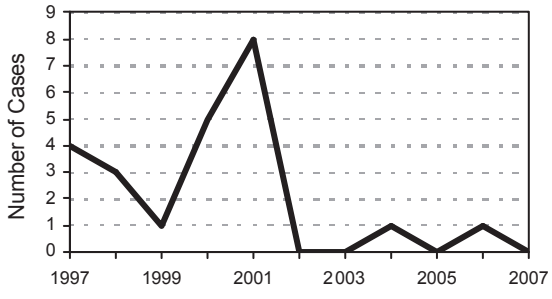
CRUDE DATA	
Number of Cases	0
Annual Incidence[a]	
LA County	0[b]
California	0.01[b,c]
United States	0.01[b]

[a] Cases per 100,000 population

[b] Rates based on less than 19 observations are unreliable.

[c] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

Figure 1
Measles
Reported Cases by Year of Onset
LAC, 1997-2007



DESCRIPTION

Measles is a vaccine-preventable disease caused by a paramyxovirus and is transmitted by contact with respiratory droplets or by airborne spread. Common signs and symptoms of measles include fever, cough, conjunctivitis, runny nose, photophobia, Koplik spots, and a generalized maculopapular rash. Severe complications are rare, but can include acute encephalitis and death from respiratory or neurologic complications. Immunocompromised individuals are more likely to develop complications. All persons who have not had the disease or who have not been successfully immunized are susceptible. The minimum clinical criteria for measles are fever of at least 101°F, a generalized rash lasting at least three days, and either cough, coryza, conjunctivitis, or photophobia. A case is confirmed by a positive IgM titer or a four-fold increase in acute and convalescent IgG titers.

DISEASE ABSTRACT

- From 81 measles suspect reports received at the LAC Immunization Program, there were no confirmed measles cases identified in LAC during 2007, marking the fourth time this has occurred in over 40 years.
- During 2007, 4 measles cases were reported in California.

IMMUNIZATION RECOMMENDATIONS

- Measles disease can be effectively prevented by Measles-Mumps-Rubella (MMR) or Measles-Mumps-Rubella-Varicella (MMRV) vaccine, given in accordance with recommendations from the CDC's Advisory Committee on Immunization Practices (ACIP).
- Usually, two doses of measles-containing vaccine are given via MMR or MMRV vaccine. The first dose is recommended at 12 months of age. The second dose can be given as early as four weeks after the first dose, but is usually given at ages 4 to 6 years.
- Vaccination is recommended for those born in 1957 or later who have no prior MMR vaccination, no serological evidence of measles immunity, or no documentation of physician-diagnosed measles. Proof of immunization with two MMR doses is recommended for health care workers and persons attending post-secondary educational institutions as well as others who work or live in high-risk settings.
- Over 95% of those who receive the current live attenuated measles vaccine develop immunity.
- Although the titer of vaccine-induced antibodies is lower than that following natural disease, both serologic and epidemiologic evidence indicate that vaccine-induced immunity appears to be long-term and probably life-long in most individuals.
- Women should not become pregnant within 4 weeks of vaccination.

- Individuals who are severely immunocompromised for any reason should not be given MMR or MMRV vaccine.
- All foreign travelers who are not immune to measles should be vaccinated, ideally 2 weeks prior to travel.
- Unvaccinated infants 6 months of age and older should be vaccinated if they are traveling outside of the US.

STRATIFIED DATA

Trends: Over the past 10 years, the number of confirmed measles cases has decreased significantly (Figure 1). Although absolute numbers are low, the number of reported measles cases started increasing in 1999. In 2002, 2003, 2005, and 2007 no confirmed cases of measles were identified in LAC, marking only four times this has occurred in more than 40 years. The single cases in 2004 and 2006 were imported cases, whose rash onsets occurred within 18 days of traveling outside of the US.

COMMENTS

In the year 2000, the CDC stated that measles was no longer endemic in the US. High vaccination coverage, a highly effective vaccine, and diligent public health surveillance activities have contributed to the limited number of measles cases nationwide. However, even a limited number of cases serve as a reminder that measles can and still does occur in the US. The risk of imported disease remains because the virus continues to circulate in other parts of the world, putting unvaccinated individuals at risk for measles infection. During 2007, large measles outbreaks were reported in Japan, Canada, the United Kingdom, and Switzerland. In May, another state's Department of Health identified a measles case that had traveled from another country to attend an event. The subsequent public health investigation identified 102 California residents that were possibly exposed to the case, 7 of whom were residents of LAC. All 7 LAC residents reported a history of vaccination or previous disease. None developed measles-like symptoms. In another 2007 situation, a different state's Department of Health identified a measles case in a child who had traveled on an international flight from another country and traveled to multiple cities in the US. Six cases of measles were linked to the index case through exposures during travel, in the airport, and during an event. Five of the seven cases had no documented measles vaccination. While no LAC measles cases were identified in association with any of the exposures in Japan, Canada, the United Kingdom, Switzerland, and the two states, the potential disease exposures serve as a reminder that we must continue to sustain high measles vaccine coverage levels. According to the most recent National Immunization Survey data, over 93% of children 19-35 months of age in LAC are vaccinated against measles.

Because LAC is in many ways a "gateway" to the US for travelers, it is important that an effective measles surveillance system be maintained in LAC. The public health department depends on healthcare providers and laboratories to identify measles cases and report them in a timely manner. Routinely reminding reporting facilities about the reporting requirements dictated by the California Code of Regulations, Title 17, Section 2500 is an activity that should continue to be implemented. In addition, healthcare providers can play an important role in preventing further transmission by promoting appropriate pre-travel vaccination and by being aware of travel history when evaluating symptomatic patients. The possibility of measles should also be considered in persons with exposure to travelers or exposure to measles in their community (e.g., in healthcare, school, daycare, or household settings). In addition, since measles is highly contagious it is essential that appropriate airborne infection control measures be followed stringently with all suspect measles cases.

CASE INVESTIGATION

The LAC Immunization Program immediately investigate all suspect measles cases that are reported in order to verify diagnosis, medical history information, immunization status, and past travel history. Physicians and suspect cases are contacted directly by phone to verify the diagnosis and determine if the minimum clinical criteria for measles classification have been met. If a measles report involves a school or a sensitive setting like a health care facility, a school nurse or a medical administrator is contacted to

assist in investigative efforts and to immediately implement isolation procedures necessary for preventing the spread of the disease. Susceptible contacts are identified and offered MMR vaccination to prevent natural measles occurrence. If vaccine is contraindicated, immune globulin (IG) may be given instead. IG is recommended for infants less than 6-months of age, pregnant women, and immunocompromised individuals.

Both clinical examination and laboratory tests are important in the diagnostic confirmation of the disease. Blood specimen collections are arranged for serological analysis by public health nurses or Immunization Program surveillance staff if physicians have not ordered them. The testing laboratory is contacted to obtain measles IgM and IgG antibody levels. Detection of both types of antibodies is important in disease testing. Measles IgM antibodies are detectable from 2-28 days after rash onset. The presence of IgG antibodies in the serum indicates prior exposure to measles, either by natural means or by immunization. In the absence of an IgM test, a four-fold rise in measles IgG antibody titers between an acute serum specimen and a convalescent specimen at 2 weeks later usually indicates current or recent measles infection.

In summary, the decline in the number of measles cases in LAC is attributable to the effectiveness of the MMR vaccine, diligent surveillance activities, and the success of the various outreach and educational programs implemented by the LAC Immunization Program and others to improve vaccination coverage rates in the county.

ADDITIONAL RESOURCES

Additional information about measles is available at:

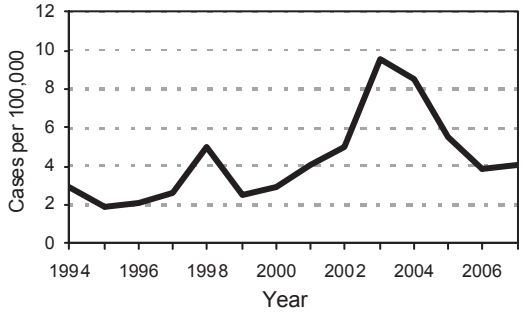
- National Center for Immunization and Respiratory Diseases – http://www.cdc.gov/vaccines
- Immunization Action Coalition – http://www.immunize.org
- LAC Immunization Program – http://www.lapublichealth.org/ip

MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	395
Annual Incidence[a]	
LA County	4.1
United States	N/A
Age at Onset	
Mean	27
Median	25
Range	0–84 years

[a] Cases per 100,000 population.

Figure 1
Viral Meningitis
Incidence Rates by Year of Onset
LAC, 1994–2007



DESCRIPTION

Viruses are the major cause of aseptic meningitis syndrome, a term used to define any meningitis (infectious or noninfectious), particularly one with a cerebrospinal fluid lymphocytic pleocytosis, for which a cause is not apparent after initial evaluation and routine stains and cultures do not support a bacterial or fungal etiology. Viral meningitis can occur at any age but is most common among the very young. Symptoms are characterized by sudden onset of fever, severe headache, stiff neck, photophobia, drowsiness or confusion, nausea and vomiting and usually last from 7 to 10 days.

Nonpolio enteroviruses, the most common cause of viral meningitis, are not vaccine-preventable and account for 85% to 95% of all cases in which a pathogen is identified. Estimates from the Centers for Disease Control and Prevention (CDC) indicate that 10 to 15 million symptomatic enteroviral infections occur annually in the United States, which includes 30,000 to 75,000 cases of meningitis. Transmission of enteroviruses may be by the fecal-oral, respiratory or other route specific to the etiologic agent.

Other viral agents that can cause viral meningitis include herpes simplex virus, varicella-zoster virus, mumps virus, lymphocytic choriomeningitis virus, human immunodeficiency virus, adenovirus, parainfluenza virus type 3, influenza virus, measles virus and arboviruses, such as West Nile virus (WNV). Since its arrival in Southern California in 2003, WNV has become an important cause of viral meningitis, especially during the summer and fall among adults; and the appropriate diagnostic tests should be obtained.

Treatment for most forms of viral meningitis is supportive; recovery is usually complete and associated with low mortality rates. Antiviral agents are available for treatment of viral meningitis due to several herpes viruses: herpes simplex virus-1 (HSV-1), HSV-2, and varicella-zoster virus. Supportive measures, and to a lesser extent antiviral agents, are the usual treatments for viral meningitis.

DISEASE ABSTRACT

- The incidence of viral meningitis has continued to be low compared to the peak in 2003 (Figure 1).
- WNV infection contributed to 4% of all reported cases of viral meningitis.
- Heightened surveillance conducted in late 2007 probably contributed to increased identification of viral meningitis cases caused by enterovirus as well as the overall number of cases.

Trends: In 2007, there were a total of 395 reported cases of viral meningitis, representing an annual incidence of 4.1 per 100,000. Though this is a small increase compared to the previous year when 373 cases were reported at an incidence of 3.9 cases per 100,000, this is a marked decrease from previous years when incidence was as high as 9.6 cases per 100,000 (2003) (Figure 1).

Seasonality: Enteroviruses demonstrate a seasonality in temperate climates that typically peaks in the late summer and early fall. WNV follows a similar pattern. The onset of viral meningitis cases in LAC usually follow this trend closely, as seen in the five-year average in Figure 2 where around a hundred cases are seen each month from July through September. This trend is also seen in 2007, peaking in August with 59 cases (Figure 2).

Figure 2
Viral Meningitis
Cases by Month of Onset
LAC, 2007

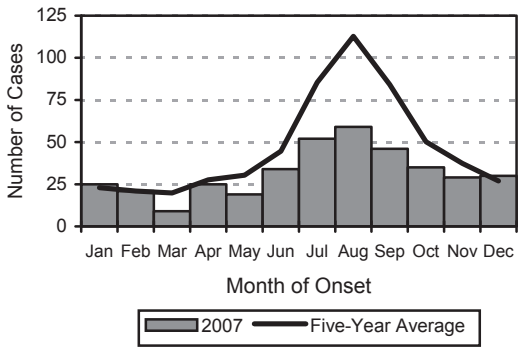


Figure 3
Viral Meningitis
Incidence Rates by Age Group
LAC, 2007 (N=395)

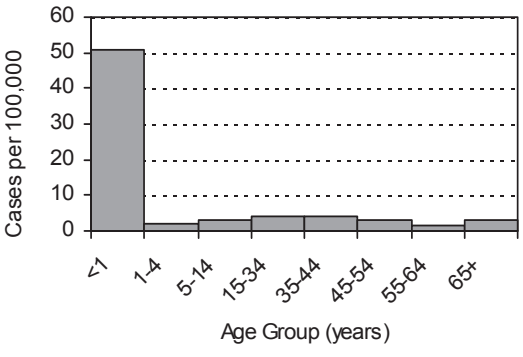
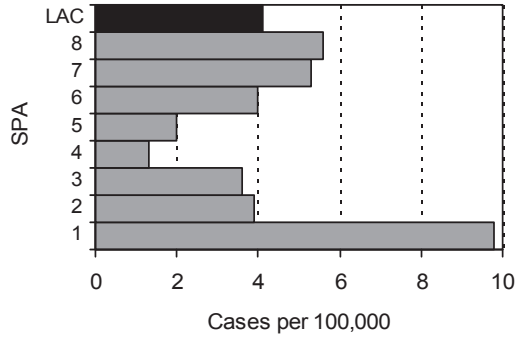


Figure 4
Viral Meningitis
Incidence Rates by SPA
LAC, 2007 (N=395)



Age: Infants less than 1 year old continued to have the highest age-group specific rate at 50.7 cases per 100,000 (Figure 3).

Sex: The male to female rate ratio of cases was 1:1.

Race/Ethnicity: The incidence rates across race and ethnicity groups ranged from 2.3 to 3.9 cases per 100,000, the lowest occurring in Asian/Pacific Islanders. The rates were similar among Hispanics, whites, and blacks (data not shown).

Location: The highest incidence of viral meningitis continued to occur in SPA 1 (9.8 per 100,000).

Clinical Presentation: The case fatality rate remained low; three deaths were reported in 2007 (less than one percent case fatality rate). Of the 70 cases in which an etiology was identified, 49 (70%) were caused by an enterovirus. More cases of WNV meningitis were reported (n=14, 20% among those with known etiologies) than in 2006. They accounted for 4% of all reported cases in 2007 but only 1% in 2006. The viral etiologies of 82% of cases in 2007 remain unknown.

COMMENTS

The highest incidence in LAC in 2007, as well as for previous years, occurred among children less than one and those with residence in SPA 1 (Antelope Valley). It is common for small children who are not yet toilet trained to transmit enteroviruses—the most frequently identified etiology of viral meningitis—to other children or to adults who change their diapers, as these viruses can be found in the stool of infected persons. Though SPA 1 has the smallest population (n=357,142) of all SPAs in LAC, it continually carries the highest rates of viral meningitis in LAC. Reasons for this trend are unknown.

In late 2007, an increased level of activity of coxsackie B1 virus, a type of enterovirus, was associated with severe neonatal disease and multiple deaths in LAC and other areas of the US. Though none of the deaths was associated with viral meningitis in LAC, this enterovirus can be associated with the syndrome as well as encephalitis, myelitis, and myopericarditis. It has an epidemic pattern of circulation, with increases usually lasting 2 to 3 years. As a result of the increase, LAC requested all hospitals in the county to report all enterovirus-positive cases of severe or fatal myocarditis, aseptic meningitis, or sepsis-like febrile illness that occurred among children during June through November 2007. Surveillance for viral meningitis is generally passive; this change in procedures may explain the slight rise in reported meningitis cases caused by enterovirus, as well as the overall number of viral meningitis cases for 2007. In 2006, only 4% of reported cases (n=15) had an etiology identified. Sixty percent of those cases (n=9) were caused by an enterovirus. This year, 18% (n=70) of reported cases had known etiologies and 70% (n=49) were enteroviruses. Active surveillance is being continued in 2008.

The emergence of WNV in LAC in 2003 and subsequent introduction of WNV surveillance have not markedly affected the trend in overall viral meningitis annual incidence rates. Since 2003, increased reporting of viral meningitis and testing for underlying WNV infection have been encouraged among health care providers and hospital infection control practitioners. However, the peak incidence of viral meningitis in LAC did not correspond with the peak incidence of WNV, which occurred in 2004. Further, WNV meningitis only contributed 10% of cases at its highest incidence in 2004 and has decreased considerably since then.

With passive surveillance, the number of cases reported annually is considered to be substantially lower than the actual burden of disease. Investigations are initiated only for outbreaks, not individual cases. Information about the causative agents of viral meningitis is rarely included with case reports because viral cultures and nucleic acid-based tests, such as PCR analysis of the cerebral spinal fluid, are not routinely performed at most medical facilities. Improvements in molecular testing capabilities should lead to faster diagnoses and more appropriate management of viral meningitis including less use of antibiotics plus fewer and shorter hospital admissions.

PREVENTION

Good personal hygiene, especially hand washing and avoiding contact with oral secretions of others, is the most practical and effective preventive measure.

ADDITIONAL RESOURCES

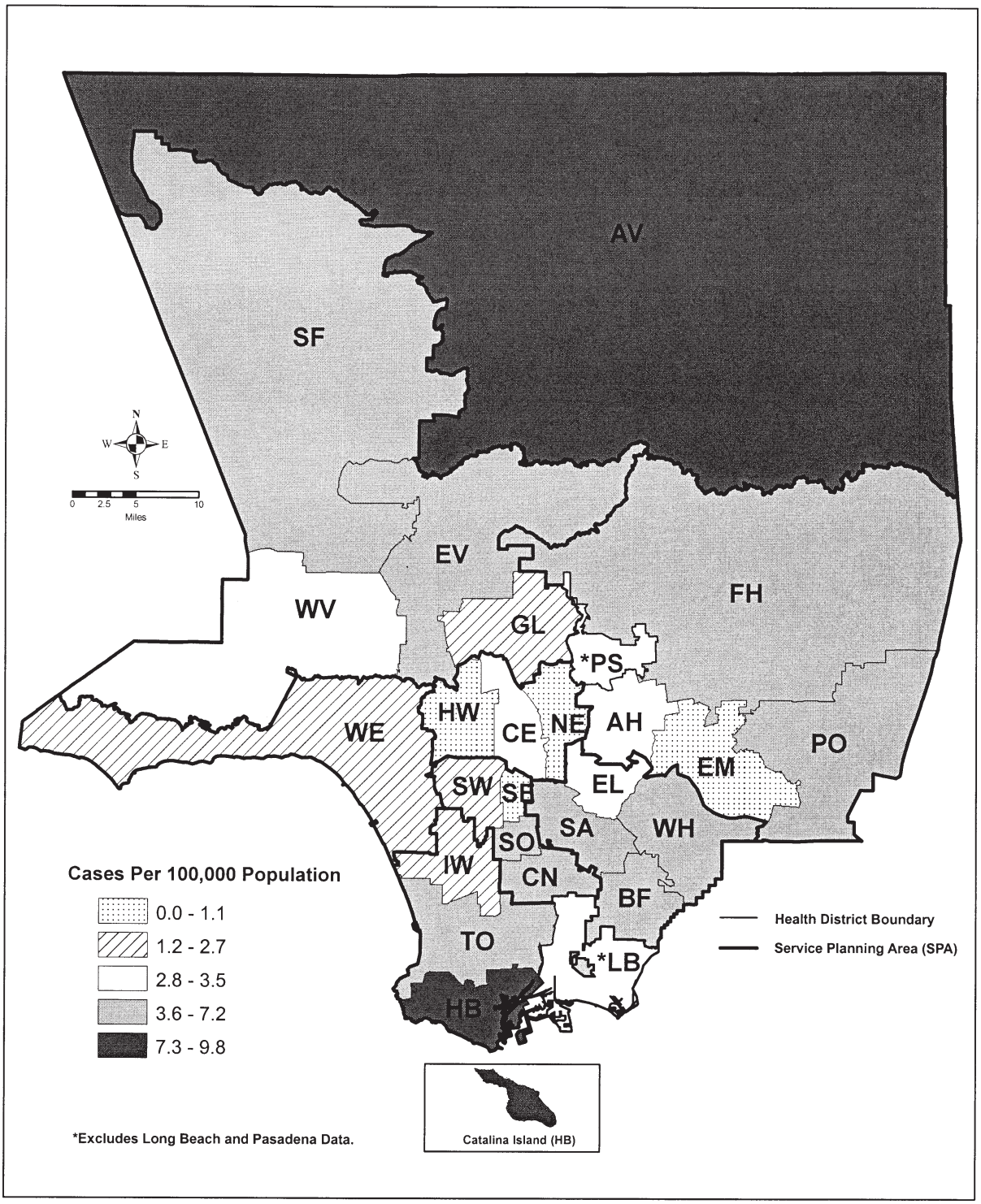
Centers for Disease Control and Prevention (2008). National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases, Viral (Aseptic) Meningitis at:
http://www.cdc.gov/meningitis/viral/viral-faqs.htm

Centers for Disease Control and Prevention (2008). National Center for Immunization and Respiratory Diseases, Division of Viral Diseases, Non-Polio Enterovirus Infections at:
http://www.cdc.gov/ncidod/dvrd/revb/enterovirus/non-polio_entero.htm

Centers for Disease Control and Prevention (2008). Increased detections and severe neonatal disease associated with coxsackievirus B1 infection—United States, 2007. *Morbidity and Mortality Weekly Report*, 57(20), 553-556. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5720a4.htm

Centers for Disease Control and Prevention (2003). Outbreaks of aseptic meningitis associated with echoviruses 9 and 30 and preliminary reports on enterovirus activity—United States, 2003. *Morbidity and Mortality Weekly Report*, 52(32), 761-764. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm

Map 10. Meningitis, Viral
Rates by Health District, Los Angeles County, 2007*



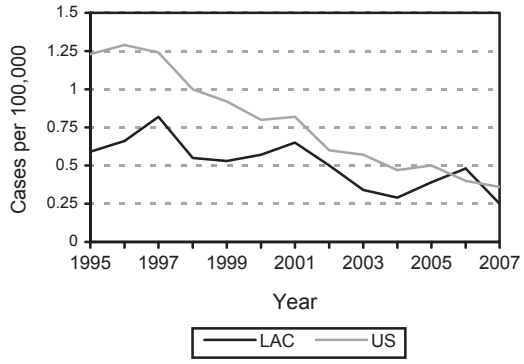
MENINGOCOCCAL DISEASE

CRUDE DATA	
Number of Cases	24
Annual Incidence[a]	
LA County	0.25
California	0.48[b]
United States	0.36[b]
Age at Diagnosis	
Mean	31
Median	28
Range	0–85 years

[a] Cases per 100,000 population.

[b] Calculation based on the MMWR 2007 Final Report of Nationally Notifiable Infectious Diseases and the 2007 estimate of populations at www.census.gov.

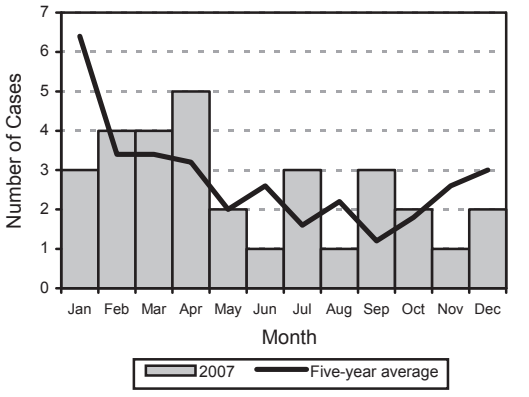
Figure 1
Meningococcal Disease
Incidence Rates by Year of Onset
LAC and US, 1995–2007



DESCRIPTION

Meningococcal disease occurs most often as meningitis, an infection of the cerebrospinal fluid (CSF) or meningococcemia, an infection of the bloodstream. It is transmitted through direct or droplet contact with nose or throat secretions of persons colonized in the upper respiratory tract with the *Neisseria meningitidis* bacterium. Common symptoms include sudden onset of fever, headache, nausea, vomiting, stiff neck, petichial rash, and lethargy which can progress to overwhelming sepsis, shock, and death within hours. Long-term sequelae include significant neurologic or orthopedic complications such as deafness or amputation secondary to disseminated intravascular coagulation and thromboses. Meningococcal disease affects all age groups but occurs most often in infants. Of the 12 serogroups, only A, C, Y, and W-135 are vaccine-preventable.

Figure 2
Meningococcal Disease
by Month of Onset
LAC, 2007 (N=24)



For the purpose of surveillance, Los Angeles County Department of Public Health (LAC DPH) defines a confirmed case invasive meningococcal disease when *N. meningitidis* has been isolated from a normally sterile site (e.g., blood or CSF). In the absence of a positive culture, reports are defined as probable in the setting of clinical symptoms consistent with invasive meningococcal disease and when there is evidence of the bacteria in a normally sterile site by gram staining, polymerase chain reaction (PCR) analysis, or CSF antigen test.

DISEASE ABSTRACT

- Confirmed invasive meningococcal disease cases decreased by 50% in 2007 compared to 2006 with 24 and 46 cases reported, respectively.
- Three deaths were documented in 2007 compared to 1 in 2006.
- There were 17 (71%) culture-confirmed cases: 5 (29%) from CSF, 9 (53%) from blood, and 3 from

both CSF and blood (18%). Twenty-one (88%) cases were serogrouped: 5 (24%) were identified as serogroup B, 8 (38%) serogroup C, 6 (29%) serogroup Y, 1 (5%) was W135, and 1 CSF isolate was untypeable.

- No outbreaks were documented in 2007.

STRATIFIED DATA

Trends: The incidence of invasive meningococcal disease decreased by nearly 50% to 0.25 per 100,000 population in 2007 (N=24) from 0.48 per 100,000 in 2006 (N=46) (Figure 1). Seventy-one percent (n=17) of the cases were culture-confirmed in 2007 compared to 83% (n=38) in 2006. The incidence rate has been slowly decreasing in LAC since 2003 and is below the national rate of 0.33 per 100,000 estimated for 2007. Despite the decrease in cases, more deaths were documented in 2007: three deaths (13%) compared to one in 2006 (2%).

Seasonality: Most cases were reported during winter and early spring (Figure 2). There were no cases reported in October and November.

Age: The age-specific incidence rates declined in all age groups with the exception of the 35-44 year old group. Infants <1 year decreased in 2007 (2.0 versus 2.8 per 100,000) compared to 2006. The rates among 15-34 years were also lower (0.2 versus 0.3 per 100,000). The rate among adults > 65 also decreased in 2007 (0.8 versus 0.2 per 100,000).

Sex: The male-to-female rate ratio was 1.1:1.

Race/Ethnicity: Invasive meningococcal cases were reported most frequently in Hispanics (n=11, 46%) followed by whites (n=9, 38%), blacks (n=3, 13%), and Asians (n=1, <1%). The incidence rates by race/ethnicity are unstable.

Location: Cases were reported from all eight Service Planning Areas (SPA). No significance noted.

COMMENTS

As a part of public health meningococcal disease surveillance, clinical laboratories are requested to send isolates of every culture-confirmed case to the LAC Public Health Laboratory (PHL) for serotyping**.** In 2007, 21 isolates were serogrouped: 16 (76%) were culture-confirmed and 4 (19%) isolates were serogrouped using whole blood or CSF PCR. The remaining cases (n=3, 14%) had positive CSF antigen tests or gram stains. Most isolates were serogroup C, 8 (38%), followed by serogroup Y (n=6, 29%), serogroup B (n=5, 24%), and 1 (5%) isolate was W135. A larger proportion of isolates were serogroup

Figure 3
Meningococcal Disease
Incidence Rates by Age Group
LAC, 2007

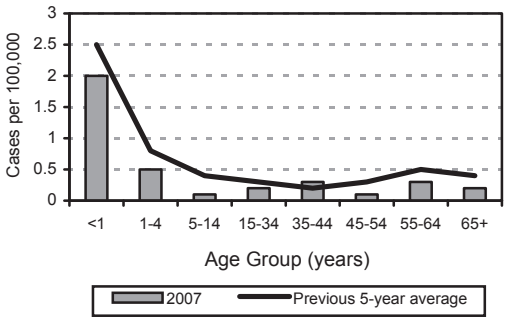


Figure 4
Meningococcal Disease
Incidence Rates by Race/Ethnicity
LAC, 2007

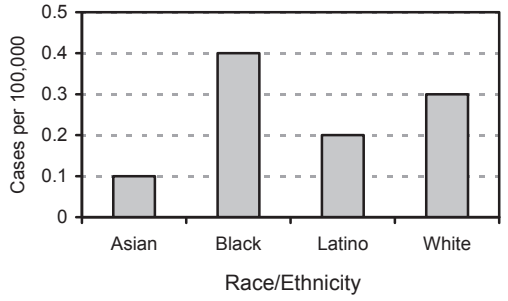
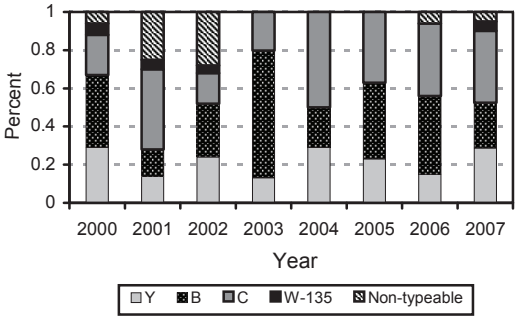


Figure 5
Meningococcal Disease
by Serogroup
LAC, 2000–2007



C compared to previous surveillance years (Figure 5). The mean and median ages of the vaccine preventable cases (n=15) were 33.4 and 21 years, respectively, and ranged from 0–85 years. Non-vaccine preventable serogroup B cases (n=5) had a mean age of 16, median age of 18, and range of 0–39. With greater widespread use of the MCV4 vaccine, the incidence of serogroups C, Y, and W-135 is expected to decline. However, due to the lack of universal vaccine protection against invasive meningococcal disease, clinicians must still maintain diagnostic clinical acumen.

LAC DPH and the California Department of Public Health have continued to conduct enhanced meningococcal disease surveillance with the goals of (1) monitoring the epidemiology changes of meningococcal disease; (2) assisting with identification and management of cases and outbreaks; (3) assessing vaccine effectiveness; (4) ascertaining the usefulness of PCR in culture negative cases, particularly in patients treated with antibiotics prior to culture; and (5) helping contribute to improvements in the overall diagnosis and management of invasive meningococcal disease.

PREVENTION

Antimicrobial chemoprophylaxis of close contacts of sporadic cases of meningococcal disease remains the primary means for prevention of meningococcal disease. Close contacts include: a) household members, b) daycare center contacts, and c) anyone directly exposed to the patient's oral secretions (e.g., through kissing, mouth-to-mouth resuscitation, endotracheal intubation, or endotracheal tube management). Because the rate of secondary disease for close contacts is highest during the first few days after onset of disease in the primary patient, antimicrobial chemoprophylaxis should be administered as soon as possible (ideally within 24 hours after the case is identified). Conversely, chemoprophylaxis administered greater than 14 days after onset of illness in the index case-patient is probably of limited or no value. Prophylactic treatment and follow-up of close contacts are routinely handled by the LAC DPH, Community Health Services.

In 2004, a new quadrivalent meningococcal conjugate (MCV4), Menactra®, was approved for use in the U.S. This vaccine protects against serogroups A, C, Y, and W-135, the same serogroups as MPSV4, but provides longer lasting immunity. MCV4 is recommended for use in persons aged 11 to 55 years, although the use of MPSV4 is acceptable when MCV4 is not available. Generally, only a single dose of either vaccine is recommended. As of 2006, MCV4 is part of the childhood vaccination schedule and recommended for all children between ages 11-12 years. Additionally, unvaccinated college freshman who live in dormitories are at higher risk for meningococcal disease and should be vaccinated with MCV4.

ADDITIONAL RESOURCES

Centers for Disease Control and Prevention (2007). Active Bacterial Core Surveillance Report, Emerging Infections Program Network, *Neisseria meningitidis*, 2007-*Provisional*. Retrieved December 15, 2008, from the CDC Web site: http://www.cdc.gov/ncidod/dbmd/abcs/survreports/MEN_2007_provisional.pdf

Centers for Disease Control and Prevention (2005). Prevention and control of meningococcal disease. Recommendations of the Advisory Committee on Immunization Practices. *Morbidity and Mortality Weekly Report*, 54(RR07), 1-21. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/PDF/rr/rr5407.pdf

Centers for Disease Control and Prevention (2007). Recommended immunization schedules for persons aged 0-18 years—United States, 2007. *Morbidity and Mortality Weekly Report*, 55(51), Q1-4. Retrieved October 29, 2008, from the CDC Web site: http://www.cdc.gov/mmwr/PDF/wk/mm5551-Immunization.pdf

Raghunathan, P.L., Bernhardt, S.A., & Rosenstein, N.E. (2004). Opportunities for control of meningococcal disease in the United States. *Annual Review of Medicine*, 55, 333-353.

MUMPS

CRUDE DATA	
Number of Cases	5
Annual Incidence[a]	
LA County	0.05[b]
California	0.12[c]
United States	0.27[c]
Age at Diagnosis	
Mean	35.2 years
Median	44.0 years
Range	6.0–53.0 years

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

Figure 1
Mumps
Incidence Rates by Year of Onset
LAC and US, 1997-2007

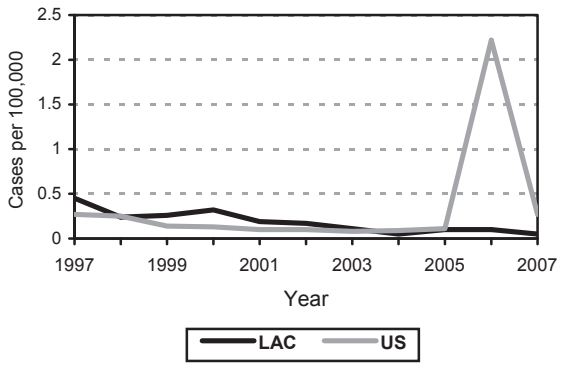
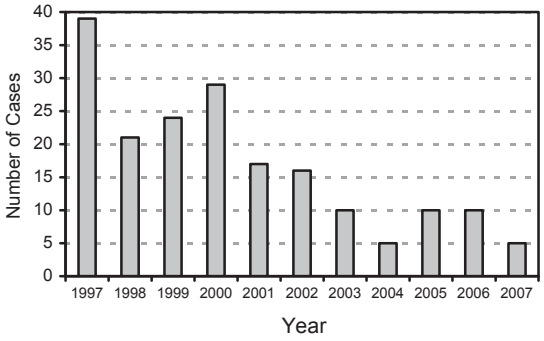


Figure 2
Mumps
Cases by Year of Onset
LAC, 1997-2007



DESCRIPTION

Mumps is a vaccine-preventable disease caused by an RNA paramyxovirus that is transmitted by direct contact with respiratory droplets from infected persons. Symptoms begin 14–18 days after exposure, with a range of 12–25 days, and include swelling of salivary glands, fever, and inflammation of the testes in teenage and adult males. Up to 20% of infected individuals may be asymptomatic. Sequelae include encephalitis, meningitis, orchitis, arthritis, and deafness. In addition, pregnant women who contract mumps are at increased risk of spontaneous abortions. Most reported cases are diagnosed based on clinical symptoms and do not have supporting laboratory confirmation (i.e., positive IgM titer, significant increase between acute and convalescent IgG titers, or culture confirmation). The minimum clinical criteria for mumps is an acute onset of unilateral or bilateral swelling of the parotid or other salivary gland lasting $\geq$2 days without other apparent cause. Although single probable or confirmed cases are reportable, only outbreaks of two or more cases are investigated.

DISEASE ABSTRACT

- Compared to 2006, there was a 41.7% decrease in the number of suspect mumps reports.
- Of 60 suspect mumps reports received at the LAC Immunization Program during 2007, only five were identified as confirmed mumps cases.

Table 1. Mumps Cases by Case Classification, 2007 vs. 2006

	Confirmed		Probable	
	2007	2006	2007	2006
Number of Cases	5	10	13	63
Age at Onset				
Mean	35.2	31.5	19.9	16.0
Median	44.0	32.0	10.5	9.0
Range	6.0 – 53.0	3.0 – 56.0	3.0 – 64.0	1.0 – 55.0

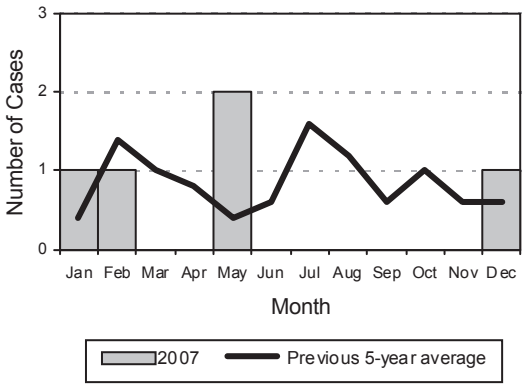
IMMUNIZATION RECOMMENDATIONS

- Mumps disease can be prevented by Measles-Mumps-Rubella (MMR) or Measles-Mumps-Rubella-Varicella (MMRV) vaccine, given in accordance with recommendations from the CDC's Advisory Committee on Immunization Practices (ACIP).
- Usually, two doses of mumps-containing vaccine are given via MMR or MMRV vaccine. The first dose is recommended at 12 months of age. The second dose can be given as early as four weeks after the first dose, but is usually given at ages 4 to 6 years.
- Vaccination is recommended for those born in 1957 or later who have no prior MMR vaccination, no serological evidence of mumps immunity, or no documentation of physician-diagnosed mumps. Proof of immunization with two MMR doses is recommended for health care workers and persons attending post secondary educational institutions as well as others who work or live in high-risk settings.
- Approximately 90% of those who receive two doses of the current live attenuated mumps vaccine develop immunity.
- Women should not become pregnant within 4 weeks of vaccination.
- Individuals who are severely immunocompromised for any reason should not be given MMR or MMRV vaccine.
- All foreign travelers who are not immune to measles should be vaccinated, ideally 2 weeks prior to travel.
- Unvaccinated infants 6 months of age and older should be vaccinated if they are traveling out of the country.

STRATIFIED DATA

Trends: Since 1997, the annual number of LAC mumps cases has decreased by 87% (Figure 2). This decline reflects the effectiveness of the MMR vaccine in reducing the incidence of disease in the general population. Although the greater media attention and general public awareness related to the 2006 multi-state mumps outbreak resulted in a large number of suspect case reports (n=103) in 2006, only 10% (n=10) were confirmed cases and 61% (n=63) were probable cases. In 2007, there was a decrease in the number of suspect case reports (n=60). Among the 60 suspect cases, 8% (n=5) were identified as confirmed and 30% (n=18) as probable cases. However, since 2006 it should be noted that vaccination history and negative laboratory results have been considered irrelevant by the California Department of Health Services based upon studies conducted by the CDC during the Midwest outbreak. Thus, a large number of the probable cases in 2006-2007 would have been

Figure 3
Mumps
Cases by Month of Onset
LAC, 2007



classified as false prior to 2006 because they had documentation of 2 doses of MMR vaccine and/or negative laboratory results.

Seasonality: Historically, mumps incidence peaks during the winter and summer seasons. However, suspect mumps cases are reported throughout the year (Figure 3).

Age: Similar to previous years, 80% (n=4) of all confirmed cases in 2007 were in persons over the age of 15 (Figure 4). Children and young adults are more likely to have been fully immunized. Table 1 indicates that probable cases in the last couple years were on average younger than the confirmed cases.

Sex: The male-to-female ratio of the confirmed cases was 1.5:1.

Race/Ethnicity: Three of the confirmed cases were Asian and two were Hispanic.

Location: Confirmed cases were reported in SPA 1, 2, 3, 6, and 7 (Figure 5). None of the cases was epidemiologically linked to another 2007 case, but the case in SPA 2 was epidemiologically linked to a 2006 case with onset in December.

Figure 4
Mumps
Cases by Age Group
LAC, 2007

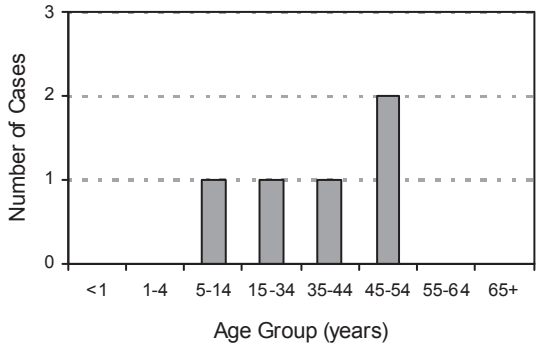
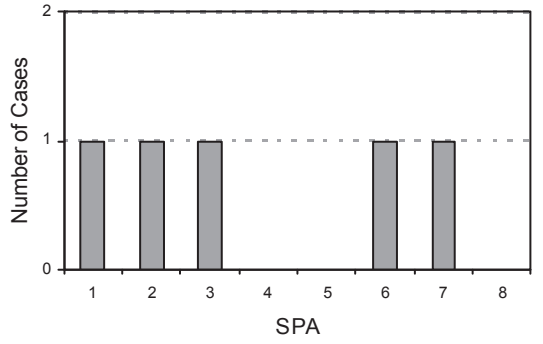


Figure 5
Mumps
Cases by Service Planning Area
LAC, 2007



COMMENTS

The 2006 multi-state mumps outbreak, which resulted in more than 6,000 reported mumps cases, had a profound impact on mumps surveillance nationwide. Vaccine efficacy was reevaluated, the case definition was slightly revised, and laboratory test guidelines were changed. Changes in case classifications also resulted in a large number of suspect cases that would have been classified as false prior to 2006 being classified as probable after 2006. Greater media attention and general public awareness also significantly increased the number of mumps reports.

During 2007, mumps outbreaks were also reported internationally. The state of Maine reported at least seven confirmed mumps cases, prompting some universities to exclude from classes students who were not up to date with their mumps vaccinations. The Maine outbreak was believed to be linked to outbreaks in the Canadian provinces of New Brunswick, Nova Scotia, Prince Edward Island, and Alberta. Internationally, 232 mumps cases were identified in an Ethiopian refugee camp between August 1 and November 9, 2007. The United States was in the process of resettling approximately 1,000 refugees from this camp and notified state health departments of potential imported mumps cases. However, LAC did not receive any notifications of imported mumps cases.

While there were no outbreaks (i.e., 3 epidemiologically linked cases) reported in LAC, there was one situation that required close monitoring. Two LAC cases (a father with onset in January 2007 and his son with onset in December 2006) were discovered to be epidemiologically linked to a laboratory-confirmed case in another state (with onset in January 2007). The father and son had traveled internationally in December 2006. Multiple family, friend, and work contacts were identified. The continued identification of cases in LAC and in other parts of the world indicates that more work needs to be done to increase

vaccination coverage and prevent further transmission. It should be noted that not all cases of parotitis are due to mumps. Sporadic cases among highly immunized populations are most likely caused by other agents such as parainfluenzae virus types 1 and 3, influenza A virus, coxsackie A virus, echovirus, lymphocytic choriomeningitis virus, human immunodeficiency virus, and other non-infectious causes such as drugs, tumors, immunologic diseases, and obstruction of the salivary duct. Determination of epidemiological linkages, MMR vaccination status, and appropriate laboratory testing (mumps IgM antibody assay and viral culture) will help ensure that only true mumps cases are reported.

Cluster Identification: None of the confirmed cases in 2007 were epidemiologically linked to each other. As described above, one case was linked to a 2006 LAC case and a 2007 laboratory-confirmed case in another state. The index case from this cluster of three cases was exposed in another country. An additional 2007 case (not related to the cluster) was also exposed in another country and was linked to a 2008 LAC case.

Vaccination Status: Only one of the confirmed cases was fully immunized with two doses of MMR vaccine. The remaining four cases did not know or remember their vaccination status.

Laboratory Confirmation: Eighty percent (n=4) of the confirmed cases had supporting laboratory confirmation. One case was epidemiologically linked to a 2007 laboratory-confirmed case in another state.

ADDITIONAL RESOURCES

Additional information is available at:

- National Center for Immunization and Respiratory Diseases – http://www.cdc.gov/vaccines
- Immunization Action Coalition – http://www.immunize.org
- LAC Immunization Program – http://www.lapublichealth.org/ip

PERTUSSIS (WHOOPING COUGH)

CRUDE DATA	
Number of Cases	69
Annual Incidence[a]	
LA County	0.71
California	1.62[b]
United States	3.49[b]
Age at Diagnosis	
Mean	10.9 years
Median	4.0 years
Range	10 days – 59 years

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious Diseases issues of MMWR (57: 901, 903-913).

Figure 1
Pertussis Incidence Rates
by Year of Onset
LAC and US, 1997-2007

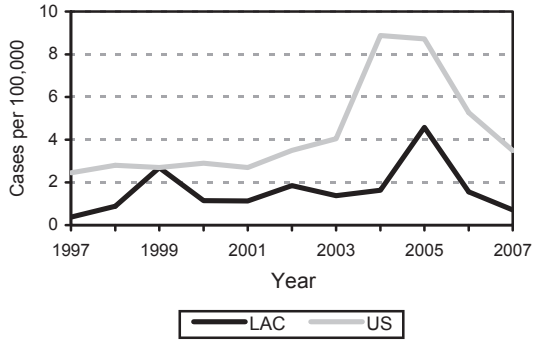
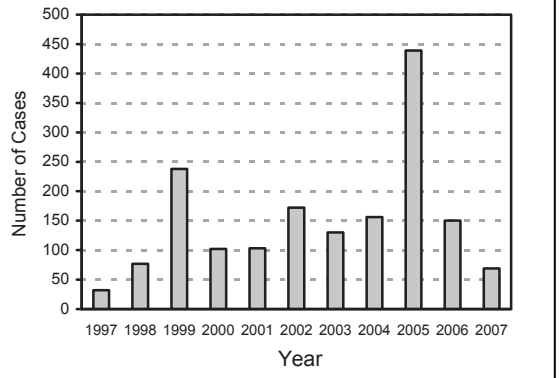


Figure 2
Pertussis Cases by Year of Onset
LAC, 1997-2007



DESCRIPTION

Pertussis, commonly known as whooping cough, is a vaccine-preventable disease spread by close contact with the respiratory secretions of infected individuals. Typical symptoms include paroxysmal coughing, inspiratory whooping, and post-tussive vomiting. Complications include pneumonia, seizures, and encephalopathy. Infants under 1 year of age are at highest risk for developing severe complications.

The minimum clinical criteria for pertussis is a cough lasting at least two weeks with paroxysms of coughing, inspiratory "whoop," or post-tussive vomiting, without other apparent causes. Pertussis is confirmed by either positive *Bordetella pertussis* culture or PCR.

DISEASE ABSTRACT

- Only 69 cases were reported in 2007 (0.71 cases per 100,000), which is the lowest number of reported cases and incidence rate since 1997.
- One pertussis-related death occurred in 2007, marking the twelfth death within the last 10 years.
- Of the 2007 cases, 82% were not adequately immunized that could have been fully protected against pertussis (7 months to 64 years old).

IMMUNIZATION RECOMMENDATIONS

- A pertussis-containing vaccine should be administered at 2, 4, 6, 15-18 months, and 4-6 years of age to provide protection against the disease.
- Immunity conferred by the pertussis component of the DTP/DTaP vaccine decreases over time, with some vaccinated individuals becoming susceptible to pertussis 5-10 years following their last dose.
- In Spring 2005, 2 Tdap vaccines were licensed for use in adolescents and adults, one for persons aged 10-18 years (Boostrix, GlaxoSmithKline) and the other for persons aged 11-64 years (ADACEL, Sanofi Pasteur).

STRATIFIED DATA

Seasonality: Typically, the summer months have the highest pertussis incidence in LAC (Figure 3). However, in 2007, there were peaks in the winter months of March and December. March accounted for 15% (n=10) of cases; six of the cases were a part of two separate household clusters. December accounted for 20% (n=14) of cases; three of the cases had epidemiological linkages to other cases with December onset dates. The onset of cases was distributed fairly uniformly throughout the rest of the year.

Age: Although the majority of reported cases are still in children <1 year of age, the proportion of cases in the <1 age group is slightly smaller in 2007 (45%) compared to the previous five year average (51%). As seen nationally, cases are slightly increasing among adolescents and adults, as evidenced by the fact that 30% (n=21) of the cases were over 14 years of age in 2007 compared to an average of 26% (n=54) in the previous five years (Figure 4). Increased recognition and diagnosis of pertussis in older age groups has contributed to the increase in reported cases among adolescents and adults.

Sex: The male-to-female case ratio was approximately 1:1.4.

Race/Ethnicity: After adjusting for the age differential in the cases, incidence rates in 2007 for blacks, Hispanics, whites, and American Indians were lower than the previous 5-year averages (Figure 5). However, it should be noted that the previous 5-year average is influenced by the high incidence rates reported in 2005, for which whites had the highest incidence rate at 6.1 cases per 100,000. The incidence rates for Hispanics and whites were approximately equivalent to the total LAC rate. However, the LAC population proportion of whites (30%) is much lower than that for Hispanics (48%).

Location: For the first time in over five years, West SPA 5 had the highest incidence rate of 1.2 cases per 100,000 (n=8); two of the cases in SPA 5 were epidemiologically linked. The second highest incidence rate occurred in South Bay SPA 8 with 0.9 cases per 100,000 (n=10); 60% (n=6) of the 10 cases were epidemiologically linked to cases living within two unrelated households.

Figure 3
Pertussis Cases by Month of Onset
LAC, 2007

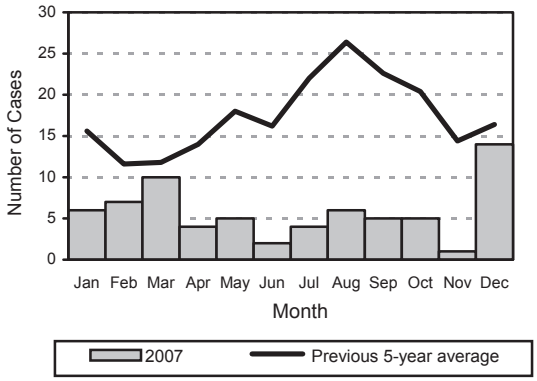


Figure 4
Pertussis Cases by Age Group
LAC, 2007

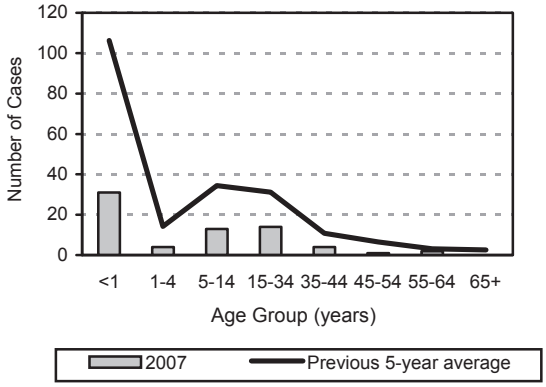
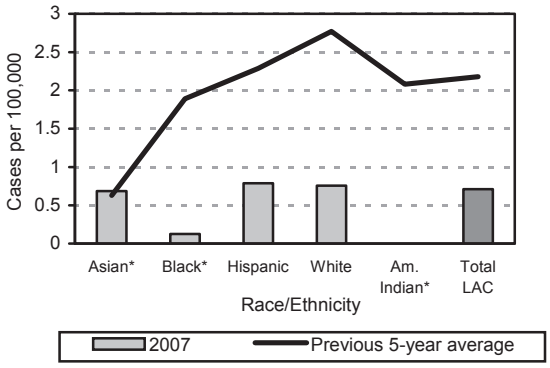


Figure 5
Pertussis Age-Adjusted Incidence Rates
by Race/Ethnicity, LAC, 2007



*Rates unreliable due to small number of observations.

COMMENTS

During 2007, pertussis received some media attention due to school outbreaks in the Virgin Islands and South Carolina. No LAC were identified in association with either of these outbreaks nor were there any outbreaks in LAC.

Historically, pertussis incidence peaks every 3 to 5 years. The last peak in incidence occurred in 2005, which was the same year the two Tdap vaccines for adolescents and adults were licensed. Following the cyclical nature of pertussis incidence, a high incidence would not be expected in 2007. However, compared to the last 10 years, an incidence of 0.71 cases per 100,000 in 2007 is unusually low. The decrease in pertussis activity is not likely to be due to increased use of pertussis vaccine. According to the most recent National Immunization Survey (NIS) data, vaccine coverage levels for 4+ doses of DTaP among children 19-35 months of age in LAC has consistently been above 80%; 85% in 2006 compared with an average of 83.9% during the previous 5 years (2001-2005). An NIS telephone survey conducted from May to August 2007 found that Tdap vaccine coverage levels among adults aged 18 to 64 years of age is only 2.1%. Additional surveillance and epidemiological studies will be needed to monitor the impact of Tdap vaccination on pertussis incidence following its 2005 licensure. However, it is clear that more work needs to be done to increase Tdap vaccination rates.

Trends: The epidemiology of pertussis in LAC is shifting to different age groups, racial/ethnic groups, and geographic areas (LAC IP, 2007). During the winter quarters preceding the most recent peak incidence years (1999, 2002, and 2005), more LAC cases were reported among adolescents 10 to 19 years of age. whites are contributing more of the LAC adolescent/adult cases. The geographic face of pertussis is also shifting outside of the historical high morbidity areas for vaccine-preventable diseases in central Los Angeles to surrounding areas with higher proportions of whites (West Los Angeles, South Bay, and Antelope Valley).

Laboratory Confirmation: More than half of the reported cases (59%, n=41) were laboratory confirmed by either *B. pertussis* culture or PCR. Culture is considered the gold standard laboratory test because it is the most specific of all the laboratory tests for pertussis. While the PCR test's rapidity and sensitivity can greatly aid in the diagnosis of pertussis, specificity can be poor with high rates of false-positive results.

Vaccination Status: Of the 38 cases who could have had full immunity from vaccination (7 months to 64 years old), only 18% (n=7) were fully up to date. Of these 38 cases, 68% (n=26) were 10 years of age or older. Although the 26 cases would have been eligible for Tdap vaccine, none had received Tdap.

Less than one fifth of all cases (19%, n=13) were younger than two months of age and were too young to receive pertussis vaccine. Approximately 26% (n=18) of cases were between 2–6 months of age. Of these, 56% (n=10) were up to date with pertussis vaccination for their age, but would not have developed full immunity against pertussis. Of the 12 children who could have had full immunity from childhood DTaP vaccination (7 months to 9 years old), 58% (n=7) were fully up to date. The previous 5-year trend has indicated that, on average, 65% of cases 7 months to 9 years of age were adequately immunized.

Complications/Hospitalizations: Approximately 39% (n=27) were hospitalized, with an average hospital stay of 7 days (range 1-16 days). Among the hospitalized cases, 93% (n=25) were less than one year of age. Of the 6 cases who developed pneumonia, 83% (n=5) were infants less than one year of age.

Case Fatalities: There was one pertussis-related death in 2007. The fatality occurred in a Hispanic female infant who was less than 1 month of age. The principal diagnosis in the discharge/death summary was cardiorespiratory arrest. The female infant died 18 days after cough onset. The infant was in contact with 3 family members who were also coughing around the same time. During the first 13 days of her illness, the patient sought hospital care and was discharged both times without a pertussis diagnosis. During the third hospital visit 4 days later, she was admitted into the pediatric intensive care unit with a diagnosis of hypoxemia, respiratory failure, lymphocytosis, and suspect pertussis. A PCR test detected *Bordetella pertussis* DNA and azithromycin treatment was initiated. The patient expired the next day. Earlier consideration of pertussis may have prevented death.

REFERENCES

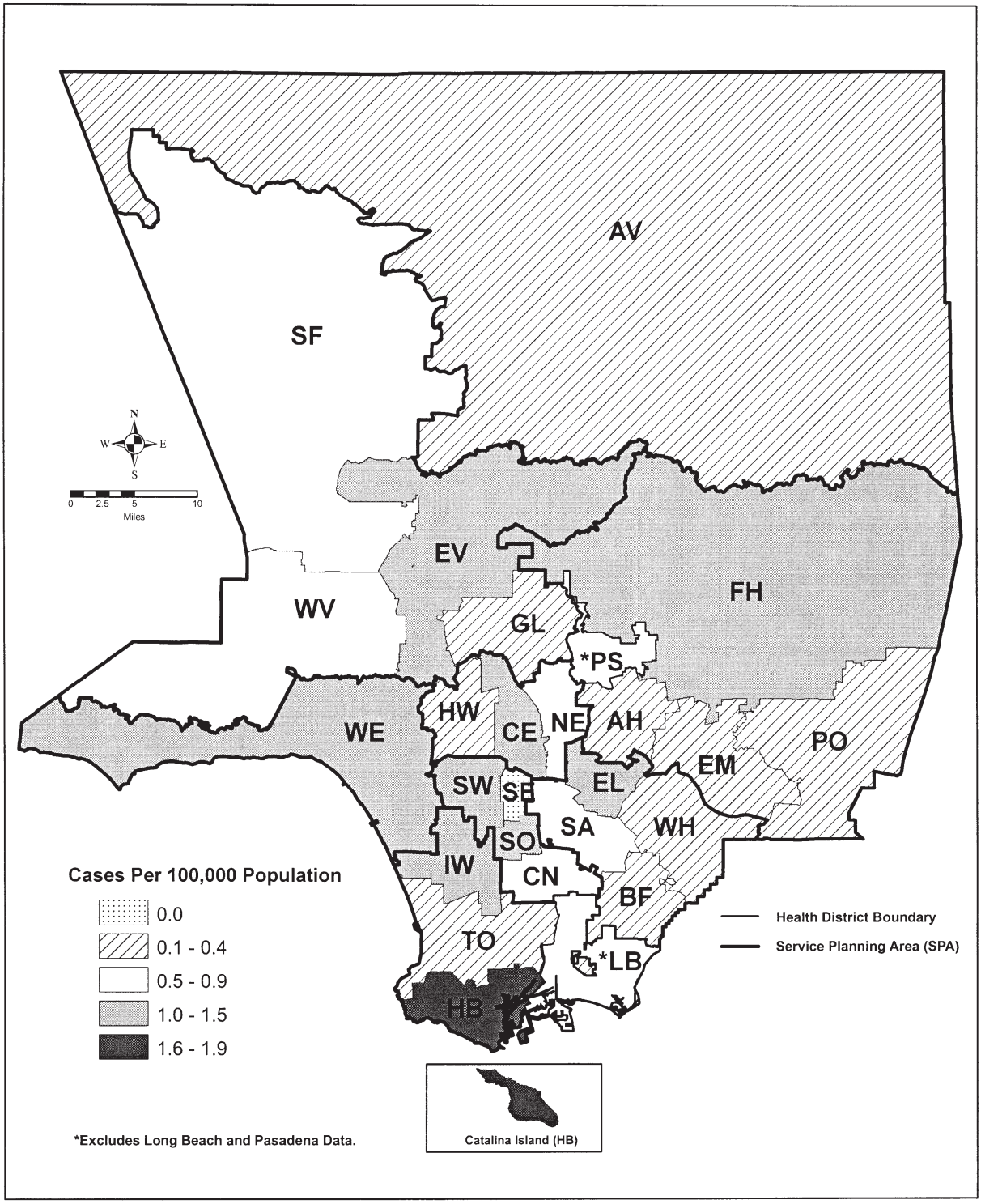
Los Angeles County Immunization Program (2007). The endemic and cyclical nature of pertussis disease morbidity: The evolving epidemiology of a unique vaccine-preventable disease in Los Angeles County. Los Angeles County Department of Public Health.

ADDITIONAL RESOURCES

Additional information is available at:

- National Center for Immunization and Respiratory Diseases – http://www.cdc.gov/vaccines
- Immunization Action Coalition – http://www.immunize.org
- LAC Immunization Program – http://www.lapublichealth.org/ip

Map 11. Pertussis
Rates by Health District, Los Angeles County, 2007*



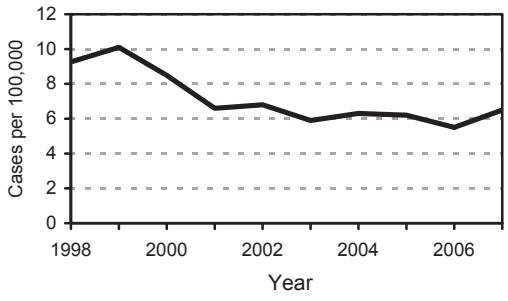
PNEUMOCOCCAL DISEASE, INVASIVE

CRUDE DATA	
Number of Cases	625
Annual Incidence[a]	
LA County	6.5
United States	14.0[b]
Age at Diagnosis	
Mean	51
Median	56
Range	0 days -100 years

[a] Cases per 100,000 population.

[b] National projection of IPD incidence from Active Bacterial Core Surveillance areas data, 2007 (CDC, 2007).

Figure 1
Invasive Pneumococcal Disease
Incidence Rates by Year of Culture
LAC, 1998–2007



DESCRIPTION

Invasive pneumococcal disease (IPD) is a leading cause of illness in young children and causes considerable illness and death in the elderly. The infectious agent, *Streptococcus pneumoniae*, is spread by direct and indirect contact with respiratory discharge and attacks various parts of the body resulting in pneumonia, bacteremia, and meningitis. *S. pneumoniae* has become increasingly resistant to antibiotics during the last decade. Disease caused by *S. pneumoniae* is vaccine-preventable.

ACDC has followed IPD as a special surveillance project since late 1995 and added IPD to its list of reportable diseases in October 2002. Cases are defined as LAC residents with a positive isolate for *S. pneumoniae* collected from a normally sterile site (e.g., blood, cerebral spinal fluid). Antibiotic susceptibility is identified by disk or dilution diffusion. Minimum inhibitory concentration (MIC) breakpoints utilized by participating laboratories are based on standards developed by the Clinical and Laboratory Standards Institute. For this report, an isolate of *S. pneumoniae* is considered nonsusceptible to an antibiotic if the results indicate intermediate or high-level resistance.

S. pneumoniae is the most common bacterial cause of community acquired pneumonia and otitis media (ear infections). However, these non-invasive forms of infection are not counted in LAC surveillance. Therefore, the data presented in this report underestimate all disease caused by *S. pneumoniae* in LAC.

DISEASE ABSTRACT

- The incidence rate increased slightly in LAC in 2007.
- The overall percentage of penicillin nonsusceptible infections has increased slightly. The percentage of penicillin nonsusceptible isolates increased or remained the same for all age groups except for cases aged 5-14 years and 45-54 years.
- The highest incidence of IPD continued to be among blacks.

STRATIFIED DATA

Trends: IPD occurred at an incidence rate of 6.5 per 100,000 in 2007 (N=625), an increase from the previous year (5.5 per 100,000, N=533) (Figure 1).

Seasonality: The seasonal trend in 2007 followed the typical peak for IPD in winter months, dropping in the spring and summer months (Figure 2).

Sex: The male-to-female rate ratio was approximately 1:1.

Age: The age of IPD cases ranged from birth to 100 years old with a mean of 51 years and median of 56 years. The incidence rate increased or stayed the same from 2006 in all age groups. The incidence rate has increased consistently since 2005 in persons aged 55-64 years. As expected, the highest rate (21 cases per 100,000) occurred in cases aged 65 years and older (Figure 3).

Race/Ethnicity: The incidence decreased among whites and blacks and increased among Latinos and Asians. The highest incidence of IPD occurred among blacks (8.2 cases per 100,000). This rate was more than twice as high as that of whites and approximately three times as high as that of Latinos and Asians (Figure 4).

Disease Severity: Hospitalization status was known for 71% of cases. Of these cases, 94% were hospitalized. Hospitalization was more frequent in cases 65 years and older (99%) and occurred less in children under 5 years (80%). The overall case fatality was 14%, similar to 2006 and higher than the national case fatality of 10.3% (CDC, 2007). Adults aged 35-44 years had the highest case fatality (34%) of all age groups followed by cases aged 55-64 years (18%) and cases older than 65 years (14%).

Antibiotic Susceptibility: Antibiotic resistance information was provided for 93% of cases. The percentage of isolates nonsusceptible to penicillin has increased slightly compared to the previous 5 years. The same is true of isolates nonsusceptible to erythromycin and cefotaxime. The percentage of isolates nonsusceptible to trimethoprim-sulfamethoxazole (TMP-SMZ) decreased to 20% in 2007.

The percentage of cases with penicillin nonsusceptible S. pneumoniae (PNSP) isolates

Figure 2
IPD Cases By Month of Culture
LAC, 2007

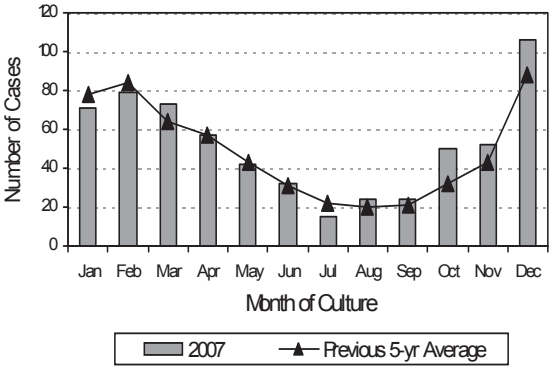


Figure 3
Incidence Rates of IPD Cases by Age
LAC, 2005-2007

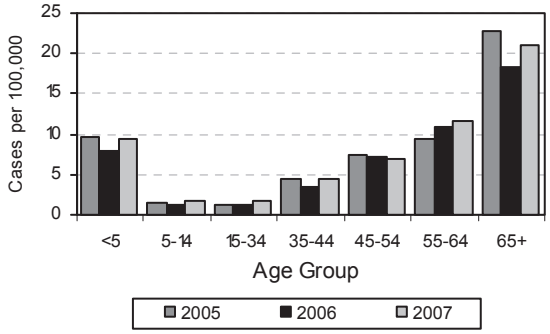
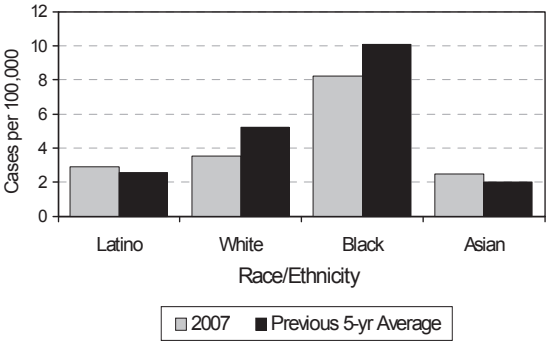


Figure 4
Incidence Rates of IPD Cases by Race/Ethnicity
LAC, 2007



has increased for cases aged < 5 years, 15-34 years, and 35-44 years, as well as cases over 65 years of age. Cases aged 5-14 years and 45-54 experienced a decrease in PNSP (Figure 6). The percentage of PNSP isolates has remained about the same for adults 55-64 years old.

COMMENTS

In 2007 IPD increased in all age groups except for adults aged 45-54 years. Surprisingly, adults aged 35-44 years had the highest case fatality (34%) of all age groups. Cases <5 years showed the highest percentage of PNSP isolates. The percentage of PNSP isolates increased or remained the same for all age groups with the exception of cases aged 5-14 years and 45-54 years which experienced a considerable decrease in the percentage of PNSP.

In LAC, incidence of IPD in blacks (8.2 cases per 100,000) is over two times that of whites and about 3 times that of Latinos and Asians. The black-to-white rate ratio is similar to the ratio found nationally; however, the incidence rates in Los Angeles County for both whites and blacks are lower than the national incidence rates (national rates: 12 and 24 cases per 100,000 respectively) (CDC, 2007).

Laboratories are the source for many of the IPD case reports to ACDC: 58% of cases were reported by laboratories only. Many of the limitations in the data are due to the limited access laboratories have to patient information. Race/ethnicity data and outcome status, in particular, are often missing from laboratory reported cases. Only 54% of reports contained race/ethnicity data and 37% contained outcome status. The unavailability of outcome status is further exacerbated by the requirements of laboratory reporting procedures. Cases often are reported before the final outcome is known due to the requirement to report positive cultures within seven days. Therefore, case fatality rates may be unreliable.

Figure 5
IPD Isolates Nonsusceptible to Selected Antimicrobial Agents
LAC, 2007

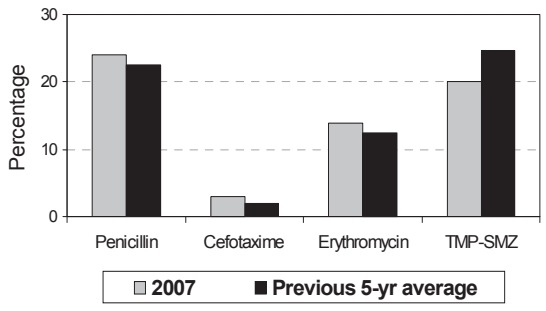
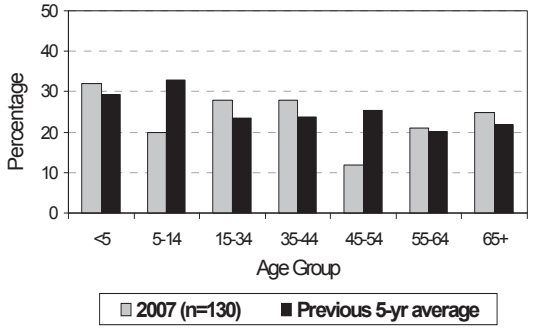


Figure 6
PNSP Isolates by Age
LAC, 2007



PREVENTION

Two effective vaccines are available for pneumococcal disease. Heptavalent pneumococcal conjugate vaccine (Prevnar®) is recommended by the Advisory Committee on Immunization Practices (ACIP) for all children under 2 years, and for children up to 5 years at high risk of invasive pneumococcal infections. The 23-valent pneumococcal polysaccharide vaccines (Pnu-Imune®23 and Pneumovax®23) are recommended for all adults ≥65 years and those >2 years at high risk of IPD. For children aged 2 to 5 years at high risk of invasive pneumococcal infections, ACIP recommends the use of pneumococcal conjugate vaccine followed at least 2 months later by the 23-valent pneumococcal polysaccharide vaccine. This regimen provides protection against a broader range of serotypes, although supporting data are limited (CDC, 1997).

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Centers for Disease Control and Prevention (2007). Active Bacterial Core Surveillance Reports, Emerging Infections Program Network, *Streptococcus Pneumoniae 2007*. Available at: http://www.cdc.gov/ncidod/dbmd/abcs/survreports/SPNEUMO_2007_provisional.pdf

ADDITIONAL RESOURCE

Flannery, B., Schrag, S., Bennett, N.M., Lynfield, R., Harrison, L.H., Reingold, A., et al. (2004). Impact of childhood vaccination on racial disparities in invasive *Streptococcus pneumoniae* infections. *Journal of the American Medical Association*, 291(18), 2197-2203.

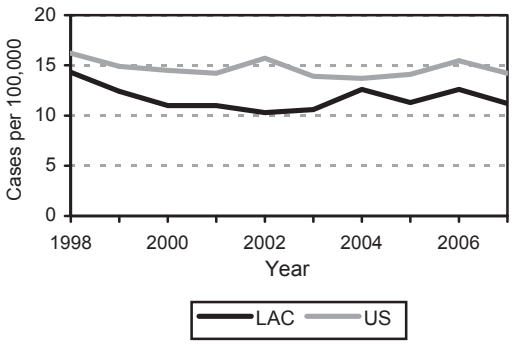
SALMONELLOSIS

CRUDE DATA	
Number of Cases	1081
Annual Incidence[a]	
LA County	11.2
California	11.0[b]
United States	14.2[b]
Age at Diagnosis	
Mean	27.9
Median	22
Range	<1-101

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

Figure 1
Salmonellosis
Incidence Rates by Year
LAC and US, 1998–2007



DESCRIPTION

Salmonellosis is caused by a Gram-negative bacillus, *Salmonella enterica*, of which there are more than 2,500 serotypes. This disease is transmitted by the fecal-oral route, from animal or human, with or without intermediary contamination of foodstuffs. The most common symptoms include diarrhea, fever, headache, abdominal pain, nausea and sometimes vomiting. Occasionally, the clinical course is that of enteric fever or septicemia. Asymptomatic infections may occur. The incubation period is usually 12–36 hours for gastroenteritis, longer and variable for other manifestations. Communicability lasts as long as organisms are excreted, usually from 2–5 weeks, but may last for months to years. Healthy people are susceptible, but persons especially at risk are those who are on antacid therapy, have recently taken or are taking broad-spectrum antibiotic therapy or immunosuppressive therapy, or those who have had gastrointestinal surgery, neoplastic disease, or other debilitating conditions. Severity of the disease is related to the serotype, the number of organisms ingested, and host factors. Immunocompromised persons, such as those with cancer or HIV infection, are at risk for recurrent *Salmonella* septicemia. Occasionally the organism may localize anywhere in the body, causing abscesses, osteomyelitis, arthritis, meningitis, endocarditis, pericarditis, pneumonia, or pyelonephritis.

DISEASE ABSTRACT

- The LAC 2007 salmonellosis crude rate decreased 11% when compared to 2006 (Figure1). This rate is comparable to the state rate and remains below the national rate.
- *Salmonella* serotype e*nteritidis* was again the most common serotype in 2007. However, the percent of change was -10% due to a continued decrease in the total number of isolates (Table 1).
- Five outbreaks were investigated in 2007, compared to nine in 2006.
- SPA 6 had the highest rate (12.6 per 100,000) of salmonellosis during 2007.

STRATIFIED DATA

Trends: The rate of salmonellosis cases for LAC in 2007 was 11.2 cases per 100,000 population, an 11% decrease from the 2006 rate of 12.6 but similar to the 2005 rate of 11.3 (Figure 1). This rate remains below the national rate. Reasons for this decrease are unknown. ACDC continues to include "presumptive cases", those that meet a clinical case definition and have an epidemiological link to a laboratory confirmed case. If the presumptive cases are removed, the 2007 rate decreases to 10.6 per 100,000 population.

Salmonella Serotypes: For the fourth year, *S. enteritidis* was the number one serotype, however, the incidence has continued to decrease to 24.2% of total isolates serotyped.

Table 1. Most Frequent *Salmonella* Serotypes—LAC, 2006–2007

Serotype	2006 (N=1217)		2007 (N=1011)*		
	No.	Percent	No.	Percent	%Change
Enteritidis	328	26.9	245	24.2	-10.0
*Typhimurium***	173	14.2	146	14.4	+1.4
Newport	76	6.2	76	7.5	+21.0
Heidelberg	49	4.0	58	5.7	+42.5
Agona	21	1.7	46	4.5	+164.7
Montevideo	47	3.9	28	2.8	-28.2
Oranienburg	27	2.2	25	2.4	+9.0
I 4,5,12:i:--	48	3.9	23	2.3	-41.0
Blockley	1	0.08	22	2.2	+2650.0
Braenderup	23	1.9	19	1.9	0

* Includes only serotyped isolates. (three cases for 2007 had two different serotypes of *Salmonella*)
** Includes *S. typhimurium* var. 05 negative (formally var. *copenhagen*)

No commonalities were identified among 2007 *S. blockley* cases.

Seasonality: In 2007, incidence peaked in August (Figure 2) and was greater than the five-year average. Incidence was also greater than the five-year average for the months of April, July, and November. There were outbreaks recorded for the months of March, June, August and November (Table 2).

Age: As shown in Figure 3, the highest age group rates of infection occurred among infants aged less than one year (66.9 per 100,000 population) followed by children aged 1-4 years (31.7 per 100,000 population). This is typical for salmonellosis. In 2007, the rate for infants aged less than one year was slightly higher than the five-year average.

Hospitalization: In 2007, 19.7% of cases were hospitalized for more than 24 hours, compared to 19% in 2006. Ages ranged from less than 1 year to 101 years. The average age of the hospitalized patient was 38 years and the median age was 37 years.

Sex: The male-to-female rate ratio was 1:1.2.

Figure 2
Salmonellosis
Cases by Month of Onset
LAC, 2007

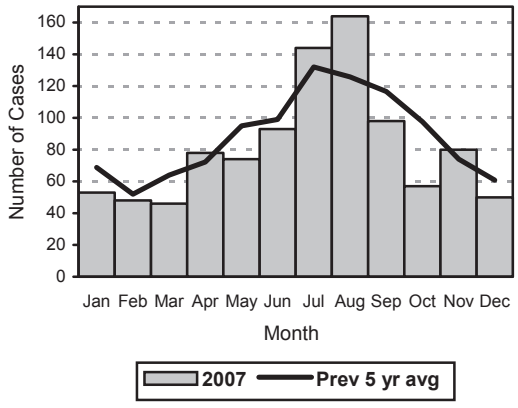
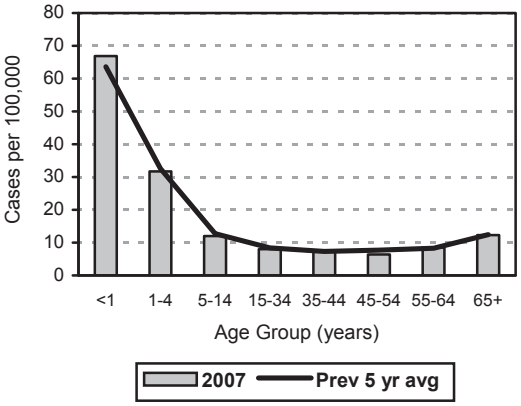


Figure 3
Salmonellosis
Incidence Rates by Age Group
LAC, 2007



Race/Ethnicity: Again, the highest age-adjusted rate was among whites (13.1 per 100,000 population), followed by Hispanics (11.4 per 100,000 population) then Asians (10.4 per 100,000 population), and blacks (7.8 per 100,000 population, Figure 4). The rates for whites and Asians were higher than the five-year average (12.7 and 8.9 per 100,000, respectively). The rates for Hispanics and blacks were lower than the five-year average (11.9 and 10.0 per 100,000, respectively).

Location: Harbor Health District in SPA 8 had the highest district rate with 17.0 cases per 100,000. The lowest district rate was in El Monte Health District (SPA 3) with 4.4 cases per 100,000. Of all SPAs, SPA 6 had the highest rate with 12.6 cases per 100,000 (Figure 5).This increase may be due to the changing demographics in the area. SPA 8 had the lowest rate at 10.1 cases per 100,000. No single SPA had a rate significantly higher or lower than LAC average.

Figure 4
Salmonellosis
Age-Adjusted Rates by
Race/Ethnicity
LAC, 2007

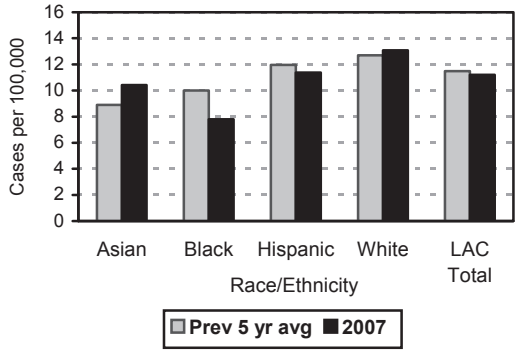


Figure 5
Salmonellosis
Incidence Rates by
Service Planning Area
LAC, 2007

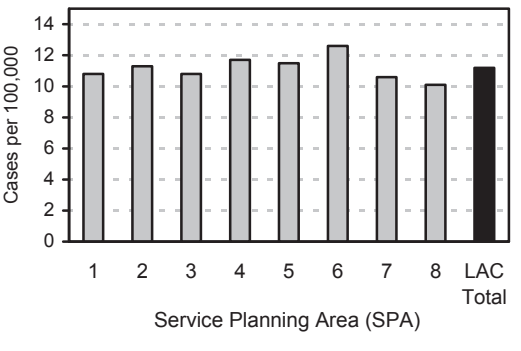


Table 2. Salmonellosis Outbreaks in LAC, 2007

Onset Month	Outbreak Setting	Total # Ill	Culture Positive	Serotype	Suspect Vehicle	Suspect Source
March	Community	6	6	*S.* Agona	Unknown food vehicle	Undetermined
March	Community	3	3	*S.* Montevideo	Sprouts	Sprouts
June	Church	15	4	*S.* Heidelberg	Homemade Food	Cross Contamination/Raw Poultry
August	Restaurant	40	18	*S. enteritidis*	Eggs Benedict	Shell Eggs
November	Private Home	11	7	*S. enteritidis*	Unknown food vehicle	Unknown food source
TOTAL		75	38			

COMMENTS

After a peak in 1994, from 1995 through 2000, a steady decline occurred in the LAC rate of salmonellosis. The LAC rate has been relatively stable or ranged between 10-13 since 2002 (Figure 2). Continued surveillance is necessary to determine long term trends.

Travel was noted as a risk factor for 16.3% of cases (n=176); of those 33.5% traveled domestically. Of those who traveled outside of the United States, 44.5% (n=52) traveled to Mexico.

There were five salmonellosis outbreaks during 2007 compared to nine identified in 2006. Two outbreaks were serotype e*nteritidis*, the others involved multiple serotypes (Table 2). Outbreak-related cases (both confirmed and presumptive) made up 7% of total cases in 2007 compared to 4.3% of total cases in 2006. This year *Salmonella Enteritidis*, the predominant serotype for 2007, was found to be the cause for two outbreaks with a total of 51 cases. Only one salmonellosis outbreak investigation cited restaurant food as a source compared to three in 2006. The use of PFGE and comparison of PFGE patterns with other laboratories through PulseNet, the national molecular subtyping network, continues to help identify potentially related clusters within LAC.

Salmonellosis was reported as a contributing cause of death in two people, both of whom had underlying health problems such as cancer and chronic disease. These cases were 80 years of age or older.

PREVENTION

Each outbreak of salmonellosis is investigated and preventive measures are recommended. Review of investigation reports shows that many persons engage in high-risk food handling behaviors such as: consumption of raw or undercooked meats or produce; use of raw eggs; not washing hands and/or cutting boards after handling raw poultry or meat; and having contact with reptiles. These investigations demonstrate a need for improved public education on proper handling and preparation of produce and animal-derived foods and the risk related to handling reptiles.

Reptile-associated salmonellosis (RAS) has been a consistent problem in LAC and nationally for 15 years. In 2007, 10.5% of cases (n = 113) had some type of reptile exposure, most of which were turtle related. Despite press releases, pamphlets and periodic sweeps of areas where turtles are sold, these

animals remain popular and many people are not aware of laws controlling their sale. When RAS cases occur, District Public Health Nurses should educate case patients and their families on the risk related to reptiles. Emphasis is on the following:

- Always wash hands thoroughly with soap and water after handling reptiles or their cages and equipment;
- Owners and potential purchasers of reptiles should be educated about the risk of acquiring salmonellosis from these animals;
- Persons at increased risk for infection, such as children less than 5 years of age and imunocompromised persons should avoid both direct and indirect contact with reptiles;
- Reptiles are inappropriate pets for households with children less than 5 years of age and immunocompromised persons. If expecting a new child, remove pet reptiles from the home before the child arrives and thoroughly clean the home;
- Reptiles should not be kept in preschools and child care facilities.

ADDITIONAL RESOURCES

General information about salmonellosis—
http://www.cdc.gov/nczved/dfbmd/disease_listing/salmonellosis_gi.html

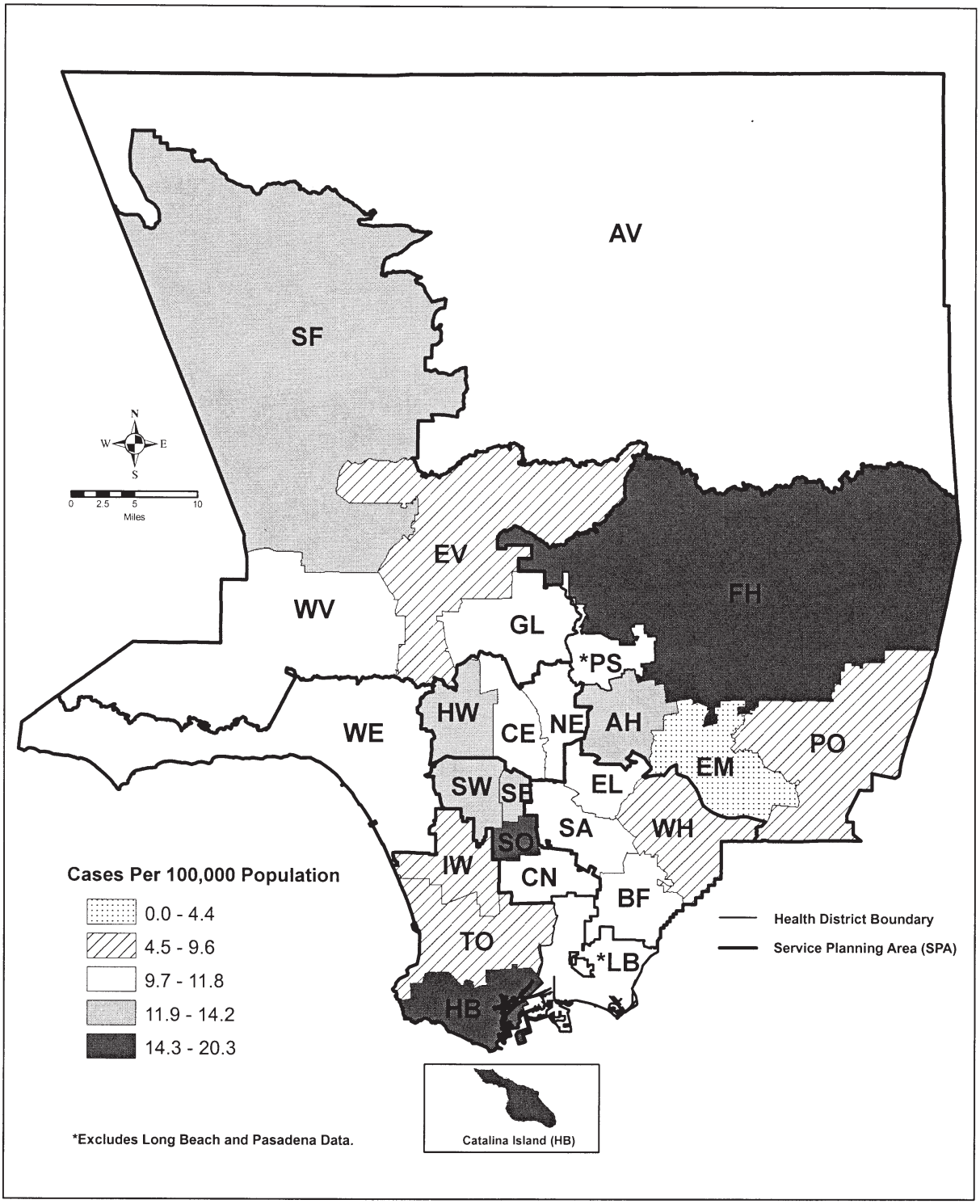
General information and reporting information about this and foodborne diseases in LAC—
www.lapublichealth.org/acd/food.htm

Reptile-associated salmonellosis information—http://www.lapublichealth.org/acd/Diseases/Reptiles.htm

Centers for Disease Control and Prevention (2003). Reptile-associated salmonellosis--selected states 1998-2002. *Morbidity and Mortality Weekly Report*, 52(49), 1206-1209.

Centers for Disease Control and Prevention (2004). Salmonellosis associated with pet turtles--Wisconsin and Wyoming, 2004. *Morbidity and Mortality Weekly Report*, 54(9), 223-226.

Map 12. Salmonellosis
Rates by Health District, Los Angeles County, 2007*



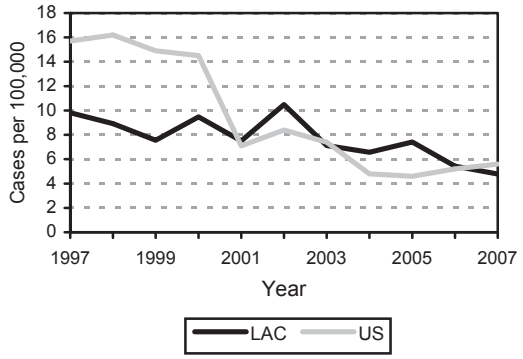
SHIGELLOSIS

CRUDE DATA	
Number of Cases	463
Annual Incidence[a]	
LA County	4.78
California	3.25[b]
United States	5.6[b]
Age at Diagnosis	
Mean	24.65
Median	21
Range	<1– 98

[a] Cases per 100,000 population.

[b] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

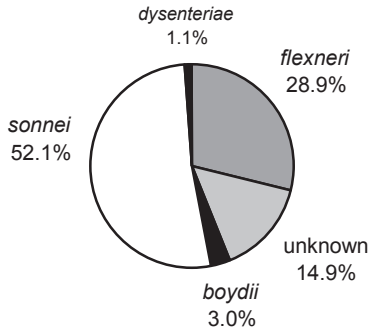
Figure 1
Shigellosis
Incidence Rates by Year of Onset
LAC and US, 1997–2007



DESCRIPTION

Shigellosis is caused by a Gram-negative bacillus with four main serogroups: *Shigella dysenteriae* (group A), *S. flexneri* (group B), *S. boydii* (group C) and *S. sonnei* (group D). Incubation period is 1-3 days. Human are the definitive host; transmission occurs when individuals fail to thoroughly wash their hands after defecation and spread infective particles to others, either directly by physical contact, including sexual behaviors, or indirectly by contaminating food. Infection may occur with ingestion of as few as 10 organisms. Common symptoms include diarrhea, fever, nausea, vomiting, and tenesmus. Stool may contain blood or mucous. In general, the elderly, the immunocompromised, and the malnourished are more susceptible to severe disease outcomes.

Figure 2
Shigellosis
Percent by Serogroup
LAC, 2007 (N=463)



DISEASE ABSTRACT

- There was an 11.6% decrease in reported cases in 2007.
- Three shigellosis-associated outbreaks were investigated in 2007.
- In 2007, incidence peaked in July and other months stayed below the five-year average through the entire year (Figure 3). This was due primarily to a large outbreak and several family clusters during the month of July. The rate of travel related cases that occurred from July through September decreased to 44% when compared to 60% in 2006.

STRATIFIED DATA

Trends: There was an 11.6% decrease in the number of cases during 2007. This is lowest rate in over twenty years. The rate in LAC continues to decline since peaking in 2005 (Figure 1).

Serotypes: In 2007, *S. sonnei* (n=241; 52.1%) represented a smaller percentage of case when compared to 2006 (n=315; 60%) but remains the dominant serotype. Other serotypes identified during 2007 include: *S. flexneri* (n=134), *S. dysenteriae* (n=5), and *S. boydii* (n=14) (Figure 2).

Age: Infants less than 1 year (8.7 per 100,000) and children 1–4 (17.3 per 100,000) had the highest rates. The rate for children aged 1-4 years was significantly higher than all other age groups but below the five-year average. Infants had the highest rates above the five-year average (Figure 4). The rates for adults between the ages of 45 and 65+ were significantly lower than the county average.

Race/Ethnicity: During 2007, Hispanics aged 1-4 years again had the highest age-adjusted rate (Figure 5). Hispanic children aged <1, 1-4 and 5-14 had higher age adjusted rates compared to other race/ethnicities. Overcrowding and living with extended family members in addition to the higher overall rate in Hispanics may be possible causes. Black adults aged 45-55 years, had a higher rate than other ethnicities.

Location: The rates for SPA 6 (7.65 per 100,000) and SPA 4 (6.89 per 100,000) were significantly higher than the county average (4.77 per 100,000). The increase in SPA 6 is consistent with previous years. The rate for SPA 8 (2.5 per 100,000) was significantly lower than the county average. The three outbreaks involved cases from all SPAs except for SPA 1. The majority of men who have sex with men (MSM) cases (50%) were seen in SPA 4.

Severity of Illness: Fourteen percent of shigellosis cases (n=66) were hospitalized for at least two days. There were no shigellosis-associated deaths reported.

Risk Factors: Exposure to a case inside or outside the household (21%) and foreign travel (16%) were the most commonly reported potential sources of infection. The majority of foreign travel–associated illness (42%) involved visiting Mexico. Four of the 14 *S.boydii* cases reported travel to Mexico, Pakistan, and within the US. Two of the five *S. dysenteriae* traveled to Peru and Egypt during the incubation period. In 2007, three percent of cases were in MSM compared to five percent in 2006.

Figure 3
Shigellosis
Cases by Month of Onset
LAC, 2007

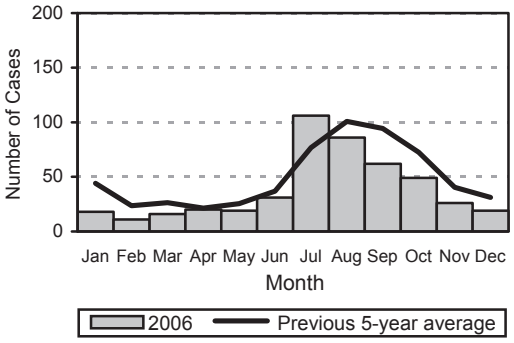


Figure 4
Shigellosis
Incidence Rates by Age Group
LAC, 2007

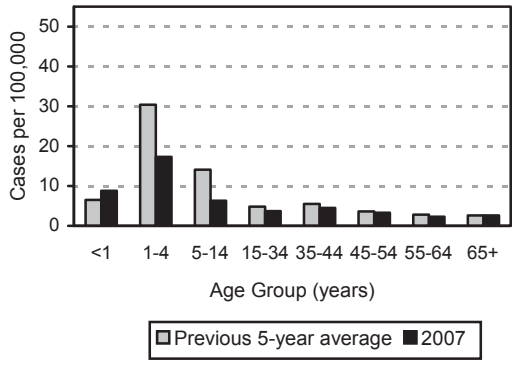
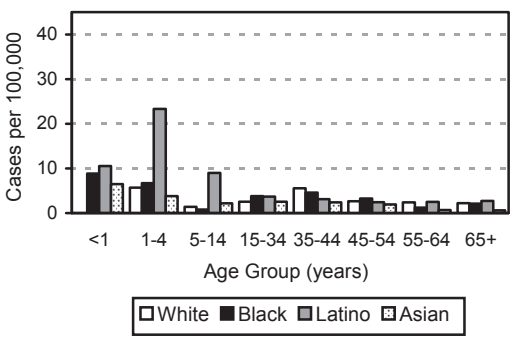


Figure 5
Shigellosis Incidence Rates
by Age Group and Race
LAC, 2007 (N=463)



COMMENTS

There were three shigellosis outbreaks investigated in 2007, all were laboratory confirmed. One was a community outbreak involving a day care setting, the second was a foodborne outbreak involving a restaurant, and the third involving a board and care facility. There was no source identified in any of the outbreaks that were investigated.

Certain sexual practices—especially those in which there is direct contact with fecal material—are a potential source of infection. There were 12 shigellosis cases reported in MSM in 2007. No links could be established among these cases. *S. flexneri* (83%) was again the predominant serotype in 2007 for this risk group; in 2002 the predominant MSM serotype was *S. sonnei* (56%).

PREVENTION

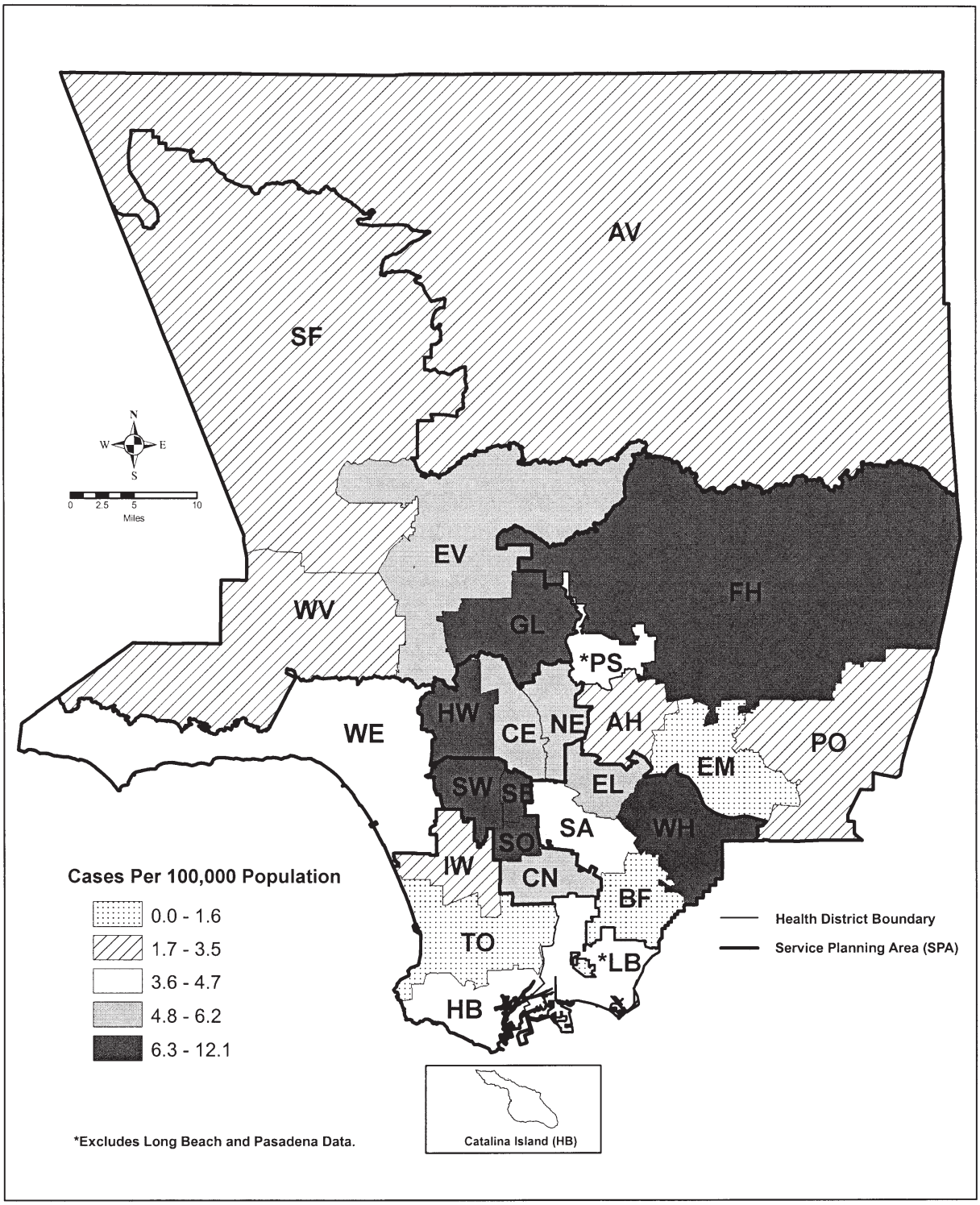
Hand washing is vital in preventing this disease. Young children or anyone with uncertain hygiene practices should be monitored to promote compliance. Hand washing is especially important when out in crowded areas such as amusement parks or shopping malls. Children should not be allowed to swim or wade while ill with diarrhea; ill children (exhibiting symptoms) in diapers should never be allowed in public swimming areas. Swimming or wading in areas not designated for such activities should be avoided, especially in areas where there are no toileting or hand washing facilities. In LAC, cases and symptomatic contacts in sensitive occupations or situations (e.g., food handling, daycare and healthcare workers) are routinely removed from work or the situation until they have culture negative stool specimens tested in the Public Health Laboratory.

ADDITIONAL RESOURCES

CDC General Information – http://www.cdc.gov/nczved/dfbmd/disease_listing/shigellosis_gi.html

LAC General Information – http://www.lapublichealth.org/acd/Diseases/Shigellosis.htm

Map 13. Shigellosis
Rates by Health District, Los Angeles County, 2007*



INVASIVE GROUP A STREPTOCOCCUS (IGAS)

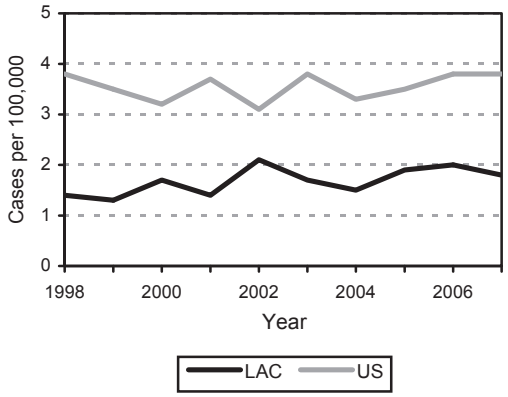
CRUDE DATA	
Number of Cases	171
Annual Incidence[a]	
LA County	1.8
California	---[c]
United States[b]	3.8[b]
Age at Diagnosis	
Mean	52
Median	54
Range	2 months–97 years

[a] Cases per 100,000 population.

[b] National projection of IGAS incidence from Active Bacterial Core Surveillance areas data, 2006 [1]. Data available beginning in 1997.

[c] Not notifiable.

Figure 1
IGAS
Incidence Rates by Year of Onset
LAC and US[b], 1998–2007



DESCRIPTION

Invasive Group A Streptococcal (IGAS) disease is caused by the group A beta-hemolytic *Streptococcus pyogenes* bacterium. Transmission is by direct or, rarely, indirect contact. Illness manifests as various clinical syndromes including bacteremia without focus, sepsis, cutaneous wound or deep soft-tissue infection, septic arthritis, and pneumonia. It is the most frequent cause of necrotizing fasciitis, commonly known as "flesh eating bacteria." IGAS occurs in all age groups but more frequently among the old. Infection can result in severe illness, including death.

For surveillance purposes in LAC, IGAS is defined as isolation of *S. pyogenes* from a normally sterile body site (e.g., blood, cerebrospinal fluid, synovial fluid, or from tissue collected during surgical procedures) or from a non-sterile site if associated with streptococcal toxic shock syndrome (STSS) or necrotizing fasciitis (NF). IGAS cases are characterized as STSS if the diagnosis fulfills the CDC or Council of State and Territorial Epidemiologists (CSTE) case definitions for this syndrome; and as NF if the diagnosis was made by the treating physician.

S. pyogenes more commonly causes non-invasive disease that presents as strep throat and superficial skin infections. However, these diseases are not counted in LAC surveillance of invasive disease, therefore, the data presented in this report underestimates all disease caused by *S. pyogenes* in LAC.

DISEASE ABSTRACT

- The case fatality rate has increased compared to previous years.
- No clusters or outbreaks were reported.

STRATIFIED DATA

Trends: The incidence rate of reported IGAS was 1.8 per 100,000 (N=171) during 2007, similar to 2006 where 2.0 cases per 100,000 (N=197) were reported (Figure 1).

Seasonality: Although cases were observed throughout the year, a winter/spring seasonality commonly associated with streptococcal pharyngitis was observed during the spring and winter months. The number of cases in 2007 peaked in May (Figure 2) whereas the highest number of cases for the previous 5 years occurred in April.

Age: The age of cases ranged from 12 months to 97 years with a mean of 52 years and median of 54 years. For all age groups, the incidence rate was equal to or lower than the previous 5-year average with the exception of cases aged 55-64 years. In this group the 2007 incidence rate was slightly higher than the average incidence rate for the previous 5-years. The highest rate of cases occurred in those aged 65 years and older (Figure 3).

Gender: The male-to-female rate ratio decreased from 2:1 in 2005 and 2006 to 1.3:1 in 2007.

Race/Ethnicity: Race/ethnicity was known for 87% of cases. The percentage of cases that were black increased from 14% (n=23) in 2006 to 22% (n=33) in 2007. The incidence rate among blacks was the highest overall and increased from 2.7 per 100,000 in 2006 to 3.9 per 100,000 in 2007 (data not shown).

Location: The incidence rates for SPAs 2, 5, and 6 were higher compared to LAC overall with the highest rate occurring in SPA 6 (3.3 cases per 100,000). The incidence rates for all other SPAs were lower than that of LAC overall (Figure 4). However, stratification of cases by SPA produced small numbers and unstable rates for all SPAs except SPAs 2, 3, and 6.

Clinical Presentation: IGAS cases presented most often with cellulitis and bacteremia (Table 1). The number of cases presenting with pneumonia increased from 9% in 2006 to 13% in 2007. The percentage of cases with STSS (12%) and necrotizing fasciitis (7%) remained approximately equal. Clinical presentation data was available for 88% of cases.

The case fatality rate increased from 10% in 2005 and 14% in 2006 to 17% in 2007. This rate exceeds the 2007 national estimate of 11% (CDC). Of the 15 cases that met the criteria for STSS and for which outcome information was available, 7 (47%) died.

Risk Factors: Risk factor information was collected for 86% of cases, 33% of which reported no risk factors. Diabetes was reported more than any other risk factor (25%), followed by chronic heart disease (19%), alcohol abuse (14%), history of blunt trauma (10%), and malignancy (8%). Alcohol abuse and history of blunt trauma were more common in cases less than 50 years while

Figure 2
IGAS
Cases by Month of Onset
LAC, 2007

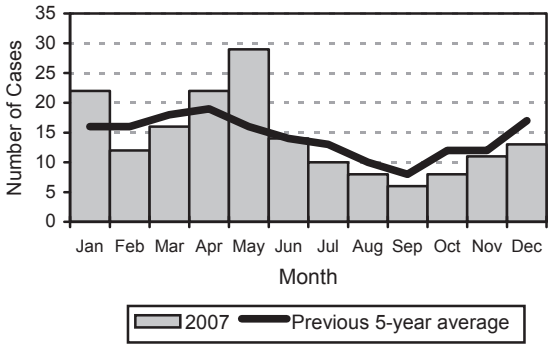
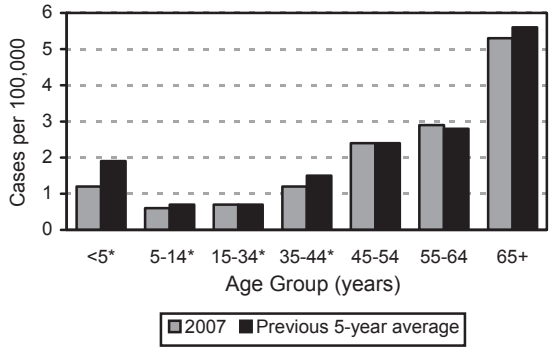
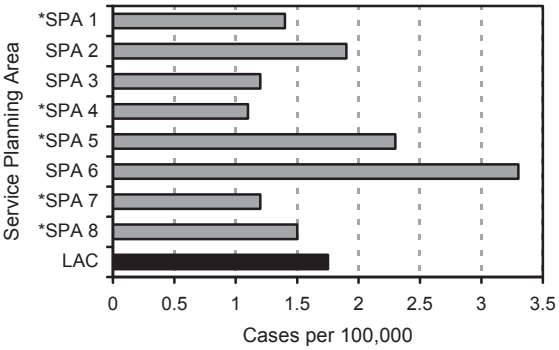


Figure 3
IGAS Incidence Rates by Age Group
LAC, 2007 (n=166)



* Small numbers prduced unstable rates in these age groups.

Figure 4
IGAS Rates by Service Planning Area
LAC, 2007 (n=166)



* Small numbers produced unstable rates for these SPAs.

diabetes, chronic heart disease, and malignancy were more prevalent in cases older than 50 years (data not shown).

Table 1. Frequency and Percentage of IGAS Clinical Syndromes, LAC, 2007

Syndrome	Number	Percent*
Cellulitis	42	28
Bacteremia (without focus)	37	25
STSS	18	12†
Non-Surgical Wound Infection	17	11
Pneumonia	20	13
Necrotizing Fasciitis	10	7
Other	51	34

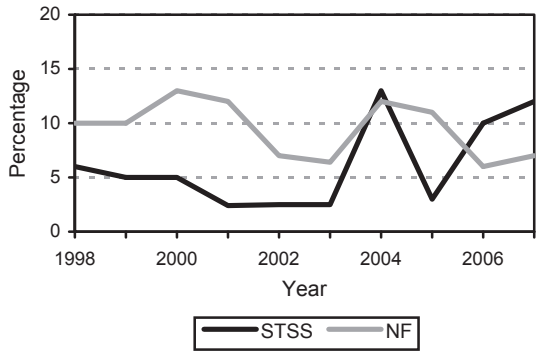
* Overlapping syndromes will total over 100%.
† Denominator data is slightly different for STSS than other syndromes (n=153 for STSS, n=150 for all other syndromes).

COMMENTS

The incidence rate of IGAS has remained relatively unchanged. However, certain demographic groups, including persons aged 65 years and older and blacks, remain at greater risk of infection. In previous years, SPA 5 had the highest incidence rate in the county. However, in 2007, the highest incidence rate was seen in SPA 6 (3.3 cases per 100,000). This change reflects both a decrease in incidence in SPA 5 as well as an increase in incidence in SPA 6. It is uncertain whether this was due to reporting bias or if true changes in incidence of IGAS occurred in these SPAs.

While the percentage of STSS and necrotizing fasciitis cases remained about the same as 2006, the overall case fatality rate increased. Of the 18 STSS cases in 2007, the outcome was known for 15 cases (83%). Of these cases, 7 were fatal (47%). The high case fatality associated with STSS suggests that IGAS case fatality is strongly affected by STSS incidence.

Figure 5
IGAS Clinical Presentation of STSS and NF
LAC, 1998–2007



Although IGAS disease is not a mandated reportable disease in California, LAC DPH has required laboratories, hospitals, and healthcare providers to report IGAS disease since 1993. Surveillance has been predominately passive and information pertaining to patient demographics, clinical presentation, intervention, and outcome was often incomplete in the past. Complete IGAS reporting requires active case follow-up, particularly for STSS and NF as the classification of these syndromes requires more intensive review. In 2002, a new IGAS history form including a specific section for STSS reporting was developed and distributed to infection control professionals. Increased information about IGAS and its various clinical syndromes has been systematically collected since that time with increasing success.

PREVENTION

The spread of IGAS can be prevented by good hand washing. CDC guidelines for good hand washing can be found at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5605a4.htm. All wounds should be kept clean and monitored for signs of infection such as redness, swelling, pus, and pain. A person should seek medical care if any signs of wound infection are present especially if accompanied by fever. High risk groups such as diabetics are encouraged to seek medical care sooner particularly if experiencing fever, chills, and any redness on the skin.

REFERENCE

Centers for Disease Control and Prevention (2007). Active Bacterial Core Surveillance Reports from 1997 to 2007-*Provisional*. Report available at: www.cdc.gov/ncidod/dbmd/abcs/survreports.htm

ADDITIONAL RESOURCES

- General Information – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm
- National Institutes of Health – http://www.niaid.nih.gov/factsheets/strep.htm
- IGAS in Los Angeles County –

Bancroft, E.B. & Hagemen, L. (2006). Risk factors for invasive group A streptococcal disease in Los Angeles County, 2004-2006. *Acute Communicable Disease Control Special Studies Report*, 81-84. Available at: http://lapublichealth.org/acd/reports/spclrpts/spcrpt06/spcl06[1].new.pdf

Hageman, L. (2006). Risk factors for invasive group A streptococcal disease. *The Public's Health*, 6(9), 8-9. Available at: http://www.lapublichealth.org/media/docs/TPH_NovDec_2006v4.pdf

IGAS Publications:

American Academy of Pediatrics Committee on Infectious Diseases (1998). Severe invasive group A streptococcal infections: a subject review. *Pediatrics*, 101(1), 136-140.

Centers for Disease Control and Prevention (2002). Prevention of invasive group A streptococcal disease among household contacts of case patients and among postpartum and postsurgical patients. *Clinical Infectious Diseases*, 35(8), 950-959.

O'Brien, K.L., Beall, B., Barrett, N.L., Cieslak, P.R., Reingold, A., Farley, M.M., et al. (2002). Epidemiology of invasive group A streptococcal disease in the United States, 1995-1999. *Clinical Infectious Diseases*, 35(3), 268-276.

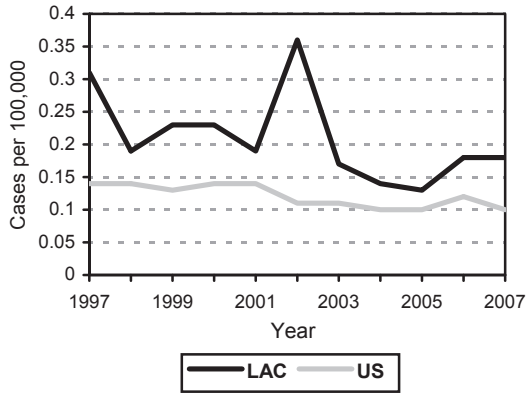
Kaul, R., McGeer, A., Low, D.E., Green, K., Schwartz, B. (1997) Population-based surveillance for group A streptococcal necrotizing fasciitis: clinical features, prognostic indicators, and microbiologic analysis of seventy-seven cases. *American Journal of Medicine*, 103(1), 18-24.

TYPHOID FEVER, ACUTE

CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.18[b]
California	0.16[c]
United States	0.10[c]
Age at Diagnosis	
Mean	36.4
Median	31.0
Range	13-75

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from Final 2007 Reports of Nationally Notifiable Infectious diseases issue of MMWR (57:901, 903-913).

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1997–2007

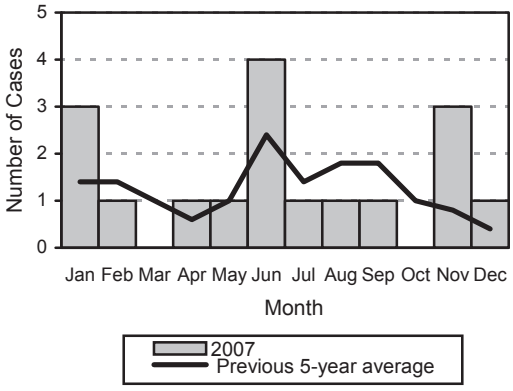


* Rates based on less than 20 observations are unreliable.

DESCRIPTION

Typhoid fever, or "enteric fever," is an acute systemic disease caused by the Gram-negative bacillus *Salmonella typhi*. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Common symptoms include insidious onset of persistent fever, headache, malaise, anorexia, constipation (more commonly than diarrhea), bradycardia, enlargement of the spleen, and rose spots on the trunk. Humans are the only known reservoir for *S. typhi*. Vaccine is available to those at high risk or travelers.

Figure 2
Acute Typhoid Fever
Cases by Month of Onset
LAC, 2007



DISEASE ABSTRACT

- Travel was the most common risk factor identified in LAC; 82.3% of cases reported travel to typhoid endemic countries. One case recently immigrated from an endemic country.
- Fifty-three percent of cases were Asian in 2007.

STRATIFIED DATA

Trends: The yearly incident has decreased after a peak in 2002 however, there was an increase in cases in 2006 but remains stable in 2007.

Age: In 2007, 59% of acute cases were in adults consistent with the five-year average (Figure 3).

Race/Ethnicity: In 2007, acute typhoid cases occurred in Asians and Latinos. There was one white case reported (Figure 4). Black cases are rare. In 2007, Asian cases increased compared to the five-year average.

Figure 3
Acute Typhoid Fever by Age Group
LAC, 2007

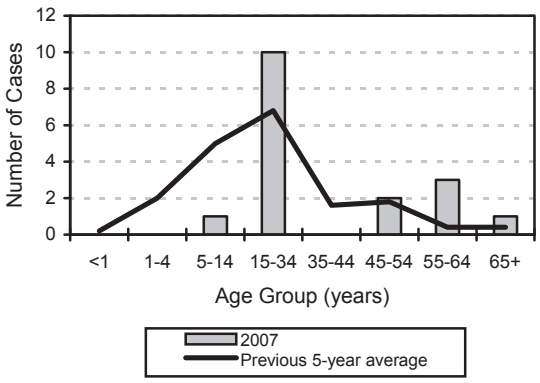
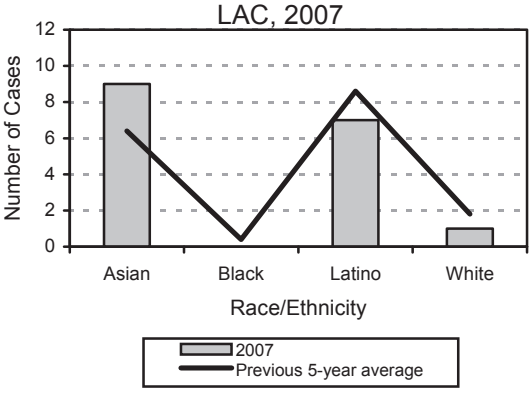


Figure 4
Acute Typhoid Fever by
Race/Ethnicity
LAC, 2007



PREVENTION

Handwashing after using the toilet, before preparing or serving food, and before and after caring for others is important in preventing the spread of typhoid. When traveling to locations where sanitary practices are uncertain, foods should be thoroughly cooked and served at appropriate temperature; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in high endemic areas. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases.

COMMENTS

The majority of cases (n=14, 82.3%) traveled to endemic areas outside the US; Pakistan, India, Bangladesh, Philippines, and Cambodia were reported travel destinations. Some of the cases (n=6, 35%) traveled to India. Typhoid fever may have been a contributing cause to of death in one case.

ADDITIONAL RESOURCES

CDC General Information – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

CDC Traveler's Health Information – http://wwwn.cdc.gov/travel/yellowBookCh4-Typhoid.aspx

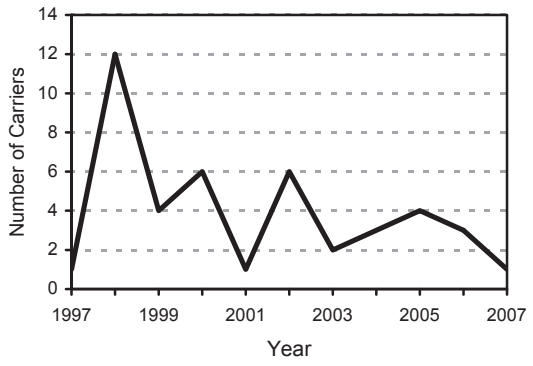
LAC General Information – http://www.lapublichealth.org/acd/Diseases/TyphoidCase.htm

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	1
Total Number of Carriers	10
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	N/A
Range	N/A

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1997–2007



DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella typhi*. Chronic carriers of typhoid are, by definition, asymptomatic. Transmission may occur person-to-person or by ingestion of food or water contaminated by the urine or feces of acute cases or carriers. Humans are the only known reservoir for S. typhi. Among untreated cases, 10% will shed bacteria for three months after initial onset of symptoms and 2-5% will become chronic carriers. The chronic carrier state occurs most commonly among middle-aged women.

DISEASE ABSTRACT

- There was one new carrier of typhoid fever identified in 2007.
- All typhoid carriers are monitored semi-annually and reported to the state registry. During 2007, no carriers of typhoid were closed at the state level. A total of 10 carriers remained under case management in LAC at the end of 2007.

COMMENTS

The single new carrier was foreign born. Previously unknown carriers are sometimes identified when testing household contacts to a new acute typhoid cases for S. *typhi.* The single new carrier was not associated with any acute cases. The carrier was identified during a cholecystectomy.

Upon identification, each new carrier is added to the typhoid carrier registry. All carriers are visited semi-annually by a public health nurse to assess and emphasize compliance with a signed typhoid carrier agreement. Per state code, carriers are to remain under the supervision of the local health officer until cleared. Conditions for release from supervision are also mandated by state code. An approved public health laboratory must test the cultures for the purpose of release.

ADDITIONAL RESOURCES

CDC General Information – http://www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm
LAC General Information – http://www.lapublichealth.org/acd/Diseases/TyphoidCarrier.htm

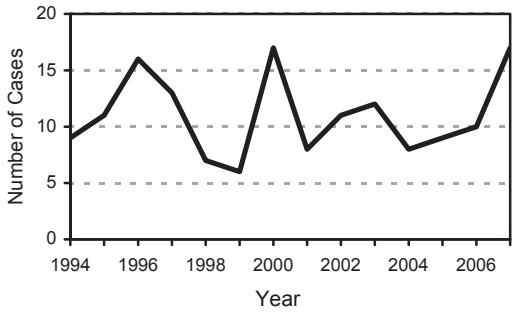
TYPHUS FEVER

CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.18[b]
United States	N/A
Age at Onset	
Mean	39
Median	46
Range	4–65 years

[a] Cases per 100,000 population.

[b] Rates based on less than 20 observations are unreliable.

Figure 1
Murine Typhus
Cases by Year of Onset
LAC, 1994–2007



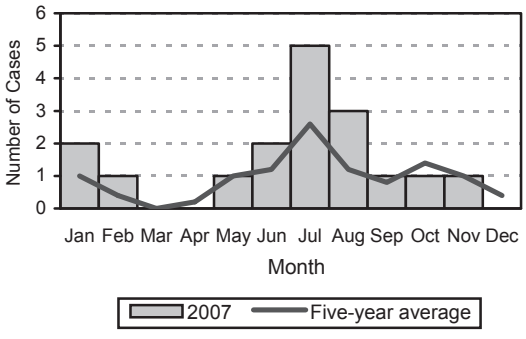
DESCRIPTION

Typhus fever (murine typhus, endemic typhus) is caused by the bacteria, *Rickettsia typhi* and *R. felis*, and transmitted through the bite or contact with feces of an infected flea. Reservoir animals are predominantly rats and opossums that live in areas with heavy foliage. In Los Angeles County (LAC), most reported cases of typhus occur in residents of the foothills of central LAC. Symptoms include fever, severe headache, chills, and myalgia. A fine, macular rash may appear three to five days after onset. Occasionally, complications such as pneumonia or hepatitis may occur. Fatalities are uncommon, occurring in less than 1% of cases, but increases with age. The disease is typically mild in young children. Typhus infection is not vaccine preventable, but can be treated with antibiotics.

DISEASE ABSTRACT

- The number of cases reported in 2007 (n=17) is a 70% increase from 2006 and continues a rise since 2004.
- No outbreaks occurred. However, two cases were linked to visiting a park in San Marino.
- There continues to be increased reports of typhus in LAC Health Districts where typhus has not historically been often seen.

Figure 2
Murine Typhus
Cases by Month of Onset
LAC, 2007



STRATIFIED DATA

Trends: Seventeen cases were reported in 2007, a 70% increase from 2006 (n=10). This number is equivalent to the highest ever reported to LAC DPH when seventeen was also reported in 2000 (Figure 1).

Seasonality: In 2007, a substantial number of cases occurred in July and August (Figure 2). Typhus fever is a seasonal disease and most cases will be seen in the summer and fall. Seasonality is mostly likely related to chance exposure to fleas relating to time spent outdoors with animal reservoirs of infection and their infected fleas.

Age: In 2007, the mean and median ages were 39 and 46 years, respectively. Ages of cases ranged from 4 to 65 years; the largest number of cases occurred in those between 45 and 54 years old (n=6, 35%) (data not shown).

Sex: There were almost twice as many cases reported among females as males. The male-to-female case ratio was 1:1.8. In the past in LAC, gender had been distributed evenly.

Race/Ethnicity: Most cases were of white race/ethnicity (n=12, 71%). One case each (6%) occurred in a Hispanic and an Asian (data not shown). Two cases (12%) had unknown race/ethnicity information.

Location: More than half of the cases (n=11, 65%) were residents of, or reported substantial recreational activity in, health districts around the foothills of central LAC or in the metropolitan area, localities which have historically been endemic for typhus fever. Mammalian reservoirs such as rats, opossum, and cats from these areas have been serologically positive for *R. typhus* and *R. felis*. The remaining six cases resided in the West (n=4, 24%), Torrance (n=1, 6%), and Bellflower (n=1, 6%) health districts, and did not report any activity in the endemic localities.

Transmission and Risk Factors: Human infection most commonly occurs by introduction of infectious flea fecal matter into the bite site or into adjacent areas that have been abraded by scratching. Almost half of the cases in 2007(n=8, 47%) reported an exposure to fleas or flea bites within the 2 weeks prior to onset of illness. Of the cases that were not exposed to fleas, almost all reported keeping pets or observing other types of small mammals (e.g., rats, opossums) on their residential property, and thus may have had exposure to animals that carry fleas. The single case that denied having pets or seeing animals around his residence resided near Griffith Park and had substantial foliage around his home.

COMMENTS

The rise in confirmed cases in 2007 continues an increase seen since 2004. No outbreaks occurred; however, a cluster of two cases were reported with onset in July and was linked to visiting a park in San Marino. The occurrence of typhus in localities where typhus is not usually seen (e.g., West and Bellflower Health Districts) also substantially contribute to the number seen this year. Results from a CDPH/CDC study of fleas collected from opossums from the Long Beach/Orange County outbreak in 2006 indicate that *R. felis* may be the main infectious agent in those jurisdictions. It is possible that *R. felis* is a main infectious agent in adjacent LAC areas as well. On the other hand, the increase in reporting and confirmation may reflect increased awareness of endemic typhus due to media attention and alerts issued by these health departments.

When a diagnosis of typhus fever is confirmed by serology, each case is interviewed regarding potential exposures. If possible, field studies of the property where exposure occurred and surrounding areas in the neighborhood are conducted by an environmental health specialist. In addition, local residents are contacted and provided with education about typhus and prevention of the disease by controlling fleas and eliminating harborage for potentially typhus-infected animals that carry fleas.

The nonspecific clinical presentation and the lack of a definitive test during the acute phase of the illness make the early diagnosis of typhus fever difficult. Thus, diagnosis of typhus fever depends on the clinical acumen of the treating physician and often requires acute and convalescent serology, and so is frequently confirmed after the patient has recovered. Reporting of typhus or suspect typhus cases can help identify areas in LAC that may require monitoring for the presence of disease in the animal populations and the institution of control measures.

PREVENTION

Typhus infection can be prevented through flea control measures implemented on pets. Foliage in the yard should be trimmed so that it does not provide harborage for small mammals. Screens can be placed on windows and crawl spaces to prevent entry of animals into the house.

ADDITIONAL RESOURCES

General information about typhus fever is available from the ACDC website at:
http://www.lapublichealth.org/acd/vectormurine.htm

Publications:

Azad, A.F., Radulovic, S., Higgins, J.A., Noden, B.H. & Troyer, J.M. (2007). Flea-borne rickettsioses: ecologic considerations. *Emerging Infectious Diseases*, 3(3), 319–327.

Civen, R. & Ngo, V. (2008). Murine typhus: an unrecognized suburban vector-borne disease. *Clinical Infectious Diseases*, 46, 913-918.

Sorvillo, F.J., Gondo, B., Emmons, R., Ryan, P., Waterman, S.H., Tilzer, A., et al. (1993). A suburban focus of endemic typhus in Los Angeles County: association with seropositive domestic cats and opossums. *American Journal of Tropical Medicine and Hygiene*, 48(2), 269–273.

Williams, S.G., Sacci, J.B., Schriefer, M.E., Andersen, E.M., Fujioka, K.K., Sorvillo, F.J., et al. (1992). Typhus and typhuslike rickettsiae associated with opossums and their fleas in Los Angeles County, California. *Journal of Clinical Microbiology*, 30(7), 1758–1762.

VIBRIOSIS

CRUDE DATA	
Number of Cases	14
Annual Incidence[a]	
LA County	0.15
United States	0.20
Age at Diagnosis	
Mean	44
Median	43
Range	14–86 years

[a] Cases per 100,000 population.

Figure 1
Selected Vibrio Species
Cases by Year of Onset
LAC, 1997–2007

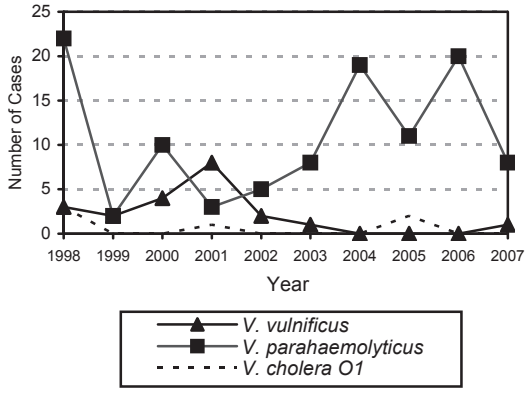
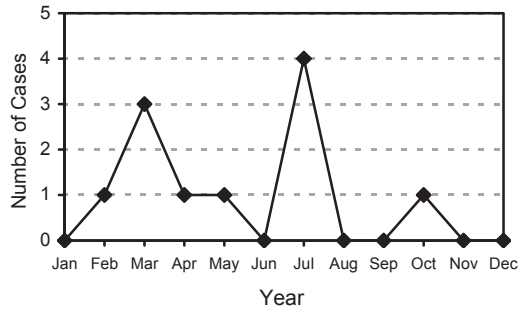


Figure 2
Vibriosis
Cases by Month of Onset
LAC, 2007



DESCRIPTION

The genus *Vibrio* consists of Gram-negative, curved, motile rods, and contains about a dozen species known to cause human illness. Transmission is most often through ingestion via a foodborne route, but also from contact between broken skin and contaminated water. Presenting symptoms vary by species and mode of transmission. The *Vibrio* species of greatest public health importance in the US are: *V. vulnificus* which causes a primary septicemia and is often associated with oysters harvested in the Gulf of Mexico, and *V. parahæmolyticus*, which presents as gastrointestinal illness. Cholera, a potentially fatal diarrheal disease caused by *V. cholerae* serotypes O1 and O139, is rarely imported into the US.

DISEASE ABSTRACT

- Thirteen cases of vibriosis were reported in 2007, a significant decrease from 33 cases reported in 2006. None was fatal.
- There were four cases of *V. alginolyticus* infections, two of which were related to recreational water exposures, one of which was a work-related injury, and one case whose risk factors could not be identified. There was one case of *V. cholerae* non-O1/non-O139 sepsis; risk factors were undetermined. There was one case of *V. vulnificus* in a man who had eaten seafood. No cases of toxigenic *V. cholerae* O1/O139 were reported in 2007.

STRATIFIED DATA

Seasonality: Among reported vibriosis cases with distinct onset dates, the majority (62%, n=8) occurred between June and October (Figure 2). *Vibrio* infections typically increase during the summer months when ocean temperatures rise, allowing the bacteria to flourish.

Age: *Vibrio* cases were all adults except for one juvenile who was 11 years old. The average age of cases was 44 years, median age was 36 years (Table 1).

Severity: For vibriosis cases with distinct onset and resolution dates (n=16), duration of illness averaged 8 days (range 1-43). Five cases required hospitalization.

Table 1. Vibrio Cases by Species, Race, Age and Sex—LAC, 2007

Species	No. of cases	Race (no. of cases)	Mean Age, years (range)	Sex Ratio M:F
V. parahæmolyticus	8	Asian (3), Hispanic(5), white (12), black (0)	45 (14-86)	0.81:1
V. cholerae non-O1/O139	1	Asian (1)	79 (79)	0:1
V. alginolyticus	4	Hispanic (2), white (2)	54.5 (54-55)	2:0
V. vulnificus	1	Hispanic (1)	69 (69)	1:0
V. furnissii	0	n/a	n/a	0:0

Species-specific Risk Factors:

Vibrio parahæmolyticus
Eight cases of *V. parahæmolyticus* were reported during 2007. All 8 were identified through stool culture. Four reported eating seafood recently, with three specifying raw oysters.

***Vibrio cholerae* non-O1/O139**
One case of non-toxigenic *V. cholerae* gastroenteritis was reported in 2007. Its risk factors could not be determined. The case denied eating raw seafood, and had not travelled internationally in years.

Vibrio alginolyticus
Two *V. alginolyticus* infections were wound infections, one of which was caused by a work injury. The other wound infection was in a man suffering from complications due to diabetes. Two *V. alginolyticus* infections were in girls who had recreational seawater exposure.

COMMENTS

In LAC, risk of *Vibrio* infection can be reduced by not eating raw fish and shellfish. In 2007, there was a dramatic reduction in *V. parahæmolyticus* cases from the previous year. This is probably a result of close oversight by oyster harvesters in Washington State, following the *V. parahæmolyticus* outbreak in 2006. Adult men may be more at risk for *Vibrio* infections because of their tendency to engage in behaviors exposing them to seawater and untreated water (such as surfing or river rafting) or to eat raw or partially cooked seafood, especially oysters. However in 2007 males and females were equally to cite recreational water exposures as a risk factor for their infections.

There was a higher number of *V. alginolyticus* cases in 2007 than in the previous three years. The two cases that occurred in females were related to recreational water exposure. Warmer summer temperatures may be affecting the growth of *Vibrio alginolyticus* in the water.

ADDITIONAL RESOURCES

Mouzin, E., Mascola, L., Tormey, M.P. & Dassey, D.E. (1997). Prevention of *Vibrio vulnificus* infections. Assessment of regulatory educational strategies. *Journal of American Medical Association*, 278(7), 576-578. Retrieved November 10, 2008, from the JAMA Web site: http://jama.ama-assn.org/cgi/content/abstract/278/7/576

More information on Centers for Disease Control and Prevention — http://www.cdc.gov/nczved/dfbmd/disease_listing/vibriov_gi.html

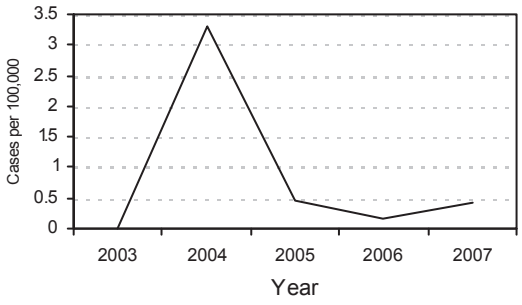
WEST NILE VIRUS

CRUDE DATA	
Number of Cases	43
Annual Incidence[a]	
LA County	0.44
California[b]	1.04
United States[b]	1.20
Age at Diagnosis	
Mean	61.5
Median	62
Range	15–94 years

[a] Cases per 100,000 population.

[b] Incidence calculated with 2007 population estimates from www.census.gov.

Figure 1
West Nile Virus Disease
Incidence Rates by Year of Onset
LAC, 2003-2007



DESCRIPTION

Life Cycle and Epidemiology

West Nile virus (WNV) is a single-stranded RNA virus placed within the family Flaviviridae, genus Flavivirus. Within the genus Flavivirus, WNV has been serologically classified within the Japanese encephalitis (JE) virus antigenic complex, which includes the human pathogens JE, Murray Valley encephalitis, Saint Louis encephalitis (SLE), and Kunjin viruses.

WNV was indigenous to Africa, Asia, Europe, and Australia, and was introduced to North America in 1999, when it was first detected in New York City. The likely origin of the introduced strain was the Middle East, but the mode of introduction remains unknown. Since 1999, human and non-human WNV surveillance data has documented that WNV has extended its range through most of the continental United States as well as to Canada and Mexico.

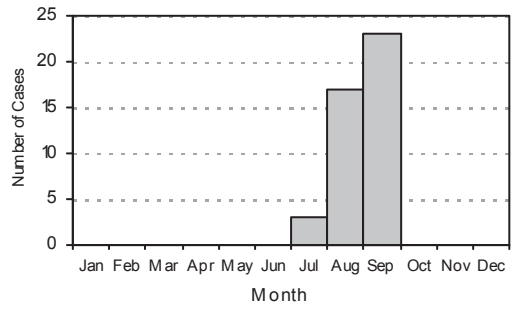
The life cycle of the virus involves the transmission of the virus between mosquitoes and bird reservoir hosts. Humans are incidentally infected when bitten by an infected mosquito, usually a *Culex* or *Anopheles* species. The incubation period for human infection is 2 to 14 days. Birds, especially corvids such as the North American crow, are the optimal hosts for harboring and replicating the virus. Mosquitoes become infected when they feed on infected birds**,** which may circulate high level of viremia for several days. Infectious mosquitoes carry virus particles in their salivary glands and infect susceptible bird species during blood-meal feeding. Bird reservoirs will sustain an infectious viremia for 1 to 4 days.

In 2002, evidence of WNV transmission was shown to occur via the transfer of all blood product components including platelets, packed red blood cells, and plasma. Beginning 2003, blood donors were screened for WNV infection utilizing polymerase chain reaction (PCR) testing. Millions of units of blood were screened for WNV utilizing PCR based technology, testing donor mini-pools. Though asymptomatic donors have been identified as positive for WNV in LAC, no transmission associated with blood products has been reported. Additional routes of transmission that have been documented include transplantation of WNV-infected organs, transplacental (mother-to-child), occupational exposures, and through breast milk.

Clinical Infection and Diagnosis

Most persons who become infected with WNV will not develop clinical illness or symptoms. About 20% of persons infected will develop WNV fever with symptoms that include fever, headache, rash, muscle weakness, fatigue, nausea and vomiting, and occasionally lymph node swelling. Approximately one in 150 patients will develop more severe illness, manifesting as WNV neuro-invasive disease (NID). WNV NID includes encephalitis, meningitis, and acute flaccid paralysis (AFP). WNV-associated encephalitis is commonly associated with fever, altered mental status, headache, and seizures; WNV encephalitis usually necessitates high levels of specialized medical care. Focal neurologic deficits, including limb paralysis, cranial nerve palsies, Parkinsonian-like tremors, and other movement disorders have been observed. WNV-associated meningitis usually involves fever, headache, and stiff neck, and has a good prognosis.

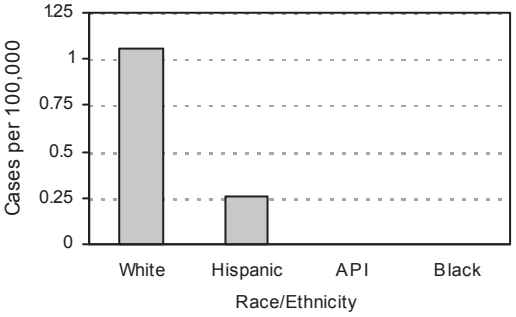
Figure 2
West Nile Virus Disease
Cases by Month of Onset
LAC, 2007 (N=43)



DISEASE ABSTRACT

- The overall incidence of reported WNV infections in 2007 was 0.44 cases per 100,000 population, rising from a low of 0.17 in 2006 when only 16 cases were confirmed (Figure 1).
- Case fatalities (n=5) occurred for the first time since 2004.
- Meningitis continues to be the most commonly reported clinical condition, comprising 32% (n=14) of cases.
- Most WNV infections occurred in persons residing in San Fernando Valley.

Figure 3
West Nile Virus Disease
Incidence Rates by Race/Ethnicity
LAC, 2007



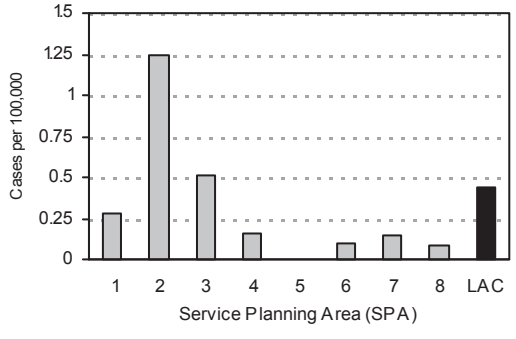
STRATIFIED DATA

Trends: WNV infection, including in asymptomatic blood donors, occurred at an incidence rate of 0.44 per 100,000 population in 2007. Both the total number and incidence of WNV infection has decreased dramatically since 2004 when 309 cases were confirmed at an incidence of 3.3 cases per 100,000 population (incidence re-calculated with updated population estimates) (Figure 1).

Seasonality: Onset of cases occurred July through October and peaked in September (Figure 2). Since 2004, the onset of WNV cases has been limited to July through October.

Age: The median age was 62 years (range: 15–94 years). The highest incidence occurred in the 65 and over age group (1.9 per 100,000) (data not shown).

Figure 4
West Nile Virus Disease
Cases by Service Planning Area
LAC, 2007



Almost all cases (n=40, 93%) were at least 45 years old.

Sex: Over three times as many male WNV cases were reported than female cases, a rate ratio of 3.4:1. The incidence rates were 0.68 cases and 0.20 cases per 100,000, respectively.

Race/Ethnicity: In 2007, WNV cases occurred only in whites and Hispanics, with whites accounting for the greatest proportion of reported cases (72%) as well as the highest incidence rates of infection (n=31, 1.1 per 100,000). Hispanics comprised 28% of cases (n=12, 0.26 per 100,000) (Figure 3).

Location: The greatest number of reported WNV cases were reported from SPA 2, the San Fernando Valley area (n=27, 1.3 per 100,000). The second highest incidence occurred in SPA 3, the San Gabriel Valley area (n=9, 0.51 per 100,000). WNV occurred sparsely and sporadically in the remaining SPA locations (Figure 4).

Disease Severity: The WNV infections reported presented most frequently as neuroinvasive disease (n=28, 65%); 12 were diagnosed as encephalitis, 14 as meningitis, and 2 as acute flaccid paralysis. A substantial number of infections were asymptomatic blood donors (n=7, 16%). Of those symptomatic cases, 86% (n=31) were hospitalized. Five fatalities (12%) occurred in 2007, the first since 2004 when 14 deaths (5% of cases) were reported. Four of the deaths were diagnosed with encephalitis and one with WNV fever.

COMMENTS

The first symptomatic WNV case in LAC associated with environmental evidence was documented in 2003. In 2004, an outbreak of 309 WNV infections, including asymptomatic blood donors, with 14 deaths were reported in LAC — the most of any CA jurisdiction. In response to the outbreak, LAC DPH added WNV infection to its list of reportable diseases by authority of the Health Officer under California Code of Regulations, Title 17, Sections 2511 and 2505. Physicians and laboratories are required to report all positive laboratory findings of WNV tests to the DPH within one working day.

The following years presented a markedly different picture, with numbers declining to a low of 16 in 2006. This year, however, over twice as many cases were reported. The rise in cases, as well as the continued detection of positive mosquito pools, dead birds and other reservoir animals, has demonstrated that WNV remains endemic in the LAC and southern CA region. As the number of cases has fluctuated greatly from year to year (ranging from 16 to 43 since 2005), the baseline level of cases expected for this region remains to be seen. Sustained surveillance of humans, as well as other animals, will be required in the coming years to help guide public health officials in providing targeted health education to communities at particularly high risk.

PREVENTION

Prevention and control of WNV and other arboviral diseases is most effectively accomplished through integrated vector management programs. These programs include surveillance for WNV activity in mosquito vectors, birds, horses, other animals, and humans; and implementation of appropriate mosquito control measures to reduce mosquito populations when necessary. Additionally, when virus activity is detected in an area, residents are alerted and advised to increase measures to reduce contact with mosquitoes. Currently, there is no human vaccine available against WNV but several vaccines are under development. Important preventive measures against WNV include the following:

- Apply insect repellant to exposed skin. A higher percentage of DEET in a repellent will provide longer protection. DEET concentrations higher than 50% do not increase the length of protection.
- When possible, wear long-sleeved shirts and long pants when outdoors for long periods of time.
- Stay indoors at dawn, dusk, and in the early evening, which are peak mosquito biting times.
- Help reduce the number of mosquitoes in areas outdoors by draining sources of standing water. This will reduce the number of places mosquitoes can lay their eggs and breed.

A wide variety of insect repellent products are available. CDC recommends the use of products containing active ingredients which have been registered with the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing. EPA registration of repellent active ingredients indicates the materials have been reviewed and approved for efficacy and human safety when applied according to the instructions on the label. Of the active ingredients registered with the EPA, three have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature. Products containing these active ingredients typically provide longer-lasting protection than others:

DEET (N,N-diethyl-m-toluamide)
Picaridin (KBR 3023)
Oil of lemon eucalyptus

Oil of lemon eucalyptus [p.menthane 3, 8-diol (PMD)], a plant based repellant, is registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the US it provided protection similar to repellants with low concentrations of DEET.

VECTOR CONTROL

There are five local mosquito and vector control districts within LAC that provide mosquito abatement services to all areas of the county. They carry out mosquito and sentinel chicken surveillance, provide public information, and are critical to mosquito-borne disease control. They include:

- Greater Los Angeles County Vector Control District (GLACVCD)
- San Gabriel Valley Mosquito and Vector Control District (SGVMVCD)
- Los Angeles County West Vector Control District (LACWVCD)
- Antelope Valley Mosquito and Vector Control District (AVMVCD)
- Compton Creek Mosquito Abatement District (CCMAD)

These five local mosquito and vector control districts work closely with the ACDC to investigate confirmed and presumptive human cases of locally acquired mosquito-borne disease to identify mosquito breeding sites and to put into place appropriate control measures.

ADDITIONAL RESOURCES

- Centers for Disease Control and Prevention: http://www.cdc.gov/ncidod/dvbid/westnile/index.htm
- California Department of Health Services: http://www.westnile.ca.gov
- Acute Communicable Disease Control Program, Los Angeles County Public Health: http://www.lapublichealth.org/acd/index.htm
- Vector Management Environmental Health, Los Angeles County Public Health: http://www.lapublichealth.org/eh/index.htm
- For additional information on EPA-registered repellants: http://www.epa.gov/pesticides/factsheets/insectrp.htm

Mosquito and Vector Control District Websites:

- Greater Los Angeles County Vector Control District: http://www.glacvcd.org
- West Los Angeles Vector Control District: http://www.lawestvector.org
- San Gabriel Valley Mosquito and Vector Control District: http://www.sgvmosquito.org
- Antelope Valley Mosquito and Vector Control District: http://www.avmosquito.org
- Mosquito and Vector Control Association of California: http://www.mvcac.org

DISEASE OUTBREAK SUMMARIES

2007

COMMUNITY-ACQUIRED DISEASE OUTBREAKS

ABSTRACT

- In 2007, 130 community-acquired disease outbreaks accounted for 1,690 cases of illness (Figure 1).
- Schools were the most common setting of community-acquired outbreaks (46%).
- The number of reported outbreaks (130) was a decreased from 2006 and below the previous 7-year average (142).

DATA

Disease outbreaks are defined as clusters of illness that occur in a similar time or place, or case numbers above baseline for a specified population or location. Depending on the nature of the outbreak, investigation responsibility is maintained by either ACDC or Community Health Services with ACDC providing consultation as needed. The outbreaks reported in this section do not include outbreaks associated with food (see Foodborne Outbreaks chapter) or facilities where medical care is provided (see Healthcare Associated Outbreaks chapter).

Varicella caused most community-acquired outbreaks in LAC (32%) gastroenteritis (GE) of various etiologies, followed by ectoparasites (scabies and pediculosis) were the second and third most common cause of outbreaks, comprising 25% and 18% of all outbreaks respectively (Figure 2, Table 1). Collectively accounting for 75% of all community-acquired outbreaks in 2007, the dominance of these three disease categories is similar to past years (75% in 2006 and 2005 and 72% in 2004).

GE outbreaks, specifically caused by norovirus, had the highest incident-specific case average attributed to the seven confirmed norovirus outbreaks (mean of 35 cases per outbreak), followed by 16 undetermined GE outbreaks (mean of 15 cases per outbreak). While not laboratory confirmed, the signs and symptoms of these undetermined GE outbreaks were consistent with a norovirus presumptive diagnosis. Important to note in 2007, due to a documented increase in county-wide norovirus activity, a reduction in collecting diagnostic viral specimens was instituted. Larger outbreaks might have been more likely to warrant additional laboratory testing. While the overall number of outbreaks for 2007 decreased from the previous year, the number of GE outbreaks (both norovirus confirmed and clinically suspect) went up in 2007. These figures highlight the increased circulation of norovirus and reflect the ease this agent can be transmitted from person-to-person in

Figure 1
Community Acquired Outbreaks
Number of Persons Affected
LAC, 2000–2007

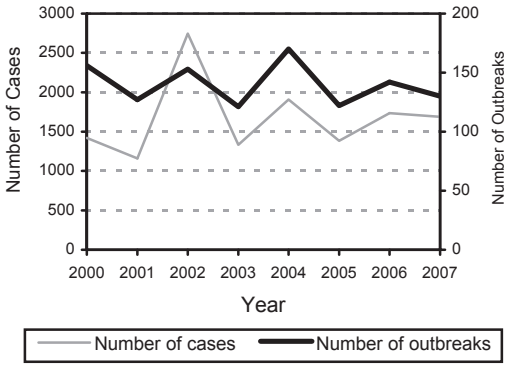
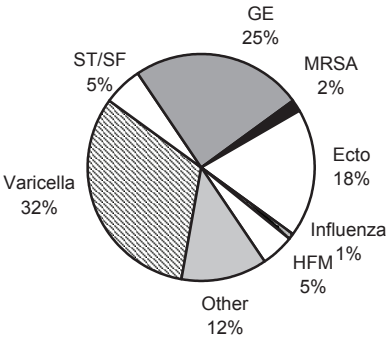
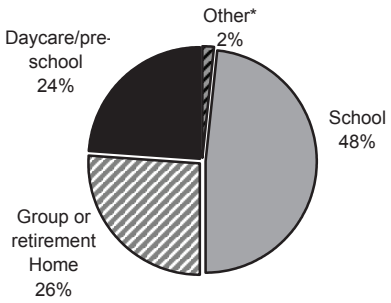


Figure 2
Community-Acquired Outbreaks by
Type of Disease* LAC, 2007 (N=130)



* ST/SF=strep throat/scarlet fever; Ecto=ectoparasites; HFM=Hand, foot & mouth; GE=Gastroentestinal; Other=unknown respiratory, RSV, impetigo, unknown febrile illness.

Figure 3
Community Outbreaks by Setting
LAC, 2007 (N=130)

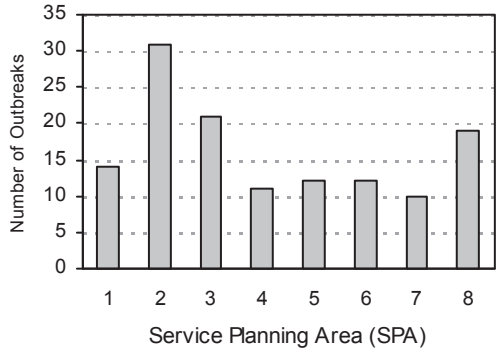


* Other includes: juvenile camp, detention center

community settings. (Table 1).

The most common outbreak settings (Figure 3) for illness transmission were schools [elementary schools (51), middle schools (8), after-school care (1), high schools (1), and universities (2)] accounting for 48% of all outbreaks. The predominance of reported outbreaks affecting children in school settings can be seen over the last several years. Settings with young children in daycare or pre-school accounted for an additional 20%. Group and retirement home settings were the second most common site of community-acquired outbreaks reported in 2007, accounting for 26% of all outbreaks. The 2006 year also reported high impact in this setting (30%). This recent two year figures more than doubles the previous five-year-average percentage of 13% ranging from 11% to 16%.

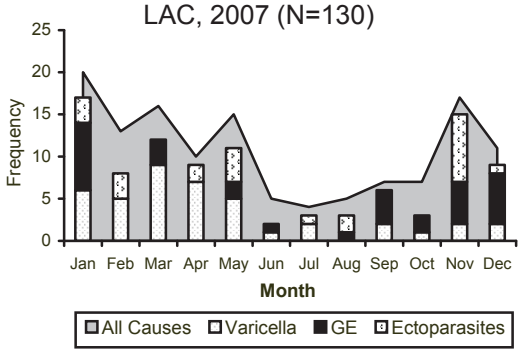
Figure 4
Community Outbreaks by SPA
LAC, 2007 (N=130)



Outbreaks were reported from all eight SPAs (Figure 4). SPA 2, in the San Fernando Valley, had the most outbreaks (31) for 2007.

The chart of community-acquired outbreaks by onset month (Figure 5) shows a bimodal distribution. Varicella outbreaks predominated the early months of the year. GE occurred throughout the year, but tended towards the cooler months with outbreaks focused in the winter, spring and fall. This cooler season predominance illustrates the importance of norovirus circulation during this reporting period.

Figure 5
Community Outbreaks by Selected Diseases and Onset Month
LAC, 2007 (N=130)



COMMENTS

There was a decrease in the number of outbreaks and outbreak associated cases in 2007 from the prior year; however, the number of outbreaks in 2007 was closer to the median of outbreaks for the last eight years. Varicella remained the most common cause of community-acquired outbreaks in LAC since 1999 (also see summary of the Varicella Project in the Special Reports section). In 2007, eight varicella outbreaks were identified in the Antelope Valley Health District (SPA 1), where the LACDHS Varicella Acute Surveillance Project is in place, which tied SPA 2 for most reported outbreaks of varicella.
Community-acquired outbreaks result in an interaction among particular age groups, location and specific diseases. A profile emerges where the very young and early adolescent acquire infection/infestation at school (70% in pre-school, elementary, middle, or after-school). Varicella, pediculosis (head lice), and gastroenteritis were most common in this young group. The second age group affected by outbreaks is in the older population associated with group-home settings (26%). In this age category, GE and scabies are the most common causes (Table 2). The increased ranking of the group and retirement home as a setting for outbreaks was fueled by the increased norovirus activity during 2007.

Table 1. Community-Acquired Outbreaks by Disease— LAC, 2007

Disease	No. of outbreaks	No. of cases	Cases per outbreak (average)	Cases per outbreak (range)
Varicella	42	515	12	5-48
Scarlet fever/strep throat	7	56	8	4-15
Scabies	14	82	6	2-16
Hand, foot & mouth disease	6	28	5	2-9
Pediculosis	10	116	12	3-26
GE illness - Norovirus	7	246	35	13-59
GE illness - Shigella	2	6	3	2-4
GE illness - Unknown	23	375	16	3-38
Fifth disease	5	46	9	5-16
Conjunctivitis	4	48	12	3-20
MRSA	2	13	7	6-7
Influenza B	1	4	4	4
Other*	7	115	22	4-45
Total	**130**	**1,690**	**13**	**2–59**

* Includes: unknown respiratory, RSV, impetigo, unknown febrile illness.

Table 2. Community-Acquired Outbreaks by Disease and Setting — LAC, 2007

Disease	Group Home[a]	School[b]	Preschool or Daycare	Other[c]	Total
Varicella	0	40	1	1	**42**
Scarlet fever/strep throat	0	4	3	0	**7**
Scabies	13	1	0	0	**14**
Hand, foot & mouth disease	0	1	5	0	**6**
Pediculosis	0	5	5	0	**10**
GE illness - Norovirus	3	1	3	0	**7**
GE illness - Shigella	1	0	1	0	**2**
GE illness - Unknown	15	2	6	0	**23**
Fifth disease (Parvovirus)	0	5	0	0	**5**
Conjunctivitis	0	1	3	0	**4**
MRSA	1	1	0	0	**2**
Influenza B	1	0	0	0	**1**
Other	0	2	4	1	**7**
Total	**34**	**63**	**31**	**2**	**130**

[a] Includes centers for retirement, assisted living, rehabilitation, and shelter.
[b] Includes elementary (51), middle (7), after-school (1), high schools (1) and university (2).
[c] Includes juvenile camp, detention center.

FOODBORNE OUTBREAKS

DESCRIPTION

Foodborne outbreaks are caused by a variety of bacterial, viral, and parasitic pathogens, as well as toxic substances. To be considered a foodborne outbreak, both the state and the CDC require at minimum the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food or drink (CDC, 1996).

The system used by LAC DPH for detection of foodborne outbreaks begins with a Foodborne Illness Report (FBIR) from individuals or healthcare providers. This surveillance system monitors complaints from residents, illness reports associated with commercial food facilities, and foodborne exposures uncovered during disease-specific case investigations (e.g., *Salmonella, Shigella, Campylobacter*). LAC Environmental Health Services Food and Milk (F&M) Program investigates each FBIR by contacting the reporting individual and evaluating the public health importance and need for immediate follow-up. When warranted, a thorough inspection of the facility is conducted. This is often sufficient public health action to prevent additional foodborne illnesses.

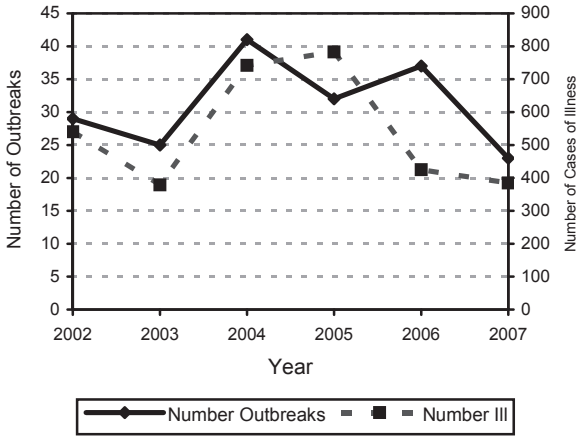
ACDC's Food Safety Unit and F&M review all FBIRs and investigate reports with the greatest public health importance. An epidemiologic investigation will typically be initiated when there are illnesses in multiple households, multiple reports from the same establishment in a short period of time, or ill individuals who attended a large event with the potential for others to become ill. The objective of each investigation is to determine the agent of infection, determine extent of the outbreak, identify a food vehicle or processing error, and take any actions needed to protect the public's health.

OVERVIEW

In 2007 there were 16% fewer FBIRs reported than in 2006 (1700 versus 2019). The F&M program contacted each individual making the FBIR, and performed a site inspection on 32% of FBIR reports that were deemed high priority (n=537). The remaining FBIRs were referred to district Environmental Health F&M inspectors or another agency for follow-up.

Of the 31 investigations conducted by ACDC that were suspected to be foodborne in 2007, 30 were conducted by the Food Safety Unit. Of the 31 investigations, 26 were initiated by FBIR complaints and 5 were initiated through other surveillance activities. Ten of the 31 outbreaks were determined to be person-to-person transmission of norovirus in a food setting and not considered to be food-related (32%). The remaining 21 outbreaks determined to be foodborne are summarized here. These 21 outbreaks encompassed 385 cases of foodborne illness with an average of 7 persons per outbreak (range 2-70 cases) (Figure 1).

Figure 1
Foodborne Outbreaks
Number of Persons Affected
LAC, 2002–2007



Seasonality: Foodborne outbreak investigations occurred throughout the year in 2007, with no seasonal pattern (Figure 2).

Implicated Food Vehicles: A food vehicle was epidemiologically implicated in 57% of foodborne outbreaks (n=12). Implicated food

items included produce (n=7), egg dishes (n=2), poultry (n=1), fish (n=1) and molé with multiple ingredients (n=1).

Agent: An agent was identified in 90% of foodborne outbreak investigations (n=19). Agents were confirmed in 57% of these outbreaks (n=12), which was an improvement over previous years (Figure 3). Reasons for no laboratory testing include lack of cooperation, delayed notification and cases being out of town or unavailable.

The most prevalent agents identified in foodborne outbreaks in 2007 were bacterial (43%, n=9), which included Salmonella (n=5), Campylobacter (n=1), Shigella (n=1), and bacterial toxin (n=2). The number of outbreaks determined to be caused by a bacterial agent in 2007 was comparable to that seen in 2006 (9 versus 8).

Norovirus was also a common agent laboratory confirmed and suspected in outbreak investigations in 2007 (38%, n=8). The number of foodborne outbreaks where norovirus was identified in 2007 was down 70% from what was seen in 2006 (8 versus 27), indicating a milder norovirus season in 2007. The LAC Public Health Laboratory tests human specimens for norovirus using the reverse transcription-polymerase chain reaction (RT-PCR) method. Results are used for confirming the etiology agent of an outbreak and not for diagnosing individual cases.

Contributing Factors: An ill food handler was identified in three outbreaks (14%). Two of these outbreaks involved the same food handler. Two food handlers were identified with hepatitis A in one outbreak. The Public Health Department provided notification and prophylaxis to persons potentially exposed to foods prepared by the ill food handlers. No patrons reported illness and no additional cases of hepatitis A were found related to the restaurant.

Outbreak Location: The most common locations for reported foodborne outbreaks were restaurants (52%, n=11) followed by food that was brought or catered to a work place (19%, n=4). Other locations include places of worship, schools, and fairs. The largest number of outbreaks were reported from SPA 2 (24%) (Table 1). There was one multi-district and one multi-county outbreak, but there were no outbreaks that involved multiple states.

Figure 2
Foodborne Outbreak Investigations
by Month of Onset
LAC, 2007 (N=21)

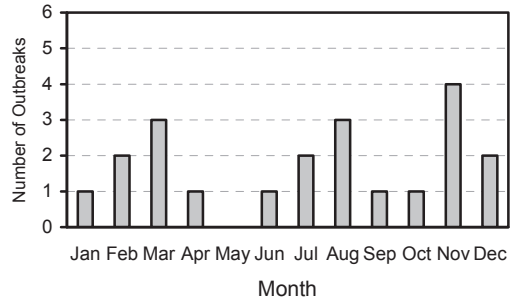


Figure 3
Foodborne Outbreaks
% with Suspected/Confirmed Etiologic Agent
LAC, 2003–2007

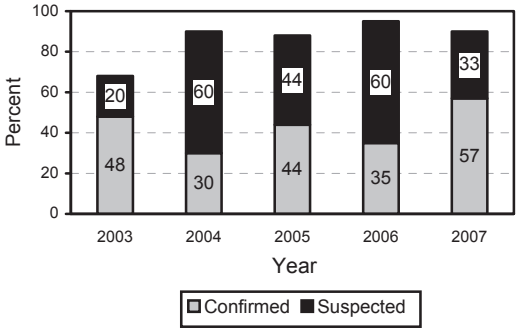


Figure 4
Foodborne Outbreaks
by Etiologic Agent Category
(Lab Confirmed and Suspect)
LAC, 2003–2007

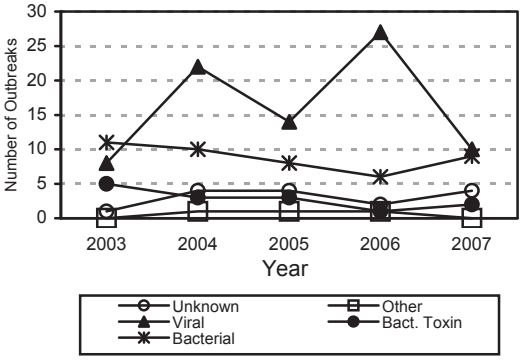


Table 1. Frequency of Foodborne Outbreaks by Location, 2007 (N=21)

SPA	Frequency	Percent
1	2	10%
2	5	24%
3	3	14%
4	4	19%
5	1	5%
6	1	5%
7	1	5%
8	3	14%
Multi-district	1	5%
Multi-county	1	5%
Multi-state	0	0%
Total	21	106%

INVESTIGATION HIGHLIGHTS

There were fewer FBIRs received from consumers by ACDC and fewer foodborne outbreaks investigation in 2007 than occurred in 2006. The reduction in FBIRs from consumers in 2007 may indicate a true decrease in foodborne illness in the community, but the actual cause is unknown. Persons with mild symptoms, long incubation periods, and poor public and medical community awareness of public health procedures may contribute to under-reporting of foodborne disease as well.

The largest foodborne outbreak investigated this year by the Food Safety Unit involved two separate LAC restaurants with 89 cases identified. Laboratory results confirmed the agent in this outbreak as norovirus. The outbreak was attributed to an ill food handler working at both locations. Case control analysis of food items eaten at both restaurants implicated green salad or fruit salad items.

A large shigellosis outbreak occurred at a restaurant with most of the 72 cases identified as residing in LAC. Laboratory results confirmed the agent in this outbreak as *Shigella sonnei.* Case control analysis of food items eaten implicated pre-made salads or leafy greens in this outbreak.
A large salmonellosis outbreak occurred at a restaurant in the city of Los Angeles, with 39 cases identified. Laboratory results confirmed the outbreak as *S. enteridid*is. A hollandaise sauce made with shell eggs was implicated in the case control food analysis.

A bacterial toxin outbreak occurred among persons eating precooked fried chicken at an office luncheon with 15 cases identified. The chicken eaten at the event tested positive for high levels of bacteria (*C. perfringens)* at the LAC Public Health Laboratory. The outbreak was most likely due to mishandling of the food by event organizers.

ACDC along with LAC Community Health Services also investigated a report of two food handlers ill with Hepatitis A from two separate catering companies. Notification and prophylaxis were provided to persons potentially exposed to foods prepared by the ill food handlers. No cases of hepatitis A were subsequently reported.

Table A. Foodborne Outbreaks in LAC, 2007 (N=21)

	Agent	Species	Confirmed/ Suspected	Source	Setting	OB#	Cases	HD
1	Norovirus		Confirmed	Undetermined	Workplace	31	35	31
2	Norovirus		Confirmed	Salads	Restaurant	161	20	86
3	Norovirus		Confirmed	Salads	Restaurant	163	29	62
4	Norovirus		Suspected	Undetermined	Restaurant	70	15	5
5	Norovirus		Suspected	Undetermined	Restaurant	149	7	34
6	Norovirus		Suspected	Berries	Restaurant	181	30	86
7	Norovirus		Suspected	Undetermined	Workplace	197	11	91
8	Norovirus		Suspected	Undetermined	Restaurant	3	7	79
9	Salmonella	montevideo	Confirmed	Sprouts	Community	99	3	multi
10	Salmonella	heidelberg	Confirmed	Molé	Church	114	15	69
11	Salmonella	agona	Confirmed	Undetermined	Community	98	6	5
12	Salmonella	enteritidis	Confirmed	Eggs hollandaise	Restaurant	129	39	34
13	Salmonella	enteritidis	Confirmed	Mac Cheese	Residence	179	14	79
14	Bacterial toxin	C. perfringens	Confirmed	Chicken	Workplace	1	15	9
15	Bacterial toxin		Suspected	Beans	Residence	62	25	6
16	Campylobacter	jejuni	Confirmed	Watermelon	Fair	130	4	19
17	Shigella	sonnei	Confirmed	Wonton Salad/ Spinach	Restaurant	136	72	5
18	Tetrototoxin		Suspected	Fish	Restaurant	63	2	91
19*	Hepatitis A		Confirmed	N/A	Restaurant	46	2	84
20	Undetermined		N/A	Undetermined	Restaurant	120	5	34
21	Undetermined		N/A	Undetermined	Workplace	135	16	25

* Investigation conducted by ACDC, EHFM and DPHN

REFERENCE

Centers for Disease Control and Prevention (1996). Surveillance for foodborne disease outbreaks – United States, 1988-1992. *Morbidity and Mortality Weekly Report*, 45(SS-5), 58. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/00044241.htm

ADDITIONAL RESOURCES

LAC resources:

- Communicable Disease Reporting System
  Hotline: (888) 397-3993
  Faxline: (888) 397-3779
- For reporting and infection control procedures consult the LAC DHS Foodborne Disease Section in the B-73 Manual – http://lapublichealth.org/acd/procs/b73/b73index.htm

Centers for Disease Control and Prevention:

- Foodborne and Diarrheal Diseases Branch – http://www.cdc.gov/enterics/
- Outbreak Response and Surveillance Team – http://www.cdc.gov/foodborneoutbreaks/
- FoodNet – http://www.cdc.gov/foodnet/
- Norovirus Information – http://www.cdc.gov/foodborneoutbreaks/

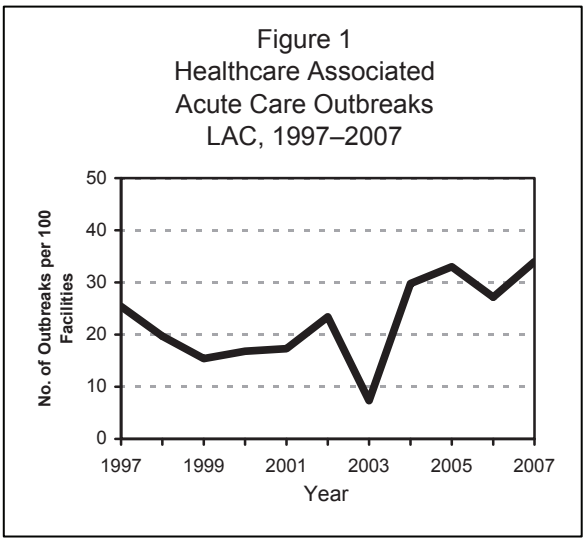
Other national agencies:

- FDA Center for Food Safety and Applied Nutrition – http://www.cfsan.fda.gov/
- Gateway to Government Food Safety Information – http://www.foodsafety.gov/

HEALTHCARE ASSOCIATED OUTBREAKS: ACUTE CARE HOSPITALS, CLINICS AND PROVIDER OFFICES

DEFINITION

Healthcare associated outbreaks occur in acute care hospitals, clinics, or other types of healthcare facilities. This chapter will discuss outbreaks in aforementioned healthcare settings excluding subacute settings such as skilled nursing facilities (see separate chapter in this report). Outbreaks in such settings are defined as clusters of nosocomial (health-facility acquired) infections related in time and place, or occurring above a baseline or threshold level for a facility, specific unit, or ward. Baseline is defined as what is normally observed in a particular setting.



ABSTRACT

Confirmed acute care hospital outbreaks increased 25% from 2006 to 2007 to the highest number in 10 years.

Table 1. Number of Reported Outbreaks in Acute Care Hospitals, Clinics and Provider Offices—LAC, 2003-2007

	YEAR				
Type of Facility	**2003**	**2004**	**2005**	**2006**	**2007**
Acute Care Hospitals	8	31	34	28	35
Clinic	0	0	0	0	1
Provider Office	0	0	0	0	2
Total	**8**	**31**	**34**	**28**	**38**

Acute Care Hospitals: There were 35 outbreaks reported in acute care hospitals in 2007 (Table 1). Thirty-four percent (n=12) occurred in a unit providing intensive or focused specialized care (e.g., NICU, cardio-thoracic unit, telemetry) (Table 2). Nine percent (n=3) occurred in the psychiatric or behavioral unit and 14% (n=5) occurred in a subacute unit located within the acute care hospital. Scabies outbreaks continues to account for the majority of acute care outbreaks (n=14, 40%). Forty-six percent (n=16) of acute care outbreaks were of bacterial etiology (Table 3). Drug resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and vancomycin-resistant enterococci (VRE) were responsible for 11 outbreaks (31%) in 2007, with more than half attributed to *Acinetobacter baumannii* (n=7). In 2007, the etiologic agents contributing the largest number of cases in acute care outbreaks were *C. difficile* (n=179, 34%) followed by *A. baumannii* (n =141 or 27%).

Clinics/Provider Offices: Three outbreaks occurred in an outpatient clinic or private provider office associated with an acute care hospital. The ectoparasite *Sarcoptes scabiei* caused one outbreak with the majority of cases (n=9, 33%) (Table 4). Inadequate cleaning and disinfection of a reusable medical device

resulted in two outbreaks (67%) caused by multiple bacterial organisms, such as *Pseudomonas aeruginosa*, *Klebsiella oxytoca* and *Enterobacter cloacae.*

Table 2. Acute Care Hospital Outbreaks by Unit—LAC, 2007

Outbreak Location	No. of Outbreaks
Cardio-thoracic	1
Hematology-Oncology	1
Intensive Care – Adult	5
Intensive Care- Neonatal	2
Medical-Surgical	4
Psychiatric	3
Sub-acute Unit within a Hospital	5
Telemetry	3
Transitional Care	2
Multiple Units	9
Total	**35**

Table 3. Acute Care Hospital Outbreaks by Disease/Condition—LAC, 2007

Disease/Condition/ Etiologic Agent	No. of Outbreaks	No. of Cases
Acinetobacter baumannii	7	141
Aspergillosis	2	7
Clostridium difficile	4	179
MRSA	1	5
Norovirus	2	46
Pseudomonas aeruginosa	2	13
Scabies	14	85
Vancomycin-resistant Enterococci (VRE)	1	28
Unknown Gastroenteritis	2	25
Total	**35**	**529**

Table 4. Clinic And Provider Office Outbreaks by Disease/Condition, LAC, 2007

Disease/Condition/ Etiologic Agent	No. of Outbreaks	No. of Cases
Endophthalmitis	1	4
Scabies	1	9
Multiple bacteria	1	6
Total	**3**	**19**

COMMENTS

Nurses, doctors, respiratory therapists and other members of the health care community believe that patient safety is high priority. However, study after study has demonstrated that this belief does not always transfer to appropriate behavior of health care workers providing direct patient care, as evidenced by an increasing number of health care associated infections (HAIs) worldwide (Cookson, et al., 1999; Mah, et al, 2006). California is among 27 states to enact legislation designed to protect the public by mandating hospitals and related health facilities (e.g., ambulatory surgical centers, dialysis centers) to disclose HAI rates (McGiffert, 2006). In 2006, Senate Bill (SB) 739 was approved, which directs hospitals to evaluate and augment existing infectious disease control programs and implement new standards to prevent HAI. A statewide advisory committee was established on July 1, 2007 to provide guidance to hospitals and ensure compliance with the chosen process measures (central line insertion practices, influenza vaccination of employees and patients, and surgical antimicrobial prophylaxis). Hospitals are mandated to report these measures through the California Department of Public Health and the National Healthcare Safety Network (NHSN) of the Centers for Disease Control and Prevention (CDC) (CDPH, 2007). ACDC is an active participant in the statewide HAI advisory committee and continues to work with state and local providers on implementation and compliance requirements.

Multi-drug resistant Acinetobacter outbreaks reported to LAC increased 600% from 2003 (n=1) as compared to 2007 (n=7). Overall, LAC experienced a 50% increase in outbreaks due to multi-drug

resistant organisms. In 2007, there were 11 multi-drug resistant organism (MDRO) outbreaks reported as compared to eight MDRO outbreaks reported in 2006. *Pseudomonas aeruginosa, Acinetobacter baumannii,* and vancomycin-resistant Enterococci are all pathogens that cause significant morbidity and/or mortality in the immunocompromised hospitalized patient. MDRO outbreaks are not unique to LAC and have increased nationwide, capturing the attention of state legislatures. Recently, MRSA has received a considerable amount of public attention. News media accounts dramatically report the profound and devastating impact an MRSA infection can have on the patient and family (Engel, 2008; PRNewswire, 2008). For the hospitalized patient, acquisition of an MDRO nosocomial infection lengthens hospital days and greatly increases the patient's risk of a negative outcome (Siegel, et al., 2006).

The majority of reported acute care facility outbreaks (n=14) were caused by the ectoparasite *Sarcoptes scabiei*. While rarely the cause of serious morbidity or mortality and usually characterized as a nuisance disease, the economic costs incurred to successfully manage an outbreak can be high (De beer, et al., 2006). *Clostridium difficile* (*C. difficile*) is an organism we continue to see in the LAC hospital population. It was responsible for the greatest number of cases (n=179) reported in hospital outbreaks in 2007. Several outbreaks occurred in an outpatient setting affiliated with an acute care hospital, where a re-usable medical device utilized during a diagnostic or therapeutic procedure was implicated in two of these outbreaks. We determined that staff improper cleaning and disinfection practices contributed to both outbreaks (see 2007 Special Studies Report)

The ACDC Hospital Outreach Unit's Liaison Public Health Nurses (LPHNs) continue to collaborate with partners in the hospital, clinic and other health care settings on the mission to enhance emerging infectious disease preparedness and increase communicable disease and outbreak reporting. Established relationships are maintained with the hospital Infection Preventionist to communicate essential health information that can be disseminated quickly throughout the facility. Among LPHN responsibilities are to make at least an annual visits to their assigned hospital and attend monthly hospital infection control committee (ICC) meetings, if invited. In 2007, the LPHNs conducted 215 hospital visits to update the hospital profile and distribute pandemic influenza, hand washing and related communicable disease education materials. As of end of 2007, the LPHNs are invited to ICC meetings at 14 acute care hospitals.

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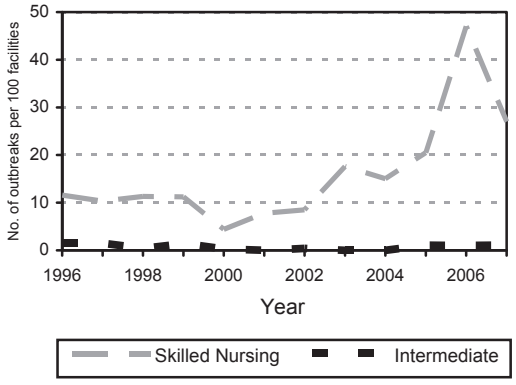
HEALTHCARE - ASSOCIATED OUTBREAKS
SUB-ACUTE CARE FACILITIES

DEFINITION

Healthcare-associated outbreaks are defined as clusters of infections in healthcare settings related in time and place, or occurring above a baseline or threshold level for a facility, specific unit, or ward. Baseline is defined as what is normally observed in a particular setting.

The sub-acute care facilities include skilled nursing facilities, intermediate care facilities and psychiatric care facilities. Skilled nursing facilities provide continuous skilled nursing care to patients on an extended basis. Intermediate care facilities also provide skilled nursing care to patients, but the care is not continuous. Psychiatric facilities provide 24-hour inpatient care for patients with psychiatric needs.

Figure 1
Sub-acute Facility Outbreaks
LAC, 1996–2007



ABSTRACT

- Total confirmed sub-acute care associated outbreaks decreased 34% from 176 outbreaks in 2006 to 116 outbreaks in 2007. This was largely due to a decrease in outbreaks of gastroenteritis.
- In 2007, the number of skilled nursing facility outbreaks decreased 36% from an unusually high outbreak year in 2006 (Table 1). The rate of skilled nursing facility outbreaks decreased from 47 per 100 facilities in 2006 to 27 per 100 facilities in 2007 (Figure 1).
- There was no change in the number of outbreaks in intermediate care facilities from 2006 to 2007. This is the first year in which intermediate care and psychiatric facilities are examined as separate categories in the annual report.

Table 1. Number of Reported Outbreaks in Sub-acute Healthcare Facilities, LAC, 2003–2007

	YEAR				
Type of Facility	**2003**	**2004**	**2005**	**2006**	**2007**
Intermediate Care Facilities	0	0	0	3	3
Psychiatric Care Facilities	-	-	-	-	3
Skilled Nursing Facilities	75	63	76	173	110
Total	75	63	76	176	116

Intermediate Care Facilities: Reported intermediate care facility outbreaks did not change in 2007, with 3 outbreaks in 2007 as compared to 3 in 2006. Scabies accounted for 33% of total cases in 2007 (Table 2).

Table 2. Intermediate Care Facility (ICF) Outbreaks by Disease/Condition—LAC, 2007

Disease/Condition	No. of Outbreaks	No. of Cases
Scabies	1	3
Unknown Rash	1	4
Varicella (Chickenpox)	1	2
Total	3	9

Psychiatric Facilities: In 2007, there were 3 outbreaks in psychiatric facilities, all of which were unspecified gastroenteritis (Table 3).

Table 3. Psychiatric Care Facility Outbreaks by Disease/Condition—LAC, 2007

Disease/Condition	No. of Outbreaks	No. of Cases
Unspecified Gastroenteritis	3	20
Total	3	20

Skilled Nursing Facilities: Reported skilled nursing facility outbreaks decreased by 36% in 2007, with 110 outbreaks in 2007, as compared to 173 outbreaks in 2006. Unspecified gastroenteritis was the most commonly reported outbreak disease, accounting for 49% of outbreaks in 2007 and 74% of cases. Scabies was the second most commonly reported outbreak disease for 2007.

Table 4. Skilled Nursing Facility (SNF) Outbreaks by Disease/Condition—LAC, 2007

Disease/Condition	No. of Outbreaks	No. of Cases
Gastroenteritis • unspecified (n=40) • norovirus (n=14)	54	1100
Scabies	43	181
Unknown Rash	7	98
Respiratory illness • unspecified (n=4) • influenza (n=2)	6	103
Total	110	1482

COMMENTS

Los Angeles County skilled nursing facilities (SNFs) experienced a decrease in the total number of reported gastrointestinal outbreaks, both due to norovirus and unspecified causes, in 2007. SNFs accounted for 117 outbreaks of gastroenteritis involving 2,428 cases in 2006, compared with 54 outbreaks involving 1,100 cases in 2007. Scabies outbreaks and total cases also declined slightly; in 2007, there was a 10% decrease from 48 outbreaks (338 cases) in 2006 to 43 outbreaks (181 cases).

The formation of the Water and Sub-acute Care Unit within the Acute Communicable Disease Control Program (ACDC) in 2007 has permitted focus on working directly with the SNFs in LAC and LAC DPH Community Health Services (CHS) staff to assess communicable disease issues in licensed health facilities, as well as conduct outbreak surveillance of facilities, excluding acute care. In addition, this is the first year in which intermediate care and psychiatric facilities are examined separately in the annual report; previous years had incorporated outbreak information for these and skilled nursing facilities into one healthcare-associated outbreak report. Due to this, some of the trend information for previous years may be skewed by intermediate care and psychiatric care facilities.

In 2007, ACDC initiated a needs assessment of area health officers, area medical directors, nurse managers, public health nurse supervisors and public health nurses (PHNs) in the 24 health districts to determine training needs, assess the interaction with SNFs in their district and identify ways in which ACDC could improve upon the health facilities outbreak investigation data collection form. Respondents reported interest in information targeted to PHNs regarding multi-drug resistant organisms, outbreak investigations and norovirus. Additional information describing the survey results can be found in the 2007 Special Studies Report "Survey of Community Health Services' Interactions with Skilled Nursing Facilities in Los Angeles County".

Based on feedback from the survey, a revised health facilities outbreak investigation data collection form was developed that captures information that was not previously captured on the older form, such as facility census, information on treatment and prophylaxis, number of specimens collected, and laboratory results. The revised form will aid PHNs during outbreak investigations and will capture the most pertinent information for ACDC to use in epidemiological analysis. Currently the form is being piloted in two health districts and a final form for use by all districts is planned by the end of 2008.

The survey also identified multi-drug resistant organisms (MDROs) as a topic on which PHNs and facilities needed additional information. As a result, a summary of recommended infection control guidelines for the prevention and control of multi-drug resistant organisms in long term care (LTC) facilities was updated. These guidelines are specific to LTC facilities in LAC and emphasize the use of standard precautions for all patients, as well as contact precautions, when appropriate. The updated guidelines were distributed to each of the SNFs and ICFs that are licensed in LAC and to CHS staff.

Lastly communication and collaboration with the Health Facilities Inspection Division is continuing to improve. ACDC conducted joint trainings with Health Facilities Inspection Division on infection prevention and communicable diseases to SNF staff.

PREVENTION

The majority of outbreaks in sub-acute care facilities are caused by agents that are spread via person-to-person contact. Thus, appropriate hand hygiene by staff and residents is a crucial infection control measure. It is also important for staff to implement use of isolation precautions when indicated.

RESOURCE

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ACUTE COMMUNICABLE DISEASE CONTROL
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