ACUTE COMMUNICABLE DISEASE CONTROL PROGRAM

ANNUAL MORBIDITY REPORT

AND

SPECIAL STUDIES REPORT

2006

Los Angeles County
Department of Public Health

Public Health
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Acute Communicable Disease Control Program
Annual Morbidity Report
2006

● 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 (ACDC) is the lead program for the surveillance and investigation of most communicable diseases—responsibilities exclude tuberculosis, sexually transmitted diseases, and HIV or 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.

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 Latino (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 a 1999 survey, almost one-third of respondents stated they were born outside of the US. In 2002, an Immigration and Naturalization Report found that California was home to the largest number of legal immigrants to the US, and over one-third of these immigrants reported settling in LAC. 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.

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

- **Food and Water Safety Unit**: The aim of this unit is to decrease morbidity related to food and waterborne 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*.
- **Vectorborne Diseases and Central Nervous System Infections Unit**: This 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.
- **Hospital Outreach Unit:** This unit assists hospitals and other healthcare facilities with outbreak investigations and provides consultation on infection control issues. It strives to enhance communication with hospitals by interacting with infection control professionals, emergency departments, and laboratories.

- **Bloodborne Pathogens and Antimicrobial Resistance Unit**: Conducts surveillance and investigations of the viral hepatidities, MRSA, and invasive disease caused by pneumococcus and group A streptococcus.

- **Immunization Program**: Its 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.

- **Electronic Data Collection Section**: The aim of this section is to enhance surveillance and epidemiology capacity to improve disease reporting and improve detection of unusual occurences. Activities include syndromic surveillance and electronic reporting from laboratories.

- **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.

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

Emerging and Re-Emerging Infectious Diseases—Los Angeles County, 2006

New diseases emerge, conditions once thought gone reemerge, and existing diseases acquire added prominence. While West Nile virus (WNV) was undoubtedly one of the more notable infectious diseases to emerge in recent years, its local impact continued to decline in 2006, with just 16 human WNV infections reported, including 1 case of encephalitis, 4 cases of meningitis, 8 cases of WNV fever, and 3 asymptomatic blood donors; there were no associated deaths. WNV environmental surveillance in mosquitoes, dead birds, and sentinel chickens documented that WNV has become enzootic in Los Angeles County (LAC). Arbovirus experts speculate local weather conditions and 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, play a role in the decline of human infections.

Emerging and Re-Emerging Diseases

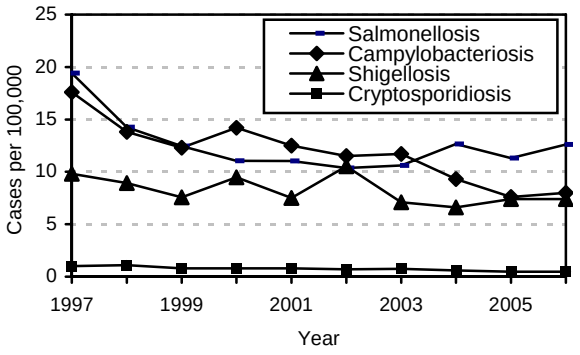
West Nile virus infection continued to decreased compared to 2004; the virus is now enzootic to our region and human cases of illness can be expected annually.

Food- and Waterborne Diseases

Investigation of cases and outbreaks of diseases spread by food and water sources make up a large portion of activities conducted by ACDC. Overall, food- and waterborne diseases have declined since the mid-1990's and stabilized at lower rates as shown in Figure 1; also see separate reports on campylobacteriosis, cryptosporidiosis, listeriosis, salmonellosis, shigellosis, typhoid fever, and vibriosis for details. The declining trend in reported cases is most evident with the bacterial diseases campylobacteriosis and shigellosis, and mirrors national trends depicting sustained decreases among

many foodborne illnesses, particularly those of bacterial origin. While the underlying causes for these local and national trends are not known, the implementation of control measures at every level 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 with particular attention to fresh produce safety. Locally, a highly publicized restaurant grading system implemented in LAC in 1998 may have also improved food safety through education of food handlers and the public regarding best practices to reduce foodborne disease.

Figure 1
Selected Food and Waterborne Diseases
Incidence Rates by Year
LAC, 1997–2006



The LAC 2006 salmonellosis crude rate rose slightly compared to 2005 (Figure 1), and has remained below the national rate since 1998 after an overall decrease of more than 100% since 1994. The national incidence of salmonellosis has also been decreasing, but at a much slower rate than seen in LAC in the previous 10 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 2006, at least 104 (8.6%) of LAC salmonellosis cases reported contact with turtles, lizards or snakes.

In 2006, there were 37 foodborne disease outbreaks representing 425 individuals with illness; this represented 15% more outbreaks than in 2005, but fewer persons were affected. While the overall incidence of most of 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 treatment or complications. However, some infections may be invasive, especially among children, the elderly and those with certain chronic medical conditions (e.g., the immunocompromised), leading to hospitalization and death. Further efforts are needed to improve food and water quality and to educate food industry and the public about proper food storage, handling, and preparation.

The community-wide outbreak of hepatitis A that started in August of 2005 did not decrease to base-line levels until July of 2006. There were two outbreaks of acute hepatitis A in 2006. The first occurred in a bar in the south bay area in May and consisted of eight patrons. Transmission was believed to be due to a contaminated ice chest that patrons had access to. After Environmental Health closed down the bar and the owner corrected sanitation and food hygiene practices, no more cases were identified. The second outbreak, also affecting eight people, occurred in September, 2006. Eight people who ate at a single restaurant in Pomona in August were diagnosed with acute hepatitis A in September. Despite an active investigation, including a case-control study and Environmental Health inspections, no food or worker source could be found.

Vaccine Preventable Diseases

Surveillance for influenza is being scrutinized closely and enhanced in light of pandemic preparations. Working with the syndromic surveillance team, analyses specific for influenza-like illness surveillance have been devised, especially in children under 5 who are often considered harbingers of influenza activity in the community. A pilot surveillance system was established with the Los Angeles Unified School District (LAUSD); the results tallied well with other standard surveillance systems for influenza including emergency department data and viral isolates. To keep the public and healthcare professionals abreast of influenza related activities, a newsletter was developed to be distributed weekly during the

standard influenza season (October-April). It includes results of our varied surveillance systems as well as breaking information from the US government or research.

Vaccine Preventable Diseases

- Immunization levels in LAC continue to be among the highest for large urban areas in the United States.
- However, a resurgence of reported mumps cases occurred nationally in 2006.

Vaccine-preventable disease incidence has decreased dramatically due to immunizations. Keeping young children current with their immunizations has historically been considered the most efficient method available to prevent disease incidence in children and control disease incidence among adults. Immunization levels in LAC among children 19-35 months of age continue yearly to exceed the national Healthy People year 2010 goal of 80% and are among the highest levels for large urban areas nationally. Despite these successful strides in vaccination coverage levels, select vaccine-preventable diseases have shown a resurgence in recent years. After a 30-year record high of reported pertussis cases in 2005 due in conjunction to the historical 3-5 year cyclical trend of increasing pertussis rates, improved recognition and reporting, and adolescents and adults comprising a larger proportion of cases, case numbers decreased in 2006. However, a pertussis outbreak occurred at a local university in 2006, continuing the trend of increased cases identified among adolescents/adults. In addition, during January to October 2006, a multi-state mumps outbreak occurred in the Midwest area of the United States, primarily affecting the 18-24 year age group; a high proportion of whom were college students. This outbreak had a profound impact on mumps surveillance nationwide and doubled the number of reports received in LAC in 2006, as compared to previous years. Although measles is no longer considered endemic in the United States, global travel and the endemic presence of measles in other countries continue to produce cases in the United States. In 2006, a lab-confirmed measles case was identified in LAC and rash onset occurred within 18 days of traveling outside of the United States. Due to a personal beliefs exemption, the case had never received any MMR vaccine.

In light of this resurgence in cases, controlling the incidence of ten unique vaccine-preventable diseases continues to be a challenge for the LAC Immunization Program and requires a multi-level plan of attack. Efforts are already in place to increase the usage of vaccines among adults and adolescents (i.e., Tdap, MMR, varicella, hepatitis B), while maintaining high childhood vaccine coverage levels. In addition, a sensitive surveillance and case management system specific to the epidemiology of each disease is required. For example, by employing a multi-lingual enhanced case management system, nearly all infants (98% and 97%, respectively) exposed to hepatitis B in 2006 received dose one of the hepatitis B vaccine and HBIG within 24 hours of birth. The future success of controlling vaccine-preventable disease incidence in LAC will depend on high vaccine coverage levels among children, adolescents, and adults along with the use of sophisticated and sensitive surveillance systems for each disease.

Hospital Outbreaks and Outreach

The Hospital Outreach Unit (HOU) is an integral component of the public health link to infection control professionals and community healthcare agencies. The unit incorporates five liaison public health nurses (LPHN), two program specialist PHNs, an epidemiology analyst, and a medical epidemiologiest who interface with infection control professionals at 104 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 situation. The team identifies and responds to potential risks and threats during hospital outbreaks and assist with investigations. The scope has expanded to include non-hospital healthcare settings, such as large clinics and jail medical services.

As in past years, the most common cause of reported hospital outbreaks was scabies. This was followed in number by outbreaks of *Acinetobacter baumanii* and methicillin-resistant *Staphylococcus areaus* (MRSA) infections. In 2006, the most common outbreaks in skilled nursing and other sub-acute health facilities were due to gastroenteritis and scabies, similar to previous years. For the first time the new

highly toxigenic strain of *Clostridium difficile* (B1/NAP1) was confirmed in Los Angeles County. Selected hospital outbreak investigation summaries are available in ACDC's 2006 Morbidity Report.

Healthcare associated infections (HAI) have generated a great deal of attention locally and across the United States for several years. In response, California approved Senate Bill 739 in 2006, which imposes reporting requirements and establishes the California HAI Advisory Committee to monitor and prevent hospital-acquired infections. The HOU is working with the California Department of Public Health as a part of this advisory committee to make recommendations related to reporting of hospital acquired infections, use of national guidelines, and public reporting of process measures for preventing the spread of HAI.

Prevention and control of HAI must include collaborating with subacute nursing facilities (SNF) and other healthcare facilities. In 2005 and 2006, ACDC initiated a SNF needs assessment to assess general communicable disease reporting knowledge, infection control practices, identify knowledge gaps and elicit training needs. Based on these findings, ACDC is exploring collaboration with LACDPH Health Facilities Inspection Division and the Hospital Association of Southern California (HASC) on the best way to address training needs.

The HOU continues to work with governmental and specialty organizations to standardize guidelines for the cleaning and disinfection of semi-critical devices. In 2006, HOU investigated two outbreaks that implicated improper and/or inconsistent disinfection and cleaning practices of reusable medical devices. The first outbreak involved an adult ICU and *Escherichia coli* found on the transesophageal echocardiography (TEE) probe, a flexible endoscope used to visualize the heart. The second outbreak involved a neonatal ICU where *Pseudomonas aeruginosa* was discovered on a laryngoscope blade. In both outbreaks, instrument cleaning was in violation of the facility's established cleaning and disinfection policy (see 2006 Special Studies Report for detailed article).

Bioterrorism Surveillance, Preparedness and Response

In 2001, the mandated list of reportable diseases was modified to provide greater emphasis on diseases deemed likely indicators of bioterrorism activity (i.e., anthrax, botulism, brucellosis, plague, smallpox, tularemia, and viral hemorrhagic fevers). Education to strengthen awareness and understanding of disease and outbreak reporting continued throughout 2006, and ACDC provided tailored educational materials related to disease reporting to healthcare providers in LAC.

Bioterrorism Preparedness

In 2006, BT-related surveillance projects were further expanded and integrated into public health. These systems were shown to be useful indicators of morbidity and mortality.

The achievements of ACDC's bioterrorism surveillance and preparedness sections during 2006 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, was continued with the addition of several local hospitals. Our syndromic surveillance proved capable of detecting patterns of illness and community outbreaks and complemented traditional disease surveillance activities. Volume data from the ReddiNet® system for emergency department visits during influenza season strongly correlated with virologic test results. Nurse call line, coroner data, 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.

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 labs. We currently have live feeds from six (6) laboratories representing 10 hospitals and two independent labs. We have six labs currently in testing and a dozen more poised to begin testing in 2007. Establishing electronic lab reporting is a very time consuming process and on average takes roughly 8 to 12 months to implement.

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PURPOSE

The Acute Communicable Disease Control (ACDC) Program 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 2006 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 Public Health website for more information at lapublichealth.org/phcommon/public/unitinfo/unitdirlist.cfm?ou=ph).

LAC DEMOGRAPHIC DATA

LAC population estimates used for this report are created by the Population Estimates and Projections System (PEPS) provided to the LAC DHS, 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 2006 Reports of Nationally Notifiable Infectious Diseases.[1] This report also includes US Census population estimates—these were used to calculate national and California rates of disease. According to that report, the population of the US in 2006 was 296,410,000 and the population of California was 36,132,000.

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 2006 reports of nationally notifiable infectious diseases. MMWR 2007; 56(33):853–863. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5633a4.htm

Table A. Los Angles County* population by year, 2001–2006

Year	Population	% change
2001	9,122,861	
2002	9,253,109	1.4%
2003	9,398,128	1.6%
2004	9,535,937	1.5%
2005	9,582,956	0.5%
2006	9,644,738	0.6%

* Does not include cities of Pasadena and Long Beach.

Table B. Los Angles County* population by age group, 2006

Age (in years)	Population	%
<1	144,825	1.5%
1–4	580,257	6.0%
5–14	1,474,646	15.3%
15–34	2,791,126	28.9%
35–44	1,506,357	15.6%
45–54	1,299,772	13.5%
55–64	868,327	9.0%
65+	979,428	10.2%
Total	**9,644,738**	**100.0%**

* Does not include cities of Pasadena and Long Beach.

Table C. Los Angles County* population by sex, 2006

Sex	Population	%
Male	4,771,987	49.5%
Female	4,872,751	50.5%
Total	**9,644,738**	**100.0%**

* Does not include cities of Pasadena and Long Beach.

Table D. Los Angles County* population by race, 2006

Race	Population	%
Asian	1,270,774	13.2%
Black	843,479	8.8%
Latino	4,624,005	47.9%
White	2,877,851	29.8%
Other**	28,629	0.3%
Total	**9,644,738**	**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, 2006	
Health District	**Population**
SPA1	**347,823**
Antelope valley	347,823
SPA 2	**2,146,515**
East Valley	457,254
Glendale	353,559
San Fernando	460,426
West Valley	875,276
SPA 3	**1,720,297**
Alhambra	358,154
El Monte	477,775
Foothill	314,365
Pomona	570,003
SPA 4	**1,260,196**
Central	370,009
Hollywood Wilshire	540,747
Northeast	349,440
SPA 5	**636,309**
West	636,309
SPA 6	**1,041,685**
Compton	292,780
South	187,713
Southeast	179,218
Southwest	381,974
SPA 7	**1,379,540**
Bellflower	369,513
East Los Angeles	225,069
San Antonio	450,428
Whittier	334,530
SPA 8	**1,112,373**
Inglewood	435,627
Harbor	209,567
Torrance	467,179
Total	**9,644,738**

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

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).

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 2006. If the onset was unknown, the date of diagnosis was used.
   - **Annual Incidence Rates in LAC**: Number of new cases in 2006 divided by LAC census population (minus Long Beach and Pasadena) multiplied by 100,000.
   - **Annual Incidence Rates in the US and California**: 2006 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 2006. 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.

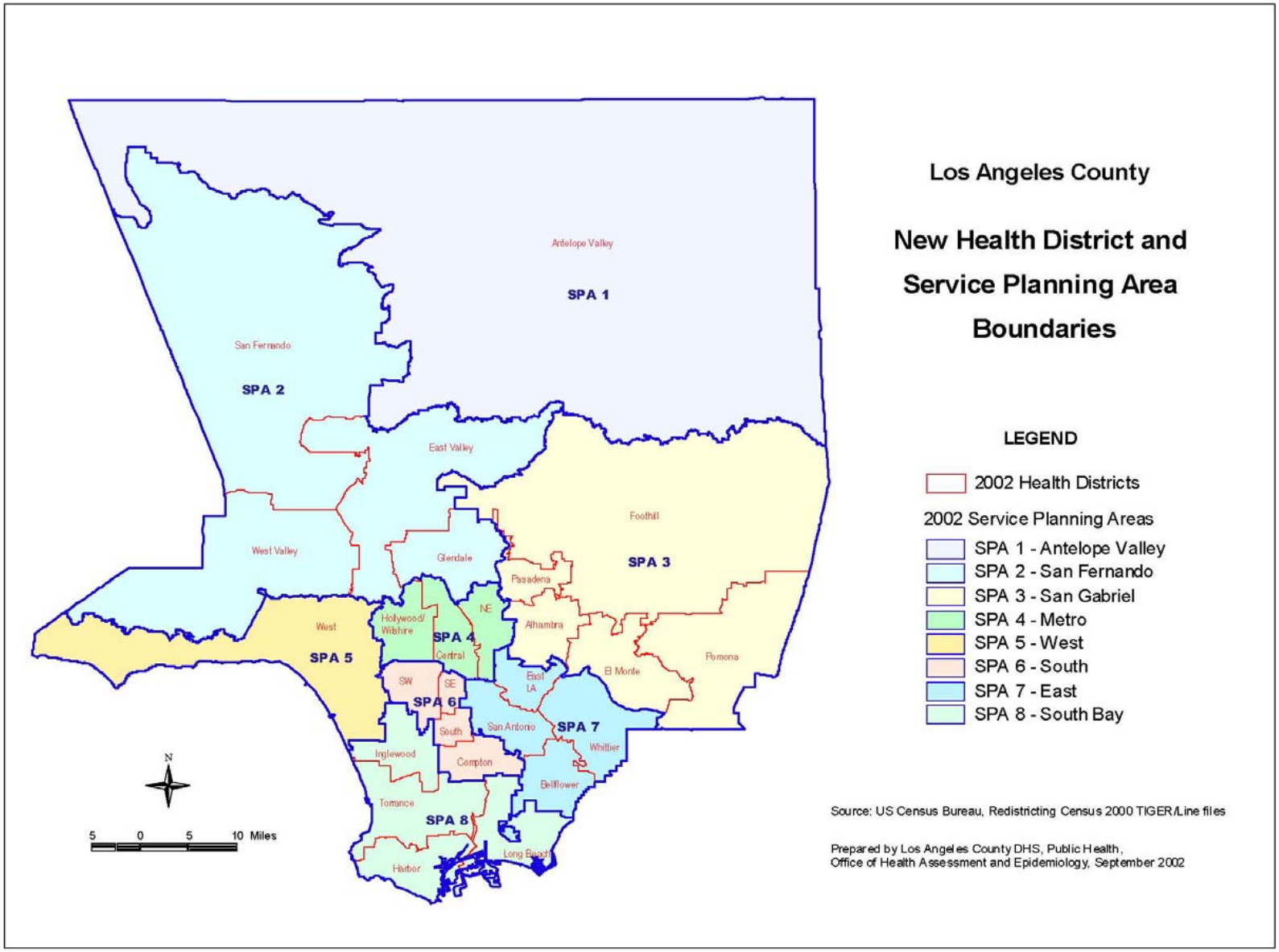
3. Disease Abstract
   This provides a synopsis or the highlights of disease activity in 2006.

4. Stratified Data
   - **Trends**: Any trends in case characteristics during recent years.
   - **Seasonality**: Number of cases that occurred during each month of 2006.
   - **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.


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
Antelope Valley
SPA 1
San Fernando
SPA 2
East Valley
Foothill
SPA 3
West Valley
Glendale
Pasadena
NE
Hollywood/ Wilshire
SPA 4
Alhambra
West
SPA 5
Central
Pomona
El Monte
East LA
SW
SE
SPA 6
South
San Antonio
SPA 7
Whittier
Inglewood
Compton
Bellflower
Torrance
SPA 8
Long Beach
Harbor
N
5 0 5 10 Miles
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

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, 2001-2006

Disease	Year of Onset 2001	2002	2003	2004	2005	2006	Previous 5-year Average	5-Yr 95% upper Limit[a]
Amebiasis	139	102	121	114	114	94	118	142
Botulism	2	2	0	3	8	2	3	8
Brucellosis	9	11	7	4	8	5	8	12
Campylobacteriosis	1141	1067	1100	884	725	775	983	1290
Cholera	0	0	1	0	0	0	0	1
Coccidioidomycosis	68	76	73	133	214	196	113	222
Cryptosporidiosis	77	62	71	56	45	48	62	84
Cysticercosis	37	18	12	8	15	11	18	38
Dengue	5	7	0	5	10	2	5	12
E. *coli* O157:H7	31	31	27	18	13	12	24	38
Encephalitis	41	61	38	133	72	46	69	136
Foodborne outbreaks	48	29	25	40	32	49	35	51
Giardiasis	446	441	401	320	313	376	384	497
Haemophilus influenzae type b	5	4	0	2	3	5	3	6
Hansen's Disease (Leprosy)	2	11	9	9	2	2	7	14
Hepatitis A	542	438	374	321	480	364	431	583
Hepatitis B	44	32	73	72	57	62	56	87
Hepatitis C	1	3	0	5	3	4	2	6
Hepatitis unspecified [b]	1	0	1	0	4	7	1	4
Kawasaki syndrome [b]	33	34	35	42	56	75	40	57
Legionellosis	18	25	21	15	31	24	22	33
Listeriosis, nonperinatal	27	14	17	21	25	25	21	30
Listeriosis, perinatal [b]	3	7	3	6	3	12	4	8
Lyme disease [b]	5	8	6	0	7	16	5	11
Malaria	46	38	60	51	45	33	48	62
Measles	8	0	0	1	0	1	2	8
Meningitis, viral	378	466	899	807	527	373	615	1011
Meningococcal infections	58	46	32	28	37	46	40	61
Mumps	17	16	10	5	10	10	12	20
Pertussis	103	172	130	156	439	150	200	439
Psittacosis	1	0	0	0	0	1	0	1
Q-fever	1	4	0	4	0	1	2	5
Relapsing fever [b]	0	1	0	0	0	2	0	1
Rheumatic fever, acute	6	0	0	1	0	0	1	6
Rubella	0	0	0	0	1	0	0	1
Salmonellosis	1006	956	995	1205	1085	1217	1050	1223
Shigellosis	684	974	669	625	710	524	732	975
Strongyloidiasis	0	0	0	0	0	0	0	0
Tetanus [b]	2	2	1	2	0	4	1	3
Trichinosis [b]	0	0	0	0	0	1	0	0
Tularemia	0	0	1	0	0	0	0	1
Typhoid fever, case	17	33	16	13	12	17	18	33
Typhoid fever, carrier	1	6	2	3	4	3	3	7
Typhus fever	8	11	12	8	9	10	10	13
Vibrio	15	14	13	26	14	18	16	26

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

[b] 2006 data over 95% upper limit.

Table H. Annual Incidence Rates of Selected Notifiable Diseases by Year of Onset
Los Angeles County, 2001-2006

Disease	Annual Incidence Rate (Cases per 100,000)[b]					
	2001	2002	2003	2004	2005	2006
Amebiasis	1.52	1.10	1.29	1.20	1.19	0.97
Botulism	0.02	0.02	-	0.03	0.08	0.02
Brucellosis	0.10	0.12	0.07	0.04	0.08	0.05
Campylobacteriosis	12.50	11.50	11.70	9.27	7.57	8.04
Cholera	-	-	0.01	-	-	-
Coccidioidomycosis	0.75	0.82	0.78	1.39	2.23	2.03
Cryptosporidiosis	0.84	0.67	0.75	0.59	0.47	0.50
Cysticercosis	0.41	0.19	0.13	0.08	0.16	0.11
Dengue	0.05	0.08	-	0.05	0.10	0.02
E. *coli* O157:H7	0.34	0.33	0.29	0.19	0.14	0.12
Encephalitis	0.45	0.66	0.40	1.39	0.75	0.48
Giardiasis	4.89	4.75	4.26	3.36	3.27	3.90
Haemophilus influenzae type b	0.05	0.04	-	0.02	0.03	0.05
Hansen's Disease (Leprosy)	0.02	0.12	0.10	0.09	0.02	0.02
Hepatitis A	5.94	4.72	3.98	3.37	5.01	3.77
Hepatitis B	0.48	0.34	0.78	0.76	0.59	0.64
Hepatitis C	0.01	0.03	-	0.05	0.03	0.04
Hepatitis unspecified	0.01	0.00	0.01	-	0.04	0.07
Kawasaki syndrome	0.36	0.37	0.37	0.44	0.58	0.78
Legionellosis	0.20	0.27	0.22	0.16	0.32	0.25
Listeriosis, nonperinatal	0.30	0.15	0.18	0.22	0.26	0.26
Listeriosis, perinatal[a]	2.05	4.96	2.12	4.25	2.14	8.47
Lyme disease	0.05	0.09	0.06	-	0.07	0.17
Malaria	0.50	0.41	0.64	0.53	0.47	0.34
Measles	0.09	-	-	0.01	-	0.01
Meningitis, viral	4.14	5.02	9.56	8.46	5.50	3.87
Meningococcal infections	0.64	0.50	0.34	0.29	0.39	0.48
Mumps	0.19	0.17	0.11	0.05	0.10	0.10
Pertussis	1.13	1.85	1.38	1.64	4.58	1.56
Psittacosis	0.01	-	-	-	-	0.01
Q-fever	0.01	0.04	-	0.04	-	0.01
Relapsing fever	-	0.01	-	-	-	0.02
Rheumatic fever, acute	0.07	-	-	0.01	-	-
Rubella	-	-	-	-	0.01	-
Salmonellosis	11.02	10.30	10.58	12.64	11.33	12.62
Shigellosis	7.50	10.50	7.11	6.55	7.41	5.43
Strongyloidiasis	-	-	-	-	-	-
Tetanus	0.02	0.02	0.01	0.02	-	0.04
Trichinosis	-	-	-	-	-	0.01
Tularemia	-	-	0.01	-	-	-
Typhoid fever, case	0.19	0.36	0.17	0.14	0.13	0.18
Typhoid fever, carrier	0.01	0.06	0.02	0.03	0.04	0.03
Typhus fever	0.09	0.12	0.13	0.08	0.09	0.10
Vibrio	0.16	0.15	0.14	0.27	0.15	0.19

[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, 2002-2006

Disease	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Amebiasis	6.2	7.0	7.6	6.6	8.4	7.8	8.4	9.6	8.6	5.2	7.4	10.0	108.8
Botulism	0.0	0.4	0.4	0.2	0.0	0.4	0.2	0.2	0.2	0.0	0.6	0.2	2.8
Brucellosis	0.8	0.8	0.8	0.4	0.2	0.6	1.2	0.8	0.4	0.6	0.4	0.0	7.0
Campylobacteriosis	70.8	49.4	58.2	65.6	86.6	92.0	105.4	98.6	86.2	71.6	72.4	50.0	910.0
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	11.2	8.0	9.2	9.2	9.6	8.8	10.4	13.6	15.4	12.2	13.0	9.4	139.4
Cryptosporidiosis	4.6	3.2	3.2	4.2	3.8	4.4	5.0	9.2	6.2	4.0	4.2	3.2	56.4
Cysticercosis	1.2	1.0	2.0	1.4	1.6	1.0	1.2	1.0	1.0	0.6	0.2	0.2	12.8
Dengue	0.0	0.4	0.0	0.0	0.0	0.4	1.0	1.2	0.8	0.4	0.0	0.0	4.4
E. *coli* O157:H7	1.0	0.6	0.8	1.0	1.2	1.6	3.6	4.2	2.8	2.0	0.8	0.4	20.0
Encephalitis	3.0	3.8	5.4	4.4	4.6	4.6	8.4	12.4	9.2	4.0	3.8	3.4	69.8
Giardiasis	27.2	17.8	28.2	25.6	26.2	27.8	35.2	36.2	35.0	30.4	26.0	22.8	369.4
Haemophilus influenzae type b	0.6	0.4	0.4	0.0	0.0	0.2	0.0	0.2	0.0	0.4	0.2	0.4	2.8
Hansen's Disease (Leprosy)[a]	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis A	45.0	35.4	27.2	22.0	26.6	20.0	24.6	28.4	36.6	38.6	40.0	32.4	395.4
Hepatitis B	6.4	7.6	5.6	6.2	7.2	5.8	4.0	4.4	2.8	6.2	6.8	6.8	70.8
Hepatitis C	0.6	0.6	0.6	0.4	0.4	0.6	0.6	0.4	0.4	0.8	0.2	0.8	7.2
Hepatitis unspecified	0.2	0.2	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.2	2.4
Kawasaki syndrome	6.4	6.0	4.8	3.6	3.8	5.0	2.6	3.6	3.0	2.2	4.0	3.0	48.0
Legionellosis	1.6	1.4	1.8	1.2	2.6	2.4	1.4	1.2	0.4	2.8	3.8	1.2	23.2
Listeriosis, nonperinatal	0.8	0.8	1.4	1.6	1.4	1.4	3.0	3.2	2.6	1.4	0.6	1.6	20.4
Listeriosis, perinatal	0.2	0.0	0.4	0.4	0.6	0.4	0.8	1.2	1.0	1.0	0.2	0.0	6.2
Lyme disease	0.2	0.2	0.0	0.2	0.2	1.8	1.6	0.8	0.4	0.4	0.0	0.0	5.8
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	21.6	19.6	22.4	26.2	31.2	43.6	84.4	111.4	84.0	50.4	36.4	24.0	614.6
Meningococcal infections	6.2	4.8	3.0	4.6	2.2	2.6	2.2	1.8	1.4	2.6	2.8	3.4	37.8
Mumps	0.4	1.4	1.0	0.8	0.4	0.6	1.6	1.2	0.6	1.0	0.6	0.6	10.2
Pertussis	15.6	11.6	11.8	14.0	18.0	16.2	22.0	26.4	22.6	20.4	14.4	16.4	209.4
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	0.4	0.4	0.0	0.0	0.2	0.2	0.2	0.4	0.0	0.0	0.0	0.0	1.8
Relapsing fever	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6
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	68.8	52.0	64.0	72.2	95.0	99.0	132.0	125.8	116.6	97.6	74.0	60.8	1091.4
Shigellosis	48.2	27.2	30.2	23.6	27.8	45.2	80.0	113.8	107.6	92.4	54.4	46.0	700.4
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	0.2
Tetanus	0.4	0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.2	0.4	0.0	0.0	1.8
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	1.0	1.4	1.4	0.8	1.0	2.4	2.2	2.8	2.8	1.2	0.4	0.8	18.2
Typhoid fever, carrier	0.0	0.0	0.8	0.0	0.4	0.6	0.8	0.2	0.2	0.0	0.2	0.4	3.6
Typhus fever	0.6	0.0	0.0	0.2	1.0	1.0	1.4	1.2	1.4	1.2	0.8	0.4	9.2
Vibrio	0.2	0.4	0.6	0.4	1.2	1.8	4.0	2.6	1.4	1.8	1.6	0.4	17.0

[a] Not applicable.

Table J. Number of Cases of Selected Notifiable Diseases by Age Group
Los Angeles County, 2006

Disease	<1	1-4	5-14	15-34	35-44	45-54	55-64	65+	Total[a]
Amebiasis	0	0	5	28	26	18	9	8	94
Botulism	0	0	0	0	0	1	1	0	2
Brucellosis	0	0	0	4	0	1	0	0	5
Campylobacteriosis	21	91	97	207	105	81	68	105	775
Cholera	0	0	0	0	0	0	0	0	0
Coccidioidomycosis	1	1	3	51	30	42	32	36	196
Cryptosporidiosis	0	1	4	7	22	5	6	3	48
Cysticercosis	0	0	0	6	2	0	3	0	11
Dengue	0	0	0	1	0	1	0	0	2
E. *coli* O157:H7	0	5	3	4	0	0	0	0	12
Encephalitis	2	8	8	15	3	4	1	5	46
Giardiasis	0	47	66	105	66	47	29	15	376
Haemophilus influenzae type b	2	0	0	1	0	1	0	1	5
Hansen's Disease (Leprosy)	0	0	0	1	0	1	0	0	2
Hepatitis A	0	5	20	114	83	73	33	36	364
Hepatitis B	0	0	0	20	21	15	3	3	62
Hepatitis C	0	0	0	0	2	0	1	1	4
Hepatitis unspecified	0	0	1	2	1	1	0	1	7
Kawasaki syndrome	18	50	7	0	0	0	0	0	75
Legionellosis	0	0	0	1	2	2	5	14	24
Listeriosis, nonperinatal	0	0	0	2	1	4	6	12	25
Listeriosis, perinatal[b]	0	0	0	8	3	0	0	0	12
Lyme disease	0	0	3	7	2	2	1	1	16
Malaria	0	2	2	8	7	11	1	2	33
Measles	0	1	0	0	0	0	0	0	1
Meningitis, viral	71	14	47	111	53	42	23	10	373
Meningococcal infections	4	5	8	9	2	3	7	8	46
Mumps	0	1	2	2	1	3	1	0	10
Pertussis	58	14	33	21	8	7	6	3	150
Psittacosis	0	0	0	0	0	0	0	1	1
Q-fever	0	0	0	0	0	0	1	0	1
Relapsing fever	0	0	0	1	0	0	1	0	2
Rheumatic fever, acute	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	100	221	208	251	105	112	80	140	1217
Shigellosis	5	118	134	111	71	39	17	29	524
Strongyloidiasis	0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	1	1	0	1	1	4
Trichinosis	0	0	0	0	0	0	0	1	1
Tularemia	0	0	0	0	0	0	0	0	0
Typhoid fever, case	0	2	5	8	1	1	0	0	17
Typhoid fever, carrier	0	0	1	0	1	0	1	0	3
Typhus fever	0	0	1	1	5	0	1	2	10
Vibrio	0	0	1	5	3	3	3	3	18

[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, 2006

Disease	Age-group Rates (Cases per 100,000)[b]							
	<1	1-4	5-14	15-34	35-44	45-54	55-64	65+
Amebiasis	-	-	0.3	1.0	1.7	1.4	1.0	0.8
Botulism	-	-	-	-	-	0.1	0.1	-
Brucellosis	-	-	-	0.1	-	0.1	-	-
Campylobacteriosis	14.5	15.7	6.6	7.4	7.0	6.2	7.8	10.7
Cholera	-	-	-	-	-	-	-	-
Coccidioidomycosis	0.7	0.2	0.2	1.8	2.0	3.2	3.7	3.7
Cryptosporidiosis	-	0.2	0.3	0.3	1.5	0.4	0.7	0.3
Cysticercosis	-	-	-	0.2	0.1	-	0.3	-
Dengue	-	-	-	-	-	0.1	-	-
E. *coli* O157:H7	-	0.9	0.2	0.1	-	-	-	-
Encephalitis	1.4	1.4	0.5	0.5	0.2	0.3	0.1	0.5
Giardiasis	-	8.1	4.5	3.8	4.4	3.6	3.3	1.5
Haemophilus influenzae type b	1.4	-	-	-	-	0.1	-	0.1
Hansen's Disease (Leprosy)	-	-	-	-	-	0.1	-	-
Hepatitis A	-	0.9	1.4	4.1	5.5	5.6	3.8	3.7
Hepatitis B	-	-	-	0.7	1.4	1.2	0.3	0.3
Hepatitis C	-	-	-	-	0.1	-	0.1	0.1
Hepatitis unspecified	-	-	0.1	0.1	0.1	0.1	-	0.1
Kawasaki syndrome	12.4	8.6	0.5	-	-	-	-	-
Legionellosis	-	-	-	-	0.1	0.2	0.6	1.4
Listeriosis, nonperinatal	-	-	-	0.1	0.1	0.3	0.7	1.2
Listeriosis, perinatal[a]	-	-	-	6.9	11.6	-	-	-
Lyme disease	-	-	0.2	0.3	0.1	0.2	0.1	0.1
Malaria	-	0.3	0.1	0.3	0.5	0.8	0.1	0.2
Measles	-	0.2	-	-	-	-	-	-
Meningitis, viral	49.0	2.4	3.2	4.0	3.5	3.2	2.6	1.0
Meningococcal infections	2.8	0.9	0.5	0.3	0.1	0.2	0.8	0.8
Mumps	-	0.2	0.1	0.1	0.1	0.2	0.1	-
Pertussis	40.4	2.4	2.2	0.8	0.5	0.5	0.7	0.3
Psittacosis	-	-	-	-	-	-	-	0.1
Q-fever	-	-	-	-	-	-	0.1	-
Relapsing fever	-	-	-	-	-	-	0.1	-
Rheumatic fever, acute	-	-	-	-	-	-	-	-
Rubella	-	-	-	-	-	-	-	-
Salmonellosis	69.0	38.1	14.1	9.0	7.0	8.6	9.2	14.3
Shigellosis	3.5	20.3	9.1	4.0	4.7	3.0	2.0	3.0
Strongyloidiasis	-	-	-	-	-	-	-	-
Tetanus	-	-	-	-	0.1	-	0.1	0.1
Trichinosis	-	-	-	-	-	-	-	0.1
Tularemia	-	-	-	-	-	-	-	-
Typhoid fever, case	-	0.3	0.3	0.3	0.1	0.1	-	-
Typhoid fever, carrier	-	-	0.1	-	0.1	-	0.1	-
Typhus fever	-	-	0.1	-	0.3	-	0.1	0.2
Vibrio	-	-	0.1	0.2	0.2	0.2	0.3	0.3

[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, 2006

Disease	Asian	Black	Hispanic	White	Other[a]	Unknown
Amebiasis	10	2	32	39	2	2
Botulism	0	0	2	0	0	0
Brucellosis	0	0	5	0	0	0
Campylobacteriosis	92	34	336	302	4	6
Cholera	0	0	0	0	0	0
Coccidioidomycosis	15	27	68	75	3	2
Cryptosporidiosis	0	8	20	16	2	2
Cysticercosis	0	0	9	2	0	0
Dengue	0	0	1	1	0	0
E. *coli* O157:H7	1	0	3	8	0	0
Encephalitis	4	8	20	12	1	1
Giardiasis	36	26	137	149	7	5
Haemophilus influenzae type b	0	0	3	1	0	1
Hansen's Disease (Leprosy)	0	0	2	0	0	0
Hepatitis A	25	64	124	125	1	16
Hepatitis B	10	4	26	21	0	1
Hepatitis C	0	0	2	2	0	0
Hepatitis unspecified	2	0	2	1	0	1
Kawasaki syndrome	25	8	28	11	3	0
Legionellosis	6	3	5	10	0	0
Listeriosis, nonperinatal	3	1	8	13	0	0
Listeriosis, perinatal[b]	1	3	7	1	0	0
Lyme disease	1	0	2	11	1	1
Malaria	5	22	1	5	0	0
Measles	1	0	0	0	0	0
Meningitis, viral	29	33	195	101	5	9
Meningococcal infections	2	3	28	13	0	0
Mumps	3	0	3	3	0	1
Pertussis	8	4	79	59	0	0
Psittacosis	0	0	1	0	0	0
Q-fever	0	0	1	0	0	0
Relapsing fever	0	0	0	2	0	0
Rheumatic fever, acute	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Salmonellosis	138	95	609	351	4	20
Shigellosis	23	42	356	99	1	3
Strongyloidiasis	0	0	0	0	0	0
Tetanus	1	0	2	1	0	0
Trichinosis	1	0	0	0	0	0
Tularemia	0	0	0	0	0	0
Typhoid fever, case	7	0	8	1	0	1
Typhoid fever, carrier	1	0	2	0	0	0
Typhus fever	1	0	3	6	0	0
Vibrio	2	0	4	12	0	0

[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, 2006

Disease	Race/Ethnicity Rates (Cases per 100,000)[b]			
	Asian	Black	Hispanic	White
Amebiasis	0.8	0.2	0.7	1.4
Botulism	-	-	-	-
Brucellosis	-	-	0.1	-
Campylobacteriosis	7.2	4.0	7.3	10.5
Cholera	-	-	-	-
Coccidioidomycosis	1.2	3.2	1.5	2.6
Cryptosporidiosis	-	0.9	0.4	0.6
Cysticercosis	-	-	0.2	0.1
Dengue	-	-	-	-
E. *coli* O157:H7	0.1	-	0.1	0.3
Encephalitis	0.3	0.9	0.4	0.4
Giardiasis	2.8	3.1	3.0	5.2
Haemophilus influenzae type b	-	-	0.1	-
Hansen's Disease (Leprosy)	-	-	-	-
Hepatitis A	2.0	7.6	2.7	4.3
Hepatitis B	0.8	0.5	0.6	0.7
Hepatitis C	-	-	-	0.1
Hepatitis unspecified	0.2	-	-	-
Kawasaki syndrome	2.0	0.9	0.6	0.4
Legionellosis	0.5	0.4	0.1	0.3
Listeriosis, nonperinatal	0.2	0.1	0.2	0.5
Listeriosis, perinatal[a]	6.6	29.4	7.7	4.2
Lyme disease	0.1	-	-	0.4
Malaria	0.4	2.6	-	0.2
Measles	0.1	-	-	-
Meningitis, viral	2.3	3.9	4.2	3.5
Meningococcal infections	0.2	0.4	0.6	0.5
Mumps	0.2	-	0.1	0.1
Pertussis	0.6	0.5	1.7	2.1
Psittacosis	-	-	-	-
Q-fever	-	-	-	-
Relapsing fever	-	-	-	0.1
Rheumatic fever, acute	-	-	-	-
Rubella	-	-	-	-
Salmonellosis	10.8	11.3	13.2	12.2
Shigellosis	1.8	5.0	7.7	3.4
Strongyloidiasis	-	-	-	-
Tetanus	0.1	-	-	-
Trichinosis	0.1	-	-	-
Tularemia	-	-	-	-
Typhoid fever, case	0.5	-	0.2	-
Typhoid fever, carrier	0.1	-	-	-
Typhus fever	0.1	-	0.1	0.2
Vibrio	0.2	-	0.1	0.4

[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, 2006

Disease	Male		Female	
	Cases	Rate (Cases per 100,000)[b]	Cases	Rate (Cases per 100,000)[b]
Amebiasis	54	1.1	35	0.7
Botulism	2	0.0	0	-
Brucellosis	1	0.0	4	0.1
Campylobacteriosis	440	9.2	335	6.9
Cholera	0	-	0	-
Coccidioidomycosis	134	2.8	62	1.3
Cryptosporidiosis	30	0.6	18	0.4
Cysticercosis	5	0.1	6	0.1
Dengue	2	0.0	0	-
E. *coli* O157:H7	6	0.1	6	0.1
Encephalitis	23	0.5	23	0.5
Giardiasis	255	5.3	115	2.4
Haemophilus influenzae type b	3	0.1	2	0.0
Hansen's Disease (Leprosy)	1	0.0	0	-
Hepatitis A	241	5.1	123	2.5
Hepatitis B	49	1.0	13	0.3
Hepatitis C	3	0.1	1	0.0
Hepatitis unspecified	4	0.1	3	0.1
Kawasaki syndrome	38	0.8	37	0.8
Legionellosis	13	0.3	11	0.2
Listeriosis, nonperinatal	13	0.3	12	0.2
Listeriosis, perinatal[a]	7	9.6	4	5.8
Lyme disease	7	0.1	9	0.2
Malaria	22	0.5	11	0.2
Measles	0	-	1	0.0
Meningitis, viral	191	4.0	182	3.7
Meningococcal infections	24	0.5	22	0.5
Mumps	6	0.1	4	0.1
Pertussis	58	1.2	92	1.9
Psittacosis	0	-	1	0.0
Q-fever	1	0.0	0	-
Relapsing fever	2	0.0	0	-
Rheumatic fever, acute	0	-	0	-
Rubella	0	-	0	-
Salmonellosis	583	12.2	631	12.9
Shigellosis	275	5.8	249	5.1
Strongyloidiasis	0	-	0	-
Tetanus	2	0.0	2	0.0
Trichinosis	0	-	1	0.0
Tularemia	0	-	0	-
Typhoid fever, case	8	0.2	9	0.2
Typhoid fever, carrier	2	0.0	1	0.0
Typhus fever	7	0.1	3	0.1
Vibrio	10	0.2	8	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 O-1. Selected Notifiable Diseases
SPA 1. Antelope Valley Area
Los Angeles County, 2006

Disease	Frequency	Rate (Cases per 100,000)[b]
	Antelope	Antelope
Amebiasis	2	0.6
Botulism	0	-
Brucellosis	0	-
Campylobacteriosis	25	7.2
Cholera	0	-
Coccidioidomycosis	67	19.3
Cryptosporidiosis	4	1.2
Cysticercosis	2	0.6
Dengue	0	-
E. *coli* O157:H7	0	-
Encephalitis	5	1.4
Giardiasis	11	3.2
Haemophilus influenzae type b	0	-
Hansen's Disease (Leprosy)	0	-
Hepatitis A	3	0.9
Hepatitis B	2	0.6
Hepatitis C	0	-
Hepatitis unspecified	0	-
Kawasaki syndrome	1	0.3
Legionellosis	0	-
Listeriosis, nonperinatal	0	-
Listeriosis, perinatal[a]	1	1.3
Lyme disease	0	-
Malaria	0	-
Measles	0	-
Meningitis, viral	45	12.9
Meningococcal infections	2	0.6
Mumps	0	-
Pertussis	12	3.5
Psittacosis	0	-
Q-fever	0	-
Relapsing fever	0	-
Rheumatic fever, acute	0	-
Rubella	0	-
Salmonellosis	33	9.5
Shigellosis	6	1.7
Strongyloidiasis	0	-
Tetanus	0	-
Trichinosis	0	-
Tularemia	0	-
Typhoid fever, case	0	-
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, 2006

Disease	Frequency					Rate (Cases per 100,000)[b]				
	EV	GL	SF	WV	TOTAL	EV	GL	SF	WV	TOTAL
Amebiasis	13	16	2	8	39	2.8	4.5	0.4	0.9	1.8
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	0	0	1	0	1	-	-	0.2	-	0.0
Campylobacteriosis	36	36	73	72	217	7.9	10.2	15.9	8.2	10.1
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	1	5	32	19	57	0.2	1.4	7.0	2.2	2.7
Cryptosporidiosis	2	0	3	8	13	0.4	-	0.7	0.9	0.6
Cysticercosis	0	0	0	1	1	-	-	-	0.1	-
Dengue	0	0	1	0	1	-	-	0.2	-	0.0
E. *coli* O157:H7	0	3	2	1	6	-	0.8	0.4	0.1	0.3
Encephalitis	5	0	3	0	8	1.1	-	0.7	-	0.4
Giardiasis	24	37	28	35	124	5.2	10.5	6.1	4.0	5.8
Haemophilus influenzae type b	0	0	1	0	1	-	-	0.2	-	0.0
Hansen's Disease (Leprosy)	0	0	0	0	0	-	-	-	-	-
Hepatitis A	9	15	6	28	58	2.0	4.2	1.3	3.2	2.7
Hepatitis B	3	3	3	6	15	0.7	0.8	0.7	0.7	0.7
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	0	0	0	0	0	-	-	-	-	-
Kawasaki syndrome	1	4	5	4	14	0.2	1.1	1.1	0.5	0.7
Legionellosis	0	0	1	2	3	-	-	0.2	0.2	0.1
Listeriosis, nonperinatal	0	4	0	3	7	-	1.1	-	0.3	0.3
Listeriosis, perinatal[a]	0	0	0	1	1	-	-	-	0.5	0.2
Lyme disease	1	1	1	3	6	0.2	0.3	0.2	0.3	0.3
Malaria	0	1	1	3	5	-	0.3	0.2	0.3	0.2
Measles	0	0	0	1	1	-	-	-	0.1	0.0
Meningitis, viral	13	13	20	26	72	2.8	3.7	4.3	3.0	3.4
Meningococcal infections	3	2	2	4	11	0.7	0.6	0.4	0.5	0.5
Mumps	0	2	0	2	4	-	0.6	-	0.2	0.2
Pertussis	6	4	10	12	32	1.3	1.1	2.2	1.4	1.5
Psittacosis	0	0	0	1	1	-	-	-	0.1	0.0
Q-fever	0	0	0	0	0	-	-	-	-	-
Relapsing fever	0	0	1	0	1	-	-	0.2	-	0.0
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	43	44	71	112	270	9.4	12.4	15.4	12.8	12.6
Shigellosis	19	17	26	25	87	4.2	4.8	5.6	2.9	4.1
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	1	0	2	3	-	0.3	-	0.2	0.1
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	0	2	0	1	3	-	0.6	-	0.1	0.1
Vibrio	0	0	0	2	2	-	-	-	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-3. Selected Notifiable Diseases
SPA 3. San Gabriel Area
Los Angeles County, 2006

Disease	Frequency					Rate (Cases per 100,000)[b]				
	AH	EM	FH	PO	TOTAL	AH	EM	FH	PO	TOTAL
Amebiasis	3	0	1	2	6	0.8	-	0.3	0.4	0.3
Botulism	0	1	0	0	1	-	0.2	-	-	0.1
Brucellosis	1	0	0	0	1	0.3	-	-	-	0.1
Campylobacteriosis	28	8	20	36	92	7.8	1.7	6.4	6.3	5.3
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	4	0	3	4	11	1.1	-	1.0	0.7	0.6
Cryptosporidiosis	1	0	1	1	3	0.3	-	0.3	0.2	0.2
Cysticercosis	0	5	1	0	6	-	1.0	0.3	-	0.3
Dengue	0	0	0	0	0	-	-	-	-	-
E. *coli* O157:H7	1	1	0	1	3	0.3	0.2	-	0.2	0.2
Encephalitis	6	1	5	0	12	1.7	0.2	1.6	-	0.7
Giardiasis	4	8	16	18	46	1.1	1.7	5.1	3.2	2.7
Haemophilus influenzae type b	0	0	0	0	0	-	-	-	-	-
Hansen's Disease (Leprosy)	0	0	0	0	0	-	-	-	-	-
Hepatitis A	9	6	18	24	57	2.5	1.3	5.7	4.2	3.3
Hepatitis B	2	0	3	1	6	0.6	-	1.0	0.2	0.3
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	3	0	0	0	3	0.8	-	-	-	0.2
Kawasaki syndrome	5	2	2	4	13	1.4	0.4	0.6	0.7	0.8
Legionellosis	0	1	2	1	4	-	0.2	0.6	0.2	0.2
Listeriosis, nonperinatal	4	2	1	1	8	1.1	0.4	0.3	0.2	0.5
Listeriosis, perinatal[a]	1	0	0	1	2	1.3	-	-	0.8	0.5
Lyme disease	0	0	0	0	0	-	-	-	-	-
Malaria	0	0	1	3	4	-	-	0.3	0.5	0.2
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	22	5	16	35	78	6.1	1.0	5.1	6.1	4.5
Meningococcal infections	1	1	2	0	4	0.3	0.2	0.6	-	0.2
Mumps	0	0	0	0	0	-	-	-	-	-
Pertussis	4	1	3	13	21	1.1	0.2	1.0	2.3	1.2
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	0	0	0	0	0	-	-	-	-	-
Relapsing fever	0	0	1	0	1	-	-	0.3	-	0.1
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	47	27	54	61	189	13.1	5.7	17.2	10.7	11.0
Shigellosis	21	5	22	14	62	5.9	1.0	7.0	2.5	3.6
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	0	0	-	-	-	-	-
Trichinosis	0	0	1	0	1	-	-	0.3	-	0.1
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	2	0	4	1	7	0.6	-	1.3	0.2	0.4
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	1	0	1	1	3	0.3	-	0.3	0.2	0.2
Vibrio	0	0	0	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-4. Selected Notifiable Diseases
SPA 4. Metro Area
Los Angeles County, 2006

Disease	Frequency				Rate (Cases per 100,000)[b]			
	CE	HW	NE	TOTAL	CE	HW	NE	TOTAL
Amebiasis	2	12	3	17	0.5	2.2	0.9	1.3
Botulism	0	0	0	0	-	-	-	-
Brucellosis	0	0	0	0	-	-	-	-
Campylobacteriosis	20	49	29	98	5.4	9.1	8.3	7.8
Cholera	0	0	0	0	-	-	-	-
Coccidioidomycosis	9	4	1	14	2.4	0.7	0.3	1.1
Cryptosporidiosis	3	7	3	13	0.8	1.3	0.9	1.0
Cysticercosis	0	0	0	0	-	-	-	-
Dengue	0	0	0	0	-	-	-	-
E. *coli* O157:H7	0	1	0	1	-	0.2	-	0.1
Encephalitis	2	1	0	3	0.5	0.2	-	0.2
Giardiasis	11	36	10	57	3.0	6.7	2.9	4.5
Haemophilus influenzae type b	0	0	0	0	-	-	-	-
Hansen's Disease (Leprosy)	0	0	1	1	-	-	0.3	0.1
Hepatitis A	52	22	5	79	14.1	4.1	1.4	6.3
Hepatitis B	8	6	2	16	2.2	1.1	0.6	1.3
Hepatitis C	0	0	0	0	-	-	-	-
Hepatitis unspecified	0	0	0	0	-	-	-	-
Kawasaki syndrome	4	4	2	10	1.1	0.7	0.6	0.8
Legionellosis	0	4	3	7	-	0.7	0.9	0.6
Listeriosis, nonperinatal	2	2	1	5	0.5	0.4	0.3	0.4
Listeriosis, perinatal[a]	1	0	2	3	1.3	-	2.6	1.1
Lyme disease	2	3	0	5	0.5	0.6	-	0.4
Malaria	2	3	0	5	0.5	0.6	-	0.4
Measles	0	0	0	0	-	-	-	-
Meningitis, viral	8	6	9	23	2.2	1.1	2.6	1.8
Meningococcal infections	0	4	0	4	-	0.7	-	0.3
Mumps	1	0	1	2	0.3	-	0.3	0.2
Pertussis	2	10	2	14	0.5	1.8	0.6	1.1
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	53	82	44	179	14.3	15.2	12.6	14.2
Shigellosis	27	54	22	103	7.3	10.0	6.3	8.2
Strongyloidiasis	0	0	0	0	-	-	-	-
Tetanus	0	2	0	2	-	0.4	-	0.2
Trichinosis	0	0	0	0	-	-	-	-
Tularemia	0	0	0	0	-	-	-	-
Typhoid fever, case	0	0	0	0	-	-	-	-
Typhoid fever, carrier	0	1	0	1	-	0.2	-	0.1
Typhus fever	0	0	1	1	-	-	0.3	0.1
Vibrio	0	3	0	3	-	0.6	-	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-5. Selected Notifiable Diseases
SPA 5. West Area
Los Angeles County, 2006

Disease	Frequency	Rate (Cases per 100,000)[b]
	West	West
Amebiasis	12	1.9
Botulism	0	-
Brucellosis	0	-
Campylobacteriosis	119	18.7
Cholera	0	-
Coccidioidomycosis	9	1.4
Cryptosporidiosis	2	0.3
Cysticercosis	0	-
Dengue	1	0.2
E. *coli* O157:H7	0	-
Encephalitis	1	0.2
Giardiasis	44	6.9
Haemophilus influenzae type b	1	0.2
Hansen's Disease (Leprosy)	0	-
Hepatitis A	24	3.8
Hepatitis B	3	0.5
Hepatitis C	0	-
Hepatitis unspecified	0	-
Kawasaki syndrome	3	0.5
Legionellosis	1	0.2
Listeriosis, nonperinatal	4	0.6
Listeriosis, perinatal[a]	0	-
Lyme disease	2	0.3
Malaria	3	0.5
Measles	0	-
Meningitis, viral	10	1.6
Meningococcal infections	1	0.2
Mumps	2	0.3
Pertussis	11	1.7
Psittacosis	0	-
Q-fever	0	-
Relapsing fever	0	-
Rheumatic fever, acute	0	-
Rubella	0	-
Salmonellosis	104	16.3
Shigellosis	34	5.3
Strongyloidiasis	0	-
Tetanus	0	-
Trichinosis	0	-
Tularemia	0	-
Typhoid fever, case	2	0.3
Typhoid fever, carrier	0	-
Typhus fever	1	0.2
Vibrio	6	0.9

[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, 2006

Disease	Frequency					Rate (Cases per 100,000)[b]				
	CN	SO	SE	SW	TOTAL	CN	SO	SE	SW	TOTAL
Amebiasis	2	0	1	1	4	0.7	-	0.6	0.3	0.4
Botulism	0	0	0	0	0	-	-	-	-	-
Brucellosis	1	0	0	0	1	0.3	-	-	-	0.1
Campylobacteriosis	12	13	19	19	63	4.1	6.9	10.6	5.0	6.0
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	6	4	3	3	16	2.0	2.1	1.7	0.8	1.5
Cryptosporidiosis	0	1	0	2	3	-	0.5	-	0.5	0.3
Cysticercosis	0	0	0	0	0	-	-	-	-	-
Dengue	0	0	0	0	0	-	-	-	-	-
E. *coli* O157:H7	0	0	0	0	0	-	-	-	-	-
Encephalitis	0	1	0	0	1	-	0.5	-	-	0.1
Giardiasis	5	4	9	16	34	1.7	2.1	5.0	4.2	3.3
Haemophilus influenzae type b	0	0	0	0	0	-	-	-	-	-
Hansen's Disease (Leprosy)	0	0	0	0	0	-	-	-	-	-
Hepatitis A	7	5	10	15	37	2.4	2.7	5.6	3.9	3.6
Hepatitis B	2	1	1	2	6	0.7	0.5	0.6	0.5	0.6
Hepatitis C	0	0	0	1	1	-	-	-	0.3	0.1
Hepatitis unspecified	0	0	0	0	0	-	-	-	-	-
Kawasaki syndrome	2	1	3	2	8	0.7	0.5	1.7	0.5	0.8
Legionellosis	0	0	0	0	0	-	-	-	-	-
Listeriosis, nonperinatal	0	0	0	1	1	-	-	-	0.3	0.1
Listeriosis, perinatal[a]	0	0	1	1	2	-	-	2.4	1.1	0.8
Lyme disease	0	0	0	0	0	-	-	-	-	-
Malaria	1	1	0	6	8	0.3	0.5	-	1.6	0.8
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	9	7	2	13	31	3.1	3.7	1.1	3.4	3.0
Meningococcal infections	5	2	4	3	14	1.7	1.1	2.2	0.8	1.3
Mumps	0	0	0	0	0	-	-	-	-	-
Pertussis	8	1	4	4	17	2.7	0.5	2.2	1.0	1.6
Psittacosis	0	0	0	0	0	-	-	-	-	-
Q-fever	1	0	0	0	1	0.3	-	-	-	0.1
Relapsing fever	0	0	0	0	0	-	-	-	-	-
Rheumatic fever, acute	0	0	0	0	0	-	-	-	-	-
Rubella	0	0	0	0	0	-	-	-	-	-
Salmonellosis	42	15	32	53	142	14.3	8.0	17.9	13.9	13.6
Shigellosis	25	23	18	40	106	8.5	12.3	10.0	10.5	10.2
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	0	0	0	1	1	-	-	-	0.3	0.1
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	0	0	0	1	1	-	-	-	0.3	0.1
Typhoid fever, carrier	0	0	0	0	0	-	-	-	-	-
Typhus fever	0	0	1	0	1	-	-	0.6	-	0.1
Vibrio	0	0	0	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-7. Selected Notifiable Diseases
SPA 7. East Area
Los Angeles County, 2006

Disease	Frequency					Rate (Cases per 100,000)[b]				
	BF	EL	SA	WH	TOTAL	BF	EL	SA	WH	TOTAL
Amebiasis	1	2	2	2	7	0.3	0.9	0.4	0.6	0.5
Botulism	0	0	0	1	1	-	-	-	0.3	0.1
Brucellosis	0	0	2	0	2	-	-	0.4	-	0.1
Campylobacteriosis	20	16	26	32	94	5.4	7.1	5.8	9.6	6.8
Cholera	0	0	0	0	0	-	-	-	-	-
Coccidioidomycosis	1	3	2	3	9	0.3	1.3	0.4	0.9	0.7
Cryptosporidiosis	3	2	1	2	8	0.8	0.9	0.2	0.6	0.6
Cysticercosis	0	0	1	0	1	-	-	0.2	-	0.1
Dengue	0	0	0	0	0	-	-	-	-	-
E. *coli* O157:H7	0	0	0	1	1	-	-	-	0.3	0.1
Encephalitis	2	1	4	1	8	0.5	0.4	0.9	0.3	0.6
Giardiasis	14	5	7	4	30	3.8	2.2	1.6	1.2	2.2
Haemophilus influenzae type b	1	1	1	0	3	0.3	0.4	0.2	-	0.2
Hansen's Disease (Leprosy)	0	1	0	0	1	-	0.4	-	-	0.1
Hepatitis A	8	7	13	5	33	2.2	3.1	2.9	1.5	2.4
Hepatitis B	3	1	1	1	6	0.8	0.4	0.2	0.3	0.4
Hepatitis C	0	0	0	0	0	-	-	-	-	-
Hepatitis unspecified	0	0	1	0	1	-	-	0.2	-	0.1
Kawasaki syndrome	2	1	3	3	9	0.5	0.4	0.7	0.9	0.7
Legionellosis	1	1	2	3	7	0.3	0.4	0.4	0.9	0.5
Listeriosis, nonperinatal	0	0	0	0	0	-	-	-	-	-
Listeriosis, perinatal[a]	0	0	2	0	2	-	-	1.9	-	0.7
Lyme disease	0	0	0	0	0	-	-	-	-	-
Malaria	1	0	1	0	2	0.3	-	0.2	-	0.1
Measles	0	0	0	0	0	-	-	-	-	-
Meningitis, viral	10	5	36	8	59	2.7	2.2	8.0	2.4	4.3
Meningococcal infections	1	2	2	1	6	0.3	0.9	0.4	0.3	0.4
Mumps	1	0	1	0	2	0.3	-	0.2	-	0.1
Pertussis	13	2	5	7	27	3.5	0.9	1.1	2.1	2.0
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	36	49	58	32	175	9.7	21.8	12.9	9.6	12.7
Shigellosis	15	26	27	16	84	4.1	11.6	6.0	4.8	6.1
Strongyloidiasis	0	0	0	0	0	-	-	-	-	-
Tetanus	1	0	0	0	1	0.3	-	-	-	0.1
Trichinosis	0	0	0	0	0	-	-	-	-	-
Tularemia	0	0	0	0	0	-	-	-	-	-
Typhoid fever, case	1	0	2	0	3	0.3	-	0.4	-	0.2
Typhoid fever, carrier	0	0	2	0	2	-	-	0.4	-	0.1
Typhus fever	1	0	0	0	1	0.3	-	-	-	0.1
Vibrio	4	0	0	2	6	1.1	-	-	0.6	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 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, 2006

Disease	Frequency				Rate (Cases per 100,000)[b]			
	HB	IW	TO	TOTAL	HB	IW	TO	TOTAL
Amebiasis	0	3	4	7	-	0.7	0.9	0.6
Botulism	0	0	0	0	-	-	-	-
Brucellosis	0	0	0	0	-	-	-	-
Campylobacteriosis	23	20	22	65	11.0	4.6	4.7	5.8
Cholera	0	0	0	0	-	-	-	-
Coccidioidomycosis	2	3	7	12	1.0	0.7	1.5	1.1
Cryptosporidiosis	0	1	0	1	-	0.2	-	0.1
Cysticercosis	0	0	1	1	-	-	0.2	0.1
Dengue	0	0	0	0	-	-	-	-
E. *coli* O157:H7	0	0	1	1	-	-	0.2	0.1
Encephalitis	3	3	2	8	1.4	0.7	0.4	0.7
Giardiasis	4	9	14	27	1.9	2.1	3.0	2.4
Haemophilus influenzae type b	0	0	0	0	-	-	-	-
Hansen's Disease (Leprosy)	0	0	0	0	-	-	-	-
Hepatitis A	22	10	13	45	10.5	2.3	2.8	4.0
Hepatitis B	3	1	2	6	1.4	0.2	0.4	0.5
Hepatitis C	2	0	0	2	1.0	-	-	0.2
Hepatitis unspecified	0	0	1	1	-	-	0.2	0.1
Kawasaki syndrome	2	7	8	17	1.0	1.6	1.7	1.5
Legionellosis	0	1	0	1	-	0.2	-	0.1
Listeriosis, nonperinatal	0	0	0	0	-	-	-	-
Listeriosis, perinatal[a]	0	1	0	1	-	1.0	-	0.4
Lyme disease	1	1	1	3	0.5	0.2	0.2	0.3
Malaria	0	2	4	6	-	0.5	0.9	0.5
Measles	0	0	0	0	-	-	-	-
Meningitis, viral	15	7	30	52	7.2	1.6	6.4	4.7
Meningococcal infections	0	2	2	4	-	0.5	0.4	0.4
Mumps	0	0	0	0	-	-	-	-
Pertussis	5	1	10	16	2.4	0.2	2.1	1.4
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	37	44	42	123	17.7	10.1	9.0	11.1
Shigellosis	14	16	11	41	6.7	3.7	2.4	3.7
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	0.5	-	-	0.1
Typhoid fever, carrier	0	0	0	0	-	-	-	-
Typhus fever	0	0	0	0	-	-	-	-
Vibrio	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.

DISEASE SUMMARIES
2006

AMEBIASIS

CRUDE DATA	
Number of Cases	94
Annual Incidence[a]	
LA County	0.97
United States	N/A
Age at Diagnosis	
Mean	39.9
Median	40
Range	5-87 years

[a] Cases per 100,000 population.

Figure 1
Amebiasis
Incidence Rates by Year
LAC, 1996–2006

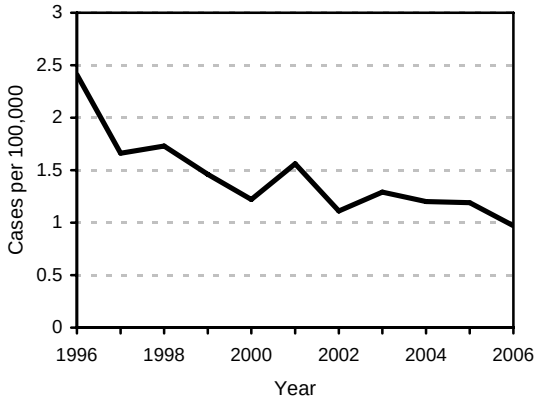
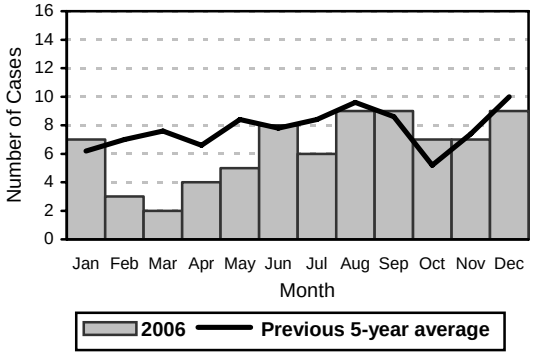


Figure 2
Amebiasis
Cases by Month of Onset
LAC, 2006



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 lakes and 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. The most commonly ordered parasite test (microscopy of stool for ova and parasites) cannot distinguish *E. histolytica* from *E. dispar*, a non-pathogenic amebic species. There is an available EIA test, however, that can distinguish between the two.

DISEASE ABSTRACT

- Amebiasis incidence has decreased substantially over the past 10 years. In 2006 the rate decreased from 1.19 per 100,000 to 0.97 per 100,000.
- Decreasing numbers of refugees and immigrants from endemic regions or a reduction in testing may account for the decrease in cases.
- No amebiasis outbreaks were reported during 2006.

STRATIFIED DATA

Trends: After a small increase in 2003, the 2006 amebiasis incidence rate decreased still further to 0.97 per 100,000 (Figure 1).

Seasonality: Amebiasis incidence usually peaks in the summer months; however, in 2006 the incidence rose in the summer months and remained elevated through December (Figure 2).

Age: While amebiasis is ubiquitous, it is a disease more often diagnosed among adults (Figure 3). About two-thirds of the cases reported in LAC during 2006 were among those aged 15–54 (n=72, 77%). Amebiasis is rare among those below age 5 and especially rare among those below age 2. Dysentery in infants is typically due to Shigella.

Sex: Males (57%) continue to be slightly more likely to contract amebiasis than females, with a ratio of 1.74:1.

Race/Ethnicity: In 2006, whites had the highest rate, closely followed by Asians and Latinos (Figure 4). The rate for Asians increased from 0.4 per 100,000 in 2005 to 0.8 per 100,000 in 2006. The rate for blacks decreased from 0.8 per 100,000 in 2005 to 0.2 per 100,000 in 2006.

Location: Three SPAs had rates greater than the county mean rate: SPA 2 (1.8 per 100,000), SPA 4 (1.3 per 100,000) and SPA 5 (1.9 per 100,000).

Risk factors: Many of the cases (n=33, 35%) were recent immigrants (less than 6 months) and 20 cases (21%) reported recent foreign travel.

Figure 3
Amebiasis
Incidence Rates by Age Group
LAC, 2006

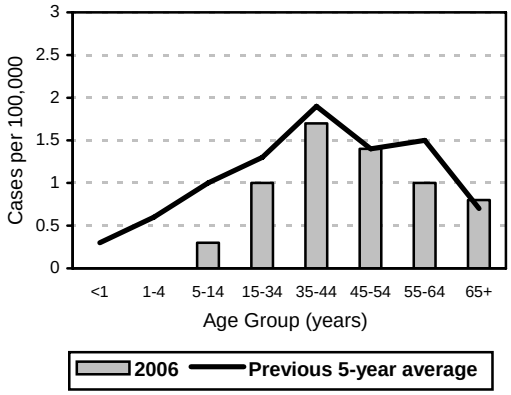
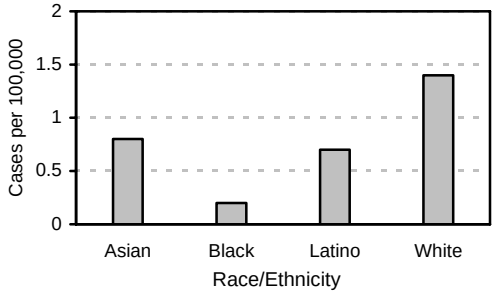


Figure 4
Amebiasis
Incidence Rates by Race/Ethnicity
LAC, 2006



COMMENTS

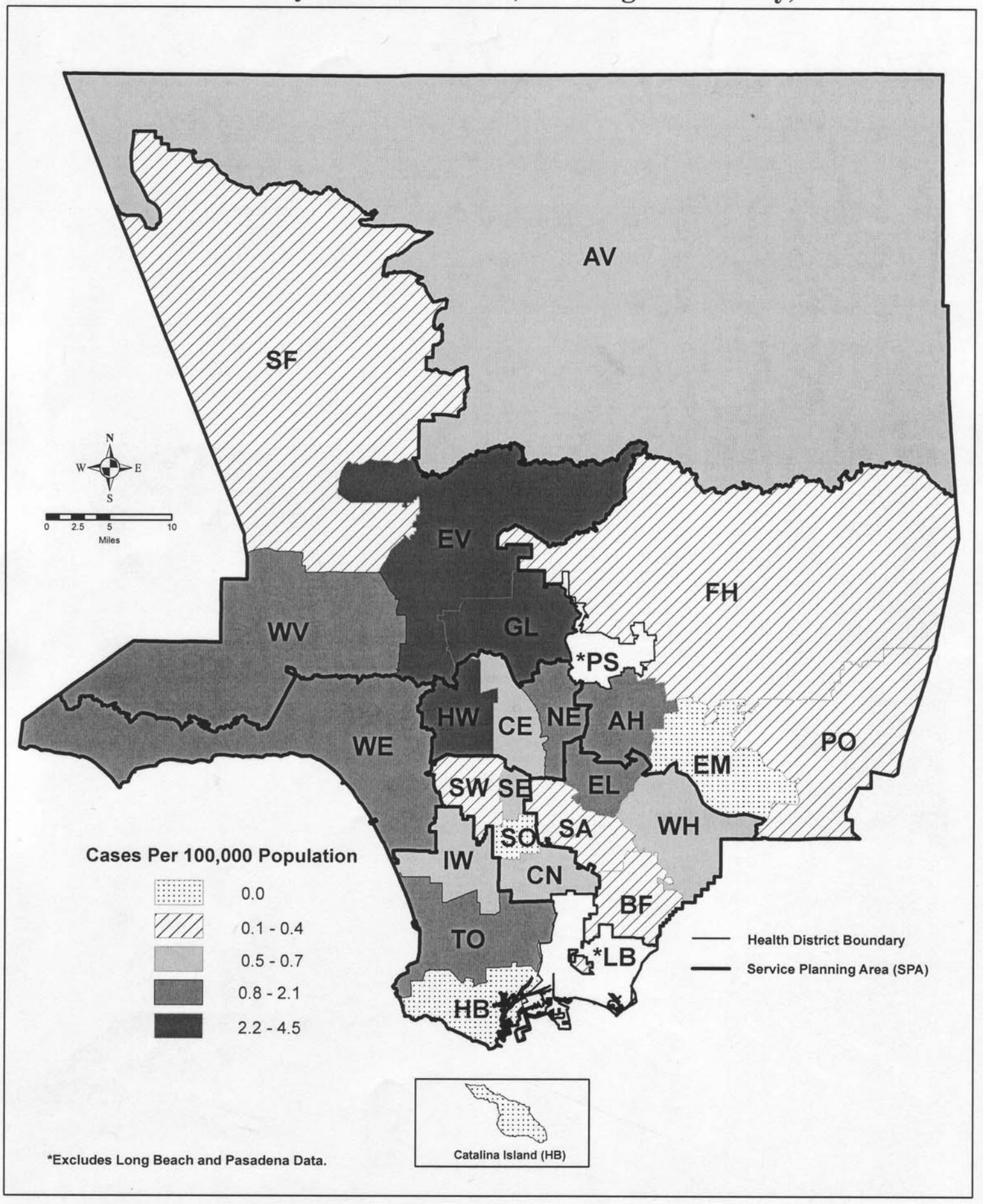
Amebiasis is no longer nationally reportable, so there are no current national rates for comparison. The disease remains reportable in California because a large proportion of the population travels to endemic countries in Asia and Central America. The impact of new tests that distinguish *E. histolytica* from *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*.

ADDITIONAL RESOURCES

Amebiasis - Health Information for International Trave, 2008:
wwwn.cdc.gov/travel/yellowBookCh4-Amebiasis.aspx

More CDC Information on Amebiasis:
www.cdc.gov/ncidod/dpd/parasites/amebiasis/default.htm

Map 1. Amebiasis
Rates by Health District, Los Angeles County, 2006*



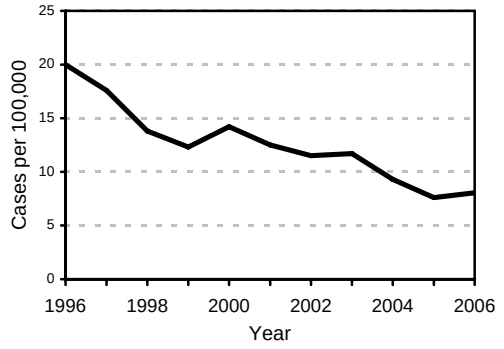
*Excludes Long Beach and Pasadena Data.

CAMPYLOBACTERIOSIS

CRUDE DATA	
Number of Cases	775
Annual Incidence[a]	
LA County	8.0
United States	N/A
Age at Diagnosis	
Mean	34.16
Median	32
Range	0–98

[a] Cases per 100,000 population.

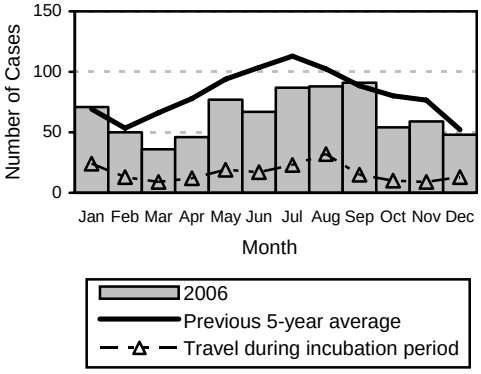
Figure 1
Campylobacteriosis
Incidence Rates by Year of Onset
LAC, 1996–2006



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, 2006



DISEASE ABSTRACT

- There was a 6.9% increase in the incidence of campylobacteriosis in 2006.
- In 2006, overall age-adjusted rates were highest for whites.
- One outbreak of campylobacteriosis was investigated in 2006.

STRATIFIED DATA

Trends: The incidence of campylobacteriosis increased by 6.9% in 2006. After two years of relative stability in 2002 and 2003, the rate of campylobacteriosis decreased significantly from 11.7 cases per 100,000 to 9.3 in 2004 and 7.6 in 2005 ($p < 0.05$). In 2006, the rated increased slightly to 8.0 cases per 100,000. Continued surveillance is needed to identify any new trend.

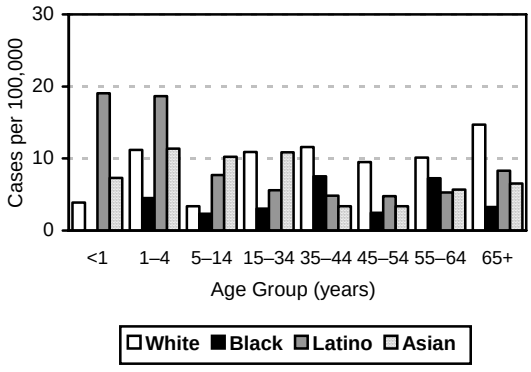
Seasonality: With the exception of January and September, monthly incidence decreased when compared to the previous five-year average. Incidence increased in the spring and summer as seen in other years. Peaks during these seasons may be associated with the increase in travel. Travel is a risk factor 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 questionable. In 2006, 197 cases (25.4%) reported travel during the incubation period. Of these, 30% traveled within the US. Mexico was the most commonly named (33.5%) travel destination outside the US, although other locations in Central and South America and Europe were named frequently. In 2006, overall incidence peaked in September and travel related incidence peaked in August (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.

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 [1]. Among men above the age of fifteen, only 1.3% reported sexual contact with other men (MSM).

Race/Ethnicity: The highest overall age-adjusted rate was in whites (9.96 cases per 100,000 population); this was a decrease from 2005 (11 per 100,000). In 2006 the age-adjusted rate for Latinos was stable (7.0) although Latinos had similar incidence to whites. Age-adjusted rates for Asians (7.7) and blacks (4.0) increased. Latino infants and children have the highest age adjusted rates when compared to other races by age group. Asians showed a higher rate for several age groups (Figure 3).

Figure 3
Campylobacteriosis Incidence Rates
by Age Group and Race/Ethnicity
LAC, 2006 (N=775)



Location: SPA 2 again had the highest number of cases at 217 (10.1 per 100,000), and SPA 5 had the highest rate with 18.7 per 100,000 (N= 119). The higher rate in SPA 5 is consistent with previous years and is significantly higher than any other SPA.

Severity of Illness: Thirteen percent of campylobacteriosis cases (N=101) were hospitalized for at least two days. Two campylobacteriosis-associated deaths occurred in a 78 year-old male and a 52 year-old male. Both deaths were associated with multiple medical problems including a history of liver and lung cancer. Although, there is no active surveillance of disease sequelae, there was one report of Guillain-Barré syndrome (GBS) subsequent to a campylobacteriosis diagnosis. Fifteen percent of campylobacteriosis cases were immunocompromised (N=120). Reasons for immunosuppression included HIV, AIDS, diabetes, leukemia, kidney and liver transplant, lupus, cancer, and recent diagnosis of cancer with treatment.

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.

COMMENTS

Consuming raw milk or raw milk products was a risk factor for twelve sporadic cases; four of these cases consumed the milk or product while traveling outside the US and two consumed unpasteurized cheese brought back from Mexico.

There was one campylobacteriosis outbreaks investigated in 2006. This outbreak was travel related, involving a missionary group. There were two confirm cases in this outbreak.

REFERENCES

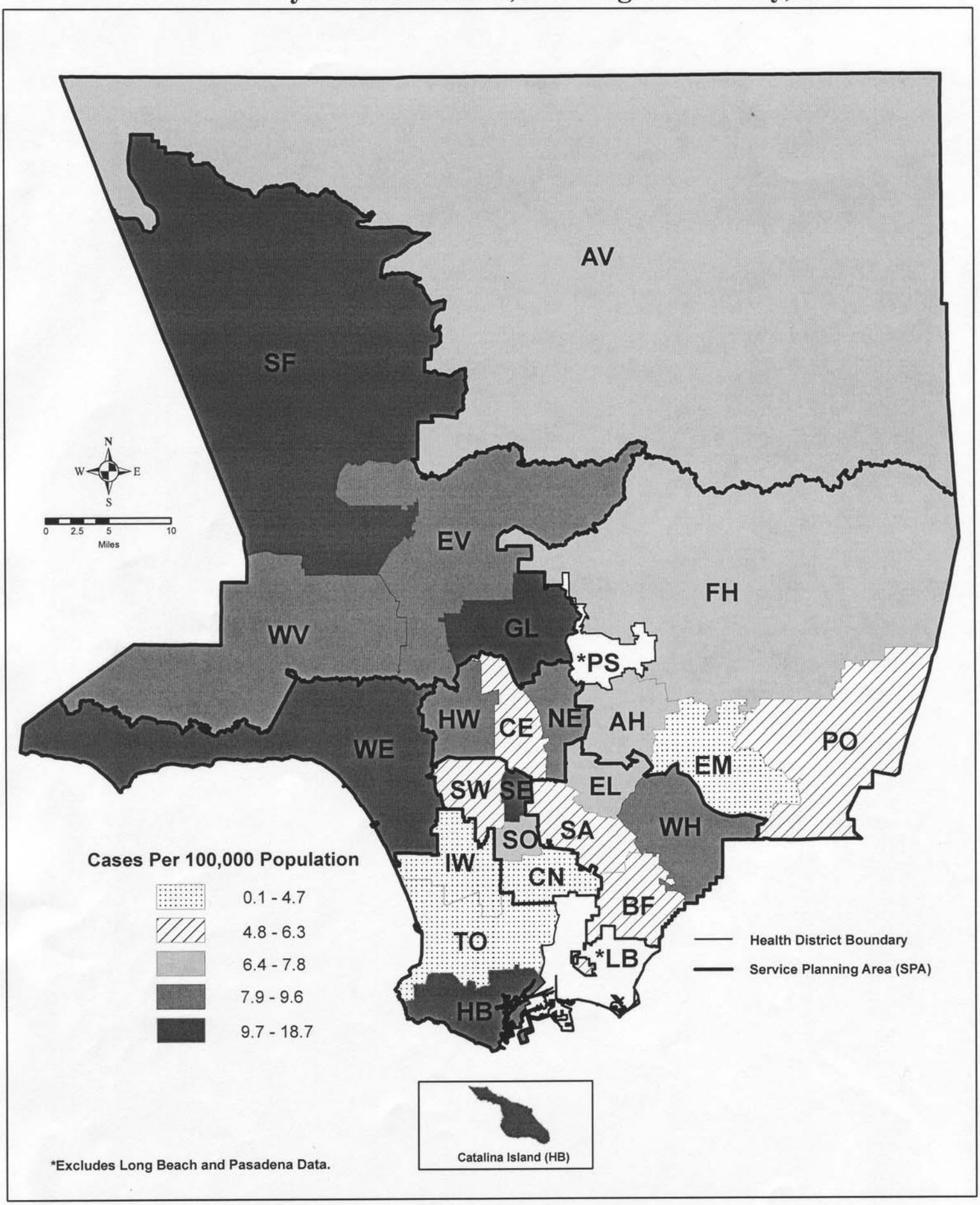
1. Allos BM. Campylobacter jejuni infections: update on emerging issues and trends. Clin Infect Dis 2001; 32(8):1201–1206.

ADDITIONAL RESOURCES

Disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/campylobacter_g.htm

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

Map 2. Campylobacteriosis
Rates by Health District, Los Angeles County, 2006*



*Excludes Long Beach and Pasadena Data.

COCCIDIOIDOMYCOSIS

CRUDE DATA	
Number of Cases	196
Annual Incidence[a]	
LA County	2.03
California	8.67[b]
United States	3.01[b]
Age at Diagnosis	
Mean	46.8
Median	48
Range	3-88 years

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Coccidioidomycosis
Incidence Rates by Year of Onset
LAC, 1997–2006

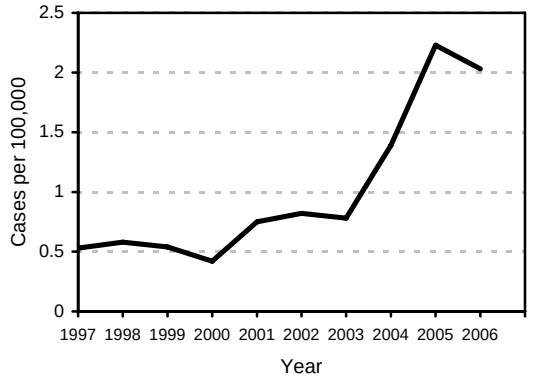
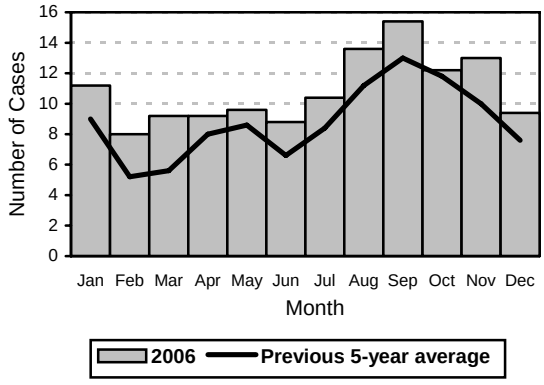


Figure 2
Coccidioidomycosis
by Month of Onset
LAC, 2006 (N=196)



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 as follows: arid to semi-arid regions, dust storms, lower altitude, hotter summers, warmer winters, and sandy, alkaline soils. It is endemic in the southwestern US 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. Blacks, Filipinos, pregnant women, the very young (<5 years), elderly, and immunocompromised individuals are at high risk for severe disease.

DISEASE ABSTRACT

- The incidence rate for coccidioidomycosis has been increasing since 2000, when it was at its lowest point in 10 years (1997-2006) in LAC.
- Cost in terms of disease severity and hospitalization is substantial.
- The incidence of coccidioidomycosis this year is slightly lower than last year. 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 2.03 cases per 100,000 population which decreased from last year's rate of 2.23 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 2006 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 15-34 and 45-54 years (Figure 3). The greatest incidence rate was in the 65+ age group (3.7/100,000). The youngest case was less than 1 year of age. The mean age for males was 45 years and for females, 49 years (Figure 3).

Sex: The male-to-female rate ratio was 2.2:1. Males had an overall higher incidence rate, 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 of 3.2 cases per 100,000 was observed among blacks compared to the other race/ethnic groups. Whites had an incidence rate of 2.6 (n = 75), Latinos 1.5 (n= 68), Asians 1.2 (n=15) and others (n=3). Race was unknown in 2 cases (Figure 4).

Location: SPA 1 (Antelope Valley Health District) had the highest number of coccidioidomycosis cases (n=67), within SPA 2. San Fernando Valley had 32 cases and West Valley had 19 cases. SPA 1 and 2 cases combined comprise 60% of the total. This has added significance because the incidence rate per 100,000 in Antelope Valley is 19.3, San Fernando Valley 7.2 and West Valley 2.2. These districts are more arid than the rest of the county, thus have higher risk.

Travel: Travel history was available for 158 cases. Of those with a travel history, 53% (n=83) reported travel within four weeks before onset of illness, while 47% (n=75) reported no travel. Of those traveling, many reported multiple travel destinations: 42% (n=35) traveled within California including San Fernando Valley, Central Valley, and adjacent

Figure 3
Coccidioidomycosis
Incidence by Age and Sex
LAC, 2006 (N=196)

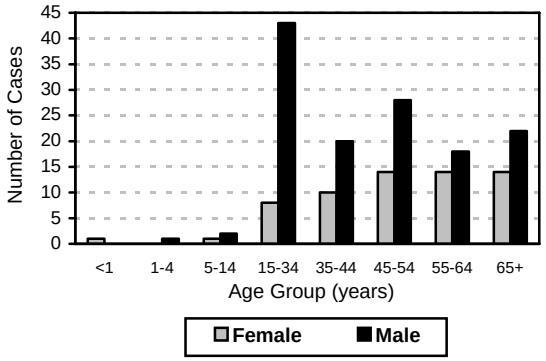


Figure 4
Coccidioidomycosis
Percent Cases by Race/Ethnicity
LAC, 2006

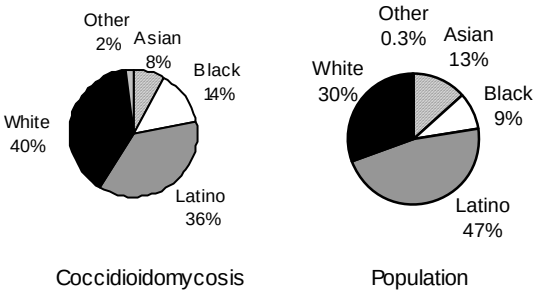
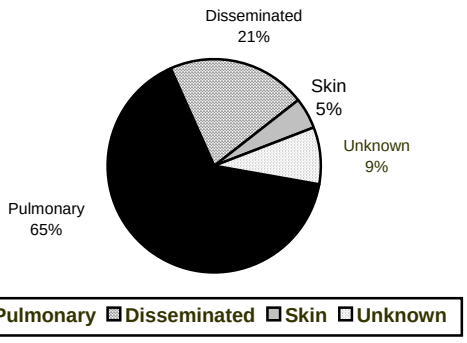


Figure 5
Coccidioidomycosis
by Infection Site
LAC, 2006 (N=196)



counties of Bakersfield and Oxnard; 52% (n=43) traveled outside California to Las Vegas, Arizona, Texas, Mexico, and South America, and 6% (n=5) 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 146 cases assessed, 97 cases (66%) reported having an underlying disease: 24% (n=35) diabetes, 7% (n=10) malignancy, 2% (n=3) HIV, 3% (n=4) organ transplants, and 28% (n=41) coded as other (e.g. asthma, kidney problems, sickle cell anemia). No disease history was reported in 36% (n=53) of cases. Some cases had multiple underlying diseases.

Severity of Disease: Sites of infection were reported as primary pulmonary 65% (n=128), disseminated 21% (n=41), meningitis 0.5% (n=1), skin 5% (n=9), and 9% (n=17) of the case infection sites were not indicated (Figure 5). Of the cases, 47 were culture-confirmed and 113 cases were diagnosed by serological, histopathological, or molecular testing. Some cases had multiple labs available for diagnosis. Of the 178 cases where information was available, 71% (n=127) were hospitalized.

COMMENTS

In LAC, the 2006 incidence for coccidioidomycosis was slightly lower than the previous year. Though there is a plateau in the rate of cases this year, overall, the rate has been increasing since 2000. 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 ages 45-64, especially males are affected instead of the very young and old, who are normally at high risk for illness, which may reflect a higher outdoor recreational or occupational exposure in these groups.

As in past years, residents of the Antelope Valley and the 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 cocci endemic area.

The increased number of cases reported in SPA 2 may be due to a reporting bias. It was determined that cases were not being reported consistently from a single source, and after education was provided on reporting guidelines and procedures, an increase in the number of reports was noted.

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.

Although coccidioidomycosis cannot be readily prevented, improved understanding of the epidemiology of this disease can assist in developing more effective prevention strategies. To increase awareness among Antelope Valley residents and healthcare workers, a series of presentations on the epidemiology, clinical symptoms, diagnosis and treatment of coccidioidomycosis were provided.

Nikkomycin Z is an experimental compound that has been shown to exhibit antifungal properties by inhibiting chitin synthesis. Funding to continue clinical trials of nikkomycin Z is being sought, but even if the fund-raising efforts are successful, the drug is unlikely to be available for general use for another five to seven years.

Currently, vaccine research is being conducted in part by the state of California.

ADDITIONAL RESOURCES

Bussum LV. National Fire Weather Report, 2003. Report available at the National Weather Service, Boise, ID website: http://fire.boi.noaa.gov/FIREWX/AnnualReport/2003NationalReport.pdf

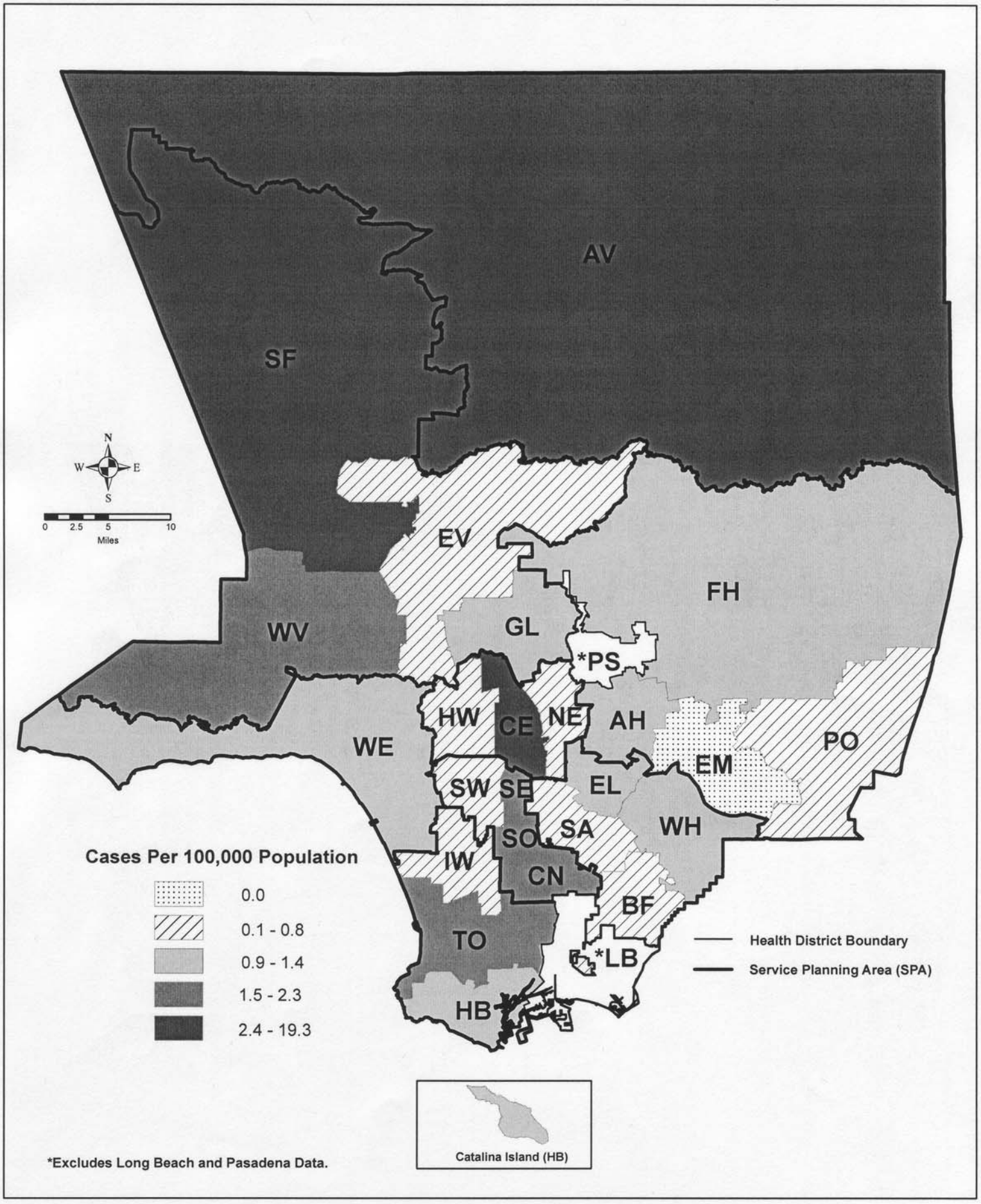
CDC website: www.cdc.gov/ncidod/dbmd/diseaseinfo/coccidioidomycosis_t.htm

Kirkland TN, Fierer J. Coccidioidomycosis: a reemerging infectious disease. Emerg Infect Dis 1996; 2(3):192–199.

Valdivia L, Nix D, Wright M, et al. Coccidioidomycosis as a common cause of community-acquired pneumonia. Emerg Infect Dis 2006; 12(8):958-969.

Valley Fever Center for Excellence website: www.vfce.arizona.edu/NAE-home.htm

Map 3. Coccidioidomycosis
Rates by Health District, Los Angeles County, 2006*



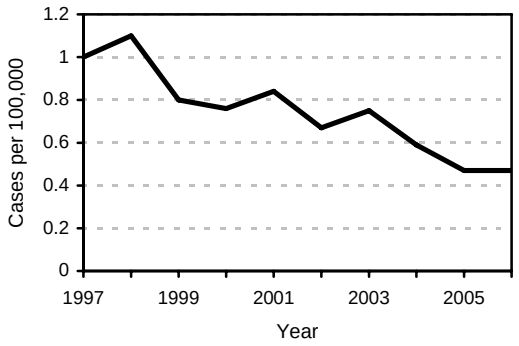
CRYPTOSPORIDIOSIS

CRUDE DATA	
Number of Cases	48
Annual Incidence[a]	
LA County	0.47
California	0.94[b]
United States	2.05[b]
Age at Diagnosis	
Mean	40
Median	39
Range	3-89

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

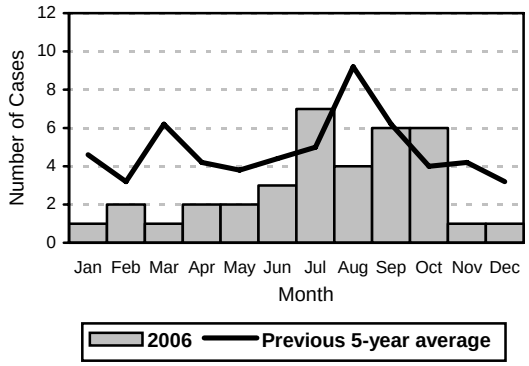
Figure 1
Cryptosporidiosis
Incidence Rates by Year of Onset
LAC, 1997–2006



DESCRIPTION

Cryptosporidiosis is fecal-orally transmitted when cysts of the parasite *Cryptosporidium parvum* are ingested. Common causes include unprotected sexual contact, particularly among men who have sex with men (MSM), and by swallowing 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.

Figure 2
Cryptosporidiosis
Cases by Month of Onset
LAC, 2006 (N=48)



DISEASE ABSTRACT

- The incidence rate for this disease decreased from 0.59 per 100,000 in 2004 to 0.47 per 100,000 in 2006. The incidence of this disease has remained the same for 2005 and 2006 and is the lowest incidence rate in the past ten years. The last outbreak of this disease occurred during 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 (0.47 cases per 100,000) remained the same in 2006 (Figure 1).

Seasonality: In 2006, there was a peak in July, 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 55-64 and 45-64 age groups (Figure 3).

Sex: The male-to-female ratio was 5:3 (18 females). This marks a noticeable increase in the number of female cases from 2005 (n=7).

Race/Ethnicity: Blacks had the highest incidence rate (Figure 4), followed by whites and Latinos. Race was unknown for 2 cases (4.2%). The rate for blacks decreased from 1.2 per 100,000 in 2005 to 0.9 per 100,000 in 2006. There were no cases among Asians in 2006.

Location: Location information was available for all 48 cases. Hollywood-Wilshire (HW) Health District had the highest incidence rate, 1.3 per 100,000 (n=7), followed closely by Antelope Valley (AV) Health District, which had 1.2 per 100,000 (n=4).

Risk Factors: Complete risk factor data was not available for all cases; 10 cases (21%) were either unable to be located or refused to be interviewed (Figure 5). HIV infection and AIDS accounted for 46% of the cases. Animal contact (38%) and recent international travel (25%) were the other most common risk factors following HIV status. Many cases had more than one risk factor.

Figure 3
Cryptosporidiosis
Incidence Rates by Age Group
LAC, 2006

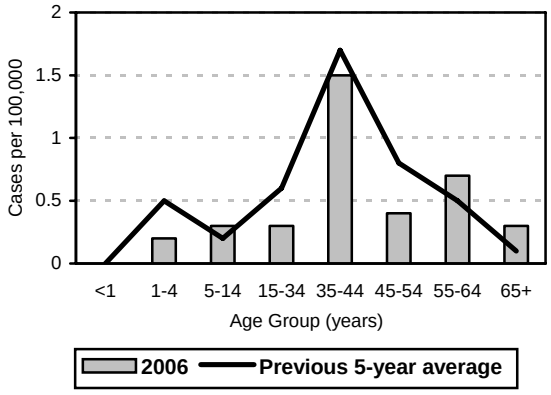


Figure 4
Cryptosporidiosis
Incidence Rate by Race/Ethnicity
LAC, 2006

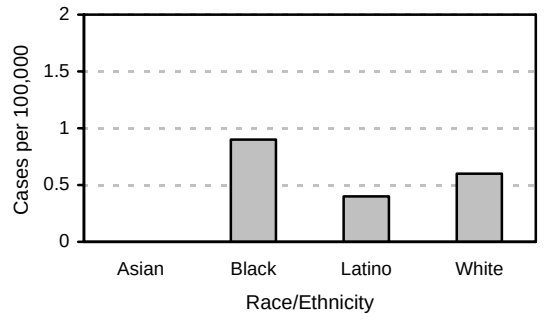
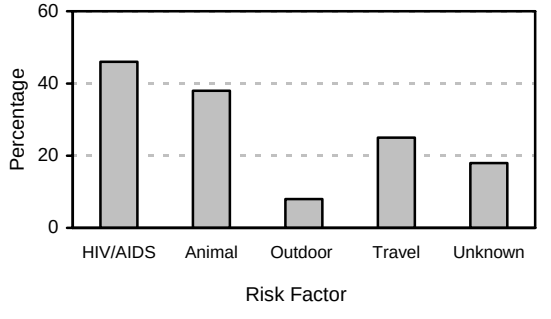


Figure 5
Cryptosporidiosis
by Reported Risk Factor
LAC, 2006



COMMENTS

Risk factors were self-reported and were not proven to be the actual source of infection. A large percentage (n=22, 46%) of the cryptosporidiosis cases were among HIV positive males. In 2006, the majority of male HIV cases were Latino (n=11, 50%). In 2005 and 2004 the majority of cases were black (44% and 45% respectively). 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. There has not been an outbreak of cryptosporidiosis in LAC since 1988, which involved contaminated swimming pool water [1].

RESOURCES

1. Sorvillo FJ, Fujioka K, Nahlen B, Tormey MP, Kebabjian R, Mascola L. Swimming-associated cryptosporidiosis. Am J Public Health 1992; 82(5):742-744.

ADDITIONAL RESOURCES

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

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

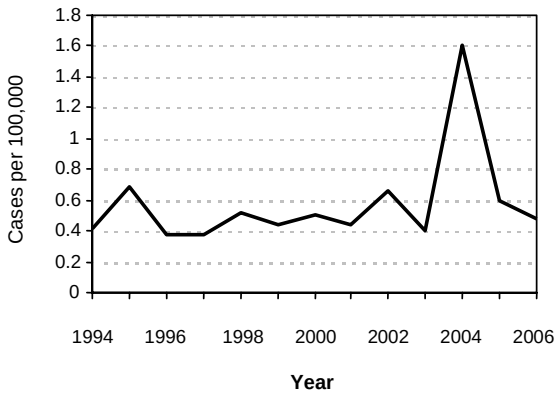
ENCEPHALITIS

CRUDE DATA	
Number of Cases[a]	46
Annual Incidence[b]	
LA County	0.48
California	N/A
United States	N/A
Age at Onset	
Mean	25.1
Median	15.5
Range	0–80 years

[a] Excludes AIDS encephalopathy cases.

[b] Cases per 100,000 population.

Figure 1
Encephalitis
Incidence Rates by
Year of Onset
LAC 1994-2006



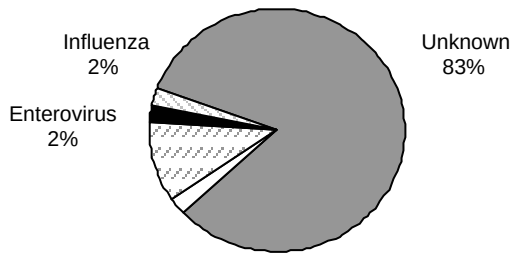
DESCRIPTION

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 section). 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 United States: West Nile virus (WNV), eastern equine encephalitis (EEE) virus, western equine encephalitis (WEE) virus, St. Louis encephalitis (SLE) virus and La Crosse (LAC) virus, all of which are transmitted by mosquitoes.

DISEASE ABSTRACT

- In 2006, 46 viral encephalitis cases were reported. The incidence of viral encephalitis decreased from 0.59 cases per 100,000 population in 2005 to 0.48 cases per 100,000 population in 2006 (Figure 1).
- The number of reported encephalitis cases declined in 2006 by 22% compared to 2005 when 56 cases were reported. The underlying etiologies of encephalitis were identified in only 11 (24%) cases and included: 1 WNV (see WNV Report for details), 8 herpes simplex virus (HSV), 1 influenza, and 1 enterovirus (Figure 2). No deaths were reported.
- The majority of encephalitis cases occurred in children <15 years old (n=18, 39%), followed by adolescents and young adults ages 15-34 years (n=15, 33%);

Figure 2
Encephalitis by Etiology
LAC, 2006 (N=46)



adults between 35-64 years (n=8, 17%), and those more than 65 years (n=4, 9%).
- Latinos had the greatest number of encephalitis cases (n=20, 45%), followed by whites (n=11, 25%), blacks (n=8, 18%), and Asians (n=4, 9%).
- The number of reported encephalitis cases was highest in SPA 3 (n=12, 0.7 per 100,000), followed by SPAs 7 and 8 (n=8 each, 0.8 and 0.9 per 100,000, respectively), and SPA 2 (n=7, 0.3 per 100,000).

The annual incidence of acute encephalitis reported in the medical literature varies from 3.5–7.4 cases per 100,000 person-years. In 2006, the overall LAC viral encephalitis rate of 0.48 per 100,000 person-years was slightly lower than the 2005 incidence rate (.59 cases per 100,000) and rates quoted in surveillance literature. Rationale for the lower rate may be far fewer cases of WNV-associated encephalitis reported in 2006 compared to 2005; misclassification of encephalitis cases as meningitis; and underreporting of hospitalized encephalitis cases, since all reporting is passive. The case fatality from encephalitis has ranged from a high of 38% in 1997 to a low of 0% in 2006 and remains lower than the 2005 overall state case fatality rate of 12% reported by the California Encephalitis Project. The higher encephalitis mortality rate reported by the California Encephalitis Project, a California Department of Health Services' research project, may be biased as more severely ill individuals are more likely to be included in this data source. Further, cases are often reported before the final outcome of the patient is known and so the LAC record of mortality may be incomplete.

Of particular public health concern in LAC are the arthropod-borne viral (arboviral) encephalitides, SLE, WEE and WNV encephalitis, endemic to California. Since 1985, sporadic cases of SLE have been reported each year following an outbreak of 16 cases in 1984. The last confirmed SLE case in LAC was in 1997. The potential for another SLE outbreak exists, as sporadic cases in previous years and 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 2006, only 1 of 16 (6%) documented WNV infections had a clinical history compatible with encephalitis. This case was laboratory-confirmed WNV and thought to be locally acquired. In 2006, far fewer WNV associated encephalitis cases were seen compared to 2005 and 2004 when 13 and 48 cases were noted in respective years. This is consistent with overall surveillance data showing a continued decline in WNV infections over the past three years. Like SLE virus, WNV is transmitted principally by *Culex* species mosquitoes. Enhanced surveillance for early detection of virus activity in birds and mosquitoes will be crucial to guide control measures in 2006.

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).

Future Directions: Surveillance for WNV infection in humans, mosquitoes, sentinel chickens, and dead birds will continue throughout the state of 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

Glaser CA, Gilliam S, Schnurr D, et al. In search of encephalitis etiologies: diagnostic challenges in the California Encephalitis Project, 1998–2000. Clin Infect Dis 2003; 36(6):731–742.

Khetsuriani N, Holman RC, Anderson LJ. Burden of encephalitis-associated hospitalizations in the United States, 1988–1997. Clin Infect Dis 2002; 35(2):175–182.

Johnston RT. Acute Encephalitis. Clin Infect Dis 1996; 23:219–226.

Nicolosi A, Hauser WA, Beghi E, Kurland LT. Epidemiology of central nervous system infections in Olmsted County, Minnesota, 1950–1981. J Infect Dis 1986; 154(3):399–498.

Trevejo RT. Acute encephalitis hospitalizations, California, 1990-1999: unrecognized arboviral encephalitis? Emerg Infect Dis 2004; 10(8):1442-1449.

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

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

For more detailed information such as causal information and effective management strategies: www.postgradmed.com/issues/1998/03_98/guti.htm

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

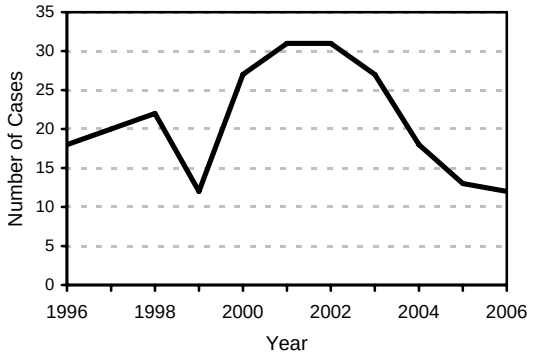
ESCHERICHIA COLI O157:H7 / HEMOLYTIC UREMIC SYNDROME

CRUDE DATA	
Number of Cases	12
Annual Incidence[a]	
LA County	---[b]
California	25
United States	
Age at Diagnosis	
Mean	10.4
Median	7
Range	1-27 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 1996–2006



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

- There was a decrease in confirmed cases in 2006.
- There were no LAC outbreaks in 2006.

STRATIFIED DATA

Trends: After peaking in 2001 and 2002, rates of *E.coli* O157:H7 infection have been steadily decreasing. This is the third year with fewer than twenty cases in LAC since 1999 (Figure 1). There were eight cases of HUS in addition to the 12 cases of O157.

Seasonality: In 2006, 58% of confirmed cases occurred during the summer with a peak of three cases in September (Figure 2). This is consistent with the 5-year average, although the peak was later in the summer months.

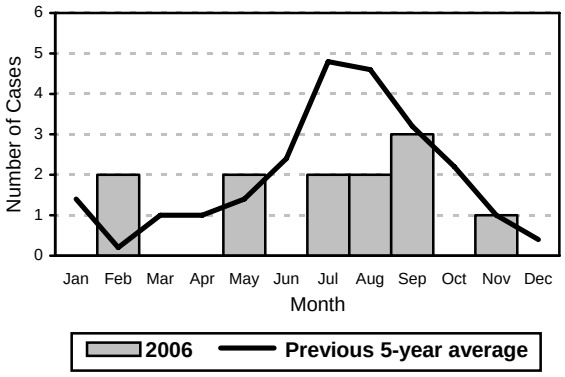
Age: In 2006, there were more cases in children (67%; n=8) than in adults. There were two family clusters involving siblings. One family cluster involving two siblings both with O157:H7 isolated and the second family cluster involved one sibling with O157:H7 and the other with HUS only (without lab confirmation of 0157:H7 infection). All other cases were sporadic and not linked to an outbreak.

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

Race/Ethnicity: Eight cases were reported in whites, three in Latinos, and one in Asians. There were no confirmed cases among blacks.

Location: SPA 2 had six confirmed cases, all unrelated. SPA 3 had three cases but they were unrelated. SPAs 5, 7, and 8 had one case each.

Figure 2
Escherichia coli O157:H7
Cases by Month of Onset
LAC, 2006



Severity of Illness: Most cases (75%; n=9) reported bloody diarrhea and abdominal cramps, and only two cases reported having fever (mean temperature was 101.0^{0}F). Two cases (16%) 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 raw milk (8%), ground beef (25%), steak (25%), fast food (75%) or food from other types of restaurants (16%). Eight percent (N= 1) traveled to Texas. One confirmed case received antibiotic therapy, which increases the risk of HUS, but did not develop HUS.

HUS: In 2006, there were eight reported HUS cases without lab confirmation of *E. coli* O157:H7 infection. All eight cases were one to four years of age. All cases required hospitalization with no deaths. No cases reported any recent antibiotic therapy prior to the onset of HUS. Two cases required dialysis. No case reported the consumption of raw milk; however consumption of ground beef (50%) steak (25%), cider (12%), and lettuce (12%) was reported. No travel was reported.

COMMENTS

There were six cases of other STEC (non-O157:H7) reported with different serotypes. There were no outbreaks related to *E. coli* O157:H7 in LAC during 2006.

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.

PFGE has been helpful in detecting clusters of *E. coli* O157:H7. PulseNet is a nationwide network of laboratories that perform PFGE, or “DNA fingerprinting” of foodborne bacteria. This network permits rapid comparison of fingerprint patterns to identify clusters and enhance outbreak investigation.

PREVENTION

Increased public education to prevent STEC infection is needed. 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 this disease can be found at:
www.cdc.gov/ncidod/diseases/submenus/sub_ecoli.htm.

Foodborne disease active surveillance is available from FoodNet (CDC) at: www.cdc.gov/foodnet.

Information from the Gateway to Government Food Safety is available at: www.foodsafety.gov.

Information about outbreaks (nationwide) is available from the Outbreak Response and Surveillance Team of the CDC at: www.cdc.gov/foodborneoutbreaks/index.htm.

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

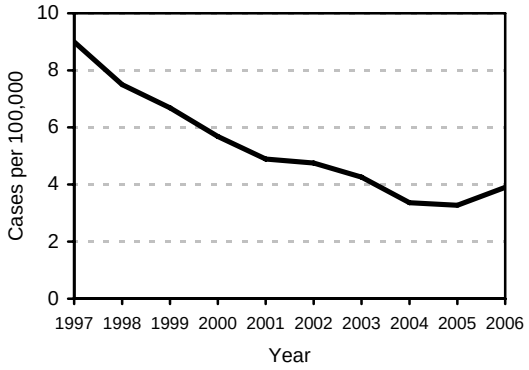
GIARDIASIS

CRUDE DATA	
Number of Cases	376
Annual Incidence[a]	
LA County	3.9
California	6.37[b]
United States	6.39[b]
Age at Diagnosis	
Mean	31
Median	30
Range	<1–89 years

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

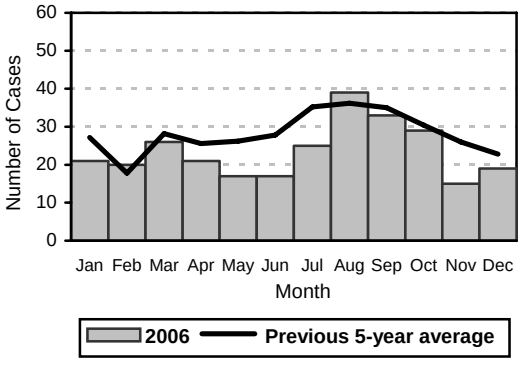
Figure 1
Giardiasis
Incidence Rates by Year of Onset
LAC, 1997–2006



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 usually 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, 2006



DISEASE ABSTRACT

- The incidence of reported Giardiasis in Los Angeles County has dropped dramatically over the past 10 years, and has remained low for the past 4 years.
- The incidence of Giardiasis in 2006 increase from 2005 (3.3 per 100,000) by 18%, primarily due to a 34% increase in the incidence rate for men (from 3.8 to 5.3 per 100,000).
- Incidence tends to increase during summer months when high-risk activities such as recreational water exposure also increase.

STRATIFIED DATA

Trends: Giardiasis incidence in LAC remains low in 2006 relative to the last 10 years, and the incidence has been reduced by over 50% since 1997 (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.) (Figure 2).

Age: As in previous years, the highest age-specific incidence rate occurred among children aged 1–4 years (8.1 cases per 100,000) (Figure 3).

Sex: Males are more then twice as likely to contract *Giardia* than females in 2006 (2.2:1), an increase from that seen in 2005 (1.4:1). The incidence for men in 2006 (5.3 per 100,000) increased from 2005 (3.8 per 100,000) by 34% where as the rate for woman dropped by 12% (2.7 to 2.4 per 100,000).

Race/Ethnicity: Whites continue to have higher race/ethnicity specific incidence rates (5.2 per 100,000) than other races (Figure 4).

Location: SPA 5 (West Area) had the highest reported incidence (6.9 per 100,000) followed by SPA 2 (San Fernando Area) (5.8 per 100,000).

Figure 3
Giardiasis
Incidence Rates by Age Group
LAC 2006

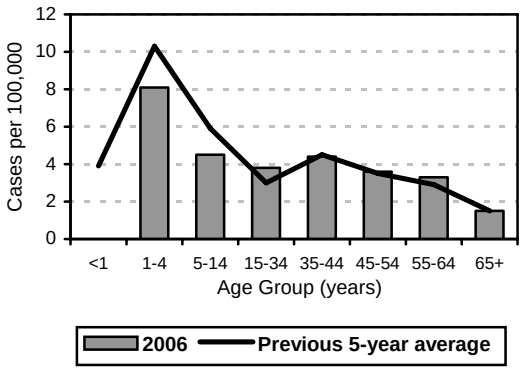
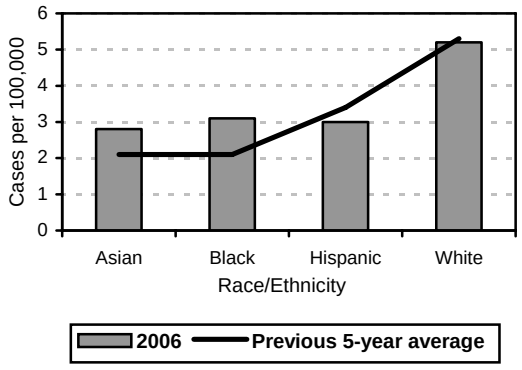


Figure 4
Giardiasis
Incidence Rates by Race/Ethnicity
LAC, 2006



COMMENTS

There has been a considerable decline in incidence of *Giardia* over the past decade. While the specific reasons for this decrease are unknown, several factors may have contributed including advances in food and water safety as well as improved education about safety regarding recreational water (i.e., avoiding drinking lake and pool water, keeping babies in diapers and individuals with diarrhea from swimming in public facilities). There was no outbreak reported in 2006.

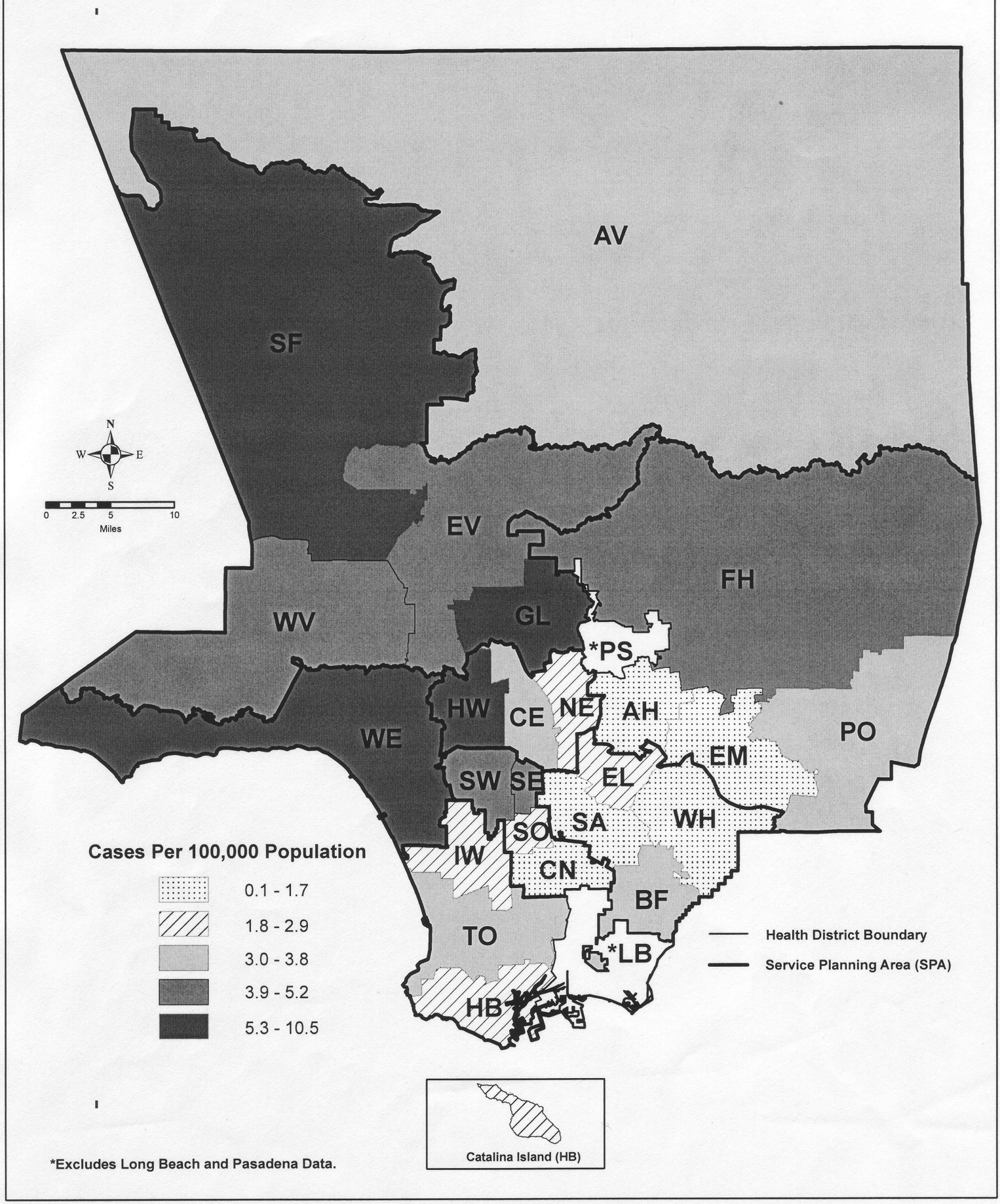
ADDITIONAL RESOURCES

CDC. Giardiasis surveillance--United States, 1992–1997. MMWR 2000; 49(SS07):1–13. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss4907a1.htm

CDC. Parasitic Disease Information Fact Sheet—Giardiasis. Available at: www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardia.htm

CDC. Surveillance for foodborne-disease outbreaks--United States, 1998—2002. MMWR 2006; 55(SS10):1-34. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss5510a1.htm

Map 4. Giardiasis
Rates by Health District, Los Angeles County, 2006*



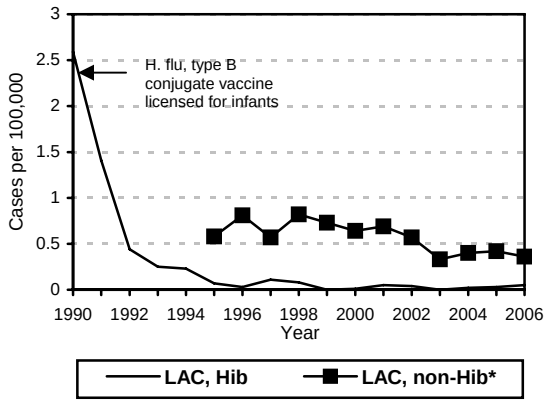
*Excludes Long Beach and Pasadena Data.

HAEMOPHILUS INFLUENZAE INVASIVE DISEASE

CRUDE DATA	
Number of Cases	66
Annual Incidence[a]	
LA County	0.68
California	1.01[b]
United States	0.82[c]
Age at Diagnosis	
Mean	59.0
Median	66.0
Range	<1 – 98.0

[a] Cases per 100,000 population.
[b] Cases per 100,000 persons, aged less than 30 years. In California, *H. influenzae* among persons > 29 years of age is not reportable.
[c] Calculated from 2007 Summary of notifiable diseases issues of MMWR (56:853-863).

Figure 1
H. influenzae Invasive Disease
Incidence Rates by Year
LAC, 1990–2006

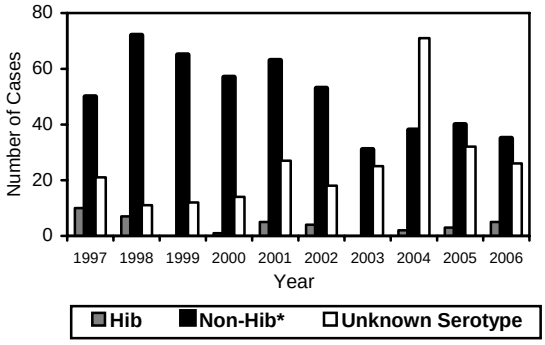


* Surveillance became mandated in 1995. Excludes unknown serotypes

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, 1997-2006



* Surveillance became mandated in 1995. Excludes unknown

DISEASE ABSTRACT

- Of the 5 Hib cases identified in 2006, none were completely vaccinated.
- The epidemiology of H. *influenzae* invasive disease is now being shaped by non-Hib and unknown serotypes (Table 1, Figure 2, Figure 3).
- Like previous years, non-Hib incidence peaked during the months of January to March.

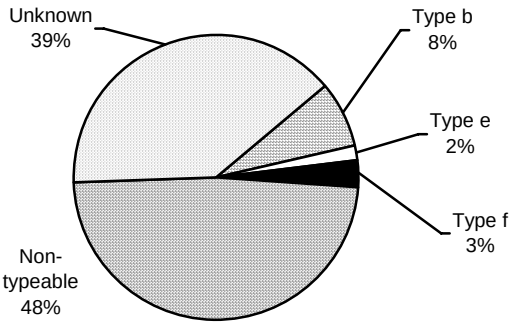
Table 1: *H. influenzae* Crude Data by Serotype, 2006 vs. Previous 5-Year Average

	B		Non-Hib		Unknown type	
	2006	Previous 5-Year Average	2006	Previous 5-Year Average	2006	Previous 5-Year Average
No. of Cases	5	2.8	35	45.2	26	36.0
Age at Onset						
Mean	30.8	23.4	58.4	41.4	65.3	61.8
Median	34.0	14.0	71.0	40.5	65.0	67.3
Range	<1 – 73.0	1.0 – 60.5	<1 – 92.0	<1 - 92.4	18.0 – 98.0	10 – 97.2
LAC Case Fatality	0%	14.3%	11.4%	6.6%	7.7%	6.3%

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 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, 2006 (N=66)



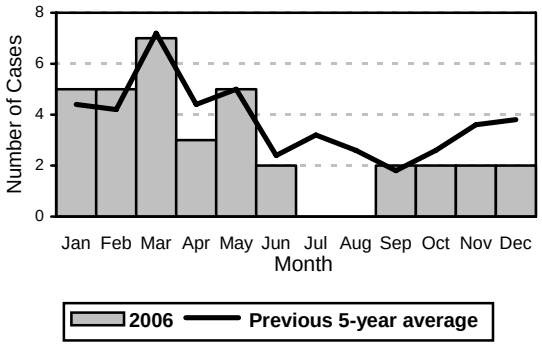
STRATIFIED DATA

Seasonality: The 5 Hib cases had disease onset in January (n=1), February (n=1), October (n=1), and December (n=2). Similar to previous years a temporal pattern has been evidenced in LAC, with a peak in non-Hib cases during the months of January to March. These three months accounted for 48.6% (n=17) of the non-Hib cases (Figure 4).

Sex: The male-to-female ratio of Hib, non-Hib, and unknown serotype cases was 1.5:1, 1.3:1, and 1.2:1 respectively.

Age: Of the 5 Hib cases, two were less than 6 months of age, while the remaining three were 34, 47, and 73 years of age. The number of non-Hib cases by age in 2006 followed the trend of the previous five years – the 65+ age group (60%, n=21) remaining the most affected by non-Hib invasive disease (Figure 5). Only 9% (n=3) of non-Hib cases were under the age of 5. Of the 26 cases with unknown serotype, 96% (n=25) were over the age of 30 and were not actively investigated for serotype as detailed in LAC's priority investigation criteria. In addition, 50% (n=13) of these unknown serotype cases were in the 65+ age group.

Figure 4
H. influenzae Invasive Disease
Cases Due to Non-Hib Serotype
by Month of Onset
LAC, 2006 (n=35)



Race/Ethnicity: Two of the Hib cases were Hispanic, one was white, one was black, and one's race was unknown. Among the non-Hib cases where the race/ethnicity was known (n=19), Hispanics accounted for 47% (n=9) of the cases, followed by blacks (n=5, 26%), whites (n=4, 21%) and Asians (n=1, 5%). Among the unknown serotype cases of whom race/ethnicity was identified (n=16), 38% were among Hispanics (n=6), followed by whites (n=4, 25%), blacks (n=4, 25%), and Asians (n=2, 12%). (Figure 6.)

Location: The 5 Hib cases resided in SPA 2 (n=1), SPA 5 (n=1), and SPA 7 (n=3). The number of non-Hib cases per SPA ranged from 3 to 7. SPA 6 accounted for 7 non-Hib cases. San Fernando Valley (SPA 2) accounted for 6 cases. San Gabriel Valley (SPA 3) and East (SPA 7) accounted for 5 non-Hib cases each. South Bay (SPA 8) had 4 cases followed by Metro (SPA 4) and West (SPA 5) with 3 cases each. An additional 5% (n=2) of non-Hib cases had no identified SPA. The number of unknown serotype cases per SPA ranged from 2 to 7, with SPA 5 accounting for 7 cases. SPA 2 accounted for 4 cases. SPA 4 and SPA 6 accounted for 3 cases each followed by SPA 1, SPA 3, SPA 7, and SPA 8 with 2 cases each. One unknown serotype case did not have a residence indicated.

Figure 5
H. influenzae Invasive Disease
Serotype Non-Hib Cases by Age Group
LAC, 2006 (N=35)

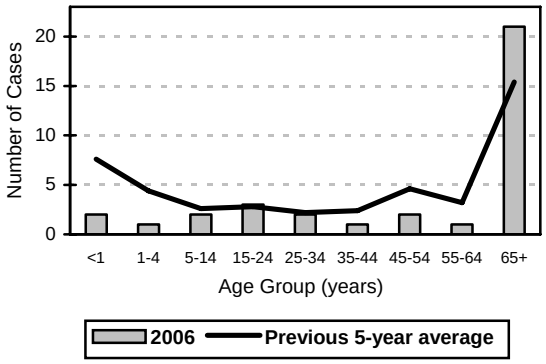
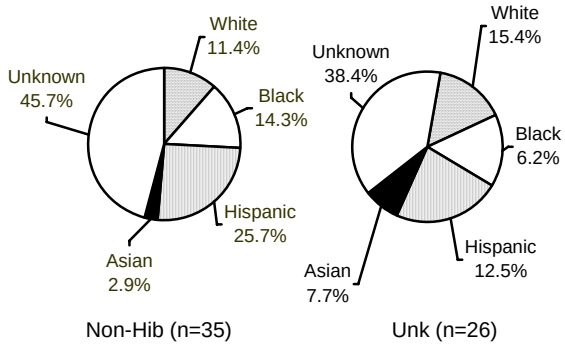


Figure 6
H. influenzae Invasive Disease
Percent Cases by Race/Ethnicity
LAC, 2006



COMMENTS

The only cases of *H. influenzae* disease investigated in LAC in 2006 are those in persons less than 30 years of age. Contacts of these cases are investigated and chemoprophylaxis is given when appropriate.

Rates of invasive Hib disease in children have decreased to extremely low levels since Hib vaccines became available in 1990. Among the 66 H. *influenzae* cases, only 5 (8%) were Hib cases and only 2 (3%) were less than 30 years of age. None of the cases had any known exposure to a confirmed/suspected case. Four Hib cases were hospitalized indicating the severity of type B disease.

Only one of the Hib cases (the 5-month-old) was vaccinated. Although the child was not up-to-date with immunizations, the child was too young to have completed a three-dose primary vaccination series and would not have developed protective antibody levels.

Case Fatalities: There were six fatalities among *H. influenzae* cases: four were non-Hib cases and two were unknown serotypes. One of the fatalities was a premature baby of a substance-abusing mother who subsequently died from various complications. The other five fatalities (83%) were in persons over the age of 30 so the cases were not investigated for further details. However, information on complications was provided for three cases; two of the cases had pneumonia and one had meningitis. Males accounted for four of the six (66.7%) case fatalities. Three of the fatalities were Hispanic, two were white, and one was of unknown race/ethnicity.

ADDITIONAL RESOURCES

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

- National Immunication Program – www.cdc.gov/vaccines
- Immunization Action Coalition – www.immunize.org
- LAC Immunization Program – www.lapublichealth.org/ip
- Acute Communicable Disease Control Program – http://lapublichealth.org/acd/procs/b73/b73index.htm

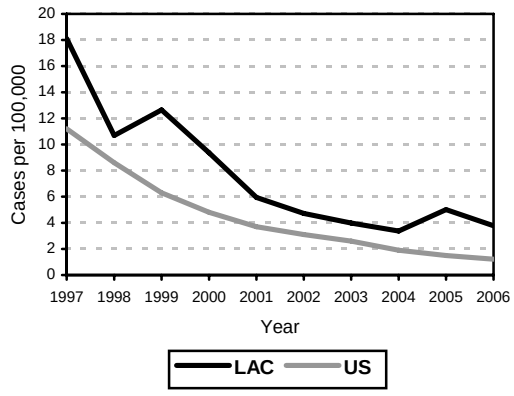
HEPATITIS A

CRUDE DATA	
Number of Cases	364
Annual Incidence[a]	
LA County	3.77
California	2.75[b]
United States	1.21[b]
Age at Diagnosis	
Mean	41
Median	41
Range	1-100 years

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

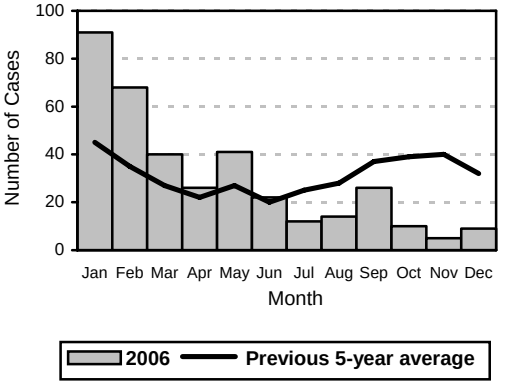
Figure 1
Hepatitis A
Incidence Rates by Year
LAC and US, 1996–2006



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, 2006



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: 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 (5.01 to 3.77 per 100,000) (Figure1).
- The hepatitis A incidence rate in blacks and in those between the ages of 35-54 increased in 2006 from 2005.
- There were two outbreaks of hepatitis A in 2006.

STRATIFIED DATA

Trends: The hepatitis A incidence rate was 3.77 cases per 100,000 in 2006 which was lower than last year (Figure 1).

Seasonality: Historically, there is an increase of hepatitis A cases in summer to early autumn, but 2006 was different than the previous five-year average (Figure 2).

Age: The overall mean age for hepatitis A cases in 2006 was 41 years. The mean age differed significantly by race and ethnic groups. The mean age for Latinos was 30 years while Asian, black, and white cases had mean ages of 43, 46, and 48 years, respectively. Historically, the age-specific rate has been highest in children aged 5-14 years and 65 and older. However, in 2006, the rate was highest among those 35-54 years (Figure 3).

Sex: The hepatitis A cases male-to-female rate ratio was 2:1. Among Asian cases, the male-to-female rate ratio was 1:1, while among Latino, white, and black cases, incidence rate ratios were higher among males, at 1.2:1, 2.5:1, and 4:1 respectively.

Race/Ethnicity: Compared to the previous five-year average, the incidence rate for blacks is for the first time higher than other races (7.6 per 100,000), followed by whites (4.3), Latinos (2.7), and Asians (2.0), respectively (Figure 4).

Location: Of the eight SPAs across LAC, two had rates that were greater than the overall county mean rate for this disease: SPA 4 (6.3 per 100,000) and SPA 8 (4.0 per 100,000) (Figure 5).

Severity of Illness: Among all hepatitis A cases in 2006, there was one reported fatality. Twenty-seven percent (n=98) of hepatitis A cases were hospitalized. The age of those hospitalized ranged from 1 to 92 years, with a median age of 43.

Risk Factors: Of the 364 confirmed cases, 88% were interviewed by public health nurses for risk factors. Risk factors were identified for only 40% (n=128) of the cases (including some cases with multiple risk factors). Of those with identified risk factors, recent travel outside of the US (n=59, 46%) was the most common risk factor reported in 2006, followed by eating raw shellfish (n=45, 35%), and being in contact with another case (n=26, 20%), and MSM (n=18, 14%), respectively (Figure 6). Among travelers, Mexico and Central American destinations (75%) were most frequently cited.

Figure 3
Hepatitis A Incidence Rates
by Age Group LAC, 2006 (N=364)*

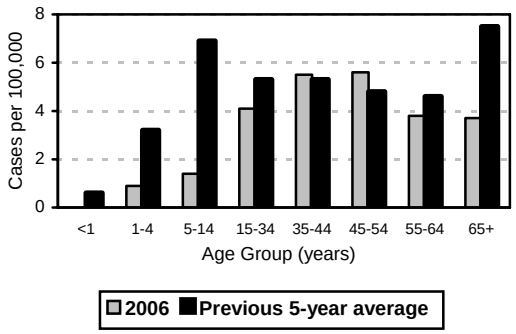


Figure 4
Hepatitis A Incidence Rates
by Race/Ethnicity
LAC, 2006

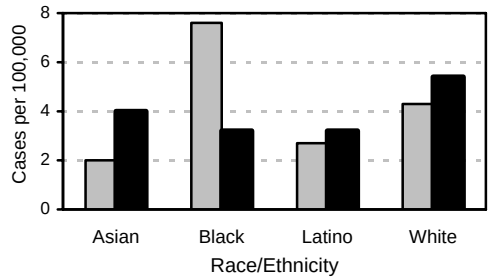
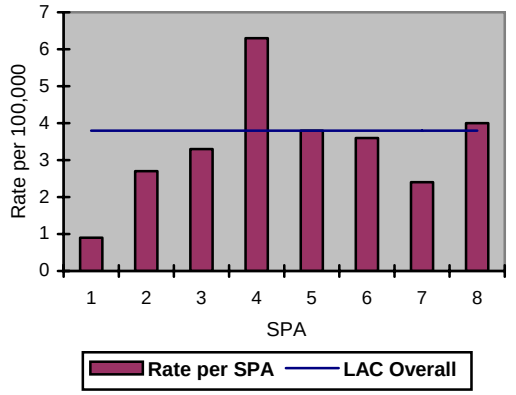


Figure 5
Hepatitis A Incidence Rates by SPA
LAC, 2006

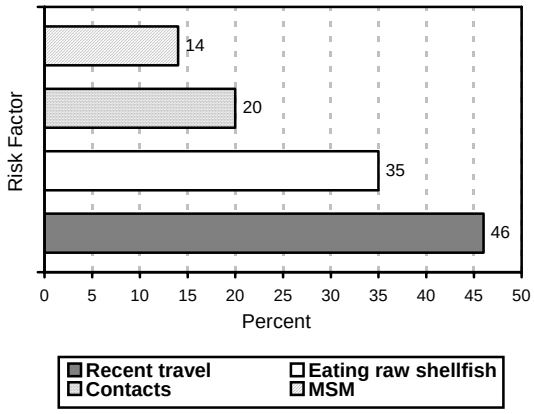


PREVENTION

Effective strategies for decreasing the number of hepatitis A cases in LAC include adding hepatitis A vaccine to the children's immunization program and public health nurses providing immune globulin (IG) to close contacts of cases and educating clients about the importance of hand hygiene on reducing infections when cases of acute hepatitis A are reported to Public Health.

Post-exposure prophylaxis with IG is used to control outbreaks in LAC. It has been suggested that outbreaks of HAV could also be effectively interrupted through vaccine use, leading to sustained reduction in disease incidence.

Figure 6
Hepatitis A Reported Risk Factors
LAC, 2006



*Includes cases identifying multiple risks.

COMMENTS

Rates of acute hepatitis A have varied widely in the past several years, despite an overall decline of acute hepatitis A in the US. What follows is an account of the changes in the true incidence of disease, coupled with a change in case definitions, that explain the fluctuations in acute hepatitis A in LAC.

Prior to 1998, the highest rate of acute hepatitis A occurred in those 5-14 years in LAC, especially among Latino children. However, with the inclusion of hepatitis A vaccine into Vaccine for Children's Program in 1999, the rate of acute hepatitis A in children decreased. The decrease of hepatitis A in children was the major source of the decrease of hepatitis A in the population as a whole from 1999-2004 in LAC. With the decrease in the rate of hepatitis A in children, the number of cases in adults also decreased but increased as a proportion of the total number of cases of hepatitis A in LAC.

In LAC, prior to 2005, hepatitis A cases were often counted as "acute" even if the only information received about the patient was a positive IgM test. However, many other jurisdictions have documented "false positive" results on the IgM test, especially in the elderly who often receive screening tests despite lack of symptoms or medical indication. Therefore, since January 1, 2005, we have been consistently applied the CDC/CSTE criteria to all reported cases of acute hepatitis A The effect of consistently applying this more stringent case definition, which includes clinical and laboratory findings in addition to a single serological test, was to remove those reported cases who lacked evidence of clinical symptoms or liver damage. Utilizing the standardized case definition, the rate of acute hepatitis A dropped even more than the expected drop due to the use of the vaccine. The number of cases in all age groups, especially those aged >65 years, decreased. This was expected as many of the initial reports in the older adult population, based on a single positive laboratory test, were felt to be due to over aggressive screening and not due to newly acquired infection.

However, from August 2005 to July 2006, LAC sustained a 12 month community-wide outbreak of acute hepatitis A. The overall rate increased from 3.37 in 2004 to 5.01 in 2005, despite a more restrictive case definition of acute hepatitis A. If the new definition had not been implemented in 2005, it is anticipated that the 2005 and 2006 incidence rate of acute hepatitis A during the community outbreak would have been even larger. Even so, it is remarkable that the rate increased during this time of steadily decreasing rates nationwide and in California. While the outbreak affected most race/ethnicity groups and geographic regions of the county, the proportion of hepatitis A cases increased in blacks and in those ages 15-54 years. Furthermore, 11% of the cases during this time period occurred in the homeless, a population which is estimated to comprise only 1% of county's total population.

As the community-wide outbreak came to an end during the summer of 2006, the rate of hepatitis A again fell to below historical levels. This can be best appreciated in Figure 2 where the number of cases

reported each month from July to December is below the previous 5-year average. The discrepancy between the July to December 2006 cases and the previous 5-year average is large because the previous 5-year average is calculated including cases that were considered “confirmed” under the previous, less restrictive, case definition used before 2005 as well as outbreak cases that occurred during August to December 2005. (See 2005 Special Studies Report on Acute Hepatitis A for more information.)

In LAC, prior to 2005, the age-specific rate has been highest in children aged 5-14 years and 65 and older. However, using the CDC/CSTE acute hepatitis A criteria, in 2006 the rate was highest among those 35-54 years (Figure 2), consistent with 2005.

During the outbreak period of 2005 (August through December), cases in blacks increased. This trend continued into the first half of 2006. The hepatitis A incidence rates among the blacks was almost double that compared to the previous 5-year average (7.6 versus 3.2 per 100,000).

There were 11% (n= 41) of acute cases identified as homeless. 42% of them were black males (n=17). After identifying the homeless as a disproportionately affected group, LAC DPH did an outreach project to collaborate with the downtown homeless organizations to provide education and hepatitis A vaccine for food service providers at the downtown Skid Row area.

In 2006, ACDC investigated two hepatitis A outbreaks, associated with licensed food and drink establishments. The first was reported in June 2006; 7 cases with onset in May were identified in patrons of a cocktail lounge. After investigation by DPH Environmental Health Food and Milk Program, District Public Health staff, and ACDC, a contaminated ice chest was a suspected source. The ice was probably contaminated by a patron who had been diagnosed with acute hepatitis A in April and was known to take ice and drinks from the public chest with his bare hands. In September 2006, 8 cases of acute hepatitis A were identified in patrons who ate at a restaurant in Pomona during August. A case-control study was unable to identify the source of the outbreak. It is most likely that an intermittent source of hepatitis A, such as an asymptomatic food worker or contaminated food product, or an external contamination of publicly available food (such as the salsa bar) was the source of this outbreak. Outbreaks of hepatitis A without a clear source being identified are commonly reported.

PREVENTION

International travel was the most common risk factor reported in 2006, followed by eating raw shellfish and contact with a household member or sexual partner who had HAV, and MSM. Therefore, it is important to educate travelers, consumers of raw shellfish, and MSM about hepatitis A vaccinations. Sustaining and further reducing hepatitis A incidence can be achieved by improving vaccination coverage in all US children starting at 2 years of age. Increased awareness of the public about the mode of hepatitis transmission and the importance of good personal hygiene may also lead to a significant reduction in disease incidence.

ADDITIONAL RESOURCES

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

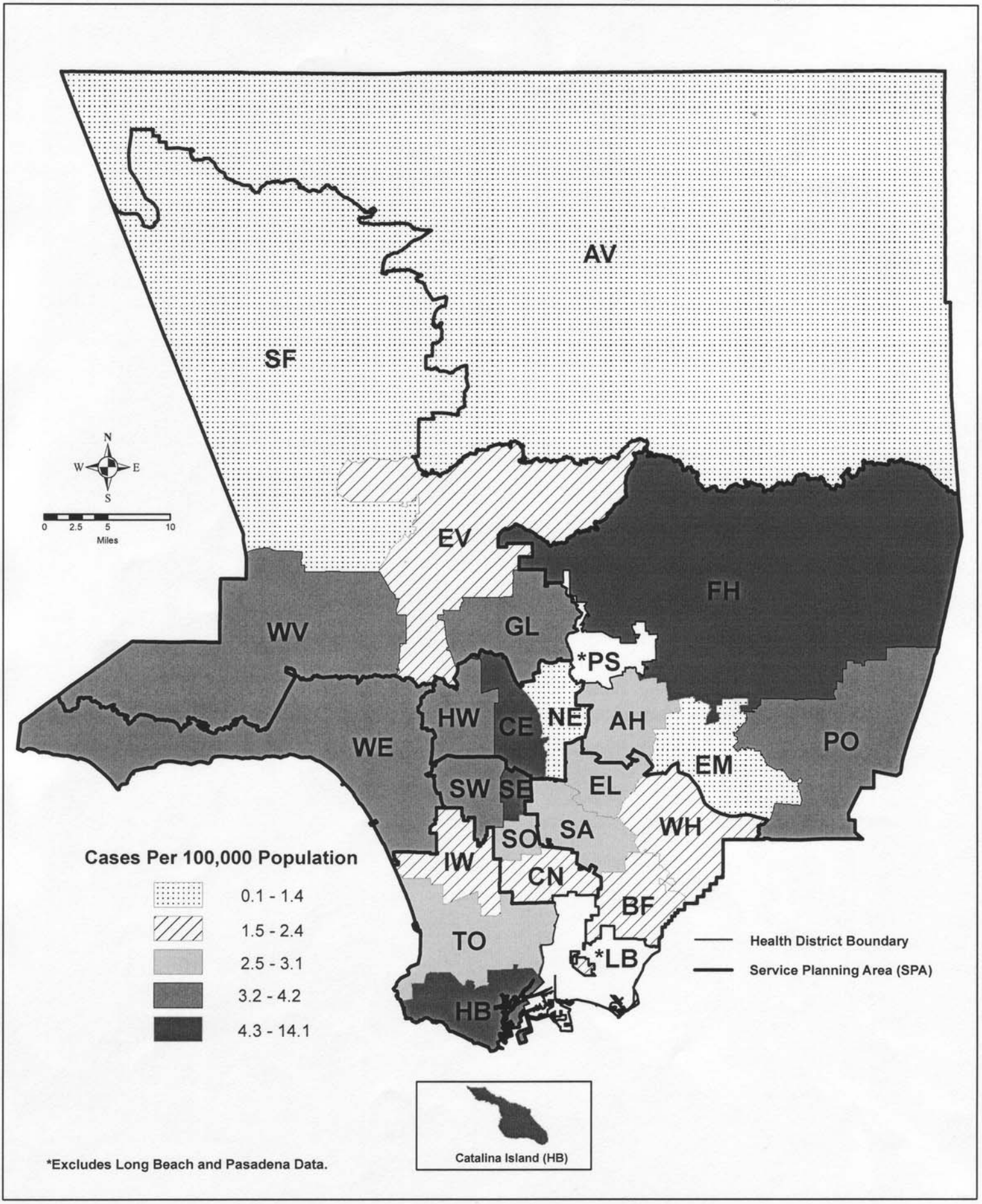
Publications:
CDC. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2006; 55(RR07):1-23.
Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5507a1.htm

CDC. Surveillance for acute viral hepatitis--United States, 2005. MMWR 2007; 56(SS03):1-24.
Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss5603a1.htm

CDC. Hepatitis A outbreak associated with green onions at a restaurant--Monaca, Pennsylvania, 2003. MMWR 2003; 52(47):1155-1157. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm52d1121a1.htm
CDC. Positive test results for acute hepatitis A virus infection among persons with no recent history of acute hepatitis--United States, 2002-2004. MMWR 2005; 54(18):453-456. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5418a1.htm

CDC. Foodborne transmission of hepatitis A--Massachusetts, 2001. MMWR 2003; 52(24):565-567. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5224a2.htm

Map 5. Hepatitis A
Rates by Health District, Los Angeles County, 2006*



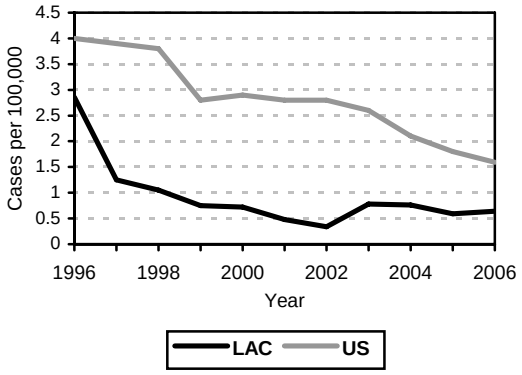
HEPATITIS B, ACUTE (NONPERINATAL)

CRUDE DATA	
Number of Cases	62
Annual Incidence[a]	
Los Angeles	0.64
California	1.18[b]
United States	1.59[b]
Age at Diagnosis	
Mean	41
Median	41
Range	15-84 years

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

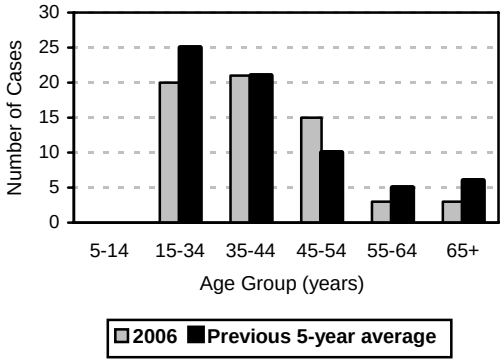
Figure 1
Hepatitis B
Incidence Rates by Year
LAC and US, 1996–2006



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 adults 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
Number Cases by Age Group
LAC, 2006



For the purpose of surveillance, ACDC uses the CDC/CSTE criteria for acute hepatitis B. The criteria include: 1) discrete onset of symptoms and 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 slightly increased from the previous year (Figure 1); there were 62 cases confirmed for 2006 versus 57 cases in 2005.
- The greatest numbers of confirmed acute cases were in persons aged 15-44 years and the majority of cases were males.
- Multiple sex partners, predominately in MSM, remain the most frequently identified risk factor.
- No outbreaks were reported in 2005.

STRATIFIED DATA

Seasonality: None.

Age: Cases ranged in age from 15 to 84 years (the median age was 41) with 66% occurring in those aged under 45 years (Figure 2).

Sex: The male-to-female rate ratio was 3.8:1. The number of cases in males exceeded those in females in all ethnic groups.

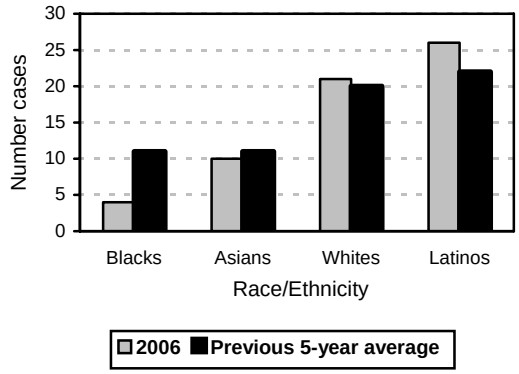
Race/Ethnicity: The highest number of cases was seen in Latinos (n=26) which is consistent with the previous five-year average, followed by whites (n=21), Asians (n=10), and blacks (n=4) respectively (Figure 3).

Location: SPA 4 (n=16) had the most cases, followed by SPA 2 (n=15), SPA 3 (n=6), SPA 6 (n=6), SPA 7(n=6), SPA 8 (n=6), SPA 5 (n=3), and SPA 1 (n=2) respectively.

Severity of Illness: Among all acute HBV cases in 2006, there were no fatalities reported.

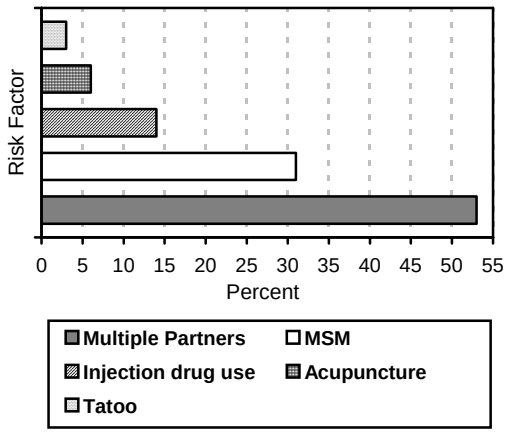
Risk Factors: Risk factors were identified in 58% (N=36) of confirmed cases (including some cases with multiple risk factors). Of those with risk factors, multiple sexual partners (n=19, 53%) was the most common risk factor reported, followed by MSM (n=11, 31%), injection drug use (n=5, 14%), acupuncture (n=2, 6%), and tattoo (n=1, 3%) (Figure 4).

Figure 3
Acute Hepatitis B
Number cases by Race/Ethnicity*
LAC, 2006



* Excludes perinatal cases.

Figure 4
Hepatitis B Reported Risk Factors*
LAC, 2006



*Includes cases identifying multiple risks.

COMMENTS

In LAC, there were 403 cases initially reported to have acute hepatitis B in comparison to the 381 cases reported for 2005. In both years, the percentage of cases that met the CDC/CSTE criteria for confirmation was similar (~15%). 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 2006, all acute hepatitis B cases were aged 15 years or older. Sixty-six percent were in younger adults aged 15-44 years. People with multiple sexual partners and MSM continue to be at risk for hepatitis B; thus, preventive efforts including education and vaccinations should continue to focus on these high-risk populations. In LAC, hepatitis B vaccine is provided to high-risk groups at the Public Health District Health Centers at no charge in an effort to reduce hepatitis B incidence.

Only 58% of the cases had an identified risk factor for acute hepatitis B. LAC DPH will 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

Decreasing rates of acute hepatitis B in children under age 19 is evidence of the successful immunization strategy to eliminate HBV transmission in LAC. The immunization 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.

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

CDC Viral Hepatitis B - www.cdc.gov/ncidod/diseases/hepatitis/slideset/index.htm

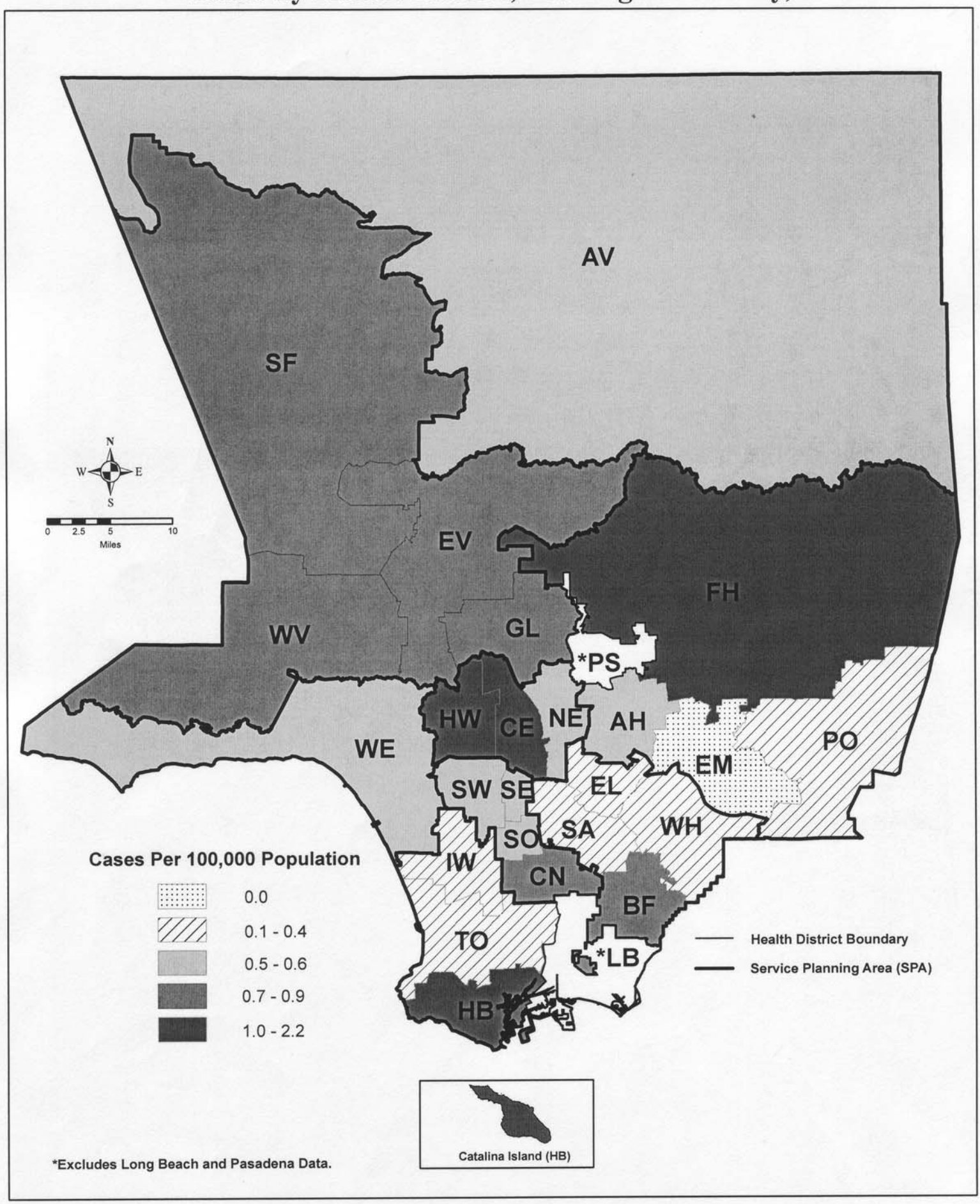
CDC Viral Hepatitis Resource Center - www.cdc.gov/ncidod/diseases/hepatitis/resource/index.htm#pubs

Hepatitis B Vaccine Information - www.cdc.gov/ncidod/diseases/hepatitis/b/factvax.htm

Publications:
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. MMWR 2005; 54(9):220-223. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/mm5409a2.htm

Transmission of hepatitis B and C viruses in outpatient settings--New York, Oklahoma, and Nebraska, 2000-2002. MMWR 2003; 52(38):901-906. Available at: www.cdc.gov/mmwr/PDF/wk/mm5238.pdf

Map 6. Hepatitis B
Rates by Health District, Los Angeles County, 2006*



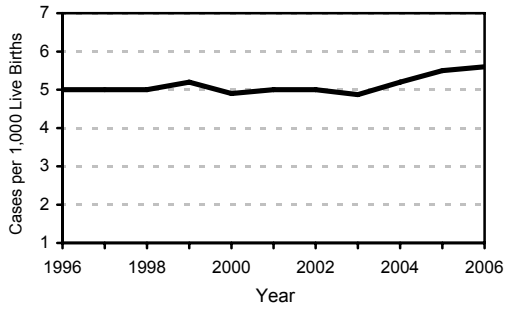
*Excludes Long Beach and Pasadena Data.

HEPATITIS B, PERINATAL

CRUDE DATA	
Number of Infants Born to HBsAg Positive Mothers	795
Incidence of Exposure[a]	
LA County	5.6
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.

Figure 1
Perinatal Hepatitis B
Incidence Rates of Infants Born to
HBV-Positive Mothers by Year
LAC, 1996–2006



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. Within 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 and up to 25% will die from chronic liver disease as adults. Postexposure 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. Postvaccination 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, and household contacts.

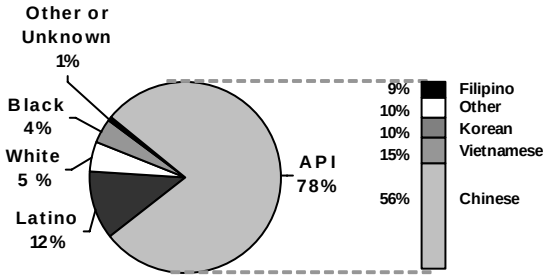
DISEASE ABSTRACT

- 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, 98% received hepatitis B vaccine and 97% received HBIG within 24 hours of birth.
- Among those infants whose pediatric health care providers responded to a survey after the completion of the full vaccination series, 92% of infants were protected against HBV, 5% were still susceptible, and 3% were infected with HBV.
- The incidence of exposure of infants born to HBsAg-positive mothers increased by 2% from 5.5 to 5.6 per 1,000 infants born in 2006.

STRATIFIED DATA

Trends: In 2006, 795 infants (including 12 sets of twins) were born to 783 HBsAg-positive women. The incidence of exposure of infants born to HBsAg-positive mothers increased by 2% from 5.5 to 5.6 per 1,000 infants born in 2006. (Figure 1).

Figure 2
Perinatal Hepatitis B
by Maternal Race/Ethnicity
LAC, 2006 (N=795)



Race/Ethnicity: The majority of the cases were among Asian/Pacific Islanders (API). Six hundred-nine (78%) of the women were API, 92 (12%) were Latino, 45 (5%) were white, 32 (4%) were black, and 5 (1%) were classified as other or unknown ethnic group (Figure 2). Of API women, over half were Chinese (n=345, 56%). The remaining API women included: Vietnamese (n=90, 15%), Korean (n=60, 10%), Filipino (n=55, 9%), and others from various countries (e.g., Cambodia, Thailand, Samoa, Tonga, Japan, Burma, Indonesia; India, Argentina, and Panama (n=59, 10%).

Age: The age-range of mothers was 15–44 years of age with a median age of 31 years.

Location: The majority of the HBsAg-positive mothers (n=392, 50%) resided in SPA 3, which has a large Asian constituency. An additional 13% resided in SPA 4 (n=100), followed by SPA 2 (n=97, 12%), SPA 7 (n=57, 7%), SPA 8 (n=52, 7%), SPA 6 (n=43, 5%), SPA 5 (n=37, 5%), and SPA 1 (n=5, 1%).

Countries of Origin: The majority (n=714, 91%) of the HBsAg-positive women giving birth were born outside of the US. Of these women, 644 (90%) 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, and several Central and South American countries.

ENHANCED CASE MANAGEMENT

In 2006, enhanced case management was completed for 791 HBsAg-positive mothers, their 798 newborns, and 1,341 households. Case managers made numerous attempts to complete follow-up of mothers, infants and household contacts. The majority (72%, n=569) of the HBsAg-positive mothers were reported in 2005. An additional 15% were reported in 2004 (n=122) followed by 2006 (n=99, 13%) 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. Educating pregnant HBsAg-positive women about HBV disease and transmission,
2. Identifying and referring household contacts for screening and vaccination,
3. Notifying hospitals of the expected deliveries and requesting that the hospitals return documentation after the infant's birth with the dates and times of the administration of hepatitis B vaccine #1 and HBIG,
4. Notifying the infant's health care provider about the need for hepatitis B vaccine #2 at 1 to 2 months and hepatitis B vaccine #3 at six months of age,
5. Reminding parents about these needed vaccinations, and
6. Sending postvaccination serology letters to pediatric health care providers.

Infant Immunoprophylaxis Completion Rates: Of 798 eligible infants (including 7 sets of twins) born to 791 mothers, nearly all received the hepatitis B vaccine #1 (n=780, 98%) and HBIG (n= 770, 97%) within 24

hours of birth. The majority of infants (n=748, 94%) received HBIG and a complete three-dose series of hepatitis B vaccine (Table 1).

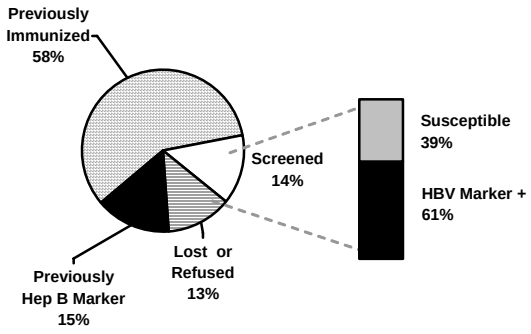
Table 1. Summary of Infant Hepatitis B Immunoprophylaxis, LAC—2006 (N=798)

Hepatitis B Immunoprophylaxis	# of Infants	Percent*
Received hepatitis B vaccine #1 ≤ 12 hours after birth	769	96%
Received hepatitis B vaccine #1 ≤ 24 hours after birth	780	98%
Received HBIG ≤ 12 hours after birth	760	95%
Received HBIG ≤ 24 hours after birth	770	97%
Completed HBIG/3-dose hepatitis B vaccine series	748	94%

* Percent of infants receiving hepatitis B immunoprophylaxis out of a total 798 infants born to 791 HBsAg+ mothers who completed follow-up in 2006.

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 1,341 household and sexual contacts identified, 778 (58%) had already been vaccinated against hepatitis B, and 198 (15%) were known to have serologic evidence of hepatitis B infection. Of the remaining 365 (27%) contacts, 192 (14%) were screened for serologic evidence of hepatitis B infection or immunity, while 173 (13%) refused screening or vaccination, were lost to follow-up, or moved. Of the 192 (14%) household contacts that were serologically screened, 118 (61%) had positive markers for hepatitis B and therefore did not need vaccine. The remaining 74 (39%) 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, 56 (75%) 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, 2006 (N=1,341)



Postvaccination Serology Results: Postvaccination 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 180 infants screened in 2006. Of these, 166 (92%) had antibodies to hepatitis B surface antigen indicating protection against HBV, 5 (3%) were HBsAg-positive and infected, and 9 (5%) were negative for both markers and revaccination was recommended.

ADDITIONAL RESOURCES

Information from the CDC:

- General information – www.cdc.gov/vaccines/vpd-vac/hepb/
- Publications – www.cdc.gov/ncidod/diseases/hepatitis/resource/pubs.htm
- Perinatal hepatitis B vaccine recommendations - www.cdc.gov/mmwr/PDF/rr/rr5416.pdf

Additional information:

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

HEPATITIS C, ACUTE

CRUDE DATA	
Number of Cases	4
Annual Incidence	
LA County	0.04[a]
California	0.07[b]
United States	0.26[b]

[a] Rates based on fewer than 19 cases are unreliable.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

DESCRIPTION

The Hepatitis C virus (HCV) is the most common 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 [1]. 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:

1. A positive HCV test (antibody test 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;
2. Serum alanine aminotransferase (ALT) greater than 400; and
3. No evidence of either acute hepatitis A or B disease.

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

DISEASE ABSTRACT

- There were four cases of confirmed acute hepatitis C in 2006, compare to 3 cases confirmed in 2005.
- No fatal cases of acute hepatitis C were reported in 2006.
- All cases were white.

STRATIFIED DATA

Seasonality: None.

Age: Cases ranged in age from 43 to 85 years (the median age was 51; the mean age was 58).

Sex: In 2006, the male-to-female rate ratio was 3:1, which differed compared to the previous year (1:2 in 2005)

Race/Ethnicity: In 2006, all cases were white. It remained the same as the previous year.

Location: SPA 8 (n=2) had the most cases, followed by SPA 6 (n=1) and homeless (n=1), respectively.

Risk Factors: Of the four confirmed acute cases, risk factors were identified in 50% (n=2) of the cases (including some cases with multiple risk factors). The most commonly identified risk factor for infection were multiple sexual partners and injection drug use (n=2), followed by MSM (n=1) and being in contact with another case (n=1), respectively.

COMMENTS

There were 158 cases initially reported to have acute hepatitis C in 2006 as compared to 79 cases reported in 2005. Upon further investigation, only four, 3% (n=3; 4% in 2005) met the acute hepatitis C surveillance criteria. The stringent criteria for acute hepatitis C illustrates the difficulty of counting initially reported cases as confirmed acute hepatitis C for surveillance purposes. Therefore, 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 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. Half of the cases denied having risk factors for infection. The two cases that reside in SPA 8 (Harbor HD) lived in the same census tract. After further investigation, no link could be established between these cases.

Although the number of new 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. LAC DPH will use a new risk factor form starting 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

1. CDC. Recommendation for prevention and control of hepatitis C virus (HCV) infection and HCV related chronic disease. MMWR 1998; 47(RR19):1-39. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00055154.htm

ADDITIONAL RESOURCES

Further information about hepatitis is available from:

- American Liver Foundation – www.liverfoundation.org
- Hepatitis Foundation International – www.hepfi.org/living/index.htm
- CDC – www.cdc.gov/ncidod/diseases/hepatitis

Publications:
CDC. Guidelines for laboratory testing and result reporting of antibody to hepatitis C virus. MMWR 2003; 52(RR03):1-16. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5203a1.htm

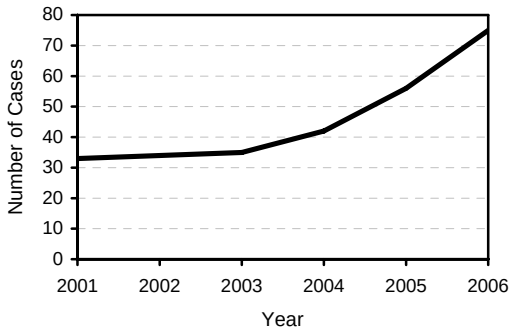
CDC. Surveillance for acute viral hepatitis--United States, 2005. MMWR 2007; 56(SS03):1-24. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss5603a1.htm

KAWASAKI SYNDROME

CRUDE DATA	
Number of Cases	75
Annual Incidence[a]	
LA County	0.78
United States	N/A
Age at Diagnosis	
Mean	2.3
Median	2
Range	3 m/o – 8 y/o

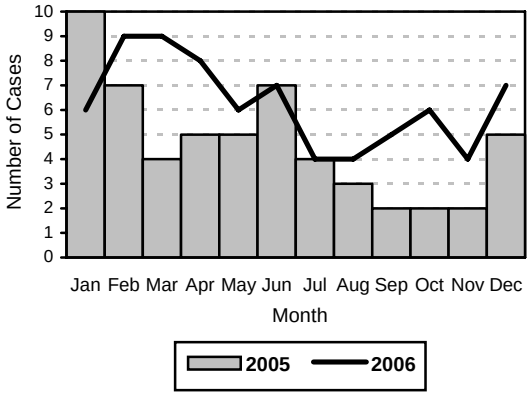
[a] Cases per 100,000 population 2006 LAC Census Estimates.

Figure 1
Kawasaki Syndrome
Cases by Year of Onset
LAC, 2001–2006



DESCRIPTION

Figure 2
Kawasaki Syndrome
Cases by Month of Onset
LAC, 2005-2006



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 noncontagious 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 [3]. Chest X-ray 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 [3]. KS is usually treated with a combination of aspirin (typically, 80-100 mg/kg/day in four doses) and IVIG (intravenous gamma globulin 2 gm/kg, a single infusion over 8 to 12 hours). Early treatment can prevent the processes that lead to coronary artery disease.

DISEASE ABSTRACT

- The incidence of KS in LAC increased 34% in 2006 (N=75) compared to 2005 (N=56).
- The recurrent cases were reported in 4% (n=3) of confirmed cases (N=75) in 2006.
- In 2006, coronary artery aneurysm was reported in 5% (n= 4) of cases with IVIG treatment (n=74).

STRATIFIED DATA

Trends: A total of 75 confirmed cases met the CDC surveillance case definition in 2006. There is a continued increase in the number of reported cases from 2001 to 2006 (Figure 1).

Seasonality: KS occurs year-round, but more cases are reported in winter and spring (Figure 2).

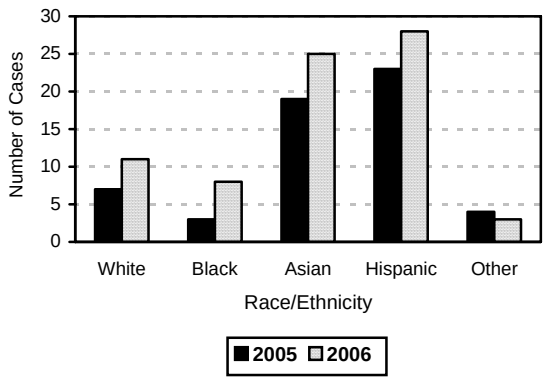
Age: 91% (n=68) of confirmed cases (N=75) were reported in children under 5 years old. Mean age was 2.3 years old, median was 2 years old. The range of age was from 3 months to 8 years old.

Gender: The male-to-female ratio was 1.03:1, unusual to previous reports. 51% (n=38) of confirmed cases were boys, 49% (n=37) of confirmed cases were girls. Descriptive studies show this disease has been approximately 1.5 times more common in boys than in girls.

Race/Ethnicity: The incidence rate for Asians (2.0 per 100,000 population, n=25) was higher compared to other racial groups, as it has been in past years. The incidence rates of other racial groups increased in 2006; black (0.9 per 100,000 population, n=8), Hispanic (0.6 per 100,000 population, n=28), white (0.4 per 100,000 population, n=11), Other (n=3) (Figure 3).

Location: The highest rate was found in SPA 8 (1.5 per 100,000 population, n=17), South Bay Area in LAC. The lowest rate was found in SPA 1 (0.3 per 100,000 population, n=1), Antelope Valley Area in LAC. SPA 3 (0.8 per 100,000, n=13), SPA 4 (0.8 per 100,000 population, n=10), SPA 6 (0.8 per 100,000 population, n=8), SPA 2 (0.7 per 100,000 population, n=14), SPA 7 (0.7 per 100,000 population, n=9), SPA 5 (0.5 per 100,000 population, n=5) incidence rates were noted.
Note: Incidence rate for cases less than 20 is unreliable.

Figure 3
Kawasaki Syndrome
Incidence by Race/Ethnicity
LAC, 2005-2006



Risk Factors: Unknown according to CDC [1] and other research reports.

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

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

COMMENTS

There were three recurrent cases (4%) similar to previously reported rates. All three cases of recurrent cases developed cardiac complications including coronary artery aneurysm. Additional studies on the etiology and pathogenesis of KS are needed to allow for improved diagnosis, treatment, and prevention. In November 2006, a new study refuted an earlier study. The new study finds no link between KS and a newly discovered coronavirus [2]. Atypical or incomplete cases in infants are not counted as confirmed cases because they do not meet the CDC case definition criteria. ACDC uses the documentation of admission, history and physical, discharge summary, and the result of the echocardiogram submitted by infection control professionals to determine possible KS cases.

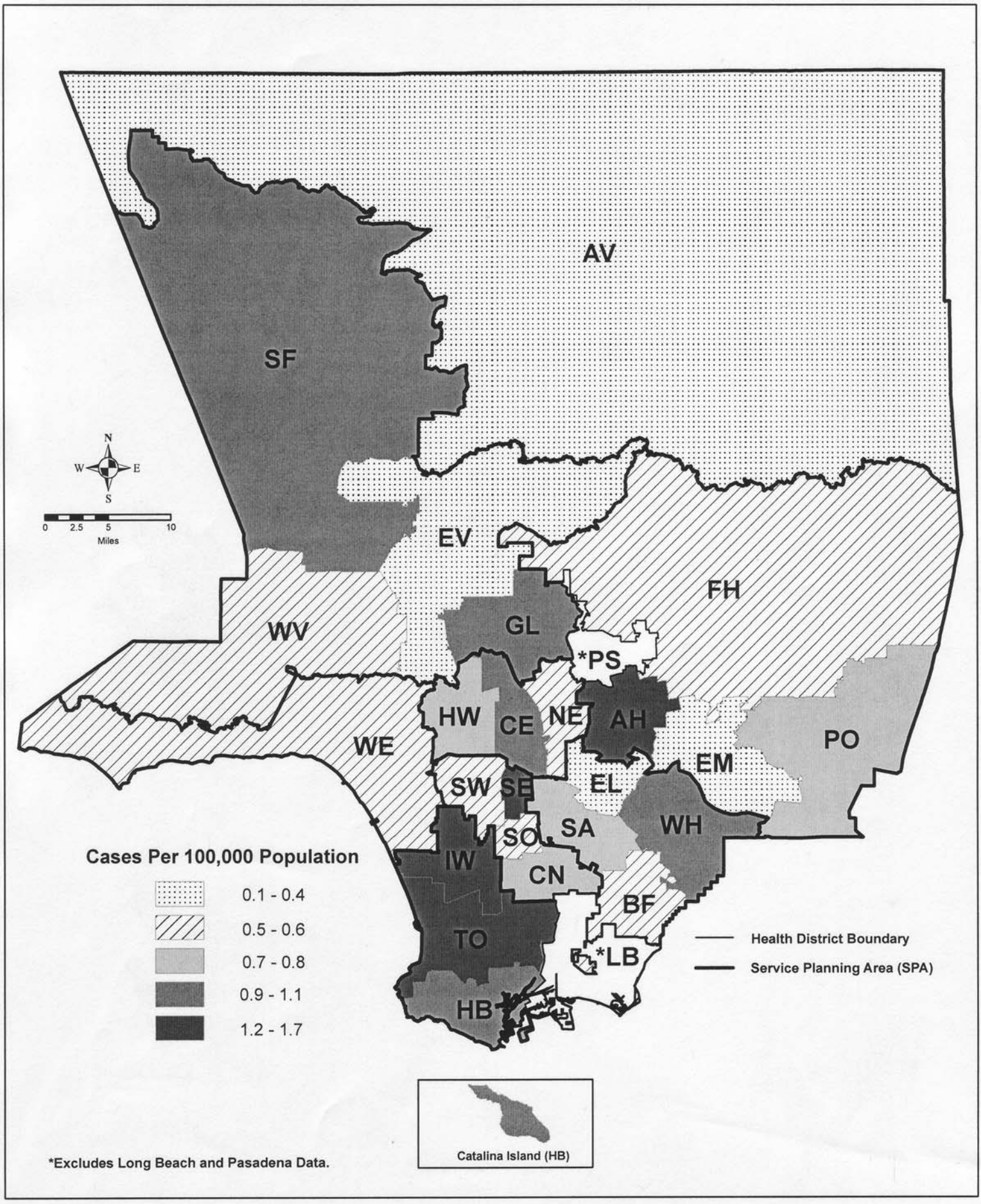
REFERENCES

1. CDC. Kawasaki Syndrome--United States. MMWR 1983; 32(7):98-100.
2. New study finds no link between Kawasaki disease and newly discovered coronavirus. Retrieved from EurekAlert website: www.eurekalert.org/pub_releases/2006-11/idso-nsf112006.php.
3. Taubert KA, Shulman ST. Kawasaki disease. Am Fam Physician 1999; 59(11):3093-3102, 3107-3108.

ADDITIONAL RESOURCE

Burns JC. The riddle of Kawasaki disease. N Engl J Med 2007; 356(7):659-661.

Map 7. Kawasaki Syndrome
Rates by Health District, Los Angeles County, 2006*



*Excludes Long Beach and Pasadena Data.

LEGIONELLOSIS

CRUDE DATA	
Number of Cases	24
Annual Incidence	
LA County	0.25
California	0.27[a]
United States	0.96[a]
Age at Diagnosis	
Mean	64
Median	67
Range	26–87 years

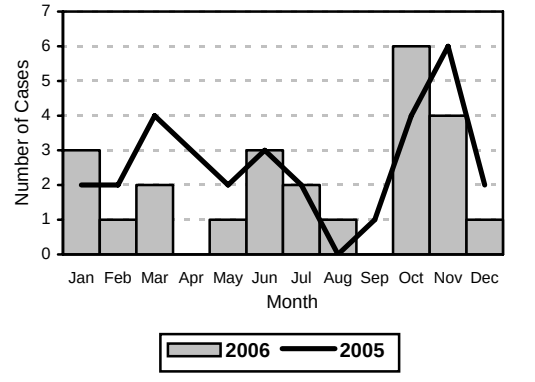
[a] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Legionellosis
Cases by Year of Onset
LAC, 1996–2006

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 or by aspiration of contaminated water, and water birthing. Person-to-person transmission does not occur. 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, 2005–2006



DISEASE ABSTRACT

- The incidence of legionellosis in LAC is decreasing.
- Two unrelated nosocomial cases (1 definite and 1 possible) were reported in 2006.
- No cases of Pontiac fever were reported in 2006.
- The case fatality rate decreased from 16% to 4% in 2005 and 2006, respectively.

STRATIFIED DATA

Trends: A total of 24 reported cases met the CDC surveillance case definition for LD in 2006. This is lower than the peak incidence of 32 cases reported in 1997 in which a community outbreak occurred (Figure 1).

Seasonality: Cases occurred throughout the year, with a peak in October—this peak was unrelated to nosocomial incidents.

Age: Consistent with the expected higher frequency among older persons, the mean age of reported cases was 64 years, the median age was 67 years, and the age range was 26-87 years.

Fatality: In 2006, the fatality rate decreased to 4% (1/24) compared to 16% (5/31) in 2005. The age of the expired case was 73 years.

Gender: There were 13 (54%) male cases and 11 (46%) female cases.

Race: The majority of cases 42% (n=10) occurred in whites. The next most reported racial group was Asians 25% (n=6), Hispanics 21% (n= 5), followed by blacks 12% (n=3).

Ethnicity: The majority of cases reported were among non-Hispanics 79% (n=19), as compared to Hispanics 21% (n= 5).

COMMENTS

In 2006, 22 (92%) LD cases were diagnosed by Legionella urinary antigen, 2 (8%) were diagnosed by direct fluorescent antibody (DFA) staining, and none by BAL/sputum culture, or serologic antibody titers. As in 2005, 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; therefore, is very useful for prompt initiation of treatment by clinicians. However, this diagnostic test will only consistently screen for Legionella pneumophila serogroup 1. Not using culture to detect infection could result in an incomplete surveillance of legionellosis. 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 needs further research to determine its reliability. This diagnostic method offers minimal impact to patients for their therapeutic management because seroconversion occurs later during the course of infection.

Legionnaire's disease is more prevalent during summer and early fall. The more favorable weather conditions could explain increased exposure risk during outdoor and recreational activities (i.e., hot tubs, cruise ships, hotels, swimming pools, etc). However, data show that LD is equally distributed throughout the year. Outbreaks of LD continue to occur worldwide and surveillance is in full force. There were 4 travel related cases this year 17% (n=4). These cases were found to be unrelated to any outbreak case through collaboration with the Centers for Disease Control and Prevention and the California Department of Health Services..

One definite nosocomial and one possible nosocomial LD case were reported in LAC in 2006 by different medical facilities. Each medical facility conducted eight weeks of prospective active surveillance and six months of retrospective review to detect other possible cases of nosocomial related LD. No additional LD cases were found in either situation.

The number of LD cases in LAC has decreased despite improvements in reporting, monitoring, and ease of diagnostic methods. In 2006, there were 41 reported cases, compared to 43 cases in 2005, a 5% decrease. There are no specific reasons for the decline in the number of cases that met the case definition, but the following are considered to be some of the factors that may have contributed to this decline: 1) clinical awareness continues to be low despite the number of years since LD was first detected; 2) clinicians are still not familiar with the timing of serology collection of single titers to meet the

laboratory criteria of case definition; 3) cases may have been missed due to convalescent samples being taken prematurely or not at all; 4) challenge of calling providers to order tests, although the individual is willing to submit; and 5) individual is unwilling to test due to financial reasons and/or don't see the importance of follow-up after treatment. 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. Legionella will be made a mandatory laboratory reportable disease in 2007.

Reasons for the decrease in the case fatality rate are unknown. It is hypothetically possible that an increase in surveillance has resulted in the increased finding of more mild disease though this is not supported by our total number of reported cases.

ADDITIONAL RESOURCES

Guidelines:

CDC. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). MMWR 2003; 52(RR10):1-42. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm

CDC. Guidelines for preventing health-care associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Practices Advisory Committee (HICPAC). MMWR 2004; 53(RR3):1-36. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm

Squier CL, Stout JE, Krsytofiak S, et al. A proactive approach to prevention of health care-acquired Legionnaires' disease: the Allegheny County (Pittsburg) experience. Am J Infect Control 2005; 33(6):360-367.

State of Maryland, Department of Health and Mental Hygiene. Report of the Maryland scientific working group to study legionella in water systems in healthcare institutions. June 14, 2000. Report available at: www.dhmh.state.md.us/html/legionella.htm

LAC Department of Health Services. Legionellosis: taking the mystery out of laboratory diagnosis. The Public's Health 2001; 1(3):4-5. Available at: www.lapublichealth.org/wwwfiles/ph/ph/ph/TPH_October_2001.pdf

Reviews:

- Stout JE, Yu VL. Hospital-acquired Legionnaires' disease: new developments. Curr Opin Infect Dis 2003; 16(4):337-341.
- Sabria M, Yu VL. Hospital-acquired legionellosis: solutions for a preventable infection. Lancet Infect Dis 2002; 2(6):368-373.

Selected Articles:

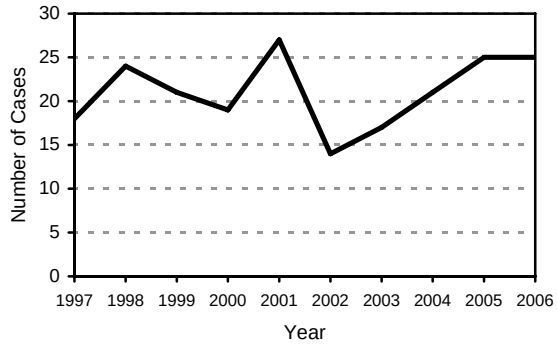
- Benin AL, Benson RF, Besser RE. Trends in Legionnaires' disease, 1980- 1998: declining mortality and new patterns of diagnosis. Clin Infect Dis 2002; 35(9):1039-1046.
- Garbino J, Bornand JE, Uckay I, Fonseca S, Sax H. Impact of positive legionella urinary antigen test on patient management and improvement of antibiotic use. J Clin Pathol 2004; 57(12):1302-1305.
- Franzin L, Scolfaro C, Cabodi D, Valera M, Tovo PA. *Legionella pneumophila* pneumonia in a newborn after water birth: a new mode of transmission. Clin Infect Dis 2001; 33(9):e103-104.
- Fields BS, Benson RF, Besser RE. Legionella and Legionnaires' disease: 25 years of investigation. Clin Microbiol Rev 2002; 15(3):506-526.

LISTERIOSIS, NONPERINATAL

CRUDE DATA	
Number of Cases	25
Annual Incidence[a]	
LA County	0.26
United States	N/A
Age at Diagnosis	
Mean	62.96
Median	64
Range	20–90 years

[a] Cases per 100,000 population.

Figure 1
Nonperinatal Listeriosis
Cases by Year of Onset
LAC, 1997–2006



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 2006, 25 nonperinatal listeriosis cases were reported, the same as the previous year (2005, n=25) (Figure 1).
- There were two case fatalities in 2006. As in 2005, these fatalities were more likely due to severe underlying disease (i.e., cancer, liver disease).
- Although one multi-state cluster was identified by PulseNet, no food source was identified. Additionally, there were no confirmed foodborne listeriosis outbreaks during 2006.

STRATIFIED DATA

Trends: Since 2002 (N=14), the number of nonperinatal listeriosis cases has been increasing (Figure 1). In 2006 there were 25 cases of nonperinatal listeriosis; the same as 2005.

Seasonality: Listeriosis typically follows a seasonal trend with most cases occurring during the summer months. During the previous five years, the highest incidence of cases occurred during July and August. This year's trend was different in that there were two peaks (one in July and another in October) (Figure 2).

Age: Advanced age is considered a risk factor for nonperinatal listeriosis. In 2006, 48% (n=12) of nonperinatal listeriosis cases were 65 years of age or older - an increase from 2005 (36%, n=9). In 2006, the median age of nonperinatal listeriosis cases was 64 years, markedly higher than the median age of 54 years in 2005. The majority of cases in 2006 were over the age of 45 years.

Sex: Similar to previous years, more males (n=13) than females (n=12) contracted nonperinatal listeriosis; though due to the relatively small number of cases, the difference in the infection rate between the two sexes is probably not significant.

Race/Ethnicity: In 2006, whites and Latinos had the highest numbers of incident cases of nonperinatal listeriosis (n=12, 48%, and n=9, 43%, respectively) (Figure 4). Since 2004, the annual numbers of Latino cases has remained the same. In 2006 there was a significant increase in white cases.

Location: Geographic information was known for all 25 of the cases. During 2006, there was no significant clustering of cases by location.

Predisposing Conditions and Medical Risk Factors: In 2006, 72% (n=18) of the nonperinatal cases occurred in adults older than 65 years of age. In addition, 56% had cancer; 36% had history of gastrointestinal disease; 32% had recent chemotherapy; 20% had kidney disease; 20% had recent antibiotic use; and 20% had recent steroid use. Twenty-two (88%) 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, 25% of cases reported eating

Figure 2
Nonperinatal Listeriosis
Cases by Month of Onset
LAC, 2006

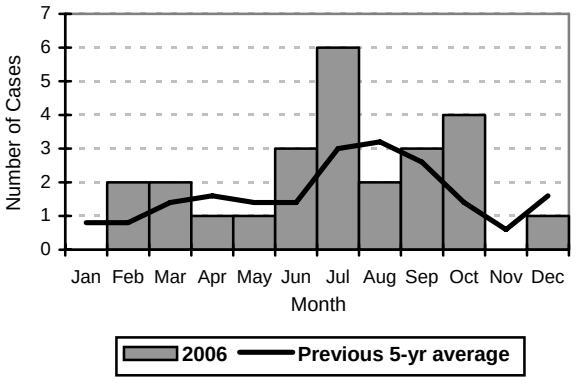


Figure 3
Nonperinatal Listeriosis Incidence
by Age Group
LAC, 2006

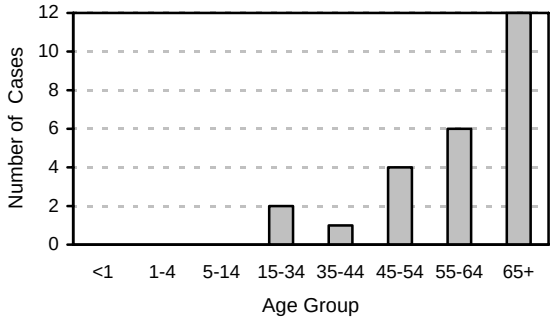
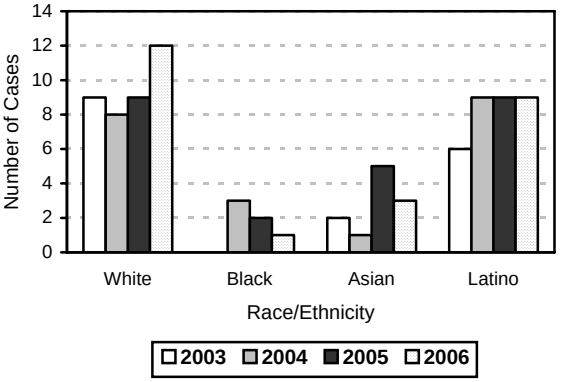


Figure 4
Nonperinatal Listeriosis
Incidence by Race/Ethnicity
LAC, 2003-2006



Mexican or soft cheese; 16% cold cuts or deli meats; 16% other cheese (non-Mexican-style cheese; non-soft cheese); 16% raw fruits; and 20% raw vegetables (Table 2).

Outcome: Two (8%) of the 25 cases in 2006 died. These cases were not of advanced age but were severely immunocompromised with cancer and liver disease.

Culture Sites: *L. monocytogenes* was isolated from blood only in 22 (88%) cases, CSF in two (8%) cases, and one culture drawn from ascitic fluid.

PFGE-identified Clusters: All *L. monocytogenes* isolates are analyzed by pulsed field gel electrophoresis (PFGE). Two cases matched a PulseNet pattern which was part of a cluster with cases from New York, Ohio and Texas.

Table 1. Predisposing Factors in Cases of Nonperinatal Listeriosis—LAC, 2006

Medical Conditions	Number	Percent
Age >65 years	18	72
Cancer	14	56
Gastrointestinal Disease	9	36
Chemotherapy	8	32
Kidney Disease	5	20
Prior Antibiotic Use	5	20
Steroid Use	5	20
Autoimmune Disease	4	16
Liver Disease	4	16
Lung Disease	4	16
Antacid Use	3	12
Chronic Alcoholism	3	12
Diabetes	3	12
Radiation Therapy	3	12
Other Immunosuppressive Therapy	2	8
No Identified Risk Factors	1	4

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 2. High-risk Foods among Cases of Nonperinatal Listeriosis—LAC, 2006

Risk foods	Number	Percent
Raw Vegetables	5	20
Raw Fruit	4	16
Cold Cuts/Deli-Meats	4	16
Soft Cheese	4	16
Other Cheese	4	16
Mexican Style Cheese	3	12

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 disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

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

LISTERIOSIS, PERINATAL

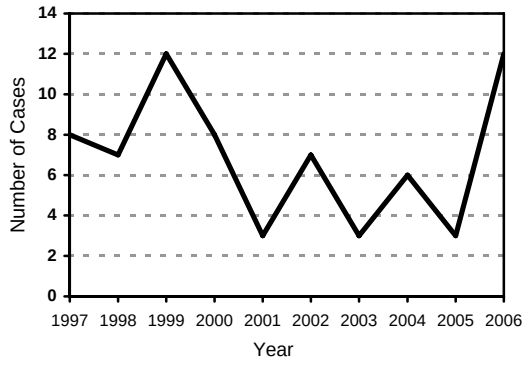
CRUDE DATA	
Number of Cases[a]	12
Annual Incidence[b]	
LA County	8.47[c]
United States	N/A
Age at Onset	
Maternal:	
Mean	28.36 years
Median	30 years
Range	16-38 years
Infant Gestational:	
Mean	31 weeks
Median	31 weeks
Range	22-37 weeks

[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, 1997–2006



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 increased markedly from three cases in 2005 to 12 cases in 2006 (Figure 1). The 12 cases included ten single births and one set of twins.

- Eight cases were born ill at varying lengths of gestation. Two cases resulted in fetal demise at 22 and 31 weeks gestation. The outcomes of the remaining two cases were unknown due to inability to contact the family for follow-up.

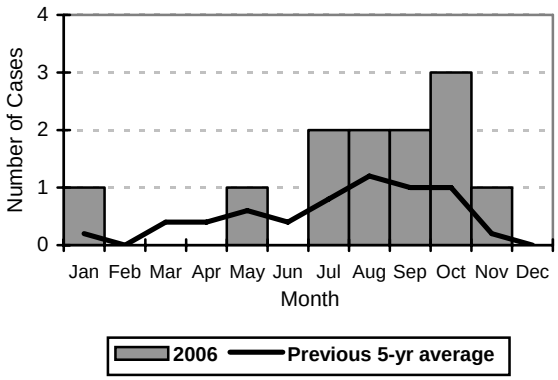
STRATIFIED DATA

Trends: Since 2001, the number of perinatal listeriosis has fluctuated, ranging from 3 to 12 cases, with a marked increase from three cases in 2005 to 12 cases in 2006 (Figure 1).

Seasonality: In 2006, the seasonality of perinatal listeriosis was slightly, though insignificantly, later than the average annual incidence of the previous five years. Perinatal listeriosis cases peaked in October during 2006 (Figure 2).

Age: During 2006, the average maternal and gestational ages of perinatal cases at disease onset (28 years and 31 weeks, respectively) were higher compared to those in 2005 although the overall five year trend remains unchanged.

Figure 2
Perinatal Listeriosis
Cases by Month of Onset
LAC, 2006



Sex: In 2006, seven infants were identified as male and five as female. The male to female ratio was 1.4:1. In 2005 the male to female ratio was unknown. During 2004 and 2003, the male to female ratios were 2:3 and 2:1, respectively.

Race/Ethnicity: In 2006, 58.3% (n=7) of the cases were Latino, which is similar to years past. There was an increase in black cases from 0 cases in 2005 to 3 in 2006 (25%). The remaining cases were white (n=1, 8.3%) and Asian (n=1, 8.3%). However, due to small numbers of cases, it is difficult to draw conclusions from this information.

Location: In 2006, three cases resided in SPA 4 (Central and Northeast health districts), SPAs 3, 6 and 7 had two cases each. Additionally, one case resided in each of SPAs 1, 2 and 8. In 2005, reported perinatal cases were from only SPA 4 and 6.

Type of Delivery: Five infants (42%) were delivered by caesarian section. Two infants (17%) were delivered vaginally. The mode of delivery for the remaining infants is unknown.

Outcome: There were no maternal fatalities. Two (33%) neonates were stillborn – one at 22 and one at 31 weeks of gestation. Eight infants (67%) were delivered sick at varying weeks of gestation ranging from 25-37 weeks of gestation. The outcomes of the other two infants are unknown.

Culture Sites: Listeriosis was culture confirmed in six maternal and ten neonatal isolates. Among culture-positive mothers, five (83%) mothers had *L. monocytogenes* isolated from blood, one mother had *L. monocytogenes* isolated from peritoneal fluid. Of the ten neonatal isolates, six (60%) had *L. monocytogenes* isolated from blood; the other isolates were from wound, amniotic fluid, gastric aspirate and sputum.

Maternal Clinical Signs/Outcomes: In 2006, ten mothers had fever (91%). Temperatures were recorded for five mothers with an average temperature of 102°F. Signs and symptoms were unknown for one case. Similar to the previous three years no mothers had meningitis.

Onset: In 2006, 12 neonates/infants (100%) were categorized as early onset cases in which the disease onset is 0 to 6 days after birth.

High-risk Foods: Six cases (50%) reported eating at least one potentially high-risk food. All six ate Mexican-style cheese; the other risk foods included: soft cheeses (n=2), raw fruits (n=3) and raw vegetables (n=3) (Table 1).

Risk factors: Four mothers (36%) had known predisposing medical risk factors other than pregnancy. Those factors included use of iron supplements, chronic anemia, 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.

Table 1. High-risk Foods among Cases of Perinatal Listeriosis—LAC, 2006

Risk foods	Number	Percent
Mexican-style Cheese	6	50
Raw Fruit	3	25
Raw Vegetables	3	25
Soft Cheese	2	17
Other Cheese	0	0
Cold Cuts/ Deli Meats	0	0
Yeast Products	0	0
Raw Milk	0	0

In addition, fruits and vegetables should be thoroughly washed. Uncooked 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.

Given the seasonality of perinatal listeriosis, prevention strategies should take effect before April. Possible preventive methods include education during prenatal checkups, outreach to Hispanic/Latino communities, and food safety notices at food and deli markets.

COMMENTS

Incidence of perinatal listeriosis in LAC increased to 12 cases in 2006. Prevention efforts should be targeted towards Hispanic and black women, especially since Hispanics are the fastest growing segment of the LAC population. There were no perinatal cases associated with outbreaks in 2006.

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 2006, there were no cases of *L. monocytogenes* in LAC associated with a multi-jurisdictional outbreak identified in this manner.

ADDITIONAL RESOURCES

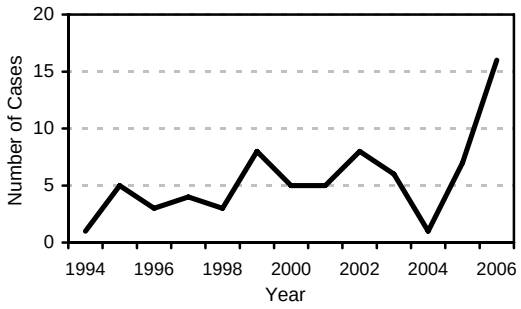
General disease information is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

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

LYME DISEASE

CRUDE DATA	
Number of Cases	16
Annual Incidence[a]	
LA County	0.17[b]
California	0.24[c]
United States	6.72[c]
Age at Diagnosis	
Mean	33
Median	28.5
Range	8–69 years

Figure 1
Lyme Disease Cases
by Year of Onset
LAC, 1994–2006



[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] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

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 [1]. 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. In contrast, the incidence in Connecticut, one of the most endemic states in the US, was 51.56 per 100,000 in 2005 [2,3]. Nevertheless, LD has been well documented to occur in counties throughout the state of California (CA) — Trinity County in northern California reported an incidence of 19.23 per 100,000 in 2005 [1] — 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. EM resembles a rapidly expanding red bull's eye and occurs in 60-90% of cases. If there is no rash, other early symptoms such as fever, body aches, headaches, and fatigue are often unrecognized as indicators of LD. 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 (IV) antibiotics. Currently, there is no vaccine.

Because the EM rash is unique to LD and can distinguish it from other diseases with similar early symptoms, its presentation precludes the need for further testing. For purposes of surveillance, the Centers for Disease Control and Prevention (CDC) requires a confirmed case of LD to have documented EM that is at least 5cm in diameter or at least one late manifestation of LD diagnosed by a healthcare provider 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; and LD should primarily be diagnosed by a healthcare provider's consideration of the clinical presentation and history of tick exposure. If indicated, the CDC, Food and Drug Administration, the Association of State and Territorial Public Health Laboratory Directors, and the American College of Physicians currently recommend a two-step serologic testing procedure for LD: an initial enzyme immunoassay (EIA) or immunofluorescent antibody (IFA) screening test, and if positive or equivocal, followed by IgM and IgG Western immunoblotting [4].

DISEASE ABSTRACT

- In 2006, there was a 129% increase in reported cases that met CDC surveillance criteria; most likely due to increases of LD seen in the eastern US.
- The majority of cases (81%) in 2006 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: The number of cases has increased by nearly 129% from 7 confirmed cases in 2005 to 16 in 2006 (Figure 1). This number is twice as high as any year in which LAC has recorded incidence of LD. However, the number of cases reported with a possible exposure within LAC (n=3) remains similar to previous years. Since 1994, cases with possible exposure within LAC has ranged from 0 to 5.

Seasonality: There was a peak number of cases occurring in the summer months of June (n=6) and July (n=4) (Figure 2). A similar peak occurred in 2005 in July (n=2) and August (n=2). 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.

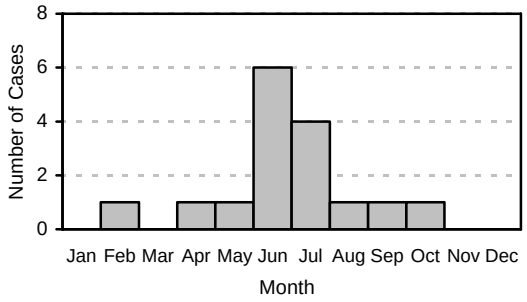
Age: The average age of cases in 2006 was 33, the median was 28.5, and the ages ranged from 8–69 years old. Nationally, LD is most common among persons aged 5–19 years and 30 years and older.

Sex: The male to female ratio was 0.78:1. Nationally, LD occurs more commonly among males.

Race/Ethnicity: Of those cases in which race/ethnicity were known, most were white (n=11, 78%). There were two Latinos (14%) and one Asian (7%).

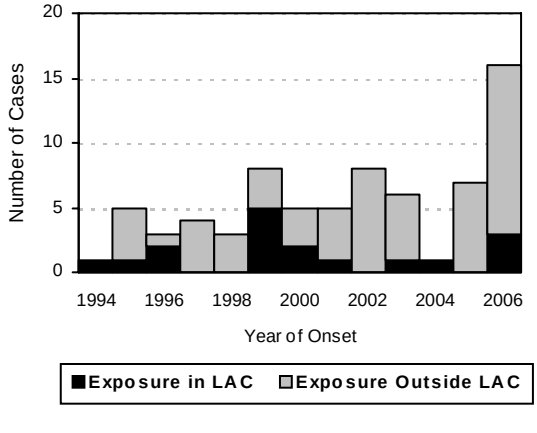
Location: LD does not commonly occur in ticks in LAC, most cases were likely exposed to infected ticks while outside of the county. However, three cases (19%) reported no history of travel outside of LAC within three months of their onset of EM rash (Figure 3). These cases occurred among residents from SPAs 2, 5, and 8.

Figure 2
Lyme Disease Cases
by Month of Onset*
LAC, 2006



*Previous 5-yr average not available.

Figure 3
Lyme Disease Cases
by Location of Exposure
LAC, 1994–2006



Disease Severity: Most cases (n=13, 81%) demonstrated EM. Rash sizes ranged from 5–20cm, with a mean of 10.25cm and median of 10cm. Five cases (31%) experienced swelling of one or a few joints, a symptom characteristic of late LD, two of them in combination with EM. One case experienced an additional late symptom: a facial nerve palsy consistent with a cranial neuropathy.

Risk Factors: Many of the cases (n=10, 63%) recalled a tick bite within three months of their onset. Thirteen cases (81%) reported travel outside of LAC prior to their onset of symptoms (Figure 3). Of the thirteen, nine (69%) recalled incurring the tick bite during their travels. The remaining either denied or could not recall a tick bite. However, published studies show that few patients - only about one third – can recall being bitten by a tick [5]. All traveled to areas where LD is known to be highly endemic: 11 to the eastern US and 2 to Europe – Sweden, in particular. Of the three that remained within LAC, one had traveled to northern California, where LD is more common, over three months before the onset of her EM rash. She could not recall a tick bite. Only one case with no history of travel recalled a tick bite near her residence - a rural area of the San Fernando health district (SPA 2).

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 controling ticks on pets.

COMMENTS

Each year only 20 to 30 suspected LD cases from LAC residents are reported to LAC DPH by clinicians and laboratories. Many 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 has ranged from none to eight cases a year. However, in 2006 twice the number of confirmed cases typically seen in a single year in LAC was reported. It is likely that this increase reflects increases in LD in the ten states where it is most prevalent (located in the northeastern, mid-Atlantic, and north-central areas of the US), occurring since it became a nationally notifiable disease in 1991 [3]. During the period of 2003–2005, these ten states accounted for 93% of cases nationwide and had an average annual incidence rate per 100,000 persons of 29.1 in 2003, 26.8 in 2004, and 31.6 in 2005. A considerable proportion of cases from LAC, 69% during 2006, reported travel to these highly endemic areas. The number of cases confirmed with possible exposure within LAC remains similar to previous years.

Furthermore, changes in reporting processes may have increased the number of suspected cases reported to LAC DPH. 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.

The increase in confirmed cases highlights the complicated issues in the diagnosis and surveillance of LD that can result in both overdiagnosis and underreporting. One challenge to surveillance is the misdiagnosis of EM, which occurs even in the highly endemic eastern states [6]. One might expect that the misdiagnosis of EM could be even greater in non-endemic or low endemic areas of the country such as LAC where clinicians have not had as much clinical experience with LD. Not only do the early and late symptoms of LD resemble those of many other diseases, but also the laboratory tests available are often inaccurate in diagnosing LD. Laboratory diagnostic tests may not reliably detect the infection early in the

course of disease or can be interpreted incorrectly. Despite this, the surveillance of LD in LAC is heavily based on positive laboratory reports; and reports are confirmed only after consultation with the healthcare provider as well as the patient regarding symptoms and tick exposure. The response rate of healthcare providers in requests for confirmation has not been fully investigated; it most likely varies from year to year and could affect the trends in confirmed LD cases.

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1. California Department of Health Services. 2005 Annual Report. Report available at: www.dhs.ca.gov/ps/dcdc/disb/disbindex.htm
2. CDC. Lyme disease statistics. Report available at: www.cdc.gov/ncidod/dvbid/lyme/ld_statistics.htm
3. CDC. Lyme disease--United States, 2003–2005. MMWR 2007; 56(23):573–576.
4. Fritz CL, Vugia DJ. Clinical issues in Lyme borreliosis: a California perspective. Infect Dis Rev 2001; 3(3):111-122.
5. Gerber MA, Shapiro ED, Burke GS, Parcells VJ, Bell GL. Lyme disease in children in southeastern Connecticut. N Engl J Med 1996; 335(17):1270-1274.
6. Feder HM, Whitaker DL. Misdiagnosis of erythema migrans. Am J Med 1995; 99(4):412-419.

ADDITIONAL RESOURCES

More information about Lyme disease is available from the CDC at:
www.cdc.gov/ncidod/dvbid/lyme/index.htm

A brochure on Lyme disease from the California Department of Public Health is available at:
www.cdph.ca.gov/healthinfo/discond/Documents/Lyme/LymeDiseaseBrochure2005.pdf

PUBLICATIONS

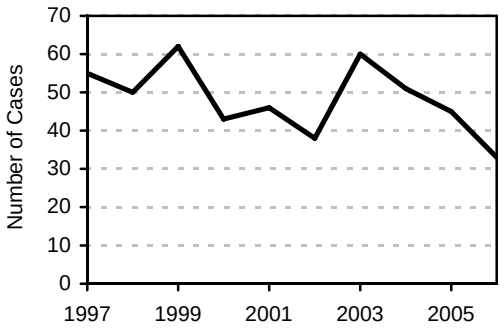
1. Nadelman RB, Wormser GP. Lyme borreliosis. Lancet 1998; 352(9127):557–565.
2. Barbour AG. Lyme Disease: The Cause, the Cure, the Controversy. Baltimore, MD: The Johns Hopkins University Press; 1996.
3. Steere AC. Lyme disease. N Engl J Med 2001; 345(2):115–125.
4. Sood SK. Lyme disease. Pediatr Infect Dis J 1999; 18(10):913–925.
5. Shapiro ED, Gerber MA. Lyme disease. Clin Infect Dis 2000; 31(2):533-542.

MALARIA

CRUDE DATA	
Number of Cases	33
Age at Onset	
Mean	38
Median	40
Age Range	3–69 years
Annual Incidence	
LA County	0.34
California	0.43[a]
United States	0.50[a]

[a] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Malaria
Cases by Year of Onset
LAC, 1997–2006



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. Each case of malaria requires the demonstration of parasites in thick or thin blood smears, regardless of whether the person experienced previous episodes of malaria while outside the country.

Malaria is usually acquired outside the continental United States (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. In 1988–89, the last autochthonous cases in California (CA) occurred in San Diego among thirty migrant workers infected with *P. vivax*. Since then, local transmission has not occurred in southern CA due to the inadequate number of people infected with the malaria parasite necessary 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 travelers who took some form of antimalarial chemoprophylaxis during travel to a malaria-endemic region has increased since the previous year to 52%. Almost all who took prophylaxis reported complete compliance with the regimen.

STRATIFIED DATA

Trends: In 2006, there were 33 reported cases compared to 45 reported the previous year: a 27% decrease. This continued a decline in cases that began in 2003 when 60 cases were reported (Figure 1). Most cases (n=21, 64%) were infected with *P. falciparum* in 2006 (Figure 2), similar to the proportion affected in 2005 (n=29, 65%).

Seasonality: Seasonality for malaria was not determined. Malaria is acquired abroad and is independent of LAC weather or seasonal patterns.

Age: The mean age of infection has increased in 2006 to 38 (range: 3–69 years); the median age was 40. The largest number of cases (n=11, 33%) occurred in an older age group than previous years (45–54 years). In 2005 the largest number occurred in the 15–24 year age group (Figure 3).

Sex: The ratio of male-to-female cases was three to one (3:1).

Race/Ethnicity: The majority of reported malaria cases occurred among blacks, which included African-Americans and African immigrants (n=22, 67%). Five cases each (15%) were reported among Asians and whites. Only one case (3%) of Latino ethnicity was reported. Since the early 1990s, blacks have had the highest proportion of reported malaria cases, with the exception of year 2003, where whites outnumbered blacks. Race and ethnicity were known for all cases.

Disease Severity: There were no deaths or severe complications associated with malarial infection in 2006, however, most (n=24, 73%) required hospitalization. The mean length of hospitalization was 2.7 days and ranged from 1 to 7 days.

Figure 2
Malaria Cases by Species
LAC, 2006 (n=33)

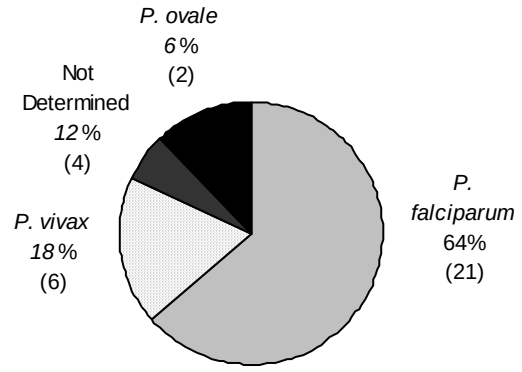
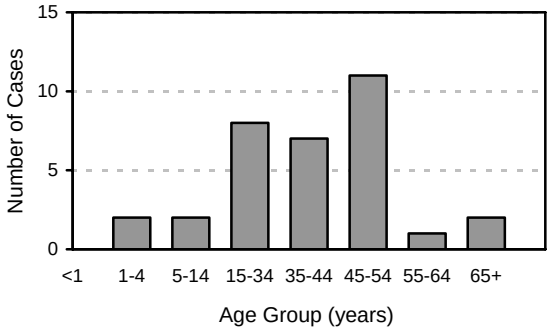


Figure 3
Malaria
Cases by Age Group
LAC, 2006 (n=33)



Transmission and Risk Factors: All cases reported recent travel to a foreign country, with Africa continuing to be the most common region visited. Twenty-three (70%) reported malaria cases were from individuals who were traveling to or coming from African countries. Reports of travel to Nigeria, the most frequently reported country, increased from 9 in 2005 to 16 in 2006 (n=16) (Table 1). The most commonly reported reason for travel was visiting friends and relatives (n=19, 71%). Refugees and immigrants made up only 7% (n=2) of cases with known travel reasons. Purpose of travel was reported for 82% of cases.

Among the 21 cases that reported US residency prior to their most recent travel, 11 individuals (52%) took prophylaxis, which was at least twice as high a rate of usage compared to the previous two years. Information on antimalarial prophylaxis usage was available for 20 (95%). Almost all (n=10) took their medication correctly as prescribed. When stratified by purpose of travel, the proportion of prophylaxis usage among cases was higher in those who traveled for work than for pleasure (67% vs. 53%) (Table 2). Traveling for work in 2006 included individuals who traveled as part of volunteer service or for a scientific conference. Tourism and visiting friends and family were classified as traveling for pleasure. Prophylaxis

usage among travelers for work (67%) has remained similar to that found in 2005 (60%). Usage among travelers for pleasure has increased markedly from 12% in 2005 to 53% in 2006.

Table 1. Malaria Cases by Country of Acquisition and *Plasmodium* Species— LAC, 2006

Country of Acquisition	*P. falciparum*	*P. vivax*	*P. ovale*	Not Determined	Total
Africa	**19**	**1**	**2**	**1**	**23**
- Cameroon	2	0	0	0	2
- Ghana	1	0	0	0	1
- Nigeria	12	1	2	1	16
- Sierra Leone	2	0	0	0	2
- Uganda	2	0	0	0	2
Asia/Oceania	**1**	**3**	**0**	**2**	**6**
- India	0	1	0	1	2
- Indonesia	1	0	0	0	1
- Papua New Guinea*	0	2	0	0	2
- Vanuatu	0	0	0	1	1
Latin America	**0**	**2**	**0**	**1**	**3**
- Guatemala	0	1	0	0	1
- Honduras	0	1	0	0	1
- Mexico	0	0	0	1	1
Unknown	**1**	**0**	**0**	**0**	**1**
Overall Total	**21**	**6**	**2**	**4**	**33**

*One case also traveled to Indonesia and Guatemala in addition to Papua New Guinea.

Table 2. Prophylaxis Use Among US Travelers with Malaria, 2006

Reason for Travel	Total Cases (N)	Prophylaxis Use (N)	(%)
Pleasure	17	9	53
Work	3	2	67
Other/Unknown	1	0	0
Total	**21**	**11**	**52**

Seven of 27 cases (26%) reported a history of infection with malaria in the twelve months prior to their most recent episode. The species of the prior infections were not identified for any cases. No cases were acquired through blood transfusion or transplantation.

PREVENTION

Prevention method of malaria includes 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.

COMMENTS

The reason for the overall decrease in malaria cases is most likely due to a decrease in overseas travel and incoming refugees from malaria endemic countries. The number of malaria cases overall 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). 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 2006, refugees and immigrants made up only 7%.

Information on travel and prophylaxis is obtained by interviewing patients. The data is 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.

ADDITIONAL RESOURCES

Additional information about malaria is available from the CDC at: www.cdc.gov/malaria/

CDC. Malaria surveillance--United States, 2004. MMWR 2006; 55(SS04):23-37. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/ss5504a2.htm?s_cid=ss5504a2_e

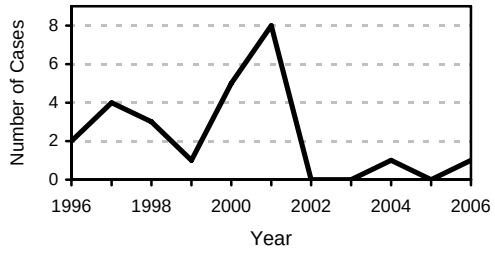
CDC. Transmission of *Plasmodium vivax* malaria--San Diego County, California, 1988 and 1989. MMWR 1990; 39(6):91-94. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00000814.htm

MEASLES

CRUDE DATA	
Number of Cases	1
Annual Incidence[a]	
LA County	0.01[b]
California	0.02[b]
United States	0.02[c]

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Measles
Reported Cases by Year of Onset
LAC, 1996-2006



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 64 measles suspect reports received at the LAC Immunization Program, there was only one confirmed measles case identified in LAC during 2006.
- During 2006, 6 measles cases were reported in California. Since all recent measles cases have been imported, an effective measles surveillance system needs to be maintained.

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 or history of disease. 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 vaccine.

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, and 2005, no confirmed cases of measles were identified in LAC, marking only three 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 United States.

Sex: Female.

Race/Ethnicity: Asian.

Seasonality: Rash onset in January.

Age: The case was 3 years of age.

Location: The case resides in SPA 2 (San Fernando HD) but the illness was not linked to local transmission. The case acquired measles while traveling to and from India and developed clinical symptoms of measles within 18 days of returning to the United States.

Vaccination Status: Due to a personal beliefs exemption, the case did not receive any MMR vaccine.

Laboratory Confirmation: The case was confirmed with a positive IgM antibody titer.

Complications: The case survived but was hospitalized for 4 days with dehydration and pneumonia.

COMMENTS

It is important to be reminded that while measles is no longer considered to be endemic in the United States, the virus continues to circulate in other parts of the world putting susceptible individuals at risk of measles infection. LAC's single measles case this year was identified in January. As previously mentioned, the case was an imported case who was unvaccinated. In March, the Colorado Health Department notified the LAC Immunization Program of their imported case who had 2 LAC contacts. In April, CDC notified local health departments of a Venezuelan measles case who was infectious while attending a conference in Chicago. Later that same month, the LAC Immunization Program was notified of an Australian case who was incubating measles during a 4-hour layover at LAX airport. In June, the CDC released a media advisory regarding a measles outbreak in Germany, which notified World Cup games attendees of potential exposure. Then from July to August, a multi-state investigation identified 3 measles cases associated with the adoption of children in China. Only one of the cases had documentation of having received 2 doses of a measles-containing vaccine. While no LAC measles cases were identified in association with any of the exposures in Colorado, Chicago, LAX, Germany, or China, 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 90% of children 19-35 months of age in LAC are vaccinated against measles. In addition, ensuring that travelers are immune to measles can minimize the importation of measles. Healthcare providers can play an important role in pre- and post-travel-related health screenings by promoting appropriate pre-travel vaccination and by being aware of travel history when evaluating symptomatic patients.

It is important that an effective measles surveillance system be maintained in LAC. For surveillance to be effective, suspected cases must be reported to the health department in a timely manner. The 2006 LAC case is a prime example of delayed reporting. Although healthcare providers suspected measles and ordered the appropriate laboratory tests, the case was not reported to the health department. Furthermore, the final diagnosis of "not measles" was made before final lab results were even available. When the labs were determined to be positive, the laboratory reported the results to the LAC Immunization Program. However, 22 days had passed since symptom onset. This is problematic because the maximum incubation period for measles is 18 days and the maximum communicability period is 4

days after onset. The extended reporting lag time led to delayed or missed opportunities for effective public health intervention. Fortunately, all contacts were immune to measles and no other cases were identified. In response to this situation, the LAC Immunization Program called the reporting facility to remind them that measles cases should be reported within one working day of identification of the suspected case, regardless of whether lab results are ready. Routinely reminding reporting facilities about the reporting mandates by the California Code of Regulations, Title 17, Section 2500 is an activity that should continue to be implemented.

In 2006, the 64 suspect measles reports came from a variety of sources. Half (n=32) of the suspect cases were first reported by laboratories, 17.2% (n=11) were reported by hospitals/clinics, 17.2% (n=11) were reported by school nurses, and the remaining 15.6% (n=10) were reported by other sources, including the state health department, other counties, and workplaces. Among the 64 suspect cases, 39.1% (n=25) had febrile-rash illnesses that were ruled out because they did not meet the minimum clinical criteria for measles. Thirty-seven of the 64 suspect cases (57.8%) had laboratory studies performed. For 5 of the 37 cases, testing was conducted due to clinical suspicion of measles; results were negative for 4 cases, ruling out measles as the cause of illness. The remaining 32 patients tested were reported to the health department by laboratories due to false positive lab results. Further investigation revealed that the individuals were asymptomatic and that measles antibody tests were performed to test for immunity as part of a routine physical examination, school entrance requirement, or employee health requirement.

It is the policy of the LAC Immunization Program to 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 to 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:

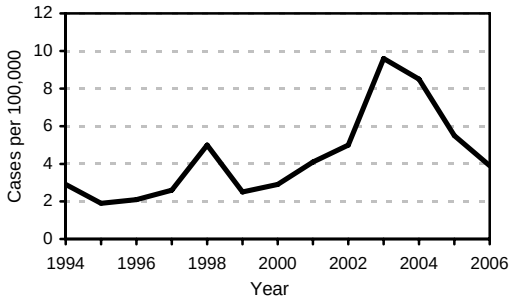
- National Immunization Program – www.cdc.gov/vaccines
- Immunization Action Coalition – www.immunize.org
- LAC Immunization Program – www.lapublichealth.org/ip

MENINGITIS, VIRAL

CRUDE DATA	
Number of Cases	373
Annual Incidence[a]	
LA County	3.9
United States	N/A
Age at Onset	
Mean	25
Median	24
Range	0–85 years

[a] Cases per 100,000 population.

Figure 1
Viral Meningitis
Incidence Rates by Year of Onset
LAC, 1994–2006



DESCRIPTION

Viruses are the major cause of aseptic meningitis syndrome, a term used to define any meningitis (infectious or noninfectious), particularly one with a 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 fecal-oral, respiratory or by another 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 immunodefieciency 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 should be considered 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. Good personal hygiene, especially hand washing and avoiding contact with oral secretions of others, is the most practical and effective preventive measure.

DISEASE ABSTRACT

- The incidence of viral meningitis has continued to decrease since its peak in 2003 (Figure 1). The seasonal peak, usually very high, is seen only weakly this year (Figure 2).
- WNV infection contributed to fewer cases of viral meningitis in 2006 (1% of all cases) compared to 2005 (3%).
- No outbreaks were reported.

Trends: In 2006, there were a total of 373 cases of viral meningitis compared to 530 in 2005, representing a 30% decrease from 2005. The annual incidence also decreased, dropping from 5.5 per 100,000 in 2005 to 3.9 per 100,000 in 2006. This continues a decreasing trend from a peak incidence of 9.6 cases per 100,000 in 2003.

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 previous 5-year average in Figure 2 where approximately a hundred cases are seen each month from July through September. This trend appeared weakly in 2006, however, peaking in August with 46 cases (Figure 2).

Age: Infants less than 1 year old continued to have the highest age-group specific rate at 49 cases per 100,000 (Figure 3).

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

Race/Ethnicity: The incidence rates across race and ethnicity groups ranged from 2.3 to 4.2 cases per 100,000, the lowest occurring in Asian/Pacific Islanders. The rates were similar among Latinos, whites, and blacks (data not shown).

Location: The highest incidence of viral meningitis continued to occur in SPA 1 (13 per 100,000); the lowest in SPA 5 (1.6 per 100,000) (Figure 4). However, because SPA 5 had such a low case count (n=10), the calculated incidence rate is unstable.

Figure 2
Viral Meningitis
Cases by Month of Onset
LAC, 2006

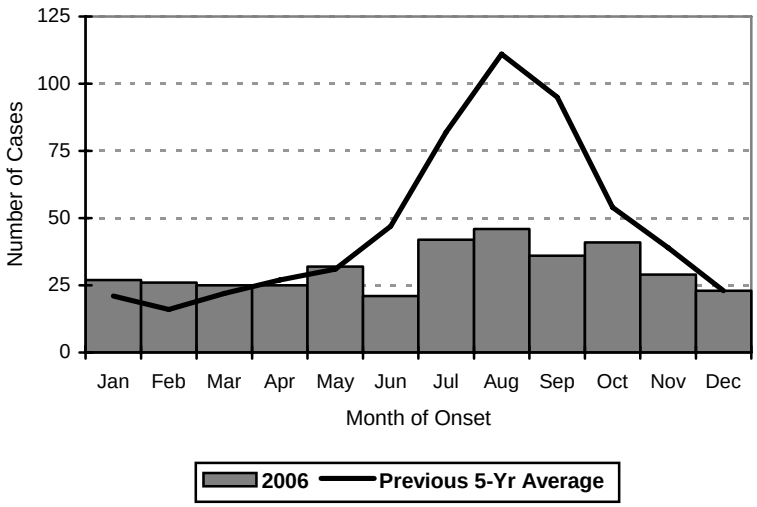


Figure 3
Viral Meningitis
Incidence Rates by Age Group
LAC, 2006 (N=373)

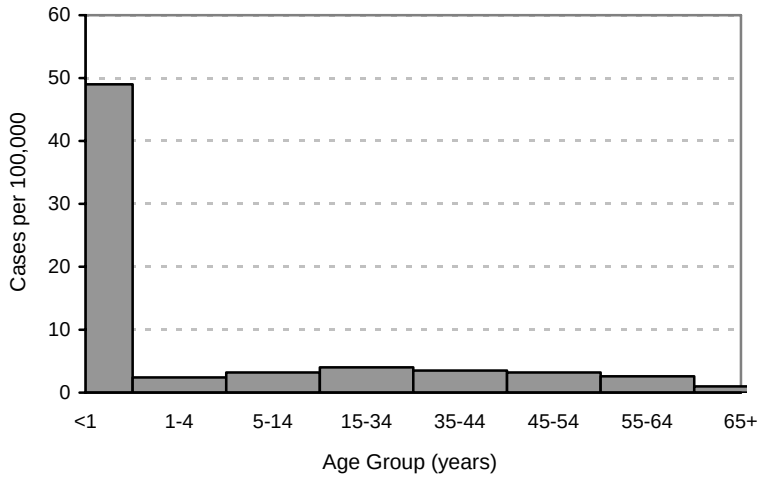
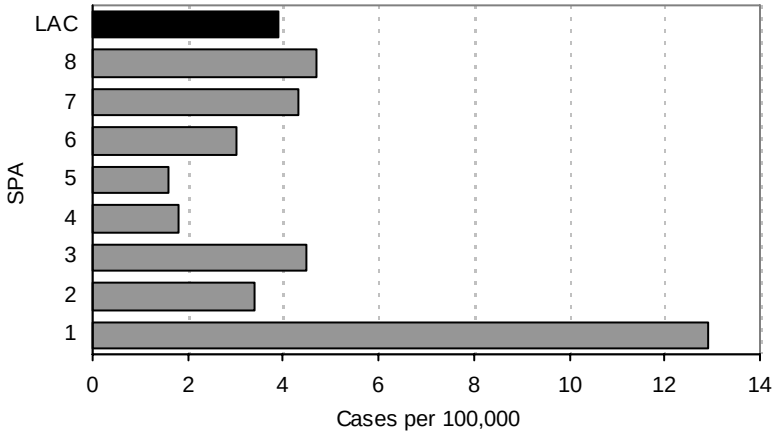


Figure 4
Viral Meningitis
Incidence Rates by SPA
LAC, 2006 (N=373)



Clinical Presentation: The case fatality rate remained low; only two deaths were reported in 2006 (less than one percent case fatality rate). Of the 15 cases in which an etiology was identified, 9 (60%) were caused by an enterovirus. WNV infection has been less prevalent as a cause of viral meningitis than in 2005. Only 27% of cases (n=4) in which an etiology was known, or 1% of all cases, were associated with WNV infection. However, the viral etiology is not investigated in all cases; the etiologies of 96% of cases in 2006 remain unknown.

COMMENTS

The highest incidence in LAC in 2006, 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=342,804) of all SPAs in LAC, it continually carries the highest rates of viral meningitis in LAC. Reasons for this trend are unknown.

The low incidence in 2006 continues a decreasing trend since a substantial peak in 2003. That peak coincided with national and regional outbreaks, including California, which occurred due to serotypes of enteroviruses that are associated with an epidemic circulation pattern. Individual enterovirus serotypes have different temporal patterns of circulation; and the changes in predominant serotypes can be accompanied by large-scale outbreaks. However, no predictable patterns exist for these serotypes or for viral meningitis in general. There is significant yearly variation and no long-term trends have been identified.

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.

Because surveillance for viral meningitis is passive, 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. No outbreaks occurred in 2006. 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 inappropriate antibiotics and fewer and shorter hospital admissions.

ADDITIONAL RESOURCES

CDC. Respiratory and Enteric Viruses Branch, Viral (Aseptic) Meningitis at:
www.cdc.gov/ncidod/dvrd/revb/enterovirus/viral_meningitis.htm

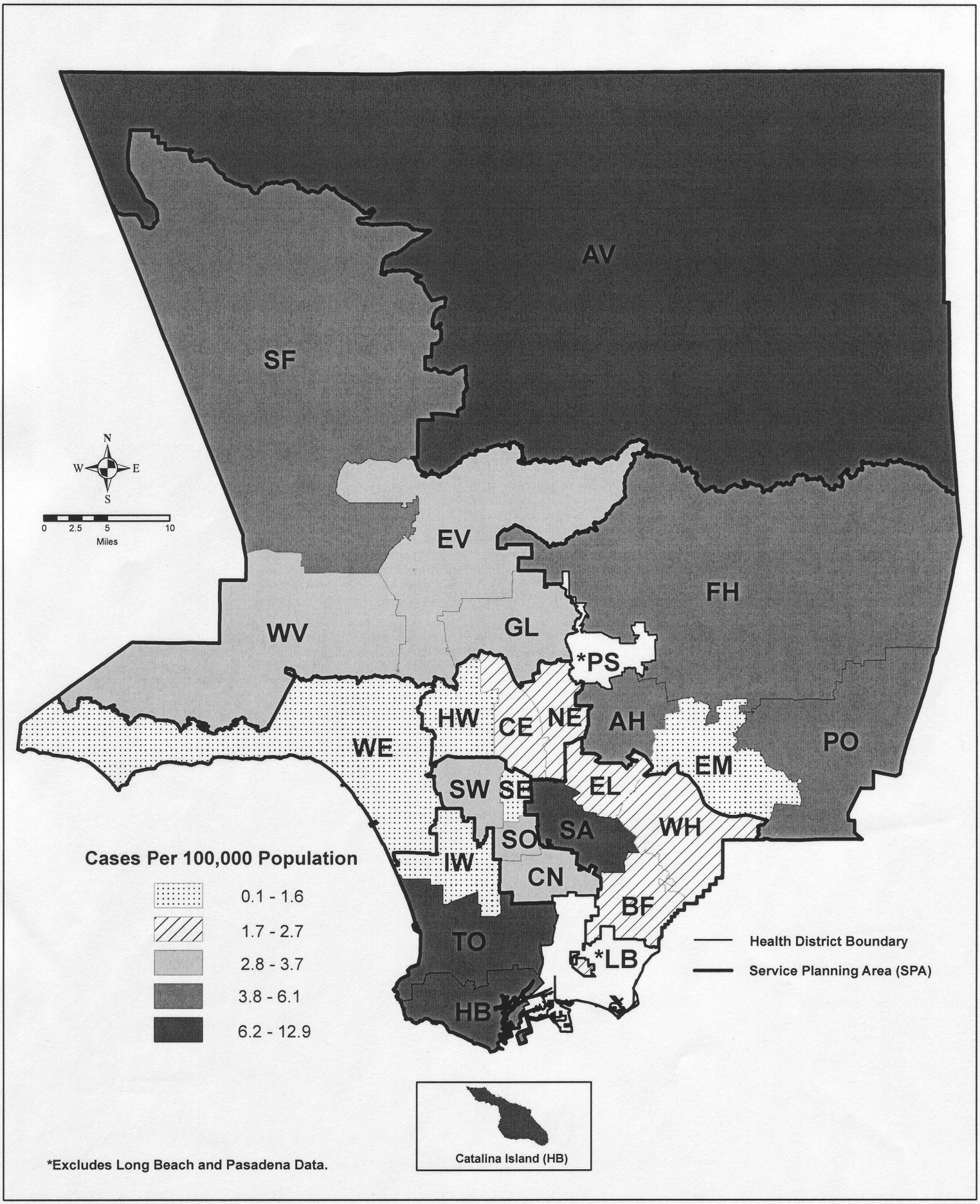
CDC. Respiratory and Enteric Viruses Branch, Non-Polio Enterovirus Infections at:
www.cdc.gov/ncidod/dvrd/revb/enterovirus/non-polio_entero.htm

Association of State and Territorial Directors of Health Promotion and Public Health Education, Infectious Facts, Viral Meningitis at: www.astdhpphe.org/infect/vmenin.html

CDC. Outbreaks of aseptic meningitis associated with echoviruses 9 and 30 and preliminary reports on enterovirus activity--United States, 2003. MMWR 2003; 52(32):761-764. Available at:
www.cdc.gov/mmwr/preview/mmwrhtml/mm5232a1.htm

CDC. Enterovirus surveillance--United States, 2002–2004. MMWR 2006; 55(6):153-156. Available at:
www.cdc.gov/mmwr/preview/mmwrhtml/mm5506a3.htm

Map 8. Meningitis, Viral
Rates by Health District, Los Angeles County, 2006*



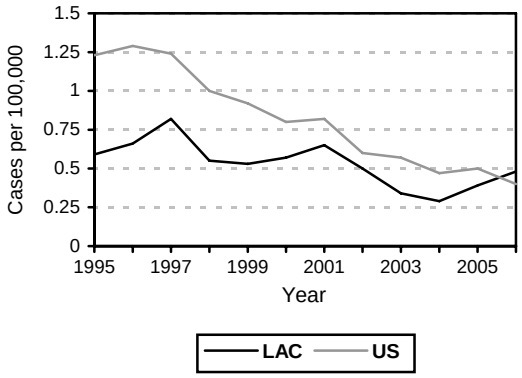
*Excludes Long Beach and Pasadena Data.

MENINGOCOCCAL DISEASE

CRUDE DATA	
Number of Cases	46
Annual Incidence[a]	
LA County	0.48
California	0.51[c]
United States[b]	0.40[c]
Age at Diagnosis	
Mean	32
Median	18.5
Range	<0–82 years

[a] Cases per 100,000 population.
[b] Based on 2005 population estimates and the Active Bacterial Core Surveillance Report.
[c] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Meningococcal Disease
Incidence Rates by Year of Onset
LAC and US, 1995–2006

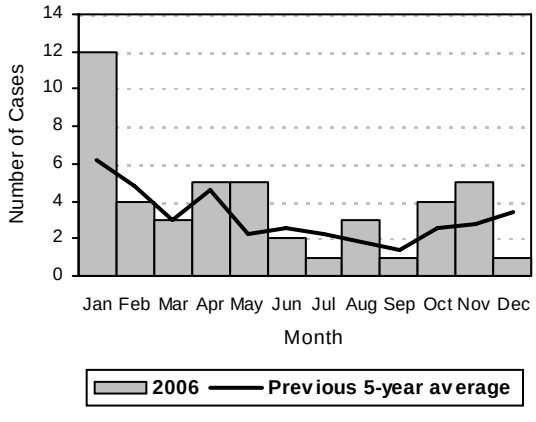


DESCRIPTION

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.

For the purpose of surveillance, the LAC DPH defines reports of invasive meningococcal disease as confirmed 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.

Figure 2
Meningococcal Disease
by Month of Onset
LAC, 2006 (N=46)



DISEASE ABSTRACT

- Confirmed invasive meningococcal disease cases increased by 24% in 2006 compared to 2005 with 46 and 37 cases reported, respectively.
- Fewer deaths were documented in 2006: one death compared to two in 2005.
- There were 38 (83%) culture-confirmed cases:

11 (29%) from CSF, 22 (58%) from blood, and 5 (13%) from both blood and CSF (Figure 5). Thirty-four (74%) cases were serogrouped: 14 were identified as serogroup B (41%), 13 serogroup C, 5 serogroup Y, and 2 untypeable.

- A cluster of two cases reported in a high school prompted mass distribution of antimicrobial prophylaxis to students and staff .

STRATIFIED DATA

Trends: The incidence of invasive meningococcal disease increased by 23% to 0.48 per 100,000 population in 2006 (N=46) from 0.39 per 100,000 in 2005 (N=37) (Figure 1). Eighty-three percent (n=38) of cases were culture-confirmed in 2006 compared to 93% in 2005. The incidence rate has been slowly increasing in LAC since 2003 and is above the national rate of 0.35 per 100,000 estimated for 2005. Despite the increase, fewer deaths were documented in 2006: one death (2%) compared to two in 2005 (5%).

Seasonality: Most cases were reported during winter and early spring (Figure 2).

Age: The incidence rates among infants <1 year increased in 2006 (2.8 versus 2.1 per 100,000) compared to 2005. The rates among 15-34 years were similar to last year (0.3 versus 0.4 per 100,000). The rate among adults 55-64 increased slightly in 2006 (0.8 versus 0.6 per 100,000).

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

Race/Ethnicity: Invasive meningococcal cases were reported most frequently in Latinos (n=28, 61%) followed by whites (n=13, 28%), blacks (n=3, 6%), and Asians (n=2, 4%). The incidence rates by race/ethnicity are noted in Figure 4.

Location: Cases were reported from all eight Service Planning Areas (SPA). The number of cases was highest in SPA 6 (n=14) and SPA 2 (n=11), followed by SPA 7 (n=6); and finally SPAs 4, 5, 8 with 4 cases each.

Figure 3
Meningococcal Disease
Incidence Rates by Age Group
LAC, 2006

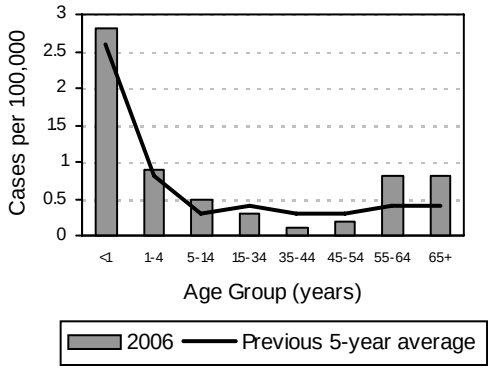
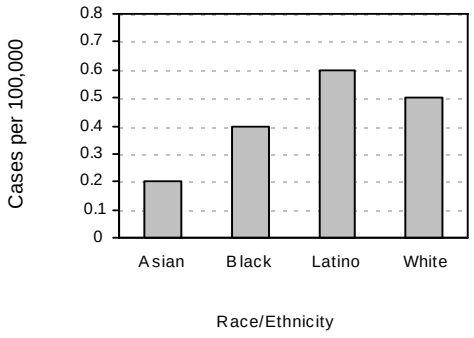


Figure 4
Meningococcal Disease
Incidence Rates by Race/Ethnicity
LAC, 2006



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) day care 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 respective health district in LAC.

In 2004, a new quadrivalent meningococcal conjugate (MCV4), Menactra®, was approved for use in the United States. 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.

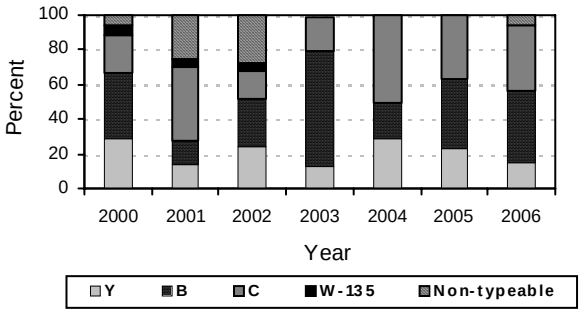
Although no noticeable changes were found with respect to the serogroup distribution of invasive meningococcal isolates from 2005 to 2006 and the introduction of MCV4 in 2004, enhanced surveillance for invasive *N. meningitidis* infections remains important (Figure 5). LAC DPH and the California Department of Health Services (CDHS) have continued to participate in 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.

An analysis of two years of statewide meningococcal surveillance data is expected to be published in the coming year.

COMMENTS

As a part of public health meningococcal disease surveillance, for every culture-confirmed case reported to DPH, clinical laboratories are requested to send isolates to the LAC Public Health Laboratory (PHL) for serotyping**.** In 2006, the LAC PHL received 34 case isolates (89% of all culture-confirmed cases) for serogroup identification. Of these, 14 (41%) were serogroup B; 13 (38%) serogroup C; and 5 (15%) serogroup Y, and 2 (6%) were not typeable (Figure 5). As in 2004 and 2005, no serogroup W-135 isolates were identified. Whereas, in 2005 of the 25 isolates that were serogrouped, 10 (40%) were serogroup B, 10 (40%) serogroup C, and 5 (20%) serogroup Y. Therefore, the distribution of serogroups did not change substantially between 2005 and 2006 (Figure 5). The mean and median ages of the vaccine preventable cases were 44.2 and 55 years, respectively, and ranged from 0–82 years. Non-vaccine preventable serogroup B cases had a mean age of 25.7, a median age of 17.5 and range of 0–56. 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.

Figure 5
Meningococcal Disease
by Serogroup
LAC, 2000–2006



Two students from the same high school in SPA 2 were reported with serogroup B meningococcal disease: one was a confirmed meningococcemia diagnosed by culture and the other a probable meningitis diagnosed by PCR. The cluster prompted to set up a point of distribution (POD) clinic at the high school where the cases attended. Antimicrobial prophylaxis was provided over a period of two days by LAC DPH to 2861 students and staff. Full details of this investigation are detailed in an accompanying 2006 Special Studies Report.

ADDITIONAL RESOURCES

CDC. Recommended immunization schedules for persons aged 0-18 years—United States, 2007. MMWR 2007; 55(51):Q1-4. Available at: www.cdc.gov/mmwr/PDF/wk/mm5551-Immunization.pdf

CDC. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, *Neisseria meningitidis*, 2005. Available at: www.cdc.gov/ncidod/dbmd/abcs/survreports/mening05.pdf.

CDC. Prevention and control of meningococcal disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005; 54(RR07):1-21. Available at: www.cdc.gov/mmwr/PDF/rr/rr5407.pdf

Meningococcal Disease Prevention Plan, Division of Communicable Disease, California Department of Health Services. Available at: www.dhs.ca.gov/ps/dcdc/disb/pdf/Meningococcal%20Plan%20Final%202003.pdf

CDC. Control and prevention of meningococcal disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000; 49(RR07):1–10. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/rr4907a1.htm

CDC. Prevention and control of meningococcal disease and meningococcal disease and college students. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2000; 49(RR07):1–10. Available at: www.cdc.gov/mmwr/PDF/rr/rr4907.pdf

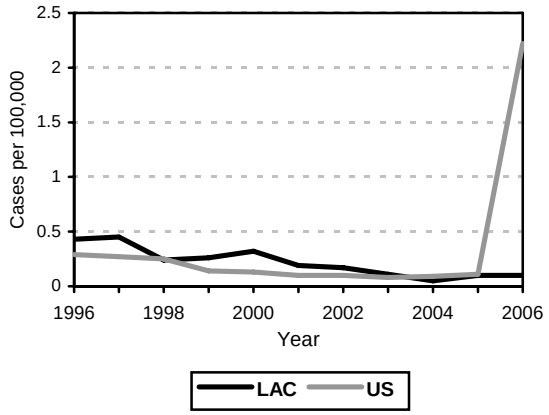
Raghunathan PL, Bernhardt SA, Rosenstein NE. Opportunities for control of meningococcal disease in the United States. Annu Rev Med 2004; 55:333-353.

MUMPS

CRUDE DATA	
Number of Cases	10
Annual Incidence[a]	
LA County	0.10[b]
California	0.06
United States	2.22[c]
Age at Diagnosis	
Mean	31.5 years
Median	32.0 years
Range	3.0 – 56.0 years

[a] Cases per 100,000 population.
[b] Rates based on less than 19 observations are unreliable.
[c] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

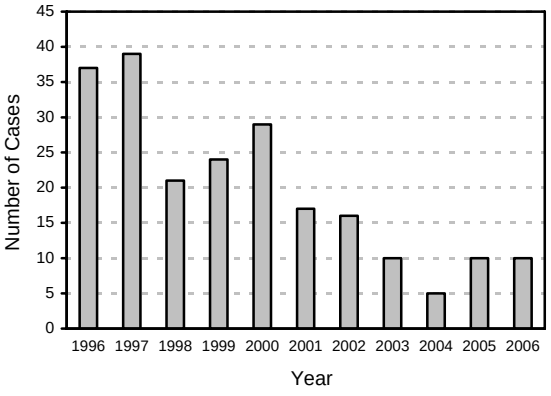
Figure 1
Mumps
Incidence Rates by Year of Onset
LAC and US, 1996-2006



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.

Figure 2
Mumps
Cases by Year of Onset
LAC, 1996-2006



DISEASE ABSTRACT

- Greater media attention and public awareness of mumps following the multi-state mumps outbreak in the Midwest in 2006 resulted in twice as many suspect mumps reports compared to 2005.
- Of 103 suspect mumps reports received at the LAC Immunization Program during 2006, only 10 were identified as confirmed mumps cases.
- During 2006, there were 21 reported cases in CA, of which 48% were reported in LAC.

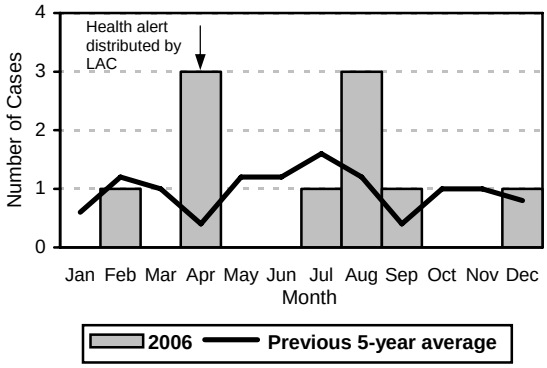
IMMUNIZATION RECOMMENDATIONS

- Two doses of mumps-containing vaccine, usually given as Measles-Mumps-Rubella (MMR), are normally recommended to achieve immunity. 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 who have no prior MMR, particularly if they are in a high-risk setting.
- Approximately 90% of those who receive two doses of the current live attenuated mumps vaccine develop immunity.
- Generally, persons can be considered immune to mumps if they were born before 1957, have serologic evidence of mumps immunity, have documentation of physician-diagnosed mumps, or have documentation of vaccination with at least one dose of live mumps vaccine on or after their first birthday.
- Women should not become pregnant within 4 weeks of vaccination.
- Individuals who are severely immunocompromised for any reason should not be given MMR vaccine.

STRATIFIED DATA

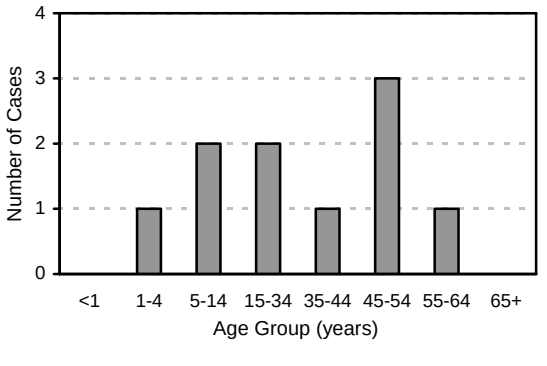
Trends: Since 1995, the annual number of cases of mumps has decreased by 76% (Figure 2). This decline reflects the effectiveness of the MMR vaccine in reducing the incidence of disease in the general population. The 2006 multi-state mumps outbreak in the Midwest area of the United States resulted in greater media attention and general public awareness of mumps. In LAC, twice as many suspect cases were reported in 2006 (n=103) compared to 2005 (n=50). Among the 103 suspect cases, 10 were identified as confirmed and 63 as probable cases. However, it should be noted that vaccination history and negative lab results were considered noncontributory in 2006 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 this year would have been classified as false in previous years because they had documentation of 2 doses of MMR vaccine and/or negative lab results.

Figure 3
Mumps
Cases by Month of Onset
LAC, 2006



Seasonality: Historically, mumps incidence peaks during the winter and spring seasons. However, mumps cases have been reported throughout the year. In 2006, cases occurred throughout the year with peaks in April (n=3) and August (n=3). The summer months of July, August, and September accounted for 50% (n=5) of confirmed cases (Figure 3). The first MMWR report on the Iowa outbreak occurred in late March. LAC followed up with a health alert in early April subsequently increasing the number of suspect mumps reports.

Figure 4
Mumps
Cases by Age Group
LAC, 2006



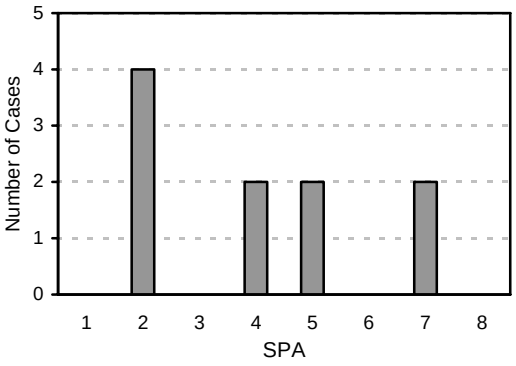
Age: Similar to previous years, 70% (n=7) of all confirmed cases in 2006 were in persons over the age of 15 (Figure 4). Children and young adults are more likely to have been fully immunized.

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

Race/Ethnicity: More than half of the confirmed mumps cases occurred among non-Latinos. There were 4 white cases, 3 Hispanic cases, 2 Asian cases, and 1 as unspecified race/ethnicity (data now shown).

Location: Confirmed cases were reported in four of the eight SPAs (Figure 5). Four of the cases (40%) resided in San Fernando Valley (SPA 2). Metro (SPA 4), West (SPA 5), and East (SPA 7) reported two cases each. None of the cases was epidemiologically linked to another 2006 case, although there were cases linked to 2007 cases (details in the Comments section below).

Figure 5
Mumps
Cases by Service Planning Area
LAC, 2006



COMMENTS

During January to October 2006, more than 5,700 mumps cases were reported in the United States, including more than 2,500 cases from the multi-state outbreak in the Midwest area. The predominant age group affected in the Midwest outbreak was the 18-24 year age group; a high proportion of whom were college students. The close-contact environment of college dormitories may have facilitated transmission of the mumps virus. The Midwest outbreak had a profound impact on mumps surveillance nationwide. On April 7, the Immunization Program released a health alert urging Los Angeles County healthcare providers to be vigilant about mumps. Greater media attention and general public awareness also increased the number of mumps reports. Vaccine efficacy was reevaluated, the case definition was slightly revised, and laboratory test guidelines were revised.

The efficacy of the mumps component of the MMR vaccine was reevaluated. Efficacy was estimated to be approximately 80% after one dose and approximately 90% after two doses. Thus, individuals who received 2 doses may still be susceptible to mumps. In the United States, where mumps vaccination coverage is high, most mumps cases will likely occur in persons who have received 2 doses [1].

In April 2006, the California Department of Health Services (CDHS) updated mumps surveillance guidelines and specimen collection guidelines for mumps virus testing. In addition, a mumps case report form was created and introduced for use in reporting probable and confirmed mumps cases to the state. Most notably, the CDHS also changed the classification of mumps cases. Prior to 2006, suspect mumps cases that received 2 doses of MMR vaccine were classified as false cases (regardless of clinical symptoms). In 2006, a suspect mumps case that met the clinical case definition (regardless of MMR vaccination history), is not laboratory-confirmed, and is not epidemiologically-linked to another probable or confirmed case was classified as a probable mumps case.

The value of mumps serological testing in previously vaccinated individuals was also questioned. In vaccinated individuals, the IgM response is highly variable and may be absent. In addition, it may not be possible to observe a 4-fold rise between acute and convalescent IgG titers. Thus, it was determined that a negative lab result, especially in previously vaccinated individuals, did not rule out mumps. Urine cultures were also no longer recommended because of lack of sensitivity. There are concerns with relying only on clinical classification of a mumps case. A clinical diagnosis of mumps may be unreliable since agents other than the mumps virus can cause parotitis. Parotitis can also be caused by 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. As a result of the new case definition and laboratory test guidelines, a large number of suspect cases that would have been classified as false prior to 2006 were classified as probable in 2006.

Cluster Identification: None of the confirmed cases in 2006 were epidemiologically linked to each other. One case was linked to a 2005 case. Another case was exposed in the Phillipines and was subsequently linked to two cases with onset in 2007. None of the cases reported traveling to the states involved in the Midwest outbreak.

Vaccination Status: Only two of the confirmed cases were fully immunized with 2 doses of MMR vaccine. One case (age 3) had received 1 dose of MMR vaccine but was up-to-date for his age. The remaining 7 cases did not know or remember their vaccination status.

Laboratory Confirmation: Ninety percent (n=9) of the confirmed cases had supporting laboratory confirmation. One case was epidemiologically linked to a 2007 lab-confirmed case in another state.

REFERENCE

1. CDC. Brief report: update: mumps activity--United States, January 1–October 7, 2006. MMWR 2006; 55(42):1152-1153.

ADDITIONAL RESOURCES

Additional information is available at:

- National Immunization Program – www.cdc.gov/vaccines
- Immunization Action Coalition – www.immunize.org
- LAC Immunization Program – www.lapublichealth.org/ip

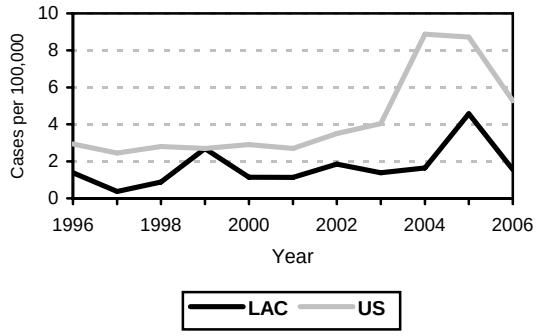
PERTUSSIS (WHOOPING COUGH)

CRUDE DATA	
Number of Cases	150
Annual Incidence[a]	
LA County	1.56
California	4.43
United States	5.27[b]
Age at Diagnosis	
Mean	13.6 years
Median	6.0 years
Range	8 days–89 years

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Pertussis
Incidence Rates by Year of Onset
LAC and US, 1996-2006

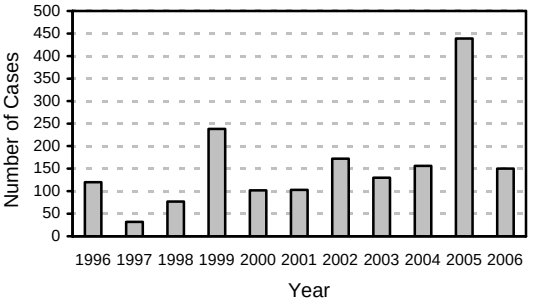


DESCRIPTION

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 *B. pertussis* culture or PCR.

Figure 2
Pertussis
Cases by Year of Onset
LAC, 1996-2006



DISEASE ABSTRACT

- Following a record-high of 438 cases in 2005, 150 cases were reported in 2006, which is similar to pre-2005 baseline levels.
- Preceding their illness, less than half of the cases in 2006 indicated contact to a person who had a prolonged cough.
- Of the 2006 cases that could have been fully immunized and protected against pertussis, approximately one fourth were not adequately immunized.

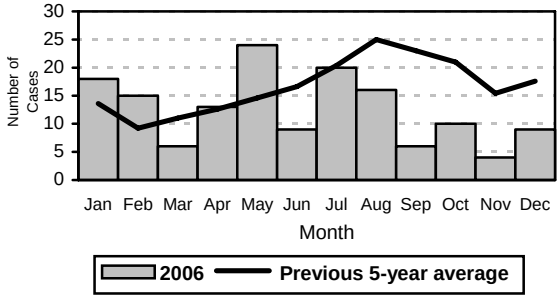
IMMUNIZATION RECOMMENDATIONS

- A pertussis-containing vaccine should be administered at 2 months, 4 months, 6 months, 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

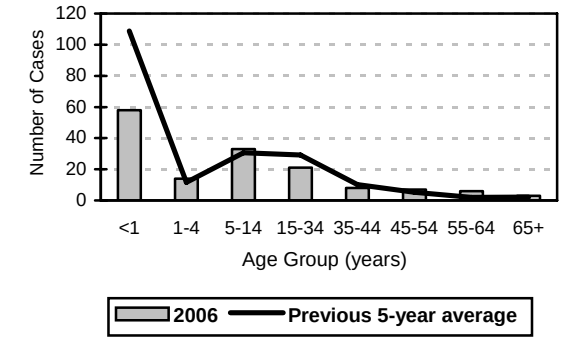
Seasonality: Following the record-high number of cases reported in 2005, a higher number of cases were reported during the first 5 months of 2006 compared to the previous five-year average. The number of cases peaked in May, which accounted for 16% (n=24) of cases. (Note: The only LAC pertussis outbreak in 2006 occurred in May and involved 4 cases.) From June to December, the number of 2006 cases was lower than the previous five-year average during this same time period. Typically, the summer months have the highest pertussis incidence in LAC. In 2006, 46% (n=69) of reported cases had disease onset during the months of May, June, July, and August. (Figure 3)

Figure 3
Pertussis
Cases by Month of Onset
LAC, 2006



Age: Although the majority of reported cases are still in children less than one year of age, the proportion of cases in the <1 age group is smaller in 2006 (39%) compared to the previous five year average (54%). As expected, cases are increasing among adolescents and adults, as evidenced by the fact that 30% (n=45) of the cases were over 14 years of age (Figure 4) in 2006 compared to an average of 24% (n=49) in the previous five years. Increased recognition and diagnosis of pertussis in older age groups has contributed to the increase in reported cases among adolescents and adults.

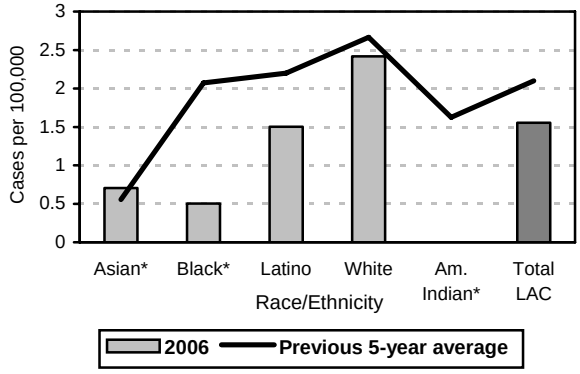
Figure 4
Pertussis
Cases by Age Group
LAC, 2006



Sex: The male-to-female case ratio was approximately 1:1.6.

Race/Ethnicity: After adjusting for the age differential in the cases, incidence rates in 2006 for blacks, Latinos, 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. Only whites had a higher incidence rate than the total LAC rate. The incidence rate for Latinos was approximately equivalent to the total LAC rate. However, the LAC population proportion of whites (30%) is much lower than that for Latinos (48%).

Figure 5
Pertussis
Age-Adjusted Incidence Rates by
Race/Ethnicity
LAC, 2006



*Rates unreliable due to small number of observations.

Location: For the second year in a row, Antelope Valley (SPA 1) had the highest incidence rate of 3.5 cases per 100,000 (n=12). Of the 12 cases reported in SPA 1, 42% (n=5) were epidemiologically linked to cases living within two households. The second highest incidence rate occurred in East (SPA 7) with 2.0 cases per 100,000 (n=27), followed by West (SPA 5) with 1.7 cases per 100,000 (n=11), South (SPA 6) with 1.6 cases per 100,000 (n=17),

San Fernando Valley (SPA 2) with 1.5 cases per 100,000 (n=32), South Bay (SPA 8) with 1.4 cases per 100,000 (n=16), San Gabriel Valley (SPA 3) with 1.2 cases per 100,000 (n=21), and Metro (SPA 4) with 1.1 cases per 100,000 (n=14).

At the health district level, Bellflower (n=13) and Antelope Valley (n=12) had the highest incidence rates, each reporting 3.5 cases per 100,000. Compton had 2.7 cases per 100,000 (n=8), followed by Harbor with 2.4 cases per 100,000 (n=5). The lowest incidences rates were in El Monte and Inglewood health districts, each reporting only 1 case and an incidence rate of 0.2 cases per 100,000.

COMMENTS

In 2005, two Tdap vaccines were newly licensed for use in adolescents and adults. The Immunization Program conducted multiple intervention activities (*i.e.*, health alerts, fact sheets, a symposium) to increase the community's awareness of pertussis cases in individuals of all ages. In addition, LAC experienced a significantly high incidence rate of 4.5 cases per 100,000, which was consistent with similar increases throughout California and the United States. It was also observed that more cases were being reported among adolescents and adults. Whether the increase in pertussis incidence represented a true increase in disease or improved recognition and reporting remains unclear.

During 2006, the Immunization Program continued to promote the Tdap vaccines. Because they have yet to be provided to the population at large, data on the impact of the vaccines is not yet available. No county-wide pertussis-specific intervention activities were conducted. The only outbreak of pertussis occurred at a local university where four epidemiologically-linked cases were identified, prompting the health district to conduct a Tdap vaccination clinic in which 201 faculty and students were vaccinated. Although the 2006 incidence rate in LAC decreased to pre-2005 baseline levels (1.56 cases per 100,000), adolescents and adults now comprise a larger proportion of cases. As discussed previously in this report, infants less than one year of age no longer make up the overwhelming majority of cases. However, infants still account for the majority of complications/hospitalizations. The only fatal case in 2006 occurred in an infant less than 2 months of age. Thus, in order to protect the population at large, it is critical that high DTaP and Tdap coverage rates are achieved in LAC.

Trends: Pertussis incidence normally peaks every 3 to 5 years. Between 1990 and 1999, there was an annual average of 101 cases reported, with the highest incidence occurring in 1999 (n=238). During 2000-2004, an annual average of 133 cases was reported, with the highest incidence occurring in 2002 (n=172). In 2005, 439 cases were reported, which was the highest number of cases reported in more than 35 years. In 2006, 150 cases were reported, which is comparable to pre-2005 baseline levels.

Laboratory Confirmation: More than half of the reported cases (55%, n=83) were not laboratory confirmed by either *B. pertussis* culture or PCR.

Vaccination Status: Less than one fifth of cases (14%, n=21) were younger than two months of age and were too young to receive pertussis vaccine. About 43% (n=65) of cases were 10 years of age or older; so even if they were fully immunized in early childhood, they would not have had complete immunity against pertussis in 2006 and would thus be eligible for Tdap vaccine.

Approximately 23% (n=35) of cases were between 2–6 months of age. Of these, 80% (n=28) were up-to-date with pertussis vaccination for their age, but would not have developed full immunity against pertussis. Of the 29 children who could have had full immunity from vaccination (7 months to 9 years old), 21 (72%) 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 37% (n=55) were hospitalized, with an average hospital stay of 7 days (range 1-24 days). Among the hospitalized cases, 85% (n=47) were less than one year of age. Of the 15 cases who developed pneumonia, 8 (53%) were infants less than 1 year of age. One of the 15 cases with pneumonia, a child in the 1-4 year age group, also developed seizures. One additional case in the 1-4 year age group developed seizures.

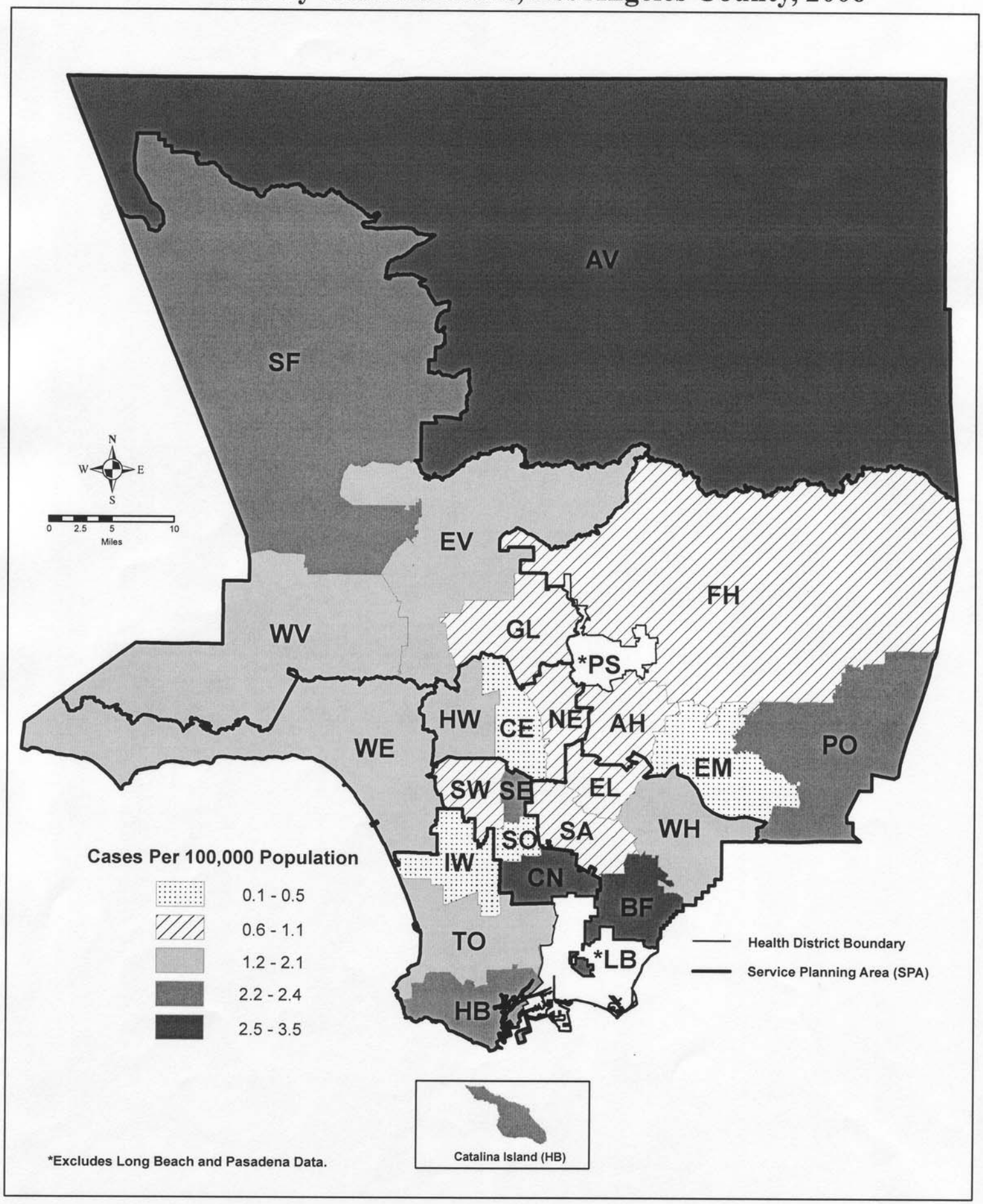
Case Fatalities: There was one pertussis-related death in 2006. The fatality occurred in a Hispanic female infant who was less than 2 months of age and was too young to receive pertussis vaccine. The principal diagnosis in the discharge/death summary was caradiorespiratory failure. The female infant died 6 days after cough onset and a PCR test detected *Bordetella* pertussis DNA. The infant was exposed to her twin brother whose cough onset was 3 weeks prior. Earlier consideration of pertussis for the brother would have initiated the administration of appropriate chemoprophylaxis to close contacts. Disease and death may have been prevented in this female infant.

ADDITIONAL RESOURCES

Additional information is available at:

- National Immunization Program – www.cdc.gov/vaccines
- Immunization Action Coalition – www.immunize.org
- LAC Immunization Program – www.lapublichealth.org/ip

Map 9. Pertussis
Rates by Health District, Los Angeles County, 2006*



*Excludes Long Beach and Pasadena Data.

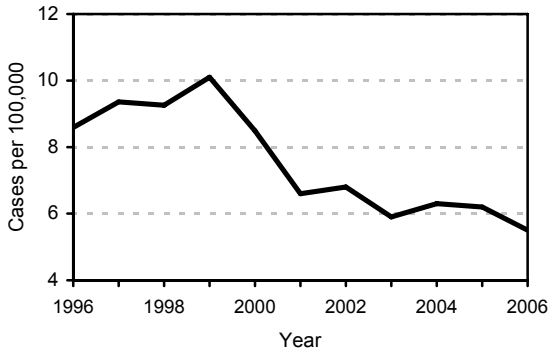
PNEUMOCOCCAL DISEASE, INVASIVE

CRUDE DATA	
Number of Cases	533
Annual Incidence[a]	
LA County	5.5
United States	14.0[b]
Age at Diagnosis	
Mean	52
Median	56
Range	0–101 years

[a] Cases per 100,000 population.

[b] National projection of IPD incidence from Active Bacterial Core Surveillance areas data, 2005 [1].

Figure 1
Invasive Pneumococcal Disease
Incidence Rates by Year of Culture
LAC, 1996–2006



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 determined 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 one of the most common bacterial causes 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 decreased in LAC in 2006.
- There was no change in the overall percentage of penicillin nonsusceptible infections. However, an increase was observed in the 45-64 years age group while all other age groups remained approximately equal or decreased from 2005 (Figure 3).
- The highest incidence of IPD continued to be among blacks—the incidence rate of this group was at least twice as high as that of whites or Latinos (Figure 4).

STRATIFIED DATA

Trends: IPD occurred at an incidence rate of 5.5 per 100,000 in 2006 (N=533), a decrease from the previous year (6.2 per 100,000, N=590) (Figure 1).

Seasonality: The seasonal trend in 2006 followed the typical peak for IPD in the winter months, dropping in the spring and summer months (Figure 2).

Sex: The male-to-female rate ratio was 1.1:1. Males had a slightly higher incidence than females (6 vs. 5 cases per 100,000).

Age: The age of IPD cases ranged from birth to 101 years old with a mean of 52 years and median of 56 years. Compared to previous years, the incidence greatly decreased in children <1 year and in persons older than 65 years. A slight decrease was also observed in the 1-4 year age group. The distribution of incidence across the remaining age groups in 2006 remained similar to previous years (Figure 3).

Race/Ethnicity: The highest incidence of IPD occurred among blacks. With an incidence of 10.2 per 100,000, this rate was at least twice as high as that of whites or Latinos (Figure 4).

Disease Severity: During 2006, hospitalization status was known for 80% of the cases. Of these, 94% were hospitalized. Hospitalization was more frequent in cases older than 65 years (98%) and occurred less in children aged less than 5 years (78%). The overall case fatality was 14%, slightly higher than the national case fatality (11%) [1]. Most deaths occurred among adults 65 years and older (43% [n=16]); however, the 45–64 age group followed closely at 32% (n=12).

Antibiotic Susceptibility: Since 2004, there has been an increasing proportion of isolates nonsusceptible to trimethoprim-sulfamethoxazole (TMP-SMZ), increasing to 25% in 2006 (n=37). The percent of isolates nonsusceptible to penicillin and erythromycin remained the same as 2005, while cefotaxime increased (Figure 5). Almost all reported cases had antibiotic resistance information provided (95%).

Figure 2
IPD Cases By Month of Culture
LAC, 2006

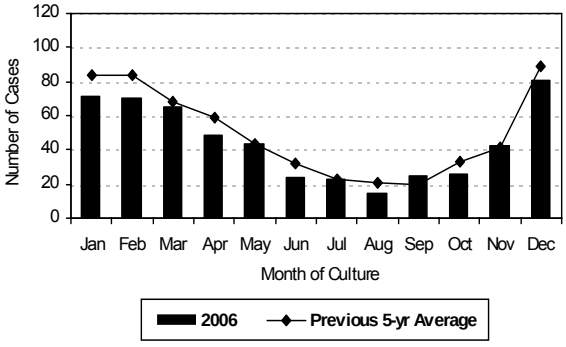


Figure 3
Incidence Rates of IPD Cases by Age
LAC, 2004-2006

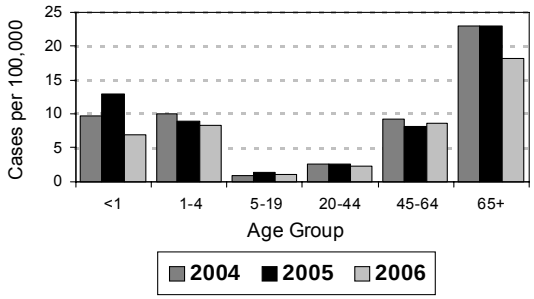
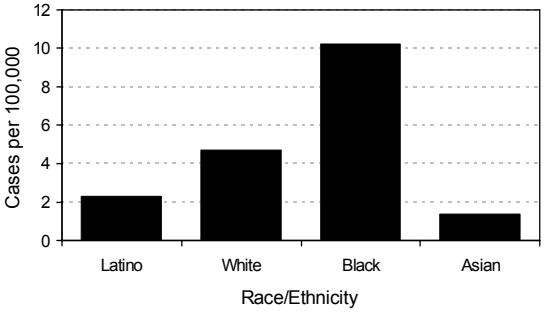


Figure 4
Incidence Rates of IPD Cases by Race/Ethnicity
LAC, 2006



The proportion of cases with penicillin nonsusceptible *S. pneumoniae* (PNSP) isolates decreased or remained the same in almost all age groups except in cases aged 45 to 64 years. In this age group there has been an increasing trend of greater nonsusceptibility to penicillin since 2004.

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 less than age 2 years, and for children up to age 5 years who are 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 over age 2 years who are at high risk of invasive pneumococcal disease. For children aged 2 to 5 years who are at high risk of invasive pneumococcal infections, ACIP recommends 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 [2].

Figure 5
IPD Isolates Nonsusceptible to Selected Antimicrobial Agents
LAC, 2004–2006

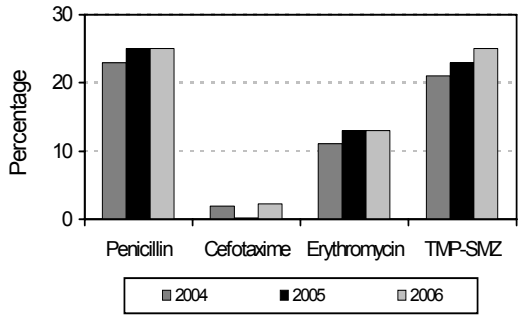
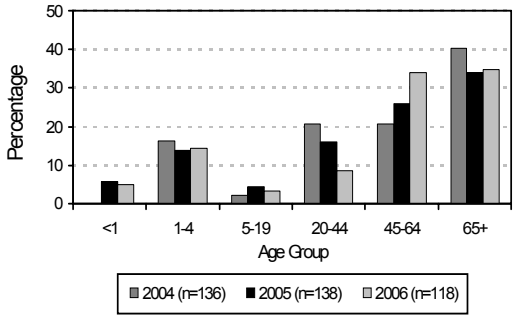


Figure 6
PNSP Isolates by Age
LAC, 2004–2006



COMMENTS

LAC experienced a decline of IPD in 2006, especially in those aged less than one year or older than 65 years. Though the overall proportion of PNSP isolates remained the same as 2005 (25%), a 30% increase of PNSP was observed in the 45 to 64 years age group, making it nearly equal to the proportion of PNSP isolates in the 65 years and older age group.

Incidence of IPD in blacks is over two times the incidence in whites or Latinos in LAC. The ratio of black-white incidence is similar to that found nationally; however, the incidence is much lower for both whites and blacks, which are 12 and 25 per 100,000 in the national population, respectively [1]. Interestingly, black IPD cases were more likely to be female (52%) and aged between 45 and 64 years (53%) when compared to non-blacks (45% female and 32% aged 45-64 years). Studies have indicated that the difference in incidence among blacks is associated with rates of breastfeeding, attendance in daycare, and underlying infections such as HIV [3].

Laboratories are the source for many of the IPD case reports to ACDC: 58% of cases were reported by laboratories only. Much of the limitations in the data are due to the minimal access that laboratories have to patient information. Race/ethnicity data and outcome status, in particular, are often missing from laboratory reported cases. Only 65% of case reports contained race/ethnicity data and 49% 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.

REFERENCES

1. Active Bacterial Core Surveillance Reports from 1997 to 2005 from the CDC's Division of Bacterial and Mycotic Diseases. Report available at: www.cdc.gov/ncidod/dbmd/abcs/survreports.htm
2. CDC. Prevention of pneumococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997; 46(RR08):1–24.
3. Flannery B, Schrag S, Bennett NM, et al. Impact of childhood vaccination on racial disparities in invasive Streptococcus pneumoniae infections. JAMA 2004; 291(18):2197-2203.

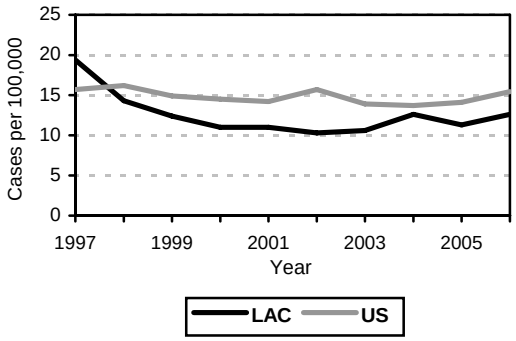
SALMONELLOSIS

CRUDE DATA	
Number of Cases	1217
Annual Incidence[a]	
LA County	12.6
California	13.67[b]
United States	15.45[b]
Age at Diagnosis	
Mean	27.7
Median	22
Range	<1-95

[a] **Cases per 100,000 population.**

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR **(56:853-863).**

Figure 1
Salmonellosis
Incidence Rates by Year
LAC and US, 1997–2006



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 2006 salmonellosis crude rate increased 11.5% when compared to 2005 (Figure1). This rate continues to remain below both the state and national rates.
- *Salmonella* serotype *enteritidis* was again the most common serotype in 2006. However, the percent of change was a decrease of 9.1 % due to a decrease in the total number of isolates (Table 1).
- Nine outbreaks were investigated in 2006, compared to four in 2005.
- SPA 5 continues to have the highest rate (16.3 per 100,000) of salmonellosis during 2006.

STRATIFIED DATA

Trends: The rate of salmonellosis cases for LAC in 2006 was 12.6 cases per 100,000 population, an 11.5% increase from the 2005 rate of 11.3 but similar to the 2004 rate of 12.6 (Figure 1). This rate remains below the national rate. Reasons for this increase are unknown but may be due to increases in the black and Asian population groups and an increase in the number of outbreaks investigated in 2006. 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 2006 rate decreases to 12.3 per 100,000 population.

Salmonella Serotypes: For the third year, *S*. e*nteritidis* was the number one serotype, however, the incidence has decreased to 26.9% of total isolates serotyped.

Table 1. Most Frequent *Salmonella* Serotypes—LAC, 2005–2006

Serotype	2005 (N=1,032)*		2006 (N=1,217)*		
	No.	Percent	No.	Percent	%Change
Enteritidis	306	29.6	328	26.9	-9.1
Typhimurium**	150	14.6	173	14.2	-2.7
Newport	60	5.8	76	6.2	+7.4
Heidelberg	47	4.5	49	4.0	-11.6
I 4,5,12:i:-	32	3.1	48	3.9	+25.8
Montevideo	16	1.5	47	3.8	+149.0
Oranienburg	24	2.3	27	2.2	-4.6
Stanley	7	0.7	27	2.2	+227.0
Braenderup	22	2.1	23	1.9	-11.3
Infantis	11	1.1	23	1.9	+77.3
Mbandaka	16	1.5	23	1.9	+21.9

* Includes only serotyped isolates. (Eight cases for 2005 had two different serotypes of *Salmonella*)
** Includes *S.* Typhimurium var. Copenhagen.

Seasonality: In 2006, incidence again peaked in July (Figure 2) and was again dramatically greater than the five-year average. Incidence was also greater than the five-year average for the months of June, August, October, November and December. There were outbreaks recorded for the months of June, July, August, October and December (Table 2).

Age: As shown in Figure 3, the highest age group rates of infection occurred among infants aged less than one year (69.0 per 100,000 population) followed by children aged 1–4 years (38.1 per 100,000 population). This is typical for salmonellosis. The rate for all age groups except adults aged 35-44 years is higher than the five-year average.

Hospitalized: In 2006, 19% of cases were hospitalized for more than 24 hours, compared to 23.0% in 2005. Ages ranged from less than 1 year to 95 years. The average age of the hospitalized patient was 39.7 years and the median age was 39 years.

Sex: The male-to-female rate ratio was 1:1.06.

Figure 2
Salmonellosis
Cases by Month of Onset
LAC, 2006

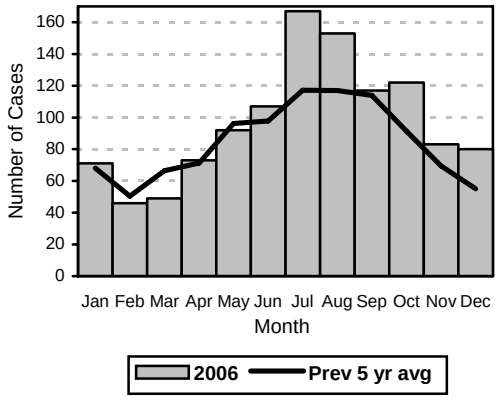
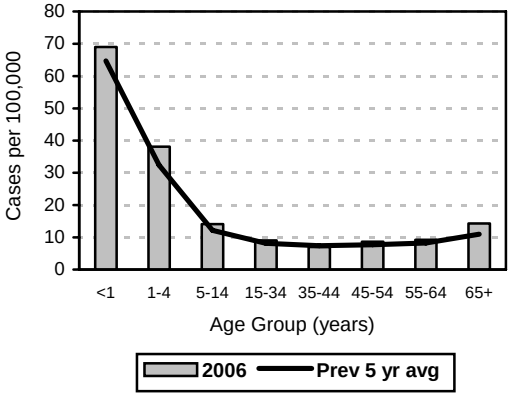


Figure 3
Salmonellosis
Incidence Rates by Age Group
LAC, 2006



Race/Ethnicity: Again, the highest age-adjusted rate was among whites (13.7 per 100,000 population), followed by Latinos (13.1 per 100,000 population) then Asians (12.9 per 100,000 population), and blacks (11.8 per 100,000 population, Figure 4). The rate for whites was lower than 2005 (15.4 per 100,000). The rates for Latinos, Asians and blacks were higher than 2005 (10.3, 9.1 and 8.9 per 100,000, respectively). This may be due to high numbers of family clusters in these populations and outbreaks that involved primarily Latino, Asian and black cases.

Location: East Los Angeles District in SPA 4had the highest district rate with 21.8 cases per 100,000. The lowest district rate was in El Monte Health District (SPA 3) with 5.7 cases per 100,000. Of all SPAs, SPA 5 again had the highest rate with 16.0 cases per 100,000. SPA 1 again had the lowest rate at 9.5 cases per 100,000 (Figure 5). All SPAs had an increase in rate with the exception of SPA 8. No single SPA had a rate significantly higher or lower than LAC average.

Figure 4
Salmonellosis
Age-Adjusted Rates by
Race/Ethnicity
LAC, 2005–2006

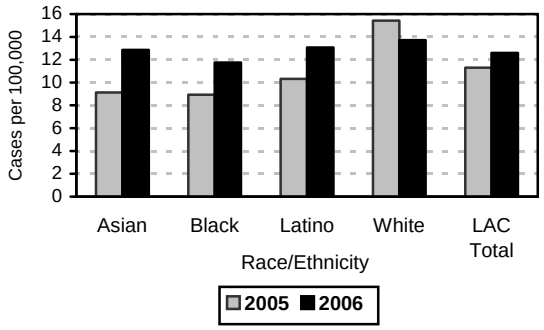


Figure 5
Salmonellosis
Incidence Rates by
Service Planning Area
LAC, 2006

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.

Health education targeted at specific high-risk groups is an ongoing necessity; for example, 26.4% of the salmonellosis cases in 2006 were in the infant through four-year age group. This age group has consistently been the highest risk group for LAC since 1982. When cases occur, District Public Health Nurses should educate parents and teachers in preschools and day care facilities. Emphasis is on the following:

- Washing hands for parents, teachers and preschoolers;
- Proper preparation of foods and formula for this age group; cross contamination is a common risk;
- Proper handling and cooking of uncooked meat, poultry and fish to prevent cross contamination;
- Keeping kitchen and utensils clean and preventing cross contamination;
- Avoiding reptile pets in the home, preschool and child care facilities and;
- Avoiding other pets that may carry *Salmonella*, such as baby chicks or ducklings.

Table 2. Salmonellosis Outbreaks in LAC, 2006

Onset Month	Outbreak Setting	Total # Ill	Culture Positive	Serotype	Suspect Vehicle	Suspect Source
January	Day care	7	6	*S. stanley*	Person-to-person	Probable reptile source with secondary transmission
March	Restaurant	4	4	*S. oranienburg*	Unknown food vehicle	Unknown food source
June	Banquet hall	20	3	*S. typhimurium*	Chicken skewers	Chicken
July	Staff party at bakery	5	5	*S. heidelberg*	Milkshake	Raw shell egg
August	Assisted living facility	2	2	*S. agona*	Unknown	Probable secondary transmission
September	Restaurant	3	2	*S. typhimurium var copenhagen*	Unknown food vehicle	Unknown food source
October	Health facility	2	2	*S. hiduddify*	Unknown	Probable reptile source with secondary transmission
October	Skilled nursing facility	2	2	*S. thompson*	Unknown	Probable secondary transmission
December	Banquet hall	7	4	*S. enteritidis*	Potato appetizer	Unknown ingredient
TOTAL		**52**	**30**			

COMMENTS

After a peak in 1994, starting in 1995 through 2000, a steady decline occurred in the LAC rate of salmonellosis. The LAC rate in 2004 had increased, but then adjusted down again in 2005 (Figure 2). The rate has again increased to a rate similar to 2004. Continued surveillance is necessary to determine trends.

Travel was noted as a risk factor for 16.8% of cases (n=204); 33% traveled domestically. Of those who traveled outside of the United States, 57% (n=77) traveled to Mexico. Exposure to a reptile was reported as a risk factor for 8.6% (n=104) of cases.

There were nine salmonellosis outbreaks during 2006 compared to four identified in 2005. Two outbreaks were serotype Typhimurium or a variation of that serotype, the others involved multiple serotypes (Table 2). Outbreak-related cases (both confirmed and presumptive) made up 4.3% of total cases in 2006 compared to 3.5% of total cases in 2005. This year *Salmonella enteritidis*, the predominant serotype for 2006, was found to be the cause for only one outbreak with a total of seven cases. Three of the nine salmonellosis outbreak investigations cited restaurant or catered food as a source. One investigation cited a drink made with raw shell eggs as a source for a group of employees at a bakery. The use of PFGE and comparison of PFGE patterns with other laboratories through PulseNet, the national molecular subtyping network for foodborne disease, continues to help identify potentially related clusters within LAC.

Salmonellosis was reported as a contributing cause of death in eight people, all of whom had underlying health problems such as cancer, immune deficiency, chronic tuberculosis, and chronic liver disease. Ages of these individuals ranged from 1 to 84 years.

ADDITIONAL RESOURCES

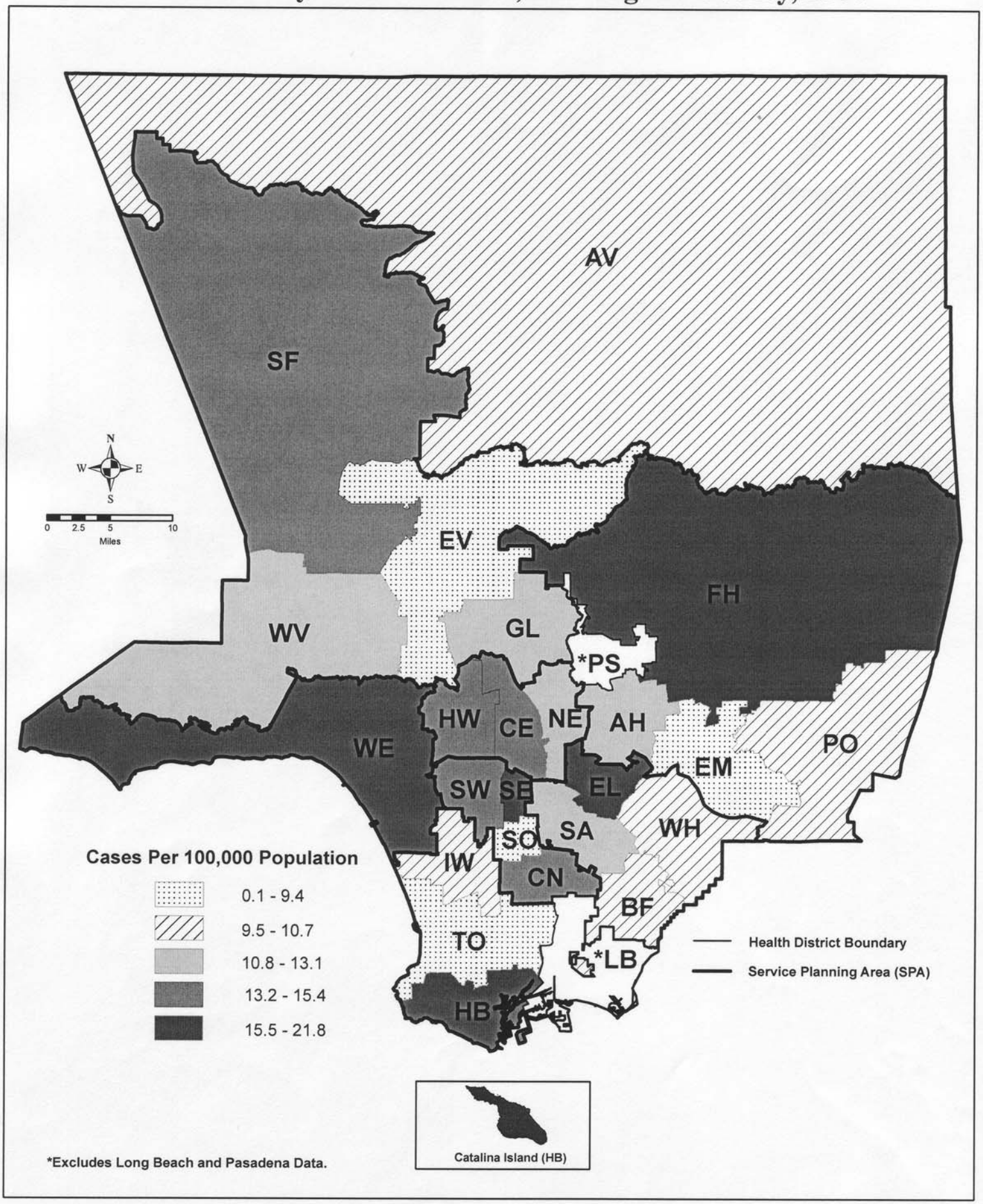
General information about salmonellosis is available at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/salmonellosis_g.htm

General information and reporting information about this and foodborne diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

CDC. Reptile-associated salmonellosis--selected states 1998-2002. MMWR 2003; 52(49):1206-1209.

CDC. Salmonellosis associated with pet turtles--Wisconsin and Wyoming, 2004. MMWR 2005; 54(9):223-226.

Map 10. Salmonellosis
Rates by Health District, Los Angeles County, 2006*



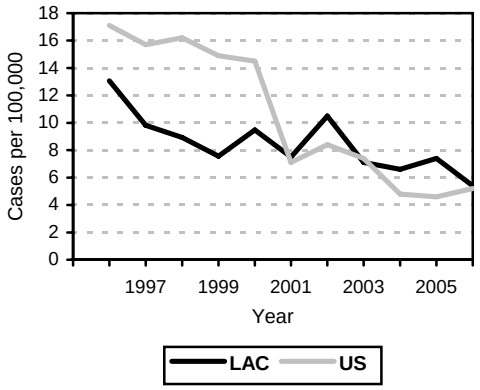
SHIGELLOSIS

CRUDE DATA	
Number of Cases	524
Annual Incidence[a]	
LA County	5.4
California	5.18[b]
United States	5.23[b]
Age at Diagnosis	
Mean	23.3
Median	18
Range	<1– 98

[a] Cases per 100,000 population.

[b] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

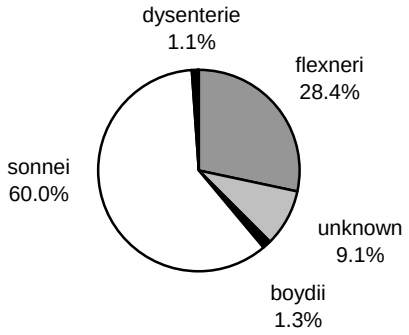
Figure 1
Shigellosis
Incidence Rates by Year of Onset
LAC and US, 1996–2006



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, 2006
(N=524)



DISEASE ABSTRACT

- There was a 35.5% decrease in reported cases in 2006.
- Two shigellosis-associated outbreaks were investigated in 2006.

STRATIFIED DATA

Trends: There was a 35.5% decrease in the number of cases during 2006. This is lowest rate in over twenty years. The LAC rate had been decreasing since a peak in 2002 (Figure 1), before peaking again in 2005. Although the 2006 rate may be an adjustment from the 2005 increase, continued surveillance is needed to identify an emerging trend.

Serotypes: In 2006, *S. flexneri* (n=149; 28.4%) represented a larger percentage than 2005 (n=122; 17.2%). *S. sonnei* remains the dominant serotype (n=315; 60%). Other serotypes identified during 2006 include: *S. boydii* (n=7) and *S. dysenterie* (n=6) (Figure 2).

Seasonality: In 2006, incidence peaked in August and stayed at or below the five-year average through the entire year (Figure 3). There were nine family clusters during the month of August. The rate of travel related cases that occurred from July through September decreased to 48% as compared to 60% in 2005.

Age: Children aged 1–4 years (20.3 per 100,000) and 5-14 (9.1 per 100,000) again had the highest rates; however, these rates were lower than the previous five-year average. The rate for children aged 1-4 years was significantly higher than all other age groups. Adults 65 years and older were the only age group to have a rate higher than the five-year average (Figure 4). This rate was still significantly lower than the county average.

Race/Ethnicity: During 2006, Latinos aged 1–4 years again had the highest age-adjusted rate (Figure 5). For the fourth year, Latino infants and children aged 5–14 had higher age adjusted rates compared to other race/ethnicities. This year, Latinos aged 65 years and older also 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 Latinos may be possible causes. Blacks adults aged 45-55 years, had a higher rate than other ethnicity. All but one case among Latinos were male; of these male cases one self-reported as MSM and the others refused to disclose their sexual orientation.

Sex: The male-to-female rate ratio was 1.1:1. Men are still the preponderant group as reflected in the 2006 ratio.

Location: The rates for SPA 6 (10.2 per 100,000) and SPA 4 (8.2 per 100,000) were significantly higher than the county average (5.45 per 100,000). The increase in SPA 6 is consistent with previous years and may be due to changing demographics in that location. The two outbreaks involved cases from SPAs 3, 4, 5, and 6. The majority of MSM cases (66%) were seen in SPA 4.

Figure 3
Shigellosis
Cases by Month of Onset
LAC, 2006

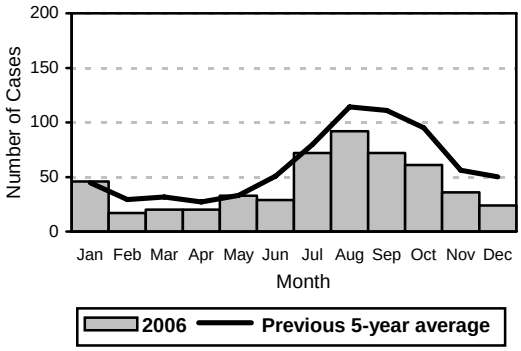


Figure 4
Shigellosis
Incidence Rates by Age Group
LAC, 2006

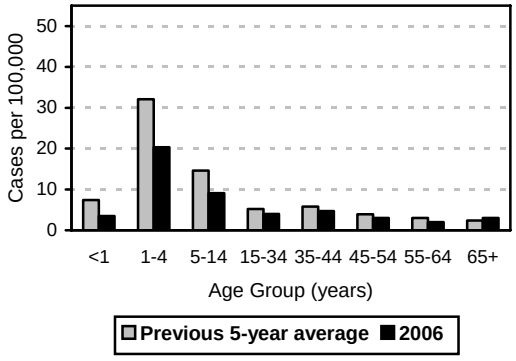
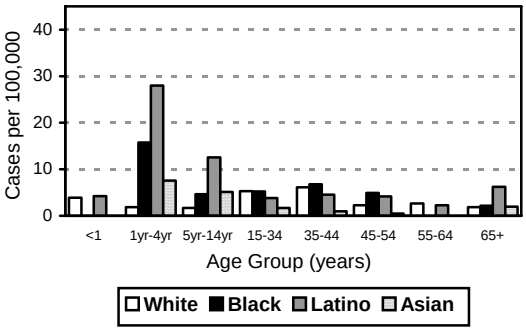


Figure 5
Shigellosis Incidence Rates
by Age Group and Race
LAC, 2006 (N=524)



Severity of Illness: Fifteen percent of shigellosis cases (n=79) were hospitalized for at least two days. There were two shigellosis-associated deaths reported; both cases were immunocompromised.

Risk Factors: Exposure to a case inside or outside the household (15%) and foreign travel (15%) were the most commonly reported potential sources of infection. The majority of foreign travel–associated illness (50%) involved visiting Mexico. Two of the seven *S.boydii* cases reported travel to Africa and India. Three of the six *S. dysenterie* traveled to India, Mexico, and Asia during the incubation period. One *S. dysenterie* case was found during contact follow-up of a typhoid case. In 2006, five percent of cases were in MSM compared to four percent in 2005.

PREVENTION

Careful 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.

COMMENTS

There were two shigellosis outbreaks investigated in 2006, both laboratory confirmed. One was a community outbreak involving a day care setting and the second was a foodborne outbreak involving a restaurant.

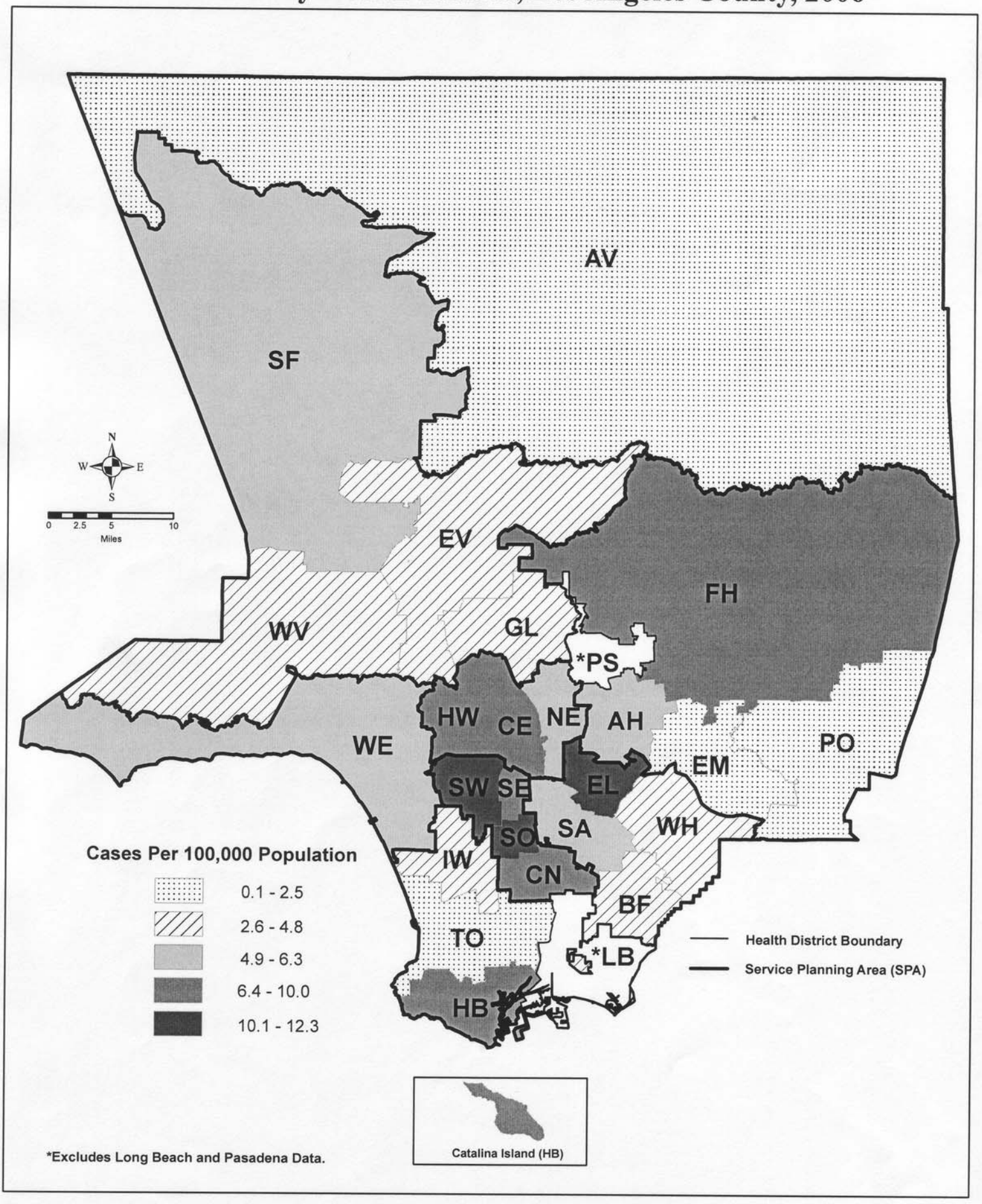
Certain sexual practices—especially those in which there is direct contact with fecal material—are a potential source of infection. There were 28 shigellosis cases reported in MSM in 2006. No links could be established among these cases. *S. flexneri* (55%) was again the predominant serotype in 2003 and 2004 for this risk group; in 2002 the predominant MSM serotype was *S. sonnei* (56%).

ADDITIONAL RESOURCES

General information about shigellosis is available at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/shigellosis_g.htm

General information and reporting information about this and foodborne diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

Map 11. Shigellosis
Rates by Health District, Los Angeles County, 2006*



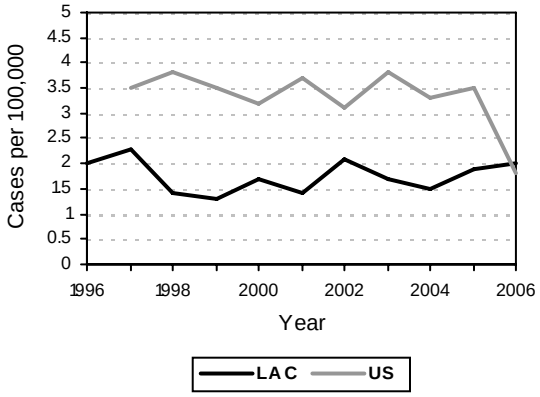
*Excludes Long Beach and Pasadena Data.

INVASIVE GROUP A STREPTOCOCCUS (IGAS)

CRUDE DATA	
Number of Cases	197
Annual Incidence[a]	
LA County	2.0
California	---[c]
United States [b]	1.82[d]
Age at Diagnosis	
Mean	49
Median	51
Range	1–96 years

[a] Cases per 100,000 population.
[b] National projection of IGAS incidence from Active Bacterial Core Surveillance areas data, 2005 [1]. Data available beginning in 1997.
[c] Not notifiable.
[d] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
IGAS
Incidence Rates by Year of Onset
LAC and US[b], 1996–2006



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 very 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 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

- STSS clinical presentation and 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 2.0 per 100,000 (N=197) during 2006, similar to 2005 where 1.9 cases per 100,000 (N=179) were reported (Figure 1).

Seasonality: Although cases were observed throughout the year, a winter/spring seasonality commonly associated with streptococcal pharyngitis was observed as the number of cases increased during the spring and winter months, peaking in April (Figure 2).

Age: The age of cases ranged from 1 to 96 years with a mean of 49 years and median of 51 years. In all age groups the rate of cases in 2006 was higher than the previous 5-year average, with the exception of the less than one year age group, where no cases were reported (4 to 10 reported cases in previous years). The highest rate of cases occurred in those aged 65 years and older (Figure 3).

Gender: Similar to 2005, the male-to-female ratio remained at 2:1 in 2006. In previous years the distribution was nearly equal.

Race/Ethnicity: Race/ethnicity was known for 81% of cases. There has been an increase in the percentage of white cases and a decrease in Latino cases. Similar to 2005, blacks had the highest reported incidence at 2.7 per 100,000 (data not shown).

Location: The incidence rate was highest in SPA 5 (3.3 cases per 100,000) compared to LAC overall (2.0 cases per 100,000). Incidence for SPAs 2, 4, and 8 were slightly higher than LAC overall, while SPAs 3 and 7 had lower rates (Figure 4). However, stratification of cases by SPA produced small numbers and unstable incidence rates for SPAs 1 and 7.

Clinical Presentation: IGAS cases presented most often with cellulitis and bacteremia (Table 1). STSS increased from 5 cases in 2005 (3%) to 18 cases in 2006 (10%) (Figure 5). However, necrotizing fasciitis and pneumonia decreased since 2005 (data not shown). Other syndromes reported include osteomyelitis (5%), septic arthritis (5%), and meningitis (2%). Clinical presentation data was available for 90% of cases.

The case fatality rate has increased from 9% in 2005 to 14% in 2006. This rate is equivalent to the national estimate [1].

Risk Factors: Nearly one third of IGAS cases reported no risk factors (30%). Diabetes was reported more than any other risk factor (24%), followed by history of blunt trauma (15%), alcohol abuse (14%), chronic heart disease (13%), and malignancy (13%). Alcohol abuse and history of blunt trauma were more common in younger cases less than 50 years while diabetes, chronic heart disease, and malignancy were more prevalent in cases older than 50 years (data not shown). Risk factor information was collected for 81% of cases.

Figure 2
IGAS
Cases by Month of Onset
LAC, 2006

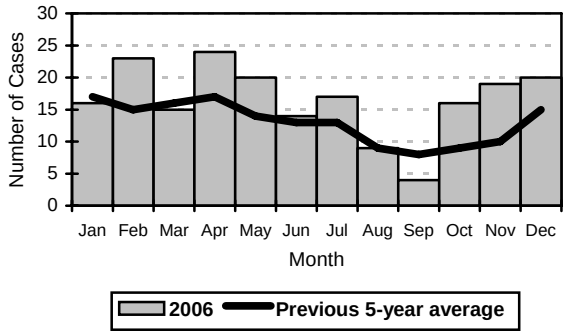


Figure 3
IGAS Incidence Rates by Age Group
LAC, 2006 (n=196)

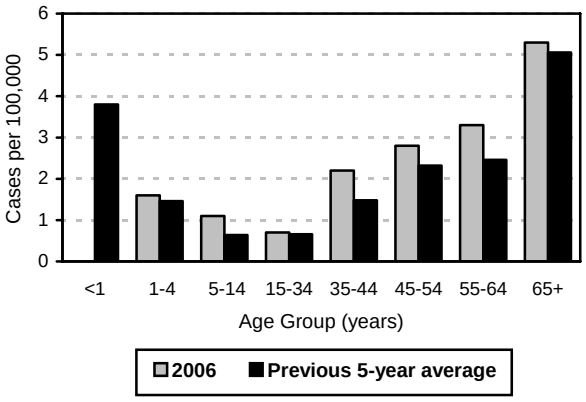
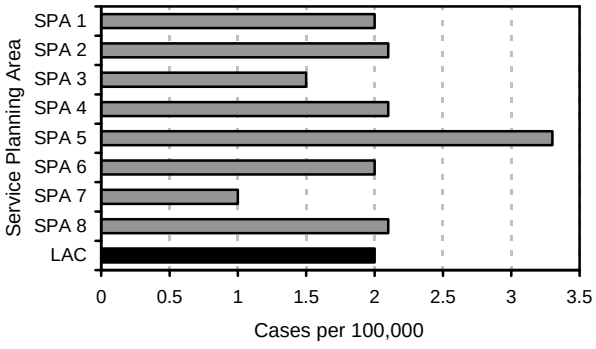


Figure 4
IGAS Rates by Service Planning Area
LAC, 2006 (n=185)



COMMENTS

Although the number of cases increased from 2005, the incidence remained the same at approximately 2 cases per 100,000. However, certain demographic groups in Los Angeles County were at greater risk of infection, including persons aged 65 years and older, blacks, and males. In addition, residents of SPA 5 continued to have the greatest incidence of IGAS disease compared to the rest of the county. It is unknown if this was due to reporting bias or if SPA 5 residents were at increased risk for IGAS infection.

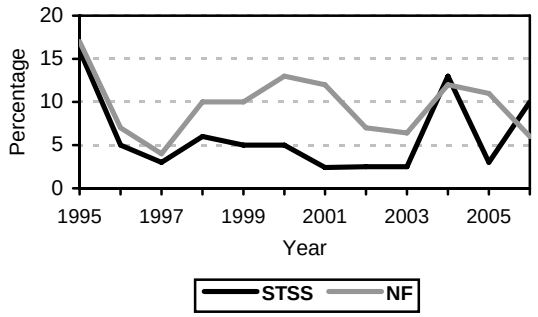
Table 1. Frequency and Percentage of IGAS Clinical Syndromes, LAC, 2006

Syndrome	Number	Percent*
Cellulitis	63	35
Bacteremia (without focus)	43	24
STSS	18	10
Non-Surgical Wound Infection	18	10
Pneumonia	16	9
Necrotizing Fasciitis	11	6
Other	50	28

*Overlapping syndromes will total over 100%.

The number of STSS cases in 2006 more than tripled from 2005 (18 vs. 5), which most likely accounted for the increase in case fatality. Of the 18 STSS cases in 2006, the outcome was known for 16 cases (89%). Of these cases, 10 were fatal (63%). In the past ten years, with the exception of 2004, the number of STSS cases ranged from three to eight (2-6%). In 2004, there were 17 STSS cases and the overall case fatality was 26% (73% among STSS cases). Interestingly, the majority of STSS cases in 2006 were male (83%) compared to 2004 where the majority were female (65%). The rise in STSS and case fatality in 2004 had been attributed possibly to changes in the reporting of IGAS during that year. However, as reporting methods have not changed and clinical presentation was known for approximately 90% of the cases each year from 2004 to 2006, the pattern of STSS and case fatality in 2004 and 2006 suggests not only that the increases were real trends but also that IGAS case fatality is strongly affected by STSS incidence.

Figure 5
IGAS Clinical Presentation of STSS and NF
LAC, 1995–2006



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.

ADDITIONAL RESOURCES

For more information about IGAS visit:

- www.cdc.gov/ncidod/dbmd/diseaseinfo/groupastreptococcal_g.htm
- National Institutes of Health – www.niaid.nih.gov/factsheets/strep.htm

For specific information about risk factors for IGAS in Los Angeles County 2004-2006 visit:

- Hageman L. Risk factors for invasive group A streptococcal disease. The Public's Health 2006; 6(9):8-9. Available at: www.lapublichealth.org/media/docs/TPH_NovDec_2006v4.pdf

- Bancroft EB, Lindsey H. Risk factors for invasive group A streptococcal disease in Los Angeles County, 2004-2006. Acute Communicable Disease Control Special Studies Report 2006:81-84. Available at: http://lapublichealth.org/acd/reports/spclrpts/spcrpt06/spcl06[1].new.pdf

IGAS Publications:

- Bancroft EB, Hageman L. Risk factors for invasive group A streptococcal disease in Los Angeles County, 2004-2006. Acute Communicable Disease Control Special Studies Report 2006:81-84. Available at: http://lapublichealth.org/acd/reports/spclrpts/spcrpt06/spcl06[1].new.pdf
- Prevention of invasive group A streptococcal disease among household contacts of case patients and among postpartum and postsurgical patients: recommendations from the Centers for Disease Control and Prevention. Clin Infect Dis 2002; 35(8):950-959.
- O'Brien KL, Beall B, Barret NL, et al. Epidemiology of invasive group A streptococcal disease in the United States, 1995-1999. Clin Infect Dis 2002; 35(3):268-276.
- American Academy of Pediatrics. Committee on Infectious Diseases. Severe invasive group A streptococcal infections: a subject review. Pediatrics 1998; 101(1):136-140.
- Kaul R, McGeer A, Low DE, Green K, Schwartz B. Population-based surveillance for group A streptococcal necrotizing fasciitis: clinical features, prognostic indicators, and microbiologic analysis of seventy-seven cases. Am J Med 1997; 103(1):18-24.

REFERENCE

1. Active Bacterial Core Surveillance Reports from 1997 to 2005 from the Centers for Disease Control and Prevention's Division of Bacterial and Mycotic Diseases. Report available at: www.cdc.gov/ncidod/dbmd/abcs/survreports.htm

TYPHOID FEVER, ACUTE

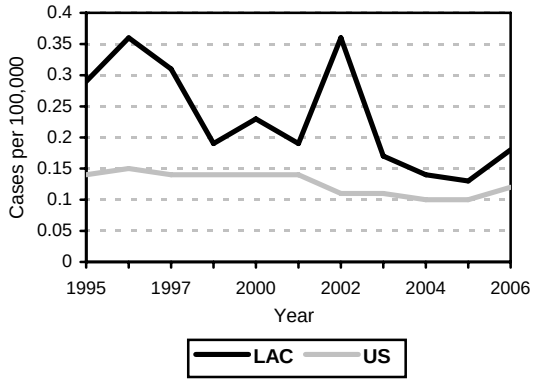
CRUDE DATA	
Number of Cases	17
Annual Incidence[a]	
LA County	0.18[b]
California	0.21[c]
United States	0.12[c]
Age at Diagnosis	
Mean	18.70
Median	20.0
Range	1-48

[a] Cases per 100,000 population.

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

[c] Calculated from 2007 Summary of notifiable diseases issue of MMWR (56:853-863).

Figure 1
Acute Typhoid Fever
Incidence Rates by Year of Onset
LAC* and US, 1996–2006

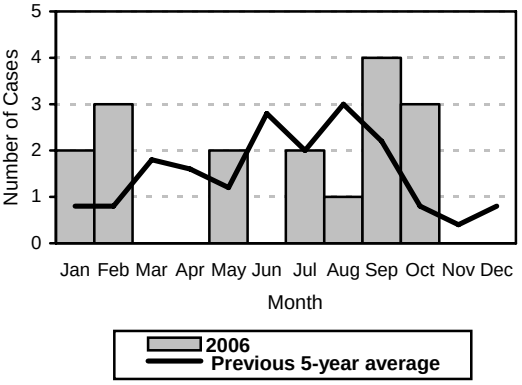


*Rates based on less than 20 observations are unreliable.

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, 2006



DISEASE ABSTRACT

- Travel was the most common risk factor identified in LAC; 76% of cases reported travel to typhoid endemic countries. One case recently immigration and one case visited from endemic countries.
- Fifty-eight percent of cases were Asian in 2006.

STRATIFIED DATA

Trends: The yearly incident has decreased after a peak in 2002. However, there were 41% more cases in 2006 compared to 2005.

Seasonality: In 2006, the number of cases peaked in September (Figure 2); however, no cases seemed to coincide with the winter holidays. Typhoid cases occur sporadically throughout the year and are not necessarily associated with traditional travel periods.

Age: In 2005, 75% of acute cases were in adults consistent with the five-year average (Figure 3). The age group of 15-34 years has consistently represented the highest percentage of cases in the past five years.

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

Race/Ethnicity: In 2006, acute typhoid cases occurred in Asians and Latinos as seen in 2005. There were no cases in Blacks or White (Figure 4). In 2006, Asian cases increased compared to the five-year average. Continued surveillance is needed to identify emerging trends. I

Location: In 2006, SPA 3 had the majority of cases (41%). This may be due to the rise in Asian population in SPA 3. SPA 2 and 7 had three cases each (18%). SPA 6 and 8 had one case each (6%). SPA 5 had two cases (12%) (data not shown).

Figure 3
Acute Typhoid Fever
by Age Group
LAC, 2006

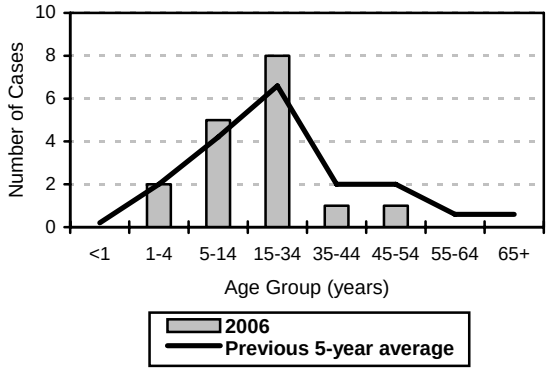
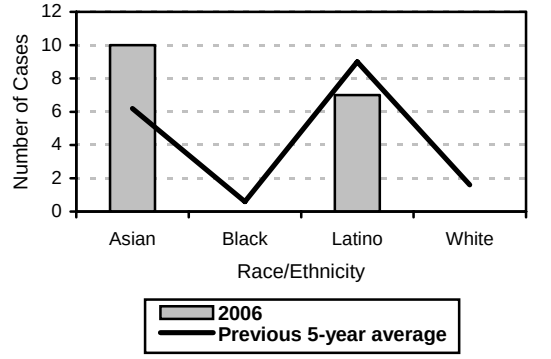


Figure 4
Acute Typhoid Fever
by Race/Ethnicity
LAC, 2006



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 hot; bottled water should be used for drinking as well as for brushing teeth and making ice. Vaccination should be considered when traveling in areas of high endemicity. LAC tests household contacts of confirmed cases for *S. typhi* to identify any previously undiagnosed carriers or cases.

COMMENTS

The majority of cases (n=11, 65%) traveled to endemic areas outside the US; Mexico, India, Bangladesh, Indonesia, Philippines and Cambodia were reported travel destinations. One case was infected by previously undiagnosed carrier in the household.

ADDITIONAL RESOURCES

General information about typhoid fever available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

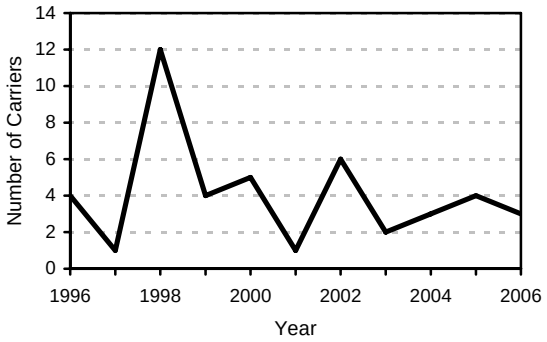
Traveler's health information is available at: wwwn.cdc.gov/travel/yellowBookCh4-Typhoid.aspx

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

TYPHOID FEVER, CARRIER

CRUDE DATA	
Number of New Carriers	3
Total Number of Carriers	17
Annual Incidence[a]	
LA County	N/A[b]
United States	N/A
Age at Diagnosis	
Mean	40 years
Range	5-61 years

Figure 1
Typhoid Fever Carriers
by Year of Detection
LAC, 1996–2006



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

DESCRIPTION

The chronic typhoid carrier state can occur following symptomatic or subclinical infections of *Salmonella 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 were three new carriers identified in 2006.
- During 2006, three carriers were closed as lost to follow-up, leaving a total of 17 carriers under case management in LAC at the end of 2006.

COMMENTS

All new carriers were foreign born; two were male and one was female. Two previously unknown carriers were identified while testing household contacts to a new acute typhoid case, all in the same household. The other carrier was identified when presented to the hospital with fevers and tested positive for Campylobacter; subsequently the patient was found to have *S. typhi* infection.

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

Disease information is available from CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/typhoidfever_g.htm

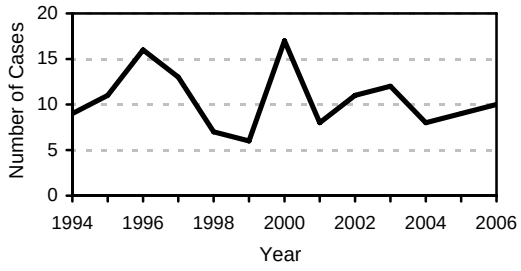
General information and reporting information about this and other diseases in LAC is available at:
www.lapublichealth.org/acd/food.htm

TYPHUS FEVER

CRUDE DATA	
Number of Cases	10
Annual Incidence[a]	
LA County	0.09[b]
United States	N/A
Age at Onset	
Mean	43
Median	40.5
Range	13–73 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, 1994–2006



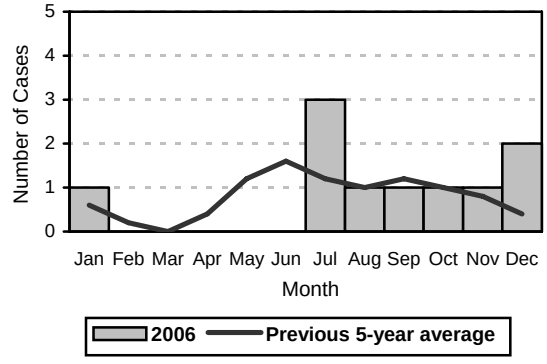
DESCRIPTION

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 2006 (n=10) falls within range of the number reported annually in previous years. No outbreaks occurred.
- Increased reports of typhus in unusual localities as well as those occurring in the Long Beach and Orange County jurisdictions indicate the endemic areas of typhus may be shifting.

Figure 2
Murine Typhus
Cases by Month of Onset
LAC, 2006



STRATIFIED DATA

Trends: The number of cases reported in 2006 (n=10) increased in compared to the 9 cases reported in 2005. However, the number of 2006 case report fall within the range of 8–12 cases reported annually in the previous five years (Figure 2).

Seasonality: 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. In 2006, most cases occurred during these times of the

year; however, cases were also uncharacteristically reported throughout the fall and into December (Figure 2).

Age: In 2006, the mean and median ages were 43 and 40.5 years, respectively. Ages of cases ranged from 13 to 73 years; most cases occurred in those under 65 years (n=8, 80%) (data not shown).

Sex: There were at least twice as many cases reported in males as females. The male-to-female case ratio was 2.3:1. The gender distribution in previous years has been roughly equivalent.

Race/Ethnicity: Most cases were of white race/ethnicity (n=6, 60%). Three cases (30%) occurred in Latinos and one (10%) in an Asian (data not shown).

Location: Most cases (n=7, 70%) 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 three cases (30%) resided in the West, West Valley, and Bellflower 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. Only 30% of the cases in 2006 (n=3) 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 observing other types of small mammals (e.g., rats, opossums, dogs and cats) on their residential property, and thus may have had exposure to animals that carry fleas. One case worked as a parking attendant in the downtown LA area and reported no exposure to animals or activity in the foothills of central LAC. Typhus infection cannot be transmitted from person to person.

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.

COMMENTS

Though the number of typhus fever cases confirmed in LAC in 2006 has not changed remarkably relative to previous years, the higher proportion of cases appearing in health districts in which typhus is not usually seen has shown that the endemic areas of typhus may be shifting. In addition to cases reported in unusual locations within the county, the public health departments of Long Beach and Orange County have also confirmed cases in their jurisdictions during the latter part of 2006, either for the very first time or the first in many years. However, 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.

ADDITIONAL RESOURCES

General information about typhus fever is available from the ACDC website at:
www.lapublichealth.org/acd/vectormurine.htm

Publications:

Azad AF, Radulovic S, Higgins JA, Noden BH, Troyer JM. Flea-borne rickettsioses: ecologic considerations. Emerg Infect Dis 1997; 3(3):319–327.

Sorvillo FJ, Gondo B, Emmons R, et al. A suburban focus of endemic typhus in Los Angeles County: association with seropositive domestic cats and opossums. Am J Trop Med Hyg 1993; 48(2):269–273.

Williams SG, Sacci JB, Schriefer ME, et al. Typhus and typhuslike rickettsiae associated with opossums and their fleas in Los Angeles County, California. J Clin Microbiol 1992; 30(7):1758–1762.

VIBRIOSIS

CRUDE DATA	
Number of Cases	24
Annual Incidence[a]	
LA County	0.19
United States	N/A
Age at Diagnosis	
Mean	46
Median	43
Range	14–86 years

[a] Cases per 100,000 population.

Figure 1
Selected Vibrio Species
Cases by Year of Onset
LAC, 1997–2006

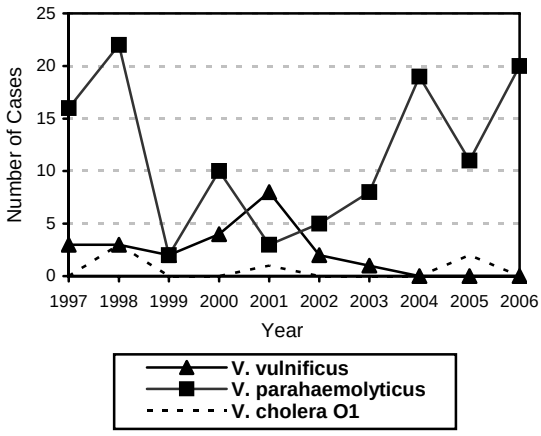
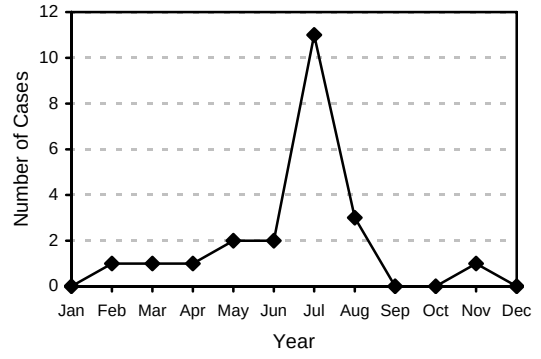


Figure 2
Vibriosis
Cases by Month of Onset
LAC, 2006



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. parahaemolyticus*, 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

- Twenty-four cases of vibriosis were reported in 2006, an increase from 14 cases reported in 2005.
- No fatal cases of vibriosis were reported in 2006.
- No cases of *V. vulnificus* or toxigenic *V. cholerae* O1/O139 were reported in 2006. There were two cases of *V. alginolyticus* infections related to surfing injuries and one case of *V. furnissii* infection in a leg wound.

STRATIFIED DATA

Trends: Over the last 10 years, case reports of Vibrio infections peaked in 1998 with 36 cases (7 cases were part of an outbreak). Reported cases of *V. vulnificus* remained zero since 2004, a substantial decline compared to the 10-year peak of eight cases occurring during in 2001 (Figure 1). *V. cholerae* non-O1/non-O139 cases declined from two cases in 2005, down to one case in 2006.

Seasonality: Among reported vibriosis cases with distinct onset dates, the majority (64%, n=16) 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 14 years old. The average age of cases was 46 years (Table 1).

Sex: Slightly over half of the cases were male (52%, n=13, Table 1).

Race/Ethnicity: Reported cases were most often Non-Latino white (54%, n=14, Table 1), which is consistent with 2005. Latinos historically constituted a more significant proportion of all vibriosis cases.

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, 2006

Species	No. of cases	Race (no. of cases)	Mean Age, years (range)	Sex Ratio M:F
V. parahaemolyticus	20	Asian (3), Latino (5), White (12), Black (0)	45 (14-86)	0.81:1
V. cholerae non-O1/O139	1	Latino (1)	67 (67)	0:1
V. alginolyticus	2	White (2)	54.5 (54-55)	2:0
V. furnissii	1	Latino (1)	61 (61)	1:0

Species-specific Risk Factors:

Vibrio parahaemolyticus
Twenty cases of *V. parahaemolyticus* were reported during 2006. All 20 were identified through stool culture. Seventeen reported eating seafood recently, with 12 specifying raw oysters. Of these 12, 11 were linked to contaminated oysters harvested in Puget Sound, WA.

***Vibrio cholerae* non-O1/O139**
One case of non-toxigenic *V. cholerae* gastroenteritis was reported in 2006. It was related to travel to Mexico.

Vibrio alginolyticus
Both *V. alginolyticus* infections were wound infections. The patients had been exposed to seawater via surfing injuries in separate incidents.

COMMENTS

In LAC, risk of Vibrio infection can be prevented or reduced by avoiding eating raw fish and shellfish. In 2006 there were no cases of *V. vulnificus* infection. This continued absence of cases is most likely due to a state-mandated oyster ban that took effect in 2003 banning Gulf Coast Oysters harvested between April 1st and October 31st. Oysters from Gulf Coast waters during warm months pose a higher risk for *V. vulnificus* contamination. 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.

ADDITIONAL RESOURCES

Mouzin E, Mascola L, Tormey MP, Dassey DE. Prevention of *Vibrio vulnificus* infections. Assessment of regulatory educational strategies. JAMA 1997; 278(7):576–578. Abstract available at: www.jama.ama-assn.org/cgi/content/abstract/278/7/576

Disease information regarding *Vibrio vulnificus* is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/vibriovulnificus_g.htm

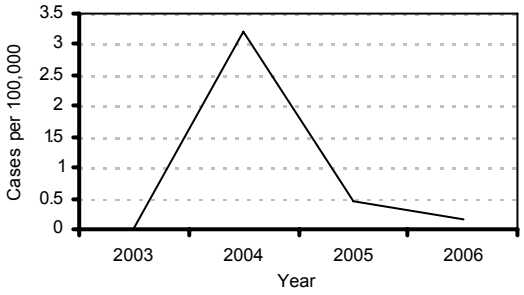
Disease information regarding *Vibrio parahaemolyticus* is available from the CDC at:
www.cdc.gov/ncidod/dbmd/diseaseinfo/vibrioparahaemolyticus_g.htm

WEST NILE VIRUS

CRUDE DATA	
Number of Cases	16
Incidence LAC[a]	
LA County	0.17
California	N/A
United States	N/A
Age at Diagnosis	
Mean	50.9
Median	50.5
Range	28–82 years

[a] **Cases per 100,000 population.**

Figure 1
West Nile Virus Disease
Incidence Rates by Year of Onset
LAC, 2003-2006



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. Additional routes of transmission that have been documented include transplantation of WNV-infected organs, blood transfusions, transplacental (mother-to-child), occupational exposures, and through breast milk.

Clinical Infection and Diagnosis

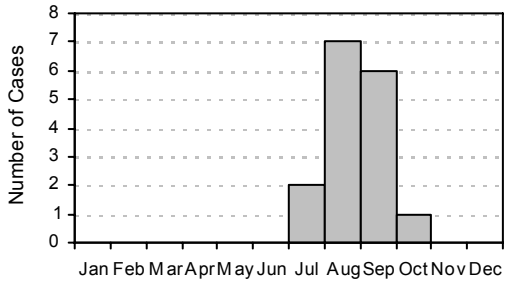
Most persons who become infected with WNV will not develop clinical illness or symptoms. Approximately one in 150 patients will develop more severe illness, manifesting as WNV neuro-invasive disease (NID), and about 20% of persons infected will develop WNV fever with symptoms that include fever, headache, rash, muscle weakness, fatigue, nausea and vomiting, and occasionally lymph node swelling. WNV NID includes encephalitis, meningitis, and acute flaccid paralysis (AFP). WNV-associated encephalitis is commonly associated with the following symptoms: 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.

DISEASE ABSTRACT

- The overall incidence of reported WNV infections in 2006 was 0.17 cases per 100,000 population, far lower than the incidence rates of previous years, when 3.2 per 100,000 and 0.46 per 100,000 were confirmed in 2004 and 2005, respectively (Figure 1).
- There were no case fatalities in 2005 or 2006.
- Meningitis was the most commonly reported clinical condition as it was in 2005, comprising 25% (n=4) of cases. In 2005, meningitis comprised 34.8% of cases (n=15).
- There were few or no cases in children in both 2005 and 2006.
- Most WNV infections occurred in persons residing in San Fernando Valley.

Figure 2
West Nile Virus Disease
Cases by Month of Onset
LAC, 2006 (N=16)



STRATIFIED DATA

Trends: WNV infection, including in asymptomatic blood donors, occurred at an incidence rate of 0.17 per 100,000 population in 2006. Both the total number and incidence of WNV infection decreased dramatically since 2004 when 309 cases were confirmed at an incidence of 3.2 cases per 100,000 population. In 2005, the incidence was 0.46 per 100,000 (n=43) (Figure 1).

Seasonality: Onset of cases occurred July through October and peaked in August (Figure 2). A similar epidemiologic symptom onset curve also occurred in 2005.

Age: The median age was 50.5 years (range: 28–82 years). For age groups ≥35 years, the incidence rates were similar (they ranged 0.2-0.4 cases per 100,000). There was more varied distribution in 2005 where incidence rates ranged from 0.3 cases per 100,000 among children under 10 to 11.6 cases per 100,000 in those greater than 80 years old.

Sex: A higher proportion of male WNV cases were reported than female cases. The incidence rates were 0.25 cases and 0.08 cases per 100,000, respectively.

Race/Ethnicity: Whites had the greatest proportion of reported cases (81%) as well as the highest incidence rates of infection (n=13, 0.45 per 100,000). Latinos accounted for 13% of cases (n=2, 0.04 per 100,000), and only 6% of reported cases occurred among Asian Pacific Islanders (n=1, 0.1 per 100,000). No cases in

Figure 3
West Nile Virus Disease
Incidence Rates by Race/Ethnicity
LAC, 2006

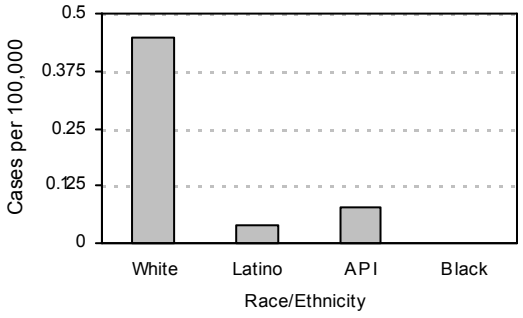


Figure 4
West Nile Virus Disease
Cases by Service Planning Area
LAC, 2006

blacks were reported (Figure 3).

Location: The greatest number of reported WNV cases were reported from SPA 2 (n=10, 0.47 per 100,000). WNV cases occurred in only two other areas: SPAs 3 and 4. WNV was distributed more widely in 2005, though SPA 2 also accounted for most cases.

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.

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.

COMMENTS

The first symptomatic WNV case in LAC with associated 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. The following years have presented a markedly different picture. In 2005, the county only documented 43 infections and no deaths. The decline continued in 2006, during which only 16 cases and no deaths were reported.

In response to the 2004 WNV outbreak, LAC DPH specifically added WNV infection to its list of reportable diseases by authority of the Health Officer under California Code of Regulations, Title 17, Sections 2503 and 2505. Physicians and laboratories are required to report all positive laboratory findings of WNV to the DPH within one working day. Continued vector surveillance efforts have demonstrated that, despite the decline in incidence in LAC, WNV remains endemic (enzootic) in the LAC and southern CA region. 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.

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 (SGVVCD)
- Los Angeles County West Vector Control District (LACWVCD)
- Antelope Valley Mosquito and Vector Control District (AVMVCD)
- Compton Creek Mosquito Abatement District

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: www.cdc.gov/ncidod/dvbid/westnile/index.htm
- California Department of Health Services: www.westnile.ca.gov
- Acute Communicable Disease Control Program, Los Angeles County Public Health: www.lapublichealth.org/acd/index.htm
- Vector Management Environmental Health, Los Angeles County Public Health: www.lapublichealth.org/eh/index.htm
- For additional information on EPA-registered repellants: www.epa.gov/pesticides/factsheets/insectrp.htm

Mosquito and Vector Control District Websites:

- Greater Los Angeles County Vector Control District: www.glacvcd.org
- West Los Angeles Vector Control District: www.lawestvector.org
- San Gabriel Valley Mosquito and Vector Control District: www.sgvmosquito.org
- Antelope Valley Mosquito and Vector Control District: www.avmosquito.org
- Mosquito and Vector Control Association of California: www.mvcac.org

DISEASE OUTBREAK SUMMARIES

2006

COMMUNITY-ACQUIRED DISEASE OUTBREAKS

ABSTRACT

- In 2006, 142 community-acquired disease outbreaks accounted for 1,743 cases of illness (Figure 1).
- Schools were the most common setting of community-acquired outbreaks (46%).
- The number of reported outbreaks (142) surpassed the previous eight-year average of reported outbreaks (141).

DATA

Disease outbreaks are defined as clusters of illness that occur in a similar time or place, or unusual case numbers above baseline in a specified area. 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 section) or facilities where medical care is provided (see Healthcare Associated Outbreaks section).

Varicella caused most community-acquired outbreaks in LAC (35%). Gastroenteritis (GE) of various etiologies closely followed by ectoparasites (scabies and pediculosis) were in a near tie for second most common cause of outbreaks, each comprising 20% of all outbreaks (Figure 2, Table 1). Collectively accounting for 75% of all community-acquired outbreaks in 2006, the dominance of these three disease categories is similar to past years (75% in 2005 and 72% in 2004).

The agents causing the most cases per outbreak were norovirus (9 outbreaks, mean of 35 cases per outbreak), followed by GE of undetermined cause (16 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 etiology. Important to note in 2006, due to documented increase in county-wide norovirus activity, a reduction in collecting diagnostic viral specimens was instituted. These figures highlight the increased circulation of norovirus and reflect the ease this agent can be transmitted from person to person in community settings (Table 2).

The most common outbreak settings were schools [elementary schools (47), middle schools (13), after-school care (1), high schools (1), and universities (3)] accounting for 46% of all outbreaks. This is similar to 2005 when most outbreaks (60%) were associated with schools settings. Indeed, in most prior report years, the

Figure 1
Community Acquired Outbreaks
Number of Persons Affected
LAC, 1998–2006

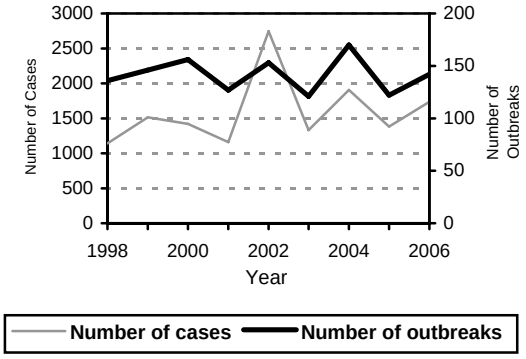
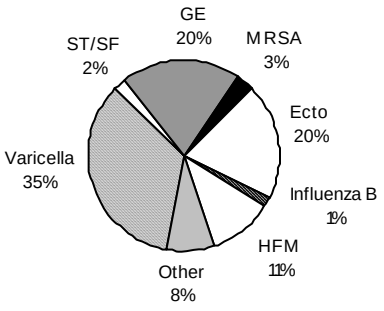
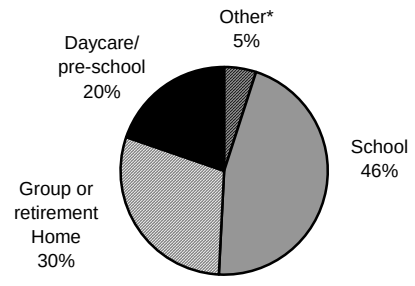


Figure 2
Community-Acquired Outbreaks by
Type of Disease* LAC, 2006 (N=142)



*ST/SF=strep throat/scarlet fever; Ecto=ectoparasites; HFM=Hand, foot & mouth; GE = Gastroentestinal; Other = MRSA, pertussis, ringworm, typhus, unknown resp., viral menigitis.

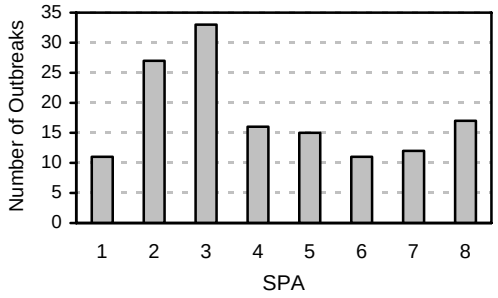
Figure 3
Community Outbreaks by Setting
LAC, 2006 (N=142)



*Other includes: jail (2), vocational work setting (2), restaurant (2) and tattoo parlor (1)

proportion of outbreaks in schools had always been greater than 50%; the prior five year average for schools is 59%. Group and retirement home settings were the second most common site of community-acquired outbreaks reported in 2006, with 30% of the outbreaks. Prior report years had group and retirement home setting consistently lower; the previous five-year-average percentage was 13%. Settings with young children in daycare or pre-school accounted for an additional 20%. (Figure 3).

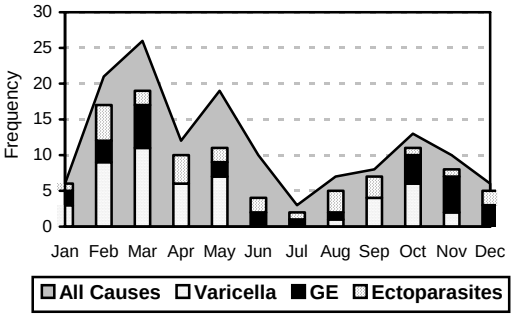
Figure 4
Community Outbreaks by SPA
LAC, 2006 (N=142)



Outbreaks were reported from all 8 SPAs (Figure 4). SPA 3, in the San Gabriel and Pomona Valleys, had the most outbreaks reported in 2006.

The chart of community-acquired outbreaks by onset month (Figure 5) shows a peak in the distribution for March. Varicella outbreaks tended to show a bimodal seasonality with reports occurring during the traditional school year and low numbers during the summer and winter break. GE occurred throughout the year, but tended towards the cooler months with outbreaks focused in the early spring and fall months. 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, 2006 (N=141)



COMMENTS

There was an increase in the number of outbreaks and outbreak associated cases reported in 2006 from the prior year; however, the number of outbreaks in 2006 was only one above the mean number 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 Studies Report section). In 2006, seven varicella outbreaks were identified in the Antelope Valley Health District (SPA 1), where the LAC DPH Varicella Surveillance Project is in place, but most outbreaks of varicella was identified in SPA 3 (n=11).

Community-acquired outbreaks result from 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 (62% in pre-school, elementary, or middle school). Varicella, hand, foot and mouth disease (HFM), and pediculosis (head lice) were most common in this young group. The second age group affected by outbreaks is in the older population associated with group-home settings (30%). 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 increase norovirus activity during 2006.

An unusual outbreak in 2006 was caused by non-tuberculosis Mycobacterium chelonie associated with a tattoo parlor. As this outbreak differs from the usual outbreaks investigated, it has an expanded report located within the 2006 Special Studies Report Section.

Table 1. Community-Acquired Outbreaks by Disease—LAC, 2006

Disease	No. of outbreaks	No. of cases	Cases per outbreak (average)	Cases per outbreak (range)
Varicella	49	584	12	5-53
Scarlet fever/strep throat	3	44	15	3-21
Scabies	15	92	6	2-23
Hand, foot & mouth disease	16	164	10	2-67
Pediculosis	13	78	6	2-11
GE illness - Norovirus	9	311	35	13-79
GE illness - Shigella	1	2	2	2
GE illness - Salmonella	2	11	6	2-9
GE illness - Giardia	1	4	4	4
GE illness - Unknown	16	244	15	5-35
Fifth disease	2	14	7	5-9
Conjunctivitis	2	13	7	6-7
MRSA	4	19	5	3-9
Influenza B	2	18	9	8-10
Other*	7	145	21	3-119
Total	**142**	**1,743**	**12**	**2–119**

* Includes: pertussis, ringworm, Staphylococcus aureus, non-tuberculosis Mycobacterium chelonie, unknown respiratory

Table 2. Community-Acquired Outbreaks by Disease and Setting—LAC, 2006

Disease	Group Home[a]	School[b]	Preschool or Daycare	Other[c]	TOTAL
Varicella	0	47	2	0	**49**
Scarlet fever/strep throat	0	2	0	1	**3**
Scabies	14	0	0	1	**15**
Hand, foot & mouth disease	0	2	14	0	**16**
Pediculosis	1	6	5	1	**13**
GE illness - Norovirus	9	0	0	0	**9**
GE illness - Shigella	0	0	1	0	**1**
GE illness - Salmonella	1	0	1	0	**2**
GE illness - Rotavirus	0	0	1	0	**1**
GE illness - Unknown	13	0	3	0	**16**
Fifth disease (Parvovirus)	0	2	0	0	**2**
Conjunctivitis	2	0	0	0	**2**
MRSA	1	2	0	1	**4**
Influenza B	0	0	0	2	**2**
Other	1	4	1	1	**7**
Total	**42**	**65**	**28**	**7**	**142**

[a] Includes centers for retirement, assisted living, rehabilitation, and shelter.
[b] Includes elementary (n=47), middle (n=13), after-school (1), high schools (n=1) and University (3).
[c] Includes jail, vocational training sites, restaurants, tattoo parlor.

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.[1]

The system used by LAC DPH for detection of foodborne outbreaks begins with a Foodborne Illness Report (FBIR). 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 and Water Safety Program (F&WS) also review all FBIRs. ACDC investigates foodborne outbreaks 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 extent of the outbreak, identify a food vehicle or processing error, and determine the agent of infection.

INVESTIGATIONS SUMMARY

In 2006 there were 48 outbreak investigations performed jointly by F&WS and the F&M programs. Twenty-three percent of these investigations (n=11) were caused by person-to-person transmission of norovirus in a food setting and not considered to be food-related (Table 1).

For outbreaks identified as foodborne (n=37), an agent was determined in 95% of outbreaks (n=35). A majority of outbreaks were determined to be caused by a viral agent, with 16% lab confirmed and 57% suspected based on clinical and epidemiological information. Thirty-five percent of investigations identified a contributing factor in the preparation of the meal being investigated (n=13), with an ill food handler identified in 11% of outbreaks (n=4). A food item was implicated in 35% of investigations (n=13). Restaurants were the most commonly identified eating location (43%, n=16), and SPA 4 was the most commonly reported geographical area (24%, n=9).

The percent of foodborne outbreaks with suspected and confirmed viral etiology continues to increase, as exemplified by the large percent found in 2006. In addition, a new, more virulent strain of norovirus was identified in one outbreak (GII.4 Minerva), and may be responsible for the severity seen in recent outbreaks.

Table 1. Outbreak Investigations Summary

Investigations	Frequency	Percent
Total	48	100%
Person-to-person norovirus	11	23%
Foodborne outbreak identified	37	77%

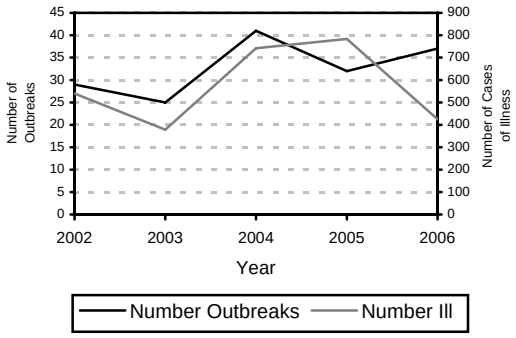
Foodborne Outbreaks Identified	Frequency	Percent
Total	37	100%
Agent determined	35	95%
Bacterial (lab confirmed)	6	16%
Viral (lab confirmed)	6	16%
Viral (suspect norovirus)	21	57%
Contributing factor identified	13	35%
Ill food handler	3	8%
Food item implicated	13	35%
Seafood (sushi, tuna)	6	16%
Occurred at a restaurant	16	43%
Occurred in SPA 4	9	24%

1 CDC. Surveillance for foodborne disease outbreaks—United States, 1988–1992. MMWR 1996; 45(SS-5):58. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00044241.htm

Overview: In 2006, there were 2012 FBIRs reported from consumers eating food from establishments located in LAC. Thirty-nine percent of reports (n=784) were investigated by the F&M program, and 23% (n=453) were referred to district inspectors or another agency for follow-up. The remaining 39% (n=775) were either duplicate reports on the same establishments, or contained incomplete or inaccurate complaint information for follow-up.

In 2006, 37 foodborne outbreaks were jointly investigated by the F&WS and F&M programs, representing 425 cases of foodborne illness, and an average of 9 persons per outbreak (range 1-57 cases) (Figure 1). One waterborne outbreak identified in 2006 occurred in a bar where hepatitis A infections were associated with ice served at the bar.

Figure 1
Foodborne Outbreaks
Number of Persons Affected
LAC, 2002–2006



Seasonality: Foodborne outbreak investigations occurred throughout the season in 2006, with many outbreaks occurring in the late winter and spring months (Figure 2).

Figure 2
Foodborne Outbreak Investigations
by Month of Onset
LAC, 2006 (N=37)

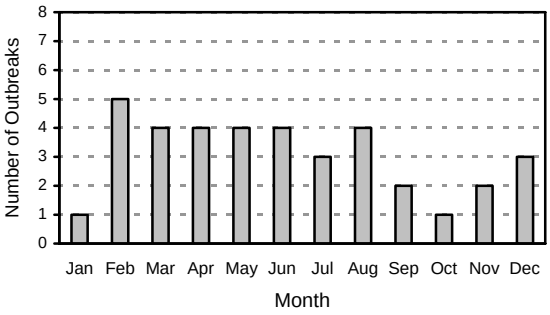
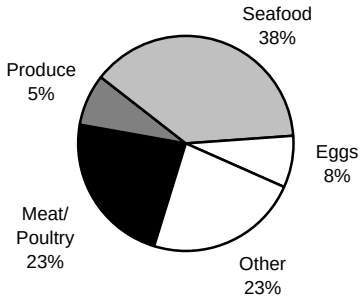


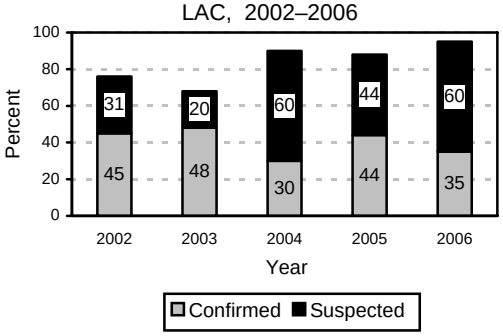
Figure 3
Foodborne Outbreaks
with Implicated Food Vehicles
LAC, 2006 (n=13)



Implicated Food Vehicles: A food vehicle was epidemiologically implicated in 35% of foodborne outbreaks (n=13), with an etiologic agent lab confirmed in a food item in one outbreak. A seafood product was the most commonly implicated item (38%, 2 sushi, 1 tuna, 2 tuna salad) followed by meat and poultry items (23%, 2 chicken, 1 beef) (Figure 3).

Agent: In 2006, an agent was laboratory confirmed in 35% of investigations (n=13), similar to previous years (Figure 4). Of the 60% of outbreaks with a suspect agent, 57% (n=21) were suspected to be norovirus based on based on symptoms onsets, symptoms durations, incubation period, duration of symptoms, secondary cases in households, and/or negative bacterial test results. Reasons for no laboratory testing include lack of cooperation, delayed notification and cases out of town/unavailable. Of foodborne outbreaks

Figure 4
Foodborne Outbreaks
% with Suspected/Confirmed Etiologic Agent
LAC, 2002–2006



with a lab confirmed or suspect agent (n=35), 73% of these investigations were viral etiology (n=27; 25 norovirus, 2 hepatitis A) and 16% of these were identified as bacterial (n=6; 5 salmonella, 1 campylobacter) (Figure 5). Foodborne outbreaks reports with a viral etiology appear to be increasing in more recent years.

Outbreak Location: The most common locations for reported foodborne outbreaks were restaurants (43%, n=16) followed by food that was brought or catered to a workplace (14%, n=5) or eaten at home (14%, n=5)(Figure 6). Other locations include places of worship, schools, and parks. The geographic distribution of the outbreaks by SPA is summarized in Table 2. SPA 4 reported the most outbreaks (24%, n=9), similar to that reported in 2005 (28%). There were several multi-district and one multi-county outbreak, but there were no outbreaks that involved multiple states.

Figure 5
Foodborne Outbreaks
by Etiologic Agent Category
(Lab Confirmed and Suspect)
LAC, 2002–2006

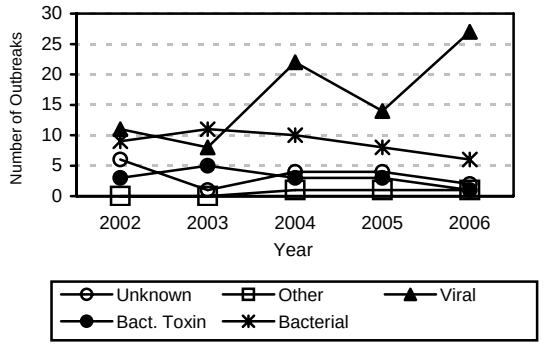


Figure 6
Foodborne Outbreaks
by Place Eaten
LAC, 2006 (N=37)

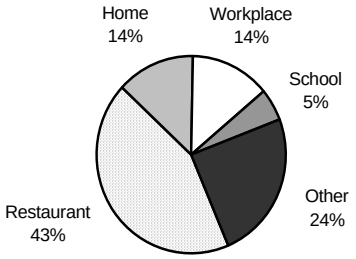
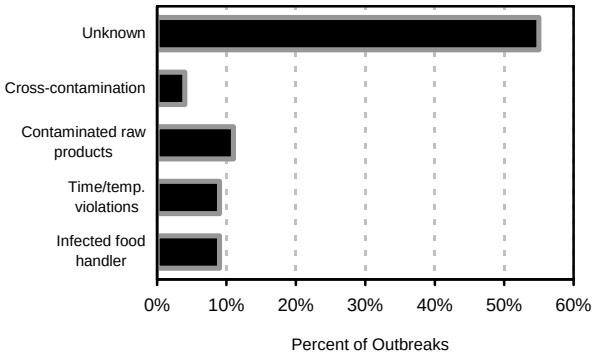


Table 2. Frequency of Foodborne Outbreaks by Location, 2006

SPA	Frequency	Percent
1	1	3%
2	6	16%
3	5	14%
4	9	24%
5	7	19%
6	0	0%
7	4	11%
8	3	8%
Multi-district	2	5%
Multi-county	1	3%
Multi-state	0	0%
Total	37	100%

Contributing Factors: In 2006, a contributing factor was identified in 35% of foodborne outbreak investigations (n=13) (Figure 7). The most frequent factors identified were potential contamination of raw food products (11%, n=4). An ill food handler was identified in 8% (n=3) of outbreaks, with one food handler lab confirmed with norovirus and 3 suspected to be norovirus based on symptoms.

Figure 7
Foodborne Outbreaks with Known
Probable Contributing Factors (N=37)
LAC, 2006



DISCUSSION

The percent of foodborne outbreaks with viral etiology continue to increase in recent years, as exemplified by the large percent found in 2006. In addition, a new, more virulent strain of norovirus (GII.4 Minerva) was identified in a large person-to-person outbreak affecting multiple jurisdictions. This outbreak affected 113 persons and resulted in 35 medical visits and 2 hospitalizations. According to the US Centers for Disease Control and Prevention (CDC), norovirus infection and illness reports have increased significantly, with the appearance of this new strain accounting for at least 60 percent of the outbreaks occurring this past winter 2005. Outbreaks have occurred across the US in a variety of settings, including colleges, prisons, elementary schools, cruise ships and long-term care facilities. The increased reports of norovirus illness prompted federal health officials to gather for an assessment of this new strain. The pathogen is named for the Minerva II cruise ship, where health officials first became aware of the particularly virulent norovirus strain during a shipboard outbreak in January 2006.

Since 1999, the LAC Public Health Laboratory has been testing human specimens for norovirus using the reverse transcription-polymerase chain reaction (RT-PCR) method. This method is still considered to be experimental and is only used to diagnose outbreaks as a whole, not for individual cases. There has been a marked increase in the number of viral GE and confirmed norovirus outbreaks since 1999.

To assist in the identification of national outbreaks, the PulseNet system is used to monitor for strains of various etiologic agent. PulseNet is a public health network sponsored by the CDC that uses the collaboration of laboratories and health departments at local, state, and federal levels to detect outbreaks through comparison of results of pulsed-field gel electrophoresis (PFGE) of pathogens. The PFGE are monitored for strains of various etiologic agents. When similar resulting patterns are detected, an investigation may be initiated. In addition, PFGE results can link solitary case occurring locally to a larger, previously identified outbreak occurring on a wider geographical scale (e.g., multistate *E. Coli* O157:H7 outbreak).

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.

Table A. Foodborne Outbreaks in LAC, 2006 (N=37)

	Agent	Confirmed/ Suspected	Strain/Type	OB#	Source	Setting	Cases	HD
1	Norovirus	Lab Confirmed		174	Undetermined	Restaurant	14	Whittier
2	Norovirus	Lab Confirmed		178	Undetermined	Hotel Rest	26	Inglewood
3	Norovirus	Lab Confirmed		220	Tuna Salad	Restaurant	8	Central
4	Norovirus	Lab Confirmed*		148	Potato	Dining Hall	57	Central
5	Norovirus	Suspected		20	Undetermined	Residence	25	E. Valley
6	Norovirus	Suspected		48	Undetermined	Funeral	6	Multi
7	Norovirus	Suspected		54	Undetermined	Work Place	7	Central
8	Norovirus	Suspected		72	Undetermined	Restaurant	10	Antelope Valley
9	Norovirus	Suspected		74	Undetermined	Restaurant	8	Central
10	Norovirus	Suspected		90	Sushi	Restaurant	9	West
11	Norovirus	Suspected		95	Undetermined	Restaurant	17	San Fernando
12	Norovirus	Suspected		102	Undetermined	Restaurant	5	Pomona
13	Norovirus	Suspected		112	Undetermined	Restaurant	6	Whittier
14	Norovirus	Suspected		133	Undetermined	Work Place	6	San Fernando
15	Norovirus	Suspected		134	Undetermined	Work Place	6	West
16	Norovirus	Suspected		138	Undetermined	Work Place	7	Hollywood Wilshire
17	Norovirus	Suspected		167	Undetermined	School	19	Central
18	Norovirus	Suspected		172	Undetermined	School	4	West
19	Norovirus	Suspected		180	Undetermined	Residence	9	West
20	Norovirus	Suspected		235	Tuna Salad	Church	7	West
21	Norovirus	Suspected		238	Undetermined	Restaurant	12	Harbor
22	Norovirus	Suspected		38	Undetermined	Restaurant	8	Alhambra
23	Norovirus	Suspected*		37	Undetermined	Residence	13	Multi
24	Norovirus	Suspected		16	Undetermined	Residence	8	West
25	Norovirus	Suspected		162	Muffins	Retreat	19	San Antonio
26	Salmonella	Lab Confirmed	*typhimirum*	150	Chicken	Dining Hall	39	San Antonio
27	Salmonella	Lab Confirmed	*heidelberg*	161	Raw egg shake	Restaurant	8	West
28	Salmonella	Lab Confirmed	*oranienberg*	169	Undetermined	Restaurant	6	Central
29	Salmonella	Lab Confirmed	*typhimirum*	198	Chicken	Restaurant	5	Central
30	Salmonella	Lab Confirmed	*enteritidis*	236	Potato Puffs	Dining Hall	19	Foothill
31	Hepatitis A	Lab Confirmed		145	Ice	Bar	8	Harbor
32	Hepatitis A	Lab Confirmed		176	Undetermined	Restaurant		Pomona
33	Shigella	Lab confirmed	*sonnei*	9	Sushi	Restaurant	8	Central
34	Toxin	Lab confirmed	(Scombroid)	124	Tuna	Restaurant	2	West Valley
35	Bacterial Toxin	Suspected		217	Meatballs	Residence	7	Central
36	Unknown GI	Unknown		15	Undetermined	Work Place	7	Bellflower
37	Unknown GI	Unknown		96	Undetermined	Restaurant	13	Central

Table B. LAC Foodborne Outbreaks Laboratory Summary: Outbreaks Confirmed Etiologic Agent, 2006

Number of Outbreaks	Bacterial	Bacterial Toxin	Norovirus	Hep A	Unknown/ Other	Total
Investigated	6	1	27	2	2	37
Tested	6	1	4	2	2	13
Lab Confirmed	6	1	4	2	2	13

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

CDC:

- Foodborne and Diarrheal Diseases Branch – www.cdc.gov/foodborne
- Outbreak Response and Surveillance Team – www.cdc.gov/foodborneoutbreaks
- FoodNet – www.cdc.gov/foodnet
- Norovirus Information – www.cdc.gov/foodborneoutbreaks/

Other national agencies:

- FDA Center for Food Safety and Applied Nutrition – www.cfsan.fda.gov
- Gateway to Government Food Safety Information – www.FoodSafety.gov

HEALTHCARE ASSOCIATED OUTBREAKS

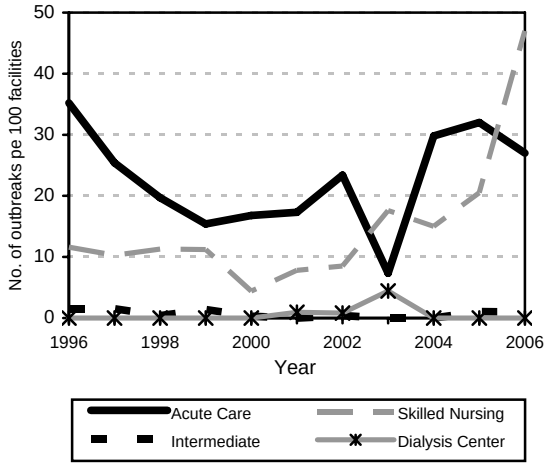
DEFINITION

Healthcare associated outbreaks are defined as clusters of nosocomial (health-facility acquired) or home-healthcare-associated 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 healthcare associated outbreaks increased 81% from 2005 to 2006 and 123% from the mean number of outbreaks the previous 4 years.
- In 2006, skilled nursing facility (SNF) outbreaks were responsible for the entire increase in healthcare facility outbreaks, and increased 128% from 2005 (Table 1). This was largely due to a significant increase in gastrointestinal (GI) outbreaks.

Figure 1
Healthcare Associated Outbreaks
LAC, 1996–2006



Denominator data from the Electronic Licensing Management System(ELMS) database for LAC

Table 1. Number of Reported Outbreaks in Healthcare Facilities LAC, 2002–2006

	YEAR				
Type of Facility	**2002**	**2003**	**2004**	**2005**	**2006**
Acute Care Hospitals	26	8	31	34	28
Provider Offices	2	0	0	0	0
Dialysis Facilities	1	9	0	0	0
Intermediate Care/Psych	1	0	0	3	3
Skilled Nursing Facilities	37	75	63	76	173
TOTAL	**67**	**92**	**94**	**113**	**204**

Acute Care Hospitals: There were 28 outbreaks reported in acute care hospitals in 2006 (Table 1). Fifty percent (n=14) of these outbreaks occurred in a unit that required intensive or focused specialized care (e.g., NICU, cardio-thoracic unit, burn unit) (Table 2). Eighteen percent (n=5) occurred in the psychiatric or behavioral units within the acute care hospital. As in previous years, scabies accounted for the majority of acute care outbreaks (n=8 or 29%). Fifty percent (n=14) of acute care outbreaks were of bacterial etiology (Table 3). Multi-drug resistant organisms such as MRSA, *Stenotrophomonas maltophilia* and *Acinetobacter baumannii* accounted for 8 outbreaks in 2006. In 2006, the etiologic agents contributing the largest number of cases in acute care outbreaks were mold (n=85 or 24%), followed by scabies (n=83 or 25%).

Table 2. Acute Care Hospital Outbreaks by Unit—LAC, 2006

Outbreak Location	No. of Outbreaks
Intensive Care-Neonatal	7
Multiple Units	7
Psychiatric	5
Intensive Care - Adult	3
Medical-Surgical	2
Burn	1
Cardio-thoracic	1
Nursery, Intermediate Care	1
Telemetry	1
Total	**28**

Table 3. Acute Care Hospital Outbreaks by Disease/Condition—LAC, 2006

Disease/Condition/ Etiologic Agent	No. of Outbreaks	No. of Cases
Scabies	8	83
Acinetobacter baumannii	3	36
MRSA	3	12
Multiple Mold	2	85
Stenotrophomonas maltophilia	2	21
Unknown Gastroenteritis	2	27
Candida albicans	1	6
Elizabethkingia meningoseptica	1	25
Escherichia coli	1	8
Multiple Bacterial Organisms	1	3
Norovirus	1	8
Pseudomonas aeruginosa	1	11
Salmonellosis (Non-Typhoid)	1	3
Vancomycin-Resistant Enterococcus faecium	1	6
TOTAL	**28**	**334**

Skilled Nursing Facilities: Reported skilled nursing facility outbreaks increased by 128% in 2006, with 173 outbreaks in 2006, as compared to 76 outbreaks in 2005. Gastroenteritis, including unknown GI, and scabies were the most common causes (Table 4), together accounting for 95% of the total outbreaks in SNFs and 97% of the total cases.

Table 4. Skilled Nursing Facility (SNF) Outbreaks by Disease/Condition LAC, 2006

Disease/Condition	No. of Outbreaks	No. of Cases
Gastroenteritis • unspecified (n=1) • norovirus (n=60)	61	1574
Unknown Gastroenteritis	56	854
Scabies	48	338
Unknown Rash	4	60
Clostridium difficile	1	8
Salmonellosis (Non-Typhoid)	1	2
Respiratory illness • unspecified	1	2
Headlice	1	2
Total	**173**	**2840**

COMMENTS

Healthcare associated infections (HAI) have generated a great deal of attention in the US within the past few years, with a focus on public disclosure of HAI's in the acute care hospital setting [1]. There has been

ongoing debate among stakeholders on how to best facilitate HAI disclosure, and no consistent process to disseminate the information, based on the same criteria, has been identified. In September 2006, California approved Senate Bill (SB) 739, which directs hospitals to evaluate and augment existing infectious disease control programs and implement new standards to prevent HAI. Implementation began July 1, 2007 and will be phased in over a three-year period. Major components of the bill are pandemic influenza preparation and planning, evaluating the judicious use of antibiotics and annual state reporting its implementation of specified infection surveillance and infection prevention process measures, and to develop, implement and evaluate compliance with policies and procedures to prevent surgical site infection, ventilator associated pneumonia, and subject to surveys by CDPH Licensing and Certification on compliance with new infection control procedures and reporting measures [2]. ACDC is working with the state and local providers regarding the requirements of this bill.

Los Angeles County experienced a slight decrease in the number of reported scabies outbreaks in both acute care and skilled nursing healthcare facilities from 2005 to 2006. In 2005, 13 scabies outbreaks (229 cases) were reported in acute care facilities, as compared to 8 scabies acute care facility outbreaks (83 cases) in 2006 (Table 3). Overall, SNF scabies outbreaks also decreased. In 2005, 55 scabies outbreaks (404 cases) were reported in SNFs, as compared to 48 (338 cases) SNF outbreaks in 2006, a decrease of 13%.

In 2005 and 2006, ACDC initiated a SNF needs assessment to assess general communicable disease reporting knowledge, ascertain staff infection control practices, and to identify knowledge gaps and elicit training needs. One hundred SNFs in Los Angeles County were randomly selected to participate in the needs assessment and fifty-nine (59%) responded to the survey questionnaire. All respondents (n=59) reported that they have an infection control policy and procedure manual and 51 (86%) reported that the manual is reviewed annually. At the time of the survey, fifty-eight respondents (98%) reported that they have at least one individual assigned to infection control activities that are trained in disease surveillance, prevention and control, and fifty-four (92%) reported that the individual assigned to infection control activities is a full-time employee. Eighty-six percent are interested in infection control and reportable disease training for their staff. Additional training topics identified include hand hygiene education, MRSA, *Clostridium difficile*, scabies and influenza management and control. Based on these findings, ACDC will explore collaboration with LAC DPH Health Facilities Inspection Division to address training needs.

ACDC investigated two outbreaks that implicated improper and/or inconsistent disinfection and cleaning practices of reusable medical devices. The first outbreak involved an adult ICU and *Escherichia coli* found on the transesophageal echocardiography (TEE) probe, a flexible endoscope used to visualize the heart. The second outbreak involved a neonatal ICU and *Pseudomonas aeruginosa* discovered on a laryngoscope blade. In both outbreaks, instrument cleaning was in violation of the facility's established cleaning and disinfection policy (see 2006 Special Studies Report for detailed article). Staff non-compliance with their facility's instrument cleaning and disinfection policies is frequently cited in the literature as a cause of hospital-acquired infection [3].

For several years throughout the US, cases and outbreaks of *Clostridium difficile* associated disease (CDAD) have increased. The CDC has verified that the new highly toxic strain of *Clostridium difficile* (*C. diff*) has been confirmed in LAC patients. This strain of *C. diff*, known as B1/NAP1, has been associated with high recurrence rate and fatality. The *C. diff* bacillus produces several exotoxins that can cause colitis, ileus, and even death. The new strain produces as much as16 times more toxin A and 23 times more toxin B, compared with the common strain. The bacillus is carried in feces and is transmitted through direct and indirect contact with the contaminated environment or hands of healthcare providers. Previously, the severely ill and elderly patients on prolonged antimicrobials were typically affected; however, more and more the disease is being found among the otherwise healthy population. Symptoms include watery bloody diarrhea, severe cramping, abdominal pain, and fever. An advisory was sent to hospital infection control professionals informing them that the virulent strain was now identified in LAC and to strengthen appropriate infection prevention and control measures to reduce nosocomial transmission. ACDC will continue to monitor the situation and encourage our healthcare partners to conduct surveillance by screening symptomatic patients appropriately to help identify future trends of the disease and its changing epidemiology.

Another disturbing trend is the increase in multidrug-resistant organisms (MDROs) that are seen in all healthcare settings, and of particular significance in hospitalized patients. Methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococcus (VRE) and certain Gram-negative bacteria (e.g., *Acinetobacter baumannii* and *Elizabethkingia meningoseptica*), are resistant to multiple classes of antimicrobial agents [4]. The full economic impact of MDROs on acute healthcare facilities and society at large has yet to be determined; however, the literature cites challenges faced because "…so many variables and perspectives are involved". These challenges have many elements, including clinician prescribing practices and the appropriate and judicious use of antibiotics; development of new antimicrobial agents; surveillance for antimicrobial-drug resistance, implementing infection control measures; adapting laboratory methods for detecting new types of antimicrobial-drug resistance, education programs, and influencing drug choice [5]. ACDC will continue to monitor this shift and collaborate on control and prevention efforts with state and national organizations.

The ACDC Hospital Outreach Unit (HOU) is an integral component of the public health link to infection control professionals and community healthcare agencies. Team members continue to strengthen communication and collaboration between public health and the acute care hospitals to increase disease and outbreak reporting.

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Acute Communicable Disease Control
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2006

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2006 ANNUAL MORBIDITY REPORT

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ACUTE COMMUNICABLE DISEASE CONTROL PROGRAM
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