Epidemiologic Summary of Hantavirus Pulmonary Syndrome (HPS) in California, 2001 - 2008

Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 16 cases of hantavirus pulmonary syndrome (HPS) with estimated onset dates from 2001 through 2008. The highest numbers of cases were in 2003 (5) and 2006 (4).
- During the surveillance period, 4 (25.0 percent) cases were reported to have died with HPS.
- The median age among cases was 45 years (range: 12 to 74 years) and the highest number of cases occurred among persons 55 to 64 years of age (4 cases).
- HPS cases reported White non-Hispanic (68.8 percent), Hispanic (25.0 percent) and Native American (6.3 percent) race/ethnicities. The ratio of male to female cases was 1.7:1.0.
- Avoiding contact with rodents and their excreta are primary strategies for reducing the risk of hantavirus exposure and provide the best opportunities for HPS prevention and control.

Background

Hantavirus pulmonary syndrome (HPS) is a rodent-borne viral disease that was first recognized in 1993 when an outbreak of severe respiratory illnesses occurred among residents of the southwestern United States (US). HPS is an acute respiratory illness characterized by a flu-like prodrome consisting of fever, chills, myalgias, headaches, and gastrointestinal symptoms, followed by often severe cardiopulmonary dysfunction resembling adult respiratory distress syndrome (ARDS). Nationwide, the case-fatality ratio for HPS is 30 to 40 percent.

Hantaviruses are maintained in rodents which shed the virus in their urine and feces; humans become infected when rodent excreta are stirred into the air and inhaled. Sin Nombre virus is the hantavirus that causes the majority of the HPS cases in the US. Its reservoir, the deer mouse, is prevalent in undeveloped areas throughout the western US and will readily enter homes and buildings in search of food or nesting material. There is no national *Healthy People 2010* target objective for HPS.

We describe here the epidemiology of HPS in California from 2001 through 2008. Data for 2008 are provisional and may differ from data in future publications. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes[1]. Because of the small numbers of reported cases, incidence rates were not calculated.

California reporting requirements and surveillance case definition

California Code of Regulations, Title 17, requires health care providers to report suspected cases of hantavirus infections to their local health department immediately by telephone. HPS is not included in state regulations requiring notification by laboratories to local health officials.

Local health officers are required by regulation to report to CDPH cases of hantavirus infections. CDPH officially counted cases that satisfied the Centers for Disease Control and Prevention (CDC) surveillance case definition for HPS. During the surveillance period, CDC defined a confirmed case as one with clinically compatible illness and laboratory confirmation. Clinically compatible illness included one or more of these clinical features: (i) a febrile illness (i.e., temperature greater than 101.0^{o} F [greater than 38.3^{o} C]) characterized by bilateral diffuse interstitial edema that may radiographically resemble ARDS, with respiratory compromise requiring supplemental oxygen, developing within 72 hours of hospitalization, and occurring in a previously healthy person or/and (ii) an unexplained respiratory illness resulting in death, with an autopsy examination demonstrating noncardiogenic pulmonary edema without an identifiable cause. Laboratory confirmation included detection of hantavirus-specific immunoglobulin (Ig) M or rising titers of hantavirus-specific IgG, or detection of hantavirus-specific ribonucleic acid sequence by polymerase chain reaction in clinical specimens, or detection of hantavirus antigen by immunohistochemistry.

Epidemiology of HPS in California

CDPH received reports of 16 cases of HPS with estimated onset dates from 2001 through 2008. The highest numbers of cases were in 2003 and 2006 and the lowest numbers were in 2002 and 2007. There were no reported cases in 2001, 2005, and 2008 [Figure1]. During the surveillance period, 4 (25.0 percent) cases were reported to have died with HPS.

The number of HPS cases during the surveillance period was highest among persons 55 to 64 years of age [Figure 2]. The median age among cases was 45 years (range: 12 to 74 years). HPS cases reported White non-Hispanic (68.8 percent), Hispanic (25.0 percent) and Native American (6.3 percent) race/ethnicities. The ratio of male to female cases was 1.7:1.0.

Ten cases were residents of Northern California and 6 were residents of Southern California. The counties of Los Angeles (2), Mono (2), San Bernardino (2), and San Diego (2) were the only counties to report more than 1 case. Public health investigation of HPS cases revealed that the likely sites of exposure were the eastern Sierra Nevada (Mono, Inyo, Alpine Counties) for 7 cases, the northern Sierra Nevada (El Dorado, Nevada, Sierra, Plumas Counties) for 4 cases, the southern California mountains and deserts for 3 cases, and undetermined for 2 cases.

Figure 1. California HPS case counts by estimated onset year

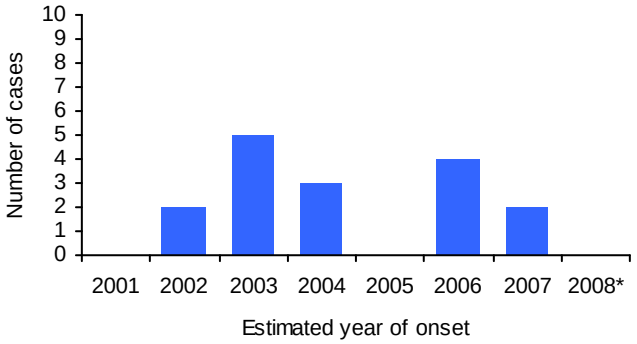
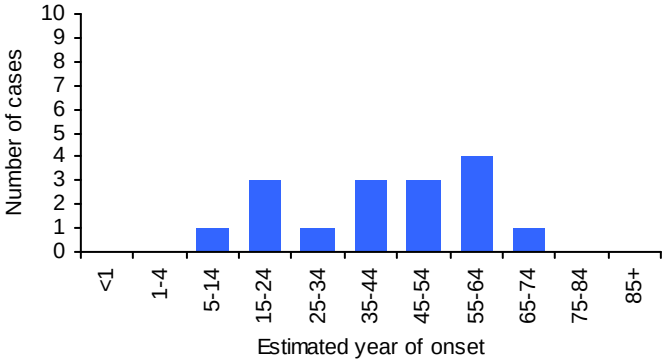


Figure 2. California HPS case counts by age-group



Notes for Figures 1 and 2
*2008 data are provisional

Comment

HPS infections are associated with domestic, occupational, or recreational activities that bring humans into contact with rodents and their excreta, usually in rural settings[2]. Many HPS cases in California reported working in or cleaning confined poorly ventilated areas around their home or work place--such as storage buildings, sheds, or basements--prior to onset. A substantial proportion of cases were residents of or visitors to the eastern Sierra Nevada; 3 cases were residents of coastal counties who became ill after camping in the eastern Sierra. Finally, follow-up investigations indicated that at least 4 cases may have been exposed at either their residence or their worksite, underscoring the ubiquity with which infected mice occur in some areas.

Avoiding contact with rodents and their excreta are primary strategies for reducing the risk of hantavirus exposure and provide the best opportunities for HPS prevention and control. Useful measures include preventing rodents from entering buildings, eliminating current rodent infestations, and proper respiratory protection when working in poorly ventilated areas infested with rodent excreta.

References and resources

[1] Epidemiologic Summaries of Selected General Communicable Diseases in California, 2001-2008: Technical Notes
http://www.cdph.ca.gov/data/statistics/Documents/technicalnotes-episummary-aug2409.pdf

[2] Hantavirus Pulmonary Syndrome—United States: Updated Recommendations for Risk Reduction. MMWR July 2002, 51 (RR09); 1-12.

Last updated10/22/2009

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