

AN EPIDEMIOLOGY PUBLICATION OF THE PUBLIC HEALTH DIVISION  
OREGON DEPARTMENT OF HUMAN SERVICES

## HANTAHELPER

**I**N 1993, AN OUTBREAK of acute respiratory failure and shock killed primarily healthy adults in the Southwestern United States. That disease, now known as Hantavirus Pulmonary Syndrome (HPS), was found to be caused by Sin Nombre Virus (SNV)—a previously unknown hantavirus.<sup>1,2</sup>

Since this discovery, the number of different hantaviruses identified in the Western Hemisphere has grown to at least 23.<sup>3</sup> Each hantavirus species appears to have a single predominant rodent host species whose members may acquire chronic, asymptomatic, lifelong infection.<sup>4</sup> SNV is by far the major cause of HPS in the U.S.

### CLINICAL DISEASE

HPS typically begins as headache, fever, and myalgias that commence 1–6 weeks after exposure to the urine, droppings, or saliva of infected rodents. This prodrome is followed within a few days by diffuse, interstitial pulmonary edema, often resembling ARDS radiographically and leading to respiratory failure. Thrombocytopenia and hemoconcentration (due to capillary leakage) are characteristic laboratory findings.<sup>5</sup> Treatment consists of aggressive respiratory and hemodynamic support; there is no specific therapy for HPS.<sup>6,7</sup> The case-fatality rate is 30%–40%.

### EPIDEMIOLOGY

From recognition of the disease in 1993 through April 2006, CDC logged 439 cases of HPS, 154 (35%) of which were fatal. The disease has been reported from 30 states. Most HPS cases occur in spring and summer, but the seasonality of HPS can vary by elevation, location, and biotic community, and cases have

been identified throughout the winter and early spring.<sup>8</sup>

CDC recently reported that during January–March of this year, a total of nine confirmed cases of HPS were reported from Arizona, New Mexico, North Dakota, Texas, and Washington State.<sup>9</sup> Why is this important? During 1994, 1999 and 2000, high national case counts were presaged by more than six cases being identified during January–March. In 1994 and 1999, following increased rainfall and vegetative biomass, rodent populations increased, suggesting a biological explanation for these high-incidence years.

Eight cases of hantavirus infection have been identified in Oregon since 1993, including one this April (see Table). Note that six of these resided east of the Cascade Moun-

tain of SNV. Studies of SNV in North America have shown great genetic and geographic diversity that may be the result of the genetic diversity of deer mice.<sup>10</sup> The relationship between the virus and its host shows remarkable concordance, supporting the idea of a long history of co-evolution.

To improve our understanding of this relationship, investigators at Portland State University have been collecting specimens of both host and virus from five parks in the Portland area. Trapping at each park 19 times over the course of three years, 5,058 animals from 21 species were captured and tested for antibody to SNV by enzyme-linked immunosorbent assay. Deer mice testing positive for antibody to SNV were found in all five parks. Overall, 5.3% tested positive, with the infection rate vary-

### Hantavirus Pulmonary Syndrome Cases in Oregon, 1993–2006

Year	County	Age Range*	Sex	Exposure
1993	Wasco	10-19	M	Farming
1994	Washington	50-59	M	Contact with mice at home
1995	Deschutes	20-29	M	Camping
1995	Klamath	20-29	F	Unknown
1996	Klamath	40-49	M	Contact with mice at home
2005	Washington	60-69	F	Contact with mice at home
2005	Wasco	30-39	M	Farming
2006	Deschutes	20-29	M	Unknown

\*exact ages withheld to maintain confidentiality

ains (Deschutes, Klamath and Wasco Counties). Five cases had definite exposure to mice in the basement or under the house; the other three did not recall contact with mice, but their work activities included farming and landscaping.

### OF MICE AND MEN

The deer mouse *Peromyscus maniculatus* is the predominant res-

ing from 0%–30%, depending on the park and the season.

The PSU investigators have also been characterizing the local deer mice and hantavirus strains genetically. Their research suggests that the deer mice in Oregon are a distinct species, and that the local virus likely constitutes a new strain. This might help to explain why Oregon

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## CD SUMMARY

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has had so few HPS cases compared to nearby states like Washington (33 cases), Idaho (12), and Nevada (21). If the hantavirus found in Oregon is a different strain or species, it may be less pathogenic or more difficult to acquire than other strains.

### MICE THAT BITE MICE

Is it possible to reduce the infection rate among the reservoir mice? SNV is spread among deer mice through aggressive biting, so reducing the relative density of the deer mouse population compared to that of other mammals in the area might reduce transmission among mice, which would in turn reduce the exposure of humans. PSU research into these rodent-virus relationships around Portland suggests that maintaining biodiversity suppresses hantavirus prevalence in the host population.

### RECOMMENDATIONS

Public health education should focus on reducing risk among people living in rural areas, especially in spring and summer, historically the peak season for HPS. CDC's "Seal Up! Trap Up! Clean Up!" campaign (<http://www.cdc.gov/rodents/index.htm>) offers detailed information on preventing transmission of diseases from rodents. Measures to prevent HPS include

- sealing up holes inside and outside the home to prevent entry by rodents;
- trapping rodents around the home to help reduce the rodent population;
- cleaning up potential rodent food

sources and nesting sites; and

- taking precautions when cleaning.

### CONCLUSIONS

Early returns from other states suggest that 2006 may be a high-incidence year for hantavirus in the U.S. There's plenty of hantavirus in the rodent populations of Oregon, but, fortunately, human cases have been rare here—only eight cases since 1993. Cases have been more common east of the Cascade mountain range. Refer concerned patients to the CDC web site above for prevention advice—especially if they'll be mucking around mouse-infested basements. Suspect hantavirus in patients with severe respiratory illness and thrombocytopenia.<sup>11</sup> Report suspected cases to the patient's local health department within one working day..

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### MUMPS REPORTABLE AS OF JULY 1

Since we asked for voluntary reporting of mumps (*CD Summary*, May 2), 57 cases have been identified in Oregon. Of these, 42 have been in Lane County, and none are known to be connected to the outbreak in the Midwest.

By temporary administrative rule authorized by Oregon Revised Statute 183.335(5), we will require reporting of suspected or confirmed mumps as of July 1. Reports should be made to the local health department for the jurisdiction in which the patient resides. The temporary rule will last for 180 days, and during this time, we anticipate making mumps reportable indefinitely. In that spirit, we invite your comments at a hearing on August 22 at 1 p.m., Room 120B, Portland State Office Building, 800 NE Oregon St., Portland. You may also call in your comments to the Acute & Communicable Disease Prevention section at (971) 673-1111; or e-mail us at [ohd.acdp@state.or.us](mailto:ohd.acdp@state.or.us).

Thank you in advance for your cooperation with this rule.

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