

Hantavirus in California

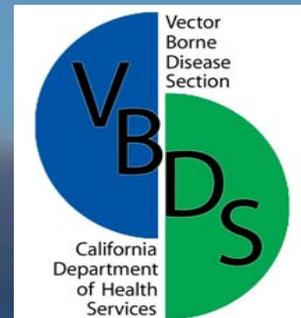
Or...

How to avoid Mickey Mouse
and still have fun in
Disneyland



Joe Burns

**California Dept. of Health Services
Vector-Borne Disease Section**



Overview

- **VBDS Mission**
- **A Brief History of Hantavirus**
- **Etiology and Investigations**
- **Symptoms and Treatment**
- **Risk Factors...Avoiding and Preventing it in the First Place!!**

VBDS Mission Statement

To protect the public health and well-being of Californians from arthropod and animal transmitted diseases and injurious pests.

USFS-DHS Cost-Share Agreement

In 1992, VBDS entered into a Challenge Cost-Share Agreement with the Pacific Southwest Region of the USFS to maintain cooperative surveillance and control of vector-borne diseases within the National Forests of California

National Forests in California



CDHS/VBDS Responsibilities:

- **Disease Investigation**
- **Surveillance and Control**
- **Expertise and Education**

History



- First detected in 1993 in Four Corners region



* ATTENTION *

IF YOU HAVE A
FEVER ALONG WITH
MUSCLE ACHES AND
PAINS, PLEASE STAY
IN YOUR CAR AND
WE WILL EXAMINE
YOU THERE.

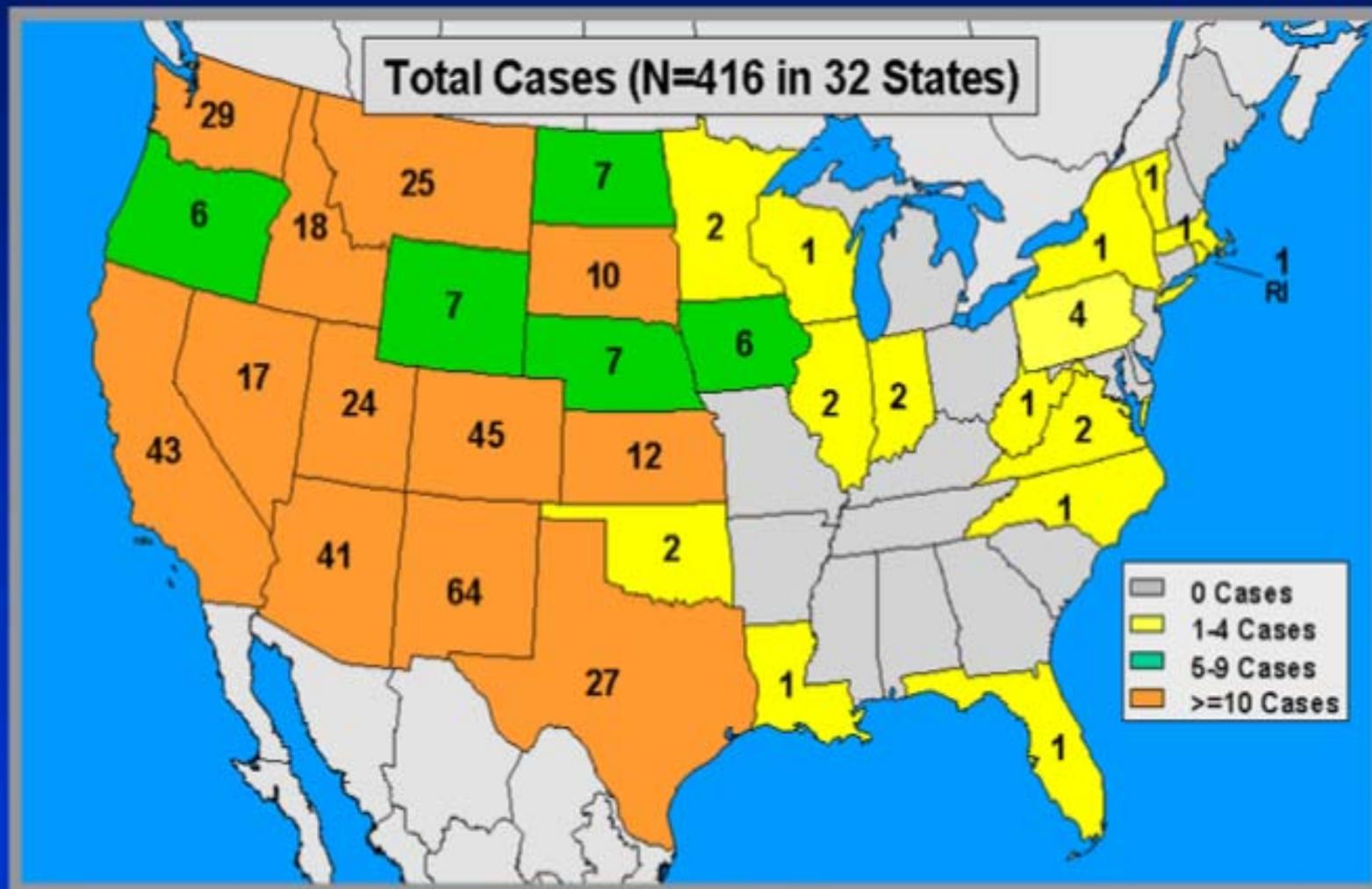
*Hantavirus comes to Four Corners.
Summer 1993.*

History continued...

- First detected in 1993 in Four Corners region
- Unusual disease “recognized” by physician for the Navajo Nation
- Initial case fatality rate of 76%
- Still maintains high mortality rate (>35%)

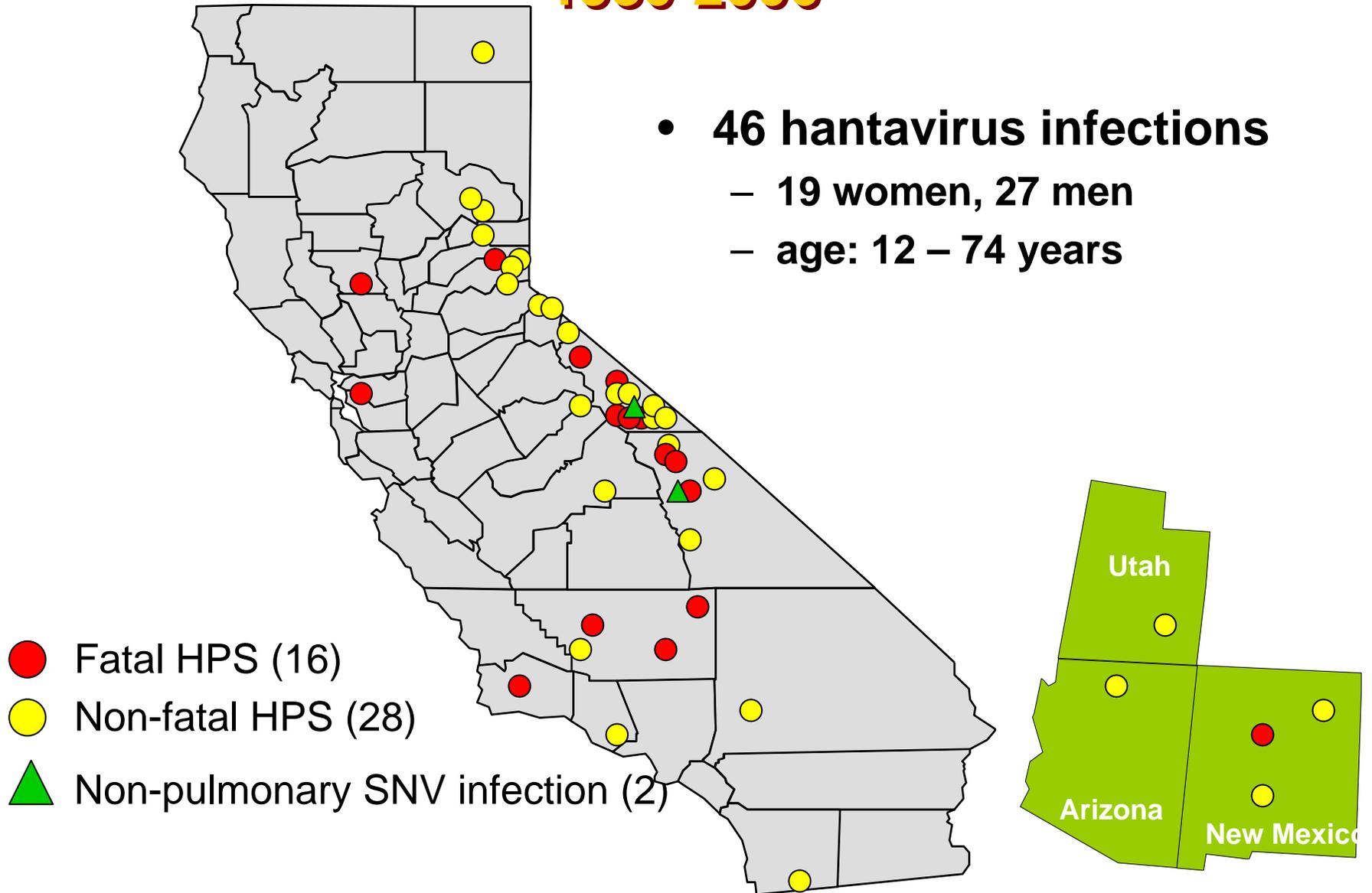


Hantavirus Pulmonary Syndrome Cases by State of Residence United States – February 1, 2006



Five cases were reported with either unknown state of residence or were not residents of the United States.

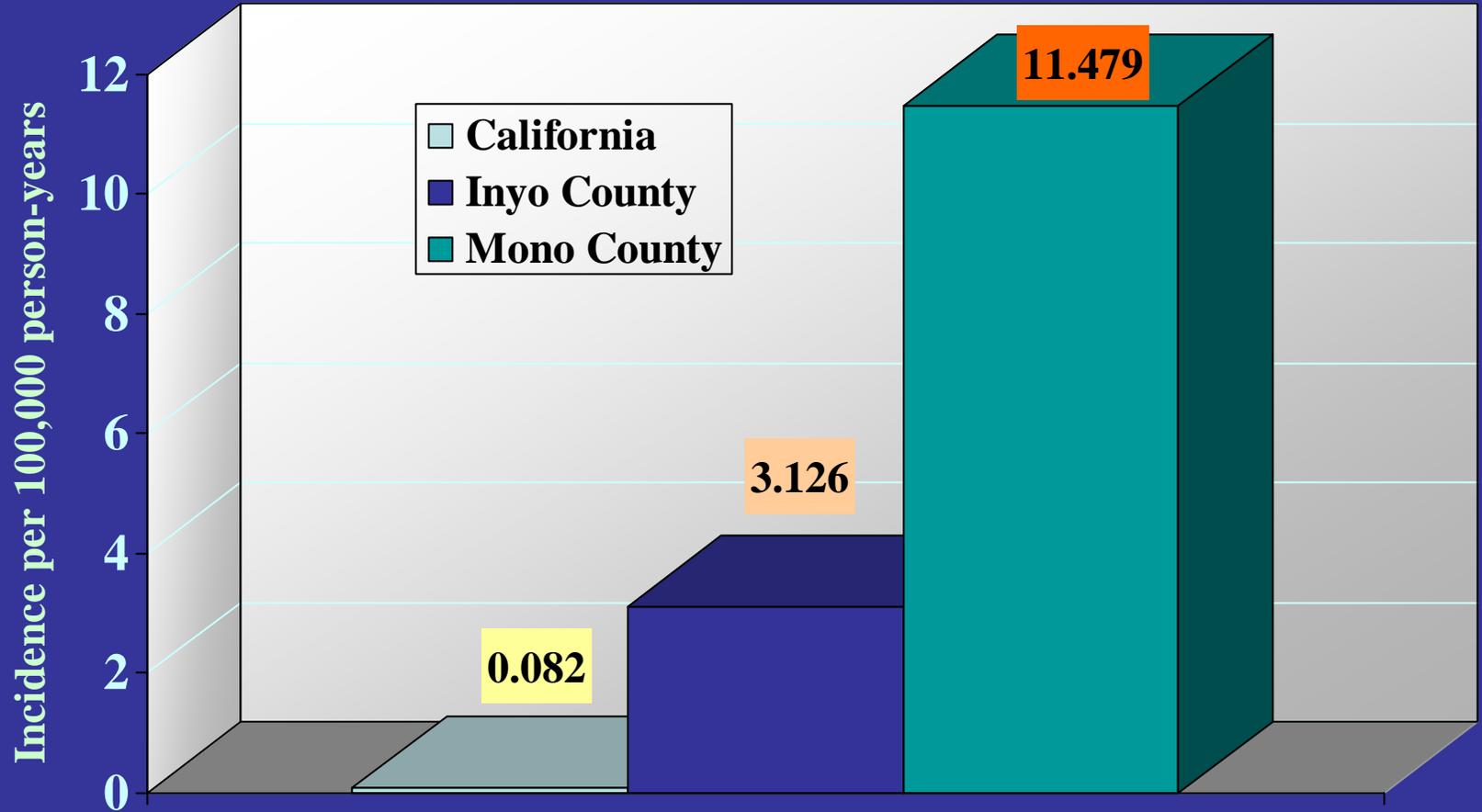
Hantavirus infection in California residents 1980-2006



- **46 hantavirus infections**
 - 19 women, 27 men
 - age: 12 – 74 years

Mapped by suspected site of exposure

Incidence of SNV infection California, 1993-2001



Hantavirus Etiology

- **Family: Bunyaviridae**
- **Sin Nombre Virus – causal agent of HPS**
- **Numerous hantaviruses in the Western Hemisphere**

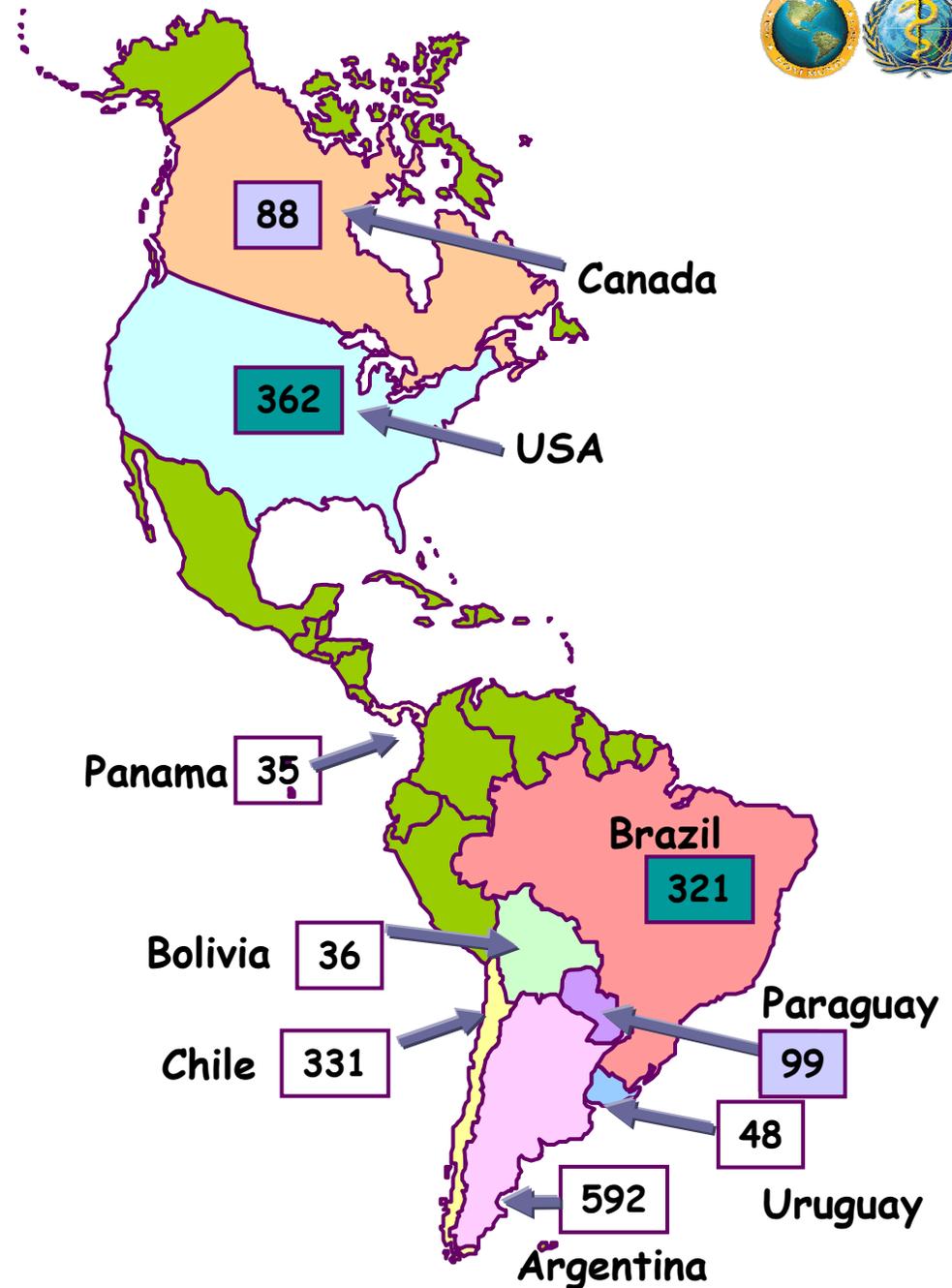


Number of Cases of Hantavirus Pulmonary Syndrome (HPS)

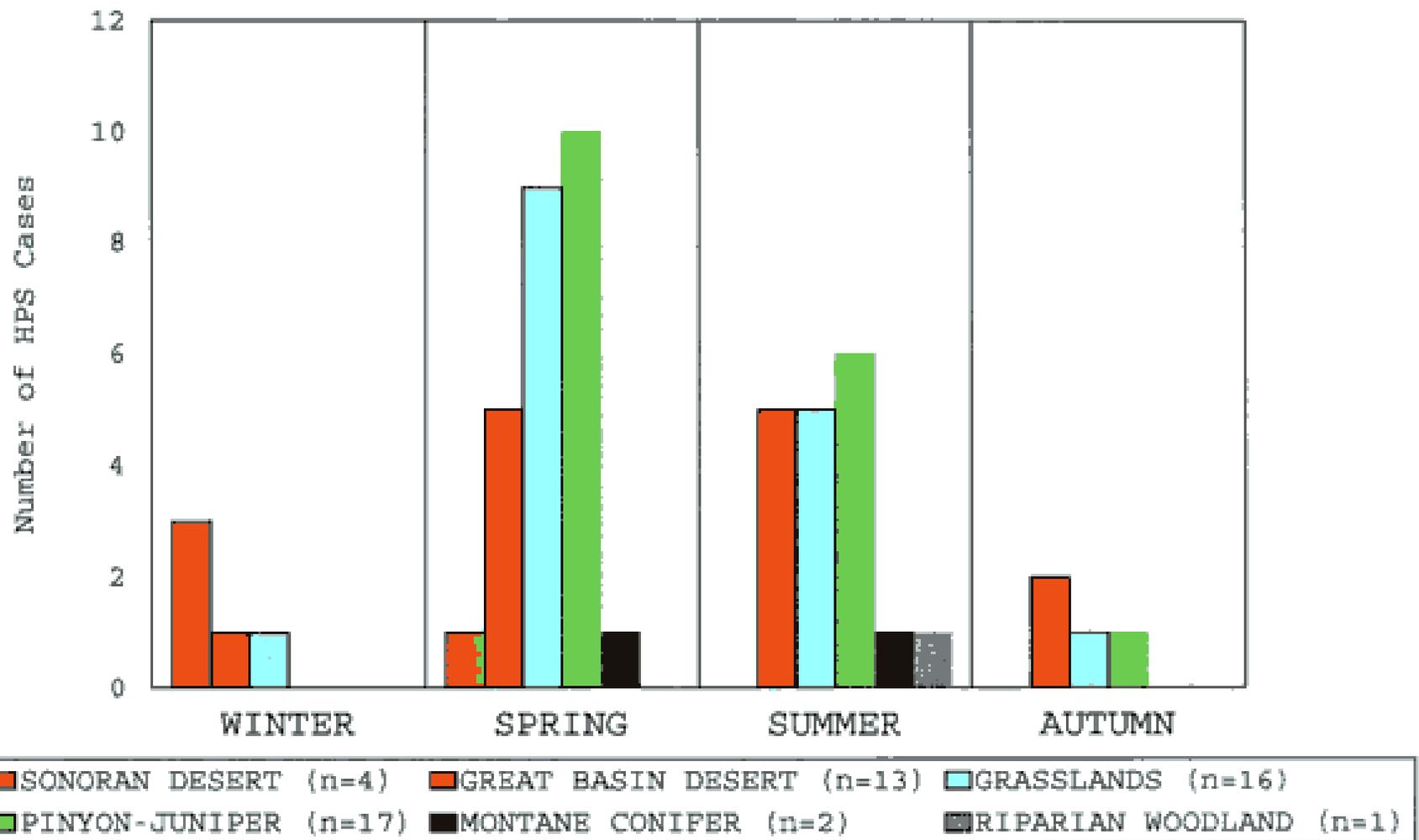
(Region of the Americas, 1993-2004*)

□ = No. of cases

Total cases = 1910



* 2004 using preliminary data.



Number of hantavirus pulmonary syndrome cases occurring in specific biomes by season of onset (1993–1995) (n = 53 cases).

Etiology continued...

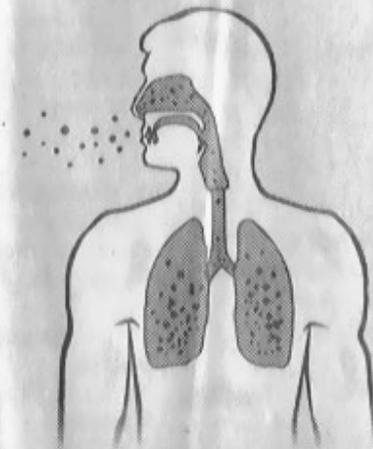
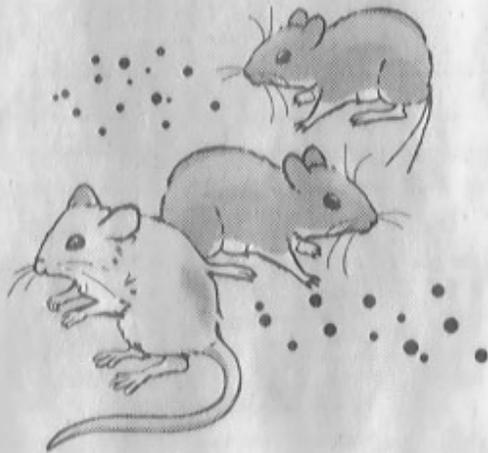
- Reservoir and Vector:
Peromyscus
maniculatus a.k.a. deer mouse
 - Habitat: found throughout California and U.S.; desert to alpine
 - Temporal and spatial variations in density and seroprevalence
 - Probably lifelong infection



Primary Method of Infection

How the virus is given to humans

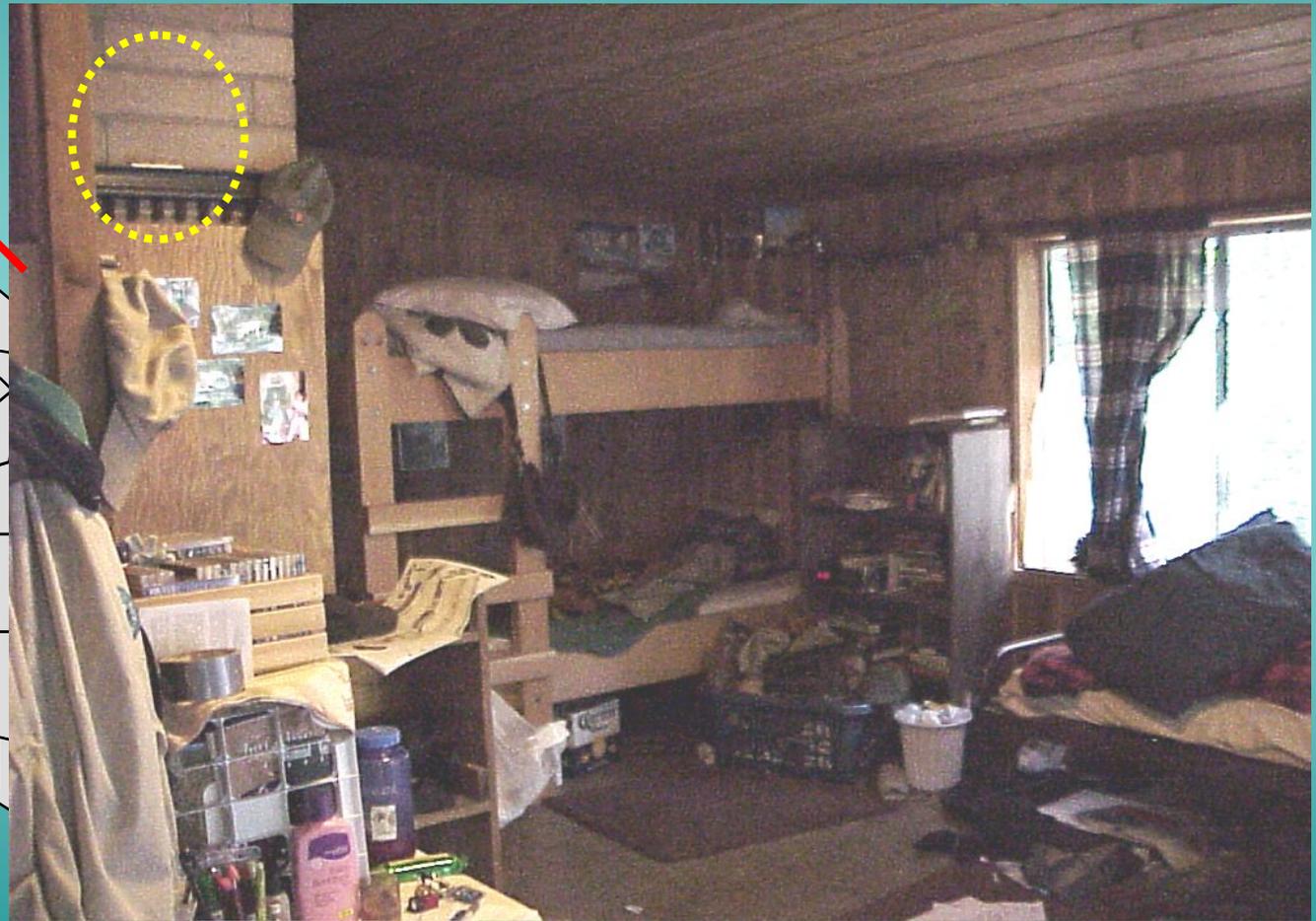
- 1 Mouse droppings, urine and saliva containing the virus collect in areas where humans and mice coexist.
- 2 Particles containing the virus become airborne when disturbed.
- 3 Particles are inhaled and person becomes ill with the hantavirus pulmonary syndrome.

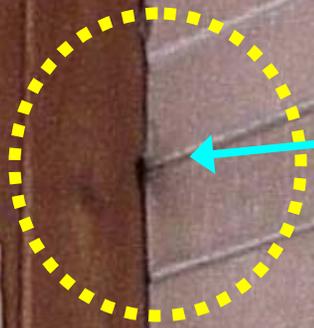
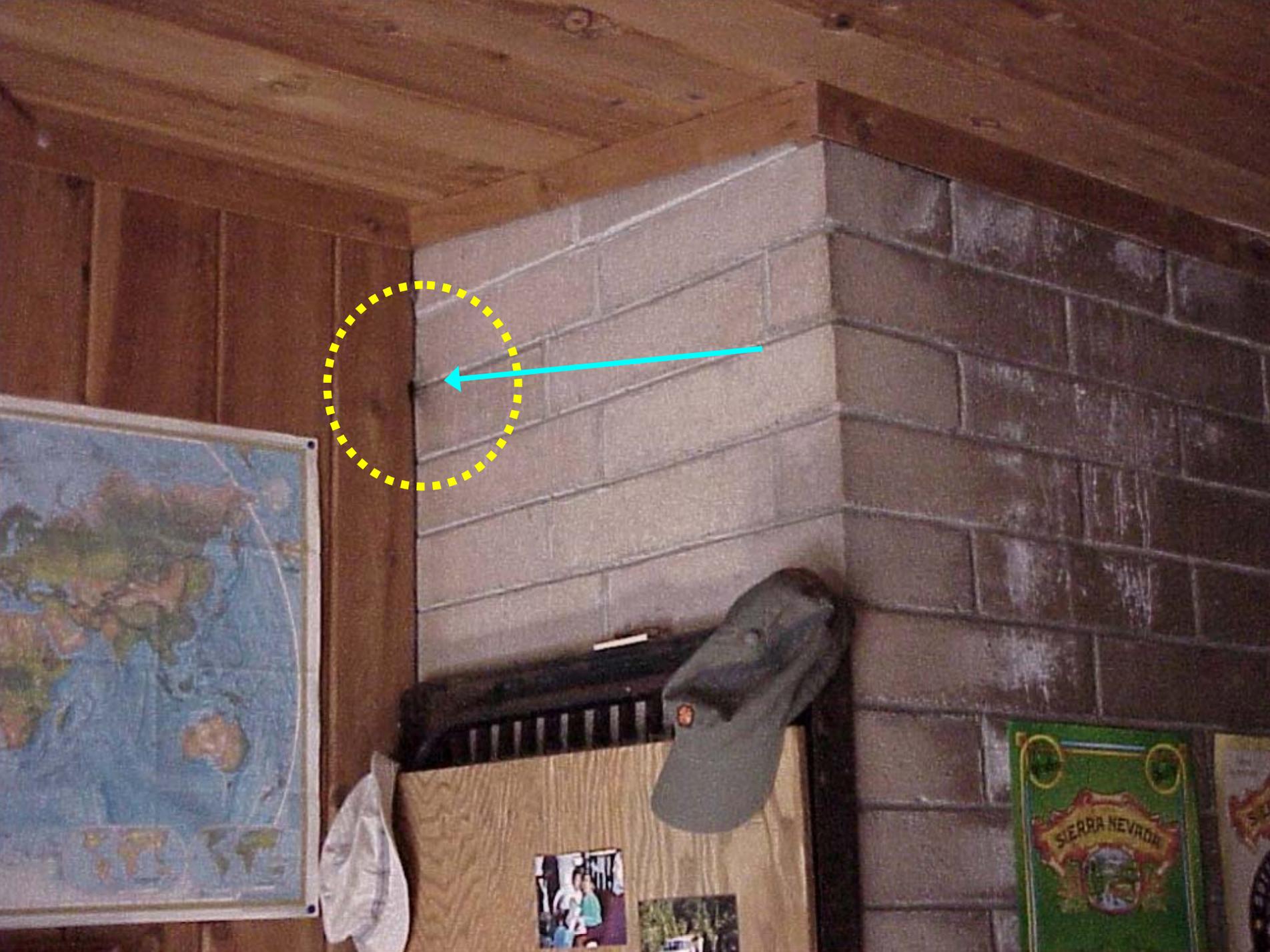


Hantavirus Risk Evaluation

- **12 of 46 cases of SNV infection identified in Californians had confirmed or suspected occupational exposure**
 - **utility worker (3)**
 - **graduate student/field biologist (2)**
 - **ranch hand**
 - **sanitation worker**
 - **USFS employee**
 - **camp counselor**
 - **oil company employee**
 - **truck driver**
 - **social service volunteer**

2004: HPS in the Plumas N.F.





Investigation

- **Exposure investigation**
 - frequently handled rodents as field biologist for academic research project
 - deficiencies noted in personal protection protocols for rodent handling
 - 11 of 24 *P. maniculatus* collected from study sites were seropositive
 - evidence of rodent ingress and activity at workers' cabins
 - 5 of 21 *P. maniculatus* collected from cabins were seropositive

Hantavirus Symptoms

- **The illness begins as a nonspecific febrile prodrome, sharing many of its initial symptoms with other more common viral infections.**
- **Clinical symptoms include fever, muscle and body aches, chills, dry cough, nausea, vomiting, diarrhea. Following these symptoms, patients may experience shortness of breath due to fluid filling the lungs.**

HPS CLINICAL PRESENTATION

Most Frequent

fever

chills

muscle pain
(often non-
specific)

Frequent

headaches

nausea,
vomiting

abdominal
pain

diarrhea

cough

malaise

Other

shortness of
breath

dizziness

pain in joints

back or chest
pain

sweats

Treatment

- Largely supportive
- Clinical Trial: **Ribavirin** did not work
- No vaccine
- Early diagnosis critical to positive outcome

Hantavirus Risk

- **Factors increasing risk:**
 - Presence of deer mice in structures.
 - Structures vacant during the winter months.
 - Fire camps, fire lookouts, seasonal use facilities
 - Lack of sunlight and airflow in structure.
 - Sweeping (aerosolizing) rodent urine & feces.
 - Contact with rodent urine and feces.
- **Most outdoor locations considered low risk.**

Risk Reduction Methods

- **Education**
 - Presentations, information brochures.
- **Reduce rodent harborage in structures**
- **Destruction of virus**
 - Open structures to light and air prior to entering.
 - Disinfect with bleach, Lysol or household disinfectant.
- **Prevent inhalation of virus**
 - Wear dust mask when cleaning (N95 mask is better).
 - Mop rather than sweep (or wet sweep).

Questions?

