

Occupational Health - Zoonotic Disease Fact Sheet #11

****HANTAVIRUS****

Hemorrhagic fever with renal syndrome (HFRS), Hantaan virus, Puumala virus, Seoul virus, nephropathia epidemica; Hantavirus Pulmonary Syndrome (HPS), Sin Nombre virus, Four Corners virus, Bayou virus, Black Creek Canal virus

SPECIES: Wild rodents, deer mice. ***potential hazard in field studies***

AGENT: Spherical, enveloped particles 90-100 nm in diameter. Bunyaviridae; single stranded, negative sense RNA genome

Two recent researcher Hantavirus Pulmonary Syndrome (HPS) cases (1 fatal) associated with trapping of rodents in field studies

PATHOGENICITY: Characterized by an abrupt onset of fever lasting 3-8 days, conjunctival injection, prostration, backpain, headache, abdominal pains, anorexia and vomiting; hemorrhagic manifestation appears from third to sixth day, followed by proteinuria, hypotension and shock. Fatality (7%) occurs during the hypotension and anuric phase; HPS characterized by fever, myalgia, GI complaints then abrupt onset of respiratory distress and hypotension; mortality approx 40-50%; in survivors, recovery rapid with full restoration of normal lung function

EPIDEMIOLOGY: Endemic in areas with its rodent reservoir including China, Korea, Japan, Scandinavia, Commonwealth of Independent States; other hantaviruses have been identified in urban rats in major Asian and Western cities including USA and Brazil; HPS viruses in south USA (Texas, Arizona, Florida). As of 1998, 200 cases in U.S., eleven in Kansas.

MODE OF TRANSMISSION: Aerosol transmission from infected rodent excreta; virus present in urine, feces, saliva of persistently infected animals; virus concentration highest in the lungs of the rat

INCUBATION PERIOD: From 5-42 days; average 12-16 days

COMMUNICABILITY: Not directly transmitted from person-to-person

DRUG SUSCEPTIBILITY: Ribavirin given IV has shown to be effective during the early phase of the HFRS illness; has not shown any effectiveness for HPS to date

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to 1% sodium hypochlorite, 70% ethanol, 2% glutaraldehyde. Sensitive to heat

LABORATORY-ACQUIRED INFECTIONS: Infections were documented in laboratories over 6 countries; by the end of 1985, 126 lab-acquired infections of HFRS reported in Japan; in 1986 4 lab-acquired infections reported in the U.K.; most cases were caused by aerosols generated by infected rodents

PRIMARY HAZARDS: Aerosol and droplet exposure of the mucous membranes, accidental parenteral inoculation, ingestion

SPECIAL HAZARDS: Generation of aerosols when working with infected rodents. Working in field conditions - trapping wild rodents

PREVENTION & CONTROL: Gloves and gowns, respirators should be worn when handling potentially infectious specimens, cultures or tissues. Allow aerosols to settle.

BIOSAFETY LEVELS: Potentially infected tissue samples should be handled in BSL-2 facilities in accordance with BSL-3 practices. Experimentally infected rodent species known not to excrete the virus can be housed in animal biosafety level 2 (ABSL-2) facilities in accordance with ABSL-2 practices. Biological safety cabinets and other physical containment devices should be used whenever procedures with high potential for generating aerosols are conducted. Serum or tissue samples from potentially infected rodents should be handled in accordance with BSL-3 practices, although BSL-2 laboratories can be used. **CDC guidelines at** <https://www.k-state.edu/safety/lab/labsafety/topics/biologicalsafety/biosafetyLevels.html> and <https://www.k-state.edu/safety/lab/labsafety/topics/biologicalsafety/animalBiosafetyLevels.html>