Outbreak of Human Rabies in Madre de Dios and Puno, Peru Due to Contact with the Common Vampire Bat, *Desmodus rotundus*

Submitted by: Peru
Outbreak of human rabies in Madre De Dios and Puno, Peru due to contact with the common vampire bat, *Desmodus rotundus*
Background

- Human rabies infections in Peru are typically associated with vampire bat or dog bites.
- 1975 - 2006: 234 vampire bat-transmitted human rabies associated deaths were reported from Peru (Epidemiology Office).
- 1987 - 2002: Madre de Dios (MDD), a Department located in the jungle, reported 42 human rabies cases.
- 1989: A large outbreak (24 cases) occurred among gold miners and their family members.
Outbreak investigation

- 23 human deaths occurred between December 2006 and February 2007.
- Areas: MDD, Puno and Cusco.
- Acute febrile syndrome and neurologic manifestations (paralysis, agitation) followed by death.
- Whole brains sent for testing
  - Peruvian National Institutes of Health: detection of rabies antigen by DFA.
  - CDC through NMRC D for sequencing.

Location of the outbreak
Results

- **Cases:**
  - Inambari District (MDD): 6 cases.
  - Ayapata District (Puno): 17 cases.
  - 57% males; 35% under 15 y-old.

- **Laboratory confirmation:**
  - 19 (83%) by direct fluorescent assay (DFA).
  - 2 sequenced: Vampire bat variant rabies.

- **Incubation period:** 8-87 days (average: 31 days)

- **Rabies post-exposure vaccination with Suckling Mouse Brain Vaccine (SMBV) initiated in 7 cases:**
  - 4 started 10 days prior to disease onset.
  - 3 cases discontinued their vaccinations; all died.
Observational risk factors

- All cases were associated with vampire bat bites; ≤ 8 days prior to symptom onset.
- Living in rural areas without protection from vampire bat bite (i.e., nonexistent or permeable household walls and roofs).
- No history of vaccination prior to vampire bite.
- Infrequent or no use of mosquito nets.
- 6 cases were migrant gold miners/panners, who died after returning to their homes in Cusco.
Vampire bat bites among humans

Outbreak

n = 27

Month
July August September October November December January
Bitten persons
0 1 0 3 2 8 10

Vampire bat bites among humans

Outbreak

n = 252

Month
July August September October November December January
Bitten persons
0 8 15 17 20 26 42 124
Timeline of human rabies cases, Inambari - MDD and Ayapata - Puno, Epi week 51 – 2006 to week 10 – 2007

Case clustering in families

- 20 Brother
- 24 Wife
- 52 Parents
- 24 Daughter

Died: 
- 4
- 1

Survived: 
- 29
- 24
- 36
Active surveillance for vampire bat bites among people at gold mining sites, Inambari - MDD, 11/01/07
Active surveillance for vampire bat bites among people at gold mining sites, Inambari - MDD, 11/01/07

Wound one day after vampire bat bite
Ayapata - Puno, 29/01/07
Rabies post-exposure vaccination for persons with history of vampire bat bite, Inambari - MDD, 11/01/07

Typical housing at Ayapata, Puno permitting vampire bats incursion, 29/01/07
Inadequate use of mosquito nets, MDD, 12/02/07

Phylogenetic tree of rabies viruses

- Venezuela V3, V5
- Colombia V3
- Brazil 1 V3
- Peru-Brazil V3
- Argentina V3
- Brazil 2 V3
- Bolivia V3
- Brazil 3 V3
- Mexico 1 V3
- Mexico-Colombia V3
- Mexico V11
- Colombia V8/V3 - Peru V3
- Mexico V8 atypical
- Tadarida brasiliensis V9 North America
- Tadarida brasiliensis V4 South America
- Colonial bats North America
- Other bats South America
- Sagu monkey Brazil
- Solitary bats North America
- Terrestrial carnivores North America
- Out group
**Recommendations**

- Education on vampire bat rabies transmission.
- Reinforce early reporting of vampire bat bites and to obtain proper care and post-exposure prophylaxis.
- Initiate ecological studies to elucidate transmission dynamics in vampire bat populations of the affected areas.
- Provide sufficient and timely cell culture based rabies vaccine doses for outbreak control.
- Necessary to vaccinate persons at-risk?

**Acknowledgments**

- Health personnel of MDD, Puno and Cusco
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- Center of Disease Control (CDC)
“Albino” Vampire bat (Desmodus rotundus)

Thanks!

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