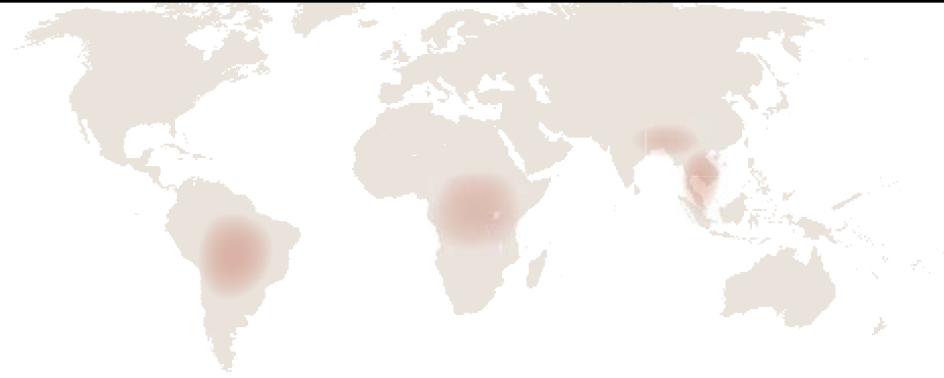


PREVENT

Emerging Pandemic Threats



Human Exposure to Peridomestic Rodents in Khon Kaen, Thailand: Results from a Participatory Rapid Appraisal

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Rodents: a public health problem

<i>Pathogens that can transmitted from rodents to humans</i>	
Virus	Bacteria
<ul style="list-style-type: none"> • Hantavirus * • Hemorrhagic fever with renal syndrome* • Crimean-Congo hemorrhagic fever • Omsk hemorrhagic fever • Kyasanur Forest Disease • Tick-borne encephalitis • Powassan encephalitis • Lymphocytic Choriomeningitis virus • Lassa fever* • South American arena viruses* • Colorado tick fever • Venezuelan quine encephalitis • Western equine encephalitis • Hepatitis E • Cowpox* 	<ul style="list-style-type: none"> • Leptospirosis* • Lyme disease • Tick-borne relapsing fever • Scrub typhus • Murine typhus • Sylvatic epidemic typhus • Queensland tick typhus or spotted fever • Rocky Mountain spotted fever • Bartonella illnesses • Human granulocytic anaplasmosis • Q-fever • Salmonellosis* • Tularemia* • E. coli 0157/VTEC* • Plague • Rat-bite fever • Haverhill fever • Listeriosis*

*Carrier

Meerburg, B.G., G.R. Singleton, and A. Kijlstra, Rodent-borne diseases and their risks for public health. Crit Rev Microbiol, 2009. 35(3): p. 221-70

Background

- Rodents are reservoirs of numerous pathogens, and come into regular contact with humans.
- The best way to prevent disease spread from rodent to humans is to minimize human exposure to rodents and their excreta and bodily fluids.



Types of exposure

- Touching
 - The infected animal directly
 - Something that the animal touched
- Eating/Drinking
 - Contaminated foods
 - Contaminated water
- Inhaling



Study Rationale



- Rodents pose a substantial health risk to communities in Southeast Asia, including Thailand
- Risk behaviors surrounding human-rodent interaction are not well-documented
- Community knowledge is needed to inform the development of feasible, acceptable, effective strategies to mitigate the risks posed by rodents

Study Objectives



- Describe peridomestic rodent exposure in selected communities
 - Identify the types of people who are most exposed
 - Explore how, where and when different people come in contact with peridomestic rodents
 - Ascertain the factors and behaviors that put people at risk (or that might protect them)
- Understand how people in these communities perceive peridomestic rodents and how these perceptions might affect exposure
- Identify strategies people use (or might be able to use) to mitigate the risk of peridomestic rodent exposure in these communities

Study design

- Qualitative, exploratory study that used rapid appraisal and participatory research techniques
- Methods used:
 - community mapping
 - transect walks
 - seasonal calendars
 - focus group discussions
 - causal flow diagrams
 - key informant interviews



Study setting

- June-August 2013
- Khon Kaen province:
 - 2 urban study sites in Muang district
 - 2 rural study sites in Mancha Khiri district
- This presentation: 1 urban and 1 rural site
- Study participants:
 - 78 men, 79 women,
 - 26 boys, 26 girls
- From random selection of
 - Men, women, and children aged 10-14 years
 - Who had lived in the community for at least 6 months



Study ethics

- Ethical approval for this study was obtained from:
 - FHI 360 Protection of Human Subjects Committee (PHSC)
 - Khon Kaen University Ethical Committee (KKU EC)
- Informed consent and a photography permission/waiver were obtained from all participants and parents of minor participants



'Peridomestic Rodents' vs. *Noo*



- Study focused on peridomestic rodents (rats and mice); the emic term *noo* was used by researchers.
- Participants talked mainly about animals from Family *Muridae*, but also include animals from Family *Rattus* and some non-rodents (e.g., shrews).
- Difference between urban and rural participants:
 - Rural participants mentioned 12 types of *noo* (18 different local names)
 - Urban participants mentioned 10 types of *noo* (11 different local names).
- Both differentiated between rodents found:
 - In and around the home: small, widely viewed as “smelly” and “dirty,” never eaten.
 - In the fields: larger, widely viewed as “clean” and “yummy,” and were a source of food and income.

Types of exposure in the home and in the field

- Killing trapped/caught rodents
- Removing live/dead rodents from traps or glue pads
- Handling dead rodents found, bought or killed
- Butchering/cleaning – mostly adults
- Cooking – mostly adults, some boys
- Bites/scratches
- Contact with chewed items (e.g., rice sacks, vegetables, chicks/ducklings killed by rodents) (also at school)
- Direct contact with feces, urine and nests (also at school)
- Handling rodent babies found in nests
- Contact with dogs that had killed rodents

Types of exposure in and around the home

- Handling and consuming contaminated food and water
- Sweeping feces and nests (also at school)
- Playing with small mice – mostly children
- Contact with utensils, pots, plates, etc., licked or urinated/defecated/walked on by rodents
- Contact with cats that had killed rodents



Types of exposure in the field

- Catching rodents that have been flooded out of holes with bare hands – men and boys
- Stepping on or handling decomposing rodents – mostly adults
- Swimming/wading in flooded paddies or ponds contaminated by dead rodents and excreta – children, rice farmers, fishermen
- Digging up nests and rodents – adults, boys



Mitigation strategies in the home and field

Eradicate

- Kill rodents with minimal or no handling (e.g., break back, leave in sun)
- Dogs
- Poison (Kaek Dum) – serious concerns about safety

Discard

- Throw dead rodents in pond, forest, drain or field



Mitigation strategies in and around the home



Protect

- Food and water in refrigerator (urban only)
- Cover rice storage with wire net
- Mothballs in rice storage
- Wrap aluminum or galvanized steel around base of rice storage
- Use a plastic bag, gloves or tongs when handling dead rodents – mostly girls and women
- Keep food/water covered or in a container

Eradicate

- Cats
- Cage and glue traps

Discard

- Throw away chewed items and contaminated food and water
- Pick out feces from grains
- Bury, burn or throw in trash dead rodents, entrails and chicks/ducklings killed by rodents
- Feed contaminated food to livestock

Deter

- Keep house, animal housing and surrounding area clean

Clean

- Wash contaminated rice before eating
- Wash hands after killing rodents (urban only, not boys)
- Wash contaminated areas and items with soap

Mitigation strategies in the field

Protect

- Take more precautions if have a wound – adults
- Remove teeth of live rodents with pliers before transporting to eat/sell – men
- Wait to go to the field until after sunup
- Boots – unpopular, not always protective

Eradicate

- Snares – men, boys
- Flood or smoke rodents out of holes
- Shoot with guns
- Kapdak Fah Pah traps

Deter

- Electric fences - men
- Fireworks (urban only) - men
- Pour old motor oil on trails and nests – men
- Mow long grass



Discussion - Exposure



- Exposure is near-universal.
- Occupation is unlikely to be linked to level of exposure, but may predict some types of exposure.
- Exposure and mitigation strategies were similar in urban and rural locations.
- Where people are exposed differs by age and gender:
 - *Women and girls* mainly reported exposure in and around the home
 - *Children* reported exposure at school
 - *Men and boys* reported exposure both in the field and in/around home
 - Higher exposure was reported among *men aged 30-60*

Discussion - prevention



- Mainly men and boys reported implementing mitigation strategies in the field; all family members implement strategies in the home.
- Participants reported varying degrees of success, feasibility, and acceptability for the different methods.
- Some strategies may increase risk, due to increased contact with rodents.
- Disposal of dead rodents is an issue from a behavioral perspective. People are using a variety of strategies, some riskier than others.

Conclusions

- Members of these communities are regularly exposed to peridomestic rodents and their excreta and regularly engage in behaviors that could put them at risk.
- Peridomestic rodents pose a significant economic and health burden in these communities, and people are motivated to find new solutions to the problem.
- Different strategies are needed to deal with exposure in and around the home and in the field.
- Recommended next steps include determining which of the identified strategies could reduce the risk of disease transmission, and testing several of the identified low-risk mitigation strategies in behavioral trials.



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