PROBLEM-BASED LEARNING
IN THE SCIENCES

MOSQUITO COAST

A Problem about West Nile Virus and Mosquito-Borne Disease

Shelagh A. Gallagher

Problem Log

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Notes Page

Directions: Use this space to list up to 10 facts that seem important to this problem. Also make note of questions that come to mind as you read, especially information that seems to be missing from this account that would help you understand the problem better.

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10. _____

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Learning Issues Board

Hunches:

What We Know	Learning Issues	Plan of Action

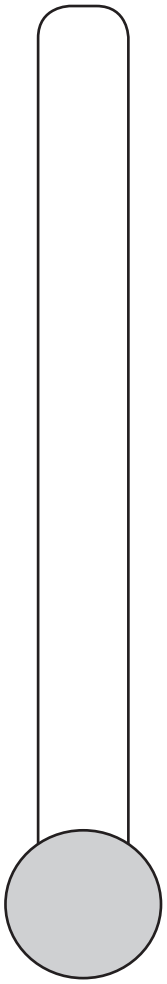
Risk Thermometer

Directions: Mark the place on the thermometer that indicates how risky the situation seems to you right now. A higher temperature indicates greater risk. To determine the risk rating, think about:

- *Factors that make a situation more risky or less risky*
- *Facts you know about this situation right now*

Use facts from the case to justify your risk rating on the lines below.

Grading criteria: (1) Multiple reasons are provided to explain the risk rating, (2) ideas are consistent with the rating, (3) the facts provided are accurate, and (4) the opinions provided are justified.



HIGH Risk

MODERATE Risk

LOW Risk

What Do Medical Entomologists Do?

Medical entomologists study diseases that are transmitted by insects and arthropods. Professionals in this field conduct research on how insect-borne diseases enter and take hold in a community. They consider insect and human behavior and identify *vectors* and *hosts* that allow disease to be transferred from insects to humans, and sometimes to other animals as well.

Medical entomologists are research scientists, not physicians. However, they do participate in public health projects and provide information to communities about the risk of insect-borne diseases. They are sometimes involved in the development of public policy, helping state and local officials develop recommendations, rules, and regulations to keep the public safe from disease.

Medical entomologists find jobs at universities, in private companies, or in local, state, or government agencies. The military hires medical entomologists to protect troops from insect-borne diseases in foreign lands. There have been many times in military history when more people have died from insect-related diseases than from actual combat, leading historian Hans Zinsser to say, "Soldiers have rarely won wars. They more often mop up after the barrage of epidemics. And Typhus, with its brothers and sisters—plague, cholera, dysentery—has decided more campaigns than Caesar, Hannibal, Napoleon, and all the inspector generals of history."*

* Zinsser, H. (1935). *Rats, lice, and history*. Boston: Little, Brown, & Co.

Examples of Diseases Transferred by Bugs

Ticks

- Lyme disease
- Tick-borne encephalitis
- Relapsing fever
- Heartland virus disease
- Rocky Mountain spotted fever

Mosquitoes

- Dengue fever
- Yellow fever
- Malaria
- West Nile virus
- Eastern equine encephalitis
- Zika virus

Sandflies

- Sandy fever
- Leishmaniasis

Fleas

- Plague
- Typhus

Lice

- Trench fever

Reflective Moment: **Sam Foss, Option A**

Look at the list of questions on the Learning Issues Board. Identify one question that is particularly important to you in your role as a medical entomologist. Explain why it is important. If you think there is an important question missing from the Learning Issues, list it below, and justify why it should be added to the list.

A quality response: (1) addresses the question, (2) stays on topic, (3) is plausible or reasonable, and (4) gives enough detail to make your ideas clear.

Reflective Moment: **Sam Foss, Option B**

Based on what you understand so far, who is at risk in this problem? Consider who might be *directly* at risk and who might be *indirectly* at risk. What is the difference between those directly and indirectly at risk? What relationships do they share?

A quality response: (1) addresses the question, (2) stays on topic, (3) is plausible or reasonable, and (4) provides facts to support and clarify your ideas.