

CLASSROOM ACTIVITY

Learning from Lyme

Since its discovery in 1975, Lyme disease has become one of the most commonly reported diseases transmitted by insects, spiders or other arthropods. Declining biodiversity may be one factor contributing to the rise in this disease among humans. The ticks that infect humans feed on a number of hosts, only some of which are effective at transmitting the disease; but human impact on natural habitats has greatly reduced species diversity in tick hosts. Recent studies indicate that the species that adapt best to these changing conditions are also more likely to carry and transmit Lyme disease to ticks, which then convey the disease to humans. Preserving a balance of species could be essential in preventing an increase in Lyme disease among humans and may have an impact on other emerging infectious diseases.

CLASS DISCUSSION

Establish Prior Knowledge

Call on students to share what they know about how diseases are transmitted. Explain to students that in 1975 a new type of disease was discovered in Lyme, Connecticut. Lyme's disease is caused by a bacterium that, if left untreated, can cause serious problems to the heart, joints, and nervous system. The bacterium is spread primarily by ticks. Explain that in the video they are about to see students will learn how scientists are surveying woodland animals to determine which animals pose a high risk for transmitting the disease.

Exploration

Have students watch the video and take notes. Use the following questions to guide a class discussion.

- What is Lyme's disease?
(Answer: A bacterium that is transmitted by bites from insects, ticks, and other arthropods.)
- How do these vectors (insects, ticks and other arthropods) transmit Lyme's disease from one host to another?
(Answer: The tick, for example, hatches and takes one blood meal from a host. Then it molts into the nymphal stage. If the host was infected with Lyme's disease, then the tick will be a carrier and can infect another host.)
- How do scientists determine which animals represent a high risk for transmitting the disease and which represent a low risk.
(Answer: They capture animals and count the ticks that feed on them and drop off. Then they test the DNA of the ticks to determine what percentage of them carry Lyme's disease.)
- Why is the opossum called a dilution host?
(Answer: The opossum feeds many ticks but most of them do not carry Lyme's disease.)
- What percentage of white-footed mice were infected? What percentage of skunk, opossum, or raccoon were infected?
(Answer: 90% of the ticks on the mice were infected, while only 10% of the ticks on the skunk, opossum, and raccoon were infected.)
- How does the fragmentation of the landscape lead to more of a risk of disease for humans?
(Answer: When forests are chopped up and divided into smaller pieces of land, species are lost. The last species to survive in a fragmented landscape is the white-footed mouse, which is more likely than other species of carry Lyme's disease.)

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Learning from Lyme (cont'd)

Wrap-Up

Use the following question to wrap up your discussion:

- What did the researcher mean when she said, “Human impact can bite us back?”
(Answers: Students may say that destroying natural areas will create an unbalance in animal populations that can lead to unwanted consequences, such as Lyme’s disease. Accept reasonable responses.)