OVERVIEW

BIG IDEA
Epidemiologists can have a major positive impact on the health of populations by identifying sources of disease, prioritizing risk factors, and proposing prevention measures

OBJECTIVE
9.4: Identify the roles of an epidemiologist.

AGENDA
1. Epidemiologist vs. Physician
2. Is Epidemiology in YOUR Future?
3. Epidemiology vs. Medicine
4. Outbreak at Watersedge Simulation

HOMEWORK
Reflect on your level of interest in a career in epidemiology.

LESSON 9.4
Epidemiology

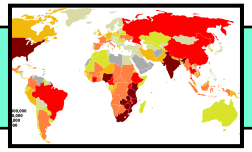
SUMMARY:

This lesson will introduce the specific discipline of epidemiology in a variety of ways. Students will read about how epidemiology is different from medicine, watch a video highlighting the work of epidemiologists, and conduct an interactive online simulation where they take on the role of epidemiologist to solve an outbreak mystery.

STANDARDS:

NHES 1.12.1: Predict how healthy behaviors can affect health status.

IL Learning Standard 22.A.5a: Explain strategies for managing contagious, chronic, and degenerative illnesses



MODULE 9: EPIDEMIOLOGY LESSON 9.4

Epidemiology

Obj. 9.4: Identify the roles of an epidemiologist.

DO NOW

Epidemiologist vs. Physician

What do you think the differences are in the work of an **epidemiologist** compared with a **physician**? (List as many differences as you can!)

DISCUSS

Is Epidemiology in Your Future?

Watch the video and take notes on epidemiology in the box below.

NEW INFO

Epidemiology vs. Clinical Medicine

What is Epidemiology? the branch of medical science that deals with the incidence, distribution, and control of disease in a population

What comes to mind when we think of Epidemiology?

- Individual pt. vs. groups of people
- Global impact
- Detective work
- Social/behavioral science
- Predict & prevent instead of respond to disease

DO NOW: Ask students to recall the definition of "epidemic" (from lesson 9.2. Tell them to use this definition to make inferences about the work of an epidemiologist. Hint: Epidemiology is a PUBLIC HEALTH CAREER (remind them to think of how to solve health problems on an individual vs. population level).

DISCUSS: (Run time 7:29) http://www.rwjf.org/en/about-rwjf/newsroom/newsroom-content/2008/03/is-epidemiology-in-your-future.html#content

- Critical thinking, questions, knowing how to find info
- Combining doing good with thinking well
- Environmental
- Lab
- Politics
- Broad field

READ

How are Epidemiology & Medicine Different?

A comparison between the practice of public health and the more familiar practice of health care helps in describing epidemiology. First, where health care practitioners collect data on an individual patient by taking a medical history and conducting a physical exam, epidemiologists collect data about an entire population through surveillance systems or descriptive epidemiological studies. The health care practitioner uses his or her data to make a differential diagnosis. The epidemiologist's data is used to generate hypotheses about the relationships between exposure and disease. Both disciplines then test the hypotheses, the health care practitioner by conducting additional diagnostic studies or tests, the epidemiologist by conducting analytical studies such as cohort or case-control studies. The final step is to take action. The health care practitioner prescribes medical treatment, and the epidemiologist, some form of community intervention to end the health problem and prevent its recurrence.

One succinct way to sum up the task of epidemiologists is to say that they "count things." Basically, epidemiologists count cases of disease or injury, define the affected population, and then compute rates of disease or injury in that population. Then they compare these rates with those found in other populations and make inferences regarding the patterns of disease to determine whether a problem exists,. For example, in the hepatitis B example earlier, you might ask: Is the rate of disease among people with no know risk factors greater than we would expect? Is the pattern or distribution of the cases suspicious? Once a problem has been identified, the data are used to determine the cause of the health problem; the modes of transmission; any factors that are related to susceptibility, exposure, or risk; and any potential environmental determinants.

Source: CDC Excite <http://www.cdc.gov/excite/classroom/intro_epi.htm>

Doctors & other health care practitioners	BOTH	Epidemiologists
Who: individual patients How: taking medical history & conducting a physical exam	Collecting data	Who: entire populations (small or large) How: surveillance systems or descriptive epidemiological studies
Data used to make a diagnosis	Using data	Data used to generate hypotheses about the relationships between exposure and disease
Test diagnosis by conducting additional diagnostic studies or tests (ex: biopsy or MRI)	Testing Hypothesis	Test hypothesis by analytical studies such as cohort or case-control studies
Prescribes medical treatment to patient	Taking Action	Creates a community intervention to end the health problem and prevent its recurrence

READ: The CDC Excite website has a wealth of useful resources on Epidemiology. Some of the material will be referenced in upcoming lessons in this module.

CDC Excite <http://www.cdc.gov/excite/classroom/intro_epi.htm>

THINK

Outbreak at Watersedge

You will take on the role of a real epidemiologist and investigate an outbreak using an online simulation. The website is very user-friendly, but you must read directions carefully. Do not skip over any dialogue because you feel it is unimportant, or you will miss the big picture. This assignment will require you to be online for **45 min – 1 hr**.

INTRO: Find out your mission!

After you enter your name you will find the Staff Epidemiologist [Shoua Shinde]
Tip: Scroll to left/right and cursor will change to arrow to move.
Meet: Leslie Hernandez, Health Planner

1. What is her job?

2. What is one common symptom the patients in the hospital all experience?

PART 1: Mapping Interview Data from Interviews with 5 Hospitalized Patients

You will be asked to map places that the sick visited prior to the illness. Case #1 will be modeled, but cases #2-5 you need to map.

3. How many sick patients visited the Watersedge Mall? _____

4. How many sick patients visited the Bowling Alley? _____

5. Which place did all of the patients visit? _____

PART 2: Observations at Thompson Park

6. According to Mai, zoonotic diseases are caused by parasites transmitted between _____ and _____.

Tip: You only have about 5 min. to click around on objects and snap pictures to record observations in your notebook. Shoua will call to ask you to return to the Dept. of Health after about 5min.

7. List the top 3 objects or parts of the park that you find most suspicious. Explain why:

1.

2.

3.

Note: Shoua will give you feedback about the photos/notes you took.

8. What does Shoua say about the water fountain?

PART 3: Mapping Water Access Points in Thompson Part (Interviews # 6 – 10)

9. Based on places where patients accessed water (the pinpoints on your map), which areas should you take samples from?

THINK: This online simulation will take approximately 45-60 minutes, so it could be assigned for homework or completed in 1-2 class periods. Students can work in pairs or groups of 3-4 if needed based on technology resources.

Website: http://www.mclph.umn.edu/watersedge/game.html

ANSWERS:

2. SEVERE DIARRHEA
3. 2
4. 1
5. Thompson Park
6. ANIMALS AND HUMANS
7. 1. WATER FOUNTAIN. IT MAY BE CONTAMINATED 2. LAKE. IT MAY BE DIRTY 3. FLYER FOR PARK CLEANUP. MAYBE THE FOOD THEY SERVED WAS CONTAMINATED
8. says she'll find out about the well, and tells you to take water samples. (also says to sample beach water)

PART 4: Taking samples at Thompson Park

10. Talk to the concession stand worker. Where does he say they got the water for the fruit punch?

Tip: You only have about 5 min. to take samples, so don't waste time. Shoua will call to ask you to return to the Dept. of Health after about 5min.

CONCLUSION: Review the Data

11. What did the results of the water sample tests show?

12. What did the tainted water test positive for? _____

13. Why was there contamination only in that fountain?

14. From the list, which factors contributed to the outbreak? (list AT LEAST 3 things)

15. Now explain the relationship between these contributing factors? (from #14) How did they all come together to make people sick?

REFLECTION:

16. **What similarities and differences did you notice between this outbreak investigation and John Snow's cholera outbreak?**

17. **Which of the roles of an epidemiologist did you carry out in the simulation.**

18. **This epidemiologic investigation, like the ones we have studied in class, involved an infectious disease outbreak. What noncommunicable, chronic diseases might epidemiologists study? (List at least 3)**

An Epidemiologist Career

What appeals to you & does not appeal to you about a career in epidemiology? Write a one paragraph reflection about your level of interest in the career.

ANSWERS:

10. WATER FOUNTAIN BY THE WATER
11. The fountain near the water is contaminated.
12. Cryptosporidium
13. It's the only one that gets it's water from the old well and the pipes were never updated.
14. Heavy Rains; Water Runoff From Cattle; Parasite in the Well; Malfunctioning Fountain Filter

HOMEWORK: The purpose of this homework assignment is to provide students with a chance to reflect upon their career aspirations and how they would enjoy the public health career they learned about in this lesson. Most high schoolers don't understand or consider careers in public health because there is less awareness and glamorization of the field. Consider having a local epidemiologist speak with students if time and resources permit.