INSTRUCTOR'S GUIDE

Was it the Food?

OVERVIEW:

Benjamin is an eight-year old who develops fever, diarrhea, and abdominal cramping. He has had a variety of possible exposures that could have led to the illness. When several of his classmates also become ill, the local health department decides to conduct an investigation in the school. Benjamin must be treated appropriately and the cause of the outbreak must be determined in order to protect the health of children in the community.

GOAL:

Determine an accurate and effective diagnosis and treatment plan for Benjamin. Then form a logical conclusion about the source of the outbreak using a relative risk calculation.

ROLE:

You are a team of family medicine doctors and epidemiologists from the local health department.

> Lesson 9.8, focuses on calculating relative risk, an important preparation for this case study. Encourage students to use their workbook and notes!

OBJECTIVE:

Obj. 9.9: Perform a relative risk calculation in order to provide evidence for determining the source of the outbreak.

DELIVERABLES:

1) SOAP Note
2) Relative Risk Report
3) 2-4 minute presentation of conclusions

> **NHES STANDARDS:**
> **6.12.1:** Assess health practices and overall health status
> **IL Health & Development:**
> **22.A.5a:** Explain strategies for managing contagious, chronic, & degenerative illnesses (e.g. various treatment & support systems)

ASSESSMENT:

Your SOAP note Assessment & Plan sections along with your relative risk report will be evaluated on a rubric.

Case Introduction:

Benjamin is a happy, healthy second grader who is proud to say he has not yet missed a single day of second grade (and it's already May!). He has two younger twin sisters (age 2) who are both in daycare. He lives with his mother and father in a suburban area and participates in soccer, swim lessons, and piano classes. He is very helpful around the house and helps his mom cook or bake frequently. Benjamin attends the local elementary school and eats hot lunch every day.

On Wednesday at noon, Benjamin complained to his teacher that he was feeling sick and ran to the bathroom. He was picked up by his father a few hours later, as he had diarrhea, a fever of 102.5, and cramps in his "tummy." He has now had these symptoms for 48 hours so his mother takes him in to his pediatrician on Friday afternoon.

The pediatrician asks many questions and obtains the following information from Benjamin and his mother:
- It is unlikely that Benjamin came into contact with his baby sisters' diapers or feces
- Benjamin recently baked cookies with his mother; she warns him not to eat the cookie dough since it has raw eggs; Benjamin denies having eaten anyway, but mother reports that she has seen him do it before
- At school on Monday, Benjamin ate a chicken salad sandwich, green beans, an apple, a chocolate chip cookie, and a carton of Vitamin D milk. He did not eat anything for lunch on Tuesday because he did not have an appetite.
- Benjamin ate cereal with milk for breakfast on both Monday and Tuesday.
- Benjamin ate vegetarian lasagna with garlic bread and a glass of milk for dinner on Monday.
- Benjamin did not come into contact with anyone who was sick (as far as he knows).
- No one else in Benjamin's family is currently sick; his mother checked with the daycare supervisor and she reported that there are no serious illnesses among children, other than the usual colds.

SOAP Note

Subjective:

Signs & Symptoms	
Allergies	
Medications	
Past medical history	
Last oral intake	
Events leading to injury or illness	
Frequency	
Associated Symptoms	
Radiation	
Character	
Onset	
Location	
Duration	
Exacerbating Factors	
Relieving Factors	

Objective:

Measurements	
Vital Signs	
Exam Results	
Lab Results	

Research:

Research the illnesses that Benjamin may have by using the following list of common bacterial and viral culprits for diarrhea.

Pathogen	Modes of Transmission	Incubation Time Range	Other Information
Norovirus			
Campylobacter			
Salmonella **CORRECT DIAGNOSIS**			
Staphylococcus aureus			
Listeria monocytogenes			

Salmonellosis (infection with Salmonella) causes Diarrhea, Abdominal cramping, & Fever. Symptoms usually occur 12-72 hours after infection and last 4-7 days. Most people recover without treatment.

Contamination often occurs through beef, poultry, milk, or eggs, but any food, including vegetables, may become contaminated. Thorough cooking kills *Salmonella*. Food may also become contaminated by the hands of an infected food handler who did not wash hands with soap after using the bathroom. To avoid it, cook poultry, ground beef, and eggs thoroughly. Do not eat or drink foods containing raw eggs, or raw (unpasteurized) milk.

Of these possible infectious agents, which seems most consistent with the information presented about Benjamin's case? Explain your answer.

Assessment:

Write a short summary of the patient's situation, then complete a differential diagnosis including at least three possible diagnoses. Before you make your final diagnosis and support it with evidence and reasoning, move on to the next page and determine whether you need any additional information. Then come back to the assessment box on this page and write your final diagnosis.

Assessment:	
Summary	
Differential Diagnoses	1. 2. 3.
Final Diagnosis	*Claim:* *Evidence:* *Reasoning:*

Data Collection:

Determine what additional information you need, if any, to make a final diagnosis. Write any additional questions for Benjamin or his mother in the space below.

Questions

Plan:

Create a plan for Benjamin, using information you research about the treatment and management of his diagnosed illness.

Plan:	
Steps of Plan *(Consider mental, social and physical health; short- and long-term needs, and follow-up care required)*	

School Outbreak: Relative Risk Report

Apparently Benjamin was not the only child who experienced diarrhea, fever, and abdominal cramping. Officials at the local health department suspect that there was a contaminant in some portion of the school cafeteria's hot lunch. Use the following information to create 2x2 tables to try to determine the exact source of the outbreak.

- 73 children did not get sick
  - 42 of these children ate hot lunch; the rest did not

- 28 children did get sick
  - 27 of these children ate hot lunch; one did not

- Of the 69 children who ate hot lunch
  - 25 of the 63 children who ate a chicken salad sandwich got sick
  - 2 of the 6 children who did not eat a chicken salad sandwich got sick
  - 20 of the 51 children who ate a chocolate chip cookie got sick
  - 7 of the 18 children who did not eat a chocolate chip cookie got sick

#1 2x2 Table for ___Type of Lunch Eaten___ **(Exposure) &** ___Illness Status___ **(Outcome)**

	SICK	NOT SICK	Total
ATE HOT LUNCH	27	42	69
BROUGHT COLD LUNCH	1	31	32
Total	28	73	101

Calculation: (27/69) / (1/32) = 12.6

Relative Risk Statement: Those who ate hot lunch were 12.6 times more likely to get sick than those who brought cold lunch.

#2 2x2 Table for _Consumption of chicken salad sandwich_ **(Exposure) &** _Illness Status_ **(Outcome)**

	SICK	NOT SICK	Total
ATE CHICKEN SANDWICH	25	38	63
DID NOT EAT CHICKEN SANDWICH	2	4	6
Total	27	42	69

Calculation: (25/63) / (2/6) = 1.2

Relative Risk Statement: Those who ate a chicken salad sandwich were 1.2 times more likely (20% more likely) to get sick than those who did not.

#3 2x2 Table for _Consumption of cookie_ **(Exposure) &** _Illness Status_ **(Outcome)**

	SICK	NOT SICK	Total
ATE COOKIE	20	31	51
DID NOT EAT COOKIE	7	11	18
Total	27	42	69

Calculation: (20/51) / (7/18) = 1.008

Relative Risk Statement: Those who ate a cookie were equally likely to get sick than those who did not.

Final Presentation:

Prepare a 2-4 minute presentation to your colleagues at the local health department as well as administrators at the elementary school where the illness outbreak occurred.

PRESENTATION PLANNING		
Team Member	Portion of Presentation	Notes

Rubric:

You will be graded on the stated objective using the rubric below:

Obj. 9.9: Perform a relative risk calculation in order to provide evidence for determining the source of the outbreak.			
Needs Improvement	**Emerging Mastery**	**Partial Mastery**	**Mastery**
Assessment: Pathogen is not be diagnosed correctly; supporting evidence identified is missing **Treatment Plan:** -Treatment plan is not aligned or missing **Relative Risk Report**: Major errors in calculations; meaning of numerical result not explained	**Assessment:** Pathogen is not diagnosed correctly; supporting evidence identified is limited or missing **Treatment Plan:** -Treatment plan is not appropriate or thorough; or is inadequately explained in written form **Relative Risk Report**: Some errors in calculations performed; meaning of numerical result explained in a confusing manner	**Assessment:** Pathogen may or may not be diagnosed correctly; but supporting evidence identified is limited **Treatment Plan:** -Treatment plan is mostly appropriately and comprehensively identified and adequately explained in written form **Relative Risk Report**: Most calculations performed accurately; meaning of numerical result explained logically in most cases	**Assessment:** Correct pathogen is diagnosed and proper supporting evidence included **Treatment Plan:** -Treatment plan appropriately and comprehensively identified and clearly explained in written form **Relative Risk Report**: All calculations performed accurately; meaning of numerical result explained logically in all cases

Post-Case Wrap-up Questions:

Module 9 Learning Objectives:
Obj 9.1: Identify the scientific thinking John Snow used to identify the source of the famous cholera epidemic.
Obj 9.2: Identify factors shaping historical epidemics & explain their impact on health outcomes.
Obj 9.3: Communicate information to the public regarding prevention of a serious infectious disease epidemic
Obj 9.4: Identify the roles of an epidemiologist
Obj 9.5: Compare & contrast different types of epidemiological studies
Obj 9.6: Differentiate a causative and correlative relationship between variables.
Obj 9.7: Identify epidemiological questions by identifying outcomes and possible exposures.
Obj 9.8: Quantify the relationship between two variables using relative risk

ANSWER THE FOLLOWING QUESTIONS ON A SEPARATE SHEET OF PAPER.

Obj. 9.1: How were John Snow's methods for investigating the cholera outbreak similar to and different from the methods you used to investigate the illness outbreak in this case study?

Obj. 9.2: How is the treatment of the illness Benjamin acquired different today than it would have been one hundred years ago?

Obj. 9.3: What percentage of students at the school were affected by this illness? Who was most at risk? What could be done to avoid illness outbreaks like this at the school in the future?

Obj 9.4: What roles would an epidemiologist play in this outbreak?

Obj 9.5: Describe how a scientist might study this illness using cross-sectional, case-control, and cohort methodologies? Which would be most appropriate in this scenario?

Obj 9.6: Consider the results of the relative risk calculation. Does the conclusion represent a causative or correlative relationship? Why?

Obj 9.7: Write an epidemiological question related to this case study scenario.

Obj 9.8: Which relative risk calculation provides the most conclusive information about the source of the outbreak? Explain.