



# *A Typical Cold?*

by

*Brent J.F. Hill*

*Department of Biology, University of Central Arkansas*

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## **Part I—The Initial Physical Examination**

### ***Scenario***

Mary and Bill adopted a three-year-old toddler named Sam two weeks ago. Sam is good-natured and very inquisitive. Typically, before the finalization of an adoption, children are required to undergo a routine examination by a physician. However, the required examination is not meant to be a complete health screening, and many conditions are not even checked. Therefore, Mary and Bill are bringing Sam to Trinity Medical Center for a standard physical examination by a pediatrician to assess his health status.

### ***Patient History***

Very little information was known about Sam's parents. However, it was known that they died in an automobile accident when Sam's father suffered a massive heart attack. In the past two weeks Sam has done very well adjusting to his new environment. Moreover, he has had all the proper immunizations for his age.

Sam's adoptive parents, Mary and Bill, have noticed some greasy/oily stools in his diaper. In addition, they are concerned about his wheezing (when breathing).

### ***Physical Examination***

#### Vital Signs

- Age: 3 yrs., 1 month
- Weight: 28 lbs. (lower 10%-tile)
- Height: 3 ft. 1 inch
- Pulse: 115 beats/minute
- Respirations: 30 breaths/minute
- Blood Pressure: 95/60 (systolic/diastolic) mmHg

#### General Appearance

- Happy, energetic child

#### Head and Neck

- Runny nose but his ears are clear of fluid

#### Lungs

- Cracking sounds are present
- Coughing and wheezing are noticeable

#### Cardiovascular

- Normal

#### Abdominal

- No swelling is present

#### Genitourinary

- Not assessed

#### Extremities

- Full mobility is present
- Pulse found in arms and legs

#### Neurological

- Normal reflexes

#### Physician Comments

- Have a complete blood count and chest x-ray done. Also, schedule a follow-up appointment for tomorrow to review the lab results and chest x-ray.

#### ***Objectives for PBL group***

1. Assign people positions/roles for the case study such as group leader, typist, secretary, and editor.
2. Brainstorm on what you (*a*) know about the case, and (*b*) do not know, but would like to know about the case.
3. Formulate your initial ideas (or hypotheses) about what is wrong with Sam.
4. Identify and define terms and concepts you do not understand.
5. Write an approximately one-page group report that includes (*a*) the roles each person is assigned to, (*b*) your initial hypothesis and the evidence that led to its formulation, and (*c*) the terms and concepts that were initially identified as being unknown to you. Make sure you properly cite the source when explaining a concept.
6. You will be given Part II upon completion of Part I.



## Part II—The Follow-up Visit

### *Scenario*

Today is Sam's follow-up medical appointment. The weather is very hot and humid, which makes it almost unbearable to be outside. Sam's parents parked their car in the parking lot of Trinity Medical Center and went into the air-conditioned comfort of the pediatric clinic.

They were immediately seen by the pediatrician, and Mary expressed her concern over the color of Sam's sputum. Mary was upset that she had forgotten to tell the pediatrician the other day about this fact. The sputum Sam had been coughing up was green and viscid.

While talking with Mary and Bill about Sam's sputum, the pediatrician looked over at Sam and noticed a white "frosting" on his face (the "frosting" is an indication of salty build-up on the drying edge of sweat). The pediatrician asked Mary and Bill if they had noticed this salty build-up before.

"That must be why his skin tastes a bit salty when I kiss him on his cheek," Mary replied.

The pediatrician then went over the blood count and chest x-ray results (described below) with Mary and Bill.

After describing the chest x-ray results to them, the pediatrician had a hypothesis about Sam's chest x-ray results. To test her hypothesis the pediatrician ordered a sweat chloride test (the result is listed below).

### *Blood Lab Results*

- White blood cell count: values within normal limits.
- White blood cell differential: lymphocytes, monocytes, eosinophils, and basophils are within normal limits. There is a slight elevation in neutrophils.
- Red blood cell count: values within normal limits.
- Hematocrit: values within normal limits.
- Platelet count: values within normal limits.

### *Chest x-ray Results*

- Some hyperinflation and bronchial wall thickening is apparent.

### *Sweat Chloride Test Results*

- Indeterminate.

### *Objectives for Your PBL Group Session*

1. Identify the most important concepts ("learning issues") from both Part I and Part II that you need to investigate to diagnosis the causes for Sam's symptoms.
2. Divide up the "learning issues" for each group member to investigate.
3. The group leader will need to turn in a list of your "learning issues" which identifies by name the group member assigned to each one.

### *Part II Individual Report*

1. Define terms and concepts you don't understand while investigating your "learning issue."
2. Thoroughly explain your "learning issue."

3. Do you have a different hypothesis about the case after investigating your “learning issue”? Provide the reasons or evidence for the change in your thinking or for why you still consider your initial hypothesis to be the most valid one.
4. Cite all the sources you used. Make sure that you include in-text citations as well as a bibliography at the end of your report.



## Part III—Your Explanation of Sam’s Condition

Upon completing Part II, each member of your group is now the “expert” for a particular learning issue that is involved with Sam’s condition. Hopefully, this research has either reaffirmed your hypothesis about Sam’s condition or enabled you to formulate a new hypothesis. If you are unsure whether you are “on the right track,” please check with the instructor. Your next task is to prepare a group report that addresses the points detailed below.

### **Objectives and Issues to Address in Preparing Your Final Group Report**

1. What type of disease is Sam suffering from?
2. What tissues and organs does this disease affect? Once you identify all the tissues and organs, briefly explain their respective dysfunction.
3. Does this disease affect exocrine or endocrine glands; please explain your answer. In addition, what role do goblet cells play in this disease state?
4. Explain the reasoning behind the appearance of his sputum.
5. Typically, a pulmonary function test will not be given until about age 7. However, if Sam was given a pulmonary function test it will demonstrate a decreased  $FEV_1$  (forced expiratory volume in 1 second) and FVC (forced vital capacity). Based on these hypothetical pulmonary function test results, answer the following questions:
  - a. What can you infer about the surface area and/or diffusion distance for gas exchange in Sam’s lungs?
  - b. How does the presence of sputum relate to Sam’s pulmonary function tests?
  - c. Do these tests correlate with Sam’s chest x-ray results? Make sure you explain your answer.
6. Explain how this disease affects the function of the pulmonary system on a cellular level. You might want to diagram a cell to help with the explanation. Make sure you specifically address osmosis (water movement) and ion transport of the cell.
7. Explain why the sweat chloride test (Part II) is used as a diagnostic tool for Sam’s disease. In addition, suggest why the pediatrician should order a “nasal potential difference measurement” to be taken.
8. Explain and give the reasoning behind two treatment options.

### **Final Group Report**

1. Give a *complete and detailed* physiological and/or anatomical reasoning behind your answers to the objectives above.
2. In addressing the questions and issues above, you may indicate the question number and then give your explanation in narrative form.
3. Limit your report to five to six pages, excluding references.
4. Cite all sources. This includes both in-text citations and a bibliography list at the end of your report.

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