Problems: 2004 Disease Detectives

Problem 1: Respiratory Illness reported in Pennsylvania

Part I: A total of 280 persons associated with the American Association of Science Teachers (AAST) National Convention in Pittsburgh on April 21-24 have been hospitalized with respiratory infections. Onsets of illness were in the period April 22 – March 3; the majority occurred from July 25 to July 31. The infected members were staying at two different hotels in the Pittsburgh area. Forty-nine of the infected persons have died. The deaths were primarily due to pneumonia. Local doctors who treated the AAST members isolated a bacterium in a majority of the fatalities similar to the bacterium *Legionella pneumophila.*

You are the team of CDC detectives in Pittsburgh who received the telephone call from concerned AAST officials and Hotel managers.

1. **In the space provided, give at least three reasons why a Disease Detective should investigate the problem of respiratory illness among AAST convention members? (3 points)**

2. **Is this problem consistent with the definition of an outbreak? If so, why? If not, why not? (3 points)**

3. **Describe the initial steps of an investigation your team would implement in response to this problem. (7 points)**

Part II: After collecting information from the infected and unaffected conventioneers you discover the following facts:

- there were a total of 1500 members attending the convention

- 140 infected and 560 unaffected members stayed at Hotel A

- 28 infected and 260 unaffected members stayed at Hotel B

- 56 infected and 202 uninfected members stayed at Hotel C

- 56 infected and 198 uninfected members stayed at Hotel D

- 238 infected members attended the president's banquet on the first evening of the convention while 610 unaffected members attended the same banquet held in ballroom B at the convention Center

- 84 infected members and 61 unaffected members attended the director's council meeting held in ballroom C at the convention Center

- 274 infected members and 1171 unaffected members attended the science supply display held in the convention center's main display hall

4. **Construct a chart or data table that describes the respiratory problem using the above information. (5 points)**

5. **Which location was most likely to be associated with risk of illness? (one point)**

6. **Explain how you reached your conclusion. (10 points)**

7. **Name the type of study design that was used. (1 points)**

8. **Name the risk estimate you calculated. Show a sample calculation. (2 points)**

Problem II:

This year about 552,200 Americans are expected to die of cancer, more than 1,500 people a day. Cancer is the second leading cause of death in the US, exceeded only by heart disease. In the US, 1 of 4 deaths is from cancer. Nearly five million lives have been lost to cancer since 1990. In 2004, about 1,220,100 new cancer cases were expected to be diagnosed. The American Cancer Society tracks cancer occurrence, including the number of deaths, cases, and how long people survive after diagnosis. Below is a chart showing the 1991-1995 cancer mortality rates based on gender for selected cancers in Pennsylvania. The rates are per 100,000.

Cancer Sites	Rate of Female Mortality	Rate of Male Mortality
All sites	147.6	223.3
Non-Hodgkin's Lymphoma	5.8	8.7
Pancreas	7.2	9.4
Melanoma	1.5	3.2
Liver	2.0	4.2
Leukemia	5.2	8.7
Lung/Bronchus	32.2	71.8
Oral	1.2	3.6
Stomach	3	7.1
Urinary Bladder	1.8	6.3
Colon/Rectal	16.7	25.2

Question 9: Does this survey represent cancer incidence rates for all individuals in Pennsylvania? Why or Why not? (1 point)

Question 10: Does this survey represent cancer mortality rates for all people in the United States? Why or Why not? (2 points)

Question 11: For what cancer is the difference in mortality rate based upon gender the least? (Points 2)

Question 12: Name two cancers that have the greatest difference in mortality rate based upon gender? (Points 2)

Question 13: What one possible risk factor and/or hypothesis may explain the differences between gender in question 12? (2 points)