Team # _____

Disease Detectives
Battle at Valley Forge
January 8, 2011

Part I

A. 10 pts Each of the cases below was due to bacterial contamination. For each, indicate:

    a. What type of bacteria caused the illness?

    b. What practices contribute to contamination by this bacteria in the marketplace?

    c. How should a consumer handle food to avoid food poisoning from this bacteria?

Case I: The Bon Vivant soup company sold canned vichyssoise, a potato soup which is served cold. In 1971, a man died and his wife became ill. The FDA closed the canning plant and found 5 cans of the same batch contained a toxin.

a.

b.

c.

Case II: Two Iowa egg producers shipped eggs to 14 states, with over 2000 illnesses reported between May and July, 2010.

a.

b.

c.

Case III: In 1993, 4 children died after eating hamburgers from Jack-In-The-Box, and hundreds were sick in Seattle and several western states.

a.

b.

c.

d. What common practice in modern food production has contributed to this increasingly common problem in the U.S.?

B. 6 pts (tie-breaker) This year, Science Olympiad has concentrated on food-borne illnesses for Disease Detectives. Provide at least three other modes of transmission and give an example for each.

Part II

1. What term should be used in each case? (Terms are meant to be unique to one statement.)
11 pts

a. Blankets from smallpox victims were distributed among American Indians to spread the deadly disease. The blankets were _____.

b. Mosquitoes spread malaria, tsetse flies spread sleeping sickness. These insects are _____.

c. Toxoplasmosis is common in cats. Humans can be infected, so this is an example of _____.

d. "Cancer alley" is the name given to an area near Baton Rouge. The unusual incidence of cancers is commonly blamed on industrial toxins to explain this _____.

e. The Spanish flu of 1918 is a classic case of a(n) _____.

f. There were several _____ of H1N1 cases in 2011.

g. Health officials feared that cases would spread acoss the US in a full-fledged _____.

h. 2 pts. Compare the terms you used in a and c.

i. 2 pts. Compare the terms you used in e and g.

2. 15 pts Pick three of the following microbes can cause foodborne diseases, and give the following information: type of microbe (bacteria, virus, fungus), typical incubation period, symptoms, length of illness expected, methods of diagnosis, and treatments. You may choose from *Salmonella, Campylobacter, Escherichia coli, Norovirus,* or *Listeria.*

Part III 13 pts

The Sea Princess cruise ship sailed from Miami with 500 passengers for a week in the Caribbean. On the fourth day, 116 passengers complained of nausea and diarrhea that struck overnight. The health officer in San Juan, Puerto Rico was sent to investigate. The passengers and crew were not allowed to disembark in case they were suffering from that scourge of cruise ships, norovirus.

The health officer wanted to rule out food poisoning, and he was delighted to find that the kitchen staff had the dinner orders from the previous night. (Crew members eat buffet-style from the same offerings, but there was no record of what they ate. Mr. X decided to use the data from the passengers to see if he could identify a problem quickly.) The dinner choices are shown below. (Salad and vegetables are offered to all diners at the table.)

Entrees:
Chicken cordon bleu with rice
Roast beef with baked potato
Vegetable lasagna
Dessert:
Pot de crème (chocolate egg custard)
Apple pie
Death by Chocolate cake

The inspector marked the menus of patients and tallied the numbers. He found that of 212 people who ordered chicken, 44 were ill; of 191 choosing beef, 27 were ill; of 97 ordering lasagna, 45 were ill. For the desserts, the numbers were: 92 for pot de crème, 80 were ill; for 125 ordering apple pie, 12 were ill; and from 283 choosing chocolate cake, 24 were ill.

a. 1 pt. What kind of study will this be?

b. 2 pt. What equation will you use to analyze this information? Use the above area to show your work!
Clearly state the meaning of the variables.

c. 2 pt. What foods, if any, are likely sources of food poisoning?

d. 2 pt. What are some errors or limitations associated with this data? Give at least two.

e. 2 pt. What other data could be collected to address these flaws?

f. 2 pt. What additional data should the inspector collect to confirm his conclusions?

g. 2 pt. Should the ship be kept quarantined? Justify your answer.

Part IV

The map shows the incidence of melanoma by state. One state is included in the key to clarify the color for each rate. Rates are per 100,000 and are age-adjusted to 2000 U.S. standard pop'n.
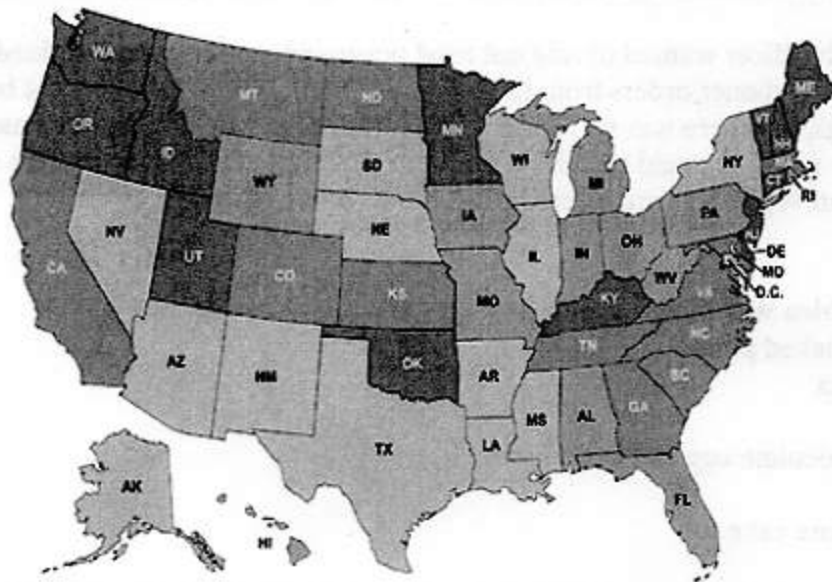
Interval	States
8.6-16.7 Light green	AK
16.8-19.2 Medium green	AL
19.3-22.1 Medium blue	CA
22.2-28.1 Dark blue	WA
Did not meet Criteria	NV

2 pts List 5 states from different areas of the country with the highest rates of melanoma.
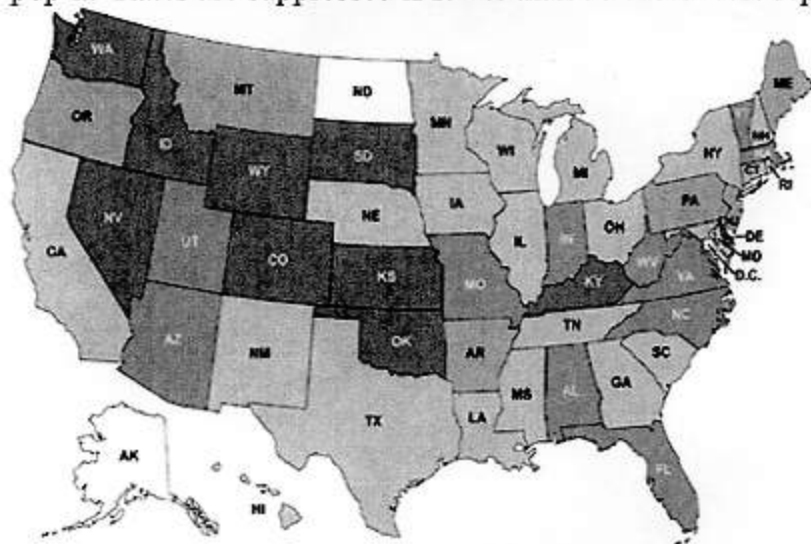
4 pts Suggest 2 unrelated reasons for high rates of melanoma, and relate those possible factors to a specific state or region.

3 pts What data would you collect to test your hypotheses for causes of melanoma in a region? Specifically address your ideas in the previous part.

1 pt Compare the incidence of melanoma in Minnesota and in Louisiana:

1 pt Compare the death rate from melanoma in Minnesota and in Louisiana, using the map below:

The map shows the death rate from melanoma by state. One state is included in the key to clarify the color for each rate. Rates are per 100,000 and are age-adjusted to 2000 U.S. standard pop'n. Rates are suppressed if fewer than 16 cases were reported.

Interval	States
1.5-2.6	CA
Light green	
2.7-2.8	AR
Medium green	
2.9-3.0	AL
Medium blue	
3.1-3.9	WA
Dark blue	
Rates were	AK
Suppressed	DC
White	ND

2 pts Make a statement relating the reported incidence and death rates in Louisiana and Minnesota.

4 pts (tie-breaker) Reported incidence of and reported death from melanoma depends on many factors, but for tie-breaker grading, make one inference from these data and explain your reasoning. Then describe what data you would collect to test your hypothesis.