SEVEN LAKES HIGH SCHOOL

CAPTAINS EXCHANGE
DISEASE DETECTIVES 2018-2019

Rules: always show work and keep answers in decimal form, unless otherwise told.

_____/201 points

Part 1: General Vocabulary and Knowledge

Hyperendemic disease:	A. Time in between exposure to a pathogen and visible symptoms
Hypoendemic disease:	B. General ability of a host to resist developing a particular disease
Latency period:	C. Biological response to multiple substances where one substance worsens the effect of another substance
Incubation period:	D. Increase in the occurrence of a disease in a large and geographically widespread population
Quarantine:	E. Capacity to cause disease in a host
Isolation:	F. Time in between exposure to a pathogen and infection
Immunity:	G. Separation of ill persons to prevent transmission to the susceptible
Virulence:	H. Sudden increase in occurrence of a disease above a normal level in a somewhat geographically widespread population
Pathogenicity:	I. Illness acquired from a hospital setting
Infectivity:	J. Disease that is constantly present at a high incidence and/or prevalence rate
Nosocomial infection:	K. Living organism that transmits disease
Synergistic effect:	L. Periodic increases and decreases in the occurrence, interval, or frequency of disease
Vector:	M. Non-living object that transmits infectious agent
Fomite:	N. Disease that is constantly present at a low incidence or prevalence and affects a small proportion of individuals in a population
Epidemic:	O. Severity of disease that agent brings to host
Outbreak:	P. Sudden increase in occurrences of a disease in a particular place
Pandemic:	Q. Measure of ability of pathogen to establish itself in a host
Seasonal trend:	R. The separation of well people who have been exposed to a pathogen or are suspected of being exposed

1. Define surveillance, and name and define 3 types. (4 points)

2. What are the 10 steps of an outbreak investigation? (10 pts)

3. Describe confirmed, probable, and possible cases and how they differentiate. (6 pts)

4. Name the CDC's food production chain and describe one example for each link. (8 pts)

5. What are the 4 levels of disease prevention, and what do they mean? Provide one example for each level. (8 pts)

6. Who is the father of epidemiology, and what is his main "claim to fame"? (2 pts)

7. What are Hill's Criteria for Causation, and what does each mean? (Bonus point if you put Hill's first name) (18 pts)

8. What are the stages of disease progression? Define each. (10 pts)

Part 2: Case -Studies (unless otherwise said, always show work and leave number in decimal form up to thousandths place)

Case #1: The Seven Lakes High School choir of 180 people was having a potluck on May 5, 2014. One choir brought sandwiches, which all included lettuce, tomatoes, mayonnaise, and either roast beef or chicken. One choir brought salad, composed mainly of lettuce. Another choir brought desserts, including ice cream and uncooked cookie dough. The last choir brought milk and fruit juice. 1 to 2 days later, many choir students began to complain of sickness. Their symptoms all included nausea, vomiting, abdominal cramps, watery diarrhea, malaise, a low fever, muscle pain, and headaches.

	Attended choir potluck	Did not attend choir potluck
Case	96	3
Control	56	25

1. Calculate the appropriate measure of risk for this study. (4 pts)

2. Interpret the result of the previous question. (2 pts)

3. Why are the sandwiches a possible confounder? (2 pts)

Sandwiches have been ruled out as a possible cause and therefore are not being studied.

	Did Eat			Didn't Eat		
Food	Case	Control	Total	Case	Control	Total
Salad	49	32	81	17	60	71
Ice cream	32	37	96	40	16	56
Cookie dough	25	24	49	14	89	103
Milk	33	40	73	50	19	79
Fruit juice	15	20	35	49	68	117

4. Calculate the attack rate for each of these foods and express them in underline percentages to the tenth place. (10 pts)

5. Given the above results, which food had the greatest risk of transmitting the illness? (2 pts)

6. With all the information given so far, which disease is this most likely to be? (4 pts)
   a. Salmonella
   b. Botulism
   c. E. coli
   d. Norovirus
   e. B. cereus
   f. Vibrio

7. Why might there be 3 unexposed people who still got sick? (hint: look at the disease chosen above) (3 pts)

8. What is the most common test to detect a foodborne illness? (3 pts)

9. What is the chain of infection, with examples for this case? (12 pts)

10. What is vertical transmission? Would the transmission of this illness be considered vertical transmission? (4 pts)

Case #2: There has been an outbreak of measles among children in Fort Collins, Colorado. The first case was reported on November 5, and today is November 11. As of today, 60 children have come down with the virus, and there have been 7 deaths. Common symptoms include fever, dry cough, runny nose, sore throat, inflamed eyes, white spots on the inner cheek, and a blotchy skin rash. The incubation period is estimated to be around 10-14 days. People are contagious through droplet transmission for about 8 days after symptoms begin.

11. Given the information and the chart, draw an epicurve. (6 pts)

Date	# of cases
11/5	1
11/6	12
11/7	5
11/8	15
11/9	9
11/10	11
11/11	7

12. What is an index case? What date did the index case show up in, in this scenario? (2 pts)

13. Given the graph and the information above, what type of epi-curve is this outbreak? Explain. (3 pts)
    a. Common continuous source
    b. Point source
    c. Common intermittent source
    d. Propagated source

14. Calculate the case-fatality rate and express it in a percentage to the tenths place. (2 pts)

15. What is droplet transmission? (2 pts)

16. What are 4 ways to prevent contracting measles? (4 pts)

17. Write a case definition for this outbreak. (4 pts)

18. What is the difference between quarantine and isolation? Which would you put the infected children into? (4 pts – 2 for each component)

19. What is the epidemiological triad? (3 pts)

20. Why would this not always be considered a nosocomial infection? (2 pts)

Part 3: General epidemiology
1. What does the Germ Theory of Disease state? (2 pts)

2. What are Koch's four postulates? (4 pts)

3. What is the Hawthorne Effect? Describe a scenario in which this type of bias can be seen. (4 pts)

4. What is PulseNet? (2 pts)

5. Name 3 types of studies, and atleast 2 advantages and 2 disadvantages for each. (12 pts)

6. What is herd immunity? (2 pts)

7. What are the 4 types of errors? Define each. (8 pts)

8. What is a double blind experiment? (2 pts)

9. Is it possible for relative risk to be less than 1? If so, what does it mean? (2 pts)

10. What does the acronym "DALYS" mean? (1 pt)