Disease Detectives Test
SSSS 2019
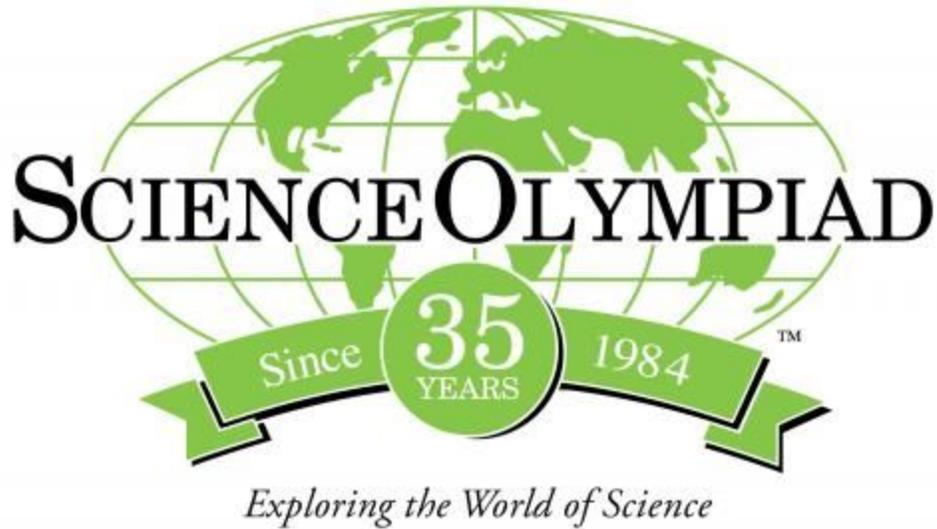
Please write your answers legibly in the spaces provided. Point values will be indicated next to the question or heading. Partial credit may be awarded, so please make sure to show all you work.
You have 50 minutes to complete this test. Good luck!

If you have any questions about this test, please contact me at harshitha.uppada@gmail.com.

Names: _____

School: _____

Team Number: _____

Part I: Multiple Choice

➢ Each question is worth 1 point.

Use the following answer choices to identify the types of surveillance for Questions 1-6. Some answer choices may be used more than once, while some may not be used at all.

  a. Active Surveillance
  b. Passive Surveillance
  c. Sentinel Surveillance
  d. Syndromic Surveillance

1. A physician diagnoses a patient with mononucleosis, and then proceeds to report the case to the local health department.

2. Epidemiologists receive a case report of Salmonella infecting a man who recently ate at Chipotle. Their team recruits a group of local health practitioners to monitor and report any further cases of Salmonella acquired from eating at Chipotle.

3. Health professionals track cases of hematuria (blood in the urine) in order to capture possible cases of kidney failure.

4. A local health department decides to do their annual monitorization of the number of influenza cases during the winter season in the city of Chicago.

5. After diagnosing a patient with poliomyelitis, a doctor reports this patient file to local epidemiologists.

6. To capture cases of tuberculosis in patients with a suppressed immune system, health professionals record cases of those who were exposed to the suspected exposure and complained of spinal pain.

7. What type of diagram did John Snow use when he conducted his investigation of the cholera epidemic in 1854?
    a. Cloropleth map
    b. Spot map
    c. Scatter plot
    d. Population pyramid

8. Which of the following major determinants has the greatest influence on health at a population level?
    a. Social/societal characteristics
    b. Genes and biology
    c. Health behaviors
    d. Medical care

9. What types of cases may be used when validating a hypothesis?
    a. Undetermined
    b. Possible
    c. Probable
    d. Confirmed

10. Termination of all transmission of infection by extermination of infectious agents refers to which of the following steps for disease control?
    a. Control
    b. Elimination
    c. Eradication
    d. Extinction

11. Screening for type 2 diabetes is an example of what level of prevention?
    a. Primordial
    b. Primary
    c. Secondary
    d. Tertiary

12. Treatment given to exposed individuals to prevent illness prior to onset of symptoms is known as…
    a. Latent
    b. Nosocomial
    c. Incubation
    d. Prophylaxis

Use the following image to answer Questions 13-15.
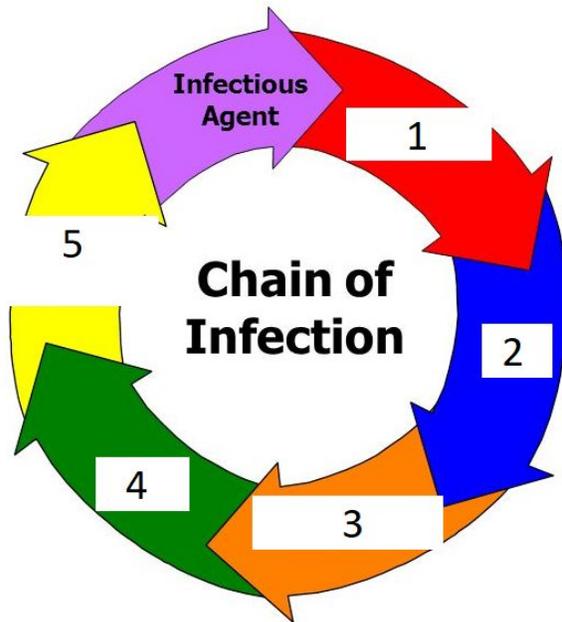
13. At which point in the chain of infection would the spread of infection begin to occur?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

14. Excretions and secretions, non‑ intact skin, the respiratory tract, the gastrointestinal tract, and mucous membranes are examples of which event(s) in the chain of infection? (Circle all that apply)
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

15. Vectors are responsible for…
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5

16. What is it called when the infectious agent begins its invasion of the host tissue?
    a. Contamination
    b. Infection
    c. Disease
    d. Virulence

17. Exposure to the infectious agent marks the beginning of what stage?
    a. Stage of susceptibility
    b. Stage of subclinical disease
    c. Stage of clinical disease
    d. Stage of disability

18. What type of carrier is able to transmit the infectious agent after the clinical signs of the disease have disappeared?
    a. Asymptomatic
    b. Incubatory
    c. Convalescent
    d. Chronic

19. Which of the following characteristics usually are not present in a line listing?
    a. Patient name
    b. Age
    c. Date of onset
    d. Marital status

20. Which of the following conditions is NOT required to establish a cause-and-effect relationship?
    a. The symptoms present must be recurrent in majority of cases
    b. The association should be compatible with existing theory and knowledge
    c. Multiple hypotheses must be considered before making conclusions about association
    d. An increasing amount of exposure increases the risk of contracting the illness

Use the following answer choices to match the diseases with their respective modes of transmission for Questions 21-30. Some questions may have multiple answers.

       a. Airborne transmission
       b. Water-borne transmission
       c. Food-borne transmission
       d. Vector transmission

21. Tuberculosis

22. Shigellosis

23. SARS

24. Chagas disease

25. Giardiasis

26. Hepatitis

27. Lyme disease

28. Varicella

29. Typhoid fever

30. Influenza

Part II: Free Response
➢ The point value for each question will be indicated next to it.
➢ The answers don't have to be exactly the same, the point is earned as long as the message is conveyed in any sense

Read the following case study to answer the following questions.

"During the summer of 2019, a weeklong convention was held in Washington at the Microsoft headquarters, where 120 Microsoft employees attended. Soon after the gathering, the CDC local health department began receiving reports of Hepatitis cases."

31. Here is the data for the number of cases received. Using the following chart, create an epidemiology curve on the provided grid lines. (4 pts)

July 6, 2019	1
July 8, 2019	1
July 9, 2019	4
July 11, 2019	3
July 12, 2019	6
July 13, 2019	8
July 15, 2019	9
July 16, 2019	7
July 17, 2019	11
July 18, 2019	12
July 19, 2019	9
July 20, 2019	6
July 21, 2019	7
July 22, 2019	5
July 23, 2019	4

July 25, 2019	4
July 27, 2019	3
July 30, 2019	2
July 31, 2019	1
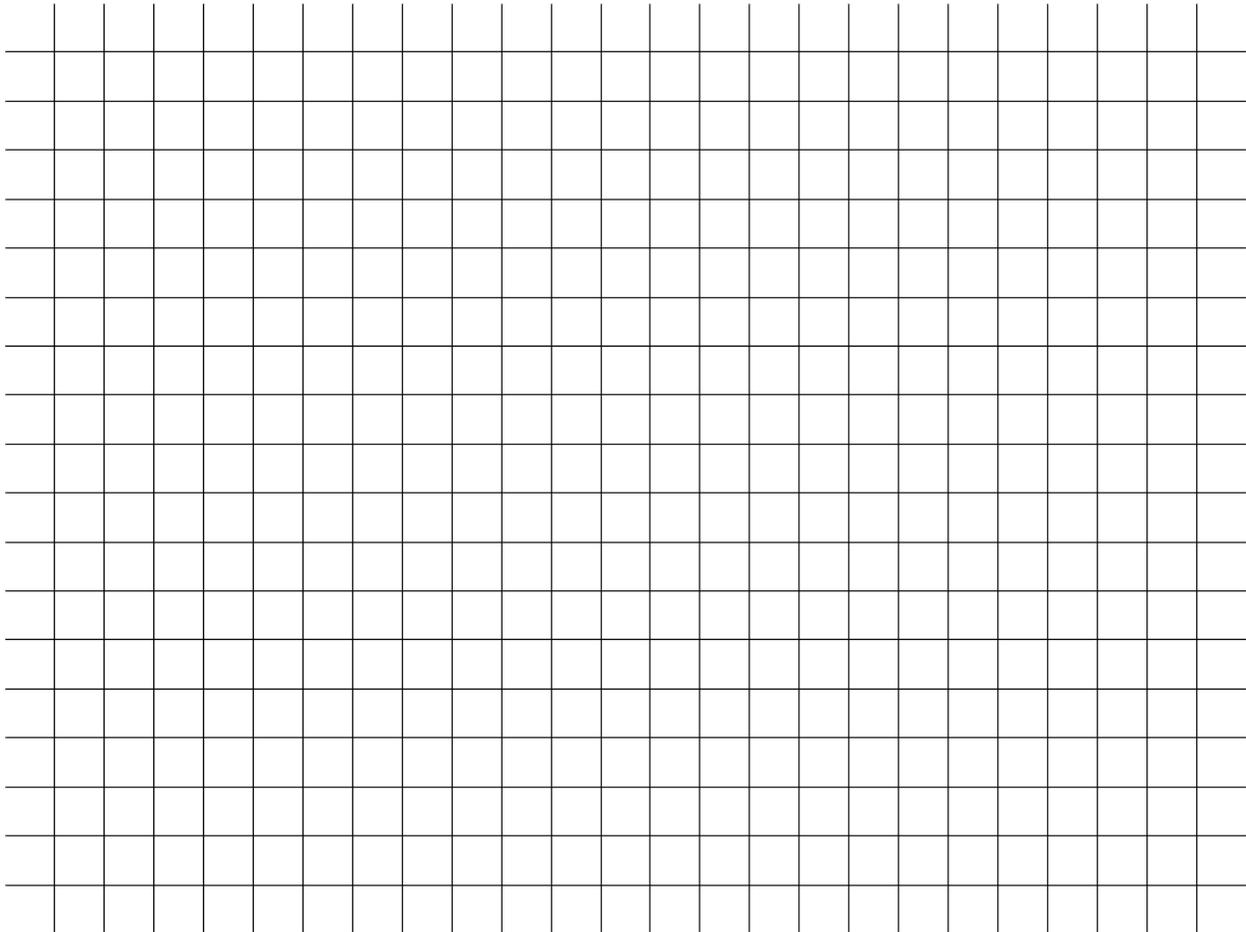
32. Identify the type of epi curve. (1 pt)

33. The incubation period for Hepatitis is 15-50 days, the average being 28 days. Knowing this, what is the most likely period of exposure? (2 pts)

34. Identify the index case. What may this specific case represent in this outbreak? (2 pts)

Epidemiologists believe that the food eaten during the convention may have caused the outbreak. The following is a table consisting of the food eaten by the employees who attended.

FOOD	CASES			CONTROLS		
	Ate	Did not eat	Total	Ate	Did not eat	Total
Salad	12	91	103	10	7	17
Shrimp tempura	34	69	103	4	13	17
Pasta	14	89	103	13	4	17
Chicken parmesan	78	25	103	5	12	17
Macarons	25	78	103	2	15	17

35. Which food has the highest risk of illness associated with it? Calculate the relative risk. (2 pts)

36. Interpret the relative risk; what does this calculation mean in context? (1 pt)

Answer the following questions about the disease:

37. What type of agent causes this illness (e.g. bacteria, virus, prion, etc.)? (1 pt)

38. List three symptoms of Hepatitis. (3 pts)

39. List three prevention measures that may be taken beforehand. (3 pts)

To analyze the data, investigators will do a Chi-Square test.

40. Create a 2X2 contingency table for the food that has the highest risk of illness associated with it. (10 pts)

41. Provide a null and alternative hypothesis for a Chi-Square test. (4 pts)

42. Assume that the null hypothesis is true and create a 2X2 table consisting of the expected counts of people in each category. (4 pts)

43. Calculate the Chi-Square statistic. (5 pts)