MY SO PRACTICE TEST

DIVISION C - HIGH SCHOOL, GRADES 9-12

PRACTICE TEST

Instructions

- There are 34 questions on this test.
- You have 50 minutes to complete this test.
- You may write your answers directly in the test.
- You may use any notes or resources you have created or collected.
- You may use a calculator and scratch paper if necessary.
- The scenarios presented here are hypothetical but based on actual outbreaks and public health problems
- Good Luck!

Test Questions

1. Which of the below statements about epidemiology is true?
   a. The diagnosis and treatment of illnesses in individual patients are an important part of epidemiology.
   b. Epidemiologic methods are targeted at populations, communities and groups of individuals.
   c. Epidemiologists are primarily concerned with individuals.
   d. A goal of epidemiology is to treat cases of illness found in individuals.

2. Which of the below is defined as a measure of the frequency with which new cases of illness, injury, or other health condition occur, expressed explicitly per a time frame?
   a. Incidence rate
   b. Mortality rate
   c. Prevalence rate
   d. Proportionate morbidity ratio

Figure 1. Measles Cases by Date of Onset, October 15, 1970–January 16, 1971
(source: Centers for Disease Control and Prevention. Measles outbreak—Aberdeen, S.D.
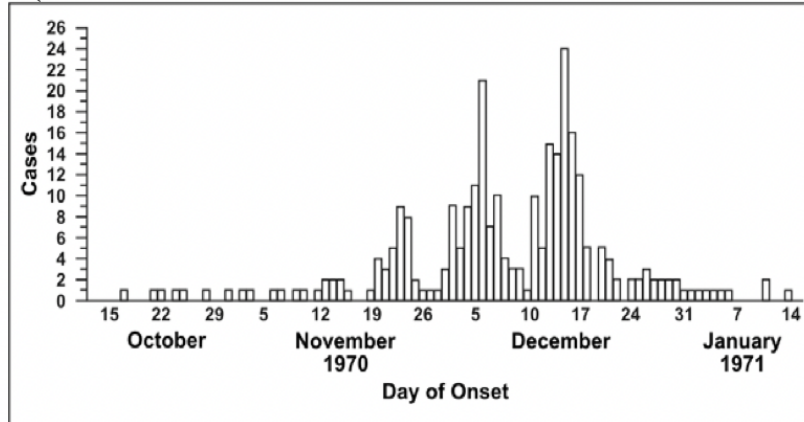
3. The distance between the peaks in Figure 1 is a good estimate of which of the below?
   a. Duration of the outbreak
   b. Duration of illness
   c. Incubation period
   d. Period of communicability

4. Measles is a highly contagious disease and is spread from person-to-person by respiratory droplet nuclei that may remain infectious and suspended in the air for as long as 30 minutes after the source has left the area. This represents which of the below modes of transmission?
   a. Airborne
   b. Direct
   c. Droplet spread
   d. Vector borne

5. Investigators reviewed hospital records and selected a group of patients who were admitted for a variety of reasons but became infected with Methicillin resistant Staphylococcus aureus (MRSA) while in the hospital. They then selected a group of patients who were admitted for the same reasons and became infected with regular Staphylococcus aureus. They compared death rates among the two groups of patients. This is an example of which of the below study types? (select all that apply)
   a. Case-control
   b. Clinical trial
   c. Experimental
   d. Observational

6. Your school is piloting a new physical education class based on Marine Corps boot camp training routines. You have been asked to evaluate the impact of this class on the body mass index (BMI) of the 20 students taking it. Your null hypothesis is that there is no difference between the BMI of students before and after the 12-week class
(i.e., $BMI^{post\text{-}training} - BMI^{pre\text{-}training} = 0$).

   Which of the below would you use to test this hypothesis?
   a. Chi square
   b. Fishers exact
   c. Paired T-test
   d. Students T-test

7. Which of the below tests would you use to determine the statistical significance of the association between illness and contact with fecal matter?
   a. Chi square
   b. Fishers exact
   c. Paired t-test
   d. Students T-test

Infected humans can spread the virus to other persons in multiple ways. Ebola is spread through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth) or other methods, including

- blood or body fluids (e.g., urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with Ebola;
- objects (e.g., needles or syringes) that have been contaminated with the virus; and
- infected fruit bats or primates (apes and monkeys).

Ebola is not spread through the air or by water, or typically, by food. However, in Africa, Ebola might be spread as a result of handling bushmeat (wild animals hunted for food) or contact with infected bats. No evidence is available that mosquitos or other insects can transmit Ebola virus. Only a limited number of mammal species (e.g., humans, bats, monkeys, and apes) have shown the ability to become infected with and spread Ebola virus.

8. Which of the following persons would be at the least risk for contracting an Ebola infection?
   a. Someone who flew aboard a plane with a person who was infected with the Ebola virus.
   b. A person who washed the body of a patient who died from Ebola.
   c. A nurse who cared for a patient with severe vomiting who was infected with Ebola.
   d. A patient who was injected by a needle previously used to treat another patient with Ebola.

9. Which of the following would be least important in controlling an epidemic of Ebola infections?
   a. Avoid contact with blood or body fluids of persons suspected of having an Ebola infection.
   b. Ask patients with Ebola to wear masks to protect health care workers from infection.
   c. Avoid reusing syringes or needles used for injections in health care settings.
   d. Perform proper burial of persons suspected of dying from Ebola infection.

10. Identify the case definition of the following patient based on the information provided.

    Person developed fever, diarrhea, and vomiting 1 week after helping prepare the body of a family member for burial who is believed to have died from Ebola virus.

    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

11. Identify the case definition of the following patient based on the information provided.

    Person from an area with cases, but no known exposure to a person with Ebola, their blood, or body fluids developed fever, diarrhea, and vomiting. The person denies contact with bats or eating bushmeat.

    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

12. Identify the case definition of the following patient based on the information provided.

    Person developed fever, diarrhea, and vomiting with no known exposure to a person with Ebola, but has a positive test for IgM antibodies to Ebola virus.

    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

13. Identify the case definition of the following patient based on the information provided.

    Person has fever, diarrhea, and vomiting 10 days after caring for a person confirmed as having Ebola virus.

    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

14. Which of the case definition categories is likely to have the greatest sensitivity?
    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

15. Which of the case definition categories is likely to have the greatest specificity?
    a. Confirmed
    b. Probable
    c. Suspect
    d. Not a Case

Health care providers caring for Ebola patients and family and friends who are in close contact with these patients are at the highest risk for getting sick because they might come in contact with infected blood or body fluids of sick patients.

During Ebola outbreaks, disease can spread quickly within health care settings (e.g., clinic or hospital). Exposure to Ebola can occur in health care settings where hospital staff are not wearing correct personal protective equipment, including masks, gowns, gloves, and eye protection.

Dedicated medical equipment (preferably disposable) should be used by health care personnel providing patient care. Thorough cleaning and disposal of instruments (e.g., needles and syringes) is also important. If instruments are not disposable, they must be sterilized before reuse. Without adequate instrument sterilization, virus transmission can continue and amplify an outbreak.

After a person recovers from Ebola, they can no longer spread the virus.

16. Contact tracing is an important part of efforts to control an Ebola epidemic. On the basis of what you have read with the previous information, which of the following would be the lowest priority person to contact?
    a. A health care worker in a poorly equipped hospital who cared for patients with Ebola infection.
    b. The spouse of a person with Ebola infection.
    c. A patient in a poorly equipped hospital treating multiple patients with Ebola virus.
    d. The neighbor of a person with Ebola infection.

On March 24, 2014, CDC issued the following outbreak update:

According to the World Health Organization (WHO), the Ministry of Health (MoH) of Guinea has reported an outbreak of Ebola hemorrhagic fever in four southeastern districts: Guekedou, Macenta, Nzerekore and Kissidougou. Reports of suspected cases in the neighboring countries of Liberia and Sierra Leone are being investigated. In Guinea, a total of 86 suspected cases, including 59 deaths (case fatality ratio: 68.5%), had been reported as of March 24, 2014. Preliminary results from the Pasteur Institute in Lyon, France suggest Zaire ebolavirus as the causative agent. Médecins sans Frontières (MSF/Doctors without Borders) is helping the Ministry of Health of Guinea in establishing Ebola treatment centers in the epicenter of the outbreak. CDC is in regular communication with its international partners WHO and MSF regarding the outbreak, to identify areas where CDC subject matter experts can contribute to the response.

You are one of the CDC subject matter experts asked to contribute to the response. You are on a flight to Guinea and access the following information about Guinea from the U.S. State Department website.

The U.S. State Department describes Guinea as "a developing country in western Africa with minimal facilities for tourism. Travelers who plan to stay in Conakry, the capital, should make reservations well in advance. French is the official language; Pular, Malinké, and Soussou are also widely spoken." The website indicates that "Medical facilities are poorly equipped and extremely limited, both in the capital city and throughout Guinea. Medicines are in short supply and of questionable quality, sterility of equipment should not be assumed, and treatment is frequently unreliable. Some private medical facilities provide a better range of treatment options than public facilities, but are still well below Western standards. Ambulance and emergency rescue services are extremely limited in Conakry and practically non-existent in the rest of the country."

Figure 2. Map of Guinea Source: U.S. State Department
(http://travel.state.gov/content/passports/english/country/guinea.html).

Part of your preparation to go to the field includes reviewing what is known about Ebola virus infections. You review 2 early reports from the Bulletin of the World Health Organization. The first report describes 218 cases of acute viral hemorrhagic fever in southern Sudan during June–November 1976. The second report discusses 318 cases in Zaire during September–October 1976. Although both outbreaks occurred at approximately the same time, testing has indicated different strains were involved, and they appear to be unrelated.

The index case in the Zaire outbreak involved a man aged 44 years who was an instructor at the Yambuku Mission School. He had symptom onset beginning September 1, 1976, after receiving an injection of chloroquine for presumptive malaria at the outpatient clinic at Yambuku Mission Hospital (YMH). Within a week, multiple YMH patients became ill. The 120-bed hospital was closed on September 30, after 11 of 17 staff had died from the illness. Investigators from WHO and other groups conducted active surveillance and a series of investigations. During November–December, 10 teams of 4 persons each visited 550 villages and interviewed 34,000 families.

They collected serum specimens from persons in villages in the epidemic area if the person reported acute febrile illness during the epidemic period and had been in contact with a probable case, and from all volunteers in 8 villages, each of which had ≥5 probable cases. They collected serum specimens from persons in villages in the epidemic area if the person reported acute febrile illness during the epidemic period and had been in contact with a probable case, and from all volunteers in 8 villages, each of which had ≥5 probable cases.

17. WHO and other groups conducted active surveillance. Which of the following determines if surveillance is active or not?
   a. The type of information that is collected.
   b. The source of information that is collected.
   c. How the information is analyzed.
   d. How the information is collected.

Another 6 teams visited all villages reporting possible cases to the surveillance teams and gathered detailed information. They selected a group of control subjects, meaning persons from the same village as probable case-patients and, if possible, matched by age and sex with a probable case-patient in the same family.

18. What study design was used for the investigation?
   a. Case-control
   b. Clinical trial
   c. Experimental
   d. Observational

19. Which answer best explains why investigators selected persons from the same village as probable case-patients and matched them by age and sex with a probable case-patient in the same family?
   a. They did not have to go elsewhere for information, and the selection was a matter of convenience.
   b. They wanted control subjects to be as similar as possible to case-patients, except for those factors possibly related to exposure.
   c. They wanted to be sure to get the same information from both case-patients and control subjects.
   d. They wanted to reduce the likelihood of observer bias.

Figure 3. Number of cases of Ebola hemorrhagic fever in the Équateur Province region, by day of onset and probable type of transmission
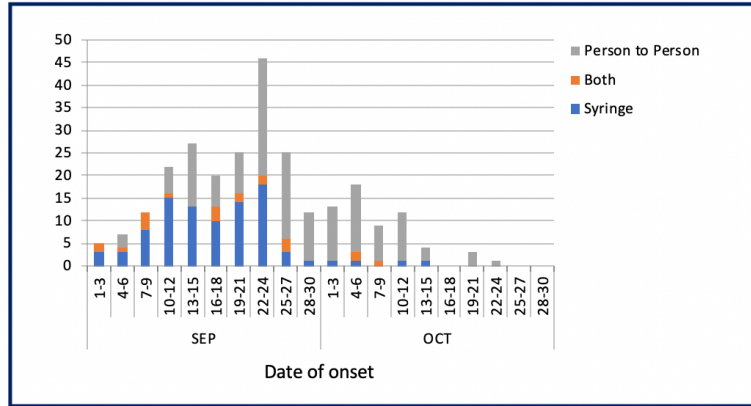
20. Which of the following statements is not supported by this graph?
    a. Contaminated syringes were a major factor in transmission early during this outbreak.
    b. Contaminated syringes were what caused the outbreak.
    c. Person-to-person transmission was important in the latter part of the epidemic.
    d. Person-to-person transmissions caused more cases than were caused by contaminated syringes.

21. Contact tracing indicates that multiple people were infected at the Yambuku Mission Hospital during the start of this epidemic. What type of infection are these an example of?
    a. Doctor-acquired infections
    b. Health care–associated infections
    c. Occupational infections
    d. Zoonotic infections

Lassa fever is transmitted among humans by contact with urine or droppings from rodents and causes a hemorrhagic fever with symptoms similar to that of Ebola. You know from your past experience that lead is an element on the periodic table that is often associated with mining activities in developing countries. You quickly grab a reference book and read about lead poisoning.

22. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

    Similar illness in other household members.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

23. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

Relatively constant time interval between onset of cases in households with multiple causes.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

24. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

Illness in people who just moved into the area or were passing through.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

25. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

Relatively level epi curve.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

26. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

Increasing frequency or severity of illness among individuals with increasing exposure.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

27. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

    Those who recover never experience the same symptoms again.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

28. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

    Symptoms limited to a group of individuals with similar occupations and ages.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

29. Identify whether the given epidemiologic observation or phenomenon is a characteristic of communicable diseases with person-to-person transmission such as Lassa fever, a characteristic of environmental problems such as lead poisoning, a characteristic of both, or a characteristic of neither.

    Reports of similar illness in other areas around the same time period.

    a. Characteristic of Communicable Disease
    b. Characteristic of an Environmental Problem
    c. Characteristic of Both
    d. Characteristic of Neither

Table 1. Characteristics of probable and suspected cases of acute lead poisoning in select LGAs(Jan 1—June 1, 2010), Kano State, Nigeria.

	Died (N=78)		Alive (N=179)		
	No.	%	No.	%	Case fatality rate
Age group					
<5	72	92.3	103	57.5	41.1%
5-15	6	7.7	35	19.6	14.6%
>15	0	0.0	41	22.9	0%
Total	78	100	179	100	30.4%

30. Which of the following statements about the information in Table 1 is true?
    a. Children younger than 5 were 27 times more likely to die than those between 5 and 15 years of age.
    b. Children younger than 5 years of age were the most likely to die from this illness.
    c. Adults are over 50% of the affected population.
    d. Adults appear to have been exposed as much to whatever caused the illness as young children.

31. Which of the following statements about the information in Table 1 is false?
   a. Almost one-third of cases died.
   b. Adults were more likely to be affected than young children.
   c. Children younger than 5 years of age were the most likely to die from this illness
   d. The illness was both more common and more severe among children younger than 5 years of age than among older children or adults.

Table 2. Demographic results of household survey in Gezawa and Bagwai, Nigeria, May, 2010.

Demographic	Gezawa (n = 53 homes)	Bagwai (n = 65 homes)	Both villages (n = 118 homes)
Mean number of married men per compound	3.1	2.1	2.6
Mean number of mothers per compound	3.7	3.0	3.4
Mean number of children aged <5 years per compound	4.8	3.1	4.2
Total number of children aged <5 years in the village, as of May 2009	259	204	463
	No. (%)	No. (%)	No. (%)
Number of children aged <5 years living at time of survey (%)	181 (70)	164 (80)	345 (75)
Number of children aged <5 years who had died within last 12 months before survey (%)	78 (30)	40 (20)	118 (25)
Number compounds with ≥1 pregnant women (%)	26 (49)	24 (37)	50 (42)

32. Which of the below statistical tests would you use to test the hypothesis that the mean number of children <5 years of age per compound in Gezawa was not statistically significantly different than that in Bagwai?
   a. Chi square
   b. Fishers exact
   c. Paired t-test
   d. Students t-test

33. What percentage of children under 5 years of age had died within the last 12 months in the two villages combined?
   a. 15.7%
   b. 25.5%
   c. 30.8%
   d. 65.2%

34. What is the odds ratio of children dying in Gezawa as compared to Bagwaj?
   a. 0.83
   b. 1.17
   c. 1.77
   d. 2.92

ANSWER KEY

1.	**B**	15.	**A**	29.	**A**
2.	**A**	16.	**D**	30.	**B**
3.	**C**	17.	**D**	31.	**B**
4.	**A**	18.	**A**	32.	**D**
5.	**D**	19.	**B**	33.	**B**
6.	**C**	20.	**B**	34.	**C**
7.	**B**	21.	**B**		
8.	**A**	22.	**C**		
9.	**B**	23.	**A**		
10.	**C**	24.	**A**		
11.	**D**	25.	**C**		
12.	**A**	26.	**B**		
13.	**B**	27.	**A**		
14.	**C**	28.	**B**		