

Team Name: Answer Key Team Number: B

Students Names: \_\_\_\_\_

Welcome to

# Disease Detectives

Total of 57 points on 1st half of test

Tie Breaker #1 was graded in the event of a tie worth 7 pts → Highest score wins

Any additional tie breakers were determined by the # of correct answers on each page starting with #1



## Holt Invitational

## February 24, 2018

Instructions: Please do not begin until directed to do so. Each question is worth 1 point unless otherwise stated. Tie breakers will be noted with a TB and the tiebreaker order. Please write the letter answer response in the line space to the left of each questions. Good Luck!

- D 1. Which of the following best describes zoonosis?
- They are diseases that may spread from animals to humans
  - They are diseases that may spread from humans to animals
  - Influenza is just one example of the many types of zoonosis
  - Both A and C are correct
  - All of the Above
- E 2. Which of the following incorrectly pairs the disease with its vector?
- West Nile fever: *Culex* Mosquito
  - Malaria: *Anopheles* Mosquito
  - Lyme Disease: Ticks
  - Rickettsiosis: Fleas
  - Chagas disease: Black flies
- C 3. Although many food borne illnesses exhibit different symptoms, which of the following (if any) are common first symptoms across many different illnesses? TB #2
- Nausea
  - Vomiting
  - Abdominal Cramps
  - Diarrhea
  - Sweating
  - Chills
  - Fever
- I and II only
  - I, II and III. only
  - I, II, III, and IV
  - I, III, VI, and VII only
  - None of the above is the correct
- B 4. Which of the following contributes most toward the distribution of vector-borne diseases, according to the WHO?
- Worldwide distribution of mosquitoes
  - Environmental and social factors
  - Education and wealth
  - Travelling

4

C 5. Which of the following describe(s) an effect of pesticide residues left in food?

- I. Cancer
- II. Negative effects on the nervous system
- III. Negative effects on the immune system
- IV. Killing vectors such as mosquitoes

- a. I and IV only
- b. II and III only
- c. I, II, and III only
- d. I, II, III, and IV

H 6. Which of the following is NOT a type of infectious pathogen found in birds?

- a. Protozoa
- b. Viruses
- c. Bacteria
- d. Fungi
- e. Metazoan parasites such as ectoparasites and endoparasites
- f. A and E
- g. B and C
- h. None of the Above

True 7.  True or False: Ectoparasites refer to lice and ticks, while Endoparasites refer to nematodes and tapeworms.

B 8. Which of the following describes the type of virus that causes influenza?

- a. Reoviridae
- b. Orthomyxoviridae
- c. Togaviridae
- d. Filoviridae

D 9. Which of the following classes of virus have an enveloped capsid? TB#3

- I. Togaviridae
- II. Bornaviridae
- III. Retroviridae
- IV. Astroviridae
- V. Calciviridae
- VI. Orthomyxoviridae

- a. I only
- b. I and VI only
- c. I, III, IV, and V
- d. I, II, III, and VI only
- e. All of the Above
- f. None of the Above

+5

- F 10. Which of the following is NOT a possible host for avian influenza?
- a. Human
  - b. Birds
  - c. Pigs
  - d. Horses
  - e. C and D
  - f. None of the Above

- A 11. Avian influenza is best describes as which class of influenza?
- a. Influenza A
  - b. Influenza B
  - c. Influenza C
  - d. None of the Above

- True 12. True or False: The "H" and the "N" in H1N1 stand for "Hemagglutinin" and "Neuraminidase" respectively.

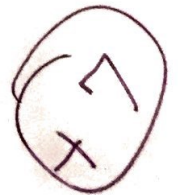
- B 13. H5N8 refers to a new strain of avian influenza that arose in 2014 and is still around today. Which of the following, according to recent publication by Kang et. al, is evidence suggesting that migrating aquatic birds are the probable transmission vectors?

- a. Widespread disease in humans across Asia and the Americas
- b. Lack of pathology and high shedding rates in wildfowl
- c. Decreasing avian population after migration
- d. All of the Above

- False 14. True or False: The international trade of live poultry likely was a great contributor in the long-distance spread of H5N8.

- G 15. Bird migration has an effect on the \_\_\_\_\_ of infectious diseases.
- a. Prevalence
  - b. Distribution
  - c. Evolution
  - d. A and B only
  - e. A and C only
  - f. B and C only
  - g. All of the Above
  - h. None of the Above

- True 16. True or False: Anthroponosis refers to disease that can be spread from humans to animals.



- B 17. Which of the following is NOT true about West Nile Virus?
- In humans, it can cause swelling of the brain and spinal cord (Encephalitis)
  - The disease first appeared in the US in 2001
  - It is common for birds that are infected to die within 3 weeks
  - West Nile was first isolated from the West Nile District of Uganda

- A 18. Which of the following describes the type of virus that West Nile is?
- Flavivirus
  - Retrovirus
  - Togavirus
  - Orthomyxovirus

- F 19. Which of the following is NOT true about the symptoms of West Nile Virus?
- Only about 1 in 5 individuals who are infected with the virus develop a fever and other symptoms
  - Roughly 1 in every 150 individuals develop a severe but sometimes fatal illness of the central nervous system
  - Symptoms, aside from fever include loss of vision and lethargy
  - Tremors and convulsions are other common symptoms
  - All of the Above
  - None of the Above

False 20. True or False: West Nile Virus reduces the fecundity (reproductive capability) and the lifespan of mosquitos affected.

True 21. True or False: Although the vector for West Nile Virus is the mosquito, we can also see the virus amplified in birds.

- C 22. Which of the following refers to incidental transmission of West Nile Virus?
- Transmission from a mosquito to a bird
  - Transmission from a horse to a human
  - Transmission from a mosquito to a horse or a human
  - Transmission from a human to a horse

+6

4

- B 23. Which of the following is true about the relationship, if any, between the WNV and bird diversity?
- Areas of low bird diversity tend to have lower incidence of WNV
  - b. Areas of higher bird diversity tend to have lower incidence of WNV
  - Areas of higher bird diversity tend to have higher incidence of WNV
  - There is no relationship between West Nile Virus (WNV) and the bird population

- A 24. An "individual who is infected with a virus, bacteria, or other microorganism who transmits such microorganism to an unusually large amount of people" is known as a:
- a. Superspreader
  - Spreader
  - Vector
  - High frequency vector

True 25. True of False: WNV is responsible for a 45% decline in the American crow population.

- A 26. Which of the following diseases is/are CORRECTLY matched to its/their mode(s) of transmission?
- a. Cryptococcosis; inhaling fungi
  - Pneumonic plague; tick bite
  - Q fever; air droplets
  - A and C
  - All of the Above
  - None of the Above

Match each food and waterborne illness to the facts about them: (9 pt)

- |          |                                   |          |  |
|----------|-----------------------------------|----------|--|
| <u>H</u> | 1. <i>Salmonella</i>              | <u>H</u> | A. fecally contaminated water, fatigue and cramps  |
| <u>F</u> | 2. Norovirus                      | <u>F</u> | B. ground beef, fecal contamination, 1-10 day inc per                                    |
| <u>E</u> | 3. <i>Campylobacter</i>           | <u>E</u> | C. processed meats, soft cheeses, refrigerated seafood                                   |
| <u>B</u> | 4. <i>E. coli</i>                 | <u>B</u> | D. Poorly canned food  |
| <u>C</u> | 5. <i>Listeria</i>                | <u>C</u> | E. raw poultry, water, inc 2-5 days  |
| <u>G</u> | 6. <i>Clostridium perfringens</i> | <u>G</u> | F. shellfish, produce, 12-48 hr inc period,  |
| <u>I</u> | 7. Cholera                        | <u>I</u> | G. beef, poultry, 6-24 hr inc period, diarrhea   |
| <u>A</u> | 8. Beaver Fever                   | <u>A</u> | H. eggs, poultry, dairy,   |
| <u>P</u> | 9. Botulism                       | <u>P</u> | I. contaminated water, causes dehydration and diarrhea, not found in developed countries |

+13

<del>G</del> 4. Cluster	<del>14C.</del> A disease that is native to a certain area <b>Endemic</b>
<del>K</del> 5. Fomite	11D. Study of the causes of disease <b>Etiology</b>
<del>O</del> 6. Prion	10E. Time in between contact with pathogen and infection <b>Latent period</b>
<del>N</del> 7. Incidence	20F. Capacity for a disease to spread <b>Infectivity</b>
<del>S</del> 8. Prevalence	4G. Cases grouped over time and place <b>cluster</b>
<del>J</del> 9. Incubation Period	<del>3H.</del> More diseases than expected in a certain area/time
<del>E</del> 10. Latent Period	12I. An animal that transmits disease <b>vector</b>
<del>D</del> 11. Etiology	21J. Capacity to cause disease <b>pathogenicity</b>
<del>H</del> 12. Vector	5 K. A physical object that serves to transmit an infectious agent from person to person <b>Fomite</b>
<del>M</del> 13. Zoonosis	<del>2L.</del> A prevalent disease over a country or the world <b>Pandemic</b>
<del>T</del> 14. Endemic	13M. The transmission of a disease through animals <b>Zoonosis</b>
<del>I</del> 15. Index Case	7 N. Number of new diseases in pop. over time <b>Incidence</b>
<del>B</del> 16. Surveillance	6 O. A misfolded protein that causes disease <b>Prion</b>
<del>V</del> 17. Herd Immunity	19 P. Temporary immunity imparted to fetus from mother <b>passive Immunity</b>
<del>P</del> 18. Active Immunity	8 Q. Total cases of disease in pop. at a period of time
<del>F</del> 19. Passive Immunity	<del>1R.</del> A widespread occurrence of an infectious disease <b>Epidemic</b>
<del>J</del> 20. Infectivity	9 S. Time in between contact with pathogen and symptoms <b>Incubation period</b>
<del>A</del> 21. Pathogenicity	15 T. The first patient in an epidemiological study <b>Index case</b>
<del>A</del> 22. Virulence	16U. Systematic collection, analysis, sharing of health data <b>surveillance</b>
	18V. Immunity to disease that one's been prior infected with <b>Active Immunity</b>

H6

Label each disease with its respective agent: bacteria, virus, protists(excavata), prion, fungi, abiotic exposure:

1. Botulism Bacteria
2. Shigella Bacteria
3. Wart virus
4. Lead poisoning abiotic
5. Japanese Encephalitis virus
6. Rift-Valley fever virus

Tie Breaker  
Next page



+ 22

## Tie Breaker #1 (Highest score wins)

Recently the city of Scranton has experienced an unfortunate outbreak after the annual Spring Festival. Within three days of the outbreak, people began to fall ill, experiencing nausea, diarrhea, and even convulsions. There were 203 attendees at the festival and you know what they ate and if they are sick or not.

	Sick	Healthy
Ate Kevin's Chili-dogs	48	112
Did not eat the chili-dogs	7	36

- Write your hypotheses for a chi-squared test: (1pt per Hypothesis)  
Alternative hypothesis: the disease is associated with the chili dogs (will not accept caused by chili dogs)
- What is the chi-squared statistic? (1pt)  
Null Hypothesis: the disease is not associated with eating chili dogs  
Chi-square statistic is 3.2302
- What is the p-value? (1pt)  
The p-value is 0.072293
- How many degrees of freedom? (1pt)  
1
- Find the odds ratio? (1pt)  
2.2
- Find the relative risk? (1pt)  
1.84
- Would you use the odds ratio or relative risk, why? (1pt) - Partial credit possible  
You would use relative risk since the risk is pretty high so odds might overestimate