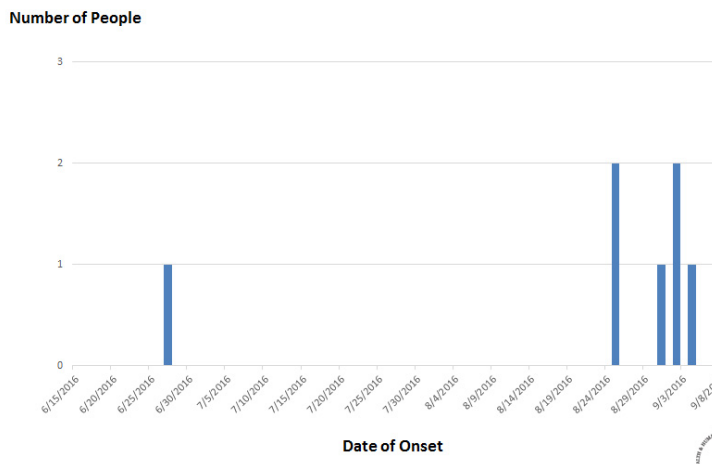


## Disease Detectives – Key

1. b (1)
2. c (1)
3. pathogens multiply faster (1), mosquitoes transmit disease (1)
4. d (1)
5. d (1)
6. b (1)
7. clinical symptoms (0.5), host characteristics (0.5), time (0.5), place (0.5)
8. d (1)
9. d (1)
10.
  - a. vectorborne (1)
  - b. vehicular (1)
  - c. airborne (1)
  - d. droplet (1)
  - e. vectorborne (1)
  - f. genetic (1)
11. Droplets are large ( $>5\ \mu\text{m}$ ) and are usually transmitted by sneezing or coughing (1), while airborne disease particles are  $< 5\ \mu\text{m}$  and can be transmitted as aerosols (1).
12. c (1)
13. fecal, oral (1)
14. Shiga (1), bacteriophages/phages (1)
15. (Adapted from <http://www.cdc.gov/ecoli/2016/o157h7-09-16/epi.html>)



(1) for correctly-placed bars

(1) for x AND y labels

16. d (1)
17. Min incubation period:  $8/26/16 - 3\ \text{days} = 8/23/16$   
 Max incubation period =  $9/5/26 - 8\ \text{days} = 8/28/16$

(1) for work shown above

Range is from 8/23/16 to 8/28/16

(1) for right answer

18. (1) Odds ratio (this is a case-control)

19. (3) For each incorrectly calculated odds ratio, -0.5. If relative risk was used instead of odds ratio, give no points.

Food	Ill			Not ill			Risk Measure
	Ate	Didn't eat	Total	Ate	Didn't eat	Total	
Pizza	6	1	7	18	3	21	1
Salad	2	5	7	11	10	21	0.363636364
Ice Cream	3	3	7	3	18	21	6
Cookies	4	3	7	15	6	21	0.533333333
Soda	5	2	7	5	16	21	8
George's fried Chicken With drippy fish	3	4	7	6	15	21	1.875

20. ice cream (1) and soda (1), both have high odds ratios. People who ate ice cream were 6x as likely to be ill than those who didn't, and those who drank soda 8x of those who didn't. (1 for specific mention of odds ratios)

21.

- a. 3 (1)
- b. 4 (1)
- c. 6 (1)
- d. 5 (1)
- e. 7 (1)
- f. 1 (1)
- g. 2 (1)

22.

- a. 1 (1)
- b. 4 (1)
- c. 6 (1)
- d. 8 (1)
- e. 3 (1)
- f. 7 (1)
- g. 11 (1)
- h. 10 (1)
- i. 5 (1)

- j. 13 (1)
- k. 14 (1)
- l. 2 (1)
- m. 9 (1)
- n. 12 (1)

23. Expected cases:  $(14 \text{ cases}/100000 \text{ person-year}) * (1 \text{ year}/52 \text{ weeks}) * (80 \text{ people}) = 0.000215 \text{ cases/week}$  (1)

Yes, since the actual number of cases in a week was far greater than expected. (1)

24. The denominator is the population begins at 80, and decreases as people die. -2.5 if no work is shown.

- a.  $2/79 = 0.0253$  (1)
- b.  $3/79 = 0.0380$  (1)
- c.  $3/79 = 0.0380$  (1)
- d.  $1/78 = 0.0128$  (1)
- e.  $1/78 = 0.0128$  (1)

25. Incidence is the number of people who are newly infected/number of vulnerable (never infected).

$4/77 = 0.0519$  (2)

26.

	Positive test result	Negative test result	Total
Has <i>Campylobacter</i>	$0.7 * 0.1125 = 0.07875$ (1)	$0.3 * 0.1125 = 0.03375$ (1)	0.1125
Doesn't have <i>Campylobacter</i>	$0.1 * 0.8875 = 0.08875$ (1)	$0.9 * 0.8875 = 0.79875$ (1)	0.8875 (1)
Total	0.1675 (1)	0.8325 (1)	1

27.  $0.07875/0.1675 = 0.4701$  (1)

Sensitivity or true positive rate (1)

28.  $0.79875/0.8325 = 0.9595$  (1)

Specificity or true negative rate (1)

29.  $0.4701/(1-0.9595) = 11.607$  (1)

Since this value is far greater than 1 (1), it indicates that the test result is highly associated with the disease (1).

30. (2) Any 2 of the following: wash food-preparation surfaces, separate raw and cooked foods, cook to safe temperatures, refrigerator foods promptly, rinse vegetables and fruits