Disease Detectives Event
Athens Invitational 2012

Total score_____

Name_____   Team #_____
Name _____   School_____

1	26	51	76
2	27	52	77
3	28	53	78
4	29	54	79
5	30	55	80
6	31	56	81
7	32	57	82
8	33	58	83
9	34	59	84
10	35	60	85
11	36	61	86
12	37 graph 5pts	62	87
13	38 graph	63	88
14	39 graph	64	89
15	40 graph	65	90
16	41 graph	66	91
17	42	67	92
18	43	68	93
19	44	69 on back	94
20	45	70	95
21	46	71	96
22	47	72	97
23	48	73	98
24	49	74	99
25	50	75	100
		Total correct =	

The ten steps:

64)_____

65)_____

66)_____

67)_____

68)_____

69)_____

70)_____

71)_____

72)_____

73)_____

74)_____

use this space if needed for other
questions_____
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DISEASE detectives

Part 1- Matching. On your answer sheet, write the correct letter that matches each vocabulary word. (it continues on the next page)

1)Jaundice	A) An infection acquired in a hospital setting
2)epidemic	B) A rare, fatal disease affecting the brain and central nervous system of cattle; mad cow disease; transmitted through contaminated animal feed.
3)vector	C) A yellowish tinge to the skin and tissues caused by bile pigments; a common symptom of liver disease
4) pandemic	D) one of the components of the <u>immune system</u> of the body; it has antimicrobial activity (<u>bacteriocide</u>, <u>fungicide</u>) and is part of the innate defense, mainly at mucoses..
5)Fomite	E) a substance (a virus or toxin or immune serum) that is introduced into the body to produce or increase immunity to a particular disease.
6) Zoonosis	F) An infection with Listeria monocytogenes, a bacterium that can be found in vegetables, milk, cheese, meat, and seafood.
7) Aerosol transmission	G) an inanimate object (as a dish, toy, book, doorknob, or clothing) that may be contaminated with infectious organisms and serve in their transmission

8) Endemic	H) A potent toxin produced by enterohemorrhagic E. coli (EHEC) that is released into intestinal tissues and contributes to severe diarrhea and other complications in humans.
9) endotoxin	I) A disease that affects the nerves of the body and can lead to paralysis.
10) Inoculum	J) When an infectious agent or disease is constantly present in a given population at a specific level.
11) Lactoferrin	K) When a mist of infectious particles released from one person via coughing or sneezing is transmitted to another person.
12) Listeriosis	L) A substance present on the surface of a gram-negative bacteria that is released when cells are destroyed by infection.
13) nosocomial infection	M) any disease of animals communicable to humans
14) Shiga toxin	N) prevalent throughout an entire country, continent or the whole world; epidemic over a large area
15) BSE Bovine Spongiform Encephalopathy	O) an insect or other organism that transmits a pathogenic fungus, virus, bacterium, etc.
16) GBS Guillain Barre` syndrome	P) Affecting many persons at the same time, and spreading from person to person in a locality where the disease is not permanently prevalent.

Part 2- General knowledge questions – answer all questions to the best of your knowledge

17) What is the first step in an outbreak investigation?

a. Verify the diagnosis
b. Prepare a case definition
c. Prepare to investigate
d. Prepare a budget

The epidemiological triad includes what three elements?

18) _____

19)_____

20) _____

Match the famous scientist to his achievement:

21)Hippocrates   a)used systematic study to end Cholera outbreak
22)John Snow   b)developed theories that environments influenced disease
23)Koch   c)created a set of postulates to prove disease is linked to a
                                                            cause
24)Etiology is
a) the study of the physiologic cause of a disease
b)the study of the cure of a disease
c) the study of the disease's prevention
d) the study of a disease's presence in the environment

25) Antibodies bind to proteins called
a) DNA
b) virions
c) antigens
d) antidotes

26) In 1965, 400 soldiers were exposed to radiation from a bomb explosion. A total of 50 soldiers were 25 yards away, 100 soldiers were 1000 yards away, 200 soldiers were 2000 yards away, and 75 soldiers were 5000 yards away when the bomb exploded. A disease detective wants to determine the effect of this radiation exposure and these soldiers developing cancer. What data analysis would you perform?

a. Odds ratio
b. Attack rate
c. Relative risk
d. Risk ratio
e. Incidence rate

Match the outbreak settings to the agent causing the outbreak

Outbreak Settings

27)__ Kitwit, Zaire, 1995

28)__ Jack-in-the-Box, Pacific NW, 1993

29)__ New Mexico/Arizona Four Corners, 1993

30)__ Meatpacking plant employees, Omaha, 1999

31__ Public school students eating frozen strawberries, United States, 1997

32__ Restaurant-associated, Kearney, 1999

33__ Mosquito-associated, New York City, 1999

34__ "Party in the Pasture" or Cornstalk, Ill,1999

35__ Laboratory Monkeys, Reston, VA, 1989

36__ Salad-bar associated bioterrorism event, Oregon, 1987

Agent Causing Outbreak

A. Shigella
B. Hepatitis A
C. Salmonella
D. Ebola/Ebola related viruses
E. E. coli O157:H7
F. Rubella
G. Hantavirus
H. Measles
I. West Nile Virus
J. Botulism

The following co-workers became ill following an in-office Chinese New Year celebration held on February 3 at 12:00 PM:

Chris   (February 4, 4:00 a.m.)
Karen   (February 4, 7:30 a.m.)
Bob   (February 4, 10:00 a.m.)
Tom   (February 4, 10:00 a.m.)
Josh   (February 4, 8:00 p.m.)
Jane   (February 4, 11:30 p.m.)
Adi   (February 4, 12:00 p.m.)
Wayne   (February 4, 11:00 a.m.)
Kim   (February 4, 9:00 a.m.)
John   (February 4, 4:12 p.m.).

37-41   Please construct an epidemic curve using 2-hour increments on the grah provided. Please include a legend for the figure. (5 points)

title

42) . Stool specimen from ill birthday party attendees were submitted to the state lab. Four specimens tested positive for Norovirus and negative for enteric bacteria. The stool specimen from the catering food worker was negative for both Norovirus and enteric bacteria. What intervention measure would you suggest?

a. Wear gloves only when handling raw meat
b. Never wear gloves
c. Use good personal hygiene during food preparations , wear gloves whenever possible
d. Use the same cutting board and knife for raw meats and vegetables
e. Thaw raw meat on the counter at room temperature

Name two types of bacteria commonly found to cause foodborne illness that are gram positive
43)a) E. coli   c)Bacillus Cereus
44)b) Campylobacter   d)Staphylococcus

Name two types of bacteria commonly found to cause foodborne illness that are gram negative
45)a) Salmonella   c) Listeria
46)b) Shigella   d)C. perfringens

47) Which of the following is least likely to reproduce in the environment? Outside of host.
a)bacteria
b)fungi
c)virus
d)worms

48) A common kitchen instrument, worksurface, etc.hich transmits disease
a) endemic
b) fomite
c) exotoxin
d) ,cluster

49) Multicellular parasites are most likely to cause disease in humans if they are ingested in which life stage?
a) spore
b) egg
c) larva
d) nymph
e) adult

50) Which of the following best represents the "danger zone" of temperatures for bacterial growth
a) 0-100 F
b) 40- 140 F
c) 60- 200 F
d) <20 or >120

51) Why are the concentrations of toxins such as PCB's much higher in larger, predatory fish?
a) biomagnification
 b) larger mass of fish
c) lives longer, more time to accumulate
d) a and c

52) What state had an outbreak of Listeria in September 2011?

53) How was the Listeria transmitted to the public? (what food item)?

54) What is the name of the national network of public health and food regulatory agency laboratories coordinated by the Centers for Disease Control and Prevention (CDC). The network consists of: state health departments, local health departments, and federal agencies (CDC, USDA/FSIS, FDA).?

55) Which of the following is an example of cross-contamination?
a. Jane infects John by sneezing on him
b. George's raw chicken drips onto his fruit salad inside the fridge. George later gets a salmonella infection from the fruit salad.
c. A virus infects a bacterial cell, providing it with a new gene that makes the bacteria even more dangerous
d. A disease affecting one population and another disease affecting another population suddenly and inexplicably switch populations

56) In the example in 38 b., how could George have stopped himself from getting sick?
a. induce vomiting
b. separate the chicken and fruit salad in the fridge
c. cook the chicken before eating it
d. stand on his head and do the hokey-pokey

57) A cluster of cases
a. occurs within a small geographic area
b. occurs within roughly the same time period
c. does not necessarily need to contain a number of cases greater than the expected amount
d. a and b

58) The Spanish Flu in 1918 and the Black Plague in the Middle Ages were examples of
a. endemics
b. vehicles
c. epidemics
d. pandemics

59) E. coli outbreaks have been traced to
a) spinach
b) ground beef
c) lettuce
d) apple juice
e) all of the above

60) The sale of turtles in the 60s and 70s was greatly decreased as a household pet because of what pathogen?

61) Uncooked pork is most associated with what foodborne pathogen or disease?

62) Hemolytic uremic syndrome is caused by _____

63) The E. coli strain notorious for causing the most deaths in the US was_____

64) This year, in September 2011, we suffered the most deadly foodborne illness outbreak in U.S. history, with 31 deaths connected to the bacteria _____

For 65-74, please list the ten initial steps to follow to start an investigation to determine an outbreak (in order) on the back of your answer sheet

65)
66)
67)
68)
69)
70)
71)
72)
73)
74)

75) Give one guideline to support the evidence of an outbreak

Outbreak at the wedding reception

	Sick	Not sick
Ate the food at the reception	72	63
Did not eat food at reception	2	13
	74	76

One hundred and fifty individuals attended a wedding reception. Several persons became ill with diarrhea and vomiting between 12 and 48 hours after eating food served at the reception. Calculate the attack rates for
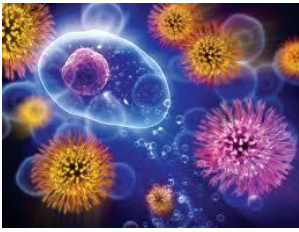
(Show work)
76) Ill persons who ate the food served at the reception

77) Ill persons who did not eat the food at the reception.

78) Calculate the RR relative risk ratio

79) Do you think the outbreak was caused by food at the reception? y/n

Outbreak in Panama

Acute renal failure is a serious medical condition in which the kidneys (the organ responsible for eliminating toxic substances from the body) either function poorly or not at all. The condition is life threatening without prompt medical attention. Acute renal failure can be due to underlying illnesses, or can be caused by infections or ingesting certain chemicals. Kidney function can be assessed by measuring the level of a creatinine in a patient's blood. Levels of 1.5 mg/dl (milligrams per deciliter) or higher indicate impaired kidney function.

In September 2006, a physician at a hospital in the Republic of Panama reported to health officials that he had noticed an unusual number of older men that all developed unexplained, new onset acute renal failure as well as some different neurological symptoms. Upon reviewing some of the hospital's medical charts and records, health care officials noticed that a few persons with these symptoms actually had presented to the hospital as far back as June of 2006. Some patients complained of different types of gastrointestinal symptoms such as nausea, stomach pain, and/or diarrhea when they first presented to the hospital. These symptoms were either accompanied by or followed very shortly thereafter in all cases by oliguria or anuria (decreased or absent urine production). Loss of appetite and fatigue were also found among many of the patients. Many patients also typically developed unusual neurological signs a few days later. These were variable between patients and included weakness in the muscles of the face, weakness of the arms and legs, and encephalopathy (severe confusion and inability to respond). Twelve (57%) of twenty one patients had died. Patients presenting to this hospital with these symptoms typically had creatinine levels of 10 mg/dl or higher. About two months before the outbreak, the hospital system added the new drug lisinopril for hypertension to its pharmacy. Physicians noticed that some of the sick patients had been taking this new drug. One side effect of this type of medication is a dry cough. Some patients brought their medications with them to the hospital, which included bottles of a prescription cough syrup. Health authorities suspected that contamination of one of these medications may have been causing the illness.

80) What levels of creatinine in the blood indicate renal failure?
List two other symptoms these patients had.

81)
82)

What are the two possible sources of this outbreak?

83)
84)

. List two sources of information investigators could use to identify additional cases of acute renal failure in this community?

85)
86)

87) Explain briefly why investigators matched controls to cases by gender.

 Besides the possible exposures already identified, name two other possible exposures you would want to include in your questionnaire.

88)
89)

Conference Outbreak
May 9-13, 2006

Total Number
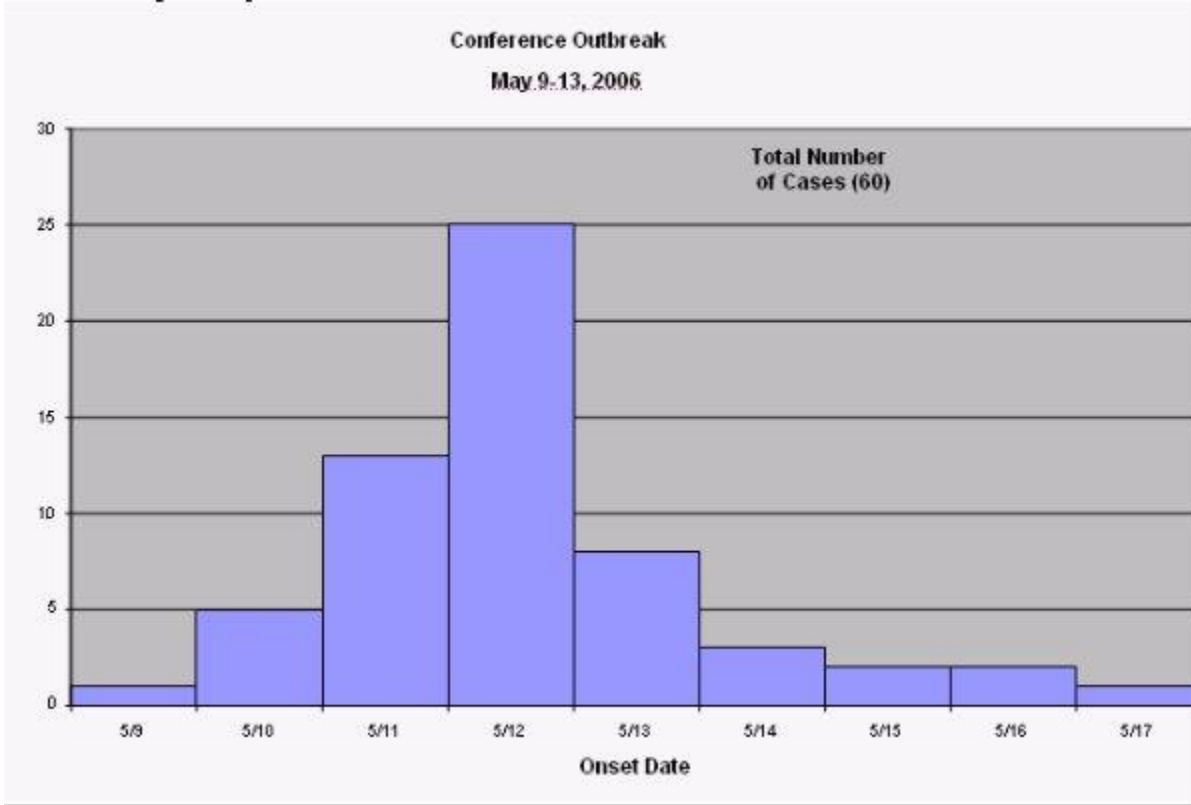of Cases (60)

Onset Date

Figure 1. Number of cases of illness during a conference by date of onset of symptoms, May 9-17

90) What do disease detectives call this type of histogram?

Table 1. Associations between potential risk factors and onset of acute renal failure syndrome among case- and control-patients, Panama, 2006.

Associations between potential risk factors and onset of acute renal failure syndrome

		Cases (n=42)		Controls (n=140)	
		No.	%	No.	%
Used cough syrup	yes	17	40.5	4	2.9
	no	25	59.5	136	97.1
Used any ACE inhibitor	yes	26	61.9	34	24.3
	N0	16	38.1	106	75.7

Calculate odds ratios for use of cough syrup and ACE inhibitors. Show all work.

91)Cough Syrup:

92) Used any ACE inhibitor:

93) A measure of the frequency of a new injury or case of illness in a population_____

94) The occurrence of more than the expected number of cases of a particular disease, chronic condition, or injury occurring over a very wide area (several countries or continents)._____

95) The middle value in a set of numbers_____

96) The occurrence of the expected number of cases of a particular type of disease, chronic condition, or injury in a given area, or among a specific group of people, over a particular period of time._____

For 97-100, list 4 ways to prevent outbreaks of foodborne diseases.
97)
98)
99)
100)

Tie breaker
Explain the difference between a case control study and a cohort study

The End!

Disease Detectives Event
Athens Invitational 2012

Total score_____

Name_____   Team #_____
Name _____   School_____

1 C	26 E	51 D	76 72/135= .533
2 P	27 D	52 COLORADO	77 2/15= .133
3 O	28 E	53 CANTALOUPES	78 .533/.133= 4:1
4 N	29 G	54 PULSENET	79 YES
5 G	30 F	55 B	80 > 1.5 MG/DL
6 M	31 B	56 B	81 NAUSEA, DIARRHEA, VOMITING
7 K	32 E	57 D	82 ANURIA, OLIGURIA, NEUROSIS
8 J	33 I	58 D	83 LISINOPRIL
9 L	34 E	59 E	84 COUGH MEDS
10 E	35 D	60 SALMONELLA	85 MEDICAL DOCUMENTS,ETC
11 D	36 C	61 TRICHINOSIS/.ELLA	86 CDC REPORTS, ETC
12 F	37 graph / 5pts	62 E. COLI	87 MEN WERE AFFECTED
13 A	38 graph	63 0157:H7	88 OPEN-exposures
14 H	39 graph	64 LISTERIA	89
15 B	40 graph	65 SEE BACK	90 EPI CURVE
16 I	41 graph	66	91 23.12
17 C	42 C	67	92 5.07
18 HOST	43 C	68	93 INCIDENCE
19 AGENT	44 D	69 on back	94 PANDEMIC
20 ENVIRONMENT	45 A	70	95 MEAN
21 B	46 B	71	96 ENDEMIC
22 A	47 C	72	97 open- prevention ideas
23 C	48 B	73	98
24 A	49 C	74	99
25 C	50 B	75 NL STATISTICAL DATA	100
		Total correct =	

The ten steps:

65) Prepare for field work
66)Establish existence of an outbreak
67)Verify diagnosis
68)Identify cases
69) Describe in terms of person, place time
70)Form a Hypothesis
71)Evaluate your hypothesis
72)Refine your hypothesis and additional studies
73) Implement control measures
74) Communicate your findings

37-41

Illness among office workers after party

February 4

(or other appropriate)

Number of persons affected

4-5am	6-7am	8-9am	10-11am	12-1pm	2-3pm	4-5pm	6-7pm	8-9pm	10-11pn