

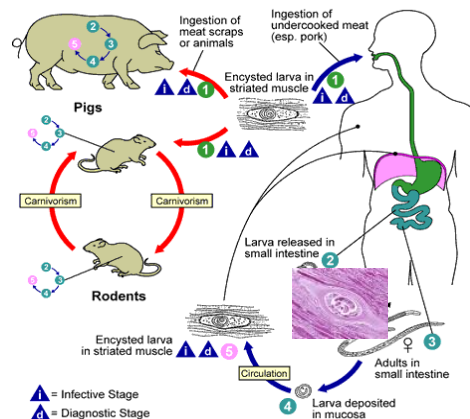


Basic epidemiological concepts

EXERCISES

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At the end of the course, the student should be able to:

- Calculate and interpret the concepts explained in “Basic epidemiological concepts” session

Exercise 1

Endemic, Epidemic, Pandemic, Outbreak, Sporadic ?

1. Disease A: 22 cases occurred within 3 weeks; usually 0 or 1 per year
2. Disease B: About 60 cases are usually reported in this region per week, slightly less than the national average
3. Disease C: usually 40–50 cases per week; last week, 48 cases
4. Disease D: fewer than 10 cases per year; last week, 1 case
5. Disease E: usually no more than 2–4 cases per week; last week, 13 cases

Exercise 1

Ratio, Proportion, Rate, or none?

1. no. animals in farm A who tested positive for disease X / estimated no. animals in farm A
2. no. animals in farm A who died from disease X in 2012 / no. of animals in farm A who died in 2012
3. no. of animals in farm A who died from disease X in 2012 / estimated no. of animals in farm A on July 1, 2012
4. no. of animals in farm A who died from disease X in 2012 / no. of animals in farm A who died from disease Y in 2012
5. no. animals in farm A newly diagnosed with disease X last year / no. animals in study A without disease X at beginning of same year

Exercise 2

In January 2010 you began a one-year study of TB in a subsidized housing community in the Lower East Side of City Y. You enrolled 500 residents in your study and checked on their status on a monthly basis. At the start of your study on January 1st, you screened all 500 residents. Upon screening, you found that 20 of the healthy residents were immigrants who were vaccinated for TB and so were not at risk. Another 30 residents already had existing cases of TB on January 1st.

What was the prevalence of TB in the screened community on January 1st?

Exercise 3

We were interested in the problem of XX in a nursing home with 800 residents. We would begin by doing blood tests on all residents to determine which were infected by XX. If 50 of the residents were infected by XX initially, which is the prevalence of XX at this point in time? Which is the standard way of expressing this?

If we want to estimate the incidence of XX in this population over the next 12 months, we would then need to do additional blood tests to determine how many new cases developed during the span of time. Because some of the residents might die or be transferred to other facilities during the year, we ideally would like to take blood tests frequently, but for financial and logistical reasons, we might simply conduct a second series of blood tests after one year. If 25 were found to be infected at the end of a year, then which would be the incidence ?

Exercise 4

Consider a group of 1000 newborn infants. 100 infants were born with serious birth defects associated to listeriosis and 20 of these 100 died during the first year of life. 90 of the 900 remaining infants without any birth defects also died during the first year of life.

What is the overall cumulative incidence of mortality due to listeriosis in this population?

- a. $110/1000 = 11\%$
- b. $10/900 = 1.1\%$
- c. $20/1000 = 2\%$
- d. $90/1000 = 9\%$

Exercise 5

An infectious disease is introduced into a school with 1200 students. Fortunately, the disease only lasts a few days, and all of the infected students recover and then have long lasting immunity against the disease (they can only be infected once). The incidence rate for the outbreak, which begins the first week of school, remains constant throughout the school year at 1 new case per hundred uninfected students per week. By the end of the forty-week school year, how many students would you expect to have contracted the disease? Use the formula for approximating the cumulative incidence from the incidence rate.

- a. 136
- b. 392
- c. 480
- d. 520
- e. 634

Exercise 6a

If the prevalence of a disease has been more or less constant for the past ten years (i.e., new cases have been balanced by cures or deaths of prevalent cases), what would be the effect of a treatment that prolongs the life of people suffering from the disease?

- a. It would increase the prevalence
- b. It would decrease the prevalence
- c. It would have no effect on prevalence

Exercise 6b

If the prevalence of a disease has been more or less constant for the past ten years (i.e., new cases have been balanced by cures or deaths of prevalent cases), what would be the effect of a new program that reduces the incidence of the disease?

- a. It would increase the prevalence
- b. It would decrease the prevalence
- c. It would have no effect on prevalence

Exercise 6c

If the prevalence of a disease has been more or less constant for the past ten years (i.e., new cases have been balanced by cures or deaths of prevalent cases), what would be the effect if a large number of healthy people immigrated into the population?

- a. It would increase the prevalence
- b. It would decrease the prevalence
- c. It would have no effect on prevalence

Exercise 7

1. A heart disease prevalence of 0.125 should be reported as:
 - a. 125 cases of heart disease per 100 persons
 - b. 12.5 cases of heart disease per 1000 persons
 - c. 125 cases of heart disease per 1000 persons
 - d. None of the above

Exercise 8

A proportion is a type of ratio in which the denominator takes into account the dimension of time

- a. True
- b. False

Exercise 9

1. Point prevalence in December, 1 ?
2. Period prevalence in summer?
3. Incidence Risk per year?
4. Incidence Rate per year?

Animal	January	February	March	April	May	June	July	August	September	October	November	December
A					DISEASE							
B												
C								WITHDRAWN				
D		DISEASE										
E												
F						DISEASE						
G											DISEASE	
H												
I												
J						WITHDRAWN						
												Total

Exercise 1

A cohort study is conducted to determine whether non washing the hands before cooking is associated with an increased risk of the foodborne X. The findings are as follows

- the frequency of X in people who not wash the hands is 27 per 1,000 person-years.
- the frequency of X in people who wash the hands is 3 per 1,000 person-years.

What is the rate ratio?

- a. 30
- b. 0,333
- c. 9
- d. 9 per 1000 person-years
- e. 0.333 per 1000 person-years
- f. 30 per 10000 person-years
- g. 24 per 1000 person-years

Exercise 2

A cohort study is conducted to determine whether non washing the hands before cooking is associated with an increased risk of the foodborne X. The findings are as follows

- the frequency of X in people who not wash the hands is 27 per 1,000 person-years.
- the frequency of X in people who wash the hands is 3 per 1,000 person-years.

Calculate the rate difference the above study. Which of the following is it?

- a. 27 per 1000 person-year
- b. 9%
- c. 9
- d. 24 per 10000 person-years
- e. 24%

Exercise 3

In 2004 there was an outbreak of Salmonellosis on the south of country Y. Over a period of a few weeks there were 20 cases reported to Y's health authorities, most of the infected persons were residents of city X. X's health department requested help in identifying the source from Y's health authorities. The investigators quickly performed descriptive epidemiology. The epidemic curve indicated a point source epidemic, and most of the cases lived in the X area, although some lived far away. They conducted hypothesis-generating interviews, and taken together, the descriptive epidemiology suggested that the source was one of five or six food establishments in the X area, but it wasn't clear which one. Consequently, the investigators wanted to conduct an analytic study to determine which restaurant was the source.

The investigators invited all 20 cases of salmonellosis to answer questions from a questionnaire designed for this study, and 19 of the cases agreed to complete the survey. What is the OR?

		CASE	CONTROL
Ate at Z restaurant	YES	18	7
	NO	1	29

Exercise 4

A study is done to examine whether there is an association between use of cooking at high temperatures and risk of getting the infection Y. Compared to people who do not cook at high temperatures, individuals who cook at high temperature have a relative risk of 0.7.

Which of the following is a correct interpretation of this finding?

- a. The incidence of infection Y in those who cook at high temperature is 0.7 (or 70%).
- b. Those who cook at high temperature have 0.7 times the risk of getting infected compared to those who do not cook at high temperature
- c. The risk difference in this study is 70 per 100 persons that cook at high temperature.
- d. The risk difference in this study is 30 per 100 persons that cook at high temperature.
- e. The risk difference in this study is 0.70 per 100 persons that cook at high temperature.

Exercise 5

A cohort study is conducted to investigate whether there is an association between raw milk consumption and infection by pathogen X. The investigators group the subjects into four risk categories: a) non-drinkers, b) less than 1 glass per week, c) less than 2 glass per day, d) greater than two glasses per day. Which of the following statements is true regarding calculation of the strength of association in this study?

- a. Relative risk can't be calculated because there is more than one risk category.
- b. Risk difference can't be calculated because there is more than one risk category.
- c. The most logical approach would be to calculate the relative risk of each of the drinking groups using the non-drinkers as a reference group.
- d. The most logical approach would be to calculate the risk difference of each of the drinking groups using the non-drinkers as a reference group.
- e. The most logical approach would be to calculate the attributable risk percent of each of the drinking groups using the non-drinkers as a reference group.

Exercise 6

When public health officials are interested in determining the number of cases which could possibly be prevented by eliminating a risk factor, which measure of association would they be interested in?

- a. Relative risk
- b. Odds ratio
- c. Risk difference
- d. Prevalence
- e. Incidence in the exposed group