

3. *Sensitivity & specificity.* A screening test for a preclinical stage of a cancer is known to have a sensitivity of .90 (i.e., 90%) and a specificity of .96 (i.e., 96%). The prevalence of this cancer in its preclinical phase in the population is 1 per 1000 (.001). Assume we use this test in one-hundred thousand (100,000) people. Based on this information, determine:

- a. the total number with disease = _____
- b. the number of true positives = _____
- c. the number of true negatives = _____
- d. the number of false negatives = _____
- e. the number of false positives = _____
- f. the total number of test positives = _____

Comment: If you wish, you can set up the data in a 2-by-2 table to help with your calculations. (Table will not be graded.)

4. *Vital statistics.* Use the data in the table below to calculate the following vital statistics. (Complete calculations and report final results, as indicated.)

<u>Vital statistics for problem on this page</u>	
Total midyear population	50,000
Number of live births	500
Total deaths (all cause)	425
Deaths in infants under 1 year of age	5
Deaths due to cancer	100

- a. crude mortality rate (per 100,000)
- b. cancer mortality rate (per 100,000)
- c. infant mortality rate (per 1,000)
- d. Assuming immigration and emigration are balanced and death rates are constant, and basing your answers on the reported births and deaths, is this population stationary (“steady-state”)? (circle)
- Yes No
- e. Justify your answer to *d.*

5. *Age-adjustment.* Age-stratified data for two populations are:

Population A			Population B		
Age Group	Cases	Persons	Age Group	Cases	Persons
Young	198	99,000	Young	1	1,000
Old	5	1,000	Old	990	99,000
All	203	100,000	All	991	100,000

- a. *Which* of the populations, A or B, has the higher crude death rate? *By how much?* (Look at the data.)

- b. *In the younger age group*, which population, A or B, has the higher age-specific death rates. *By how much?* (You will need to complete elementary calculations *before* answering this question.)

- c. *In the older age group*, which population, A or B, has the higher age-specific death rates. *By how much?* (Some calculation required.)

- d. Question deleted . . .

6. *Study Design 1.* Read the following passages. Then, answer the questions below. Questionnaires were mailed to every 10th person listed in the city telephone directory. Each person was asked to list age, sex, smoking habits, and respiratory symptoms during the preceding seven days. About 20% of the questionnaires were completed and returned. About 10% of respondents reported having upper respiratory symptoms.

a. Is this study experimental or observational? (circle) experimental observational

b. Justify the choice you made in *a*.

c. Is this study an ecological study? (circle) yes no

d. Justify the choice you made in *c*.

e. Is this study longitudinal or cross-sectional? (circle) longitudinal cross-sectional

f. Justify the choice you made in *e*.

g. Classify the study (circle single best choice):

a) randomized trial	b) non-randomized trial
c) cohort	d) case-control
e) cross-sectional	f) ecological

7. *Study Design 2.* 1,500 employees of a major aircraft company were initially examined in 1951 and were classified by diagnostic criteria for coronary artery disease (CAD). New cases of CAD have been identified by examinations every three years and through death certificates. Incidence rates in different subgroups have been computed.

a. Is this study experimental or observational? experimental observational

b. Is this study an ecological study? yes no

c. Is this study longitudinal or cross-sectional? longitudinal cross-sectional

d. Is this a case-control study? yes no

e. Classify the study? (circle single best choice):

a) randomized trial	b) non-randomized trial
c) cohort	d) case-control
e) cross-sectional	f) ecological

Multiple Choice and Matching

1. Match the term with its brief description.

- ___ public health
- ___ epidemiology
- ___ pathology
- ___ morbidity

a. study of health and disease on a population basis

b. organized activity to prevent disease and promote health

c. study of disease

d. related to disease or disability

2. List the causes of death in correct rank order *as of 1990* (p. 8).

- ___ first
- ___ second
- ___ third
- ___ forth

a. cancer

b. cardiovascular

c. unintention injuries

d. chronic lung diseases (e.g. COPD)

3. Morbidity and mortality patterns associated with the *epidemiologic transition* of the 20th century are characterized a switch from _____ cause to _____ cause.

a. acute infectious . . . chronic infectious

b. acute non-infectious . . . chronic infectious

c. acute infectious . . . chronic non-infectious

d. chronic infectious . . . chronic non-infectious

4. What does it mean when an epidemiologist says there is "interdependence" between factors?

a. there is a spectrum of effects

b. multiple factors act together to result in an effect

c. there is a long induction period

d. much of the disease goes unnoticed or unreported

5. Match the British epidemiologist with their brief bio.

- ___ William Farr
- ___ John Snow
- ___ Sir Richard Doll
- ___ John Graunt

a. Victorian (19th century) surgeon / anesthesiologist who became quintessential epidemiologic hero; known for innovative theory about waterborne theory of cholera

b. First Registrar General for national vital statistics system; miasmaist who was late to adopt contagion theory

c. 20th century Brit known for studies about smoking and health

d. 17th century haberdasher; first to use morbidity and mortality data for demographic and epidemiologic purposes

6. Match the goal of each type of prevention

- ___ primary
- ___ secondary
- ___ tertiary

a. delay onset or reduce severity

b. slow progression or prevent sequelae

c. prevent new occurrences

7. This marks the *beginning* of the *subclinical* stage of disease.

a. exposure to the ultimate agent

b. first symptoms

c. diagnosis

d. resolution of symptoms

8. How long is the incubation period for HIV and AIDS?

a. a number of hours

b. a number of days

c. a number of weeks

d. a number of years

9. Put the stages in the natural history of disease in correct chronological order

- ___ first
- ___ second
- ___ third
- ___ fourth

- a. subclinical
- b. susceptibility
- c. clinical
- d. recovery, disability, or death

10. Match the term with its brief description.

- ___ iceberg phenomenon
- ___ spectrum of disease
- ___ induction
- ___ latency

- a. broad range of manifestations and severities
- b. health problem largely undetected
- c. time between causal action and initiation
- d. time between disease initiation and detection

11. Causal factor rarely (if ever) acts alone.

- a. True
- b. False

12. The incidence of a disease depends on the prevalence of complementary factors in the population.

- a. True
- b. False

13. Select the most accurate statement.

- a. Phenylketonuria is a genetic disease caused by an inborn error in metabolism.
- b. Phenylketonuria is an environmental disease caused by the consumption of phenylketones.
- c. both A & B
- d. neither A nor B

14. Smoking is a *necessary* factor in the cause of lung cancer.

- a. True
- b. False

15. Match the term with its brief descriptor.

- ___ Agent
- ___ Host factor
- ___ Environmental factor
- ___ Epidemiologic homeostasis

- a. external conditions other than the agent
- b. inherent factors that influence the susceptibility to disease or likelihood of exposure
- c. the balance of factors determining the level of disease in a population
- d. a biologic, physical, or chemical cause

16. Match the concept with its brief description.

- ___ Causal web
- ___ Sufficient/component cause model
- ___ Spectrum of disease
- ___ Epidemiologic iceberg

- a. Diseases have a broad range of manifestations and severities
- b. Causal factors combine to complete causal mechanisms
- c. A large percentage of a problem is unreported or hidden from view.
- d. Direct and indirect causes form complex hierarchal interrelations

17. Which of the following factors can lead to an epidemic?

- a. increases in susceptibility
- b. environmental factors that favor propagation or retention of the agent
- c. increases in the pathogenicity of agents
- d. all of the above

18. The factors of a 1) slippery surface, 2) brittle bones, and 3) use of a psychoactive drug that causes loss of equilibrium contribute to a particular hip fracture. What is the *causal complement* to the slippery surface?

- a. brittle bones
- b. use of the psychoactive drug
- c. brittle bones + use of the psychoactive drug
- d. fracture