

Epidemiology Midterm, Oct. 22, 2003

- ▶ Coverage: Chaps 1, 2, 3, & 6.
- ▶ Please write your *name* on the BACK of last page in the upper right-hand corner.
- ▶ M/C stands for “multiple-choice”, in which case you should *circle* the single best response.
- ▶ Open ended responses require only 2 to 4 concise sentences. Please write *neatly* and use proper English.
- ▶ All questions worth 1 point unless specified in [square brackets]

CHAPTER 1

1. Both *epidemiology* and *public health* are used to improve health and prevent disease. How do they *differ*? [2]
2. Both *epidemiology* to *medicine* seek to prevent disease (and the progression of disease) and improve treatment of disease. How do they *differ*? [2]
3. List two features of the *demographic transition* of the 20th century. [2]
 - (a) _____
 - (b) _____
4. Describe the *epidemiologic transition* of the 20th century. [2]
5. Briefly define *epidemiology*. [2]

6. Provide the *epidemiologic term* used to refer to definitions: [2]

Term	Definitions
	disease occurrence in <i>excess</i> of normal expectancy
	disease occurrence at a <i>constant or predictable</i> rate
	related to disease or disability
	related to death

7. (M/C) In what year did epidemiology become an established (separate) field of study?

- (a) 1750 (b) 1800 (c) 1850 (d) 1900

8. (M/C) What is the most common cause of death in the United States today?

- (a) heart disease (b) cancer (c) pneumonia/influenza (d) HIV/AIDS

9. (M/C) What was the most common cause of death 100 years ago?

- (a) heart disease (b) cancer (c) pneumonia/influenza (d) HIV/AIDS

10. (M/C) Which type of well-being is NOT part of the WHO definition of health?

- (a) physical (b) mental (c) social well-being
(d) spiritual well-being (e) all of the above are part of the WHO definition of health

11. (M/C) Which is the correct rank order of life expectancy in the U.S.?

- (a) white female, white male, af am female, af am male
(b) white male, white female, af am female, af am male
(c) white female, af am female, af am male, white male
(d) white female, af am female, white male, af am male

12. True or false? Cancer rates are on the increase in the United States.

- (a) true (b) false

13. Match the name of the pioneering epidemiologist with their brief bio. [2]

Epidemiologist: Farr, Graunt, Louis, Snow

Name	Description
	18 th century Frenchman who emphasized the “medicine of observation”
	17 th century Englishman who was first to use population-based data to study disease
	19th century Victorian physician who innovated and tested theories about contagion
	first Registrar General of a national vital statistics branch; innovated many demographic and epidemiologic methods

CHAPTER 2

14. True or false? Causal factors rarely (if ever) act alone.

- (a) True (b) False

15. (M/C) Is pap screening (checking for early signs of cervical cancer before clinical symptoms arise) a form of primary, secondary, or tertiary prevention?

- (a) primary (b) secondary (c) tertiary

16. (M/C) Is vaccination a form of primary, secondary, or tertiary prevention?

- (a) primary (b) secondary (c) tertiary

17. (M/C) Is the health education to prevent HIV infection a form of primary, secondary, or tertiary prevention?

- (a) primary (b) secondary (c) tertiary

18. What event marks the beginning of the clinical stage of disease?

19. What is the goal of primary prevention?

20. Describe the *incubation period* of a disease? (Identify beginning and end of period, and what occurs during this interval.)

[2]

21. Match the period with its description. Terms: induction period, latent period [1]

Period	Description
	time between causal action and initiation of disease
	time between initiation of disease and disease detection

22. Match the term with its description. Terms: subclinical stage, iceberg phenomenon, spectrum of disease [1½]

Term	Description
	when a disease displays a <i>broad range of manifestations</i> and severities
	when a large percentage of problem is <i>undetected</i> in population
	when signs and symptoms are not yet apparent in an <i>individual</i>

23. True or false?: The amount of disease caused by a causal factor depends on the prevalence of its causal complements in the population.

- (a) true (b) false

24. Is smoking a necessary, sufficient, or non-necessary contributing cause of lung cancer?

- (a) necessary (b) sufficient (c) non-necessary contributing

25. A given causal mechanism consists of factors {D, E, F}. What is the causal complement of {D+E}?

26. Classify the following causal factor for malaria as agent, host, or environmental. [1½]

Agent, host, or environment?	Causal factor
	<i>Anopheles</i> mosquito
	presence/absence of sickle cell trait (determines susceptibility)
	<i>Plasmodium</i> species (protozoan)

27. (M/C) Secondary prevention occurs during this stage of disease:

- (a) Susceptibility (b) Subclinical (c) Clinical (d) Recovery, disability, or death

28. What does it mean when an epidemiologist says that factors are *interdependent* or *interact causally*? [2]

29. Briefly describe the causal web model of disease. [2]

CHAPTER 3

30. Match the type of agent with its description. Agents: helminth, protozoan, bacteria, virus [2]

Agent	Description
	submicroscopic agent containing its own genetic material but incapable of replicating outside of host
	minute unicellular organisms having complex life cycles
	parasitic worms
	microscopic unicellular organisms capable of independent reproduction

31. Provide an example of an *innate chemical* barrier to infection

32. What do we call a disease shared by human and non-human animals?

33. Match the term with its description. Terms: contamination, infection, infectious disease, reservoir [2]

Term	Description
	normal habitat where agent lives and multiplies
	presence of living agent replicating within the body
	presence of living agent within body accompanied by signs or symptoms
	presence of living agent on an exterior surface

34. What's the *difference* between a vehicle and vector?

35. What is the *difference* between a modified-live vaccine and killed vaccine?

36. (M/C) Which type of vaccine generally provides longer and more potent immunity, killed or modified-live?

- (a) killed (b) modified-live

37. (M/C) This is the *proportion* of a population that is resistant to a disease.

- (a) acquired immunity (b) herd immunity (c) vaccination (d) none of above

38. (True or false?) During the acute phase of HIV infection, a person may be HIV-negative while having high levels of circulating virus in his or her system. During this phase, the person may serve as a source of infection for others.

- (a) true (b) false

39. Provide a reason to study the infectious disease process.

40. (M/C) What type of transmission was operative during the infamous Broad Street pump outbreak (Chap 1)?

- (a) vector borne (b) cyclopropagative (c) common vehicle spread (d) serial transfer

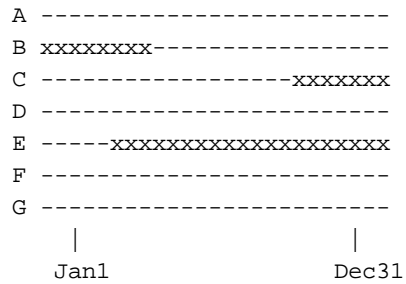
41. What does an epidemiologist mean when he or she refers to a *portal* of infection?

42. Read the article attached to this exam and then provide the following information:

- (a) What is the *reservoir* of this agent?
- (b) What *vector* transmits this agent?
- (c) Why is it important to understand the shape of the agent?
- (d) List a *host factor* that influences pathogenicity of the agent.
- (e) Identify a method of environmental control of the disease.
- (f) Identify a surveillance method epidemiologists use to keep tabs on the agent

CHAPTER 6

43. The figure below represents a cohort of 7 individuals followed for a year. In this figure “x” represents a period of illness and “-” represents a period on non-illness. There is no loss to follow-up, and recovery confers immunity. (This scenario is similar to the one describe in exercise 6.1.) *Please leave your answer in the form of a fraction.*

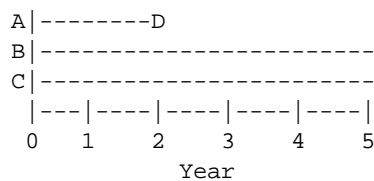


- (a) What is the *prevalence* on Jan 1? [2]
 - (b) What is the *prevalence* on Dec 31? [2]
 - (c) What is the *incidence proportion* over the interval? [2]
44. A cohort of 150 people begins with 10 cases. The cohort is followed for five (5) years during which 16 new cases arise. Leave your answer in the form of a fraction.
- (a) What is the *prevalence* of disease X at the *start* of follow-up? [2]
 - (b) Assume all cases survive. What is the *prevalence* at the *end* of follow-up? [2]
 - (c) What is the *incidence proportion* of disease over the interval? [2]
 - (d) What is the *incidence rate* of disease over the follow-up interval? [2]

45. Using the demographic data from an open population in the table below, calculate the vital statistics requested.

Total midyear population	25,000
Population size, 65 years of age or older	750
Number of live births	300
Total deaths (all cause)	250
Deaths in infants under 1 year of age	3
Deaths in persons 65 and over	125

- (a) Crude birth rate per 1,000
- (b) Crude death rate per 1,000.
- (c) Infant mortality rate per 1000.
- (d) Age-specific death rate in those over 65 years of age per 1000.
46. In the schematic below, dashed lines (--) represent healthy living and D indicates disease onset in persons A, B, and C.



- (a) What is the risk of disease? [2]
- (b) What is the rate of disease? [2]
- (c) (M/C) What the dimensionality of the risk?
- (a) dimensionless (pure number) (b) inverse-time ("person-time") (c) other
- (d) (M/C) What the dimensionality of the rate?
- (a) dimensionless (pure number) (b) inverse-time ("person-time") (c) other

47. (M/C) Prevalence is the likelihood an individual selected at random will
(a) currently have the disease (b) develop the disease (c) recover from the disease (d) die from the disease
48. True or false? Incidence proportions can NOT be calculated in open populations.
(a) true (b) false
49. What happens to the prevalence of a disease in a population when the average duration of the disease increases?
(a) it increases (b) it decreases (c) it stays the same
50. A cohort is a type of:
(a) open population (b) dynamic population (c) closed population (d) none of the above
51. Express the rate 0.0222 year^{-1} with a 1000 person-year multiplier.
(a) 2.22 per 1000 p-yrs (b) 22.2 per 1000 p-yrs (c) 222 per 1000 p-yrs (d) none of above
52. What can happen to the size of an *open population* over time?
(a) may shrink (b) may grow (c) may remain constant (d) all of the above
53. Match the term with its description. Terms: incidence proportion, incidence rate, prevalence count, incidence count. [2]

	inverse of “waiting time” to disease
	average risk of disease
	number of cases (old and new)
	number of disease onsets

54. What does a demographer mean when he or she says the population is *stationary*? [2]
55. When does the numerical value of a one-year risk approximately equal the rate of disease? [2]