

Introduction to Veterinary Epidemiology Selected Study Questions

Agree-Disagree format:

1. Disease prevention means to reduce the frequency of disease to a level of little or no socio-economic importance.
2. The list used to select a probability sample is called the sample unit.
3. In case-control studies, bias in the assembly of case or control groups commonly will lead to odds ratios greater than 6 or 7 when no association between factor exposure and disease exists.

Multiple Choice Formats

Clinical Trials

4. A randomized clinical trial was designed to compare two different treatment approaches for asthmatic attacks. The purpose of randomization in this study was to:
 - a) Obtain treatment groups of similar size.
 - b) Select a representative sample of patients for study.
 - c) Increase patient compliance with treatment.
 - d) Decrease the likelihood that observed differences in clinical outcome are due to chance.
 - e) Obtain treatment groups with comparable baseline prognoses.
5. In a double-blinded clinical trial concerning the management of osteoarthritis, half the patients received a nonsteroidal anti-inflammatory agent and the other half received pharmacologically inert substance. Two-thirds of the patients in the former group and one-third of the patients in the latter group reported relief of symptoms. The patients' perceptions of improvement on treatment with an inert substance is best described as:
 - a) Intention to treat.
 - b) Noncompliance.
 - c) Placebo effect.
 - d) Type II error.
 - e) False-positive result.

6. In a randomized clinical trial comparing the effectiveness of a new vaccine to that of a standard vaccine for measles, the evaluating clinician knew which vaccine each patient received but the patients themselves were unaware of the treatment assignment. This design is best described as:
- a) Unblinded.
 - b) Single-blinded.
 - c) Double-blinded.
 - d) Triple-blinded.
 - e) None of the above.
7. Which of the following actions is most likely to result in an increase in statistical power of a clinical trial comparing different weight loss programs?
- a) Blinding the clinician who evaluates weight loss.
 - b) The use of a comparison group that receives only a pharmacologically inert substance.
 - c) Measurement of patients satisfaction with treatment rather than the actual reduction in weight.
 - d) Increasing the number of patients studied.
 - e) Restricting the study to patients with only mild obesity.
8. A small clinical trial is designed to compare the effectiveness of a new versus a standard chemotherapeutic regimen for treatment of lymphoma. No difference in 5-year survival percentages is observed despite the fact that in truth, the new treatment is superior. The failure to detect a benefit for the new treatment is best described as:
- a) Observer bias.
 - b) Placebo effect.
 - c) Type I Error.
 - d) Type II Error.
 - e) Blinding.

9. A clinical trial was conducted to evaluate the benefits of an intensive exercise program in reducing the subsequent mortality among persons who survived at least 30-days after an initial myocardial infarction. Patients were randomized to receive either the usual care (controls) or the exercise program. Among 100 controls, 30 died within the 3-year follow-up period compared with 50 deaths among the 100 patients on the exercise program. The relative risk of death for the exercise group compared to the controls was:
- a) 0.20.
 - b) 0.30.
 - c) 0.50.
 - d) 0.60.
 - e) 1.67.

Cohort Studies

A prospective cohort study is conducted of the relationship between visual impairment and the risk of injuries from falls among the elderly. A total of 400 visually impaired persons age 70 or older are compared against 400 persons of comparable age without visual impairment. Over a 5-year follow-up period, 80 visually impaired persons have injuries from falls and 20 non-visually impaired persons have injuries from falls.

10. The attributable risk (risk difference) is:

- a) 0.05.
- b) 0.10.
- c) 0.15.
- d) 0.20.
- e) 0.50.

11. The attributable risk percent (Attributable Fraction among the exposed) is:

- a) 15%.
- b) 20%.
- c) 50%.
- d) 67%.
- e) 75%.

Case-Control Studies

In an unmatched case-control study of risk factors for congenital defects of the neural tube, maternal deficiency of folate was in 15 of 100 mothers of cases and 10 of 200 mothers of controls.

12. The odds of exposure (mother with low folate) among cases is:

- a) 15/100.
- b) $(15/100)/(85/100)$.
- c) $(15/100)/(10/200)$.
- d) $(15 \times 190) / (85 \times 10)$.
- e) $(85 \times 10) / (15 \times 190)$.

13. The odds ratio for exposure is:

- a) 15/100
- b) $(15/100)/(85/100)$.
- c) $(15/100)/(10/200)$.
- d) $(15 \times 190) / (85 \times 10)$.
- e) $(85 \times 10) / (15 \times 190)$.

In a case-control study of risk factors for migraine headaches, the odds ratio for high levels of stress was 3.2 with a 95% confidence interval of 1.7 to 6.1.

14. Based on the above data, the minimal percentage increase in the odds of high levels of daily stress for cases as compared to controls at a 95% level of confidence was:

- a) 1.7%.
- b) 6.1%.
- c) 17%.
- d) 61%.
- e) 70%.

15. If the sample size were doubled, the width of the 95% confidence interval is expected to:

- a) Decrease.
- b) Increase.
- c) Remain unchanged.
- d) Include the null value.
- e) Change, but the direction cannot be predicted.

In a case-control study of risk factors for oral cancer, the odds ratio for consumption of fresh fruit is 0.6 with a 95% confidence interval of 0.4 to 0.9.

16. Based on the above data, the effect of fresh fruit upon the risk of oral cancer is:

- a) Protective.
- b) No effect.
- c) Harmful.
- d) Uncertain from the information presented.

17. At the 5% level of statistical significance the association between fresh fruit consumption and the risk of oral cancer is:

- a) Statistically significant.
- b) Not statistically significant.
- c) Of uncertain statistical significance without a hypothesis test.
- d) Not appropriately assessed by statistical significance because randomization was not employed.

18. Each of the following is likely to be an advantage of case-control studies as opposed to prospective cohort studies **EXCEPT**:

- a) Less expensive.
- b) Can be completed more rapidly.
- c) More efficient for the study of rare diseases.
- d) More efficient for the study of diseases that develop slowly.
- e) The temporal relationship between exposure and disease is better refined.

Outbreak Investigations

During an 8-hour work shift at a corporate headquarters building, 30 employees (20 females and 10 males) visited the company's physician with complaints of nausea, vomiting headaches and dizziness. All affected individuals responded to supportive treatment and were sent home. In order to search for possible causes of the outbreak, the physician performed an investigation.

19. If 600 persons worked in the building, then the attack rate was:

- a) 3%.
- b) 5%.
- c) 10%.
- d) 20%.
- e) 30%.

20. If 400 females and 200 males worked in the building, the relative risk for males as compared to females was:

- a) 0.3.
- b) 0.5
- c) 1.0.
- d) 2.0.
- e) 3.0.

Distribution of cases and Population at risk by floor of the office building

Floor	Number of cases	Population at risk
A	4	20
B	7	155
C	6	135
D	8	180
E	5	110
Total	30	600

21. The floor with the highest risk of disease was:

- a) A.
- b) B.
- c) C.
- d) D.
- e) E.

22. The risk for workers on the high-risk floor was how many times greater than the average risk among all workers.

- a) 1.
- b) 2.
- c) 3.
- d) 4.
- e) 5.

23. If the average risk of all workers was applied to the number of workers on the high-risk floor, the expected number of cases on that floor would have been:

- a) 1.
- b) 2
- c) 3.
- d) 4.
- e) 5.

A survey of all workers was conducted to determine whether other persons were affected beyond those who sought care at the physician's office. All 600 employees were surveyed, and 400 questionnaires were completed and returned. A total of 80 persons reported symptoms consistent with the syndrome observed among workers who sought medical attention.

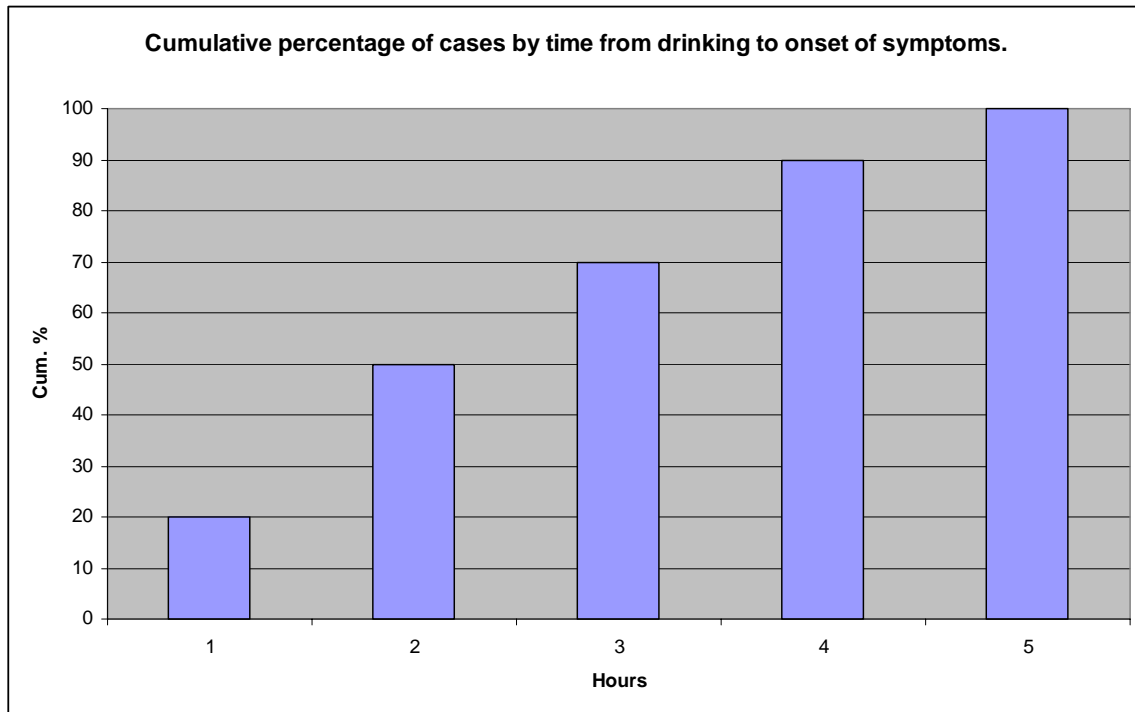
24. The response rate to the questionnaire was:

- a) 5.0%.
- b) 7.5%.
- c) 20.0%.
- d) 37.5%.
- e) 67.0%

25. Based on the survey the actual attack rate was:

- a) 5%.
- b) 7.5%.
- c) 20.0%.
- d) 37.5%.
- e) 67.0%.

Based on responses to the questionnaire the exposure most strongly associated with the development of illness was drinking from a water cooler on the entrance level of the building. The cumulative percentage distribution of times from first drinking from the water cooler that day to the development of symptoms is shown in the chart below:



26. From the chart, the median incubation period in hours was:

- a) 1.
- b) 2.
- c) 3.
- d) 4.
- e) 5.

Miscellaneous

27. SNVDO is

- A. a marginal punched card system for sorting data;
- B. the Swedish-Norwegian Viral Diseases Organization;
- C. a classification and nomenclature for animal diseases;
- D. a veterinary medical clinical data abstracting program;
- E. a program for Surveillance of National Veterinary Disease Outbreaks.

28. Which of the following is not a primary prevention measure?

- A. Installation of ventilation fans in a barn.
- B. Use of a screening test to detect subclinical disease.
- C. Vaccination of puppies against distemper.
- D. Supplying information on care and feeding of puppies.
- E. All above are primary prevention measures.

You examine a herd of 90 dairy cows for mastitis and find evidence of current infection in 10 cows.

29. If you were to pick randomly one cow to have students examine, the odds it would not have mastitis are:

- a) 2 : 1
- b) 5 : 2
- c) 6 : 1
- d) 8 : 1
- e) 9 : 1

In a clinical setting an elderly gentleman explains that his unsavory neighbors, whom he describes as Hell's-Angels, commonly dump antifreeze in the gutters. This morning, Ajax, his 9-year old Pomeranian was loose in the front yard unobserved. The elderly gentleman is concerned that Ajax may have ingested antifreeze. You explain that treatment for antifreeze ingestion can be risky and expensive. You and the client agree that the evidence for exposure is "soft". The client asks if there is a test that can be done to detect antifreeze ingestion. You confirm that there is a spectrophotometric test that detects breakdown products of ethylene glycol but it is subject to false positive results.

30. The spectrophotometric test for anti-freeze (ethylene glycol) yielded an optical density (O.D.) reading of 0.985. It has been determined that O.D. readings in the range of 0.950 to 1.000 have a sensitivity of 75% and a specificity of 55% for detection of anti-freeze toxicosis. What is the likelihood ratio positive (LR+) for a test O.D. of 0.985? Choose the closest value.

- A. 0.17
- B. 0.94
- C. 1.7
- D. 16.7%
- E. 19.4%

31. Based on further inquiry (Ajax was not near gutters when discovered, and the client had not directly examined the gutters to determine whether antifreeze had been present) you decide that exposure to antifreeze was unlikely. In your estimation at most there is one chance in ten that Ajax ingested antifreeze. If your estimate of risk for ingestion is correct and based on the spectrophotometric test results what is the post-test probability that Ajax ingested antifreeze? Pick the closest number.

- a) 1%.
- b) 5%.
- c) 10%.
- d) 15%.
- e) 25%.

32. We wish to compare two vaccination programs (A or B) to control Rinderpest (a viral disease of ruminants). The cumulative benefits and costs are provided in the table below. If the economic efficiency of the program is the sole criteria for choosing between the programs which program will be chosen?

Project	Benefits	Costs	NPV	B:C
A	\$150M	\$100M	_____	_____
B	\$10M	\$1M	_____	_____

- a. Project A
- b. Project B
- c. neither project
- d. both projects

The following table summarizes results of a survey on dry ewes*, on the Hopland Field Station; it shows the proportion (in %) of ewes of various ages that were dry in different years.

Table - 0

Year	Age in Years			Mean	Standard Deviation
	3	4	5		
2002	10.5	14.5	14.3	13.1	2.2
2003	11.4	12.4	4.6	9.5	4.2
2004	12.5	10.5	9.7	10.9	1.4

* - Ewes that failed to develop a functional mammary gland.

33. Which one of the following would be the most appropriate title for this table?

- a. Age-adjusted percentages of dry ewes for a 3-year period.
- b. Age-standardized rates of dryness in ewes from 2002-2004.
- c. Age-converted percentages of dry ewes for a 3-year period.
- d. Age-specific rates of dryness in ewes from 2002-2004.
- e. Annual dryness rates in ewes for a 3-year period.

In a report summarizing the results of a study of dogs with mitral valve insufficiency, that compared serum sodium levels in dogs treated with diuretic drugs and dogs not receiving treatment, the difference in mean serum sodium levels was reported to be NOT statistically different at the 5% level of significance. In addition, the researchers reported that, for the sample size employed in this study, the power of the chosen statistical test to detect a difference of at least 5 mEq/L in the mean serum sodium of the two groups of dogs was 0.20.

34. All of the following statements about the power of the chosen statistical test are true EXCEPT:

- A. The reported value for power suggests that the research team should not conclude that "no difference exists between the mean serum sodium levels of the two groups of dogs".
- B. The power of the test will decrease if the probability of a type II error increases.
- C. This value of power represents a 20% chance that the statistical test will detect a difference in serum sodium levels between the two groups of dogs of at least 5 mEq/L, given that such a difference actually exists.
- D. This value of power represents the probability of detecting a difference of at least 5 mEq/L in mean serum sodium levels when the null hypothesis is true.
- E. Given the reported value of power, a statistically significant difference in the mean serum sodium levels of the two groups of dogs may have been observed if the investigators had used a larger sample size.

35. Another way of expressing the probability of a false positive test result in an animal that is healthy, is:

- A. $P(T+|D-)$
- B. $P(D-|T+)$
- C. $P(D- \text{ and } T+)/P(T+)$
- D. $P(D-)*P(T+)$
- E. $P(D- \text{ and } T+)$

36. In an ROC curve of a diagnostic test the sensitivity of the test is plotted on the y-axis and the _____ is plotted on the x-axis.

- A. sensitivity
- B. specificity
- C. false negative rate
- D. false positive rate
- e. true positive rate