Epidemiology: HLSC 2003
Assignment 2

Group ID: _____

Group Members (those in attendance only):

1. _____ 2. _____ 3. _____ 4. _____

Instructions: Under each description, name the study type and describe why using information from Class 6 and Chapter 3 of Basic Epidemiology. If you believe the described study is a cohort study, you must state which type (retrospective or prospective) for full marks.

1. The entire population of a given community is examined in 2013, and all who are judged to be free from esophageal cancer are questioned extensively about their diets. These people then are followed for several years to see whether or not their eating habits will predict their risk of developing esophageal cancer.

   Study Type: Prospective Cohort **Analytic or Descriptive?** Analytic

   Rationale: Participants were screened to determine if they were free of the disease outcome at the start of the study; they are all at risk for developing esophageal cancer. The exposure was then assessed (diet), but people were not randomly assigned to diet groups; they were simply asked how they currently eat (naturally occurring exposure). Participants were then followed into the future to determine the extent of disease that occurs (outcome of interest is esophageal cancer). The directionality of the study is forward – E assessed, then D.

   Identify at least one strength and one limitation of this type of study design:

   Strengths - can study rare exposures, can assume temporal sequence, can examine multiple outcomes from a single exposure, can help determine a cause-effect relationship

   Limitations: Expensive, time consuming, loss to follow up, not useful if disease outcome you are measuring is rare (unlikely it will develop in your cohort), classification of outcome may be influenced by researcher's/participant's knowledge of exposure, need large groups,

2. To test the efficacy of vitamin C in preventing colds, army recruits are randomly assigned to one of two groups: one in which 500 mg of vitamin C is administered daily and one in which 500 mg of a placebo is administered daily. Both groups are followed to determine the number and severity of subsequent colds.

   Study Type: Experimental **Is this study Observational (Y/N)?** No

   Rationale: Participants are randomly assigned to the exposure, and followed to determine the extent to which they develop the outcome (colds). The exposure is controlled by the researchers. The directionality of the study is forward – E assessed, then D.

3. A study examines the effect of childhood trauma on alcohol dependence. Adults with current alcohol dependence are identified using an addictions treatment clinic. Controls are selected from a random sample of the general population. Participants are asked about traumatic experiences that occurred when they were children.

   Study Type: Case-Control Study

Where does this study fit on the study hierarchy of strength in determining causation (the bottom being level one)? Level 4 (moderately useful in determining causation)

Rationale: Disease status determined first - participants were recruited for the study based on their disease status and placed in two groups. Participants were then asked about an exposure that occurred in the past (traumatic experiences in childhood). The directionality of the study is backward – D assessed, then E.

Identify at least one strength and one limitation of this type of study design:

Strengths: particularly good for rare disease outcomes, can examine multiple exposures, relatively inexpensive, can help determine a cause-effect relationship

Limitations: cannot determine incidence (begin with the outcome/disease), difficult to select appropriate controls, subject to recall bias and interviewer bias, cannot determine temporal sequence.

4. Researchers were interested in testing the hypothesis that good social support is associated with good perceived health (outcome). They randomly select 5000 adults from Alberta using random digit dialing and interviewed them by phone. During the interview they ask if people believe they currently have good social support from family and friends (yes or no) and at the same time ask if they believed they are currently in good health (yes or no).

Study Type: Cross-sectional study **What is the exposure of interest?** Good social Support

Rationale: Exposure and outcome measured from a sample at the same time. If the disease was first assessed, and people were placed into disease/non disease groups before data was collected on exposure status in past, this would be a case-control study.

Identify at least one strength and one limitation of this type of study design:

Strengths: Inexpensive, quick, data often available from surveillance data, multiple outcomes and exposures examined at one time, no follow up required, can show potential relationships between outcomes and exposures, can be both analytical and descriptive, helps develop hypothesis for future studies

Limitations: Often largely descriptive, cannot determine temporal sequence, over represent long-term illness, difficult to examine rare outcomes (hard to find in a sample population).

5. A physician working in an emergency department has 3 patients who arrive in the emergency department with a strange but similar cluster of symptoms over a one month period. He writes and publishes a paper describing these 3 cases.

Study Type: Case-series

Rationale: All 3 individuals have outcome (i.e., strange cluster of symptoms); no individuals without the outcome to compare them to. Exposure status of participants unknown. This is not a case report as there is more than 1 individual.

Identify at least one strength and one limitation of this type of study design:

Strengths: can draw attention to unusual cases, shares information about potentially isolated cases, can discover new phenomenon of interest, organizes similar findings and makes them available, good for the development of potential hypothesis, may trigger more rigorous surveillance systems

Limitations: Not really a "study Design" per se. No strength in proving causation, cases may not be related ultimately.

6. Researchers are interested to determine if exposure to fluoride in drinking water is associated with increased incidence of bone fractures. They used data available from 36 different municipalities and compared them to determine if there was a correlation between fluoridated water and bone fractures among the identified communities.

Study Type: Ecological Study

Rationale: Comparing groups of people (municipalities) rather than individuals based on geographical location.

Identify at least one strength and one limitation of this type of study design:

Strengths: data readily available, easy to conduct, can identify clues and trends, see correlations between exposures and outcomes, do not need contact with individuals, can suggest avenues of potential further study, may prompt more advanced surveillance.

Limitations: Subject to the ecological fallacy, Subject to confounding (if populations structures largely different based on demography or exposure), cannot determine causation

7. Investigators want to test the hypothesis that working with certain chemicals in the manufacturing of tires increases the rate of death. Using employee occupational health records from past decades, they identify employees of a large tire factory and divide them by exposure and non-exposure to the chemical (those who handled the chemical in the manufacturing process vs. those who were involved with more clerical/management work in the company). They then determine their current outcome status (i.e. death) through telephone contact and death registries.

Study Type: Retrospective Cohort

Is the time of data collection in the past, present, or in the future: Present (and possibly the future)

Rationale: Study takes place in current time, but exposure status is determined based on past records. After exposure status is determine, cohort members outcome status is examined (though the use of death registries and telephone contact)

Identify at least one strength and one limitation of this type of study design:

Strengths: Can bypass all the years of waiting required in a prospective design, can find cohorts with specific exposures (occupational, institutional, environmental), can calculate the incidence of disease, can determine temporal sequence, fairly good for determining causation

Limitations: quality data may not be available or be incomplete, may misclassify someone based on exposure status from records, if know that outcome in the present, may bias the selection of exposure subjects, not good for rare diseases