Analytic study designs - Assignment

Part I

The following questions are based on the attached paper "Cancer and Tobacco Smoking" (Morton L. Levin, Hyman Goldstein, and Paul R. Gerhardt, *JAMA*, May 27, 1950, pages 336-338).

1. What study design has been employed (circle one)

   A. case-control
   B. Cohort (prospective)
   C. retrospective cohort (or historical cohort)
   D. ecologic
   E. May be either a or c

   In one or two sentences justify your choice.

2. The comparison group was composed of "those with symptoms referable to the same site but which proved not to be due to cancer." Briefly discuss the appropriateness of this comparison group and its likely effect on the association observed in the study. (3-6 sentences).

3. Histories of tobacco usage were obtained routinely from all admitted patients before the final diagnosis had been established. "This procedure is considered especially important from the standpoint of excluding bias." The authors are referring to bias from:

   A. selective survival
   B. cohort effect
   C. antecedant-consequent confusion
   D. ecologic fallacy
   E. selective recall

   Explain.

4. The authors state that "There were more than twice as many cases of lung cancer among cigarette smokers as among any other group". Briefly discuss the meaningfulness of this statement.

5. Which interpretation of the data in Table 4 is correct? [Watch out--this is tricky.]

   A. Cumulative incidence of lung cancer in cigarette smokers* is approximately 2 1/2 times the cumulative incidence in nonsmokers (20.7/8.6).

   B. Incidence density rate of lung cancer in cigarette smokers* is approximately 2 1/2 times that in nonsmokers (20.7/8.6).

   C. Prevalence of lung cancer among all cigarette smokers* admitted to Roswell Park Memorial Institute is approximately 2 1/2 times that among all nonsmokers admitted to Roswell Park Memorial Institute (20.7/8.6).

   D. Prevalence of cigarette smoking* among lung cancer cases is approximately 2 1/2 times the prevalence of nonsmoking among lung cancer cases (20.7/8.6).

   E. None of the above statements is correct.

   In one or two sentences justify your answer.

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*Note: 25 years' duration or longer.

Note: The two articles for this assignment were included the packet of copyrighted material sold at the Health Affairs Bookstore. The page numbers jump to reflect the insertion of those pages.

Part II

The next five questions are based on the attached paper "The Mortality of doctors in relation to their smoking habits", (Richard Doll, Austin Bradford Hill, *British Medical Journal*, June 26, 1954, pages 1451-1455).

The questions are designed to direct your thoughts in reviewing the study. Your answers can be brief! [It is suggested that you read through the entire paper before answering the questions.]

1. Doll and Hill state (page 1451, column 1) that "Further retrospective studies of that same kind would seem to us unlikely to advance our knowledge materially or to throw any new light upon the names of the association."

   a. What specific design does "that same kind" refer to?

   b. Why do the authors regard it necessary that there be studies employing a different design (a "prospective" one). What are some advantages of a prospective, rather than a retrospective, approach?

2. What study design have Doll and Hill in fact employed (check one):

   A. case control with incident cases
   B. cohort (prospective)
   C. cohort (historical
   D. cross-sectional
   E. ecologic
   F. case control nested within a cohort

   In one or two sentences justify your choice.

3.

   a. The study group was recruited from members of the medical profession in the United Kingdom in 1951. Briefly, discuss the appropriateness of using this target population. What problems would one anticipate in recruiting and following these subjects? How might these problems be minimized?

   b. In reading the Methods Section, what drawbacks of a prospective investigation of this nature are vividly apparent?

4.

   a. Think about the approach to measuring smoking status in the Levin et al. study in Part I and the Doll and Hill study. Are you more confident in the validity of either approach? What is the "real" exposure factor or factors?

   b. Lung cancer is a disease presumed to have a long latency period. How do Doll and Hill justify their use of current smoking habits as the exposure variable?

5. In contrast to many earlier investigations, Doll and Hill studied deaths rather than diagnosed cases. Cite some advantages and disadvantages of using deaths rather than incident cases.

6. What is the reason given for standardizing rates by age (p.ÿ1452)? Do you agree?

7. What is the reason for concern about the criteria upon which the diagnosis of lung cancer was based (page 1452, 2nd column)?

8. Read the first paragraph under "Method of Smoking" (page 1453) carefully. We will take up this concept (nondifferential misclassification bias) later in the course. [No response required.]

9. Are the results from the "prospective" study basically consistent with those of the retrospective studies? Cite several factors that might account for the lower rates in the present study. [Thought question: how were the authors able to estimate death rates from their retrospective study?]

10. Read the paragraph headed "The Diagnoses" (page 1454) carefully. We will consider this concept ("Detection bias") later in the course. [No response required]

11. Doll and Hill end their conclusion: "It seems clear that smoking cannot be a major factor in [the] production [of deaths attributable to coronary thrombosis], but the steady increase in mortality with the amount of tobacco smoking recorded suggests that there is a subgroup of these cases in which tobacco has a significant adjuvant effect," (p.1455). Was that "data dredging" or prescience? [No need to write, just think.]

12. How would you, speaking on behalf of Doll and HIll, respond to the argument that people who have never smoked, or who have stopped smoking, are often more health conscious, eat better diets, get more exercise, use more preventive health services, and handle stress better than people who smoke, and that these reasons, rather than smoking, may be responsible for the results observed in the study?