Babylon **U**niversity – **C**ollege **O**f **M**edicine
Department of Community Medicine

Lectures in Community Medicine
For 4th Stage Students
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Lecture 7
Analytical Observational Studies

Case Control Study:

A case control study begins with the selection of cases which should represent all cases from a specified population. The most difficult task is to select controls; the controls should represent people who would have been designated study cases if they had developed the diseases. An important aspect of this study is the determination of the start and duration of exposure, the exposure status is usually determined after the development of the disease (retrospective) and usually by direct questioning of the affected person. Exposure may be determined by biochemical measurement, established recording system.

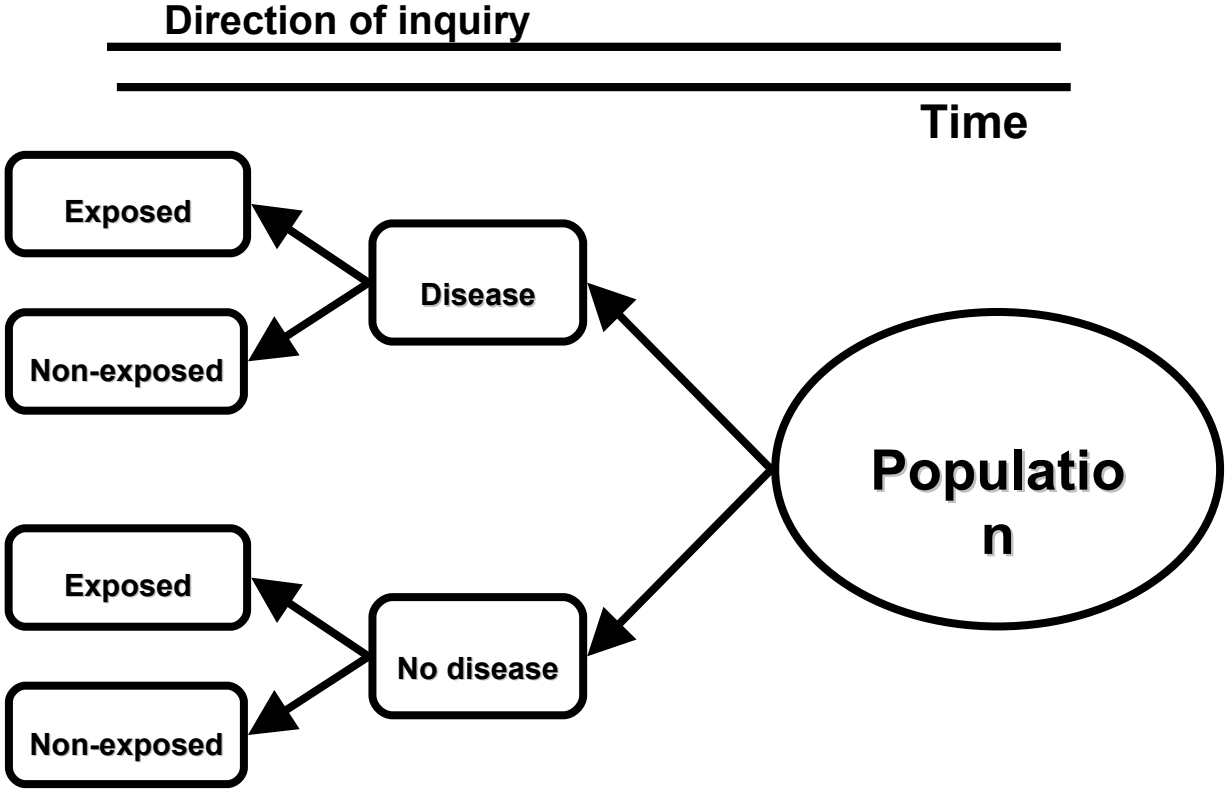

Figure shows case control study design

Sources of selection of cases in case control study

- Hospital-based case control study: the cases will be identified from the hospital or other health care facilities. These are common, relatively easy and inexpensive.
- Population-based case control study: It involves locating and obtaining data from all affected individuals or a random sample from population.

Selection of controls in case control study:

It is the most difficult aspect of Case Control Study (CCS), it depends on:

1. Characteristics and sources of cases.
2. Need to obtain comparable and reliable information from cases and controls.
3. Practical and economic considerations.

The control should be comparable to the source of the population of cases. Any exclusion or restrictions made in the selection of cases should be applied equally to the controls and vice versa.

Advantages of case control studies:

1. Suitable for rare diseases.
2. Results can be obtained quickly.
3. Relatively inexpensive and short term study.

Disadvantages of case control studies:

1. Incidence or absolute risk cannot be determined directly from a case control study.
2. Difficulty in selection of the control.
3. Case-control studies rely upon retrospective data which lead to recall bias.
4. Because the data are collected after the event (retrospectively) it is difficult to be whether correlation is causal or not.

Example of case control study of coronary heart disease (CHD) and cigarette smoking:

	CHD	Control
Smoke Cigarettes	a 112	b 176
Do not smoke	c 88	d 224
Total	200	400
% of smoking	56%	44%

$$\text{Odd's ratio} = \frac{\text{odd's that cases exposed}}{\text{odd's that control exposed}}$$

$$= \frac{\text{cases with exposure} \times \text{control without exposure}}{\text{control with exposure} \times \text{cases without exposure}}$$

$$= \frac{ad}{bc} = \frac{a/c}{b/d}$$

$$= 1.6 = \frac{112 \times 224}{176 \times 88} = \frac{25088}{15488}$$

The exposure is positively related to the disease because the odd's ratio is greater than 1

Cohort Study:

Follow-up study or incidence study.
Begin with a group of people (a cohort) free of disease, who are classified into subgroups according to exposure to potential cause of disease, and the whole cohort is followed up to see how the subsequent development of new

cases of the disease differ between the groups with and without exposure. Cohort study is a longitudinal study. Cohort study provides the best information about the causation of disease and the most direct measurement of the risk of developing disease.

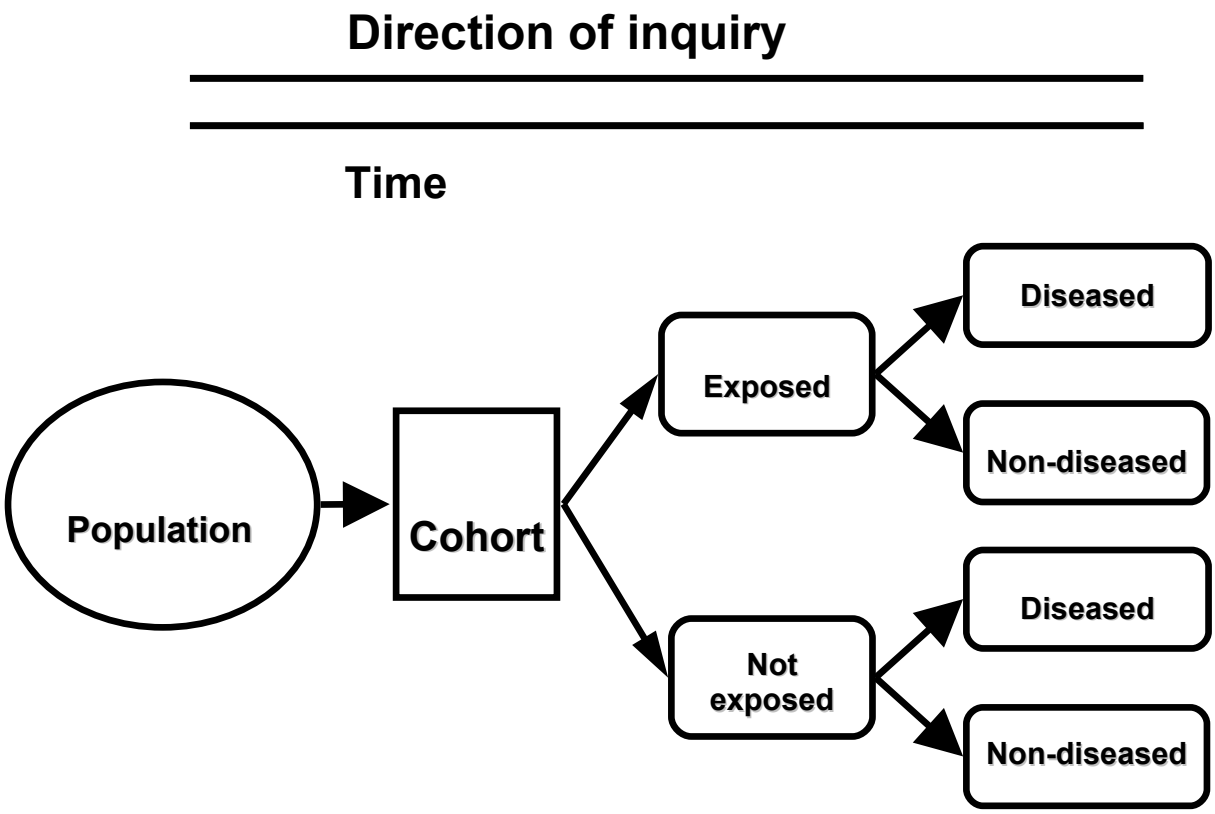

Figure shows cohort study design

Advantages of Cohort studies:

1. They allow complete description of the individuals experience subsequent to exposure.
2. They provide clear temporal sequence of exposure and disease.
3. They provide excellent opportunity to study rare exposures.
4. They permit the assessment of multiple outcomes that may be related to the same risk factor.
5. They permit the direct assessment of risk of exposure and disease development .
6. Less chance of bias .

Disadvantages of Cohort studies:

1. Not suitable for rare disease.
2. Long-term follow up may be needed when the latency period for outcome of interest is long.

3. Attrition or loss of people from the sample during the course of the study.
4. Time consuming.
5. Expensive.
6. The exposure status may change during the conduct of the study.