

# Confounding

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2004 Epidemiology, Biostatistics and Clinical  
Research Methods Summer Session  
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Part 13

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## Definition

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- Mixing of effects
  - Distortion of the true relationship between exposure and disease by the influence of one or more other factors

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Under what circumstances does a variable confound an exposure-disease relationship?

- When, in the data, the potentially confounding factor (PCF) is associated with exposure but is not believed to be a result of exposure; and

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2. When in non-exposed persons in the population the PCF is a “risk factor” for the disease -- i.e., it is either
- a) A cause of the disease
  - b) A correlate of a cause, or
  - c) Influential in the recognition or diagnosis of the disease

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- In a case-control study, the PCF need not be a risk factor for disease if it influences selection probability differentially in cases and controls

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**Control of confounding can be accomplished in the:**

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- 1. Design
  - a) Matching
  - b) Restriction
  - c) Randomization
- 2. Analysis
  - a) Stratification
  - b) Multivariate modeling

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**Exercises:**  
**Criteria for Confounding**

1. A woman's risk of breast cancer is directly correlated with her age at the time of birth of her first child. When evaluating the association between total number of births and breast cancer risk, should age at first birth be controlled?

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**Exercises:**  
**Criteria for Confounding**

2. The presence of vaginal adenosis is related both to DES exposure in utero and an increased risk of vaginal adenocarcinoma. Should this variable be controlled when examining the DES-vaginal adenocarcinoma association?

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**Exercises:**  
**Criteria for Confounding**

3. Postmenopausal estrogens are given more commonly to women who experience hot flashes than to other women. Estrogen use predisposes to the development of endometrial hyperplasia, a benign condition in itself but one that predisposes to the development of endometrial cancer. An early symptom of endometrial cancer is vaginal bleeding, but this often occurs in healthy postmenopausal estrogen users as well.

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## Exercises: Criteria for Confounding

4. When conducting a case-control study to measure the degree of association (if any) between estrogen use and endometrial cancer, which of the following should be controlled?
- a) Age
  - b) Presence of hot flashes
  - c) Presence of endometrial hyperplasia
  - d) Occurrence of vaginal bleeding

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