Week 8: Course Review

Video 1: Review Session (EPI 201)

EPI202 – Epidemiologic Methods II

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Counterfactuals

- Counterfactual theory
- Exchangeability

Measures

- Prevalence
- Cumulative incidence, odds
- Incidence rates
- Person time, steady state
- Open and closed cohorts
- Kaplan Meier Curves
- Relationship between measures
- Ratio and difference measures

Directed Acyclic Graphs

- Directed Acyclic Graphs
- Properties of confounding
- M-bias
- Bias from conditioning on a common effect

Study Design

- Cohort
  - Open vs. closed cohort
  - Person-time, cumulative exposures
  - Risk-sets
  - Confounding and bias in cohort studies

- Case-control
  - Efficient sampling from study base
  - Confounding and bias in case-control studies
  - Case-control sampling schemes
  - Estimated measures in case-control studies

Confounding

- Direction of bias due to uncontrolled confounding
- Ways to eliminate/minimize confounding
  - In the design phase
  - In the analysis (more on this in EPI202)

Effect Measure Modification

- Confounding vs. effect measure modification
- Additive vs. multiplicative interaction

Causal Inference

- Individual and average causal effects
- Association vs. causation

- Causal Inference in Ideal Randomized Experiments
  - Exchangeability in randomized experiments
  - Marginal and conditional randomization

- Causal Inference in Observational Studies
  - Consistency
  - Positivity
  - Exchangeability
  - Well-defined interventions

Sufficient and Component Cause Theory

- Sufficient cause
- Component cause
- Necessary cause
- Interaction between component causes

Philosophy of Science and Hill Criteria

- Karl Popper and Falsification of testable hypotheses
- Hill criteria

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Video 2: Review Session (EPI 202)

Part 1

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Statistical Inference in Epidemiology

- Hypothesis tests
- Confidence intervals
- Statistical versus biologic significance
- Justification for inferential statistics in the absence of randomization

Crude Data Analysis

- Hypothesis tests
- Point estimates and confidence intervals
  - Person-time data
  - Count data
  - Case-control data

Stratified Data Analysis
Person-time, Count, Case-control data

- Tradeoff between bias and efficiency
- Weighting options
- Hypothesis tests, point estimates and confidence intervals after adjusting for confounders in person-time data

Effect Measure Modification Analysis

- Impact of effect measure modification on the interpretation of summary estimates
- Statistical tests of heterogeneity

Matching in Design and Analysis

- Matching in the design and analysis of cohort studies
- Matching in the design and analysis of case-control studies
- Relative efficiency
- Hypothesis tests, point estimates and confidence intervals for matched case-control studies

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Week 8: Course Review

Video 3: Review Session (EPI 202)

Part 2

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Magnitude of Confounding

- Determinants of the magnitude of bias due to uncontrolled confounding
- Recall direction of confounding

Misclassification

- Measurement error and misclassification
- Independent versus dependent misclassification
- Nondifferential versus differential misclassification
- Indices of measurement accuracy
- Correcting estimates using external validation studies
- Impact of misclassification on estimation procedures, hypothesis tests, confounding and effect measure modification

Regression Models

- Relationship between stratified tabular analysis and regression models
- Interpretation of results

Standardization and IPW

- Standard populations
- Traditional and unified approach
- Inverse probability of treatment weights
- Relationship between approaches for standardization

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