Week 8 – Tuesday Session

Course Review

EPI202 – Epidemiologic Methods II
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Final Exam Details

- The exam will be in class on Wednesday December 14 from 5:30-7:00 PM in Kresge G1 or during class on Thursday December 15, 2022. You can attend the session of our choice.

- The exam will be on Canvas and contain
  - Multiple choice questions
  - True/False questions
  - Fill in the blank
  - Calculations and interpretations

- You will have 90 minutes to complete the exam once you begin, so please arrive a few minutes early to set up. Canvas will close the exam once it is due.

- If you are a Mac user, do not use Safari to take the exam. It is safer to use either chrome or firefox.

- The exam is closed book. You may not use class notes or online resources. As outlined in the academic integrity statement, you are not permitted to discuss the content of the exam with anyone until we let you know that the entire class has completed the exam. You may use only the following resources when completing the exam:
  - The "EPI202 roadmap" with relevant equations. There will be a link on the exam to download a fresh copy if you need one and we will have hard copies for anyone who would like one.
  - A calculator (can be a hand calculator, the calculator on your phone or computer, or other software)
  - The "EPI202 calculator" excel spreadsheet. There will be a link on the exam to download a fresh copy if you need one.
  - Any other statistical package to complete tabular analyses (such as R, Stata, SAS etc.), however, you may find it quicker and easier to use the EPI202 calculator.

EPI 201

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
- Target trial emulation

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

EPI 202 – PRE MIDTERM

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
- E-Value

Effect Measure Modification Analysis

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

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

EPI 202 – POST MIDTERM

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

GOOD LUCK ON THE FINAL EXAM!