***Module overview***

In epidemiology, it’s really common to be interested in the relationship between two things. In this module, we’re going to discuss some of the most commonly used measures of such relationships. We’ll also begin discussing when we should choose one measure over another and some of the ways we should (and should NOT) interpret the results of applying these measures to data.

* “Things” is admittedly vague here, but we use these measures so commonly and in so many different ways, that it is difficult to find a more specific word. Traditionally, though, the relationship of interest in epidemiology is described as being between an *exposure* and an *outcome.*
* “Relationship” here simply means that knowing something about the first thing (e.g., an exposure) also provides me with some information about a second thing (e.g., an outcome).
* Examples of relationships between things that epidemiologists might be interested in include:
  + Height and weight
  + Pathogen and disease
  + Behavior and health
  + Environmental exposure and disease
  + Policy and quality of life
  + Intervention and behavior

***Module topics / Key Concepts***

* Know the big-picture difference between Absolute vs. relative measures. This includes knowing what kinds of questions each measure is typically most helpful in answering.
* Be able to calculate and interpret a relative risk (risk ratio).
* Be able to calculate and interpret an odds ratio (relative odds).
* Be able to calculate and interpret an attributable risk (absolute and percent).
* Be able to calculate and interpret absolute risk reduction and number needed to treat.
* Measures of sampling variability
  + P-values
  + P-value functions
  + Confidence intervals

***Required Readings***

Please read the following textbook chapters **before** our next in-class lab session:

* Szklo, M., & Nieto, F. J. (2019). *Epidemiology: Beyond the Basics*. Burlington: Jones & Bartlett Learning.
  + Chapter 3. Section 3.1, 3.2, pages 87-102
* Cannell B. *R for Epidemiology*. 2020. <https://www.r4epi.com/>.
  + Chapter 22. Describing the relationship between a continuous outcome and a continuous predictor
  + Chapter 23. Describing the relationship between a continuous outcome and a categorical predictor
  + Chapter 24. Describing the relationship between a categorical outcome and a categorical predictor
* Pearl J., & Mackenzie D. (2018). *The Book of Why: The New Science of Cause and Effect*. Basic Books.
  + Chapter 1. The Ladder of Causation
* [Wasserstein RL, Lazar NA. The ASA Statement on p-Values: Context, Process, and Purpose. *Am Stat*. 2016;70(2):129-133. doi:10.1080/00031305.2016.1154108](https://uthtmc.sharepoint.com/:b:/s/SPHCannellEpiIII/EaffT9lvv41FvDbnH-53T8oBnzaQeK3Gu1lPN5U8Tp0aoQ?e=COFiZJ)
* [Wasserstein RL, Schirm AL, Lazar NA. Moving to a World Beyond “p < 0.05.” *Am Stat*. 2019;73(sup1):1-19. doi:10.1080/00031305.2019.1583913](https://uthtmc.sharepoint.com/:b:/s/SPHCannellEpiIII/EeICt5WH-4pOlywdAonesRoBdjAuTq4o9la2SkupZVPhyg?e=D2vwHN)

***Optional supplemental material***

* None

***Assignments***

1. Check on learning quiz
2. Lab
3. Module quiz