Epidemiology:
The story of disease
The 5 Ws:

What is Epidemiology?

Where/When?    What?
“the study of the occurrence and distribution of health-related states or events

Who?    Why?
in specified populations, including the determinants influencing such states,

How?
and the application of this knowledge to control the health problem”

It is the story of a disease in order to improve health and wellbeing in a population

(Porta, 2008)
Medicine vs Epidemiology
What: Leading Cause of Death

(CDC NCHS, National Vital Statistics System, Mortality)
Who:

- New cases (incidence)
- Existing cases (prevalence)
Where/When:
Why:

Cause A $\rightarrow$ Outcome Z

Cause A $\rightarrow$ Outcome Z

Factor G $\leftarrow$ Outcome Z

Cause A $\rightarrow$ Outcome Z

Tooth Loss

- Male
- Diet
- Age
- Obesity
- Diabetes
- Dentist
Confounding

Sunny Weather

Ice Cream → Sunburns
Epidemiology is a Team Sport

Why:

Dahlgren and Whitehead, 1991
How do we get the data?

- **Cross-Sectional Study**
  - # of Yes
  - Total #

- **Cohort Study**
  - # of Yes
  - Total #
  - vs

- **Case-Control Study**
  - # of Yes
  - Total #

- **Look back**

- **Randomized Control Trial**
  - Intervention Group
  - Control group
  - Odds
  - Outcome

May 17, 2023
Association does not equal causation

Who: ___________
What:___________
Where:__________
When:___________
Why: ___________

Cases were more likely to:

• Be within the blue circle
• Weight above normal range
• Under the age of 50
• 30 minutes of exercise per week
• Dislike all vegetables
• Never went to the doctor
• Male

(Associations)
How do we really get the why (causation)?

- Exposure came before outcome
- The relationship cannot be explained by any other factor

Epidemiology is *Really* a Team Sport
How to we fix it?
“foolish, drunken, and harebrained women most often bring forth children like unto themselves, morose, and languid”

– Aristotle

“Spirituous Liquors… (are) too often the cause of weak, feeble and distempered children who must be, instead of an advantage and strength, a charge to their country”

- College of Physicians, London, 1725

“fetal alcohol syndrome”

- Smith & Jones, 1973
What?

Fetal Alcohol Spectrum Disorders:
• Fetal alcohol syndrome (FAS)

• Partial fetal alcohol syndrome (PFAS)

• Alcohol-related neurobehavioral disorders (ARND)

• Alcohol-related birth defects (ARBD)
Who & where?

• Partnered with school districts
  • 1st grade children

Tier I: Growth Assessment
  • Height, weight, head circumference

Tier II: Dysmorphology Exam
  • Facial features
  • Minor anomalies

Tier III: Further Assessment
  • Neurodevelopmental
  • Maternal Interviews

Case Conference: Diagnosis
FASD conservatively affects 1% to 5% of school children

(or 1 in 20)

(May, Chambers et al., JAMA, 2018)
FASD may affect 3.1% to 9.8% of school children

(or 1 in 10)
Implications for North Carolina Schools

- Number of K-12 North Carolina Students: 1.48 Million

  - Lowest possible estimate:
    - 1% of 1,480,000 = 14,800 children with FASD in NC schools.
  - Conservate estimate:
    - 5% of 1,480,000 = 74,000 children with FASD in NC schools.
When & Why?

Fetal Alcohol Spectrum Disorders
Mothers of children with FASD tend to be:

- Lower in weight / body mass index
- Poorer dietary intake
- More likely to be nutrient insufficient
- Less likely to take a prenatal vitamin

(Associations)
Why?

- Genetics
- Dose
- Maternal Physical Traits
- FASD
- Maternal Diet
- Alcohol Exposure
- Breastfeeding
- Childbearing History
- Drug Exposure
- Metabolism
- Prenatal Care
- Mental Health
- Paternal Factors
Why do they drink?

1. Pregnancy was unplanned
2. Drinking because of stress or to cope with abuse or trauma
3. Reliance on drinking venue and fellow drinkers for support
4. Socialization
5. Feelings of invincibility
UNC NRI Participant Pool

https://uncnri.org/participant-pool/