Identifying and Capitalizing on Population Health Research Opportunities

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ISSWSH WEBINAR

Disclosures

- None

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A bit about me and my perspective

- Expertise in the science (art) of study design
- Like any facet of science, best practices in study design are constantly evolving
- Clinician-epidemiologist collaborations are very helpful: clinicians improve clinical relevance, epidemiologists improve study quality

Tonight's goals

1. Review epidemiologic research and the most common types of studies and their pros and cons
2. Discuss options for obtaining data and the pros/cons of different data sources
3. Highlight common study biases that are particularly relevant in sexual health medicine

Please ask questions as we go!

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A primer on population health study types

Case study or series

In-depth description of an individual patient or series of patients

Pros:
- Often quick to write up
- Can raise awareness of previously unappreciated or urgent clinical situations

Cons:
- Does not inform clinical care or etiologic understanding

Observational studies

Non-randomized study of groups of patients

Pros:
- Wide range of data types available
- Can often collect important analytic details

Cons:
- Very difficult to draw causal conclusions

Randomized trials

Studies in which participants are randomized to receive agent under study

Pros:
- Much easier to draw causal conclusions
- Sub analyses of particular groups very feasible

Cons:
- $$

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Goals of epidemiologic research

Descriptive	Causal inference	Predictive
Goal: describe a phenomenon in a particular population	To validly estimate the magnitude of the effect of an exposure on an outcome	Generate algorithms to predict certain outcomes
• Case series and studies • Observational	• Observational (if advanced methods employed, and even then…probably not) • Randomized trials (gold standard)	• Observational data • Randomized trial data

How does population health science generate knowledge?

- Knowledge ≠ the results of a single study
  - Possible exception: well-designed, appropriately-sized randomized trial with negligible attrition
- Epidemiologists think about studies as contributions to a body of knowledge
  - Each study is a concerted effort in reducing biases whenever possible, acknowledging them openly, and trying to incrementally move the field forward
- A flawed study presented as completely valid can be (in my not-very-humble opinion) worse than no study at all

A thorough understanding of bias is critical to population health research

Information bias (aka misclassification)

Your measure of something is incorrect

Example

You ask patients if they have vulvodynia – some say yes although their pain is due to breastfeeding

Confounding

Relationship of interest is obscured by effects of other factors

Example

Yellowed fingers are associated with lung cancer because of confounding by cigarette smoking

Selection bias

Participants in your study differ in their risk of the exposure and outcome

Example

Participants in a study of a testosterone cream for vulvodynia are more likely to drop out due to side effects of the cream or worsening vulvodynia symptoms

Smith & Phillips 1992 doi: 10.1136/bmj.305.6856.757

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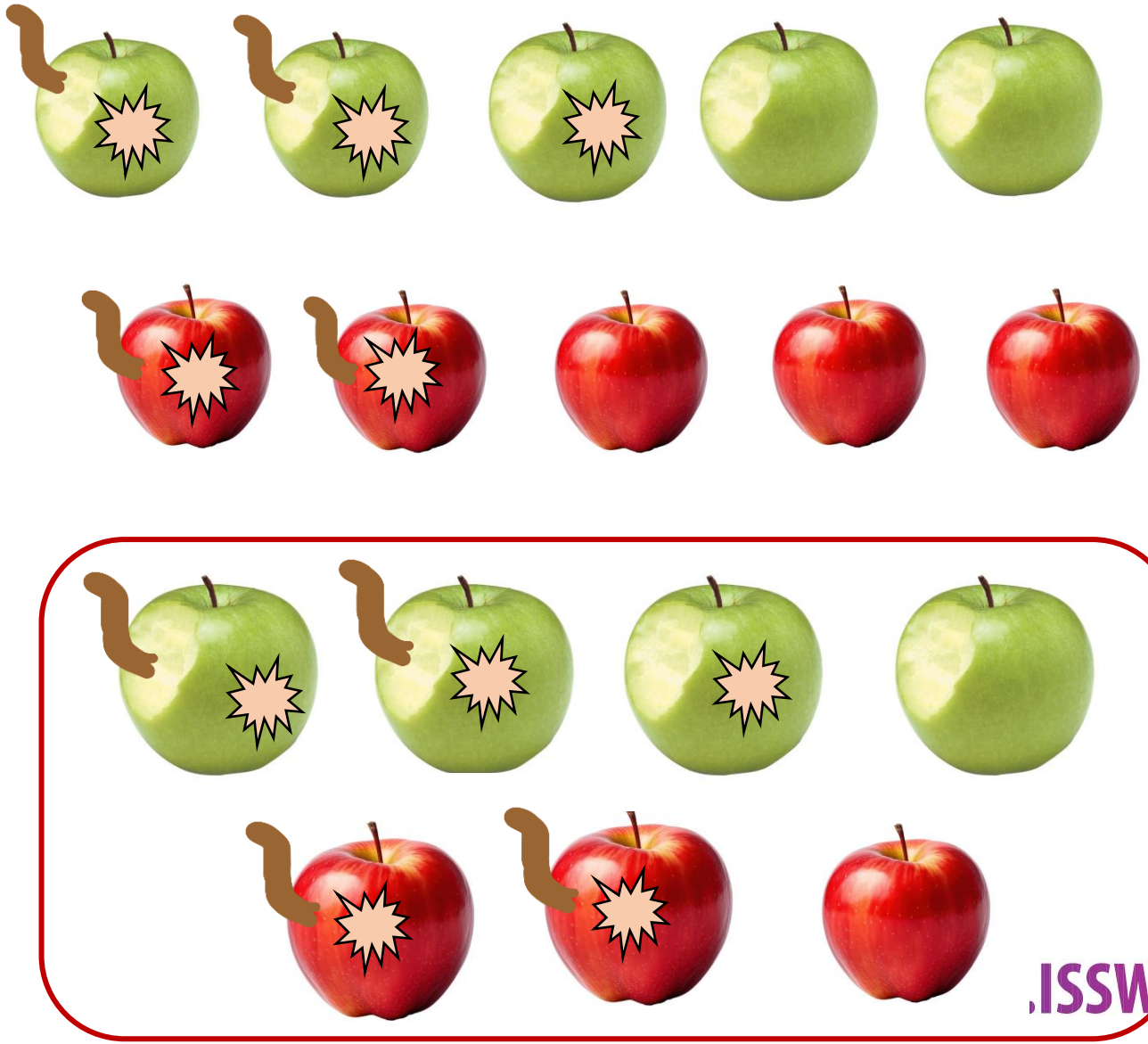
More on selection bias because it is tricky



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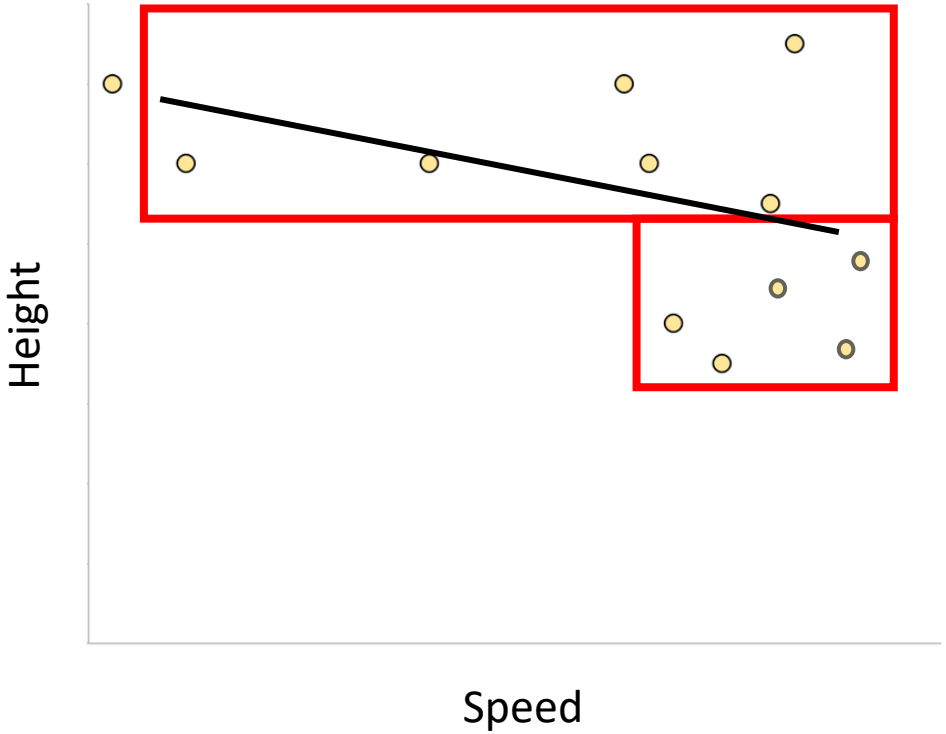
Why are we talking about worms?

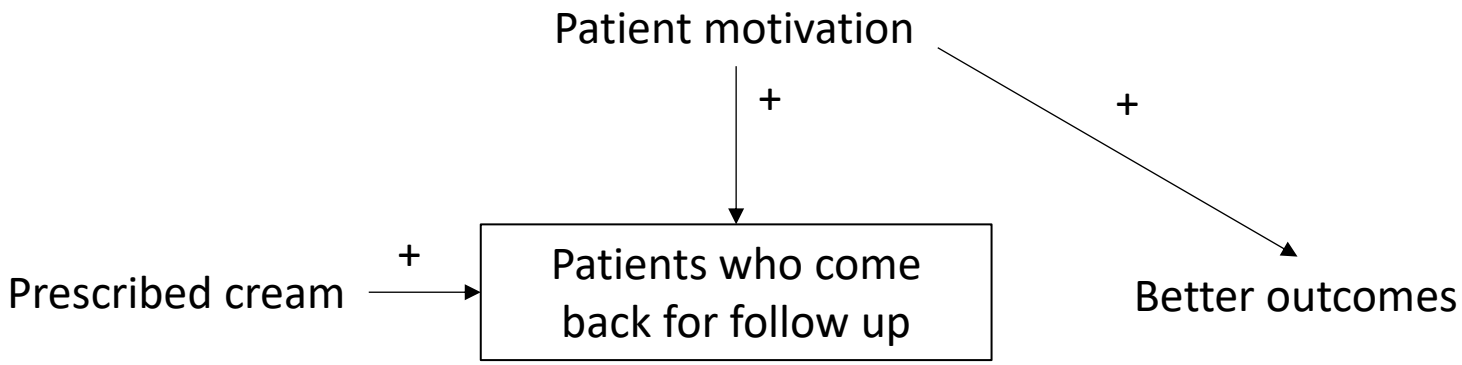
- Selection bias *distorts* effect estimates



Banack et al 2023 https://doi.org/10.1093/aje/kwad203

A potentially more relevant example

- Comparing estrogen + testosterone cream to vestibulectomy for pain mitigation at 12 months in patients with vestibulodynia
  - Best case: Randomized controlled trial! But let's say we don't have the resources
  - Let's say you want to do a retrospective chart review



Selection bias is particularly concerning in cross-sectional studies

- Cross-sectional studies collect information on an exposure and outcome *at the same time*
- For example, surveying patients at an OB/gyn clinic for oral contraceptive use and vulvar pain

A note on selection bias for clinical researchers

- An extra benefit of using medical record data as a starting point is that there is less risk of bias due to who opts in
  - If you do conduct a study where you are following up with patients who were seen at a clinic, *compare features of responders to non-responders*
  - This is a great way to assess the possible risk of selection bias!

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This is not the same as generalizability!

- You can validly estimate causal effects in a non-generalizable sample!
- Generalizability is important, but it is not *as* important as selection bias in causal research
- This is good news – you do not usually need to seek out nationally-representative data sets, but you still need good quality data

Why do we care about bias?

- Because I essentially studied it for five years

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Why do we care about bias?

- Because it distorts our ability to estimate the magnitude and estimate of an effect we are interested in
- It is very difficult and costly to minimize all sources of bias, so you often have to make cost-benefit analyses about the right approach to a given study
  - This will depend on your question
- Often you are making the most of existing data, which requires very careful consideration of bias

On the topic of data…

- Where can you get data?

1. Medical record abstraction

Pros:
- Very detailed clinical information
- More nuanced data (depending on clinician)
- Objective measures (e.g., blood pressure)

Cons:
- Very time consuming to extract (or costly to obtain)
- Requires training and alignment
- Different clinicians may note/assess things different
- Sample is inherently people in the clinic

On the topic of data…

- Where can you get data?

2. Electronic claims data

Pros:

- Someone has already extracted the clinical information for you
- Diagnosis and procedure codes often accurate, provide clinical details
- Large sample sizes readily available

Cons:

- Expensive
- Things that aren't billable aren't captured
- Often missing deeply important confounders (income, education, etc.)

On the topic of data…

- Where can you get data?

3. Nationally available datasets (for now…)

Pros:
- Typically representative datasets with large sample sizes
- Free to use
- Data have been cleaned already

Cons:
- Don't often capture many topics relevant to sexual medicine
- Sometimes outdated

On the topic of data…

- Where can you get data?

4. Epidemiologic cohort studies

Pros:

- Often get detailed data and decent sample sizes
- Can be more customized to a certain topic than national surveys
- Better confounding data than claims

Cons:

- It can be challenging to get data (might be changing)
- You have to know where to look
- Most will not include sexual health/function data

Example

C1. In the past month, about how often did you have sexual intercourse with your partner (your partner's penis inserted into your vagina)? (b_intercoursefreq) *ADDED 8/13/20*

LESS THAN ONCE PER MONTH…1
ONCE PER MONTH…2
2-3 TIMES PER MONTH…3
ONCE PER WEEK…4
2-3 TIMES PER WEEK…5
4-6 TIMES PER WEEK…6
DAILY…7

What are the study objectives?
What is required of participants?

Click here to enroll.

Want to enroll later? Fill out the screener and we'll contact you when you're ready. Already enrolled? Login and fill out your latest survey.

Contact us at bupresto@bu.edu or follow us on Facebook & Twitter

https://sites.bu.edu/presto/

Successful addition of a new optional survey

PRESTO Study - Sexual Health And Well-being Questionnaire

JOURNAL ARTICLE

Predictors of Non-Response to a Sexual Health Survey in a North American Preconception Cohort Study

Get access >

Julia C. Bond, MPH ✉, Jasmine Abrams, PhD, Amelia K. Wesselink, PhD, Katharine O. White, MD, Kenneth J. Rothman, DrPH, Lauren A. Wise, ScD

The Journal of Sexual Medicine, Volume 19, Issue 11, November 2022, Pages 1707–1715,
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Other cohorts have sexual health data

Swan
Study of Women's Health Across the Nation

Investigating Health for Mid-Life and Older Women

The Study of Women's Health Across the Nation (SWAN) is a multi-site longitudinal, epidemiologic study designed to examine the health of women during their middle years. The study examines the physical, biological, psychological and social changes during this transitional period.

SWAN is an active study with engaged investigators and participants.

https://www.swanstudy.org/

Nurses' Health Study

https://nurseshealthstudy.org/

Home | About | For participants | For researchers

SELF Research Study

Understanding how uterine fibroids develop

The National Institutes of Health (NIH) is supporting the continuation of the Study of the Environment, Lifestyle & Fibroids (SELF) to understand how Uterine fibroids develop.

Study goal

The purpose of this research is to learn how uterine fibroids develop, who is at risk of developing them, and how to prevent health problem caused by fibroids.

SELF
STUDY OF ENVIRONMENT, LIFESTYLE & FIBROIDS

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Researchers often hang onto tons of unanalyzed data

Obtain R01 funding for a 5-year project

Spend 1-2 years getting things off the ground

Collect data for 2-3 years

Analyze data furiously to finish grant aims

Think of 40 other papers that would be awesome

Get the next grant, lament would-be-awesome papers forever

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The upside

- If you have data analysis skills, you can contact scientists publishing on projects that you think are cool and often get your hands on some data
- There can be great opportunity for thesis projects, applied learning projects, student grants
  - Rarely do PIs have unallocated money, but you can sometimes find opportunities for students (research grants, etc)
- If you are interested in being a leader in population health sexual medicine science – learn statistical analysis software! R is the best. Or find a cool data analyst.

https://www.r-project.org/

How to approach population health research

1. Collaborate collaborate collaborate
   - Disclosure: I have a PhD in epidemiology, so I am clearly bought in, but:
   - Careful study design at the beginning of a given project produces better research
   - Find an epidemiologist or biostatistician or other population health expert
   - Look at schools of public health or schools of medicine
2. Seek out small-dollar funding opportunities
   - You can sometimes get grants from schools that could pay for a data analyst's time

How to approach population health research

3. Think very critically about sources of bias
   - How are you capturing information? How accurate is it?
   - Do you have valid data on confounders?
   - Who is in this dataset and *who is not?*
4. Descriptive work is often underrated

Final thoughts

- Case studies, case series, review articles, and small surveys are all great ways to dip your toe into population health research
- As your questions get more complex, your methods should, too
- As much as possible, having an epidemiologist or other population health expert on the team can only help (many of us are very friendly!)

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Questions!

- Please email me anytime: jcbond@bu.edu