Gender Identity and Expression

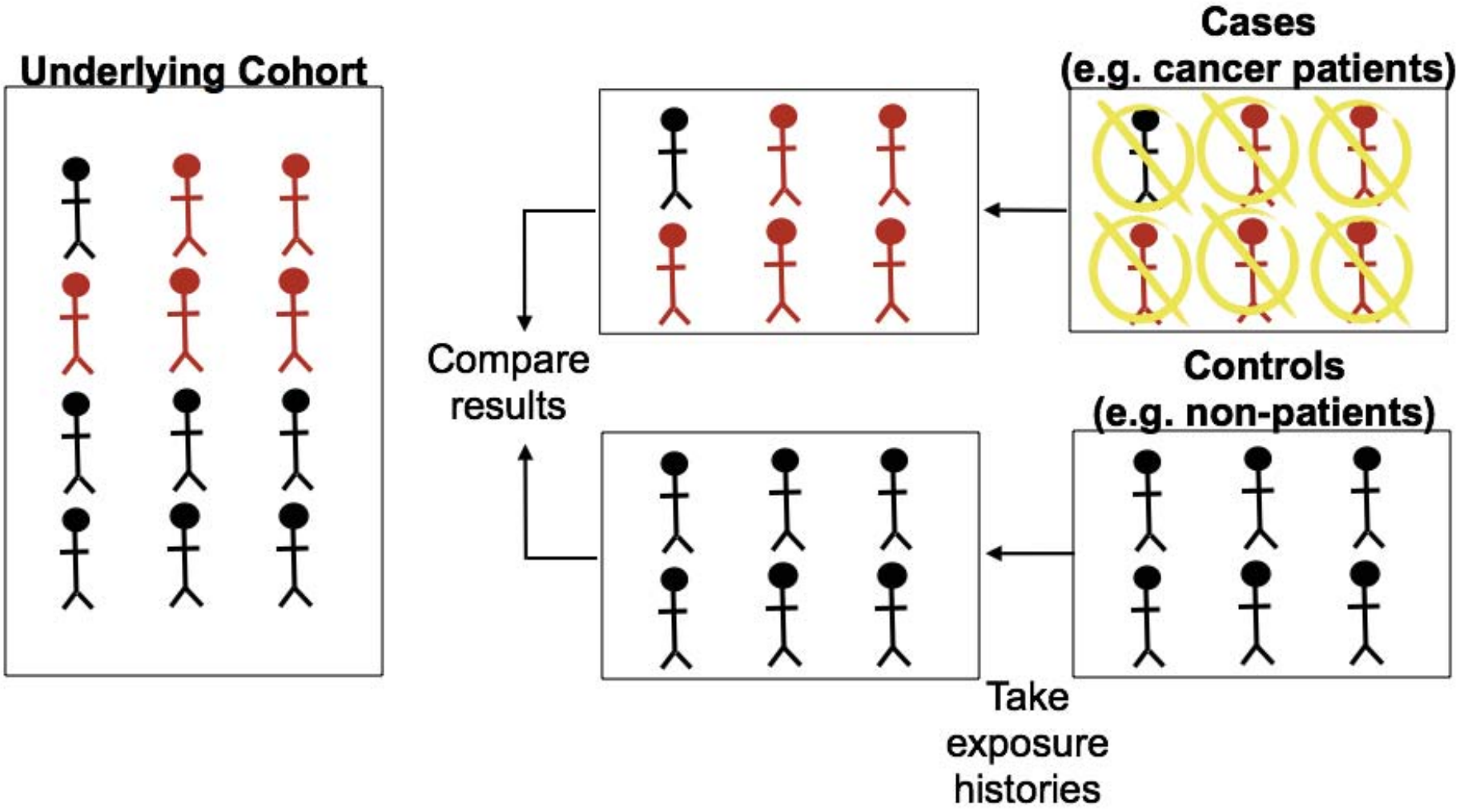
Week 8

Objectives

1. Describe research methods for studying gender identity and expression as they relate to health

2. Identify some key health disparities in relation to gender identity and expression

3. Learn more details about the case-control study design and apply to a health problem



Case-control

Process

1. Participants selected on the basis of if they do (cases) or do not (controls) have a particular disease/outcome

2. Then compare proportion having an exposure

Approach began relatively recently in response to shift from acute to chronic public health

Strengths

- Avoids logistic difficulties of studying diseases of long latent periods
- Efficient design
    - With respect to time, money (disease already occurred), and long latent periods
- Can get adequate numbers of diseased and non-diseased people, ideal when outcome is rare
- Ideal for evaluating multiple exposures for one outcome, as well as interrelationships of various exposures
- Can test hypotheses or explore a wide range of exposures (“fishing expedition”) for future studies
    - Useful in early stages of knowledge

Limitations

- Bias susceptibility
    - Selection bias (differential selection of cases or controls on basis of exposure status)
    - Observation bias (differential recording of exposure between study groups based on disease status)
- Challenge to determine temporality
- Difficulty in knowing appropriate time window for exposure and getting accurate past exposure information
- Cannot calculate incidence rates/risk, nor relative or attributable rates/risk directly, must estimate with odds ratio (OR)
- Great first study but must design carefully

Source of Cases

Need definition of disease (preferably homogenous for similar mechanisms), strict diagnostic criteria

Must be selected independently of exposure

Potential sources

Hospital-based (easy and inexpensive)

- Advantages
    - Convenient, easily identified, sufficient numbers, inexpensive, minimal effort
    - Cases/controls similar in accuracy of recall (both “sick”), minimizes recall bias
    - Good cooperation, minimizing non-response bias
- Disadvantages
    - Controls are ill, may not represent exposure distribution in population from which cases derived
    - Disease for which controls hospitalized may be associated with study exposure
        - e.g., smoking and lung – wouldn’t use bronchitis, COPD
    - Selection factors for hospitalization may differ between cases and controls (referral patterns, primary vs. tertiary hospitals)

Sources of Cases cont.

Population-based (avoids potential bias but logistic and cost considerations)

- Advantages
  - Generally ensures comparability –from same source population
- Disadvantages
  - Difficult to enumerate all members of population to select from (town lists in MA)
  - Difficult to gain cooperation for participation – time, motivation.
    - Non-response greater than hospitalized cases – major threat to validity
  - Expensive and time consuming
  - Quality of information – may not recall exposures as accurately as cases

Others: disease registries; special surveys; random digit dialing; friends, spouses, sibs, neighbor controls

Sources of Controls

Ideally, direct random sample of the reference population from which the cases originated

Controls must be sampled independently of exposure

Bias

Chance, bias, and confounding issue in any analytic study

Types of bias not unique to case-control, but more of a possibility because of design

- Selection bias
    - Occurs when controls or cases are more (or less) likely to be included if they have been exposed (inclusion in study is not independent of exposure)
- Recall bias
    - Relates to differences in the ways exposure information is remembered/ reported by cases, who have experienced an adverse health outcome, and by controls, who have not
- Can result in an overestimate or underestimate

Bias cont.

Careful of interpretation of data-derived hypotheses (chance)

Most case-control studies test a small number of specific hypotheses

Often collect data on many risk factors and conduct numerous comparisons

Must distinguish between

- Tests of hypotheses specified in advance (a priori hypotheses)
- “Fishing expeditions:” associations emerge as data analyzed (a posteriori hypotheses)
    - Interpret with caution
    - Can then be tested in studies specifically designed to do so

How to Design a Study

Cell Phones and Brain Cancer

"…The final, definitive trials on phone radiation may not settle this issue—but, as of now, the evidence remains far from convincing. Understanding the rigor, labor, evidence and time required to identify a real carcinogen is the first step to understanding what does and does not cause cancer."

Mukherjee, Siddhartha. "Do Cellphones Cause Brain Cancer?" *New York Times Magazine*, April 13, 2011.

Brain Cancer

- Gliomas—tumor of the brain, arising from glial cells
  - 77% of primary malignant brain tumors
  - Rare ~9 cases per 100,000 person-years
  - Median age at diagnosis varies (range: 43-64)
  - Causes are mostly unknown
    - High doses of ionizing radiation and rare genetic factors
  - Very poor prognosis
    - Survival related to age at diagnosis (better survival in young) and histologic tumor sub-type

Lag (or Latent) Period

Induction period for high dose ionizing radiation: ~10 years

Design your own study

How would you design a study to answer this question?

- Case-control
- Cohort
- Trial/intervention

Questions to Consider

- What is the gap in knowledge you hope to address?
- What study design do you propose to use?
- What will be the specific aims (hypotheses)?
- Exposure and outcome: how will they be defined?
- Target population?
- What other variables will you collect as possible confounding variables or effect modifiers?
- Analytical approach
- How will you ensure that chance, bias, and confounding will be minimized as alternative explanations for your findings?
- What do you anticipate will be the strengths and weaknesses of your study?
- What will be the likely next steps?

	Case-Control	Cohort	Trial
Strengths	+ Efficient use of time/money + Efficient for long latent period (ideal for rare outcomes) + Can evaluate multiple exposures	+ Can evaluate multiples outcomes + Efficient for rare exposures + Correct temporal sequence + Good exposure information + If prospective, can minimize bias in exposure ascertainment + Can directly measure incidence	+ "Gold standard" + Optimal for small to moderate-sized effects + Greater degree of control over exposure + Randomization: minimizes selection bias and confounding + Placebo: minimizes observation bias
Limitations	−Temporal sequence is hard to establish − Inefficient for rare exposures −Cannot calculate incidence rates *Potential biases:* −Selection bias −Observation bias −Recall bias	−Rare diseases: require large sample size (inefficient) −Latent period: requires long follow-up (if prospective) −Need to minimize loss to follow-up for validity −If retrospective, requires availability of pre-recorded information on exposure and confounding variables	− Logistically more difficult and expensive −Ethical issues −Compliance and losses to follow-up

Some questions never go away…

"Sheryl Crow: My Brain Tumor May Be Related to Cell Phone Use"

"There are no doctors that will confirm that but I do have the theory that it's possible that it's related to that. I used to spend hours on the old archaic cell phones."

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