How To Do Research

From Idea To Abstract

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Disclosures

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- None

Outline

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- Scientific Method
- Study Design
- IRB Protocol
- Writing an Abstract
- Making a Poster
- Other useful information

Scientific Method

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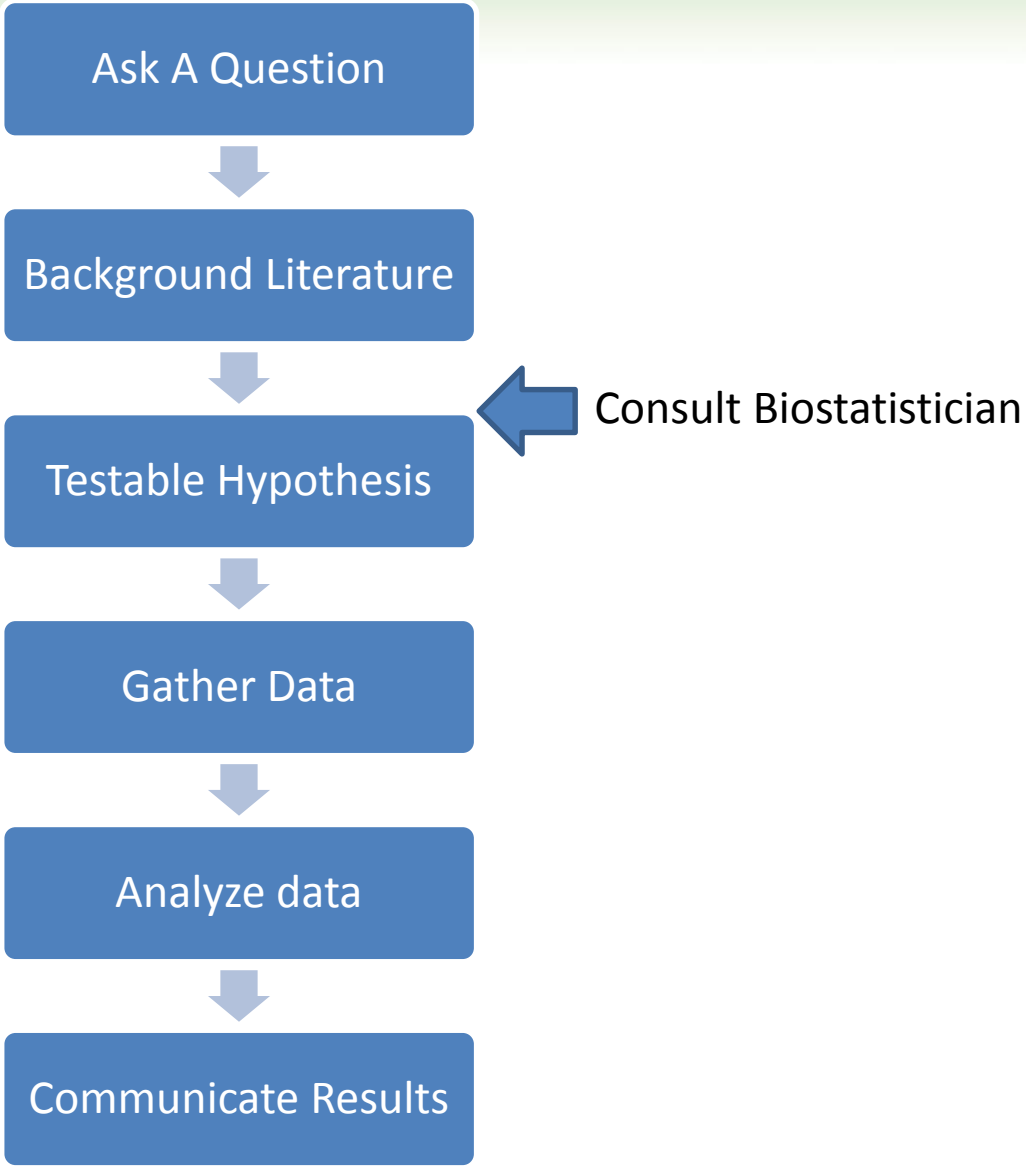

Scientific Method- Question

- Idea stage
- Culture of research
- Freedom to ask questions
- Forums to answer questions
- Consult the literature

Scientific Method-Literature

- PubMed, Google Scholar, Medical Librarians
- Narrow the focus
- What is has and has not been answered

Scientific Method- Testable Hypothesis

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- Idea to testable research hypothesis
  - Null Hypothesis: implies no difference between groups, or the current state
  - Alternative Hypothesis: assertion that some difference or effect exists between groups

Scientific Method- Study Design

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- How will you answer your question
  - What study design is needed?
- Retrospective or prospective
- Observational or experimental
- Dependent on
  - Research support
  - Logistics
  - Cost

Study Design

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- Goals of study design
  - Clearly plan out before beginning
  - How will data be obtained
  - Statistical analysis plan
- If meeting abstract deadline is the goal
  - Start from that deadline and work backwards
  - Make reasonable assumptions about IRB process and data collection
  - Abstract draft can be started prior to final results

Study Design

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- Case Study
  - Unique event
- Case Series
- Case-Control
  - Two groups, one with an outcome one without, retrospectively analyzed
- Cohort
  - Longitudinal analysis of a group of subjects
  - Retrospective or prospective

Study Design

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- Cohort Study
  - Prospective or retrospective
  - Defined population sharing some characteristic or attribute
  - Estimates risk of disease, incidence rate and relative risk
  - Prospective cohort studies can be used to discover causal relations
    - Cannot determine causality (need experimental trail)

Study Design

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- Experimental
  - Pilot Study: small sample 10-20 subjects
    - Determines ease of conducting a larger study
    - Allows for sample size estimation
    - Necessary without any prior data
- Randomized Controlled Trial
  - Subjects are assigned to a specific treatment
  - Clearly defined inclusion/exclusion criteria
  - Design
    - Parallel- each group receives different treatments
    - Crossover- each group receives sequences of different treatments over time
      - Subjects can serve as their own controls
    - Cluster- groups of subjects are randomized

Study Design

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- Meta-Analysis
  - Study question
    - Primary and secondary research hypotheses
    - Protocolize study selection
  - Literature search
  - Study Selection
  - Tests of heterogeneity
  - Analysis
    - Fixed/ Random/Mixed Effects models

Study Design-Survey

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- Best to use validated survey
  - Ask authors permission
- If creating your own
  - Determine the audience
  - Avoid bias
  - Allow adequate time
  - Have someone unrelated to the study test the survey

Research Protocol

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- Assemble
  - Literature
  - Research hypothesis
  - Study design
- Need to add
  - Title
  - Investigators
  - Purpose
  - Dates of data collection

Study Protocol

Date:

Study Title:

Principal Investigator (PI):

Co-Investigators (Co-I)

Introduction:

Purpose:

Study Design:

Methods:

References (if applicable):

Literature Review:

Institutional Review Board

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- Serves to protect the rights and welfare of human participants as subjects in research
- Members
  - Scientific, MD/PharmD/PhD
  - Non-Scientific
  - Community member
- IRB is your friend
  - Protect you as a researcher just as much as the human subjects

Scientific Method-Data

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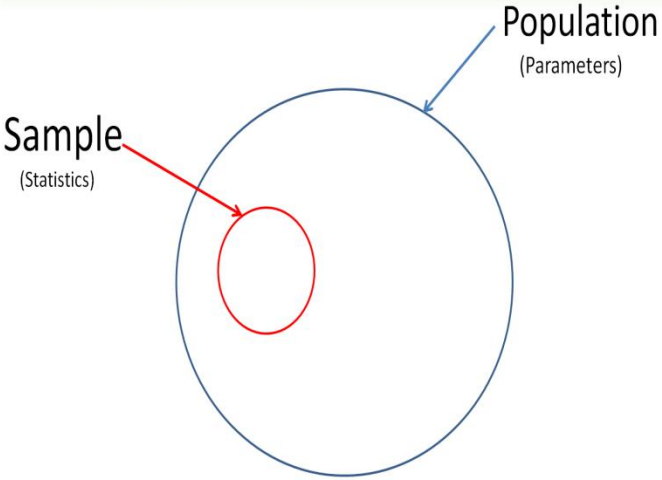
- Electronic Data from medical records
- Survey
  - Validated tool's are preferred
  - Un-validated, self written survey's can also work
- Chart Review
  - Requires people and time

Scientific Method-Data

- Inclusion Exclusion Criteria
- Sampling
  - Reduce Bias
  - Convenience Sample, based on available data
  - Select appropriate controls or comparative group



Scientific Method-Analysis

- Conduct tests to directly answer the research hypothesis
- Follow your protocol
- Understand clinical vs. statistical significance
- It is ok to analyze the data multiple ways
  - Most retrospective studies are underpowered
  - Don’t P-hack

Abstract

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- All meetings outline the criteria and structure of abstracts
  - Assemble required information from protocol and results
- Have all co-investigators read and approve
- Try not to wait till the last minute

Things to consider

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- At this point
  - The study is complete, ideally
  - You know what you did, methods
  - You have results
  - You're waiting to hear back

- …So why not draft a manuscript

Things to consider

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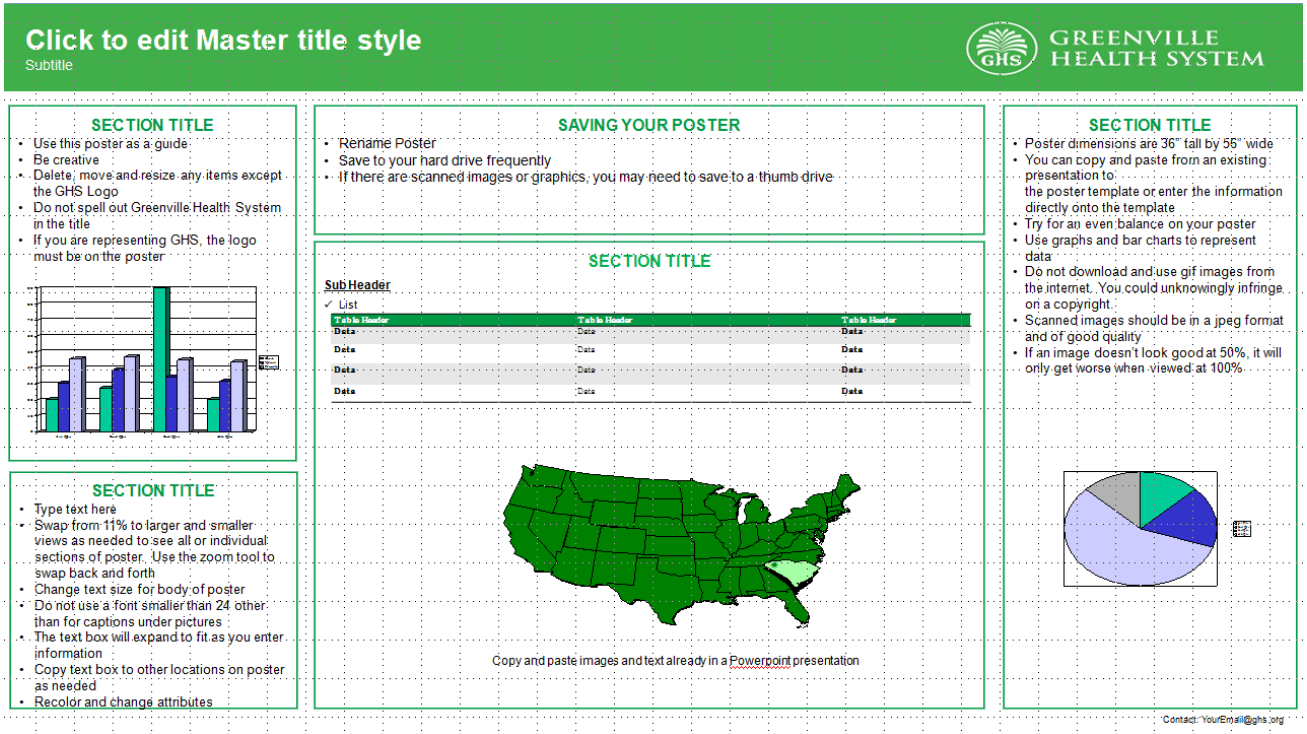
- If your abstract gets accepted
  - Poster or Podium
  - Who will present?
  - Are accepted abstracts invited for manuscripts?
- If your abstract gets denied
  - Feedback?
  - Another meeting
  - Publish without attending meeting

Poster

- Use a template
- More figures, tables, and graphs, than words
- Fill in from the protocol and abstract



Podium Presentation

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- Bullet Points, not paragraphs
- Don’t read from the slides
- Have a script
- Practice Practice Practice

Now What?

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- Write a manuscript for publication
- Use information gained for future work
- Repeat the process

Questions?

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