How to Work with your Statistician

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Outline

- Why you need a statistician
- What statisticians do
- How to work with your statistician
- Conclusion

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Why Do You Need a Statistician?

- In clinical research, we use treatment effect observed in patients treated on a trial (***sample***) and generalize it to all patients (***population***) with those conditions
- Conclusions drawn from trials
  - assume patients on the trial are representative sample of the population
  - based on ***statistical inference*** – hypothesis testing, estimation

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Why Do You Need a Statistician?

- Statistical tests are valid under only certain assumptions and statisticians are trained to understand these assumptions
- They can help ensure
  - Study is designed in a way that
    - Satisfies the appropriate assumptions
    - Minimizes bias and confounding factors
  - Appropriate analysis is planned at trial completion

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Why Do You Need a Statistician?

- For secondary analysis
  - The statistician who works on the original trial knows the data best
  - Provide insight toward whether certain analysis is feasible based on the available data

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What Can a Statistician Do?

- Design stage
  - Provide scientific input
  - Translate clinical questions into statistical hypotheses
  - Participate in trial design - not just sample size calculations (more on this later)
  - Formulate an analysis plan
  - Provide input in data collection plan
    - CRFs
    - Database

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What Can a Statistician Do?

- During trial
  - Safety monitoring
  - DSMB report
  - Interim analysis
- End of trial
  - Analyze data
  - Provide analysis report
  - Participate in abstract/manuscript writing

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What Can a Statistician Do?

- Secondary analysis
  - Translate clinical questions into statistical hypotheses
  - Collaborate on proposal writing for use of NCTN clinical trial biospecimens (power calculation, analysis plan, and beyond)
  - Analyze data
  - Provide analysis report
  - Participate in abstract/manuscript writing

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Ultimate Goal

Help design and conduct ***feasible***, ***valid***, and ***successful**** trials and secondary analyses

*successful ≠ positive

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How to Work with your Statistician

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https://www.youtube.com/watch?v=Hz1fyhVOjr4

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Contact your statistician as early as possible

- Most statisticians are involved in multiple projects
  - In addition to methodology research, teaching, and service
  - Assigned to multiple committees
- Interactive and ***iterative*** process (more on this later)
- Provide sufficient time to plan the study

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What to expect at the initial meeting?

- Provide background information
  - Disease – we want to understand the science behind the study
  - What is known about disease or treatment
- What does statistician want to know?
  - Objectives of study (your hypothesis)
  - Outcomes/endpoints to assess objectives
    - How are they measured
    - At what time point

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What to expect at the initial meeting?

- Your ***initial*** plan (iterative)
  - Eligibility
  - Accrual rate/duration
  - Sample size limitations – if exists
- Timeline
- Funding
  - not applicable for Alliance-funded studies

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What to expect at the initial meeting?

- For secondary analysis
  - Bring your preliminary hypothesis
  - Bring a few published manuscripts (for scientific background)
  - Be prepared to explain the science

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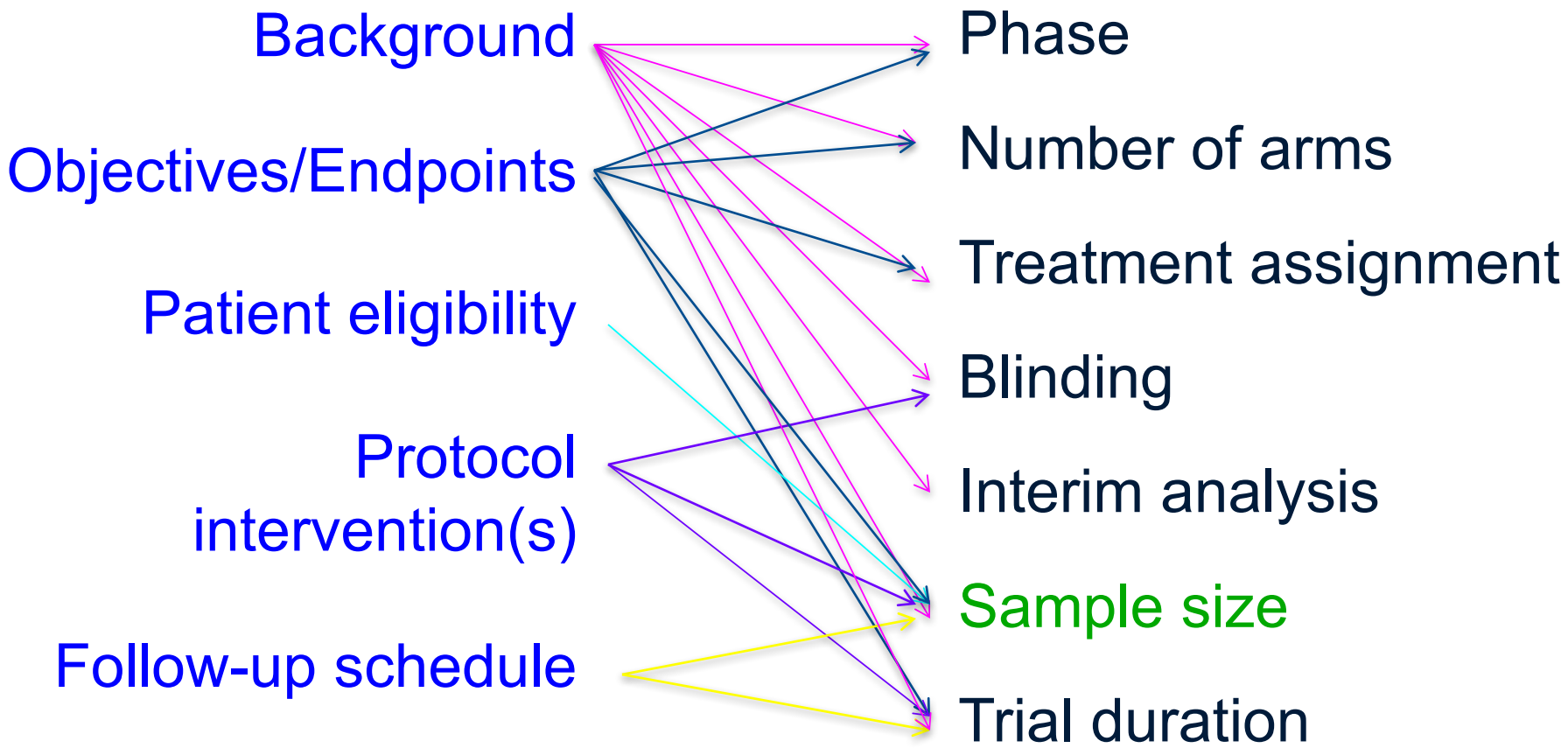
Trial Elements Affecting Study Design



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How Background Affects Study Design

- Purpose
  - Summarizes previous work
  - Justifies the new trial
- Provides
  - Outcome estimates (historical control)
  - Treatment effect
- Design elements affected (all)
  - Phase
  - Number of arms
  - Randomization/blinding
  - Interim analysis
  - Sample size
  - Trial duration

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How Objectives/Endpoints Affect Study Design

- Purpose - Defines objectives/endpoints
- Provides
  - Type of response
  - Response time point
- Design element affected:
  - Phase
  - Number of arms
  - Randomization
  - Sample size (methodology)
  - Trial duration (timing of response)

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How Eligibility Affects Study Design

- Purpose
  - Sets criteria for patients to be included in trial
- Provides
  - Type of patients included in trial
    - Disease, stage, molecular profile
    - Age, performance status etc…
- Design element affected
  - Sample size
    - Outcome estimate (historical control)
    - Adherence, withdrawal, drop-out
    - Enrollment rate

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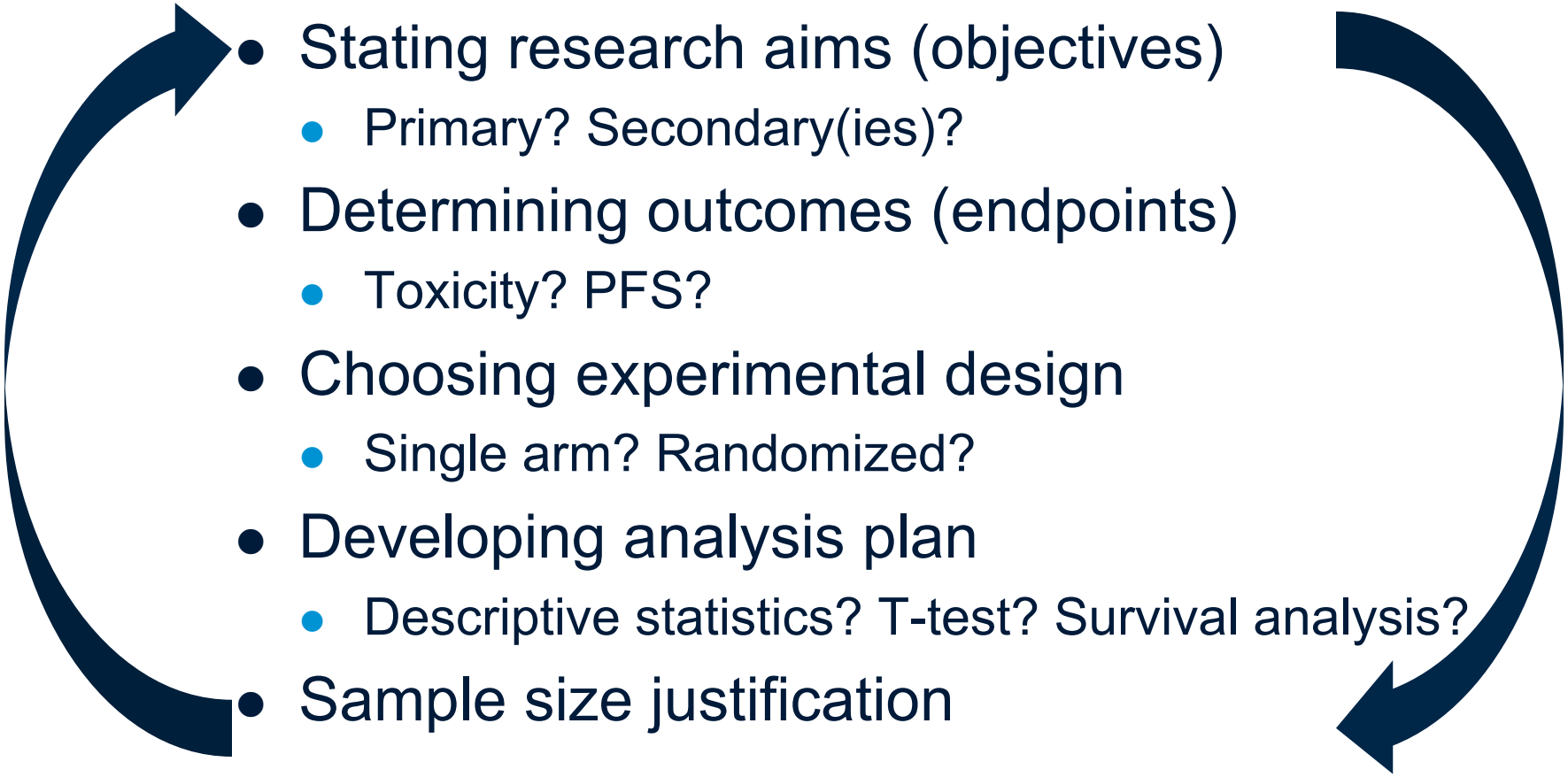
Interactive and Iterative Process



- Stating research aims (objectives)
  - Primary? Secondary(ies)?
- Determining outcomes (endpoints)
  - Toxicity? PFS?
- Choosing experimental design
  - Single arm? Randomized?
- Developing analysis plan
  - Descriptive statistics? T-test? Survival analysis?
- Sample size justification

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Hypothesis is the Driver for Secondary Analysis

- Hypothesis defines your
  - Population
  - Outcome
  - Variable of interest
  - The relationship between outcome and variable of interest
- Well defined hypothesis is the key to successful secondary analysis project

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Conclusion

- Contact your statistician early and often
  - A good plan is the key to success
- Stay engaged and be interactive

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Thank You!

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