Principles of Survey Design

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Outline

- Introduction
- Basic survey designs
- Selection of participants
- Mode of administration
- Instrument design
- Concluding remarks

Introduction

❖ Definition

A survey is a **systematic method of collecting data** from a population of interest. It tends to be quantitative in nature and aims to collect information from a **sample of the population** such that the results are **representative of the population within a certain degree of error**.

❖ Why do a survey?

- ✓ Information not available from other sources
- ✓ Unbiased representation of population of interest
- ✓ Standardization of measurement

Introduction

- Steps in conducting a survey

Goals
What you want to learn?

Sample
Who will you interview?

Interview
How will you interview?

Questionnaire
What will you ask?

Conduct
Who will administer the survey? Cost, …

Data
Collect and analyze
Produce reports

Steps in conducting a survey

- **Goals**
  - ✓ Clarify the purpose of the survey
  - ✓ Stakeholders, issues to be explored, …
- **Sample**
  - ✓ Study design
  - ✓ Characteristic of your target population
  - ✓ **Census**, sample, sub-groups, …
  - ✓ Sampling scheme and sample size

Steps in conducting a survey

❖ Questionnaire

- ✓ Decide on what questions to ask
- ✓ Set the types of response formats
- ✓ Set the layout of the questionnaire
- ✓ Pilot testing – if possible

❖ Interview

- ✓ What is the best method of communication?
- ✓ Interviews (face-to-face, telephone)
- ✓ Self-administered (web, mail) survey
- ✓ Paper-and-pencil vs computer-assisted

Steps in conducting a survey

Conduct

- ✓ Design the survey, select the sample,
- ✓ Administer the questionnaire (trained interviewer, mail)
- ✓ Collect the data

Data

- ✓ Code the responses in a standardized form
- ✓ Analyze the data & describe the sample
- ✓ Generalize the results to the target population
- ✓ Write a report/article/presentation

Before you plan to do a survey…

- Think about who is going to …
  - ✓ Design and administer the survey
  - ✓ Enter, analyze and interpret the data
  - ✓ Write up and present the results/findings
  - ✓ Use the findings
  - ✓ Pay for it all…

- Is there an existing survey collecting similar data?
- Does the survey require approval (ethical, …)?

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Basic survey designs

- Objectives

Descriptive	Analytical
Estimates (exploratory)	Explains (explanatory)
What? Profiles characteristics of group	**Why?** Analyzes why group has characteristics
No statistical hypothesis: Does not require comparisons between groups or over time	**Assumes a statistical hypothesis**: Requires comparisons between groups or over time
Example: What is the prevalence of diabetes among adults in Singapore?	**Example**: Are adult diabetic more likely (than adult non-diabetics) to have hypertension?

Basic survey designs

- Study Design

  - **Cross-Sectional Surveys**

    ✓Data are collected at one point in time from a sample selected to represent a larger population.

Population

Adult hypertensive patients in Singapore in **2011**

↓

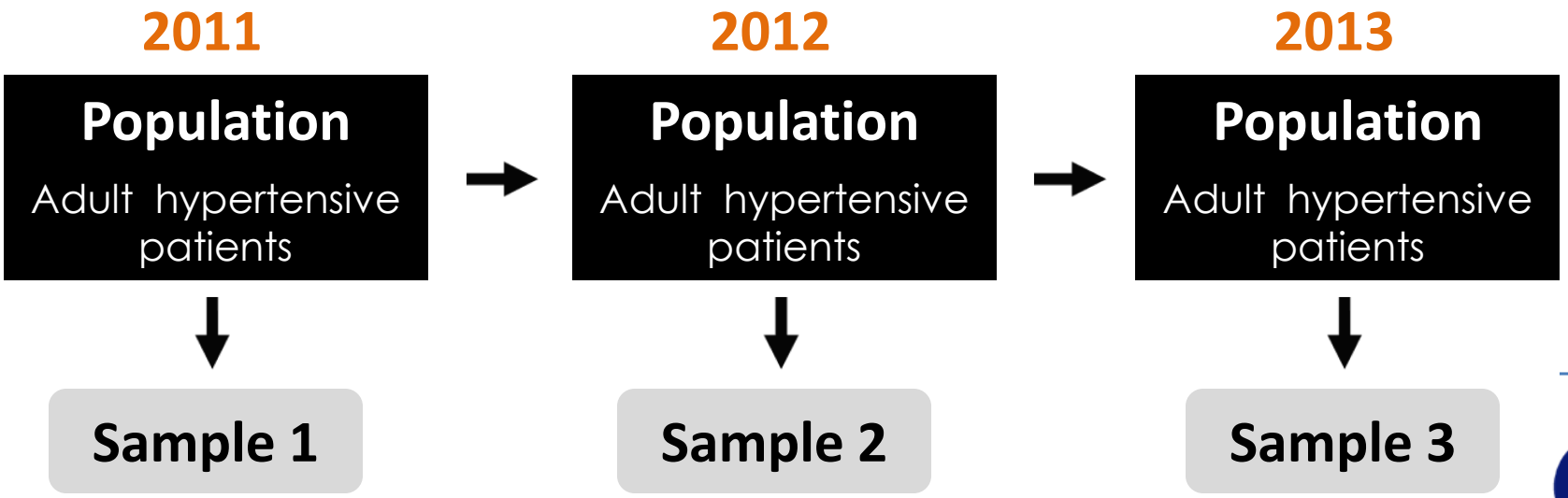
Sample

200 Hypertensive patients

Basic survey designs

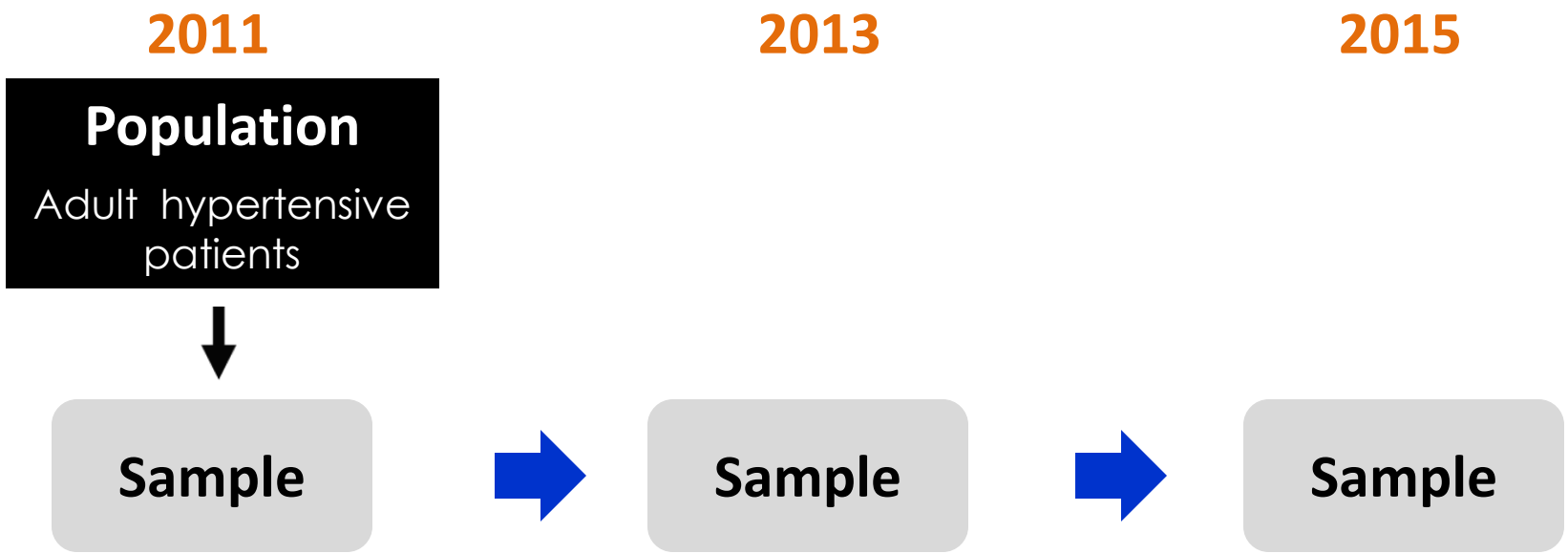
- Study Design

  - **Longitudinal Surveys: Trends**
    - ✓ A series of cross-sectional surveys
    - ✓ Different samples of comparable population over time
    - ✓ Provides rich data source of health care over time



Basic survey designs

- Study Design
  - **Longitudinal Surveys: Panel**
    - ✓Study the same sample of respondents at different times



Basic survey designs

Selection of an appropriate **survey design** requires a good understanding of the **survey objectives** (descriptive or analytic) and matching it with an appropriate **study design**

- **Example**

  - ✓ Is the **incidence** of myocardial infraction greater in adult patients with both hypertension and diabetes **compared** to adult patients with hypertension alone?

Longitudinal (Panel) + **Analytical hypothesis** = **Cohort Study**

Basic survey designs

	Descriptive	Analytic
Cross-sectional		
Longitudinal [Panel]		

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Selection of participants

- Who will be in the sample?

  - **Target population**

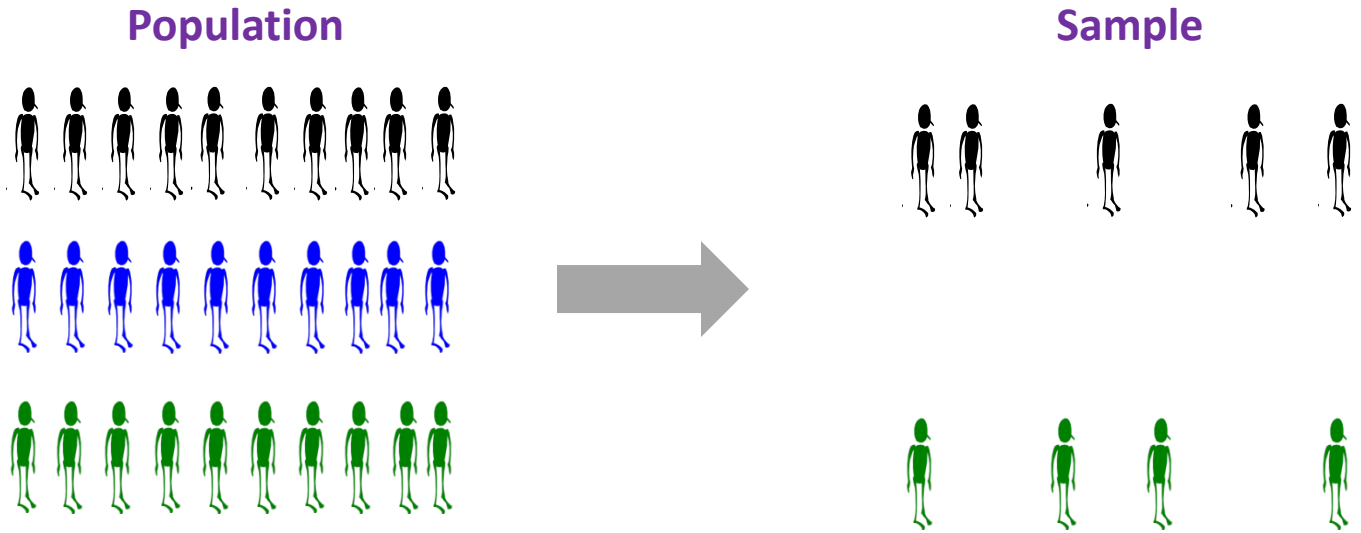
    - ✓ The group about which information is desired
    - ✓ Sample eligibility criteria are reflective of this population
      - Adults patients with persistent hypertension

  - **Sampling element**

    - ✓ Ultimate unit providing information e.g. patient, hospital
    - ✓ Complex designs require several stages of sampling
      - Hospitals, wards, eligible patients

Selection of participants

- How is the sample selected?
  - **Simple random sample**
    - ✓Every element has equal chance of being selected
    - ✓Requires little knowledge of the population in advance
    - ✓May not be very efficient

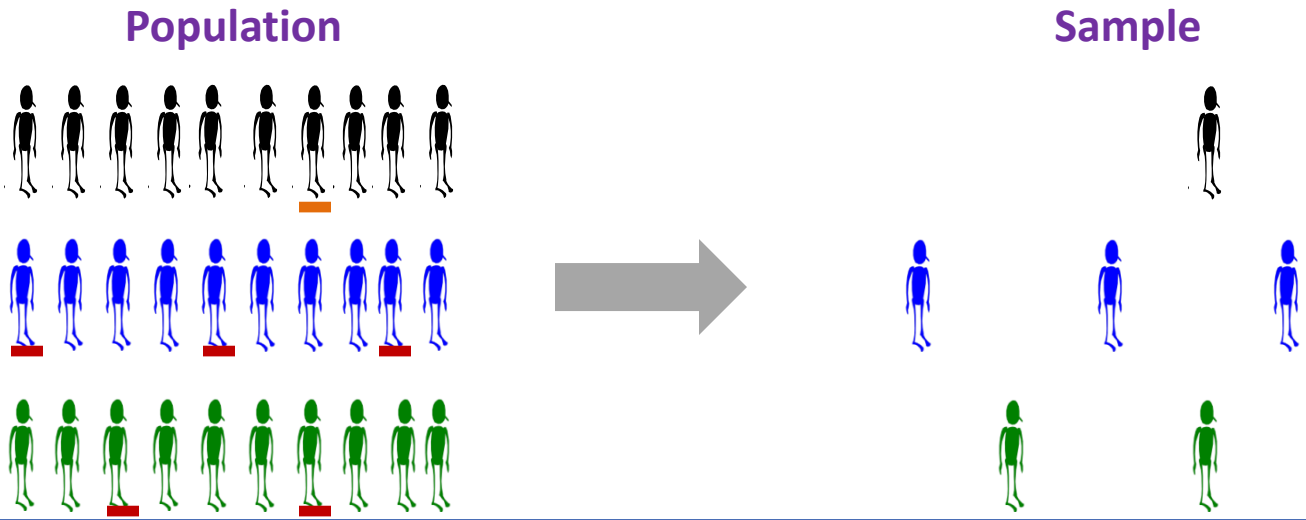


Selection of participants

- How is the sample selected?

  - **Systematic random sample**

    - ✓ An approximate of the simple random sample
    - ✓ High precision and easy analysis
    - ✓ May be inefficient and induced bias

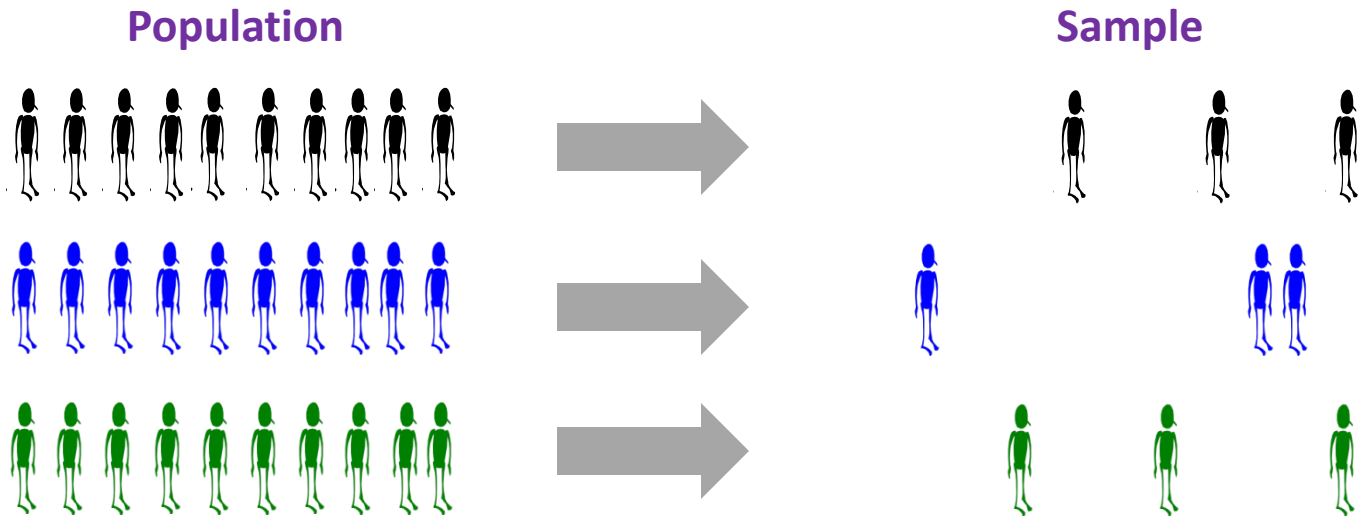


Selection of participants

- How is the sample selected?

  - **Stratified sample**

    - ✓ Ensures that certain groups are included e.g. Race
    - ✓ Highest precision
    - ✓ Prior knowledge of the population & complex analysis

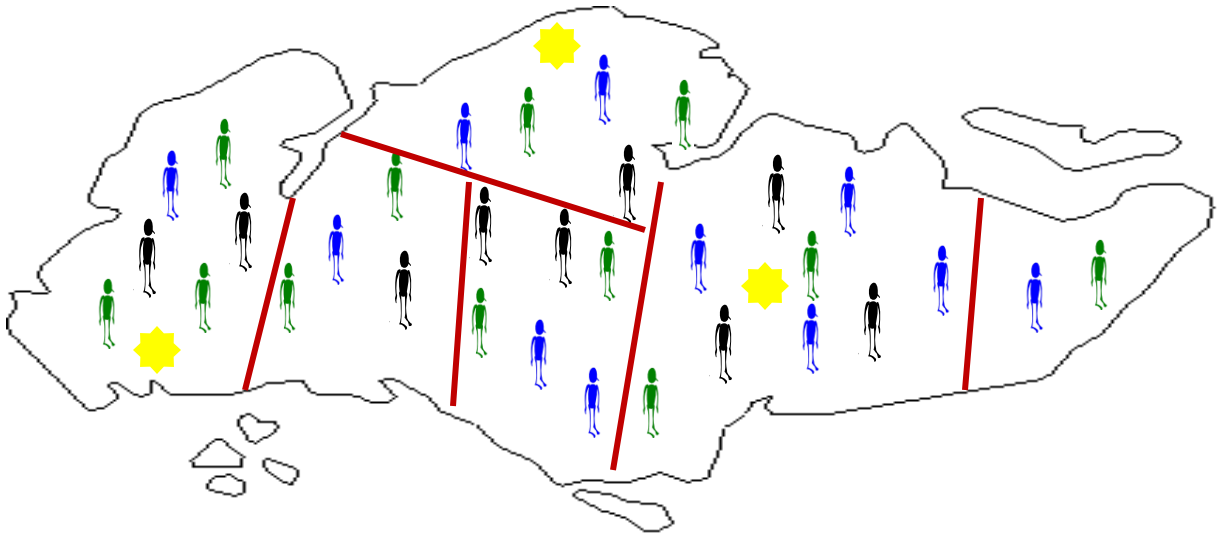


Selection of participants

- How is the sample selected?

  - **Cluster sample**

    - ✓ Used when target population is spread over large area
    - ✓ Lowest cost and ensures certain groups are included
    - ✓ Lowest precision and complex analysis



Selection of participants

- How many will be in the sample?
  - ✓ Study objectives and design
  - ✓ Level of precision and confidence

- **Adjustments**
  - ✓ Finite population correction
  - ✓ Expected response rate
  - ✓ Expected proportion of eligibles (screening required)

Survey Costs

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Choosing the Method of Data Collection

❖ Considerations

- Study objective and target population
  - ✓ Types of questions
  - ✓ Response rate
- Cost
- Time
- Readily available methods

Choosing the Method of Data Collection

- **Methods**

  1. Personal (Face-to-Face) interview
  2. Telephone interview
  3. Self-administered (Mail)

  - Paper and pencil
  - Computer-assisted interview (**CAI**)

    1. CAPI: computer-assisted personal interview
    2. CATI: computer-assisted telephone interview
    3. CASI: computer-assisted Self-interviewing

Choosing the Method of Data Collection

❖ Comparison

Variable	Face-to-Face	Phone	Mail
Cost	Costly	Moderate	Cheapest
Speed	Slow	Fast	Moderate
Response rate	High	Moderate	Low to moderate
Burden on respondent	Low	Moderate	High
Length of Questionnaire	Long	Moderate	Short
Sensitive questions	Poor	Moderate	Best
Lengthy answer choices	Best	Good	Poor
Open-ended responses	Best	Good	Poor
Complexity of Questionnaire	Best	Good	Poor
Possibility of interviewer bias	High	Moderate	None

Choosing the Method of Data Collection

- **Advantages** of CAI
  - ✓ Operational issues and cost
  - ✓ Time to complete
  - ✓ Reduction in interviewer errors (branching, editing, …)
  - ✓ Data available faster after collection

- **Disadvantages** of CAI
  - ✓ Increase front-up cost
  - ✓ Only a subset of the target population own computers
  - ✓ Differences in capabilities of peoples computers

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Designing Survey Questionnaires

❖ Considerations

- Objectives → outcome (list)
- Borrow questions/questionnaires
- Develop your own questionnaire

❖ Elements of survey questionnaire

- The questions
- The response formats or categories
- Any special instructions

Designing Survey Questionnaires

❖ Questions

- ✓ Words → clarity (concept, respondent)
- ✓ Phrase → balance (leading?, ambiguity?)
- ✓ Sentence → length

➢ Tips

- ✓ Questions must be reliable and valid
- ✓ Specific, clear and concise using simple language
- ✓ Do not use emotional, negatives, or leading questions
- ✓ Avoid two questions in one
- ✓ Unnecessary questions should not be included

Designing Survey Questionnaires

❖ Questions

- Don't you agree that AIDS can be transmitted by shaking hands with an AIDS patient or any other physical contact?

- Do you agree or disagree that HIV/AIDS can be transmitted by shaking hands with a HIV/AIDS patient?

Designing Survey Questionnaires

❖ Responses

- ✓ Open-ended questions → salience
- ✓ Closed-end questions → multiple choice, rating, ranking

➢ Tips

- ✓ Allow enough space for the response (open-ended)
- ✓ Options should reflect concept being measured
- ✓ Options should be mutually exclusive
- ✓ Include all options (don't know, not applicable, …)

Designing Survey Questionnaires

❖ Format of the questionnaire

- ✓ Account for the mode of data collection
- ✓ Short, simple, relevant and interesting
- ✓ Start with easy, non-threatening but necessary questions
- ✓ Keep questions dealing with the same topic together

AND THEN …

- Data entry
- Data analysis and interpretation
- Report writing / presentation

Use the results….

Remarks

- Understand the goals of the project
- Use clear, concise, and relevant questions
- Include mutually exclusive & exhaustive options
- Simple, short, organized & easy to answer survey
- Mode of administration: cost, time, response rate
- Pilot-test your survey
- Introduce your survey & how long it will take
- Analyze the data, publish and use the results


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Questions?