

Equity in Evidence: Addressing Minority Representation in Research

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Disclosures

The planners and speakers have indicated that there are no relevant financial relationships with any ineligible companies to disclose.

Objectives

- 1 **Review historical context surrounding underrepresentation of minority groups in research, as well as biases in healthcare**
- 2 **Identify how underrepresented communities in research impact the healthcare system**
- 3 **Discuss socioeconomic challenges to equity in research and how to mitigate these challenges**
- 4 **Identify strategies to diversify research participation**

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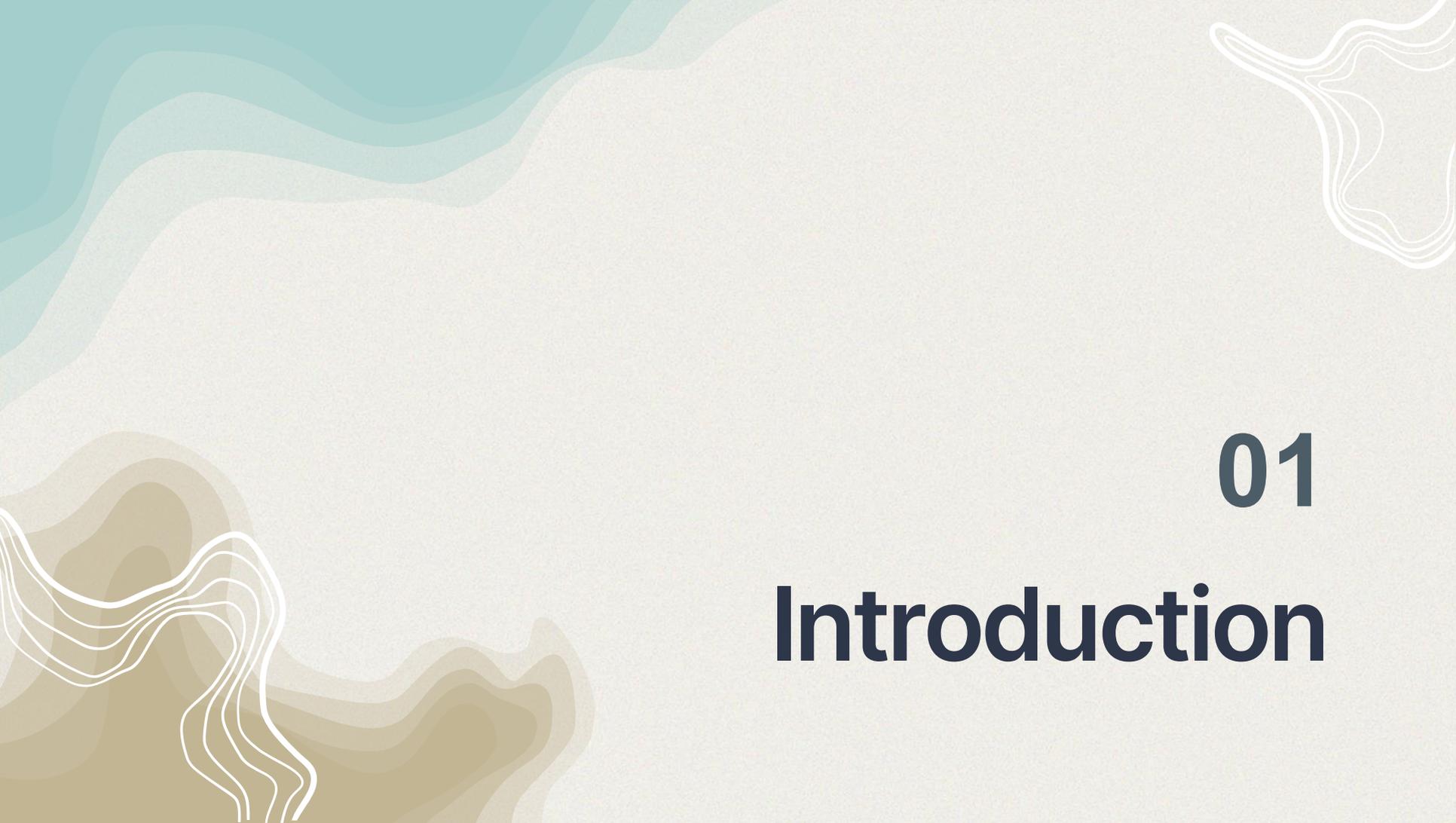
2 – Impact on the Healthcare System

3 – Socioeconomic Barriers to Inclusion

4 – Strategies to Diversify Research Participation

Abbreviations

- AIDS = Acquired Immunodeficiency Syndrome
- ASCVD = Atherosclerotic Cardiovascular Disease
- BIPOC = Black, Indigenous, and People of Color
- CFTR = Cystic Fibrosis Transmembrane Conductance Regulator
- FDA = Food and Drug Administration
- GLP1 = Glucose-like Peptide 1
- HIV = Human Immunodeficiency Virus
- HTN = Hypertension
- IRB = Institutional Review Board
- LGBTQIA+ = Lesbian/Gay/Bisexual/Transgender/Queer/Intersex/Ally community
- NIH = National Institute of Health
- PrEP = Pre-exposure prophylaxis
- RCT = Randomized clinical trial
- SDI = Social Deprivation Index
- SDOH = Social Determinants of Health
- SES = Socioeconomic status
- SGLT2i = Sodium Glucose Transport-2 inhibitor
- T2DM = Type 2 Diabetes Mellitus



01

Introduction

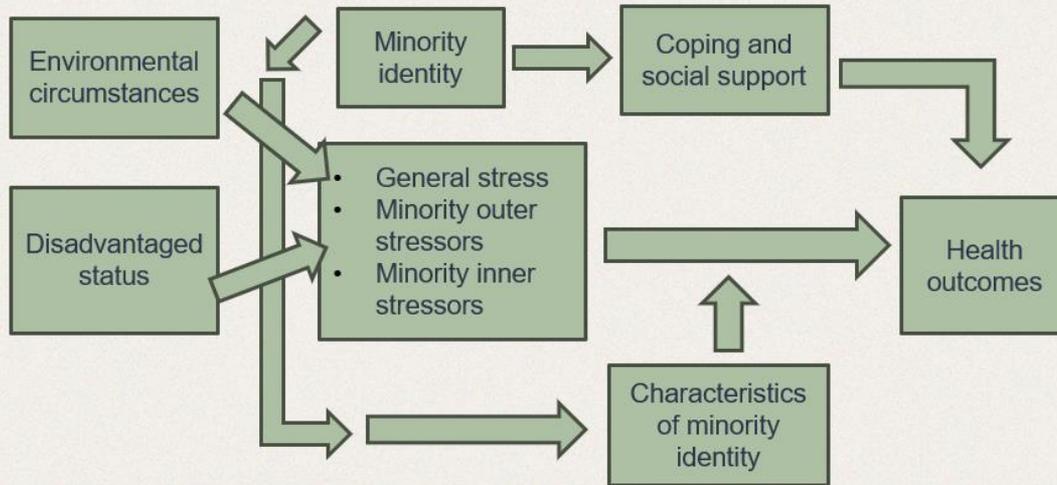
Definition of a Minority Group

- Population subgroup that differs from the dominant majority

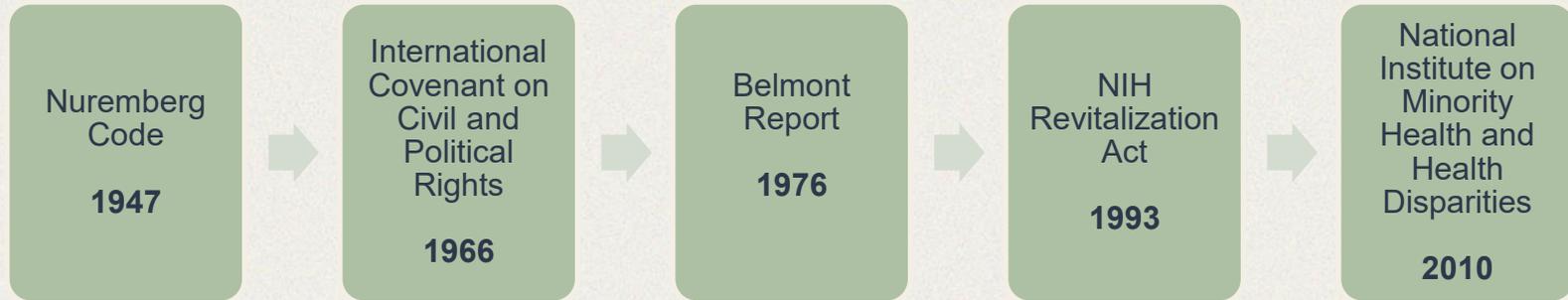


Minority Stress Model

- Theory that minority stress is produced by excess exposure to social stress
- Focuses on those who are in the LGBTQIA+ community, but also has been expanded to those who are at disadvantaged status through race and ethnicity



Advances in Ethical Considerations Throughout Research

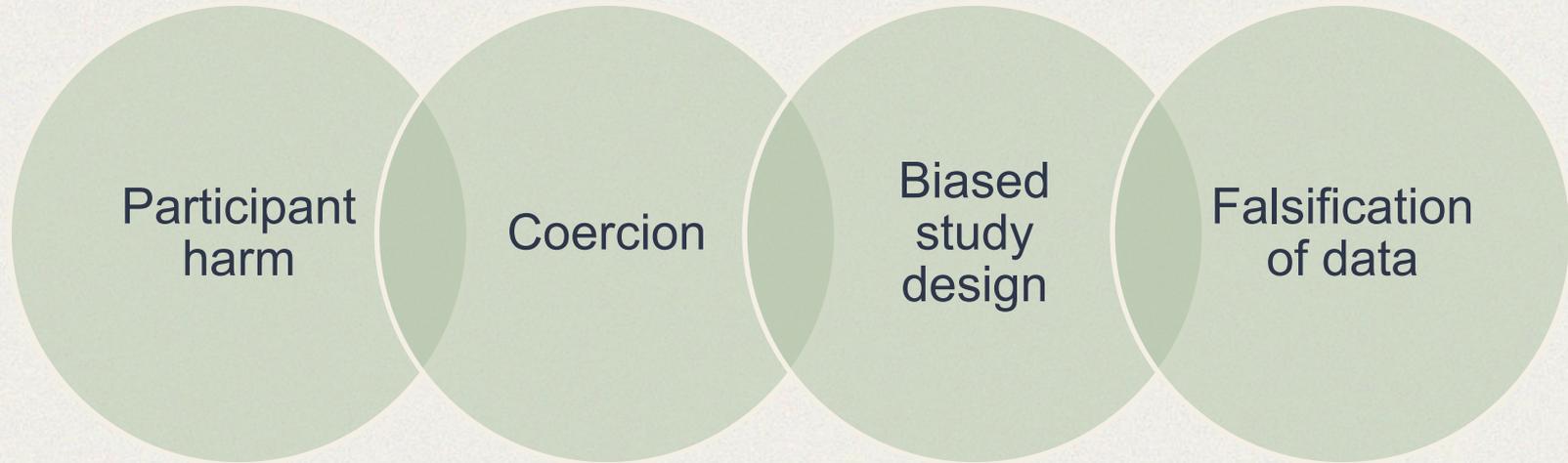


4 Core Principles of Ethical Research

1. **Nonmaleficence** -> Obligation to do no harm to the patient
2. **Autonomy** -> Patients should be allowed to make their own choices
3. **Justice** -> fair, equitable and appropriate distribution of healthcare resources
4. **Beneficence** -> Obligation of not just avoiding harm but also benefiting patients to promote their welfare



Unethical Study Designs in Research



Monitoring of the Patient Recruitment Process: Institutional Review Boards

Institutional Review Boards (IRB) – provide protection for human research participants through the review of research proposals

Committee reviews risks/benefits to subjects, equitable selection, protection of privacy, and informed consent process

Specific requirements

- At least 5 members of varying backgrounds
- At least 1 member knowledgeable about any regularly researched vulnerable groups
- Members report and recusal for conflicts of interest

Overview: Research Recruitment Process

Decide on research plans and goals

- Define target population

IRB approval

- Ensuring materials are submitted to the IRB for ethical oversight

Informed Consent

- Participants must sign an informed consent to participate

Screening for inclusion criteria

- All participants who show interest in the study may not meet all inclusion criteria

Choosing research advertising channels

- Offline versus online pros and cons?

Begin research process

- Assign participants into the study



Generalized Issues in Research Recruitment

- **Participant retention**
 - Informed consent documents
 - Incentivizing: good or bad?
- **Gaining appropriate sample size to meet power**
 - Overestimation of participants meeting inclusion criteria and willingness to enroll in trials
- **Lack of awareness of clinical trials**
 - Literacy rates
 - Rural areas and academic medical centers



Advertisement Required Information

Institutional affiliation

Purpose of the research

Who is eligible to participate

Description of participation benefits

Brief statement regarding incentives of participation

Research location

Contact information

Pros and Cons of Research Recruitment Methods: Advertising

ADVERTISING	
PROS	CONS
<ul style="list-style-type: none">• Larger reach	<ul style="list-style-type: none">• Literacy rate• Access to social media• Low retention

Rare Disease Clinical Research Network: evaluating direct-to-consumer advertising to see if this was an effective strategy to retain participation in rare disease studies

Outcome: successful in accumulating 40.1% lead generation for those to be enrolled in studies, but only 3 participants were enrolled over 6 studies

Effectiveness and Ethical Incentivization: RETAIN study

Objective	<p>To determine whether incentives improve enrollment in RCTs or serve as undue inducements</p> <p>Primary outcome: proportion of people assigned to each recruitment strategy that consented to participate</p>
Methods	<p>Recruited patients who had not heard about the incentivization for the trial and had participated in either the smoking cessation or ambulation trial</p> <p>Incentives included: \$0, \$200, \$500 for smoking trial and \$0, \$100, \$300 for ambulation trial</p> <p>Undue inducements: measured through comparing income, financial well-being and the Research Attitude Questionnaire</p>
Results	<p>Smoking trial: 21.8%, 35.9%, and 47.1% for \$0, \$200, \$500 (OR, 1.7; [95% CI, 1.34-2.17; P<0.001])</p> <p>Ambulation trial: 45.4%, 48.1%, 43% for \$0, \$100, \$300 (OR, 0.88; [95% CI, 0.64-1.22; P<0.45])</p>

Conclusion: In these 2 RCTs, it was shown that there were no ethical problems with incentives for research participation



Assessment Question #1

A new clinical trial for a groundbreaking medication is launched and has 500 participants. Of the 500 participants, 250 end up developing a severe side effect. Despite being given supportive care, the side effect did not resolve which results in the discontinuation of the trial.

Which of the four core principles of ethical research does this **most closely** represent?

- A. Justice
- B. Nonmaleficence
- C. Autonomy
- D. Beneficence



02



Impact on the Healthcare System

Harms of Non-Inclusive Research

1. Monetary Costs

2. Underrepresentation in Clinical Trials

3. Missed Opportunities for Treatment

Monetary Costs: ALLHAT Trial

- Background:
 - Hypertension (HTN) treatment can cost up to \$37 billion annually
 - **Purpose: to determine whether the occurrence of fatal coronary heart disease or nonfatal myocardial infarction is lower for high-risk patients treated with amlodipine, lisinopril, or doxazosin each compared with chlorthalidone**
 - Pre-defined subgroups: Diabetes, older, and Black patients
- Methods
 - Randomized double-blind, multicenter clinical trial
 - Participants: men and women 55 YO+ who had stage 1 or 2 HTN with at least 1 additional risk factor for a coronary heart disease event (T2DM, cigarette smoking, etc.)
 - 3 arms all compared with chlorthalidone: amlodipine, lisinopril and doxazosin

Primary outcome: Fatal coronary heart disease or nonfatal myocardial infarction combined

Secondary outcomes: All-cause mortality, fatal and nonfatal stroke, combined coronary heart disease, and combined cardiovascular disease

Monetary Costs: ALLHAT Trial Results

Outcome (Participants)	Chlorthalidone		Lisinopril	
	N = 9886 – All other racial groups N = 5369 – Black Americans		N = 5844 – all other racial groups N = 3210 – Black Americans	
All cause mortality	1382 (16.9%)	821 (17.9%)	794 (16.7%)	520 (18%)
Stroke	418 (5.4%)	257 (6%)	245 (5.3%)	212 (8%)
	RR, 1; 95% CI, 0.85 - 1.17		RR, 1.4; 95% CI, 1.17-1.68	

- Strengths: first study that included more representation of women and Black Americans with a large population, long term follow-up
- Limitations: angiotensin-receptor blockers were not included, higher step-up regimen in the ACE inhibitor group

Conclusion: In Black patients with hypertension, a thiazide-type diuretic or calcium-channel blocker are preferred over ACE inhibitors as initial single-drug therapy due to stroke risk

How Inclusivity Decreased Costs?

- **Less expensive main-stay medication**
- **Less risk of hospitalization due to stroke risk**

Lifetime Cost of Care		
Chlorthalidone	Amlodipine	Lisinopril
\$53,500	\$58,300	\$57,200

Underrepresentation: Diabetes and Anticoagulation

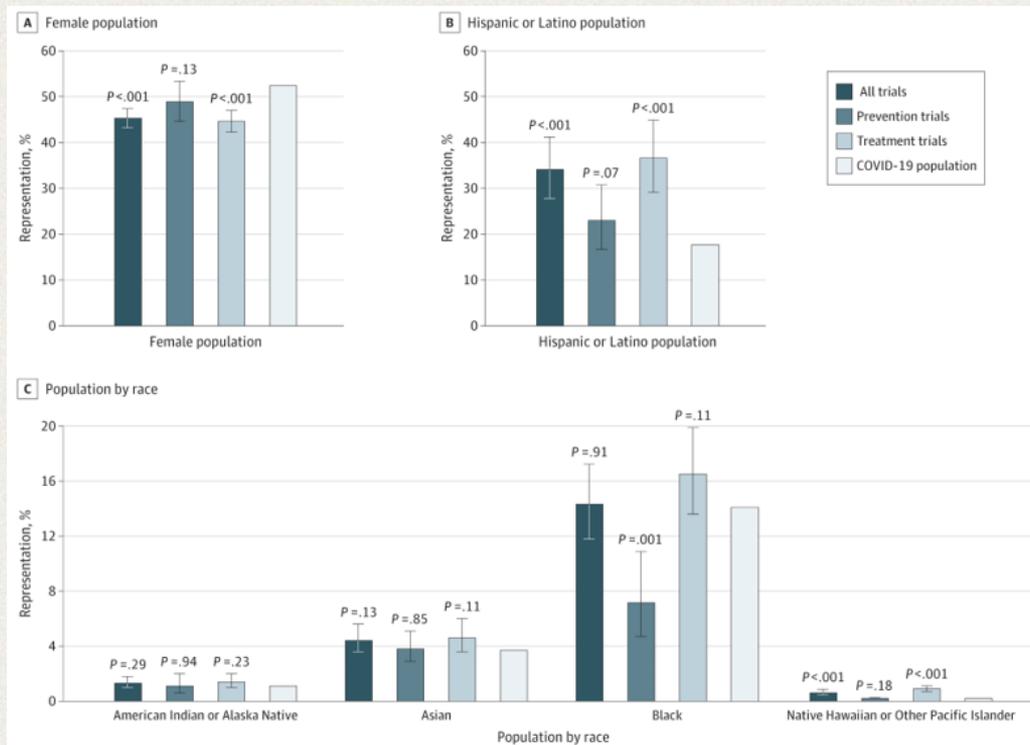
- Diabetes
 - Hispanic/Latino (17%) and Black individuals (60%) more likely to have T2DM than non-Hispanic White individuals
 - Lack of inclusion in GLP-1 and SGLT2i trials

- Warfarin dose adjustments
 - Genetic variability: CYP2C9
 - Did not know until 2013 that genotypes could have an effect on warfarin dosing

Underrepresentation Effects on Diagnosis

- Cystic fibrosis: Newborn Screenings
 - In BIPOC: more likely to carry CF transmembrane conductance regulator variants – omitted from newborn screening panels which leads to delayed diagnosis and treatment
 - 2024 US CF Foundation Patient Registry – Does not identify full CFTR genotype for non-White patients, signifying racial inequity
 - 2008 study – Influenced racial biases by suggesting individuals with African ancestry have high immunoreactive trypsinogen levels without the presence of CF
 - Third-tier sweat testing only conducted in infants who screened positive in the second tier with only 1 or 2 CFTR variants

Underrepresentation in Clinical Trials: COVID-19



Missed Opportunities for Treatment

- Inclusive research leads to innovative medicine reflective of our patient population
 - Expand access to medications
 - Influence practice guidelines
 - Introduce novel mechanisms for pharmacotherapy

PCSK9 gene discovered in Montreal and Oslo



Dallas Heart Study identified mutations in PCSK9 in Afro-American patients



Development of PCSK9 inhibitors for lipid-lowering



Assessment Question #2

Which statement below is **FALSE**?

- A. Medical Mistrust scales are used most frequently to gauge patient outlook on providers/hospital groups.
- B. Research that lacks inclusiveness will cost researchers money due to incomplete or faulty data.
- C. Racial underrepresentation can lead to racial bias and medical fallacies.
- D. Noninclusive research only wastes money for the researcher but does not directly harm patients.

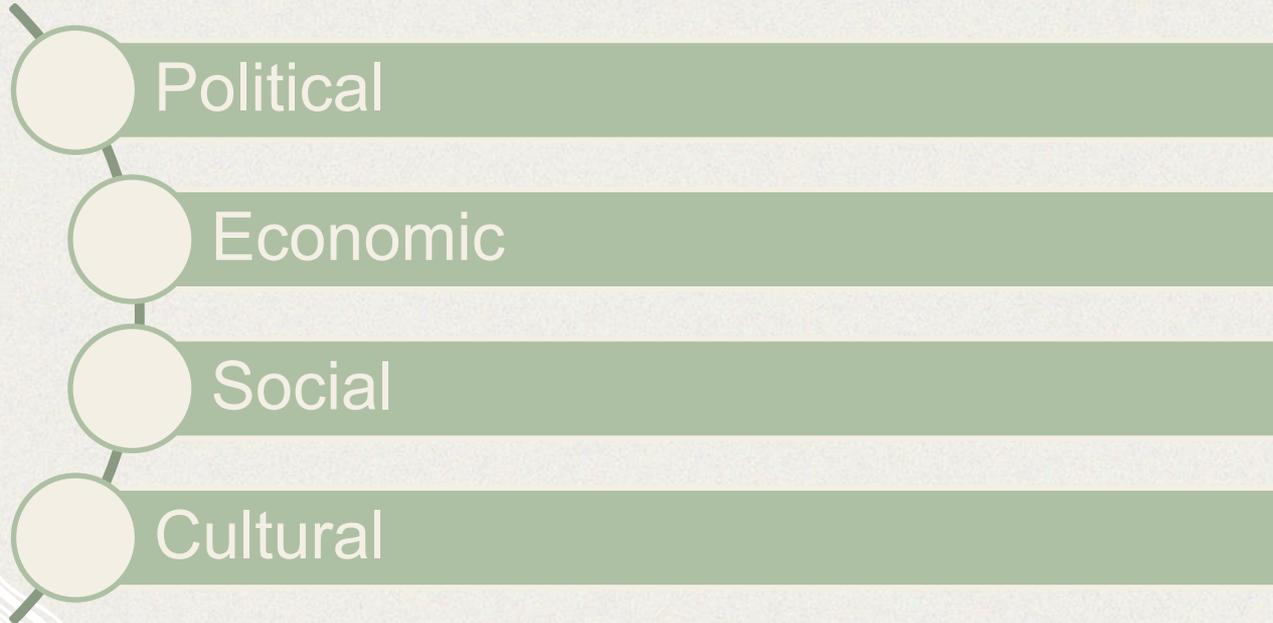


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International Barriers to Inclusion

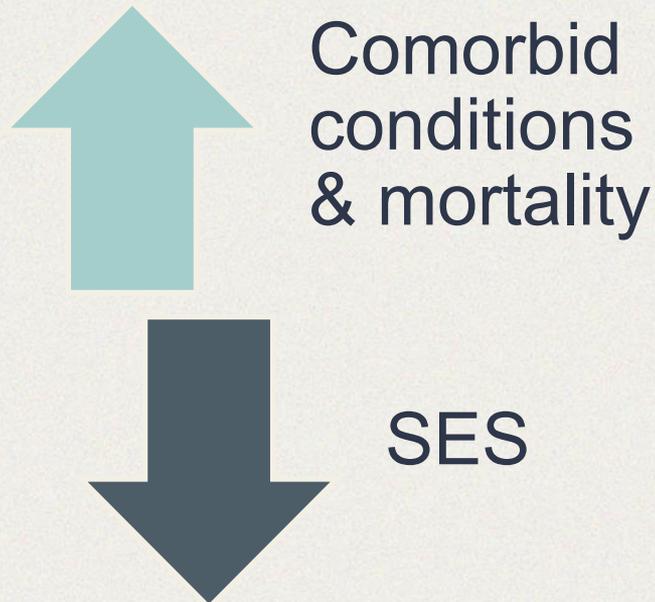
Social Determinants of Health (SDOH)

Definition: the structural political, economic, social and cultural systems that stratify societies and differentially shape living conditions across the life course



Socioeconomic Status (SES)

Definition: a key determinant of health referring to the social class or income of an individual or group



Socioeconomic Status Hypotheses

Social Mobility Hypothesis

Individuals of low SES are likely to remain in this status

Individuals of high SES are likely to accumulate benefits

Critical Period Hypothesis

Children of low SES are exposed to harmful factors that negatively impact long-term health

Health Care Access and Quality

	Personal Health Literacy	Organizational Health Literacy
Definition	The degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others	The degree to which organizations enable all individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others
Category	Social risk	Social determinant of health
Impact	Low personal health literacy = high risk of misunderstanding	Low organizational health literacy counteracts high personal health literacy

Assessment Question #3

Which of the following would **NOT** be a useful strategy to improve organizational health literacy?

- A. Provide all pharmacy employees with mandatory onboarding training for strategies to communicate medication changes to patients at discharge.
- B. Create an annual updated resource for healthcare professionals to understand where current resources can be located.
- C. Refer patients with questions regarding insurance to speak with their primary care physician
- D. Create a panel of pharmacy staff to review and update patient education sheets periodically, implementing feedback from patients.

Language Barriers

In the past 90 days, have you engaged with a non-English speaking patient?

Language Barriers

- In the UK, 64% of recruiting studies excluded participants who were unable to communicate in English
- Lack of translated research materials
 - Participants resorted to self-translation
 - Complicates already unfamiliar research process
- Analysis of U.S. clinicaltrials.gov studies
 - Over 2,700 trials had English language requirements
 - Only 390 (2.71%) mentioned accommodation of non-English language
 - Types of studies more likely to require English proficiency
 - Government-funded
 - Depression, diabetes, breast cancer, prostate cancer

IRB Literacy Requirements

- Enterprise IRB protocol available within PolicyTech
 - Outlines strategies to include vulnerable patients
 - Deaf, blind, unable to read or write
 - Require use of in-person, phone, or video conferencing interpreter
 - Reading level: 8th grade
- Strategies to improve comprehension
 - Improve readability of consent forms
 - Add additional educational materials or training for participants
 - Video resources for the trial instead of written handouts

Mistrust in Healthcare

- Several different validated scales are used to determine medical mistrust
 - Group-Based Medical Mistrust Scale, Medical Mistrust Index, and Health Care System Distrust Scale: most frequently used
 - Found differences among the scales in the object of mistrust (system vs. Individual physician) and specific group that experienced the mistrust
- Transgender healthcare
 - US Transgender Survey – done every few years and shows how those who are transgender rate their healthcare in opposition to their cisgender counterparts
 - Results of 2022 survey showed 24% of respondents avoided healthcare due to being mistreated as a trans person (this was similar to 2015's percentage)

Stigma in Healthcare

- HIV and AIDS trials
 - AIDS epidemic – first recognized in 1981, but no effective medication until 1987
 - Zidovudine trial – Baseline characteristics: 92% primarily white males
 - Could not be generalized to the overall population
 - HIV-specific criminal laws published in 35 states that punished behaviors that might transmit HIV
 - Led to less disclosure of HIV status, resistance to HIV testing, and **those who did not want to get involved in clinical trials due to these consequences**
- Activism ultimately increased the exploration of different types of drugs with less side effects
- Descovy for PrEP: Only had been studied in males and transgender women, but not cisgender females
 - 2019: Women account for 20% of reported HIV cases due to heterosexual intercourse and IV drug use

Cultural Barriers

- Cultural perceptions of information varies between ethnicities
- Stigmas:
 - Disease state (e.g. mental health, sexually transmitted disease)
 - Incentives may be perceived as inappropriate

Solution: Community Champion

- Familiar with cultural significance
- Involved and trusted in their community
- Assist with recruitment efforts

Barbershop Study: Community Champion

Background

- Pharmacist-led interventions improve health outcomes
- Non-Hispanic black men have highest rates of hypertension-related death in the United States
- Previous studies lack enrollment of non-Hispanic black men

Population

- 319 non-Hispanic black male patrons with SBP 140 mm Hg or more
- Setting: 52 black-owned barbershops

Intervention

- Barbers encouraged meetings with pharmacists

Primary Outcome

- Reduction in SBP at 6 months

Results

- Intervention group SBP reduction by 27 mm Hg compared to 9.3 mm Hg control

Social

Overview of Social Strategies

- Shorter questionnaires
- Providing transportation vouchers
- Collecting participant responses via electronic or paper means rather than verbally to research personnel
- Socially oriented incentives

Discussion

- Identified 4 behavioral approaches to improve recruitment and retention
- Non-financial incentive interventions are low to no cost once developed

Results

- Strategies that build social connections build trust
- Reducing financial, time, or social barriers had either a significantly positive or null effect

Economic Status

- Worldwide, 50% of research participants are considered high-income
- Barriers to research participation:
 - **Transportation**
 - Childcare
 - Elderly or ill family members
 - PTO or sick days
- National economic challenges
 - ~3.3 billion people live in countries prioritizing debt payments over health investments

Key Points

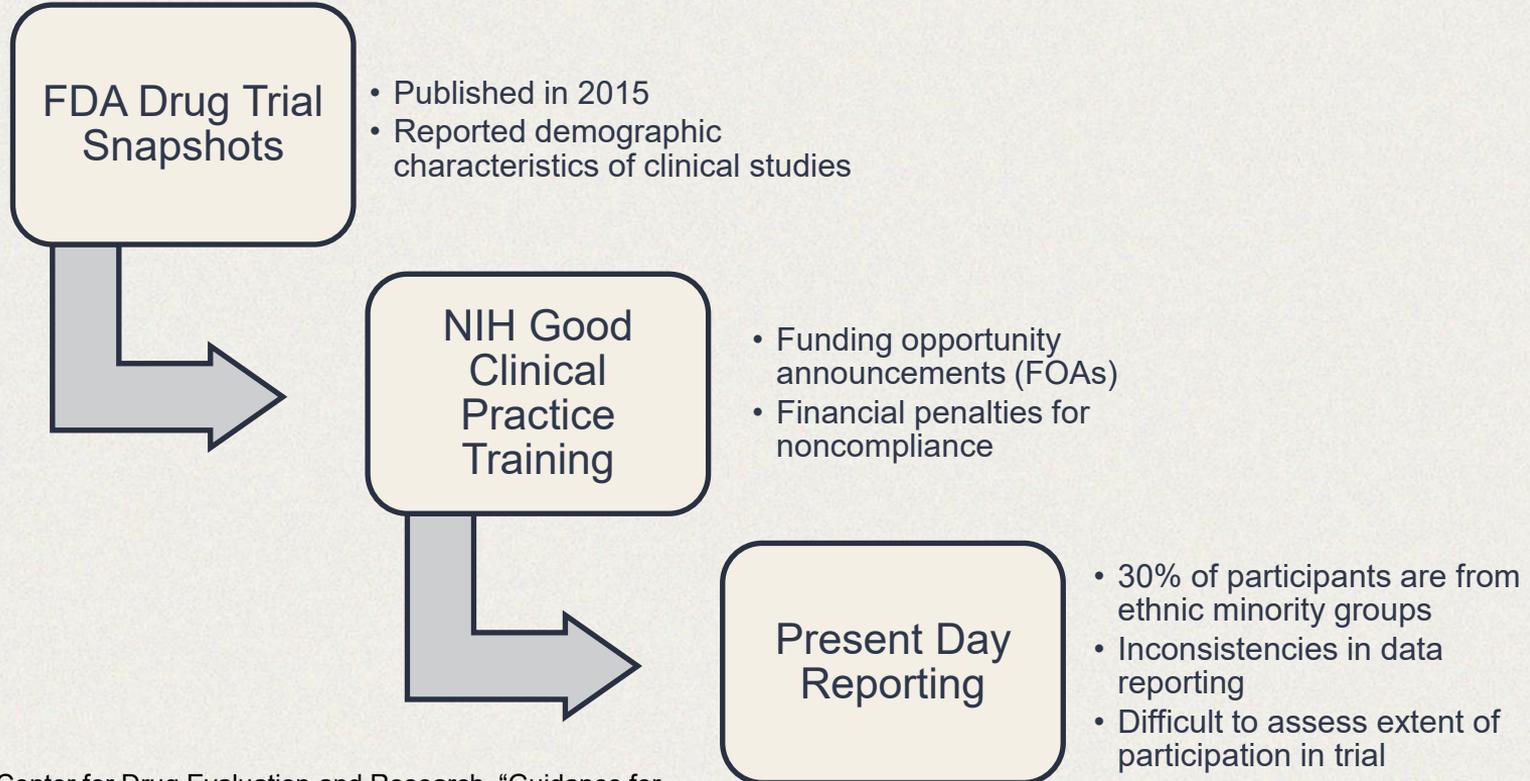
- People in minority groups are not inherently less likely to participate in research
 - Asian, Black, Latinx Americans, American Indian/Alaska Native individuals are not less likely to participate in research
- People in rural areas not less willing to participate
 - **Many socioeconomic barriers limit participation in research**
 - **Efforts should be increased to provide inclusive opportunities**



04

Strategies to Diversify Research Participation

Federal Guidance



SDOH: Healthy People 2030

Economic
Stability

Education
Access and
Quality

Health Care
Access and
Quality

Neighborhood
and Built
Environment

Social and
Community
Context

SDOH: Healthy People 2030

Economic Stability

- Employment
- Food Insecurity
- Housing Instability
- Poverty

Education Access and Quality

- Early Childhood Development and Education
- Enrollment in Higher Education
- High School Graduation
- Language and Literacy

Health Care Access and Quality

- Access to Health Services
- Access to Primary Care
- Health Literacy

Neighborhood and Built Environment

- Access to Foods That Support Healthy Dietary Patterns
- Crime and Violence
- Environmental Conditions
- Quality of Housing

Social and Community Context

- Civic Participation
- Incarceration
- Social Cohesion

Social Deprivation Index (SDI)

Living in
poverty

<12 years of
education

Single-parent
household

Living in
rented housing
units

Living in
overcrowded
housing units

Households
without a car

Non-employed
adults <65
years of age

Example: PREVENT Calculator

ASCVD Risk Estimator

- Historically used to assess 10-year risk of ASCVD
- Includes **age**, **sex**, and **race**

PREVENT Calculator

- **Removed race** as a factor
- Inclusion of **zip code** to estimate **social deprivation index (SDI)**

Building Trust: Examples of Bias

Implicit

Explicit

Geographic

Technical

Framing Effect

Overconfidence

Types of Bias in Research

Geographic Bias

- Associated with **publication bias**

Technical Bias

- “Cherry-picking”

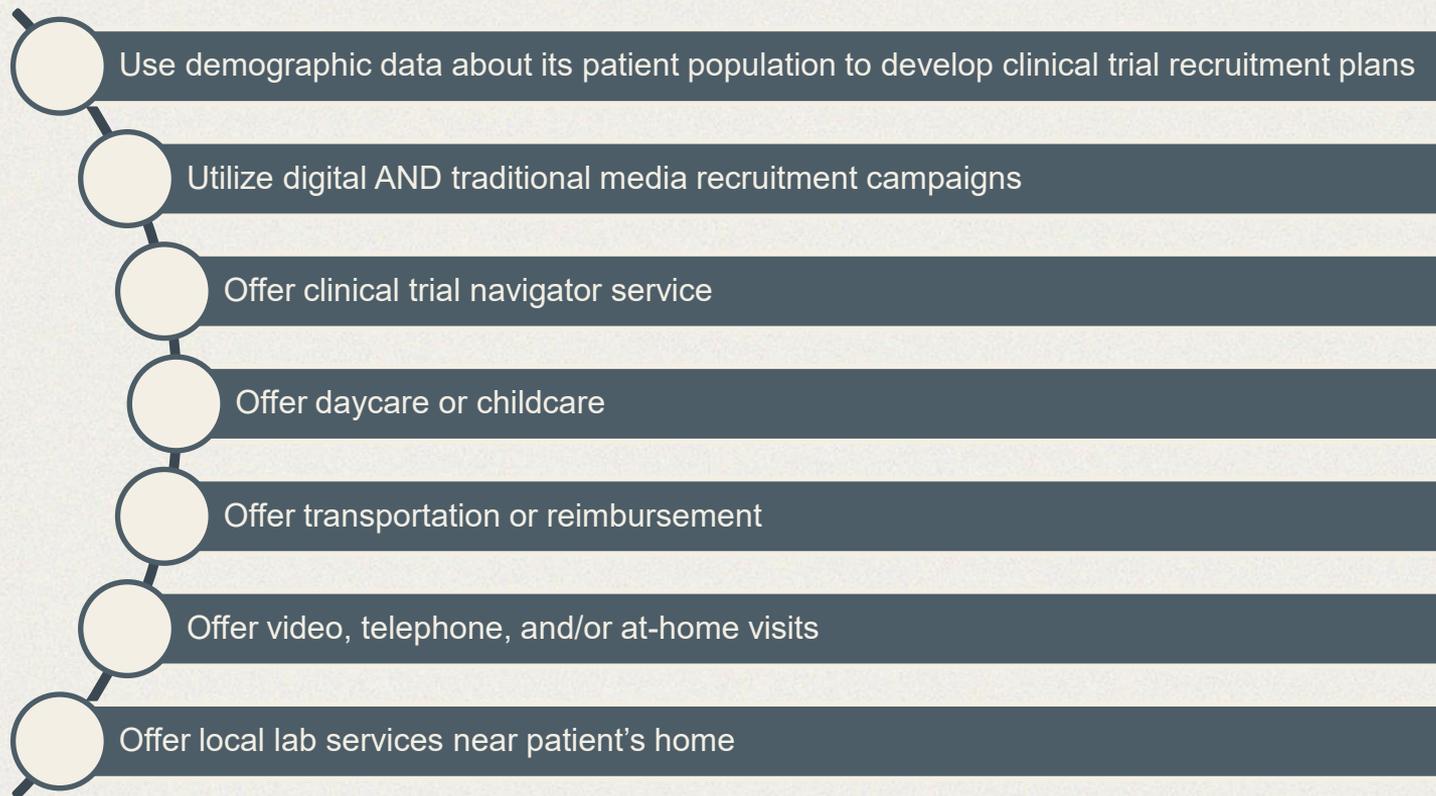
Selection Bias

- Sampling bias
- Self-selection (volunteer) bias
- Undercoverage bias

Reviewing Strategies to Improve Research Participation

Title	Mapping Strategies for Reaching Socioeconomically Disadvantaged Populations in Clinical Trials
Background	Low SES patients less likely to participate in clinical trials despite high rates of chronic medical conditions
Methods	Survey distributed to 6690 sites <ul style="list-style-type: none">• 492 responses from 381 sites (7.4%)• 47% located in the South• 16.1% located in the Midwest
Site types	<ul style="list-style-type: none">• For profit (57.5%)• Nonprofit or governmental (42.5%)• Urban (94.4%)• Suburban (2.1%)• Rural (3.5%)

Reviewing Strategies to Improve Research Participation: Survey

- 
- Use demographic data about its patient population to develop clinical trial recruitment plans
 - Utilize digital AND traditional media recruitment campaigns
 - Offer clinical trial navigator service
 - Offer daycare or childcare
 - Offer transportation or reimbursement
 - Offer video, telephone, and/or at-home visits
 - Offer local lab services near patient's home

Reviewing Strategies to Improve Research Participation: Results

For-profit sites more often provided:

- After-hours visits
- Financial compensation
- Assistance with transportation

Organization partnerships

- For-profit: civic groups, faith-based organizations, health services
- Nonprofit: patient advocacy groups

Most sites (for-profit and nonprofit):

- Do not collect socioeconomic information

Adoption of strategies to engage socioeconomically diverse populations may help minimize barriers to participation



Pharmacy Guide to Interpreting Clinical Trials

Evaluation of Primary Literature Tips and Tricks: Methods

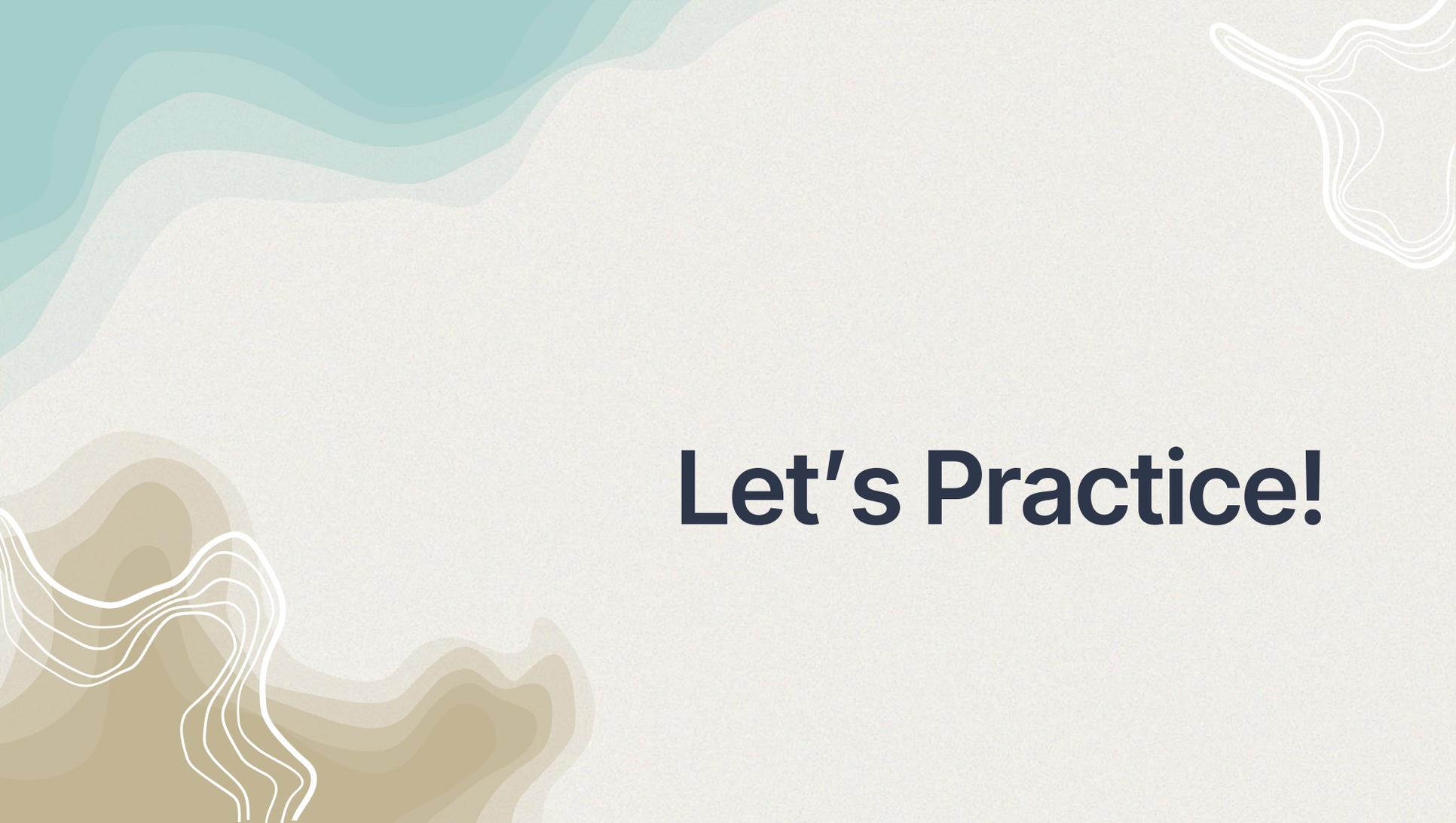
Questions to ask:

- **Inclusion and exclusion criteria:** Does this reflect a population as a whole affected by this disease state?
 - Selection bias
 - Subject recruitment methods
- **Blinding:** What type of blinding was used and was it an appropriate way to perform this particular study?
 - Broken blinds
- **Selection criteria:** Was the sample selected randomly from different communities or was it mostly one subgroup?

Evaluation of Publishing Journal

Questions to ask:

1. Where (geographically) are published trials and articles coming from?
2. Is information regarding funding easily accessible?
3. Are published materials presented in bias-free language and community-driven language guidelines?
4. Do research trials report sample justifications?

The background features a light beige textured surface. On the left side, there are wavy, layered shapes in shades of teal and brown. On the right side, there are white, hand-drawn style line art elements that resemble stylized waves or organic forms.

Let's Practice!

Example Superiority Trial

Background

To compare prasugrel and clopidogrel in terms of death from cardiovascular causes, nonfatal myocardial infarction or nonfatal stroke and assess major bleeding risk

Study design

Randomized into 2 groups (unstable angina/non-ST elevation myocardial infarction and ST-elevation with myocardial infarction)

Findings

12.1% of patients receiving clopidogrel and 9.9% of patients receiving prasugrel had a primary endpoint outcome. Major bleeding was observed in 2.4% of patients receiving prasugrel and 1.8% receiving clopidogrel

Impact

This study emphasized the importance of weighing the risks and benefits of using clopidogrel vs. prasugrel

Example Superiority Trial

Purpose

To evaluate reduction in A1C for two medications within the same class: Drug A and Drug B

Study design

Patients with an initial A1C >8% randomized to receive Drug A or Drug B and A1C was checked at 3-month intervals over 2 years

Findings

Patients who received Drug A had a mean reduction in A1c by 2.1 points
Patients who received Drug B had a mean reduction in A1c by 1.3 points

Baseline Characteristics

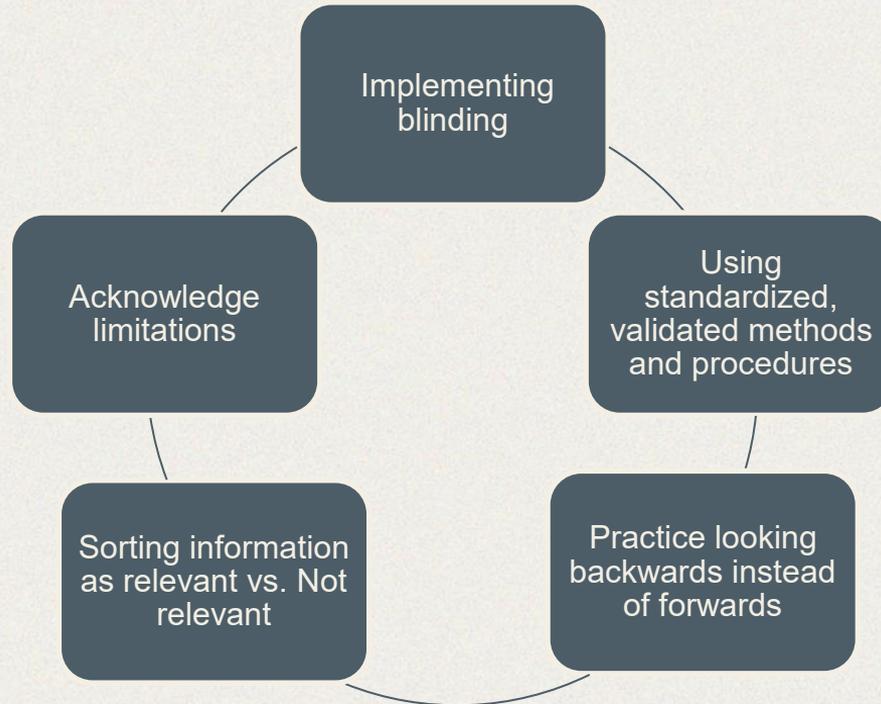
Characteristic	Drug A (N = 6813)	Drug B (N = 6795)
A1C at enrollment (mean)	9.1	9.2
History of unstable angina or STEMI (%)	19	18
Age		
Median (yr)	52	51
≥ 75	13	13
Female sex (%)	25	27
White race (%)	92	93

Assessment Question #4

Based on the previous slide, which of the following baseline characteristics **may** reduce applicability to a larger patient population in practice? (select all that apply):

- A. Unstable angina or STEMI
- B. Age
- C. Sex
- D. Race

How We Can Improve Equity in the Research Space as Healthcare Professionals



Summary

- All trials cannot be generalized depending on the population tested in and must be analyzed in a way to not perpetrate bias
- Although there has been a move towards equity in research, there is still much to be done
- By having more inclusive recruitment strategies and addressing bias, researchers can move towards better diversity representation in studies

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Questions?

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