



Effective Use of Behavioral, Communication and Social Sciences for Precision Public Health

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Learning Objectives

1. Define **behavioral science**
2. Discuss the behavioral science theories commonly used in precision public health interventions
3. Assess the design of a precision public health intervention informed by behavioral science theories
4. Explain the relationship between behavioral science in precision public health
5. Discuss future opportunities for behavioral science to inform precision public health interventions

Behavioral science: behavioral, communication and social science





Behavioral
Science

Precision
Public
Health

Precision Public Health

*“the right
intervention to the
right population at
the right time.”*



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↓ Cost of sequencing
genome

↑ Access to technologies

Precision
Public
Health

Behavioral Science

*Study of the role that
behavioral and
social factors have
on health outcomes*

Theories in...
Behavioral
Science

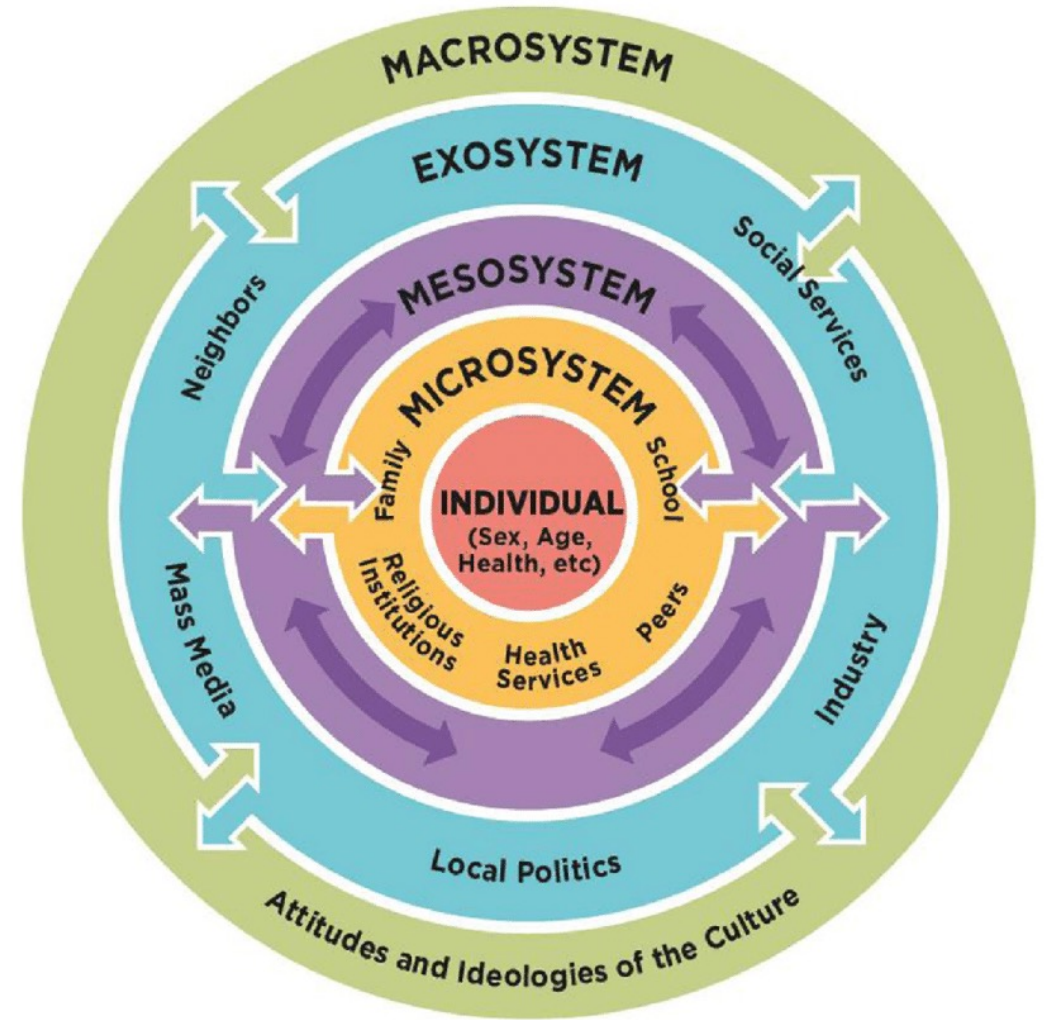
*Help us understand
why people
complete a behavior
and opportunities to
modify behavior*

Stages of Change

PRECONTEMPLATION



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Behavioral
Science

Precision
Public
Health

The Human Genome Project and Health Behavior and Health Education Research

The Human Genome Project (HGP) is a multinational initiative to map and sequence the human genome. This major biological research effort, estimated to take 15 years and cost \$3 billion, should have significant implications for public health generally, and for health behavior and health education research in particular. It is anticipated that the HGP research will lead to expanded (1) newborn genetic disease screening, (2) prenatal diagnoses and (3) trait carrier screening. The HGP also is likely to

screening of people with late onset
is screening for genetic-based
disease morbidity and mortality
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anizational, population and
response to these developments.
role of genetics in public health will be
ation research. Such research could
and humane applied human genetics.



1995

“Central to the expanding role of genetics in public health will be health behavior and education research. Such research could contribute to an effective and humane applied human genetics.”

Sorenson and Chevront



Sorenson (1993)

Kardla (2005)



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1995



HEALTH EDUCATION & BEHAVIOR

SPECIAL ISSUE
*The Challenge Ahead:
 Implications of Genomics for Health Behavior and Health Education*

Guest Editors

Catharine Wang, PhD
 Department of Health Behavior and Health Education
 Michigan Center for Genomics and Public Health
 School of Public Health
 University of Michigan

Deborah J. Bowen, PhD
 Fred Hutchinson Cancer Research Center
 Department of Health Services
 School of Public Health and Community Medicine
 University of Washington

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Susan K. Peterson, PhD, MPH
 Department of Behavioral Science



2005

SPECIAL ISSUE

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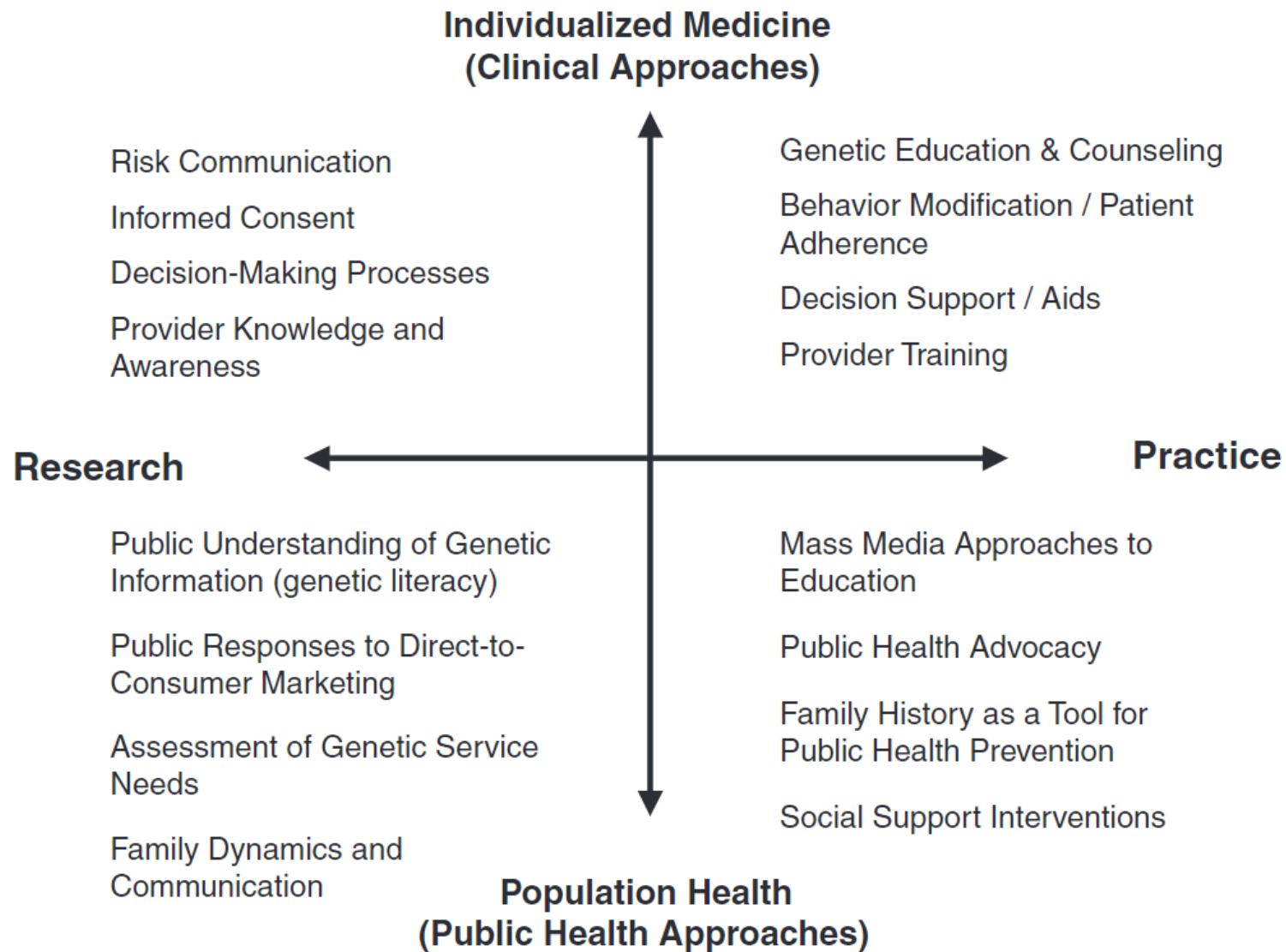
Sorenson (1993)



Kardla (2005)



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Kardia (2005)



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Priority Areas for Behavioral Science Research in PPH

- Public understanding of genetics and genomics
- Genetic and genomic risk communication
- Adequate reach of genomics-informed interventions
- Intervention development and testing to promote behavior change
- New behavioral targets informed by genomics and genetic information



2021

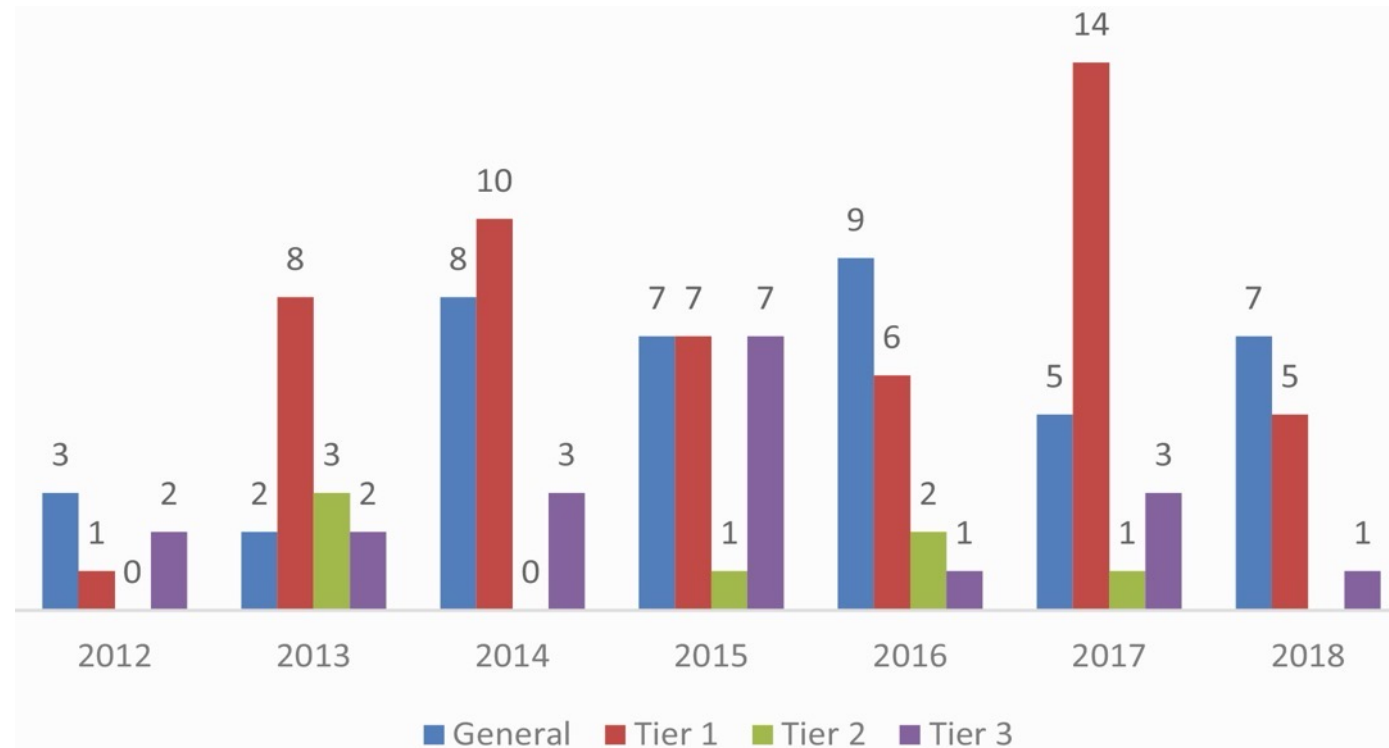


Allen (2020)



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117 studies between 2012 (prior review) and 2018



Majority focused on implementation-ready **CDC Tier 1** conditions



Public Understanding of Genomics

- Assess awareness and perceptions of genetics among individuals and providers
- Demographic factors associated with understanding
- Participation in genomic research
- Interpretation and comprehension of results
- Genetic literacy
- Tool development for measuring genetic literacy

Risk Communication

- Initiatives to improve risk communication
- Best format for delivering risk information
- Patient preferences for receiving risk information
- Risk communication patterns among affected individuals
- Accuracy and recall of risk information
- Management of uncertainty



Allen (2020)



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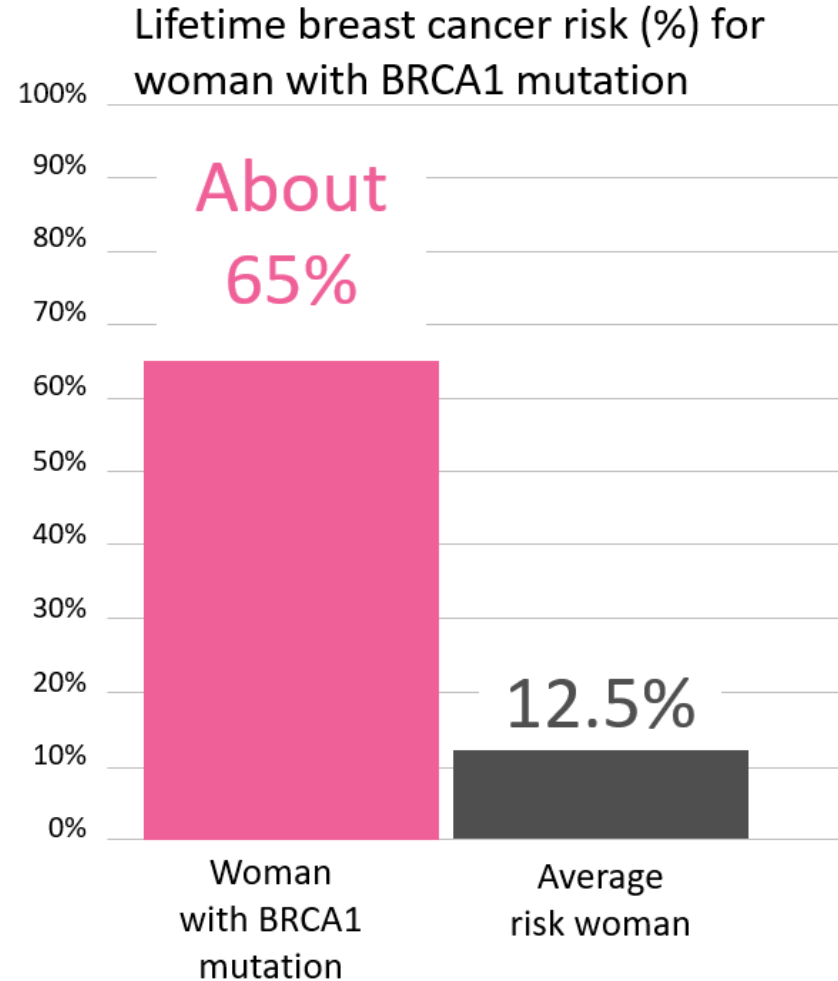
Hereditary Breast and Ovarian Cancer Lynch Syndrome Familial Hypercholesterolemia



Majority focused on implementation-ready **CDC Tier 1** conditions

The impact of genomic information about HBOC on subsequent health behaviors





Options for Individuals with BRCA1/2 Mutations

- More frequent breast exams starting at earlier age
- Yearly breast MRI
- Risk reducing surgeries (mastectomy, salpingo-oophorectomy, hysterectomy)
- Medications



Enhanced Counseling for Women Undergoing BRCA1/2 Testing: Impact on Subsequent Decision Making About Risk Reduction Behaviors

Suzanne M. Miller, PhD
Pagona Roussi, PhD
Mary B. Daly, MD, PhD
Joanne S. Buzaglo, PhD
Kerry Sherman, PhD
Andrew K. Godwin, PhD
Andrew Balshem, BA
Margaret E. Atchison, BA

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University of Michigan



2005

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The Challenge Ahead: Implications of Genomics for Health Behavior and Health Education



Miller (2005)



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**Enhanced Counseling for Women
Undergoing BRCA1/2 Testing:
Impact on Subsequent Decision Making
About Risk Reduction Behaviors**

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Andrew K. Godwin, PhD
Andrew Balshem, BA
Margaret E. Atchison, BA

*How do we best prepare
people to receive their
BRCA1/2 results and
improve their subsequent
decision making?*



Standard Genetic
Counseling
+
General Health
Information

Standard Genetic
Counseling
+
Enhanced Genetic
Counseling

***How do we best prepare
people to receive their
BRCA1/2 results and
improve their subsequent
decision making?***

Standard Genetic
Counseling
+
General Health
Information

Genetic Counseling followed by
general health information session



Standard Genetic
Counseling
+
Enhanced Genetic
Counseling

Health Educator led intervention
Used Cognitive-Social Health
Information Processing (C-SHIP) Model
to prelive genetic testing results

Theory-developed Enhanced Genetic Counseling improves decision making about risk reducing behaviors following BRCA1/2 testing

Standard Genetic
Counseling
+
Enhanced Genetic
Counseling

Theory-developed Enhanced Genetic Counseling improves decision making about risk reducing behaviors following BRCA1/2 testing

Participants in Enhanced Counseling were more likely

- to... Understand their BRCA1/2 results
- Seek information about their risk reduction options
- Undergo prophylactic oophorectomy

The impact of genomic information about HBOC on subsequent health behaviors

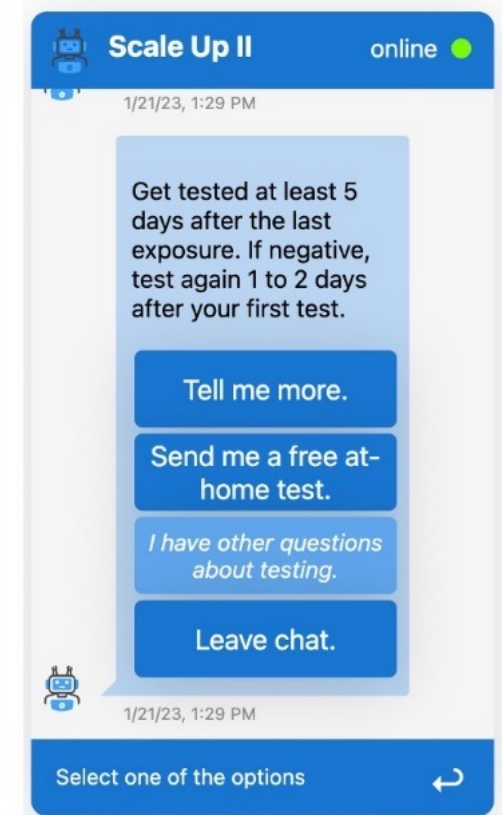
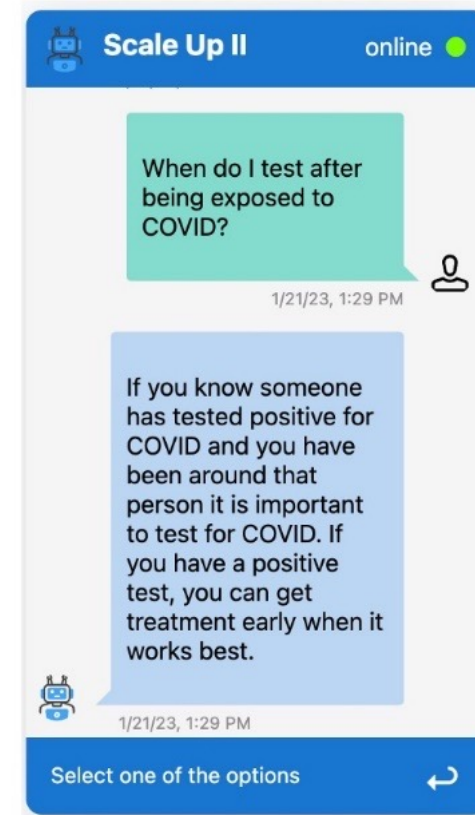


Technology-enabled support for delivery of genomic information

Timely education and connection to clinical services

Need to scale as genetic testing and population screening are becoming more common

Patient preference to receive results rapidly



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2021



Allen (2020)



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Science

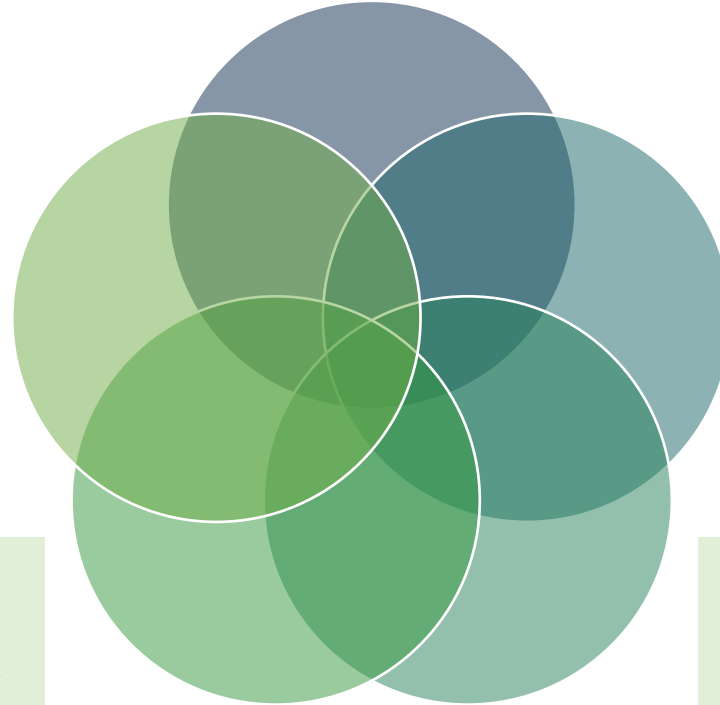
Precision
Public
Health



**Behavioral
Science**

**Implementation
Science**

**Precision Public
Health**



Health Equity

Technology



Technology

- Improved data integration from multiple-levels
- Use of technology to support intervention development and scalability

Health Equity

- Centering equity and antiracism
- Community engagement
- Will tomorrow's medicines work for everyone?

Implementation Science

- Supporting implementation of cascade screening and population based screening
- Ethical implementation of new human genomic discoveries
- De-implementation of ineffective practices



Tate (2004)



Roberts (2021)



Allen (2023)



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*There is nothing as practical
as a good theory – Kurt Lewin*

