

Developing a Diverse Research Community
SESSION 2:

SOCIAL DETERMINANTS OF HEALTH IN CLINICAL RESEARCH

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Learning Objectives

- Understand the definition of Social Determinants of Health
- Learn basic applications of Social Determinants of Health in clinical research
 - *Quality Improvement*
 - *Health Outcomes*
 - *Advocacy*
 - *Interventions*
- Understand resources needed to conduct Social Determinants of Health Research
 - *Community engagement*
 - *Other Resources*
 - *Questions/Open Discussion*

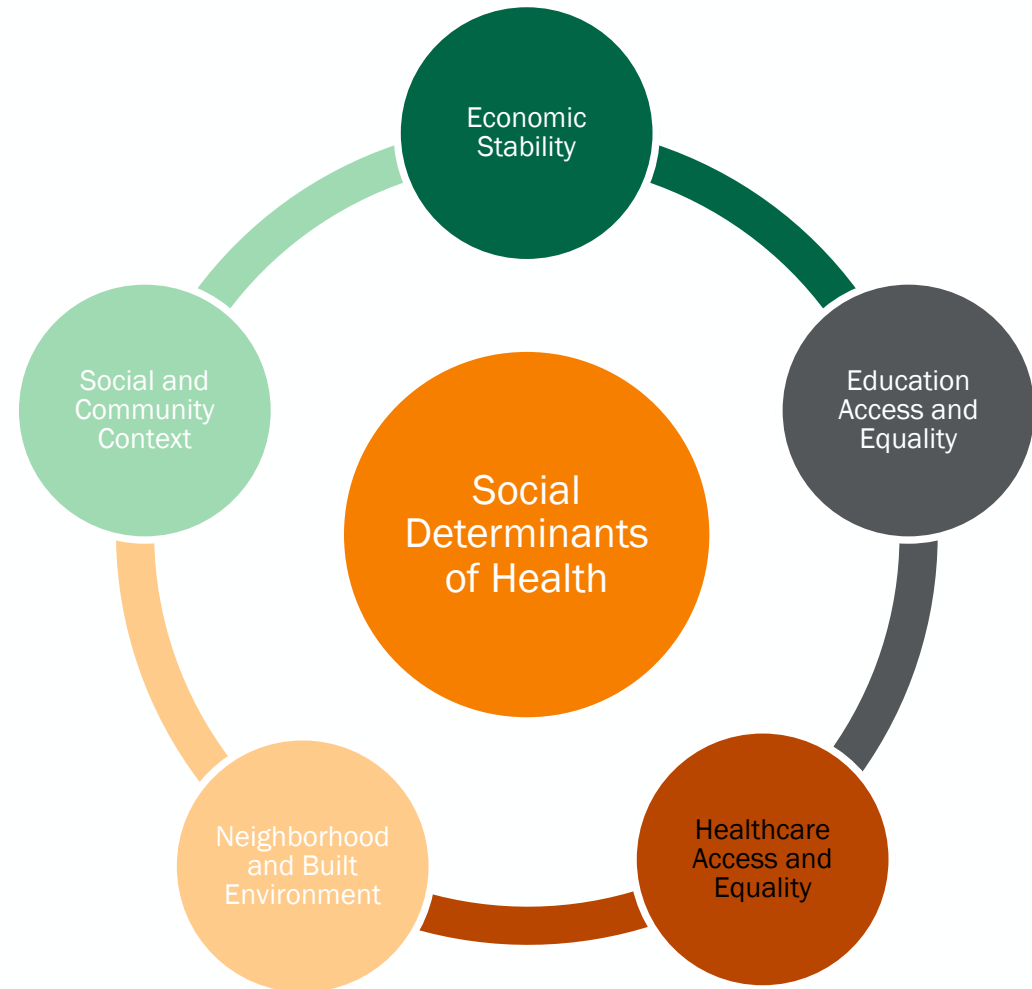
World Health Organization



- The social determinants of health (SDH) are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.
- These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems.

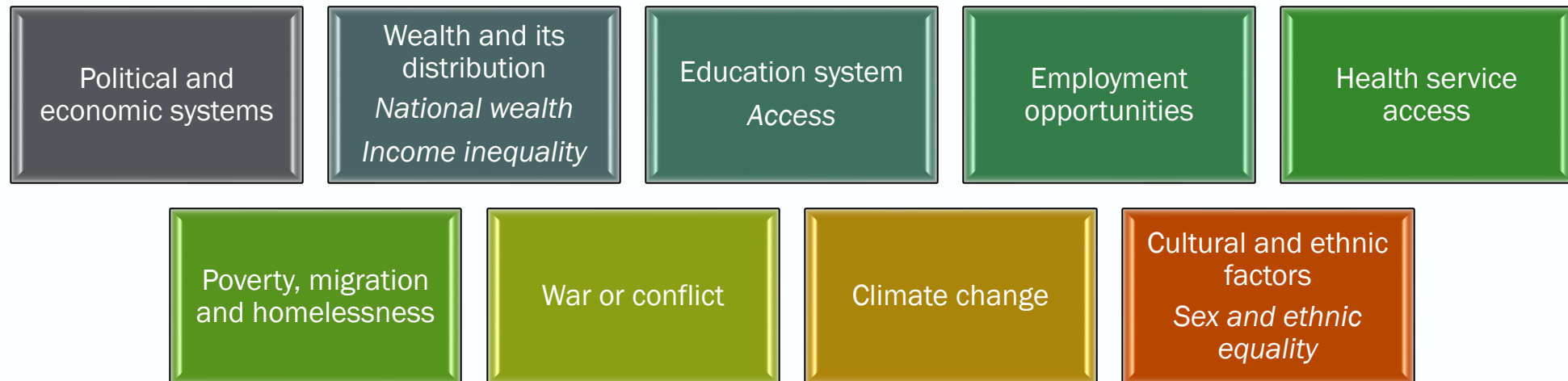
Social Determinants of Health Defined

- *Determinants imply 'causality'*
- *Social determinants involve human behavior, interaction, and systems with implications of causality of human health conditions*
- *SDoH factors from five areas of our daily lives which affect our health*
- *Five areas defined by the CDC[†]*



Distant Determinants of Health

- Country-level ecological analyses on the health
- **Structural determinants:** Fundamental structures of a nation that generate social stratification



Proximal or Intermediate Determinants

Availability of resources
to meet daily needs
safe housing and food

Access to
educational,
economic, and job
opportunities

Access to health care
services

Quality of education
and job training

Community-based
resources for living,
recreational and
leisure-time activities

Transportation
options

Public safety

Proximal or Intermediate Determinants

Social support

Social norms and attitudes
(discrimination, racism, and
distrust of government)

Exposure to crime, violence,
and social disorder
(presence of trash and lack
of cooperation in a
community)

Socioeconomic conditions
(concentrated poverty and
the stressful conditions that
accompany it)

Residential segregation

Language/Literacy

Access to mass media and
emerging technologies
(cell phones, the Internet,
and social media)

Culture

Definitions

■ Health Disparity

- *A higher burden of illness, injury, disability, or mortality experienced by one population group in relation to another*
- *Differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States.*
 - National Institutes of Health

■ Health Care Disparity

- *Differences in coverage, access, or quality of care that is not due to health needs*
- *Disparities in health care can contribute to health disparities*

■ Health Inequities

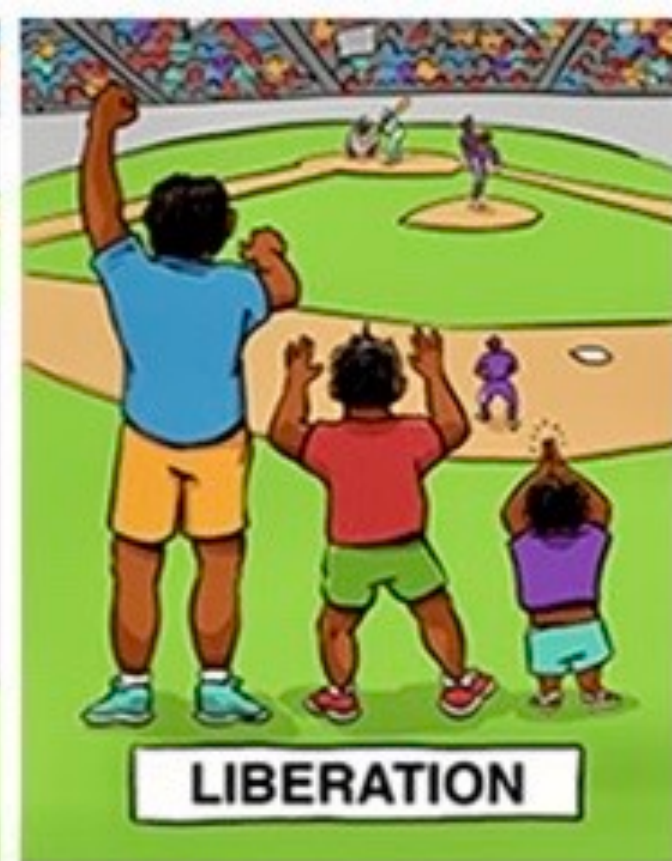
- *Differences in health which are not only unnecessary and avoidable but, in addition, are considered unfair and unjust*

Health Disparities

- Intimately linked to SDH
- Socioeconomic status (SES)
 - *One of the main contributing factors*
 - *Far-reaching in its grasp and significantly hurtful in its touch*
 - *Low SES determines not only how an individual lives but also where one lives, and how long one lives*

Health Equity

- Everyone has a fair and just opportunity to be as healthy as possible
- ...Requires removing obstacles to health:
 - *Poverty*
 - *Consequences of Discrimination*
 - Powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and healthcare
- ...Means reducing and ultimately eliminating disparities in health and its determinants that adversely affect excluded or marginalized groups
- ...The ethical and human rights principle that motivates us to eliminate health disparities

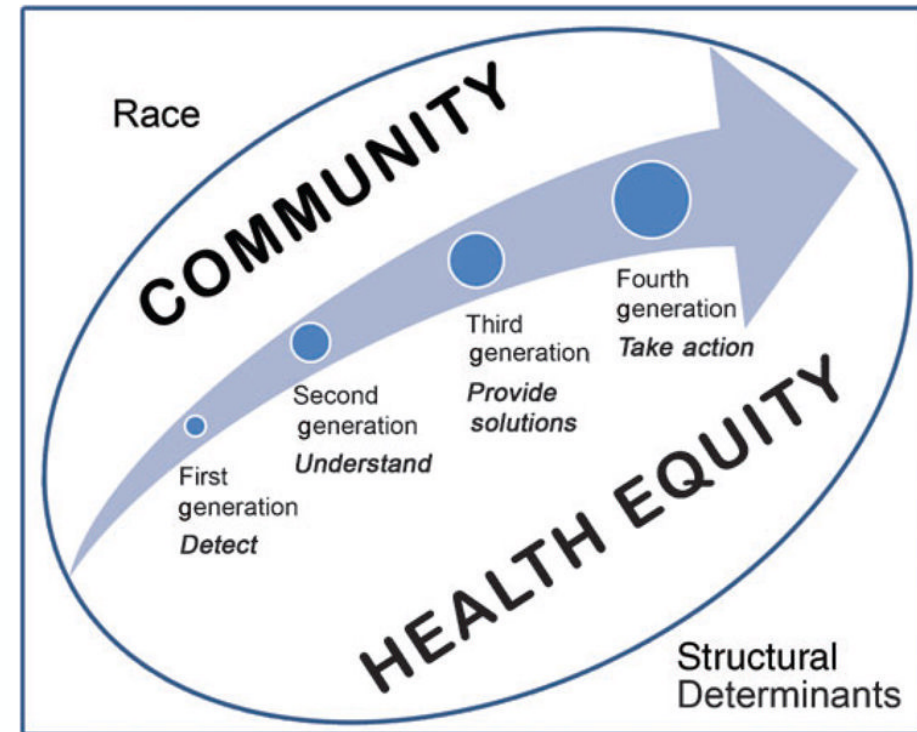


HEALTH EQUITY



Generations of health disparities research

- FIRST-GENERATION: DO DISPARITIES EXIST?
- SECOND-GENERATION: WHY DO DISPARITIES EXIST?
- THIRD-GENERATION: DO INTERVENTIONS WORK?
- FOURTH GENERATION: health equity action research trajectory (HEART)
 - *utilizing public health critical race praxis (PHCR) as our conceptual framework*
 - *addressing structural determinants of health through comprehensive multilevel interventions*
 - *utilizing comprehensive evaluation*
 - *necessitating explicit attention to self-reflection by the researcher.*



CAUSES OF CAUSES

Systemic health and
social inequities

Applications of SDoH in clinical research

Quality improvement

Patient health outcomes

Patient advocacy

Improving patient interventions

SDoH use in Quality Improvement

Issue 4 • Volume 6

Individual QI projects from single institutions

OPEN

Improving Screening for Social Determinants of Health in a Pediatric Resident Clinic: A Quality Improvement Initiative

Suzanne Friedman, MD ; Steve Caddle, MD, MPH* ; Joshua E. Motelow, MD, PhD† ;
Dodi Meyer, MD* ; Mariellen Lane, MD**

Primary Outcome: Increase SDoH screening by >90% for 9 individual questions at newborn and 1-year well visits and increase overall response at 40% of visits.

Results: 24-43% increase in SDoH screening at newborn visit; 28-83% increase in SDoH screening at 1-year visit

Identified needs increased from 8 to 19% with provider response to an increased need from 20-40%

SDoH in Patient Health Outcomes

Health disparities in infants with hypertrophic pyloric stenosis



Alexander Feliz, M.D.^{a,*}, Janette L. Holub, M.D., M.P.H.^b,
Nima Azarakhsh, M.D.^b, Marielena Bachier-Rodriguez, M.
Kate B. Savoie, M.D.^b

frontiers | Frontiers in Public Health

ORIGINAL RESEARCH
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Analyzing Relationships Between Economic and Neighborhood-Related Social Determinants of Health and Intensive Care Unit Length of Stay for Critically Ill Children With Medical Complexity Presenting With Severe Sepsis

OPEN ACCESS

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SDoH in Patient Advocacy

The Gravity Project® is a national collaborative that develops consensus-based standards improving the use of SDoH and how they are shared.

Most recently, the American Health Information Management Association (AHIMA) supported The Gravity Project® in its use of SDoH as a new data class in the US Core Data for Interoperability v2. USCDI is a standardized set of health data classes and constituent data elements used for nationwide health information exchange.

SDoH for use in improving patient interventions

SDoH can be used to change, design or re-design population interventions using individual, organizational, or community resources

Newsroom



The Apple Women's Health Study will explore gynecological conditions on an unparalleled scale.

Newsroom

Apple's support of the medical research community began with the introduction of ResearchKit and CareKit, which expanded the pace and scale at which healthcare could be studied and provided. Apple used ResearchKit to create the Apple Heart Study, which was the largest study of its kind and illustrated the impact virtual, large-scale studies can have on medical research by examining atrial fibrillation to provide validation for the irregular rhythm notification feature on Apple Watch.

"Women make up half of the world's population, yet even today there has been limited investment in studying their unique health needs," said Michelle A. Williams, a reproductive epidemiologist and dean of the faculty at the Harvard T.H. Chan School. "This study, unprecedented in scope, will greatly advance our understanding of the biological and social determinants of women's health, and lead to better health outcomes."

General social resources to conduct SDoH Research

- Community Engagement
 - *Public events, i.e. health fairs and other health-related events*
 - *Focus groups, i.e. community-based groups*
 - *Organizations*
 - Government
 - K-12 and Higher education
 - School boards
 - Religious
 - Non-profit orgs
 - *Multi-stakeholder collaborations*
 - Private and Public
 - Health behavior patterns



Center For Racial Equity | Finance | Health |
Education | Criminal Justice

We seek to improve health outcomes for Black households and increase access to healthier food in predominantly Black communities by providing funding for community-driven food organizations and innovators.

<https://walmart.org/center-for-racial-equity/health>



Giving access to the hardest to reach patients from virtually anywhere.

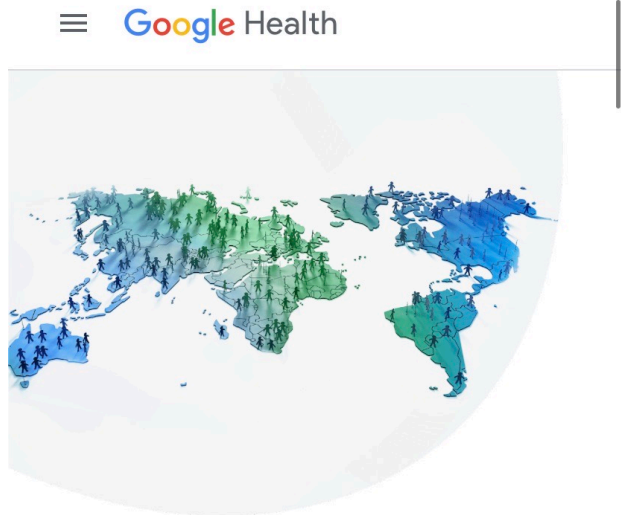
From minimizing transportation for those with disabilities or offering affordable post-treatment care, rural telehealth can bring medical equity to underserved patients who need it most.

[Watch video >](#)



The future of telehealth and rural connectivity.

<https://www.t-mobile.com/business/industry-solutions/healthcare>



Helping global communities become safer and healthier

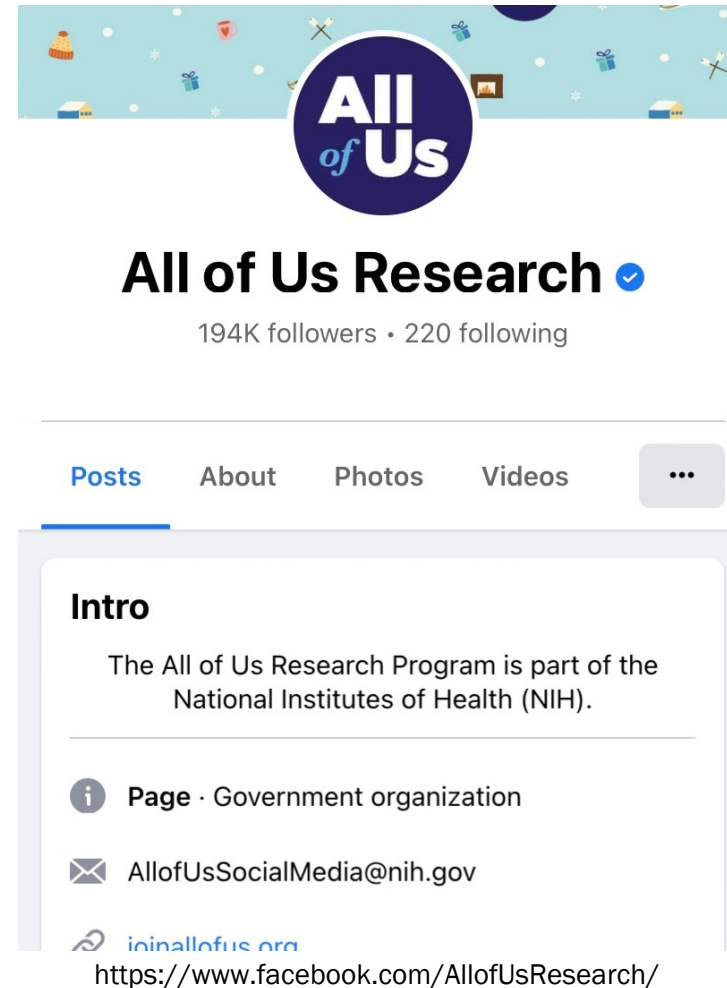
Public health aims to promote health equity and accessibility, allowing practitioners to focus on populations as small as a neighborhood or as large as a country.

Google is advancing public health by providing research and tools to tackle some of the biggest challenges the world faces today.

<https://health.google/public-health/>

Social resources to conduct SDoH Research

- Social Networking/Social Media
 - *Instagram*
 - *Twitter*
 - *Facebook*



Challenges Related to Data

- Distributed Heterogeneous data sources
- Poor temporal and geographical resolution
- May not be representative of the population of interest
- Heterogeneity and Inconsistencies
- Lack of Interoperability

Lots of Relevant Data

Some easier to link to individuals
(e.g., Tobacco and Alcohol use,
Education)

Some harder to link to individuals
(e.g., Police reports, Tweets, Blog
posts, Grocery store purchase,
Fitness class membership)

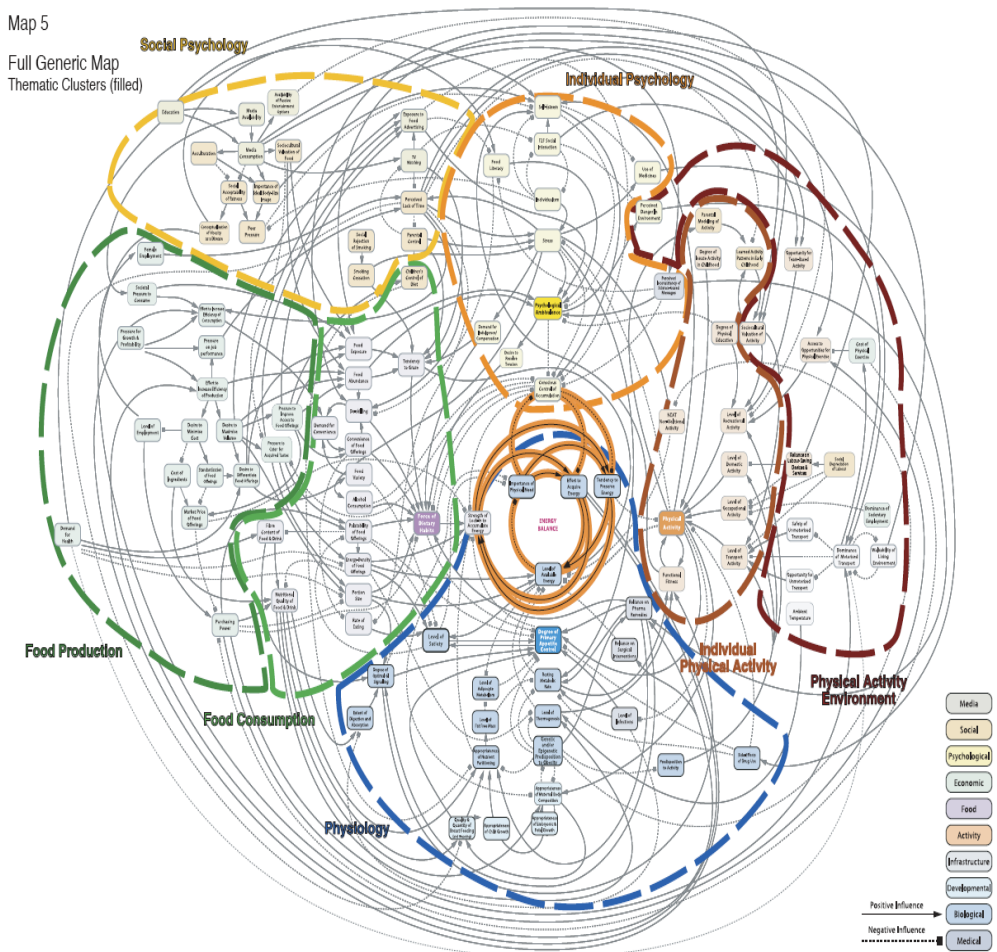
Only aggregate data exists (e.g.,
Census data, News feeds, GIS maps,
Public health databases)

Challenges in studying and analyzing SDOH

- Testing with randomized experiments is challenging
- Analysis requires longitudinal, linked data across sectors
- Opportunities for Confounding, and Bias
- Long time lags for health effects to manifest
- Integrating individual level data with group level evidence

Map 5

Full Generic Map
Thematic Clusters (filled)



<http://www.foresight.gov.uk/OurWork/ActiveProjects/Obesity/>

Some Resources to conduct SDoH research in Memphis

- Memphis Neighborhood Quality data
- CDC 500 Cities
- Environmental Systems Research Institute Demographics (ESRI)
- American Community Survey
- Nielsen Consumer data
- PolicyMap
- US. Census
- etc.

Domain/Subdomain	Social screening		Social assessment/diagnosis				Social treatment/intervention		
	LOINC questions, question panels/ protocol codes	SNOMED CT questions, question panels/ protocol codes	SNOMED CT procedure codes	SNOMED CT parent codes	SNOMED CT child codes	ICD-10-CM codes	SNOMED CT referral codes	SNOMED CT counseling/ education codes	SNOMED CT provision of services codes
Access to health care	5	1	0	3	18	3	2	1	6
Child care	1	0	1	0	0	0	1	1	8
Clothing	0	0	0	0	3	0	1	1	1
Education	6	7	0	9	35	7	3	1	4
Employment	4	7	1	16	59	10	1	6	10
Finances	6	5	2	4	27	2	2	1	5
Income/poverty	2	4	1	2	21	2			
Financial stress	4	1	1	2	6	0			
Food	3	0	1	0	8	2	2	3	3
Housing	9	4	2	18	52	4	6	3	16
Instability/insecurity	7	4	0	9	25				
Quality	2	0	2	9	27				
Immigration/migration	4	1	0	3	11	1	0	0	0
Incarceration	0	0	0	9	20	4	2	2	2
Primary language	6	4	1	1	8	0	2	1	2
Race/ethnicity	6	2	0	0	1	1	0	1	0
Residential address	1	1	0	0	0	0	0	0	0
Safety	8	5	10	32	88	58	3	16	15
General safety (type not specified)	1	1	4	9	19	23	1	6	7
Child abuse	1	0	2	14	24	10	1	5	2
Intimate partner violence	4	0	3	9	35	25	1	4	1
Neighborhood safety	2	4	1	0	10	0	0	1	5
Social connections/isolation	13	5	6	10	34	6	3	6	13
Stress	6	6	5	8	18	7	2	8	15
Transportation	2	0	0	1	13	0	1	1	6
Utilities	1	0	0	2	12	0	0	1	3
Veteran status	1	2	0	3	6	5	0	0	0
General	1	0	2	8	13	23	18	14	5
CPT codes	0	0	2	0	0	0	3	9	1
Totals									
Total number of codes	133	33			686			243	
Mean number codes per domain (SD)	6.7 (5.6)	1.6 (2.6)	6.4 (8.1)	21.3 (22.7)	6.7 (13.2)		11.5 (11.3)		

Codes for SDOH

Arons et al. 2019. Documenting social determinants of health-related clinical activities using standardized medical vocabularies. *JAMIA Open*, 2(1): 81–88



Centers for Disease Control and Prevention

CDC 24/7: Saving Lives, Protecting People™

CDC Community Health Improvement Navigator

Database of Interventions

Four ACTION Areas



**SOCIOECONOMIC
FACTORS**



**PHYSICAL
ENVIRONMENT**



**HEALTH
BEHAVIORS**



CLINICAL CARE

ARTICLE OPEN

Sociomarkers and biomarkers: predictive modeling in identifying pediatric asthma patients at risk of hospital revisits


Eun Kyong Shin¹, Ruhi Mahajan¹, Oguz Akbilgic^{1,2} and Arash Shaban-Nejad¹

The importance of social components of health has been emphasized both in epidemiology and public health. This paper highlights the significant impact of social components on health outcomes in a novel way. Introducing the concept of sociomarkers, which are measurable indicators of social conditions in which a patient is embedded, we employed a machine learning approach that uses both biomarkers and sociomarkers to identify asthma patients at risk of a hospital revisit after an initial visit with an accuracy of 66%. The analysis has been performed over an integrated dataset consisting of individual-level patient information such as gender, race, insurance type, and age, along with ZIP code-level sociomarkers such as poverty level, blight prevalence, and housing quality. Using this uniquely integrated database, we then compare the traditional biomarker-based risk

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el yields an accuracy of 65% and the sociomarker-
m-related features, the sociomarker-based model
sociomarkers play an important role in predicting
by merging multiple data sources with detailed
ditions for predicting individual health outcomes.

Urban Decay and Pediatric Asthma Prevalence in Memphis, Tennessee: Urban Data Integration for Efficient Population Health Surveillance

EUN KYONG SHIN AND ARASH SHABAN-NEJAD 

The University of Tennessee Health Science Center—Oak Ridge National Laboratory Center for Biomedical Informatics, Department of Pediatrics, The University of Tennessee Health Science Center, Memphis, TN 38103, USA

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This work was supported in part by the Le Bonheur Children's Hospital and in part by the Memphis Blight Elimination Steering Team.



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Article Contents

Geo-clustered chronic affinity: pathways from socio-economic disadvantages to health disparities



Eun Kyong Shin, Youngsang Kwon, Arash Shaban-Nejad ✉

JAMIA Open, Volume 2, Issue 3, October 2019, Pages 317–322, <https://doi.org/10.1093/jamiaopen/ooz029>

Published: 01 August 2019 **Article history** ▼



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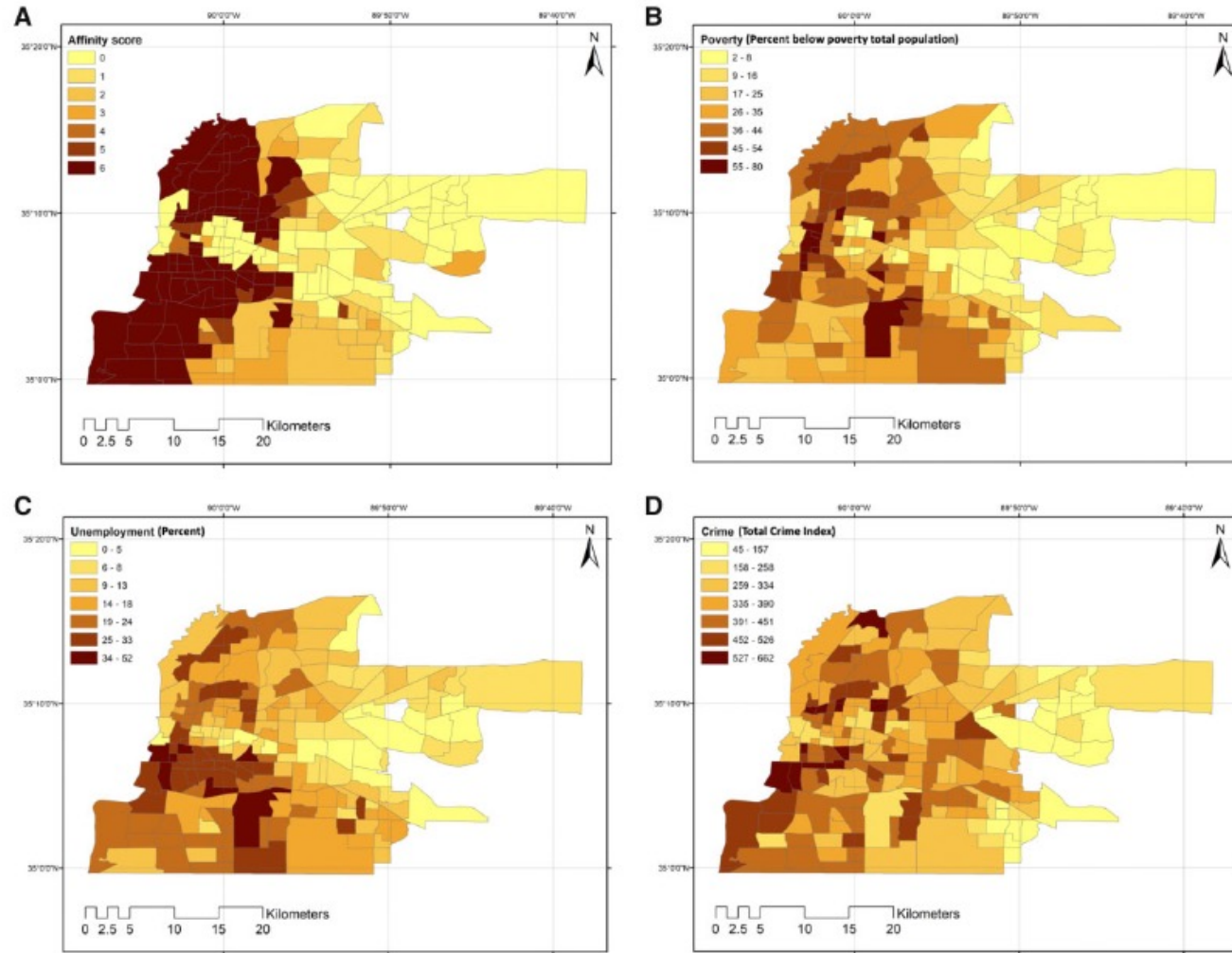


Figure 1. Distribution of socio-economic variables and chronic affinity in Memphis. A. Chronic affinity. B. Poverty. C. Unemployment. D. Crime: The crime index values are all referenced by 100, representing US average crime.

Social Determinants and Indicators of COVID-19 Among Marginalized Communities: A Scientific Review and Call to Action for Pandemic Response and Recovery

Published online by Cambridge University Press: 02 May 2022

[Whitney S. Brakefield](#), [Olufunto A. Olusanya](#), [Brianna White](#) and [Arash Shaban-Nejad](#)

Disparity in COVID-19 ...

- Illness
- Hospitalizations
- Deaths
- Testing
- Vaccination

Testing Intensity

Black

White

Hispanic

Bachelor Degree 25 Years&Up

High School Diploma 25 Years&up

Average Household Size

Median Household Income

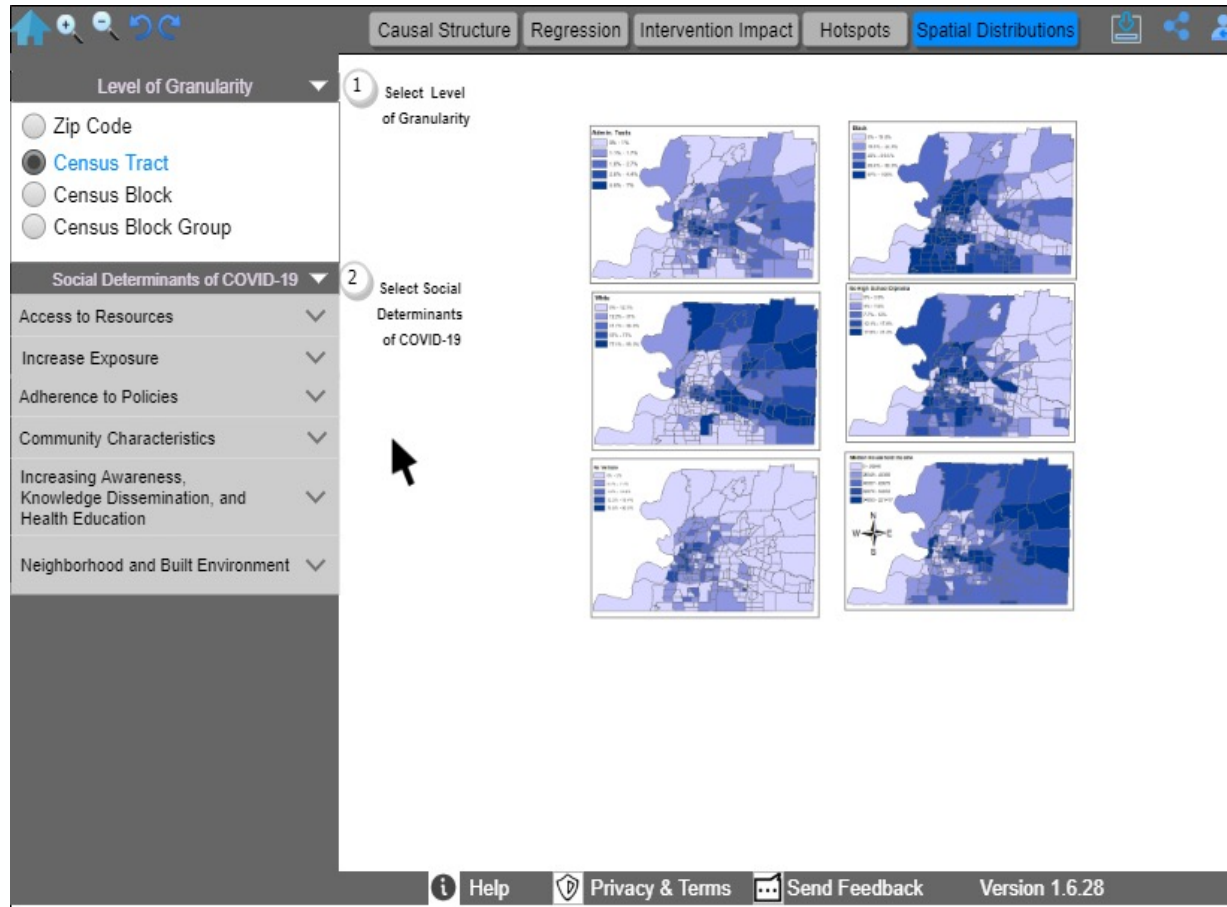
Below Poverty Rate

No Internet Subscription

No Vehicle

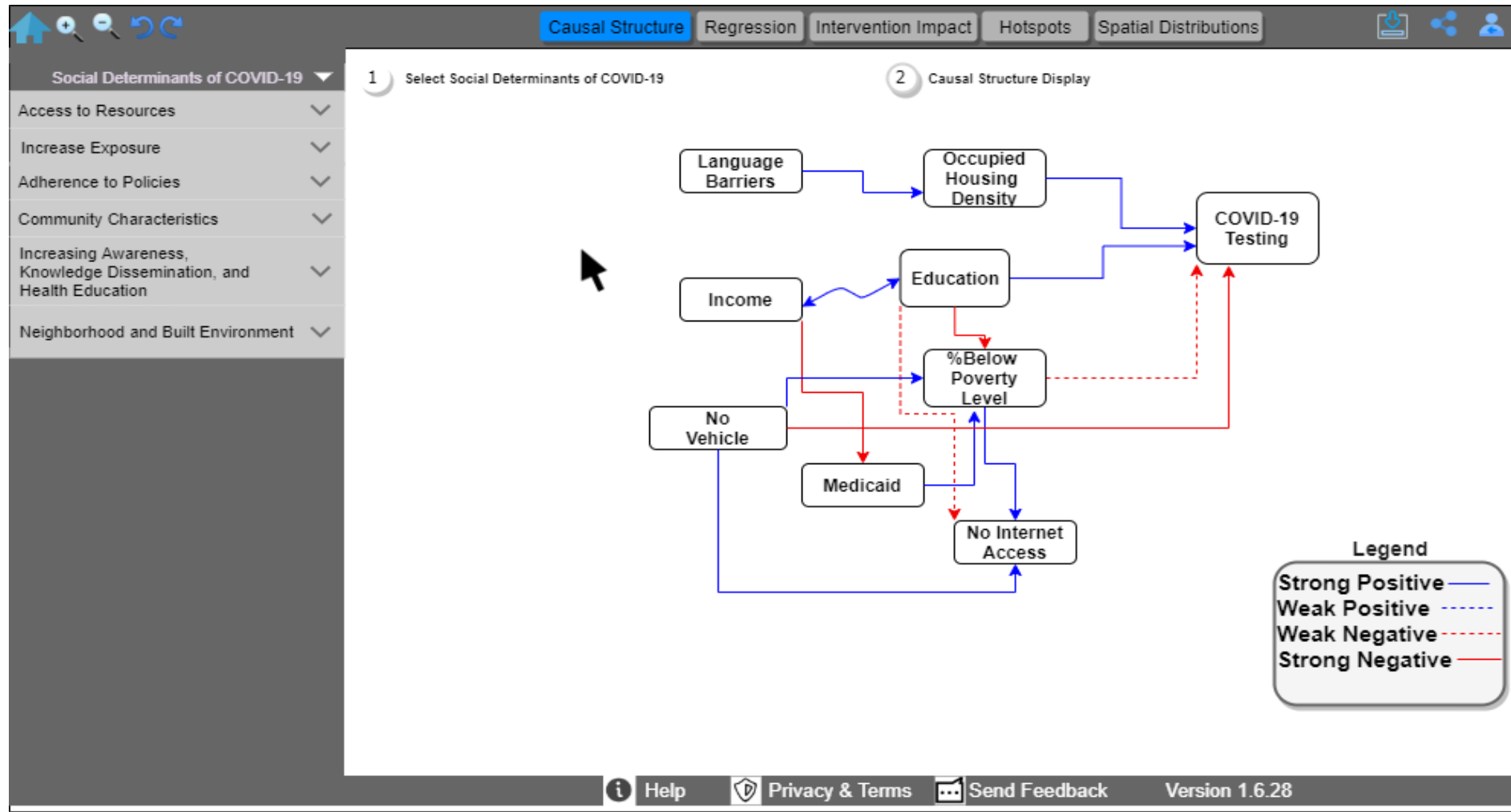
Occupied Housing Units

GEOGRAPHIC DISPARITIES IN COVID-19 TESTING AND SOCIAL DETERMINANTS OF HEALTH IN SHELBY COUNTY, TN



SPATIAL DISTRIBUTION OF COVID-19 ADMINISTERED TESTS & SDOH

Causal structure among COVID-19 testing and SDOH



The Personal Health Library (PHL)



Published on 16.3.2021 in Vol 5, No 3 (2021): March



Using a Personal Health Library–Enabled mHealth Recommender System for Self-Management of Diabetes Among Underserved Populations: Use Case for Knowledge Graphs and Linked Data

Nariman Ammar ¹ ; James E Bailey ² ; Robert L Davis ¹ ; Arash Shaban-Nejad ¹ 



Connecting SDoH and ODL data to Health Information

The screenshot displays the 'My Personal Health Library' app interface. The top navigation bar is pink with a search icon on the right. The main content area is divided into several colored tiles:

- Chronic disease self-Management** (Dark Blue):
 - Specify subscription preferences
 - focus: diet, physical activity, medication
 - frame: educational, motivational, goal-based
 - Get notifications from external Knowledge sources related to your health condition
- Reminders** (Light Blue):
 - Call Dr. Mary (with phone icon)
 - Sep 24, 2020
- Level** (Dark Blue):
 - Basic
 - Intermediate
 - Advanced
- Observations of Daily Living** (Teal):
 - Heart rate
 - Blood pressure
 - Physical activity: X miles walked
- Manage Trusted Agents** (Blue):
 - Trusted applications
 - Trusted devices
 - Trusted contacts:Physicians, Family, Co-workers
- External Knowledge Suggestions** (Purple):
 - CDC articles
 - Diabetes blog posts
 - PubMed research papers
 - Annotate concepts and link with external knowledge
- Calendar** (Grey):
 - Oct 24, 2020
 - Chemo session 1 (with calendar icon)
- Shared Notes** (Orange):
 - Dr. Mary's notes on lab tests
- Suggestions for Resources Nearby** (Pink):
 - Methodist University Hospital (with location pin icon)
 - Gyms in Memphis (with location pin icon)
- Clinical Trials** (Grey):
 - Contains a yellow plus sign icon.
- Electronic Medical Record** (Light Grey):
 - Get lab tests
 - Report an outcome

The bottom of the screen shows the standard Android navigation bar with back, home, and recent apps icons.

Thank You!