

THE HOW, WHERE AND WHO OF USING INFORMATION TO ELEVATE PATIENT HEALTH

NAACOS Fall Conference
September 24, 2023

Debbie Welle-Powell, MPA
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AGENDA

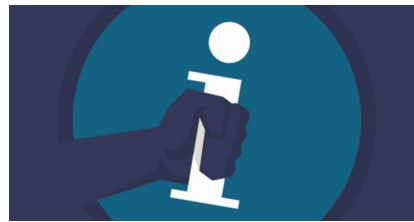
- Welcome
- Introduce the Panelists
- Overview of “Information” as a Social Determinant of Health, why does it matter
- From the panelists the effective strategies:
 - Role of the clinician, technology, data, internet, wearables & AI
 - Impact information has on disparities, health equity, etc.
 - Are we changing patient’s behavior – what does it take?
- Question and Answers

“Information” as a Social Determinant of Health

- Yet how we deliver it, where we deliver it and who delivers it is critical to improving patient outcomes.
- Information must be accessible, engaging, credible, replicable, understandable, bimodal and rooted in science to be credible.
- Information only matters if it helps patients take action and improves their health.
- The role of health literacy and the online “user journey” impacts patients use of information and health outcomes.

Complicated statistics on patient engagement

- CDC reports that between 20 to 30% of patient don't pick up their prescriptions.
- Becker's reports 33% of patients don't follow-up on referral to hospital.
- 11.7% of US population (37.3 million people) have Type 11 Diabetes and 1.4 million added each year.
- Approximately 96 million adults have pre-diabetes - 1 in every 3 adults. It's reversible.
- More than 122 million people have high blood pressure – 103 million have high blood pressure.
- # 1 Killer in America is loneliness and social isolation



Information as a determinant of health

Kapil Parakh, MD, MPH, PhD
Fall 2023



Disclosures

- Full-time Employee
Medical Lead, Fitbit / Google
- Adjunct Associate Professor -
Georgetown University
- Adjunct Assistant Professor -
Yale University
- Cardiologist, Washington DC Veterans
Affairs Medical Center
- Author, Searching for Health

Opinions expressed in this talk are my own



What is health literacy?

The ability for people to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.

Readability

is it easy to read?

Plain Language

is it easy to understand?

Health Literacy

*accessible, understandable,
and actionable?*



U.S. Department of Health and Human Services

Limited health literacy is

universal

5 in 10 US adults
have limited health literacy

9 in 10 have difficulty when
stressed, sick or in pain

[health queries on Search, YT]

inequitable

Low health literacy
disproportionately affects care of
the poor, the elderly, and the
sick

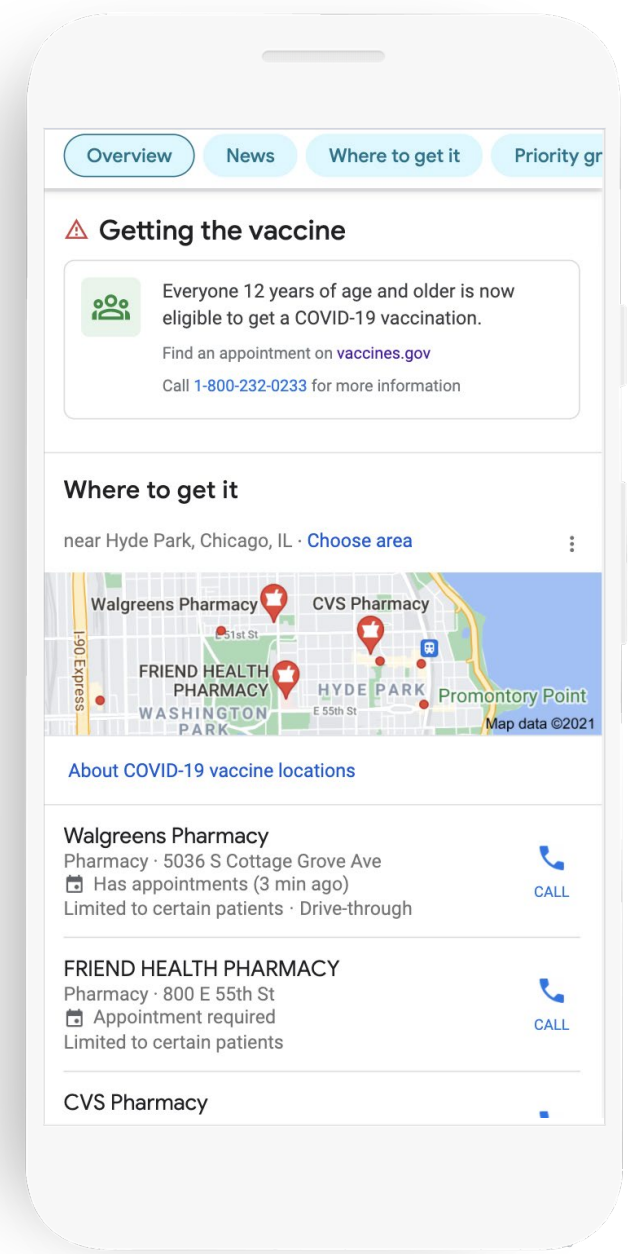
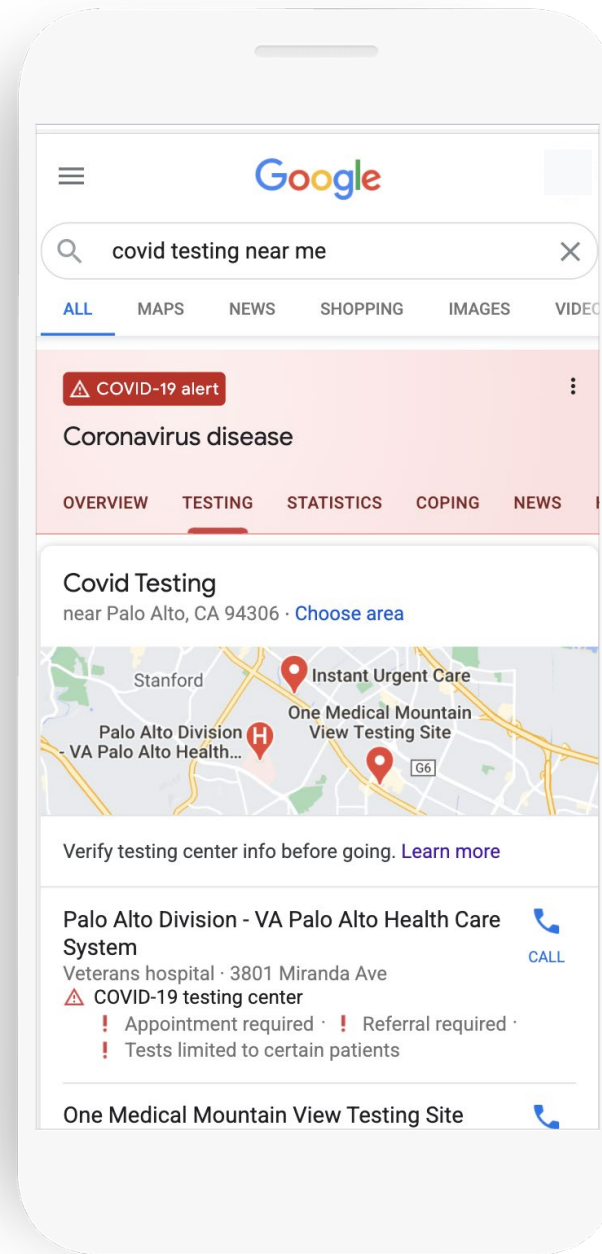
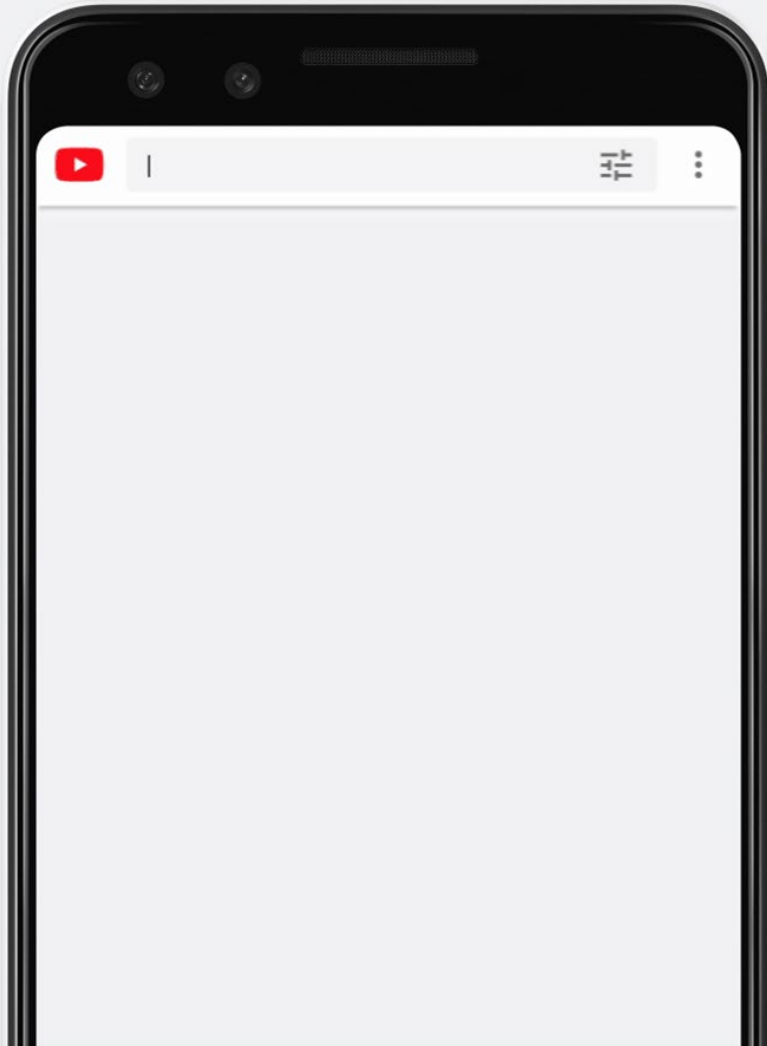
harmful

Low health literacy is
associated with less online
health info seeking,
medication errors, poor
self-care, delays in care

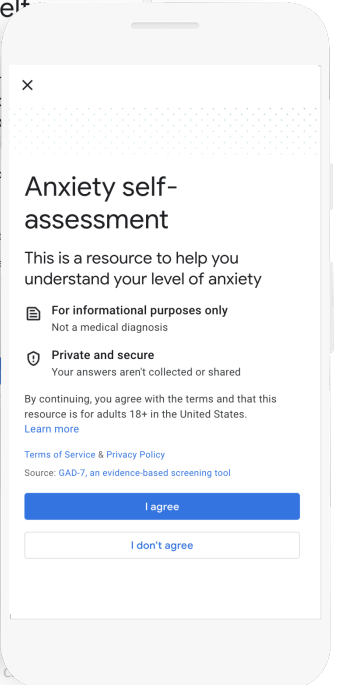
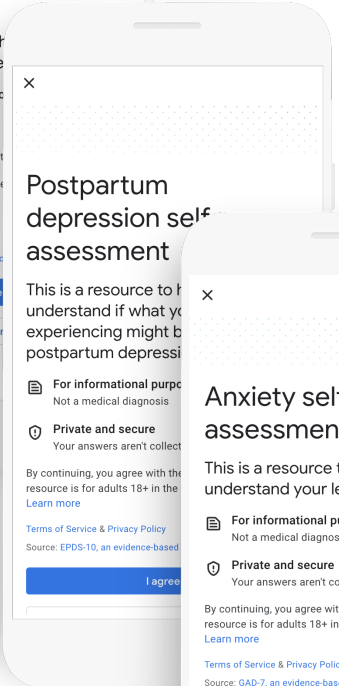
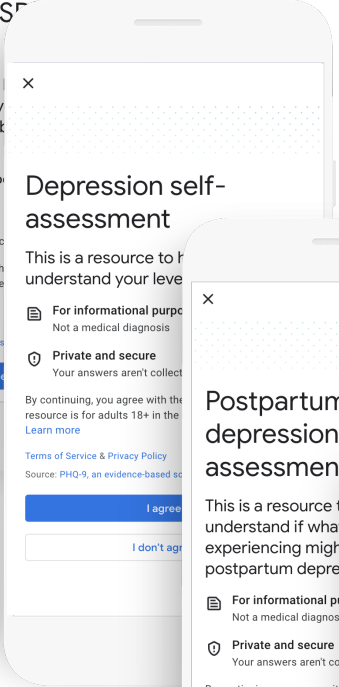
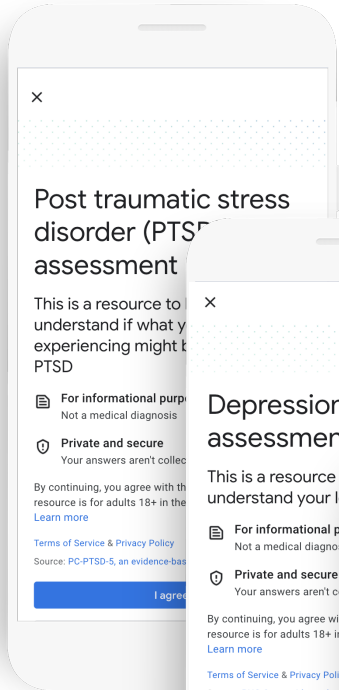
costly

Low health literacy is associated
with
low-value care (\$25B
Medicare spend)

Users need to navigate complex health information



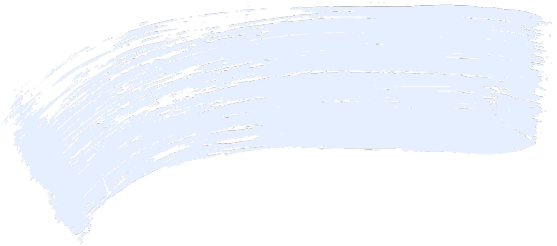
Mental health is an important area





Mental Health

Online videos are a global phenomenon



2B

Logged-in viewers visit YouTube every month.

100+

Localized versions of YouTube are now live in more than 100 countries across 80 languages.

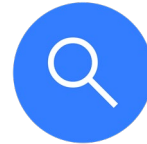
500+

Hours of content are uploaded to YouTube every minute.

1B+

Hours of YouTube's incredible content are watched every single day!

We want to harness the opportunity of the internet to help people find **reliable health information**



Accessible

Free and easily discoverable



Credible

Sources who use the best available scientific evidence



Easy to understand

Clear and helpful answers to questions

Videos can educate and inform

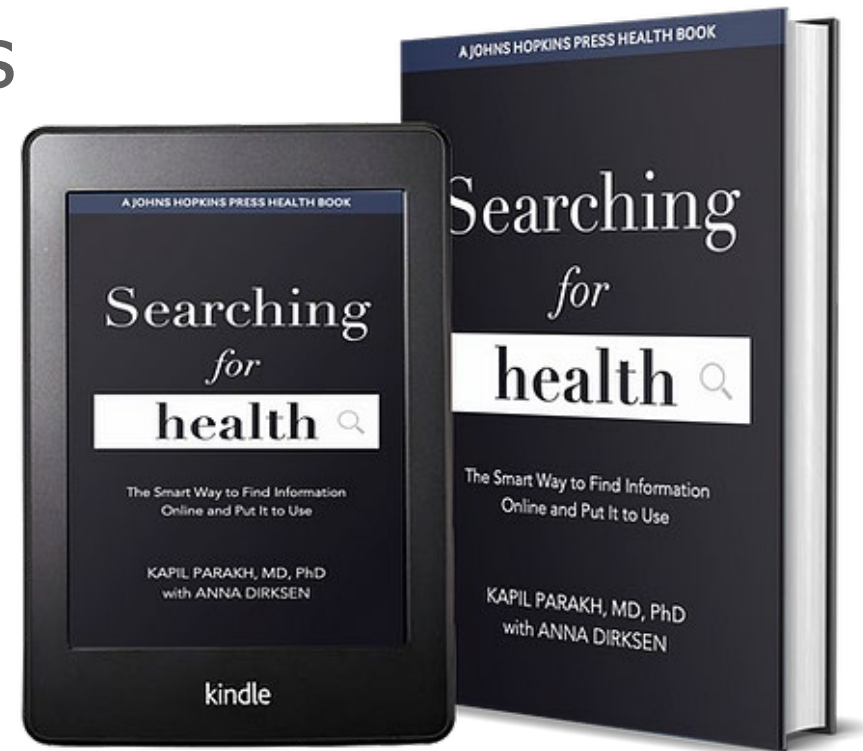


Searching for Health

The goal is to empower readers through:

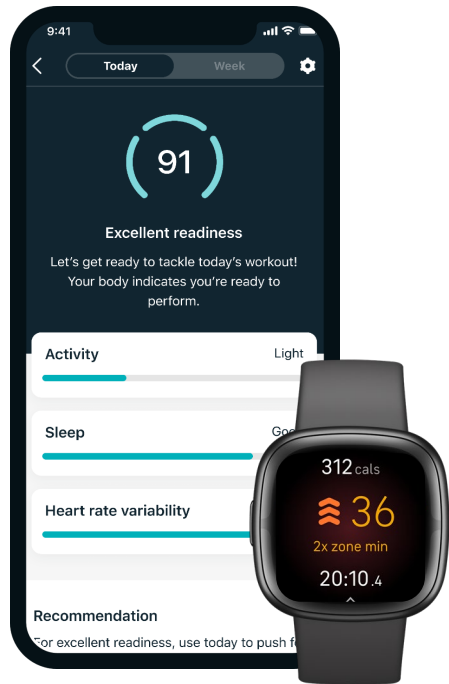
- Engaging, relatable anecdotes
- Evidence based insights*
- Practical tools*

* *over 100 references*



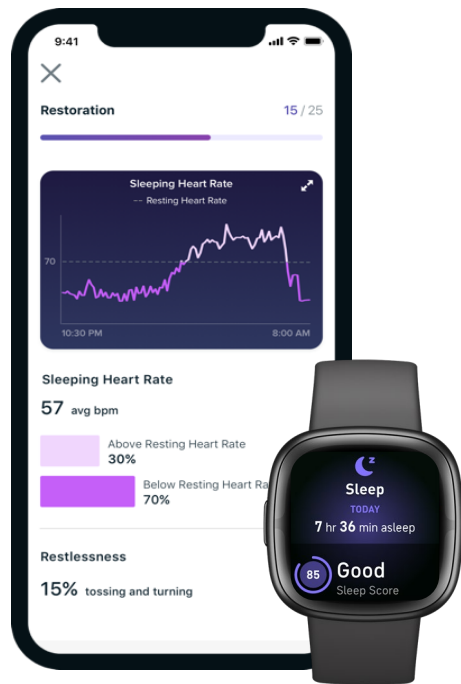
So much more than steps

Wearables have evolved from tracking your steps, to providing a 24/7 personalized health and wellbeing companion



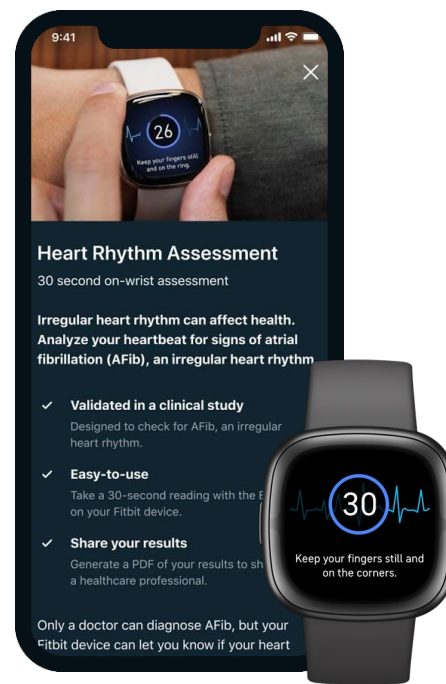
Activity

Readiness Score
Active Zone Minutes



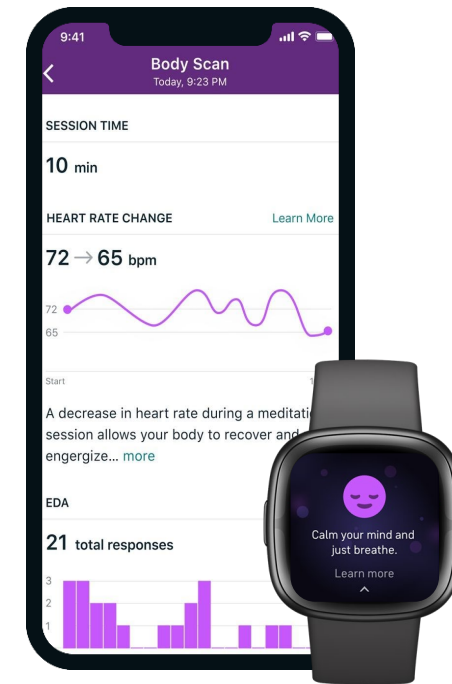
Sleep

Sleep Stages
Snore Detect



Heart Health

Continuous HR
ECG app
HR Zones
PPG Afib



Mindfulness

EDA
Stress Score
Relax app



Health Metrics

HRV
SpO2
BR



Wearables across the care continuum



Employee Health & Wellness

Provider Burnout & Retention

Research

Population Health

Promoting health & wellness

Cardiometabolic Health

Weight management

Lifestyle behavior change

Chronic Disease Support

Metabolic Health

Heart Health

Promoting healthy lifestyles in patients

Primary Care

Speciality Care

Direct-to-Employer

Wellness programming

Understanding lifestyle metrics in virtual and on site settings

Community & Rural Health Support

Wellbeing at Home

Pre/Post Op Support

RPM

Thank you

If you have any questions, please reach out to kparakh@google.com

Data Strategy For Vulnerable Populations

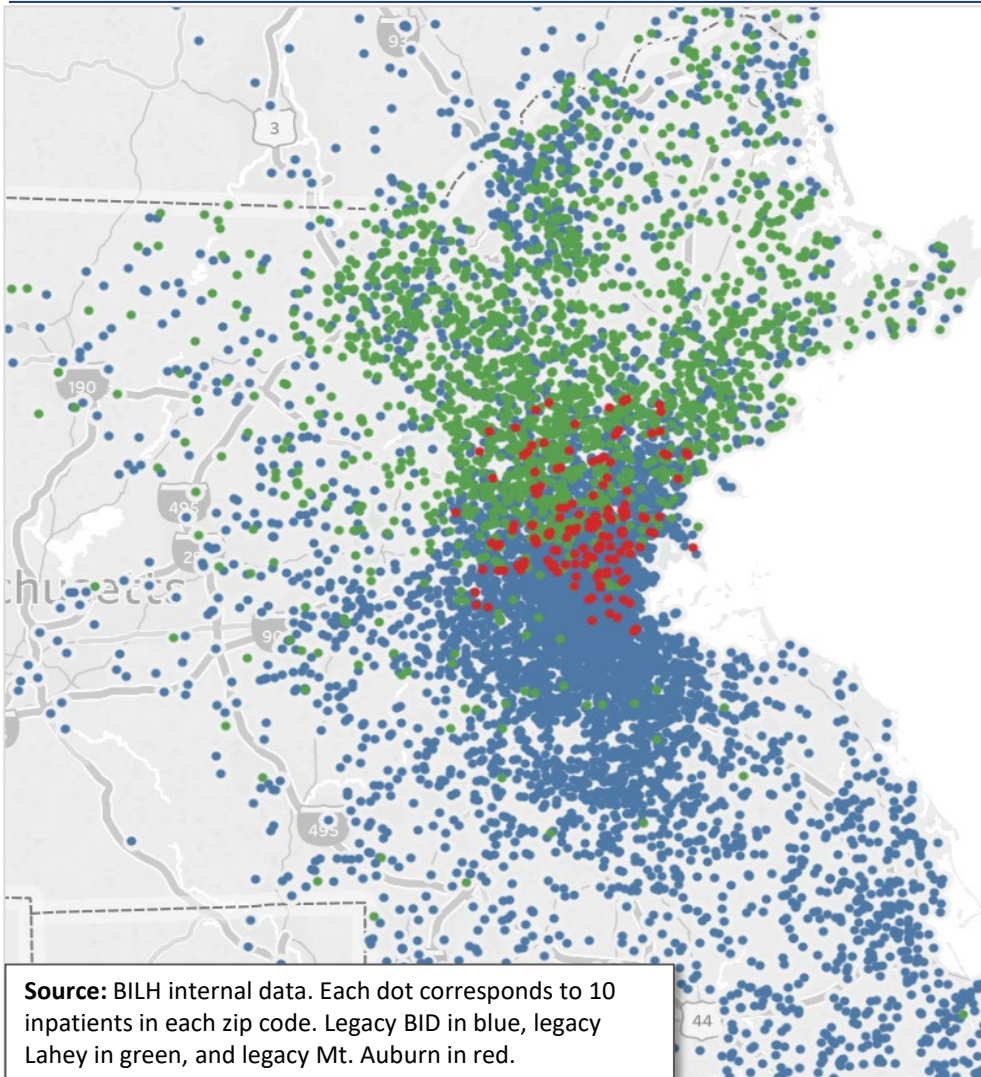
Rob Fields MD MHA
EVP, Chief Clinical Officer



Beth Israel Lahey Health

System Overview

Key Facts



Facilities	Hospitals	14
	Major Ambulatory Facilities	21
Clinicians	BILHPN PCPs	760
	Total BILHPN Physicians	4,582
	Patients	1.6 million
Clinical Operations	Operating Revenue	\$6.4 billion
	Employees	35,000
	Discharges	133,000
	ED Visits	379,000
	Outpatient Encounters	3.9 million



Burden of Acquisition

Key Issue:

Our most *vulnerable populations* are asked for a *large volume of data* for various *well-intentioned purposes*. Program qualification (SNAP, grants, public housing, etc), screening for resources referrals, and other processes all require specific data points, often of a personal nature, to *ensure distribution of limited resources*.



1

Burden of Acquisition

Key Questions

1. Can we make use of “passive” data sources to accomplish similar goals?
2. Can we use consent agreements to help capture necessary data with less burden to the patient?
3. How are operations aligned across the system to avoid duplication of data requests?
4. How is this data used and who has access?
5. What is the vehicle by which we collect this data from patients?



2 Impact

Key Issue:

SDH data can be *indirect*, such as data from consumer or publicly available sources, or *directly from the patient* themselves. While the former is easier to obtain, it is less useful outside of initiative planning. At the individual patient level, it is not precise enough and very difficult to use for initiating care management. Direct data from the patients themselves is very specific and generally of high quality but *work intensive* to capture and the *responsibility* of finding a remedy is much greater.



2

Impact

Key Questions

1. What is the purpose of having SDH data for my population?
2. How does publically available data support this purpose and what are the gaps?
3. How will I capture that data from my patients and what value is it to them?
4. Is the SDH data I have actionable and if so, what actions specifically will I take?



3

Responsibility

Collecting and using SDH data comes with a great deal of **responsibility**. While technically not dissimilar to clinical data in its sensitivity, patients may or may not **expect** their clinicians to ask, collect, purchase or otherwise engage in conversations about their social circumstances. While it may be welcomed, proceeding down this path sets a high level of expectation in regards to **data protection AND remedy** given the **potentially traumatic nature** of not only someone's life circumstance, but also the sharing of those circumstances with our teams.

3

Responsibility

Key Questions

1. What is our process to provide a remedy to patients once we identify social care gaps?
2. How do we support our patients to coordinate these non-medical needs?
3. What is our community partnership strategy and operational plan (e.g. referrals, gap closure accountability, etc.)?
4. Why and how will the community-based organizations (CBOs) engage?
5. How can health systems use this work to better engage and support communities?



Thank You

Robert.Fields@BILH.ORG



JOHNS HOPKINS CENTER
FOR MOBILE TECHNOLOGIES
TO ACHIEVE EQUITY IN
CARDIOVASCULAR HEALTH



@CiccaroneCenter

@DoctorMarvelMD



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M E D I C I N E

Bridging the Digital Divide:

How Technology, Data, and Platforms Are Poised to Improve Health Equity

Francoise Marvel, MD

Assistant Professor, Johns Hopkins Division of Cardiology

Co-Director, Digital Health Innovation Lab

Director, Ciccarone Center Education and Scholarship

The Johns Hopkins Hospital





Disclosures

I have financial relationships with a commercial entity that is relevant to the content of this presentation

- Corrie Health, Co-Founder and Equity Ownership
- Apple, Research Support

I will not reference unlabeled or unapproved uses of drugs or other products

NIMH Health Disparities Framework

		Levels of Influence*			
		Individual	Interpersonal	Community	Societal
Domains of Influence <i>(Over the Lifecourse)</i>	Biological	Biological Vulnerability and Mechanisms	Caregiver–Child Interaction Family Microbiome	Community Illness Exposure Herd Immunity	Sanitation Immunization Pathogen Exposure
	Behavioral	Health Behaviors Coping Strategies	Family Functioning School/Work Functioning	Community Functioning	Policies and Laws
	Physical/Built Environment	Personal Environment	Household Environment School/Work Environment	Community Environment Community Resources	Societal Structure
	Sociocultural Environment	Sociodemographics Limited English Cultural Identity Response to Discrimination	Social Networks Family/Peer Norms Interpersonal Discrimination	Community Norms Local Structural Discrimination	Social Norms Societal Structural Discrimination
	Health Care System	Insurance Coverage Health Literacy Treatment Preferences	Patient–Clinician Relationship Medical Decision-Making	Availability of Services Safety Net Services	Quality of Care Health Care Policies
Health Outcomes		 Individual Health	 Family/ Organizational Health	 Community Health	 Population Health

National Institute on Minority Health and Health Disparities, 2018

*Health Disparity Populations: Race/Ethnicity, Low SES, Rural, Sexual and Gender Minority

Other Fundamental Characteristics: Sex and Gender, Disability, Geographic Region

Equity First

Every person has an opportunity to achieve optimal health regardless of:

- Race
- Education
- Gender identity
- Sexual orientation
- Employment
- Ability
- Neighborhood

EQUALITY



EQUITY

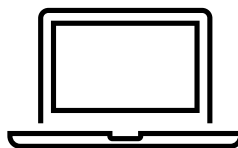


Digital Inclusion “Super” Social Determinant of Health (SDoH)

Smartphone Apps



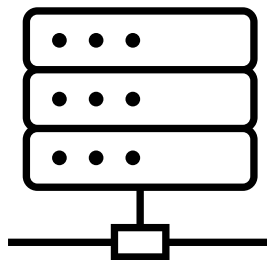
Virtual Clinics and
Data Visualization



Wearables and Sensors



Artificial Intelligence
Broadband
Internet



Coronary artery disease, PAD



Heart Failure



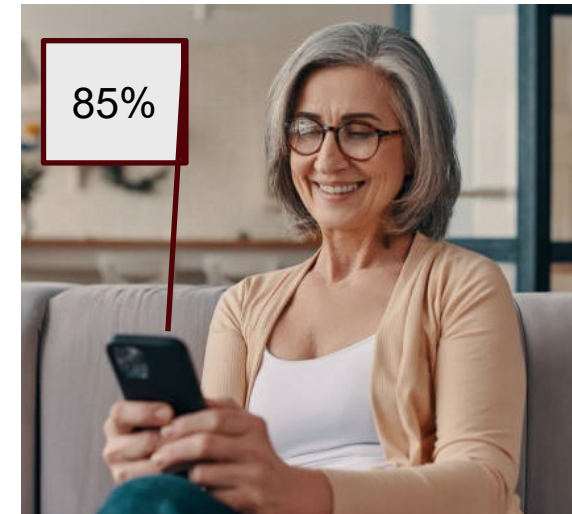
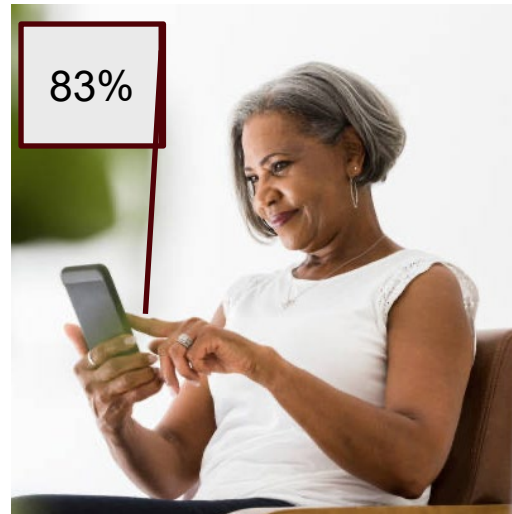
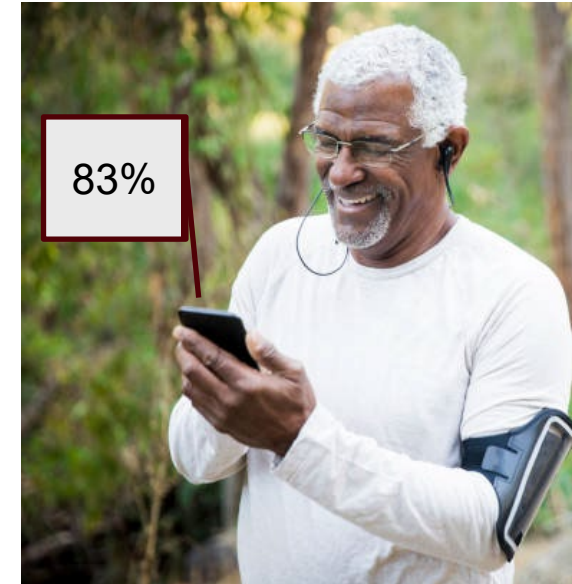
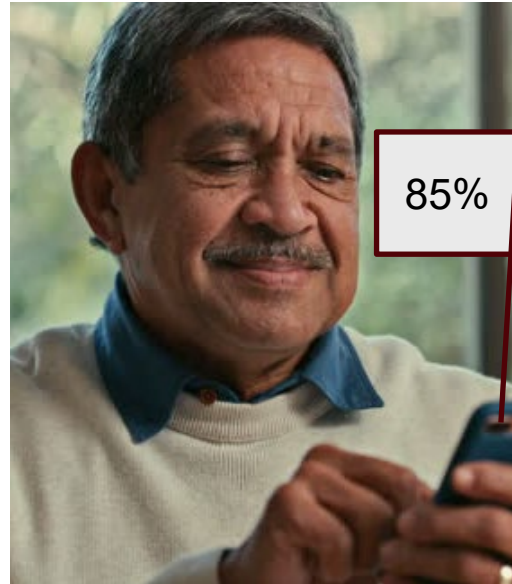
Atrial fibrillation



Cardiac Rehab

Smartphone Ownership: Diverse Groups

	Cellphone	Smartphone
Total	97%	85%
Men	97%	85%
Women	98%	85%
Ages 18-29	100%	96%
30-49	100%	95%
50-64	97%	83%
65+	92%	61%
White	97%	85%
Black	99%	83%
Hispanic	100%	85%
High school or less	96%	75%
Some college	98%	89%
College graduate	98%	93%
Less than \$30,000	97%	76%
\$30,000-\$49,999	97%	83%
\$50,000-\$74,999	97%	85%
\$75,000+	100%	96%
Urban	98%	89%
Suburban	97%	84%
Rural	94%	80%



Smartphone Usage Patterns: Health Info

Population research shows African Americans and Latinos rely heavily on **Smartphones for Health Info**:

Latino

73% Info about a health condition

African American

67% Info about a health condition

White

58% Info about a health condition

Diversity of Patient Use in Cardiology Virtual Visits

Table 1. Patient and Visit Characteristics of Ambulatory Cardiology Clinic Visits During the Pre-COVID and COVID-Era Periods^{a,b}

Characteristic	Visits, No. (%)					P value		
	Pre-COVID visits (all in person)	COVID-era visits				Pre-COVID vs COVID-era	In-person vs video ^c	In-person vs telephone ^c
Overall	87182	89 599	74 498 (83.2)	4720 (5.3)	10 381 (11.6)	NA	NA	NA
Age, mean (SD), y	67.66 (17.32)	68.56 (16.66)	69.04 (16.65)	61.09 (16.49)	68.44 (15.99)	<.001	<.001	<.001
Sex								
Female	38 926 (44.6)	40 646 (45.4)	33 441 (44.9)	1968 (41.7)	5237 (50.4)	.01	<.001	<.001
Male	48 249 (55.3)	48 947 (54.6)	41 051 (55.1)	2752 (58.3)	5144 (49.6)			
Race								
American Indian	180 (0.2)	152 (0.2)	126 (0.2)	7 (0.1)	19 (0.2)	<.001	.01	<.001
Asian	5973 (6.9)	5390 (6.0)	4202 (5.6)	378 (8.0)	810 (7.8)			
Black	6366 (7.3)	6784 (7.6)	5321 (7.1)	390 (8.3)	1073 (10.3)			
Hispanic	4661 (5.3)	4401 (4.9)	3482 (4.7)	255 (5.4)	664 (6.4)			
White	62 264 (71.4)	64 816 (72.3)	54 789 (73.5)	3283 (69.6)	6744 (65.0)			
Other	4408 (5.1)	4383 (4.9)	3618 (4.9)	235 (5.0)	530 (5.1)			
Pacific Islander	122 (0.1)	131 (0.1)	103 (0.1)	7 (0.1)	21 (0.2)			
Unknown	3208 (3.7)	3542 (4.0)	2857 (3.8)	165 (3.5)	520 (5.0)			
Insurance								
Medicaid	1324 (1.5)	1104 (1.2)	821 (1.1)	90 (1.9)	193 (1.9)	<.001	<.001	<.001
Medicare	48 380 (55.5)	46 993 (52.4)	39 567 (53.1)	1891 (40.1)	5535 (53.3)			
Other	1040 (1.2)	851 (0.9)	679 (0.9)	75 (1.6)	97 (0.9)			
Private	34 063 (39.1)	32 300 (36.0)	25 474 (34.2)	2562 (54.3)	4264 (41.1)			
Unknown	2375 (2.7)	8351 (9.3)	7957 (10.7)	102 (2.2)	292 (2.8)			
Visits/patient, mean (SD), No.	2.33 (2.11)	2.56 (2.7)	2.47 (2.69)	1.48 (0.97)	1.51 (1.09)	<.001	<.001	<.001
Visit length, mean (SD), min	28.98 (15.12)	25.51 (13.69)	25.45 (13.76)	28.83 (11.88)	24.46 (13.70)	<.001	.50	<.001
Encounter diagnoses								
Coronary artery disease	24 600 (28.2)	25 161 (28.1)	20 363 (27.3)	1265 (26.8)	3533 (34.0)	.53	.04	<.001
Hypertension	37 166 (42.6)	38 546 (43.0)	31 359 (42.1)	2006 (42.5)	5181 (49.9)	.10	.87	<.001
Atrial fibrillation or flutter	16 706 (19.2)	17 061 (19.0)	13 292 (17.8)	1343 (28.5)	2426 (23.4)	.52	<.001	<.001
Heart failure	14 319 (16.4)	14 334 (16.0)	10 488 (14.1)	1172 (24.8)	2674 (25.8)	.02	<.001	<.001
Diabetes	7809 (9.0)	8456 (9.4)	7040 (9.4)	413 (8.8)	1003 (9.7)	<.001	.65	.02
Valvular disease	19 148 (22.0)	18 051 (20.1)	15 475 (20.8)	617 (13.1)	1959 (18.9)	<.001	<.001	<.001
Chronic kidney disease	3579 (4.1)	4182 (4.7)	3112 (4.2)	243 (5.1)	827 (8.0)	<.001	.001	<.001

Abbreviation: NA, not applicable.

^b All comparisons performed using *t* test.

^a Pre-COVID period was considered from April 1, 2019, to December 31, 2019. COVID-era was considered from April 1, 2020, to December 31, 2020.

^c In-person refers to COVID-era in-person visits.

Cross-sectional study of **176,781 ambulatory cardiology visits**

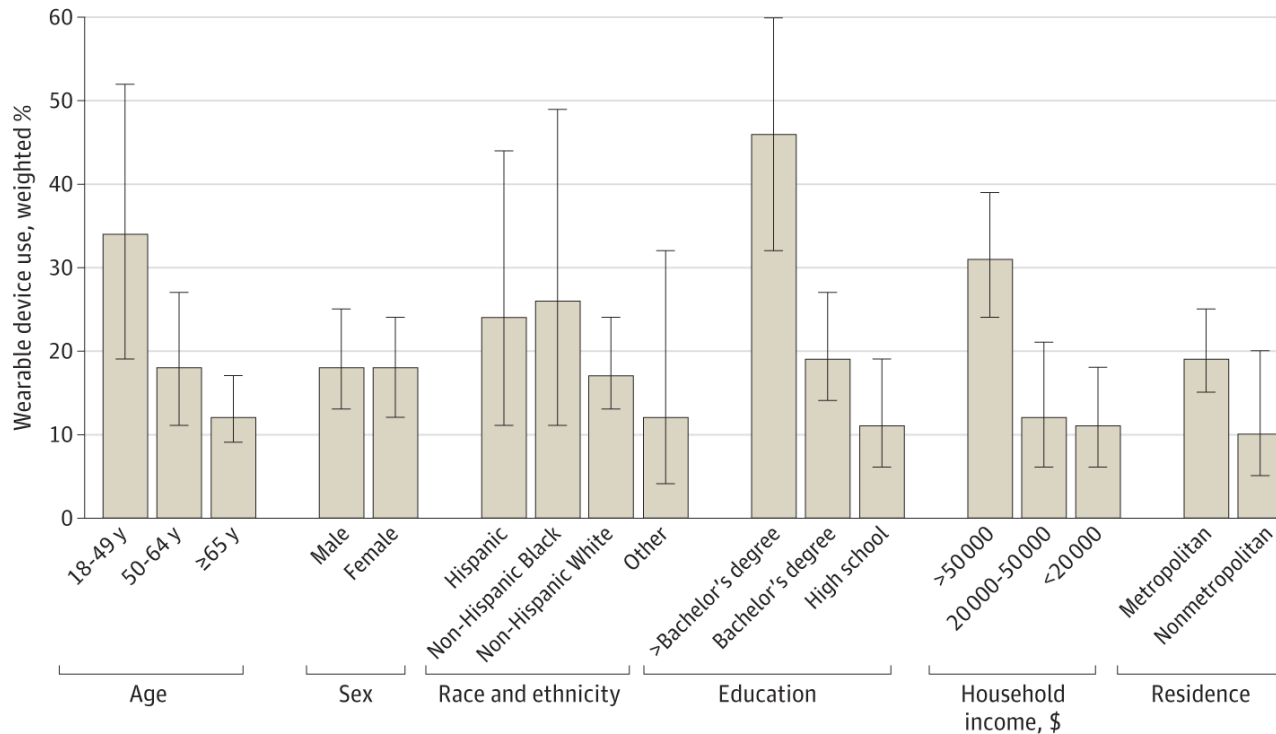
Patients using COVID-era remote visits were more likely to be **Asian, Black, or Hispanic individuals**, have private insurance, and have cardiovascular comorbidities.



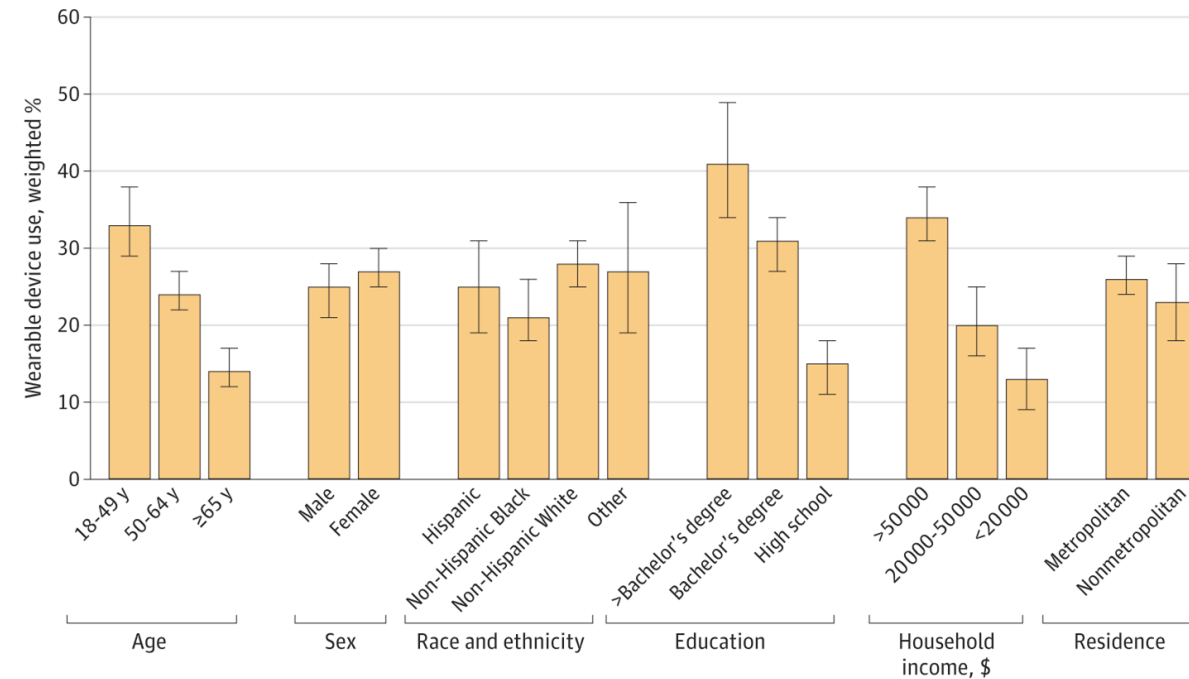
Wearable Device Use Among US Adults with CVD

- <1 in 4 use wearable devices
- Current use patterns could exacerbate disparities unless there are strategies to ensure equitable adoption.

A Wearable device use among US adults with CVD



B Wearable device use among US adults at risk for CVD



Wearable Device Use Across Demographic and Socioeconomic Subgroups Whiskers indicate 95% CIs. CVD indicates cardiovascular disease.

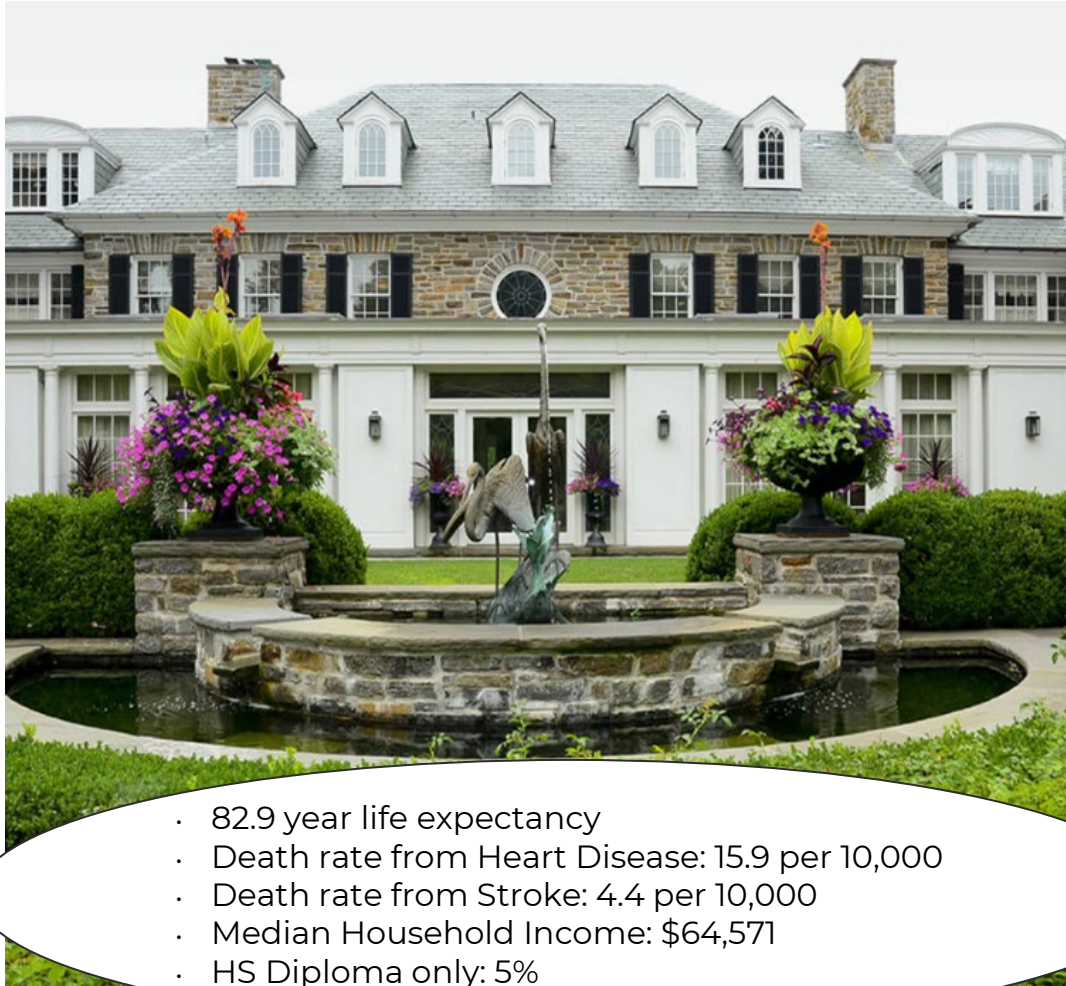
Lessons Learned at Johns Hopkins

A Tale of 2 Baltimore: 5 miles is a difference of life or death



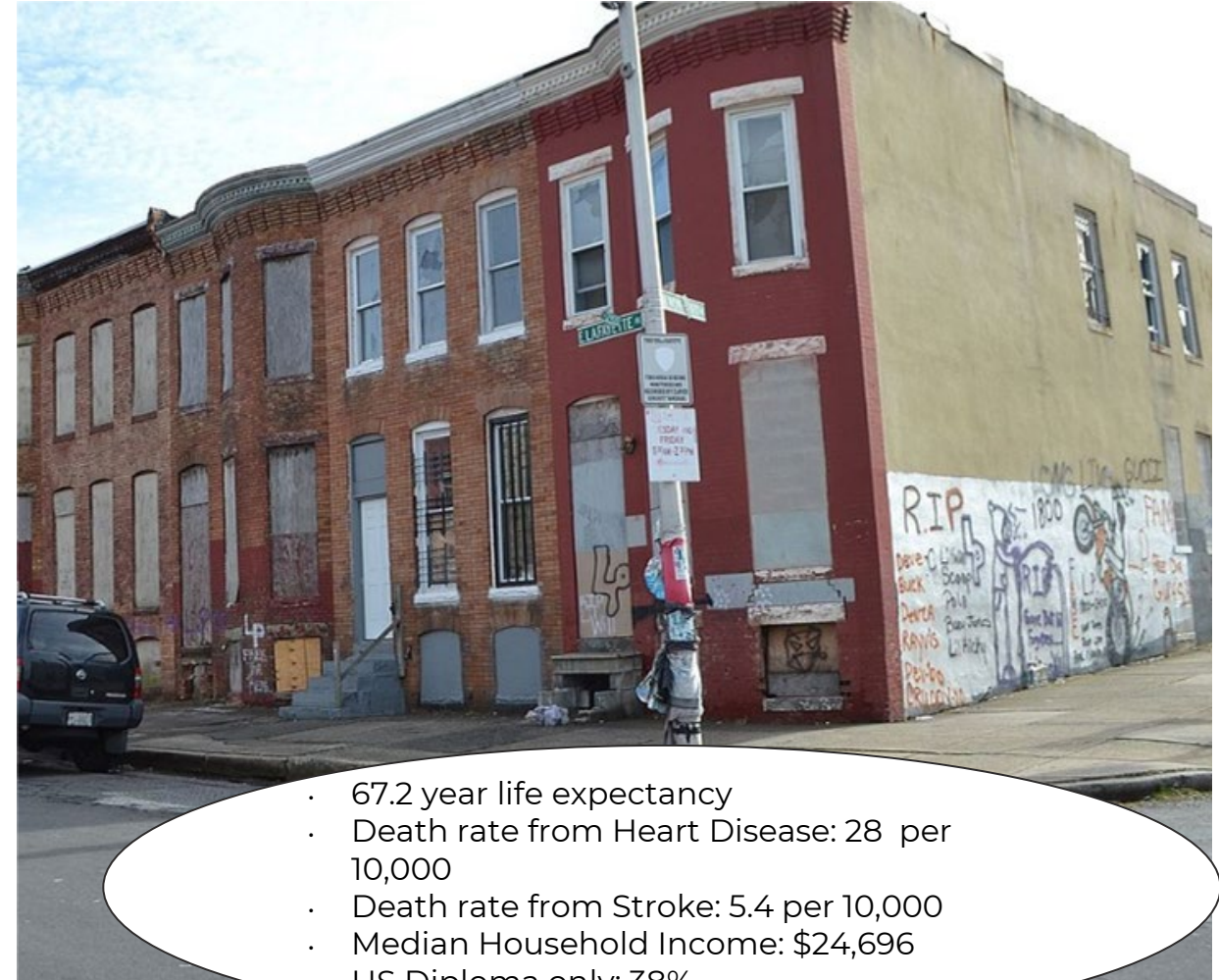
Health Disparities in Baltimore, Maryland

Roland Park:



- 82.9 year life expectancy
- Death rate from Heart Disease: 15.9 per 10,000
- Death rate from Stroke: 4.4 per 10,000
- Median Household Income: \$64,571
- HS Diploma only: 5%

Clifton-Berea:



- 67.2 year life expectancy
- Death rate from Heart Disease: 28 per 10,000
- Death rate from Stroke: 5.4 per 10,000
- Median Household Income: \$24,696
- HS Diploma only: 38%

MiCORE Trial Myocardial infarction, Combined-device Recovery Enhancement

1,064

Heart Attack Patients

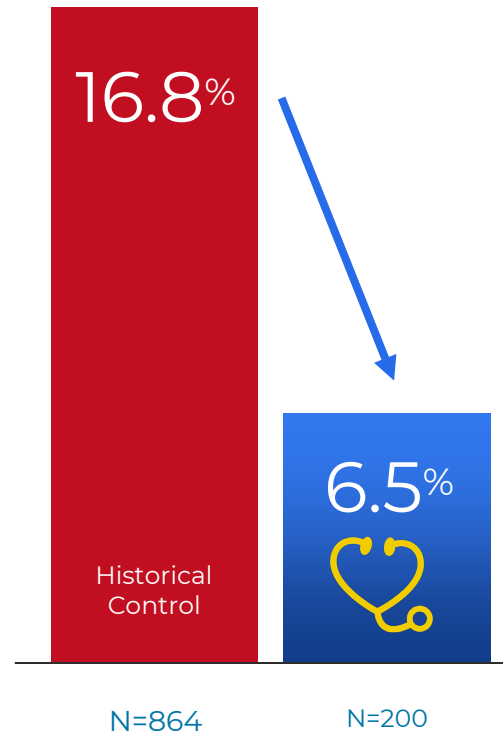


Erin Spaulding, PhD

Seth Martin, MD MHS



PRIMARY OUTCOME: 30-Day All Cause Readmissions



SECONDARY OUTCOMES:

>90% Engagement

Cost savings:

\$10K per patient **\$15K** per QALY



Can be deployed
in high acuity
settings



SOURCES:

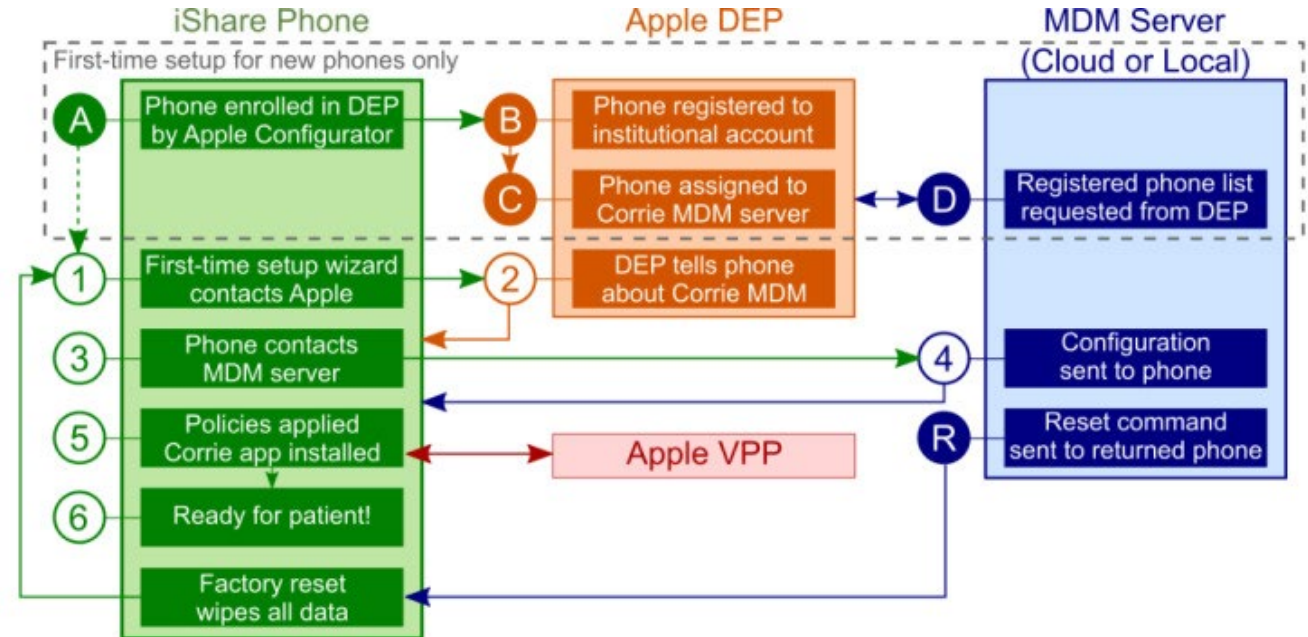
Circ Cardiovasc Qual Outcomes. 2021 Jul;14(7):e007741.

Medical Care. 2021 Nov 1;59(11):1023-1030.

Shareable Devices: iShare for Equity in Technology



Photo Permission Provided by Patient



Limited Data Use: Equity in Technology



**EmPOWERED
To Serve™**

**Health
Techuity™**

Case report

Mobile health application platform 'Corrie' personalises and empowers the heart attack recovery patient experience in the hospital and at home for an underserved heart attack survivor

Patient's perspective Meet Tammy

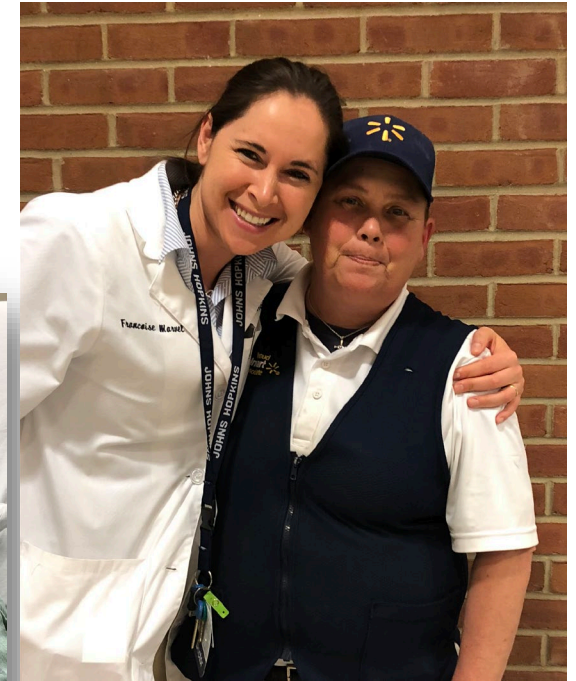


Photo Permission Provided by Patient

mTECH REHAB Trial

Human Centered Design

In partnership with the Johns Hopkins Center for Health Equity, we developed a human centered design process that sets a new standard for excellence in health technology development



Nino Isakadze, MD MHS

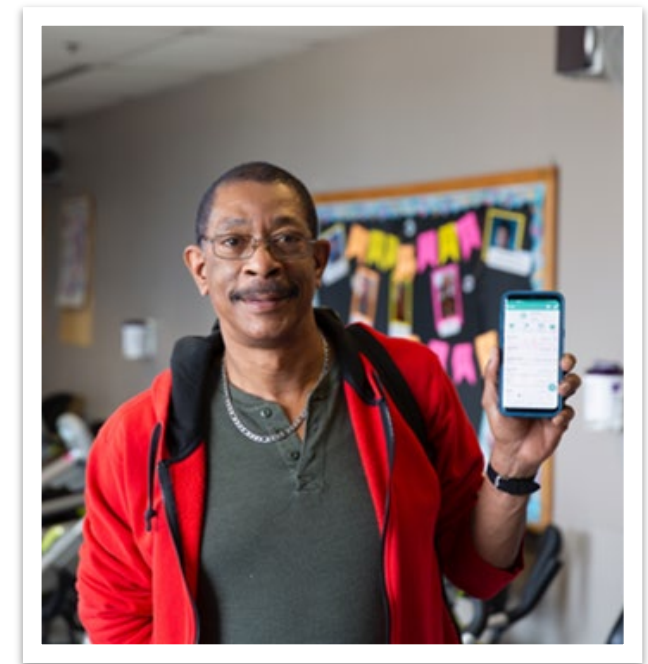


Photo Permission Provided by Patient.

mTECH REHAB Trial

Impact of mobile Technology Enabled Corrie Cardiac Rehab Program on CV Outcomes



American Heart Association

ASCVD Patients
(Adult patients admitted with STEMI, NSTEMI, CABG, PCI)

Exclusion Criteria
(LVEF<40%, ventricular arrhythmia, cardiogenic shock, ischemia)

1:1 Randomization

n=252

n=252

Virtual CR

Control Usual care

Follow up at 16 weeks

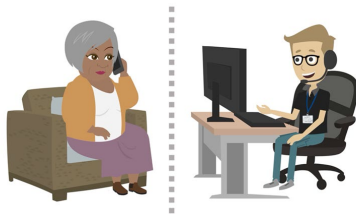
App and Devices



Clinician Dashboard



Health Coaching



Primary outcome

- 6 min walk test

Key secondary outcomes

- LDL-C
- BP, weight
- Psychosocial factors
- Engagement metrics
- Safety outcomes
- Cost of care



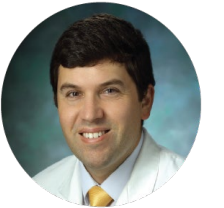
Lena Mathews, MD MHS



Nino Isakadze, MD MHS



Chang Kim, MD PhD



Seth Martin, MD MHS

Bridging the Digital Divide



Trent Johnson, MD
Cardiology Fellow



Michael Chilazi, MD
Cardiology Fellow

BRIDGING THE DIGITAL DIVIDE

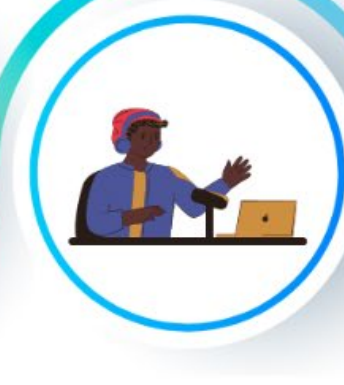
Using Digital Health and Education to Improve Cardiovascular Health in Baltimore, MD



STEP 01

Bring Leaders in Digital Health and Education Together

The *Corrie Health* Platform and *CardioNerds* Podcast will collaborate with ACC FIT and ACC Innovation sections.



STEP 02

Inform Clinicians about mHealth Tools

A podcast series will be delivered through *CardioNerds* to teach clinicians about mHealth and CVD



STEP 03

Deliver mHealth Tools in Local Communities

The *Corrie Health* mHealth tool will be utilized to screen for CVD risk factors amongst under-represented young adults



STEP 04

Generate Actionable Data

The impact of combined mobile health and digital education interventions will be studied to inform large scale digital health projects

Digital Health: Virtual Care Delivery, Access, Data

Advantages

- **Virtual visits** - reduced travel time / wait time. Less interruption of work schedule
- **Smartphones** - connectivity with resources, health apps, and clinical care team access
- **Wearables**- cost-effective methods for screening for arrhythmias, management of cardiovascular disease, and other lifestyle interventions
- **AI/Machine Learning** – large scale data interpretation, new models of prevention and disease detection

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Challenges

- Poor internet connectivity
- Device technology issues
- Comfort with technology
- Biases introduced with AI/ML
- Interoperability

Factors in Declining

- Privacy concerns
- Access to technology
- Preference in-person



Thank You

