DIGITAL MEDICINE SOCIETY

Digital Medicine R&D in Low-Resource Settings

Wednesday, December 8 at 11am-12pm ET

Santosh Shevade
Healthcare Consultant

Brinnae Bent, PhD
Digital Health Data Scientist
Edge Analytics

Amy Sheon, PhD, MPH
Digital Health Equity Consultant
Public Health Innovators, LLC

Prof Christopher James
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Isaac Rodriguez-Chavez, PhD, MHS, MS
SVP, Scientific & Clinical Affairs
ICON
Moderator

Housekeeping

- **This session will be recorded**
  - Slides and recording will be available on DiMe's webinar page after the session

- **Ask questions!**
  - **'Raise your hand'** in the Reactions and the moderator will unmute you, or
  - **Type your question** in the chat box

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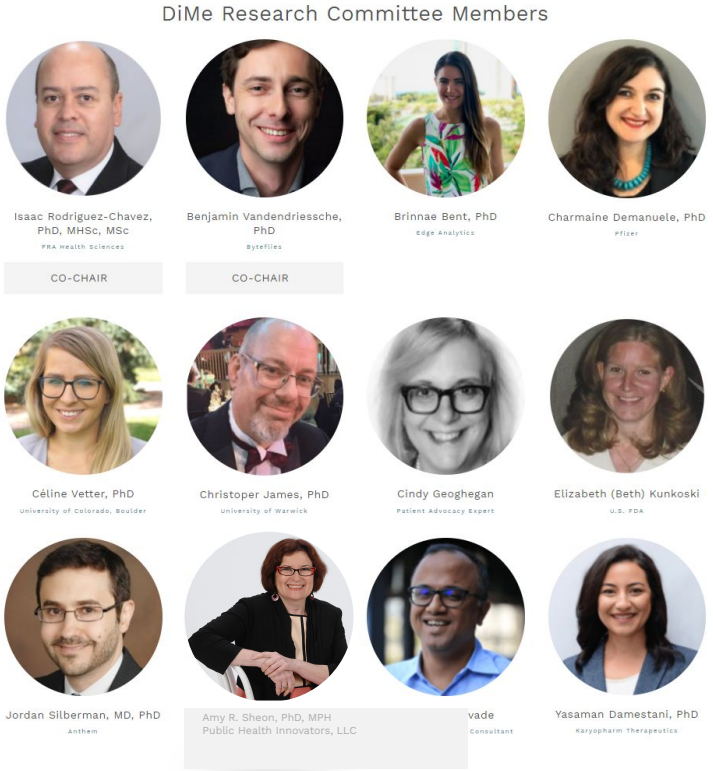
DiMe Research Committee



Source: https://www.dimesociety.org/research/dime-research-committee/

Santosh

Why are we talking about Digital Medicine in Low-Resource Settings?

Most impact areas of digital medicine match the needs in low-resource settings

- Efficient resource utilization
  - Financial
  - Human Resources
  - Infrastructure
- Optimal care delivery
- Affordability
- Learning Systems and Knowledge Management

...and more

Through our research group's initial work, we see a different picture so far

Through our research group's initial work, we see a different picture so far

- **Paucity** of systematic strategy> design> implementation for many digital medicine innovations
- **DiMe's** own work shows that research related to digital clinical measures not keeping pace with the rapid expansion & adoption of digital sensing products.
- **This** lack of evidence gathering in 'normal' settings continues to have domino impact on low-resource settings

Qualitative feedback received from the field suggest a worrying picture

- **Entrepreneurs** interested in designing/piloting/implementing digital medicine in low-resource settings face further fragmented picture of funding, regulations, and commercialization challenges.
- **Clinicians** in low-resource settings have clear ideas of what could be needed in field but are often not approached at all/only approached at later stages
- **User/patient** involvement has been nil/quite minimal and only empirical feedback is being collected.

Not all is lost!

- **Health** authorities and governments are taking more active role
  - **WHO** recently released a compendium innovative health technologies for low-resource settings 2021, which include interesting examples of digital medicine intervention products
- **DiMe** has been working actively in this field including it's work on Health Equity and Access Leadership (HEAL) Coalition.

We will continue to review this field, and push for more action!

- **Our** research group will continue to study the field, bring further insights from the field and ultimately aiming to provide practical tools for design, strategy and implementation of digital medicine in low-resource settings

Brinnae

V3 + U3

Comprehensive foundational evaluation framework for BioMeTs (Biometric Monitoring Technologies) incorporating V3 (Goldsack, et.al. 2020) and U3 (utility, usability, user experience).

A primary focus for the group has been on incorporating EDI (equity, diversity, and inclusion) into the U3 framework.

Team Members: Smit Patel, Sarah Valentine, Sunil Soni, Ninad Gujar, Ryan Bolick, Emre Sezgin, Elena Izmailova, Julien Dumail, Ben Vandendriessche, and Isaac Rodriguez-Chavez

What is usability?

Usability is concerned with the “effectiveness, efficiency and satisfaction with which specified end users achieve specified goals in particular environments” (ISO 9241-11)

Is the digital medicine product safe to use?

Is the digital medicine product easy and intuitive to use?

Do the end user(s) like the way the product is designed, looks, and feels?

Does the digital medicine product impede in any way daily living?

What is utility?

Utility refers to whether a digital medicine product has appropriate features to meet the needs of end users

Is the digital medicine product useful to the end user(s)?

Does the BioMeT meet the needs of the end user(s)?

What is user experience (UX)?

User experience (UX) is concerned with all aspects of the end user's level of satisfaction when interacting with the product

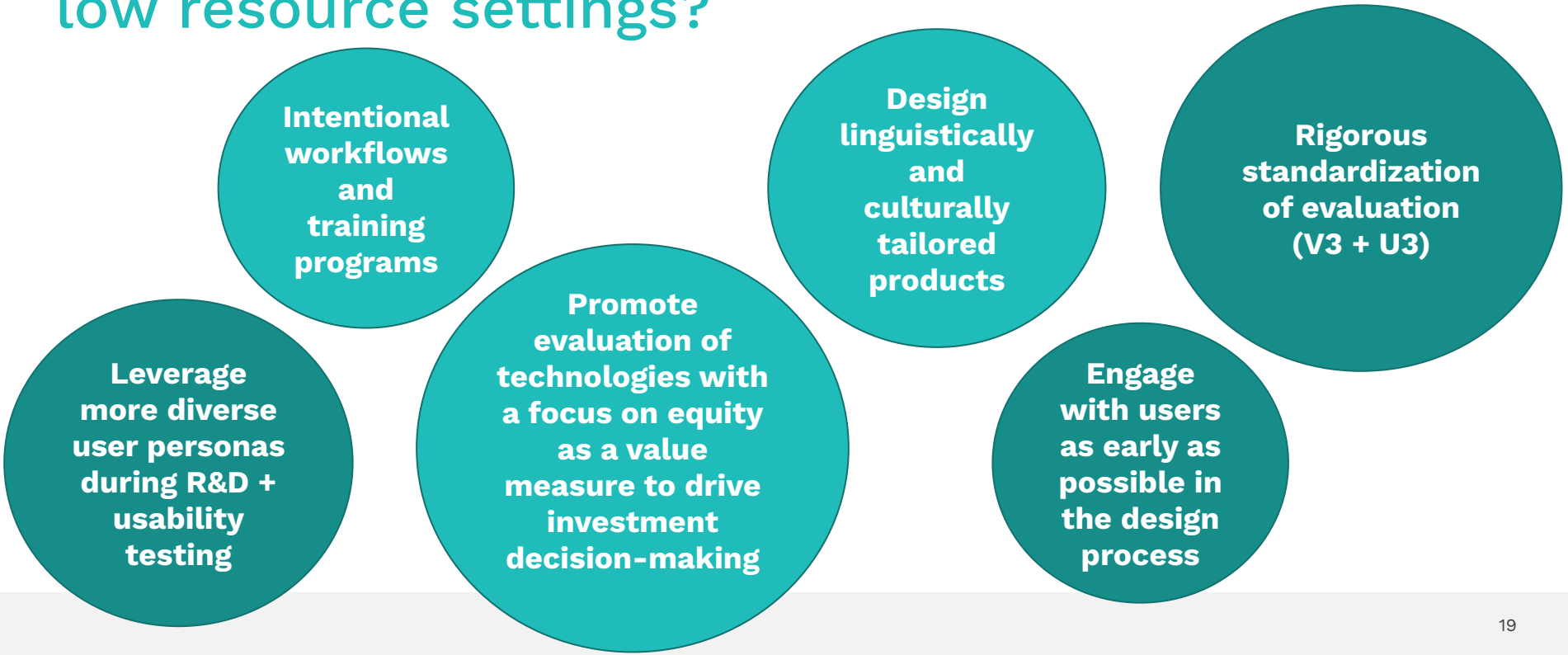
Is the BioMeT desirable - do end user(s) want to use it?

Does the end user(s) feel good about the BioMeT and the company/brand that makes it?

U3 considerations in low-resource settings

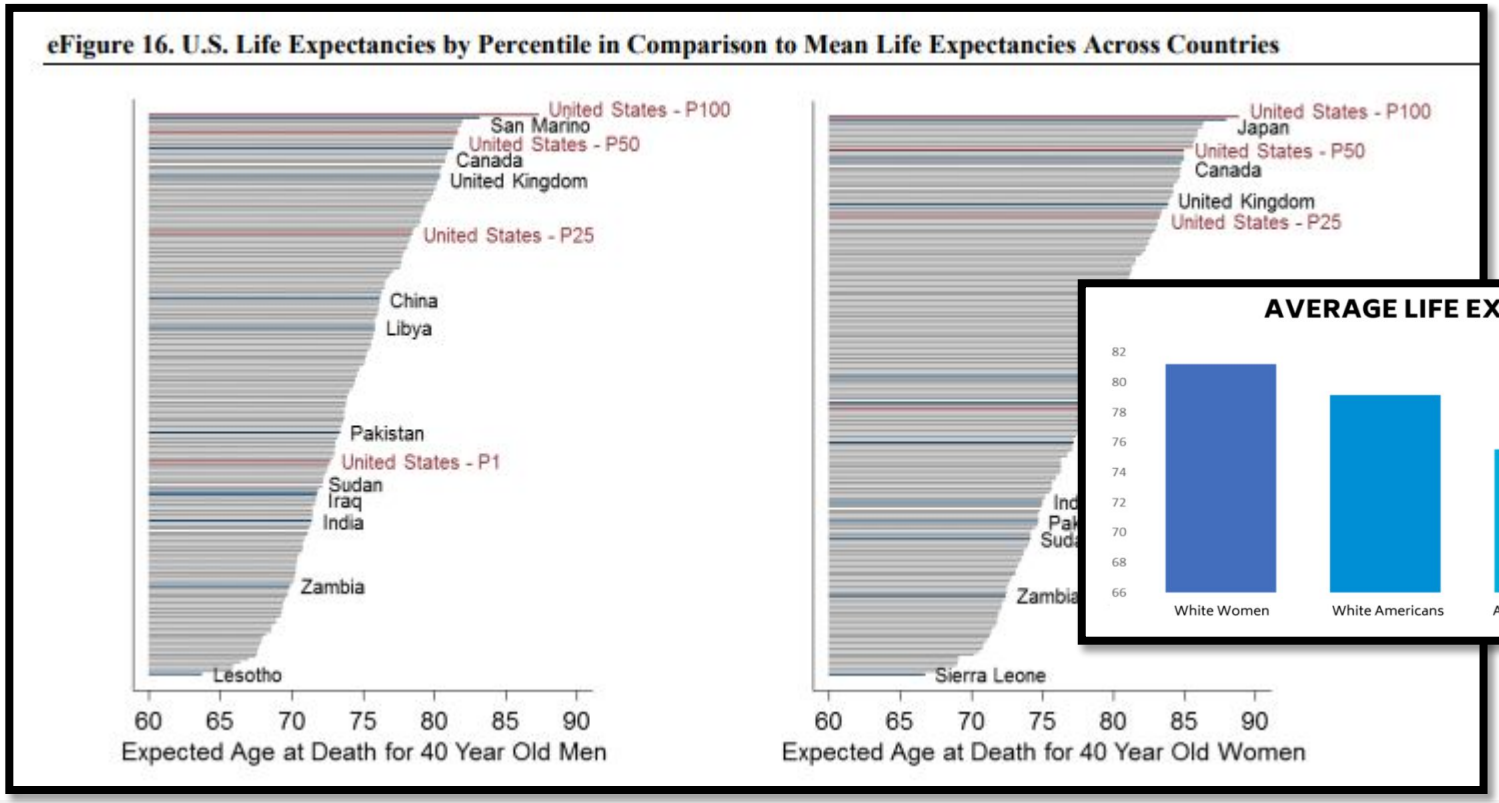
- Dependence on smartphones (BLE)
- Access to broadband internet
- Digital literacy
- Language barriers
- Lack of trust in technology
- Vulnerable populations (people with disabilities, older adults, children)
- Abandonment of wearables is 30% in the first 6 months

What can the digital medicine community do to make U3 R&D more inclusive and accessible in low resource settings?



Amy

Effect of Race & Income on Health

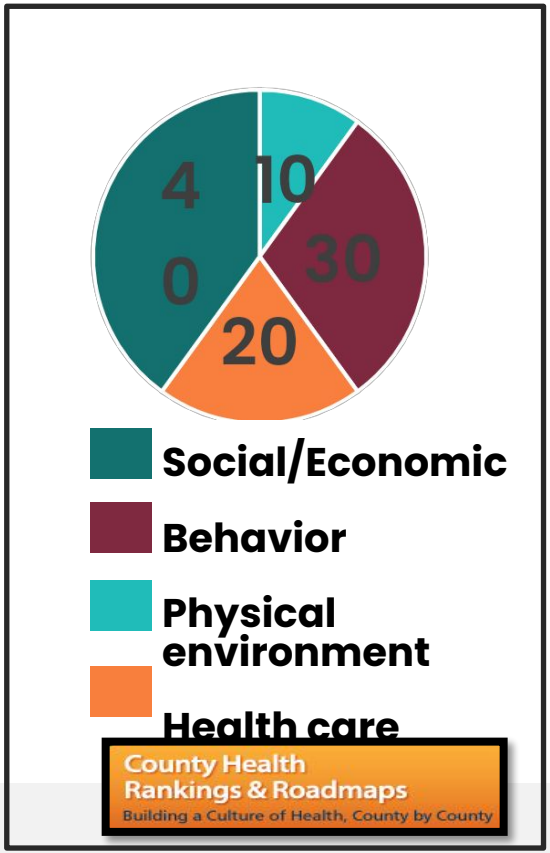


https://healthinequality.org/

The Health Inequality Project

https://www.jsi.com/racial-disparities-in-aging/

Digital Inclusion as a *SUPER* SDOH

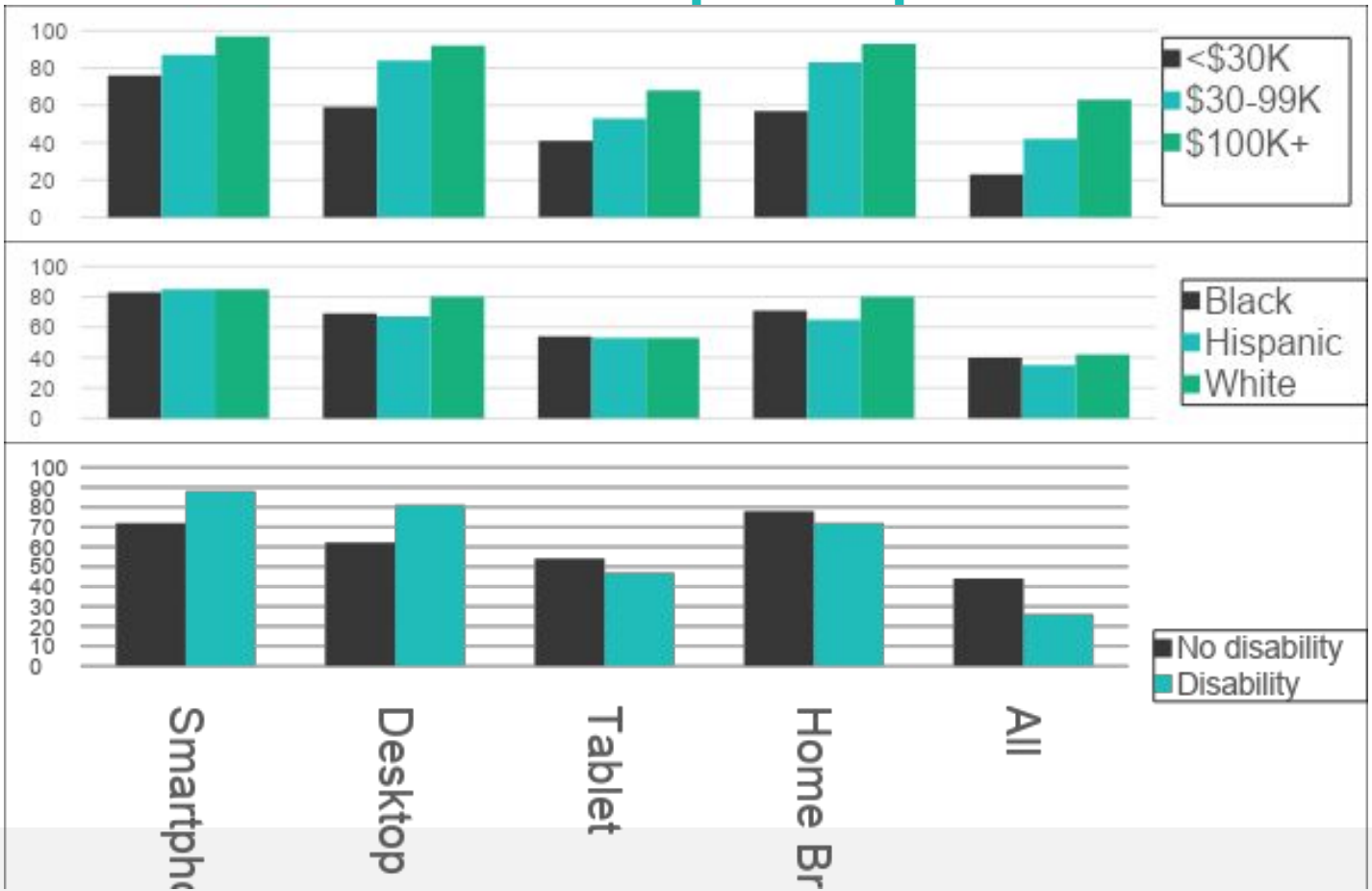


Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social integration	Health coverage
Income	Transportation	Language	Access to healthy options	Support systems	Provider availability
Expenses	Safety	Early childhood education		Community engagement	Provider linguistic and cultural competency
Debt	Parks	Vocational training		Discrimination	Quality of care
Medical bills	Playgrounds	Higher education		Stress	
Support	Walkability				
	Zip code / geography				

KFF
HENRY J KAISER FAMILY FOUNDATION

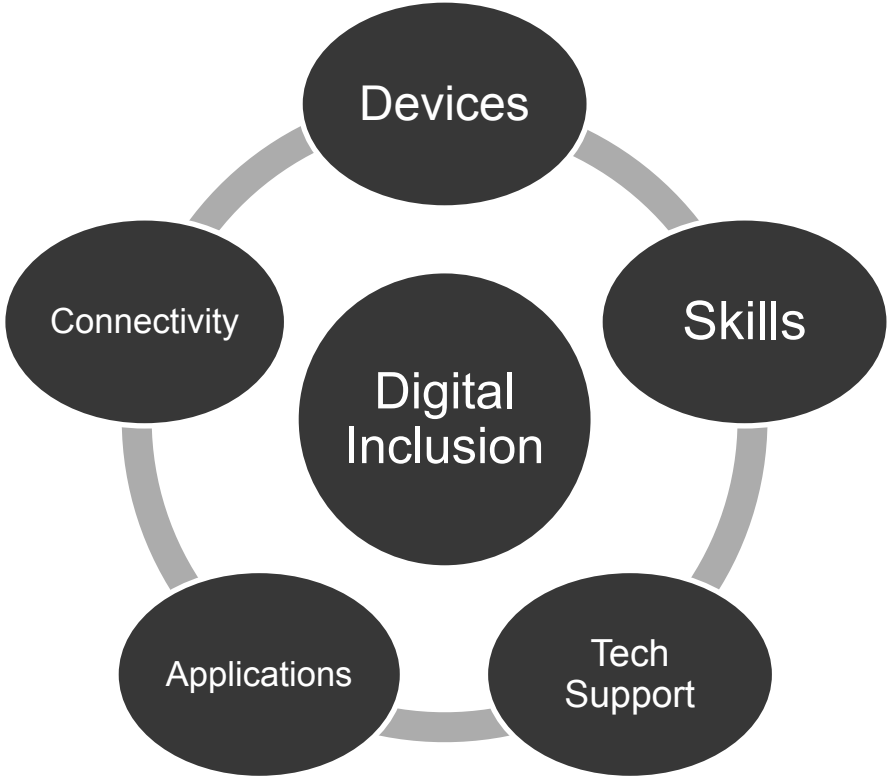
Device Ownership Disparities

Pew Research Center



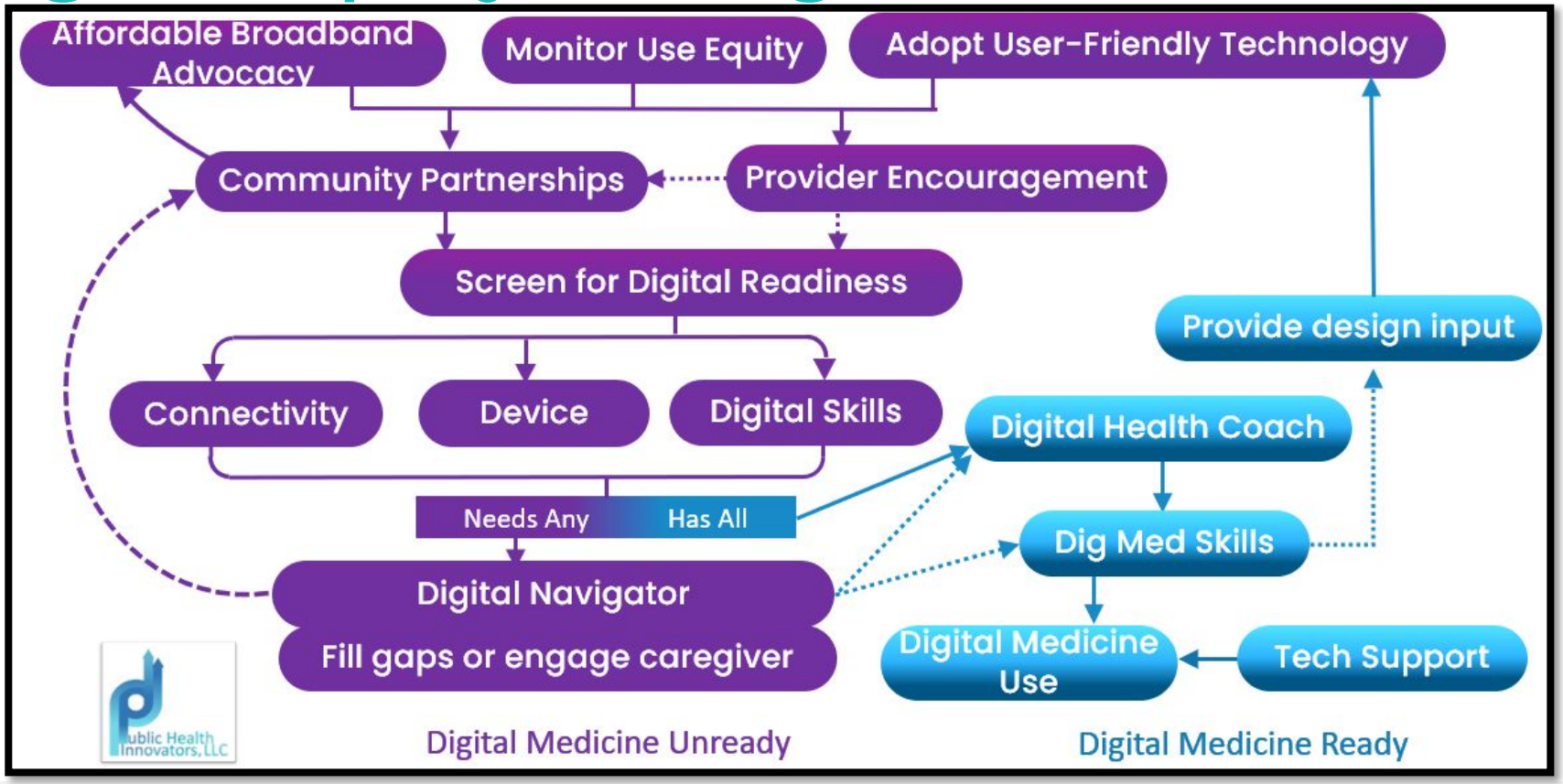
Digital Inclusion

Ensuring that all individuals and communities have access to digital tools and technology, and the skills to use them effectively



NDIA
NATIONAL DIGITAL INCLUSION ALLIANCE

Digital Equity for Digital Medicine



Learn More


Digital inclusion as a social determinant of health

Cynthia J. Sieck[1,2], Amy Sheon[3], Jessica S. Ancker[4], Jill Castek[5], Bill Callahan[6] and Angela Siefer[6]

npj Digital Medicine (2021)4:52 ; https://doi.org/10.1038/s41746-021-00413-8

https://www.nature.com/articles/s41746-021-00413-8.pdf


An Algorithm for Digital Medicine Testing: A NODE.Health Perspective Intended to Help Emerging Technology Companies and Healthcare Systems Navigate the Trial and Testing Period prior to Full-Scale Adoption

Amy R. Sheon[a] Brian Van Winkle[b] Yauheni Solad[c] Ashish Atreja[d]

https://www.karger.com/Article/FullText/494365

https://www.telehealthequitycoalition.org

Christopher to add slides here

Emerging model of healthcare

creates a challenging framework

Old model of care:

- Focus on acute conditions, reactive management
- Hospital centred, disjointed episodes
- Doctor dependent
- Patient as passive recipient; self care infrequent
- Use of ICT rare

New model:

- Focus on long term conditions, prevention & continuing care
- Integrated with people's lives in homes & communities
- Team based, shared record
- Patient as partner; self care encouraged & supported
- Dependent on ICT & devices

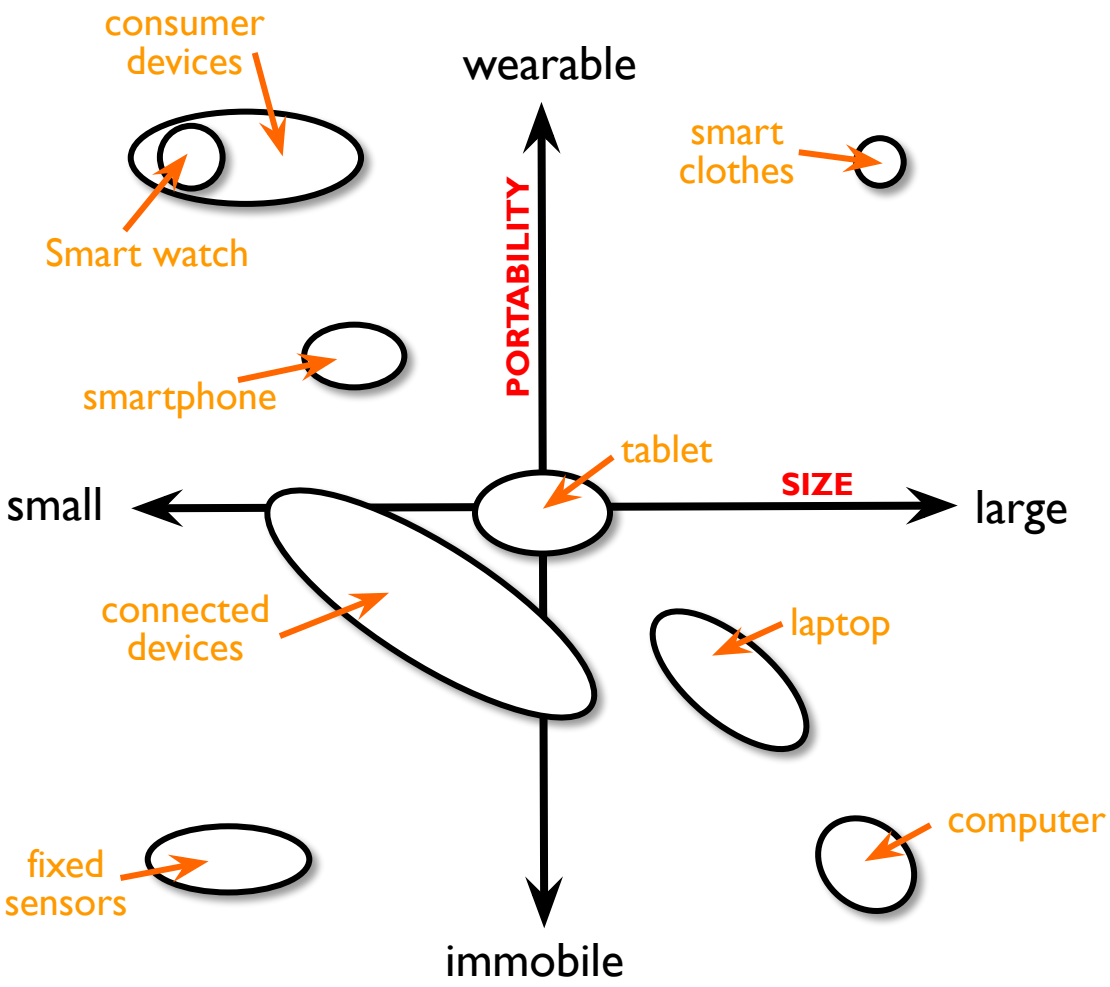

1.2 Million
wheelchair users in England


1.2 Million
wheelchair users in England
more than
half
will abandon
the product / service

Observations

> “We have no idea what the patient does outside the clinic; how the patient interacts with their tech on a daily basis.
>
> Further, We do not truly understand the compliance with, and efficacy of, individually prescribed healthcare tech.”

AT and RT clinician interviews, UoW, 2016


consumer devices
wearable
smart clothes
Smart watch
PORTABILITY
smartphone
tablet
SIZE
small
large
connected devices
laptop
computer
fixed sensors
immobile


HI, MOM AND DAD!.. I'M E-MAILING YOU A 3-D IMAGE OF THE BABY I JUST TOOK WITH THE SONOGRAM FUNCTION.
THESE iPHONES ARE AMAZING...

BIG DATA
IN A SINGLE DAY ONLINE

ENOUGH INFORMATION IS CONSUMED TO FILL
168 MILLION DVDS

294bn E-MAILS ARE SENT

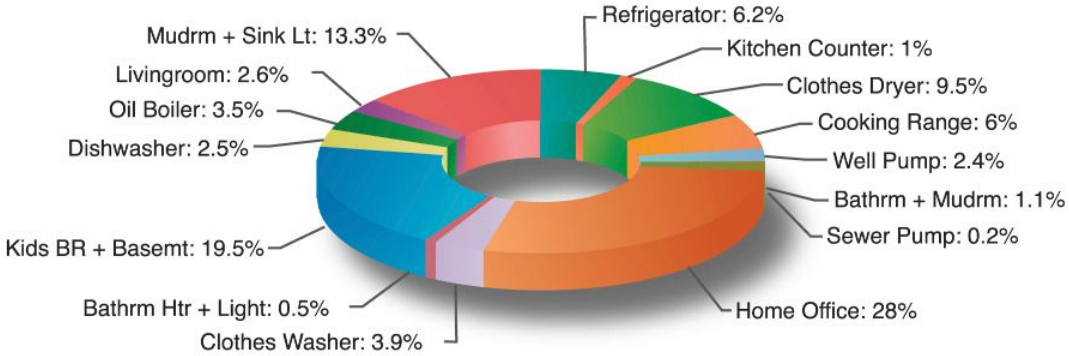
MINUTES SPENT ON FACEBOOK **4.7M**

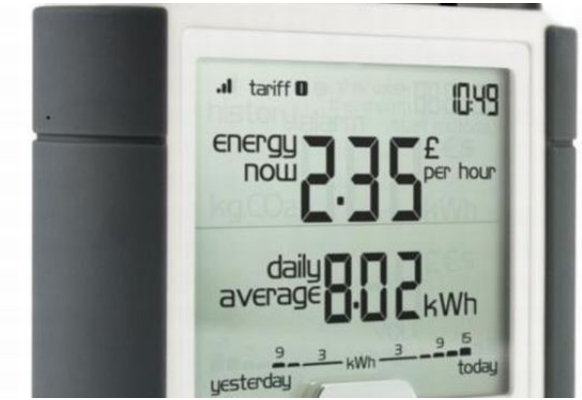
2 MILLION BLOG POSTS ARE WRITTEN

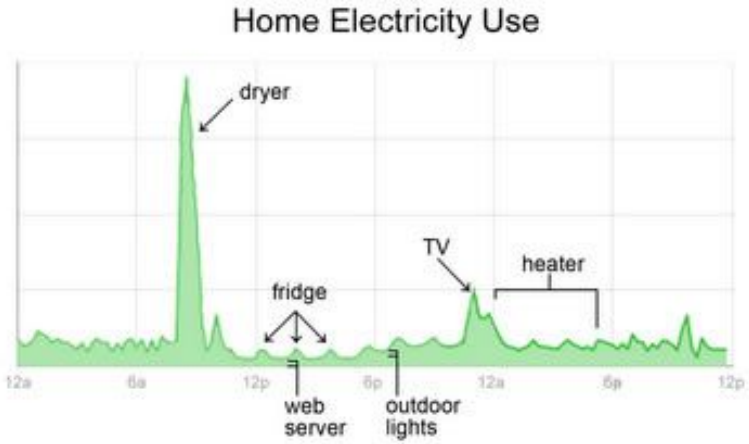
VIDEO UPLOADED TO YOUTUBE **864,000 HRS**

MORE IPHONES ARE SOLD **THAN BABIES BORN**

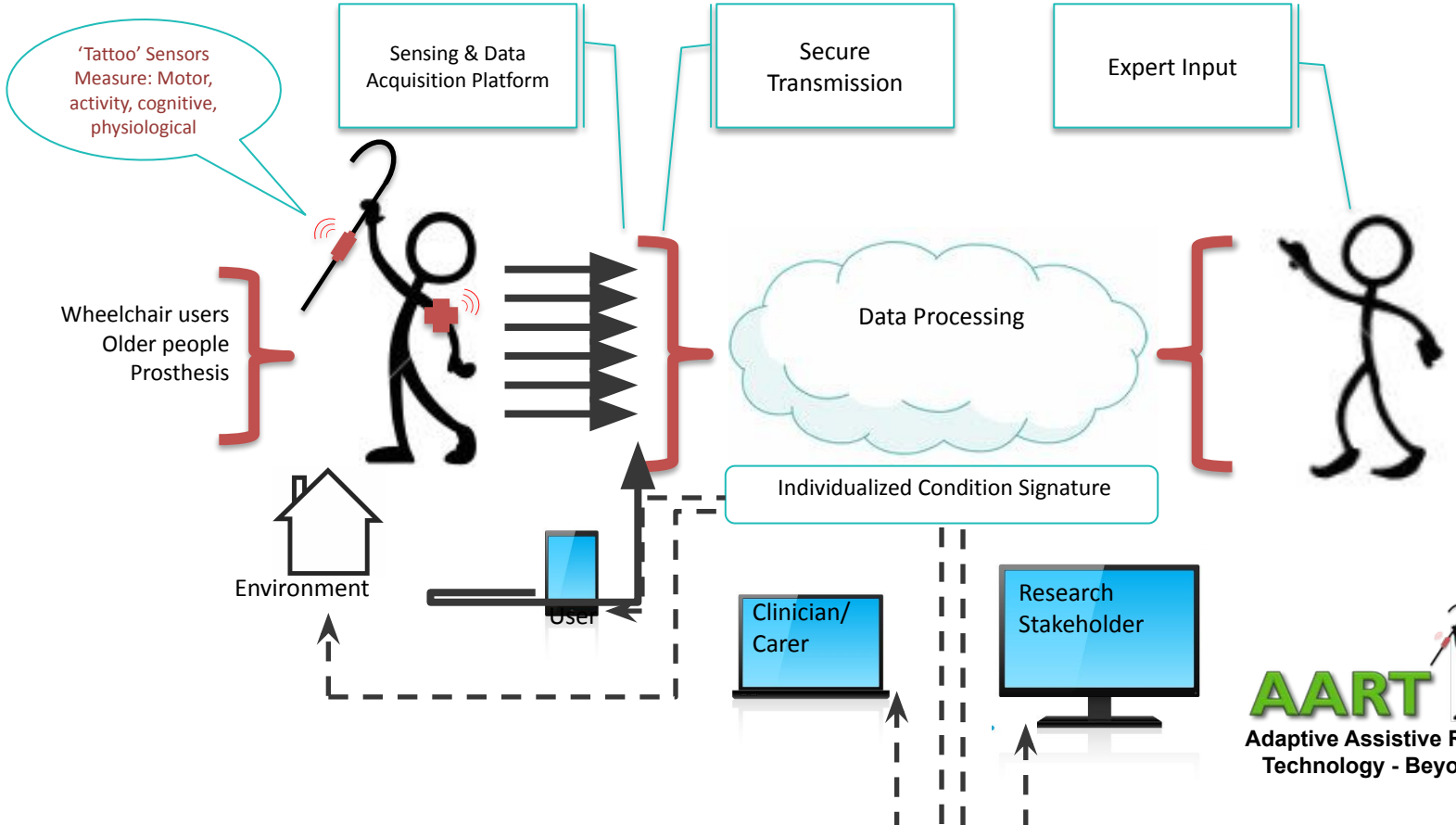
Where I've used electricity in the last 30 days







Individualized condition signature



AART BC
Adaptive Assistive Rehabilitative Technology - Beyond the Clinic

Conclusions: what is needed?

transforming healthcare of the future

- Changed mindset of end-users: patients & carers (policy makers)
- Not “patients” but end-users
- Pre-emptive efforts rewarded
- More integration with everyday technology (common language, standards)
- Agreed monitoring parameters (condition signatures)

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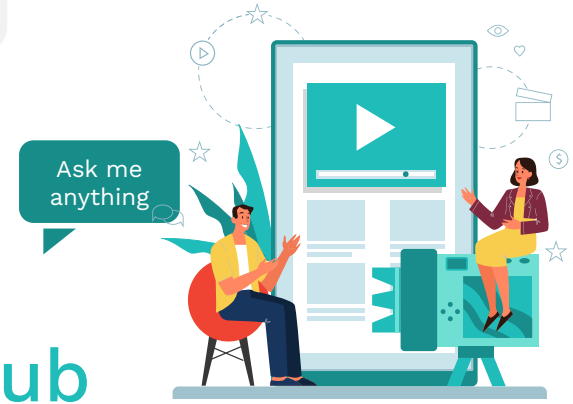

Virtual Journal club

npj | digital medicine

Digital medicine and the curse of dimensionality

December 14th, 2021
11a ET

Visar Berisha
Associate Professor, **Arizona State University** and Chief Analytics Officer at **Aural Analytics**

Jen Goldsack
Chief Executive Officer
DiMe

THANK YOU!

DIGITAL MEDICINE SOCIETY

Want to present at a future DiMe webinar? Reach out to us!

Michelle@dimesociety.org

@_DiMeSociety

linkedin.com/company/dime-society