

digitalhealth

AI + DATA

# Tackling health inequalities through data and research

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FAVOM

#AIDATA23

# Inequalities in data-driven health systems and digital health services

October 2023



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## Project summary

How has the accelerated adoption of data-driven technologies and systems during the pandemic affected inequalities, and what are the implications for health and social care looking forward?

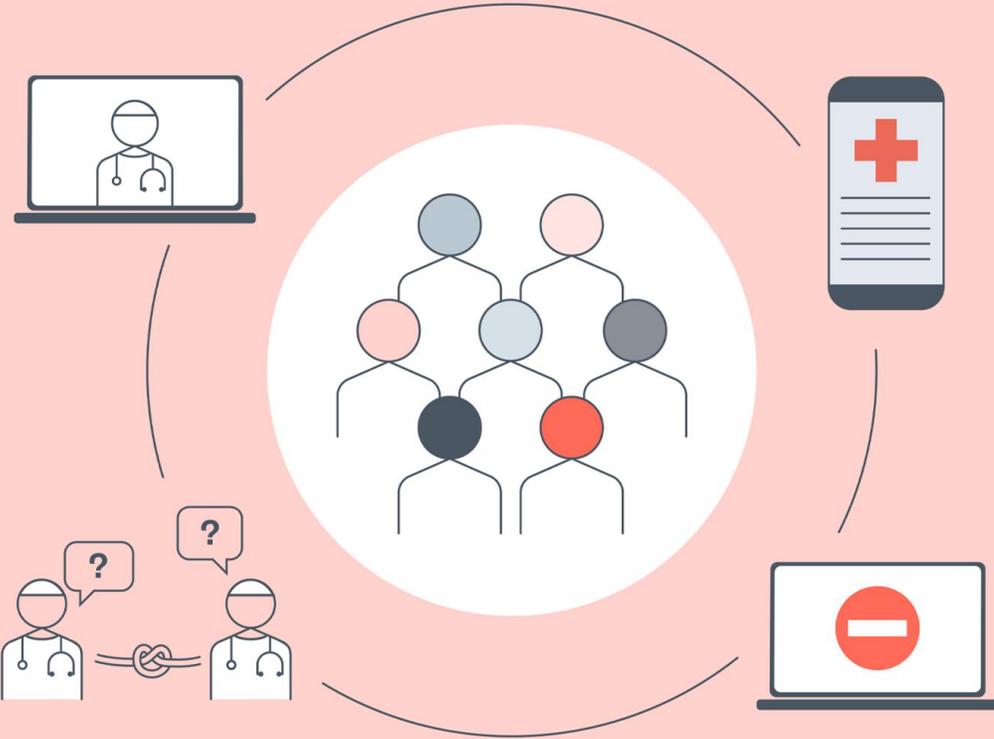


## Outputs

- Public attitudes survey – The Data Divide
- Landscape review – A Knotted Pipeline
- Ethnographic study – Access Denied?



# Policy briefing: Access Denied



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## Challenge 1



**Digital exclusion** compromises patients' experience of or access to medical care.

Digital exclusion also leads to gaps in data: if you cannot participate, your experiences are not recorded and technologies are not designed with you in mind.

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## Challenge 2



Developers and procurers of digital health services often **do not establish clear metrics** for what success looks like around health inequalities before a service is rolled out.

Impacts are also not monitored, understood and mitigated after a service is rolled out.

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## Challenge 3



People experiencing health inequalities **don't feel confident about how their data is being used or protected** by health and care organisations and national NHS bodies.

They may therefore be less inclined to participate in digital technologies, as they may not perceive that they will benefit them.

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## Challenge 4



At national levels, commissioners, developers, analysts and procurers of digital health services often **lack important social context in data** needed to understand the complexities of people's healthcare needs.

As a result they may fail to design and deploy their technologies to suit those needs.

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## Challenge 5



**Communication between different actors in the health data ecosystem is fragmented** – better coordination could improve datasets and quality of insights.

Working in siloes, teams may adopt processes, or procure software and platforms, that hamper system changes that would otherwise enable nuanced responses to local concerns about inequalities.

Get in touch!

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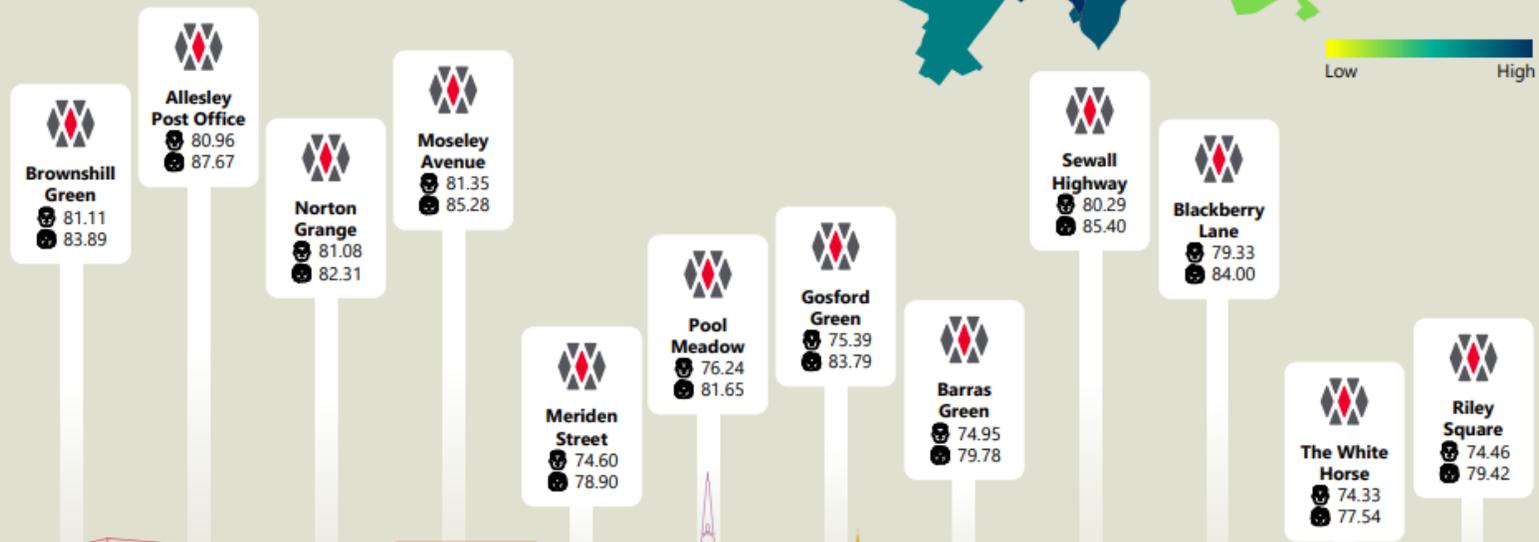
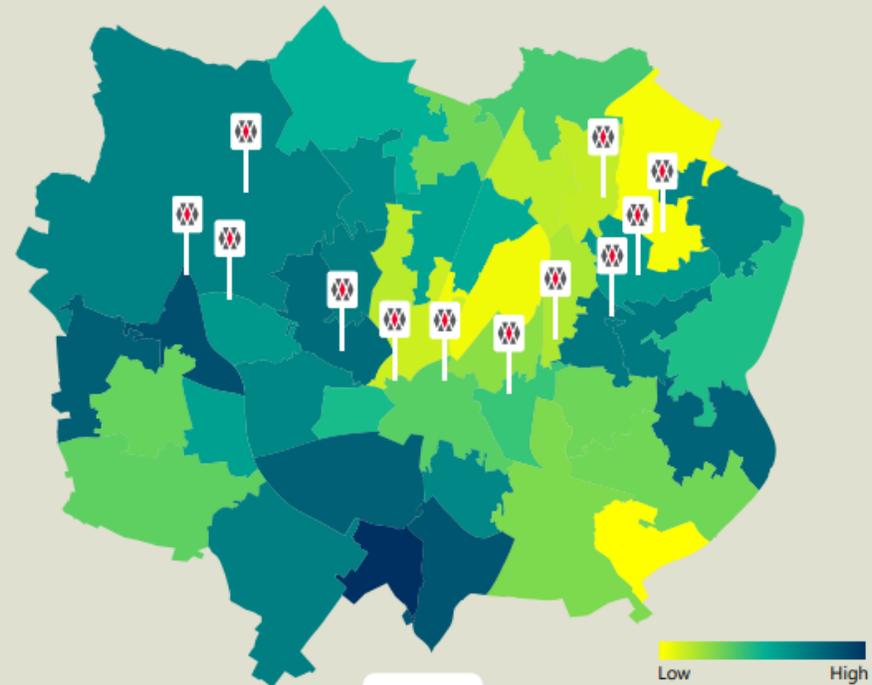


# Health Equity and Referral to Treatment

Prof Kiran Patel – Chief Medical Officer  
Daniel Hayes – Director of Performance & Informatics  
Dr Rachel Chapman – Public Health Consultant  
Dr Tim Robbins – Consultant & CRIO



# Coventry bus route 7 running between Brownhill Green and Bell Green



# The Problem: Waiting lists fuel inequality

## William from Warwick



▶ GP at first symptoms  
No co-morbidities  
Prehab



Waiting  
List  
Time 18  
weeks



WFH + supported return  
Full recovery  
No impact on family

## Norman from Nuneaton



▶ GP when can't work  
Smoker, diabetes, HTN  
Can't attend prehab



Waiting  
List  
Time 18  
weeks



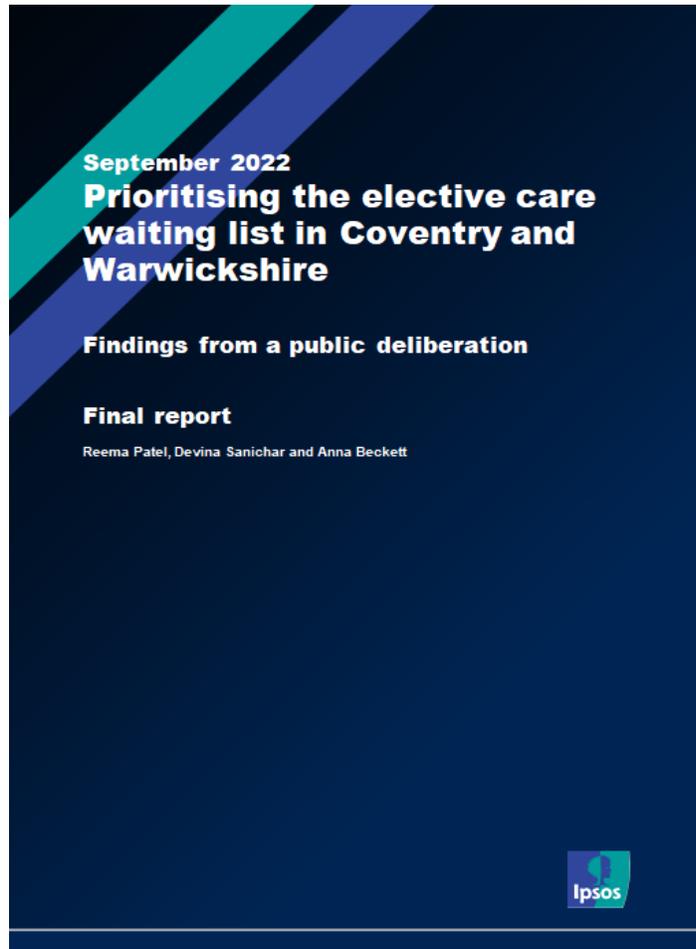
Late stage surgery  
Poor recovery  
Loses job  
Depression  
Increased healthcare cost

# Additional Factors Impacting Healthcare Outcomes

Current Factors for Booking Order			
Clinical Priority		Time on the Waiting List	
Additional Factors Impacting Healthcare			
Patients Age	Underlying Health Issues	Readmission Rates	Deprivation Score
Emergency Admissions	Cancer Diagnosis or Referral	Breaches to the Clinical Priority	Shielded Patient
Mental Health Issues	Previous Cancellations	Previous DNAs impacting Wait	Many more...

Everybody receives NHS Constitutional Standards

# Public Engagement: IPSOS



- “My dad needed a knee replacement, didn’t get it, fell it and broke his hip. Has fallen again and broken his ribs. Has had pneumonia four times. If he had his knee done, it wouldn’t have happened.”
- “All of these people should have the same right to be assisted at the same time. None of them are more important than others. Their condition should be the only factor, not social aspects.”
- “If people are suffering more than others, those people should go first. You are reducing suffering for those people. I certainly see advantages.”
- “We’re trying to solve problems that aren’t medical ones in a way. We’re looking at balancing out people who are living in deprived areas and things like that and is that for the NHS to do or is it for the government to do?”
- “Life isn’t fair, but I think it is a moral obligation as a human being to even out those odds where necessary, if possible.”



“An elective care prioritisation tool that uses a range of routinely collected patient information to prioritise waiting lists taking account of patient clinical and service need as well as health inequalities”

13  
Factors

Collaborative iterative  
development

Evaluation approved by UHCW Research and Development Department under Reference: GF0446.

Enter First Patient PID: Patient A

Click to Compare

Enter Second Patient PID: Patient B

Based on underlying factors, it is advised to book Patient A

Trauma and Orthopaedics Service		Trauma and Orthopaedics Service
Consultant A		Consultant A
Primary total prosthetic replacement of knee joint using cement		Primary total prosthetic replacement of knee joint using cement
15 Weeks Wait		47 Weeks Wait
P3		P3
7		0
1		0
75 Years		54 Years
Referred for Suspected Cancer in the last 12 Months	Additional Factors	Smoker

# What information did we have?

## Avatar – Trauma & Orthopaedics

### Patient A



- Waiting for Total Prosthetic Replacement of Knee Joint
- Priority 3
- Waited 15 Weeks

### Patient B



- Waiting for Total Prosthetic Replacement of Knee Joint
- Priority 3
- Waited 47 Weeks

In this example, we would book Patient B, as they have waited longer

# What additional information does HEARTT the tool give us?

## Patient A



- 75 Years Old
- 7 Comorbidities
- Has been referred separately to another service for suspected Cancer
- Recently came into A&E after a fall
- Has breached their clinical priority
- Lives in a deprived area

## Patient B



- 54 Years Old
- Smoker

# World Class Research Infrastructure

R&D GOVERNANCE, FINANCE, TMU



INSTITUTE FOR PRECISION DIAGNOSTICS AND TRANSLATIONAL MEDICINE

INSTITUTE FOR CARDIO-METABOLIC MEDICINE



INSTITUTE FOR HEALTH EQUITY & SOCIAL CARE

INSTITUTE FOR APPLIED & TRANSLATIONAL TECH IN SURGERY



UNIVERSITY OF BIRMINGHAM

DIGITAL & DATA DRIVEN RESEARCH UNIT





# Thank you

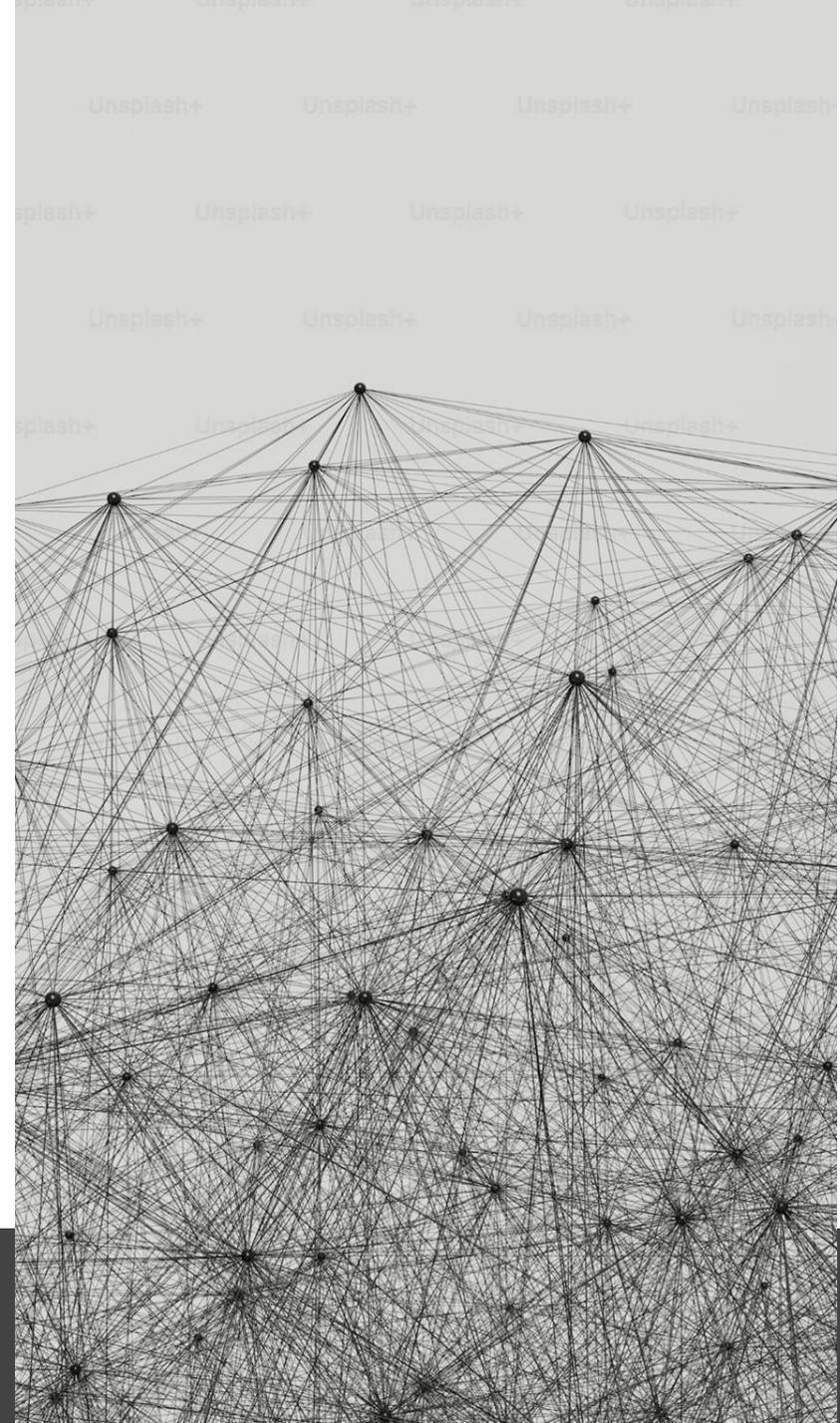
[Timothy.robbins@uhcw.nhs.uk](mailto:Timothy.robbins@uhcw.nhs.uk)

# Tackling information inequities in disability with multidimensional data and AI

**Denis Newman-Griffis, PhD** *(they/them)*

Lecturer in Data Science

University of Sheffield Information School



# Disability is an everyday experience



24%

13.6M



26%

1.42M



26%

807K



22%

419K

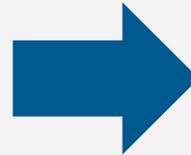


*Population identified  
as disabled*

Figures from: <https://researchbriefings.files.parliament.uk/documents/CBP-9602/CBP-9602.pdf>

# Disability is multidimensional

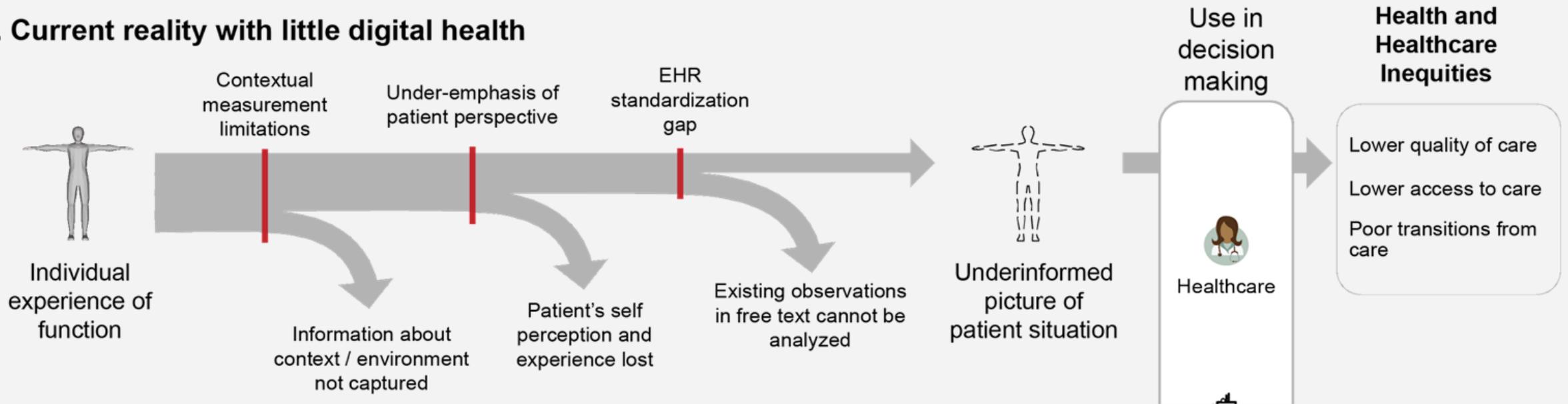
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- Experienced function
- Different situations
- Perception of self
- Identity
- Medical conditions
- Interdependent networks
- Assistive devices
- ...

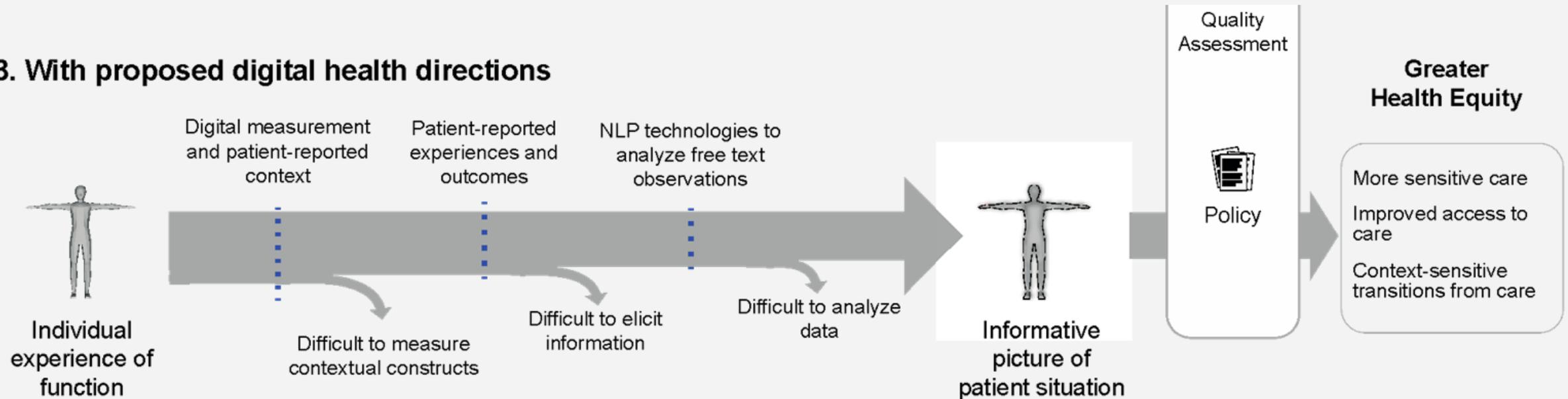
# Information loss contributes to disability inequities

## A. Current reality with little digital health



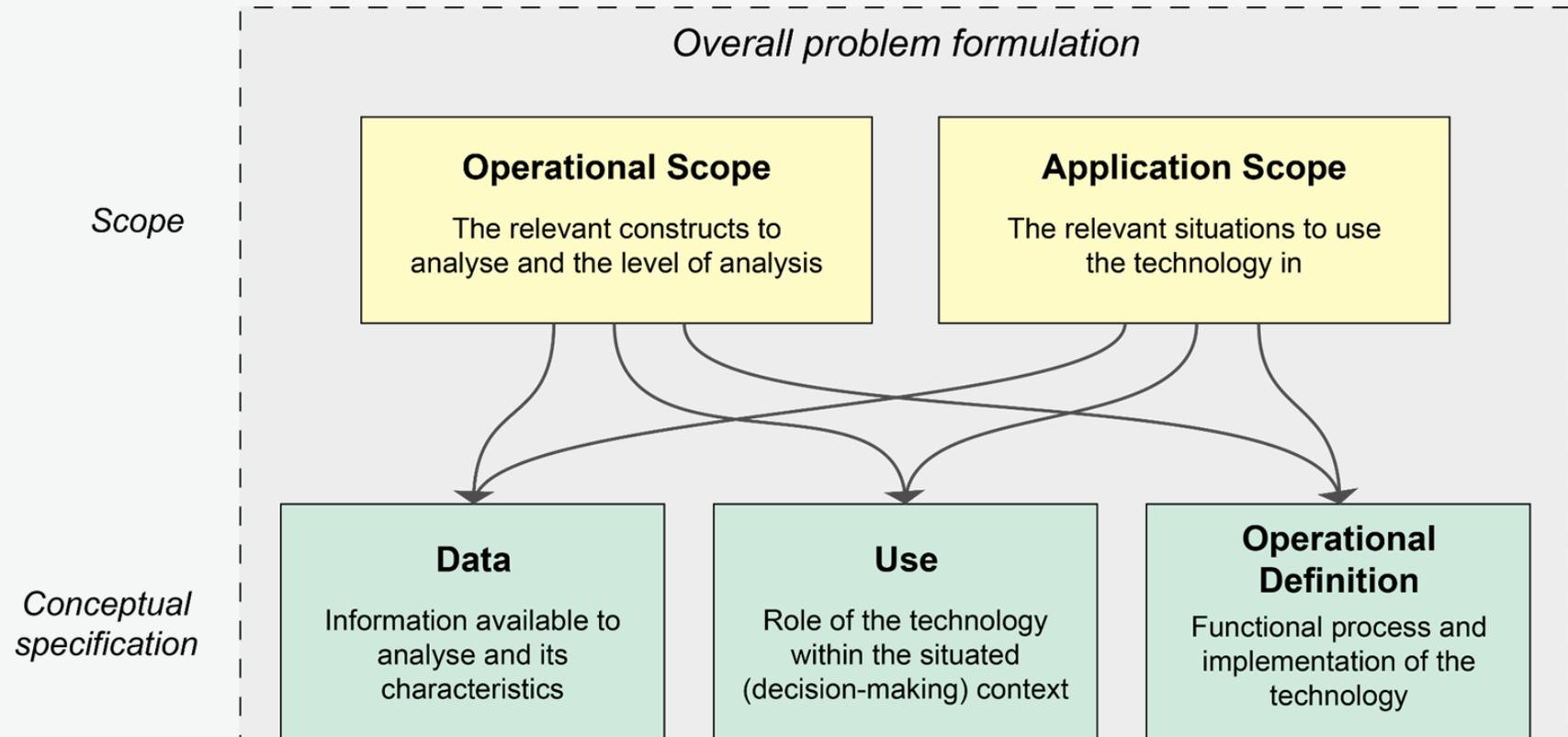
# Multidimensional data and AI can help get better information about disability experience

## B. With proposed digital health directions



# More than one way to build health AI

- Design **decisions** and **assumptions** inform how AI operationalises understanding of health



First Monday  
2023

# Inclusive and reflective AI design are needed for equity

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- **Representative teams** for technology design and evaluation
- **Representative premises** about information to be analysed with AI

- What assumptions were built into this AI system?
- Whose perspectives were consulted when designing it?
- Whose experiences were measured when evaluating it?

# Takeaways

- Multidimensional data and AI can help to get a richer picture of disability experience
- Design of health data and health AI is not neutral and must be critically examined
- AI design and evaluation must be driven by lived experience and patient priorities

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 @drgriffis



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