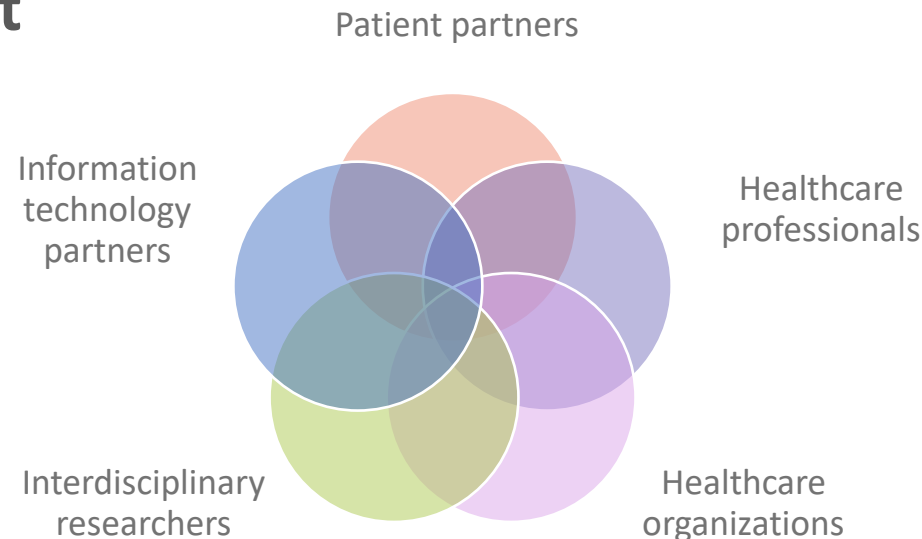


Presented by: Rick Sawatzky

October 22, 2026, Prague

Developing a mixture computerised adaptive test to enhance fairness in health measurement

Members of the Equitable People-Centred Health Measurement (EPHM) Initiative



Info & Slides:
healthyqol.com



The coordination problem:

People are not the same in how they interpret and respond to items for measuring their health

During the past 7 days, how much have you been bothered by emotional problems (such as feeling anxious, depressed or irritable)?

Not at all – Slightly – Moderately – Quite a lot – Extremely

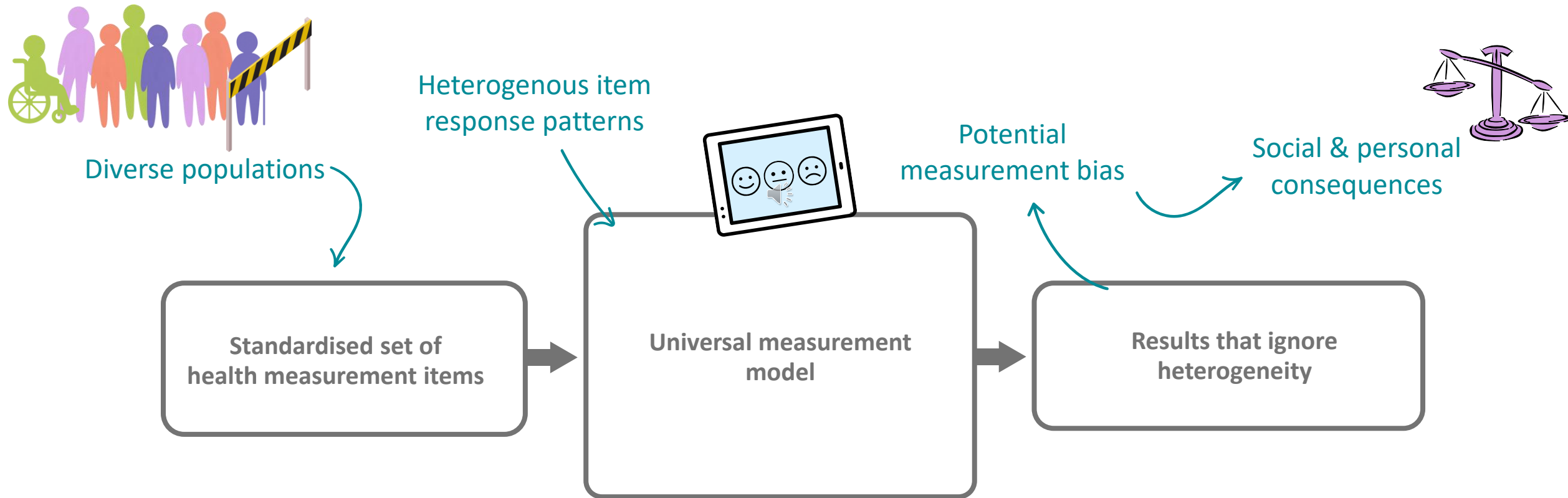


Standardised **text** $\nRightarrow$ Standardised **meaning**

Standardised **response scale** $\nRightarrow$ Standardised **responses/scores**

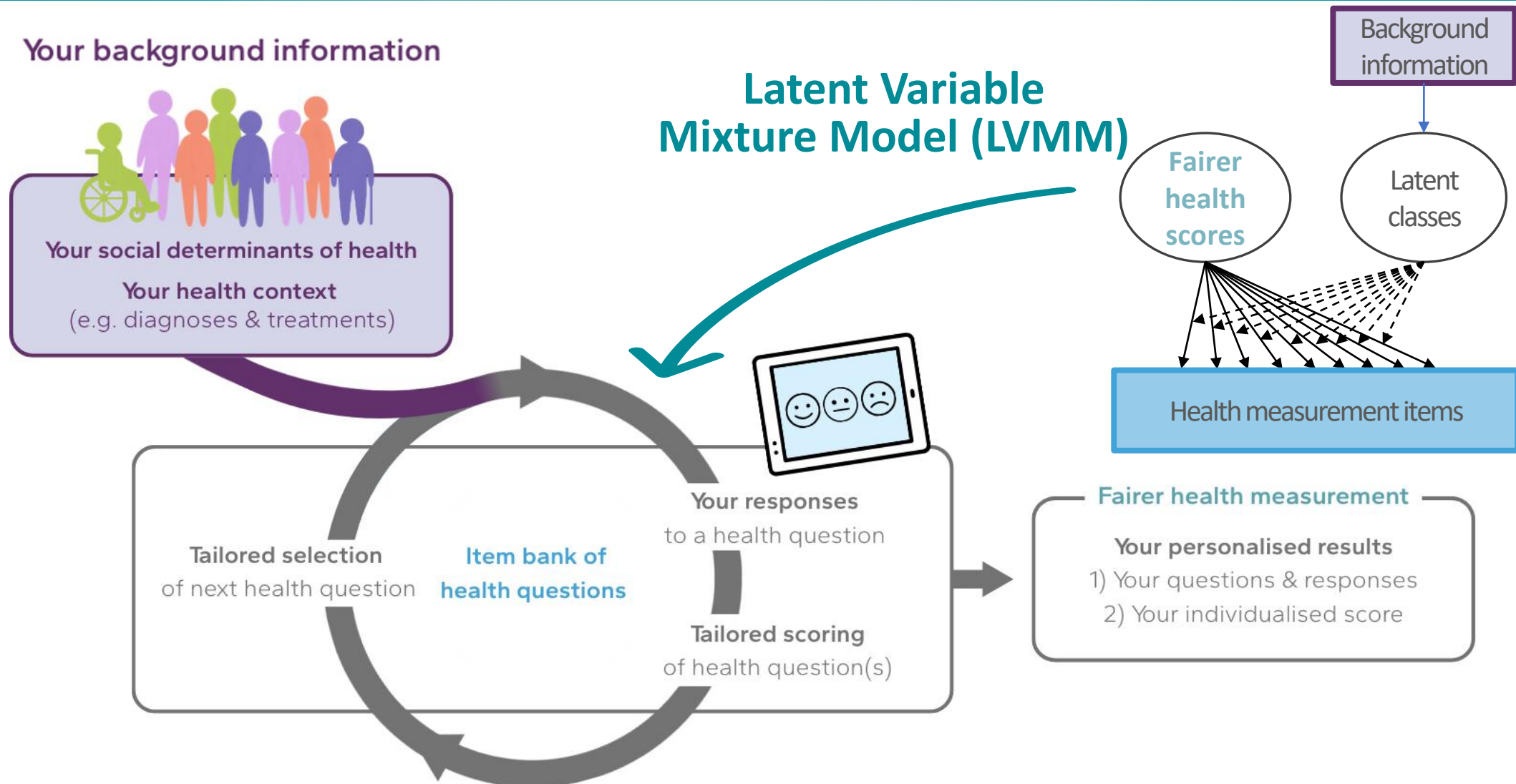
Construct has same meaning **for most people** $\nRightarrow$ **Construct** has same meaning **for all people**

Conventional measurement approaches can miss individual differences that lead to measurement bias that can perpetuate inequities



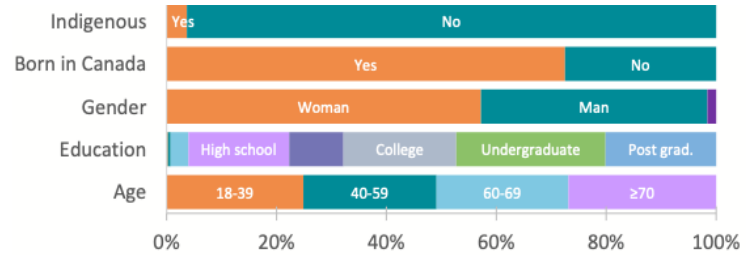
OUR PROPOSED SOLUTION

Mixture computerised adaptive test (*mixture-CAT*)

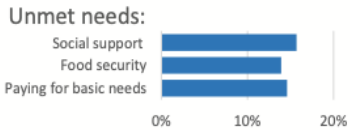


Calibration sample (N = 10,067)

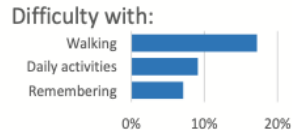
EXAMPLE DEMOGRAPHICS



EXAMPLE SOCIAL NEEDS



EXAMPLE DISABILITIES



Emotional Wellbeing

43 items that ask how much of the time a person feels certain emotions during the past 7 days (e.g., joy, hope, worry, sadness).

Kopec et al. (2006)

Tailored selection
of next health question

Item bank
emotional
wellbeing
questions

Your responses
to an emotional
wellbeing question

Tailored scoring
of health questions

THE STUDY

A mixture-CAT for emotional wellbeing

Social determinants of health

Demographics, social needs,
disability status

www.upstreamlab.org/project/spark/

Health context

Physical and mental health conditions,
health visits, medications

LVMM Results

Four latent classes were identified:

Class 1	Class 2	Class 3	Class 4
8%	41%	9%	42%

Class membership predicted by SDOH
& health-related variables

Parameter estimates were used to
program the mixture-CAT

The mixture-CAT administered to a
new validation sample of 1,781
participants

TAKEAWAY & NEXT STEPS

enhanced fairness in health measurement

Mixture-CAT can:

1. accommodate heterogeneous item responses
2. tailor the selection of questions for each person
3. tailor the scoring

NEXT STEPS

Our ongoing validation research focuses on determining how, for whom, and in what circumstances mixture-CAT and **enhance fairness in health measurement**

Try it out! Demo available at:
healthyqol.com/research-mixcat-demo



Measuring your emotional wellbeing in a personalized way

This is a shortened version to demonstrate how the mixture-CAT works.

Step 1: Background information

To help tailor this emotional wellbeing questionnaire to you, we will first ask a few example questions about your background and health.

Your personalised emotional wellbeing questionnaire will show up once you have answered all background questions.

► Click here to answer the background questions

Step 2: Personalised emotional wellbeing questionnaire

Step 3: Your personalised emotional wellbeing questionnaire results

FURTHER INFORMATION

Novel Methods for **E**quitable **P**eople-Centred **H**ealth
Measurement (**EPHM**) Study: www.healthyqol.com



Screening for **P**overty **A**nd **R**elated Social Determinants and
Intervening to Improve **K**nowledge of and Links to Resources
(**SPARK**) tool: <https://upstreamlab.org/project/spark/>



Emotional Wellbeing Item Bank of the CAT-5D-QOL:
<https://doi.org/10.1186/1477-7525-4-33>

