

# *The Quantified Self and Clinical Decision Making: Understanding Clinical Decision Bias and Errors When Using Quantified Self Data*

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# Background

- An increasing number of people use pervasive and embedded technologies, such as mobile phones and wearable/implanted sensors, to record data about their daily lives, and store such data
- This may be referred to as *The Quantified Self*.

# Promise of *The Quantified Self*

- It may prove useful to healthcare practitioners by providing information about both individual patient and population health
- It can assist general practitioners in making clinical decisions by providing insight into behaviours that may be a contributing cause of morbidity

# Promise

- National Information Board of the Dept of Health publish *Personalised Health and Care 2020: Using Data and Technology to Transform Outcomes for Patients and Citizens. A Framework for Action*
  - Integration of health data (NHS) with personal data to support self-care and real-time diagnostics

# Heuristics

- In GP settings, decision making is often based on heuristics and pattern recognition
- Research in both cognitive science and behavioural economics strongly suggest that heuristic decision making is plagued by bias and error

# Rationale

- Given the dangers, the quality of clinical decision making may therefore deteriorate with the introduction of Quantified Self Data in healthcare settings
- ...but we don't know

# Aims of the work

- Critique our methodology
- Develop a set of data-based hypotheses that can be tested in subsequent research

# Methods

- Two narrative scenarios presented to clinicians in US and UK
  - The Man Who Wobbled
  - The Dizzy Student
- The scenarios are real with small modifications
- Presented patient-derived data
  - Pulse rate
  - Caffeine intake



# Methods

- Participants asked to think aloud as they read through scenarios and examined data
- Open ended discussion
- Recorded, but not transcribed

# Results

- Mistrust of patient-derived data
- Mistrust of instruments that were not calibrated and tested by doctors themselves
- Structure of information important to hospital doctors
- Representativeness bias
- Availability bias

# Hypotheses

- $H_1$ : Quantified self data lead to a belief that the patient is 'obsessive'
- $H_2$ : Data are useful when clinicians can trust
  - The Data
  - The collection methods
  - The instruments
  - The mapping to a doctor's cognitive flow (e.g., Flow of information and data that support risk reduction)

# Hypotheses

- $H_3$ : Data appear relevant and useful when they map on to prior training
- $H_4$ : Impedance mismatch
  - Presentation and structure of data
- $H_5$ : Data useful when they support top-down risk mitigation

# Further research

- Test hypotheses
- Influence clinician training and development
- Influence product development