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**ISPOR**

*Improving healthcare decisions*

# Forum: Health Preference Research and Value Assessment Frameworks in Digital Health Technologies

*Brought to you by the*  
ISPOR Health Preference Research Special Interest Group

# Discussants

## MODERATOR

- Axel Muehlbacher, PhD, Hochschule Neubrandenburg, Neubrandenburg, MV, Germany

## SPEAKERS (30 Min)

- (10 min) Katarzyna Kolasa, PhD, PAREXEL and Kozminski University, Warsaw, MZ, Poland, [will focused on the elicitation and integration of patient preference data in the valuation of DHT.](#)
- (10 min) Panos Kanavos, PhD, London School of Economics and Political Science, London, England, UK, [will give insights into a Value Assessment Framework \(VAF\) employed to evaluate provider-facing Digital Health Technologies \(DHTs\).](#)
- (10 min) Volker Amelung, PhD, Private Institute of Applied Health Service Research (inav GmbH), Hannover, Germany, [will share his experiences from Germany, providing a unique perspective on the valuation and implementation of DHT.](#)

## DISCUSSION (20 Min)

# Value

information

money

pricing

framework

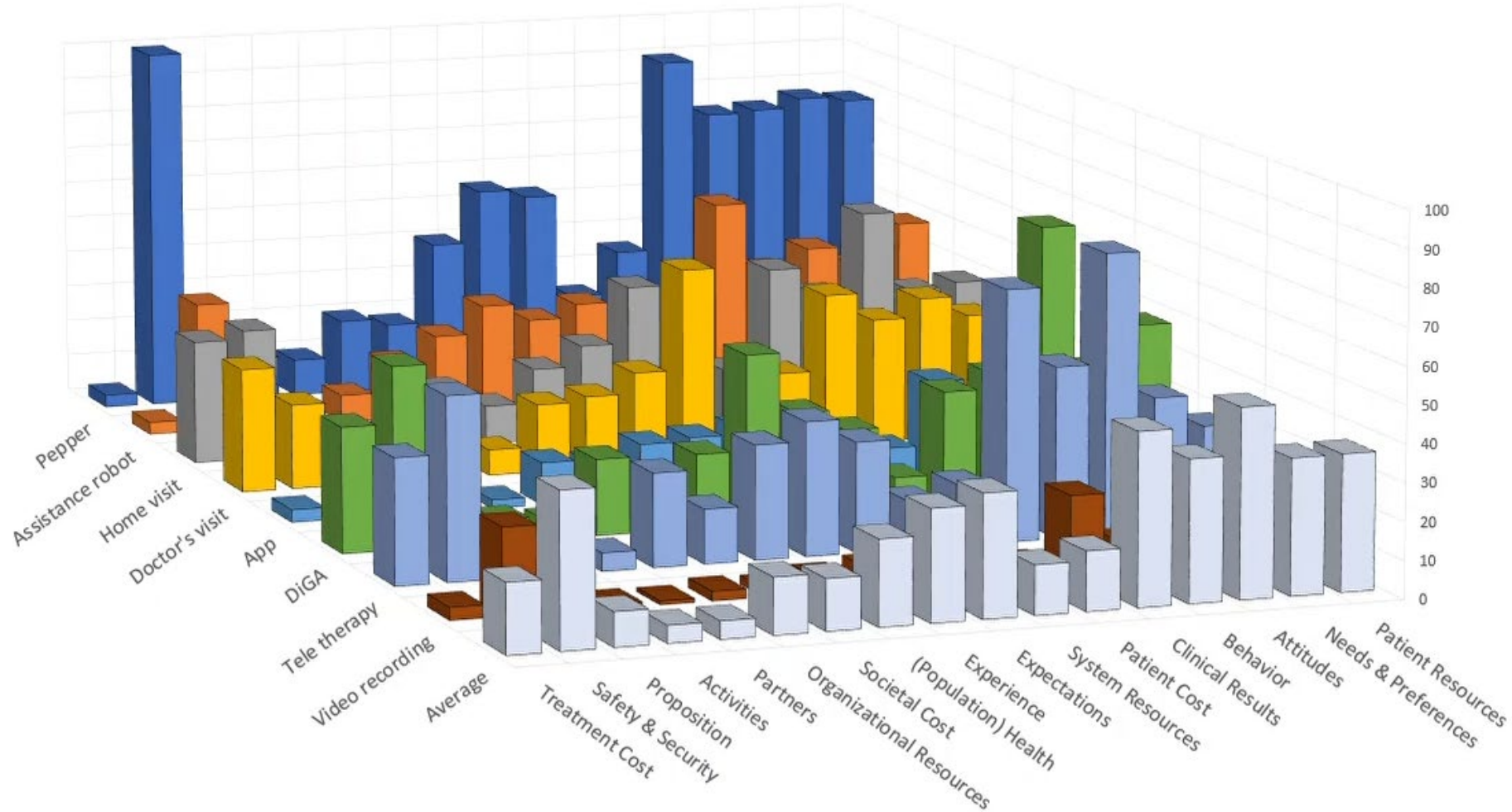
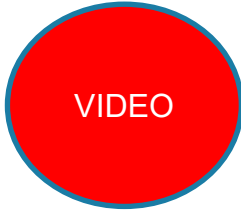
## Value-based

healthcare

proposition

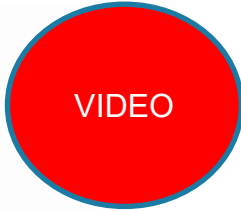
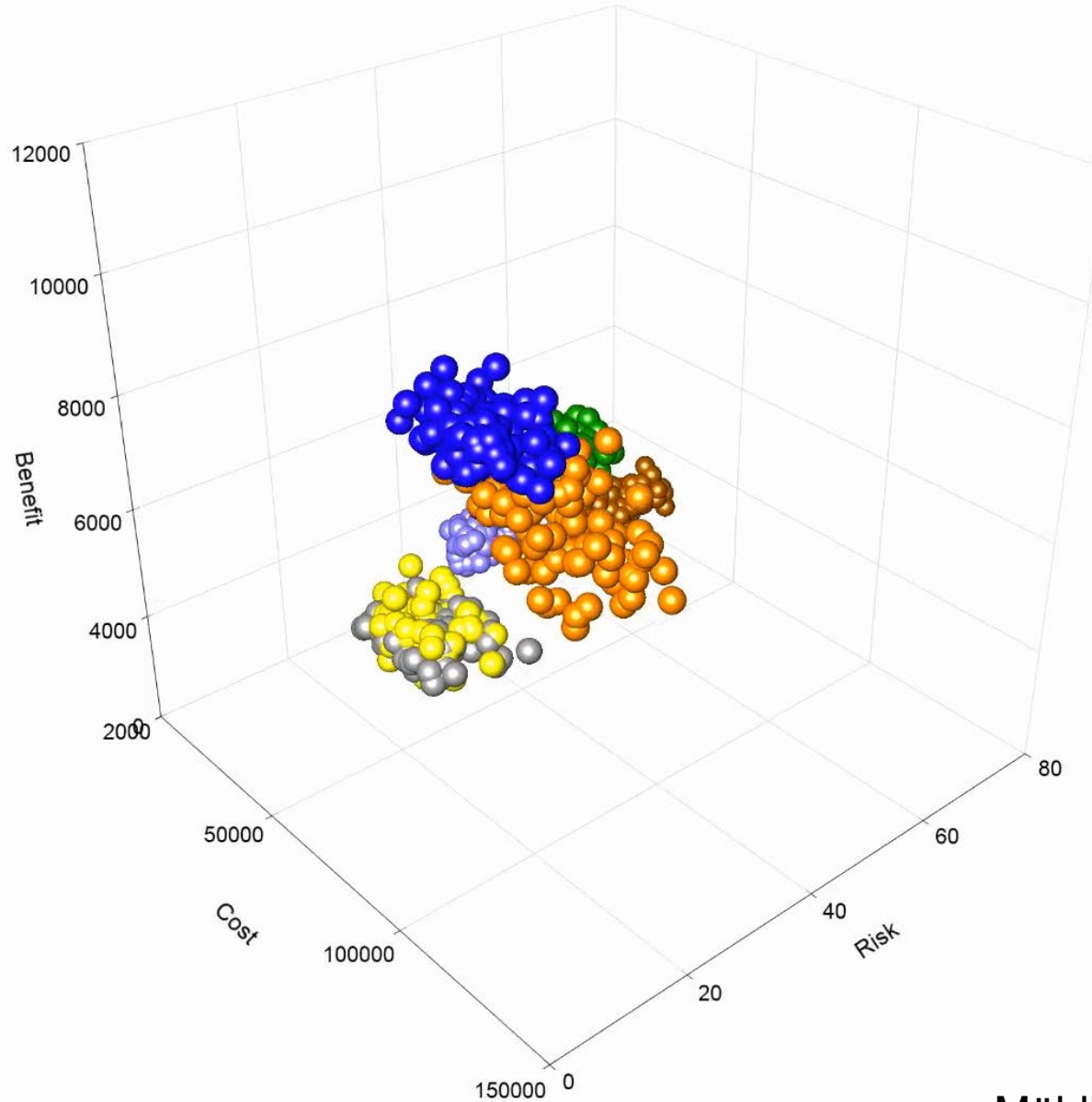
assessment

# Aggregate Simulation Partworth Values



# 3D probabilistic model: value assessment

- Pepper
- Assistance robot
- Home visit
- Doctor's visit
- App
- DiGA
- Tele therapy
- Video recording



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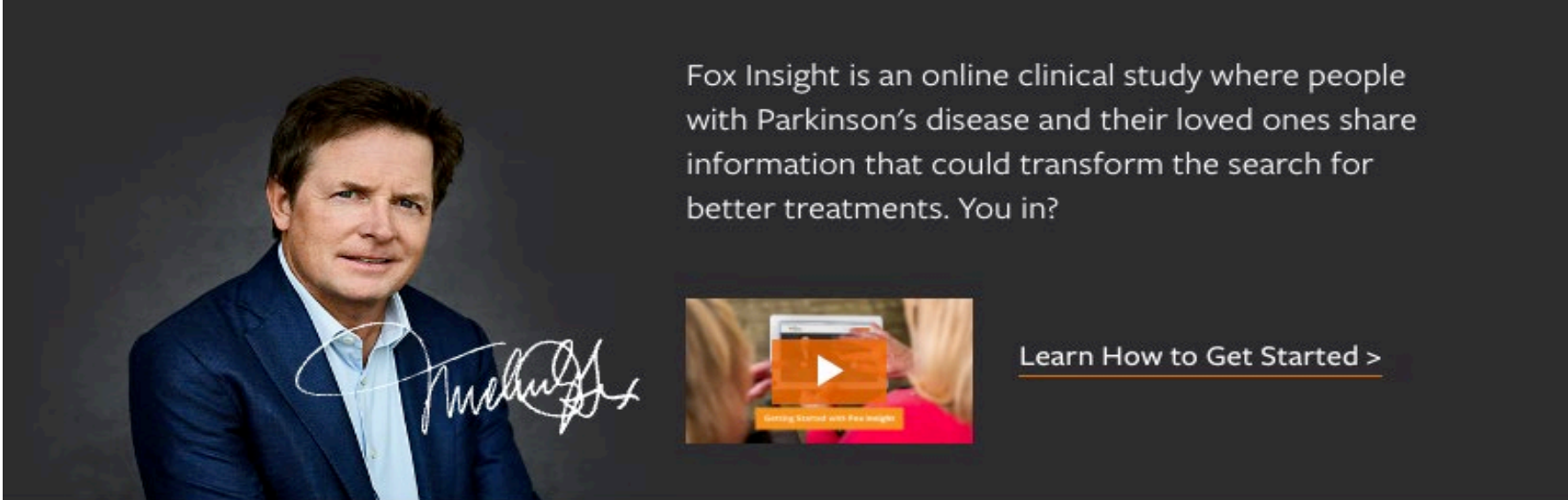
# 1

## Forum: Health Preference Research and Value Assessment Frameworks in Digital Health Technologies


*How to redefine value creation  
in the era of digital health?*

Katarzyna Kolasa, PhD  
Digital Health Leader  
Kozminski University

Until Q1'19, over 22,000 people with Parkinson's disease enrolled, making Fox Insight the largest prospectively followed Parkinson's disease cohort worldwide



Fox Insight is an online clinical study where people with Parkinson's disease and their loved ones share information that could transform the search for better treatments. You in?



[Learn How to Get Started >](#)

**Share Your Expertise**

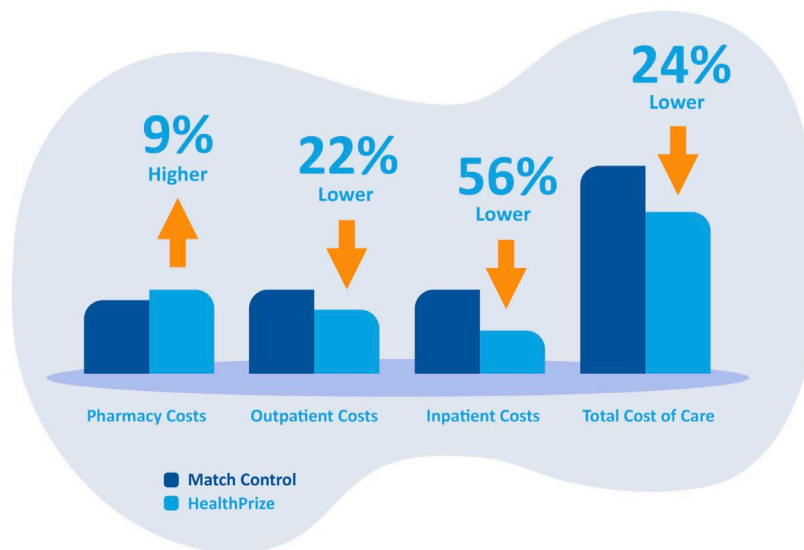
Healthier SG is a national initiative by the Ministry of Health (MOH) that aims to help all Singaporeans take steps towards better health and quality of life in the years to come.

- Subsidies of up to 87.5% for a selected chronic medications
- Subsidies of up to \$360 per year for other components such as consultation and lab tests.





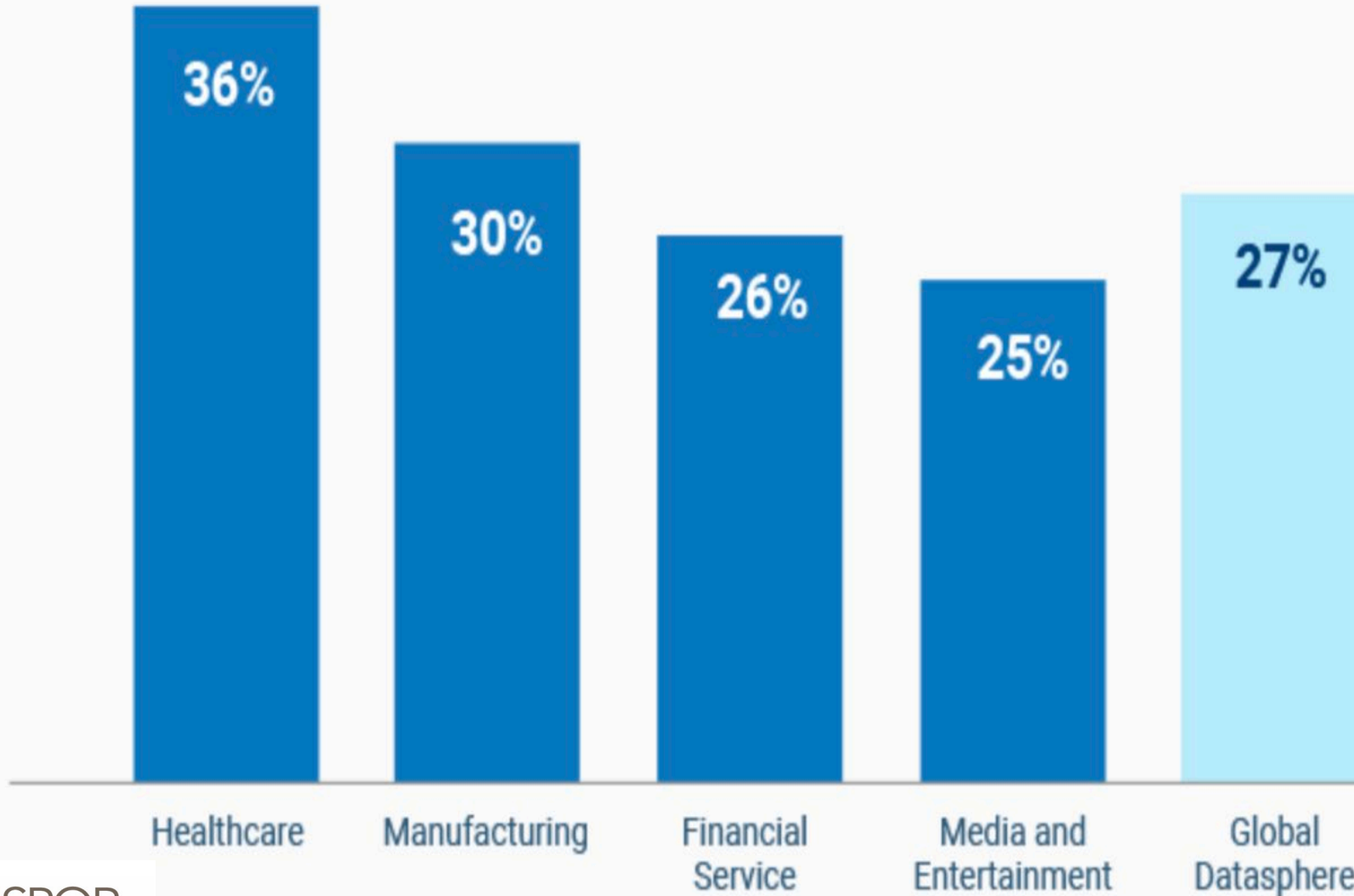
# Digital health shifts focus from treatment to prevention



” Participants receive daily prompts via text message or email to check-in to the program to engage with educational content and motivational behavior change” activities.

Participants earn points for engagement and can redeem accumulated points for e-gift cards. ”

## 2018-2025 Data – Compound Annual Growth Rate (CAGR)



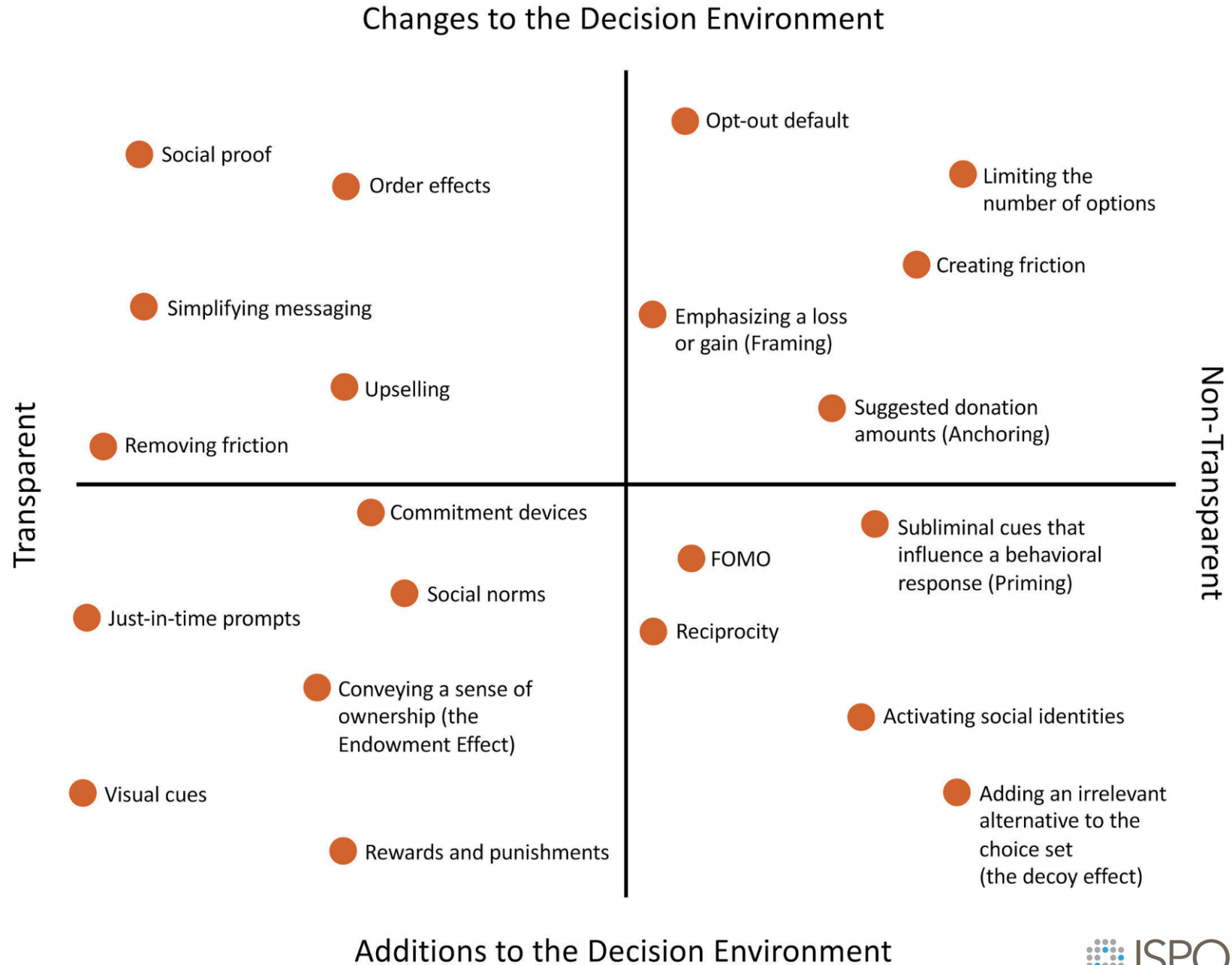
**APPROXIMATELY 30% OF THE WORLD'S DATA VOLUME IS GENERATED BY THE HEALTHCARE SECTOR TODAY!**

[https://www.rbccm.com/en/gjb/healthcare/episode/the\\_healthcare\\_data\\_explosion](https://www.rbccm.com/en/gjb/healthcare/episode/the_healthcare_data_explosion)

The era of digital transformation has arrived...



# Nudge theory



# Individual sovereignty is BACK



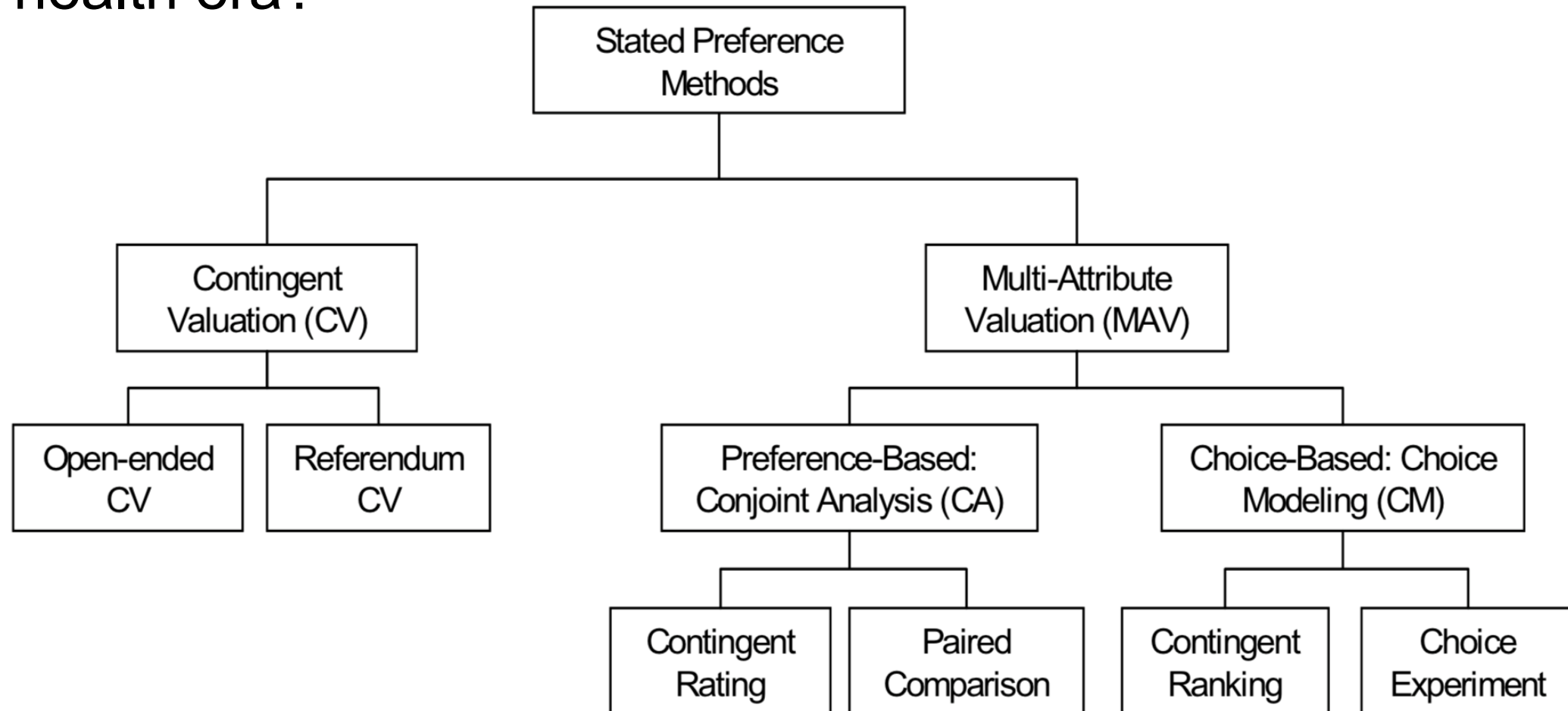


How to define value drivers for health technologies in the digital health era?

**Revealed preferences** – based on actual consumer's observed market activities.

**Stated preferences** - derived from surveys allowing researchers to control the way in which preferences are elicited.

# How to define value drivers for health technologies in the digital health era?



# How to define value drivers for health technologies in the digital health era?





# Proposed conceptual framework for health preferences studies

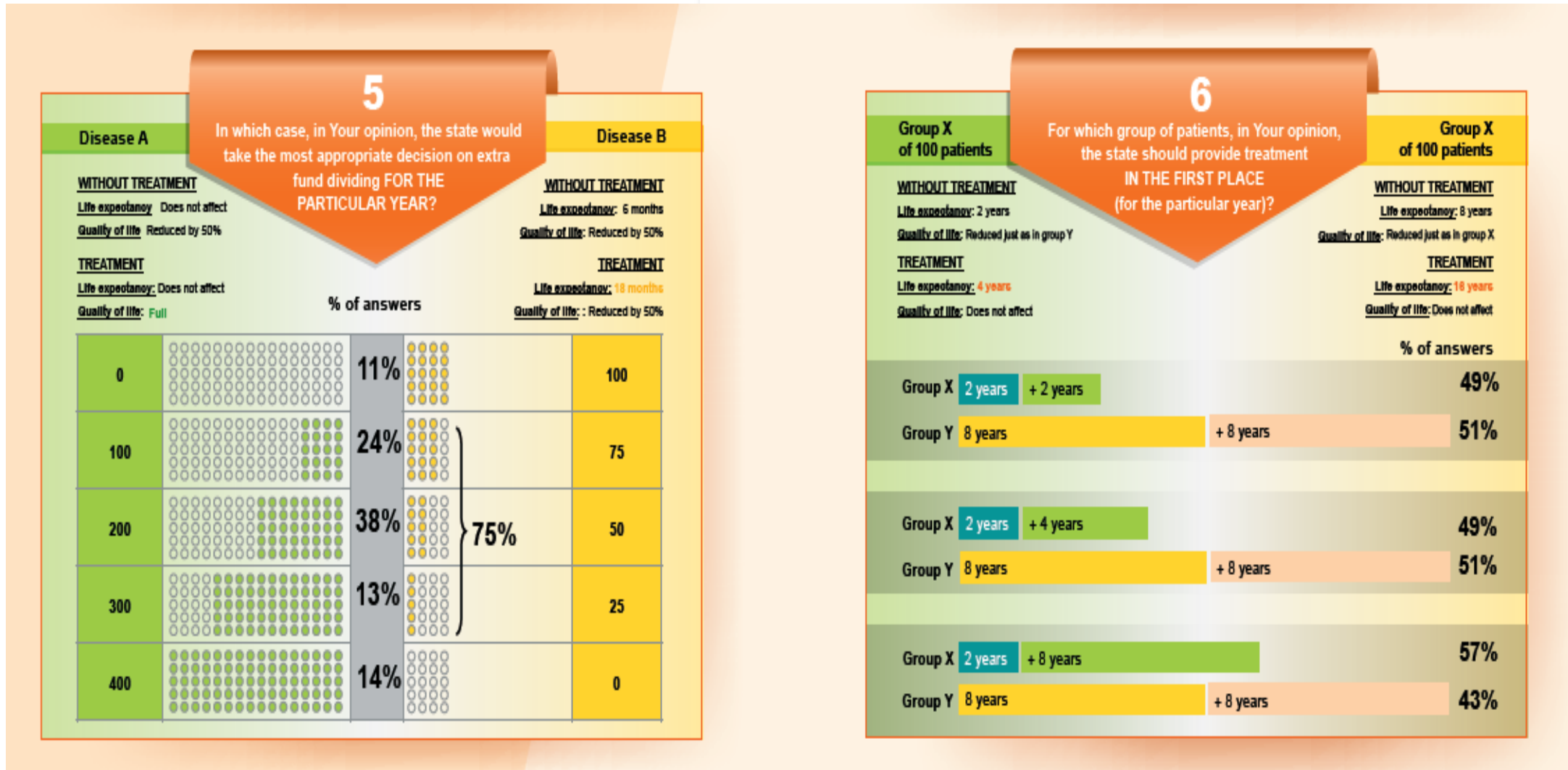
## Social Welfare Function *distributional issues*

Trade-off between different:

- objectives
- attributes
- course of action

- SWF allows to estimate the trade off between alternative course of actions.
- The intention is to define the importance (weight) to be assigned to potential gains achieved with one course of action relative to another.
- The marginal rate of substitution (MRS) along the relevant welfare curve. **MRS** is the rate at which some amount of one good can be exchanged for another good while maintaining the same level of utility (satisfaction).

# Conflicting objectives in the healthcare sector - efficiency vs equity



# Are responders willing to accept digital health against the opportunity of greater life expectancy?

HEALTHCARE 5.0



*In  $[P/(1 - P)] = a + b1 * \text{marginal trade-off} + b2 * \text{relative difference (1)}$*

*P - probability of choosing digital healthcare model*

*marginal trade-off - difference in minimal life expectancy between both models divided by the difference in maximum life expectancy between both models.*

*relative difference - percentage difference between max and min life expectancy in the digital model*

- Cross-sectional study across 320 Polish responders aged 20-39 revealed a strong preference towards digital solutions irrespective of life expectancy's gains



Preferences were mainly driven by past experiences and potentially predefined beliefs less so by the value assessment of the digital solutions (efficiency gains as new value drivers?)



# Are there any specific characteristics of digital health of greatest importance?

## HEALTHCARE 5.0



Majority of responders selected both medical exams and governmental certification for digital solutions

Communication with the VA – most preferred model



		VA is allowed to initiate <del>the</del> contact anytime if health symptoms are required	VA is allowed to connect with you only in pre-agreed time slots	You are only able to connect to VA	Quantity	
Model selection (all scenarios together)	Digital model	43%	26%	31%	100%	320
	Analogue model	49%	28%	23%	100%	186
Sex	Female	34%	24%	43%	100%	134
	Male	42%	28%	31%	100%	160
Age	20–29 y	43%	25%	32%	100%	160
	30–39 y	41%	29%	30%	100%	110
Education	Secondary or lower	43%	25%	32%	100%	210
	Higher	41%	29%	29%	100%	150
Professional status	Employed	44%	24%	33%	100%	170
	Unemployed	42%	27%	32%	100%	259
Respondent's severe disease	Yes	46%	25%	30%	100%	61
	No	45%	26%	29%	100%	108
Severe disease in the family	Yes	41%	26%	33%	100%	212
	No	44%	25%	31%	100%	192
Subjective assessment of financial independence	Low rating – below median	41%	28%	31%	100%	128
	High rating – above median	34%	32%	34%	100%	122
Subjective health self-assessment	Low rating – below median	46%	26%	28%	100%	145
	High rating – above median	45%	20%	34%	100%	122
Assessment of the healthcare system in Poland	Low rating – below median	42%	29%	29%	100%	117
	High rating – above median	41%	27%	32%	100%	155
		43%	26%	31%	100%	129

# AIValue4Health



- Under the patronage of the Polish Parliamentary Commission of Innovation and the National Chamber of Physicians, Kozminski University is organizing a public dialog about the role of AI in the healthcare system:

## *So far*

- Three systematic literature reviews,
- Two workshops with experts,
- Two presentations at the Polish Parliament
- Two DCEs based studies about physicians and general public preferences towards AI

# AIValue4Health



- Cross-sectional study across the representative sample of 1000 Polish responders. The hypothetical scenarios with DCE revealed mixed attitudes towards the use of AI in the healthcare



“Which of two visions are closer to yours...” 60% (40 %) chose digital (analog) approach to take care of the health. The preferences did not change significantly even if doctor’s safety guarantee or bonus payment were added

*Digital – wearables & apps*

*Analog – direct F2F consultation with physicians*



”Would you prefer Virtual Assistant if it is faster and safe...” 50%/50% chose YES/NO and NO was change into YES only for every 4<sup>th</sup> responder provided external validation with doctors and positive feedback from peers

# QALY is always a QALY...really?

- *We assume that two people cannot occupy the same health state and yet experience different utilities*
- Is it still fair to assume so in the digital health era?



# Patient centric healthcare

**Usefulness** - product enables user to achieve their goals - the tasks that it was designed to carry out and/or wants needs of user.

**Effectiveness** (ease of use) - quantitatively measured by speed of performance or error rate and is tied to a percentage of users.

**Learnability** - user's ability to operate the system to some defined level of competence after some predetermined period of training. Also, refers to ability for infrequent users to relearn the system.

**Attitude** (likeability) - user's perceptions, feelings and opinions of the product, usually captured through both written and oral communication.

**In contrast to clinical value drivers, digital health value drivers rely more on patients' preference**



## Conclusions

- Digital health re-introduces individual sovereignty (freedom of choice)
- Social and cultural aspects play an important role in the AI technologies implementation
- Conducting more health preference studies is crucial for advancing our understanding of value drivers for health technologies

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# 2

## Creating a Value Framework to assess digital health technologies for chronic disease management

Panos Kanavos, PhD

*Department of Health Policy & LSE Health - Medical  
Technology Research Group*

*London School of Economics, London, UK*

- Traditional HTA pathways are unsuitable for assessing the value of digital health technologies (DHTs)
  - DHTs must be held to different evidence standards due to the nature of the solution: fast-paced innovation, high volume of solutions, limited ability for RCTs, nature of risk vs. benefits, etc.
  - DHTs pose risks largely unperturbed by health systems due to big data collection and analytics.
- Alternative assessment pathways are needed to holistically assess the value of DHTs
  - This involves value assessment domains beyond economic and clinical effectiveness as well as multi-stakeholder involvement.



## Aim

To understand key stakeholder\* sentiments on where value lies in innovative health technologies used in chronic disease management in the UK, USA and Germany.

To create a value framework for digital health technology (DHT) assessment.



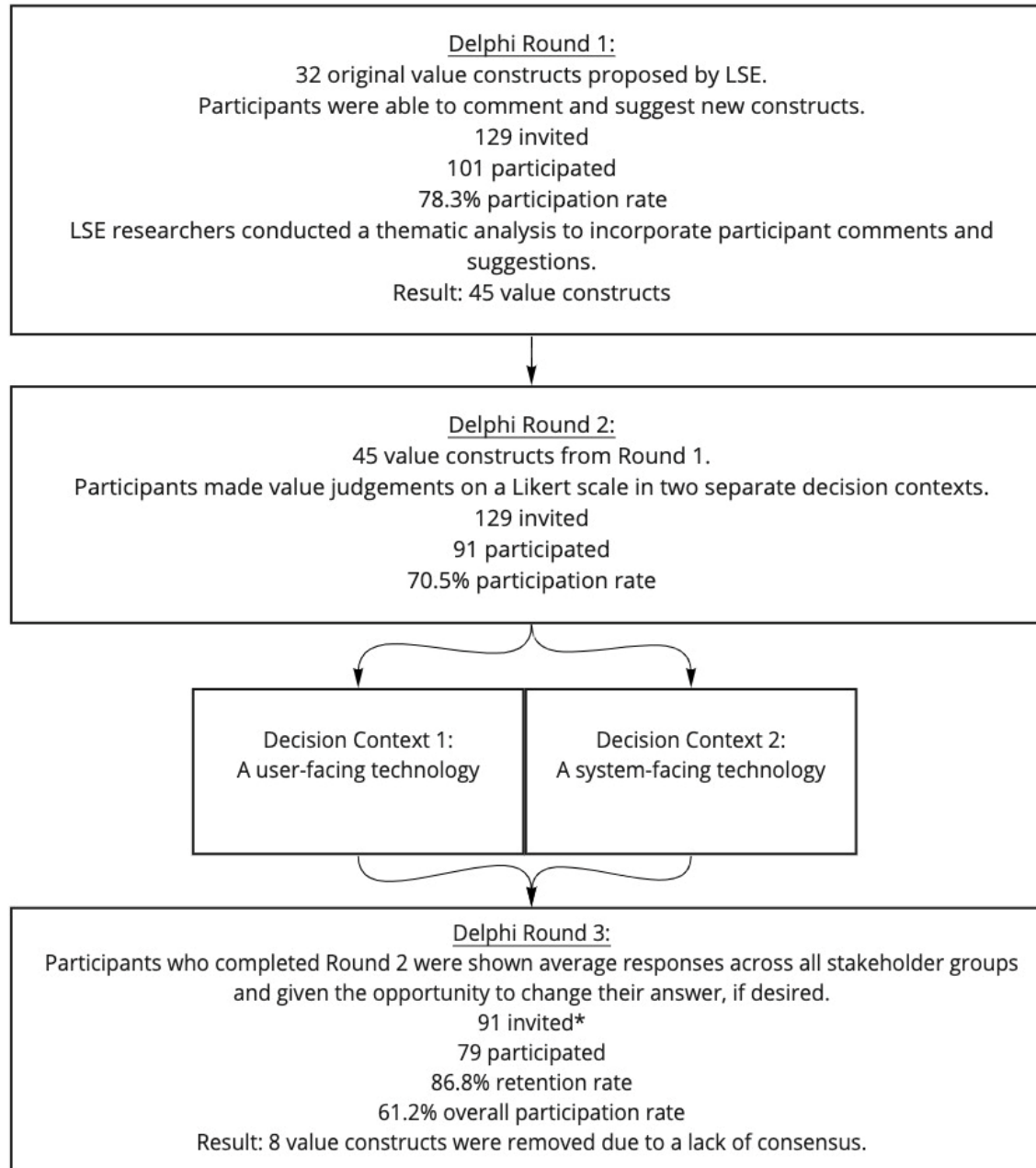
## Method

**Secondary research** via a literature review to propose an initial value framework statements and understand key issues surrounding the assessment of DHTs.

**Primary research** via the Delphi method to:

- Validate and create the DHT value framework
- Understand key stakeholder thoughts and opinions on where value lies in **user-facing** and **system-facing DHTs** used in chronic disease management; therefore, 2 Decision Contexts (DCs)

\* Stakeholders: users (patients), healthcare professionals, supply-side actors, decision-makers, influencers



\* Participants could only move onto the next round if they completed Likert judgements in both decision contexts.



Health Policy Analysis

**A Value Framework to Assess Patient-Facing Digital Health Technologies That Aim to Improve Chronic Disease Management: A Delphi Approach**

Madeleine Haig, MSc, Caitlin Main, MSc, Danitza Chávez, MSc, Panos Kanavos, PhD

**ABSTRACT**

**Objectives:** Digital health technologies (DHTs) can optimise healthc However, the fast-paced rate of innovation and varying evidence stan these technologies in an efficient and evidence-based manner. We sc the value of novel patient-facing DHTs used to manage chronic dise

**Methods:** Literature review and primary data collection from a three-i from 5 stakeholder groups (patients, physicians, industry, decision m America, United Kingdom, and Germany) took part. Likert scale da differences in both country and stakeholder groups, stability of resul

**Results:** The resulting co-created framework comprised 33 stable judgments across domains: health inequalities, data right a characteristics, clinical characteristics, and user preferences. Lac importance of value-based care models, optimizing resources for DHT design, development, and implementation; however, this was judgments. Supply-side actors and academic experts were the most

**Conclusion:** Stakeholder value judgments revealed a need for a cool policy response that updates laws to meet technological innovations assess DHTs, and involves stakeholders to understand and meet thei

**Keywords:** Delphi, digital health technology, health technology a framework

VALUE HEALTH. 2023; 26(10):1474-1484

Original Research Article

## Assessing the Value of Provider-Facing Digital Health Technologies Used in Chronic Disease Management: Toward a Value Framework Based on Multistakeholder Perceptions

### Introduction

Health systems in the post-COVID-19 world have entered an age of increased reliance on digital technology whereby patient interactions with the health system are increasingly through digital health technologies (DHTs), and their information is digitally stored, processed, and transmitted.<sup>1</sup> As populations continue to age and chronic diseases continue to be the leading cause of death, DHTs have emerged as a potential solution, particularly regarding improved diagnostics, remote monitoring, and disease self-management.<sup>2</sup> DHTs have the capacity to alleviate strains caused by rising chronic disease prevalence and the associated rise in costs.<sup>3,4</sup> In doing so, they can contribute to cost optimization, equity, efficiency and quality of care improvements, population health management, and improved clinical decision making.<sup>5</sup> DHTs also have significant variation in functionality, risk profile, and value proposition, ranging from patient-facing technologies that monitor and influence individuals' behaviors to custom-facing

tech  
telli;  
curity, and govern... the digital health ecosystem encompassed over 350 000 (regulated and unregulated) health-related apps available in 2020. Many of these applications, along with other digital solutions, are seeking health system integration and coverage by healthcare budgets. Such significant market growth raises questions about how to evaluate these technologies and whether existing methodologies are sufficient.

DHTs struggle to meet the same evidence standards as drugs, often because of rapid technical innovations and lack of adequate comparators.<sup>6-8</sup> Randomized Controlled Trials (RCTs) are considered the gold-standard for proving effectiveness; however, they present several challenges to DHTs including long timelines, measuring personalized care delivery, and developing adequate placebos. Traditional health technology assessments (HTAs) applied to pharmaceuticals and medical devices do not address



Medical Decision Making

1-14

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DOI: 10.1177/0272989X231206803

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## References

- Haig, M., Main, C., Chávez, D., & Kanavos, P. (2023). A Value Framework to Assess Patient-Facing Digital Health Technologies That Aim to Improve Chronic Disease Management: A Delphi Approach. *Value in Health*, 26(10), 1474-1484. <https://doi.org/10.1016/j.jval.2023.06.008>
- Main, C., Haig, M., Chávez, D., & Kanavos, P. (2023). Assessing value of provider-facing digital health technologies used in chronic disease management: Towards a value framework based on multi-stakeholder perceptions. *Medical Decision Making*. <https://doi.org/10.1177/0272989X23120680>

Clinical characteristics	Evidence requirements	Effectiveness of care	Efficiency
	Health system improvement	Carer outcomes	Doctor/Patient trust
	Outcomes	Communication	Quality of life
	Patient Centeredness	Disease management	Risk Management
Data rights and governance	Access	Purpose	Standards
	Commercialization of data	Real world evidence	Transparency
	Consent	Security	
	Data ownership	Knowledge dissemination	
Economic characteristics	Affordability	Resource use optimization	Incentives
	Health system integration	Value-based care	Inequalities
Technical characteristics	Connectivity	Product improvement	Interoperability
	Data uploads	Reliability and Trust	Sustainability
	Data validity	Standards	
User preferences	Convenience	Social integration	Multi-stakeholder input
	Customization	Support	Patient activation
	Impact	User experience	
	Wellbeing	User retention	
Health inequalities	Access	Education	Social determinants of health

**Table 2. Interrater agreement within stakeholder groups in Decision Context 1**

Stakeholder group	Round 2			Round 3		
	Ky	95% CI	Benchmark Interval	Ky	95% CI	Benchmark Interval
Users	0.71***	0.67 0.76	Substantial Agreement	0.74***	0.70 0.79	Substantial Agreement
Health care professionals	0.61***	0.57 0.66	Substantial Agreement	0.67***	0.63 0.72	Substantial Agreement
Supply side	0.61***	0.55 0.67	Substantial Agreement	0.69***	0.63 0.74	Substantial Agreement
Decision Makers	0.66***	0.62 0.70	Substantial Agreement	0.70***	0.65 0.74	Substantial Agreement
Influencers	0.57***	0.52 0.63	Moderate Agreement	0.66***	0.60 0.71	Substantial Agreement

Notes: Inter-rater agreement measured by the Gwet's agreement coefficient with linear weights.  
 Benchmark scale of the level of agreement as suggested by Landis and Koch (1977): Coef. < 0.00 Poor agreement; 0.00 > Coef. ≤ 0.20 slight agreement; 0.20 > Coef. ≤ 0.40 Fair agreement; 0.40 > Coef. ≤ 0.60 Moderate agreement; 0.60 > Coef. ≤ 0.80 Substantial agreement; 0.80 > Coef. ≤ 1 Almost perfect agreement [1].  
 \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

**SO WHAT?**  
 As expected, individuals within the same stakeholder groups have similar sentiments to value. When testing for differences between stakeholder groups, the first requirement is to ensure individuals within the same groups are in agreement.

- This table shows the level of agreement within each stakeholder group for each round in DC1.
- There was substantial agreement for all stakeholder groups in their round 3 responses.



**Table 3. Interrater agreement within stakeholder groups in Decision Context 2**

Stakeholder group	Round 2			Round 3		
	Ky	95% CI	Benchmark Interval	Ky	95% CI	Benchmark Interval
Users	0.72***	0.68 0.75	Substantial Agreement	0.74***	0.70 0.78	Substantial Agreement
Health care professionals	0.40***	0.32 0.48	Fair Agreement	0.53***	0.45 0.61	Moderate Agreement
Supply side	0.52***	0.42 0.63	Moderate Agreement	0.59***	0.49 0.69	Moderate Agreement
Decision Makers	0.62***	0.56 0.67	Substantial Agreement	0.66***	0.60 0.72	Substantial Agreement
Influencers	0.58***	0.52 0.65	Moderate Agreement	0.68***	0.61 0.75	Substantial Agreement

Notes: Inter-rater agreement measured by the Gwet's agreement coefficient with linear weights.

Benchmark scale of the level of agreement as suggested by Landis and Koch (1977): Coef. < 0.00 Poor agreement; 0.00 > Coef. ≤ 0.20 slight agreement; 0.20 > Coef. ≤ 0.40 Fair agreement; 0.40 > Coef. ≤ 0.60 Moderate agreement; 0.60 > Coef. ≤ 0.80 Substantial agreement; 0.80 > Coef. ≤ 1 Almost perfect agreement [1].

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### SO WHAT?

Although there are still relatively good levels of agreement for all stakeholder groups – the lower levels of agreement in comparison to user-facing technologies may indicate that there is less clarity regarding the value of system-facing technologies.

- This table shows the level of agreement within each stakeholder group for each round in DC2.
- Compared to DC1, there are lower levels of agreement within the HCP and Supply Side groups.

- **The policy response required includes a combination of a **regulatory approach and aligned incentives** through value assessments.**
  - Some value indicators are not reflected in regulation or assessment frameworks.
    - Dependent on the decision context: i.e. In the patient-facing context (DC1) “data is user owned” has consensus, but this sentiment is not reflected in any study country’s regulations nor frameworks. This indicator has dissensus in DC2, where the patient is not the primary user but is still the data subject.
- **Clear agreement that **data privacy** is highly valued**
  - but policy work still needs to be done to define what that privacy looks like in practice. Regulations need to be updated to match technological advancements.
- **Issues around **data custody** do not have consensus and need further investigation in multi-stakeholder settings.**
- **Issues around **health inequalities** are frequently raised...**
  - ... But there is not consensus around the value of DHTs reducing socioeconomic health inequalities.
  - More multi-stakeholder discussions are needed about DHTs and their relationship to health inequalities.

- **New evidence standards must be considered in value frameworks.**
  - DHTs need RWE to prove value.
  - Assessment approaches must shift from the traditional pre-market entry data collection and post-market entry pharmacovigilance towards continual data collection and assessment pre- and post- market entry.
    - This highlights why digital HTA must be different from traditional HTA: the inability to meet traditional evidence standards increases the need to use RWE to prove value; so, whose intellectual property is the collected data?
  - This also reinforces the need for a shift in assessment from economic and clinical indicators to a multi-criteria decision making analysis (MCDA) approach.
- **There is wide variation in types of DHTs, so multiple assessment approaches are needed.**
  - Varying levels of risk and benefit, varying levels of technical innovation, varying abilities to prove value using traditional methodologies, varying impact on the system.

- **Value domains:** clinical characteristics, economic characteristics, health inequalities, data rights and governance, technical and security, user preferences
- **Consensus:** there was Consensus on several/no consensus on other criteria
- **Preferences:** Different types of stakeholders have considerably different opinions on value.
  - E.g. Users are keen on the ability to own and input their own data while supply-side actors disagree.
- **Value judgements:** Across all stakeholders, value judgements differ considerably between decision contexts.
  - i.e. The context with ***user-facing technologies*** was more stable and had more indicators with consensus than the context with ***system-facing technologies***.
- **Policy-making:** Create innovative policies to satisfy value preferences of all stakeholders based on what is important to each

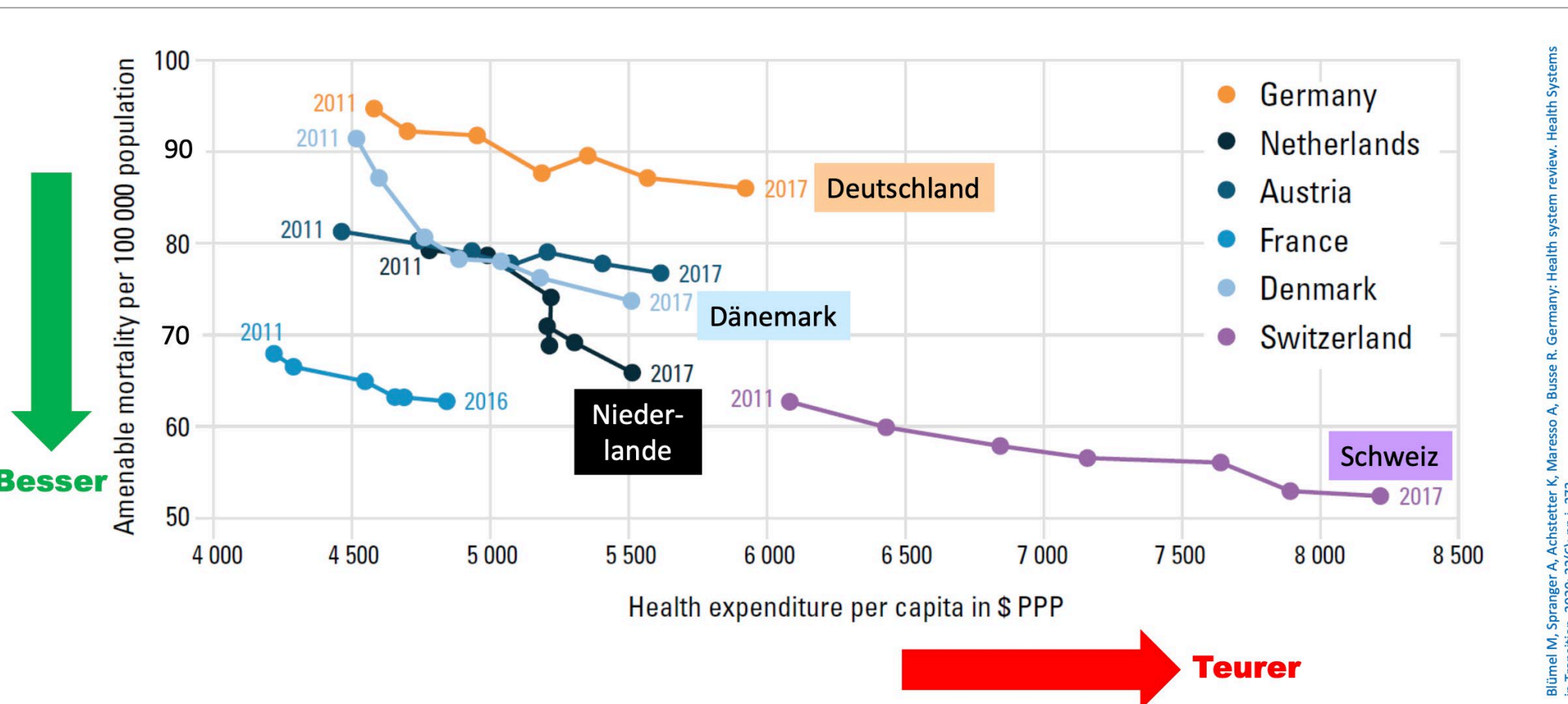
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# 3

## Health Preference Research and Value Assessment Frameworks in Digital Health Interventions – a Political Perspective

Prof. Dr. Volker E. Amelung  
Medical School Hannover

# Value for Money



Blümel M, Spranger A, Achstetter K, Maresso A, Busse R. Germany: Health system review. Health Systems in Transition, 2020; 22(6): pp.1-273.



# GEMEINSAM DIGITAL

Digitalisierungsstrategie für  
das Gesundheitswesen und die Pflege



## Key-Elements:

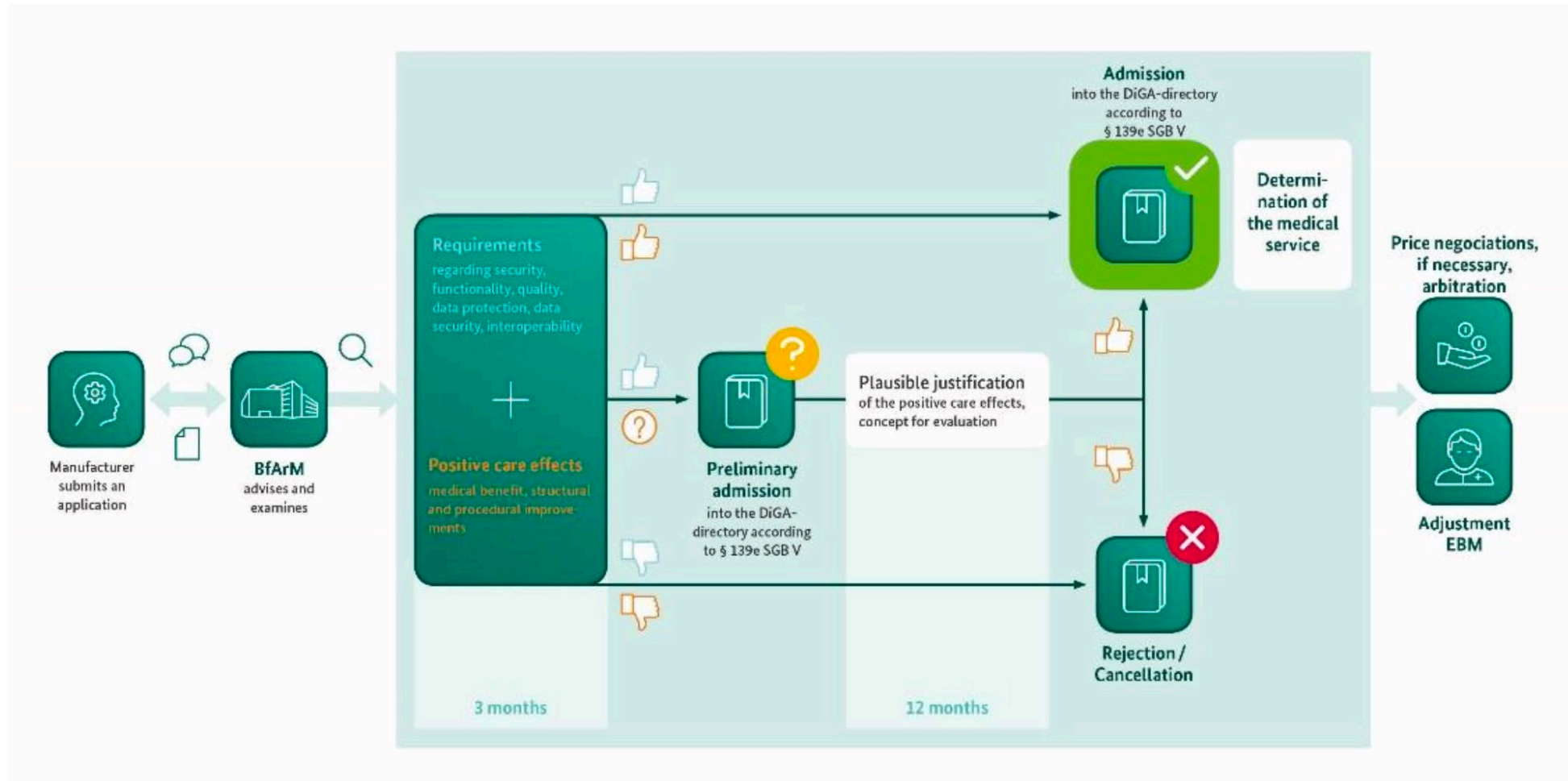
- Opt-out for EHR
- eRx and medication management
- Interoperability
- Use of data (registeries (Denmark), claim data and EHR) für research
- **Participatory approach**



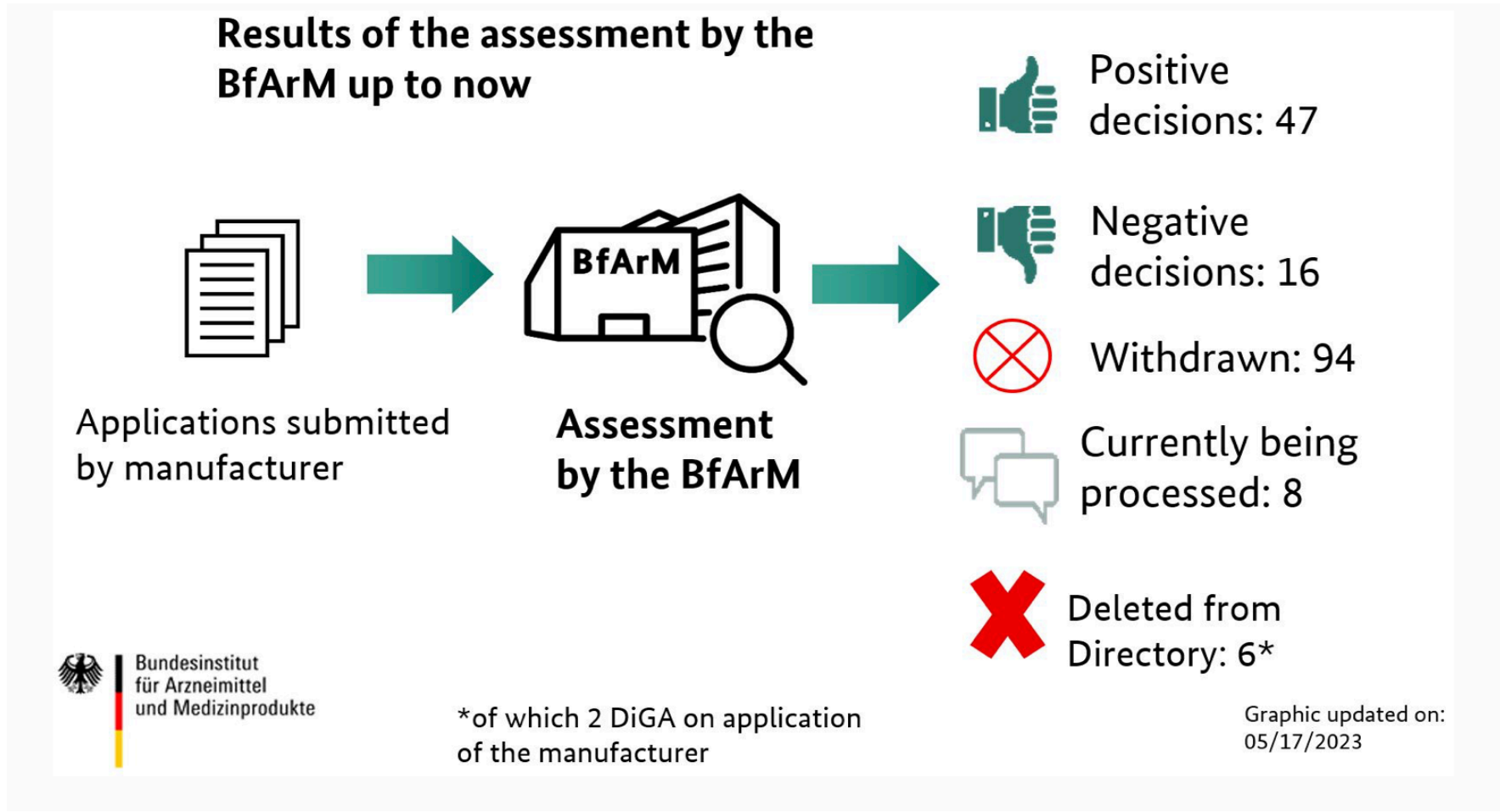
## Digital Therapeutics (DTx) - Examples ...



# Structured Market Access ...



## ... First Results ...



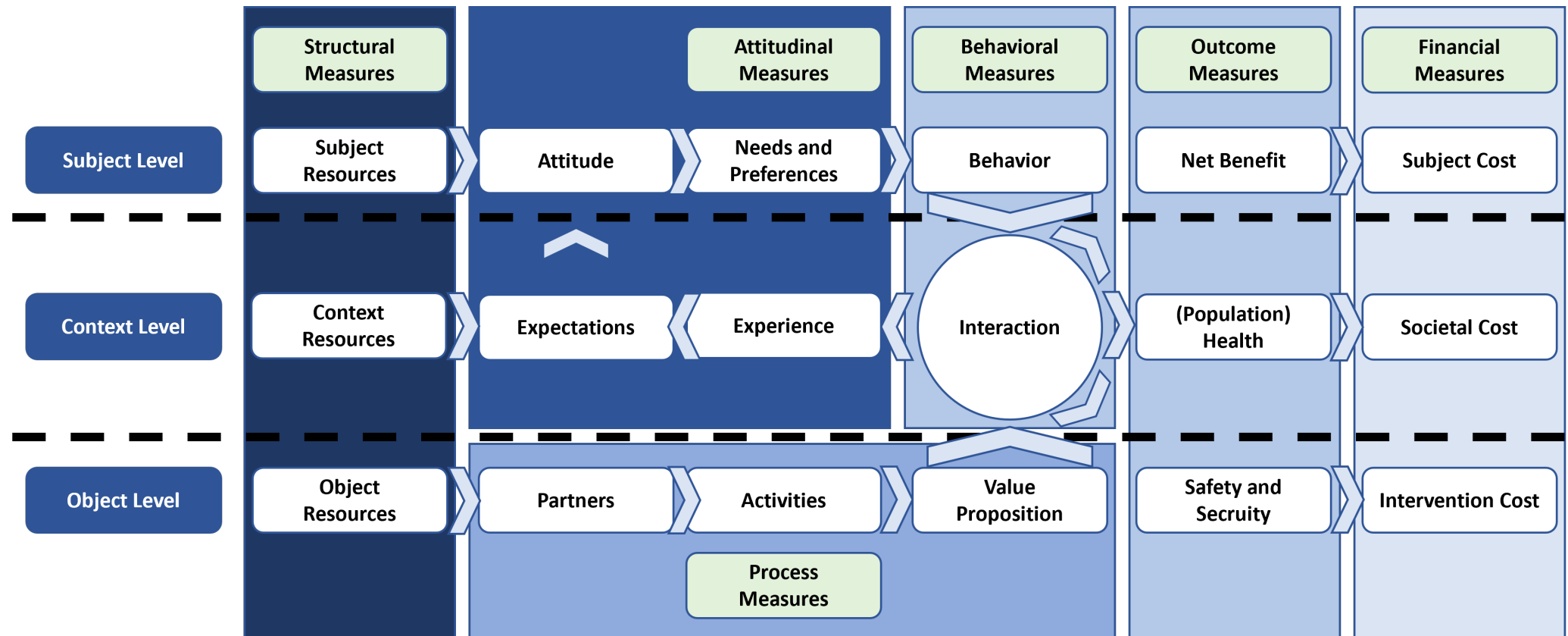
But how to convince doctors?

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# 4

**Discussion or Questions &  
Answers section (pick)**

# Value Equation



## It's time for a Poll! ... again

- **In your opinion, what specific outcomes or benefits should be included in the assessment of value for digital health interventions? (e.g., improved health outcomes, enhanced patient experience, reduced healthcare costs, increased convenience)**
- What factors influence your acceptance and willingness to engage with digital health interventions? (e.g., ease of use, privacy and security, integration with existing healthcare services, trust in the technology)
- In your experience, what barriers or challenges do you face when adopting or using digital health interventions? (e.g., technical difficulties, lack of support or guidance, concerns about privacy)
- What recommendations would you give to improve the assessment and evaluation of value dimensions in digital health interventions?



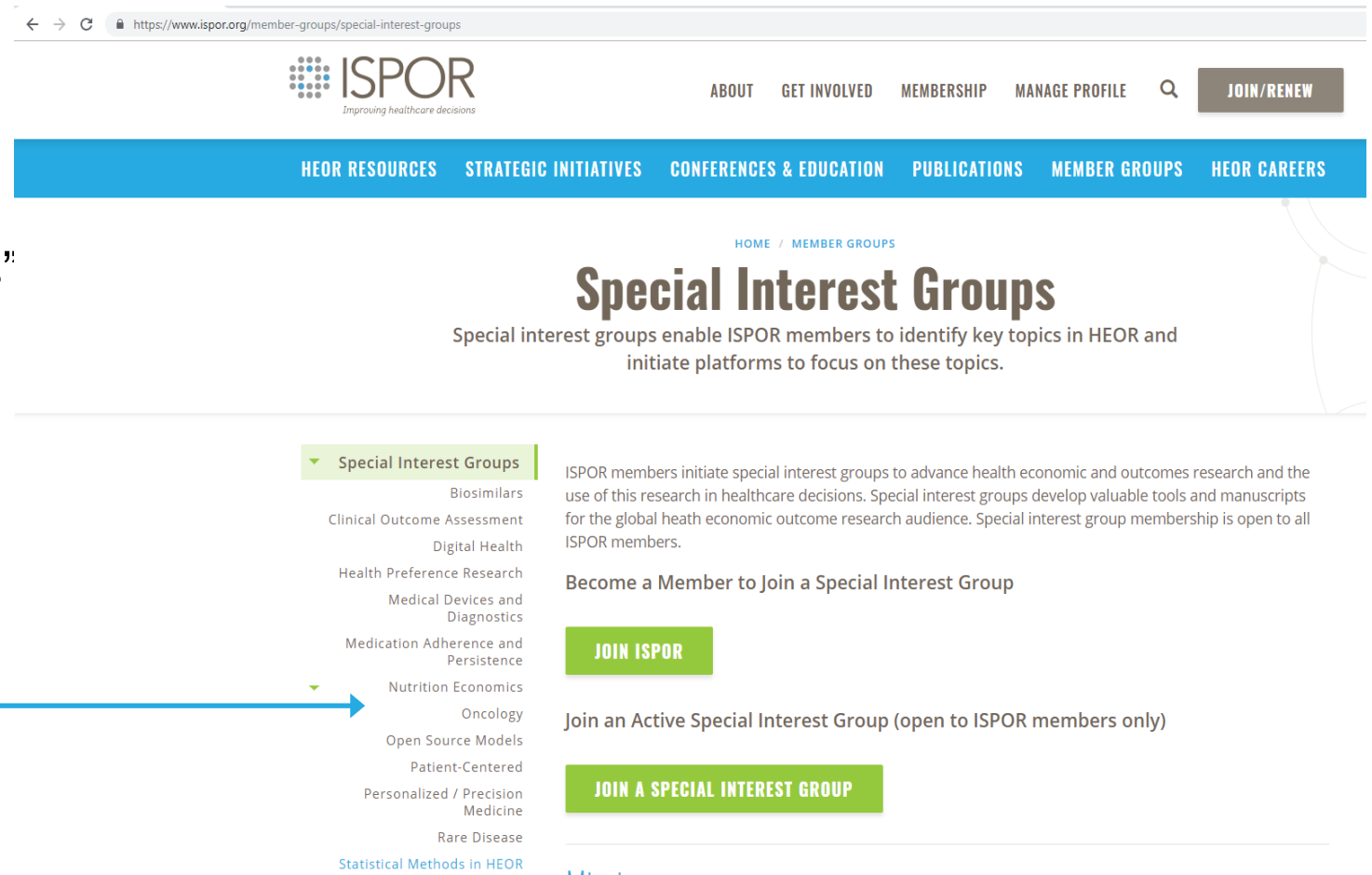
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The screenshot shows the ISPOR website's Special Interest Groups page. At the top, there is a navigation bar with links for ABOUT, GET INVOLVED, MEMBERSHIP, MANAGE PROFILE, and a JOIN/RENEW button. Below this is a secondary navigation bar with links for HEOR RESOURCES, STRATEGIC INITIATIVES, CONFERENCES & EDUCATION, PUBLICATIONS, MEMBER GROUPS, and HEOR CAREERS. The main content area features a breadcrumb trail (HOME / MEMBER GROUPS) and a large heading 'Special Interest Groups'. A sub-heading explains that special interest groups enable members to identify key topics in HEOR and initiate platforms to focus on these topics. Below this, there is a list of Special Interest Groups, including Biosimilars, Clinical Outcome Assessment, Digital Health, Health Preference Research, Medical Devices and Diagnostics, Medication Adherence and Persistence, Nutrition Economics, Oncology, Open Source Models, Patient-Centered, Personalized / Precision Medicine, Rare Disease, and Statistical Methods in HEOR. A blue arrow points from the text 'You must be an ISPOR member to join a Special Interest Group' to the 'Special Interest Groups' list. To the right of the list, there is a section titled 'Become a Member to Join a Special Interest Group' with a 'JOIN ISPOR' button and a 'JOIN A SPECIAL INTEREST GROUP' button.



## Special Interest Group Activities

- Join to stay up to date with SIG and related activities at ISPOR conferences.
- Note: All publications, webinars and conference presentations are available on SIG webpages.

## ISPOR Special Interest Groups

- Biosimilars
- Clinical Outcomes Assessment (COA)
- Digital Health
- **New!** Global Access to Medical Innovation
- Health Preference Research
- Health Equity Research
- Medical Devices & Diagnostics
- Medication Adherence & Persistence
- Nutrition Economics
- Oncology
- Open-Source Models
- Patient-Centered
- Precision Medicine & Advanced Therapies
- Rare Disease
- Real World Evidence (RWE)
- Statistical Methods in HEOR

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# 5

## Health Preference Research SESSIONS



## Health Preference Sessions Later Today

### **13:45 - 14:45**

- Workshop 227: Every Patient Matters: Introduction to Multi-Dimensional Thresholding in Health Preference Research

### **17:00 - 18:00**

- Issue Panel 250: How to Assess Patient Preferences for Use in Decision-Making Along the Medical Product Life Cycle? Learnings from Patient Preference Studies across Diverse Disease Domains

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*Improving healthcare decisions*

**Thank you!**

*For questions:*

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