



UNIVERSITY OF
CAMBRIDGE



Queen Mary
University of London

Public receptiveness to risk-based innovations within cancer screening and early diagnosis

Prof Jo Waller
Queen Mary University of London

Dr Becky Dennison
University of Cambridge

Why are public perceptions important?

change.org Start a petition My petitions Browse Subscription Q Log in

Petition details Comments

Keep cervical screening to 3 years and not extended to 5 years.



1,302,847 Signatures **1,500,000** Next Goal

[Support now](#)

Sign this petition

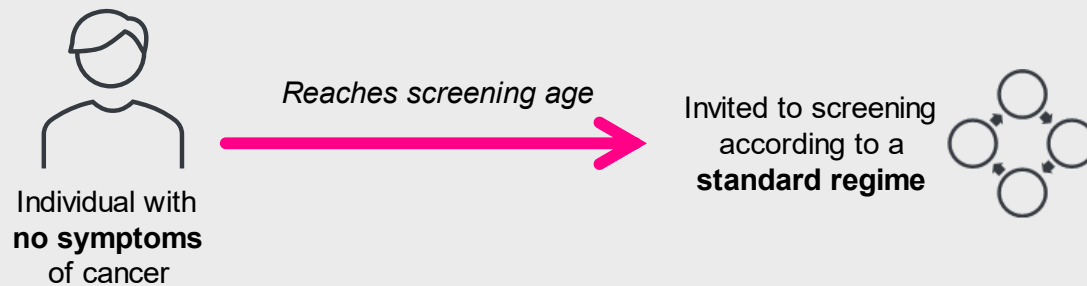
First name

Last name

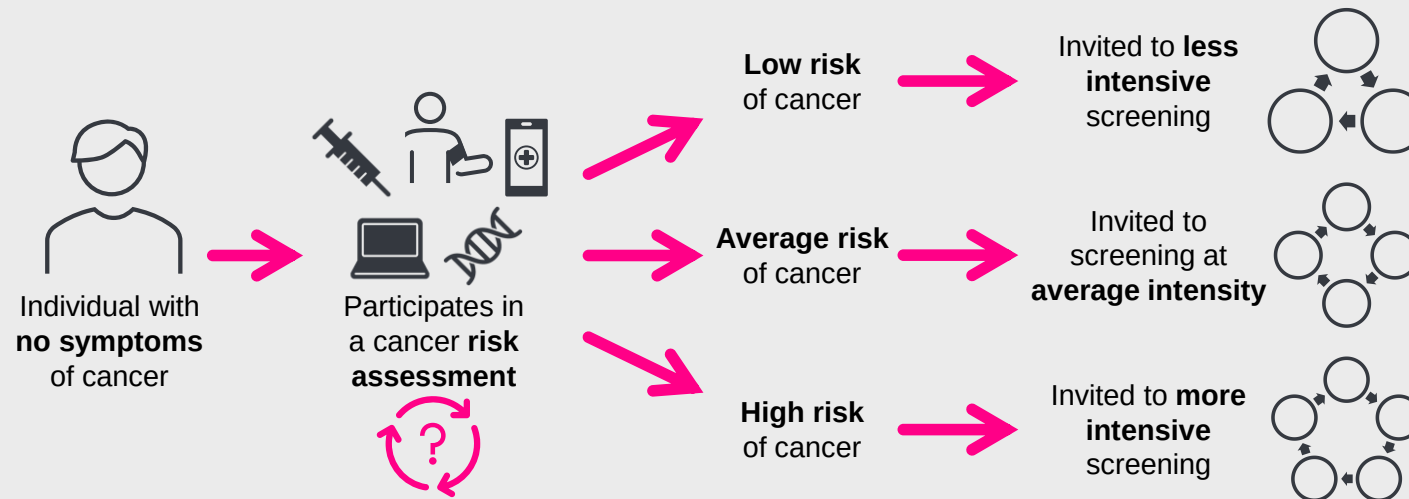
Email

Started 4 January 2022
Petition to [Welsh Government](#) and [1 other](#)

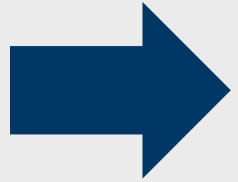
Background and rationale



“I think that even though I am low risk, my social circle, or the women that I’m in touch with or the media, all of those things, because breast cancer is such a common thing now, I would worry that... because my risk profile has given me a low risk, [starting screening later] seems too late.”
(from Kelley Jones et al, 2021)



Overview of research



Develop a detailed understanding of the attitudes of the public towards new and emerging risk-based cancer prevention, screening and diagnostic approaches and technologies

Four studies using six exemplars of novel innovations:

Polygenic
risk scores
(PRS)

Geodemo-
graphic
segment-
ation

Minimally
invasive
tests

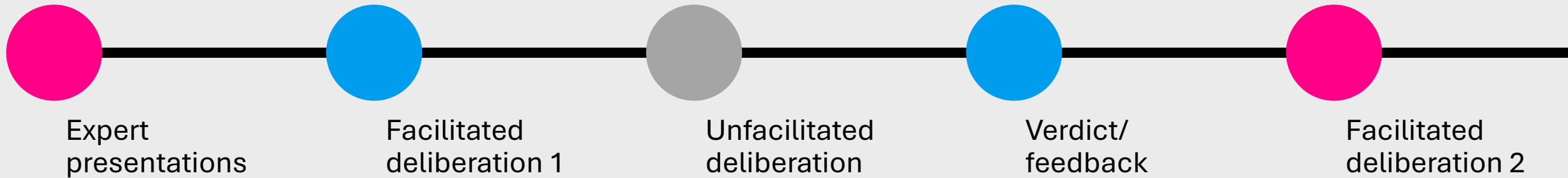
Continuous
monitoring
of
biomarkers

Artificial
intelligence
(AI)

Wearable
devices

Community juries

- Explore the views of the public on future risk-based technologies and risk-stratified cancer prevention and early diagnosis at **a societal level**
- Two online; one in-person
- 7-9 members of the public in for each jury (n = 24 in total)
- Jury structure:



- Codebook thematic analysis

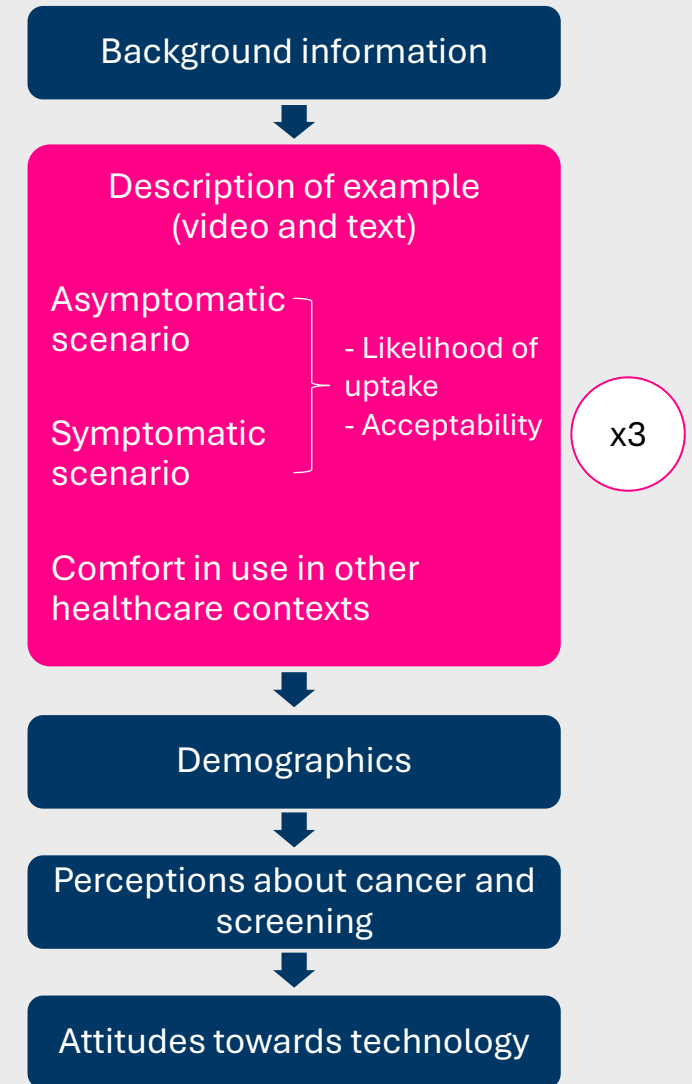
Think aloud interviews and survey

Think aloud interviews

- Explore **individual** public attitudes and receptiveness **in depth**
- 21 participants
- Three interviews using an interpreter
- Codebook thematic analysis based on the theoretical framework of acceptability (TFA)¹

Quantitative survey

- **Describe and quantify individual** attitudes and receptiveness
- 1,000 participants representative of the UK adult population
- Descriptive statistics and multivariable logistic regression



Discrete choice experiment (DCE)

- Quantify the relative importance of different **attributes** of risk-based technologies to the public
- 1,200 participants representative of the UK adult population
- Analysed using descriptive statistics and conditional logistic regression models (fixed effects logit)
- Example:

	Option 1	Option 2
Method	Non-invasive test	Questionnaire or data access
Type	Genetic	Non-genetic
Location	Community	Home
Frequency	One-off single event	Once every 5 years
Risk of cancer is overestimated in...	5 out of every 100 people	20 out of every 100 people
Risk of cancer is underestimated in...	5 out of every 100 people	10 out of every 100 people

Imagine someone has **no symptoms / a symptom that could potentially be a cancer**. Which option do you think is most acceptable?

1. Risk stratification using risk estimated in **Option 1**

2. Risk stratification using risk estimated in **Option 2**

3. **Neither** – do not estimate their risk and so offer the same healthcare to everyone

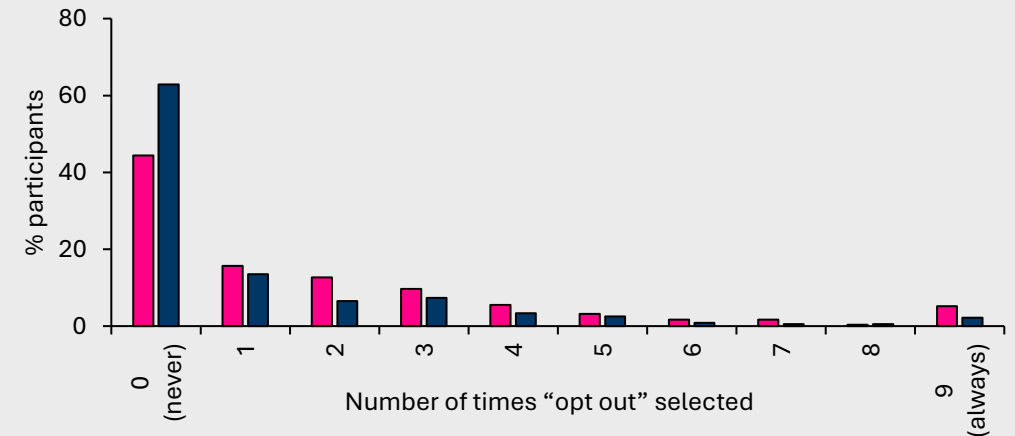
The public are receptive to risk-based innovations

Community jury verdicts

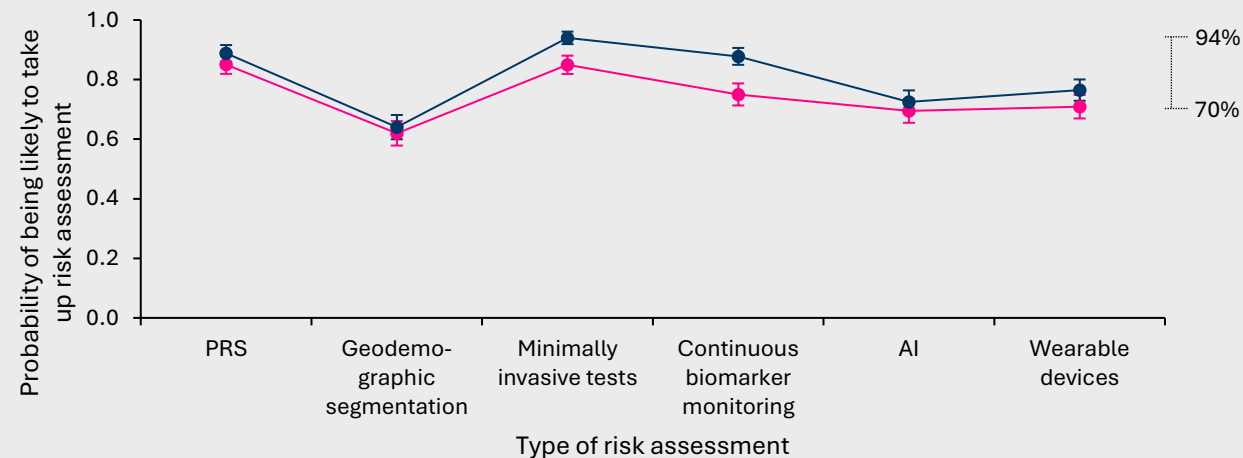


“So as a group we do believe it is acceptable to use data and use modern techniques [...]”
(Jury 3 feedback session)

Frequency of opting out in the DCE



Proportion of survey participants likely to take up the risk assessment



Asymptomatic
Symptomatic

Recommendations for those developing, adopting and translating innovations

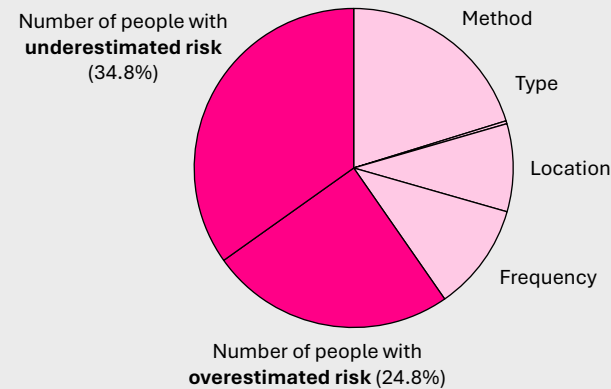


Continue to prioritise accuracy of risk categorisation

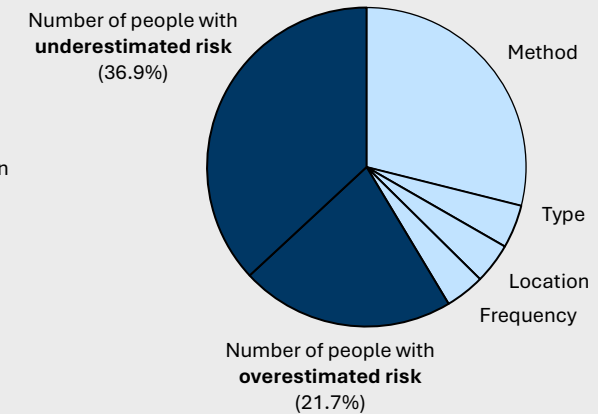
Accuracy attributes were most important in the DCE

Relative importance of each attribute:

Asymptomatic context cohort



Symptomatic context cohort



■ Asymptomatic
■ Symptomatic

Perceived effectiveness was impacted by the type of data, frequency of data collection, and potential for error

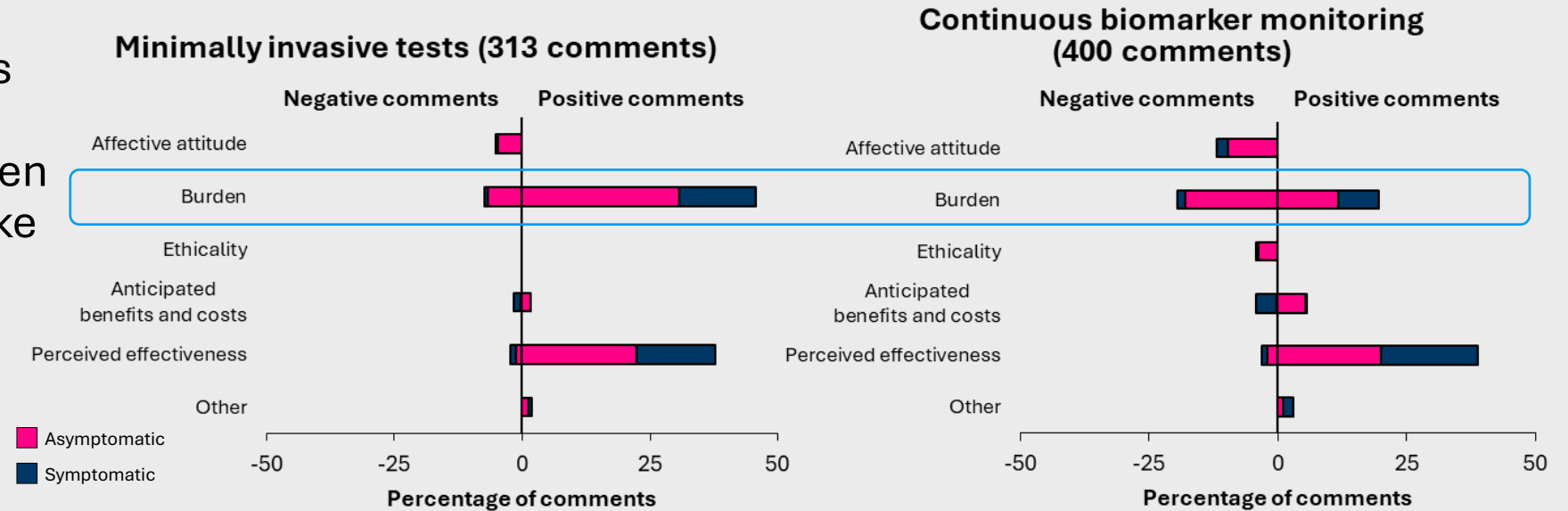


“[Continuous monitoring of biomarkers] seems really reliable and accurate, just because it’s on you at all times, for me it’s the most personal method. So yes, I think for me, that’s the most trustworthy.”
(Female, 18-29 years, Asian ethnicity, high socioeconomic status)

Think aloud interview

Burden should be low but the public will accept inconvenience

High or low burden was often considered by survey participants when deciding whether to take part in risk-based innovations



Community jury participants considered the burden different societal groups



“If you’re a mum, juggling a full-time job and caring for your kids, trying to find the time to go to your GP and have the test might be tricky.”
(P1-6, facilitated deliberation 1)

Community jury 1

Intuitiveness and transparency

Community jury participants found some risk assessments more logical in the symptomatic context, but risk stratification more logical in the asymptomatic context



Community jury 1

“If you’ve got symptoms, you should get the same test.”

(P1-8, unfacilitated deliberation)

“We just presumed we’d wear [the device] if we were showing symptoms, to further the investigation.”

(P1-7, feedback session)

Lack of explanation of the result of AI analysis of medical records was off-putting



“I think really you want an answer for somebody why you’re a low or high risk because you want to know why that’s come about, you know, I’d want an explanation.”

(Male, 40-49 years, Asian ethnicity, high socioeconomic status)

Think aloud interview

Summary of implications

- UK public are receptive to implementation of risk-based innovations within cancer healthcare
- Their priorities often align with those of researchers, innovators and policy makers
- Important to both:
 - Address the public's requirements, and
 - Communicate how the public's requirements have been addressed
- Nuances that should be considered in the context of each innovation and its target population

“The medical industry is evolving; they’re using information in a positive and constructive way”

Acknowledgements

Public receptiveness to risk-based innovations within cancer screening and early diagnosis

- **Core research team:** Becky Dennison, Jo Waller, Juliet Usher-Smith and Reanna Clune
- **Wider research team:** Joanna Tung, Stephen John, Sowmiya Moorthie, Stephen Morris, Pranjal Pandey, Alina Schumacher, Stephen Sharp, Maria Solovyeva, Lily Taylor
- **PPI:** Mary Adeson, Phil Alsop, Philip Dondi and Ruth Katz
- Team at Cancer Research UK



Dr Juliet Usher-Smith
Department of Public Health
and Primary Care
University of Cambridge



Reanna Clune
Department of Public Health
and Primary Care and
Department of Psychology
University of Cambridge

Funded by



**CANCER
RESEARCH
UK**