# Priorities of the UK public for risk-based innovations in cancer screening and referral to investigate symptoms: a discrete choice experiment

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## Supplementary material

## 1. Supplementary Table 1. Full question presented in the DCE.

*Example choice set:*

| | Option 1 | Option 2 |
|---|---|---|
| **Method of risk assessment** | **Wearable device**<br>A device like a smartwatch, patch or sensor is worn to continuously monitor factors such as sleep patterns, heart rate and temperature or to monitor biomarker levels (which are signals of what is going on in the body). | **Questionnaire or data access**<br>Cancer risk can be estimated using data from the person's existing health records (with their permission), or they could do a questionnaire to provide additional information. |
| **Type of risk assessment** | **Non-genetic**<br>Data other than a person's genes or DNA are analysed to estimate their cancer risk. | **Non-genetic**<br>Data other than a person's genes or DNA are analysed to estimate their cancer risk. |
| **Location of risk assessment** | **Community clinic/pharmacy**<br>The person would go to a community clinic (in a supermarket, for example) or pharmacy to have the wearable device set up. | **Home**<br>The person would do the questionnaire/give permission to access data in their own home. |
| **Frequency of risk assessment** | **Continuously for a 2-week period**<br>They would wear the device continuously over a two-week period. | **Constantly**<br>They would give permission for data access continuously over a prolonged period of time and update the questionnaire if anything changed. |
| **Accuracy – risk of cancer is over-estimated** | **10 out of every 100 people** who have a risk assessment are **told they are at high risk of cancer when actually they are not**. | **5 out of every 100 people** who have a risk assessment are **told they are at high risk of cancer when actually they are not.** |
| | This means that they might be offered more screening than they should be, based on their actual cancer risk. The tests may cause more harm than benefit. | |
| **Accuracy – risk of cancer is under-estimated** | **20 out of every 100 people** who have a risk assessment are **told they are at low risk of cancer when actually their risk is higher**. | **10 out of every 100 people** who have a risk assessment are **told they are at low risk of cancer when actually their risk is higher**. |
| | This means they might be offered less screening than they should be, based on their actual cancer risk. This might mean a cancer is diagnosed later than it could have been if they had been offered more tests. | |

Full question in the **asymptomatic context**:

Imagine someone has no symptoms of cancer. A decision must be made about the age at which they are first invited to screen for a particular type of cancer, and how often they should be invited.

Which option do you think is most acceptable?

1. Using their risk estimated according to **Option 1**, offer more intensive screening if they have a high risk and less intensive screening if they have a low risk.

2. Using their risk estimated according to **Option 2**, offer more intensive screening if they have a high risk and less intensive screening if they have a low risk.

3. **Neither** – do not estimate their risk and so offer the same screening to everyone (at average intensity).

Full question in the **symptomatic context**:

Imagine someone has a symptom that could potentially be a cancer. A decision needs to be made about which referral to make to investigate their symptoms. What investigations they should be offered must be decided.

Which option do you think is most acceptable?

1. Using their risk estimated according to **Option 1 alongside the clinical judgement of the GP**, arrange urgent, extensive tests if they have a high risk and refer initially for less urgent, less extensive tests if they have a low risk.

2. Using their risk estimated according to **Option 2 alongside the clinical judgement of the GP**, arrange urgent, extensive tests if they have a high risk and initially refer for a non-urgent test if they have a low risk.

3. **Neither** – do not estimate their risk and refer based on clinical judgment alone.

## 2. Supplementary Table 2. DCE question matrix.

| Block | Choice set | Alternative | Method | Type | Location | Frequency | Overestimated risk* | Underestimated risk* |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | Data | Non-genetic | Community | Constantly | 15 | 15 |
| | | 2 | Data | Non-genetic | Home | Once every year | 20 | 20 |
| 2 | 2 | 1 | Wearable device | Non-genetic | Home | Constantly | 20 | 5 |
| | | 2 | Non-invasive test | Non-genetic | Hospital | Once every year | 5 | 20 |
| 2 | 3 | 1 | Non-invasive test | Genetic | Home | One-off single event | 10 | 5 |
| | | 2 | Data | Non-genetic | General practice | One-off single event | 20 | 15 |
| 2 | 4 | 1 | Blood test | Genetic | Hospital | One-off single event | 20 | 20 |
| | | 2 | Wearable device | Non-genetic | Home | Continuously for 2 weeks | 5 | 15 |
| 1 | 5 | 1 | Non-invasive test | Non-genetic | General practice | Once every 5 years | 10 | 10 |
| | | 2 | Blood test | Non-genetic | Community | Once every year | 15 | 5 |
| 2 | 6 | 1 | Non-invasive test | Genetic | General practice | One-off single event | 15 | 15 |
| | | 2 | Blood test | Non-genetic | Community | Once every 5 years | 10 | 10 |
| 1 | 7 | 1 | Wearable device | Non-genetic | Hospital | Continuously for 2 weeks | 20 | 10 |
| | | 2 | Data | Non-genetic | Home | Once every year | 10 | 15 |
| 1 | 8 | 1 | Blood test | Genetic | General practice | One-off single event | 15 | 20 |
| | | 2 | Non-invasive test | Non-genetic | Hospital | One-off single event | 20 | 5 |
| 2 | 9 | 1 | Data | Non-genetic | Hospital | One-off single event | 10 | 10 |
| | | 2 | Non-invasive test | Non-genetic | Community | Once every 5 years | 20 | 5 |
| 1 | 10 | 1 | Wearable device | Non-genetic | Community | Constantly | 5 | 20 |
| | | 2 | Blood test | Non-genetic | General practice | Once every 5 years | 15 | 5 |
| 1 | 11 | 1 | Wearable device | Non-genetic | General practice | Constantly | 15 | 20 |
| | | 2 | Blood test | Genetic | Community | One-off single event | 20 | 15 |
| 1 | 12 | 1 | Wearable device | Non-genetic | Community | Continuously for 2 weeks | 10 | 20 |
| | | 2 | Data | Non-genetic | Home | Constantly | 5 | 10 |
| 1 | 13 | 1 | Data | Non-genetic | General practice | Once every year | 5 | 5 |
| | | 2 | Non-invasive test | Non-genetic | Home | One-off single event | 15 | 20 |
| 2 | 14 | 1 | Data | Non-genetic | Community | Once every year | 15 | 10 |
| | | 2 | Blood test | Non-genetic | General practice | One-off single event | 5 | 5 |
| 2 | 15 | 1 | Non-invasive test | Non-genetic | Community | One-off single event | 5 | 10 |
| | | 2 | Data | Non-genetic | Hospital | Constantly | 10 | 15 |
| 2 | 16 | 1 | Wearable device | Non-genetic | Hospital | Constantly | 15 | 15 |
| | | 2 | Data | Non-genetic | Home | Constantly | 20 | 20 |
| 1 | 17 | 1 | Data | Non-genetic | Community | One-off single event | 10 | 5 |
| | | 2 | Blood test | Non-genetic | Hospital | Once every year | 20 | 15 |
| 2 | 18 | 1 | Non-invasive test | Non-genetic | General practice | Once every year | 10 | 10 |
| | | 2 | Data | Non-genetic | Hospital | Once every 5 years | 5 | 20 |

** Accuracy – people out of 100 whose risk will be over- or underestimated.*

## 3. Supplementary Table 3. Details of model selection.

| | Screening context (n=601) | | | Referral context (n=601) | | |
|---|---|---|---|---|---|---|
| | Log likelihood | AIC | BIC | Log likelihood | AIC | BIC |
| **a. Model** | | | | | | |
| Basic conditional logistic model | -5363.226 | 10754.45 | 10862.17 | -4683.629 | 9395.26 | 9502.98 |
| Including constants for options 1 and 2 | -5363.046 | 10756.09 | 10871.51 | -4682.038 | 9394.08 | 9509.49 |
| Dummy coded overestimated risk | -5362.497 | 10756.99 | 10880.1 | -4681.938 | 9395.88 | 9518.99 |
| Dummy coded underestimated risk | -5362.086 | 10756.17 | 10879.28 | -4677.620 | 9387.24 | 9510.35 |
| **b. Number of classes for latent class analysis** | | | | | | |
| 2 classes | -4879.089 | 9816.178 | 10039.32 | -4266.114 | 8590.228 | 8813.367 |
| 3 classes | -4742.984 | 9573.969 | 9912.524 | -4147.905 | 8383.810 | 8722.365 |
| 4 classes | -4661.878 | 9441.756 | 9895.728 | -4051.602 | 8221.205 | 8675.176 |
| 5 classes | -4606.049 | 9360.098 | 9929.486 | *Did not converge* | | |
| **c. Seed** | | | | | | |
| Default | -4661.878 | 9441.756 | 9895.728 | -4051.602 | 8221.205 | 8675.176 |
| 39 | -4651.219 | 9420.438 | 9874.410 | *Did not converge* | | |
| 45 | -4661.876 | 9441.752 | 9895.724 | -4051.603 | 8221.205 | 8675.177 |
| 65 | -4651.220 | 9420.439 | 9874.411 | -4051.602 | 8221.205 | 8675.176 |
| 67 | -4661.878 | 9441.756 | 9895.728 | -4051.603 | 8221.206 | 8675.177 |
| 200 | -4651.219 | 9420.438 | 9874.410 | -4055.906 | 8229.811 | 8683.783 |
| 1234 | -4661.878 | 9441.756 | 9895.728 | -4105.510 | 8329.021 | 8782.992 |
| 5679 | -4661.876 | 9441.751 | 9895.723 | *Did not converge* | | |
| **d. Class membership*** | | | | | | |
| Original model | -4651.220 | 9420.439 | 9679.956 | -4051.602 | 8221.205 | 8480.722 |
| Over 50 years | -4644.118 | 9412.236 | 9684.949 | -4046.534 | 8217.067 | 8489.780 |
| Female sex | -4641.557 | 9407.115 | 9679.828 | -4041.566 | 8207.133 | 8479.846 |
| Ethnicity white | -4648.129 | 9420.258 | 9692.971 | -4048.302 | 8220.604 | 8493.317 |
| Low self-reported socioeconomic status | -4651.104 | 9426.209 | 9698.921 | -4055.916 | 8235.833 | 8508.545 |
| Degree education | -4649.532 | 9423.063 | 9695.776 | -4052.023 | 8228.046 | 8500.759 |
| Never smoked | -4646.829 | 9417.658 | 9690.371 | -4048.196 | 8220.393 | 8493.106 |
| Overweight | -4650.132 | 9424.264 | 9696.977 | -4103.594 | 8331.187 | 8603.900 |
| Cancer history | -4618.638 | 9361.275 | 9633.988 | -4044.159 | 8212.317 | 8485.030 |
| Attended screening | -4648.814 | 9421.627 | 9694.340 | -4046.150 | 8216.301 | 8489.014 |
| Worried about cancer | -4649.570 | 9423.140 | 9695.853 | -4054.265 | 8232.351 | 8505.243 |
| Think likely to get cancer | -4650.072 | 9424.143 | 9696.856 | -4057.089 | 8238.177 | 8510.890 |

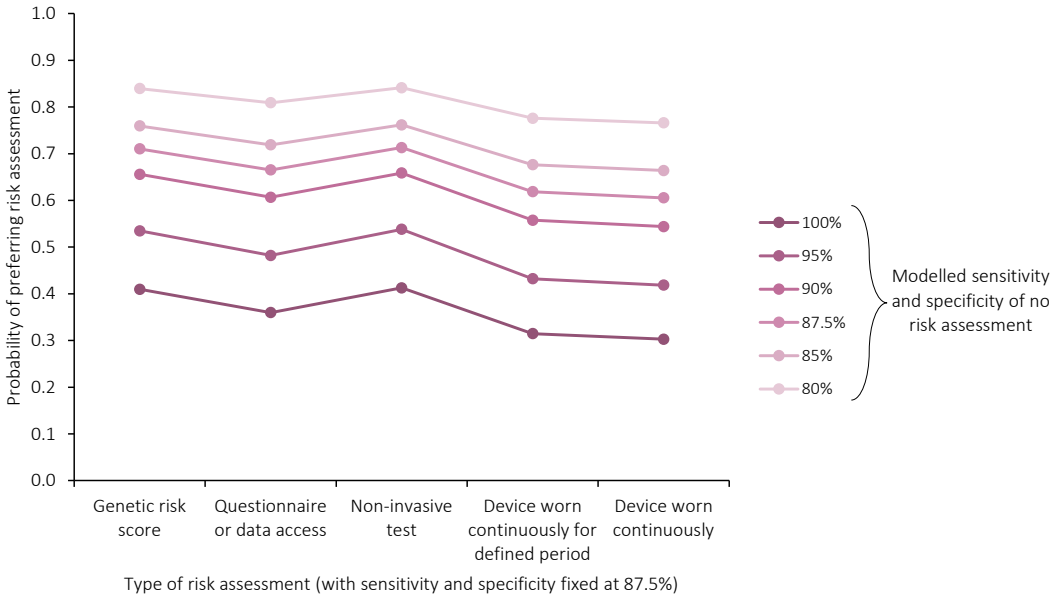
*AIC: Akaike Information Criterion; BIC: Bayesian Information Criterion.*

**601 used in calculating BIC.*

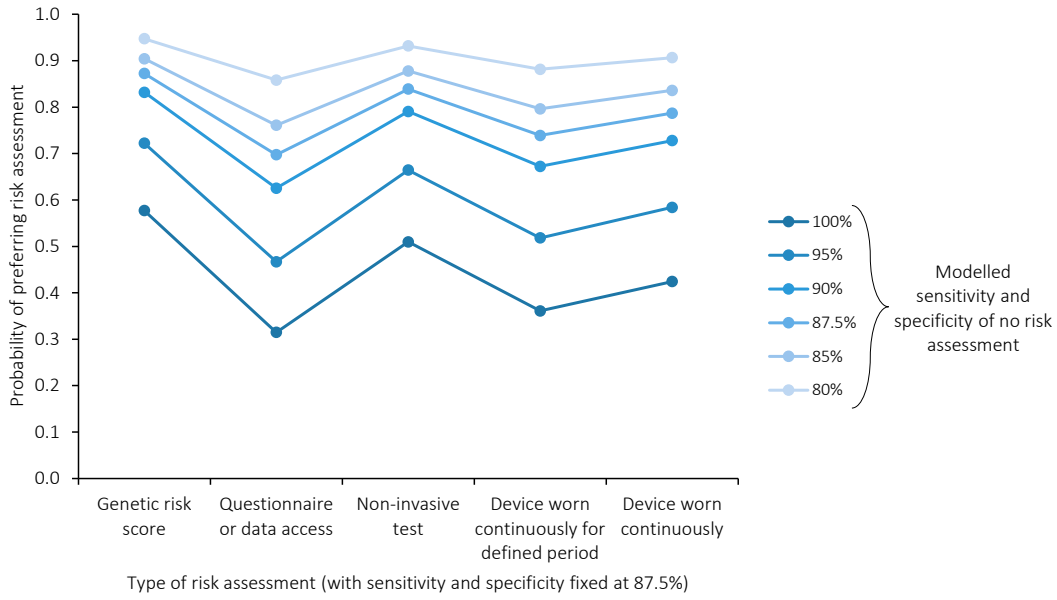
*Models with the lowest values of the AIC and BIC are highlighted in green.*

## 4. Supplementary Figure 1. Impact of varying the nonsense sensitivity and specificity variables for no risk assessments on predicted probabilities.

### Asymptomatic context cohort




### Symptomatic context cohort



## 5. Supplementary Table 4. Number of correct responses to the comprehension questions.

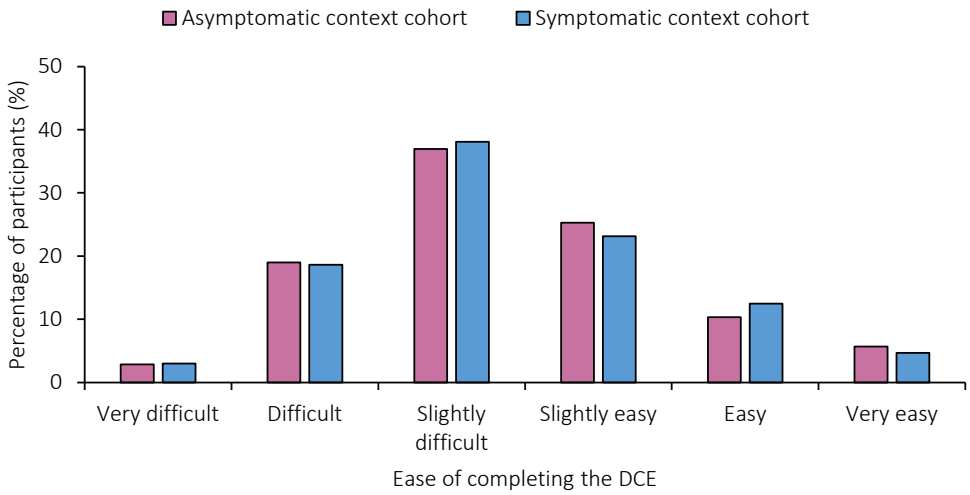
| | Asymptomatic context cohort | Symptomatic context cohort | Total (%) |
|---|---|---|---|
| Total *N* | 601 | 601 | 1,202 (100.0) |
| Q1. People may need to give a saliva or stool sample for Option 1 [true] | | | |
| Correct | 594 | 596 | 1,190 (99.0) |
| Incorrect | 7 | 5 | 12 (1.0) |
| Q2. More people would have their risk of cancer over-estimated and would be screened/tested more intensely than necessary in Option 2 compared to Option 1 [true] | | | |
| Correct | 476 | 468 | 944 (78.5) |
| Incorrect | 125 | 133 | 258 (21.5) |
| Q3. People would have to repeat the test in Option 1 quite often [false] | | | |
| Correct | 552 | 36 | 1,117 (92.9) |
| Incorrect | 49 | 565 | 85 (7.1) |
| Total number of questions answered correctly | | | |
| Zero or one | 15 | 20 | 35 (2.9) |
| Two | 150 | 134 | 284 (23.6) |
| Three | 436 | 447 | 883 (73.5) |

## 6. Supplementary Table 5. Participants' thoughts and beliefs about cancer and screening.

| | Asymptomatic context cohort | Symptomatic context cohort | Total (%) |
|---|---|---|---|
| Total *N* | 601 | 601 | 1,202 (100.0) |
| "These days, many people with cancer can expect to continue with normal activities and responsibilities" | | | |
| Strongly agree | 48 | 36 | 84 (7.0) |
| Agree | 324 | 335 | 659 (54.8) |
| Neither agree nor disagree | 159 | 151 | 310 (25.8) |
| Disagree | 65 | 73 | 138 (11.5) |
| Strongly disagree | 5 | 6 | 11 (0.9) |
| "Most cancer treatment is worse than the cancer itself" | | | |
| Strongly agree | 27 | 30 | 57 (4.8) |
| Agree | 139 | 125 | 264 (22.0) |
| Neither agree nor disagree | 205 | 214 | 419 (34.9) |
| Disagree | 187 | 181 | 368 (30.6) |
| Strongly disagree | 43 | 51 | 94 (7.8) |
| "I would not want to know if I had cancer" | | | |
| Strongly agree | 14 | 12 | 26 (2.2) |
| Agree | 25 | 22 | 47 (3.9) |
| Neither agree nor disagree | 63 | 65 | 128 (10.7) |
| Disagree | 197 | 181 | 378 (31.5) |
| Strongly disagree | 302 | 321 | 623 (51.8) |
| "Cancer can often be cured" | | | |
| Strongly agree | 79 | 79 | 158 (13.1) |
| Agree | 303 | 312 | 615 (51.2) |
| Neither agree nor disagree | 171 | 146 | 317 (26.4) |
| Disagree | 41 | 58 | 99 (8.2) |
| Strongly disagree | 7 | 6 | 13 (1.1) |
| "Going to the doctor as quickly as possible after noticing a symptom of cancer could increase the chances of surviving" | | | |
| Strongly agree | 412 | 432 | 844 (70.2) |
| Agree | 170 | 144 | 314 (26.1) |
| Neither agree nor disagree | 9 | 18 | 27 (2.3) |
| Disagree | 4 | 5 | 9 (0.8) |
| Strongly disagree | 6 | 2 | 8 (0.7) |
| "Some people think that a diagnosis of cancer is a death sentence" | | | |
| Strongly agree | 28 | 28 | 56 (4.7) |
| Agree | 137 | 129 | 266 (22.1) |
| Neither agree nor disagree | 189 | 165 | 354 (29.5) |
| Disagree | 212 | 223 | 435 (36.2) |
| Strongly disagree | 35 | 56 | 91 (7.6) |
| How likely do you think is it that you will get cancer at some point in the next 10 years? | | | |
| Extremely or moderately likely | 114 | 135 | 249 (20.7) |
| Slightly likely | 153 | 157 | 310 (25.8) |
| Neither likely nor unlikely | 195 | 148 | 343 (28.5) |
| Slightly unlikely | 41 | 57 | 98 (8.2) |
| Extremely or moderately unlikely | 98 | 104 | 202 (16.8) |
| During the past month, how often have you thought about your own chances of getting cancer? | | | |
| Not at all | 192 | 194 | 386 (32.1) |
| Rarely | 191 | 177 | 368 (30.6) |
| Sometimes | 158 | 159 | 317 (26.4) |
| Often or a lot | 60 | 71 | 131 (10.9) |

| | | | |
|---|---|---|---|
| During the past month, how often have thoughts about your chances of getting cancer affected your mood? | | | |
| Not at all | 325 | 339 | 664 (55.2) |
| Rarely | 159 | 140 | 299 (24.9) |
| Sometimes | 83 | 92 | 175 (14.5) |
| Often or a lot | 34 | 30 | 64 (5.3) |
| During the past month, how often have thoughts about your chances of getting cancer affected your ability to perform your daily activities? | | | |
| Not at all | 437 | 456 | 893 (74.3) |
| Rarely | 104 | 95 | 199 (16.6) |
| Sometimes | 39 | 37 | 76 (6.3) |
| Often or a lot | 21 | 13 | 34 (2.8) |

7. Supplementary Figure 2. Participants' ease of completing the DCE.



8. Supplementary Table 6. Participants' preferences for risk assessments in screening and referral context cohorts (sensitivity analyses).

| | a. Participants who paid attention by completing the survey in at least 7.5 minutes and not always selecting Option 1 or Option 2 | | | b. Participants who showed understanding of the concepts by answering all of the comprehension questions correctly | | |
|---|---|---|---|---|---|---|
| | Asymptomatic context cohort | Symptomatic context cohort | p value for difference between cohorts | Asymptomatic context cohort | Symptomatic context cohort | p value for difference between cohorts |
| *N* participants | 565 | 560 | **<0.001** for | 436 | 447 | **<0.001** for |
| *N* observations | 15,255 | 15,120 | overall | 11,772 | 12,069 | overall |
| Pseudo $R^2$ | 0.1045 | 0.2205 | difference | 0.1057 | 0.2256 | difference |
| **Constant (no risk assessment)** | **-0.677 (-0.825 to -0.529)** | **-0.802 (-0.965 to -0.640)** | 0.264 | **-0.611 (-0.779 to -0.442)** | **-0.762 (-0.946 to -0.577)** | 0.236 |
| **Method of risk assessment** | | | | | | |
| Questionnaire or data access | Reference | Reference | | Reference | Reference | |
| Blood test | **0.336 (0.206 to 0.466)** | **1.024 (0.881 to 1.167)** | **<0.001** | **0.348 (0.200 to 0.495)** | **0.987 (0.825 to 1.149)** | **<0.001** |
| Non-invasive test | **0.339 (0.226 to 0.452)** | **0.765 (0.645 to 0.885)** | **<0.001** | **0.401 (0.272 to 0.529)** | **0.701 (0.566 to 0.837)** | **0.002** |
| Wearable device | -0.164 (-0.339 to 0.012) | **0.258 (0.084 to 0.433)** | **0.001** | -0.143 (-0.343 to 0.056) | **0.281 (0.088 to 0.474)** | **0.003** |
| **Type of risk assessment** | | | | | | |
| Non-genetic | Reference | Reference | | Reference | Reference | |
| Genetic | 0.021 (-0.132 to 0.174) | 0.120 (-0.048 to 0.289) | 0.392 | 0.009 (-0.165 to 0.183) | **0.198 (0.008 to 0.388)** | 0.150 |
| **Location of risk assessment** | | | | | | |
| Home | Reference | Reference | | Reference | Reference | |
| Community clinic/pharmacy | -0.047 (-0.164 to 0.070) | 0.095 (-0.029 to 0.219) | 0.103 | 0.060 (-0.073 to 0.192) | 0.120 (-0.020 to 0.260) | 0.539 |
| General practice | -0.106 (-0.228 to 0.015) | -0.027 (-0.158 to 0.105) | 0.383 | -0.018 (-0.156 to 0.119) | 0.018 (-0.131 to 0.168) | 0.724 |
| Hospital | **-0.231 (-0.345 to -0.117)** | -0.039 (-0.151 to 0.072) | 0.019 | **-0.184 (-0.314 to -0.054)** | -0.041 (-0.167 to 0.085) | 0.122 |
| **Frequency of risk assessment** | | | | | | |
| One-off single event | Reference | Reference | | Reference | Reference | |
| Once every 5 years | 0.001 (-0.138 to 0.140) | 0.001 (-0.151 to 0.153) | 0.998 | 0.010 (-0.149 to 0.168) | 0.035 (-0.135 to 0.204) | 0.834 |
| Once every year | -0.042 (-0.162 to 0.077) | -0.007 (-0.138 to 0.124) | 0.698 | -0.058 (-0.195 to 0.078) | 0.039 (-0.111 to 0.188) | 0.349 |
| Continuously for 2 weeks | 0.179 (-0.079 to 0.438) | -0.016 (-0.275 to 0.243) | 0.295 | 0.158 (-0.136 to 0.452) | 0.077 (-0.211 to 0.364) | 0.699 |
| Constantly | -0.042 (-0.211 to 0.128) | 0.109 (-0.069 to 0.287) | 0.230 | 0.017 (-0.175 to 0.209) | 0.180 (-0.019 to 0.378) | 0.249 |
| **Accuracy** | | | | | | |
| Specificity | **0.045 (0.038 to 0.053)** | **0.051 (0.043 to 0.059)** | **0.273** | **0.045 (0.037 to 0.054)** | **0.053 (0.044 to 0.062)** | 0.207 |
| Sensitivity | **0.064 (0.056 to 0.071)** | **0.086 (0.078 to 0.093)** | **<0.001** | **0.061 (0.053 to 0.069)** | **0.090 (0.081 to 0.098)** | **<0.001** |
| **p value for difference versus main analysis** | | | | | | |
| | **0.003** | **<0.001** | | 0.153 | **0.025** | |

9. Supplementary Table 7. Participants' preferences for risk assessments in screening and referral context cohorts by class (latent class analysis).

Asymptomatic context cohort*

| | Class 1 (43.3%) | | Class 2 (21.5%) | | Class 3 (28.7%) | | Class 4 (6.6%) | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient | P value | Coefficient | P value | Coefficient | P value | Coefficient | P value |
| **Constant (no risk assessment)** | **-1.831 (-2.305 to -1.356)** | **<0.001** | **-2.802 (-3.552 to -2.052)** | **<0.001** | -0.150 (-0.523 to 0.224) | 0.432 | **6.820 (2.304 to 11.335)** | **0.003** |
| **Method of risk assessment** | | | | | | | | |
| Questionnaire or data access | Reference | | Reference | | Reference | | Reference | |
| Blood test | **1.313 (0.961 to 1.665)** | **<0.001** | **-1.010 (-1.508 to -0.512)** | **<0.001** | -0.113 (-0.513 to 0.286) | 0.578 | -1.640 (-4.824 to 1.543) | 0.312 |
| Non-invasive test | **1.045 (0.789 to 1.302)** | **<0.001** | **-0.672 (-1.162 to -0.182)** | **0.007** | 0.074 (-0.227 to 0.375) | 0.629 | -2.143 (-5.086 to 0.800) | 0.154 |
| Wearable device | **1.135 (0.753 to 1.518)** | **<0.001** | **-2.378 (-3.217 to -1.540)** | **<0.001** | **-0.524 (-1.017 to -0.031)** | **0.037** | -1.323 (-4.344 to 1.698) | 0.391 |
| **Type of risk assessment** | | | | | | | | |
| Non-genetic | Reference | | Reference | | Reference | | Reference | |
| Genetic | 0.026 (-0.282 to 0.334) | 0.871 | 0.226 (-0.231 to 0.683) | 0.333 | -0.180 (-0.533 to 0.174) | 0.319 | 3.973 (-0.996 to 8.942) | 0.117 |
| **Location of risk assessment** | | | | | | | | |
| Home | Reference | | Reference | | Reference | | Reference | |
| Community clinic/pharmacy | **-0.440 (-0.688 to -0.191)** | **0.001** | **0.815 (0.322 to 1.309)** | **0.001** | -0.039 (-0.325 to 0.247) | 0.791 | 2.527 (-0.186 to 5.239) | 0.068 |
| General practice | **-0.475 (-0.730 to -0.220)** | **<0.001** | **0.759 (0.265 to 1.254)** | **0.003** | -0.034 (-0.324 to 0.256) | 0.819 | 0.946 (-2.008 to 3.901) | 0.530 |
| Hospital | **-0.707 (-0.933 to -0.480)** | **<0.001** | **0.826 (0.390 to 1.262)** | **<0.001** | **-0.334 (-0.647 to -0.021)** | **0.036** | 2.798 (-0.263 to 5.859) | 0.073 |
| **Frequency of risk assessment** | | | | | | | | |
| One-off single event | Reference | | Reference | | Reference | | Reference | |
| Once every 5 years | -0.037 (-0.306 to 0.232) | 0.786 | 0.252 (-0.180 to 0.683) | 0.253 | -0.047 (-0.355 to 0.261) | 0.764 | -41.145 (-88.169 to 5.878) | 0.086 |
| Once every year | -0.141 (-0.370 to 0.088) | 0.227 | 0.147 (-0.287 to 0.580) | 0.507 | -0.146 (-0.411 to 0.118) | 0.278 | 2.326 (-1.102 to 5.755) | 0.184 |
| Continuously for 2 weeks | -0.346 (-0.828 to 0.137) | 0.160 | **1.442 (0.584 to 2.299)** | **0.001** | -0.085 (-0.701 to 0.532) | 0.788 | 2.441 (-2.307 to 7.189) | 0.314 |
| Constantly | **-0.424 (-0.768 to -0.081)** | **0.016** | 0.688 (-0.017 to 1.394) | 0.056 | -0.239 (-0.626 to 0.147) | 0.225 | 0.812 (-2.529 to 4.154) | 0.634 |
| **Accuracy** | | | | | | | | |
| Specificity | **0.066 (0.051 to 0.082)** | **<0.001** | **0.029 (0.005 to 0.053)** | **0.017** | **0.056 (0.038 to 0.074)** | **<0.001** | 0.153 (-0.043 to 0.350) | 0.125 |
| Sensitivity | **0.045 (0.032 to 0.058)** | **<0.001** | **0.105 (0.069 to 0.140)** | **<0.001** | **0.091 (0.069 to 0.112)** | **<0.001** | 0.059 (-0.250 to 0.133) | 0.548 |
| **Class membership** | | | | | | | | |
| Female sex (versus male) | **-0.842 (-1.574 to -0.111)** | **0.024** | -0.433 (-1.225 to 0.358) | 0.283 | -0.491 (-1.251 to 0.269) | 0.206 | Reference | |
| History of cancer (versus no history of cancer) | 0.594 (-0.919 to 2.107) | 0.442 | -14.028 (-384.506 to 356.450) | 0.941 | 0.366 (-1.197 to 1.929) | 0.646 | Reference | |

**Latent class analysis limited to 40 iterations.*

Symptomatic context cohort

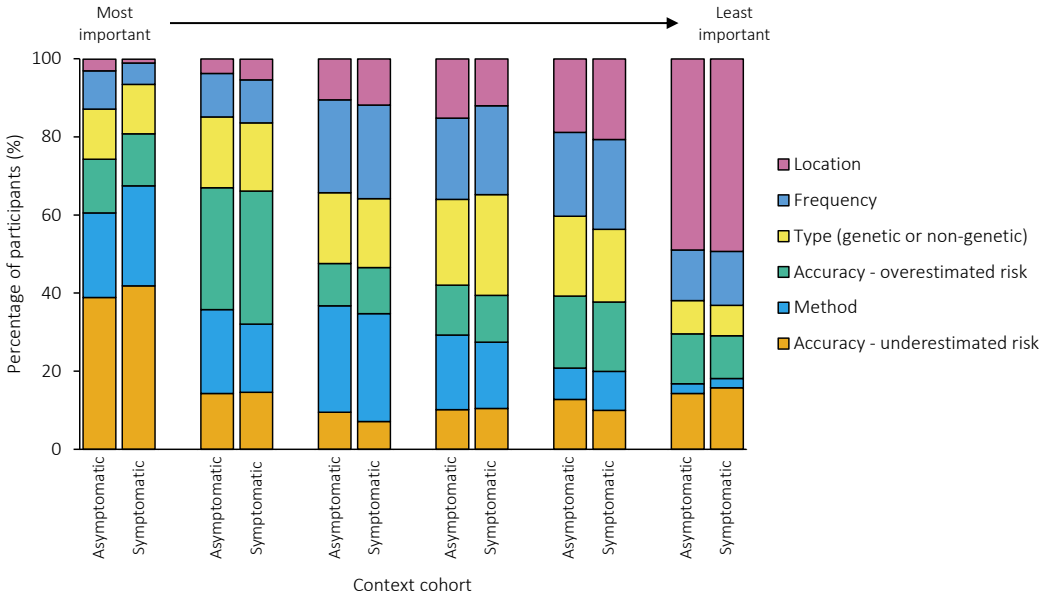
| | Class 1 (34.9%) | | Class 2 (37.8%) | | Class 3 (13.3%) | | Class 4 (14.0%) | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient | P value | Coefficient | P value | Coefficient | P value | Coefficient | P value |
| **Constant (no risk assessment)** | **-2.974 (-3.748 to -2.201)** | **<0.001** | **-2.382 (-2.806 to -1.957)** | **<0.001** | **1.283 (0.012 to 2.554)** | **0.048** | **0.910 (0.317 to 1.503)** | **0.003** |
| **Method of risk assessment** | | | | | | | | |
| Questionnaire or data access | Reference | | Reference | | Reference | | Reference | |
| Blood test | **1.446 (0.755 to 2.136)** | **<0.001** | **0.457 (0.155 to 0.759)** | **0.003** | **3.047 (2.040 to 4.054)** | **<0.001** | -0.015 (-0.592 to 0.562) | 0.960 |
| Non-invasive test | **1.066 (0.504 to 1.628)** | **<0.001** | **0.373 (0.131 to 0.614)** | **0.002** | **2.642 (1.482 to 3.802)** | **<0.001** | -0.102 (-0.580 to 0.376) | 0.676 |
| Wearable device | 0.181 (-0.391 to 0.753) | 0.535 | **0.312 (0.004 to 0.621)** | **0.047** | 0.819 (-0.310 to 1.949) | 0.155 | -0.653 (-1.357 to 0.052) | 0.069 |
| **Type of risk assessment** | | | | | | | | |
| Non-genetic | Reference | | Reference | | Reference | | Reference | |
| Genetic | 0.181 (-0.638 to 0.999) | 0.665 | **0.371 (0.122 to 0.619)** | **0.003** | 0.816 (-0.100 to 1.732) | 0.081 | -0.016 (-0.625 to 0.593) | 0.960 |
| **Location of risk assessment** | | | | | | | | |
| Home | Reference | | Reference | | Reference | | Reference | |
| Community clinic/pharmacy | 0.248 (-0.255 to 0.751) | 0.334 | 0.082 (-0.117 to 0.280) | 0.420 | 0.105 (-0.542 to 0.751) | 0.751 | -0.143 (-0.586 to 0.300) | 0.526 |
| General practice | 0.111 (-0.571 to 0.794) | 0.749 | 0.108 (-0.097 to 0.312) | 0.302 | -0.319 (-0.958 to 0.319) | 0.327 | -0.011 (-0.497 to 0.476) | 0.965 |
| Hospital | 0.168 (-0.260 to 0.597) | 0.442 | -0.004 (-0.196 to 0.189) | 0.969 | 0.135 (-0.621 to 0.891) | 0.727 | -0.183 (-0.675 to 0.310) | 0.467 |
| **Frequency of risk assessment** | | | | | | | | |
| One-off single event | Reference | | Reference | | Reference | | Reference | |
| Once every 5 years | 0.060 (-0.493 to 0.614) | 0.831 | 0.142 (-0.102 to 0.386) | 0.254 | 0.427 (-0.396 to 1.249) | 0.309 | -0.034 (-0.498 to 0.430) | 0.887 |
| Once every year | -0.004 (-0.593 to 0.586) | 0.990 | 0.017 (-0.178 to 0.212) | 0.863 | 0.468 (-0.367 to 1.304) | 0.272 | 0.119 (-0.316 to 0.553) | 0.592 |
| Continuously for 2 weeks | 0.153 (-0.654 to 0.959) | 0.710 | -0.145 (-0.589 to 0.298) | 0.520 | -0.079 (-1.506 to 1.348) | 0.914 | 0.246 (-0.754 to 1.245) | 0.630 |
| Constantly | 0.221 (-0.459 to 0.902) | 0.524 | 0.040 (-0.249 to 0.328) | 0.787 | 0.161 (-0.973 to 1.295) | 0.781 | 0.384 (-0.224 to 0.992) | 0.216 |
| **Accuracy** | | | | | | | | |
| Specificity | **0.137 (0.098 to 0.175)** | **<0.001** | **0.018 (0.002 to 0.035)** | **0.030** | 0.019 (-0.023 to 0.061) | 0.382 | **0.096 (0.065 to 0.126)** | **<0.001** |
| Sensitivity | **0.242 (0.182 to 0.301)** | **<0.001** | **0.022 (0.004 to 0.039)** | **0.017** | **0.044 (0.011 to 0.076)** | **0.009** | **0.147 (0.109 to 0.184)** | **<0.001** |
| **Class membership** | | | | | | | | |
| Female sex (versus male) | 0.003 (-0.479 to 0.485) | 0.990 | Reference | | **-1.308 (-2.044 to -0.572)** | **<0.001** | **-0.809 (-1.382 to -0.235)** | **0.006** |

10. Supplementary Table 8. Participants' reported views on the relative acceptability of using cancer risk assessments in screening and referral contexts.

| | Asymptomatic context cohort | Symptomatic context cohort | Total (%) |
|---|---|---|---|
| Total *N* | 601 | 601 | 1,202 (100.0) |
| It is *more* acceptable to use a cancer risk assessment to decide *how much screening someone is offered* | 67 | 68 | 135 (11.2) |
| It is more acceptable to use a cancer risk assessment to decide how urgently and thoroughly someone's symptoms are investigated | 146 | 171 | 317 (26.4) |
| Both are *equally* acceptable | 368 | 340 | 708 (58.9) |
| Neither are acceptable | 20 | 22 | 42 (3.5) |

*P value for difference=0.364 ($\chi^2$).*

## 11. Supplementary Figure 3. Participants' ranking of the attributes of risk assessments.




*34 (2.8%) participants did not change the order of attributes from that presented in the question.*