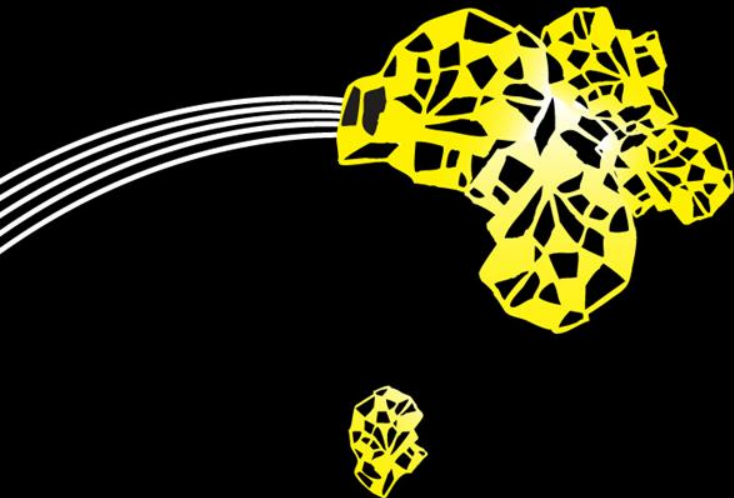
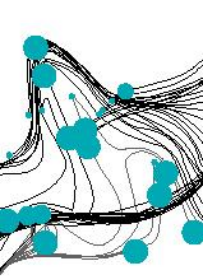


# Measuring public preferences for colorectal cancer screening using new genome-based nanotechnologies.

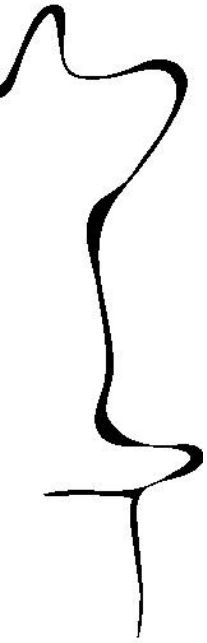
Jilles M. Fermont, Karin G.M Groothuis-Oudshoorn and Maarten J. IJzerman

Department of Health Technology & Services Research  
MIRA institute for Biomedical Technology & Technical Medicine



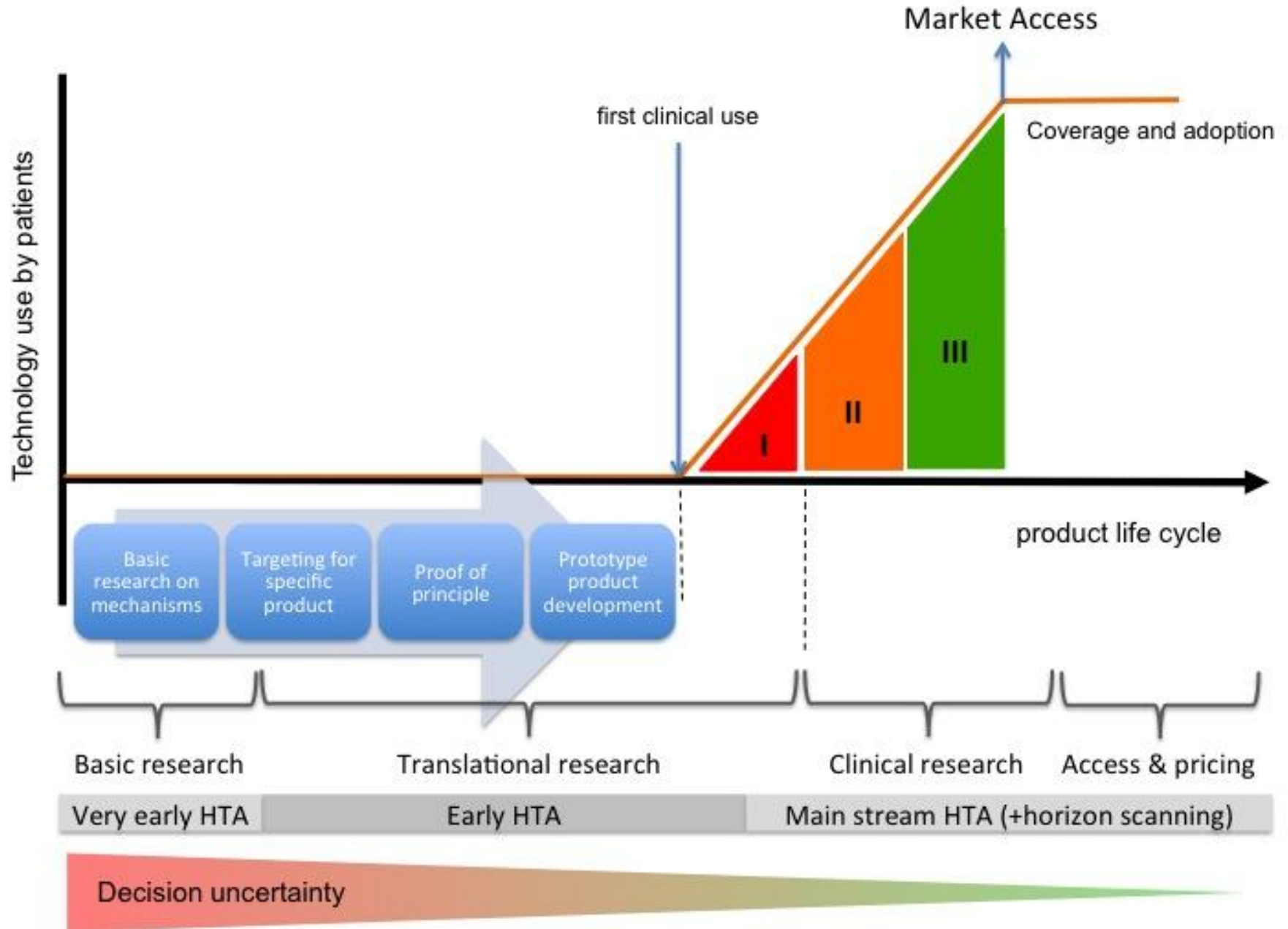


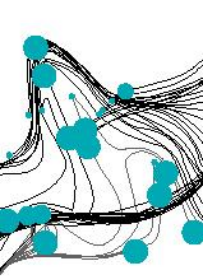
## Study purpose



- Development of medical devices rather technology driven than based on patient preferences (Martin et al. 2008)
- Genetic testing already accepted (Robson et al. 2010)
- European technology platform on nanomedicine
  - Vision paper on nanomedicine in 2020 (2005)
  - Personalized nanodiagnostics, e.g. nanopill
- Expected benefits of nanodiagnostics in CRC screening
  - Avoid handling of stool in current iFOBT testing
  - Non-invasive, yet good diagnostic performance







## Objective

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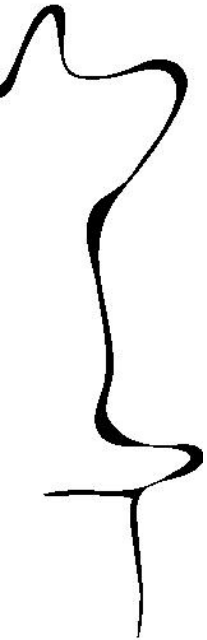
Assessment of patient preferences in  
early stage product development?

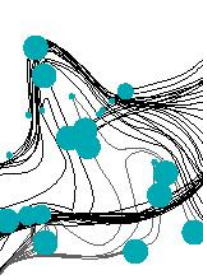


General population  
Hypothetical scenarios:  
iFOBT, sigmoidoscopy, colonoscopy and nanopill



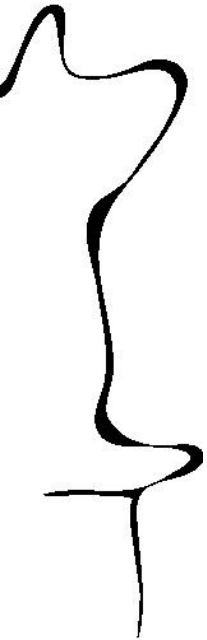
Ranking, rating or choice-based methods





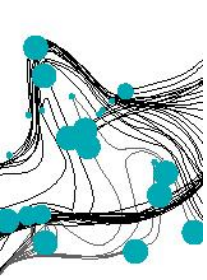
## Method: discrete choice experiment

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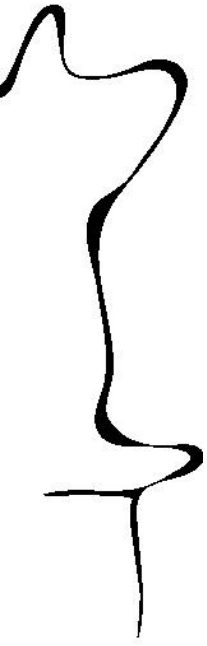
- Indirect way to predict preferences for product characteristics (i.e. attributes)
- Literature on early stage consumer research and new product development:
  - Better understanding consumer needs (Van Kleef et al. 2004)
  - Quality improvement of products and services (Garmer et al. 2004)
  - Reduced time to market, prevent wasting of resources on inappropriate prototype (Martin et al. 2011)
  - Preferences for not yet available services or technologies can be estimated. Optimize screening uptake (Marshall et al. 2007)





## Attributes

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### Preparation

- No preparation
- Laxatives
- Enemas
- Diet plus laxatives

### Specificity

- 70%
- 80%
- 90%
- 100%

### Technique

- Pill
- Stool
- Short tube
- Long tube with sedation

### Complication rate

- None
- 1/10.000
- 10/10.000
- 100/10.000

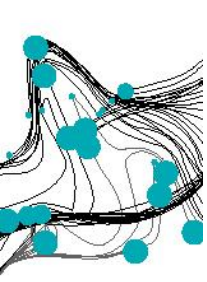
### Sensitivity

- 70%
- 80%
- 90%
- 100%

### Frequency

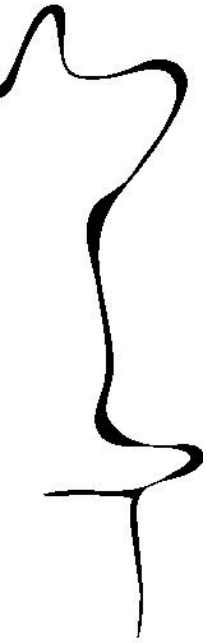
- Annual
- Biennial
- Every 5 years
- Every 10 years





## Design discrete choice experiment

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- Full profile CBC D-Efficient design generated with Sawtooth
  - 16 choice tasks per respondent (14 random, 2 hold-out)
  - Triplets (3 scenarios per choice task), 6 attributes with 4 levels each
  - Fractional factorial design
  - Balanced overlap
  - Versions: 999 were generated
- Dual-response none option
- Men and women, 50-74 years from UK and NL



Imagine that you can choose how you will be screened for colorectal cancer. Please look at the screening tests below and select the test you prefer by clicking the button below this test.

How do you need to prepare?

Before the test you need to take laxatives which cause diarrhoea to empty your colon.

Before the test you need to take enemas which cause diarrhoea to empty your colon.

For 3 days you need to alter your diet and medication. Before the test you need to take laxatives which cause diarrhoea to empty your colon.

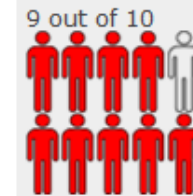
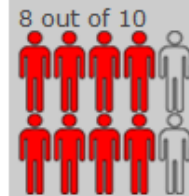
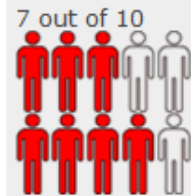
How is the test done?

A short flexible tube with a small camera is inserted through the anus into the last part of the colon. This test is done at a hospital.

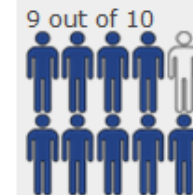
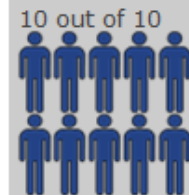
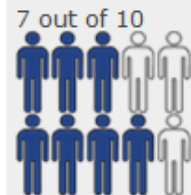
A long flexible tube with a small camera is inserted through the anus into the full colon. During the examination you will be sedated. This test is done at a hospital.

You need to swallow a pill that leaves your body through faeces after several hours. Your test results are wirelessly sent to your physician. This test is done at home.

How many out of 10 people with cancer, would the test correctly identify?



How many out of 10 people without cancer, would the test correctly identify?



How many out of 10,000 people who take this test have a complication?

None

10 out of 10,000

10 out of 10,000

How often do you need to take the test?

Every 5 years

Every year

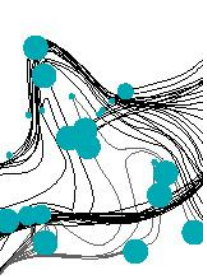
Every 10 years



If you could choose between the test you chose or not to be screened for colorectal cancer, what would you prefer?

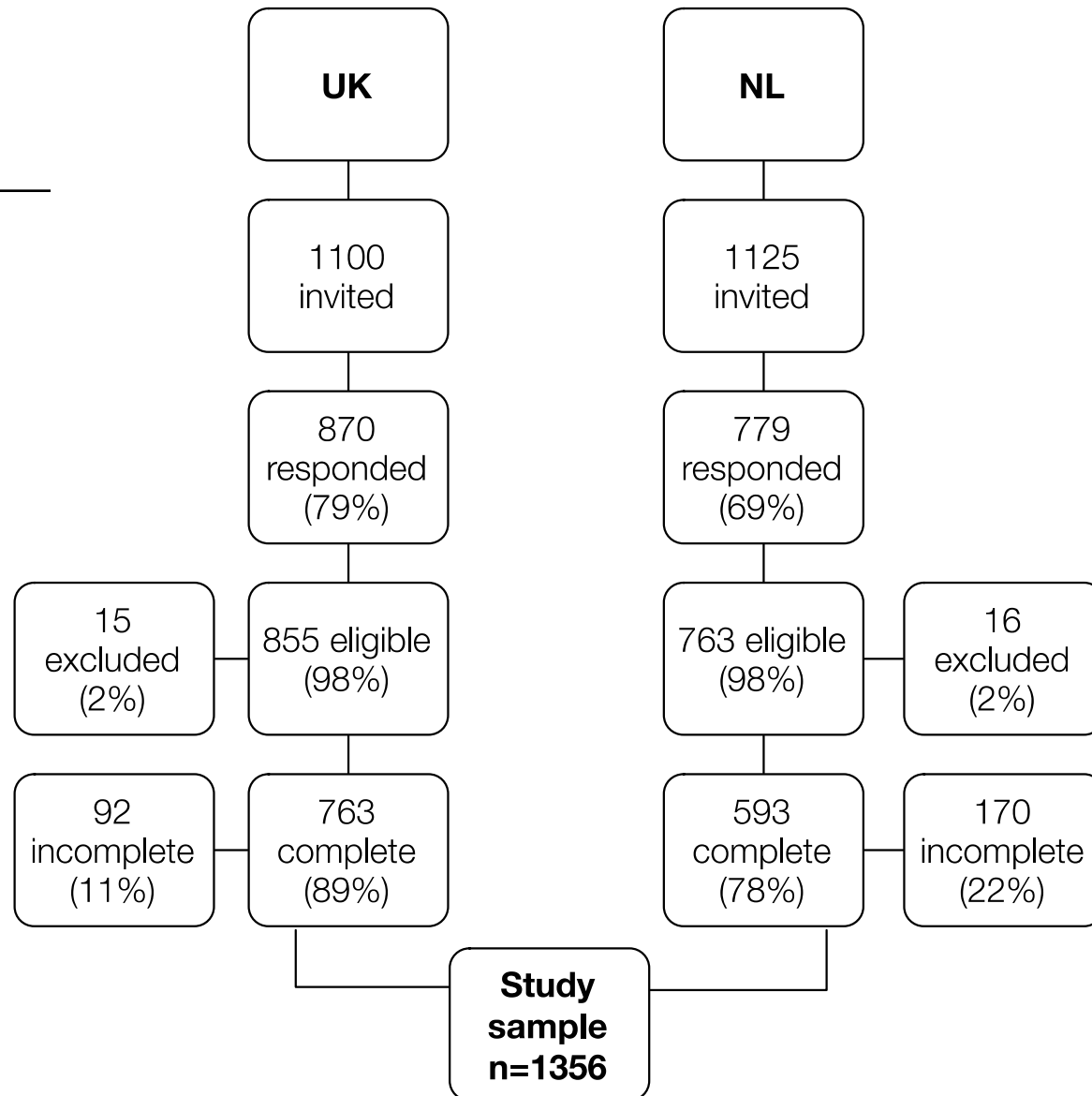
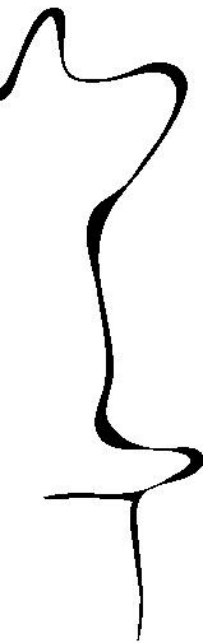
- I would still prefer the test I chose above
- I would prefer not to be screened

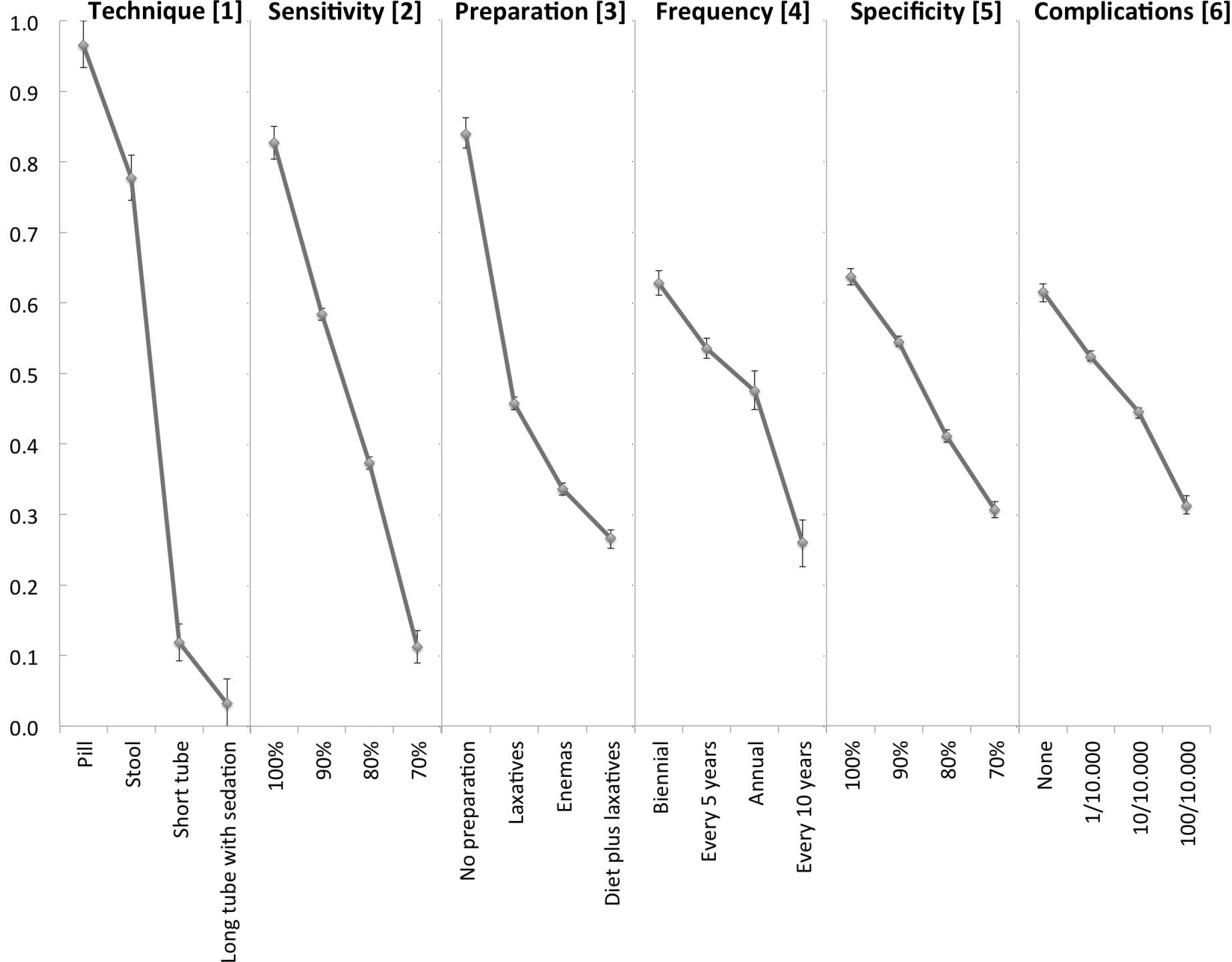


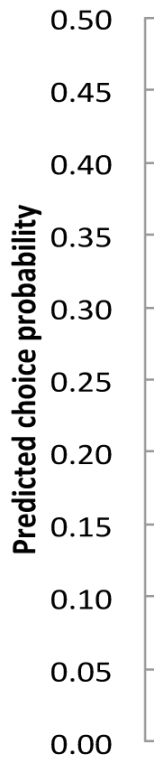


# Results

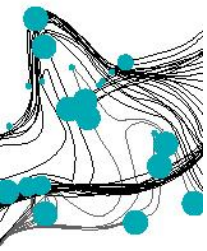
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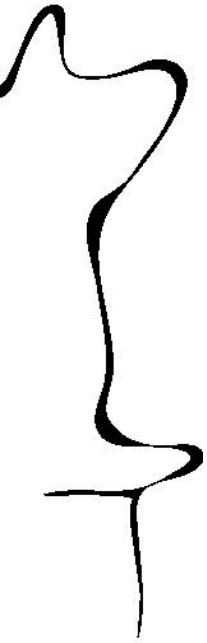


	None	iFOBT	Sigmoidoscopy	Colonoscopy	Nanopill
Preparation	-	None	Enemas	Diet plus laxatives	Laxatives
Technique	-	Stool	Short tube	Long tube with sedation	Pill
Sensitivity	-	80%	70%	90%	<b>90%</b>
Specificity	-	90%	90%	90%	<b>95%</b>
Complications	-	None	10/10000	100/10000	1/10000
Frequency	-	Biennial	Every 5 years	Every 10 years	<b>Biennial</b>



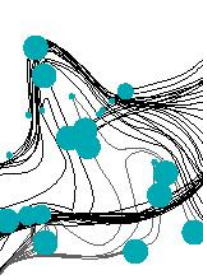
## Discussion

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- Technique first, not sensitivity
- Sensitivity over time more important as single test sensitivity
- Difference iFOBT and nanopill is small
- New insights for the developers





## Conclusion

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- Systematic analysis allows users to have full benefits of a new technology
- Outcomes suggest nanopill to be accepted by the public
- Future developments may benefit from user perception

