

FIT-screening: Is there an optimal cut-off and # tests to optimise program outcomes?

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Thanks to:

M. Denters, M. Deutekom, A.F. van Rijn, P. Fockens
CRC-screening group Radboud MC Nijmegen
Interregional Cancer Centre Amsterdam IKA

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Background

- Most FOBT-based programs use guiac FOBT
- Guiac test is the only FOBT with a proven mortality reduction
- Immunochemical fecal occult blood test (FIT) superior?

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FIT seems preferable above guiac FOBT

Reasons:

- Better test-characteristics: higher detection rates

van Rossum, Gastro 2008
Hol, Br J Cancer 2009

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OMED COLORECTAL CANCER SCREENING COMMITTEE MEETING

Saturday, May 30, DDW Chicago, 2009

Presenter: E. Dekker

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Reasons:

- **Better test-characteristics: higher detection rates**
- **Higher participation-rates: 60 vs 47%**

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Reasons:

- **Better test-characteristics: higher detection rates**
- **Higher participation-rates: 60 vs 47%**
- **Better patient perception**

van Rijn, J Publ Health
2008

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- **Better test-characteristics: higher detection rates**
- **Higher participation-rates: 60 vs 47%**
- **Better patient perception**
- **No diet and drug restrictions**

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- No diet and drug restrictions
- Automatic analysis

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- Better test-characteristics: higher detection rates
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- No diet and drug restrictions
- Automatic analysis
- Quantitative test: cut-off adjustable to local policy. Pos rate ↔ available colonoscopy resources (& optimal detection rate!)

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Aim

Discuss 2 variables for cost-effectiveness of a FIT-based program

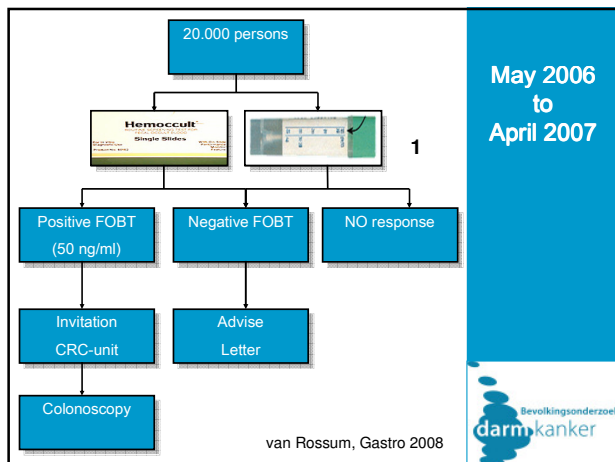
- cut-off of FIT: variations in FIT-performance according to different cut-off levels
- # samples

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Aim

Discuss 2 variables for cost-effectiveness of a FIT-based program

- cut-off of FIT: variations in FIT-performance according to different cut-off levels
- Other variables for an optimal FIT-screening program



Methods cut-off

Outcome measures:

- positivity rate (PR)
- positive predictive value (PPV)
- detection rate (DR)
- number needed to screen (NNScreen)
- number needed to scope (NNScope)

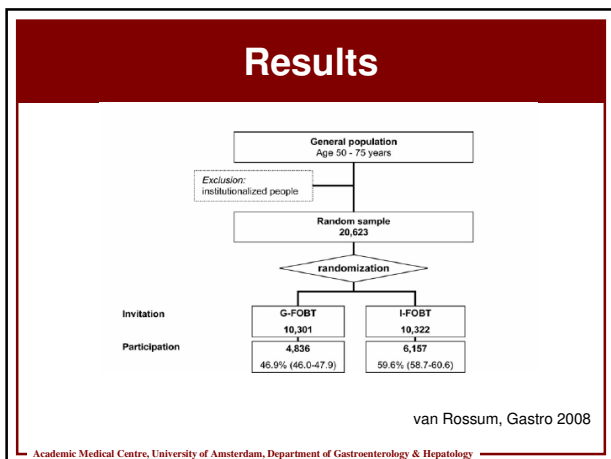
For:

- different cut-off levels of FIT(50, 75, 100, 125, 150, 175 and 200 ng/ml)
- most-advanced lesion per patient:
 - CRC
 - advanced neoplasia (CRC and/or advanced adenoma)
 - non-advanced adenoma as only finding.

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Results

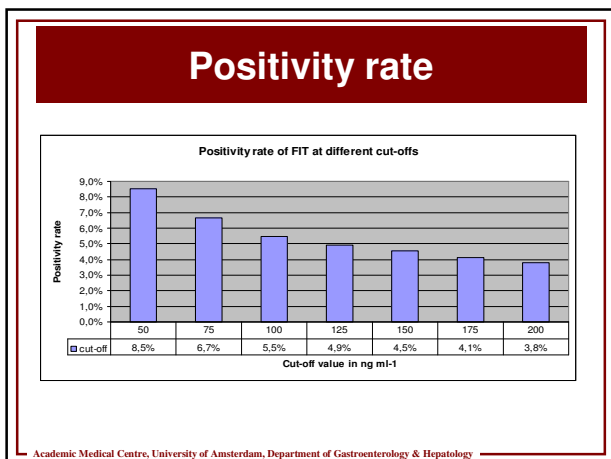
Table 1. Characteristics of Invited Persons and Participants According to Test With 95% Confidence Intervals

Characteristics	Invited (n = 20,623)				Participants (n = 10,993)			
	G-FOBT (n = 10,301)		I-FOBT (n = 10,322)		G-FOBT (n = 4836)		I-FOBT (n = 6157)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Gender								
Male	47.8	(46.8-48.8)	48.8	(47.8-49.7)	43.2	(41.8-44.6)	45.8	(44.6-47.0)
Female	52.2	(51.2-53.2)	51.2	(50.3-52.2)	56.8	(55.4-58.2)	54.2	(53.0-55.4)
Age (y)								
<60	50.4	(49.4-51.4)	51.7	(50.7-52.7)	47.5	(46.0-48.9)	51.0	(49.7-52.2)
≥60	49.6	(48.6-50.6)	48.3	(47.3-49.3)	52.5	(51.1-54.0)	49.0	(47.8-50.3)

Sign more males and older people pos FIT

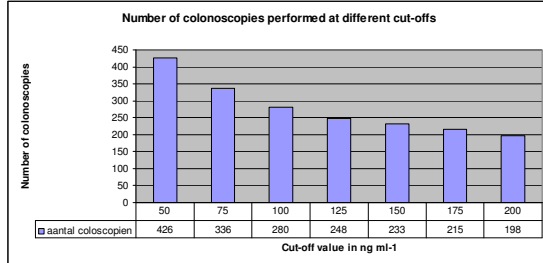
van Rossum, Gastro 2008

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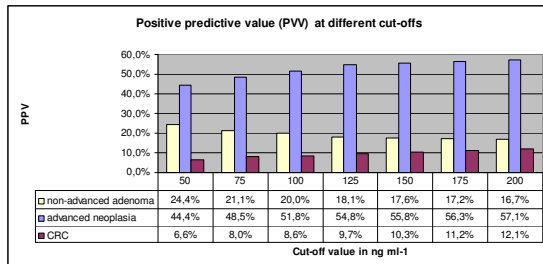
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Number of colonoscopies



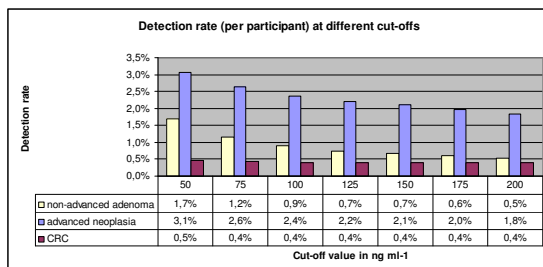
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Positive Predictive Value



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Detection rate (per participant)



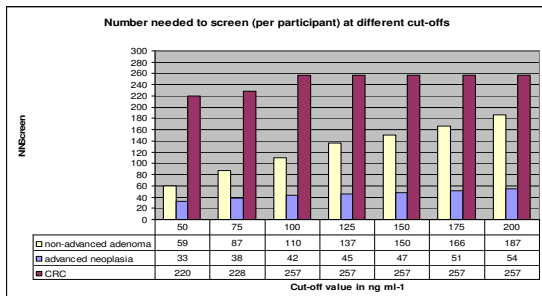
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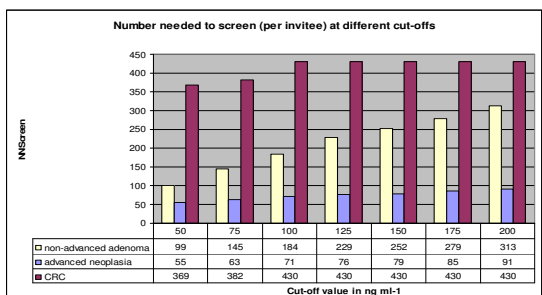
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NNScreen (per participant)



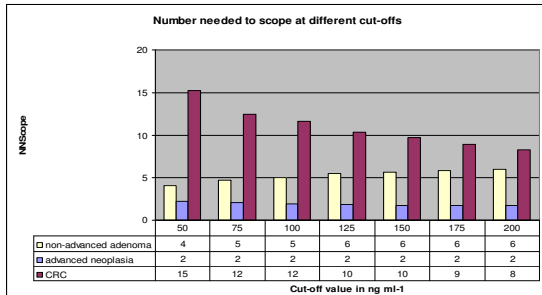
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NNScreen (for invitees)



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NNScope



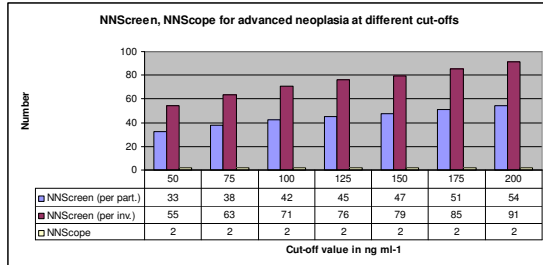
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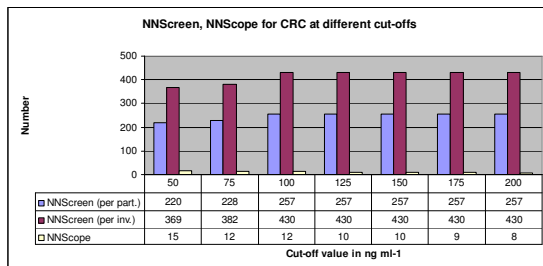
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NNScreen, NNScope advanced neoplasia



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NNScreen, NNScope CRC



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Conclusion cut-off

- Variations in cut-off level determine the test-characteristics and thus the balance between the chance of missing advanced lesions and of falsely predicting advanced neoplasia leading to unnecessary colonoscopies (detection rate vs NNScope)

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Conclusion

- Variations the cut-off level determine the test-characteristics and thus the balance between the chance of missing advanced lesions and of falsely predicting advanced neoplasia leading to unnecessary colonoscopies (detection rate vs NNScope)
- In our experience a low tresh-hold (75 or 50 ng/ml) seems an acceptable trade-off
- Full cost-effectiveness analysis needs to be performed

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Discussion

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tests

- Varying the # tests and frequency of screening rounds also determine balance between DR & NNScope: more tests increase DR but increase NNScope
- Next 2 speakers

Rozen, Aliment Pharm
& Ther 2009
Grazzini, Br J Cancer
2009

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Disease prevalence

- Disease prevalence also determine test characteristics
 - Varies between populations (geographically, between sexes and ages)
 - Decreases in consecutive screening rounds

→ adjust cut-offs for same NNScope?

Hol, Br J Cancer 2009

Steele, GUT 2009

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Perception/participation

- Cost-effectiveness of a screening program depends also on perception and participation rates, and will vary with different screening-designs and cultures.

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Variables for optimal design of FIT-screening program

- cut-off FIT
- # tests
- frequency of screening rounds
- prevalence of the disease within a certain population
- perception and participation of FIT
- local situation: costs, colonoscopy capacity

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Optimal design?

- These variables all interact with each other and the optimal design of FIT-screening is a fine balance depending on local circumstances and screening policies

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