Status of organised screening programs with FIT around the world

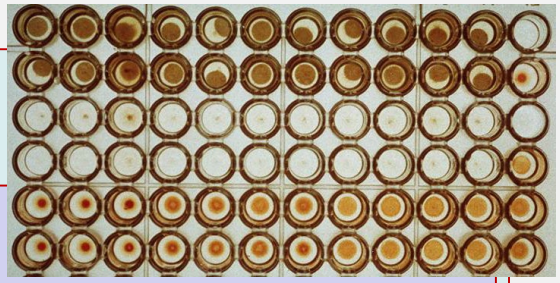
Graeme P Young

Flinders Centre
for Innovation
in Cancer

Outline

- History
- Growth
- Who is using FIT in PBOS.
- Population scope: age and interval
- Population reach
- Population participation
- FIT quality
- Test specifications
- FU rates
- Population impact of program
- **Disclaimer: This is a preliminary consideration of materials provided in the members survey. Generalisations are drawn from such data and as such should not be relied upon to assess specific circumstances as information will be subject to change and many areas are in flux.**

FIT – early history



Am J Clin Pathol. 1978;69:342-6.
Immunochemical detection of human blood in feces.
Barrows GH, Burton RM, Jarrett DD, Russell GG, Alford MD, Songster CL.
"…. developed an immunochemical test for human blood in feces using goat antibodies to hemoglobin. When employed in radial immunoassay the test is uncomplicated by cross-reaction with common human foods or other nonhemorrhagic fecal constituents. The lower limit of sensitivity for hemoglobin in stool samples is 10 mg/dl, compared with a commonly reported threshold of 100 mg/dl for peroxidase tests."

Cancer. 1980;45:1099-102.
Immunochemical detection of fecal occult blood--the fecal smear punch-disc test: a new non-invasive screening test for colorectal cancer.
Songster CL, Barrows GH, Jarrett DD.
"Twenty-nine percent of the [CRC] cases were found not to be bleeding by either test. Occult bleeding was detected by Hemoccult in 40% of the cases, and occult bleeding was detected by immunochemical testing in 65% of the cases."

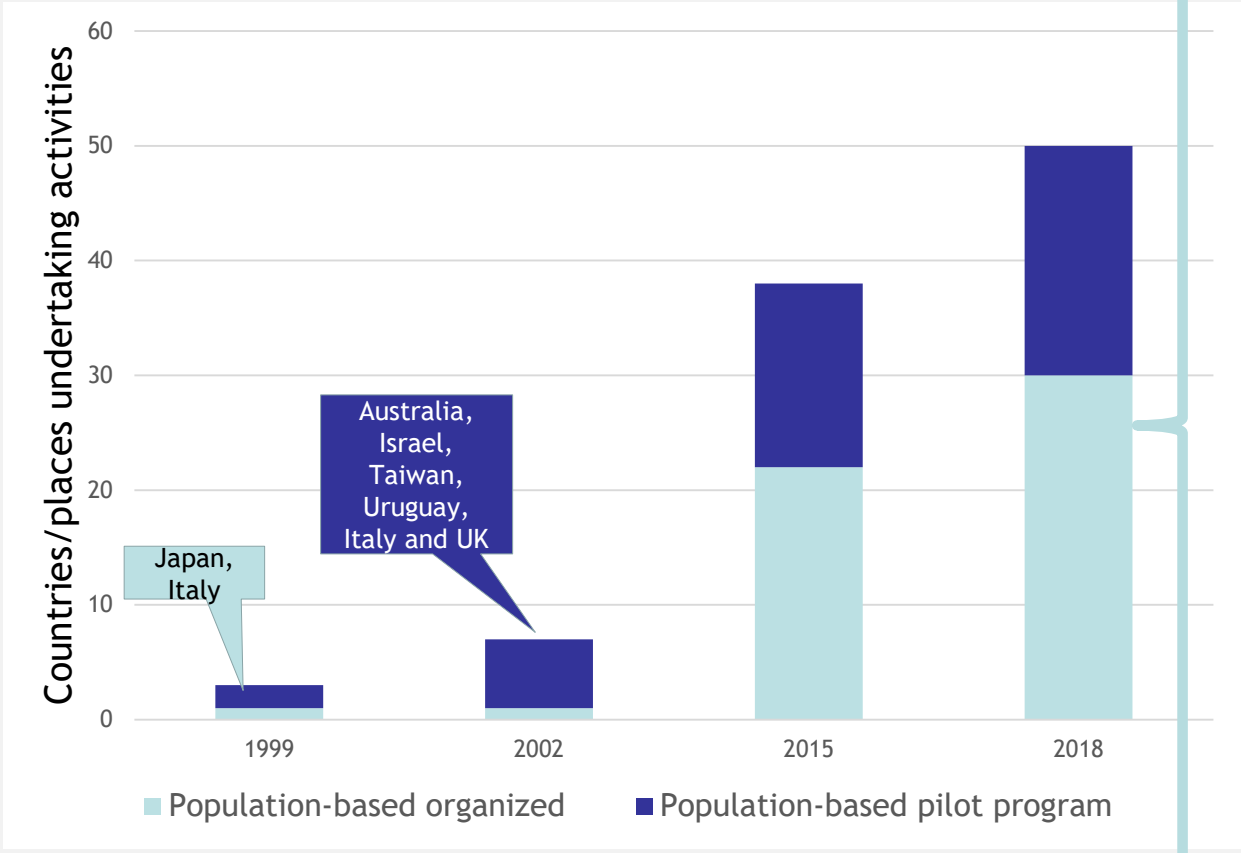
Jpn J Gastroenterol. 1984; 81:2831-33.
Immunological occult blood test for mass screening of colorectal cancer by reverse passive haemagglutination.
Saito H, Tsuchida S, Kakizaki R, et al.

Int J Cancer. 1995;61:465-9.
Reduction in risk of mortality from colorectal cancer by fecal occult blood screening with immunochemical hemagglutination test. A case-control study.
Saito H[1], Soma Y, Koeda J, Wada T, Kawaguchi H, Sobue T, Aisawa T, Yoshida Y.
"Odds ratios (OR) of dying of CRC for those screened within 1, 2 and 3 years of case diagnosis vs. those not screened were 0.40 [95% confidence interval (CI) 0.17-0.92], 0.41 (95% CI 0.20-0.82), and 0.48 (95% CI 0.25-0.92), respectively."

Growth in organized screening

- *Organised* screening is of two main types according to health-care environment:
  - **Population-Based Organised Screening (PBOS)** is defined as that which operates at a national or regional level, with an explicit policy, a team responsible for organization, invitation and health care, monitoring of outcomes and quality assurance (a public health model).
  - **Structured opportunistic screening** (SOS) is based on a practitioner model, guideline driven, and if properly established can also have a major population impact.
- Pilots are often done first, especially for PBOS.
  - **Population-based pilot programs:** These population programs are undertaken on a limited scope, usually at a regional level and with intent to roll out if successful. The usual goals are to test feasibility, test procedural options, gain experience and gain support for progressing to a PBOS program. Demonstrating cost-effectiveness is also important.

Growth in PBOS - FIT

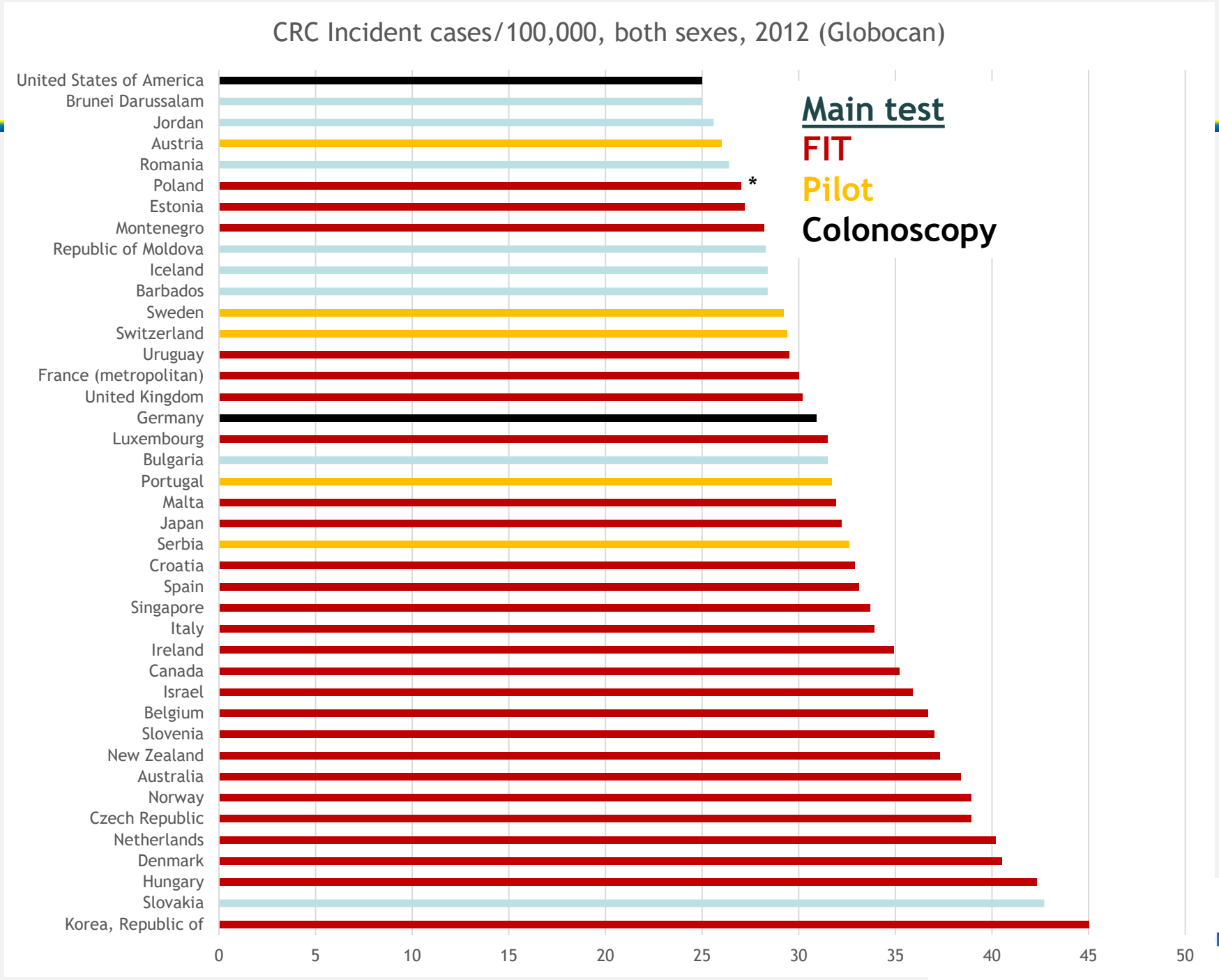


Belgium[2], Czech Republic[2], Denmark[2], Estonia[2], France[2], Hungary*[2], Ireland[2], Italy[2,3], Lithuania[2], Luxembourg[2,4], Malta[2], Montenegro[2], Netherlands[2], Norway*[2], Poland*[4], Slovenia[2], Spain[2], United Kingdom[2,3.] Canada[2], Uruguay[2], Israel[2,] Japan[2], Taiwan[2], Korea[2], Hong Kong[2], Singapore[2], Australia[2], NZ*[2]

Note: numbers for each type of program are currently being revised.

[2] FIT, [3] Flex Sig, [4] colonoscopy, * transitioning from pilot

Flinders Centre for Innovation in Cancer


CRC Incident cases/100,000, both sexes, 2012 (Globocan)
United States of America
Brunei Darussalam
Jordan
Austria
Romania
Poland
Estonia
Montenegro
Republic of Moldova
Iceland
Barbados
Sweden
Switzerland
Uruguay
France (metropolitan)
United Kingdom
Germany
Luxembourg
Bulgaria
Portugal
Malta
Japan
Serbia
Croatia
Spain
Singapore
Italy
Ireland
Canada
Israel
Belgium
Slovenia
New Zealand
Australia
Norway
Czech Republic
Netherlands
Denmark
Hungary
Slovakia
Korea, Republic of
*
Main test
FIT
Pilot
Colonoscopy
0
5
10
15
20
25
30
35
40
45
50

Population scope: age and interval

- 50-75 years is the evidence/guideline-supported population
- Age-ranges currently targetted:
  - Full range: uncertain proportion < a majority
  - Filters in place: 50-69, 55-75, 60-74, 62-72 years
  - Some have started narrow then broadened
  - Some are considering the cohort effect (USA, Taiwan)
- Interval: Some are annual but most are biennial
  - One started 5th-yearly
- Guidelines are not always concordant with PBOS policy.
  - Screening outside official program can result
  - Some jurisdictions run parallel opportunistic screening

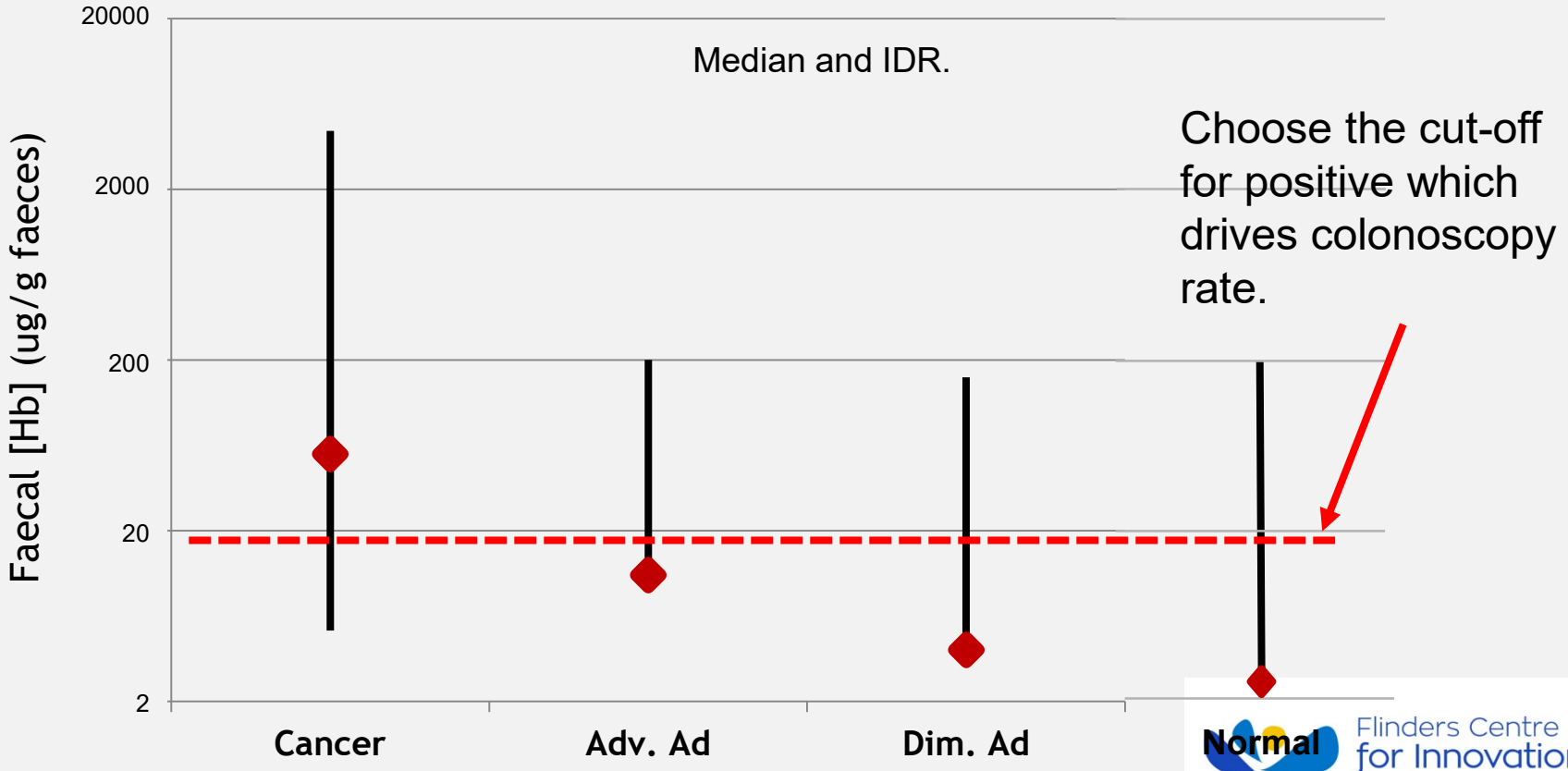
Flinders Centre for Innovation in Cancer

Criterion value (cut-off)

- Is used to trigger colonoscopy
  - 20 µg Hb/g faeces mostly
  - Also 30 and 47 µg Hb/g faeces, one “quantitative”
  - Some have adjusted or are reviewing the initial decision.
- Adjusted by gender or subsequent round?
  - Not apparent (yet)
- Criterion value (when negative) used to adjust interval?
  - Not yet.
- Inventive use of quantification is not apparent (yet)!
  - Except to constrain the colonoscopy workload.

FIT [Hb] cut-off for ideal detection

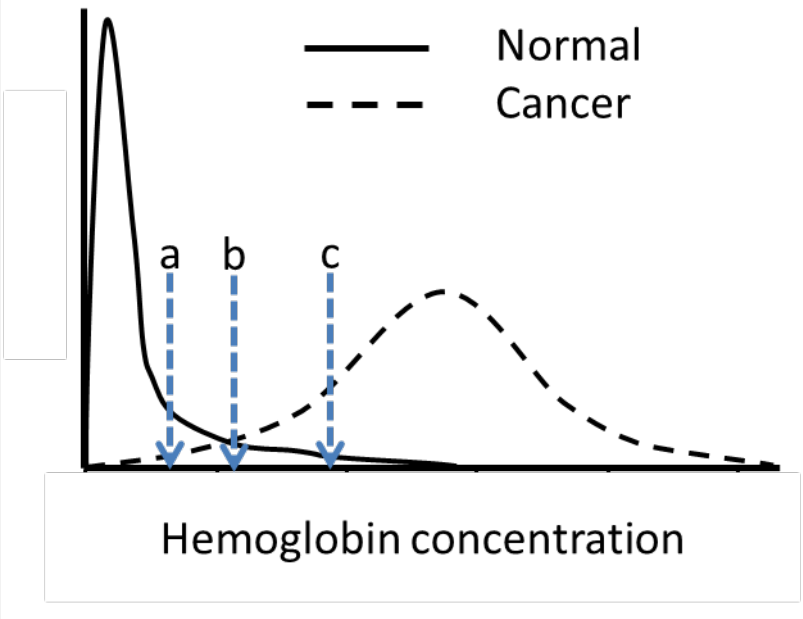
Faecal Hb concentrations in >7,000 cases who underwent colonoscopy
Advanced adenoma cases have significantly higher levels than normals.



Flinders Centre for Innovation in Cancer

What lies below the cut-off?

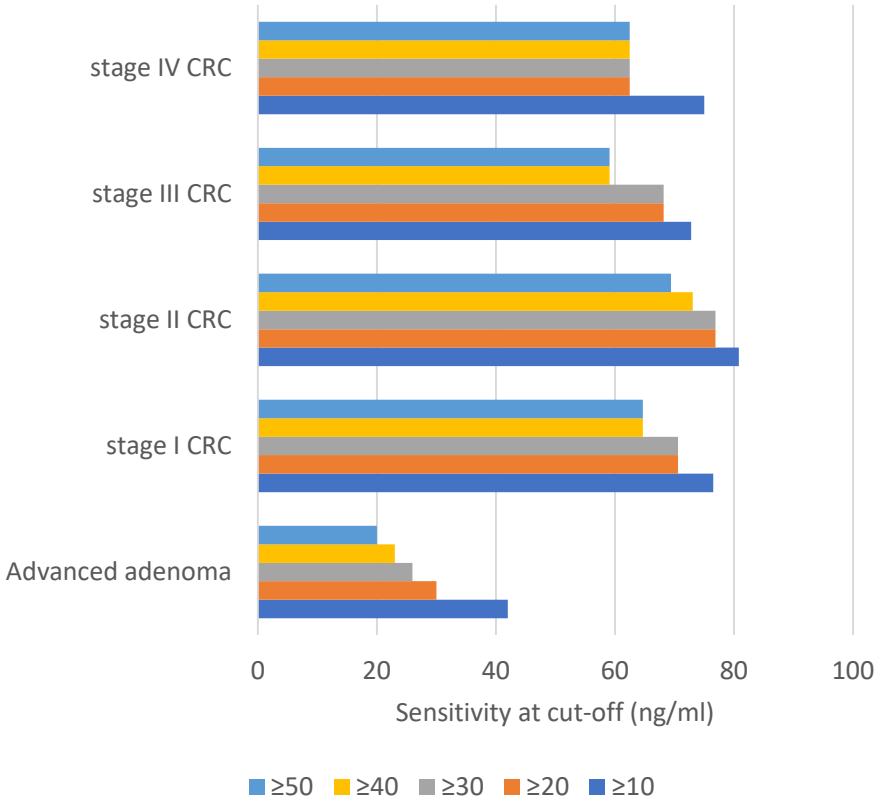
A few cancers and adenomas will be missed because colonoscopy is not triggered below the chosen concentration (a, b or c).



Therefore, “high-negative” FIT cases might warrant a personalised surveillance program.

FIT sensitivity by cut-off

Adelaide data (prelim assessment)



- Most but not all other sources support the lack of relationship between stage and faecal Hb concentration.
- Data are biased towards cases only being investigated if FIT-positive
- More research is now needed.

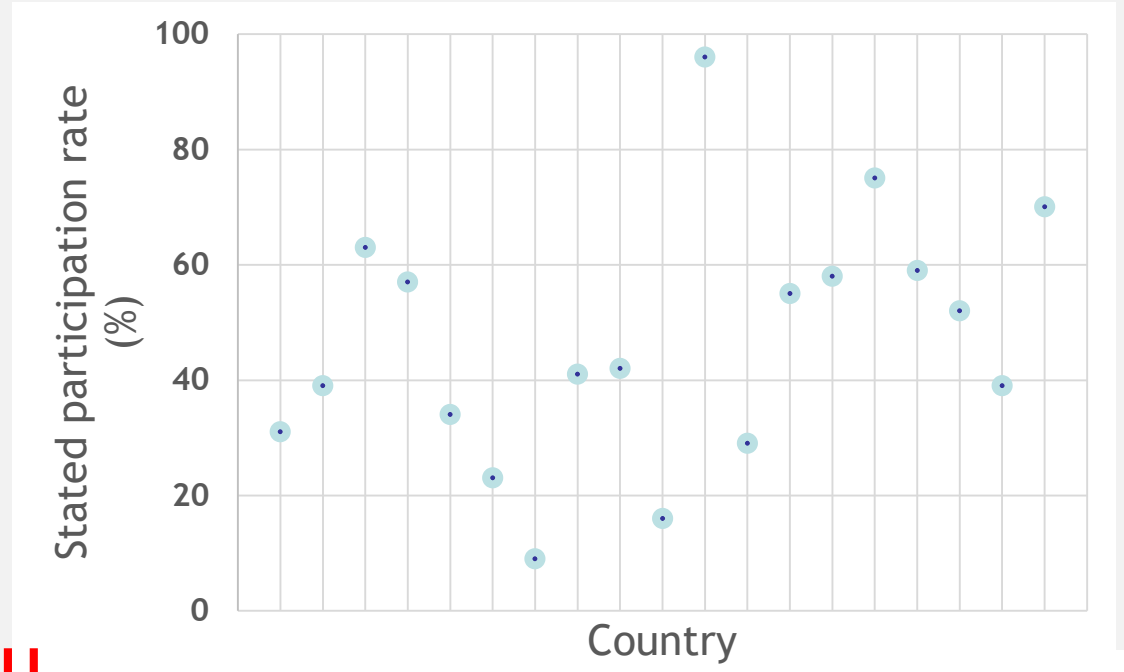
Population reach – “mass” or not?

- Can one actually identify and locate all the eligible people?
  - Some countries think they can for >95%.
- Is a filter in place?
  - Australia – no.
  - England – yes.
- Filtering options might be:
  - General health status.
  - Recent diagnostic imaging and known screening test.
  - Known to be in high-risk group.
- Personalisation with risk “algorithms”
  - In guidelines but not in PBOS.

Flinders Centre for Innovation in Cancer

Participation

- Measurement issues: the denominator.
- Opportunistic screening often runs in parallel.
  - What is its magnitude?
  - More common in countries with lower rates.
- Participation for FIT



- **Participation with FU**
  - **Data inadequate**

Flinders Centre for Innovation in Cancer

FIT quality assurance

- Varies from tightly managed, especially where contracts are established with the approved provider, to discretionary by region or provider.

Population impact of the program

- So far, only a few countries are able to report on downstream benefits
- Population outcomes of interest
  - Emergency surgery rates
  - Cancer stage at detection
  - Mortality rates
  - Incidence
- A concerted effort is now needed to compile such data.

Conclusions

- Concept of screening with FIT and advantages of such were clear by 1980
- Explosion in PBOS with FIT in last 20y.
- Most programs are not fully rolled out.
  - Some are held up in pilot mode.
- Population participation appears suboptimal but is difficult to measure.
- Changing cut-off to suit colonoscopy capacity does compromise detection.
- It is time to measure the true impact.


Flinders Centre
for Innovation
in Cancer