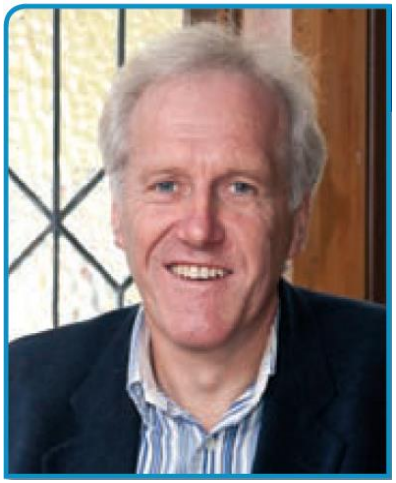

A/Prof Brian Cox

Cancer Epidemiologist

Dunedin

Flexible Sigmoidoscopy in Bowel Cancer Screening - Concurrent Workshop Repeated

Saturday, 17 August 2013	Start 8:30am	Duration: 55mins	Pyramids
	Start 9:35am	Duration: 55mins	Pyramids

Flexible sigmoidoscopy in bowel cancer screening

Brian Cox
Cancer Control and Cancer Screening
Hugh Adam Cancer Epidemiology Unit
Department of Preventive and Social Medicine
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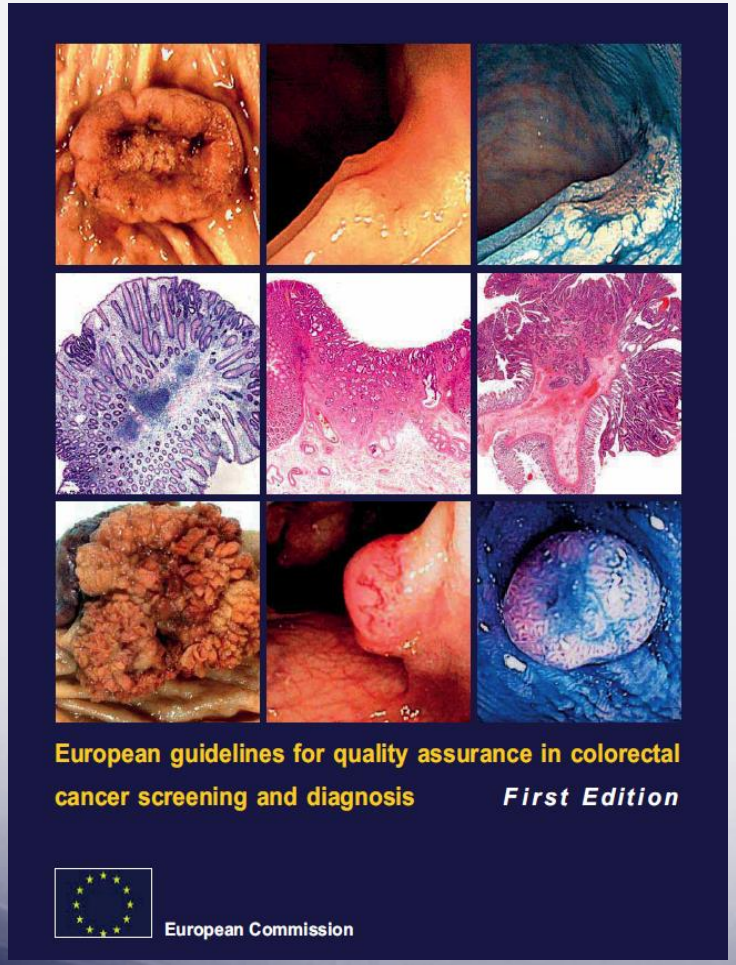
Non-RCT evidence of effect

Considerable evidence that FS is effective for more than 15 years, mainly from left-side versus right-side observational studies (which are not available for other cancer sites and are very informative, but involve a different design and interpretation than usual epidemiological studies of screening).

- ~70-80% reduction in sigmoid and rectum versus other sites in non-RCT studies. They contain some bias but the size of the reduction in incidence and mortality is so strong as to be very unlikely to be due to bias.
- The question for the last 20 years has been, not does FS reduce cancer incidence and mortality, but by how much compared to FOBT and can it be delivered as a population-based programme.
- Since 2010, RCT evidence for FS has been available to support these earlier studies.

Published in 2010 by IARC



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Levels of evidence for different screening modalities (IARC 2010)

Level of evidence:

I multiple randomised controlled trials (RCTs) of reasonable sample size, or systematic reviews (SRs) of RCTs

II one RCT of reasonable sample size, or 3 or less RCTs with small sample size

III prospective or retrospective cohort studies or SRs of cohort studies; diagnostic cross sectional accuracy studies

IV retrospective case-control studies or SRs of case-control studies, time-series analyses

V case series; before/after studies without control group, cross sectional surveys

VI expert opinion

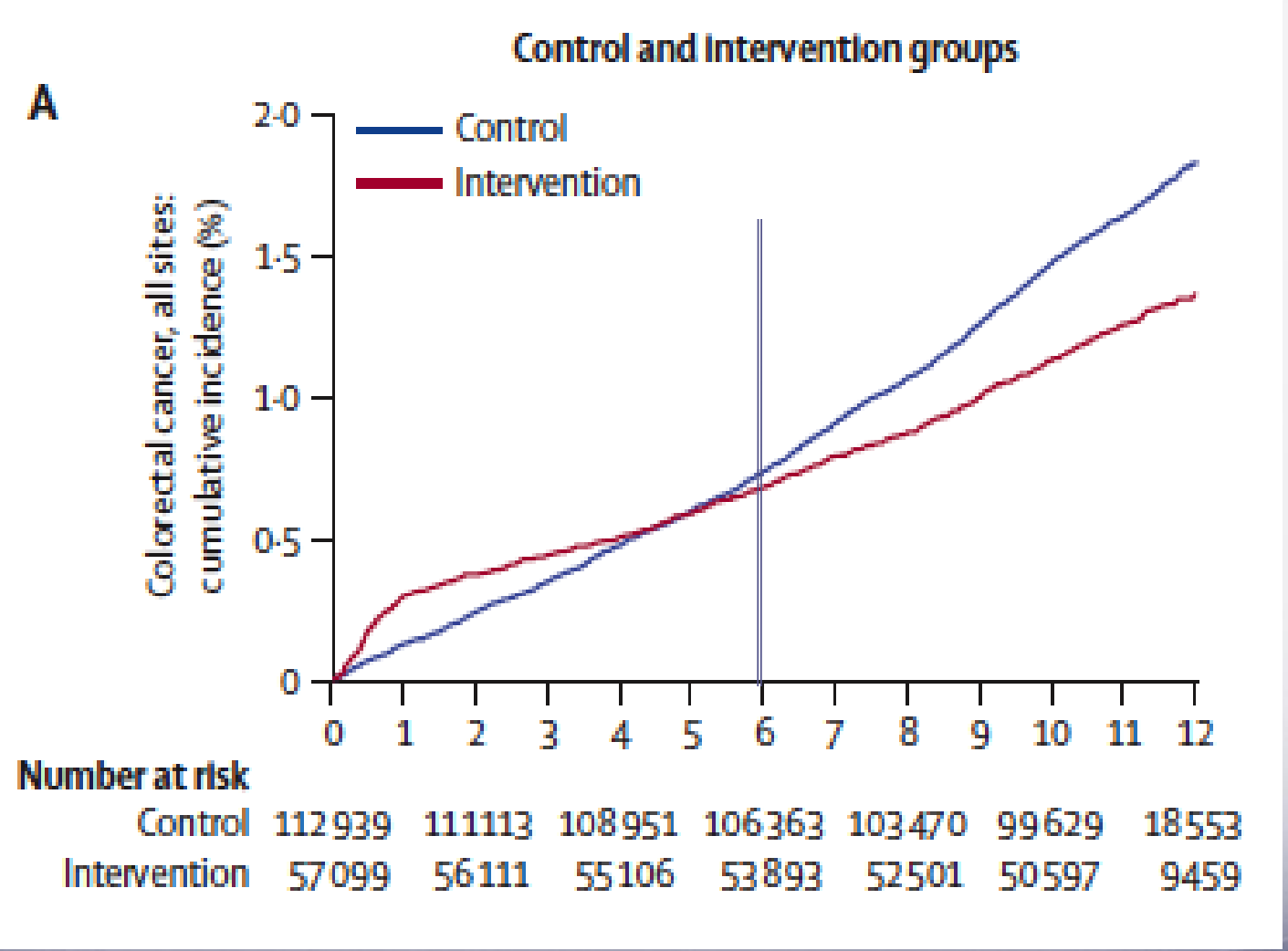
	Reduction in CRC mortality	Reduction in CRC incidence	Cost-effectiveness
Guaiac FOBT	I	–	III
Flexible sigmoidoscopy	II (I)	II (I)	III*
iFOBT	IV	–	III

* Level III evidence that it may be cost-saving relative to no screening

Randomised Controlled Trials

	Age range (years)	Participation	Follow-up	Reduction in overall CRC incidence	Reduction in overall CRC mortality
Norwegian trial[1]	55-64	65%	6 years	-2% (-26%-16%)	27% (-13%-53%)
UK trial[2]	55-64	55%	11.2 years	23% (16%-30%)	31% (18%-41%)
Italian trial[3]	55-64	58%	11 years	18% (4%-31%)	22% (-8%-44%)
PLCO trial (USA)	55-74 (repeat at 3 or 5 yesars)	87% (51%)	12 years	21% (15%-28%)	26% (13%-37%)
Overall				**20% (17%-23%)**	**27% (23%-31%)**
At 11-12 year follow-up				**21% (19%-24%)**	**27% (22%-31%)**

UK trial (Atkin et al 2010)



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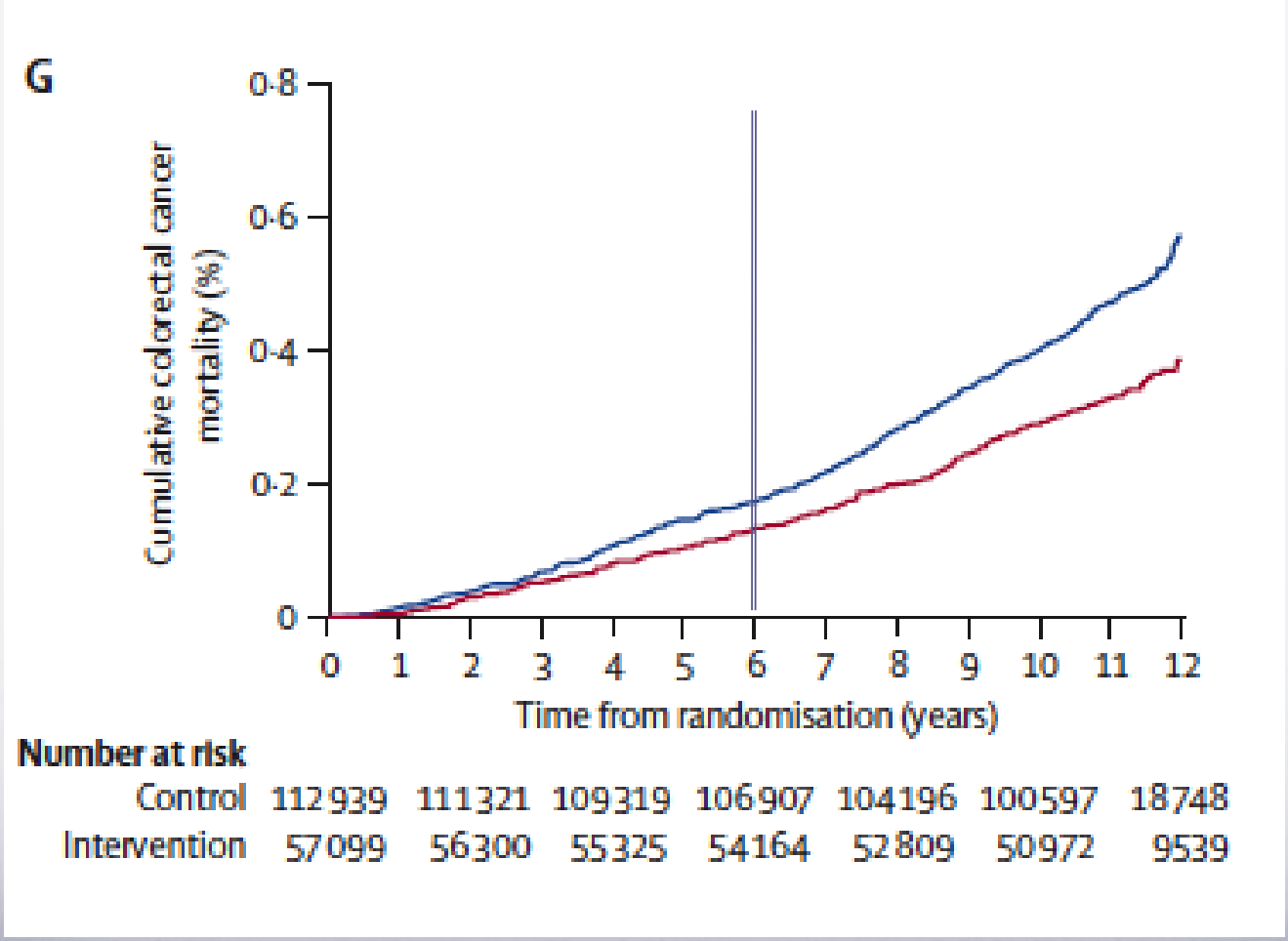
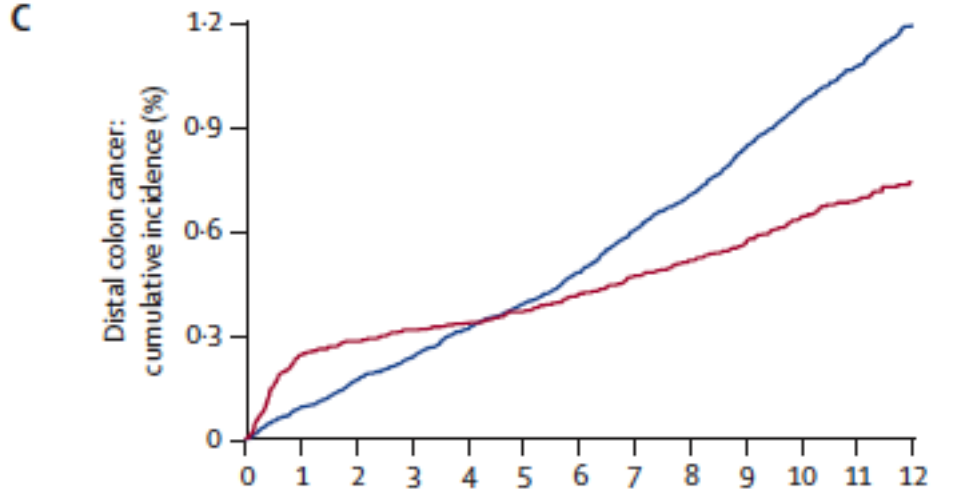
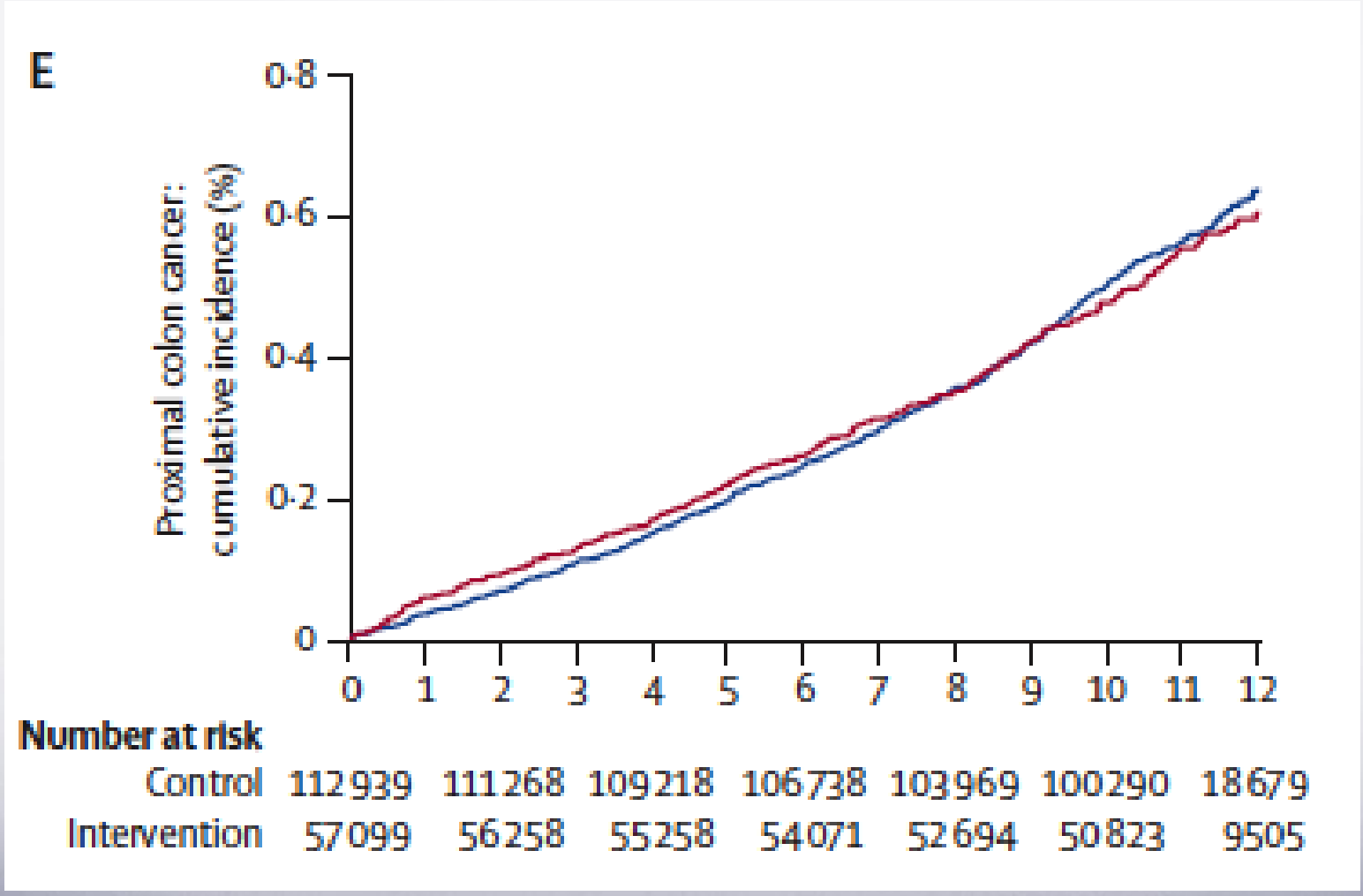


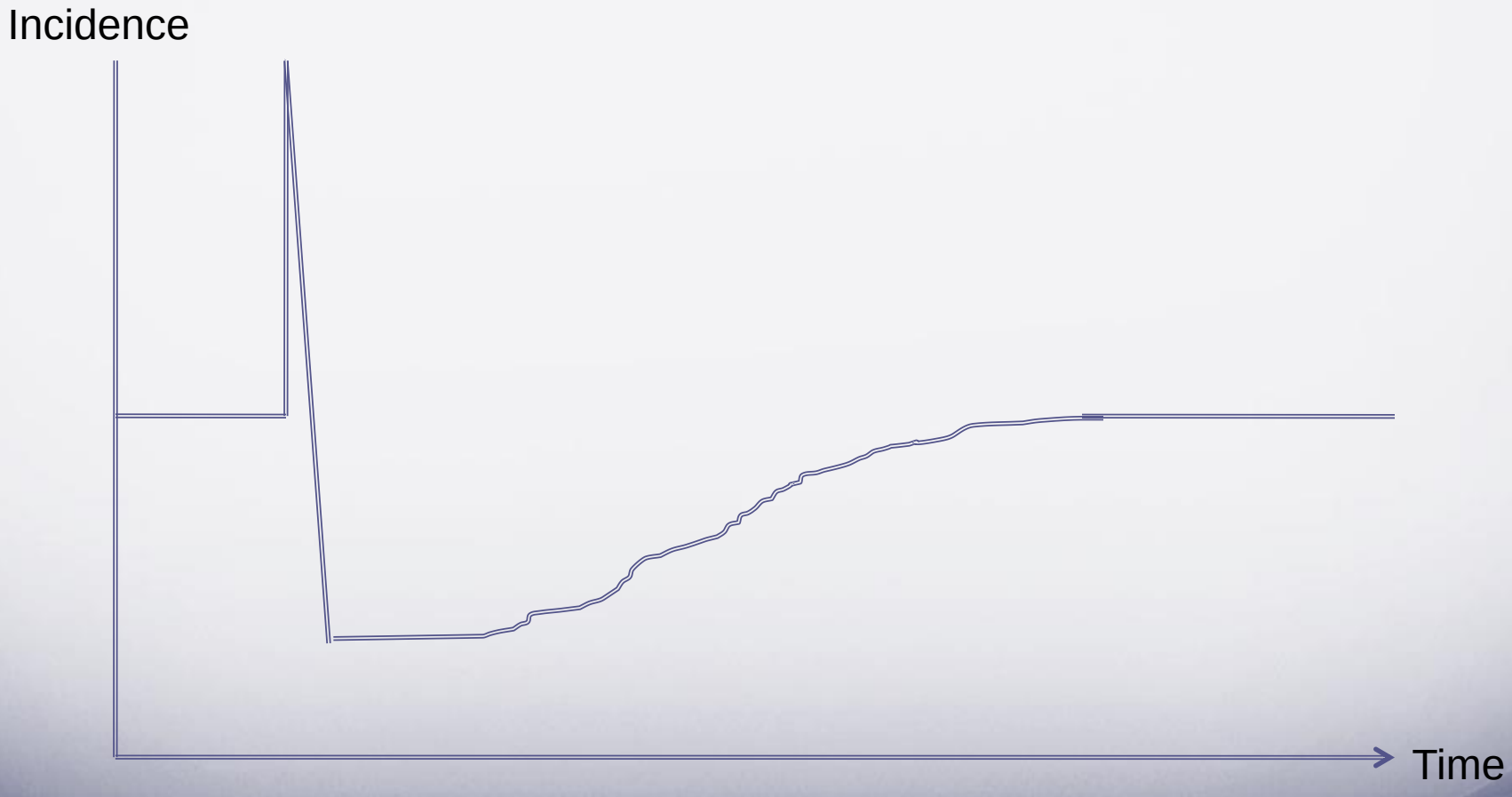


Number at risk

Control	112939	111165	109053	106529	103693	99926	18619
Intervention	57099	56153	55172	53985	52614	50744	9492


E
Proximal colon cancer: cumulative incidence (%)
0·8
0·6
0·4
0·2
0
0 1 2 3 4 5 6 7 8 9 10 11 12
Number at risk
Control 112939 111268 109218 106738 103969 100290 18679
Intervention 57099 56258 55258 54071 52694 50823 9505

Effect on incidence of a single screening test



UK trial (Atkin et al 2010)

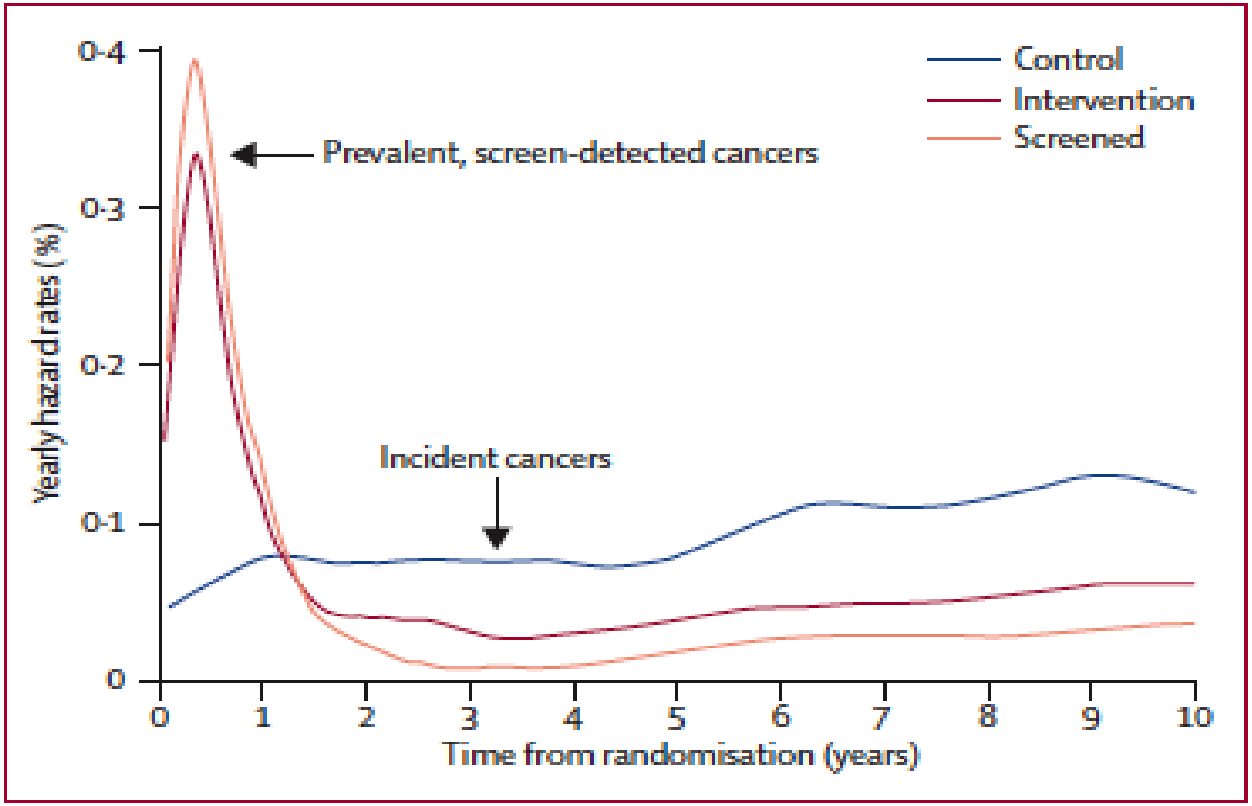


***Figure 3*: Smoothed yearly hazard rates for distal cancer (rectum and sigmoid colon)**

Curves are truncated at 10 years of follow-up because of incomplete ascertainment of cancers in the final calendar year of the study.

Advantages of flexible sigmoidoscopy

1. It visualises the abnormalities and allows biospy at the same time as the test,

- 2. Treatment of polyps may be done for some people at the same time as the screening test (reducing losses to follow-up, especially important in hard-to-reach groups).
- 3. A one-off test is nowhere near as intense on invitation processes and follow-up (considerably reducing costs and losses to follow up).
- 4. GPs and nurses can be trained to do flexible sigmoidoscopy: work within an extended gastroenterology service.
- 5. Working with gastroenterology service may make it easier for those GPs to maintain their acumen in gastroenterological disease in general.
- 6. Six-month training of a group of GPs or nurses would probably allow a programme to begin within 18 months. However, while a gastroenterologist was training someone, they would need a reduced case-load (about 15-20% lower). Bonded training overseas initially?
- 7. About 5% of screenees will need to come back for colonoscopy because high risk polyps were detected.
- 8. Given our higher incidence rate for bowel cancer than the UK, the invasive cancer prevention rate in New Zealand would be about 1 case for every 98 screening tests by FS between ages 55 and 64 years and 1 death prevented for every 170 screening tests.

The database required for one-off sigmoidoscopy is relatively simple

Invitation could be straight from the NMDS to a registered provider of screening Flexible Sigmoidoscopy,

whereas for IFOBT repeated invitation with 25-year follow-up provided across primary, secondary and tertiary care is a much more complicated process to standardise nationwide, maintain and use.

Participation

An appropriate comparison of participation between the two screening modalities is the proportion of participants who complete most of their FOBT tests over a 25-year period (not just one of the 12) with the proportion who will consent to one-off sigmoidoscopy.

The comparison of the number of endoscopies required likewise needs to consider the number required over 25 years of FOBT screening versus one-off sigmoidoscopy.

The study done by the Hugh Adam Cancer Epidemiology Unit and published in 1996 provides evidence that FS participation in New Zealand would be about 50%.

Flexible Sigmoidoscopy Or Colonoscopy for Colorectal Screening: A Randomized Trial of Performance and Acceptability

J Mark Elwood, M.D. [a], Galeb Ali, M.B.[b], Martin MT Schlup, M.D.[c], Bronwen McNoe, B.H. SC.[a], Gilbert 0 Barbezat, M.D.[c] Fiona North, Ph.D[a]., Kensie Sutton, R.N.[a], Bryan Parry, M.D.[d], Vinton S. Chadwick, M.D.[e]

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Cancer Detection and Prevention 1995; 19(4):337-347

Relatives of people treated for CRC or who had had a normal colonoscopy

- 137 with family history of CRC or adenoma
- 95 without family history of CRC or adenoma
- Aged 45-70 years
- Offered flexible sigmoidoscopy or colonoscopy
- 60% accepted invitation
- No significant difference in the participation rates for those with or without a family history
- Additional 7% accepted FOBT but declined sigmoidoscopy or colonoscopy.

Problems of merging flexible sigmoidoscopy with FOBT screening

- Particularly awkward for those aged 65 or more who have embarked on FOBT screening as the risks of flexible sigmoidoscopy are increased with age.
- The introduction of sigmoidoscopy then requires both screening modalities to run in parallel for about 10 years (as those aged 65+ reach 75) at great health sector expense and probably without sufficient staff to be able to do it.

Phased in national screening over 5 years – starting in 18 months time

Year	Age (years)																									Percent
	58					59					60					61					62					
	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	⅕	
Year 1 (2013)																										20%
Year 2 (2014)																										40%
Year 3 (2015)																										60%
Year 4 (2016)																										80%
Year 5 (2017)																										100%

Some comparisons between national FOBT and flexible sigmoidoscopy

		FOBT		Flex-sig
Age (years)		55-74		58-62
Annual eligible pop		363345		43300
Participation		53%		47%
Number screened annually		192573		20351
Screens/wk		4012		424
Colonoscopy (% of screened)		5%		5%
Colonoscopies		9629		1018
Endoscopies		9629		21369
Endoscopies/wk		201		445
Annual cases prevented	Sigmoid and below	2		200
	Total CRC prevented	4	Saving $6.7m/year (pays for screens if <$330 each)	208 (7%)
Annual deaths prevented	Total CRC	86		120
% of all CRC deaths prevented		6.8%		10%

Workforce issues

Flexible sigmoidoscopy can be provided by suitably trained GPs or nurses (as in the UK trial) within broadened gastroenterology services.

Training has been provided at the University of Hull in the UK since 1999.

The required increase in the number of gastroenterologists would probably be about 15%.

Need about 80 trained flexible sigmoidoscopists over 5 years (i.e., need to train about 16 a year for the first 5 years)

Facilities with support staff would need to be expanded.

The savings in cases of CRC prevented would be considerable. (~$67m saved over 10 years, so an investment of say, $20-30m, into gastroenterology services in set up costs over 2-3 years would seem economically viable).

Many people would prefer one-off sigmoidoscopy (with its risks) to 12 biennial FOBT tests (and its attendant risks from over-investigation or increased chance of missed lesions). The offer of the prevention of CRC rather than just mortality is powerful.

Gastroenterology services would have much greater control of the screening programme rather than having to respond to referrals.

Provision of screening through one sector of the health service is much easier to manage and lowers administration costs. This also enables the start of a national programme without a pilot study, although a phased-in process would be needed.