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Les Comtes de Méan
Liège, Belgium

6th International Meeting on Aortic Diseases

New insights into an old problem CHU Liège, APF

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When is the prevalence too low to motivate screening?

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Disclosure of Interest

Speaker name: .....

- I have the following potential conflicts of interest to report:
- Consulting
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest

Circulation

Outcome of the Swedish nationwide abdominal aortic aneurysm screening program

Wanhainen A[1], Hultgren R[2], Linné A[2], Holst J[3], Gottsäter A[3], Langenskiöld M[4], Smidfelt K[4], Björck M[1], Svensjö S[1], on behalf of the Swedish Aneurysm Screening Study group (SASS)

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Counties screened ≥6 years (mean 7.1 years) vs. counties screened <4 years (mean 1.5 years)

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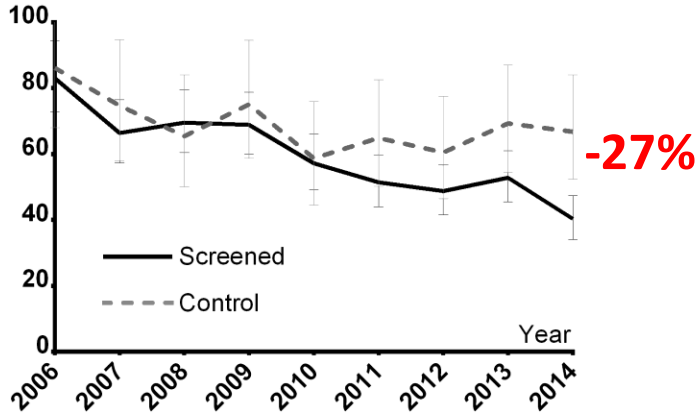
Deaths per 100,000 men aged 65 years or older

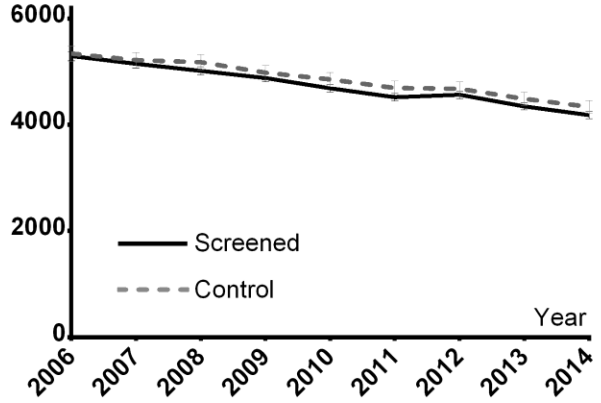
Mortality from AAA



-27%

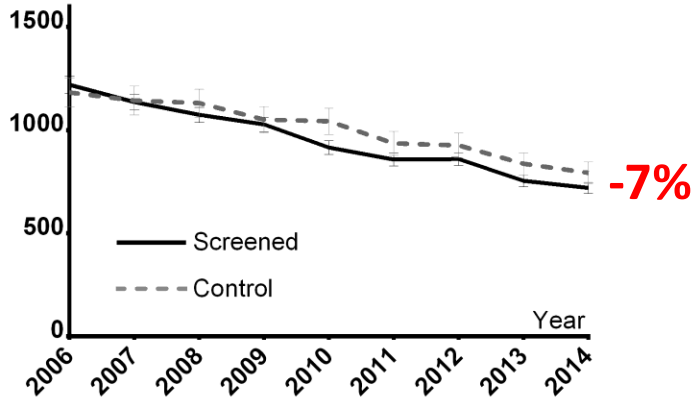
Deaths per 100,000 men aged 65 years or older

Mortality from all causes



Deaths per 100,000 men aged 65 years or older

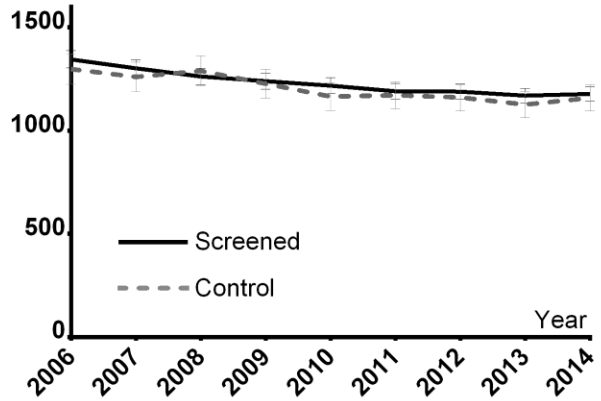
Mortality from IHD



-7%

Deaths per 100,000 men aged 65 years or older

Mortality from cancer



AAA screening programme

- **Clinical Impact**
  - [How many premature deaths are prevented when we screen a target population]
    - *Prevalence of AAA*
    - *Rate of incidental detection (how many AAAs would have been found and repaired, anyway, without screening)*
    - *Level of secondary health benefits from screening*

- **Cost per life-year (or QALY) saved**
  - [What does it cost to extend the life of a person?]
    - *All of the above, and:*
    - *Cost of AAA repair and US surveillance*

Stratified factors	No. of Studies	Prevalence
Total	56	0.048
Area		
America	12	0.043
Europe	37	0.051
1988–1992	3	0.065
1993–1995	6	0.065
1996–1998	4	0.042
1999–2001	9	0.053
2002–2004	3	0.045
2005–2007	2	0.047
2008–2010	5	0.046
2011–2013	5	0.028
Australia	4	0.067
Asia	3	0.005

PLOS ONE

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opulation - A Meta-

Shenyang, China, **2** Department of Obstetrics, Chinese People's

ent stratified factors.

ogeneity I^2 (%)	*P* from test of heterogeneity	Model
	0.000	REM
	0.000	REM
	0.000	REM
	0.231	REM
	0.000	REM
	0.000	REM
	0.000	REM
	0.000	REM
	0.085	REM
	0.000	REM
	0.000	REM
	0.000	REM
	0.000	REM

ANALYSIS: Cost (€) of extending the life-span by screening - depending on AAA Prevalence

Employ a mathematical model that was used to analyse cost-efficiency in the:

Outcome of the Swedish Nationwide Abdominal Aortic Aneurysm Screening Program

Circulation 2016

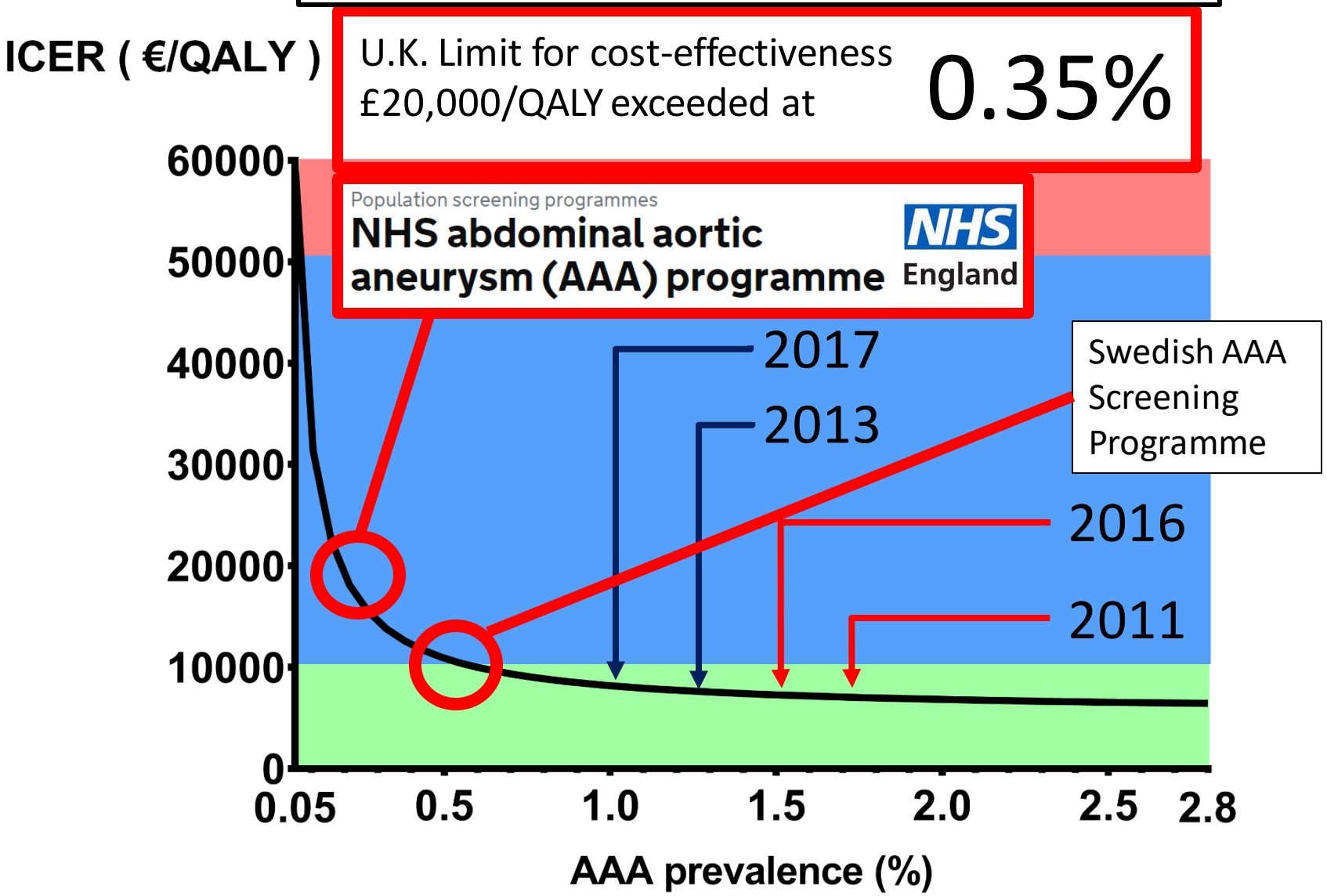
[Prevalence

Original article

BJS 2014

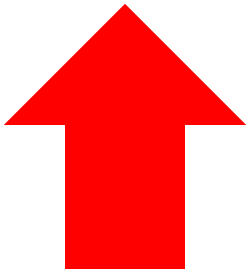
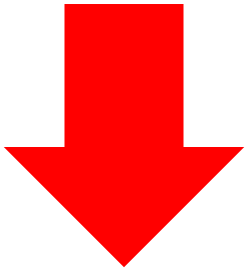
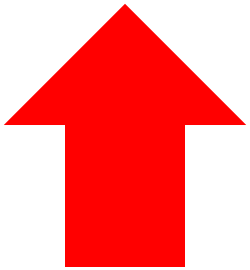
Cost-effectiveness of the National Health Service abdominal aortic aneurysm screening programme in England

M. J. Glover[1], L. G. Kim[2], M. J. Sweeting[3], S. G. Thompson[3] and M. J. Buxton[1]



Incidental detection rate:

[how many AAAs are found and repaired in a population without screening, compared to a screened population?]

High Incidental detection rate	AAAs will be found anyway	Same total cost for Screening
	Effect of Screening Programme	Costs per prevented death
		

Incidental detection rate:

[how many AAAs are found and repaired in a population without screening, compared to a screened population?]

Historical data from four randomised screening trials

Study	Age	Time	Prevalence (%)	Attendance (%)	Incidental detection rate (%)	Follow-up (years)	Annual rate (%)
Chichester	65-80	1990-2005	7.6%	74%	35%	15	2.4%
Viborg	65-73	1994-2008	4.0%	76.6%	40%	14	2.9%
MASS	65-74	1999-2012	4.9%	80.3%	42%	13	3.2%
Western Australia	65-79	1996-2004	7.2%	70%	35%	3.6	9.8%

Outcome and costs of AAA screening

Prevalence	Incidental Detection Rate	Numbers Needed to Screen to prevent one death from AAA	Cost (€) per QALY	Cost per prevented AAA death	QALYs gained per 10000 invited
Contemporary	Moderate				
1.5%	40%	667	€ 7 770	€ 43 000	100

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Low	High				
0.5%	80%	16700	€ 56 000	€ 350 000	4

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One more parameter to consider…

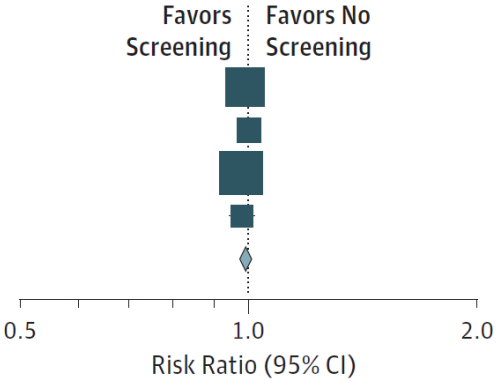
The Last (Randomized) Word on Screening for Abdominal Aortic Aneurysms

Frank A. Lederle, MD

JAMA Internal Medicine December 2016 Volume 176, Number 12

Figure. Random-Effects Model for Meta-analysis of All-Cause Mortality at Longest Reported Follow-up in the 4 Trials of Abdominal Aortic Aneurysm Screening

	Screening		No Screening		
Study Name	No. of Events	No. of Patients	No. of Events	No. of Patients	Risk Ratio (95% CI)
Western Australian trial[1] (men aged 64-83 y)	9649	19249	9734	19231	0.990 (0.971-1.010)
Chichester, United Kingdom, trial[2]	2036	2995	2067	3045	1.001 (0.967-1.037)
MASS[3]	13858	33883	14134	33887	0.981 (0.963-0.998)
Danish trial[4]	2931	6333	2964	6306	0.985 (0.949-1.022)
Total					0.987 (0.975-0.999)
$P = .03$; $I^2 = 0\%$					



0.987 (0.975-0.999)

MASS indicates Multicenter A

Invitation to AAA Screening reduces not only AAA mortality, but appears to reduce mortality from <u>all causes</u>

Cost effectiveness of abdominal aortic aneurysm screening and rescreening in men in a modern context: evaluation of a hypothetical cohort using a decision analytical model

BMJ 2012

Rikke Søgaard *associate professor*[1], Jesper Laustsen *chief vascular surgeon*[2], Jes S Lindholt *professor*[3 4]

Reduced non-AAA related mortality in screened men (odds ratio)	0.98

Cost of extending life by one year: £ 555

Outcome and costs of AAA screening

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Low	High				
0.5%	80%	16700	€ 56 000	€ 350 000	4
Contemporary	Moderate				
1.5%	40%	667	€ 145	€ 43 000	486

Conclusions

- With accepted Willingness-to-Pay rates of:
  - €10,000 to €25,000 per QALY
    - Screening for AAA will be cost-effective down to prevalence rates approximately 0.5%
    - At low prevalence rates number of lives saved is low
- High rates of Incidental Detection decreases cost-efficiency of screening
    - the contemporary rate is largely unknown and should be studied to aid decision-making!
- If there is a significant reduction in all-cause mortality from being invited to screening:
    - Paradoxically: Screening is likely cost-effective at AAA prevalence rates close to 0%
    - Estimated costs per QALY saved could drop dramatically to a tenth of present costs