In 1968, WHO defined “screening” as “the presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures which can be applied rapidly.”


Clinical Benefit
(Sensitivity/Specificity)

Ethics
(equity, psychological burden…)

Cost-effectiveness
(feasibility, viability)
Screening aim: to detect AAA before it ruptures, enabling preventive surgery and hence reducing morbidity and mortality.

AAA screening should be ethical and viable within a certain public health context.

Current evidence:

- Four Randomized trials (MASS, Viborg, Western Australia, and Chichester)
- 135,214 men (aged: 65-79 years)
- AAA prevalence range 4-7.6%

Recruitment period: 1988-1999

In a population with 4-7.6% of AAA prevalence, if we invited 10000 men to screening, we can prevent 46 AAA-related deaths in a period of 13-15 years.

Population screening of older men for AAA, in regions where the population prevalence is 4% or more, reduces aneurysm-related mortality by almost half within 4 years of screening, principally by reducing the incidence of aneurysm rupture.

(Level 1a, Recommendation A)
The Risk for a screening program: Overdiagnosis

- The smaller the AAA, the smaller the growth rate and the smaller the rupture risk.
- Therefore, by capturing mostly small AAA, the screening can be argued to change the AAA diagnosis from the life threatening condition to a risk factor.

Psychological burden and lifelong surveillance (specificity and ethical issue)

Other flaw for screening: The Underdiagnosis

- 0.23% of all men with normal findings at screening experience AAA rupture within 13 years follow-up (sensitivity issue).
- No attendance is correlated with lower socio-demographic characteristics. Therefore, AAA screening increases inequalities and does not reach those who would benefit the most (sensitivity and ethical issue).

Current screening programs

Swedish, US and UK programs assume that the men who are currently invited for screening are at the same risk than those who participated in the trials of 1988-1999.

- Same Natural History in 2015?
- Statin, ACE inh. use, ...
- Same intervention in 2015?
- Open Repair & EVAR

AAA Overdiagnosis: patients with AAA who do not benefit from the diagnosis

Overdiagnosis

45%

Psychological burden and lifelong surveillance (specificity and ethical issue)

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Every man aged 65 and over in England 1st April 2013 is invited for AAA screening.
Almost one million men invited
Over 700,000 men screened
Over 11,000 AAA (>3cm) detected (1.6%)
  • Over 10,000 men in surveillance
  • More than 1,000 men referred for surgery

Unequal fights

Inequity remains (Ethical Issue)

Consequences of the drop in prevalence

• When the prevalence of the condition screened for decreases, the potential benefits also decrease and increases the cost/QALY
• The reduction of AAA related mortality seen in the trials is unlikely to be reproducible today
• The benefit/harm ratio is probably worse today than in the trials.

Challenges in Public Health in the 21st century

• Aging
• Growing technology
• Public Medical care Financing
Impact for Public Health System

**PROS**
- Clinical Benefit
  - Reduction on AAA
- Cost savings

**CONS**
- Cost impact
  - Extra-resources

Screening program should offer more benefit than harm at reasonable cost

- Improve QoL
- Ethical impact
  - Impact in other care plans
  - Increase of waiting lists
  - Equity on access
  - Psychological burden

Cost savings

Extra-resources
- Organization
- Extra-diagnosis
- Extra-treatments

Ethical impact

Impact in other care plans
- Increase of waiting lists
- Equity on access
- Psychological burden

The cost-effectiveness

- Different impact in different countries
  - Danish study is not cost-effective (Δ Cost £43,485/QALY)
  - Acceptable Δ Cost per QALY varies country by country
    - USA: £10,000
    - Spain: £10,000

- No study considers the psychological cost of overdiagnosis
- A local pilot study should be necessary before to start a National Population Screening Program

Screening program VIABILITY

Screening program should offer more benefit than harm at reasonable cost

Screening program should offer more benefit than harm at reasonable cost

- Clinical status and CV risk factors
- Functional imaging: wall stress
- Biomarkers: MMPs, osteopontin, elastin fragments, tissue inhibitors of MMPs, ...
- Genomics: RNA signature

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Future Approach

NPSP should offer more clinical benefits than harms at reasonable cost for national public health services.
- Appropriate target population (older, family history, ...)
- Avoid overdiagnosis and overtreatment
- Pilot study in the same national territory is a good strategy
- Improve cost/effectiveness, Increase Health Value
- Detect Individual risk for AAA rupture (Personalized Medicine)

Personalized decision based on an individualized risk

- Aortic Size
- Clinical status and CV risk factors
- Functional imaging: wall stress
- Biomarkers: MMPs, osteopontin, elastin fragments, tissue inhibitors of MMPs, ...
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Summary

• National population-based AAA screening programs are challenging for Public Health Services because
  • Prevalence drops
  • Cost/effectiveness is too high for some countries
  • Ethical concerns
  • Redefine population at risk
  • Performing Local Pilot studies is a good strategy
  • Improve the Health Value within the Public Health Systems
  • Individualize the risk for AAA rupture and elective surgery

Why Nationwide Population based AAA Screening Programs are of limited value and a challenge for Public Health Systems

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