

# Ultrasonography Screening for Abdominal Aortic Aneurysms: A Systematic Evidence Review for the U.S. Preventive Services Task Force

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**Background:** Long-term follow-up of population-based randomized, controlled trials (RCTs) has demonstrated that screening for abdominal aortic aneurysms (AAAs) measuring 3 cm or greater decreases AAA-related mortality rates in men aged 65 years or older.

**Purpose:** To systematically review evidence about the benefits and harms of ultrasonography screening for AAAs in asymptomatic primary care patients.

**Data Sources:** MEDLINE, the Database of Abstracts of Reviews of Effects, the Cochrane Central Register of Controlled Trials (January 2004 through January 2013), clinical trial registries, reference lists, experts, and a targeted bridge search for population-based screening RCTs through September 2013.

**Study Selection:** English-language, population-based, fair- to good-quality RCTs and large cohort studies for AAA screening benefits as well as RCTs and cohort and registry studies for harms in adults with AAA.

**Data Extraction:** Dual quality assessment and abstraction of study details and results.

**Data Synthesis:** Reviews of 4 RCTs involving 137 214 participants demonstrated that 1-time invitation for AAA screening in men aged

65 years or older reduced AAA rupture and AAA-related mortality rates for up to 10 and 15 years, respectively, but had no statistically significant effect on all-cause mortality rates up to 15 years. Screening was associated with more overall and elective surgeries but fewer emergency operations and lower 30-day operative mortality rates at up to 10- to 15-year follow-up. One RCT involving 9342 women showed that screening had no benefit on AAA-related or all-cause mortality rates.

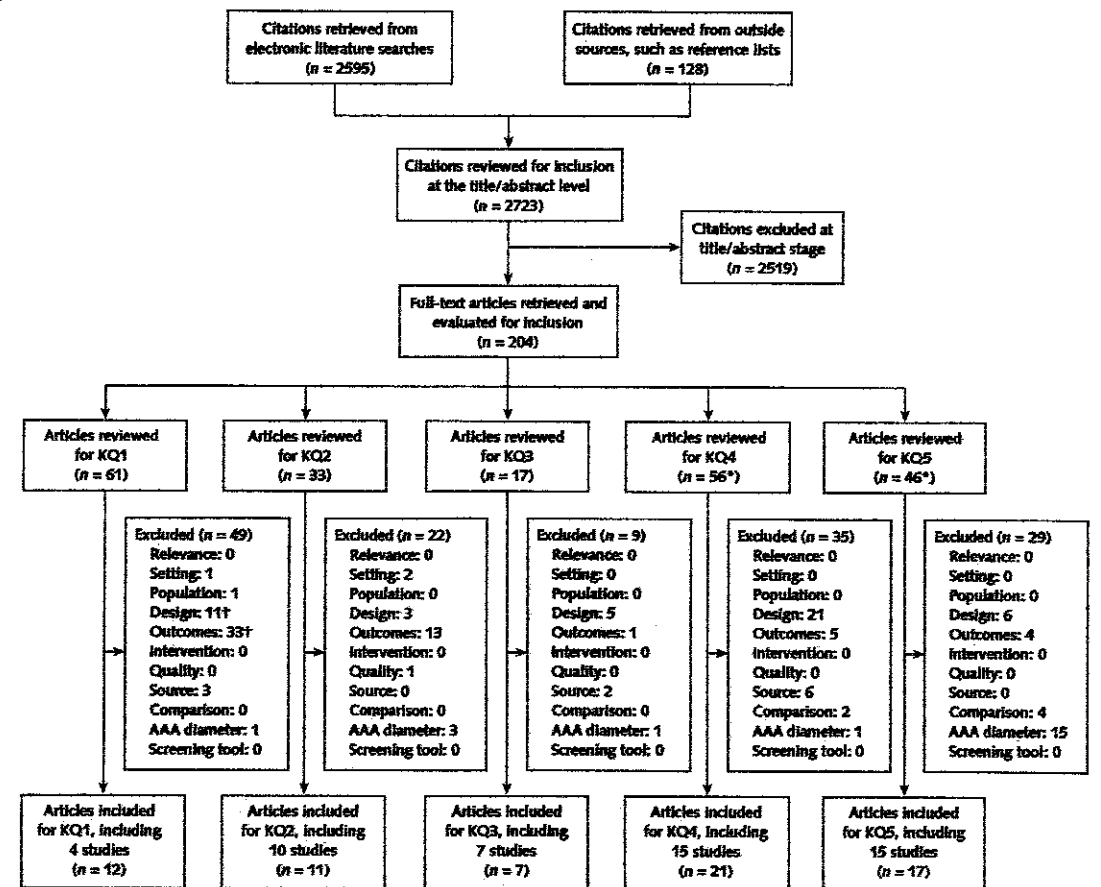
**Limitations:** Trials included mostly white men outside of the United States. Information for subgroups and about rescreening was limited.

**Conclusion:** One-time invitation for AAA screening in men aged 65 years or older was associated with decreased AAA rupture and AAA-related mortality rates but had little or no effect on all-cause mortality rates.

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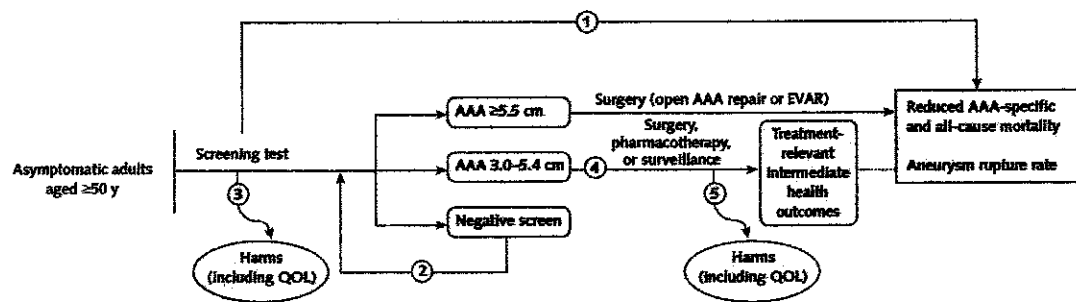
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Figure 1. Summary of evidence search and selection.



AAA = abdominal aortic aneurysm; KQ = key question.  
\* Evidence related to the treatment of small AAAs is included in the full evidence report (22).  
† One study was excluded for study design and outcomes.

Appendix Figure. Analytic framework and key questions.



**Key Questions**

- What is the effect of 1-time AAA screening on health outcomes in an asymptomatic population aged ≥50 y?
  - Does the effect of 1-time screening vary between men and women, smokers and nonsmokers, older (≥65 y) and younger (<65 y) patients, patients with and without a family history of AAA, and patients of different races/ethnicities?
  - Does the effect of 1-time screening vary between different screening approaches?
- In a previously screened, asymptomatic population without an AAA on an initial screen, what is the effect of rescreening for AAAs on health outcomes or AAA incidence?
  - Does the effect of rescreening vary between men and women, sizes of AAA, smokers and nonsmokers, older (≥65 y) versus younger (<65 y) patients, patients with and without a family history of AAA, and patients of different races/ethnicities?
  - Does the effect of rescreening vary between different time intervals?
- What are the harms associated with 1-time and repeated AAA screening?
- What is the effect of pharmacotherapy versus placebo or surgery (open AAA repair and EVAR) versus surveillance on treatment-relevant intermediate health outcomes in an asymptomatic population with small AAAs (3.0–5.4 cm) identified by screening?
  - Does the effect of pharmacotherapy, surgery, and surveillance differ between men and women, patients with smaller (3.0–4.0 cm) and larger (4.1–5.4 cm) aneurysms, smokers and nonsmokers, older (≥65 y) and younger (<65 y) patients, patients with and without a family history of AAA, patients with and without diabetes, patients with and without COPD, or patients of different races/ethnicities?
- What harms are associated with pharmacotherapy, EVAR and open AAA repair surgery, and surveillance in an asymptomatic population with small AAAs (3.0–5.4 cm) identified by screening?

AAA = abdominal aortic aneurysm; COPD = chronic obstructive pulmonary disease; EVAR = endovascular aneurysm repair; QOL = quality of life.

Table 1. Methodological and Intervention Characteristics of the 4 Included Population-Based AAA Screening Randomized, Controlled Trials

Variable	MASS (29–32)	Viborg Trial (37–41)	Western Australian Trial (42)	Chichester Trial (33–36)
Study quality	Good	Good	Fair	Fair
Participants randomly assigned, n	67 800 men	12 639 men	41 000 men	6433 men, 9342 women
Mortality follow-up, n (%)	65 834 (97.1)	12 639 (100.0)	38 704 (94.4)	6040 (93.9)*
Country	United Kingdom	Denmark	Australia	United Kingdom
Mean length of follow-up, y	13.1	13	3.6†	15.0
Mean age, y	69.2	67.7	72.6	72.0‡
AAA prevalence in screened group, %	4.9	4.0	7.2	Men: 7.6; women: 1.3
Intervention	Invitation to ultrasonography screening; follow-up of results by initial aortic diameters as follows: 3.0–4.4 cm: rescanned annually; 4.5–5.4 cm: rescanned at 3-mo intervals; ≥5.5 cm: referred to urgent vascular surgery	Invitation to ultrasonography screening; follow-up of results by initial aortic diameters as follows: 2.5–2.9 cm: rescanned after 5 y; 3.0–4.9 cm: rescanned annually; ≥5 cm: referred to vascular surgery	Invitation to ultrasonography screening; scan results sent to PCP for management or surveillance	Invitation to ultrasonography screening; follow-up of results by initial aortic diameters as follows: 3.0–4.4 cm: rescanned annually; 4.5–5.9 cm: rescanned every 3 mo or until the patient died, had surgical intervention, or declined follow-up
Control	No invitation to screening	No invitation to screening	No invitation to screening	No invitation to screening

AAA = abdominal aortic aneurysm; MASS = Multicentre Aneurysm Screening Study; PCP = primary care physician.  
\* Men only.  
† Median follow-up of 3.6 y.  
‡ Median age.