AORTIC ANEURYSM SCREENING:
A 2025 UPDATE

MEREDITH BARR & VARUN KAPILA

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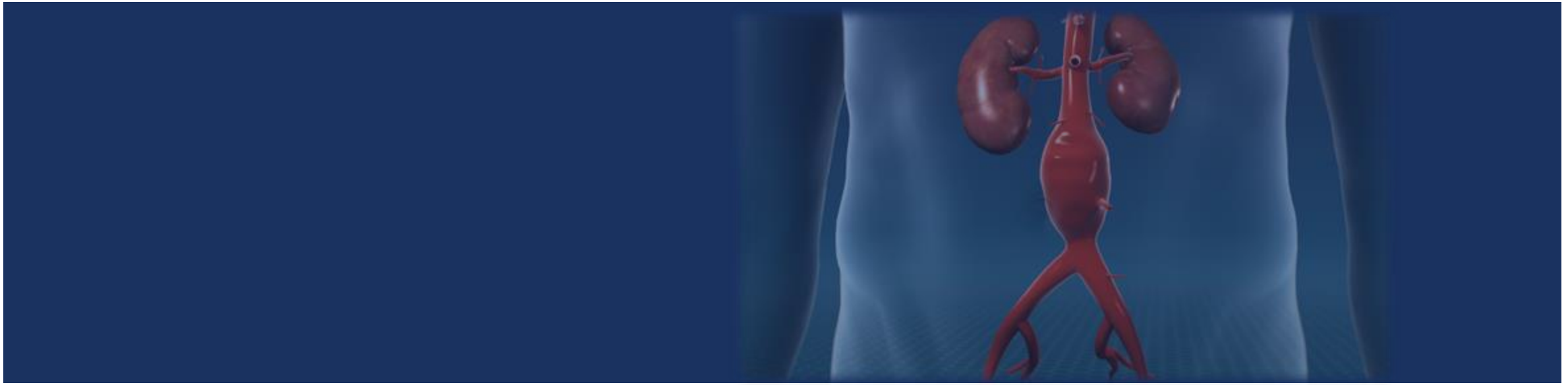


William Osler Health System | WVES

DISCLOSURES

No conflicts of interest to declare.

No affiliations.

CASE VIGNETTE

Mr. Smith is a 73-year-old male who is counselled by his primary care specialist about getting both his prostate and colon assessed for cancer screening. Thankfully, each of these studies are negative. A few months later, while at home, Mr. Smith experiences sudden onset sharp lower back and abdominal pain.

He calls 911 for emergent assistance.

A few minutes later, he collapses and suffers a cardiac arrest.

He passes away shortly after – despite attempts to resuscitate him. His autopsy reveals that he had an underlying abdominal aortic aneurysm (AAA) that ruptured, but he didn't know about it. This was his cause of death.

OVERVIEW

- Formal AAA screening programs have been successful in other nations[1,2], but no program has yet been implemented in Canada

- Together, let's answer these questions:
  1. What are the principles by which every screening program must abide?
  2. Does an AAA screening program make sense – ethically and fiscally – in Canada's current health care landscape?
  3. If so, practically speaking, how to we begin to implement it?

TEN PRINCIPLES OF SCREENING[3]

1. The condition must be an **important** health problem.
2. There should be an **accepted** treatment for patients with recognized disease.
3. Facilities for diagnosis and treatment should be **available**.
4. There should be a **recognizable** latent or early symptomatic phase.
5. The test should be a **suitable** test or examination.
6. The test should be **acceptable** to the population.
7. The natural history of the condition, including development from latent to declared disease, should be adequately **understood**.
8. There should be an **agreed policy** on whom to treat as patients.
9. The cost of case-finding (including a diagnosis and treatment of patients diagnosed) should be **economically balanced** in relation to possible expenditure on medical care as a whole.
10. Case-finding should be a **continuous** process and not a "once and for all" project.

IS THIS AN IMPORTANT HEALTH PROBLEM?

Important	Treatable	Available	Recognizable	Suitable	Acceptable	Understood	Agreed Upon	Economical	Continuous

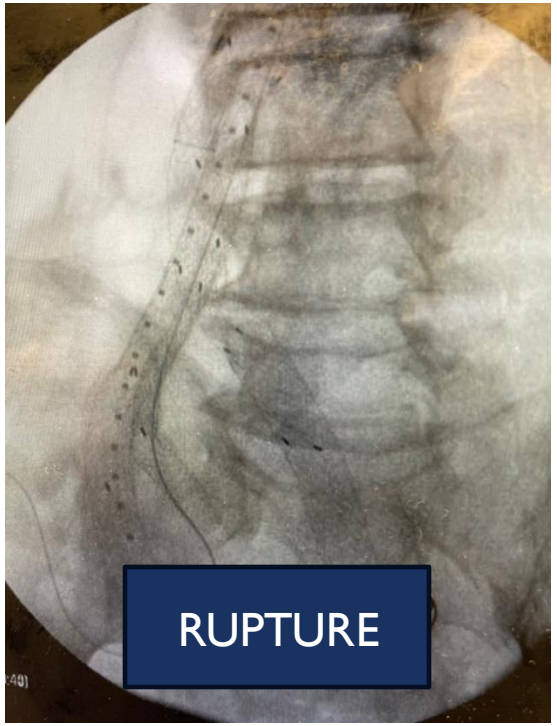
- Is it common?
  - Yes, estimated prevalence ~4-5% in Canada[4], but likely declining[5]
  - Male ~6%; female ~1.6%[4]
- Is it serious?
  - **Yes**
    - >1,200 deaths/yr in Canada[6]
    - Ruptured AAA mortality is still >80% overall[7]
      - EVAR 20-30% mortality[16,17]
      - Open repair 40-50% mortality[17]

70% of ruptured AAA patients do not know that they have an aortic aneurysm[17]

IS THERE AN ACCEPTED TREATMENT?

Important | **Treatable** | Available | Recognizable | Suitable | Acceptable | Understood | Agreed Upon | Economical | Continuous

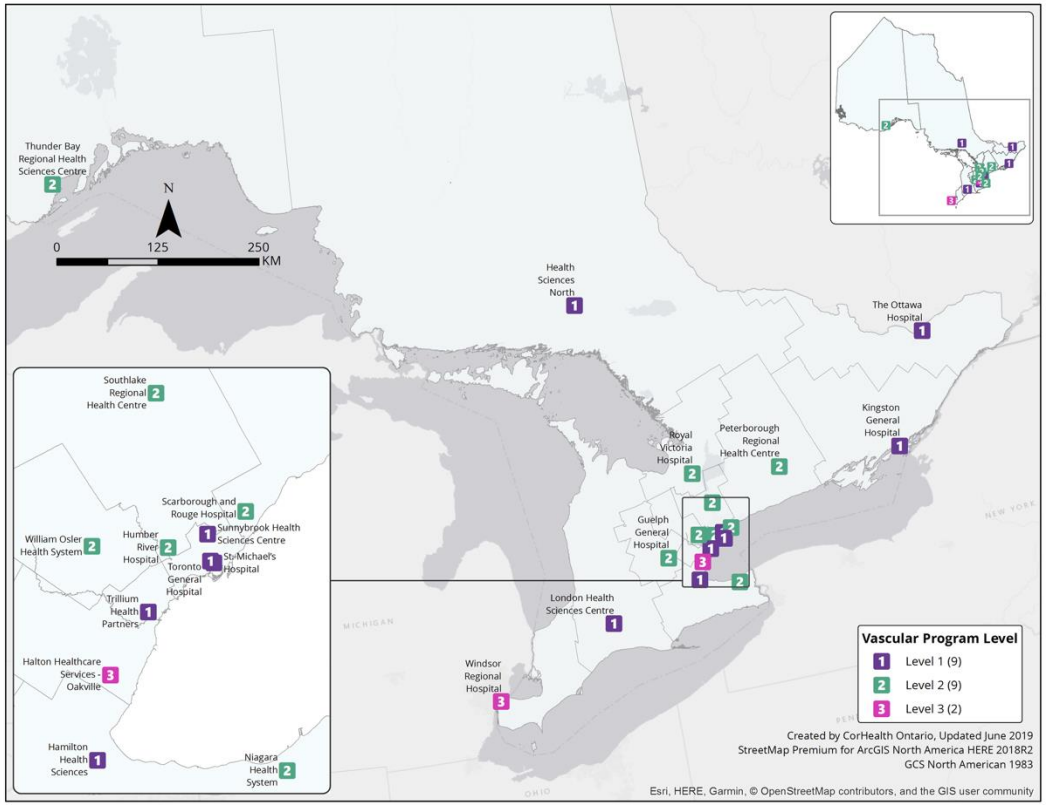
- **Yes – EVAR and OSR are each effective options**
  - Risk of secondary rupture after repair is <1%[8]
- Are outcomes better? **YES!**
  - Elective EVAR 30-day mortality is 0.5-2%[8,9,11], up to 7%[10]
  - Elective open surgical repair 30-day mortality is 2.5-6%[8,9,11]
  - Overall 6-year survival nearly 70% after either repair[11]



ARE THERE FACILITIES FOR DIAGNOSIS AND TREATMENT?

Important | Treatable | **Available** | Recognizable | Suitable | Acceptable | Understood | Agreed Upon | Economical | Continuous

- **Yes**
  - Outpatient and hospital-based accredited vascular labs already exist throughout Ontario
  - Multiple vascular centres throughout Ontario to provide treatment



IS THERE A RECOGNIZABLE LATENT/EARLY SYMPTOMATIC PHASE?

Important | Treatable | Available | **Recognizable** | Suitable | Acceptable | Understood | Agreed Upon | Economical | Continuous

- **Yes**
  - Small aneurysms easily detectable
  - Growth variable, mean 2.3 mm/yr[12] → <u>years</u> between normal aortic diameter and size at significant rupture risk
- There is **<u>not</u>** a standard early symptomatic phase

In your experience, how are <u>most</u> patients diagnosed with AAA?
(a) Incidental finding
(b) Dedicated US/CT for AAA screening
(c) Present with rupture

IS THERE A SUITABLE TEST?

Important | Treatable | Available | Recognizable | **Suitable** | Acceptable | Understood | Agreed Upon | Economical | Continuous

- **Yes**
  - Ultrasound is low-cost, fast, non-invasive, and accurate
    - Sensitivity: 98.9%[13]
    - Specificity: 99.9%[13]
  - Even for non-experts, sensitivity and specificity are each >90%
    - Canada → POCUS by medical students had 93% sensitivity and 100% specificity[14]
    - Rural Australia → 2 hours of training enabled junior doctors to detect AAA with >95% clinical accuracy[15]

IS THE TEST ACCEPTABLE TO THE POPULATION?

Important | Treatable | Available | Recognizable | Suitable | **Acceptable** | Understood | Agreed Upon | Economical | Continuous

- **Yes, I think so**
- **Financially:**
  - Accessible for patients
  - Has been shown to be cost-effective[7]
- **Psychological costs**
  - Theoretical risk of overdiagnosis – or *is it a risk?*

IS THE NAT ?

Important | Treata | nomical | Continuous

- **Yes…**

IS THERE AGREEMENT ABOUT WHOM TO TREAT?

Important | Treatable | Available | Recognizable | Suitable | Acceptable | Understood | **Agreed Upon** | Economical | Continuous

- **Yes**
  - SVS (2017) → Men at 5.5 cm; women at 5.0 cm
  - ESVS (2024) → Men at 5.5 cm; women at 5.0 cm; growth rate >10 mm/yr

IS THE COST ECONOMICALLY BALANCED?

Important | Treatable | Available | Recognizable | Suitable | Acceptable | Understood | Agreed Upon | **Economical** | Continuous

- **Yes – very!**
  - Cost-utility analysis supports current CSVS recommendations[7]
  - Cost-effective in >80% of model iterations for males and for females

1. **We recommend one-time screening ultrasonography for all men aged 65–80 years.**
2. **We suggest one-time screening ultrasonography for all women aged 65–80 years with a history of smoking or cardiovascular disease.**

IS THE COST ECONOMICALLY BALANCED?

Important | Treatable | Available | Recognizable | Suitable | Acceptable | Understood | Agreed Upon | **Economical** | Continuous

Table 4: Country-level comparisons of population-based screening programs for abdominal aortic aneurysm among males aged 65 years

		Incremental* (screening v. no screening)			
Country	**Time horizon**	**Life-years**	**QALYs**	**Costs**	**ICER, $ per QALY (CPI-adjusted)**
Canada (this study)	Lifetime	0.030	0.040	CAN$80	CAN$2418
Canada (2008)[13]	Lifetime	0.049	0.019	CAN$118.0	CAN$6194 (8227)
Estonia[42]	35 years	NA	0.0038	Euro 65.4	Euro 17 303
Netherlands[21]	Lifetime	0.0970	0.0700	Euro 421.0	Euro 4340†
Norway[21]	Lifetime	0.0570	0.0470	Euro 526.0	Euro 9860†
Iran[41]	Lifetime	0.0340	0.0250	US$140.0	US$5566
Sweden[40]	13 years Lifetime	0.0072 0.0132	0.0057 0.0109	NA NA	Euro 14 706 Euro 7570
United Kingdom[19]	30 years	0.0084	0.0067	GBP 47	GBP 7370

IS CASE-FINDING A CONTINUOUS PROCESS?

Important | Treatable | Available | Recognizable | Suitable | Acceptable | Understood | Agreed Upon | Economical | **Continuous**

- **It should be**
- Current guidelines suggest one-time screening with consideration of repeat ultrasound for select patients after 10 years

BUT

- Ruptured AAA can occur at any age
  - Mean age 73 years old[18]
  - 17% of ruptured AAA are aged 40-64[18]
  - 27% of ruptured AAA are aged >79[18]

Do you think the current Canadian AAA screening guidelines would capture most AAA patients?
(a) Yes
(b) No

KEY QUESTIONS

1. What are the principles by which every screening program must abide?
   - ✓ Wilson & Jungner's 10 Principles
2. Does an AAA screening program make sense – ethically and fiscally – in Canada's current health care landscape?
   - ✓ Meets WHO criteria
   - ✓ Models demonstrate cost-efficacy
   - ✓ No convincing evidence of harm by screening
3. If so, practically speaking, how to we begin to implement it?
   - ✓ Use Ontario as a pilot province

TAKE-HOME POINTS

1. Formalizing AAA screening has been proven to save lives.
2. AAA screening is cost-effective in the Canadian health care system.
3. Both women and men should be screened for AAA, especially if they have risk factors.

THANK YOU!

COMMENTS?
QUESTIONS?

MEREDITH.BARR@WILLIAMOSLERHS.CA

VARUN.KAPILA@WILLIAMOSLERHS.CA

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