

The Expansion Rate of Small AAA

And the Threshold for Intervention

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Financial Disclosure Slide

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 - **Medtronic**
 - **Endologix**

Current Guidelines

Class I

1. For patients with chronic dissection, particularly if associated with a connective tissue disorder, but without significant comorbid disease, and a descending thoracic aortic diameter exceeding 5.5 cm, open repair is recommended.^{371,382,468} (*Level of Evidence: B*)
2. For patients with degenerative or traumatic aneurysms of the descending thoracic aorta exceeding 5.5 cm, saccular aneurysms, or postoperative pseudoaneurysms, endovascular stent grafting should be strongly considered when feasible.^{371,469} (*Level of Evidence: B*)

AHA 2010

Interventions on descending aortic aneurysms		
TEVAR should be considered, rather than surgery, when anatomy is suitable.	IIa	C
TEVAR should be considered in patients who have descending aortic aneurysm with maximal diameter ≥ 55 mm.	IIa	C
When TEVAR is not technically possible, surgery should be considered in patients who have descending aortic aneurysm with maximal diameter ≥ 60 mm.	IIa	C
When intervention is indicated, in cases of Marfan syndrome or other elastopathies, surgery should be indicated rather than TEVAR.	IIa	C

ESC 2014

MT 2016

Thoracic Aortic Aneurysms

- Systematic review growth rates
 - Analysis large database
 - TAA growth rates
- Implications for repair / surveillance



Systematic Review of TAA Expansion Rates

- **PRISMA guidelines - search until April 2015**

- **11 studies (3 prospective / 8 retrospective)**
 - **1383 patients**

- **Heterogenous (location / pathology / methodology)**

Systematic Review of TAA Expansion / Rupture Rates

	Growth Rates (mm/y)
All TAA	0.2-4.2
Ascending and arch	0.2-2.8
Descending / TAAA	1.9-3.4

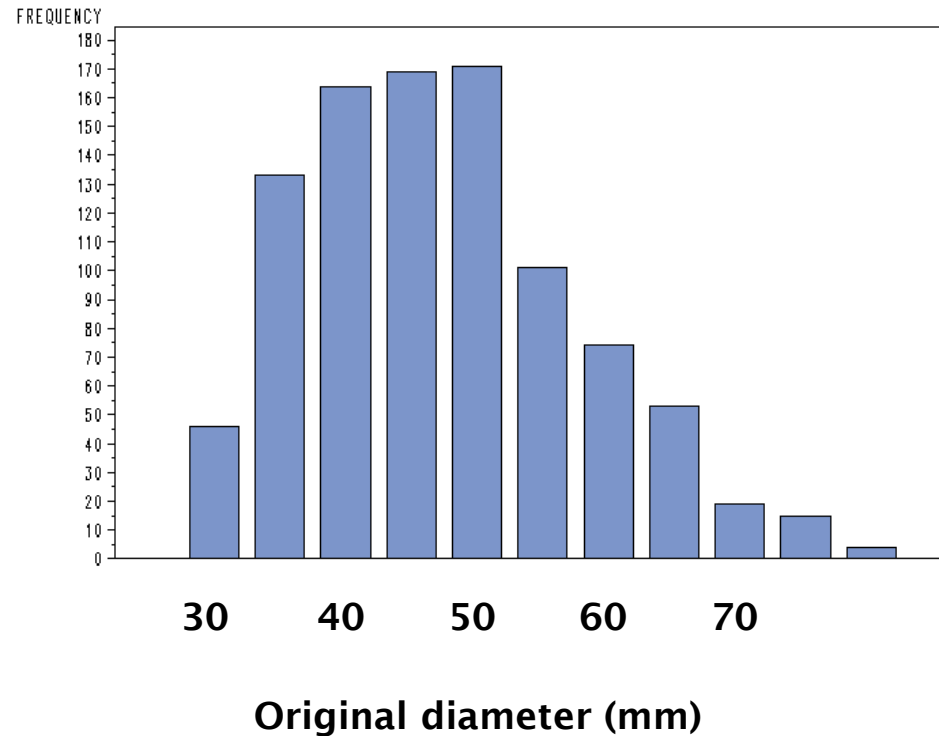
Large TAA	Aortic dissection
Distal location	COPD
Marfan	BAV

Growth Rates TAA and Surveillance

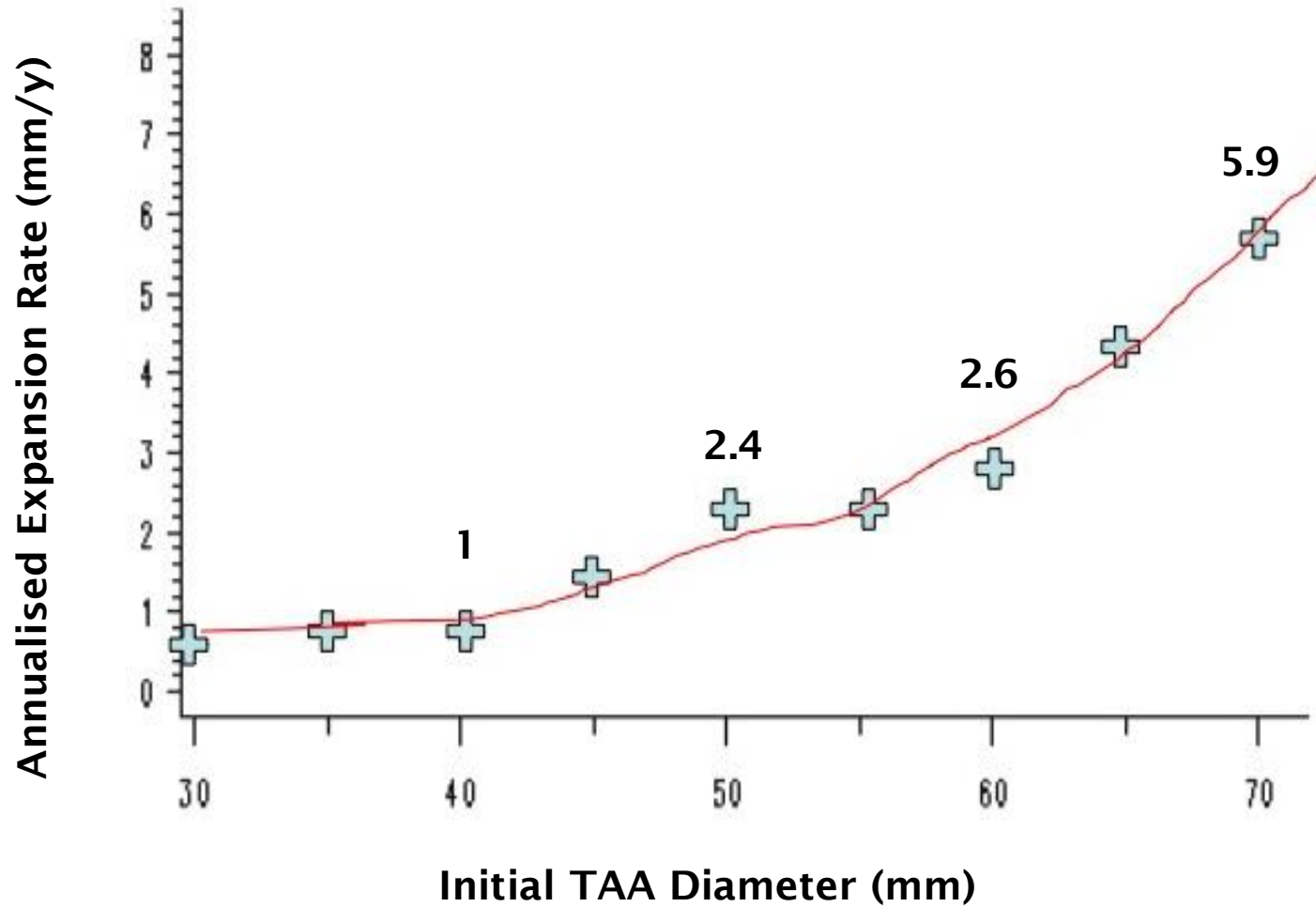
- Commercial imaging database (M2S Inc)
 - 2004-2013
 - TAA > 30mm
 - 2 CT > 3 months apart
- Annualised growth rates - time to threshold
 - Surveillance intervals

M2S Database and TAA Growth

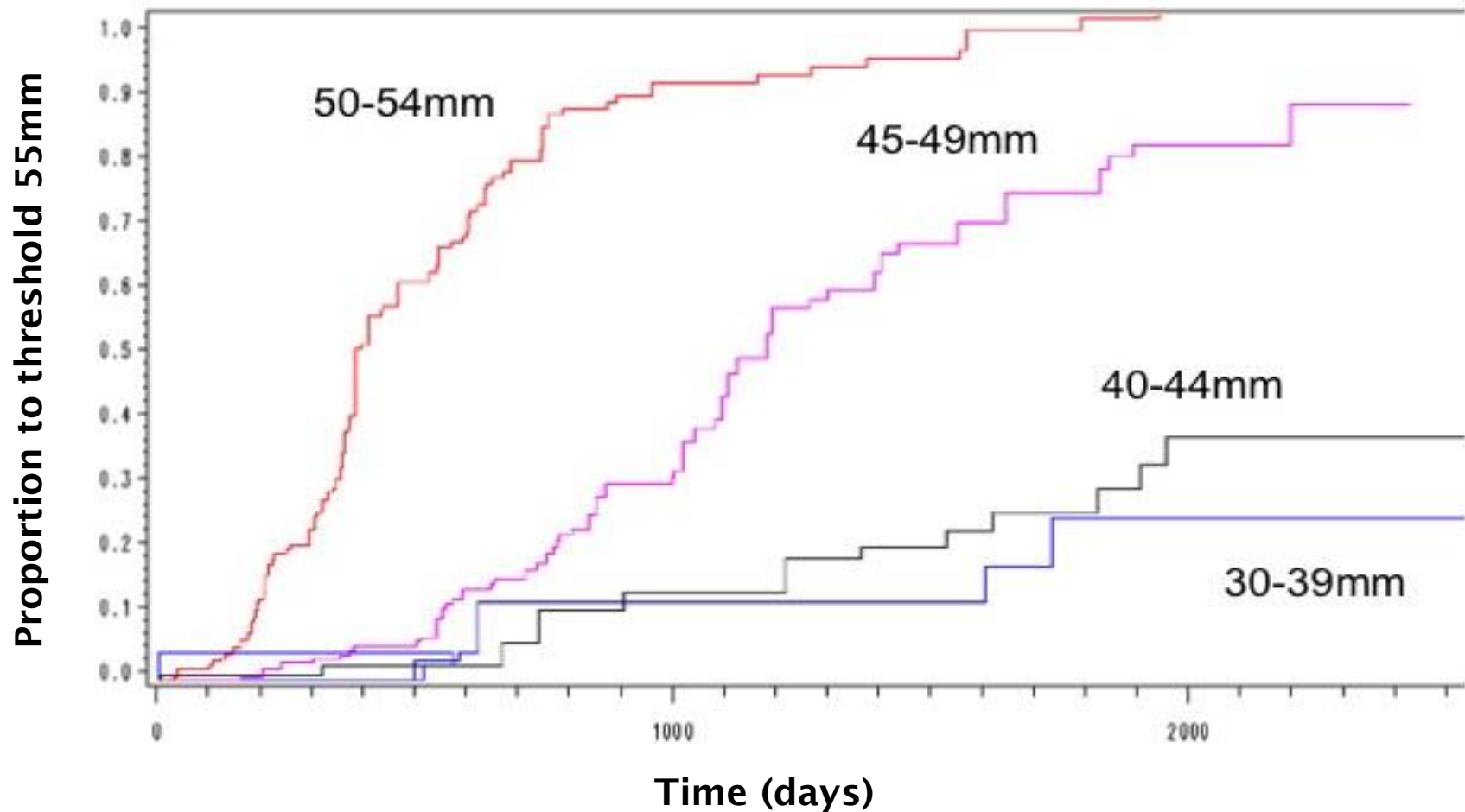
- 995 patients
- Mean time first-last CT 758d
- Mean TAA diameter 48.3mm
- No clinical information!!



TAA Expansion - Initial Diameter



Time to Threshold (55mm) - Starting Diameter



Proportion to Threshold – Surveillance Intervals

Initial Diameter (mm)	3 years	2 year	1 year	6 months
30-39	44%	0	0	0
40-44	20%	5%	0	0
45-49	58%	25%	5%	0
50-54	89%	65%	36%	15%

Predicted Aortic Events Within One Year of Diagnosis

Cardiovascular Surgery

Risk of Rupture or Dissection in Descending Thoracic Aortic Aneurysm

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Thoralf M. Sundt III, MD

Background—Current practice guidelines recommend surgical repair of large thoracic aortic aneurysms to prevent fatal aortic dissection or rupture, but limited natural history data exist to support clinical criteria for timely intervention.

Methods and Results—Of 3247 patients with thoracic aortic aneurysm registered in our institutional Thoracic Aortic Center Database, we identified and reviewed 257 nonsyndromic patients (age, 72.4±10.5 years; 143 female) with descending thoracic or thoracoabdominal aortic aneurysm without a history of aortic dissection in whom surgical intervention was not undertaken. The primary end point was a composite of aortic dissection/rupture and sudden death. Baseline mean maximal aortic diameter was 52.4±10.8 mm, with 103 patients having diameters ≥55 mm. During a median follow-up of 25.1 months (quartiles 1–3, 8.3–56.4 months), definite and possible aortic events occurred in 19 (7.4%) and 31 (12.1%) patients, respectively. On multivariable analysis, maximal aortic diameter at baseline emerged as the only significant predictor of aortic events (hazard ratio:1.12; 95% confidence interval, 1.08–1.15). Estimated rates of definite aortic events within 1 year were 5.5%, 7.2%, and 9.3% for aortic diameters of 50, 55, and 60 mm, respectively. Receiver-operating characteristic curves for discriminating aortic events were higher for indexed aortic sizes referenced by body size (area under the curve=0.832–0.889) but not significantly different from absolute maximal aortic diameter (area under the curve=0.805).

Conclusions—Aortic size was the principal factor related to aortic events in unrepaired descending thoracic or thoracoabdominal aortic aneurysm. Although the risk of aortic events started to increase with a diameter >5.0 to 5.5 cm, it is uncertain whether repair of thoracic aortic aneurysms in this range leads to overall benefit, and the threshold for repair requires further evaluation. (Circulation. 2015;132:1620–1629. DOI: 10.1161/CIRCULATIONAHA.114.015177.)

Key Words: aneurysm ■ aorta ■ prognosis ■ risk factors ■ surgery

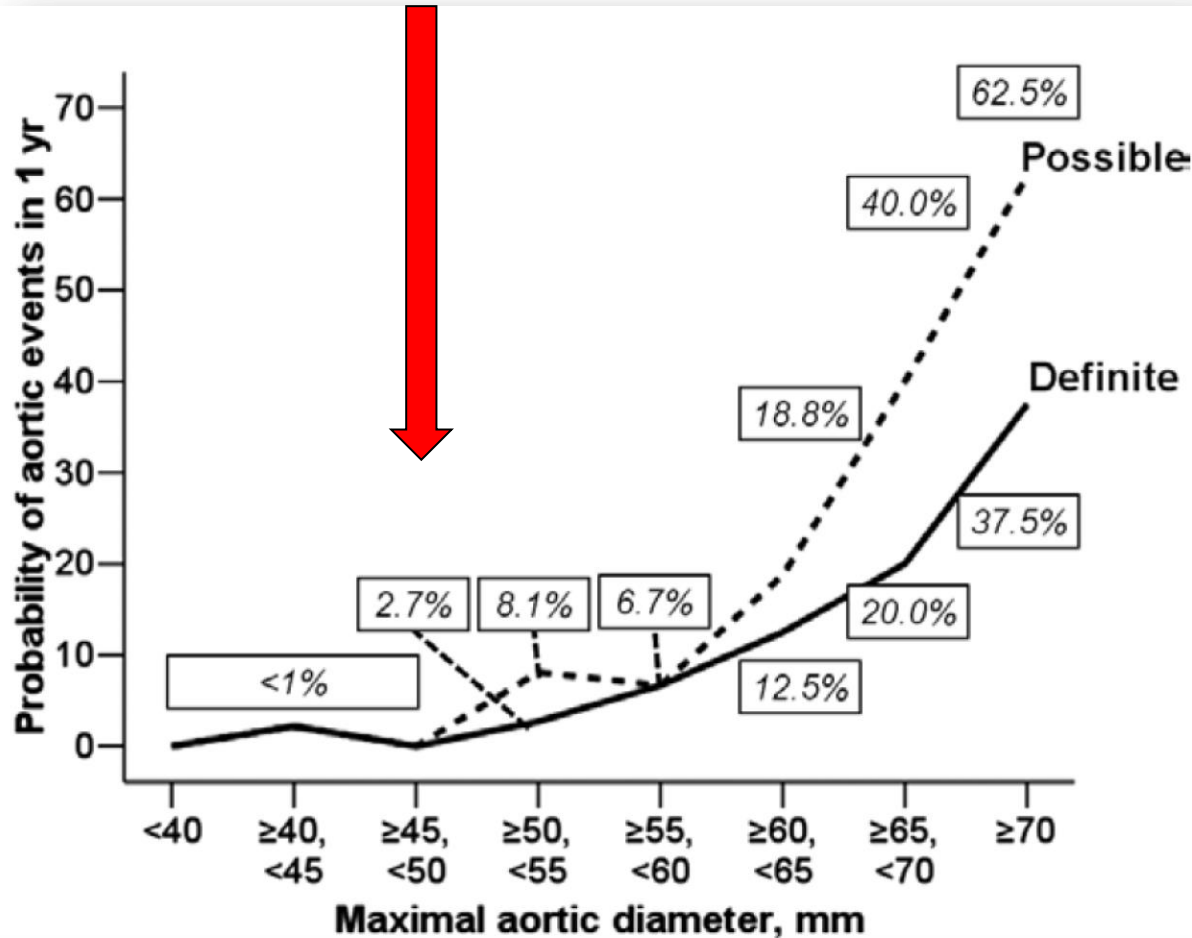
Aneurysm of the descending thoracic (DTA) and thoracoabdominal aorta (TAA) is a life-threatening disorder given the risks of aortic dissection (AD) or rupture and their associated high mortality and morbidity once complications occur. The decision to intervene prophylactically, however, is complicated by the significant mortality and morbidity associated with surgical intervention for these conditions. Current practice guidelines call for surgical repair of asymptomatic thoracic aortic aneurysms with diameters of ≥55 mm as a Class I recommendation.¹ Extensive TAAs are given a higher threshold of 60 mm.¹

Editorial see p 1600
Clinical Perspective on p 1629

Recent observations have shown that adverse aortic events may occur at smaller diameters.^{2,3} For instance, reports from the International Registry of Acute Aortic Dissection showed that

40% of patients with acute type A AD may have aortic diameter of <50 mm, and among those with type B AD, as many as 80% had aortic diameters <55 mm.⁴ These observations have encouraged re-examination of the current practice guidelines. Furthermore, progression of endovascular technology enables treatment of the aortic diseases less invasively, potentially reducing treatment-related mortality or serious morbidity.⁵⁻⁸ Convergence of these forces suggests that earlier prophylactic interventions for DTAs may be appropriate and emphasizes the need for a deeper understanding of the predictors of these aortic complications. Finally, several aortic measures indexed to body size have been proposed recently as alternatives to simple diameter for predicting complications,^{9,10} but few studies have examined the predictive value of these metrics.

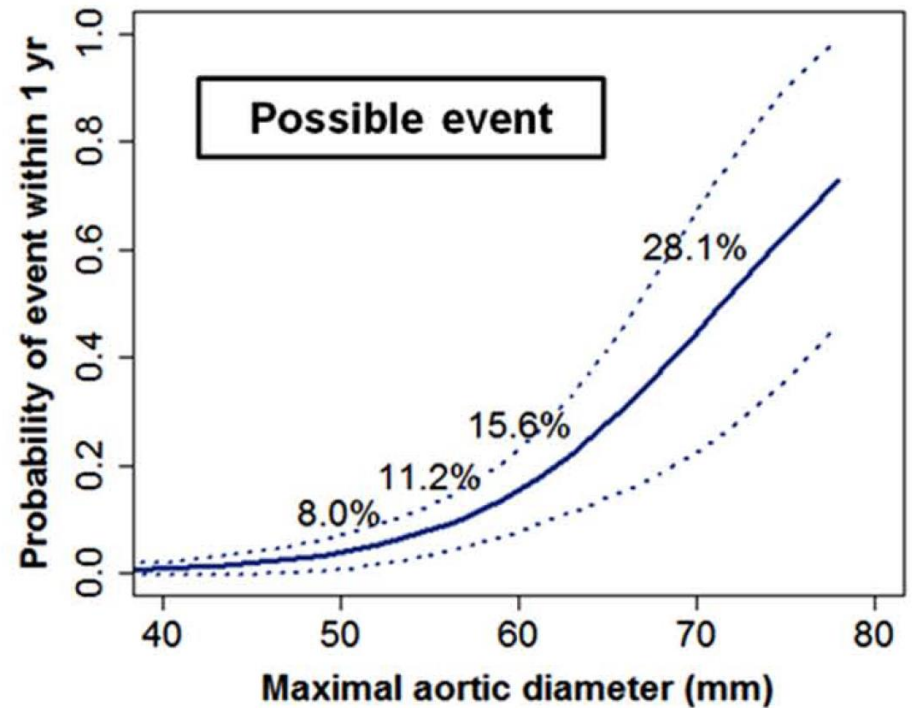
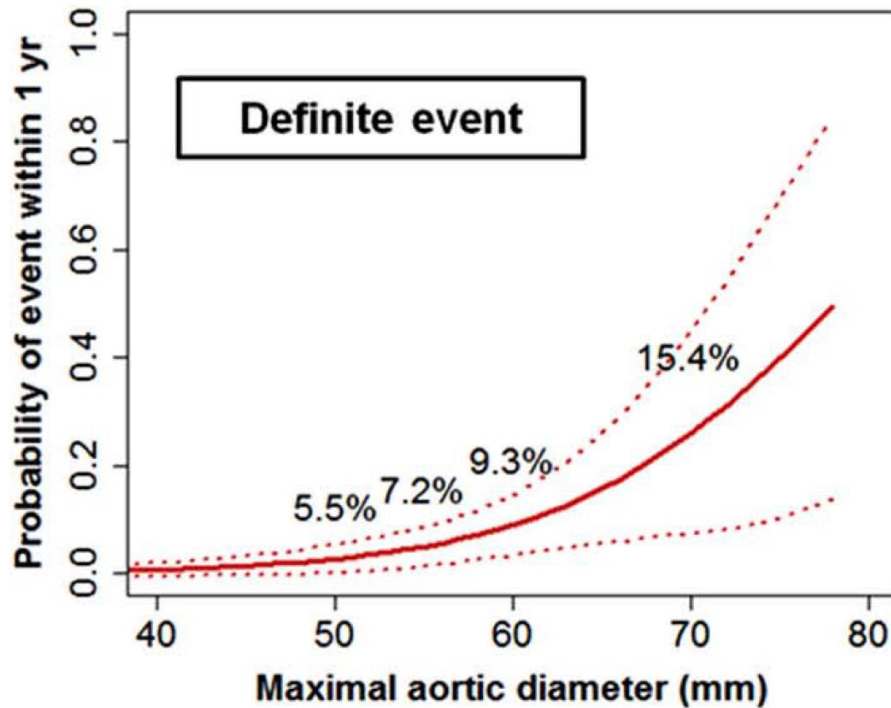
Unfortunately, there are a number of significant challenges in determining the natural course of unrepaired TAAs,



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The online-only Data Supplement is available with this article at <http://circ.ahajournals.org/lookup/suppl/doi:10.1161/CIRCULATIONAHA.114.015177/-DC1>.
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Predicted Aortic Events Within One Year of Diagnosis



Summary and Conclusions

- Expansion and event rate low below 40mm
- Rapid increase in expansion and event rate after 50mm
- Bi-annual surveillance < 40mm, annual surveillance > 40mm
- Argument that threshold should be lower

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