



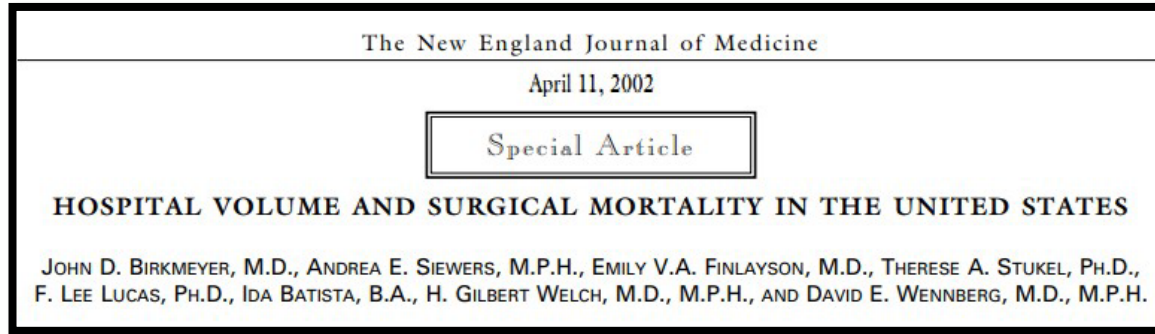
Aortic Surgery Should *NOT* be Centralized at High- Volume Centers

Dean J. Arnaoutakis, MD, MBA

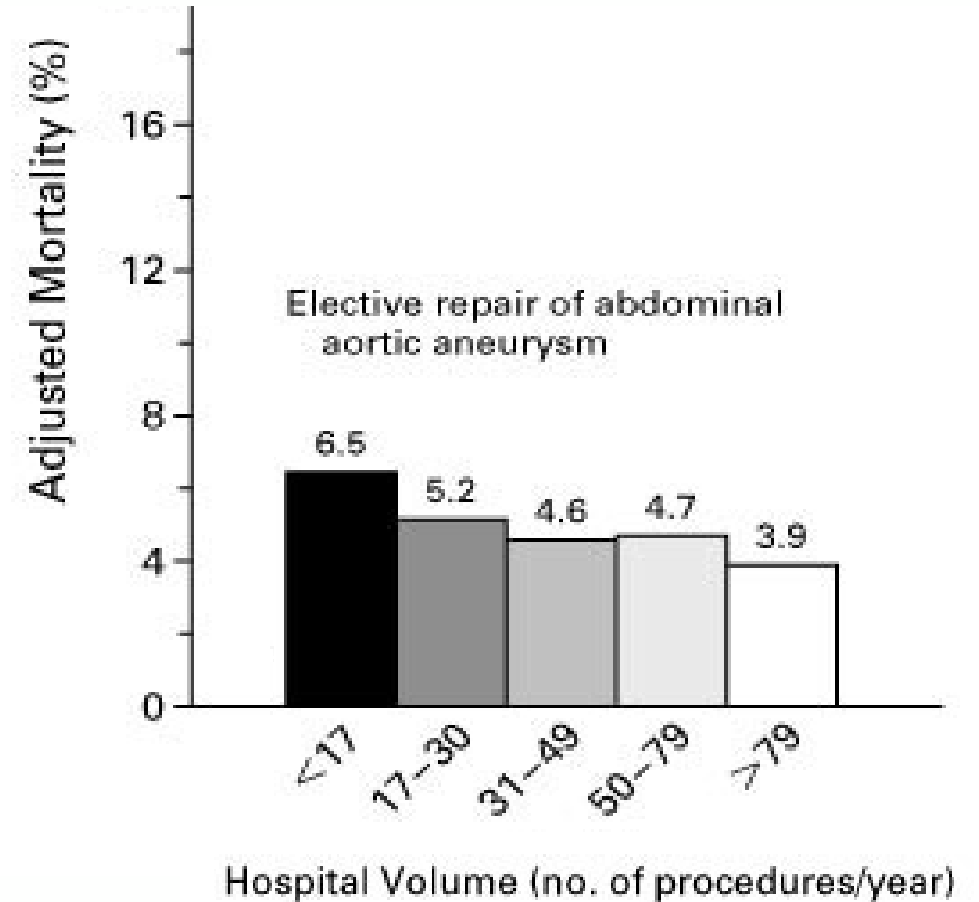
Orlando Health Wiregrass Ranch

April 24, 2026

Does volume impact outcomes of open AAA repair?



- 2.5 million medicare beneficiaries analyzed
- For open AAA repair, **>30 cases/yr** was threshold leading to most improvement



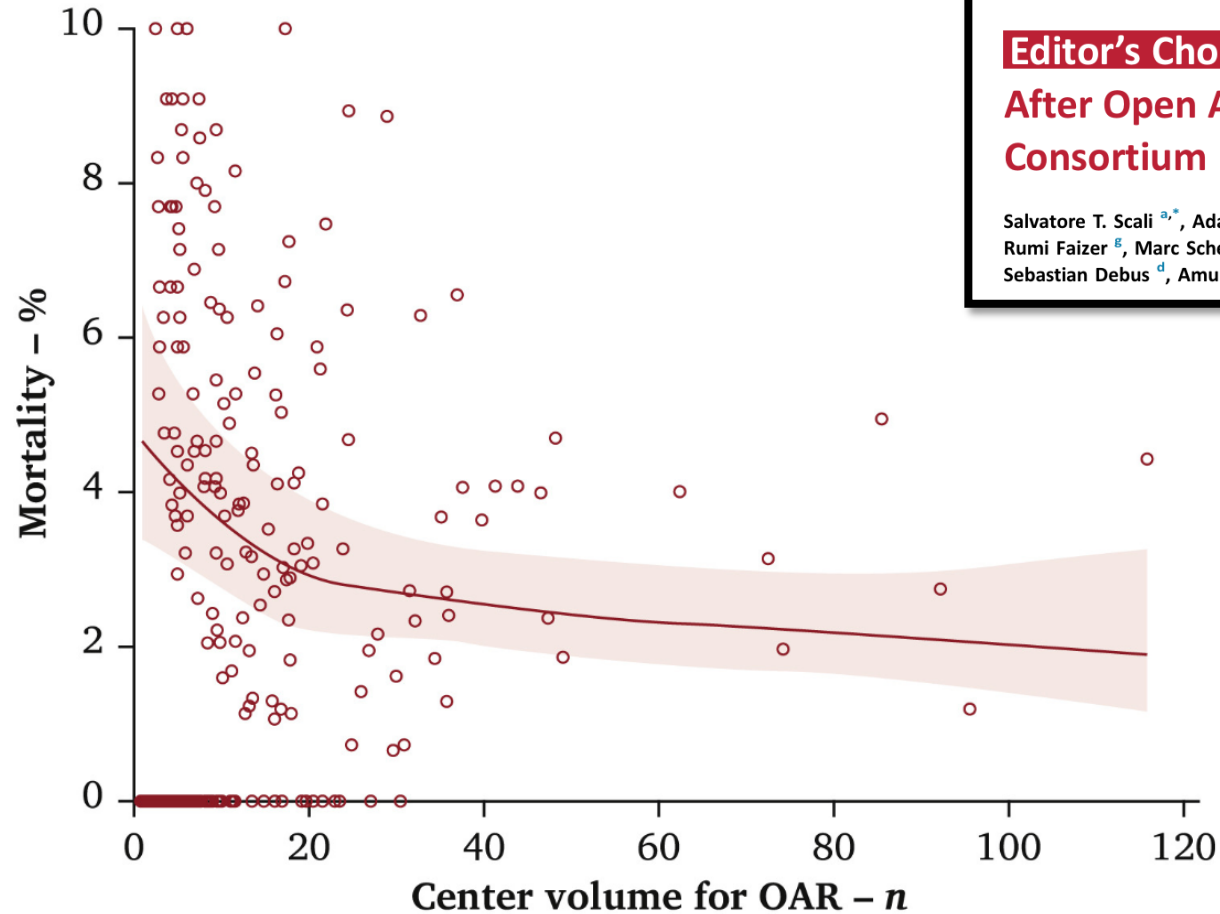
Does volume impact outcomes of open AAA repair in *modern era*?

Aorta and Major Branches

Eur J Vasc Endovasc Surg (2021) 61, 747–755

Editor's Choice – Optimal Threshold for the Volume–Outcome Relationship After Open AAA Repair in the Endovascular Era: Analysis of the International Consortium of Vascular Registries

Salvatore T. Scali^{a,*}, Adam Beck^b, Art Sedrakyan^c, Jialin Mao^c, Christian-Alexander Behrendt^d, Jonathan R. Boyle^e, Maarit Venermo^f, Rumi Faizer^g, Marc Schermerhorn^h, Barry Beilesⁱ, Zoltan Szeberin^j, Nikolaj Eldrup^k, Ian Thomson^l, Kevin Cassar^m, Martin Altreutherⁿ, Sebastian Debus^d, Amundeeep Johal^o, Martin Bjorck^p, Jack L. Cronenwett^q, Kevin Mani^p



Is volume actually driving the mortality benefit in open AAA repair?

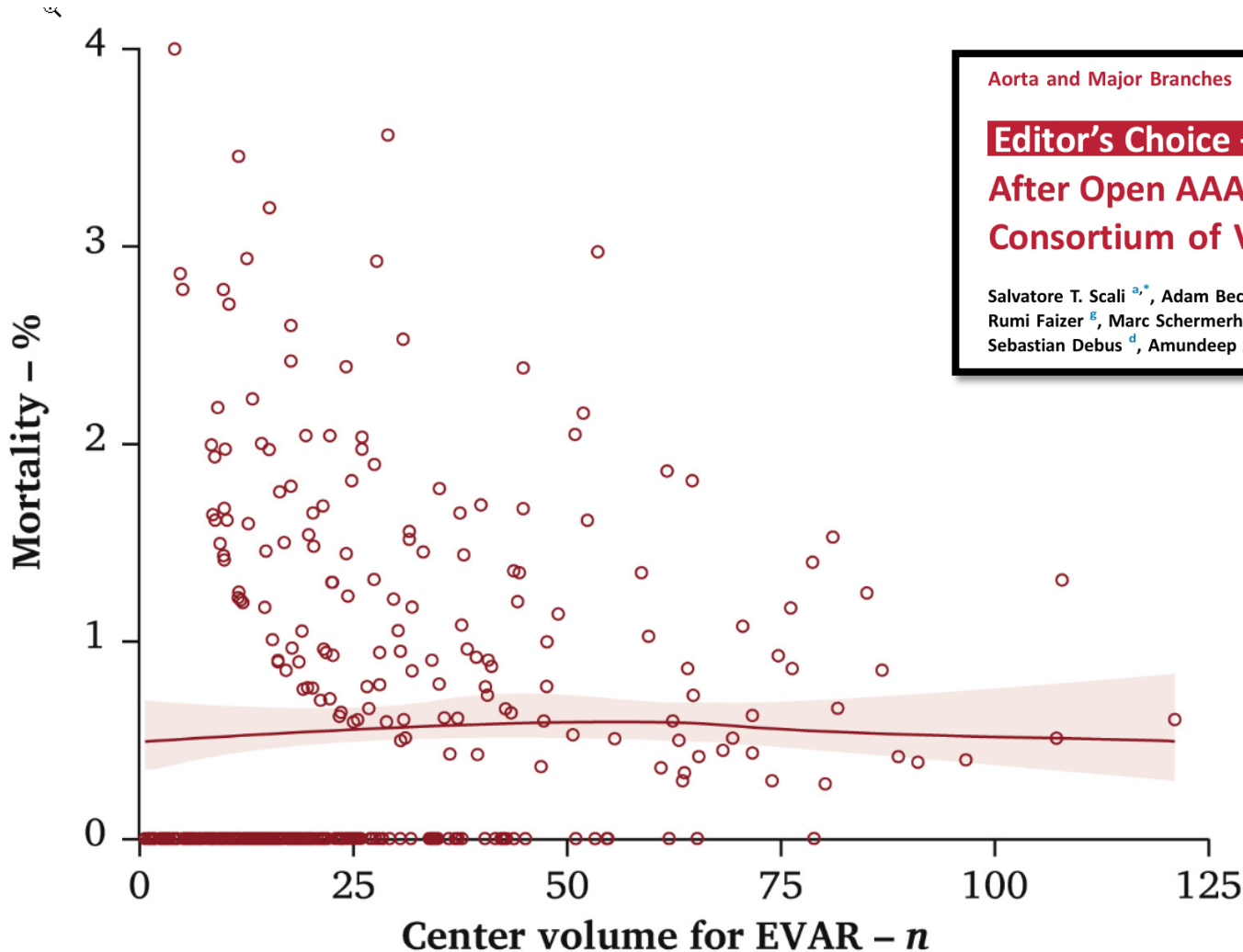
Reduction of in-hospital mortality among California hospitals meeting Leapfrog evidence-based standards for abdominal aortic aneurysm repair

JOURNAL OF VASCULAR SURGERY
June 2008

Benjamin S. Brooke, MD,^a Bruce A. Perler, MD, MBA,^a Francesca Dominici, PhD,^b
Martin A. Makary, MD, MPH,^{a,c} and Peter J. Pronovost, MD, PhD,^{a,c,d} *Baltimore, Md*

<i>Leapfrog standard</i>	<i>Rate ratio Leapfrog standard vs control</i>		<i>Ratio of rate ratios (95% CI)</i>	<i>P</i>
	<i>2000-2002 (95% CI)</i>	<i>2003-2005 (95% CI)</i>		
Control, no standard (n = 78)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	
β -blockade standard (n = 37)				
Unadjusted	1.12 (0.75-1.67)	0.70 (0.45-1.08)	0.63 (0.36-1.09)	.097
Adjusted ^b	1.56 (0.97-2.49)	0.69 (0.39-1.22)	0.49 (0.24-0.99)	.048
Case volume standard (n = 30)				
Unadjusted	1.01 (0.71-1.44)	0.86 (0.62-1.20)	0.86 (0.54-1.37)	.53
Adjusted ^c	1.32 (0.84-2.07)	1.02 (0.66-1.59)	0.80 (0.44-1.45)	.47

Does volume impact outcomes of EVAR repair?



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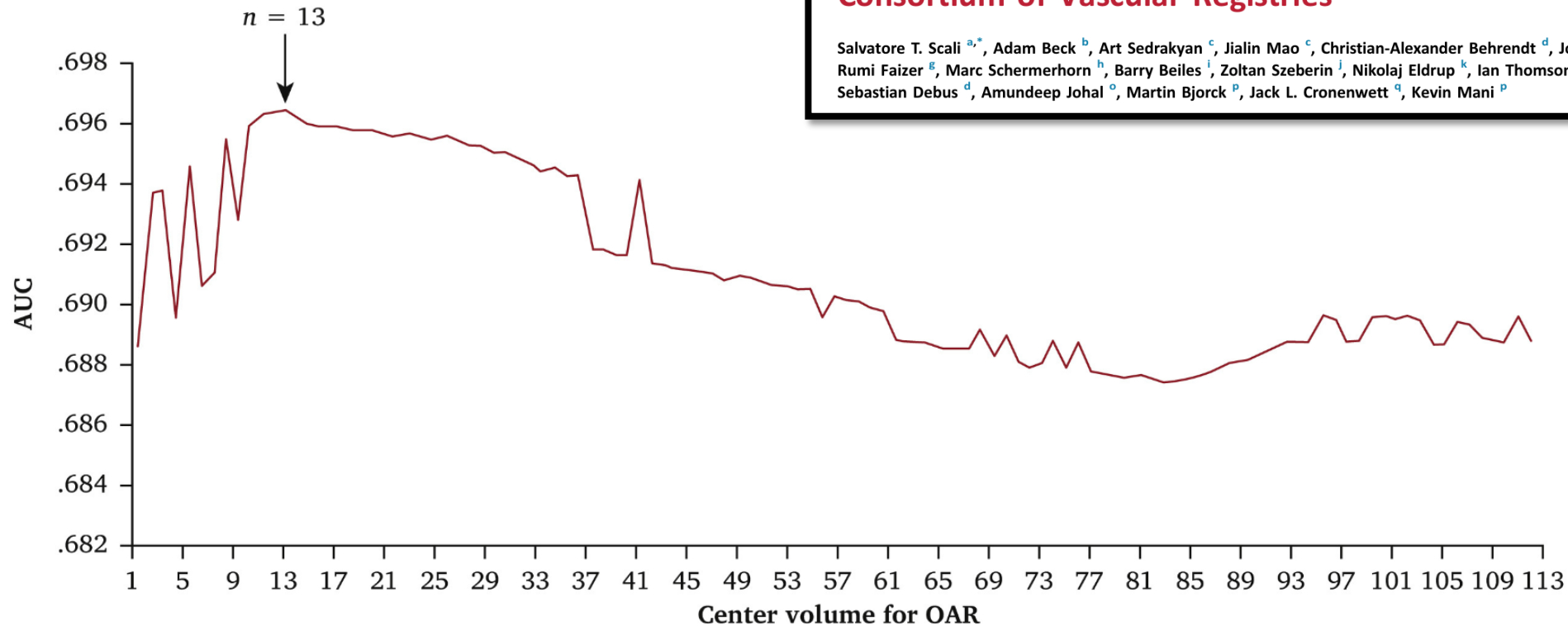
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What is practicality of regionalized aortic care?



Percentage of centers achieved volume threshold for open AAA repair?

Only 19% of centers in US achieved this goal



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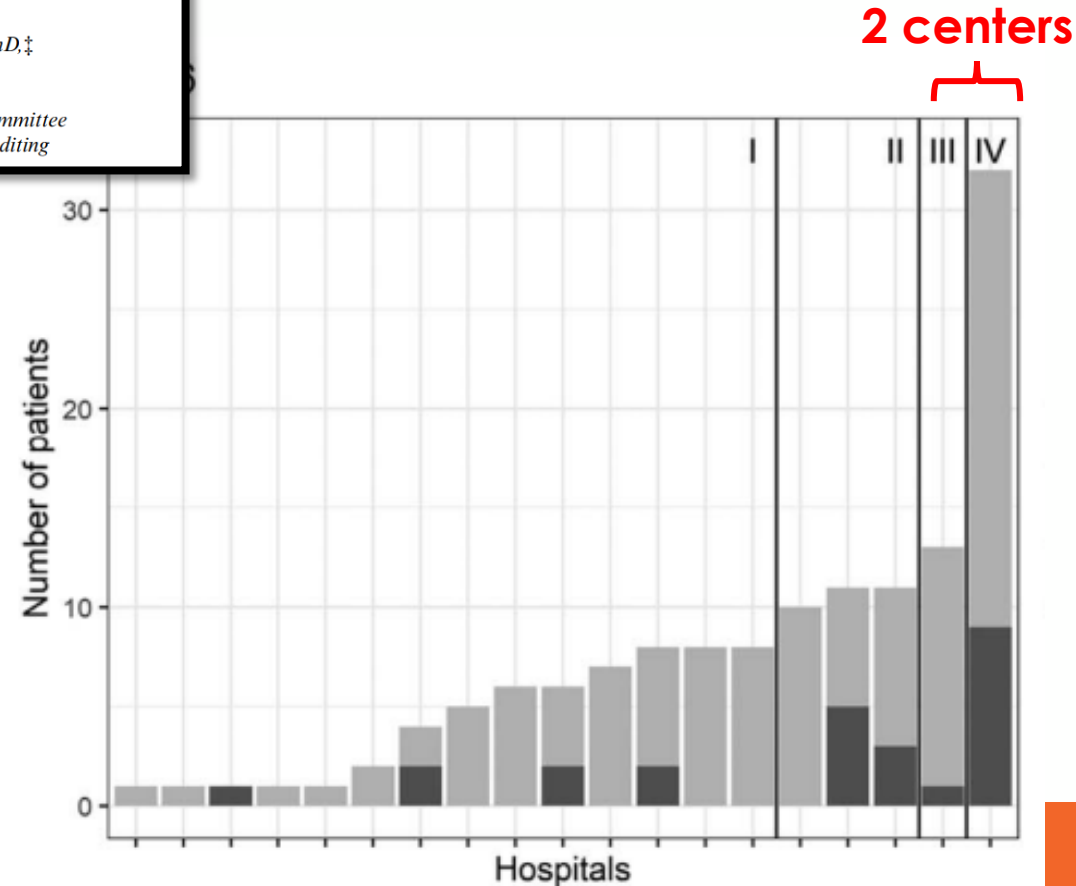
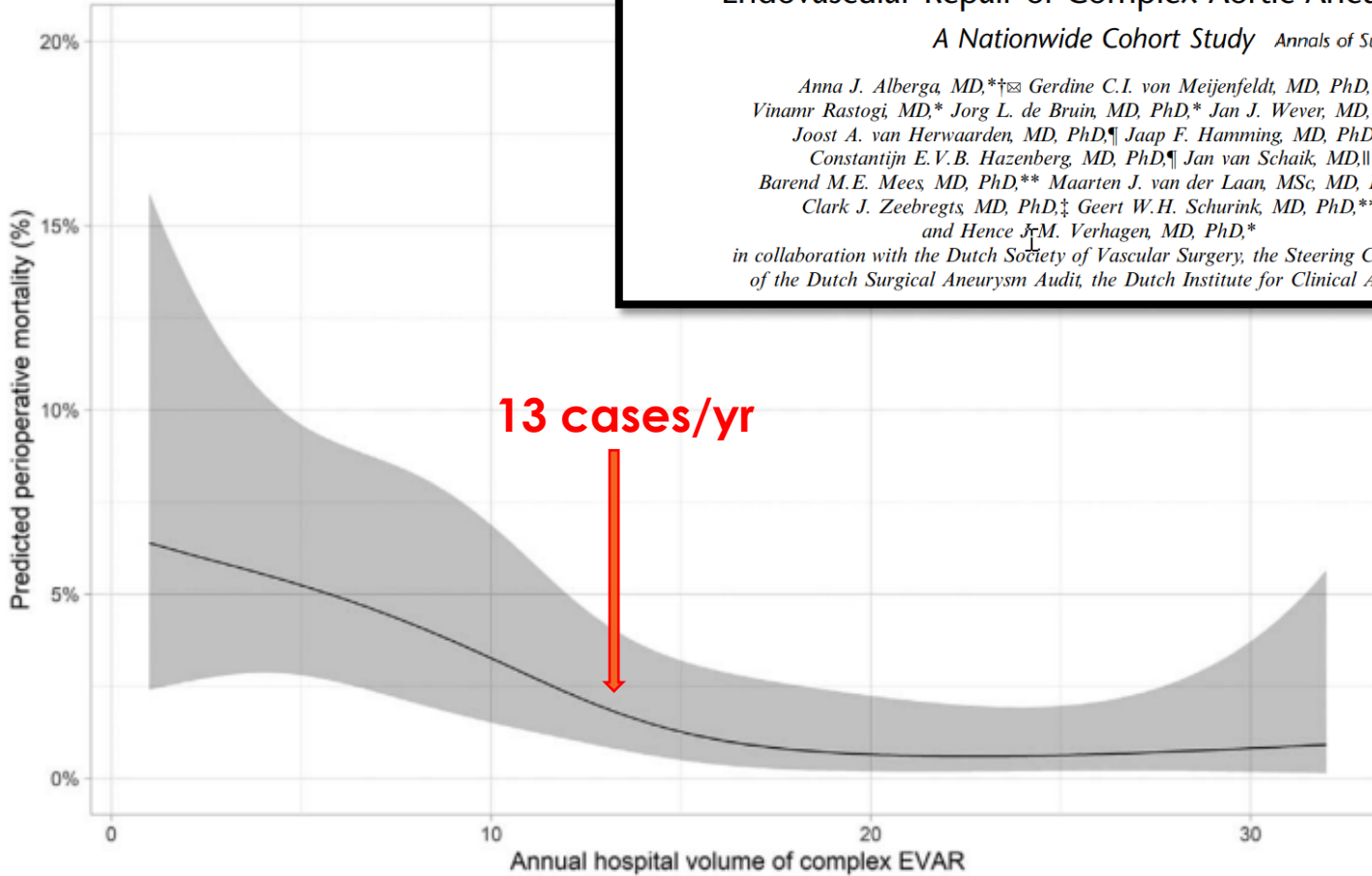
Percentage of centers achieved volume threshold for F/BEVAR repair?

Association of Hospital Volume with Perioperative Mortality of Endovascular Repair of Complex Aortic Aneurysms

A Nationwide Cohort Study *Annals of Surgery* • March 2023

Anna J. Alberga, MD,*†‡§ Gerdine C.I. von Meijenfeldt, MD, PhD,‡
 Vinamr Rastogi, MD,* Jorg L. de Bruin, MD, PhD,* Jan J. Wever, MD, PhD,§
 Joost A. van Herwaarden, MD, PhD,¶ Jaap F. Hamming, MD, PhD,||
 Constantijn E.V.B. Hazenberg, MD, PhD,¶ Jan van Schaik, MD,||
 Barend M.E. Mees, MD, PhD,** Maarten J. van der Laan, MSc, MD, PhD,‡
 Clark J. Zeebregts, MD, PhD,‡ Geert W.H. Schurink, MD, PhD,**
 and Henc J.M. Verhagen, MD, PhD,*

in collaboration with the Dutch Society of Vascular Surgery, the Steering Committee of the Dutch Surgical Aneurysm Audit, the Dutch Institute for Clinical Auditing



Can high-volume centers accommodate more volume?

Implementation of an Interdisciplinary Transfer Huddle Intervention for Prolonged Wait Times During Inter-ICU Transfer

The Joint Commission Journal on Quality and Patient Safety 2024; 50:371-376

*Sydney Hyder, MD, MS; Ryan Tang, MD; Reiping Huang, PhD, MS
Nandita Nadig, MD, MS*

- Median time to transfer 45 hours
- #1 barrier to transfer = lack of beds

Implications of ITU Bed Non-availability and the Centralisation of Vascular Services in the Treatment of Ruptured Abdominal Aortic Aneurysm. Current U.K. Practice

Eur J Vasc Endovasc Surg 24, 553-554 (2002)

*D. K. Beattie¹, A. Rodway¹, T. Ainley² and A. H. Davies*¹*

*Interventional Radiology, Imperial College School of Medicine,
St. Mary's Hospital, Praeger Road, London, W6 8RF, U.K.*

Transfer boarding delays care more in low-volume rural emergency departments: A cohort study

*Nicholas M. Mohr MD, MS^{1,2,3} | Chaorong Wu PhD⁴ | Michael J. Ward MD, PhD^{5,6}
Candace D. McNaughton MD, PhD^{5,6} | Brett Faine PharmD, MS^{1,2} |
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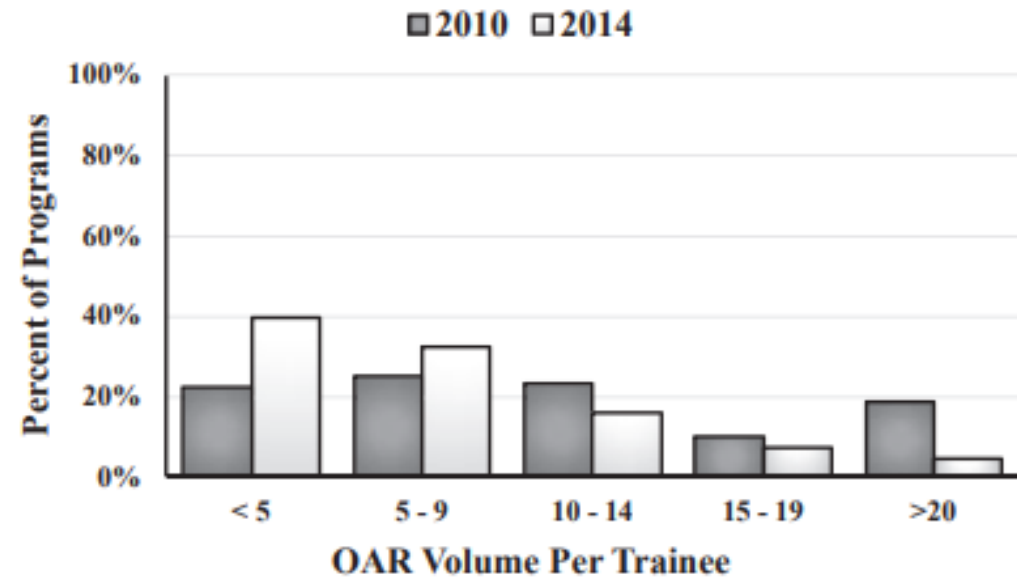
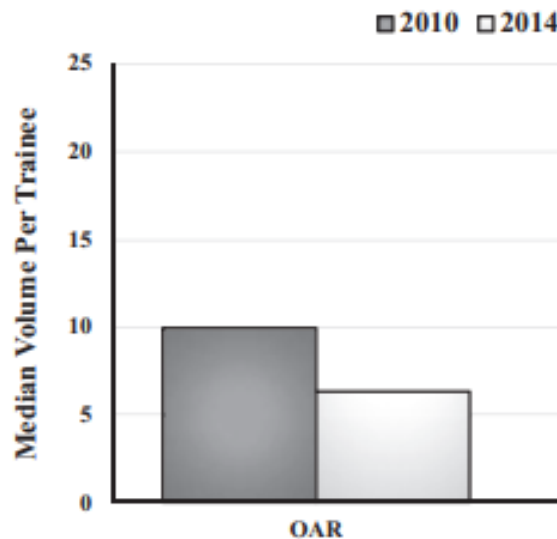
- ERs with patients awaiting transfer:
 - Detrimentially impact care delivered to other patients
 - More pronounced in rural hospitals

- Transfer of rAAA patients declined 25%
- Due to lack of ICU beds

Is open AAA regionalization detrimental to training programs?

The decline of open abdominal aortic aneurysm surgery among individual training programs and vascular surgery trainees

Margaret E. Smith, MD, MS,^a Elizabeth A. Andraska, MD, MS,^b Danielle C. Sutzko, MD, MS,^c
Anna M. Boniakowski, MD,^c Dawn M. Coleman, MD,^c and Nicholas H. Osborne, MD, MS,^c *Ann Arbor, Mich; and Pittsburgh, Pa*



Do patients want to travel distances for care?

Perceived Benefits of Local Care

- Convenience
- Support Systems
- Familiar Physicians/Hospitals

Patient Preferences for Location of Care Implications for Regionalization

Finlayson, Samuel R.G. MD, MPH^{*†}; Birkmeyer, John D. MD^{*‡#}; Tosteson, Anna N.A. ScD[#]; Nease, Robert F. Jr PhD[¶]

[Author Information](#)📄

Medical Care 37(2):p 204-209, February 1999.

- Surveyed 100 patients needing Whipple procedure for pancreatic cancer
- 100% of patients prefer local care if mortality risk equivalent to regional hospital
- 45% of patients prefer local care even if mortality risk was double

Summary

- **19% of hospitals** meet volume threshold for **open AAA repair**
- **10% of hospitals** meet volume threshold for **F/BEVAR**
- **No Volume-Outcome** relationship for **EVAR**
- Tertiary care centers **lack infrastructure** to accommodate additional patients
- Will **exacerbate problems** in our **training programs** such that even fewer vascular surgeons will have proficiency in open AAA repair
- **Patients** may **prefer** to stay **locally** for their care



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