

What Impact does Practice Volume Have On Open TAAA Repair

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Few Data and Low Disease Incidence.....

Pathology	Incidence (10,000 patient years)	Annual elective operative volume (USA)	Proportional caseload (100 AAA)
AAA	310	26,941	100
Juxta-renal AAA	54	4,754	17
TAA	60	4,577	17
TAAA	10	771	3

- **Volume – outcome relationship**
in TAA / TAAA repair



- **Causation**

- **Implications**

Relationship Caseload and Outcome In Complex Surgery

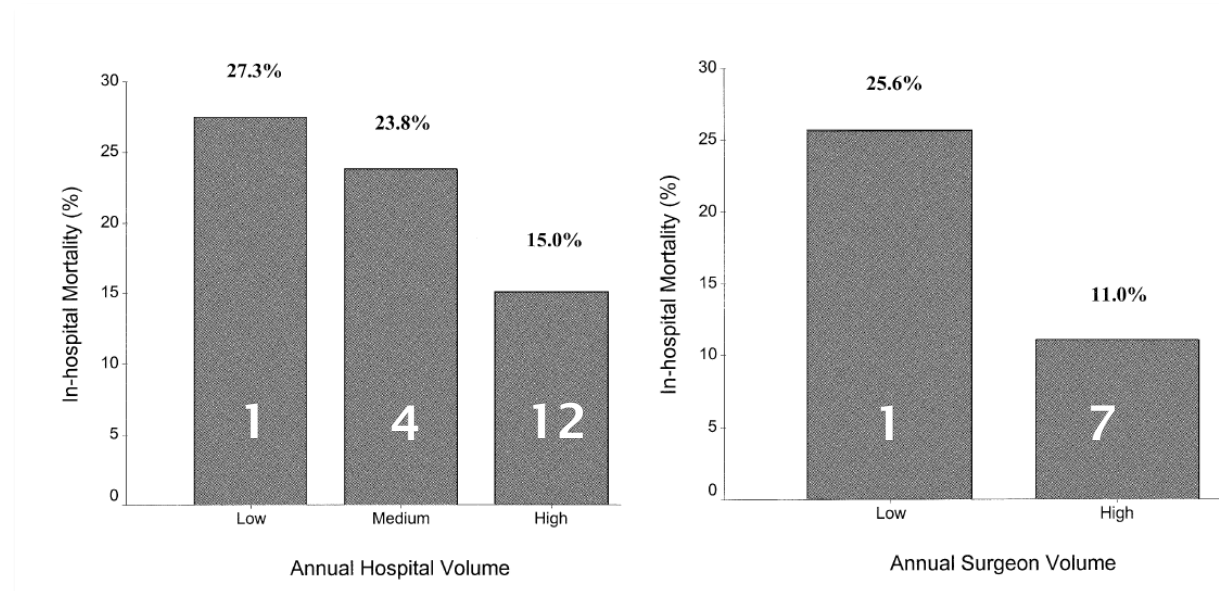
- Improved peri-operative mortality
- Improved long term outcome
- Increasing use of technology
- Less risk adverse / increase intervention
- Observed in large hospitals and academic institutions

Relationship Caseload and Outcome Open TAAA

- NIS

- 1988-1998

- 1542 patients

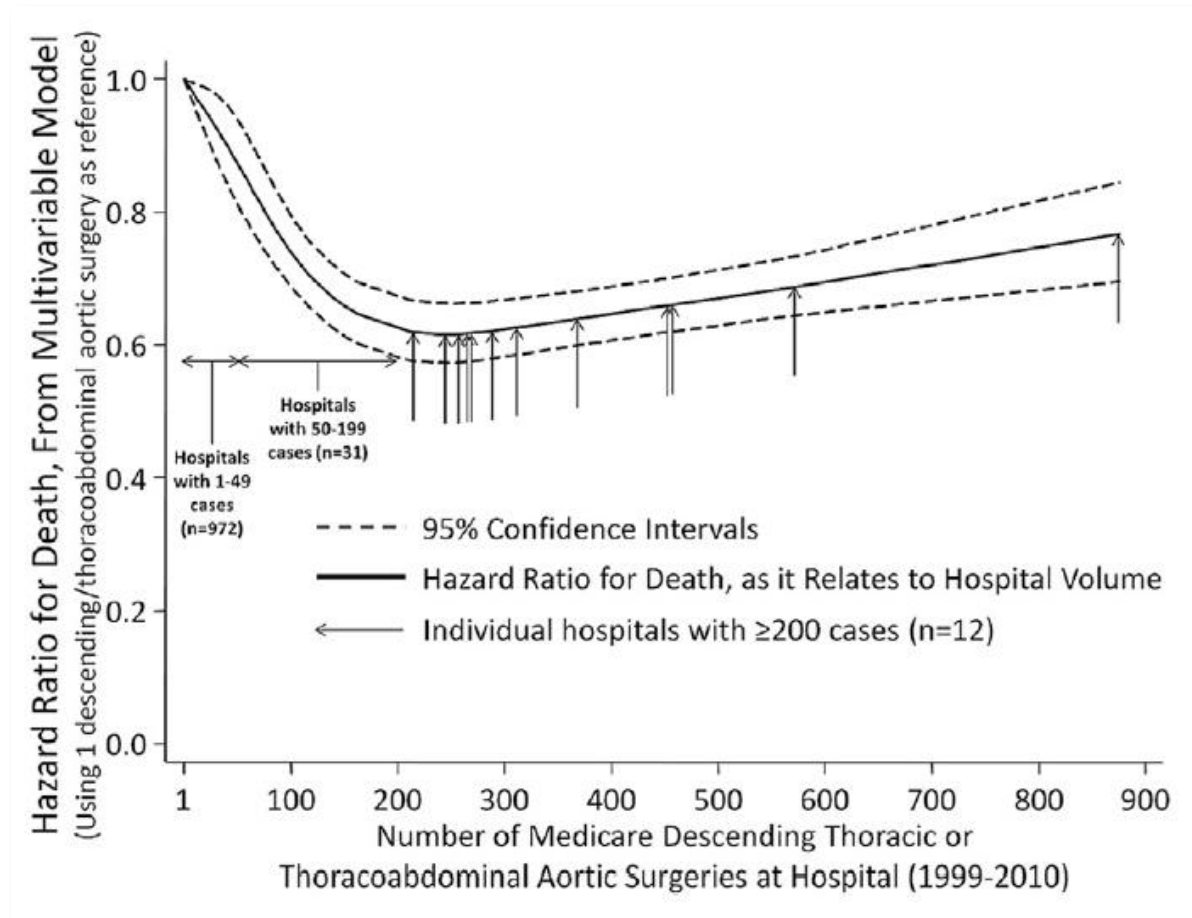


Organisation of Service – Patient Pathway

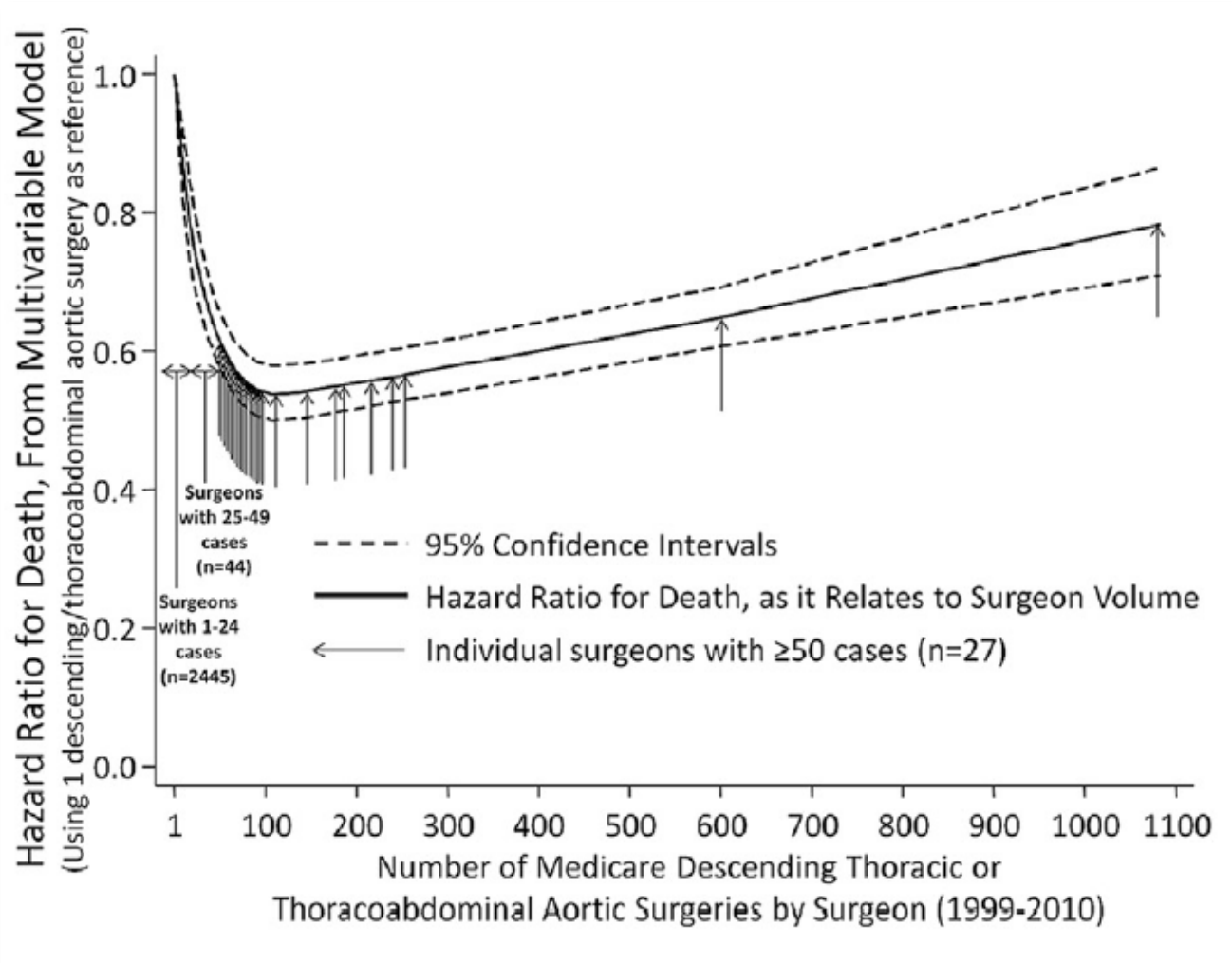
- 122 hospitals (CA) 1995-2010
 - 1188 patients
- Only 5 hospital high volume (>9 cases / y)
- 40% patients received care in high volume centres
 - OR (mortality) for high volume 0.4

TAAA and DTA Repairs – Hospital and Surgeon Volume

- 1016 hospitals (Medicare) – 5489 patients
- 1999-2010
- Median 6 cases per year (hospital) and 2 (surgeon)
- 12 hospitals high volume (>50)



TAAA and DTA Repairs – Hospital and Surgeon Volume



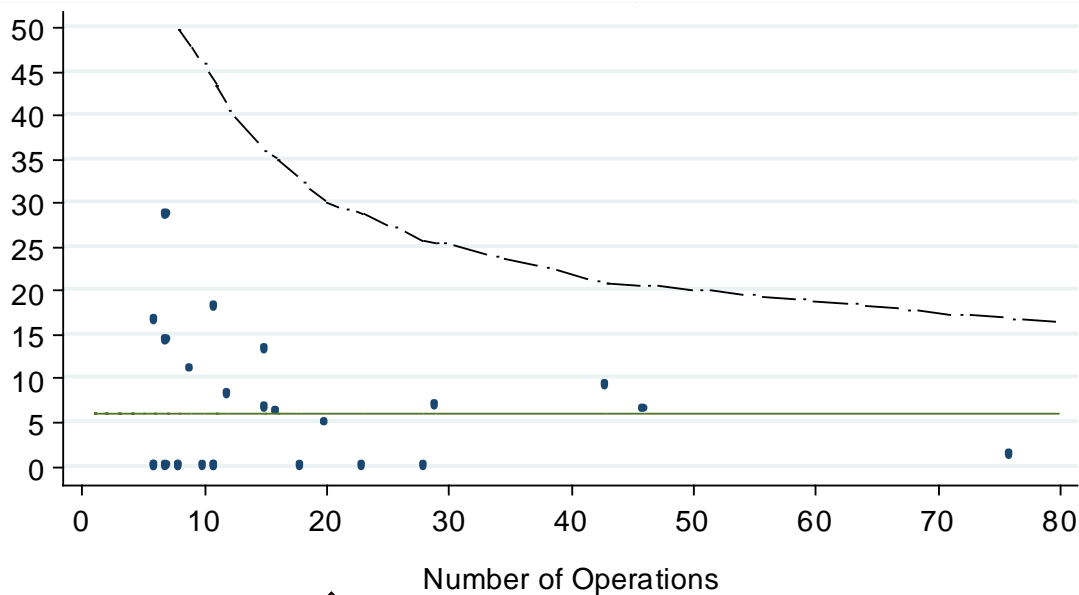
National Vascular Registry (UK) 2014

- England and Wales

- Complex AAA

- Mix of endovascular and open surgery

- TAAA / TAA / Supra-renal





The effect of surgeon specialization on outcomes after ruptured abdominal aortic aneurysm repair

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Objective: Although mortality after elective abdominal aortic aneurysm (AAA) repair has steadily declined, operative mortality for a ruptured AAA (rAAA) remains high. Repair of rAAA at hospitals with a higher elective aneurysm workload has been associated with lower mortality rates irrespective of the mode of treatment. This study sought to determine the association between surgeon specialization and outcomes after rAAA repair.

Methods: The American College of Surgeons National Surgical Quality Improvement Project database from 2005 to 2010 was used to examine the 30-day mortality and morbidity outcomes of patients undergoing rAAA repair by vascular and general surgeons. Multivariable logistic regression analysis was performed for each death and morbidity, adjusting for all independently predictive preoperative risk factors. Survival curves were compared using the log-rank test.

Results: We identified 1893 repairs of rAAAs, of which 1767 (96.1%) were performed by vascular surgeons and 126 (3.9%) were performed by general surgeons. There were no significant differences between patients operated on by general vs vascular surgeons in preoperative risk factors or method of repair. Overall 30-day mortality was 34.3% (649 of 1893). After risk adjustment, mortality was significantly lower in the vascular surgery group compared with the general surgery group (odds ratio [OR], 0.51; 95% confidence interval [CI], 0.30-0.86; $P = .011$). The risk of returning to the operating room (OR, 0.58; 95% CI, 0.35-0.97; $P = .038$), renal failure (OR, 0.54; 95% CI, 0.31-0.95; $P = .034$), and a cardiac complication (OR, 0.53; 95% CI, 0.28-0.99; $P = .047$) were all significantly less in the vascular surgery group.

Conclusion: Despite similar preoperative risk factors profiles, patients who were operated on by vascular surgeons had lower mortality, less frequent returns to the operating room, and decreased incidences of postoperative renal failure and cardiac events. These data add weight to the case for further centralization of vascular services. (J Vasc Surg 2014;51:1-7.)

Although mortality of elective abdominal aortic aneurysm (AAA) repair has steadily declined to a rate of <5%, operative mortality for a ruptured AAA (rAAA) remains at ~33.7% to 49.8%.¹⁻⁴ Death within the immediate postoperative period is usually the result of hypovolemic, hemorrhagic shock, whereas later mortality is often due to systemic inflammatory response and multi-system organ failure, even after a technically successful aneurysm repair.⁵

A number of changes have been proposed to decrease the mortality of rAAA repair. The advent of endovascular options for AAA repair (EVAR) has led to its adoption for rAAA as well.⁶ Nationally, repair of rAAA by EVAR compared with open surgical repair (OSR) was associated

with lower morbidity and mortality.^{2,7} But evidence of survival benefit with EVAR at the regional level is conflicting and was associated with greater costs.^{8,9}

In both the United States (U.S.) and in England, repair of rAAA at hospitals with a higher elective aneurysm workload was associated with lower mortality rates irrespective of the mode of treatment.^{10,11} These relationships suggest that vascular surgical procedures might be best placed within a centralized model of care to increase volume and thereby attain best outcomes.¹²

This study examined the American College of Surgeons (ACS) National Surgical Quality Improvement Project (NSQIP) database to determine the 30-day mortality and morbidity outcomes of patients undergoing emergency rAAA repair by vascular and general surgeons. NSQIP was developed as a prospective quality-assessment tool for general and vascular surgical outcomes and is representative of community as well as academic medical centers.¹³ We hypothesized that vascular surgeons would have improved outcomes after emergency rAAA repair compared with general surgeons.

METHODS

This study was reviewed and approved by the Partners Institutional Review Board (Protocol 2012P001667).

Case identification. The ACS NSQIP is a national, multi-institutional, prospectively collected database designed for quality control for its participating institutions. In 2010, it collected information from >200 U.S. hospitals. Clinical nurse reviewers collect a comprehensive array

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■ Analysis of surgical speciality and 30d mortality rAAA

■ General surgeons – 50%

■ Vascular surgeons – 33.7%

■ Morbidity and return to theatre similar difference

Variations and inter-relationship in outcome from emergency admissions in England: a retrospective analysis of Hospital Episode Statistics from 2005–2010

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Abstract

Background: The quality of care delivered and clinical outcomes of care are of paramount importance. Wide variations in the outcome of emergency care have been suggested, but the scale of variation, and the way in which outcomes are inter-related are poorly defined and are critical to understand how best to improve services. This study quantifies the scale of variation in three outcomes for a contemporary cohort of patients undergoing emergency medical and surgical admissions. The way in which the outcomes of different diagnoses relate to each other is investigated.

Methods: A retrospective study using the English Hospital Episode Statistics 2005–2010 with one-year follow-up for all patients with one of 20 of the commonest and highest-risk emergency medical or surgical conditions. The primary outcome was in-hospital all-cause risk-standardised mortality rate (in-RSMR). Secondary outcomes were 1-year all-cause risk-standardised mortality rate (1 yr-RSMR) and 28-day all-cause emergency readmission rate (RERR).

Results: 2,406,709 adult patients underwent emergency medical or surgical admissions in the groups of interest. Clinically and statistically significant variations in outcome were observed between providers for all three outcomes ($p < 0.001$). For some diagnoses including heart failure, acute myocardial infarction, stroke and fractured neck of femur, more than 20% of hospitals lay above the upper 95% control limit and were statistical outliers. The risk-standardised outcomes within a given hospital for an individual diagnostic group were significantly associated with the aggregated outcome of the other clinical groups.

Conclusions: Hospital-level risk-standardised outcomes for emergency admissions across a range of specialties vary considerably and cross traditional speciality boundaries. This suggests that global institutional infra-structure and processes of care influence outcomes. The implications are far reaching, both in terms of investigating performance at individual hospitals and in understanding how hospitals can learn from the best performers to improve outcomes.

Keywords: Quality of Health Care [MeSH], Benchmarking [MeSH], Outcomes assessment (Health Care) [MeSH], Health services research [MeSH], Mortality [MeSH], General surgery [MeSH], Orthopaedics [MeSH], Myocardial infarction [MeSH], Stroke [MeSH], Sepsis [MeSH], Femoral neck fractures [MeSH]

■ Wide variation in outcomes for emergency medical and surgical admissions

■ Outcomes for one diagnostic group associated with aggregated outcomes for individual hospital

■ “Good” and “bad” hospitals

■ Structure and process?

■ Increased resource use / bed

■ Higher staffing levels

■ Critical care provision

■ Academic activity / trial participation

■ Higher case load

Association of hospital structures with mortality from ruptured abdominal aortic aneurysm

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Background: There is significant variation in the mortality rates of patients with a ruptured abdominal aortic aneurysm (rAAA) admitted to hospital in England. This study sought to investigate whether modifiable differences in hospital structures and processes were associated with differences in patient outcome.

Methods: Patients diagnosed with rAAA between 2005 and 2010 were extracted from the Hospital Episode Statistics database. After risk adjustment, hospitals were grouped into low-mortality outlier, expected mortality and high-mortality outlier categories. Hospital Trust-level structure and process variables were compared between categories, and tested for an association with risk-adjusted 90-day mortality and non-corrective treatment (palliation) rate using binary logistic regression models.

Results: There were 9877 patients admitted to 153 English NHS Trusts with an rAAA during the study. The overall combined (operative and non-operative) mortality rate was 67.5 per cent (palliation rate 41.6 per cent). Seven hospital Trusts (4.6 per cent) were high-mortality and 15 (9.8 per cent) were low-mortality outliers. Low-mortality outliers used significantly greater mean resources per bed (doctors: 0.922 *versus* 0.513, $P < 0.001$; consultant doctors: 0.316 *versus* 0.168, $P < 0.001$; nurses: 2.341 *versus* 1.770, $P < 0.001$; critical care beds: 0.045 *versus* 0.019, $P < 0.001$; operating theatres: 0.027 *versus* 0.019, $P = 0.002$) and performed more fluoroscopies (mean 12.6 *versus* 9.2 per bed; $P = 0.046$) than high-mortality outlier hospital Trusts. On multivariable analysis, greater numbers of consultants, nurses and fluoroscopies, teaching status, weekday admission and rAAA volume were independent predictors of lower mortality and, excluding rAAA volume, a lower rate of palliation.

Conclusion: The variability in rAAA outcome in English National Health Service hospital Trusts is associated with modifiable hospital resources. Such information should be used to inform any proposed quality improvement programme surrounding rAAA.

CLINICAL PRACTICE

Mortality of emergency general surgical patients and associations with hospital structures and processes

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Abstract

Background: Variations in patient outcomes between providers have been described for emergency admissions, including general surgery. The aim of this study was to investigate whether differences in modifiable hospital structures and processes were associated with variance in mortality, amongst patients admitted for emergency colorectal laparotomy, peptic ulcer surgery, appendicectomy, hernia repair and pancreatitis.

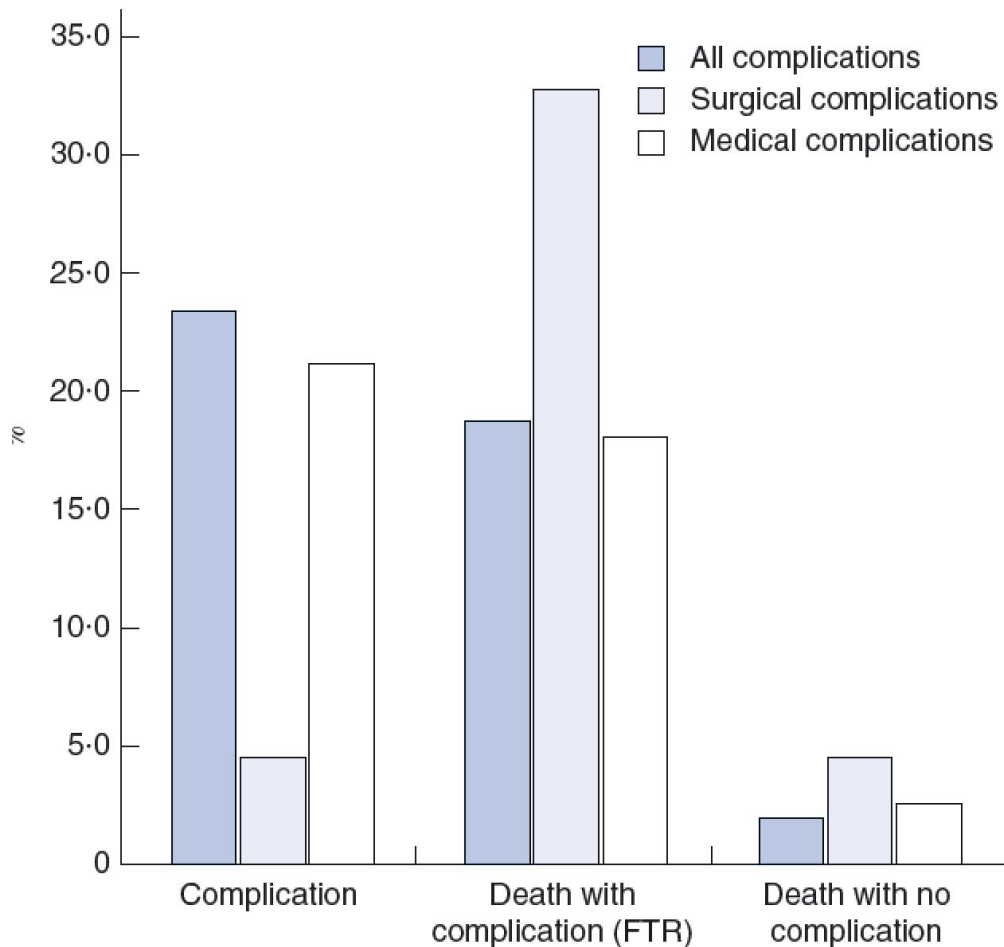
Methods: Adult emergency admissions in the English NHS were extracted from the Hospital Episode Statistics between April 2005 and March 2010. The association between mortality and structure and process measures including medical and nursing staffing levels, critical care and operating theatre availability, radiology utilization, teaching hospital status and weekend admissions were investigated.

Results: There were 294 602 emergency admissions to 156 NHS Trusts (hospital systems) with a 30-day mortality of 4.2%. Trust-level mortality rates for this cohort ranged from 1.6 to 8.0%. The lowest mortality rates were observed in Trusts with higher levels of medical and nursing staffing, and a greater number of operating theatres and critical care beds relative to provider size. Higher mortality rates were seen in patients admitted to hospital at weekends [OR 1.1 (95% CI 1.06–1.17) $P < 0.0001$], in Trusts with fewer general surgical doctors [1.07 (1.01–1.13) $P = 0.019$] and with lower nursing staff ratios [1.07 (1.01–1.13) $P = 0.024$].

Conclusions: Significant differences between Trusts were identified in staffing and other infrastructure resources for patients admitted with an emergency general surgical diagnosis. Associations between these factors and mortality rates suggest that potentially modifiable factors exist that relate to patient outcomes, and warrant further investigation.

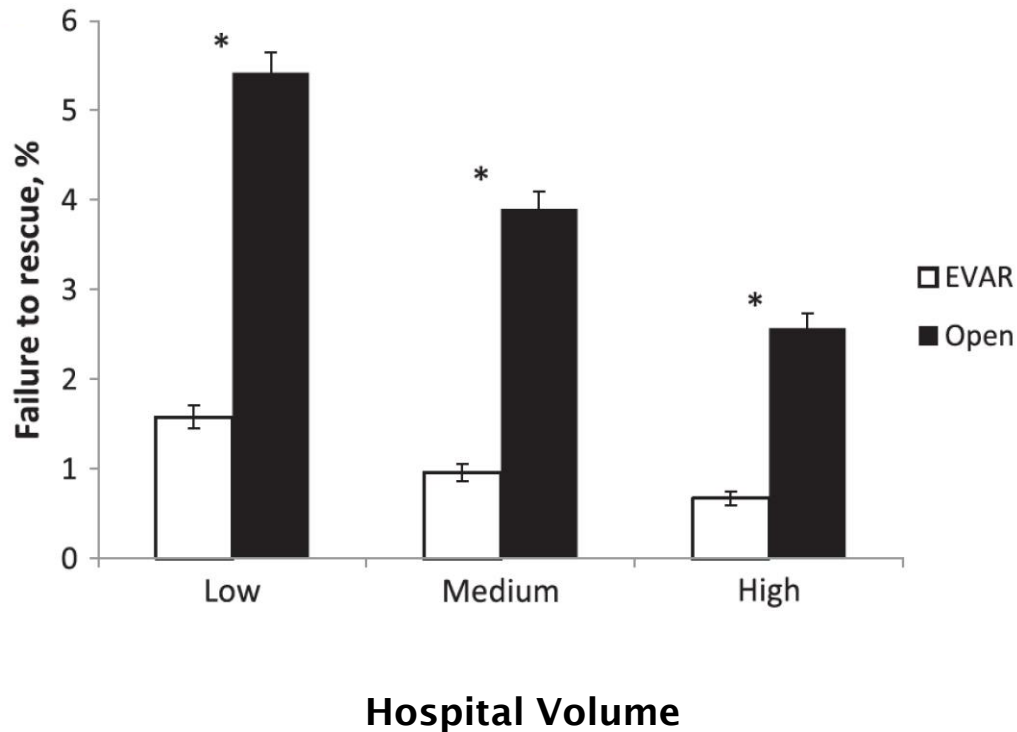
Key words: healthcare delivery; health resources; health services research; outcome

Failure to Rescue Patients after Complication



FTR rates correlated strongly with death rates, whereas complication rates did not

Failure to Rescue Patients after Complication (AAA)



Low volume hospitals:

Higher death rate OR 1.40

Higher FTR rate OR 1.3

JVS 2014 60: 1473

Ozdemir et al - unpublished

Improving Outcomes in Vascular Surgery

- Large appropriately resourced multi-speciality hospital
 - Specialist vascular unit – emergency capable
- Low FTR rate – co-dependency and protocol driven care
 - Academic institution – clinical trials
- Adequate case-load



What Seems Clear.....

TAAA disease of low prevalence and high complexity

TAAA should be treated in regional centres

What Remains for Debate.....

What the caseload / catchment area should be

**Whether open and endovascular cases should be
considered separately or together**

**Whether centres should have expertise in both open and
endovascular procedures**



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