From Passive Monitoring to Active Prevention.

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SUMMARY

- **Variability is very common in medicine**

- **Understanding the causes of the variability is complex and can be a challenge.**

- **Identifying variability should be viewed as an opportunity and not a threat.**

- **Standardizing our approach enables audit and can lead to improve outcomes.**

The Incidence of Tonsillectomy in School children.

J Alison Glover
Proceedings of RSM 1938: 1219-1236

Number of tonsillectomies officially recorded annually in public elementary school children for England and Wales
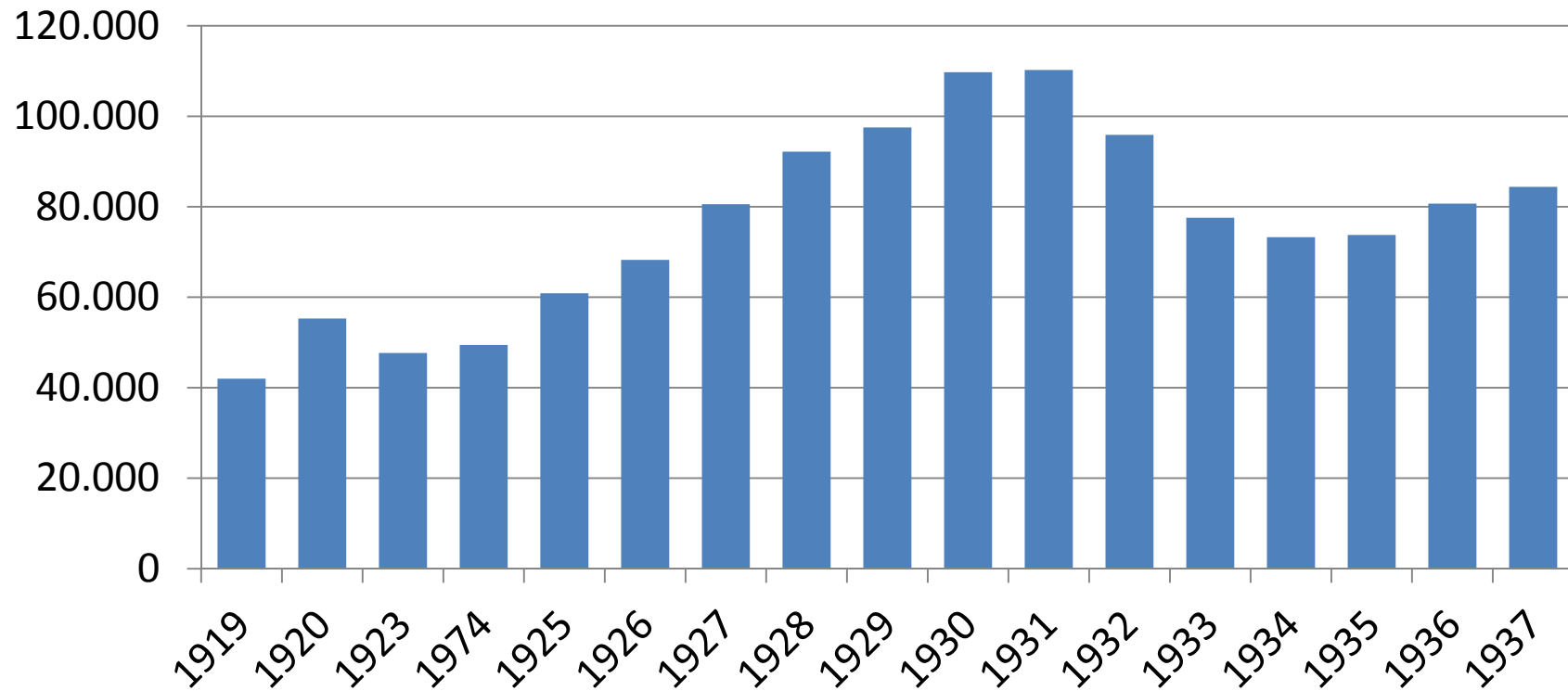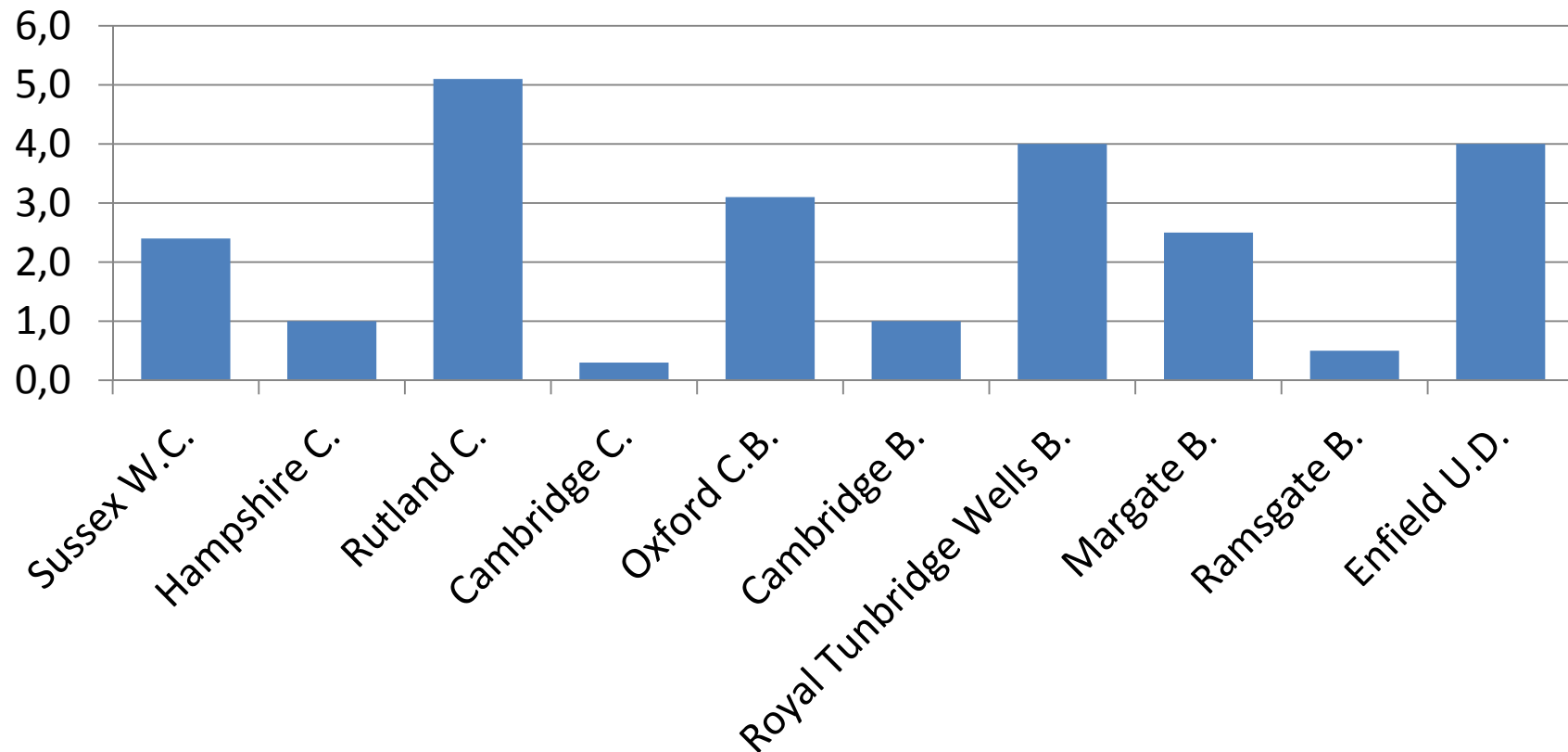
The Incidence of Tonsillectomy in School children.

J Alison Glover
Proceedings of RSM 1938: 1219-1236

The Incidence of Tonsillectomy in School Children (1936)

# The Incidence of Tonsillectomy in School children.

J Alison Glover

- The incidence remained low until after the beginning of the 20th century. About 1902 a rapid rise began, reaching a peak in 1931. There was then a sharp fall.

- A study of the geographical distribution discloses no correlation between the rate of incidence and any impersonal factor, such as over-crowding, poverty, bad housing, or climate.

- Incidence is not correlated with the general efficiency of the school medical and dental services of the area. In fact it defies any explanation, save that of variations of medical opinion on the indications for operation.

- Large and, in some cases, drastic reductions in the numbers of operations performed in elementary school children in certain areas have had no unsatisfactory results.

- The mortality from the operation is larger than is generally appreciated.

The Incidence of Tonsillectomies / 1000 Children (2007-2010)
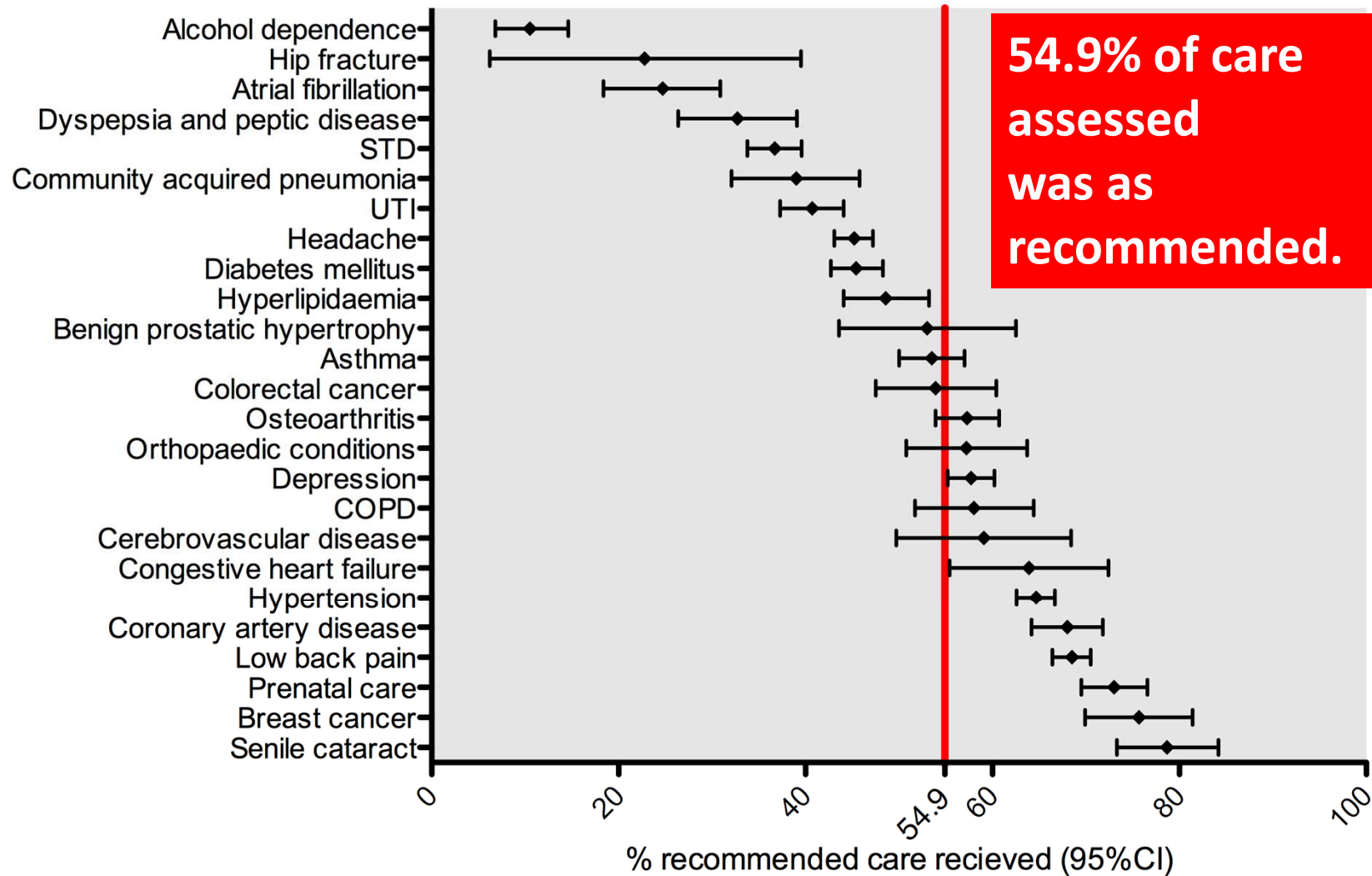## Dartmouth Atlas of Health Care
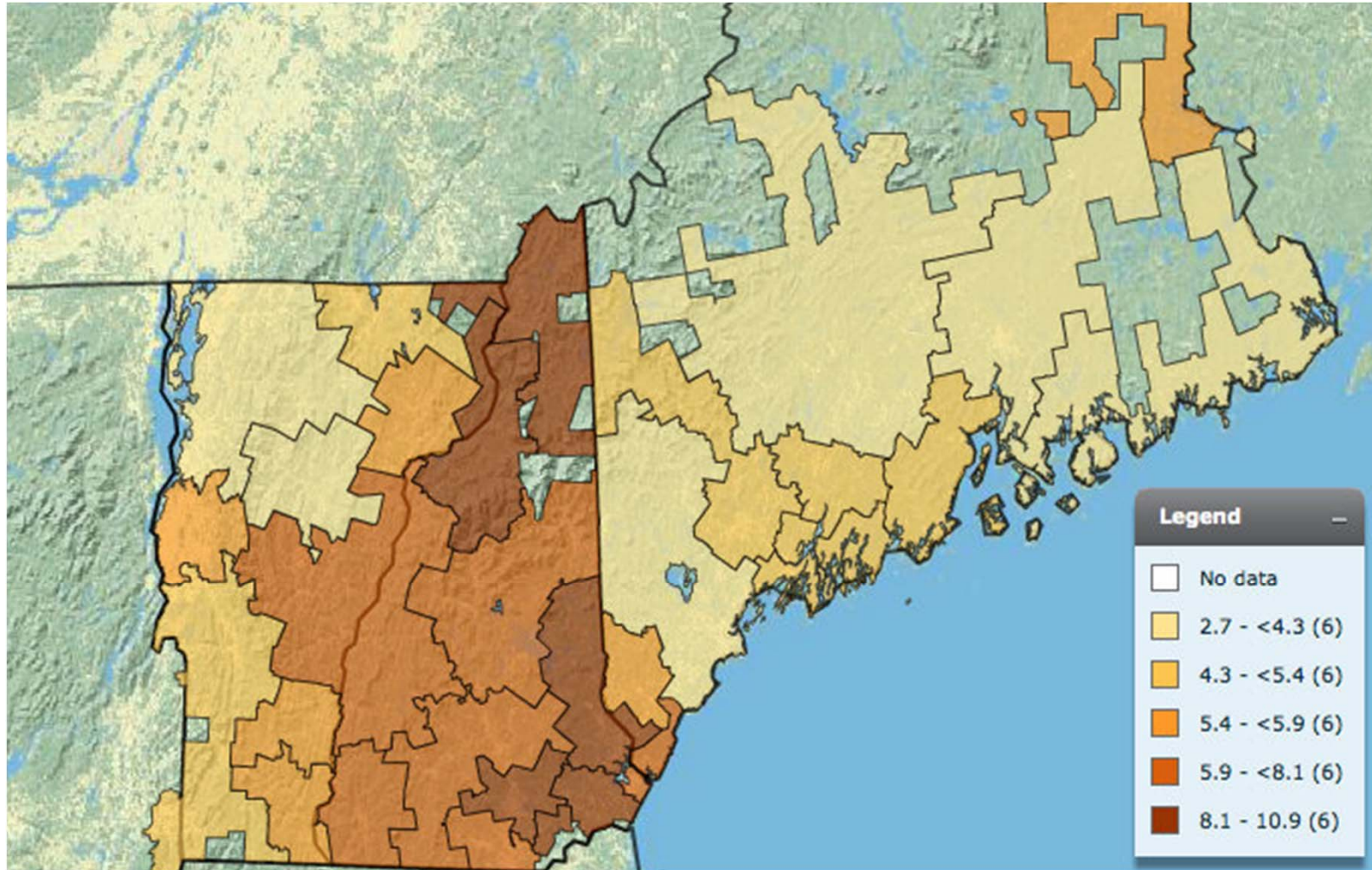
The Quality of Health Care Delivered to Adults in the United States

McGlynn EA et al.

54.9% of care assessed was as recommended.
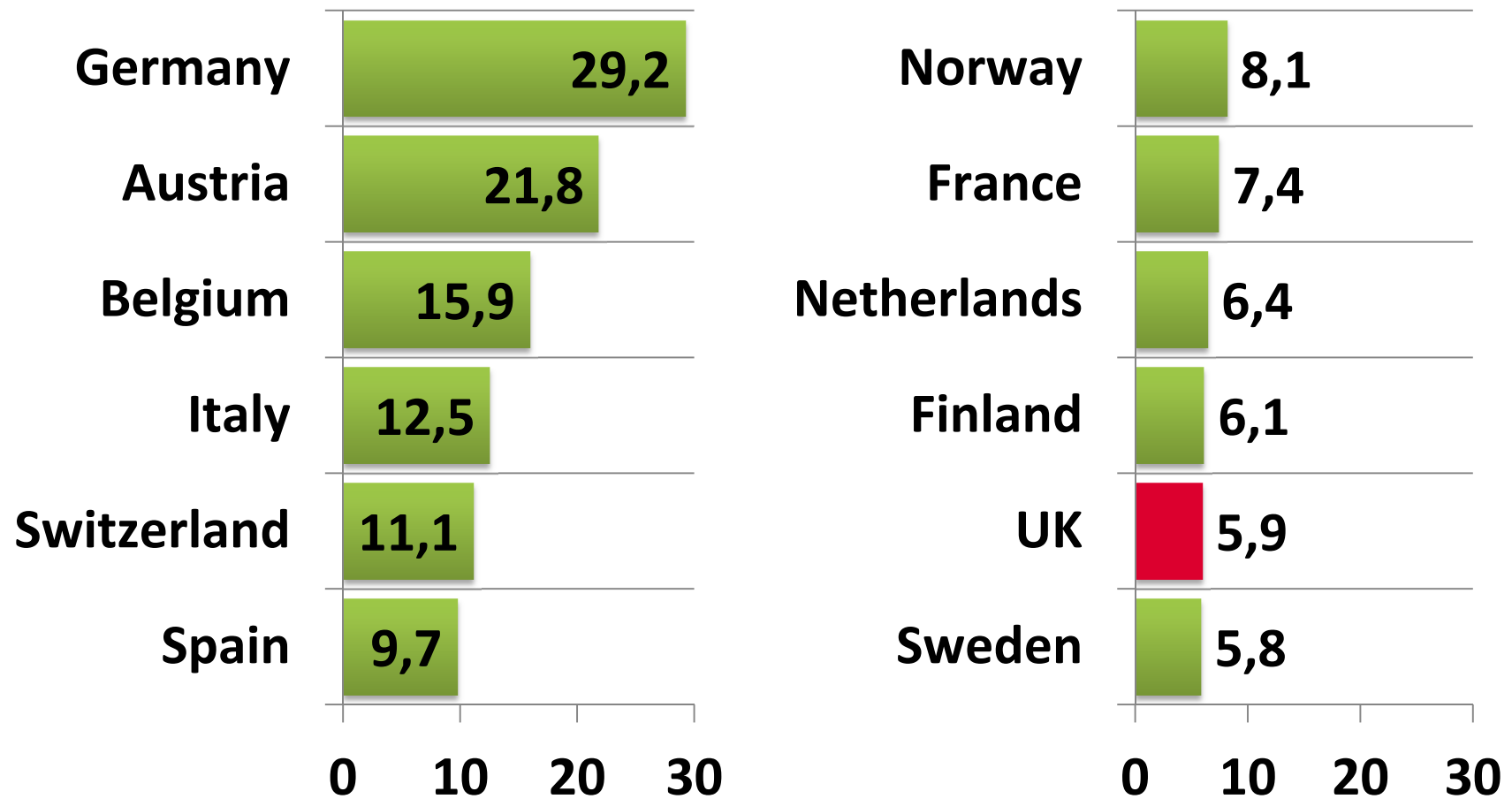
Mortality after surgery in Europe: a 7 day cohort study

Rupert M Pearse, Rui P Moreno, Peter Bauer, Paolo Pelosi, Philipp Metnitz, Claudia Spies, Benoit Vallet, Jean-Louis Vincent, Andreas Hoeft, Andrew Rhodes, for the European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology*
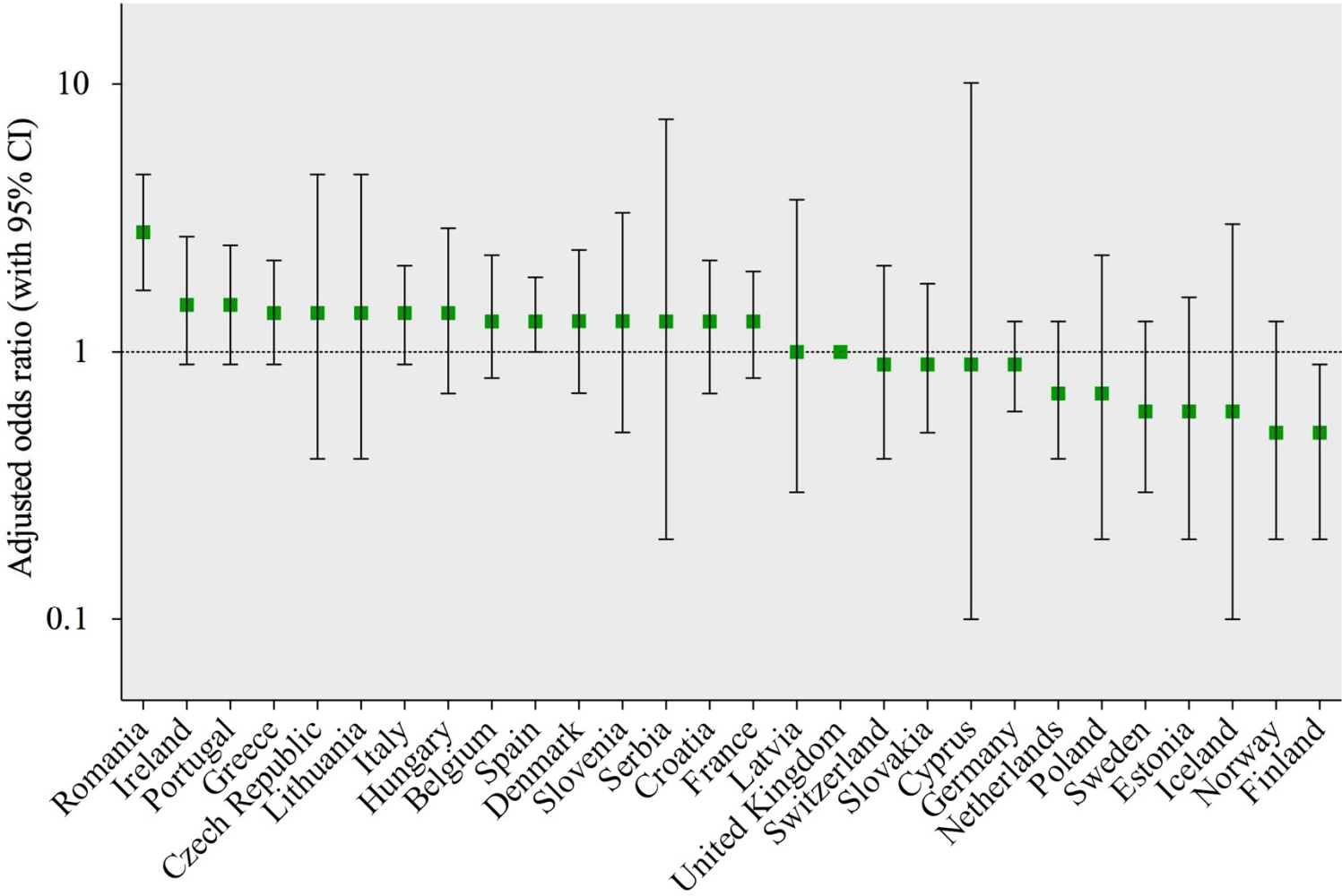
Can Reducing Variability Improve Outcome?

Surviving Sepsis Campaign: association between performance metrics and outcomes in a 7.5-year study.
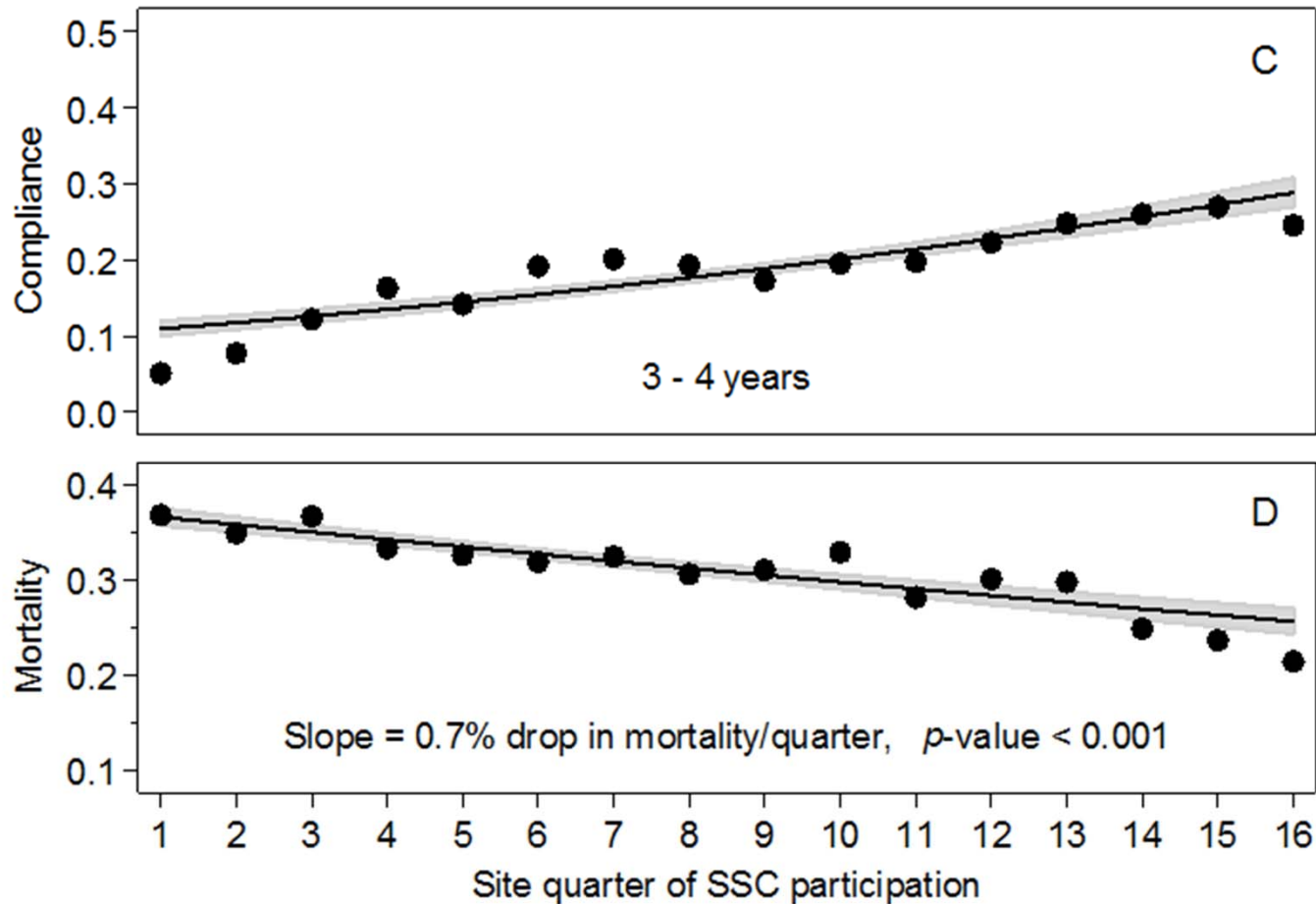
Intensive Care Medicine 2014

Lessons from SSC Database

✓ **Participation alone is associated with improvement.**

✓ **Continued participation is associated with further benefits.**

- For every quarter, mortality reduced by 1%

✓ **Higher compliance was associated with:**

- Even greater mortality reductions

- Reduced use of resources
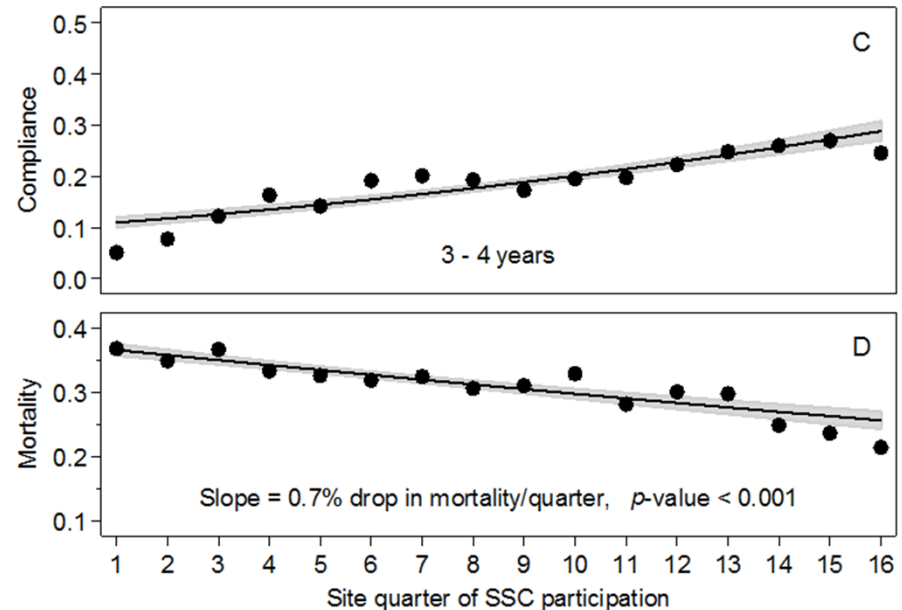
Intensive Care Medicine 2014

So how can we standardize our approach to monitoring.....?

Andrew Rhodes
Rebecca J. Cusack
Philip J. Newman
R. Michael Grounds
E. David Bennett

A randomised, controlled trial of the pulmonary artery catheter in critically ill patients
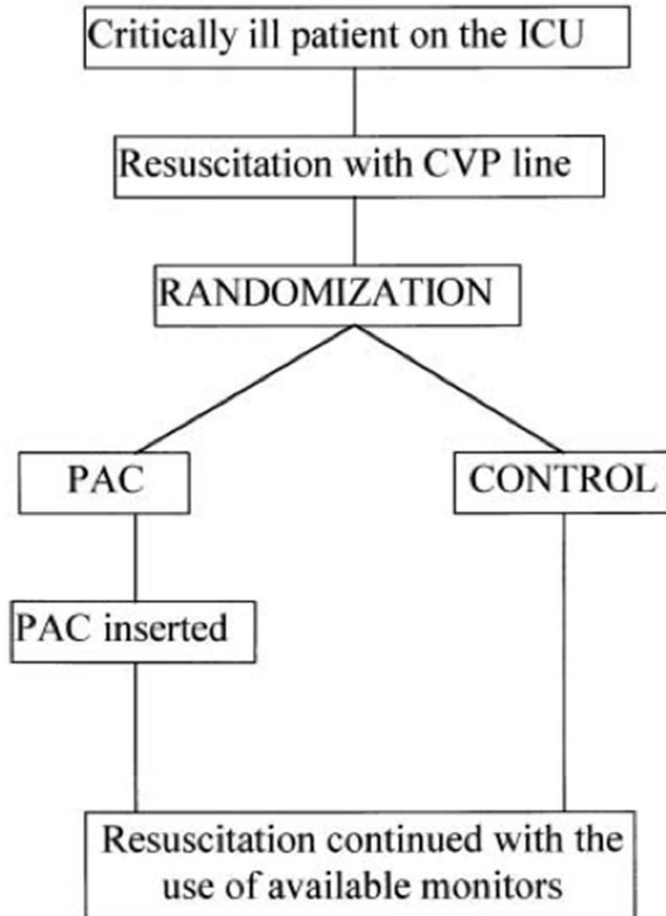
	PAC	Control	95% Confidence interval Lower	Upper	p
28 day mortality rate, n (%)	46 (47.9)	50 (47.6)	−13%	−14%	>0.99
Median length of stay for all patients (days)					
ICU	5.7 (2, 12)	4 (2, 10)	−1.8%	4%	0.47
Hospital	13 (5, 32)	14 (3, 32)	−11.1%	8.7%	0.81
Median length of stay for survivors (days)					
ICU	10 (2, 14)	6 (2, 13)	−2.4%	7.5%	0.27
Hospital	29 (15, 54)	25 (15, 53)	−17%	18%	0.81

Intensive Care Medicine 2002

Pulmonary artery catheters for adult patients in intensive care
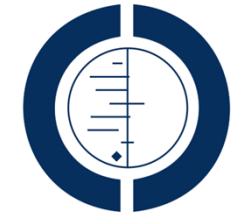
Sheila Harvey[1], Duncan Young[2], William Brampton[3], Andrew Cooper[4], Gordon S Doig[5], William Sibbald[6], Kathy Rowan[7]

THE COCHRANE COLLABORATION®

Analysis 1.1. Comparison 1 PAC versus no PAC, Outcome 1 All types mortality (general intensive care patients).

Review: Pulmonary artery catheters for adult patients in intensive care

Comparison: 1 PAC versus no PAC

Outcome: 1 All types mortality (general intensive care patients)

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Guyatt 1991	10/16	9/17		1.8 %	1.48 [0.37, 5.95]
Harvey 2005	346/506	333/507		50.4 %	1.13 [0.87, 1.47]
Rhodes 2002	46/96	50/105		11.3 %	1.01 [0.58, 1.76]
Richard 2003	199/335	208/341		36.5 %	0.94 [0.69, 1.27]
Total (95% CI)	**953**	**970**		**100.0 %**	**1.05 [0.87, 1.26]**

Total events: 601 (Treatment), 600 (Control)

Heterogeneity: Tau^2 = 0.0; Chi^2 = 1.09, df = 3 (P = 0.78); I^2 =0.0%

Test for overall effect: Z = 0.48 (P = 0.63)

0.2   0.5   1   2   5

Favours treatment   Favours control

Standardize the '*Goals*' and Develop Methods for Attaining them.

CRITICAL CARE

REVIEW

Clinical review: Update on hemodynamic monitoring - a consensus of 16

Jean-Louis Vincent[1]*, Andrew Rhodes[2], Azriel Perel[3], Greg S Martin[4], Giorgio Della Rocca[5], Benoit Vallet[6], Michael R Pinsky[7], Christoph K Hofer[8], Jean-Louis Teboul[9], Willem-Pieter de Boode[10], Sabino Scolletta[11], Antoine Vieillard-Baron[12], Daniel De Backer[1], Keith R Walley[13], Marco Maggiorini[14] and Mervyn Singer[15]

- **No hemodynamic monitoring technique can improve outcome by itself.**
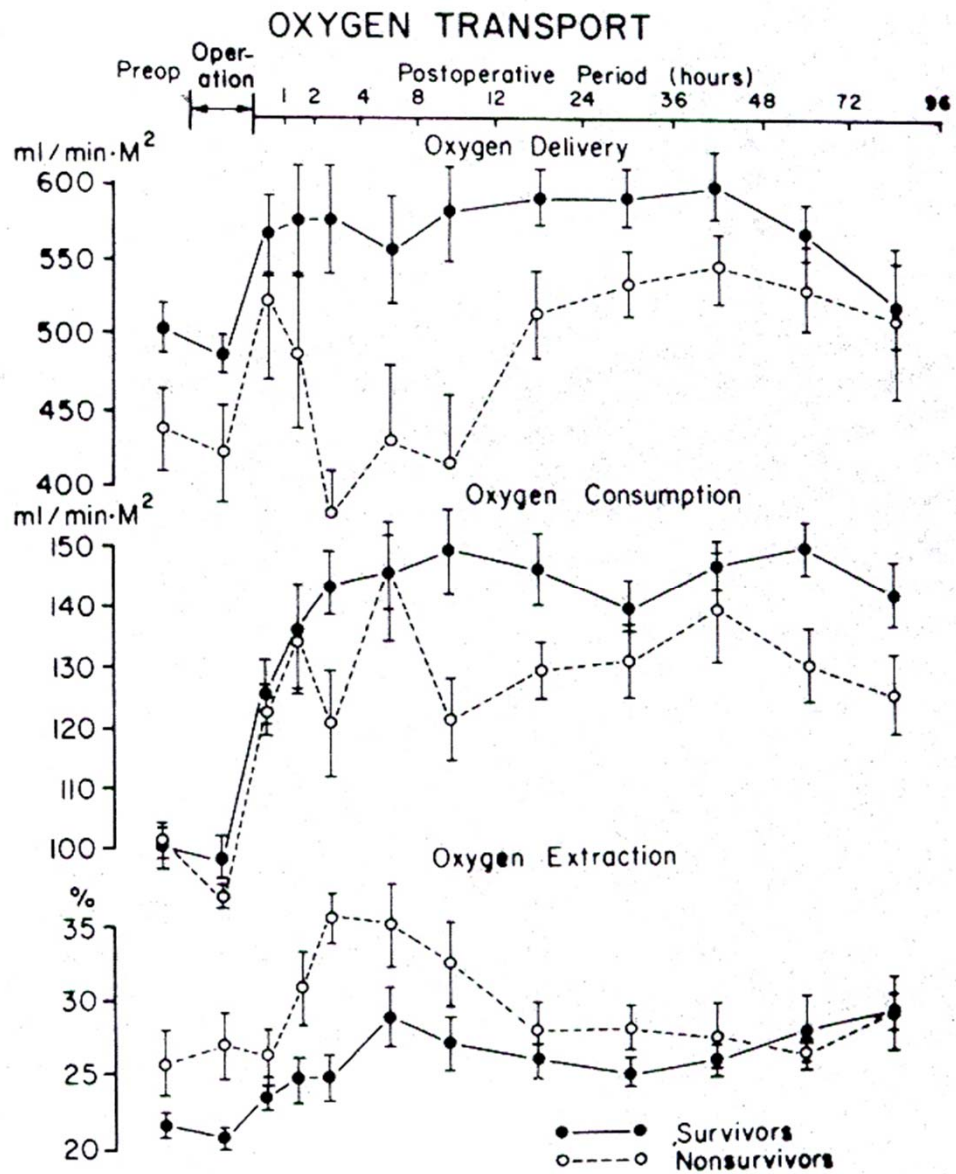
OXYGEN TRANSPORT

Shoemaker. CCM. 1979: 7; 237.
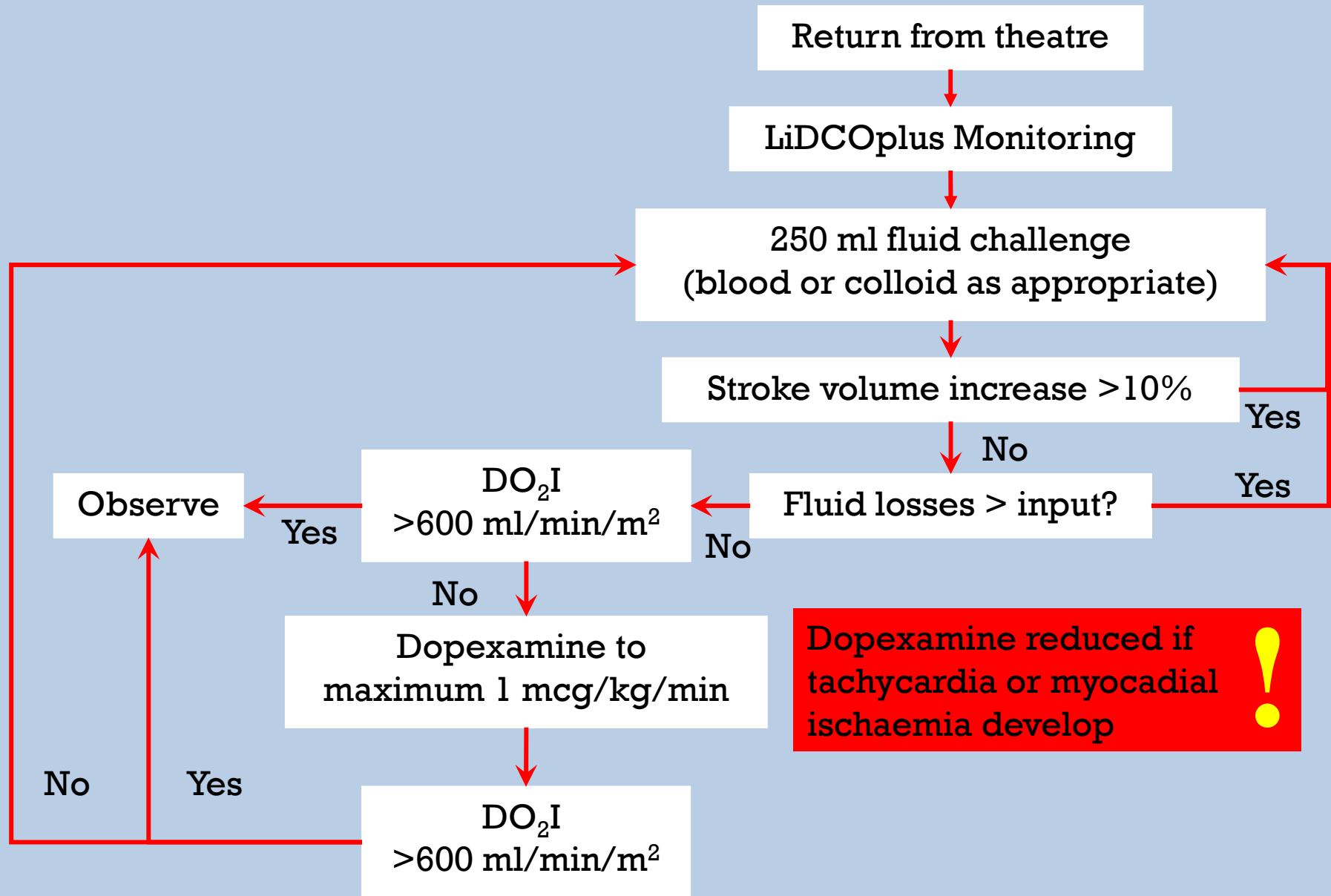
Return from theatre

LiDCOplus Monitoring

250 ml fluid challenge
(blood or colloid as appropriate)

Stroke volume increase >10%

No — Fluid losses > input? — Yes — Yes

DO_2I >600 ml/min/m^2

Observe — Yes

No — No

Dopexamine to maximum 1 mcg/kg/min

Dopexamine reduced if tachycardia or myocadial ischaemia develop

DO_2I >600 ml/min/m^2

No — Yes

St George's NHS Trust and University of London, Critical Care Directorate

BJA

Perioperative increase in global blood flow to explicit defined goals and outcomes after surgery: a Cochrane Systematic Review[†]

M. P. W. Grocott[1], A. Dushianthan[1]*, M. A. Hamilton[2], M. G. Mythen[3], D. Harrison[4], K. Rowan[4]
and Optimisation Systematic Review Steering Group[5]

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Table 2 Data synthesis for all outcomes. RR, relative risk; IV, inverse variance; MD, mean difference

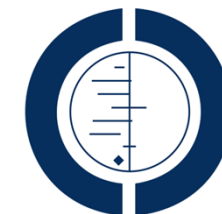| Outcome	Number of studies	Number of patients	Statistical method	Effect size and I^2	P-value
Mortality (longest follow-up)	31	5292	RR (IV, fixed, 95% CI)	0.89 (0.76–1.05), I^2=15%	0.18
Mortality (hospital or 28 day)	31	5292	RR (IV, fixed, 95% CI)	0.81 (0.65–1.00), I^2=01%	0.055
Renal impairment	21	4307	RR (IV, fixed, 95% CI)	0.71 (0.57–0.90), I^2=20%	0.004
Arrhythmia	12	2921	RR (IV, fixed, 95% CI)	0.84 (0.67–1.06), I^2=00%	0.14
Total number of infections	9	733	RR (IV, fixed, 95% CI)	0.88 (0.69–1.12), I^2=00%	0.29
Infection types					
Chest/pneumonia	13	2945	RR (IV, fixed, 95% CI)	0.78 (0.61–1.00), I^2=00%	0.054
Sepsis	5	474	RR (IV, fixed, 95% CI)	0.68 (0.26–1.77), I^2=06%	0.43
Abdominal	6	55	RR (IV, fixed, 95% CI)	0.53 (0.23–1.22), I^2=00%	0.14
Wound	10	2802	RR (IV, fixed, 95% CI)	0.65 (0.50–0.84), I^2=22%	0.0013
Urinary tract	8	612	RR (IV, fixed, 95% CI)	0.54 (0.26–1.15), I^2=00%	0.11
Respiratory failure/ARDS	9	844	RR (IV, fixed, 95% CI)	0.51 (0.28–0.93), I^2=00%	0.027
Myocardial infarction	15	3328	RR (IV, fixed, 95% CI)	1.01 (0.71–1.45), I^2=00%	0.95
Congestive cardiac failure/pulmonary oedema	14	3223	RR (IV, fixed, 95% CI)	1.00 (0.81–1.24), I^2=00%	0.98
Venous thrombosis	10	2740	RR (IV, fixed, 95% CI)	1.04 (0.39–2.77), I^2=12%	0.93
Number of patients with complications	17	1841	RR (IV, random, 95% CI)	0.68 (0.58–0.80), I^2=34%	<0.00001
Length of hospital stay	27	4729	MD (IV, random, 95% CI)	−1.16 (−1.89 to −0.43), I^2=87%	0.0019
Length of critical care stay	14	1873	MD (IV, random, 95% CI)	−0.45 (−0.94 to −0.03), I^2=87%	0.065

Perioperative increase in global blood flow to explicit defined goals and outcomes after surgery: a Cochrane Systematic Review[†]

M. P. W. Grocott[1], A. Dushianthan[1*], M. A. Hamilton[2], M. G. Mythen[3], D. Harrison[4], K. Rowan[4] and Optimisation Systematic Review Steering Group[5]

The data indicate that for every 100 patients exposed to treatment, **13/100 will avoid a complication**, 2/100 will avoid renal impairment, 5/100 will avoid respiratory failure, and 4/100 will avoid a postoperative wound infection.

Residual questions

- **Is the difference due to the act of protocolizing care?**

- **Are all elements of the protocol necessary?**
  - Different protocols
  - Different monitors
  - Different targets

- **Are the results generalizable?**
  - During or after surgery
  - In the multi-centre setting
  - Which patients

The enhanced recovery pathway

Active patient involvement

Referral from primary care	Pre-operative	Admisson	Intra-operative	Post-operative	Follow-up

The patient has the best possible management during surgery (Intra-operative)

The patient experiences the best post-operative rehabilitation (Post-operative)

Getting the patient in best possible condition for surgery

Referral from primary care
- Optimising haemoglobin levels
- Managing pre existing co morbidities e.g. diabetes/hypertension

Pre-operative
- Health & risk assessment
- Good quality patient information
- Informed decision-making
- Managing patient's expectations of what will happen to them
- Optimised health/ medical condition
- Therapy advice
- Carbohydrate loading (high energy drinks)
- Maximising patient's hydration
- Avoidance of oral bowel preparation, where appropriate
- Discharge planning – expected date of discharge (EDD)

Admisson
- Admit on the day of surgery
- Optimise fluid hydration
- Avoid routine use of sedative pre-medication
- Carbohydrate loading (high energy drinks)
- No / reduced oral bowel preparation (bowel surgery), where appropriate

Intra-operative
- Minimally invasive surgery if possible
- Individualised goal-directed fluid therapy
- Avoid crystalloid overload
- Epidural management (incl thoracic)
- Use of regional/spinal and local anaesthetic with sedation
- Hypothermia prevention

Post-operative
- No routine use of wound drains
- No routine use of naso gastric tubes (bowel surgery)
- Active, planned mobilisation within 24 hours
- Early oral hydration
- Early oral nutrition
- IV therapy stopped early
- Catheters removed early
- Regular oral analgesia e.g. paracetamol and NSAIDS
- Avoidance of systemic opiate-based analgesia, where possible

Follow-up
- Discharge on planned day or when criteria met
- Therapy support (stoma, physiotherapy, dietitian)
- 24 hour telephone follow-up if appropriate

Whole team involvement

St George's University of London

NHS

Randomized clinical trial on enhanced recovery versus standard care following open liver resection

C. Jones[1], L. Kelliher[1], M. Dickinson[1], A. Riga[2], T. Worthington[2], M. J. Scott[1,3], T. Vandrevala[3], C. H. Fry[3], N. Karanjia[2] and N. Quiney[1]

	ERP	Standard care
Before surgery	Information and education, including mobilization and dietary goals	NA
	Oral nutritional supplements	NA
	Carbohydrate drink	NA
During surgery	Standard anaesthetic protocol and surgical management	Standard anaesthetic protocol and surgical management
	Thoracic epidural for postop. analgesia	Thoracic epidural for postop. analgesia
	All patients extubated and taken to level 2 HDU	All patients extubated and taken to level 2 HDU
POD 0	Eat and drink normally	Eat and drink normally
	Oral nutritional supplements	NA
	Goal-directed fluid therapy for 6 h to optimize stroke volume	Fluid resuscitation to standard markers: CVP, urine output, lactate, mixed venous saturations
	LiDCOrapid™ — 250 ml colloid boluses	Fluid therapy at discretion of intensive care team
	Chest physiotherapy	NA
POD 1	Physiotherapy/mobilization twice daily	Physiotherapy once daily
	Stop i.v. maintenance fluid	Fluid therapy at discretion of intensive care team
	Oral nutritional supplements	NA
	Eat and drink normally	Eat and drink normally
POD 2	Diamorphine 3 mg via epidural	NA
	Epidural removed in the morning, or stopped and capped off if INR ≥ 1·5	Epidural managed by acute pain team
	Regular oral analgesics and oral morphine as needed	NA
	Physiotherapy/mobilization twice daily	Physiotherapy once daily
	Urinary catheter removed 4 h after epidural	NA
	Removal of surgical drains (if appropriate)	Removal of surgical drains (if appropriate)
	CVC removed	CVC removed at discretion of surgical team
	Blinded assessment of discharge criteria	Blinded assessment of discharge criteria
POD 3 (+4)	Physiotherapy/mobilization twice daily	Epidural managed by acute pain team; usually removed on POD 3 or 4
	Home if meets blinded assessment of discharge criteria	Urinary catheter removed 12 h after epidural in accordance with current guidelines
	Blinded assessment of discharge criteria	Blinded assessment of discharge criteria

Randomized clinical trial on enhanced recovery versus standard care following open liver resection

C. Jones[1], L. Kelliher[1], M. Dickinson[1], A. Riga[2], T. Worthington[2], M. J. Scott[1,3], T. Vandrevala[3], C. H. Fry[3], N. Karanjia[2] and N. Quiney[1]
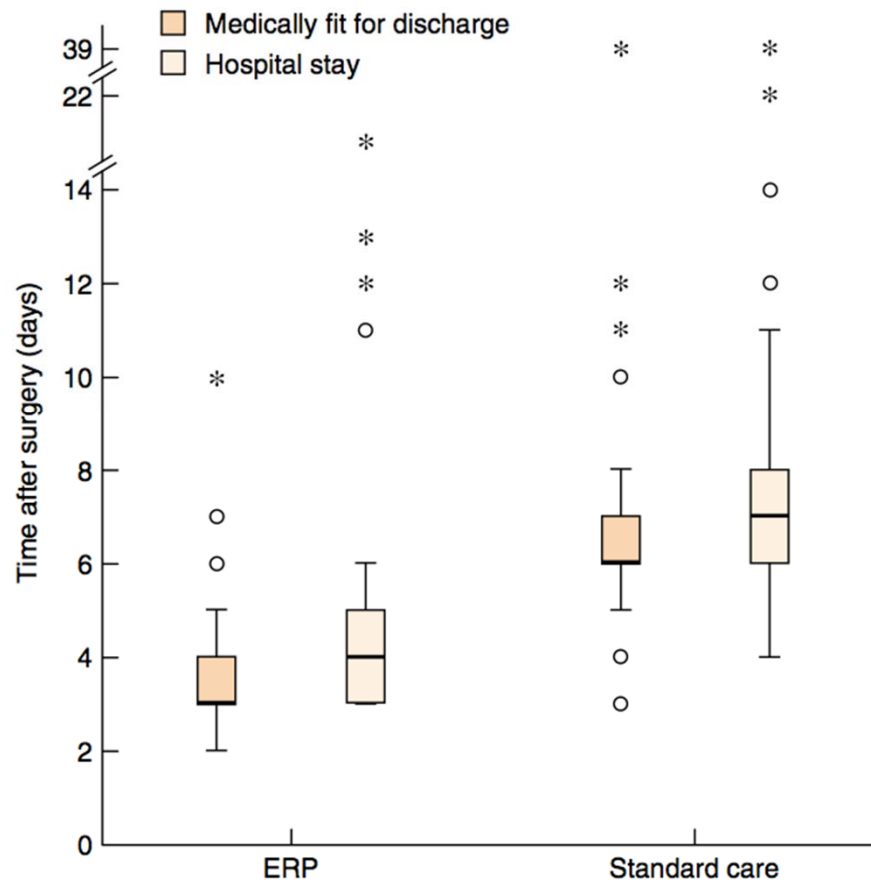
Conclusions

✓ **Post operative morbidity and mortality is common.**

✓ **There is marked variability in practice in how post operative care is delivered- this is exemplified with the handling of haemodynamics.**

✓ **There is evidence that protocolized haemodynamic therapy can reduce variability and complications.**

✓ **This should be part of a comprehensive package of care to improve the outcomes for this patient group.**

Thank You!