



TOP 5 TRAUMA PAPERS IN 2016

Ian Civil, Trauma Service, Auckland City Hospital

ORIGINAL ARTICLE

The Impact of a Pan-regional Inclusive Trauma System on Quality of Care

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Karim Brohi, FRCS,* Ross Davenport; PhD*; on behalf of the ELoTS Study Collaborators*

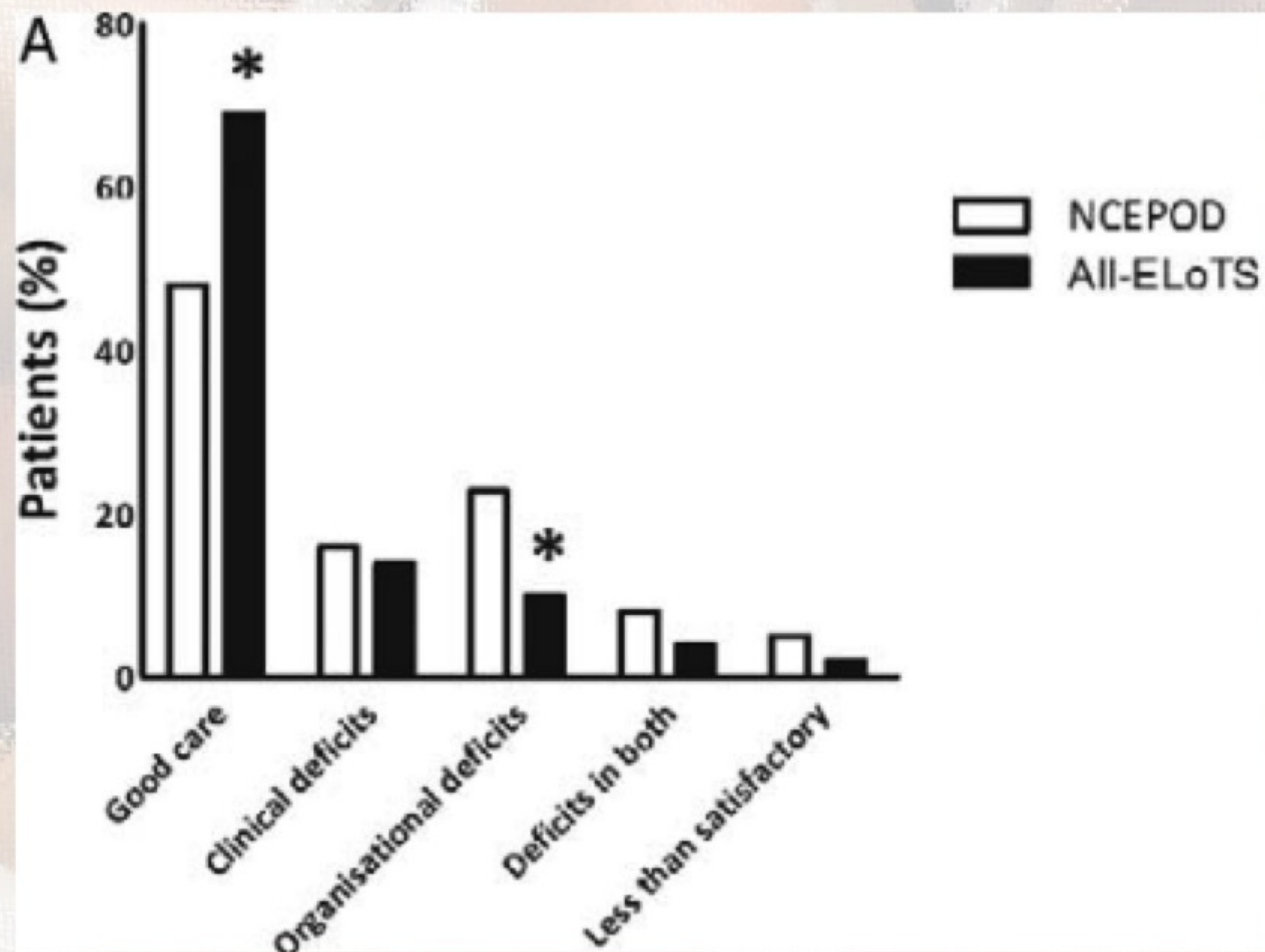
(Ann Surg 2016;264:188–194)



The Impact of a Pan-regional Inclusive Trauma System on Quality of Care

- 2007 NCEPOD report identified deficiencies in trauma care in England and Wales
 - NCEPOD report was a snapshot of trauma care over a 3 month period
 - No trauma networks in place at that time
 - In 2010 4 Networks were established in London for 10-12 million people
 - Prospective cohort study using same methodology as NCEPOD instituted and results compared
 - Neurosurgical process of care and early death (<72hours) determined
 - Casenote peer review looked for evidence of organizational or clinical deficits
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The Impact of a Pan-regional Inclusive Trauma System on Quality of Care



- %age of patients judged as having good care increased and %age of patients exposed to organisational deficits decreased
- Senior review, imaging delays and clinical care issues more common in Trauma Units than in Major Trauma Centres
- 30% of patients with ISS>15 remained in TU after new system instituted but effect on care unclear

The Impact of a Pan-regional Inclusive Trauma System on Quality of Care

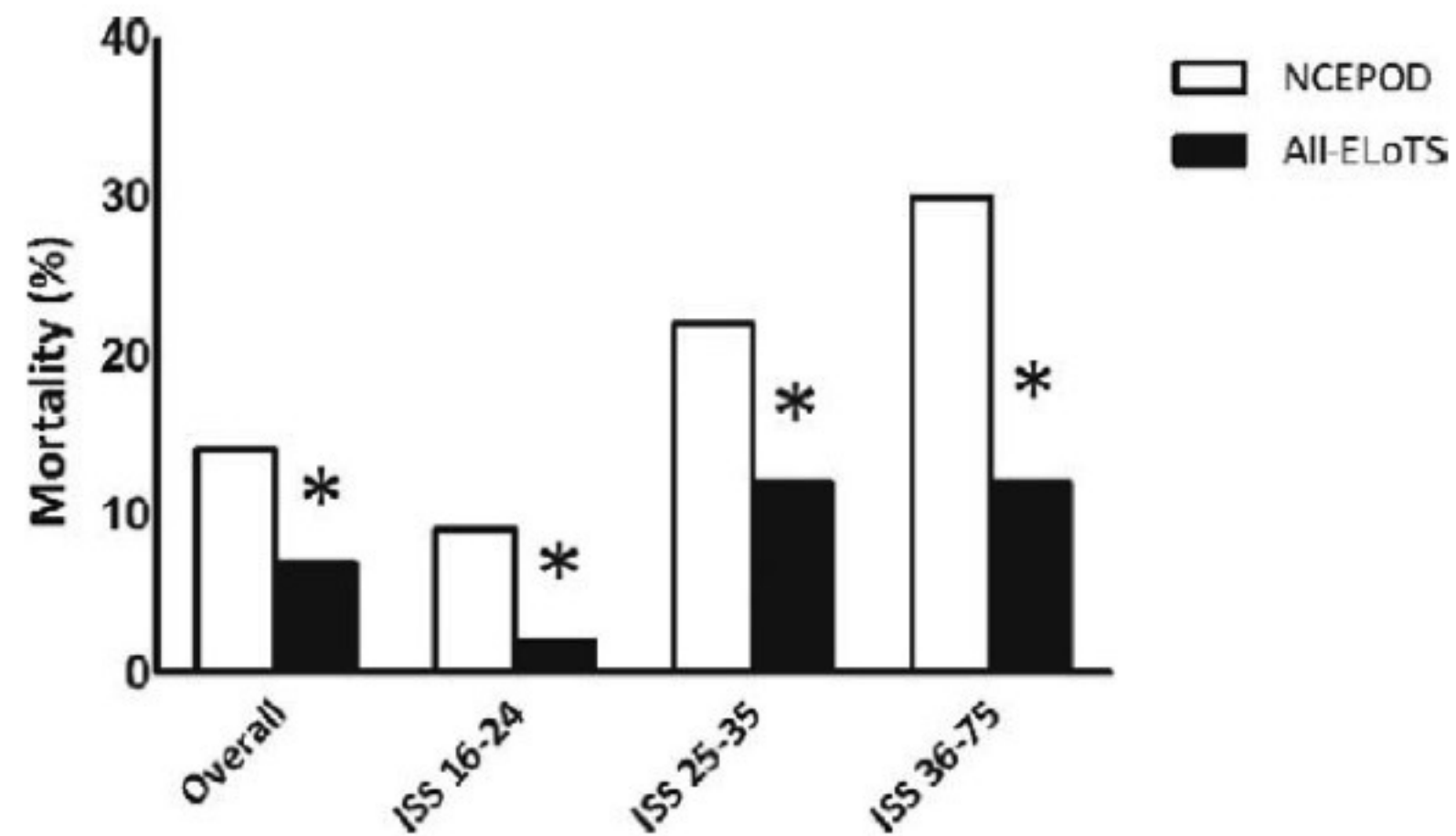


FIGURE 4. Outcome at 72 h NCEPOD versus All-ELoTS patients. Graph shows mortality within 72 h from arrival. Overall: NCEPOD: 15% versus All-ELoTS: 7%, RR 0.46 [0.29 to 0.71], $P < 0.01$; ISS 16–24: NCEPOD: 8% versus All-ELoTS: 2%, RR 0.27 [0.09 to 0.79], $P < 0.01$; ISS 25–35: NCEPOD: 22% versus All-ELoTS: 13%, RR 0.56 [0.33 to 0.97], $P = 0.03$; ISS 36–75: NCEPOD: 31% versus All-ELoTS 11%, RR 0.37 [0.33 to 0.99], $P = 0.04$.

- In the new London trauma system RR of mortality 0.37 (CI 0.33-0.99) compared with previous NCEPOD results
- Mortality advantage apparent at all levels of injury severity
- Other results included increased percentage of cases seen by consultant and reduced time from admission to CT

The Impact of a Pan-regional Inclusive Trauma System on Quality of Care

- Bold system changes (like in Victoria) can be associated with significant improvements in performance
 - Combination of geographic proximity and available rapid prehospital transportation options meant that radical change could be safely considered
 - Early improvements in process of care and mortality signs of effectiveness and overall outcome comparable with best international comparison
 - Outcomes of institution of new system of care in Wales will be of more interest in relation to the issues faced in the NZ environment
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A prospective, controlled clinical evaluation of surgical stabilization of severe rib fractures

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A prospective, controlled clinical evaluation of surgical stabilization of severe rib fractures

- Uncertainty about whether rib plating conveys any clinical advantage
- Cross-over trial design in 2013 and 2014. In 2013 all rib fractures managed non-operatively. In 2014 all suitable patients with rib fractures managed operatively
- Indications
 - Flail chest
 - >3 ribs with severe bicortical displacement
 - 30% loss of volume of hemithorax
 - Failure of medical management
 - Within 72 hours of injury
- 35 patients in each group, baseline demographics identical
- Outcomes included lengths of stay, ventilation, infections and tracheostomy

A prospective, controlled clinical evaluation of surgical stabilization of severe rib fractures

TABLE 4. Unadjusted Outcomes

Outcome	Operative (n = 35)	Nonoperative (n = 35)	<i>p</i>
Respiratory failure	17 (48.6)	25 (71.4)	0.05
Tracheostomy	5 (14.3)	16 (45.7)	0.01
Pneumonia	7 (20.0)	11 (31.4)	0.28
Days of mechanical ventilation	0 (0.0–8.0)	5.0 (0–18)	<0.01
Hospital LOS	13.0 (9.0–21.0)	16.0 (10.0–23.0)	0.11
ICU LOS	6.0 (3.0–10.0)	9.0 (4.0–15.0)	0.15

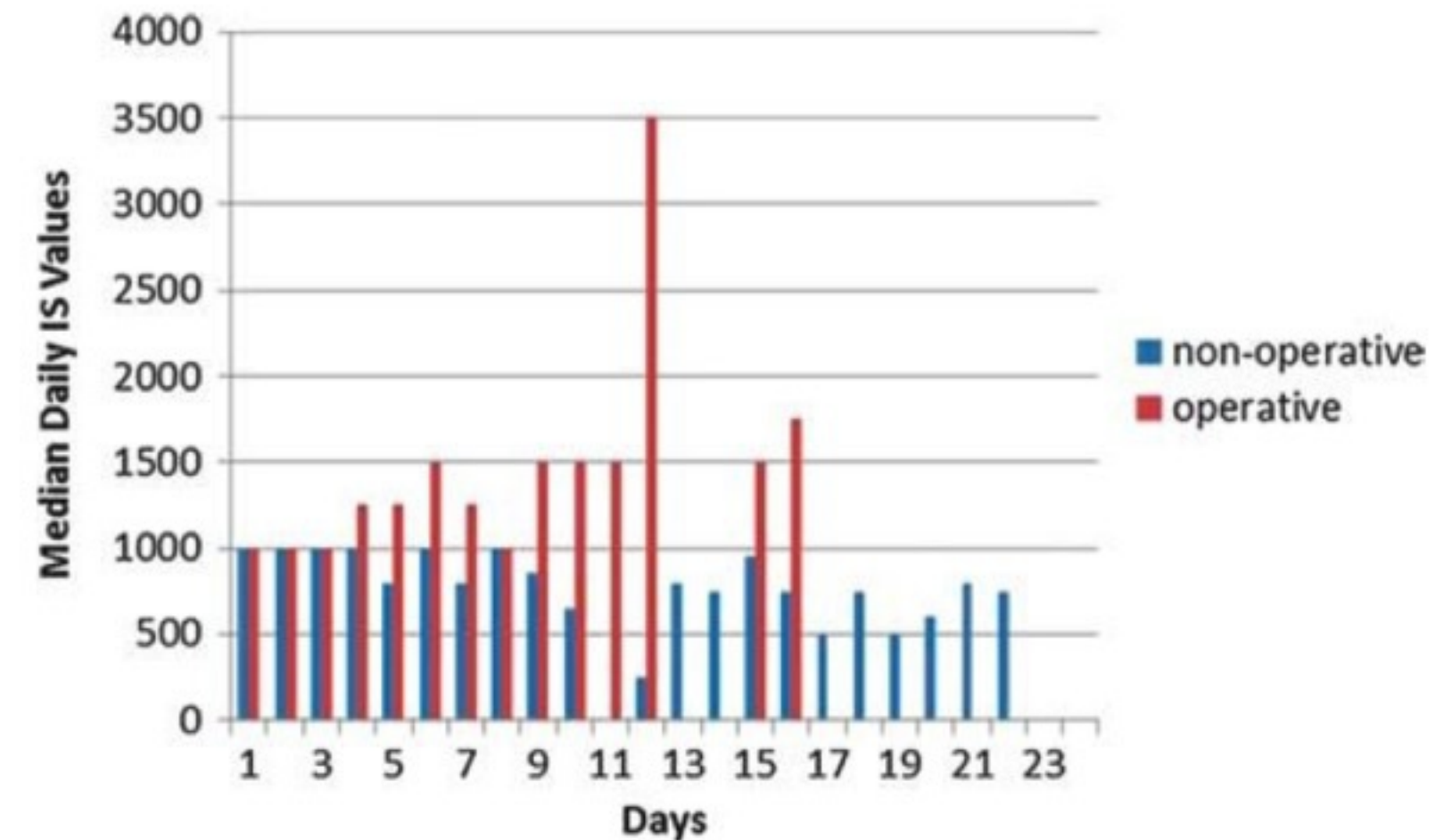


Figure 1. Daily incentive spirometry recordings.

A prospective, controlled clinical evaluation of surgical stabilization of severe rib fractures

- A small study with cohort selection technique (sequential) open to bias
 - Operative technique not described but presumably Synthes equipment used as they funded the trial
 - Low complication rate for surgery (3% = 1 patient with infection)
 - Most patients treated surgically avoided any ongoing ventilation days
 - Cost analysis not done and no long term outcome data (publication from the Alfred suggests all benefits accrue in early period and little if any difference at 12 months)
 - Authors believe selection criteria need further refinement
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Improving geriatric trauma outcomes: A small step toward a big problem

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(JTACS 2016;81:162-167)

Improving geriatric trauma outcomes: A small step toward a big problem

- Indiana University Methodist Hospital admits 3600 trauma patients/year
 - Oct 1st 2013 changed protocols to make all patients over 70 mandatory trauma calls
 - In 2 years “pre” and 2 years “post” change 2269 >70yo trauma patients admitted, 1271 “pre” and 998 “post”
 - 19.9% of all patients were >70
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Improving geriatric trauma outcomes: A small step toward a big problem

- Length of stay in ED reduced although still tiny minority progressed in under 2 hours
- Small reduction in mortality
- Only 2% of overtriage patients were over 70

TABLE 4. Mortality OR Estimates

Effect	Point Estimate	95% Wald	
		Confidence Limits	
Age	1.046	1.021	1.071
POST vs. PRE	0.689	0.484	0.979

Improving geriatric trauma outcomes: A small step toward a big problem

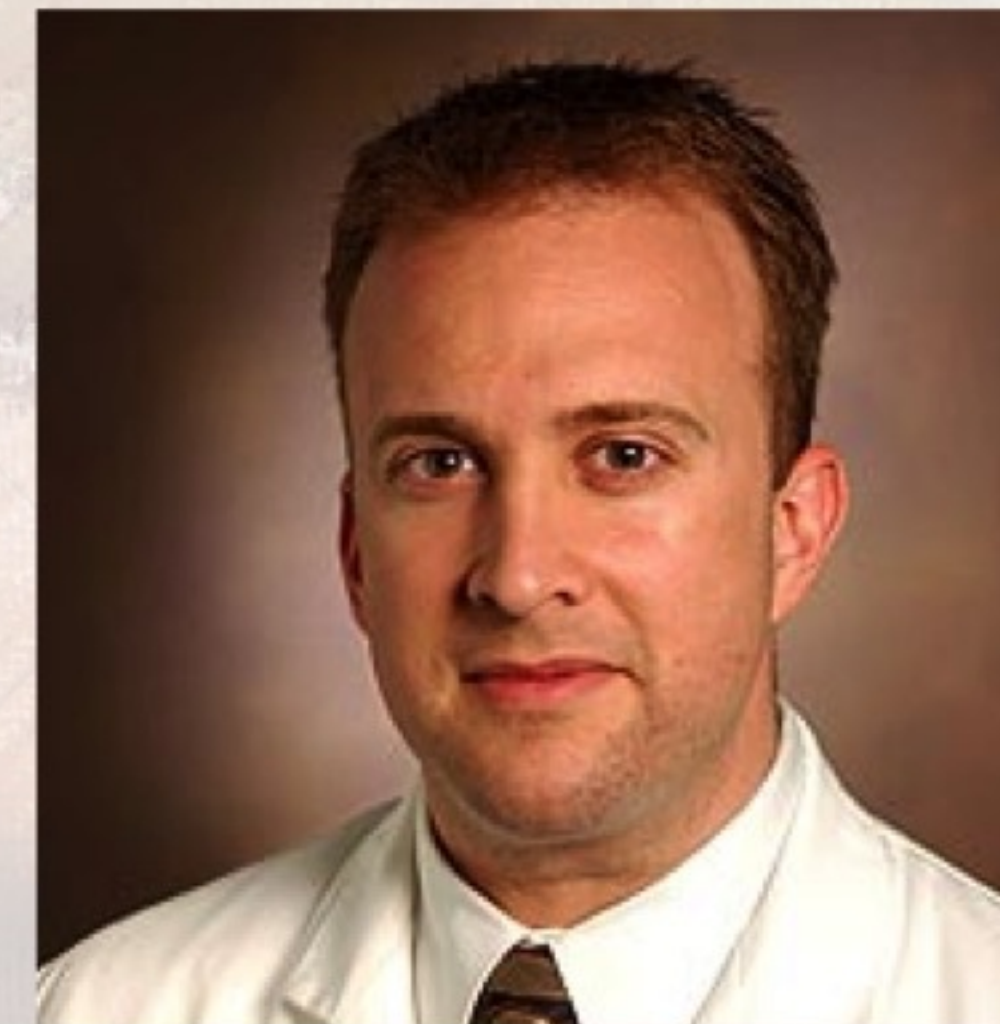
- Older trauma patients are an increasing part of everyday practice
 - Traditional approaches to selecting patients needing more immediate care and a greater range of resources may not work for the older patient
 - Usual balances of over and under triage need to be considered
 - Mandatory trauma calls for >70 confers a small benefit but the age cutoff may need to be reviewed and considered in each location determined by the prevalence of elderly in the admitted population
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Acute Fibrinolysis Shutdown after Injury Occurs Frequently and Increases Mortality: A Multicenter Evaluation of 2,540 Severely Injured Patients



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Acute Fibrinolysis Shutdown after Injury Occurs Frequently and Increases Mortality: A Multicenter Evaluation of 2,540 Severely Injured Patients



- The majority of injured patients who present to ED have hypercoagulability – rationale for fibrinolysis inhibitors questionable
- Patients who had ISS>15 presenting to Denver Health or UTH/Hermann from 2012-2014 who had early TEG studied
- Fibrinolysis defined by LY30>3% (hyperfibrinolysis), LY30 between 0.8% and 3% physiologic fibrinolysis, and LY30 <0.8% fibrinolysis shutdown

Acute Fibrinolysis Shutdown after Injury Occurs Frequently and Increases Mortality: A Multicenter Evaluation of 2,540 Severely Injured Patients



- 2540 patients studied
- 46% had fibrinolysis shutdown
- Mortality greatest (34%) for hyperfibrinolysis and 21% overall
- Deaths from haemorrhage were highest in the fibrinolysis group (30%) compared to 14% and 10% in the other two groups

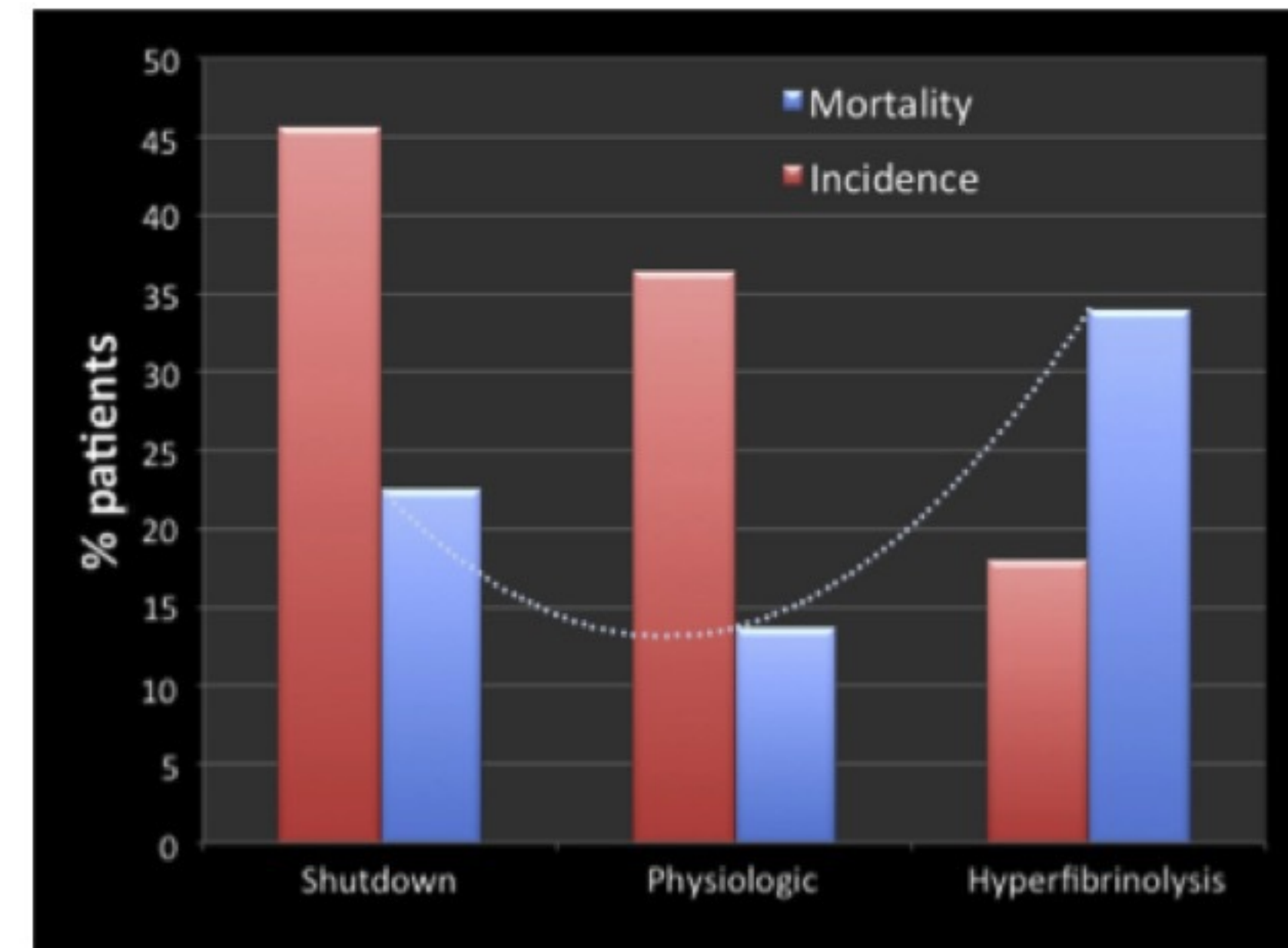


Figure 1. Incidence and mortality of severely injured trauma patients stratified by fibrinolysis phenotype.

Acute Fibrinolysis Shutdown after Injury Occurs Frequently and Increases Mortality: A Multicenter Evaluation of 2,540 Severely Injured Patients



- This result in keeping with review by Brohi which showed benefit only in a severely shocked subgroup
- Early plasma resuscitation logical as it buffers fibrinolysis and attenuates it.
- Study related to one point in time with regard to patients resuscitation and its possible parameters would change with time and resuscitation
- Use of TXA only likely to benefit those with hyperfibrinolysis and therefore their group should be targeted rather than taking a blanket approach



Return to Work and Functional Outcomes After Major Trauma

Who Recovers, When, and How Well?

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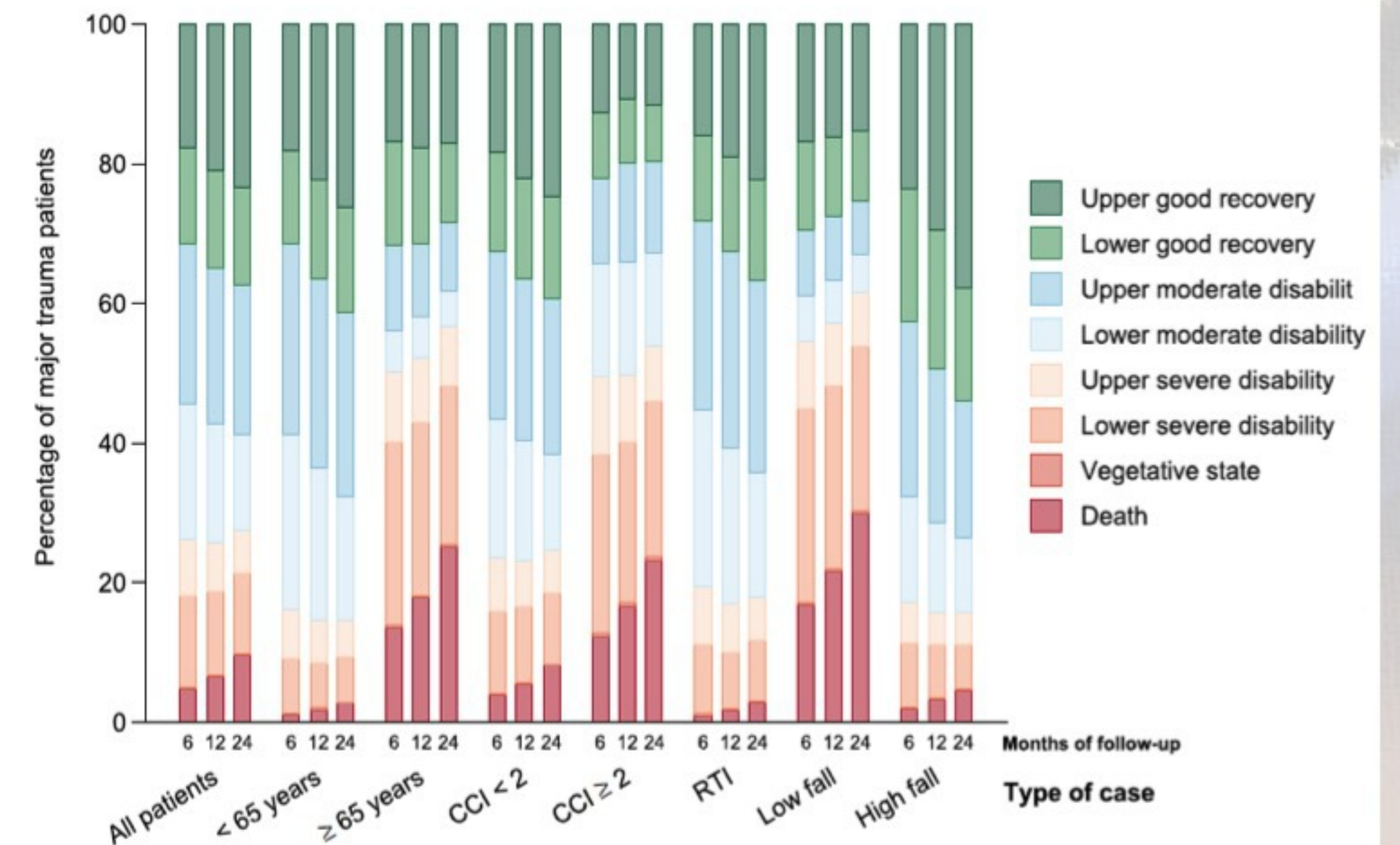
(Ann Surg 2016;263:623-632)



Return to Work and Functional Outcomes After Major Trauma

Who Recovers, When, and How Well?

- 5 years of ISS>12 major trauma patients admitted to hospital in Victoria and survived to discharge
 - 9994 patients of whom only 49 (0.5%) opted out
 - 49% road crash, 34% falls
 - 8884 (88.9%) survived to discharge
 - GOS-E and RTW assessed at 6,12 and 24 months after discharge
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Return to Work and Functional Outcomes After Major Trauma

Who Recovers, When, and How Well?

- 716 (8.1%) lost to follow up; 4.8% died after hospital discharge by 6 months and 9.7% by 24 months
 - Of those surviving to 24 months, 23% improved from 12-24 months, 57% remained the same and 20% got worse
 - RTW was 58% at 6 months, 66% at 12 months and 70% at 24 months
 - Odds of a better functional outcome 44% higher for those managed at a specialist trauma centre
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Return to Work and Functional Outcomes After Major Trauma

Who Recovers, When, and How Well?

- A surprising number of patients die after discharge, a finding mirrored in a recent US study. In this study 705 patients died when the expected mortality would have been 170 indicating significant excess mortality. Late effects of trauma and the ongoing effects of the preexisting comorbidity (particularly psychiatric) would have played a role
 - Recovery is still occurring at 2 years indicated that a longer study is required (and is no doubt being done)
 - The results as always beg the question as to whether these outcomes are representative of Australia and relevant for NZ
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