

24/7 Consultant led trauma teams do not produce better outcomes

Tony Smith

Intensive Care Medicine Specialist, Auckland City Hospital
Medical Advisor, St John Ambulance, Northern Region

Surgeon as part of trauma team #3

- Retrospective review
 - 16 months (1043 patients)
 - 4 surgeons, 2 in hospital (IH) and 2 out of hospital (OH)
- Results
 - Time to OR shorter in IH group
 - No difference in mortality or hospital length of stay
- A number of other similar studies
 - The presence of a surgical consultant does not improve outcomes

Emergency medicine consultants and trauma

- There are a number of studies that have looked at outcomes before and after increasing the numbers of emergency medicine consultants
- Conflicting results

What about emergency medicine consultants?

Effectiveness of a regional trauma system in reducing mortality from major trauma: before and a - Microsoft Internet Explorer

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BMJ 1997;315:1349-1354 (22 November)

Papers

Effectiveness of a regional trauma system in reducing mortality from major trauma: before and after study

Jon Nicholl, *director MCRU*,^a Janette Turner, *research fellow*^a

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Contributing authors are listed at the end of the article Correspondence to: Professor Jon Nicholl

Objective: To assess the effect of the development of an experimental trauma centre and regional trauma system on the survival of patients with major trauma.

Design: Controlled before and after study examining outcomes between 1990 and 1993, spanning the introduction of the system in 1991-2.

Setting: Trauma centre in North Staffordshire Royal Infirmary and five associated district general hospitals in the North West Midlands regional trauma system, and two control regions in Lancashire and Humberside.

Subjects: All trauma patients taken by the ambulance services serving the regions or arriving other than by ambulance with injury severity scores >15, whether or not they had vital signs on arrival at hospital.

Main outcome measures: Survival rates standardised for age, severity of injury, and revised trauma score.

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☐ 1: Arch Surg. 2004 Nov;139(11):1231-6. **FULL TEXT AT ARCHIVES OF SURGERY** Links

Increased survival among severe trauma patients: the impact of a national trauma system.

Peleg K, Aharonson-Daniel L, Stein M, Kluger Y, Michaelson M, Rivkind A, Boyko V: Israel Trauma Group.

Author Affiliations: Israel National Center for Trauma and Emergency Medicine Research, The Gertner Institute for Epidemiology and Health Policy Research, Sheba Medical Center, Tel-Hashomer, Israel. kobip@gertner.health.gov.il

HYPOTHESIS: The survival of severe trauma patients is affected by the implementation of a national trauma system, which brought about developments both at the hospital and prehospital levels during the past decade. **DESIGN:** A retrospective cohort study of all severely injured patients (Injury Severity Score >16) recorded in the Israeli National Trauma Registry at all level I trauma centers in Israel from January 1, 1997, to December 31, 2001. Inpatient death rates were examined overall and by subgroups. **SETTING:** The National Trauma Registry includes trauma (International Statistical Classification of Diseases, 9th Revision, Clinical Modification diagnosis codes 800-959) hospitalizations, patients who were transferred to or from other hospitals, and those who died in the emergency department. It excludes patients who were dead on arrival, discharged following treatment in the emergency department, and patients who do not fall into the definition of trauma. **Main Outcome Measure** Inpatient death. **RESULTS:** Seven thousand four hundred twenty-three severe trauma patients were recorded. Inpatient death rates decreased significantly from 21.6% in 1997 to 14.7% in 2001. The odds ratios of mortality in 1998 through 2001 vs 1997, adjusted for year, age, sex, penetrating injury, and severity of injury (Injury Severity Score >25), were 0.92, 0.89, 0.70, and 0.65, respectively, confirming the downward trend. **CONCLUSIONS:** A steady significant reduction in the inpatient death rate of severe trauma patients hospitalized at all level I trauma centers in Israel between 1997 and 2001 was observed. Although a single factor that explains the reduction was not identified, it is evident that the establishment of the trauma system brought about a significant decrease in mortality. We believe that integrated cooperation

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[Emerg Med J. 2003 Sep;20\(5\):497;author reply 497.](#)

Lack of change in trauma care in England and Wales since 1994.

[Lecky FE, Woodford M, Bouamra O, Yates DW; Trauma Audit and Research Network.](#)

Trauma Audit and Research Network, University of Manchester, Salford, Manchester, UK.
flecky@fs1.ho.man.ac.uk

To demonstrate trends in trauma care in England and Wales from 1989 to 2000. STUDY POPULATION: Database of the Trauma Audit and Research Network that includes hospital patients admitted for three days or more, those who died, were transferred or admitted to an intensive care or high dependency area. METHOD: To demonstrate trends in outcome, severity adjusted odds of death per year of admission to hospital were calculated for all hospitals (n=99) and 20 hospitals who had participated since 1989 (adjustments are for Injury Severity Score, age, and Revised Trauma Score). The grade of doctor initially seeing the injured patient in accident and emergency and median prehospital times per year of admission were calculated to demonstrate trends in the process of care. Trend analyses were carried out using simple linear regression (odds ratio versus year). RESULTS: The analysis shows a significant reduction in the severity adjusted odds of death of 3% per year over the 1989-2000 time period (p=0.001). During the period 1989-1994 the odds of death declined most steeply (on average 6% per year p=0.004). Between 1994 to 2000 no significant change occurred (p=0.35). This pattern was mirrored by the 20 permanent members where the odds of death also declined more steeply over the 1989-1994 period. The percentage of severely injured patients (ISS >15) seen by a consultant increased from 29 to 40 from 1989-1994 but has remained static subsequently. Median prehospital times for severely injured patients have not changed significantly since 1994 (51 to 45 minutes). CONCLUSION: Most of the case fatality reduction for trauma patients reaching hospital over the 1989-2000 time period occurred before 1995 when there was most marked change in the initial care of severely injured patients.

PMID: 12421775 [PubMed - indexed for MEDLINE]

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What about emergency medicine consultants?

- A number of other similar studies
 - Conflicting results
- In all studies there were confounding factors
 - Trauma system was set up at the same time
 - Impossible to separate out the effect of emergency medicine consultants
 - Most studies concluded that the trauma system was the biggest factor in improving outcomes

What about anaesthesia consultants?

- There are no studies
- They are far too busy to come to the ED
 - Is this true?



The truth...

- They can't go anywhere without a huge pile of equipment and a technician to hold their hand...



What about intensive care medicine consultants?

- There are no studies
- They are far too busy saving lives and taking phone calls to leave the ICU...
 - Is this true?



The truth...

- It is really hard to read the paper and drink coffee if you are leading a trauma team...



Consultant led trauma teams

- Take a look at the evidence
 - There is no good evidence supporting consultant led trauma teams
 - Discuss the level of evidence available
- The evidence supports factors other than trauma team leader having a large part to play in determining outcome
- Most trauma interventions can be performed by registrars
 - Trauma calls are an important part of training
- It isn't practical, or economical, to have consultant led trauma teams
- Conclusion – 24/7 consultant led trauma teams do not produce better outcomes

How good is all of this evidence?

- Levels of evidence
- Level one – randomised controlled trials
- Level two – case controlled trials
- Level three – comparative outcome studies
- Level four – case series, reviews
- Level five – expert opinion

The Smith modification

- Level one – randomised trials that support our own opinion

The Smith modification

- Level one – randomised trials that support my own opinion
- Level two – expert opinions that support our own opinion

The Smith modification

- Level one – randomised trials that support my own opinion
- Level two – expert opinions that support my own opinion
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The Smith modification

- Level one – randomised trials that support my own opinion
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- Level three – all other forms of evidence that support my own opinion
- Level four – any form of evidence that does not support our own opinion

The Smith modification

- Level one – randomised trials that support my own opinion
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- Level three – all other forms of evidence that support my own opinion
- Level four – any form of evidence that does not support my own opinion
- Level five – the uninformed opinion of morons

The uninformed opinion of morons





Is there any other evidence?

- Mortality rates for major trauma typically 15-20% for hospitals with predominantly consultant led trauma teams
- I have uncovered new research data that shows that far more impressive outcomes can be achieved without consultants

Chicago Hope trauma mortality 10%

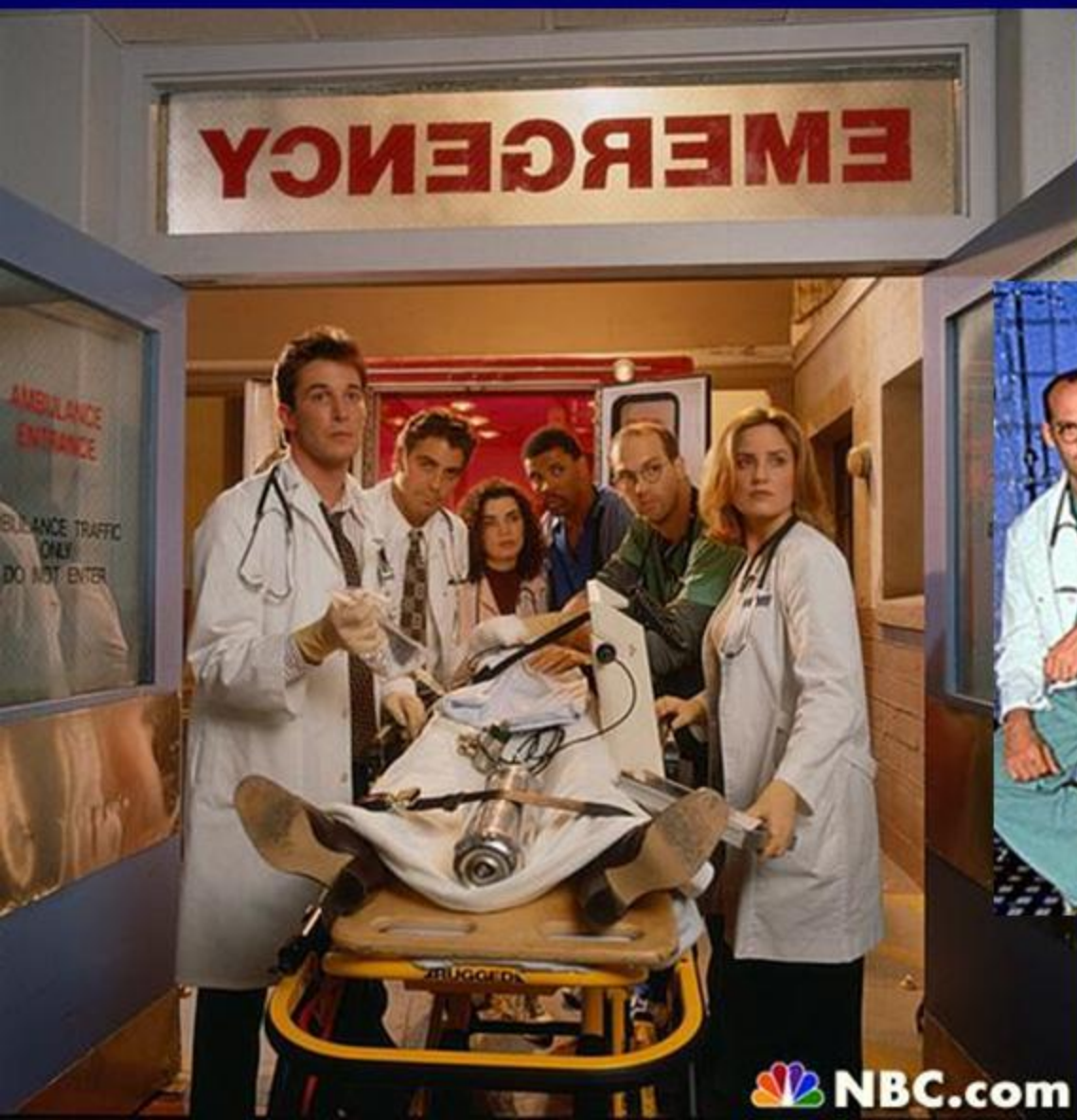


Surgical consultants and trauma

- Specialist trauma surgeons do not exist in New Zealand
- The general surgeon is almost extinct, sub-specialisation is increasingly the norm
 - Hepatobiliary surgeon
 - Head and neck surgeon
 - Breast surgeon
 - Vascular surgeon
 - Colo-rectal surgeon



ER trauma mortality 5%



Baywatch trauma mortality 0%



There is a clear trend...

- Dug deeper into the data from these studies
 - It was clear that there was a trend
- Multi-logistic regression analysis reveals that there is one over-riding factor responsible for the difference in these mortality rates
- This research is groundbreaking
 - First to hear these results

It is all about breast size...

- It has nothing to do with consultants
- It is all to do with breast size
 - Healthcare workers with larger breasts produce lower mortality rates
- We do not need to employ more consultants, we need to employ staff with larger breasts
- Targeted ACC funding
- Priority for DHBs



Trauma resuscitation isn't hard

- Airway control
 - Breathing control
 - Chest decompression
 - Vascular access
 - Resuscitation
 - Diagnosis of injuries
 - Access to a consultant
-
- Registrars can do all of these things



The impact on training

- Like it or not, registrars need to be trained
 - This requires exposure to the job
- The best exposure is one of graduated responsibility
 - This includes leading the trauma team
- If the trauma calls are always led by a consultant, registrars will never have the opportunity to learn how to do it
- 24/7 consultant led trauma calls would have a negative impact on training

The practicality

- Surgical, anesthesia and intensive care consultants are largely out of the equation
- That leaves emergency medicine consultants
 - It just isn't practical to staff all of our hospital EDs, 24/7 with emergency medicine consultants
- The cost of doing so would be prohibitive

Summary

- There is no good evidence supporting consultant led trauma teams
- What evidence we have supports other factors being more important in determining outcomes than the presence of consultants
- Most trauma interventions can be performed by registrars
 - Trauma calls are an important part of training
- It isn't practical or economical to have 24/7 consultant led trauma teams
- Conclusion – 24/7 consultant led trauma teams do not produce better outcomes

Thank you



"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Trauma is increasingly a non-surgical disease

- Most trauma patients do not need surgery
 - DPL has been replaced by FAST
 - Other resuscitation procedures do not need a surgeon
 - CT imaging has replaced surgical decision making
 - CT imaging increasingly results in non-operative approach
- When a patient requires surgery it is usually obvious and it does not require a surgeon to make the decision
- In blunt trauma, the most common form of emergency surgery is neurosurgery
- What about the evidence?

Surgeon as part of trauma team # 1

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Trauma attending in the resuscitation room: does it affect outcome?

Porter JM, Ursic C.

Department of Surgery, Northeastern Ohio Universities College of Medicine and St. Elizabeth Health Center, Youngstown, USA.

Although there are no Class I data supporting the regionalization of trauma care the consensus is that trauma centers decrease morbidity and mortality. However, the controversy continues over whether trauma surgeons should be in-house or take call from home. The current literature does not answer the question because in all of the recent studies the attendings who took call from home were in the resuscitation room guiding the care. We believe the correct question is: Does the presence of the trauma attending in the resuscitation room make a difference? At a university-affiliated Level II trauma center data from the trauma registry, resuscitation room flowsheet, and dictated admission notes were reviewed on all patients over a 6-month period. Data points were: attending present in the resuscitation room, standard demographics, resuscitation room time, time to operating room (OR), time to CT scan, length of stay, complications, and mortality. A total of 943 patients were studied with 216 (23%) having the attending present in the resuscitation room and 727 (77%) without the attending present. The groups were similar in terms of age, sex, Injury Severity Score, percentage Injury Severity Score greater than 15 (16-17.1%), and mechanism of injury (24-29% penetrating). Of all the data points studied only time to the OR had a statistically significance difference ($P < 0.05$) with it taking 43.8 minutes (+/-20.1) when the attending was present and 109.4 minutes (+/-107) when the attending was absent. There were also no missed injuries, delays to the OR, or inappropriate workups when the attendings were present. Only the time to the OR reached statistical significance. The time to the OR is indicative of the decision-making process in the resuscitation room, and it is in this area that the attendings' presence is the most useful. Also, we believe that it is important that there were no missed injuries, delays to the OR, or inappropriate workups when the attendings were present in the resuscitation room. This again speaks to the decision-making process. We believe that these data support the need for the attending to be present in the resuscitation room to facilitate accurate and timely decisions regardless of whether they take the call from home or in-house.

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Surgeon as part of trauma team #1

- Retrospective, trauma database, six months
- Compared trauma calls that had surgeon either present or not present
 - No difference in any outcomes
 - Shorter time to the OR, particularly for penetrating trauma

Surgeon as part of trauma team #2

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1: J Trauma. 1999 Sep;47(3):576-81.

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Trauma faculty and trauma team activation: impact on trauma system function and patient outcome.

Khetarpal S, Steinhilber BS, McGonigal MD, Stafford R, Ney AL, Kalb DC, West MA, Rodriguez JL.

Department of Surgery, St. Paul Ramsey Medical Center, University of Minnesota, St. Paul, USA.

OBJECTIVE: To determine the impact of the presence of an attending trauma surgeon during trauma team activation on system function and patient outcome. **METHODS:** After a retrospective review of medical records and trauma registry, a comparative study between two American College of Surgeons Committee on Trauma Level I trauma centers was performed. One center (Hennepin County Medical Center) required a chief surgical resident, two junior residents, and a board-certified emergency medicine faculty to be present in the emergency department for all trauma team activations. The attending trauma surgeon was notified at the time of trauma team activation and was neither required to be present in the emergency department at time of patient arrival nor in the hospital 24 h/day. The other center (St. Paul Ramsey Medical Center) required a chief surgical resident, two junior residents, a board-certified emergency medicine faculty member, and an attending trauma surgeon to be present in the emergency department for all trauma activations and in hospital 24 hours/day. Over a 21-month period, all major trauma patients (Injury Severity Score > 15 or emergent operation within 4 hours of admission and any Injury Severity Score) that triggered trauma team activation were examined. Resuscitation time, time to incision, probability of survival, and mortality were analyzed. **RESULTS:** Resuscitation time was shorter at St. Paul Ramsey Medical Center when compared with Hennepin County Medical Center. Analysis by mechanism of injury demonstrates that this was true for blunt trauma (39±13 vs. 27±12 minutes, $p = 0.001$) and for penetrating trauma (28±14 vs. 24±17 minutes, $p = 0.01$). Subgroup analysis of penetrating trauma victims demonstrated that there was a significant difference in resuscitation times for gunshot wounds but not for stabs. There was no difference in how quickly operations could be initiated for blunt trauma patients. However, in penetrating cases, time to incision was significantly shorter at St. Paul Ramsey Medical Center (50±29 vs. 66±43 minutes, $p = 0.01$). There was no significant difference in mortality for any category of Trauma and Injury Severity Score probability of survival in blunt or penetrating trauma. Analysis of "in-house" and "out-house" time intervals demonstrated no difference in survival in any mechanism of injury, nor was there a difference in overall mortality. **CONCLUSION:** The presence of a trauma surgeon on the trauma team reduced resuscitation time and reduced time to incision for emergent operations, particularly in penetrating trauma. However, it had no measurable impact on mortality based on Trauma and Injury Severity Score probability of survival. Attending trauma surgeon presence on the trauma team improves in-hospital trauma system function without affecting patient outcome.

PMID: 10498319 [PubMed - indexed for MEDLINE]

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Surgeon as part of trauma team #2

- **Comparative study of two trauma centres**
 - One with surgeon in hospital (IH)
 - One with surgeon out of hospital (OH)
 - 21 month period
- **Results**
 - Time to OR was shorter in IH group for penetrating trauma, but not for blunt trauma
 - No difference in mortality

Surgeon as part of trauma team #3

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1: J Trauma. 1997 Mar;42(3):490-5; discussion 495-7.

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Impact of the in-house trauma surgeon on initial patient care, outcome, and cost.

Luchette F, Kelly B, Davis K, Johanningsman J, Heink N, James L, Ottaway M, Hurst J.

Department of Surgery, University of Cincinnati College of Medicine, OH 45267-0558, USA.

BACKGROUND: The purpose of this study is to evaluate the effect of having attending trauma surgeons with added qualifications in surgical critical care present for the initial resuscitation at a regional trauma center. **METHODS:** This study is a retrospective review of patients admitted between August of 1994 and December of 1995 from our trauma registry. The patients were categorized by the call preference of the admitting physician as in-house (IH) or call-back from home (CB), day of admission (weekend vs. weekday), time of admission (AM VS. PM), and a value of the injury severity scale ≤ 15 or > 15 . Demographics, admission vital signs, Injury Severity Scale, Glasgow Coma Score, and elapsed time to diagnostic, therapeutic, and/or operative interventions were studied. The effect on intensive care unit length of stay, mortality, and hospital cost for resuscitation were also studied. **RESULTS:** The study population consisted of 1,043 patients. The IH and CB groups each included two attending surgeons. IH significantly reduced the average time to completion of diagnostic peritoneal lavage (22 vs. 34 minutes; $p < 0.05$), therapeutic intervention (21 vs 38 minutes; $p < 0.05$), and transport to the operating room (206 vs. 312 minutes; $p < 0.05$) during the AM compared with CB. There was no difference in these times for the PM admissions. There was no significant difference in intensive care unit length of stay. Among patients with severe head and thoracoabdominal injury (Abbreviated Injury Score ≥ 4 and 3, respectively) there was no difference in mortality. Analysis of cost for emergency room resuscitation in severely injured patients (Injury Severity Score ≥ 15), seen during weekdays, was significantly less when evaluated by IH (IH = \$5,097 vs. CB = \$6,779; $p < 0.05$). **CONCLUSIONS:** During the initial resuscitation of patients with severely injured during the weekdays, IH significantly reduced the cost, and elapsed time to diagnostic testing, therapeutic intervention, and to the operating room, respectively. IH reduced fatalities compared with CB.

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