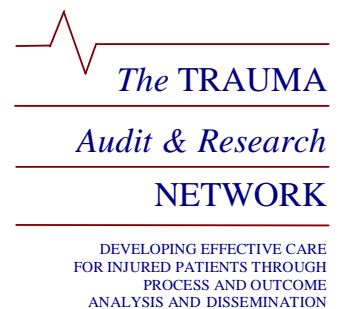


2010

The Trauma Audit &
Research Network

Quality Indicators for Trauma Outcome and Performance



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Introduction

The purpose of this document

This document details the quality indicators that aim to monitor the standards of trauma care and outcome performance at participating hospitals of the Trauma Audit & Research Network. The Indicators are taken from the Royal College of Surgeons and British Orthopaedic Association 'Better Care for the Severely Injured' 2000, BOAST4 Standards of Care and NICE Head Injury Guidelines along with a number of independent quality measures that are also monitored by the Trauma Network.

They are used in the Quarterly reports that are produced every 3 months and also the Standards of Care results published under the Performance Comparison section of the TARN website: www.tarn.ac.uk.

The Trauma Audit & Research Network

The Trauma Audit & Research Network (TARN) aim to facilitate the development of trauma services thereby reducing the associated burden of death and disability. TARN currently have the participation of over 60% of all NHS Trusts across England and Wales.

TARN's main purposes are to:

- ➔ encourage best practice within the emergency care setting by monitoring standards recommended by the Royal College of Surgeons & British Orthopaedic Association
- ➔ provide participating trusts with an assessment of the procedures and treatment administered to the injured patient
- ➔ produce analysis for clinical and epidemiological data and thereby provide a statistical base to support clinical audit
- ➔ support multidisciplinary clinical audit by analysis of case management
- ➔ provide confidential comparative statistics to clinicians and clinical governance upon patient outcome performance
- ➔ Maintain a successful and respected Research Portfolio

Quality Indicators: Head Injuries

→ **RCS/BOA Standard: There should be pre-hospital or in hospital spine protection**

Measurement: Spinal protection given pre-hospital or in hospital

Hospital case selection

Patients presenting with major head injuries AIS3+ at 1st receiving hospital or Transfers in.

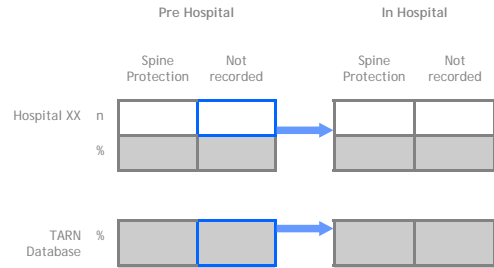
Hospital process compared against national database

Direct admissions: Number of patients pre hospital and in hospital who received:

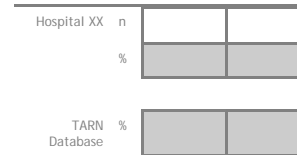
- 1) Spine Protection
- 2) No Spine Protection recorded

Transfers in: Number of patients who received:

- 1) Spine Protection
- 2) No Spine Protection recorded



Spinal protection: Transfers in



→ **RCS/BOA Standard: All receiving hospitals must have direct access to 24 hour CT scanning with on-call radiologists**

Measurement: Time to CT Scan

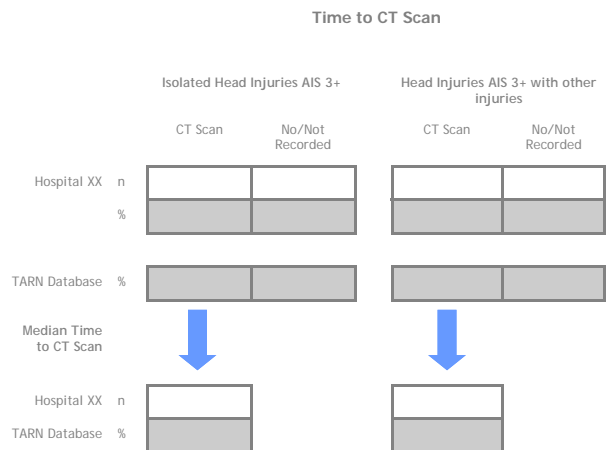
Hospital case selection

Patients presenting with major head injuries AIS3+ at 1st receiving hospital. Patients with isolated head injury and those with multiple injuries (including head injury) are separated for this analysis.

Hospital process compared against national database

- Number of patients who received:
 - 1) CT Scan
 - 2) No CT Scan/Not recorded

- Median time to CT Scan



Quality Indicators: Head Injuries

- **RCS/BOA Standard:** Patients with severe head injuries or focal signs should be transferred to the care of neurosurgery units regardless of whether they need surgical intervention

Measurement: Transfer of patients with head injuries

Hospital case selection

Patients presenting with major head injuries AIS3+ at 1st receiving hospital. Patients with isolated head injury and those with multiple injuries (including head injury) are separated for this analysis.

Hospital process compared against national database

Number of patients with serious head injuries who have been transferred in or out.

Transfer of patients with head injuries

		Isolated Head Injuries AIS 3+			Head Injuries AIS 3+ with other injuries		
		Direct Admissions	Transfers in	Transfers out	Direct Admissions	Transfers in	Transfers out
Hospital XX	n						
	%						
TARN Database	%						

- **TARN Quality Assurance Measure: Glasgow Coma Scale**

Measurement: Glasgow Coma Scale recording for patients with serious head injury

Hospital case selection

Patients presenting with major head injuries AIS3+ at 1st receiving hospital or Transfers in.

Patients with isolated head injury and those with multiple injuries (including head injury) are separated for this analysis.

Hospital process compared against national database

Number of patients with serious head injuries with a recorded Glasgow Coma Scale in the Emergency Department

Head injury AIS3+ : Direct admissions

		GCS=15	GCS<15	Not Recorded
Hospital XX	n			
	%			
TARN Database	%			

Head injury AIS3+ : Transfers in

		GCS=15	GCS<15	Not Recorded
Hospital XX	n			
	%			
TARN Database	%			

Quality Indicators: Cardiothoracic Injuries

- **RCS/BOA Standard: Examination of the chest is a fundamental component of the cardiopulmonary assessment of the seriously injured and should be supervised by the most experienced clinician**

Measurement: Most Senior Doctor treating thoracic injuries in the Emergency Department

Hospital case selection

Patients presenting at 1st receiving hospital with thoracic injuries AIS 3+ isolated and in combination with injuries affecting other body regions

Hospital process compared against national database

Number of patients seen by:

- 1) Consultant
- 2) STR
- 3) FY/Other
- 4) Grade not recorded

Most Senior Doctor treating thoracic injuries in the Emergency Department

		Consultant	STR ¹	FY/Other ²	Grade not recorded
Hospital XX	n				
	%				
TARN Database	%				

STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FY/Other² = includes SHO, House Officer, Emergency Nurse Practitioner and Clinical Assistant

- **RCS/BOA Standard: Monitoring must include pulse oximetry and serial blood gas analysis to detect hypoventilation. A 12 lead ECG is essential**

Measurement: Pulse Oximetry

Hospital case selection

Patients presenting with thoracic injuries AIS 3+ isolated and in combination with injuries affecting other body regions

Hospital process compared against national database

Number of patients where

- 1) Pulse Oximetry recorded in the Emergency Department
- 2) Pulse Oximetry has not been recorded in the Emergency Department

Pulse Oximetry Recorded

		Yes	Not Recorded
Hospital XX	n		
	%		
TARN Database	%		

Quality Indicators: Cardiothoracic Injuries

→ **RCS/BOA Standard:** Surgical airway, chest tube compression and pericardiocentesis skills must be available in every trauma team

Measurement: Chest Drain in the Emergency Department for patients with Haemo/Pneumothorax

Hospital case selection

Patients with Haemo/Pneumothorax at 1st receiving hospital— isolated or in combination with injuries in other body regions

Hospital process compared against national database

Number of patients where

- 1) Chest Drain received
- 2) Not Recorded

		Chest Drain in the Emergency Department for patients with Haemo/Pneumothorax	
		Yes	Not Recorded
Hospital XX	n		
	%		
TARN Database	%		

→ **TARN Quality Assurance Measure: Time to Chest X-Ray**

Measurement: Time to Chest X-Ray for patients with isolated and non isolated thoracic injuries AIS 3+

Hospital case selection

Patients presenting with thoracic injuries AIS2+ isolated or in combination with injuries in other body regions at 1st receiving hospital

Hospital process compared against national database

- Number of patients where

- 1) X-Ray performed
- 2) Not Recorded

- Median time to X-Ray

		ISOLATED THORACIC INJURIES		NON ISOLATED THORACIC INJURIES	
		X-Ray performed		X-Ray performed	
		Yes	No/Not Recorded	Yes	No/Not Recorded
Hospital XX	n				
	%				
TARN Database	%				
Number of X-Rays performed with details of time present		↓		↓	
		MEDIAN TIME TO X-RAY			
Hospital XX	n				
TARN Database	%				

Quality Indicators: Abdominal and Spinal Injuries

→ **RCS/BOA Standard: Abdominal Injuries** In a hospital receiving severe trauma, the input of a general surgeon into the resuscitative team is essential

Measurement: Presence and Grade of General Surgeon within the Resuscitative Team for Children and Adults.

Hospital case selection

Patients presenting with abdominal injuries AIS 3+ at 1st receiving hospital

Hospital process compared against national database

- 1) Presence of General Surgeon within the Resuscitative Team for Children
- 2) Presence of General Surgeon with the Resuscitative Team for Adults.
- 3) Number of patients treated by General Surgeons categorised by grade:
 - i) Consultant
 - ii) STR
 - iii) FY/Other
 - iv) Not recorded

		CHILD			
		Consultant	STR	FY/Other ²	Grade not recorded
Hospital XX	n				
	%				
TARN Database	%				

		ADULT			
		Consultant	STR	FY/Other ²	Grade not recorded
Hospital XX	n				
	%				
TARN Database	%				

STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FY/Other² = includes SHO, House Officer, and Clinical Assistant, ENP & Other (GP)

→ **RCS/BOA Standard: Unstable Spinal Injuries** Immediate referral must be made to the appropriate spinal injury service if there is evidence of partial or complete spinal cord or cauda equina lesion

Measurement: Transfer of patients with spinal cord injury

Hospital case selection

Patients presenting with isolated cord injury and cord injury with other injuries AIS 2+ at 1st receiving hospital

Hospital process compared against national database

Number of:

- 1) Patients transferred in
- 2) Patients transferred out
- 3) Patients not transferred
- 4) Deaths at 1st hospital

		ISOLATED CORD INJURY				
		Transferred in	Transferred out	Not transferred	Deaths at 1st Hospital	Total
Hospital XX	n					
	%					
TARN Database	%					

		NON ISOLATED CORD INJURY				
		Transferred in	Transferred out	Not transferred	Deaths at 1st Hospital	Total
Hospital XX	n					
	%					
TARN Database	%					

Quality Indicators: Abdominal & Spinal Injuries

- **RCS/BOA Standard : Abdominal Injuries** An immediate response from a senior general surgeon of sufficient experience to perform life-saving emergency laparotomy is essential. Where the infrequency of emergency calls does not allow the on-call general surgeon to be free from all other duties, practices must be agreed to adequately investigate the 'at risk' abdomen

Measurement 1: Grade of Operating Surgeon

Hospital case selection

Patients at 1st receiving hospital presenting with AIS 3+ abdominal injuries and require operation

Hospital process compared against national database

Number of patients treated by General Surgeons categorised by grade:

- 1) Consultant
- 2) STR
- 3) FY/Other
- 4) Grade not recorded

Grade of Operating Surgeon

		Consultant	STR	FY/Other ²	Grade not recorded
Hospital XX	n				
	%				
TARN Database	%				

STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FYOther² = includes SHO, House Officer, and Clinical Assistant, ENP & Other (GP)

Measurement 2: Grade of Anaesthetist

Hospital case selection

Patients at 1st receiving hospital presenting with AIS 3+ abdominal injuries and require operation

Hospital outcome compared against national database

Number of patients treated by Anaesthetists categorised by grade:

- 1) Consultant
- 2) STR
- 3) FY/Other
- 4) Grade not recorded

Grade of Anaesthetist

		Consultant	STR	FY/Other ²	Grade not recorded
Hospital XX	n				
	%				
TARN Database	%				

STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FYOther² = includes SHO, House Officer, and Clinical Assistant, ENP & Other (GP)

Quality Indicators: Abdominal & Spinal Injuries

- **RCS/BOA Standard: Abdominal Injuries** Where visceral injury requires operative management, the start of the operation must be possible within 60 minutes of admission in all cases.

Measurement: Time to Theatre for abdominal operation for visceral injury

Hospital case selection

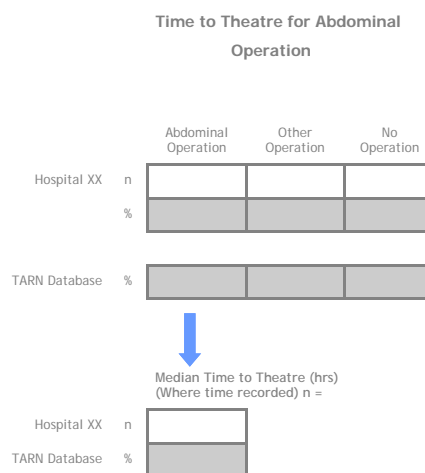
Patients at 1st receiving hospital with visceral abdominal injuries receiving abdominal operation

Hospital process compared against national database

- Number of patients who received:

- 1) Abdominal Operation
- 2) Other Operation
- 3) No Operation

- Median Time to abdominal operation for patients with abdominal injuries



Quality Indicators: Orthopaedic Injuries

→ **BOA: Boast 4 Standard: All patients (adults and children) with high energy open tibia &/or fibular fractures. The wound, soft tissue and bone excision (debridement) should be performed by senior surgeons within 24 hours of injury.**

Measurement 1 : Time to theatre

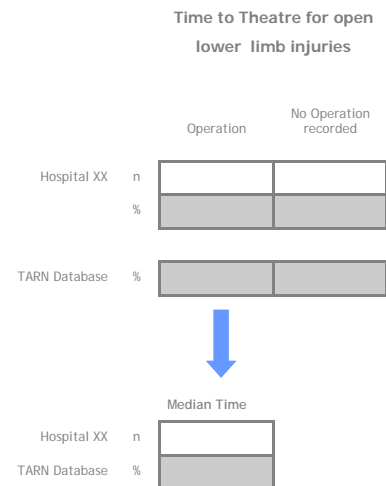
Hospital case selection

Patients with open tibia &/or fibular injuries at 1st receiving hospital

Hospital process compared against national database

- Number of patients where:
 - 1) Operation performed
 - 2) No operation/not recorded

- Median Time to theatre for patients with open limb injuries



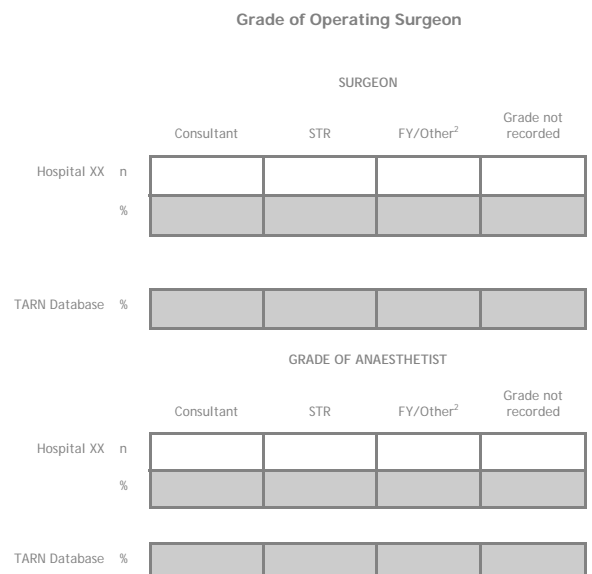
Measurement 2: Grade of Surgeon and Anaesthetist

Hospital case selection

Patients with open tibia &/or fibular injuries at 1st receiving hospital

Hospital process compared against national database

- Number of patients operated on by:
 - 1) Consultant
 - 2) STR
 - 3) FY/Other
 - 4) Grade not recorded



STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FY/Other² = includes SHO, House Officer, Emergency Nurse Practitioner and Clinical

Quality Indicators: Orthopaedic Injuries

→ TARN Quality Assurance Measure: Grade of relevant specialities in the Emergency

Measurement: Grade of Emergency speciality and Orthopaedic speciality attending patients with Open limb injuries

Hospital case selection

Patients presenting with Open limb injuries (excluding transfers in).

Hospital process compared against national database

Number of patients attended to by Emergency or Orthopaedic specialities categorised by grade:

- 1) Consultant
- 2) STR
- 3) FY/Other
- 4) Grade not recorded

	Consultant	STR ¹	FY/Other ²	Grade and/or speciality not recorded
Hospital XX n				
%				
TARN Database %				

STR¹ = includes Senior Registrar, Staff Grade, Associate Specialist and Research Fellow

FY/Other² = includes SHO, House Officer, Emergency Nurse Practitioner and Clinical Assistant

→ RCS/BOA Standard : Pelvic and Acetabular fractures. The immediate application of a Pelvic external fixator is indicated for the combination of haemodynamic and mechanical instability relating to Pelvic fracture/dislocation.

Measurement: Mortality rates and Pelvic fixation.

Hospital case selection: Patients presenting with AIS4+ Pelvic or Acetabular fractures at first receiving hospital.

- All Operations shown for AIS4+ pelvic fractures.

- Median Age
- Mortality
- Median Length of stay

Shown for National Database

Quality Indicators: Orthopaedic Injuries

- **RCS/BOA Standard Pelvic and Acetabular fractures: Imaging is required to determine the role of surgery and the need to transfer. An AP Pelvis radiograph and CT scan are required for pelvic disruptions.**

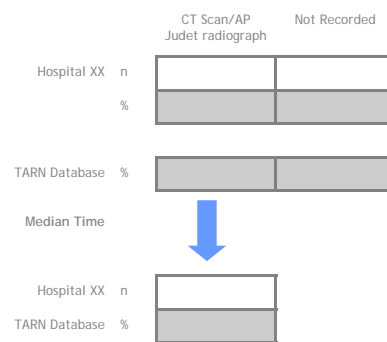
Measurement: Time to CT Scan or AP and Judet radiograph

Hospital case selection

Patients presenting with Pelvic or Acetabular fractures AIS3+ at 1st receiving hospital.

Hospital process compared against national database

- Number of patients who received:
 - 1) CT Scan/AP Judet
 - 2) No CT Scan/AP Judet recorded
- Median time to CT Scan/AP Judet



Quality Assurance Procedures

→ Internal Quality Assurance

Data Validation

The EDCR (Electronic Data Collection System), has an in-built validation system that checks for accuracy in date/time sequencing, physiological and investigative measurements. The EDCR prevents users from electronically dispatching submissions with incomplete obligatory data fields.

Coding Validation

All injury coders are trained in injury coding and their work is routinely checked until deemed fully competent in coding upon a regular basis. All coders have a sample of their codes double checked to ensure accuracy and consistency. This validation and internal quality procedure is performed each week.

TARN also holds monthly in-house Quality Assurance sessions; all coders are required to re-code a small sample from the TARN database, this ensures consistency between coders.

→ External Quality Assurance

Data Accreditation - Quality

TARN monitors percentage of CORE data fields completed by each Trust and shows this as both Clinical and Demographic data accreditation figures. These figures are updated every 3 months and shown under the Performance Comparison section of the TARN website.

Data Completeness - Quantity

TARN also monitors number of expected versus number of actual cases received from each Trust. The expected number of cases is gained from ICD10 codes submitted each year by Trusts to HES (Hospital Episode Statistics).

The data completeness figures are shown as a series of green ticks under the Performance Comparison section of the TARN website and are updated every 3 months.

The ticks range from 1: <21% of expected cases received to 4: >65% of expected cases received.

Data completeness should be considered when comparing the validity of Hospital Survival rates.

Data Quality Checks

TARN collects data from source to validate poorly performing trusts and to evaluate trusts with high quality performance.

