

The Trauma Audit & Research Network

Procedures manual

ANALYSIS
TRAINING
research
national audit


The TRAUMA
Audit & Research
NETWORK

DEVELOPING EFFECTIVE CARE
FOR INJURED PATIENTS THROUGH
PROCESS AND OUTCOME
ANALYSIS AND DISSEMINATION



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1. Information prior to joining

1.1 RESOURCE REQUIREMENTS

1.1.1 Participant Contributions

Are based on the number of new attendances to the Emergency Department each year, the number of children admitted for further care of their injuries and the number of head injured patients admitted to Neurosurgical units. The numbers used are taken from [The Directory of Critical Care](#), which contains information relating to every NHS trust in the UK and Ireland and is updated every year.

See [Participant's Contributions on www.tarn.ac.uk/how to join](#) for current details.

1.1.2 Staff Requirements

Clinical and administrative staff at a Trust receiving 70,000 new patients annually, would normally provide data on 250-300 patients each year; these patients would fulfill the current TARN Inclusion Criteria (see 2.1). Data is entered onto an [Electronic Data Collection and Reporting system \(EDCR\)](#).

Essentially the information subsequently provided should be used to facilitate multi-specialist trauma audit discussions.

Data can be collected by clinicians or by administrative staff, but in our experience a combination of the two proves to be the most effective system for consistent quality data.

Some regions of the country have Regional Coordinators who liaise between hospitals and TARN, facilitate data collection and organise local audit meetings, where they often present analyses. TARN does not fund the Regional Coordinator posts; they are normally funded by Supra-district audit groups or by a combination of local sites.

1.1.3 Training

TARN will ensure that all relevant staff members of participating Trusts receive Training (including an Overview of TARN, reporting facilities, trauma outcome process statistics and how to enter data via the EDCR system).

All initial and refresher training on the TARN Training programme is included in the participant contribute fee.

Courses are normally held at the University of Manchester every one to two months, but TARN encourages training events at Trust sites, providing certain internet and computation requirements are met.

The Annual Injury Scaling Course is discounted by 50% for one person per participating site each year. For more information regarding training courses, please refer to our website [www.tarn.ac.uk/training](#).

1.1.4 Capital Expenditure

[Everyone involved in data collection or report production will need access to a computer that is connected to the Internet, as all data is now collected via the EDCR system.](#)

1.2 SETTING UP TRAUMA AUDIT IN YOUR TRUST

1.2.1 Complete and return the following paperwork to tarn

- ✓ Membership Authorisation form
- ✓ Hospital Contacts sheet
- ✓ Training form

1.2.2 Locate the person, place and facilities

Identify the staff member/s that will collect the data and discuss relevant training courses with staff at TARN.

The data collector should be organised, proactive, enthusiastic and PC literate.

Identify a working area with a computer with **Internet connection (vital)**, desk and a telephone.

1.2.3 Introduce TARN and yourself

The data collector should introduce themselves to all levels of staff with whom they will liaise.

Don't forget the Ambulance service & Coroners office.

The Lead Clinician or data collector should introduce TARN to the rest of the hospital's Clinicians at a relevant meeting; TARN can assist with a **PowerPoint presentation** for this.

You should invite staff from clinical audit, intensive care areas, orthopaedics, paediatrics, anaesthetics, surgery and the ambulance services, to highlight the message that this important & useful data is being collected.

1.2.4 The reports

Reports are produced at regular intervals throughout the year by TARN and sent to the data collector/s and at least one clinician (usually the Consultant in Emergency Medicine).

Reports can also be generated at any time by anyone who has a **username and password** with access to the TARN EDCR system.

Ad-hoc analysis is available at any time to member sites.

2. Standards of practice

2.1 INCLUSION CRITERIA

The decision to include a patient should be based on the following points:

A. ALL TRAUMA PATIENTS IRRESPECTIVE OF AGE

B. WHO FULFILL THE FOLLOWING LENGTH OF STAY CRITERIA

DIRECT ADMISSIONS	PATIENTS TRANSFERRED IN
<p>Trauma admissions whose length of stay is 72 hours or more OR Trauma patients admitted to a High Dependency Area regardless of length of stay OR Deaths of trauma patients occurring in the hospital including the Emergency Department (even if the cause of death is medical) OR Trauma patients transferred to other hospital for specialist care or for an ICU/HDU bed.</p>	<p>Trauma patients transferred into your hospital for specialist care whose combined hospital stay at both sites is 72 hours or more OR Trauma admissions to a ICU/HDU area regardless of length of stay OR Trauma patients who die from their injuries (even if the cause of death is medical) OR Patients transferred in for rehabilitation only do not need to be submitted to TARN.</p>

C. AND WHOSE INJURIES MEET THE FOLLOWING CRITERIA

INJURY	INCLUDED	EXCLUDED
BURN	Any full thickness burn. Partial or superficial burn $\geq 10\%$ body surface area.	Partial or superficial burn $< 10\%$ body surface area.
FACIAL FRACTURE	Documented as displaced, open, compound or comminuted.	Simple, stable fracture.
FEMORAL FRACTURE	Shaft, condyle, supracondylar or head. Neck of femur < 65 years old.	Neck of femur ≥ 65 years.
FOOT OR TOE: JOINT OR BONE	Massive destruction or crush injury.	Any combination of the following: Foot fracture, any number of fractured toes, metatarsals &/or tarsals, dislocated phalanges or inter-phalangeal joints, subtalar, transtarsal or transmetatarsal joints.

HAND OR FINGER: JOINT OR BONE	Massive destruction or crush injury.	Any combination of the following: Fractured hand, any number of fractured fingers, carpal or metacarpal, carpal-metacarpal, metacarpal-phalangeal or interphalangeal dislocation.
INHALATION	All included	
JOINTS (excluding hands or feet)	Dislocation, with or without fracture.	Sprain, contusion or laceration to joint.
LIMB FRACTURE (excluding femur)	Documented as displaced, open, compound or comminuted.	Simple stable fracture.
MUSCLE, TENDON OR LIGAMENT		All injuries to muscles, tendons & ligaments, alone or in combination with other muscles, tendons, ligaments injuries.
NERVE	Any injury to sciatic, facial, femoral or cranial nerve.	All other nerve injuries, single or multiple.
PELVIS	Sacrum, coccyx, acetabulum, ilium, ischium, sacro-iliac or symphysis pubis or pubic rami fractures.	Single pubic rami fracture ≥ 65 years old.
SKIN	Laceration or penetrating skin injuries with blood loss $>20\%$ (1litre) or with damage to underlying vessel, bone or organ. Degloving injury.	Simple skin lacerations or penetrating injuries with blood loss $< 20\%$ (1litre) and no damage to internal organs or vessels: single or multiple. Contusions or abrasions: single or multiple.
SPINE	Cord injury, fracture, dislocation or nerve root injury.	Spinal strain or sprain.
VESSEL	Any injury to femoral, neck, facial or cranial vessel. Transection or major laceration. Any other vessel injury with blood loss $>20\%$.	Intimal tear or superficial laceration or perforation of any other vessel with $<20\%$ blood loss.

The above examples are shown for clarity and apply to injuries in isolation (except where highlighted in red) or where accompanied by skin injuries only.

Where applicable, all of the following should be recorded in a TARN submission:

ENDOCRINE NUTRITIONAL, METABOLIC & GU DISEASES

ICD Chapters IV, XI, XIV

- GU Diseases NFS
- Upper GI
- Lower GI
- Ulcer
- Liver disease
- Previous splenectomy
- Renal disease
- Crohn's disease,
- Colitis
- Diverticular disease
- Other GU Diseases
- Metabolic NFS
- Diabetes mellitus
- Diabetes insipidus
- Adrenal disease
- Thyroid disease
- Pituitary disease
- Other Metabolic Diseases
- Other ENM and GU Diseases

NEOPLASMS & BLOOD/IMMUNE DISEASES

ICD Chapters II, III

- Cancer of GI Tract
- Cancer of Lung
- Cancer of Breast
- Cancer of Kidney
- Cancer of GU Tract
- Cancer of Bone
- Cancer of Skin
- Cancer of Brain
- Other Neoplasms
- Thrombocytopenia
- Thrombocytosis
- Coagulopathy
- Haemophilia
- Anaemia
- Lymphoma
- Multiple Myeloma
- Leukaemia
- Other Blood/immune Diseases
- Other

MENTAL & BEHAVIOURAL DISORDERS

ICD Chapter V

- Psychosis
- Schizophrenia
- Depression
- Deliberate self-harm
- Neurosis
- Personality Disorder
- Alcohol abuse
- Drug addiction
- Anorexia/Bulimia
- Obesity
- Other

DISEASES OF THE NERVOUS SYSTEM

ICD Chapter VI

- Stroke/CVA/TIA
- Subarachnoid bleed
- Vertebrobasilar disease
- Migraine
- Epilepsy
- Cerebral palsy
- Spina Bifida/Previous spinal cord injury
- Mental handicap
- Dementia
- Parkinson's Disease
- Multiple Sclerosis
- Other

CIRCULATORY & RESPIRATORY SYSTEMS

ICD Chapters IX and X

- Heart NFS
- IHD
- Myocardial Infarction
- Carditis NFS
- Valvular heart disease
- Cardiomyopathy
- Other Circulatory
- Hypertension
- Peripheral vascular Disease
- DVT
- PE
- Vasculitis
- Asthma
- COPD
- Fibrosis NFS
- Bronchiectasis
- Cystic Fibrosis
- Other Respiratory

MUSCULO-SKELETAL & CONNECTIVE TISSUE

ICD Chapter XIII

- Arthritis
- Osteoarthritis
- Rheumatoid arthritis
- Connective Tissue Disease
- Major joint replacement
- Brittle bone disease
- Generalised osteoporosis
- Paget's Disease
- Degenerative Spinal disease
- Other

GENERAL INFECTIONS & PARASITIC DISEASES

ICD Chapter I

- HIV/AIDS
- TB
- MRSA
- STD
- Other

SKIN & SUBCUTANEOUS TISSUE, DISEASES OF THE EYE & EAR AND PREGNANCY

ICD Chapters XII, VII, VIII, XV

- Pre-existing skin conditions
- Diseases of the Eye
- Diseases of the Ear
- Pregnancy at time of injury
- Other

NO PRE-EXISTING DISEASE

MISSING

2.3 ANATOMICAL INJURY DESCRIPTIONS

2.3.1 Injury detail

Injury detail is of paramount importance to any TARN submission, therefore **all injuries** sustained by a patient must be recorded on every submission.

Information relating to injuries should be obtained from the following sources: clinician's notes, nursing notes, radiology reports, operative notes, discharge summaries and post mortem reports.

Guidelines to help with injury documentation:

- Record the **length** of all lacerations/penetrating injuries, whether external or internal.
- Record the **depth** if laceration to vessels.
- Record the **size and site** of all cerebral contusions.
- Locate all **entrance and exit wounds** on penetrating injuries.
- Record the **amount of blood loss** from internal organs.
- Record **the part of the bone** that is fractured and the **extent of that fracture**.
- All fractures should be further defined as **open or closed**.
- Record **all injuries** (no matter how insignificant they may appear).

2.3.2 Unconfirmed injuries

Injuries should only be recorded when the diagnosis is confirmed.

Never record possible, probable or suspected injuries.

2.3.3 Radiology reports and post mortems

Photocopies of all radiology reports or post mortem reports can be posted or faxed to TARN with the corresponding 12-digit submission number clearly visible; users must however ensure **all patient identifiers have been removed**.

Alternatively, the user can scan a radiology report and paste it into the relevant EDCR submission; whichever system is used the user must always **note "CT scan faxed to TARN"** or similar in the **Diary section** of the EDCR submission, so the TARN coder is aware of the presence of additional information before assigning AIS codes.

Post mortem results should be used whenever available even if this results in a delay in dispatching your submission.

All injury coding using AIS is done centrally at TARN.

Accurate and detailed injury descriptions will enable a more precise Injury Severity Score (see 3.1) and therefore a more accurate Probability of Survival calculation (see 3.2).

2.4 ABBREVIATED INJURY SCALE (AIS)

2.4.1 Background information

A.I.S. was first published in 1969 by the Association for the Advancement of Automotive Medicine (A.A.A.M.). The latest edition is now available from the AAAM website: Carcrash.org

2.4.2 Structure

- Based on anatomical injury.
- A single AIS score for each injury.
- More than 1500 injuries listed.
- Scores range from 1 to 6, the higher the score the more severe the injury.
- The intervals between the scores are not always consistent e.g. the difference between AIS3 and AIS4 is not necessarily the same as the difference between AIS1 and AIS2.

2.4.3 Example AIS codes

INJURY	NUMERICAL IDENTIFIER	AIS	SEVERITY
Fracture 1 rib	450212	1	Minor
Fractured 2-3 ribs	450220	2	Moderate
Haemo/pneumothorax	442202	3	Serious
Bilateral lung contusions	441410	4	Severe
Bilateral flail chest	450266	5	Critical
Massive chest crush	413000	6	Maximum

2.4.4 Coding structure explained

Body Region	Type of Anatomical Structure	Specific Anatomical Structure	Specific Anatomical Structure	Level	Level	AIS
4	5	0	2	6	4	4

450264.4 = Flail chest with lung contusion

2.5 THE PATH OF A TARN SUBMISSION

POTENTIAL ↓	I.T. system report produced or ICD 10 codes are used to highlight potential TARN patients.
CONFIRM ↓	Data Collector/EDCR user checks if TARN Inclusion Criteria is fulfilled - if YES
CREATE ↓	Using the EDCR system a user then creates a submission for each TARN patient and enters data gathered from ambulance sheets, radiology reports, post mortems, hospital notes, trauma sheets, operative notes and discharge summaries, a unique submission number will appear at the top of each submission screen. Further detail can be added at any time and in any order whilst a submission remains in the created status. These submissions can be accessed again using the EDCR submission summary screen, which lists their STATUS as CREATED .
DIARY ↓	Any additional information the user wishes TARN to have (e.g. radiology reports) can be added to the DIARY SECTION prior to dispatch. Diary section is also used by TARN post dispatch to inform user of any rejection or return of a submission.
VALIDATE ↓	Once all available patient data is entered, the user electronically VALIDATES the submission. The validation procedure checks to ensure no mandatory fields have been missed and if so, will not allow dispatch until all are completed.
DISPATCH ↓	The user then DISPATCHES all validated submissions to TARN. All dispatched submissions are then assigned to an individual TARN coder. No further detail can then be added by user, however further detail can be added by TARN post dispatch. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as DISPATCHED .
APPROVE ↓	Within one week all standard submissions (excluding transfers out-see below) are coded, assigned an ISS and APPROVED by TARN. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as APPROVED .
REJECT ↑	If the submission does not meet TARN inclusion criteria, the TARN coder will electronically REJECT it, informing the user of the reason in the DIARY section. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as REJECTED .
RETURN ↑	If the submission requires additional information prior to approval, the TARN coder will electronically RETURN it informing the user of the reason in the DIARY section. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as RETURNED .
REDISPATCH ↓	When user has the additional detail required, they must RE-DISPATCH the submission. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as REDISPATCHED and then when coded and approved by TARN as APPROVED .
TRANSFER ↓	Transfers out for further care to another TARN site are coded and FLAGGED whilst awaiting the second site's submission. These submissions can be viewed using the EDCR submission summary screen, which lists their STATUS as DISPATCHED with a FLAG attached. Once the second site's submission is received, TARN matches and approves both submissions.
CASE ↓	A case is a complete picture of patient care and final outcome. A case can involve one or multiple sites. When a submission is approved or a transfer out is matched and approved, a case number will appear at the top of the submission screen.
REPORT	<u>ONLY APPROVED SUBMISSIONS ARE USED IN TARN REPORTS AND ANALYSES.</u>

3. Statistics, information and reporting

3.1 THE INJURY SEVERITY SCORE (ISS)

3.1.1 Background

- ISS is based on the AIS and is calculated at discharge or death.
- Increased injury severity scores are associated with increased rates of mortality.
- Only 10% of patients with an ISS of <8 die compared with 95% of patients with an ISS of >50.

3.1.2 Calculating the ISS

- a) Code all injuries using the AIS dictionary
- b) Assign to one of the following body regions:
 - Head, neck, or cervical spine
 - Face
 - Chest or thoracic spine
 - Abdomen, pelvic contents or lumbar spine
 - Extremities or bony pelvis
 - External injuries or burns
- c) Square the highest score in each body region
- d) Add the sum of the squares of the highest AIS scores in each of **the three most severely injured body regions**.

Example

Body region	Injury	Code	AIS	AIS ²
Head	Temporal fracture	150400	2	4
Head	Small Subdural haematoma	140652	4	16
Chest	3 rib fractures	450220	2	4
Abdomen	Liver laceration (major)	541826	4	16
Extremities	Tibia fracture(displaced)	853405	3	9
External	Abrasions	910200	1	1
	ISS = 16 + 16 + 9 = 41			

ISS scores range from 1 to 75, a score of 75 results in one of two ways:

- Three AIS 5 injuries ($5^2 + 5^2 + 5^2 = 75$)
- Injuries coded as AIS6 are, by convention, given an ISS of 75

There is variation in the frequency of different scores:

- 9 & 16 are common,
- 14 & 22 are unusual
- 7 & 15 are unobtainable

3.1.3 Training

AAAM certified Injury Scaling Courses are run every year by TARN; they teach clinical & non-clinical staff how to use the AIS dictionary & assign ISS scores.

TARN member sites pay a reduced fee for these courses.

3.2 PROBABILITY OF SURVIVAL (Ps)

An Improved Approach to Outcome Predictions

3.2.1 Background

The Probability of Survival (Ps) of each patient has previously been calculated from the Revised Trauma Score (RTS), Injury Severity Score (ISS), age and method of injury (blunt or penetrating).

Additionally, the outcome of the patient (survival or death) has been taken at discharge or 93 days (whichever is sooner).

This model was referred to as TRISS (Trauma and ISS).

3.2.2 TRISS: The problems

- Most acute care audits use outcome at 30 days, not 93 days.
- RTS incurs a high number of cases with unrecorded data (respiratory rate, systolic blood pressure and Glasgow Coma Scale).
- The system of formulating ISS into the calculation contradicts some statistical reasoning.
- Transfers out to other hospital for further care are excluded.
- Patients who are intubated at scene are excluded.
- Children are included but not in a statistically acceptable fashion.
- Patients with burns injuries are excluded.
- Patients with penetrating injuries have their Ps calculated using North American model figures.

3.2.3 Ps04: The Solution

- Outcome (survival or death) used is calculated at 30 days.
- The GCS replaces the RTS in the new model.
- The ISS is incorporated using an improved format.
- Patients transferred out for further care are included.
- Patients intubated at scene with a GCS already recorded are included.
- Children have a better weighting for their age.
- Patients with burn injuries are included.
- Patients with penetrating injuries are included.
- There is now a relationship between gender and age.

In August 2004 Probability of Survival (Ps04) was introduced by TARN and the Ps of each injured patient is now more accurately calculated using:

- ✓ Age
- ✓ Gender
- ✓ Glasgow Coma Scale
- ✓ Injury Severity Score

Further details of the outcome predictor model can be found on the TARN website:
www.tarn.ac.uk/resources

The comparative outcome analysis (Ws graph)

3.3.1 Background

- The following statistics are commonly known as DEF statistics & are used internationally.
- These statistics are used to make comparisons of hospital performance; the most recent innovations can be seen on www.tarn.ac.uk/resources.
- Comparison of the Ps04 of all patients (seen at a particular site with observed outcome) can be used as an index of overall performance.
- Probabilities of survival are combined in the `Comparative Outcome Analysis (Ws) to assess a group of patients; in this way a national "league table" can be compiled containing all sites that submit data to TARN.
- Ws provides a measure of excess survivors or deaths **per 100 patients** treated at each site.

3.3.2 Interpreting Ws

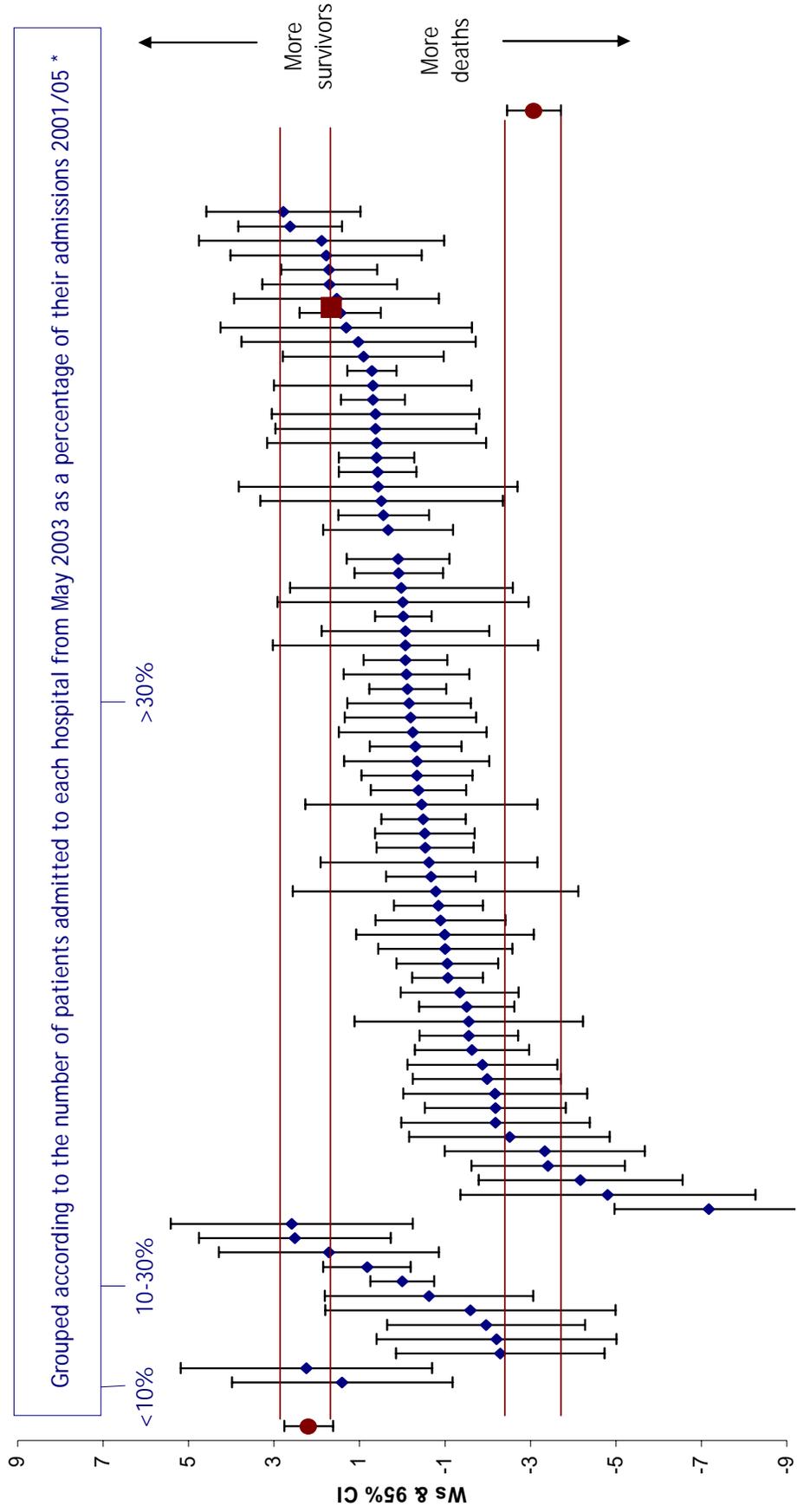
- A **high positive Ws value is desirable** this indicates that your hospital has **more survivors** than expected
- Conversely a **negative Ws** value indicates that your hospital has **fewer survivors** than expected.
- The Ws can be shown graphically (with **95% confidence intervals**) to illustrate clinical differences between hospitals relative to the UK norm (See Ws graph on page 16)
- The 95% Confidence Interval indicates that we can be **95% certain** the true Ws lies somewhere along the line accounting for different injury severity mixes and the `standardised Z statistic' (Zs) provides a measure of its statistical significance.
- A narrow range would show that there is a good deal of confidence in the value of Ws.
- The Zs value is often misquoted when comparisons of trauma care are made between hospitals, the Zs statistic is purely a measure of the statistical significance of Ws statistic; it is often said that:
 - Zs scores >1.96 indicate the hospital is significantly better than the UK average.
 - Zs scores <1.96 indicate that the hospital is significantly worse than the UK average.
- Comparisons have become more relevant to Clinicians after extensive work was undertaken to base the regression analyses on statistics derived from the AIS (98 update) dictionary and data collection in England and Wales.
- As statistical methods become more refined we can be a little more confident that these inter-hospital comparisons really do reflect variations in Clinical practice.

3.3.3 The next step

This new Ws format is an interim measure between the earlier groupings based on RTS (obsolete due to our improved Prediction Model) and our long term objective; this will group hospitals according to the actual versus predicted data returns - the latter to be based on **Hospital Episode Statistics (H.E.S)** data obtained from the Office of National Statistics.

Example of Comparative Outcome Analysis (Ws graph)

Hospital XX is highlighted



3.4.1 Clinical Case Reports

Clinical case reports provide a summary of TARN submissions, including ISS and Ps.

Users with relevant rights to the EDCR system can produce these at any time, covering any time period.

See 4.9.1 for full details of content and how to produce a clinical case report.

3.4.2 Themed Quarterly Reports

Produced by TARN every three months and sent to data collectors and clinicians at each trust.

Quarterly reports cover the following themes:

- Thoracic
- Orthopaedic
- Abdominal/Spinal
- Head injuries.

These reports include Process Measures monitoring standards set out in the Royal College of Surgeons and British Orthopaedic Association report of 2000 “[Standards of Care for the Severely Injured](http://www.rcseng.ac.uk/publications)” (www.rcseng.ac.uk/publications)

For further detail regarding content please refer to tarn website www.tarn.ac.uk/feedback.

3.4.3 Ad hoc analyses

In addition to the Cross Tabulation reports that can be produced by any EDCR user with the relevant rights (see 4.9.2 for further information), ad hoc analyses can be requested by any member site and produced by TARN at any time.

3.5.1 Local trauma audit

- **Identifying** and comparing national standards
- **Deriving** local guidelines
- **Discussions** at multi-speciality meetings
- **Communicating and acting** on discussions

These actions are central to change in practice and improvement in trauma care.

3.5.2 Closing the loop

"Closing the audit loop" involves re-analysis of performance after appropriate changes have been introduced, this can only occur if all those involved in the management of the major trauma patient are consulted and co-operate.

Central to this Process are multi-speciality audit meetings.

TARN quarterly and clinical case reports should also be shared with audit departments, purchasers, clinical governance and clinical colleagues.

3.5.3 The multi-speciality audit

The themed quarterly report is an extremely useful tool to inform multi-speciality audit meetings.

To use to your best advantage we recommend that you:

- Schedule a regular audit meeting of representatives from trauma receiving departments.
- Theme the meetings with additional data from TARN e.g. Head Injury
- Always discuss a patient who survived after serious injury and optimum care.
- Present your hospital status in relation to the other TARN sites.
- Invite speakers from TARN or other participating hospitals.



AIM TO IMPROVE YOUR TRAUMA SERVICES AS A RESULT OF THESE MEETINGS.

3.6 IMPROVING TRAUMA CARE

3.6.1 Why?

- 33% of death after injury thought to be preventable.
- The initial management of major trauma was unsatisfactory.
- The treatment and mortality rate of injured patients varied inexplicably between hospitals.
- There were delays in providing experienced staff and timely operations.

A retrospective study of 1000 trauma deaths from injury in England and Wales.

Brit.Med.J 1988: 296;1305.

Preliminary analysis of the care of injured patients in 33 British Hospitals: first report of the United Kingdom Major Trauma Outcome Study. *Brit.Med.J 1992: 305;737-740.*

3.6.2 When?

- Overall hospital care has made a valuable but variable contribution to reductions in case fatality after injury between 1989 and 1997.
- However there was significant variability in the proportion of survivors between the highest and lowest 10% of hospitals in England and Wales.
- The proportion of severely injured seen first by senior doctors increased.

Trends in trauma care in England and Wales 1989-1997. *Lancet 2000: 355;1771-75.*

3.6.3 How?

The reduction in trauma mortality was due to a strategic mixture of change:

Context: Common goals for improving trauma care

- NHS Executive
- Royal College of Surgeons
- Close inter-disciplinary cooperation
- Senior clinical involvement

Content: Targets for treatment times

- Specific protocols
- Trauma team membership
- Continuity of care from the scene to rehabilitation
- Frequent statistical analyses of performance
- Application of protocols
- Multidisciplinary audit

Process: Complex

- No formal model of change management

Management of major trauma: changes required for improvement. *Quality in Health Care 1999;8;78-85.*

Trauma audit - closing the loop. *Injury 1994;25: 511-514.*

TARN provides a nationally driven framework for the collection, submission and scrutiny of trauma survival data by hospitals, and crucially, comparison with other hospitals. The existence of such a framework allows common ground to be established between different centres and lays the foundation for a systematic process for clinical audit.

4. EDCR: User guide

4.1 GETTING STARTED

The system is designed to run from Microsoft's Windows Internet Explorer.

Open internet explorer on your PC, and select the address: www.tarn.ac.uk

The TARN Home Login page will then be displayed.

To save the address as a favourite, select the favourites option in the browser Toolbar, then select **Add to Favourites**.

4.1.1 Logging in to TARN

- The Login is shown at the right of the Home page.
- This requires you to enter the username and password supplied by TARN.
- If you wish to change your supplied password, you can do this after log in on the Home page.
- If the system has no activity for a period it will log the user out, a re-login will then be required. (There is a warning given when the session is reaching its timeout, and if timed out then a message is shown at the bottom of this panel)
- NOTE: Any work in progress but not saved may be lost.
- If the user does not have a login or there is a problem with the login then the TARN administration staff should be contacted, selection of "Contact Us" will show the details.
- If the user cannot remember the password, then selection of the "Forgotten password" option will allow the entry of the username, and will send an email of instructions to the registered email address.

4.1.2 Changing password

This allows a logged in user to change their password; it does not allow the old one to be viewed or edited. (The password entered will be shown as ●●●●●● on entry). If the Login fails then, then it should be tried again, in case of a miss-type, the entry is case independent so entry of user name or password "BILL" or "bill" or "Bill" are all treated alike.

If the user still cannot login, then they should contact TARN Administration who has the option of resetting the current password to something else (again they cannot view or edit the old password).

4.1.3 logging off

While the user is logged into the system the top menu bar will have the option to log off the current user at the right end of the bar; selection of this will log the current user out of the system with no further prompt.



4.2 DATA ENTRY SYSTEM AIDS

4.2.1 Field types

When entering submissions there are three types of entry fields these are:-

MANDATORY ENTRIES: The entry **MUST** be made in order to dispatch the submission to TARN and are marked with a **RED *** to the left of the entry field.

***Date of Arrival at the Hospital** / /

PREFERRED ENTRIES: These entries should be entered (if data available), but are not enforced and are marked with a **GREEN #** to the left of the entry fields.

#Date of Departure from Scene / /

Any entry not marked is optional and entry is not enforced.

4.2.2 Tool tips

Tool tips tell you what information should be recorded in that field e.g. Respiratory Rate Tool tip.

Respiratory Rate
Pulse Number of breaths per minute.

Simply hover the mouse over the field name to get the Tool tip.

4.2.3 Help prompts

For most fields Help Prompts are available; these can be viewed by holding the mouse over a field name and clicking the left mouse button.

Help prompts give information about what the field name means, how it is recorded in the Notes and which Location it is usually recorded in, see below.

Unnasisted Respiratory Rate

Number of breaths per minute. Ranges from 0 – 70. Normal range 16 – 24.

4.3 STANDARD ENTRY TYPES

These may be in any section, and come in any order.

TEXT (LIMITED ENTRY)

This entry type will accept text and numbers up to a preset length, e.g. Patient Post Code (first part); this example entry takes letters and numbers up to a preset total of five (5) characters.

In this particular field the entry is validated later.

The length of the entry is preset and may be different from one field to another.

FREE TEXT ENTRY

This entry type will accept a limited (but very large) entry, e.g. the entry may be larger than the visible panel (see injury details section on EDCR).

The scroll bar at the right of the panel allows the other text to be read.

DATE

The Date entry type requires entries in each part of the field set. The <TAB> key or completing all the digits required will move to the next part of the field.

The entries must be numbers only.

Date of Incident: 12/10/2005 (DD/MM/YYYY)

Each part is validated and a warning will be displayed at the end of the line if the entry is incorrect.

Invalid Day - If the Day is 0 or more than the number of days in the month

Month - If the Month is 0 or more than 12

Year - If the year is less than 1800

Date in Future - If the entry is for a future date

Invalid Entry - If the entry is invalid in other ways, e.g. "/" is not allowed.

The date is checked for leap years so an entry of 29/02/2005 would be invalid.

Dates are allowed from 1/1/1800 to "NOW". The date entered cannot be in the future.

4.3.1 Auto-population

In some fields this button (represented as two pieces of paper one on top of other, see below) this button is shown at the end of the field indicates that the selection can be auto filled.

This happens when the entry may have been entered onto a previous screen or can be inferred from a preceding entry, selection of the button will fill in this entry with that made previously.

If the entry cannot be auto-populated it will be left blank i.e. there has been no other entry made to duplicate.



4.3.2 Time

The time type entry requires an entry in each part of the field set, the <TAB> key or completing all the digits required will move onto the part of the field.

The entries must be numbers only, in the **24 hour clock format**.

Time of Arrival at the Hospital: 15: 35 (HH:MM)

Each part is validated and a warning will be displayed at the end of the line if the entry is incorrect.

- Time cannot be 00:00 - The entered time is not allowed to be exactly midnight, if the actual time was 00:00 then the entry of 00:01 should be made.
- Invalid Hours - If the hours are more than 23
- Invalid Minutes - If the minutes are more than 59
- Invalid Entry - If the entry is invalid in other ways, e.g. "/" is not allowed

4.3.3 Drop list

This type of entry is the choice of a preset entry from a list.

Usually there is the option at the top of the list for a "nothing" entry to clear the choice made.

Select the down arrow button to "drop" the list then select the choice required.

Once a choice has been made the list is hidden and the choice selected is shown.

The choices available are usually controlled by TARN Admin, if an entry required is not listed then contact your administrator.

4.3.4 Radio buttons

This entry is the choice of a single selection from a multiple choice list.

It is usually used where only one answer can be correct at any one time.

E.g. Sex

The selection of any choice will remove any previously marked choice and make the current selection the choice.

The - button will clear the choices made to this option.

4.3.5 Tick selection boxes

These entries allow the choice of one or more selections from a preset list.

It is used where multiple choices/selections are valid.

E.g. the selection of Vehicle Collision as an Injury Mechanism will open up sub choices of "Position" and "Protection".

Selection of the box will mark the choice, reselection will unset the choice.

4.3.6 Extra information entry

In places there may be the option of adding additional data to the section; this is shown by the additional of a + symbol next to the entry that can be repeated.

By selecting + an extra drop list is created so another entry can be added.

E.g. Pre-existing conditions or complications



The image shows a screenshot of a form with two input fields. The first field is labeled 'Pre-existing medical condition(s)' and the second is labeled 'Complication(s)'. Both fields have a light blue background and a small dropdown arrow and a plus sign icon on the right side, indicating they are expandable.

4.3.7 Choosing your user interface

If the user has permission to change the interface type then the choice to do so will appear on the submission screen.

The user can select between the following two formats, “Simple” and “Advanced”, with examples showing the changes to the screens.

Select the “Save” option to save the choice.

Once selected the chosen format will be saved as a user preference and used until changed.

Simple Format: With this format the user will be offered the entries as a drop list or set of radio buttons.
The user makes a selection from the lists and choices available.

Advanced Format: With this format the user can directly enter the code number of the required entry; once it has been entered the choice’s description will be shown as a confirmation.

The user also has the choice to view all the available selections if required.

Selection of the ? button will show the user the entry choices available; this will then be presented as a drop list of values.

NOTE: The numbers at the left of the names are the internal short code for the entry, which can then be used in future entries.

4.4 PRINTING

4.4.1 Printer friendly versions of pages

On each page the option for a printer friendly version of the screen is presented at the bottom of the left side bar menu.

This will reshuffle the current page details, without the top and side menus, so it is ready for printing.

4.4.2 Print blank

This option will generate a printed blank copy of the submission entry form with blank; this allows information to be gathered where there is no immediate access to a PC. The printout is several pages long, and is previewed on screen before being optionally printed.

Note that the optional extra sections (Assessment Anatomical, Attendant, etc) will not be printed. If details are recorded for these they should be attached to the printout later.

4.4.3 Print

This option will generate a printed copy of the submission entry form with details as entered; the printout is several pages long, and is previewed on screen before being optionally printed.

There are printed blank entry lines for questions that may not need to be answered in this case or for options to a question answered that did not need that option (i.e. Grade & Speciality of the Attendant 2, who as an Ambulance Paramedic does not need those entries) ; these should be ignored.

There will also be blank entry lines for any question left unanswered that should have an entry.

Note that the extra sections (Attendant, etc) are indented and included in the section to which they were added.

In the cases where multiple sections have been added they are numbered.

4.5 SUBMISSION STRUCTURE

- A submission is an entry of a hospital admission trauma event relating to the care and outcome of a patient.
- A submission replaces the completion of the data collection form.
- On selection of the submission section the screen shows a summary of submissions.
- Selection of one of the underlined numbers in the summary categories, or a selection of a status in the drop list will show all submissions in that category.
- The side bar menu shows a set of common operations relating to submissions.
- As the Viewing, Editing and New Submissions all use a common set of screens they are only covered once below.

4.5.1 Locations

A location is any place where observations can be taken or procedures can be carried out; there are nine locations in the system:

- AT SCENE
- ENROUTE
- ED (EMERGENCY DEPARTMENT)
- IMAGING
- THEATRE
- CRITICAL CARE
- WARD
- REHABILITATION
- TRANSFER

At the top of each location screen, there is a space to enter the date and time that the patient entered that location.

You only need to enter data for locations particular to your submission.

Data can be entered in any order; you may enter the Ward details prior to the At Scene details and the system will allow it.

4.5.2 Related sections

In each of the system Locations, there are options to record procedures carried out and staff in attendance. These are called RELATED SECTIONS and there are five of them:-

- OBSERVATIONS
- INVESTIGATIONS
- INTERVENTIONS
- ATTENDANTS
- OPERATIONS

These can be accessed using the buttons at the bottom of each location screen. Clicking a button will bring up another screen where details can be entered.

There is a space at the top of each section to record the date and time, this date and time will be used for all procedures in this section unless you tell the system otherwise.

The pre-populate button can be used to copy the date from the main location screen. Alternatively, you can type in the date.

As details are entered and saved at a location, the side bar menu will change. It will give details of how many procedures have been carried out at each location.

Clicking on a location will bring up more details about the data entered. Clicking on an individual field will bring up details of an observation, procedure or attendant.

OBSERVATIONS, INVESTIGATIONS AND INTERVENTIONS are further split into the following subsections:

OBSERVATIONS	INVESTIGATIONS	INTERVENTIONS
Respiration	Respiration	Imaging
Circulation	Circulation	Blood sampling
Nervous system	Nervous system	Urine sampling
Metabolism	Metabolism	Signal
Host Defence	Host defence	Other

Clicking on the **ATTENDANTS** button in a location will bring up a screen that will allow you to record attendants at that location, including ambulance staff and nurses.

Information is entered using drop down lists. Use this button to record attendants at all locations **except theatre** (see below).

Clicking on the **OPERATIONS** button in a location will bring up a screen where surgical and other procedures can be recorded.

Data entry is via drop down boxes and text entry.

The Operations section asks for details of Grade of Surgeon and Anaesthetist performing the operation, **therefore there is no need to go into the Attendants subsection at this location.**

4.5.3 Data entry in related sections

Data is entered using drop down boxes or by keyboard entry according to the field. **Some fields only require a "Yes" or "No" response.**

All that is needed is to record that the procedure was carried out. To do this, use the radio buttons.

A procedure may be marked as not performed by selection of the "No" option. A selection can be cleared using the "-" option.

4.5.4 Additional recordings in related sections

Extra sections can be added from the same category if required. If, for example the patient had two GCS observations in the Emergency Department, you would enter them as below:

Click E.D, Observations, Circulation and enter date, time and recording of 1st GCS - then Save Changes.

Save Changes will clear the E.D. Observations screen (storing the information in the crumb trail - see below) but keep you on the same screen so you can simply enter another date, time and GCS recording without moving between screens.

You may know that a particular procedure has been carried out a second time, but not have any data to enter, for example, you may know a second blood pressure reading has been taken, but not have the actual reading.

In this case, you would tick the Add New Section box. This would create a section containing the date and time and nothing else.

4.5.5 Crumb trail

Whenever you **SAVE** information in a Related Section, the screen is cleared and the information is stored under the relevant Location to the left of main screen; this is called a "crumb trail" and you can review or change any information by clicking on the relevant location, then into the data you wish to change.

You will see a number to the right of any Location you have entered Related Section data into, this number represents the number of data fields you have added, e.g. if you add GCS, Bp, Pulse and Attendant to E.D. you will see E.D. (4).

4.5.6 Conditional collection

The system is set up to prompt you for information about particular investigations, observations and interventions according to the category of injury you tick in the **Brief Injury Description** part of the Opening Section.

The system will prompt you for details in the relevant locations by putting the field on the screen at the appropriate location, along with all other fields appropriate to the patient's injuries, e.g. Intracranial Pressure Monitor will be prompted for in Critical Care when you have ticked that your case has an intracranial injury.

Some fields are appropriate to all locations and all injuries e.g. GCS.

You can still enter data for fields that aren't prompted for; use the **"Other"** drop down lists to do this.

4.6 CREATING A SUBMISSION

The submission data can be entered from a pre-printed blank form or entered directly from the case notes.

If the option selected was to enter a new submission then all the fields will be empty on entry, if editing an old submission then they will show those details previously entered and saved.

4.6.1 Choosing a hospital

This determines which hospital you are about to view or enter data for, if you only enter data for one hospital, only one option will be available.

Once a hospital site has been chosen and saved, the rest of the submission screens are available.

This will also **automatically assign the next 12 digit sequential submission number** for the new submission, and give it a TARN case number.

You will see the submission number at the top of the screen, followed by (Created) in brackets; you are now ready to enter data.

4.6.2 Opening section

MUST BE COMPLETED FOR EVERY SUBMISSION.

This contains the general submission details, including:

Age, Gender, Date of Incident, Date & Time of Arrival at Hospital, Transfer to/from, TARN Inclusion and Brief Injury Description (see 4.5.1 Conditional Collection).

As details are entered, extra options may become available, e.g.

- If the option for Full Date of Birth is selected as "Yes" then the screen will offer the following fields: dd/mm/yyyy in which to enter the data.
- If the option "No" is chosen for Full Date of Birth, then the screen will offer Short Date of Birth and if the option "Yes" is chosen, will show the following fields: mm/yyyy in which to enter the data.
- If "No" is chosen for Short Date of Birth, then the screen will offer an Age box in which to enter the data.

If a birth date is entered and an Incident date, the system will automatically calculate the age of the patient at the time of the Incident; this automatic calculation may result in an invalid date depending on the entries made, e.g. If the date of birth is entered as 1/2/2005, but the incident date is entered as 1/1/2005, then the calculated age at the time of the incident would be minus one month and this would fail the save validation.

Selection of a tick box for any Brief Injury category will open up extra options, e.g. on selection of the Facial tick box the options for: Open Skeletal Fracture, Eye and Other Facial Injury appears. **You may choose one or more of the injury categories and extra options offered.**

4.6.3 Patient details

MUST BE COMPLETED FOR EVERY SUBMISSION.

This contains the general patient details including: Postcode, Nationality, Name, NHS and Hospital numbers.

Some fields here are pre-filled from the previous Opening Section screen (if entered there), any changes made to pre-filled field will be reflected on the previous screen once saved here.

The entry for the patient postcode first numeric is not editable; this entry is calculated from the second part postcode entry when saving the record.

Note, to protect patient confidentiality: Patient's name, DOB, Full postcode, NHS and Hospital numbers are seen only by the Site user - not by TARN.

4.6.4 Incident

MUST BE COMPLETED FOR EVERY SUBMISSION.

Contains information about incident including: Date & Time of Incident, Incident postcode, Incident Location, Incident Type, Intent and Mechanism, Trapped at Scene and any additional incident detail.

4.6.5 At Scene

SHOULD BE COMPLETED IF YOUR PATIENT WAS TREATED OR OBSERVED BY ANY AMBULANCE/HELICOPTER SERVICE AT SCENE.

Contains details from the Scene of the incident including: Date & Time Ambulance called and dispatched.

This is the first section where the **RELATED SECTIONS** appear; this section allows the details entered to be expanded by selection of the related section buttons below, selection will then open an extra section of details relevant to the section chosen, multiple extra sections can be chosen if required.

4.6.6 En Route

SHOULD BE COMPLETED IF YOUR PATIENT WAS TRANSFERRED FROM SCENE BY ANY AMBULANCE/HELICOPTER SERVICE OR WAS TRANSFERRED BETWEEN SITES.

Contains any en-route details either from scene to hospital, or between transferring hospitals, including:

Type of Transport, Date & Time of Departure, Patient Report Number and Vehicle Call Sign Number.

Also contains **RELATED SECTIONS**.

4.6.7 Emergency Department (E.D.)

SHOULD BE COMPLETED IF YOUR PATIENT SPENT ANY TIME IN EMERGENCY DEPT.

Contains details of Emergency Department care, including: Date & Time of Arrival (pre-filled from Opening Section), Date & Time of leaving E.D. and presence of Trauma team.

Also contains **RELATED SECTIONS**.

4.6.8 Imaging suite

SHOULD BE COMPLETED IF YOUR PATIENT SPENT ANY TIME IN THE IMAGING SUITE.

Contains: Date & Time of Arrival.

Also contains RELATED SECTIONS.

Multiple visits to the Imaging suite can be entered by selection of the "Add New Section" option.

4.6.9 Operating theatre

SHOULD BE COMPLETED IF YOUR PATIENT SPENT ANY TIME IN AN OPERATING THEATRE.

Contains: Date & Times of Arrival and Departure.

Also contains RELATED SECTIONS.

Multiple visits to the Operating Theatre can be entered by selection of the "Add New Section" option.

4.6.10 Critical care

SHOULD BE COMPLETED IF YOUR PATIENT SPENT ANY TIME IN A CRITICAL CARE/HIGH DEPENDENCY UNIT.

Contains: Date & Time of Arrival, Type of unit, Length of stay.

Also contains RELATED SECTIONS.

Multiple visits to Critical Care unit can be entered by selection of the "Add New Section" option.

4.6.11 Ward

SHOULD BE COMPLETED IF YOUR PATIENT SPENT ANY TIME ON A WARD.

Contains: Date & Time of Arrival, Type of ward.

Also contains RELATED SECTIONS.

Multiple visits to a Ward can be entered by selection of the "Add New Section" option.

4.6.12 Rehabilitation

SHOULD BE COMPLETED IF YOUR PATIENT ANY TIME IN THE REHABILITATION UNIT OF YOUR HOSPITAL.

Contains: Date & Time of Arrival, Type of unit.

Also contains RELATED SECTIONS.

Multiple visits to Rehabilitation can be entered by selection of the "Add New Section" option.

4.6.13 Transfer

SHOULD BE COMPLETED IF YOUR PATIENT WAS TRANSFERRED IN OR OUT OF YOUR HOSPITAL, (EXCEPT FOR REHABILITATION).

This section for transfers will request different details depending whether the patient was a, transfer in, transfer out or transferred both ways submission.

One of the key points of the TARN system is the ability to link together submissions from different hospitals, where the patient details relate to the same incident; for this reason the transfers should be carefully entered to allow the system to locate matching submissions.

4.6.14 Outcome

MUST BE COMPLETED FOR EVERY SUBMISSION.

This section records the details of the patient at time of discharge or death, including: Pre-existing conditions, complications of care, Outcome at discharge and 30 days (if known), Date of discharge or death, Time of discharge or death, Dates spent in Critical care (pre-filled) and days spent Intubated, Discharge to, Glasgow Outcome Scale and Readmission details.

If **Readmission = Yes** a new set of questions will appear about dates and times of readmission and final discharge status and date.

4.6.15 Injuries

MUST BE COMPLETED FOR EVERY SUBMISSION.

This section is for a description of **every injury the patient sustained**.

Please enter each injury on a new line, by pressing the enter key.

Each entry can be longer than the visible screen if required, in which case the entered text will be automatically word wrapped.

The scroll bar at the right of the text allows the extra text to be viewed.

Any additional injury information including X-rays, CTs and PMS can be copied and pasted into the Injury section.

Alternatively they can be emailed, faxed or posted to TARN and this information **must be logged in the view diary section** so the TARN coder is aware of the presence of additional information when coding.

Where applicable, please do not dispatch a submission to TARN until the Post mortem is available, as we are unable to code it without full injury details.

4.6.16 AIS coding

COMPLETED BY TARN AND VIEWABLE BY USERS.

Once a submission has been Approved by TARN the user can see the individual AIS codes assigned to every injury for each submission, they can also see the calculated ISS.

Each submission is assigned to a TARN coder and the user can see who has coded their submission by looking in VIEW DIARY.

4.6.17 Consultations

SHOULD BE CHECKED BY USER AND ONLY COMPLETED IF PROMPTED.

The choices available here will depend on previously entered details of injury and attendees, e.g. If a head injury has been marked then details of a Neurosurgical Consultation will be prompted for (if not already documented in submission).

4.6.18 Hospital questions

THE ENTRY OF ANSWERS TO HOSPITAL QUESTIONS IS OPTIONAL AND DEPENDANT ON WHETHER SPECIFIC QUESTIONS HAVE BEEN SET BY THE HOSPITAL.

This section will display any additional questions that the hospital has requested, the questions in this section are not requested by TARN.

These are specific to the hospital selected, and may have a specified format for entry.

For details on where these are created contact TARN.

4.6.19 Tarn questions

THIS SECTION DISPLAYS ANY ADDITIONAL QUESTIONS THAT TARN MAY REQUEST FROM TIME TO TIME; THESE ARE NOT SPECIFIC TO THE HOSPITAL SELECTED.

All hospitals will be advised when & if any additional TARN questions are added.

The image shows two panels from a software interface. The left panel, titled 'sections', has a blue header and a list of items, each with a small blue square icon. The 'Opening Section' item is highlighted with a red background. The right panel, titled 'submissions', also has a blue header and a list of items, each with a small blue square icon.

sections	submissions
<input type="checkbox"/> Choose Hospital	<input type="checkbox"/> save section
<input checked="" type="checkbox"/> Opening Section	<input type="checkbox"/> view
<input type="checkbox"/> Patient Details	<input type="checkbox"/> flag
<input type="checkbox"/> Incident	<input type="checkbox"/> return
<input type="checkbox"/> At Scene	<input type="checkbox"/> validate
<input type="checkbox"/> Enroute	<input type="checkbox"/> dispatch
<input type="checkbox"/> ED	<input type="checkbox"/> select matching
<input type="checkbox"/> Imaging	<input type="checkbox"/> compare
<input type="checkbox"/> Theatre	<input type="checkbox"/> print
<input type="checkbox"/> Critical Care	<input type="checkbox"/> print (blank)
<input type="checkbox"/> Ward	<input type="checkbox"/> view diary
<input type="checkbox"/> Consultations	<input type="checkbox"/> QA submission
<input type="checkbox"/> Rehabilitation	<input type="checkbox"/> advanced interface
<input type="checkbox"/> Outcome	
<input type="checkbox"/> Injuries	
<input type="checkbox"/> Transfer	
<input type="checkbox"/> Hospital Questions	
<input type="checkbox"/> TARN Questions	
<input type="checkbox"/> AIS Coding	
<input type="checkbox"/> Blind AIS coding	

The submission search screen allows the user to find any existing submission (regardless of status) based on numerous fields.

The search options can be entered either singularly or multiply, but the result is restrictive when multiple i.e. where family name and postcode have entries only those that match for both will be shown.

The search options are not case sensitive on entry, i.e. Family Name search for Ford, ford and FORD will all return the same entries.

4.7.1 Standard searches

The simplest field to search on is the submission number, but if this is not known try using the Hospital Arrival Date fields, this will then list all submissions that arrived at your hospital within that time period.

Enter the field/s and select "Find" option.

This will produce a list of all submissions matching your criteria and you can access them simply by clicking the underlined submission number.

4.7.2 Wild card searches

The search can include symbols for wild card searching if unsure of exact spelling or detail, the symbols used are:-

- **% {percent}** : to indicate a wild card where required, this symbol can represent none, one or many characters.
- **_ {underscore}** : to indicate any single character. Note that the character must be present.

Examples below:

Fred_ would find Fredi & Freda, but not Fred or Frederick.

If the family name (m) is searched for then nothing may be found, if however the search was for m% then this would find any submissions that start with the letter m.

If the family name %man is searched for, then this will find any name ending in man, i.e. Seaman, Hillman, etc.

If the search is for a segment of the name that could be anywhere in the name then the % should be added to both ends, i.e. %man% this will then return both Seaman and Manfield and also Hunmanton.

4.8 GENERAL SUBMISSION DETAIL

In all sections any changes made **MUST** be explicitly saved by the user.

Moving away from the entry screen will not save the entered/changed details automatically.

A submission can be saved at almost any point, and returned to later for editing, there is a warning given if a save is not possible, usually due to "Live" validation in an entry. The top side bar menu shows all the submission sections, allowing for quick access as required.

If extra details or extra sections have been added to a section, e.g. Attendants then they will also be shown here (as below).

The lower side bar menu shows options available for the submission being edited.

4.8.1 Saving

On most screens any changes made to the section will **NOT be saved or prompted to be saved when the section is exited or moved away from.**

If the screen is timed out, due to inactivity the entries made will not be saved, if you are leaving the screen for a while and want to save your entered work, then **save before you leave.**

If the changes are to be saved then they should be explicitly saved.

If there are any errors on screen due to checking of the entered data they will have to be corrected before the screen can be saved, e.g. If the entry is out of bounds i.e. an age of 120 (limited to 1 - 110) there will be an on screen message shown, and the error must be corrected or cleared before the page can be saved.

4.8.2 Saving options

On screen at both top and bottom of the section is a choice of options for that section.

On entry to a section open for editing the choice may be:-

SAVE CHANGES:

This allows the saving of changes made to the section and remains in that section.

SAVE AND NEXT:

Allows saving of the changes and moving to the next Location on the list.

SAVE AND BACK:

Allows saving of changes and moving back to the main page of that section e.g. If in Attendants in Emergency Department section, you will be taken back to the Emergency Department opening screen.

4.8.3 Edit

When a submission is recalled, it is shown as a read only set, the edit option re-enables the editing of the sheet allowing entries to be made and saved.

You can not edit a submission after it has been dispatched to TARN.

4.8.4 View

If a submission has been made editable, the view option will return it to being read only, preventing any inadvertent changes from being saved.

Anybody with rights to “view data and produce reports”, will only ever see data in the View state.

Any data dispatched or approved will only be viewable not editable.

4.8.5 Add new section

Multiple sections can be recorded by selection of this option; this will repeat the section allowing multiple entries for the patient. E.g. If a patient has multiple visits to Imaging suite on different dates - use this option.

4.8.6 Delete section

Will delete all the data entered for that section.

If a section has been visited and saved with no entries, then any mandatory or preferred entries due for that section will be requested before the submission can be dispatched.

If a section has been saved in error, then the section should be deleted, this will remove it from the validation.

4.8.7 Validate

Selecting this option will validate that the submission selected is ready for dispatch, it does not dispatch it.

The submission is checked for entries in the **mandatory and preferred fields**, and any incorrect entries that would prevent the submission being dispatched.

If there is no missing data, then the validation warning screen is not shown, and the opening section is displayed.

If there is any missing data, then the screen will show a list of warnings and errors in the submission; each warning is listed with the section, question and warning.

All missing mandatory fields are highlighted in **Red**.

All missing preferred fields are highlighted in **Green**.

Selection of the underlined section name will take the user back to that section for editing.

Once all mandatory fields are completed, an option to **Dispatch this submission to TARN** appears underscored at the top of the page.

4.8.8 Dispatch

The simplest way to dispatch a submission is to validate, then use the dispatch statement (see above).

Alternatively a user can bypass the Validate option and choose the Dispatch button to the bottom left of the screen, this will also check for missing mandatory and preferred fields.

Once a submission has been dispatched the user will see the submission number at the top of the screen with (Dispatched) in brackets.

4.8.9 Approve

This is the Status of a dispatched submission that a TARN qualified coder has checked and coded.

The user can see all approved submissions by looking on the Submission Summary page and choosing the Approved status in the drop down list.

Once a submission has been approved the user can click into it and will see the submission number at the top of the screen with (Approved) in brackets.

Only when a submission has been approved by TARN can it be used in any reports.

4.8.10 Flag

A TARN coder will flag a submission if it is a transfer out to another TARN site and is awaiting the corresponding submission to match and approve.

Flagged submissions will remain in the Dispatched in-tray until un-flagged and approved by TARN.

4.8.11 Reject

This is the Status of a dispatched submission that a TARN coder has checked but it doesn't fulfil the Inclusion Criteria.

The submission is rejected and a message will be entered in the [VIEW DIARY](#) section explaining why it has been rejected.

The user can see all rejected submissions by looking on the Submission Summary page and choosing the Rejected status in the drop down list, or by clicking on the number to the side of the Rejected in-tray (also on the Submission Summary page).

Once a submission has been rejected the user can click into it and will see the submission number at the top of the screen with (Rejected) in brackets.

No further action is necessary unless user disagrees with reject reason or has further information.

4.8.12 Return

This is the Status of a dispatched submission that a TARN coder has checked, but needs further detail from the user before APPROVING.

The submission is returned and a message will be entered in the [VIEW DIARY](#) section explaining why it has been returned.

Once the additional data is added, a hospital user should [REDISPATCH](#) the submission to TARN.

The user can see all returned submissions by looking on the Submission Summary page and choosing the Returned status in the drop down list, or by clicking on the number to the side of the Returned in-tray (also on the Submission Summary page).

Once a submission has been returned the user can click into it and will see the submission number at the top of the screen with (Returned) in brackets.

4.8.13 View diary

This shows any diary notes associated with this submission and can be added to by [TARN and user](#).

Diary notes are used to communicate with others who are collaborating with the submission.

Diary notes can be added by user (before dispatch) to confirm that a Post mortem or radiology report associated with a submission has been sent to TARN.

Or by TARN (post dispatch) to clarify reasons for returning or rejecting a submission.

Submitted By: Ann Smith Date: 26/09/2005 11:42

Opening section includes details of intracranial injuries, but no CT scan on record. Is this correct?

Once a diary note has been saved it is not editable

If the submission is only being viewed, then the user cannot add to the diary notes.

4.8.14 Select matching

Used to electronically check for matching transferred submissions and is for [TARN use only](#).

4.8.15 Compare

Used to compare electronically matched transferred submissions and is for [TARN use only](#).

4.9 EDCR REPORTING

In addition to entering data, you can also produce reports to summarise and analyse data for your hospital(s). The reports area of the EDCR system allows you to produce two types of report: clinical case and cross tabulation. Full explanations of these reports and instructions about how to produce them can be found below.

The reports section can also be used by TARN staff to upload any *ad hoc* analysis that is beyond the scope of what you can produce using the clinical case and cross tabulation reports. This facility allows you to download files quickly and easily with no need for e mail attachments. Further details can be found below.

4.9.1 Clinical case reports

Clinical case reports provide a patient by patient summary of coded and approved cases for your hospital for a specified time period. The following fields are displayed for each case included in a clinical case report:

- SUBMISSION/CASE NUMBER
- MECHANISM OF INJURY
- LEVEL OF INTENT
- DATE OF INCIDENT
- TIME OF INCIDENT
- ADMISSION DATE
- ADMISSION TIME
- TRAUMA TEAM (YES/NO)
- LENGTH OF STAY
- OPERATION/PROCEDURE
- STATUS (ALIVE/DEAD)
- TRANSFER DETAILS
- EARLIEST GCS
- INJURY SEVERITY SCORE
- AGE
- SEX
- PROBABILITY OF SURVIVAL
- INJURY DESCRIPTION

Suggested cases for review are also highlighted.

To create a clinical case report, follow these steps:

- 1) Click on [REPORTS](#) on the menu bar at the top of the screen.
- 2) Click the [CREATE REPORT](#) link on the left hand side of the screen.
- 3) Choose [CLINICAL CASE](#) from the REPORT drop list.
- 4) If you only have rights for one hospital, it should appear in the [HOSPITAL SITE](#) box automatically. If you have rights for more than hospital, choose the site you want from the drop down.
- 5) Enter your [START DATE](#) and [END DATE](#). Remember to enter them in *dd/mm/yyyy* format; the dates are inclusive. If you wanted to report on data for 2004, your start date would be *01/01/2004* and your end date would be *31/12/2004*.
- 6) Choose the type of [DATE TO USE FOR RANGE](#) you want. You have the following choices:

- Entry date: when the submission was created
- Despatch date: when the submission was sent to TARN
- Return for review date: when a submission was returned by TARN for clarification or additional detail
- Re-despatch date: when the submission was sent back to TARN after being returned.
- Acceptance date: when the submission was coded and approved by TARN.
- Admission date: when the patient arrived at hospital.

The two that you will use the most are [ENTRY DATE](#) and [ADMISSION DATE](#). They allow you to produce an overview of patients that were either put into the EDCR system (entry date) or who arrived at your hospital (admission date) over a particular time period.

- 7) You can order the cases in your clinical case report in two ways: by trauma number or by date of arrival. Choose the option you want from the *Order by* drop down. There are other criteria available in the report (*TrustID, Country ID* etc.) but these are mainly for TARN use.
- 8) When you have finished setting up your report, click [GENERATE REPORT](#) at the bottom of the screen. You will receive a message saying that your report is being generated.
- 9) Click on [OK](#) and then choose [PREVIEW REPORTS](#) from the reports menu on the left of the screen.
- 10) Choose [CLINICAL CASE](#) from the [REPORTING SECTIONS](#) menu.
- 11) This will bring up a list of the Clinical case reports you have created. Click on one of them to bring up your report in Adobe Acrobat, you may get a message saying that your report is still being generated. If this happens, refresh your browser by pressing F5 on your keyboard.

4.9.2 Cross tabulation reports

Cross tabulation (cross tab) reports allow you to analyse the data for your hospital(s). They are much more powerful than clinical case reports, which simply supply a general summary of your data for a particular time period. Cross tabulations allow you to focus on particular aspects of your data. They show how two or more questions interrelate and the patterns of interaction between them. If, for example, you wanted to know how many people had been admitted to your hospital as the result of a vehicle collision and look at the pattern of age or gender, you could use a cross tabulation. To create a cross tabulation report, follow these steps.

- 1) Click on [REPORTS](#) on the menu bar at the top of the screen
- 2) Click the [CREATE REPORT](#) link on the left hand side of the screen.
- 3) Choose [CROSS TABULATION](#) from the REPORT drop list. This should bring up the main cross tabulation screen.

- 4) If you only have rights for one hospital, it should appear in the **HOSPITAL SITE** box automatically. If you have rights for more than hospital, choose the site you want from the drop down.
- 5) Enter your **START DATE** and **END DATE**. Remember to enter them in *dd/mm/yyyy* format. The dates are inclusive.

EXAMPLE:

If you wanted to report on data for 2004, your start date would be 01/01/2004 and your end date would be 31/12/2004.

- 6) Choose the type of **DATE FOR SELECTION** you want. You have a choice of incident date or admission date. Admission date is the date that the patient arrived at hospital.

There are other criteria available in the top section of the report (*TrustID, Country ID* etc.) but these are mainly for TARN use.

- 7) If you wish, you can, produce a report for a particular body region using the **INJURY TYPE** drop down if you want to produce a report on a particular type of injury. The body regions are:

- THORAX
- ABDOMEN
- HEAD
- UPPER LIMB
- LOWER LIMB
- SPINE

If you want all injury types in your report, leave this option blank.

- 8) You can also use the **ISOLATED INJURIES** option to say whether you want to produce a report on just one particular body region, or injuries in that body region with injuries to other body regions.
- 9) **CHOOSE YOUR CRITERIA** (see next page for examples of how to do this); there are a range of criteria available for use in your report. You must choose **TWO CRITERIA**.

Process measures are an edited list of the observations, investigations and interventions used in the EDCR system. We have picked out the ones that will be most useful.

The process measure options allow you to filter by first, last, lowest and highest recordings. Not all of the options will apply to every process measure.

- 10) When you have finished setting up your report, click **GENERATE REPORT** at the bottom of the screen. This will bring up a message saying that your report is being generated.
- 11) Click on **OK** and then choose **PREVIEW REPORTS** from the reports menu on the left of the screen.
- 12) Choose **CROSS TABULATION** from the **REPORTING SECTIONS** menu.
- 13) This will bring up a list of the cross tabulations you have created. Click on one of them to bring up your report in Adobe Acrobat, you may get a message saying that

your report is still being generated. If this happens, refresh your browser by pressing F5 on your keyboard.

EXAMPLE I: ISOLATED THORACIC PATIENTS ONLY

To produce this report, you would choose Thoracic from the Injury Type drop down and choose Isolated from the Isolated Injuries drop down.

EXAMPLE II: THORACIC PATIENTS WITH OTHER INJURIES

To produce this report, you would choose With Other Injuries from the Isolated Injuries drop down.

EXAMPLE III: FIRST GCS FOR ALL PATIENTS WHO WERE GIVEN MANNITOL

To produce this report, you would choose Mannitol as Process Measure 1 and GCS as Process Measure 2, choosing First as the Process Measure 2 option.

All of the other criteria work in the same way. You can either choose from a particular category on a drop list or choose All to display all categories on the list in your report.

EXAMPLE IV: VEHICLE COLLISION BY AGE

After entering your hospital and date information at the top of the report, you would select Age (all) and Mechanism of injury (vehicle collision) as your variables. This would create a report breaking down submissions relating to vehicle collisions by age.

EXAMPLE V: AGE (16 - 25) BY INJURY MECHANISM

Using the same variables in another way would produce a different report. To produce this report, you would select Age (16-25) and Injury Mechanism (all) as your variables. This would produce a report breaking down submissions relating to 16 - 25 year olds by mechanism of injury.

EXAMPLE VI: AGE BY INJURY MECHANISM

Setting both of the variables to All would produce a report showing all relevant submissions broken down by age and mechanism of injury.

4.9.3 Uploaded reports

Occasionally, you may find that you would like some analysis of your data that you are not able to produce using either the clinical case or cross tabulation reports.

TARN can upload spreadsheets, charts, database extracts, images and many other files on request. Any files that are uploaded in this way can be accessed by clicking REPORTS and choosing PUBLISHED REPORTS from the reports menu.



4.10 TARN HOME PAGE

This is the starter page for the TARN system, the screen has links to various public details of the TARN project, with the option to [login to the members only](#).

[home](#) [introduction](#) [how to join](#) [feedback](#) [resources](#) [training](#) [TARNlet](#) [Regional TARN](#) [euroTARN](#) [research](#) [contact us](#) [login](#)

From the top menu the following options can be accessed:-

INTRODUCTION

This section contains basic information about Trauma.

- How TARN evolved.
- The First Decade booklet.

HOW TO JOIN

This section details the joining process.

- Participant Contribution fees
- Membership Authorisation Form
- Site Profile

FEEDBACK

Information about Process measure contained in each Quarterly report:

- February: Thoracic
- May: Orthopaedic
- August: Abdomen and Spine
- November: Head injuries
- Information about Clinical Case reports

RESOURCES

This section lists some of the resources available.

- PS04 calculator
- TARN Overview booklet
- List of tarn participants
- FAQ
- Anatomy guide
- Tarn newsletters by month since 2000

Where the Adobe icon appears this indicates a PDF document, the other options will open further pages.

TRAINING

This section contains information about TARN training courses.

- Procedures Book
- Sample STARTUP programme
- Application for ISC
- Sample ISC programme

TARNLET

Is the paediatric TARN group, and this screen provides access to the news from it, together with lists of research and publications and the committee members.

[EUROTARN](#)

This section contains information about the 14 countries collecting trauma data across Europe, trying to develop an effective system to review the standards of trauma care across Europe.

- List of countries involved
- Progress of Eurotarn so far
- Minutes from Manchester, Hanover, Leeds and Stavanger meetings.

[RESEARCH](#)

A collated list of applicable research papers for reference.

- Past publications
- List of current research
- Collaborative projects

[CONTACT US](#)

- Directions to TARN offices
- Map of TARN offices
- Address of TARN
- Job title and Email address for all TARN staff
- Executive Board members listed

[LOGIN](#)

Used to Login to the secure areas of TARN, see "Logging in to TARN" section 4.1.1.

Please contact TARN if you represent a TARN member site and would like a username and password setting up.

There have been a few problems with Internet Explorer crashing on some PCs in the Transfers and Outcomes sections. This is a problem with the individual PCs and not the TARN site.

To put this right, you need to change the settings on your PC. If you have not already done so, we recommend that you work through the following steps as soon as possible:

Start up Internet Explorer.

Click Tools and select Internet Options from the menu.

Select the General tab, if this is not already selected.

Under Temporary Internet Files, click the Settings button.

Change the setting for Check for newer versions of stored page to Every visit to the page rather than the default setting of Automatically.

Click OK, then OK again.

Re-start Internet Explorer.

To avoid this problem, we recommend that this should be done on every PC that is used to enter TARN data.