

Key Performance Indicators for the Scottish Trauma Network

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Version history

Version	Date	Summary of changes
7.7	11/11/2022	Updated to PHS branded template
7.8	06/07/2023	Updates to KPIs 1.2, 1.3, 2.1, 2.4.3-2.4.6. Addition of KPIs 3.3 and 3.4.

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Introduction

Background

In Scotland, injury was the commonest cause of death in 2014 for those under the age of 45 years and the third most common cause of death for those aged less than 55 years, after neoplasm and diseases of the circulatory system¹. Major trauma describes serious and often multiple injuries where there is a strong possibility of death or disability.

To deliver safe, effective, and person-centred care for major trauma patients and achieve the best outcomes, we need to reduce death and disability and ensure patients continue to be supported to help maximise their quality of life.

In 2013, a report produced by the Major Trauma Subgroup of the National Planning Forum (NPF)², outlined possible ways to enhance existing major trauma services for all ages in Scotland. Patients who sustain major trauma have a better outcome if they are quickly taken to a hospital where all the specialist services, they will require are available, often referred to as definitive care. One of the significant changes in Scotland will be the introduction of major trauma centres (MTCs), where patients with suspected major trauma will be taken, either directly or after initial assessment and treatment in a trauma unit (TU) or local emergency hospital (LEH). Work to achieve this objective is underway. The system will rely on the right patients being taken to the right facility and the Scottish Ambulance Service (SAS), MTCs, TUs and LEHs will play a key role in the whole service being effective for all trauma patients.

Scottish Trauma Audit Group

The Scottish Trauma Audit Group (STAG) is one of the national audits within the Scottish National Audit Programme (SNAP) of Public Health Scotland (PHS).

STAG was set up in 1991 to audit the management of seriously injured patients in Scotland and audited trauma care until 2002. The current trauma audit was

recommenced in 2011 and currently includes patients who are seen in the emergency department (ED), in 28 hospitals (July 2022), throughout Scotland.

The NPF made a series of recommendations for the future of trauma data collection provided by STAG in view of establishing a major trauma service, (now referred to as the Scottish Trauma Network (STN)).

- All hospitals with an emergency department (ED) should contribute to STAG (n=30).
- STAG should be extended to include data collection on the full patient journey including rehabilitation and patient reported outcomes.
- STAG and the SAS data should be linked to allow for more robust information on the early stages of care.
- STAG and hospital in-patient data (SMR01 data³) linkage should be progressed allowing valuable information to be explored in relation to outcomes and survival.
- The audit should expand to include paediatric trauma.
- National Key Performance Indicators should be agreed and measured to help monitor the success of the major trauma service and drive improvements.

All these recommendations are either complete or being progressed. More information on the STAG audit can be found at www.stag.scot.nhs.uk

To achieve these recommendations STAG reviewed its current method of data collection (paper proforma) and after a robust review of options sought funds to build an electronic data collection system, now known as eSTAG. eSTAG went live in November 2017. Reporting of these data are in **Tableau**™ which is now widely used in PHS.

Key Performance Indicators

This document outlines the key performance indicators (KPIs) that were agreed by the Major Trauma Oversight Group at the Scottish Government on the 4th June 2015.

The KPI Subgroup of the STAG Steering Group first met in September 2014. The indicators have been selected following a long consultation process and literature reviews for supporting evidence.

As part of the regionalisation of trauma care in England, the Trauma Audit and Research Network (TARN) ⁴ introduced a range of performance indicators. We acknowledge and are grateful for the work done by this group, which has informed the development of the Scottish KPIs.

A clinical governance policy has been developed (Scottish National Audit Programme governance process) to ensure that there is a clear and robust process to ensure that hospitals are given direction and support to ensure improved compliance with these indicators and to drive local improvement.

The KPIs are split into three sections:

- Pre-hospital care includes the response from the call alerting the emergency services, to on-scene care, triage, and primary transfer.
- Early hospital care includes the initial reception of the patient in the ED and inter-hospital transfer (if required), through to the patient being discharged to a rehabilitation service or home.
- Ongoing hospital care includes rehabilitation of the patient and Patient Reported Outcomes Measures (PROMS) at various timeframes following discharge from hospital.

Each indicator has a description explaining the performance to be achieved and a rationale as to why it is important. There is also detail about how the indicator is reported with numerator and denominator details and the data source.

Scotland's geography differs from that of England and makes the provision of equitable trauma care inherently more challenging. The KPIs take cognisance of this fact, and are, in no small part, aimed at ensuring the correct functioning of the network, prior to patients' arrival at a hospital.

The linkage of data collected by the SAS and hospitals is essential to the success of the KPIs. The linkage work has been conducted by STAG, the SAS, and the Service Access Team of National Services Scotland and this process now takes place within the functionality of eSTAG to ensure that data are available as soon as possible to clinical and management teams within health boards.

1. Pre-Hospital Care

Pre-hospital care encompasses the response from the call alerting the emergency services, to on-scene care, triage, and primary transfer (if required).

Pre-hospital triage

1.1	
Description	Patients who have suffered significant trauma are assessed by the Scottish Ambulance Service (SAS) using the SAS Trauma Triage Tool (SASTTT).
Rationale	The Trauma system relies on the need of the patient and the capacity of the service being matched and triage will help deliver this. ⁵⁻¹³
Numerator	Number of major trauma patients who are assessed by the SAS, using the SASTTT.
Denominator	Number of major trauma patients who arrive by the SAS.
Note	May 22 - STAG steering group agreed that patients with pre-hospital medical team in attendance have already been triaged so TTT data is not required.

The triage tool will be reviewed by the SAS to ensure it is highlighting the right patients to go to the right hospitals. Although triage will be protocol-based, it is acknowledged that provider judgement ('up-triage', when a provider feels that the protocol underestimates the degree of injury; and 'down-triage' when a provider feels that the protocol overestimates the degree of injury) adds to the performance of triage. This information will be recorded, and it will therefore be possible to assess the performance of the triage trauma tool as well as provider judgement. This will provide useful data for the further development and refinement of the triage tool in Scotland, with a view to optimising under and over triage rates.

Pre alert

1.2	
Description	Patients who are triaged as requiring Major Trauma Centre (MTC) care are notified to the receiving hospital (pre-alert).
Rationale	Pre alerts allow trauma teams to be assembled prior to arrival of the patient, improving the care they receive in the initial stages of their hospital journey ^{6,14}
Numerator	Number of patients triaged as requiring MTC care for whom a pre alert is recorded.
Denominator	Number of patients triaged as requiring MTC care.
Note	May 2023 - STAG steering group agreed to change denominator to ISS > 15. This was ratified by the STN Core group in June 2023 and will be updated in eSTAG later this year.

Diversion to lower level of care

1.3	
Description	Patients who are triaged as requiring MTC care are taken directly to a MTC if they are within 45 minutes' travel time.
Rationale	The aim of the trauma system is to deliver patients to definitive care, whenever possible; to provide safer care, decrease mortality and improve functional outcome. ^{2,15-17}
Numerator	Number of patients triaged to MTC care that are within 45 minutes' travel time of a MTC and are taken directly to a MTC.
Denominator	Number of patients triaged to MTC care that are within 45 minutes' travel time of a MTC.
Note	May 2023 - STAG steering group agreed to change denominator to ISS > 15. This was ratified by the STN Core group in June 2023 and will be updated in eSTAG later this year.

2. Early hospital Care

Early hospital care includes initial reception of the patient in the ED through to the patient being discharged to a rehabilitation service or home.

Consultant led reception for patients triaged and taken to MTC care

2.1.1	
Description	Patients who are triaged as requiring MTC care and are taken to a MTC are received by a consultant led trauma team.
Rationale	A Consultant will have the necessary expertise and experience to effectively coordinate the initial assessment and treatment of a major trauma patient. ^{7,18}
Numerator	Number of patients who are triaged and taken to a MTC and are received by a consultant led trauma team.
Denominator	Number of patients who are triaged and taken to a MTC.
Paediatrics	Paediatric Emergency Medicine Consultant: Same definition as adult from 08.00-23.59. Seen by a consultant within 30mins from 00.00 to 07.59. ¹⁹
Paediatric numerator	Number of patients who are triaged and taken to PMTC care and time of admission is between 08.00 and 23.59 and are received by a consultant led trauma team. Number of patients who are triaged and taken to PMTC care and time of admission is between 00.00 and 7.59 and are seen by a consultant within 30 minutes of arrival.
Paediatric denominator	Number of patients who are triaged and taken to PMTC care and time of admission is between 08.00 and 23.59. Number of patients who are triaged and taken to PMTC care and time of admission is between 00.00 and 7.59.
Note	May 2023 - STAG Steering group agreed to change denominator to ISS > 15. This was ratified by the STN Core group in June 2023 and will be updated in eSTAG later this year.

Consultant review for patients triaged to MTC care and taken to a TU

2.1.2	
Description	Patients who are triaged to MTC care and are taken to a TU should be seen by a consultant within 60 minutes of arrival.
Rationale	A Consultant will have the necessary expertise and experience to effectively coordinate the initial assessment and treatment of a major trauma patient. ^{7,18}
Numerator	Number of patients who are triaged to MTC care and taken to a TU and are seen by a consultant within 60 minutes of arrival.
Denominator	Number of patients who are triaged to MTC care and taken to a TU.
Note	May 2023 - STAG steering group agreed to change denominator to ISS > 15. This was ratified by the STN Core group in June 2023 and will be updated in eSTAG later this year.

Time to MTC Care

2.2	
Description	Major trauma patients who are not taken directly to a MTC and are later transferred to a MTC are transferred within 24 hours.
Rationale	Some patients with major trauma will not be taken directly to a MTC due to several reasons including prolonged distance to a MTC, unstable clinical condition, under triage and patients having been taken to hospital by private transport. It is essential that these patients are transferred to definitive care, i.e., a MTC as soon as possible, improving the patient experience and outcome. ²
Numerator	Number of major trauma patients, who are admitted to a MTC within 24 hours of arrival in the first ED.
Denominator	Number of major trauma patients who are transferred from an LEH or TU to a MTC.

Time to Secondary Transfer

2.3	
Description	Time to secondary transfer to a MTC for patients who have suffered major trauma (ISS>15) is minimised to ≤ four hours from time of call (to arrange transfer) to SAS to departure.
Rationale	Major trauma patients who are not taken directly to a MTC should be transferred without delay to definitive care after initial assessment and optimisation in the receiving hospital. ²
Numerator	Number of major trauma patients who depart their receiving hospital to a MTC in ≤ four hours from call to SAS.
Denominator	Number of major trauma patients who are transferred from a non-MTC to a MTC.
Data source - Transfer by SAS	Numerator = SecondaryTransferWithin4Hr Denominator = ISS > 15, FirstHospType = LEH or TU, TransReason = MTC care
Paediatric patients transfer by ScotSTAR Paediatric Retrieval Service	Decision to mobilisation time <60 minutes. Decision to team arrival with patient <3 hours (road/mainland). Decision to team arrival with patient <4 hours (island/air). Note – these are standards set by ScotSTAR Paediatric Retrieval Service. ²⁰
Paediatric numerator	Number of patients where time from decision to mobilisation is less than 60 minutes. Number of patients where time from decision to team arrival with patient is less than 3 hours (road/mainland). Number of patients where time from decision to team arrival is less than four hours (island/air).
Paediatric denominator	Number of major trauma patients who are transferred from a non-MTC to a MTC (by ScotSTAR) and age on admission in first hospital is < 16 years. Number of major trauma patients who are transferred from a non-MTC to a MTC (by ScotSTAR) and age on admission in first hospital is < 16 years, AND team arrived by road/ mainland. Number of major trauma patients who are transferred from a non-MTC to a MTC (by ScotSTAR) and age on admission in first hospital is < 16 years, AND team arrived by air.

Time to CT head - GCS < 13 or intubated

2.4.3	
Description	Patients who have sustained a head injury with a GCS < 13 (or are intubated) have a CT scan within one hour of arrival in first hospital with an ED.
Rationale	NICE recommend that adults who have sustained a head injury and GCS less than 13 on initial assessment in the emergency department should have a CT head scan within one hour to quickly determine clinically important brain injuries. NICE Pathways
Numerator	Number of patients with a GCS <13 (or are intubated) who undergo a CT head within one hour of arrival in hospital.
Denominator	Number of patients with a GCS < 13 (or are intubated) who have a CT head within 12 hours of arrival in hospital.
Notes	Included in SNAP governance from January 2021. Exclusions: patients who die or go to theatre within one hour. May 2023 - decision to change the denominator to 12 hours of arrival in hospital. eSTAG will be updated later this year.

Time to CT head written report - GCS < 13 or intubated

2.4.4	
Description	Patients who have sustained a head injury with a GCS < 13 have a CT scan written report available within one hour of the CT scan.
Rationale	All patients with a severe head injury following trauma to the head should have a CT scan with a written report as soon as possible to determine treatment required to reduce mortality and improve functional outcome. Royal college of radiologists
Numerator	Number of patients with a GCS < 13 (or are intubated) who have a CT head within 24 hours of arrival where a CT head written report by a radiologist is available within one hour of the CT scan.

2.4.4	
Denominator	Number of patients with a GCS < 13 (or are intubated) who have a CT head within 12 hours of arrival in hospital.
Notes	Included in SNAP governance from January 2021. May 2023 - decision to change the denominator to 12 hours of arrival in hospital. eSTAG will be updated later this year.

Time to CT head - GCS 13-14

2.4.5	
Description	Patients who have sustained a head injury with a GCS 13-14 have a CT scan within 1 hour of arrival in first hospital with an ED or within 3 hours of injury.
Rationale	NICE recommend that adults who have sustained a head injury and have a GCS less than 15 at two hours after injury should have a CT head scan within 1 hour of this finding to quickly determine clinically important brain injuries. To measure this, STAG agreed to allow either 3 hours from injury time or one hour after arriving in the ED. The first option allows for observation time in ED (patients GCS may improve and CT is not required) and option 2 allows for patients whose journey to hospital is delayed. Investigation for clinically important brain injuries in patients with head injury - NICE Pathways
Numerator	Number of patients with a GCS 13-14 (and not intubated) who undergo a CT head within 60 minutes of arrival in hospital or 3 hours of injury.
Denominator	Number of patients with a GCS 13-14 (and not intubated) who have a CT head within 12 hours of arrival in hospital.
Notes	Exclusions: patients that die or go to theatre within one hour. Included in SNAP governance from January 2021. May 2023 - decision to change the denominator to 12 hours of arrival in hospital. eSTAG will be updated later this year.

Time to CT head - written report - GCS 13-14

2.4.6	
Description	Patients who have sustained a head injury with a GCS 13-14 have a CT scan written report available within one hour of the CT scan.
Rationale	All patients with a severe head injury following trauma to the head should have a CT scan with a written report as soon as possible to determine treatment required to reduce mortality and improve functional outcome. Standards of practice and guidance for trauma radiology in severely injured patients (rcr.ac.uk)
Numerator	Number of patients where a CT head written report by a radiologist is available within one hour of the time the CT scan.
Denominator	Number of patients with a GCS 13-14 (and not intubated) who have a CT head within 12 hours of arrival in hospital.
Notes	Included in SNAP governance from January 2021. May 2023 - decision to change the denominator to 12 hours of arrival in hospital. eSTAG will be updated later this year.

MTC Centre care for patients with a severe head injury

2.5	
Description	Patients who have suffered a severe head injury are managed in a MTC.
Rationale	Severe head injury (for this KPI) is defined as a patient with an AIS (Head) ≥ 3 . Patients who have suffered severe head injury should be managed in a MTC with specialist facilities to reduce mortality and improve functional outcome. ^{2,16}
Numerator	Number of patients who have suffered a severe head injury and are managed in a MTC.
Denominator	Number of patients with who have suffered a severe head injury.
Notes	May 2023 - agreed to exclude patients with end-of-life care decisions made in ED from January 2022.

Management of open long bone fractures

2.6	
Description	Patients with an open long bone fracture will receive intravenous (IV) antibiotics within three hours of first contact with Emergency Services.
Rationale	Evidence recommends that IV antibiotics are given to patients with open long bone fractures as soon as possible (ideally within three hours). ²² As injury time data is poorly collected, STAG will use “first contact with emergency services” as a surrogate. This will be the first applicable option from - date/time SAS were called; date/time the patient enters a minor injury unit or the date/time the patient enters an emergency department.
Numerator	Number of patients with a severe open long bone fracture who received IV antibiotics within three hours.
Denominator	Number of patients with a severe open long bone fracture.

Administration of tranexamic acid in patients with severe haemorrhage

2.7	
Description	Trauma patients with severe haemorrhage should be given Tranexamic Acid (TXA) within three hours of first contact with Emergency services.
Rationale	<p>Trauma patients with severe haemorrhage are defined as having received at least one unit of red blood cells within six hours of injury for the purpose of this indicator.</p> <p>TXA has been shown to reduce death by bleeding if given within three hours of injury to bleeding trauma patients. ^{23,24}</p> <p>As injury time data is poorly collected, STAG will use 'first contact with emergency services' as a surrogate. This will be the first applicable option from - date/time SAS were called; date/time the patient enters a minor injury unit or the date/time the patient enters an emergency department.</p>
Numerator	Number of trauma patients with severe haemorrhage that start the administration of TXA within three hours of first contact with emergency services.
Denominator	Number of trauma patients with severe haemorrhage (Red blood cells given within first six hours).
Notes	Denominator was changed to RCC only in July 2020 eSTAG update.

Specialist care

2.8	
Description	Patients who have suffered major trauma and are taken to a MTC, are admitted under the care of a Major Trauma Service (MTS)*.
Rationale	The MTS coordinates patient care, from the acute phase through to rehabilitation; ensuring patients receive all necessary care in a timely manner. ²
Numerator	Number of major trauma patients who are admitted to a MTC (primarily or secondarily) who are under the care of a MTS* AND admitted directly to an ITU, HDU, Major Trauma Ward, Neurosurgical Unit or Spinal Injuries Unit from the emergency department (or following theatre).
Denominator	Number of major trauma patients who are admitted to a MTC (first or transfer hospital).
Notes	<p>* Primary or joint care of the MTS (or SIU, Neurosurgery and Cardiothoracic if isolated injury) which includes review by the designated major trauma consultant led team within 24 hours of admission AND admitted directly to an ITU, HDU, Major Trauma Ward, Neurosurgical Unit or Spinal Injuries Unit from an emergency department (or following IR or surgery).</p> <p>May 2023 - agreed to exclude patients with end-of-life care decisions made in ED from January 2022.</p> <p>June 2023 - STN agreed to MTS definition for adults. Description for paediatrics under review.</p>

Time to CT Head (No longer part of SNAP Governance)

2.4.1	
<i>Description</i>	<i>Patients with a severe head injury (SHI) have a CT scan within one hour of arrival in first hospital with an ED.</i>
<i>Rationale</i>	<i>SHI is defined as a patient with a GCS ≤ 8 and/or an Abbreviated Injury Scale (AIS) (head) ≥ 3. All patients with a SHI following trauma should have a CT scan as soon as possible to determine treatment required to reduce mortality and improve functional outcome.²¹</i>
<i>Numerator</i>	<i>Number of patients with a SHI who undergo a CT head within one hour of arrival in ED.</i>
<i>Denominator</i>	<i>Number of patients with a SHI.</i>
<i>Notes</i>	<i>Discussion around cohort (NICE/ SIGN guidelines GCS<13). Agreed to start with GCS 8 as there is clinician support for this and review once we have compliance data. May 2020 – reviewed and agreed to introduce two new KPIs which better align to NICE guidelines. 2.4.1 and 2.4.2 no longer monitored.</i>

Time to CT head written report (No longer part of SNAP governance)

2.4.2	
<i>Description</i>	<i>Patients with a severe head injury have a CT scan written report available within one hour of the CT scan.</i>
<i>Rationale</i>	<i>All patients with a SHI following trauma to the head should have a CT scan with a written report as soon as possible to determine treatment required. ²¹</i>
<i>Numerator</i>	<i>Number of patients with a SHI where a CT head written report by a radiologist is available within one hour of the time the CT scan was performed.</i>
<i>Denominator</i>	<i>Number of patients with a SHI.</i>

3. Ongoing hospital care

Ongoing hospital care includes rehabilitation of the patient within a hospital setting or/and within the community.

Assessment of rehabilitation needs

3.1.1	
Description	Major trauma patients admitted to a MTC have a rehabilitation plan (RP) written.
Rationale	Rehabilitation should start as soon as appropriate to enable patients to achieve their functional potential. ^{25,26}
Numerator	Number of major trauma patients admitted to a MTC, with a length of stay of more than three days who have a RP.
Denominator	Number of major trauma patients whose length of stay is more than three days.
Note	Plan to extend SNAP governance to trauma units from January 2024.

Time to assessment of rehabilitation needs

3.1.2	
Description	Major trauma patients admitted to a MTC, who have a RP, have it written within three days of admission.
Rationale	As 3.1.1.
Numerator	Number of major trauma patients admitted to a MTC who have a RP that is written within three days of admission to a hospital.
Denominator	Number of major trauma patients admitted to a MTC (on day one, two or three) who have a RP.
Note	Plan to extend SNAP governance to trauma units from January 2024.

Functional outcome

3.2	
Description	Patients who have survived major trauma have their functional outcomes assessed at specific timelines.
Rationale	Trauma systems have been shown to reduce mortality and reduce disability. This will provide information on the functional outcome of patients with major trauma to ensure that the MTS is effective.
Numerator	Number of major trauma patients who survive to discharge who are approached about inclusion in the Patient Reported Outcome Measure (PROMs) trauma programme.
Denominator	Number of major trauma patients who survive to discharge.
Note	Plan to extend SNAP governance to trauma units from January 2024.

Timely transfer to Specialist in-patient facilities

3.3	
Description	Patients who have suffered significant trauma and are admitted to the MTC, are transferred for further specialist in-patient rehabilitation within two days of being assessed fit for transfer.
Rationale	<p>The trauma system relies on access to acute beds in the MTC for patients with these needs. Patient-centred care should also ensure patients are in the best possible facility for each stage of their pathway. The inability to transfer patients quickly when a patient is clinically ready, will cause issues with admitting new patients.</p> <p>Discussions around transfer with appropriate services should be started as soon as possible. If there is a delay with availability of specialist beds, then patients should remain in a ward that continues to meet their ongoing needs and not be transferred inappropriately.</p> <p>Fit for transfer should include patients:</p> <ul style="list-style-type: none"> • When treatment needs can be met within the Specialist In-patient facility. • When the patient can transfer using the patient transport service (or another type of transport agreed by the Scottish Ambulance Service).
Numerator	Number of adult trauma patients with a rehabilitation plan who are transferred to a specialist rehabilitation unit within 2 days of being confirmed as fit for transfer. Date patient ready = day 0.
Denominator	Number of adult trauma patients with a rehabilitation plan who are transferred to a specialist rehabilitation unit.
Note	<p>Documentation of this will be key for STAG data collection. Data to report on this will be taken from the rehabilitation minimum data set (MDS) so only patients with a rehab plan will be included.</p> <p>As the MDS can be completed after 30 days then all patients who go to specialist rehab will be included, irrespective of timeline.</p> <p>Await estag changes to allow collection of relevant data.</p> <p>Estimated summer 2023.</p>

Timely repatriation from MTC

3.4	
Description	Patients who have suffered significant trauma and are admitted to a major trauma centre (MTC) are transferred to an appropriate hospital to meet their needs, nearer home within 2 days of being assessed as fit for transfer.
Rationale	<p>The Trauma system relies on access to acute beds in the MTC for patients with these needs. Patient-centred care should also ensure patients are in the best possible facility for each stage of their pathway. The inability to transfer patients quickly, when a patient is clinically ready, will cause issues with admitting new patients. Patients who are far away from home will be limited from support from family or friends.</p> <p>Discussions around transfer with appropriate services should be started as soon as possible.</p> <p>Fit for transfer should include patients:</p> <ul style="list-style-type: none"> • When treatment needs can be met out with the MTC • Ability to transfer using patient transport service or other type of transport if agreed by the Scottish Ambulance Service.
Numerator	<p>Number of adult trauma patients (with a rehabilitation plan) who are transferred from a MTC to another hospital for repatriation or rehabilitation within 2 days of patient being fit for transfer.</p> <p>Date patient ready = day 0</p> <p>Exclude patients transferred to specialist rehabilitation units.</p>
Denominator	<p>Number of adult trauma patients (with a rehabilitation plan) who are transferred from a MTC to another hospital for repatriation or rehabilitation.</p> <p>Exclude patients transferred to specialist rehab units.</p>
Note	<p>Documentation of this will be key for STAG data collection. Plan to start with patients who have a rehabilitation plan but review how well estimated date of discharge or fit for discharge is routinely documented.</p> <p>Await estag changes to allow collection of relevant data. Estimated summer 2023.</p>

Summary

The development of Scotland's Trauma Network has revolved around the need to balance accessibility and specialist care. Large parts of Scotland are remote and rural. However, the number of people who are injured – and, severely injured – in these locations is small. Most incidents occur in urban areas, and within reasonable access times of the new MTCs.

This situation is not unique; there are other countries and regions facing similar issues. The challenge is in designing an equitable system which ensures that as many patients as possible reach definitive care as quickly as possible.

For this reason, the Scottish KPIs do not only include “traditional” measure of hospital performance, but also measures of the accessibility of the system.

It is intended that these KPIs will help to monitor the performance of the network as a whole and over time, drive its ongoing development and improvement. Furthermore, the KPIs themselves will be reviewed and updated regularly, to ensure that they are fit for purpose and capture the necessary information.

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Abbreviations

AIS	Abbreviated Injury Scale
DT	Date and time
ED	Emergency Department
GCS	Glasgow Coma Scale
ISS	Injury Severity Score
LAC	Local Audit Coordinator
LEH	Local Emergency Hospital
MOA	Mode of arrival
MTC	Major Trauma Centre
NSS	NHS National Services Scotland
PHI	Public Health and Intelligence
SAS	Scottish Ambulance Service
SASTTT	SAS Trauma Triage tool
SHA	Scottish Healthcare Audits
STAG	Scottish Trauma Audit Group
TARN	Trauma Audit and Research Network
TTL	Trauma Team Leader
TU	Trauma Unit

Appendix one: Hospitals in Scotland with an Emergency Department

Health Board	Hospital Name
NHS Ayrshire and Arran	University Hospital Ayr University Hospital Crosshouse
NHS Borders	Borders General Hospital
NHS Dumfries and Galloway	Dumfries and Galloway Royal Infirmary Galloway Community Hospital
NHS Fife	Victoria Hospital, Kirkcaldy
NHS Forth Valley	Forth Valley Royal Hospital
NHS Grampian	Aberdeen Royal Infirmary Dr Gray's Hospital, Elgin Royal Aberdeen Children's Hospital
NHS Greater Glasgow and Clyde	Glasgow Royal Infirmary Inverclyde Royal Hospital Royal Alexandra Hospital, Paisley Royal Hospital for Children, Glasgow Queen Elizabeth University Hospital
NHS Highland	Belford Hospital Caithness General Hospital Lorn and Islands DGH Raigmore Hospital, Inverness
NHS Lanarkshire	University Hospital Hairmyres, East Kilbride University Hospital Monklands, Airdrie University Hospital Wishaw
NHS Lothian	Royal Infirmary of Edinburgh St. John's Hospital, Livingston Royal Hospital for Children and Young People, Edinburgh
NHS Orkney	The Balfour, Kirkwall

Health Board	Hospital Name
NHS Shetland	Gilbert Bain Hospital, Lerwick
NHS Tayside	Ninewells Hospital, Dundee Perth Royal Infirmary
NHS Western Isles	Western Isles Hospital, Stornoway

KPI Subgroup Members

Name	Role	Health Board or equivalent
Alasdair Corfield	Consultant in Emergency Medicine STAG Research Group Chair	NHS Greater Glasgow & Clyde
Hazel Dodds	Senior Nurse, SNAP	Public Health Scotland
Malcolm Gordon	Consultant in Emergency Medicine STAG Chair	NHS Greater Glasgow & Clyde
Jan Jansen	Consultant Surgeon	NHS Grampian
Angela Khan	National Clinical Coordinator, STAG	Public Health Scotland
Prince Obike	Programme manager	Healthcare Improvement Scotland
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Original draft by Mr Jan Jansen (on behalf of STAG/MTOG)

Acknowledgements

Name	Role	Health Board or equivalent
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Dave Caesar	Clinical Lead for Major Trauma on MTOG	South-East
Helen Gooday	Consultant in Rehabilitation Medicine	NHS Grampian
Mike Johnson	Clinical Lead for Major Trauma on MTOG	Tayside
Vicky Jones	Regional Coordinator, STAG	Public Health Scotland
Robin Lawrenson	Clinical Lead	SAS
William Leach	Clinical Lead for Major Trauma on MTOG	West of Scotland
Andrew McIntyre	Associate Medical Director	SAS
Mark Mitchelson	Clinical Lead for Major Trauma on MTOG	North of Scotland
Martin O'Neill	Principal Analyst, SHA	Public Health Scotland
Neil Sinclair	Consultant Paramedic	SAS
STAG Steering Group	Various	

Meetings and Wider Consultation

Date	Meetings	Wider consultation
3 Sep 2014	KPI subgroup members	
13 Nov 2014	KPI subgroup members	
28 Nov 2014	STAG Steering Group members	
Dec 2014	V4.2 sent to Major Trauma Clinical Leads and SAS AMD for comment by 6 Jan 2015 (extended to 14 Jan 2015)	
19 Jan 2015	KPI subgroup members	
23 Feb 2015	STAG Steering Group members	
4 Mar 2015	AK, PO	
5 Mar 2015	V6.4 sent to JJ, MG, AC, CS, HD for comment	
12 Mar 2015	AK, MG	Produced presentation for MTOG and sent to Craig Bell.
18 Mar 2015	Updated to V6.5 and sent to Craig Bell for distribution to MTOG members	
19 Mar 2015	MTOG	Presented at MTOG. Minor changes to wording (v 6.6 produced). MTOG members given 2 weeks to comment before signing off.
2 Apr 2015	MTOG	No further comments received from MTOG group.
21 May 2015	STAG Steering Group members	
Nov 2016		Shared with networks for comment via Scottish Government.

Date	Meetings	Wider consultation
21 Apr 2017	Scottish Trauma Network Steering Group	Agreed on starting to report on current KPIs and these will evolve over time as the network progresses.
May 2020	Scottish Trauma Network Steering Group – discussion around updating CT head KPI to align better with NICE guidelines and ensure clinically relevant – refer to minutes for more detail.	
July 2020		Presented at STAG Clinical Leads meeting following refinements to ensure correct cohort of patients.
September 2020		Discussed at STN Clinical Forum - Request to continue monitoring current CT KPI by members of the STN Clinical Forum.
November 2020		New proposed CT head KPIs shared with Scottish Trauma Network (STN) and Regional Trauma Networks for comment. Both new head CT KPIs agreed by core group.
December 2020		Sent to COMQI for ratification. Agreed by the group who have replaced COMQI, Scottish Government National Audit Programme Board (Health) August 2021.
February 2022	STAG KPI subgroup	Discussions started regarding new KPIs and review of denominators for 1.2, 1.3 and 2.1. Agreement to change 1.1 to automatically assume use of triage tool for patients conveyed by pre-hospital medical teams.

Date	Meetings	Wider consultation
August 2022	STN Steering Group - New KPIs for time to specialist rehabilitation and repatriation agreed at this meeting.	
November 2022	Scottish Government National Audit Programme Board (Health)	New KPIs sent for ratification.
May 2023	STAG Steering Group - Agreed changes to 1.2, 1.3 and 2.1 as noted in these KPIs. Also, agreement to remove patients with end-of-life care decisions in ED from KPIs 2.5 and 2.8.	
June 2023	STN Core Group - Agreements above ratified at this meeting.	