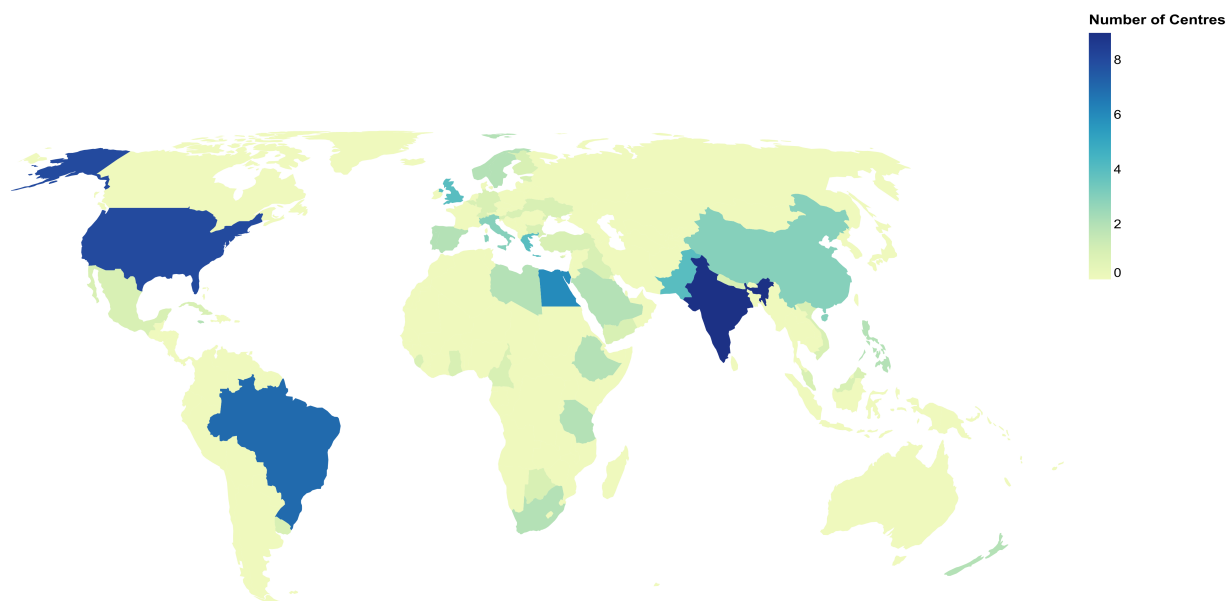


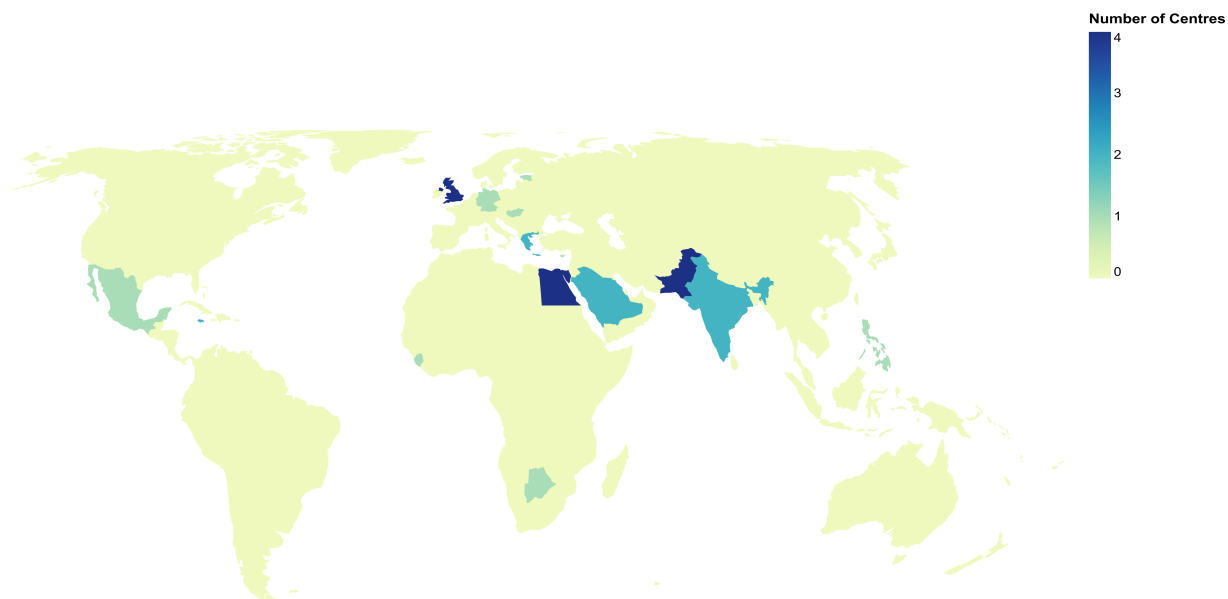


Global Epidemiology and Outcomes Traumatic Brain Injury registry (GEO-TBI)

Registered Centres



Active Centres





GEO-TBI

Foreword

Introduction

Dear GEO-TBI collaborator,

The GEO-TBI registry has been active internationally since the beginning of 2023 and data collection for the GEO-TBI: Incidence study is now concluding. We have begun drafting the first articles and will circulate them to participating site teams for review after the summer. In the meantime, we are delighted to share the second interim report to all the participant institutions, which reports a summary of the data collected so far in 2025. With all your support, we have now registered a total of almost 2300 patients!

In the report, centre-level results and calculations are reported alongside a registry-level international “benchmark”. We believe the data in the full reports (to be circulated end of January) offers interesting insight to the annual patterns of traumatic brain injury (TBI) mechanisms, management and outcomes, allowing for international comparison.

Distribution of this report

The registry-wide summary is distributed to all participating institutions. Centre-level data is only included in the report sent to the respective institution – other centres do not have access to this centre-specific data.

Rationale behind the metrics

This interim report highlights the number of patients added to the registry at this point in the calendar year and the pathway completeness for these patients (from injury to outcome). We hope that this will help in identifying any gaps in the data and improve data quality for the full report to be circulated at the end of January with all data collected in 2025.

The remainder of the metrics in this report serve to show what can be expected from the full report. This includes core metrics of TBI case volume, management and short-term outcomes. The clinical data is reported at the centre, country, HDI and registry levels.

Different injury mechanisms result in differing radiological injury characteristics – these central variables are described with heat-maps, as is the relationship of injury mechanism and the Glasgow Coma Scale (GCS). The distribution of different radiological head injury types are detailed, and the frequency of intracranial pressure (ICP) monitoring is compared against primary injury type. Rates of pre- and in-hospital intubation, time to extubation (TTE) and requirement of surgery are also reported, stratified by injury type. Short-term outcomes are summarised using GCS scores at admission and discharge. In-hospital mortality is reported for each primary head injury type alongside in-hospital intracranial infection rates and length of hospital stay (LOS). To account for loss-to-follow-up, the Glasgow Outcome at Discharge Scale (GODS) was collected for each patient, and its relation to injury type is reported. Finally, longer-term follow-up data are summarised using the extended Glasgow Outcome Scale (GOSE).

General Information

Primary Intracranial Injury types have been grouped as follows:

Injury Group	Primary intracranial injury
Acute subdural haematoma	Acute subdural haematoma
Chronic subdural haematoma	Chronic subdural haematoma
Extradural haematoma	Extradural haematoma
Parenchymal injury	<ul style="list-style-type: none"> Diffuse brain injury Focal brain injury / contusion
Skull fractures	<ul style="list-style-type: none"> Fracture of skull vault Base of skull fracture Compound fracture of skull
Traumatic subarachnoid haemorrhage	Traumatic subarachnoid haemorrhage
Miscellaneous	<ul style="list-style-type: none"> Scalp injury Concussion Injury to cranial nerve Unspecified injury to head Intraventricular haemorrhage

HDI groupings:

HDI group	HDI
Very High	≥ 0.800
High	0.700 – 0.799
Medium	0.550 – 0.699
Low	< 0.550

Human Development Index data from the 2022 Human Development Report.

The HDI data provided within unit reports pertains to the HDI group of the country in which that centre resides.

Mechanisms of injury have been grouped as follows:

Mechanism Group	Mechanism of Injury
Fall	<ul style="list-style-type: none"> Fall: level Fall: $< 2m$ Fall: $> 2m$
NOS	<ul style="list-style-type: none"> NOS: occupational NOS: recreational NOS: other NOS: unknown Blast
Vehicle	<ul style="list-style-type: none"> Vehicle collision: car Vehicle collision: motorcycle Vehicle collision: bicycle Vehicle collision: pedestrian Vehicle collision: other
Assault	<ul style="list-style-type: none"> Assault: blunt Assault: blade

Surgical management has been grouped as follows:

Surgery Group	Surgical management
Craniectomy	Craniectomy
Major surgery	<ul style="list-style-type: none"> Fracture elevation Craniotomy Posterior fossa decompression
Minor surgery	<ul style="list-style-type: none"> ICP monitoring Washout/debridement EVD Burrhole(s)
Other	Other surgical procedure
No surgery	Non-operative management only

GODS scores have been grouped as follows:

GODS group	GODS
Unfavourable	<ul style="list-style-type: none"> 1 Dead 2 Not conscious 3 Lower severe disability 4 Upper severe disability
Favourable	<ul style="list-style-type: none"> 5 Lower moderate disability 6 Upper moderate disability 7 Lower good recovery 8 Upper good recovery

GCS scores have been grouped as follows:

GCS group	GCS
Mild	13 - 15
Moderate	9 - 12
Severe	3 - 8
Dead	In-hospital mortality

GOSE scores have been grouped as follows:

GOSE group	GOSE
Dead	1 Death
Unfavourable	<ul style="list-style-type: none"> 2 Vegetative state 3 Lower severe disability 4 Upper severe disability
Favourable	<ul style="list-style-type: none"> 5 Lower moderate disability 6 Upper moderate disability 7 Lower good recovery 8 Upper good recovery
Lost to follow-up	Not assessed (recorded)

Abbreviations:

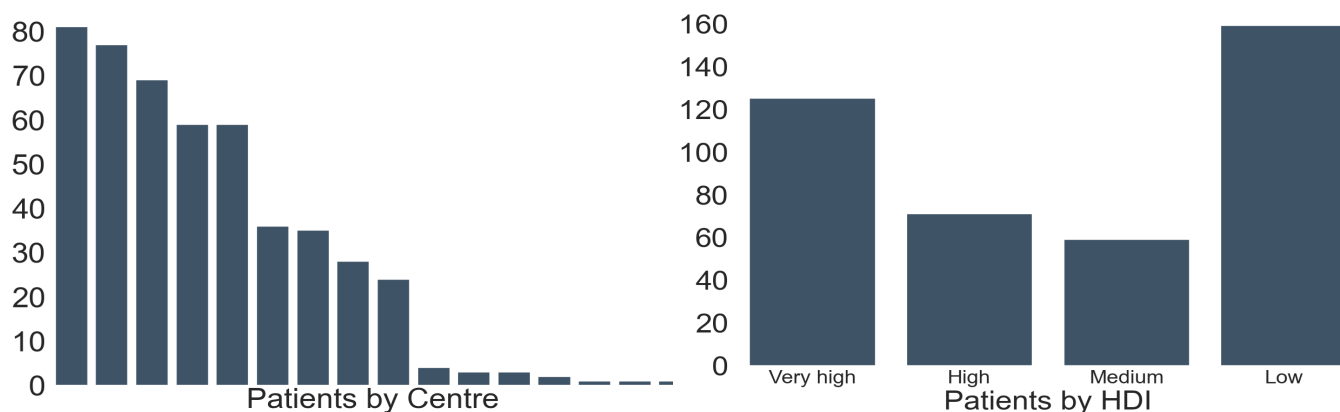
Abbreviation	Meaning
EVD	External Ventricular Drain
ICP	Intracranial Pressure
IQR	Interquartile Range
GCS	Glasgow Coma Scale
GODS	Glasgow Outcome at Discharge Scale
GOSE	Glasgow Outcome Scale-Extended
LOS	Length of Stay
NOS	Not Otherwise Specified
TTE	Time To Extubation



GEO-TBI 2025 so far

Aggregate Report

International: 483 patients

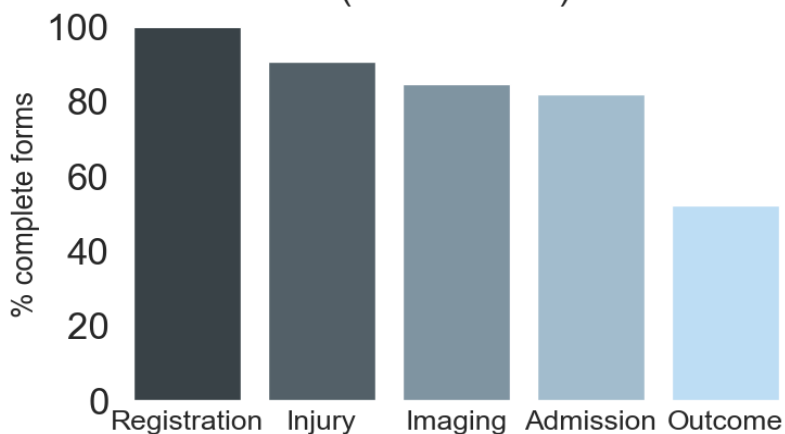


Data Integrity

This section applies to all registry submissions

Compliance Metric		International
Total registered patients	n	2272
Patient records with incomplete injury form	n[%]	215 [9.5%]
Patient records with incomplete imaging form	n[%]	352 [15.5%]
Patient records with incomplete admission form	n[%]	410 [18.0%]
Patient records with incomplete outcome form	n[%]	1085 [47.8%]

Data Compliance (International)



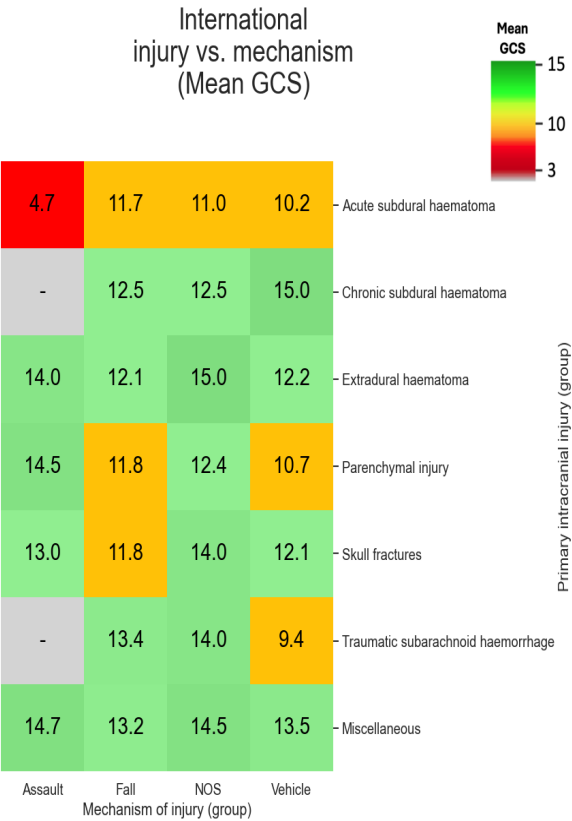
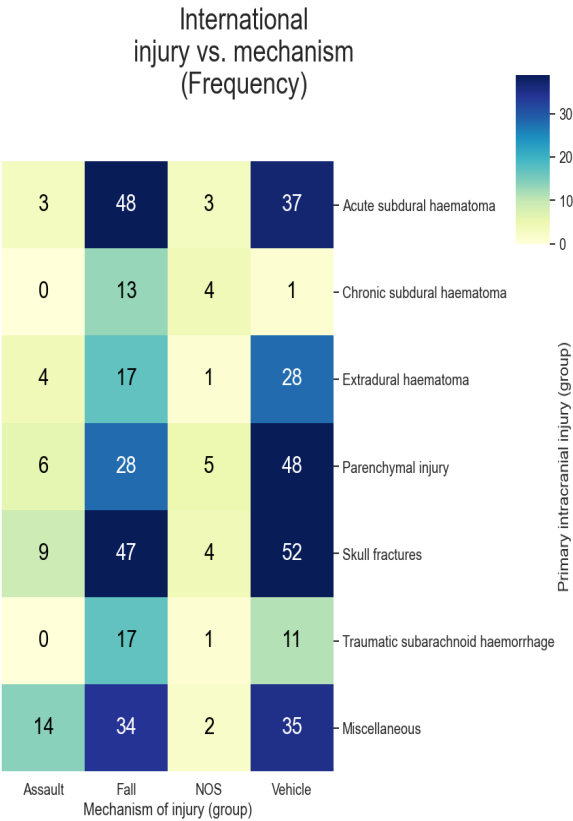
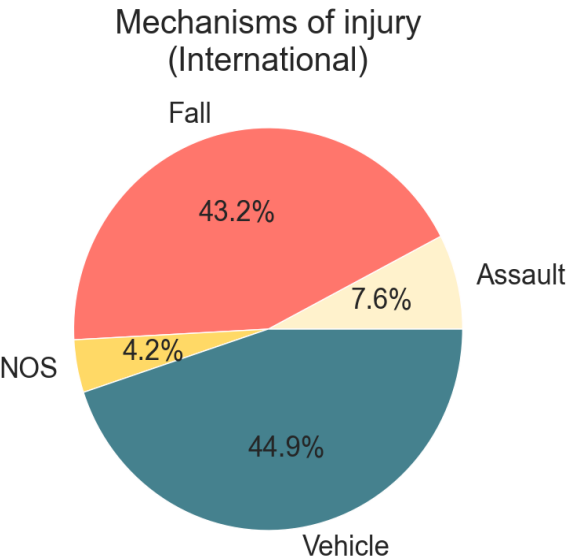
* Patients with an incomplete injury form are excluded from further analysis

Epidemiology

Injury types

Injury *		International
Acute subdural haematoma	n[%]	91 [18.8%]
Chronic subdural haematoma	n[%]	18 [3.7%]
Extradural haematoma	n[%]	51 [10.6%]
Parenchymal injury	n[%]	89 [18.4%]
Skull fractures	n[%]	117 [24.2%]
Traumatic subarachnoid haemorrhage	n[%]	29 [6.0%]
Miscellaneous	n[%]	86 [17.8%]

* Primary head injury type



Management

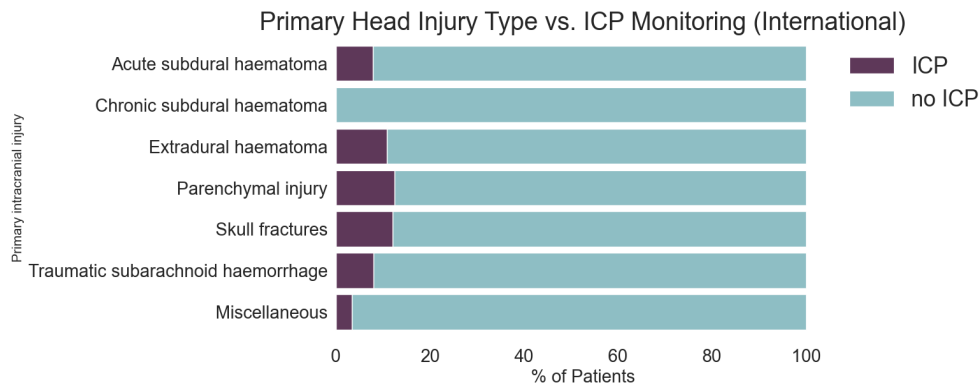
Imaging performed

Injury *		International
Acute subdural haematoma	n[%]	77.0 [84.6%]
Chronic subdural haematoma	n[%]	13.0 [72.2%]
Extradural haematoma	n[%]	45.0 [88.2%]
Parenchymal injury	n[%]	83.0 [93.3%]
Skull fractures	n[%]	98.0 [83.8%]
Traumatic subarachnoid haemorrhage	n[%]	27.0 [93.1%]
Miscellaneous	n[%]	52.0 [60.5%]

ICP Monitoring

Injury *		International
Acute subdural haematoma	n[%]	6.0 [7.9%]
Chronic subdural haematoma	n[%]	0.0 [0.0%]
Extradural haematoma	n[%]	5.0 [10.9%]
Parenchymal injury	n[%]	10.0 [12.5%]
Skull fractures	n[%]	12.0 [12.1%]
Traumatic subarachnoid haemorrhage	n[%]	2.0 [8.0%]
Miscellaneous	n[%]	2.0 [3.4%]

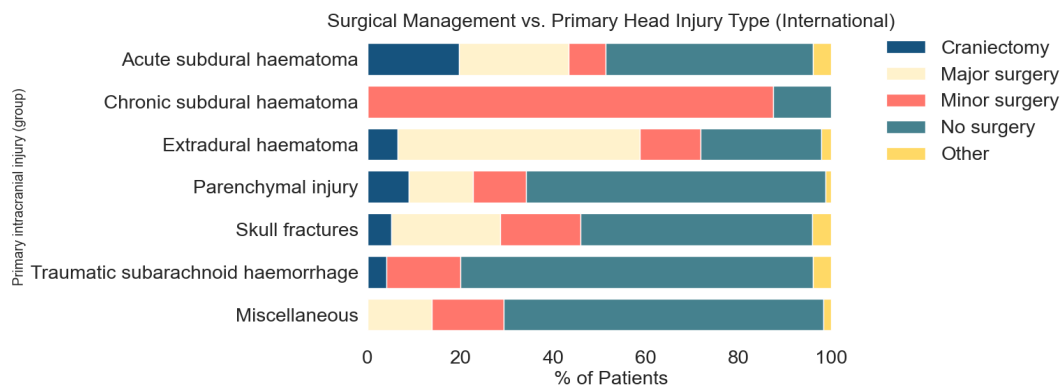
* Primary head injury type



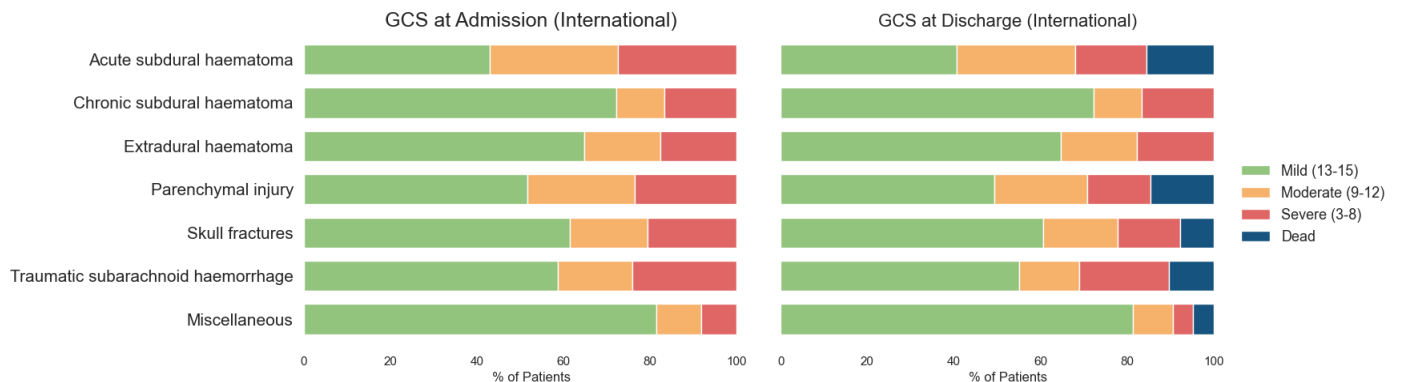
Intubation

Injury *			International
Acute subdural haematoma	Pre-hospital	n[%]	17.0 [18.7%]
	In-hospital	n[%]	26.0 [28.6%]
	Median TTE q50[IQR] (days)		3.0 [7.0]
Chronic subdural haematoma	Pre-hospital	n[%]	0.0 [0.0%]
	In-hospital	n[%]	1.0 [5.6%]
	Median TTE q50[IQR] (days)		0.0 [0.0]
Extradural haematoma	Pre-hospital	n[%]	6.0 [11.8%]
	In-hospital	n[%]	4.0 [7.8%]
	Median TTE q50[IQR] (days)		2.0 [1.25]
Parenchymal injury	Pre-hospital	n[%]	12.0 [13.5%]
	In-hospital	n[%]	23.0 [25.8%]
	Median TTE q50[IQR] (days)		2.0 [7.0]
Skull fractures	Pre-hospital	n[%]	18.0 [15.4%]
	In-hospital	n[%]	23.0 [19.7%]
	Median TTE q50[IQR] (days)		5.0 [5.5]
Traumatic subarachnoid haemorrhage	Pre-hospital	n[%]	5.0 [17.2%]
	In-hospital	n[%]	5.0 [17.2%]
	Median TTE q50[IQR] (days)		5.0 [8.0]
Miscellaneous	Pre-hospital	n[%]	6.0 [7.0%]
	In-hospital	n[%]	6.0 [7.0%]
	Median TTE q50[IQR] (days)		5.0 [6.25]

* Primary head injury type

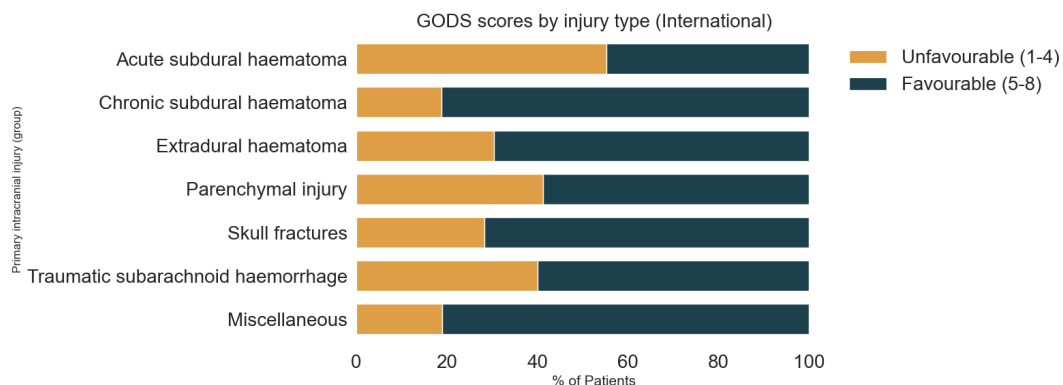


Short Term Outcomes



*Excluding patients that are missing a GCS score at discharge due to incomplete patient records

Injury *	Complications		International
Acute subdural haematoma	Intracranial infection during admission	n[%]	2.0 [2.2%]
	In-hospital mortality	n[%]	14.0 [15.4%]
	Median LoS	q50[IQR] (days)	4.0 [7.25]
Chronic subdural haematoma	Intracranial infection during admission	n[%]	1.0 [5.6%]
	In-hospital mortality	n[%]	0.0 [0.0%]
	Median LoS	q50[IQR] (days)	4.0 [5.25]
Extradural haematoma	Intracranial infection during admission	n[%]	0.0 [0.0%]
	In-hospital mortality	n[%]	0.0 [0.0%]
	Median LoS	q50[IQR] (days)	3.0 [3.0]
Parenchymal injury	Intracranial infection during admission	n[%]	4.0 [4.5%]
	In-hospital mortality	n[%]	13.0 [14.6%]
	Median LoS	q50[IQR] (days)	3.0 [6.25]
Skull fractures	Intracranial infection during admission	n[%]	2.0 [1.7%]
	In-hospital mortality	n[%]	9.0 [7.7%]
	Median LoS	q50[IQR] (days)	3.0 [6.0]
Traumatic subarachnoid haemorrhage	Intracranial infection during admission	n[%]	3.0 [10.3%]
	In-hospital mortality	n[%]	3.0 [10.3%]
	Median LoS	q50[IQR] (days)	5.0 [7.0]
Miscellaneous	Intracranial infection during admission	n[%]	2.0 [2.3%]
	In-hospital mortality	n[%]	4.0 [4.7%]
	Median LoS	q50[IQR] (days)	2.0 [4.0]

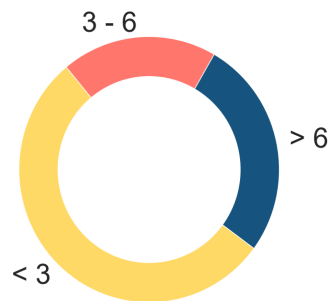


Follow-up

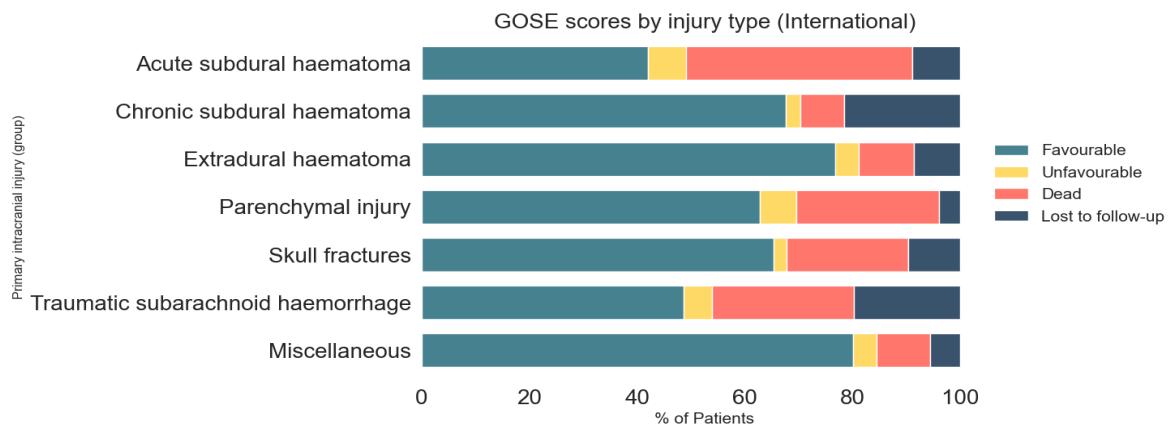
This section applies to all registry submissions

Number of patients with at least one follow-up 1187 [52.2%]

Follow-up Intervals (months)
(International)



Injury *	Time to follow-up	International
Acute subdural haematoma	q50[IQR] (days)	117.0 [184.0]
Chronic subdural haematoma	q50[IQR] (days)	82.0 [151.0]
Extradural haematoma	q50[IQR] (days)	88.5 [168.75]
Parenchymal injury	q50[IQR] (days)	20.0 [170.0]
Skull fractures	q50[IQR] (days)	54.0 [147.75]
Traumatic subarachnoid haemorrhage	q50[IQR] (days)	123.0 [167.75]
Miscellaneous	q50[IQR] (days)	16.0 [188.5]



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