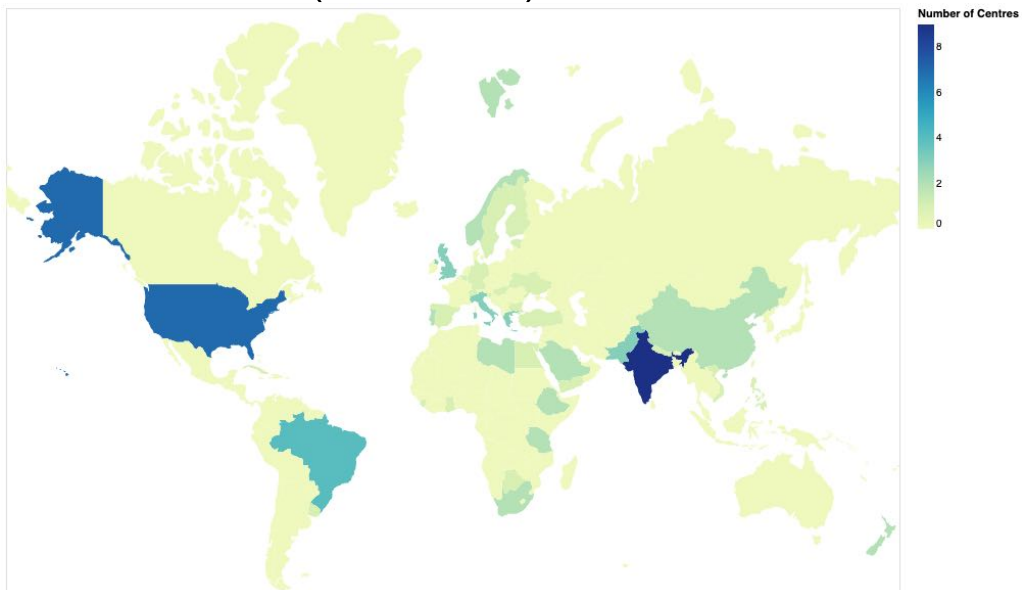


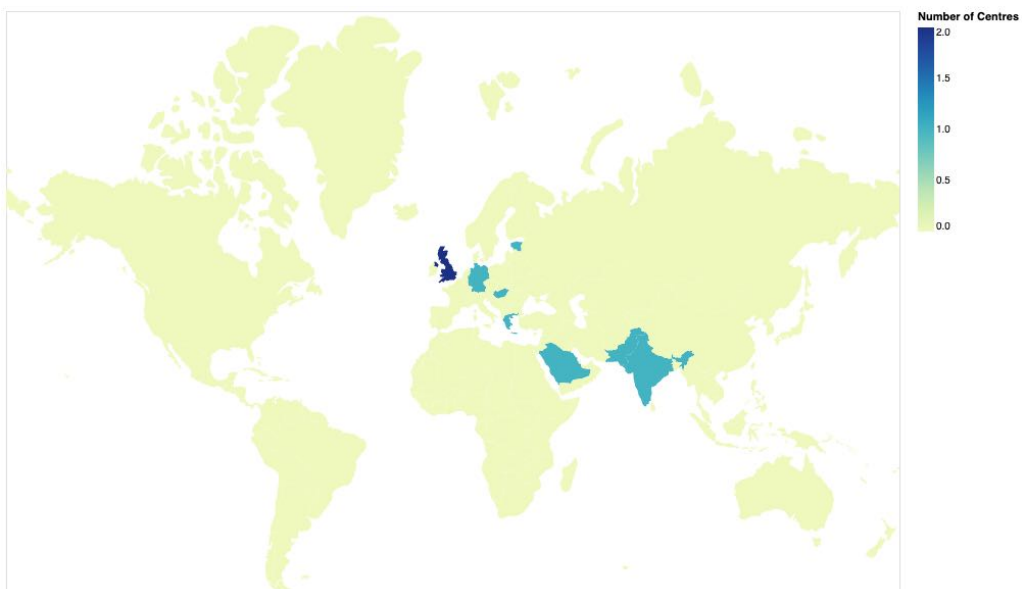


Global Epidemiology and Outcomes Traumatic Brain Injury registry (GEO-TBI)

Registered
Centres



Active
Centres





GEO-TBI

Aggregate report

Foreword

Introduction

Dear GEO-TBI participant,

We are delighted to share the first data summary report to all the participant institutions. The GEO-TBI registry has been active internationally since the beginning of 2023. Data collection for the GEO-TBI: Incidence study is ongoing. In the report, centre-level results and calculations are reported alongside a registry-level international “benchmark”. We believe the data offers interesting insight to the patterns of traumatic brain injury (TBI) mechanisms, management and outcomes, allowing for international comparison.

Distribution of this report

This report is distributed to all participant institutions. Centre-level data is only included in the report sent to the respective institution – other centres do not have access to this data.

Rationale behind the metrics

This report includes core metrics of TBI case volume, management and short-term outcomes. Data integrity and compliance is reported first to contextualise the centre-specific clinical numbers and report any gaps in the data. The clinical data has been reported at the centre, country and registry levels.

Different injury mechanisms result in differing radiological injury characteristics – these central variables are described with heat-mapped table charts, as is the relationship of injury mechanism and the Glasgow Coma Scale (GCS). The distribution of different radiological head injury types is 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 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 is 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



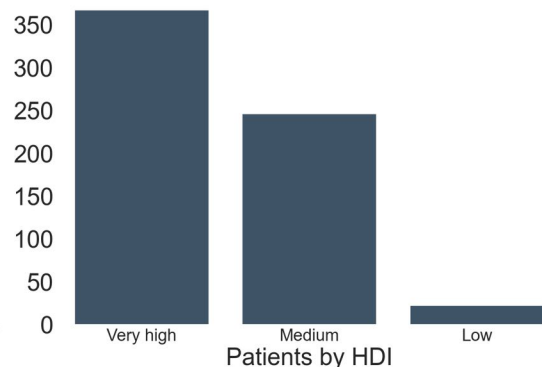
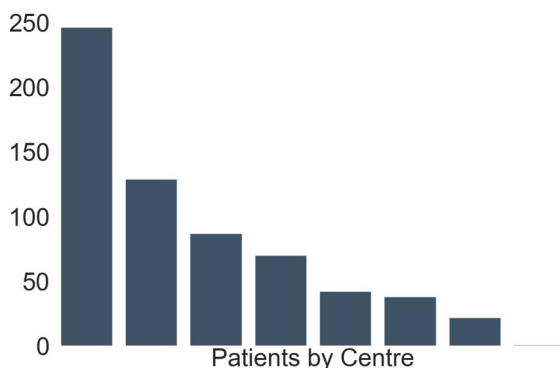
GEO-TBI

January – December 2023

Aggregate Report

Submissions

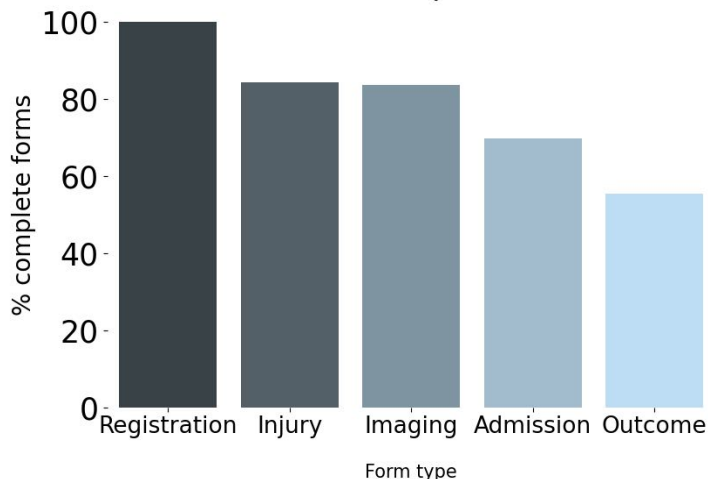
International: 635 patients



Data Integrity

	Your centre	National	Your HDI group	International
Patient records with incomplete injury form <i>n</i> [%]				123 [15.8]
Patient records with incomplete imaging form <i>n</i> [%]				129 [16.6]
Patient records with incomplete admission form <i>n</i> [%]				237 [30.4]
Patient records with incomplete outcome form <i>n</i> [%]				349 [44.7]

International Data Compliance



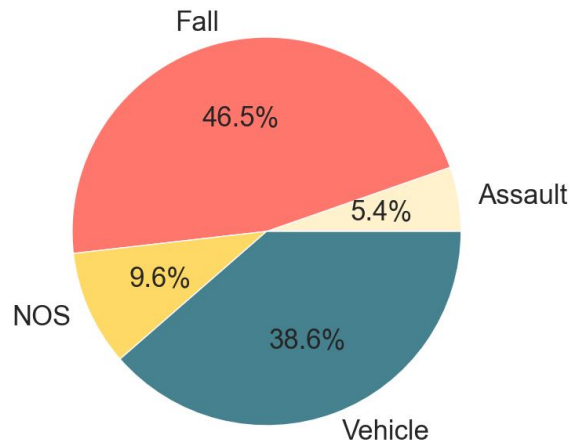
*patients with an incomplete injury form are excluded from further analysis

Epidemiology

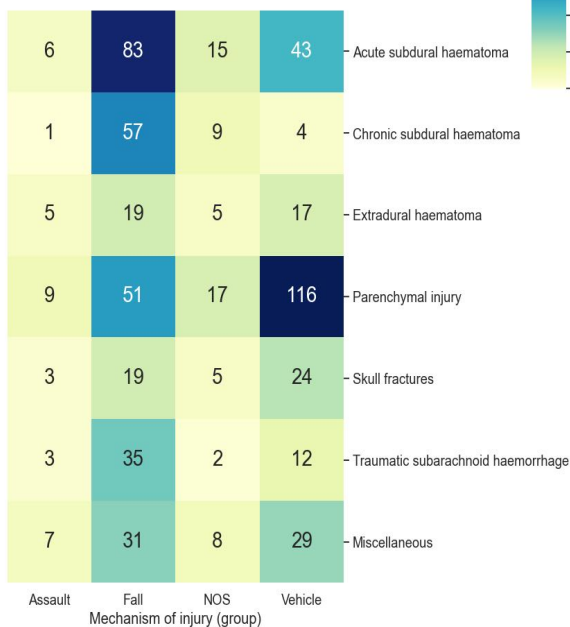
			Your centre	National	Your HDI group	International
Injury*	Acute subdural haematoma	n [%]				147 [23.1]
	Chronic subdural haematoma	n [%]				71 [11.2]
	Extradural haematoma	n [%]				46 [7.2]
	Parenchymal injury	n [%]				193 [30.4]
	Skull fractures	n [%]				51 [8.0]
	Traumatic subarachnoid haemorrhage	n [%]				52 [8.2]
	Miscellaneous	n [%]				75 [11.8]

* Primary head injury type

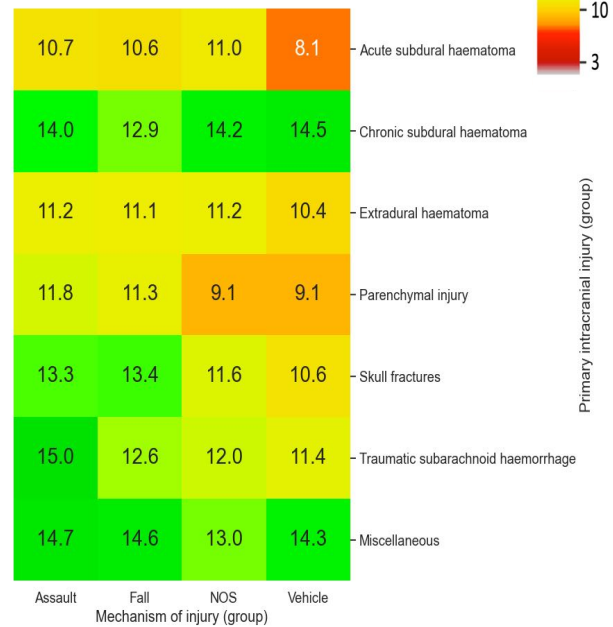
Mechanisms of injury



International injury vs. mechanism (frequency)



International injury vs. mechanism Mean GCS



Management

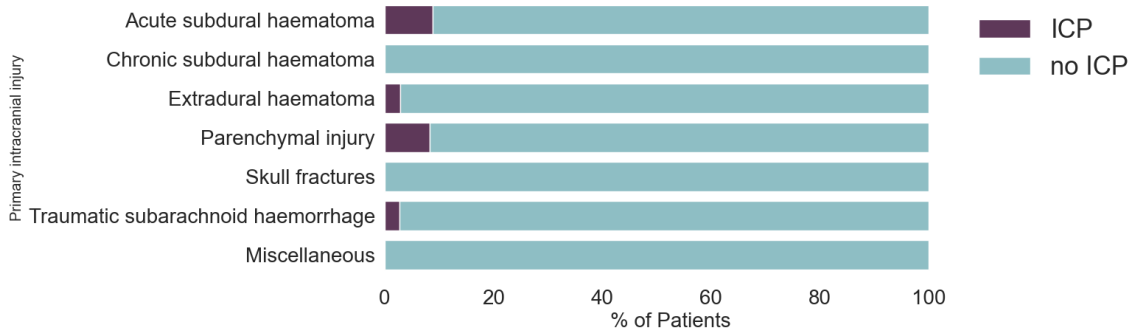
Imaging performed			Your centre	National	Your HDI group	International
Injury*	Acute subdural haematoma	n[%]				147 [100]
	Chronic subdural haematoma	n[%]				70 [98.6]
	Extradural haematoma	n[%]				46 [100]
	Parenchymal injury	n[%]				191 [99.0]
	Skull fractures	n[%]				50 [98.0]
	Traumatic subarachnoid haemorrhage	n[%]				51 [98.1]
	Miscellaneous	n[%]				69 [92]

* Primary head injury type

ICP Monitoring			Your centre	National	Your HDI group	International
Injury*	Acute subdural haematoma	n[%]				10 [8.7]
	Chronic subdural haematoma	n[%]				0 [0]
	Extradural haematoma	n[%]				1 [2.8]
	Parenchymal injury	n[%]				14 [8.2]
	Skull fractures	n[%]				0 [0]
	Traumatic subarachnoid haemorrhage	n[%]				1 [2.7]
	Miscellaneous	n[%]				0 [0]

* Primary head injury type

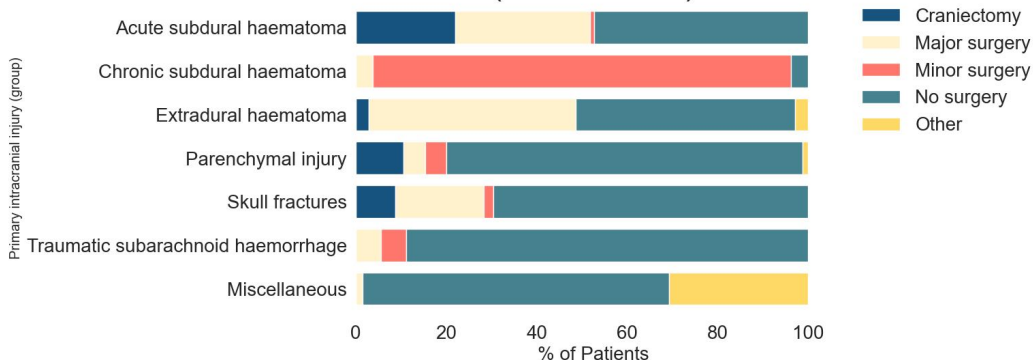
Primary Head Injury Type vs. ICP Monitoring (International)



Intubation				Your centre	National	Your HDI group	International
Injury*	Acute subdural haematoma	Pre-hospital	n[%]				43 [29.3]
		In-hospital	n[%]				80 [54.4]
		Median TTE	q50 [IQR]				2 [4.0]
Chronic subdural haematoma	Pre-hospital	n[%]				5 [7.0]	
	In-hospital	n[%]				8 [11.3]	
	Median TTE	q50 [IQR]				1 [0.25]	
Extradural haematoma	Pre-hospital	n[%]				10 [21.7]	
	In-hospital	n[%]				21 [45.7]	
	Median TTE	q50 [IQR]				2 [3.0]	
Parenchymal injury	Pre-hospital	n[%]				69 [35.8]	
	In-hospital	n[%]				98 [50.8]	
	Median TTE	q50 [IQR]				2 [3.0]	
Skull fractures	Pre-hospital	n[%]				7 [13.7]	
	In-hospital	n[%]				16 [31.4]	
	Median TTE	q50 [IQR]				3 [2.25]	
Traumatic subarachnoid haemorrhage	Pre-hospital	n[%]				6 [11.5]	
	In-hospital	n[%]				12 [23.1]	
	Median TTE	q50 [IQR]				4.5 [7.5]	
Miscellaneous	Pre-hospital	n[%]				2 [2.7]	
	In-hospital	n[%]				11 [14.7]	
	Median TTE	q50 [IQR]				2 [2.0]	

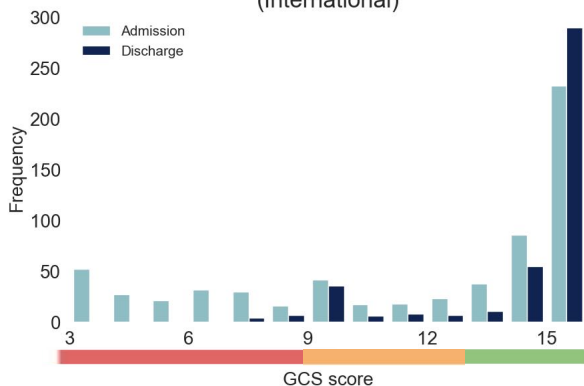
* Primary head injury type

Surgical Management vs. Primary Head Injury Type (International)

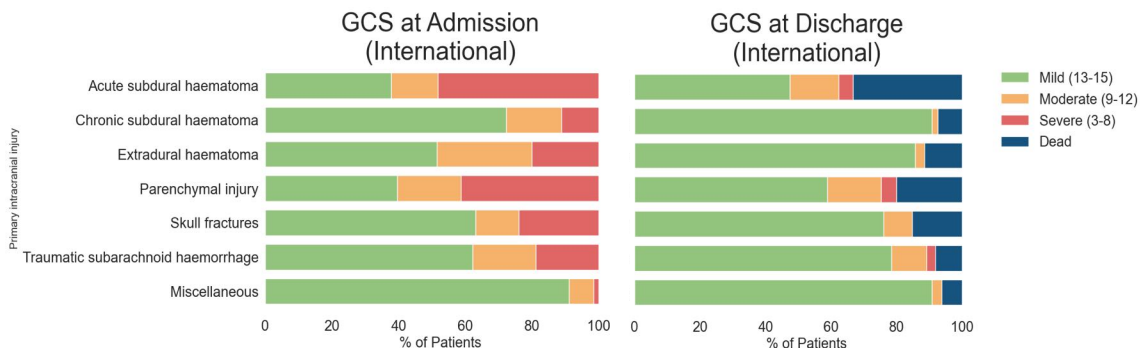


Short Term Outcomes

Distribution of GCS scores (International)



*The total number of patients with a GCS at discharge is lower than at admission, either due to patient death or incomplete patient records.

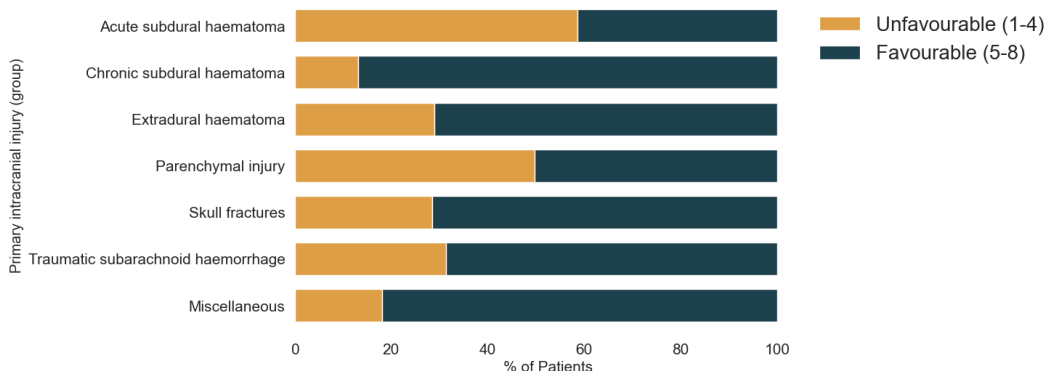


*Excluding patients that are missing a GCS score at discharge due to incomplete patient records

Injury*	Complications		Your centre	National	Your HDI group	International
Acute subdural haematoma	Intracranial infection during admission	n[%]				2 [1.4]
	In-hospital mortality	n[%]				38 [26.0]
	Median LoS	q50 [IQR]				5 [6.0]
Chronic subdural haematoma	Intracranial infection during admission	n[%]				1 [1.4]
	In-hospital mortality	n[%]				4 [5.6]
	Median LoS	q50 [IQR]				4 [7.0]
Extradural haematoma	Intracranial infection during admission	n[%]				0 [0]
	In-hospital mortality	n[%]				4 [8.7]
	Median LoS	q50 [IQR]				6 [8.5]
Parenchymal injury	Intracranial infection during admission	n[%]				3 [1.5]
	In-hospital mortality	n[%]				34 [17.6]
	Median LoS	q50 [IQR]				6 [8.0]
Skull fractures	Intracranial infection during admission	n[%]				1 [2.0]
	In-hospital mortality	n[%]				7 [13.7]
	Median LoS	q50 [IQR]				4.5 [6.0]
Traumatic subarachnoid haemorrhage	Intracranial infection during admission	n[%]				0 [0]
	In-hospital mortality	n[%]				3 [5.8]
	Median LoS	q50 [IQR]				5 [9.0]
Miscellaneous	Intracranial infection during admission	n[%]				0 [0]
	In-hospital mortality	n[%]				4 [5.3]
	Median LoS	q50 [IQR]				6 [6.0]

* Primary head injury type

GODS scores by injury type (International)

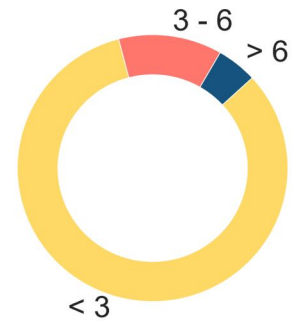


Follow-up

Number of patients with at least one follow-up n[%]
(The section applies to all registry submissions)

International: 431 [55.3]

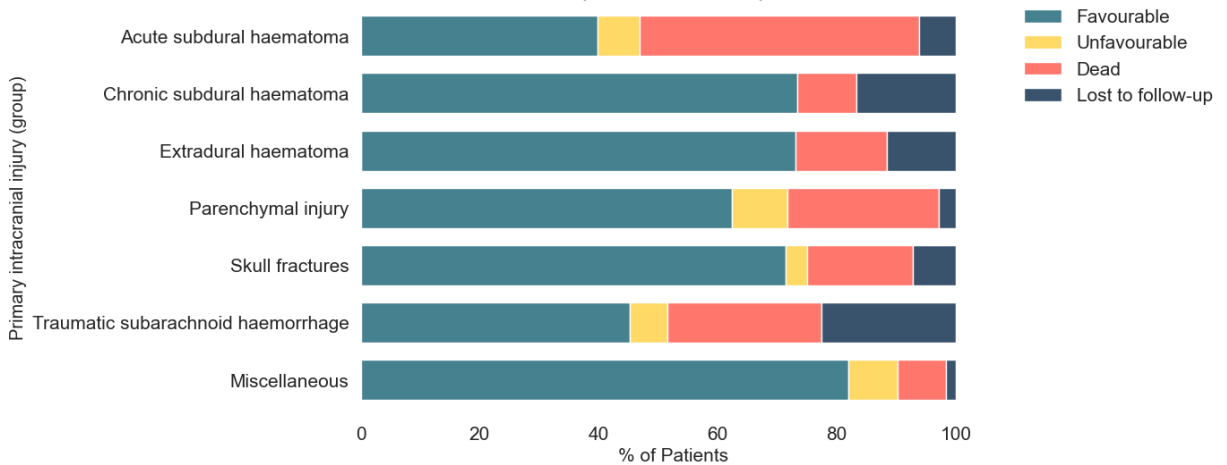
Follow-up Intervals (months)
(International)



Time to follow-up			Your centre	National	Your HDI group	International
Injury*	Acute subdural haematoma	q50 [IQR]				10 [57.5]
	Chronic subdural haematoma	q50 [IQR]				36 [62.5]
	Extradural haematoma	q50 [IQR]				11 [119.0]
	Parenchymal injury	q50 [IQR]				12 [15.0]
	Skull fractures	q50 [IQR]				14.5 [18.5]
	Traumatic subarachnoid haemorrhage	q50 [IQR]				35 [90.0]
	Miscellaneous	q50 [IQR]				11 [4.75]

* Primary head injury type

GOSE scores by injury type (International)



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