INJURY / DISEASE RELATED EVENTS

InjType = Type of injury
InjCause = Cause of injury
InjPlace = Place of injury
InjIntent = Intent of injury

<table>
<tr><td>1. CDE Variable</td><td>InjType = Type of injury
InjCause = Cause of injury
InjPlace = Place of injury
InjIntent = Intent of injury</td></tr>
<tr><td>2. CDE Definition</td><td>Type of injury: provides a broad classification of the main types of TBI
Cause of injury: describes the cause of the injury.
Place of injury: describes the place/setting at which injury occurred.
Intent of injury: describes whether the injury occurred intentionally or not</td></tr>
<tr><td>3. Recommended instrument for assessment</td><td>N/A</td></tr>
<tr><td>4. Description of measure</td><td>Categorical; unique entry</td></tr>
<tr><td>5. Permissible values</td><td>Type of injury
<table>
<tr><td>Basic/intermediate:
Closed
Penetrating
Blast
Crush</td><td>Advanced:
Closed
Closed with open depressed skull fracture
Penetrating
Penetrating – perforating
Penetrating - tangential
Blast
Crush</td></tr>
</table>
Basic/intermediate/advanced:
Place of injury:
Street/highway
Public location (e.g. bar, nightclub, station)
Home/domestic
Work/school
Sports/recreation
Military deployment
Other, specify _____
Cause of injury:
Road Traffic Incident
Incidental fall
Other non-intentional injury
Violence/assault
Act of mass violence
Suicide attempt
Other, specify _____
Intention:
Intentional
Unintentional
Undetermined</td></tr>
</table>

6. Classification: Basic/Intermediate/Advanced	See above
7. Procedure	Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.

8. Comments/Special instructions:

Please select the dominant type/cause; only one category can be checked.

Closed head injury may include patients with a primary 'blunt' type of injury with an open depressed skull fracture (differentiated in advanced version).

Penetrating brain injury (PBI) includes all types of injury in which the intracranial space was penetrated by or due to a foreign object. This could for instance include a gunshot wound, a stab wound or injury due to any other foreign object, irrespective of whether this has been retained within the brain or not. In the advanced version a further differentiation is called for specifying a *'perforating' injury* (through and through) and a *tangential penetrating* injury. In this type of injury a foreign object, mostly a bullet, has struck the skull, driving bone and/or debris into the intracranial space but the missile itself glancing of the bony skull and not passing through brain tissue. In practice, there may be some overlap between a tangential penetrating injury and a closed head injury with open depressed skull fracture. In fact, the pathophysiology may be very similar.

Blast injuries are defined by any form of TBI occurring in association with a blast explosion.

Crush injuries are defined as any form of TBI resulting from a slow mechanical force applied to the skull. Generally, such a type of injury causes substantial damage to the skull itself, whilst the brain injury may be less extensive. The amount of force transmitted to the brain is totally different in this type of injury than in for example closed injuries due to traffic incidents or in blast injuries. We therefore consider it relevant to record this type of injury separately, although its frequency of occurrence is relatively low.

9. Rationale/justification:

Different pathophysiologic mechanisms occur in different types of injury. The place and cause of injury is particularly important from an epidemiologic perspective, but may also be related to mechanism of injury and consequently type and extent of brain damage.

10. References:

Butcher I, McHugh GS, Lu J, et al. Prognostic value of cause of injury in traumatic brain injury: results from the IMPACT study. *J Neurotrauma*. Feb 2007;24(2):281-286.

INJURY / DISEASE RELATED EVENTS

InjMech = Mechanism of Injury

1. CDE Variable	InjMech = Mechanism of Injury
2. CDE Definition	Mechanistic information on the forces causing TBI.
3. Recommended instrument for assessment	N/A
4. Description of measure	Categorical; multiple entries permitted
5. Permissible values	**Intermediate/Advanced** • Acceleration/Deceleration • Direct impact: blow to head • Direct impact: head against object • Crush • Blast • Fall – ground level • Fall – from height > 1 meter (3ft) • Gunshot wound • Fragment (incl. shell/shrapnel) • Other penetrating brain injury, specify _____
6. Classification: Basic/Intermediate/Advanced	Intermediate/advanced.
7. Procedure	Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.
8. Comments/Special instructions: More than one mechanism may contribute to injury. Please check all applicable items.	
9. Rationale/justification: Different pathophysiologic mechanisms occur in different types of injury.	
10. References: N/A	

INJURY / DISEASE RELATED EVENTS

Details on injuries due to Road Traffic Incidents

TBIRT = RT injuries

<table>
<tr><td>1. CDE Variable</td><td colspan="2">TBIRT = RT injuries</td></tr>
<tr><td>2. CDE Definition</td><td colspan="2">Details on the nature of the road traffic incident because of which the TBI was sustained.</td></tr>
<tr><td>3. Recommended instrument for assessment</td><td colspan="2">N/A</td></tr>
<tr><td>4. Description of measure</td><td colspan="2">Categorical: unique entry.</td></tr>
<tr><td rowspan="3">5. Permissible values</td><td colspan="2">Basic</td></tr>
<tr><td colspan="2">Victim
Pedestrian
Motor vehicle occupant
Cyclist
Moped/Scooter
Motor Bike
Other</td></tr>
<tr><td>Intermediate/Advanced</td><td></td></tr>
<tr><td>Victim
Pedestrian
Motor vehicle occupant
Cyclist
Moped/Scooter
Motor Bike
Other</td><td>Other Party
Motor vehicle
Pedestrian
Cyclist
Moped/Scooter
Motor Bike
Tram/Bus
Train/Metro
Obstacle
No other party
Unknown</td></tr>
<tr><td>6. Classification: Basic/Intermediate/Advanced</td><td colspan="2">In the basic version only the function of the victim is recorded. In the intermediate/advanced versions details are requested also on the other party (if applicable) involved in the Road Traffic incident.</td></tr>
<tr><td>7. Procedure</td><td colspan="2">Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.</td></tr>
<tr><td colspan="3">8. Comments/Special instructions:</td></tr>
<tr><td colspan="3">9. Rationale/justification:
Information on the nature of the road traffic incident and the function of the victim is not only important from an epidemiological and prevention perspective, but also provides information on what type of intracranial and extracranial injuries might be expected.</td></tr>
<tr><td colspan="3">10. References:</td></tr>
</table>

INJURY / DISEASE RELATED EVENTS

TBIBlast = Blast Injuries

<table>
<tr><td>1. CDE Variable</td><td colspan="2">TBIBlast = Blast Injuries</td></tr>
<tr><td>2. CDE Definition</td><td colspan="2">Provides details in case of blast injuries</td></tr>
<tr><td>3. Recommended instrument for assessment</td><td colspan="2">N/A</td></tr>
<tr><td>4. Description of measure</td><td colspan="2">Categorical; unique entry.</td></tr>
<tr><td rowspan="3">5. Permissible values</td><td colspan="2">Intermediate</td></tr>
<tr><td colspan="2">Setting of blast
Enclosed
Non-enclosed
unknown
Cause of blast
IED (improvised explosive device)
Land mine
Grenade
Bomb/mortar/RPG (rocket propelled grenade)
Other
unknown</td></tr>
<tr><td colspan="2">Advanced</td></tr>
<tr><td></td><td>Setting of blast
Enclosed
Non-enclosed
unknown
Cause of blast
IED (improvised explosive device)
Land mine
RPG (rocket propelled grenade)
Grenade
Bomb
Mortar
Other, specify _____</td><td>Type of blast
Primary blast
Secondary blast
Tertiary blast
Quaternary blast
Unknown
Side of blast
Left
Right
Top
Bottom
Front
Back
Unknown</td></tr>
<tr><td>6. Classification: Basic/Intermediate/Advanced</td><td colspan="2">Intermediate/advanced</td></tr>
<tr><td>7. Procedure</td><td colspan="2">Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.</td></tr>
<tr><td colspan="3">8. Comments/Special instructions:</td></tr>
<tr><td colspan="3">9. Rationale/justification:
The incidence of blast injuries is increasing, and in particular mild TBI resulting from blast injuries is being recognized with increasing frequency. The pathophysiology of blast TBI is as yet poorly understood. It is therefore highly relevant to document detailed information on the nature of blast injuries.</td></tr>
<tr><td colspan="3">10. References:
Ling G, Bandak F, Armonda R, et al. Explosive blast neurotrauma. J Neurotrauma. Jun 2009;26(6):815-825.</td></tr>
</table>

INJURY / DISEASE RELATED EVENTS

TBIMil = Military injuries

<table>
<tr><td>1. CDE Variable</td><td colspan="2">TBIMil = Military injuries</td></tr>
<tr><td>2. CDE Definition</td><td colspan="2">Documentation of additional aspects (safety and other exposures) specific to injuries sustained during combat settings.</td></tr>
<tr><td>3. Recommended instrument for assessment</td><td colspan="2">N/A</td></tr>
<tr><td>4. Description of measure</td><td colspan="2">Categorical; unique entry.</td></tr>
<tr><td rowspan="3">5. Permissible values</td><td colspan="2">Intermediate/Advanced</td></tr>
<tr><td>Safety:
<u>Combat helmet:</u>
• No
• ACH (Advanced Combat Helmet)
• Other
• Unknown</td><td><u>Body Armour</u>
• No
• Yes
• Unknown</td></tr>
<tr><td>Other Exposure:
<u>Biological agent:</u>
• No
• Suspect
• Confirmed
• Unknown</td><td><u>Chemical agent:</u>
• No
• Suspect
• Confirmed
• Unknown</td></tr>
<tr><td>6. Classification: Basic/Intermediate/Advanced</td><td colspan="2">See Above.</td></tr>
<tr><td>7. Procedure</td><td colspan="2">Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.</td></tr>
<tr><td colspan="3">8. Comments/Special instructions:</td></tr>
<tr><td colspan="3">9. Rationale/justification:
During combat operations military personnel are generally well protected; body armour is highly effective in preventing/limiting extracranial injuries. As a consequence however, relatively more patients are seen with TBI following injuries which in the absence of protective devices might have been fatal. Typically, in combat situations, military personnel may be exposed to other methods of warfare, such as biological and chemical agents.</td></tr>
<tr><td colspan="3">10. References:</td></tr>
</table>

INJURY / DISEASE RELATED EVENTS

TBIViol = Injuries if Violence

1. CDE Variable	TBIViol = Injuries if Violence
2. CDE Definition	Details on the nature of the violence causing TBI.
3. Recommended instrument for assessment	N/A
4. Description of measure	Categorical; unique entry
5. Permissible values	• Robbery/assault • Interpersonal violence (fight) • Domestic assault • Child abuse • Gang violence • Military deployment • Other
6. Classification: Basic/Intermediate/Advanced	Advanced
7. Procedure	Obtain history from patient (if possible), witnesses, first responders, family; if not possible, then review of records.
8. Comments/Special instructions: Self-directed violence, e.g. suicide attempt, is already captured under the variable 'cause of injury'.	
9. Rationale/justification: The incidence of violence as cause of injury is increasing. Contemporary series indicate an incidence of 10%. Capturing specific information on the nature of the violence sustained is therefore relevant.	
10. References: *Maas AIR, Stocchetti N, Bullock R.* Moderate and severe traumatic brain injury in adults. *The Lancet Neurology.* Aug 2008;7(8):728-741. *Jiang JY, Feng H, Fu Z, et al*. Violent trauma in China: report of 2254 cases. *Surg Neurol*. 2007;68(suppl 2):S2-5; discussion S5	

INJURY / DISEASE RELATED EVENTS

DrugAlc = Influence of drugs and/or alcohol

1. CDE Variable	DrugAlc = Influence of drugs and/or alcohol	
2. CDE Definition	Presence of alcohol or other drugs of abuse	
3. Recommended instrument for assessment	Local hospital's toxicology laboratory	
4. Description of measure	Categorical; unique entry	
5. Permissible values	**Victim**	**If Other party**
	Alcohol: • No • Suspect • Definite • Unknown Drugs: • No • Suspect • Definite • Unknown	Alcohol: • No • Suspect • Definite • Unknown Drugs: • No • Suspect • Definite • Unknown
6. Classification: Basic/Intermediate/Advanced	Advanced	
7. Procedure	Obtain laboratory results from hospital reports.	

8. Comments/Special instructions:
Relatively few studies have addressed the specific contribution of the use of alcohol and/or drugs in the occurrence of TBI. Most studies only report on whether or not the patient may have been under influence or not. Experience in clinical practice however is that it is frequently the other party causing the injury who was under the influence and this information is seldom captured. We consider it highly relevant to do so, and have therefore differentiated this variable into whatever information is available on victim and other party. Not all hospitals obtain this information. In some countries recording of this information may not be allowed due to ethico-legal aspects and privacy legislation.
Many patients test positive for opiates and benzodiazepines because they are given these medications by healthcare personnel. Only score suspect/definite if medication/substances were likely taken prior to injury.

9. Rationale/justification:
Influence of alcohol or other drugs may be a cause of traumatic brain injury. Futher, altered neurological function by alcohol or other drugs confounds accurate assessment of a patient's neurological status.

10. References:

INJURY / DISEASE RELATED EVENTS

SafProt = Safety and protection

1. CDE Variable	SafProt = Safety and protection
2. CDE Definition	Use or deployment of protective equipment
3. Recommended instrument for assessment	N/A
4. Description of measure	Categorical; unique entry
5. Permissible values	Helmet: • No • Yes • N/A Airbag: • No • Yes • N/A Seatbelt: • No • Yes • N/A
6. Classification: Basic/Intermediate/Advanced	Advanced
7. Procedure	Firsthand description from first responders, emergency department physicians, or patient (if able to provide reliable information). Alternate source is medical record.
8. Comments/Special instructions:	
9. Rationale/justification: This information is important for public health studies.	
10. References:	