

## **External causes of morbidity or mortality chapter ICD-11 – Impact assessment and option appraisal**

We have undertaken a preliminary assessment of the 'External causes of morbidity or mortality' chapter in ICD11 (See Appendix A). It was always planned to map this chapter later since it was undergoing extensive work at the WHO end and not deemed fit for us to look at.

There are a number of key points emerging:

### **1. Overview**

SNOMED CT does not appear to represent these events in anything like as much detail as ICD11

This is most likely due to 2 main factors

- i) WHO has reorganized this chapter in relation to ICD10
- ii) The concepts that were in SNOMED CT, having migrated from CTV3, have been returned to the UK extension. These concepts were originally added to CTV3 when a similar reorganization was undertaken in the move from ICD9 to ICD10 [they were identified by an [X] prefix to the term]. The motivation for this was to enable all ICD10 codes to be reached from CTV3.

The applicable hierarchy in SCT is Event (event) SCTID: 272379006, and these are cross-mapped to the External Causes Chapter (Y) or on occasions the Z chapter (Factors influencing healthcare).

### **This chapter consists of 7 high level sections with repeating sections**

These relate to collisions, toxins, weapons, forces etc. As such they are events and are organized in 7 sections depending on the volition or the circumstances of the event.

- 1 Unintentional causes (accidents)
- 2 Intentional self harm
- 3 Assault
- 4 Undetermined intent
- 5 Operations of war or armed conflict
- 6 Legal intervention
- 7 Causes of healthcare related harm or injury

## 2. Main Sections (1 to 4 External causes by intent)

The first 4 sections have repeating similar sections e.g. collisions, falls, substances etc. and goes down to a considerable level of detail including whether the incident was on or off road and who was injured e.g. cyclist, pedestrian, person alighting etc.

- ▼ External causes of morbidity or mortality
  - ▼ Unintentional Causes
    - ▶ Transport injury events
    - ▶ Falls
    - ▶ Exposure to object
    - ▶ Exposure to person, animal or plant
    - ▶ Exposure to weapon
    - ▶ Unintentional Drowning or submersion
    - ▶ Threat to breathing
    - ▶ Exposure to thermal mechanism
    - ▶ Unintentional harmful effects of or exposure to noxious substances
    - ▶ Unintentional privation, neglect or maltreatment
    - ▶ Unintentional exposure to other or unspecified mechanism
    - ▶ Exposure to forces of nature
    - ▶ Sequelae of unintentional external causes

And in turn each header has a number of coded/rubrics below

- ▼ Transport injury events
  - ▶ Pedestrian transport accident
  - ▶ Mobility scooter transport accident
  - ▶ Other pedestrian conveyance transport accident
  - ▶ Pedal cycle transport accident
  - ▶ Motorcycle transport accident
  - ▶ Unintentional Causes: Three-wheeler: Transport
  - ▶ Car transport accident
  - ▶ Bus or coach transport accident
  - ▶ Light goods vehicle transport accident
  - ▶ Heavy goods vehicle transport accident
  - ▶ Horse transport
  - ▶ Animal drawn vehicle transport accident
  - ▶ Railway vehicle transport accident
  - ▶ Streetcar or tram transport accident
  - ▶ Agricultural tractor transport accident
  - ▶ Special agricultural vehicle transport, except tractor, transport accident
  - ▶ Special vehicle mainly used on industrial premises transport accident
  - ▶ Special construction vehicle transport accident
  - ▶ All-terrain wheeled vehicle transport accident
  - ▶ Other special all-terrain vehicle transport accident

These concepts can be valuable for clinical practice as it is helpful to know if one has been a victim or perpetrator in these events and the modus operandi e.g. the amount of force involved is helpful in assessing a patient. The three sections define in effect whether the volition of the event is:

- an accident (section 1) e.g. *Unintentional contact with powered machinery*;
- self inflicted (section 2) e.g. *Intentional self-harm by discharging a shotgun*;  
or
- an assault by another person e.g. *Assault by strangulation* (section 3).

Section 4 has overlap with the previous 3 sections, e.g.

*Fall involving ice or snow* (section 1)

vs *Undetermined intent: Fall: Fall Ice or snow* (section 4)

Specification of undetermined intent may not really add any information from a clinical viewpoint, in the same way that unspecified does not add to a clinical concept.

## 2.1. Pedal cycle accidents

We have examined one hierarchy from section 1, Pedal cycle accidents (unintentional) in detail.

There are 2 sub-sections traffic & non-traffic

*Foundation Id : <http://id.who.int/icd/entity/625609065>*

### **Pedal cycle traffic accident**

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#### **Parent(s)**

- Pedal cycle transport accident
- Special tabulation list of traffic accidents

#### **Fully Specified Name**

Pedal cyclist injured in unintentional traffic crash

#### **Intent**

- C.1.1 Unintentional

#### **Mechanism of Injury**

- C.2.1.1.3 Pedal cyclist

And within each section there are more detailed sections which may include where the accident took place.

▼ Pedal cycle transport accident

▶ Pedal cycle traffic accident

▶ Pedal cycle non-traffic accident

▼ Pedal cycle traffic accident

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Pedestrian

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Pedestrian conveyance

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Pedal cycle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Motorcycle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Car or light goods vehicle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Bus or coach or heavy goods vehicle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Animal or animal powered vehicle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Railway vehicle

Unintentional Causes: Pedal cycle: Traffic: Driver: Counterpart: Fixed object

Unintentional Causes: Pedal cycle: Traffic: Driver: No counterpart: Fall from mode of transport

Unintentional Causes: Pedal cycle: Traffic: Driver: No counterpart: Other mechanism

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Pedestrian

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Pedestrian conveyance

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Pedal cycle

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Motorcycle

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Car or light goods vehicle

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Bus or coach or heavy goods vehicle

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Animal or animal powered vehicle

Unintentional Causes: Pedal cycle: Traffic: Passenger: Counterpart: Railway vehicle

We have provisionally termed these in a more clinical format e.g.

*Pedal cycle traffic accident involving collision with light goods vehicle, pedal cyclist injured*

*Pedal cycle traffic accident involving collision with bus, pedal cyclist injured*

These could easily be altered using SQL if a different style is required, e.g.

*Pedal cyclist injured in pedal cycle traffic accident involving collision with light goods vehicle*

*Pedal cyclist injured in pedal cycle traffic accident involving collision with bus*

We are not sure the place of the accident i.e. on a 'public road' is clinically relevant, although some similar concepts do exist in SCT e.g. *Traffic accident on public road* (event) SCTID: 242089005.

In total there are 90 ICD11 codes in each low level section, such as *Pedal cycle traffic accident* (as above) and this pattern is repeated for each mode of transport and location. Whether the place of occurrence is important may be harder to define consistently on an international basis.

Having examined the pedal cycle section almost all of the ICD11 codes will require new SNOMED CT concepts if added.

With the need for 1 to many maps to allow for disjunctive ICD11 rubrics (e.g. *Unintentional Causes: Pedal cycle: Traffic: Person boarding or alighting: Counterpart: Car or light goods vehicle*) we estimate 147 SNOMED CT additional concepts are required for all of the 90 ICD11 codes in the pedal cycle accidents section.

There are 3149 codes in the External causes chapter and if our estimate is extrapolated across the remainder, this could result in approximately 5200 new SCT concepts from this chapter alone. All of these concepts would be primitive with only IS-A relationships defined.

If the distribution of the rest of the chapters had been the same we would have expected about 750 additions, so while we had expected a different distribution there is a significant impact from this chapter, and the final total of additions to SNOMED CT to enable accessing all codes within the ICD11 Mortality & Morbidity Statistics code list would be 8,000 new concepts.

### **3. Section 5 – Operations of war or armed conflict**

This section includes a level of detail of injuries sustained in a war operation down to whether a military or civilian was injured, which is not necessarily clinically relevant, but the mechanism or weapon involved is relevant.

- ▼ Operations of war or armed conflict
  - ▶ War operations involving explosion of marine weapons
  - ▶ War operations involving destruction of aircraft
  - ▶ War operations involving other explosions or fragments
  - ▶ War operations involving fires, conflagrations or hot substances
  - ▶ War operations involving firearm discharge or other forms of conventional warfare
  - ▶ War operations involving nuclear weapons
  - ▶ War operations involving biological weapons
  - ▶ War operations involving chemical weapons or other forms of unconventional warfare
  - ▶ War operations occurring after cessation of hostilities
  - ▶ Other or unspecified war operations

However the level of detail tends to stop short of what might be useful, and much of this is contained within narrower terms, for example *War operations involving firearm discharge or other forms of conventional warfare* has 3 child code/rubrics

- ▼ **War operations involving firearm discharge or other forms of conventional warfare**
  - ▶ War operations involving rubber bullets
  - ▶ War operations involving firearms pellets
  - ▶ War operations involving other firearms discharge

While much of detail that could be clinically relevant to standard clinical practice, e.g. pistol rifle, shotgun is only referenced in narrower terms. Furthermore some are missing e.g. air rifle, while some seem inappropriate, as a bayonet injury does not necessarily involve a discharge of a firearm.

### **War operations involving firearm discharge or other forms of conventional warfare**

#### **Parent(s)**

- Operations of war or armed conflict

#### **Narrower Terms**

- Battle wounds \*
- Bayonet injury \*
- Bullet: carbine \*
- Bullet: machine gun \*
- Bullet: pistol \*
- Bullet: rifle \*
- Bullet: rubber (rifle) \*
- Pellets (shotgun) \*
- war injury, drowned in war operations
- Drowned in war operations, NOS

#### **Causal Mechanisms**

- Firearm, device (physical object)
- Operations of war (event)

While other codes/rubrics are possibly less relevant to non- military practice

- ▼ **War operations involving explosion of sea-based artillery shell**
  - War operations involving explosion of sea-based artillery shell, military personnel
  - War operations involving explosion of sea-based artillery shell, civilian

#### 4. Section 6 – Legal intervention

The section contains only a few codes/rubrics all of which are of questionable relevance to standard clinical practice, other than the mode of injury.

In some cases the level of detail stops short of what would be useful e.g. mode of execution.

- ▼ Legal intervention
  - Legal intervention involving firearm discharge
  - Legal intervention involving explosives
  - Legal intervention involving gas
  - Legal intervention involving blunt objects
  - Legal intervention involving sharp objects
  - Legal execution
  - Legal intervention involving other specified means
  - Legal intervention, means unspecified

#### 6. Section 7 - Causes of healthcare related harm or injury

This section has considerable overlap with other chapters and other content within SNOMED CT as these are adverse effects, sequelae or complications of healthcare procedures, as opposed.

- ▼ Causes of healthcare related harm or injury
  - ▶ Drugs medicaments or biological substances associated with injury or harm in therapeutic use
  - ▶ Surgical or other medical procedures associated with abnormal reaction of the patient, or of later complication, without mention of misadventure at the time of the procedure
  - ▶ Surgical or other medical devices associated with injury or harm in therapeutic use
  - ▶ Surgical or other medical procedures associated with injury or harm in therapeutic use
  - ▶ Other aspects of care associated with injury or harm
  - ▶ Mode of injury or harm associated with a surgical or other medical device
  - ▶ Mode of injury or harm associated with a surgical or other medical procedure
  - ▶ Mode of injury or harm associated with exposure to a drug, medicament or biological substance

In many cases the level of detail stops short of what would be useful for a clinical record

- ▼ Drugs medicaments or biological substances associated with injury or harm in therapeutic use, Agents primarily affecting blood constituents
  - Drugs medicaments or biological substances associated with injury or harm in therapeutic use, Agents primarily affecting blood constituents, Iron preparations or other anti-hypochromic-anaemia preparations
  - Drugs medicaments or biological substances associated with injury or harm in therapeutic use, Agents primarily affecting blood constituents, Vitamin B, folic acid or other anti-megaloblastic-anaemia preparations

There are however some potentially useful concepts

- ▼ Perforation or protrusion of device, as mode of injury
  - Ocular Implant Extrusion
  - Ocular Implant Exposure

## 7. Option appraisal

There appear to be three ways of approaching this chapter:

### ***i) Define as out of scope (or postpone)***

This chapter is defined within ICD10, and therefore presumably in ICD11, as supplementary codes and are not designed to be used as primary coding. For other, but smaller sections similar to this we have opted not to include, e.g. *Findings of resistance to antibiotics*.

#### *Advantages*

Least resource & time implications

#### *Disadvantages*

Potentially clinically useful concepts could be missed.

### ***ii) Add all new content***

#### *Advantages*

There are some factors that make this potentially easier, despite the numbers involved.

- Repeating sections mean the modeling and terming can be semi-automated. This is an approach we have taken with the Injury chapter, which has similar repeating patterns
- Concepts should be easier to inspect in SCA as all are primitive with no attributes so only terms and parents would need to be inspected;
- The task for the mapping team would be relatively easy as these are all 1:1 maps.

#### *Disadvantages*

Up to 5000 new concepts to be added to SNOMED CT

Arguably not all concepts clinically relevant and recent effort has been made to expunge similar concepts derived from ICD-9CM.

Defining concepts on an international basis could be problematic, e.g. 'pavement' has very different meaning in the UK and Canada



**iii) Intermediate approach**

Concepts to be added where clinically relevant and - this would exclude the place, but would give the clinician an idea of the force of impact.

This could include sections 1, 2 & 3 but exclude sections 4, 5, 6 & 7 unless a direct or derived concept is missing in these sections or elsewhere in SNOMED CT.

*Advantages*

Consistent with current editorial approach to include clinically relevant concepts

Potential to be partially automated (recurring groups) but some concepts already in SNOMED CT so manual checking required in addition.

*Disadvantages*

Resources required not known until work is underway.

Detailed examination of 'excluded' sections required in order to identify events missing in other sections.

Defining clinical relevance on an international basis could be problematic as reporting requirements may vary by country or health system

May need to discuss with domain experts (ER or A/E).

## Appendix A

Upper levels of ICD 11 chapter Available at:

<http://apps.who.int/classifications/icd11/browse/f/en>

External causes of morbidity or mortality

### **Unintentional** Causes

Transport injury events

Falls

Exposure to object

Exposure to person, animal or plant

Exposure to weapon

Unintentional Drowning or submersion

Threat to breathing

Exposure to thermal mechanism

Unintentional harmful effects of exposure to noxious substances

Unintentional privation, neglect or maltreatment

Exposure to forces of nature

### **Intentional** Self Harm

### **Assault**

### **Undetermined** intent

Operations of **war or armed conflict**

### **Legal** intervention

Causes of **healthcare related harm or injury**