

## HEAD (cranium and brain)

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
<b>WHOLE AREA</b>				
<b>Use one of the following two descriptors when such vague information, including traumatic brain injury or closed head injury, is the only information available. While these descriptors identify the occurrence of a head injury, they do not specify its severity.</b>				
100099.9	<b>Injuries to the Head NFS</b>	115099.9	115099.9	
100999.9	Died of head injury without further substantiation of injuries or no autopsy confirmation of specific injuries.	115999.9	115999.9	
110009.1	<b>Head Injury NFS involving only headache</b>	160402.1	160402.1	5
113000.6	<b>Crush Injury</b>	113000.6	113000.6	1
<b>Must involve massive destruction of skull, brain and intracranial contents.</b>				
<b>Code a penetrating injury to a specific anatomical site (e.g., brain stem, cerebellum or cerebrum) if site is known. If site is unknown or if more than one site is injured, code to one of the following three descriptors. If the skull is not penetrated, code as scalp laceration. Code a single gunshot wound with both entry and exit wounds as one injury. Assign the following three descriptors to Head/Neck body region for calculating an ISS.</b>				
116000.3	<b>Penetrating Injury to Skull NFS<sup>a</sup></b>	116002.3	116002.3	5
116002.3	superficial; ≤ 2cm beneath entrance	116002.3	116002.3	5
116004.5	major; >2cm penetration	116004.5	116004.5	2

<sup>a</sup> New descriptor in AIS 2005

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
<b>Use the following section for blunt soft tissue injury to the scalp (head). Assign to External Body Region for calculating an ISS.</b>				
110099.1	<b>Scalp NFS</b>	110099.1	110099.1	5
110202.1	abrasion	110202.1	110202.1	5
110402.1	contusion; subgaleal hematoma if >6 months old	110402.1	110402.1	5
110403.2	subgaleal hematoma in infants ≤6 months old <sup>a</sup>	110402.1 <sup>b</sup>	None	5
110404.3	blood loss >20% by volume in infants ≤6 months old <sup>a</sup>	110402.1 <sup>b</sup>	None	5
110600.1	laceration NFS	110600.1	110600.1	5
110602.1	minor; superficial	110602.1	110602.1	5
110604.2	major; >10cm long <u>and</u> into subcutaneous tissue	110604.2	110604.2	5
110606.3	blood loss >20% by volume	110606.3	110606.3	5
110800.1	avulsion NFS	110800.1	110800.1	5
110802.1	superficial; minor; tissue loss ≤100cm <sup>2</sup>	110802.1	110802.1	5
110804.2	major; tissue loss >100cm <sup>2</sup>	110804.2	110804.2	5
110806.3	blood loss >20% by volume	110806.3	110806.3	5
110808.3	total scalp loss	110808.3	110808.3	5

### VESSELS, INTRACRANIAL

**Vessel injuries are coded separately from other injuries to the brain, except for crush-type injury, major penetrating injury to the skull or penetrating injury to the brain stem, cerebrum or cerebellum which include all accompanying brain injuries. If a vessel is not named specifically, code as Vascular Injury in Head NFS. Thrombosis includes any injury to a vessel resulting in its occlusion (e.g., intimal tear, dissection).**

120099.9	<b>Vascular Injury in Head NFS<sup>f</sup></b>	None	None	
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<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>f</sup> New descriptor in AIS 2005 that allows classification of trauma by body region, but does not allow assigning a severity code.

<b>AIS 2005</b>	<b>Injury Description</b>	<b>⇒AIS98</b>	<b>⇐AIS98</b>	<b>FCI</b>
120199.3	<b>Artery NFS<sup>a</sup></b>	121299.3	None	5
120299.3	<b>Anterior cerebral artery NFS</b>	120299.3	120299.3	2
120202.5	laceration	120202.5	120202.5	5
120204.3	thrombosis; occlusion	120204.3	120204.3	2
120205.4	bilateral <sup>c</sup>	120204.3 <sup>b</sup>	None	1
120206.3	traumatic aneurysm	120206.3	120206.3	2
120499.4	<b>Basilar artery NFS</b>	120499.5 <sup>b</sup>	120499.5 <sup>b</sup>	1
120402.5	laceration	120402.5	120402.5	5
120404.5	thrombosis; occlusion	120404.5	120404.5	1
120406.5	traumatic aneurysm	120406.5	120406.5	1
121099.3	<b>Internal carotid artery NFS</b>	121099.3	121099.3	1
121002.5	laceration	121002.5	121002.5	5
121003.6	bilateral <sup>c</sup>	121002.5 <sup>b</sup>	None	1
121004.4	thrombosis; occlusion	121004.4	121004.4	1
121005.5	bilateral <sup>c</sup>	121004.4 <sup>b</sup>	None	1
121006.3	traumatic aneurysm	121006.3	121006.3	5
121499.3	<b>Middle cerebral artery NFS</b>	121499.3	121499.3	1
121402.5	laceration	121402.5	121402.5	5
121404.4	thrombosis; occlusion	121404.4	121404.4	1
121405.5	bilateral <sup>c</sup>	121404.4 <sup>b</sup>	None	1
121406.3	traumatic aneurysm	121406.3	121406.3	5

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with those injuries.

<b>AIS 2005</b>	<b>Injury Description</b>	<b>⇒AIS98</b>	<b>⇐AIS98</b>	<b>FCI</b>
121699.3	<b>Other artery NFS [branch of anterior, posterior or middle cerebral artery or branch of basilar or vertebral artery]</b>	121699.3	121699.3	
121602.4	laceration	121602.4	121602.4	
121604.3	thrombosis; occlusion	121604.3	121604.3	
121606.3	traumatic aneurysm	121606.3	121606.3	
121899.3	<b>Posterior cerebral artery NFS</b>	121899.3	121899.3	2
121802.5	laceration	121802.5	121802.5	3
121804.3	thrombosis; occlusion	121804.3	121804.3	2
121805.4	bilateral <sup>c</sup>	121804.3 <sup>b</sup>	None	1
121806.3	traumatic aneurysm	121806.3	121806.3	5
122899.3	<b>Vertebral artery NFS</b>	122899.3	122899.3	5
122802.5	laceration	122802.5	122802.5	5
122803.6	bilateral <sup>c</sup>	122802.5 <sup>b</sup>	None	1
122804.3	thrombosis; occlusion	122804.3	122804.3	5
122805.4	bilateral <sup>c</sup>	122804.3 <sup>b</sup>	None	1
122806.3	traumatic aneurysm	122806.3	122806.3	5

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with these injuries.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
122299.3	<b>Sinus NFS<sup>d</sup></b>	122299.3	122299.3	5
122202.4	laceration	122202.4	122202.4	5
122204.3	thrombosis; occlusion	122204.3	122204.3	5
120602.4	<b>Carotid-cavernous fistula</b>	120602.4	120602.4	3
120603.4	bilateral <sup>c</sup>	120602.4	None	2
	<b>Do not code internal carotid artery injury separately.</b>			
120899.3	<b>Cavernous sinus NFS</b>	120899.3	120899.3	3
120802.4	laceration	120802.4	120802.4	3
120804.5	open laceration (bleeding externally) or segmental loss	120804.5	120804.5	3
120806.3	thrombosis; occlusion	120806.3	120806.3	3
122099.4	<b>Sigmoid sinus NFS</b>	122099.4	122099.4	1
122002.4	laceration	122002.4	122002.4	1
122003.5	bilateral <sup>c</sup>	122002.4 <sup>b</sup>	None	1
122004.5	open laceration (bleeding externally) or segmental loss	122004.5	122004.5	2
122005.6	bilateral <sup>c</sup>	122004.5 <sup>b</sup>	None	2
122006.4	thrombosis; occlusion	122006.4	122006.4	2
122007.5	bilateral <sup>c</sup>	122006.4 <sup>b</sup>	None	1
123099.4	<b>Straight sinus NFS<sup>a</sup></b>	122299.3 <sup>b</sup>	None	
123002.4	laceration <sup>a</sup>	122202.4	None	
123003.5	open laceration (bleeding externally) or segmental loss <sup>a</sup>	122202.4 <sup>b</sup>	None	
123004.5	thrombosis; occlusion <sup>a</sup>	122204.3 <sup>b</sup>	None	

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with these injuries.

<sup>d</sup> Major vein and sinus were combined as one descriptor in AIS 98. In AIS 2005, they are separate descriptors; hence, the duplication of AIS 98 matching codes.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
122499.3	<b>Superior longitudinal (sagittal) sinus</b> NFS	122499.4 <sup>b</sup>	122499.4 <sup>b</sup>	5
122402.4	laceration	122402.4	122402.4	5
122404.5	open laceration (bleeding externally) or segmental loss	122404.5	122404.5	5
122406.4	thrombosis; occlusion <sup>e</sup>	122406.4	122406.4	2
122407.4	anterior half of sinus <sup>a</sup>	122406.4	None	2
122408.5	posterior half of sinus <sup>a</sup>	122406.4 <sup>b</sup>	None	1
122699.3	<b>Transverse sinus</b> NFS	122699.4 <sup>b</sup>	122699.4 <sup>b</sup>	2
122602.4	laceration	122602.4	122602.4	5
122603.5	bilateral <sup>c</sup>	122602.4 <sup>b</sup>	None	5
122604.5	open laceration (bleeding externally) or segmental loss <sup>e</sup>	122604.5	122604.5	5
122605.6	bilateral <sup>c</sup>	122604.5 <sup>b</sup>	None	1
122607.6	torcular <sup>a</sup>	122604.5 <sup>b</sup>	None	1
122606.4	thrombosis; occlusion	122606.4	122606.4	2
122608.5	bilateral <sup>c</sup>	122606.4 <sup>b</sup>	None	1
122399.3	<b>Vein</b> NFS <sup>a</sup>	121299.3	None	5
122599.3	<b>Vein, major</b> NFS [includes <i>Galen, Labbe, Trolard, Rosenthal</i> or internal cerebral] <sup>d</sup>	122299.3	122299.3	5
122502.4	laceration	122202.4	122202.4	5
122504.3	thrombosis; occlusion	122204.3	122204.3	2
122799.3	<b>Vein, non-major</b> NFS <sup>a</sup> [any named vein that is not major]	121299.3	None	5
122702.4	laceration <sup>a</sup>	121202.4	None	5
122704.3	thrombosis; occlusion <sup>a</sup>	121204.3	None	5

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with these injuries.

<sup>d</sup> Major Vein and Sinus were combined as one descriptor in AIS 98. In AIS 2005, they are separate descriptors; hence, the duplication of AIS 98 matching codes.

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

**NERVES, CRANIAL**

Because of limitations in diagnostic capabilities, cranial nerve injuries may be described only by the type of dysfunction that exists in normal nerve activity. Unless contusion or laceration is specified, code total loss of nerve function (paralysis) as a laceration and partial loss of function (paresis) as a contusion. Do not increase the severity for multiple injuries to the same nerve. Certain nerve injuries have a higher AIS code when they occur bilaterally; these are specifically indicated. Nerve injuries are coded separately from other injuries to the brain, except for crush-type or massive penetrating brain injuries which are inclusive of all injuries to the brain. If a nerve is not named specifically, code as cranial nerve NFS.

Use one of the following three descriptors if specific nerve is not named.

130299.2	<b>Cranial nerve NFS</b>	130299.2	130299.2	5
130202.2	contusion	130202.2	130202.2	5
130204.2	laceration	130204.2	130204.2	5
130499.2	<b>I (Olfactory nerve, tract) NFS</b>	130499.2	130499.2	5
130402.2	contusion	130402.2	130402.2	5
130404.2	laceration	130404.2	130404.2	5
130699.2	<b>II (Optic nerve – intracranial and intracanalicular segments) NFS</b> [includes chiasm and tracts]	130699.2	130699.2	3
	<b>Code intraorbital segment under Face.</b> <b>If segment is unknown, code under Head.</b>			
130602.2	contusion	130602.2	130602.2	3
130604.2	bilateral	130604.2	130604.2	3
130606.2	laceration	130606.2	130606.2	3
130608.2	bilateral	130608.2	130608.2	2

<b>AIS 2005</b>	<b>Injury Description</b>	<b>⇒AIS98</b>	<b>⇐AIS98</b>	<b>FCI</b>
130899.2	<b>III (Oculomotor nerve) NFS</b>	130899.2	130899.2	3
130802.2	contusion or compression [includes injury due to transtentorial herniation]	130802.2	130802.2	5
130804.2	laceration	130804.2	130804.2	3
131099.2	<b>IV (Trochlear nerve) NFS</b>	131099.2	131099.2	3
131002.2	contusion	131002.2	131002.2	5
131004.2	laceration	131004.2	131004.2	3
131299.2	<b>V (Trigeminal nerve) NFS</b>	131299.2	131299.2	3
131202.2	contusion	131202.2	131202.2	5
131204.2	laceration	131204.2	131204.2	3
131499.2	<b>VI (Abducens nerve) NFS</b>	131499.2	131499.2	3
131402.2	contusion	131402.2	131402.2	5
131404.2	laceration	131404.2	131404.2	3
131699.2	<b>VII (Facial nerve) NFS</b>	131699.2	131699.2	3
131602.2	contusion	131602.2	131602.2	5
131604.2	laceration	131604.2	131604.2	3
131605.3	bilateral <sup>c</sup>	131604.2 <sup>b</sup>	None	2
131899.2	<b>VIII (Vestibulocochlear nerve) NFS</b> [includes <b>auditory, acoustic and vestibular nerves</b> ]	131899.2	131899.2	4
131802.2	contusion	131802.2	131802.2	5
131804.2	laceration	131804.2	131804.2	4
131806.3	bilateral	131806.2 <sup>b</sup>	131806.2 <sup>b</sup>	2

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with these injuries.



<b>AIS 2005</b>	<b>Injury Description</b>	<b>⇒AIS98</b>	<b>⇐AIS98</b>	<b>FCI</b>
132099.2	<b>IX (Glossopharyngeal nerve) NFS</b>	132099.2	132099.2	2
132002.2	contusion	132002.2	132002.2	5
132004.2	laceration	132004.2	132004.2	2
132299.2	<b>X (Vagus nerve) NFS</b> [excludes injury in neck, thorax or abdomen]	132299.2	132299.2	3
132202.2	contusion	132202.2	132202.2	5
132204.2	laceration	132204.2	132204.2	3
132499.2	<b>XI (Spinal accessory nerve) NFS</b>	132499.2	132499.2	5
132402.2	contusion	132402.2	132402.2	5
132404.2	laceration	132404.2	132404.2	5
132699.2	<b>XII (Hypoglossal nerve) NFS</b>	132699.2	132699.2	2
132602.2	contusion	132602.2	132602.2	5
132604.2	laceration	132604.2	132604.2	2

## **CODING RULES: Brain**

### **Time to Code**

Given current imaging and other radiological techniques in trauma care, virtually all brain injuries can be diagnosed within the first 24 hours. Surgical and other interventions, such as administering anticoagulants, can increase the size of a contusion or hemorrhage which would artificially inflate its severity. Therefore, coding of brain injuries should be done at 24 hours or at initial confirmed diagnosis if later than 24 hours.

### **Coma**

Under Cerebrum, several descriptors of imaging findings include coma as a modifier (i.e., intraventricular hemorrhage, ischemic brain damage directly related to head trauma, subarachnoid hemorrhage and subpial hemorrhage). If a patient sustains more than one of these documented findings involving coma, assign the coma only once to the finding that will result in the highest AIS code. If there is no difference in the AIS code, add the coma to only one of the findings and code the other finding(s) as not further specified (NFS).

#### **Example:**

<b>Coma &gt; 6 hours, but no substantiated DAI</b>	
Trauma-related ischemic brain damage	140683.5
Subarachnoid hemorrhage	140693.2

### **Diffuse Axonal Injury**

Patients with a substantiated clinical or pathological diagnosis of DAI may also have other imaging findings noted (e.g., intraventricular hemorrhage, petechial hemorrhage). In such cases, only the substantiated DAI is assigned an AIS severity code.

#### **Example:**

Mild DAI (LOC 6-24 hours)	161008.4
Intraventricular hemorrhage	do not code

Note that a diagnosis of DAI must meet specific coding rules described in the text “Diffuse Axonal Injury” (page 50). Substantiated DAI by definition includes prolonged coma.

**INTERNAL ORGANS**

**Injuries to Internal Organs (i.e., brain stem, cerebellum or cerebrum) must be verified by CT, MRI, surgery, x-ray, angiography or autopsy. Clinical diagnosis alone is not adequate for substantiating the existence of an anatomic lesion for coding purposes.**

140299.5	<b>Brain stem [hypothalamus, medulla, midbrain, pons] NFS</b>	140299.5	140299.5	1
140202.5	compression [includes transtentorial (uncal) or cerebellar tonsillar herniation]	140202.5	140202.5	1
140204.5	contusion	140204.5	140204.5	1
140208.5	infarction	140208.5	140208.5	1
140210.5	injury involving hemorrhage	140210.5	140210.5	1
140212.6	laceration	140212.6	140212.6	1
140214.6	massive destruction (crush-type injury)	140214.6	140214.6	1
140216.6	penetrating injury	140216.6	140216.6	1
140218.6	transection	140218.6	140218.6	1

**Use Cerebellum section only if cerebellum, infratentorial or posterior fossa are named. Otherwise, code under Cerebrum.**

140499.3	<b>Cerebellum NFS</b>	140499.3	140499.3	5
140402.3	contusion, single or multiple, NFS [include perilesional edema for size]	140402.3	140402.3	5
140407.2	tiny; <1cm diameter <sup>a</sup>	140403.3 <sup>b</sup>	None	5
140403.3	small; superficial; ≤15cc; 1-3cm diameter	140403.3	140403.3	5
140404.4	large; 15-30cc; >3cm diameter	140404.4	140404.4	3
140405.5	extensive; massive; total volume >30cc	140405.5	140405.5	2

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity in AIS 2005

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
	<b>Cerebellum (continued)</b>			
140410.3	hematoma (hemorrhage) NFS	140410.4 <sup>b</sup>	140410.4 <sup>b</sup>	5
	<b>Use above descriptor for “extra axial” unless further described as epidural or subdural.</b>			
140414.3	epidural or extradural NFS [include perilesional edema for size]	140414.4 <sup>b</sup>	140414.4 <sup>b</sup>	5
140416.2	tiny; <0.6cm thick <sup>a</sup>	140418.4 <sup>b</sup>	None	5
140418.4	small; moderate; ≤30cc or ≤15cc if ≤age 10; 0.6-1cm thick	140418.4	140418.4	5
140422.5	large; massive; extensive; >30cc or >15cc if ≤ age 10; >1cm thick	140422.5	140422.5	1
140426.3	intracerebellar including petechial and subcortical NFS [include perilesional edema for size]	140426.4 <sup>b</sup>	140426.4 <sup>b</sup>	5
140428.2	tiny; <0.6cm diameter [includes radiographic “shearing” lesions] <sup>a</sup>	140430.4 <sup>b</sup>	None	5
140430.4	small; ≤15cc; 0.6-3cm diameter	140430.4	140430.4	5
140434.5	large; >15cc; >3cm diameter	140434.5	140434.5	2
140438.3	subdural NFS	140438.4 <sup>b</sup>	140438.4 <sup>b</sup>	5
140440.2	tiny; <0.6cm thick <sup>a</sup>	140442.4 <sup>b</sup>	None	5
140442.4	small; moderate; ≤30cc or ≤15cc if ≤age 10; 0.6-1cm thick	140442.4	140442.4	5
140446.5	large; massive; extensive; >30cc or >15cc if ≤age 10; >1cm thick	140446.5	140446.5	2
140474.3	laceration [not from penetrating injury] NFS <sup>e</sup>	140474.4 <sup>b</sup>	140474.4 <sup>b</sup>	5
140473.3	≤2cm length or depth	140474.4 <sup>b</sup>	None	5
140472.4	>2cm length or depth	140474.4	None	3

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
	<b>Cerebellum</b> (continued)			
140478.3	penetrating injury NFS <sup>e</sup>	140478.5 <sup>b</sup>	140478.5 <sup>b</sup>	5
140477.3	≤2cm deep	140478.5 <sup>b</sup>	None	5
140476.5	>2cm deep	140478.5	None	2
140489.9	trauma-associated findings not related either to intervention or to anatomically-described head injury NFS <sup>f</sup>	None	None	
140450.3	brain swelling/edema NFS	140450.3	140450.3	5
	<b>Must be directly related to head injury, not anoxia or perilesional. Read “Brain Edema and Brain Swelling” below for coding guidance.</b>			
140458.3	infarction (acute due to traumatic vascular occlusion)	140458.3	140458.3	2
140462.3	ischemic brain damage directly related to head trauma	140462.3	140462.3	5
140466.2	subarachnoid hemorrhage	140466.3 <sup>b</sup>	140466.3 <sup>b</sup>	5
140470.2	subpial hemorrhage	140470.3 <sup>b</sup>	140470.3 <sup>b</sup>	5

### Brain Edema and Brain Swelling

The terms brain edema (BE) and brain swelling (BS) are often confused because in many regions of the world, they are intentionally used interchangeably. However, in other regions BE and BS are considered to be separate entities. Thus, the following definitions are offered.

Brain Swelling is a generic description of a swollen brain whereas brain edema represents a specific type of brain swelling, that due to increased brain water content. In BE, the increased water may either be inside of cells or between cells. Both BE and BS may be documented by any of the following depending on the data source: increased brain weight (pathological observations), swelling of the brain beyond the usual dural margin (at surgery),

imaging studies that demonstrate any of the following: obscuration of the grey-white matter junctions; compression or obliteration of the ventricles; narrowing or obliteration of the basal cisterns.

Brain Edema is best distinguished from brain swelling by the presence of: hypodensity (more black than normal brain) on CT imaging, or hypointensity on T1 or hyperintensity on T2 or flair MRI imaging. Thus, brain edema should only be diagnosed if these conditions exist. Otherwise, the diagnosis of brain swelling should be made (isodense or slightly hyperdense on CT or isodense on MRI).

<sup>b</sup> Change in severity code in AIS 2005

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

<sup>f</sup> New descriptor in AIS 2005 that allows classification of trauma by body region, but does not allow assigning a severity code.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
140699.3	<b>Cerebrum NFS [includes basal ganglia, thalamus, putamen, globus pallidus]</b> <b>Use Cerebrum section for supratentorial, anterior or middle cranial fossa; also use if trauma is vaguely described as “brain injury”.</b>	140699.3	140699.3	5
140602.3	contusion NFS [include perilesional edema for size]	140602.3	140602.3	5
140604.3	single NFS	140604.3	140604.3	5
140605.2	tiny; <1cm diameter <sup>a</sup>	140604.3 <sup>b</sup>	None	5
140606.3	small; superficial; ≤30cc or ≤15cc if ≤age 10; 1-4cm diameter or 1-2cm diameter if ≤age 10; midline shift ≤5mm	140606.3	140606.3	5
140608.4	large; deep; 30-50cc or 15-30cc if ≤age 10; >4cm diameter or 2-4cm diameter if ≤age 10; midline shift >5mm	140608.4	140608.4	2
140610.5	extensive; massive; total volume >50cc or >30cc if ≤age 10	140610.5	140610.5	1
140611.3	multiple NFS	140611.3	140611.3	3
140612.3	multiple, on same side but NFS	140612.3	140612.3	5
140613.2	tiny; each <1cm diameter <sup>a</sup>	140612.3 <sup>b</sup>	None	5
140614.3	small; superficial; total volume ≤30cc or ≤15cc if ≤age 10; midline shift ≤5mm	140614.3	140614.3	5
140616.4	large; total volume 30-50cc or 15-30cc if ≤age 10; midline shift >5mm	140616.4	140616.4	1
140618.5	extensive; massive; total volume >50cc or >30cc if ≤age 10	140618.5	140618.5	1
140620.3	multiple, at least one on each side but NFS	140620.3	140620.3	3
140621.2	tiny; each <1cm diameter <sup>a</sup>	140622.3 <sup>b</sup>	None	5
140622.3	small; superficial; total volume ≤30cc or ≤15cc if ≤age 10	140622.3	140622.3	3
140624.4	large; total volume 30-50cc or 15-30cc if ≤age 10	140624.4	140624.4	1
140626.5	extensive; massive; total volume >50cc or >30cc if ≤age 10	140626.5	140626.5	1

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
	<b>Cerebrum</b> (continued)			
140628.4	diffuse axonal injury (DAI) NFS [requires coma >6 hours or, if fatal within 6 hours, diagnosis is made by pathological examination] <sup>e</sup>	140628.5 <sup>b</sup>	140628.5 <sup>b</sup>	1
140625.4	DAI confined to white matter or basal ganglia	140628.5 <sup>b</sup>	None	1
140627.5	DAI involving corpus callosum	140628.5	None	1
<p><b>If white matter/basal ganglia <u>and</u> corpus callosum are involved, code only the more severe; do not code both. If coma exceeds 24 hours and diagnosis meets coding rules for DAI, use 161011.5 no matter what anatomic description is recorded. Read “Diffuse Axonal Injury” (page 50) for coding guidance.</b></p>				
140629.3	hematoma (hemorrhage) NFS	140629.4 <sup>b</sup>	140629.4 <sup>b</sup>	5
<p><b>Use above descriptor for “extra axial” unless described as epidural or subdural.</b></p>				
140630.3	epidural or extradural NFS [include perilesional edema for size]	140630.4 <sup>b</sup>	140630.4 <sup>b</sup>	5
140631.2	tiny; <0.6cm thick <sup>a</sup>	140632.4 <sup>b</sup>	None	5
140632.4	small; moderate; ≤50cc or ≤25cc if ≤age 10; 0.6-1cm thick	140632.4	140632.4	5
140634.5	bilateral	140634.5	140634.5	5
140636.5	large; massive; extensive; >50cc or >25cc if ≤age 10; >1cm thick	140636.5	140636.5	1

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
<b>Cerebrum</b> (continued)				
hematoma				
140638.3	intracerebral NFS [include perilesional edema for size]	140638.4 <sup>b</sup>	140638.4 <sup>b</sup>	5
140639.2	tiny; single or multiple <1cm diameter <sup>a</sup>	140640.4 <sup>b</sup>	None	5
140642.2	petechial hemorrhage(s) [includes radiographic “shearing” lesions] <sup>e</sup>	140642.4 <sup>b</sup>	140642.4 <sup>b</sup>	5
140643.2	not associated with coma >6 hours	140642.4 <sup>b</sup>	None	5
140645.4	associated with coma >6 hours	140642.4	None	1
<b>If DAI diagnosis is made, code as diffuse axonal injury to cerebrum, AIS codes 140628.4, 140625.4 or 140627.5, as appropriate, based on substantiation of injury. Do not code here. Read “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140640.4	small; ≤30cc or ≤15cc if ≤age 10; 1-4cm diameter or ≤1cm if ≤age 10; subcortical hemorrhage <sup>e,g</sup>	140640.4	140640.4	5
140647.3	not associated with coma >6 hours	140640.4 <sup>b</sup>	None	5
140649.4	associated with coma >6 hours	140640.4	None	1
<b>If DAI diagnosis is made, code as diffuse axonal injury to cerebrum, AIS codes 140628.4, 140625.4 or 140627.5, as appropriate, based on substantiation of injury. Do not code here. Read “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140646.5	bilateral	140646.5	140646.5	1
140648.5	large; >30cc or >15cc if ≤age 10; >4cm or >1cm diameter if ≤age 10	140648.5	140648.5	1
140641.5	bilateral [each >4cm] <sup>c</sup>	140648.5	None	1
subdural NFS				
140650.3	tiny; <0.6cm thick [includes tentorial (subdural) blood one or both sides] <sup>a</sup>	140650.4 <sup>b</sup>	140650.4 <sup>b</sup>	5
140651.3		140652.4 <sup>b</sup>	None	5
140652.4	small; moderate; ≤50cc or ≤25cc if ≤age 10; 0.6-1cm thick	140652.4	140652.4	5
140654.4	bilateral [both sides 0.6-1cm thick]	140654.5 <sup>b</sup>	140654.5 <sup>b</sup>	3
140656.5	large; massive; extensive; >50cc or >25cc if ≤age 10; >1cm thick	140656.5	140656.5	1
140655.5	bilateral [at least one side >1cm thick] <sup>c</sup>	140656.5	None	1
<b>In cases of bilateral subdural hematoma where one side is tiny (i.e., &lt;0.6cm thick) and the other side is ≥0.6cm thick, code only the larger one.</b>				

<sup>a</sup> New descriptor in AIS 2005

<sup>b</sup> Change in severity code in AIS 2005

<sup>c</sup> In previous editions of AIS, with few exceptions, each injury was coded separately. AIS 2005 introduces “bilateral” for certain injury descriptions. Some bilateral injuries may affect severity levels and, therefore, the ISS for patients with those injuries.

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

<sup>g</sup> Subcortical hemorrhage was a separate descriptor (140644.4) in AIS 98.



AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
	<b>Cerebrum</b> (continued)			
140688.3	laceration NFS [not from penetrating injury] <sup>e</sup>	140688.4 <sup>b</sup>	140688.4 <sup>b</sup>	5
140687.3	≤2cm length or depth	140688.4 <sup>b</sup>	None	5
140686.4	>2cm length or depth	140688.4	None	2
140690.3	penetrating injury NFS <sup>e</sup>	140690.5 <sup>b</sup>	140690.5 <sup>b</sup>	1
140691.3	≤2 cm deep	140690.5 <sup>b</sup>	None	5
140692.5	>2cm deep	140690.5	None	1
140689.9	trauma-associated findings not related either to intervention or to anatomically-described head injury NFS <sup>f</sup>	None	None	
<b>Use the following descriptors for brain swelling or brain edema directly related to head trauma, not anoxia or perilesional. Read “Brain Edema and Brain Swelling” (page 43) for coding guidance.</b>				
140660.3	brain swelling NFS <sup>h</sup>	140660.3	140660.3	5
140662.3	mild; compressed ventricles without compressed brain stem cisterns	140662.3	140662.3	5
140664.4	moderate; compressed ventricles and brain stem cisterns	140664.4	140664.4	1
140666.5	severe; absent ventricles or brain stem cisterns	140666.5	140666.5	1
140668.3	brain edema NFS <sup>h</sup>	140660.3	140660.3	5
140670.3	mild; compressed ventricles without compressed brain stem cisterns	140662.3	140662.3	5
140672.4	moderate; compressed ventricles and brain stem cisterns	140664.4	140664.4	2
140674.5	severe; absent ventricles or brain stem cisterns	140666.5	140666.5	1
140701.9	hypoxic or ischemic brain damage secondary to systemic hypoxemia, hypotension or shock not directly related to head trauma <sup>f</sup>	None	None	
140702.9	not associated with coma >24 hours <sup>f</sup>	None	None	
140703.9	associated with coma >24 hours not secondary to primary brain injury; bilateral; multifocal <sup>f</sup>	None	None	

<sup>b</sup> Change in severity code in AIS 2005

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

<sup>f</sup> New descriptor in AIS 2005 that allows classification of trauma by body region, but does not allow assigning a severity code.

<sup>h</sup> Brain swelling and brain edema were combined as one descriptor in AIS 98. In AIS 2005, they are separate descriptors; hence the duplication of AIS 98 matching codes.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
	<b>Cerebrum</b> (continued)			
140676.3	infarction [acute due to traumatic vascular occlusion]	140676.3	140676.3	1
140678.2	intraventricular hemorrhage <sup>e</sup>	140678.4 <sup>b</sup>	140678.4 <sup>b</sup>	5
140675.2	not associated with coma >6 hours	140678.4 <sup>b</sup>	None	5
140677.4	associated with coma >6 hours	140678.4	None	1
<b>If DAI diagnosis is made, code as diffuse axonal injury, AIS codes 161007.4, 161008.4, 161011.5, 161012.5 or 161013.5 as appropriate based on substantiation of the injury. Do not code this finding. Read coding rules for coma (page 40) and “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140680.3	ischemic brain damage directly related to head trauma <sup>e</sup>	140680.3	140680.3	1
140681.3	not associated with coma >6 hours	140680.3	None	
140683.5	associated with coma >6 hours	140680.3 <sup>b</sup>	None	
<b>If DAI diagnosis is made, code as diffuse axonal injury, AIS codes 161007.4, 161008.4, 161011.5, 161012.5 or 161013.5 as appropriate based on substantiation of the injury. Do not code this finding. Read coding rules for coma (page 40) and “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140682.3	pneumocephalus directly related to head trauma	140682.3	140682.3	1
140693.2	subarachnoid hemorrhage NFS <sup>e</sup>	140684.3 <sup>b</sup>	140684.3 <sup>b</sup>	5
140694.2	not associated with coma >6 hours	140684.3 <sup>b</sup>	None	5
140695.3	associated with coma >6 hours	140684.3	None	1
<b>If DAI diagnosis is made, code as diffuse axonal injury, AIS codes 161007.4, 161008.4, 161011.5, 161012.5 or 161013.5 as appropriate based on substantiation of the injury. Do not code this finding. Read coding rules for coma (page 40) and “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140696.2	subpial hemorrhage NFS <sup>e</sup>	140686.3 <sup>b</sup>	140686.3 <sup>b</sup>	5
140697.2	not associated with coma >6 hours	140686.3 <sup>b</sup>	None	5
140698.3	associated with coma >6 hours	140686.3	None	1
<b>If DAI diagnosis is made, code as diffuse axonal injury, AIS codes 161007.4, 161008.4, 161011.5, 161012.5 or 161013.5 as appropriate based on substantiation of the injury. Do not code this finding. Read coding rules for coma (page 40) and “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
140799.3	<b>Pituitary</b> injury	140799.3	140799.3	5

<sup>b</sup> Change in severity code in AIS 2005

<sup>e</sup> In AIS 98, this injury description had only one severity level. In AIS 2005, it has several.

<sup>f</sup> New descriptor in AIS 2005 that allows classification of trauma by body region, but does not allow assigning a severity code.

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
<b>SKELETAL</b>				
<b>Skull fractures are divided into base and vault. Code all skull fractures under vault unless specified as base. If a single skull fracture involves both base and vault, code the more severe. If both are of equal severity, code the fracture to point of origin. Code associated brain, vascular and nerve injuries separately.</b>				
150000.2	<b>Skull fracture NFS<sup>a</sup></b>	150400.2	None	5
<b>The skull base includes the following bones: orbital roof; ethmoid; sphenoid; basilar process of occipital bone; petrous, squamous and mastoid portions of temporal bone. The following clinical signs may be used to corroborate a diagnosis of a basilar skull fracture: hemotympanum; perforated tympanic membrane with blood in canal; mastoid hematoma (“Battle’s sign”); CSF otorrhea; rhinorrhea; periorbital ecchymosis (“raccoon eyes”).</b>				
150200.3	<b>Base (basilar) fracture NFS</b>	150200.3	150200.3	5
150202.3	without CSF leak	150202.3	150202.3	5
150204.3	with CSF leak	150204.3	150204.3	5
150206.4	complex; open with torn, exposed or loss of brain tissue; comminuted; ring; hinge	150206.4	150206.4	5
<b>The skull vault includes the following bones: frontal, occipital, parietal and temporal.</b>				
150400.2	<b>Vault fracture NFS</b>	150400.2	150400.2	5
150402.2	closed; simple; undisplaced; diastatic; linear	150402.2	150402.2	5
150404.3	comminuted; compound but dura intact; depressed ≤2cm; displaced	150404.3	150404.3	5
150406.4	complex; open with torn, exposed or loss of brain tissue	150406.4	150406.4	5
150408.4	massive; large areas of skull depressed >2cm	150408.4	150408.4	5

<sup>a</sup> New descriptor in AIS 2005

## **Diffuse Axonal Injury**

Diffuse axonal injury (DAI) is a clinicopathological complex defined as immediate and prolonged coma due to widespread damage to axons and other neuronal processes in the brain. For practical purposes, “prolonged” represents more than six hours. Coma is defined as the absence of eye opening to painful stimuli AND no following of commands AND no word utterances. For intubated patients, coma can be diagnosed based on the absence of eye opening to painful stimuli AND no following of commands. For intubated patients where local injury or hemorrhage prevents eye opening, coma can be diagnosed solely on the basis of no following of commands. If chemical paralysis or sedation preclude evaluation of these three responses, the diagnosis of coma cannot be made.

Other entities can be confused with DAI, but are not incorporated by the name DAI, including:

- imaging findings often found with DAI (see below) that are not associated with the clinical criteria of DAI or have unknown clinical findings,
- traumatic axonal damage associated with ischemia, hemorrhage or contusion irrespective of the clinical findings,
- any condition with coma less than six hours in duration.

Acceptable means of diagnosing DAI include:

- a neuropathological examination of the brain that demonstrates widespread damage to axons in the white matter of the cerebral hemispheres or cerebellum that is not associated with contusion, infarct, ischemia or mass lesions (intracerebral hematoma/hemorrhage),
- a clinical diagnosis of DAI made by a combination of clinical observations and a brain imaging study with CT or MRI. DAI can be diagnosed by a physician when a patient sustains coma from the time of the traumatic event AND remains in post-traumatic coma for more than six hours AND there is no ischemic damage (prolonged hypotension or infarction on imaging) or mass lesion (epidural, subdural or intracerebral hematoma) to explain the coma on imaging studies. Similar coma lasting less than six hours is called concussion (of various levels of severity).

DAI cannot be diagnosed on the basis of clinical observations only. There must be imaging validation. The presence of small contusions or small intracerebral hemorrhages does not preclude the diagnosis of DAI, if, in the judgment of the physician, these are insufficient in size or in location to be responsible for the observed coma. Similarly, imaging studies alone are insufficient to make the diagnosis of DAI unless clinical observations confirm that coma longer than six hours is present and there are no mass lesions to explain the coma.

Several imaging findings are commonly associated with DAI, but in themselves cannot make the diagnosis of DAI in the absence of clinical findings of immediate and prolonged coma. These include:

- small or petechial hemorrhages in the cerebral white matter, basal ganglia, thalamus, corpus callosum, fornix, septum pellucidum, periventricular regions or dorsal brainstem. These may be called “tissue tear hemorrhages”, “shear lesions”, “*Strich* lesions” or simply petechial hemorrhages.
- Small hemorrhages in the parasagittal frontal or parietal lobes. These may be called “gliding contusions”.
- Intraventricular hemorrhage.
- Evidence of small (petechial-sized) areas of non-hemorrhagic damage on sophisticated imaging studies such as magnetic transfer imaging or diffusion tensor imaging or other MRI methods that may be developed that show regions of axonal damage.

For patients who die within 24 hours, the diagnosis of DAI can be made only if:

- Coma has been present since the traumatic event AND,
- Imaging shows one or more small hemorrhages (sometimes called “tissue tear hemorrhages”, “shearing lesions” or petechiae) in the central (deepest) third of the brain (i.e., not cortical or subcortical).

AIS 2005	Injury Description	⇒AIS98	⇐AIS98	FCI
<b>CONCUSSIVE INJURY<sup>i</sup></b>				
161000.1	<b>Cerebral Concussion, NFS</b>	161000.2 <sup>b</sup>	161000.2 <sup>b</sup>	5
161001.1	mild concussion; no loss of consciousness	161000.2 <sup>b</sup>	161000.2 <sup>b</sup>	5
<b>Use 161000.1 and 161001.1 where there is convincing evidence of head injury and where the medical diagnosis is given as “concussion” with no other description or clarification.</b>				
<b>Code loss of consciousness (LOC) only where there is convincing evidence of head trauma and the diagnosis of loss of consciousness is made by a physician or recorded by a physician based on EMS corroboration. The Glasgow Coma Score (GCS) is only one indicator of brain injury and should never be used as the sole indicator. Self-reported LOC or reports of bystanders are insufficient for coding and should be disregarded.</b>				
161002.2	brief loss of consciousness NFS	160406.2	None	5
161003.2	loss of consciousness <1 hour NFS	160202.2	160202.2	5
161004.2	loss of consciousness ≤ 30 mins	160202.2	160202.2	5
161005.2	loss of consciousness 31-59 mins	160202.2	160202.2	5
161006.3	loss of consciousness 1-6 hours (severe concussion)	160206.3	160206.3	5
<b>Use this category to code a substantiated diagnosis of DAI if no anatomical description is recorded or if coma exceeds 24 hours and meets the coding rules for DAI. Read “Diffuse Axonal Injury” (page 50) for coding guidance.</b>				
161007.4	<b>Diffuse Axonal Injury</b> (prolonged traumatic coma LOC >6 hours not due to mass lesion) NFS	160210.4	None	5
161008.4	LOC 6-24 hours (mild DAI)	160814.4	160814.4	5
161011.5	LOC >24 hours NFS	160818.5	160818.5	5
161012.5	without brainstem signs (moderate DAI)	160818.5	160818.5	1
161013.5	with brainstem signs (severe DAI)	160824.5	160824.5	1
<b>Brainstem signs: decerebrate; decorticate</b>				

<sup>b</sup> Change in severity code in AIS 2005

<sup>i</sup> This section “Concussive Injury” reflects contemporary neurotrauma terminology in describing these types of brain injury. It replaces the sections “Length of Unconsciousness” and “Level of Consciousness” in AIS 98. Because this revision uses a significantly different framework for describing concussive injuries and diffuse axonal injury, the matching codes between AIS 2005 and AIS 98 are “best” choices.

