



ISS, NISS and MAIS Mapping with AAAM's ICD ISS Map May 30, 2017

The ICD ISS Map enables an analyst/researcher to derive a single patient severity score for a patient case record based on either ICD9CM or ICD10CM "initial encounter" injury codes. The ICD ISS map is based on the AIS 2005 Revision 2008 Update dictionary.

The single numerical score created by the ICD ISS Map is used to grade the overall severity of a patient. While the map was developed to calculate the Injury Severity Score (ISS), at least two other scores can also be calculated – the New ISS (NISS), and the Maximum AIS (MAIS).

The ISS is frequently used within the clinical setting and has become an integral part of all trauma registry-based severity assessment tools. The ISS is the sum of the squares of the highest AIS scores in three different ISS body regions. These body regions differ from AIS regions and are unique to the ISS calculation. To calculate an ISS, take the highest AIS severity code in each of the three most severely injured ISS body regions, square each AIS code and add the three squared numbers for an ISS.

ISS scores range from 1 to 75. A score of 75 is derived from either three AIS 5 injuries or from one AIS 6 injury. Any AIS 6 (maximal) injury is an automatic maximal ISS of 75, regardless of any other injuries that may also be found.

NISS has been proposed in the last several years as a successor to the ISS. The NISS is the sum of the squares of the three highest AIS scores anywhere in the body. While the proponents of the NISS claim its superiority over the ISS, it is still not in widespread use to date.

The MAIS is the highest (i.e. most severe) AIS severity score in a patient with multiple injuries. It is widely used by researchers, particularly in the injury prevention field, to describe overall injury to the whole body.

EXAMPLE 1

<u>Injury</u>	<u>AIS</u>	<u>ISS Region</u>
Carotid artery laceration	4	Head/neck
Concussion	2	Head/neck
Femur, open fracture	3	Extremities
Humerus, open fracture	2	Extremities
Leg laceration	1	External

$$\text{MAIS} = 4; \text{ISS} = 26 (16 + 9 + 1); \text{NISS} = 29 (16 + 9 + 4)$$

Example of ICD10 CM Map to AIS 2005 Update 2008 Table

First 10 rows of Mapping Table:

CODE	DESCRIPTION	MAX AIS SEVERITY	ISS BODY REGION	AIS CHAPTER
S00	Superficial injury of head	1	6	1
S00.0	Superficial injury of scalp	1	6	1
S00.00	Unspecified superficial injury of scalp	1	6	1
S00.00XA	Unspecified superficial injury of scalp, initial encounter	1	6	1
S00.01	Abrasion of scalp	1	6	1
S00.01XA	Abrasion of scalp, initial encounter	1	6	1
S00.02	Blisters (nonthermal) of scalp	0	0	-1
S00.02XA	Blisters (nonthermal) of scalp, initial encounter	0	0	-1
S00.03	Contusion of scalp	1	6	1
S00.03XA	Contusion of scalp, initial encounter	1	6	1

AIS Chapter Names – Legend/Enumeration

AIS chapters	AIS Chapter Names
-1	No Map
0	Other Trauma
1	Head
2	Face
3	Neck
4	Thorax
5	Abdomen
6	Spine
7	Upper Extremity
8	Lower Extremity
9	External

ISS Body Region - Legend/Enumeration

ISS Body region (br)	ISS Body Region (br)
0	No Map
1	HeadNeck
2	Chest
3	Abdominal & Pelvic Content
4	Extremities & Pelvic Girdle
5	Face
6	External

* For the purposes of this map ISS Body Regions have been assigned numeric values to indicate precedence.

How to use the ICD ISS Mapping Tables:

Prior to calculating ISS, NISS or MAIS, query your patient database for a working set of cases for the population of interest. Make sure you have a case unique identifier and ICD codes, as well as other fields of interest. With your working set of cases, iterate through each ICD code for a case and perform a table lookup using either the ICD-9-CM or ICD-10-CM mapping table. If the code is found in the mapping table, record the AIS severity, ISS body region and AIS chapter for each injury diagnosis for the case. If the code is not found in the mapping table, there is no mapping for that code to an equivalent AIS code. After mapping all cases in your working set using this technique, you can then calculate one or more single patient severity scores:

ISS Calculation: The “MAX AIS SEVERITY” and “ISS BODY REGION” values are used to calculate ISS. Disregard injuries that have an ISS Body Region of a zero.

NISS and MAIS Calculation: The “MAX AIS SEVERITY” value is used to calculate either NISS or MAIS.

Maximum AIS by AIS Chapter: Another useful analysis method is to examine maximum AIS per body region. Don't confuse this calculation with MAIS which is an individual case score. Maximum AIS per body region is a useful statistic to examine a sub-set of cases most relevant to the diagnosis being studied. For example, one might want to look at a subset of individuals the have AIS 3 or greater injuries mapped from the Head AIS Chapter of the AIS dictionary for studies that are focusing on head trauma outcomes.

Best Practice: It is highly recommended that the user of the ICD ISS Map purchase a copy of the AIS 2005 Revision Update 2008 dictionary to aid in a better understanding the types of codes and injuries being examined by the ICD ISS Map.