Methodology Used to Risk-Adjust Data

WHA Information Center, LLC (WHAIC) uses computer software (3M™ Core Grouping Software which includes 3M™ APR- DRG Software) to assign the APR-DRG to each hospitalization.

The APR-DRGs are an expansion of DRGs, a patient classification system used by the Centers for Medicare and Medicaid Services to relate hospital case mix to cost, or hospital resources consumed. The APR-DRGs were developed in response to the demand for a patient classification system with applicability beyond assessments of resource use - one that can be used to evaluate differences in outcomes such as inpatient mortality.

APR-DRGs expand basic DRGs through the addition of four subclasses that address distinct patient attributes related to severity of illness and risk of mortality.

Severity of illness denotes the extent of physiologic de-compensation or organ-system loss of function experienced by the patient, while risk of mortality refers to the likelihood of dying. The four severity-of-illness subclasses and four risk-of-mortality subclasses denote minor, moderate, major and extreme severity of illness and risk of mortality. Patients with the highest severity of illness and/or risk of mortality are characterized by the presence of multiple serious diseases.[1]

Assignment to APR-DRG severity-of-illness and risk-of-mortality subclasses takes into consideration principal diagnosis, secondary diagnoses and their combinations (comorbidities), patient age and sex, and the presence of certain OR (operating room) and non-OR procedures.

The 3M™ Core Grouping Software uses patient attributes to calculate a severity-of-illness score and a risk-of-mortality score for each relevant patient data record in a hospital inpatient data file. These scores are added to the record and are used as variables in the calculation of risk-adjusted mortality and utilization rates for hospitals.

To calculate the risk adjusted value the following methodology was used. The Actual Average Charge for each APR-DRG statewide is calculated using the four severity-of-illness levels. Then the Actual Average Charge and the Expected Average Charge are calculated using the four severity-of-illness levels for each APR-DRG for three groups; 1) each hospital, 2) each Analysis Area, and 3) each Volume Group. Then the Actual Average value for each APR-DRG for each of the three groups is divided by the Expected Average Charge for that APR-DRG/group, then multiplied by the Statewide Actual Average Charge for that APR-DRG. This produces a Risk Adjusted Charge for each of the APR-DRG/groups.

Comparison of these values will point out variations due to factors other than differences in patient risk. Groups of patients, such as those in different hospitals, may be compared as if they were all like the average patient in their APR-DRG.

Technical Notes

The total for Firearms, Assault in Table 13 differs from the total for Firearms & Explosives in Table 24 because Table 13 includes all Assaults by Firearms including those that were due to Legal Intervention (police action). Table 24 includes Assaults by Firearms excluding those that were due to Legal Intervention and also includes Assaults by Explosion.

[1] Averill RF, et al.. Development of the All Patient Refined DRGs (APR-DRGs). 3M Health Information
Systems Research Report. 1997.

U.S. Census Population

Population rates throughout this report were calculated from U.S. Census Bureau Information.

Table 1:   CO-EST2023-POP-55 2023 Population Estimates for Wisconsin Counties
Source: Population Division, U.S. Census Bureau https://www.census.gov
Release Date: June 2024

County	Analysis Area Code	Analysis Area Description	Population Census	Analysis Area Total
Columbia	1	Southern	58,091	
Dane	1	Southern	575,347	
Dodge	1	Southern	88,231	
Grant	1	Southern	51,409	
Green	1	Southern	36,951	
Iowa	1	Southern	23,956	
Jefferson	1	Southern	85,743	
Lafayette	1	Southern	16,945	
Richland	1	Southern	17,197	
Rock	1	Southern	164,278	
Sauk	1	Southern	65,920	
		Southern		**1,184,068**
Kenosha	2A	Southeastern	167,488	
Ozaukee	2A	Southeastern	93,460	
Racine	2A	Southeastern	196,613	
Walworth	2A	Southeastern	105,822	
Washington	2A	Southeastern	138,168	
Waukesha	2A	Southeastern	412,591	
		Southeastern		**1,114,142**
Milwaukee	2B	Milwaukee County	916,205	
		Milwaukee County		**916,205**
Calumet	3	Lake Winnebago	53,199	
Fond du Lac	3	Lake Winnebago	103,948	
Green Lake	3	Lake Winnebago	19,344	
Marquette	3	Lake Winnebago	15,838	
Outagamie	3	Lake Winnebago	193,234	
Waupaca	3	Lake Winnebago	51,388	
Waushara	3	Lake Winnebago	24,934	
Winnebago	3	Lake Winnebago	171,735	
		Lake Winnebago		**633,620**
Brown	4	Northeastern	271,417	
Door	4	Northeastern	30,562	
Kewaunee	4	Northeastern	20,690	
Manitowoc	4	Northeastern	81,331	
Marinette	4	Northeastern	42,106	
Menominee	4	Northeastern	4,226	
Oconto	4	Northeastern	39,775	
Shawano	4	Northeastern	41,109	
Sheboygan	4	Northeastern	117,752	
		Northeastern		**648,968**

County	Analysis Area Code	Analysis Area Description	Population Census	Analysis Area Total
Barron	5A	West Central	46,833	
Chippewa	5A	West Central	66,970	
Clark	5A	West Central	34,774	
Dunn	5A	West Central	45,794	
Eau Claire	5A	West Central	107,903	
Pepin	5A	West Central	7,441	
Pierce	5A	West Central	43,026	
Polk	5A	West Central	45,762	
Rusk	5A	West Central	14,143	
St. Croix	5A	West Central	96,763	
		West Central		**509,409**
Buffalo	5B	Southwestern	13,419	
Crawford	5B	Southwestern	15,944	
Jackson	5B	Southwestern	20,855	
La Crosse	5B	Southwestern	120,486	
Monroe	5B	Southwestern	46,151	
Trempealeau	5B	Southwestern	30,899	
Vernon	5B	Southwestern	31,170	
		Southwestern		**278,924**
Adams	6	North Central	21,449	
Florence	6	North Central	4,682	
Forest	6	North Central	9,325	
Juneau	6	North Central	26,594	
Langlade	6	North Central	19,404	
Lincoln	6	North Central	28,405	
Marathon	6	North Central	138,612	
Oneida	6	North Central	38,226	
Portage	6	North Central	71,024	
Taylor	6	North Central	20,058	
Vilas	6	North Central	23,885	
Wood	6	North Central	73,939	
		North Central		**475,603**
Ashland	7	Western Lake Superior	16,079	
Bayfield	7	Western Lake Superior	16,769	
Burnett	7	Western Lake Superior	17,092	
Douglas	7	Western Lake Superior	44,264	
Iron	7	Western Lake Superior	6,228	
Price	7	Western Lake Superior	14,102	
Sawyer	7	Western Lake Superior	18,552	
Washburn	7	Western Lake Superior	16,930	
		Western Lake Superior		**150,016**
			5,910,955	**5,910,955**

Table 2:   CC-EST2022-AGESEX-55 2023 Age/Sex Population Estimates for Wisconsin
Source: Population Division, U.S. Census Bureau https://www.census.gov
Release Date: June 2024

Both Sexes

Age Group	Population Estimate	Inpatient Age Group Total	Ambulatory Surgery Data Age Group Total	Emergemcy Department Data Age Group Total
Under 5 years	310,374			
5 to 9 years	342,533			
10 to 14 years	361,106	1,014,013	1,014,013	1,014,013
15 to 19 years	390,420	390,420		
20 to 24 years	397,095	397,095		787,515
25 to 29 years	366,616			
30 to 34 years	373,227	739,843		
35 to 39 years	371,239			
40 to 44 years	378,078	749,317	2,276,675	1,489,160
45 to 49 years	335,758			
50 to 54 years	353,004	688,762		
55 to 59 years	383,604			
60 to 64 years	418,099	801,703	1,490,465	1,490,465
65 to 69 years	376,741			
70 to 74 years	303,486	680,227		680,227
75 to 79 years	207,931			
80 to 84 years	127,611	335,542		
85 years and over	114,033	114,033	1,129,802	449,575
	5,910,955	5,910,955	5,910,955	5,910,955

Male

Age Group	Population Estimate	Inpatient Age Group Total	Ambulatory Surgery Data Age Group Total	Emergemcy Department Data Age Group Total
Under 5 years	158,282			
5 to 9 years	175,557			
10 to 14 years	185,357	519,196	519,196	519,196
15 to 19 years	200,172	200,172		
20 to 24 years	201,919	201,919		402,091
25 to 29 years	188,429			
30 to 34 years	190,201	378,630		
35 to 39 years	188,500			
40 to 44 years	192,492	380,992	1,161,713	759,622
45 to 49 years	170,648			
50 to 54 years	179,206	349,854		
55 to 59 years	192,365			
60 to 64 years	207,853	400,218	750,072	750,072
65 to 69 years	185,743			
70 to 74 years	147,177	332,920		332,920
75 to 79 years	98,159			
80 to 84 years	55,877	154,036		
85 years and over	41,579	41,579	528,535	195,615
	2,959,516	2,959,516	2,959,516	2,959,516

Female Age Group	Population Estimate	Inpatient Age Group Total	Ambulatory Surgery Data Age Group Total	Emergemcy Department Data Age Group Total
Under 5 years	152,092			
5 to 9 years	166,976			
10 to 14 years	175,749	494,817	494,817	494,817
15 to 19 years	190,248	190,248		
20 to 24 years	195,176	195,176		385,424
25 to 29 years	178,187			
30 to 34 years	183,026	361,213		
35 to 39 years	182,739			
40 to 44 years	185,586	368,325	1,114,962	729,538
45 to 49 years	165,110			
50 to 54 years	173,798	338,908		
55 to 59 years	191,239			
60 to 64 years	210,246	401,485	740,393	740,393
65 to 69 years	190,998			
70 to 74 years	156,309	347,307		347,307
75 to 79 years	109,772			
80 to 84 years	71,734	181,506		
85 years and over	72,454	72,454	601,267	253,960
	2,951,439	2,951,439	2,951,439	2,951,439

External Cause Code Category Assignment

Categories and subcategories were assigned in the following manner:

1. The code ranges used in prior years were evaluated for additions, changes and deletions.
2. The descriptions of the external cause codes currently in use were scrutinized at the category grouping levels to verify accurate grouping.
3. Subcategories were assigned to delineate the differences in intent: Accidental, Self-Inflicted, Assault, or Undetermined.
4. Category assignment of external cause codes fell into the following categories/subcategories for purposes of this report:

Category	Subcategory
Assault, not elsewhere classified	Assault
Caught/Crush, not elsewhere classified	Accidental
Cut/Pierce	Accidental Self-Inflicted Assault Undetermined
Drown/Submersion	Accidental Self-Inflicted Assault Undetermined
Electric Current	Accidental Undetermined
Explosion	Accidental Self-Inflicted Assault
Falls	Accidental Self-Inflicted Assault Undetermined
Fire/Flames	Accidental Self-inflicted Assault Undetermined
Firearms	Accidental Self-Inflicted Assault Undetermined
Hot Objects/Scalds	Accidental Self-Inflicted Assault Undetermined
Jumping	Undetermined
Legal Intervention	Legal
Machinery	Accidental

Category	Subcategory
Motor Vehicle Traffic	Accidental
	Self-Inflicted
	Assault
	Undetermined
Natural/Environmental	Accidental
	Self-Inflicted
	Undetermined
Other Motor Vehicle Non-traffic	Accidental
Other Pedal Cycle	Accidental
Other Transport	Accidental
	Self-inflicted
	Undetermined
Other Injury, not elsewhere classified	Undetermined
Overexertion	Accidental
Poisoning	Accidental
	Self-Inflicted
	Assault
	Undetermined
Radiation	Accidental
Self-Inflicted, not elsewhere classified	Self-Inflicted
Striking/Struck by	Accidental
	Assault
Terrorism	Terrorism
War	War

Diagnostic Category Assignment – Rehabilitation Services

Source: Department of Health & Human Services (DHHS), Centers for Medicare & Medicaid Services (CMS.