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: PEPANNRES 2020 Population Estimates for Wisconsin Counties
Source: Population Division, U.S. Census Bureau https://data.census.gov
Release Date: May 2021

County	Analysis Area Code	Analysis Area Description	Population Census	Analysis Area Total
Columbia	1	Southern	57,668	
Dane	1	Southern	552,536	
Dodge	1	Southern	87,336	
Grant	1	Southern	51,021	
Green	1	Southern	36,603	
Iowa	1	Southern	23,640	
Jefferson	1	Southern	85,038	
Lafayette	1	Southern	16,646	
Richland	1	Southern	17,258	
Rock	1	Southern	163,084	
Sauk	1	Southern	64,449	
		Southern		**1,155,279**
Kenosha	2A	Southeastern	169,671	
Ozaukee	2A	Southeastern	90,043	
Racine	2A	Southeastern	195,802	
Walworth	2A	Southeastern	103,953	
Washington	2A	Southeastern	136,445	
Waukesha	2A	Southeastern	406,172	
		Southeastern		**1,102,086**
Milwaukee	2B	Milwaukee County	945,016	
		Milwaukee County		**945,016**
Calumet	3	Lake Winnebago	50,209	
Fond du Lac	3	Lake Winnebago	102,902	
Green Lake	3	Lake Winnebago	18,908	
Marquette	3	Lake Winnebago	15,585	
Outagamie	3	Lake Winnebago	188,766	
Waupaca	3	Lake Winnebago	50,664	
Waushara	3	Lake Winnebago	24,326	
Winnebago	3	Lake Winnebago	171,631	
		Lake Winnebago		**622,991**
Brown	4	Northeastern	264,610	
Door	4	Northeastern	27,889	
Kewaunee	4	Northeastern	20,386	
Manitowoc	4	Northeastern	78,757	
Marinette	4	Northeastern	40,262	
Menominee	4	Northeastern	4,546	
Oconto	4	Northeastern	38,383	
Shawano	4	Northeastern	40,786	
Sheboygan	4	Northeastern	115,240	
		Northeastern		**630,859**

County	Analysis Area Code	Analysis Area Description	Population Census	Analysis Area Total
Barron	5A	West Central	45,090	
Chippewa	5A	West Central	64,737	
Clark	5A	West Central	34,720	
Dunn	5A	West Central	45,452	
Eau Claire	5A	West Central	105,260	
Pepin	5A	West Central	7,271	
Pierce	5A	West Central	42,700	
Polk	5A	West Central	43,794	
Rusk	5A	West Central	14,022	
St. Croix	5A	West Central	91,838	
		West Central		**494,884**
Buffalo	5B	Southwestern	13,033	
Crawford	5B	Southwestern	16,021	
Jackson	5B	Southwestern	20,630	
La Crosse	5B	Southwestern	118,502	
Monroe	5B	Southwestern	46,582	
Trempealeau	5B	Southwestern	29,681	
Vernon	5B	Southwestern	30,861	
		Southwestern		**275,310**
Adams	6	North Central	20,498	
Florence	6	North Central	4,298	
Forest	6	North Central	8,960	
Juneau	6	North Central	26,908	
Langlade	6	North Central	19,119	
Lincoln	6	North Central	27,566	
Marathon	6	North Central	135,593	
Oneida	6	North Central	35,751	
Portage	6	North Central	71,032	
Taylor	6	North Central	20,318	
Vilas	6	North Central	22,356	
Wood	6	North Central	72,560	
		North Central		**464,959**
Ashland	7	Western Lake Superior	15,415	
Bayfield	7	Western Lake Superior	15,242	
Burnett	7	Western Lake Superior	15,557	
Douglas	7	Western Lake Superior	43,702	
Iron	7	Western Lake Superior	5,698	
Price	7	Western Lake Superior	13,245	
Sawyer	7	Western Lake Superior	16,700	
Washburn	7	Western Lake Superior	15,712	
		Western Lake Superior		**141,271**
			5,832,655	**5,832,655**

Table 2:   PEPAGESEX 2020 Age/Sex Population Estimates for Wisconsin
Source: Population Division, U.S. Census Bureau https://data.census.gov
Release Date: June 2021

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	326,279			
5 to 9 years	344,504			
10 to 14 years	365,405	1,036,188	1,036,188	1,036,188
15 to 19 years	375,324	375,324		
20 to 24 years	390,812	390,812		766,136
25 to 29 years	379,487			
30 to 34 years	360,408	739,895		
35 to 39 years	372,748			
40 to 44 years	348,246	720,994	2,227,025	1,460,889
45 to 49 years	334,172			
50 to 54 years	364,328	698,500		
55 to 59 years	414,019			
60 to 64 years	405,806	819,825	1,518,325	1,518,325
65 to 69 years	348,757			
70 to 74 years	271,667	620,424		620,424
75 to 79 years	181,013			
80 to 84 years	119,829	300,842		
85 years and over	126,669	126,669	1,047,935	427,511
	5,829,473	5,829,473	5,829,473	5,829,473

Male Age Group	Population Estimate	Inpatient Age Group Total	Ambulatory Surgery Data Age Group Total	Emergemcy Department Data Age Group Total
Under 5 years	166,651			
5 to 9 years	176,390			
10 to 14 years	187,046	530,087	530,087	530,087
15 to 19 years	191,274	191,274		
20 to 24 years	198,505	198,505		389,779
25 to 29 years	195,674			
30 to 34 years	184,636	380,310		
35 to 39 years	188,035			
40 to 44 years	176,149	364,184	1,134,273	744,494
45 to 49 years	168,352			
50 to 54 years	182,526	350,878		
55 to 59 years	204,573			
60 to 64 years	199,932	404,505	755,383	755,383
65 to 69 years	170,341			
70 to 74 years	130,646	300,987		300,987
75 to 79 years	83,217			
80 to 84 years	51,921	135,138		
85 years and over	45,211	45,211	481,336	180,349
	2,901,079	2,901,079	2,901,079	2,901,079

Female Age Group	Population Estimate	Inpatient Age Group Total	Ambulatory Surgery Data Age Group Total	Emergemcy Department Data Age Group Total
Under 5 years	159,628			
5 to 9 years	168,114			
10 to 14 years	178,359	506,101	506,101	506,101
15 to 19 years	184,050	184,050		
20 to 24 years	192,307	192,307		376,357
25 to 29 years	183,813			
30 to 34 years	175,772	359,585		
35 to 39 years	184,713			
40 to 44 years	172,097	356,810	1,092,752	716,395
45 to 49 years	165,820			
50 to 54 years	181,802	347,622		
55 to 59 years	209,446			
60 to 64 years	205,874	415,320	762,942	762,942
65 to 69 years	178,416			
70 to 74 years	141,021	319,437		319,437
75 to 79 years	97,796			
80 to 84 years	67,908	165,704		
85 years and over	81,458	81,458	566,599	247,162
	2,928,394	2,928,394	2,928,394	2,928,394

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

Payer Code Assignment

Payer Codes for the primary and secondary payers who are expected to pay for the inpatient stay, ambulatory surgery, or emergency department visit. Only primary payer codes are utilized for this report. The primary payer data element has a field length of 5 characters and consists of two components – the payer identifier and the payer type. The primary payer is required and compatibility between the payer identifier and the payer type components is verified.

Code Structure for Payer Identifier

Code	Description
MED/T18	Medicare
T19	Wisconsin Medical Assistance (Medicaid)
nnn/BCS	3-digit plan code – Non-Medicaid Blue Cross/Blue Shield
CHA	CHAMPUS or CHAMPVA
BGR	Badger Care
OTH	Payer not identified above

Code Structure for Payer Type for use with MED, T19, nnn (Blue Cross/Blue Shield), CHA, or BGR

Code	Description
01	Fee-for-service, non-HMO Medicare, or non-HMO Medicaid
02	Alternative Health Care Insurance Plans (HMO, PPO)
03	CHAMPUS or CHAMPVA
09	Unable to determine insurance type.

Code Structure for Payer Type for use with OTH

Code	Description
11	Commercial or private insurance - fee-for-service
12	Commercial or private insurance - alternative health care insurance plan (HMO/PPO)
19	Commercial or private insurance - unable to determine insurance type
21	Employer self-funded - fee-for-service
22	Employer self-funded - alternative health care insurance plan (HMO/PPO)
29	Employer self-funded - unable to determine insurance type
31	Other organization self-funded - fee-for-service
32	Other organization self-funded - alternative health care insurance plan (HMO/PPO)
39	Other organization self-funded - unable to determine insurance type
41	Workers' Compensation
51	Non-Wisconsin Medicaid
52	51.42/ 51.437/ 46.23 County Board
54	WisconCare
55	TRICARE (CHAMPUS) supplement
59	Other government agency or program
61	Self-pay
71	Research Grant
98	Other
99	Unknown

Primary payer data submitted are converted to payer groups prior to release of data, which are included in the purchased data rather than original data submitted. The following payer groups were utilized in this report for the inpatient data individual hospital tables:

Code Structure for Payer Code Assignment

Payer Identifier	Payer Type	Payer Group	Description
MED/T18	01	1	Medicare
MED/T18	02	1	Medicare
MED/T18	09	1	Medicare
BGR	01	2	Medicaid/BadgerCare
BGR	02	2	Medicaid/BadgerCare
BGR	09	2	Medicaid/BadgerCare
T19	01	2	Medicaid/BadgerCare
T19	02	2	Medicaid/BadgerCare
T19	09	2	Medicaid/BadgerCare
nnn[1]/BCS	01	4	Commercial or Private Insurance
nnn/BCS	02	4	Commercial or Private Insurance
nnn/BCS	09	4	Commercial or Private Insurance
OTH	11	4	Commercial or Private Insurance
OTH	12	4	Commercial or Private Insurance
OTH	19	4	Commercial or Private Insurance
OTH	21	4	Commercial or Private Insurance
OTH	22	4	Commercial or Private Insurance
OTH	29	4	Commercial or Private Insurance
OTH	31	4	Commercial or Private Insurance
OTH	32	4	Commercial or Private Insurance
OTH	39	4	Commercial or Private Insurance
OTH	41	4	Commercial or Private Insurance
CHA	03	3	Other Government
OTH	51	2	Medicaid, Other State
OTH	52	3	Other Government
OTH	54	3	Other Government
OTH	55	3	Other Government
OTH	56	3	Other Government
OTH	59	3	Other Government
OTH	61	5	Self-Pay
OTH	71	6	Other or Unknown
OTH	98	6	Other or Unknown
OTH	99	6	Other or Unknown

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[1] nnn represents Blue Cross/Blue Shield plan number

Diagnostic Category Assignment – Rehabilitation Services

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