

INGENIX[®] APS-DRGs[®]

ALL PAYER SEVERITY-ADJUSTED DRGs
(APS-DRGs[®]) NORMALIZED CHARGE, LOS,
AND MORTALITY WEIGHTS
FOR PUBLIC USE
VERSION 27

COPYRIGHT PAGE

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APS-DRGs®
April 2010 Version 27

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1 Introduction

Weights for the APS-DRGs® (All Payer Severity Adjusted Diagnosis Related Groups) provide a powerful tool to assess severity across and within diagnostic groups. Based on a nationally representative all-payer sample of hospital discharges, the charge, cost, length of stay, and mortality benchmarks can be used to measure performance and to estimate costs.

THIS CHAPTER EXPLAINS:

- APS-DRGs® Normalized Weights Overview
- About Ingenix

APS-DRGs® NORMALIZED WEIGHTS OVERVIEW

Charge, cost, length of stay (LOS), and mortality weights for Version 27.0 All-Payer Severity-adjusted DRGs (APS-DRGs®) provide statistically valid, normative standards to help users identify differences in expected resource use and outcomes based on patients' clinical characteristics. Such weights also can be used to assess the performance of individual providers against national benchmarks. Ingenix, Inc. has generated these weights from a large, nationally representative database containing more than 22 million discharges from over 2,400 hospitals in 16 states. The large size of the input database allows considerable precision in the estimation process.

The Ingenix estimation procedure closely parallels methods used by the federal Centers for Medicare & Medicaid Services (CMS) in developing weights for the Medicare Prospective Payment System (PPS). The process begins by adjusting charges reported on individual records for differences in labor costs across hospitals. It then systematically trims charges, costs, and LOS, excluding observations with reported values outside predetermined levels. Means are recalculated and weights are derived by dividing these means by averages calculated across all inlier records. Results are inspected for logical consistency and reasonableness. Final weights are produced by normalizing weights so that their average across all records in the input database uniformly equals 1.000.

ABOUT INGENIX

The APS-DRGs® Normalized Charge, Cost, LOS, and Mortality Weights User's Guide is published by Ingenix, a leading solutions provider working to transform organizations and improve health care through information and technology. As one of the largest coding and reimbursement information firms, Ingenix establishes guidelines for coding, reviewing, and auditing medical episodes.

We provide tools to enhance each principal step in the revenue cycle in any reimbursement environment. Community hospitals, academic medical centers and multi-specialty clinics use Ingenix products for appropriate coding and preparation of claims, while payers and self-insured/self-administered employers use our products in the claims review process.

Ingenix is a wholly-owned subsidiary of UnitedHealth Group.

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Client Services

We welcome you as a valued client. Ingenix maintains an active Client Services department that provides expert guidance on coding and reimbursement issues affecting health claims payment. For general support issues, please contact Client Services using one of the methods detailed below.

When opening a call with Client Services, you will be issued a call ticket number. These ticket numbers correlate to individual issues, If you are experiencing multiple issues, it is recommended to obtain individual call ticket numbers.

When calling Client Services regarding a previously opened call ticket, have your call ticket number available. If you misplaced or did not receive a call ticket number, please ask the technician to provide it to you.

CLIENT SERVICES PHONE: 800-999-DRGS (3747)

1. Places you into call queue. Call is taken in order received.
2. Calls are answered in the order that they are received. If there is a high call volume, calls are held in a queue until a technician becomes available.
3. Calls classified as an industry expert category (i.e., case and reimbursement, logic encoder, etc.) will be escalated to Ingenix experts.

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Option 2	For Product Distribution questions or problems
Option 3	For EASYGroup™
Option 4	For Web.Strat™
Option 5	For WinStrat™
Option 6	For Rate Manager
Option 7	For all other issues

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Option 2	For all other issues

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1. Leave name and number and brief description of product issue.
2. Response time to voicemail is generally within a few business hours.

3. Service Technician has ability to do prior research before calling back.

 EMAIL: CLIENT.SERVICES@INGENIX.COM

1. Include name and number and detailed description of product issue.
2. Response time to email is generally within a few business hours.
3. Service Technician has ability to do prior research before calling back.

2 Methods

THIS CHAPTER EXPLAINS:

- Data
- APS-DRGs® Weight Calculation
- Results
- Data Quality and APS-DRGs® Assignment

DATA

Data from fiscal year 2007 All Payer state data sets were used to develop the weights. This contains 22 million patient discharge records on all inpatient stays from 16 states. Specifically, the sources were the Arizona Department of Health, California Office of Statewide Health Planning and Development (OSHPD) California Patient Discharge Data, Colorado Health and Hospital Association, Florida Agency for Health Care Administration Hospital Inpatient Data File, Iowa's IHA Inpatient Database, Illinois Health Care Cost Containment Council, MA Division of Health Care Finance and Policy Inpatient Hospital Discharge Database, Nevada UB Discharge Data, New Jersey Department of Health and Senior Services, State of New York SPARCS Inpatient Data, PA Health Care Cost Containment Council Special Requests Inpatient File, Rhode Island Department of Health, Hospital Discharge Data, Texas Hospital Inpatient Discharge Public Use Data File, Utah Hospital Discharge Database, Virginia Health Information Patient Level Data, and Washington State Department of Health Comprehensive Hospital Abstract Reporting System (CHARS).

APS-DRGs® WEIGHT CALCULATION

The calculation of weights for the Version 27.0 APS-DRGs® is similar to the methodology used by CMS in developing the annual DRG relative weights. This involves several steps, as described below.

☞ STEP 1. ASSIGN VERSION 27.0 APS-DRGs® TO THE DATA

The 22 million discharges described above were assigned to appropriate Version 27.0 APS-DRGs® using Ingenix's EASYGroup™ products. As appropriate, the ICD-9-CM diagnosis and procedure codes found in the data were mapped into Version 27.0 codes. An output file was then created containing linking variables, APS-DRGs®, APS-MDCs, and return codes. Finally, a series of summary statistics were calculated from the output files to assess data quality and other analytic issues.

☞ STEP 2. CREATE HOSPITAL-LEVEL WAGE FILE AND MERGE TO PATIENT FILE

The CMS Wage Index was linked to the data to obtain the associated wage index for each sample hospital. Charges on the input were adjusted by dividing a portion of each hospital-specific charge by the wage index for the area in which the hospital was located and adjusting for the hospitals indirect medical education (IME) and disproportionate share (DSH) percentages.

The CMS wage index reflects total hospital salaries and hours excluding the salaries and hours associated with skilled nursing facilities and other non-hospital cost centers, home office salaries and hours, and the fringe benefits associated with hospital and home office salaries. The portion of the charges adjusted by the CMS wage index was 62.00 percent (CMS's October 2007 estimate of the portion of the "hospital market basket" for labor-related items). The wage indices and IME and DSH percentages were the October 2007 values for the hospitals in the database. The CMS inpatient ratio of cost to charge was applied to the adjusted

charge data in order to estimate the cost. Discharges at hospitals that lacked these factors were eliminated.

STEP 3. CALCULATE AND APPLY TRIMS

Initial outlier trim points were calculated at 3.0 standard deviations from the overall arithmetic mean of the log-transformed LOS, costs, and charges. Using these trimmed data, a second set of trim points was calculated, again using 3.0 standard deviations from the arithmetic mean of the log-transformed data.

Trim points for the APS-DRGs® were then merged onto the patient file and used to identify outliers to be excluded from the remainder of the calculations. Note that outliers were determined variable by variable; for example, records containing charge outliers were not necessarily excluded from the calculations of cost, LOS, and mortality weights. Summary weights were re-estimated by APS-DRGs®, APS-MDC, and CDRG.

STEP 4. IDENTIFY AND ASSESS ATYPICAL PATTERNS THAT MIGHT AFFECT WEIGHTS

As an additional quality-control measure, certain APS-DRGs® were identified and examined, especially when they involved atypical patterns of weights. The purpose of this step was to identify potential problems in the preceding data processing steps and to ensure that apparently unusual empirical results were based upon adequate data resources. The focus of this step included the following types of APS-DRGs®:

- APS-DRGs® with no observations.
- APS-DRGs® containing less than 50 observations.
- Hospitals with an average LOS of greater than 30.
- Weights for APS-DRGs® that were five times greater than the weight for the Consolidated DRG (CDRG).
- Weights for APS-DRGs® that were non-monotonic; that is, less than weights of less severe APS-DRGs® within the same CDRG.

STEP 5. PERFORM IMPUTATIONS

All APS-DRGs® had observations in the input data set, except 8704, SEPTICEMIA W MV 96+ HRS AGE 0-17 WO CC/MCC. Although reviewed, no imputations were performed on APS-DRGs® with less than 50 observations or where the weight was greater than 5 times the CDRG weight. Hospitals with an average LOS of greater than 30 were reviewed, and 4 hospitals with an average LOS greater than 50 were thrown out. Imputations were performed for 10 charge weights, 13 cost weights, and 15 LOS weights to address monotonicity issues. Issues were identified in cases where the weight for the lower severity exceeded the middle severity or the weight for high severity is surpassed by the middle severity weight. In such cases, the anomalous weight category is combined with the middle category and the weight for the collapsed severity category is recalculated. In cases where the lower severity weight is in excess of the middle severity and the middle severity weight surpasses the high severity weight all of

the severity levels would be combined to form one category and the weight would be recalculated. Given the lack of cases in APS-DRG 8704, this DRG was combined with 8705. This parallels the methodology employed for the non-pediatric versions of these DRGs, 8700, and 8701.

STEP 6. CALCULATE RELATIVE WEIGHTS

The final, post-imputation estimated average LOS, cost, charge, and mortality for individual APS-DRGs® was then divided by the overall LOS, cost, charge, and mortality average to determine the relative weights. The latter was calculated by dividing the total days, charges, or deaths in the input database by the number of inlier records for that particular variable.

RESULTS

The input data set contained a total of 22,036,758 records. After eliminating records from 4 hospitals with average LOS of greater than 50 records, where the total charges were greater than \$10 million, the length of stay was greater than 730 or hospital wage index, IME, DSH or RCC factors were not available; 18,826,655 records were available for developing weights. After trimming outliers, 18,724,995 inlier records were used to calculate charge weights, 18,696,543.00 inlier records were used to calculate cost weights, and 18,744,276 inlier records were used to calculate LOS weights.

DATA QUALITY AND APS-DRGs® ASSIGNMENT

Frequencies for the Version 27.0 APS-DRGs® were examined for variation and compared to results from previous years.

Table 3-2 on page 14 lists the 9 APS-DRGs® with fewer than 25 weighted cases based upon their observed frequency in the claims database.

3 Final Weights

THIS CHAPTER EXPLAINS:

- Final Weights Overview

LIST OF TABLES:

- Table 3-1: APS-DRGs® (N=12) whose mortality weights are imputed (Discharge Status is part of the DRG definition)
- Table 3-2: APS-DRGs® (N=9) With Fewer Than 25 Observations in Trimmed Data

FINAL WEIGHTS OVERVIEW

Approximately 0.54 percent of the records exceeded the individual APS-DRGs® charge outlier thresholds, 0.69 percent of the records exceeded the individual APS-DRGs® cost outlier thresholds, while 0.44 percent of records were identified as LOS outliers. After excluding these records, the imputation procedure described in Chapter 2 was performed and final weights were calculated.

In general,

- **Charge weights** ranged from 0.0919 to 23.5929 with a **mean charge** of \$24,368.80.
- **Cost weights** ranged from 0.0951 to 23.2170 with a **mean cost** of \$6,382.48.
- **LOS weights** ranged from 0.2189 to 19.1392 with a **mean LOS** of 4.5693 days.
- **Mortality weights** ranged from 0 to 45.9964 with a **mean mortality** of 0.0186 deaths per discharge.

To calculate an **expected charge** (*expected cost, expected LOS, or expected mortality*) for a given discharge record, simply multiply the **charge weight** (*cost weight, LOS weight, or mortality weight*) obtained by applying APS-DRGs® to that record, by the **mean charge** (*mean cost, mean LOS, or mean mortality*) noted above.

All APS-DRGs®, except 8704: SEPTICEMIA W MV 96+ HRS AGE 0-17 WO CC/MCC, had observations for costs, charges, and LOS. Because some APS-DRGs® have mortality or non-mortality (i.e. transferred to another facility) as part of their definition, the risk of mortality for these DRGs were imputed using the average of the weights of the mortality weights APS-DRGs® for the corresponding claims assuming the claims were for patients that had a discharge status of “01.” There were 91,562 claims involving 12 APS-DRGs® weights imputed for mortality. They are listed in Table 3-1.

Weights were imputed by combining APS-DRGs® for weighting when necessary to address monotonicity. These imputations were performed for 10 charge weights, 13 cost weights, and 15 LOS weights.

APS-DRGs® are represented in the tables as four-digit numbers, consisting of two parts: a three-digit Consolidated DRG and a one-digit severity class number. The Consolidated DRG or CDRG is derived from the patient’s CMS DRG and the severity class is obtained by evaluating the patient’s secondary diagnoses and age. The APS-DRG® group number may be represented by the syntax “XXX^Y,” where “XXX” is the CDRG and “Y” is the severity class.

Table 3-1: APS-DRGs® (N=12) whose mortality weights are imputed (Discharge Status is part of the DRG definition)

APS-DRG®	DESCRIPTION
2830	AMI, EXPIRED WO CC/MC
2831	AMI, EXPIRED W CC
2832	AMI, EXPIRED W MCC
7880	NEONATE, XFRD TO ACU HOSP, LOS <2 DAYS

Table 3-1: APS-DRGs® (N=12) whose mortality weights are imputed (Discharge Status is part of the DRG definition)

APS-DRG®	DESCRIPTION
7881	NEONATE, XFRD TO ACU HOSP, LOS 2-4 DAYS
7882	NEONATE, XFRD TO ACU HOSP, LOS 5+ DAYS
7890	NEONATE, DIED, LOS <2 DAYS
7891	NEONATE, DIED, LOS 2-4 DAYS
7892	NEONATE, DIED, LOS 5+ DAYS
8940	ALC/DRUG ABUS/DEP, LEFT AMA WO CC/MC
8941	ALC/DRUG ABUS/DEP, LEFT AMA W CC
8942	ALC/DRUG ABUS/DEP, LEFT AMA W MCC

Table 3-2: APS-DRGs® (N=9) With Fewer Than 25 Observations in Trimmed Data

APS-DRG®	DESCRIPTION
0034	ECMO, TRCH MV96+/PDX EX FMN MAJ OR 0-17 WO CC/MCC
0100	PANCREAS TRANSPLANT WO CC/MCC
1292	COCHLEAR IMPLANTS W MCC
2150	OTH HEART ASSIST SYS IMPLANT WO CC/MC
02394	AMP FOR CIRC SYS DIS EXC UL&TOE 0-17 WO CC/MCC
8700	SEPTICEMIA W MV 96+ HRS AGE >17 WO CC/MC
8704	SEPTICEMIA W MV 96+HRS AGE 0-17 WO CC/MC
8705	SEPTICEMIA W MV 96+ HRS AGE 0-17 W CC
9270	EX BRN/FL-THK BRN W MV96+HR W GRF WO C/M

4 Distribution

Weights and trims for the Version 27.0 APS-DRGs® are contained in a single ASCII disk file, as documented in this section.

THIS CHAPTER EXPLAINS:

- Distribution Overview
- Format of APS-DRGs® Weight File

DISTRIBUTION OVERVIEW

- Filename: APSDRGV27WTRIM.DAT
- Description: APS-DRGs® Weight and Trims
- Record Size: 144
- Record Count: 1,223

FORMAT OF APS-DRGs® WEIGHT FILE

The format of this file is displayed in Table 4-1.

Table 4-1: Description of Weight File

FIELD	POSITION	FORMAT	DESCRIPTION
APS	1 - 5	NNNNN	APS-DRGs® Number
FILLER	6	C	
DESCRIPTION	7 - 46	C (40)	APS-DRGs® Description
FILLER	47	C	
LOSWT	48 - 56	NNN.NNNNN	Length of Stay Weight (with explicit decimal)
FILLER	57	C	
CHGWT	58 - 66	NNN.NNNNN	Charge Weight (with explicit decimal)
FILLER	67	C	
CSTWT	68 - 76	NNN.NNNNN	Cost Weight (with explicit decimal)
FILLER	77	C	
LLOSTRIM	78 - 81	NNNN	Low Length of Stay Trim
FILLER	82	C	
HLOSTRIM	83 - 86	NNNN	High Length of Stay Trim
FILLER	87	C	
LCHGTRIM	88 - 98	N(8).NN	Low Charge Trim
FILLER	99	C	
HCHGTRIM	100 - 110	N(8).NN	High Charge Trim
FILLER	111	C	
LCSTTRIM	112 - 122	N(8).NN	Low Cost Trim
FILLER	123	C	
HCSTTRIM	124 - 134	N(8).NN	High Cost Trim
FILLER	135	C	
MORTWT	136 - 144	NNN.NNNNN	Mortality Weight (with explicit decimal)

A Release Notes

THIS APPENDIX INCLUDES:

- April 2010 (Version 27)
- April 2010 (Version 26)
- June 2009 (Version 25)
- March 2008 (Version 24)

Normalized Weights for Public Use

April 2010 (Version 27)

PUB 4.12.2010

About this Release

Charge, length of stay (LOS), and mortality weights and trims have been updated for the Version 27.0 All Payer Severity-Adjusted DRGs (APS-DRGs[®]). These CMS-originated changes include reclassifying existing codes into different DRGs and making additional changes for FY 2010.

Product Version Number

Version numbers on the software and on the user's guide have changed to V27.

Ingenix Client Services

Ingenix is always striving to improve our products and services. If you require assistance or have any questions or suggestions, please contact our Client Services Department at 1-800-999-DRGS (3747) or email: client.services@ingenix.com.

Normalized Weights for Public Use

April 2010 (Version 26)

PUB 4.12.2010

About this Release

Charge, length of stay (LOS), and mortality weights and trims have been updated for the Version 26.0 All Payer Severity-Adjusted DRGs (APS-DRGs®). These CMS-originated changes include reclassifying existing codes into different DRGs and making additional changes for FY 2009.

Product Version Number

Version numbers on the software and on the user's guide have changed to V26.

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Normalized Weights for Public Use

June 2009 (Version 25)

PUB 4.12.2010

About this Release

Charge, length of stay (LOS), and mortality weights and trims have been updated for the Version 25.0 All Payer Severity-adjusted DRGs (APS-DRGs[®]). These CMS-originated changes include reclassifying existing codes into different DRGs and making additional changes for FY 2008.

Product Version Number

Version numbers on the software and on the user's guide have changed to V25.

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Normalized Weights for Public Use

March 2008 (Version 24)

PUB 4.12.2010

About this Release

Charge, length of stay (LOS), and mortality weights and trims have been updated for the Version 24 All Payer Severity-adjusted DRGs (APS-DRGs[®]). These CMS-originated changes include reclassifying existing codes into different DRGs and making the additional changes for FY 2007 detailed in *Ingenix Industry Insight No. 409*, Version 24.0 Update to the APS-DRGs[®], September 2006, which may be viewed on the Ingenix web site at www.ingenix.com.

Product Version Number

Version numbers on the software and on the user guide have changed to V24.

Client Services

If you have questions regarding the All Payer Severity-adjusted DRGs (APS-DRGs[®]) updates described above, please contact our Client Services Department at 1-800-999-DRGS (3747) or e-mail client.services@ingenix.com.