

INGENIX[®] APS-DRGs[®]

ALL PAYER SEVERITY-ADJUSTED DRGs
(APS-DRGs[®]) NORMALIZED CHARGE, LOS,
AND MORTALITY WEIGHTS

VERSION 26
FOR PUBLIC USE

COPYRIGHT PAGE

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APS-DRGs®
April 2010 Version 26

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Table of Contents

Copyright page	2
Chapter 1: Introduction	4
APS-DRGs® Overview	5
About Ingenix	5
Chapter 2: Methods	7
Data	8
APS-DRGs® Weight Calculation	8
Results	10
Data Quality and APS-DRGs® Assignment	10
Chapter 3: Final Weights	11
Final Weights Overview	12
Chapter 4: Distribution	14
Distribution Overview	15
Format of APS-DRGs® Weight File	15
Appendix A: Release Notes	16

1 Introduction

Weights for the APS-DRGs® 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, length of stay, and mortality benchmarks can be used to measure performance and to estimate costs.

THIS CHAPTER EXPLAINS:

- APS-DRGs® Overview
- About Ingenix

APS-DRGs® OVERVIEW

Charge, length of stay (LOS), and mortality weights for Version 26.0 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 13 million discharges from nearly 1,243 hospitals in 12 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 both charges 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. When problems appear to exist because of small cell sizes, weights are imputed. 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, LOS, and Mortality Weights User's Guide* is published by Ingenix, a leading healthcare information company that provides comprehensive financial and management solutions for payers, providers, and self-insured/self-administered employers. 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 patient encounter data flow for all major participants and in any reimbursement environment. Providers use Ingenix's 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 and UnitedHealth Group

Ingenix is a subsidiary of UnitedHealth Group. We supply a wide variety of software, data, and consulting services to the various businesses of UnitedHealth Group along with the greater health care industry.

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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.

VOICEMAIL: 800-999-DRGS (3747)

Press #, then 6 for Voicemail

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 2005 All Payer state data sets were used to develop the weights. This contains over 13 million patient discharge records on all inpatient stays from 12 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 26.0 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 26.0 APS-DRGs® TO THE DATA

The 13+ million discharges described above were assigned to appropriate Version 26.0 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 26.0 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.

☞ 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 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 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. 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 15 hospitals with an average LOS greater than 50 were thrown out. Imputations were performed for 8 charge weights, and 10 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

STEP 6. CALCULATE RELATIVE WEIGHTS

The final, post-imputation estimated average LOS, charge, and mortality for individual APS-DRGs® was then divided by the overall LOS, 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 13,255,300 records. After eliminating records from 15 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; 12,519,017 records were available for developing weights. After trimming outliers, 12,410,913 inlier records were used to calculate charge weights and 12,464,158 inlier records were used to calculate LOS weights.

DATA QUALITY AND APS-DRGs® ASSIGNMENT

Frequencies for the Version 26.0 APS-DRGs® were examined for variation and compared to results from previous years.

Table 3-2 on page 13 lists the 10 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=10) With Fewer Than 25 Observations in Trimmed Data

FINAL WEIGHTS OVERVIEW

Approximately 0.86 percent of the records exceeded the individual APS-DRGs® charge 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 0.0918 to 25.0805 with a **mean charge** of \$20,454.78.
- **LOS weights** ranged from 0.2079 to 18.3482 with a **mean LOS** of 4.8094 days.
- **Mortality weights** ranged from 0 to 46.7363 with a **mean mortality** of 0.0214 deaths per discharge.

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

All APS-DRGs® had observations for 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 56,759 claims involving 12 APS-DRGs® weights imputed for mortality. They are listed in APS-DRGs® (N=12) whose mortality weights are imputed (Discharge Status is part of the DRG de.

Weights were imputed by combining APS-DRGs® for weighting when necessary to address monotonicity. These imputations were performed for 8 charge weights and 10 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
7881	NEONATE, XFRD TO ACU HOSP, LOS 2-4 DAYS

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

APS-DRG®	DESCRIPTION
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=10) With Fewer Than 25 Observations in Trimmed Data

APS-DRG®	DESCRIPTION
0100	PANCREAS TRANSPLANT WO CC/MCC
0102	PANCREAS TRANSPLANT W MCC
1291	COCHLEAR IMPLANTS W CC
1292	COCHLEAR IMPLANTS W MCC
2150	OTH HEART ASSIST SYS IMPLANT WO CC/MC
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
9330	EX BRN/FL-THK BRN/MV96+HR WO GRFT WO C/M

4 Distribution

Weights and trims for the Version 26.0 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: APSDRGV26WTRIM.DAT
- Description: APS-DRGs® Weight and Trims
- Record Size: 110
- Record Count: 1,223

FORMAT OF APS-DRGs® WEIGHT FILE

The format of this file is displayed in Description of Weight File.

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	
LLOSTRIM	68 - 71	NNNN	Low Length of Stay Trim
FILLER	72	C	
HLOSTRIM	73- 76	NNNN	High Length of Stay Trim
FILLER	77	C	
LCHGTRIM	78 - 88	N(8).NN	Low Charge Trim
FILLER	89	C	
HCHGTRIM	90 - 100	N(8).NN	High Charge Trim
FILLER	101	C	
MORTWT	102 - 110	NNN.NNNNN	Mortality Weight (with explicit decimal)

A Release Notes

THIS APPENDIX INCLUDES:

- April 2010 (Version 26)
- June 2009 (Version 25)
- March 2008 (Version 24)
- August 2006 (Version 23)

Normalized Weights for Public Use

April 2010 (Version 26)

PUB 4.20.2010

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.

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

June 2009 (Version 25)

PUB 4.20.2010

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 4.20.2010

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.

Normalized Weights for Public Use

August 2006 (Version 23)

PUB 4.20.2010

About this Release

Charge, length of stay (LOS), and mortality weights and trims have been updated for the Version 23.0 All Payer Severity-adjusted DRGs (APS-DRGs®). A synopsis of changes will be summarized in a Ingenix *Industry Insight*. Ingenix *Industry Insights* can 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 V23.

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.

For More Information

For further information on this update refer to the Ingenix web site (www.ingenix.com). **The Ingenix website** is updated on a regular basis with new and timely *Industry Insights*, as well as access to source documents and other relevant documentation.