



**USER GUIDE:
COST-TO-CHARGE RATIO (CCR)
FOR INPATIENT FILES**

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California Department of Health Care Access and Information	New York State Department of Health
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Connecticut Hospital Association	North Dakota (data provided by the Minnesota Hospital Association)
Delaware Division of Public Health	Ohio Hospital Association
District of Columbia Hospital Association	Oklahoma State Department of Health
Florida Agency for Health Care Administration	Oregon Association of Hospitals and Health Systems
Georgia Hospital Association	Oregon Health Authority
Hawaii Laulima Data Alliance	Pennsylvania Health Care Cost Containment Council
Illinois Department of Public Health	Rhode Island Department of Health
Indiana Hospital Association	South Carolina Revenue and Fiscal Affairs Office
Iowa Hospital Association	South Dakota Association of Healthcare Organizations
Kansas Hospital Association	Tennessee Hospital Association
Kentucky Cabinet for Health and Family Services	Texas Department of State Health Services
Louisiana Department of Health	Utah Department of Health and Human Services
Maine Health Data Organization	Vermont Association of Hospitals and Health Systems
Maryland Health Services Cost Review Commission	Virginia Health Information
Massachusetts Center for Health Information and Analysis	Washington State Department of Health
Michigan Health & Hospital Association	West Virginia Management Information Services
Minnesota Hospital Association (provides data for Minnesota and North Dakota)	Wisconsin Department of Health Services
Mississippi State Department of Health	Wyoming Hospital Association
Missouri Hospital Industry Data Institute	
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EXECUTIVE SUMMARY

- The Healthcare Cost and Utilization Project (HCUP) Cost-to-Charge Ratio (CCR) Files are hospital-level files that can be linked to HCUP inpatient and emergency department databases to facilitate the conversion of total charges into hospital costs (expenses) for providing care. The CCRs are constructed using information from the Healthcare Cost Report Information System (HCRIS) files submitted by hospitals to the Centers for Medicare & Medicaid Services (CMS).
- Separate CCR Files are released for each inpatient database type. This document describes the following CCR for Inpatient Files:
 - CCR for the HCUP Central Distributor State Inpatient Databases (CCR-SID)
 - CCR for the National (Nationwide) Inpatient Sample (CCR-NIS)
 - CCR for the Kids' Inpatient Database (CCR-KID)
 - CCR for the Nationwide Readmissions Database (CCR-NRD)
- The CCR Files are released for each data year and should be used with the corresponding year and database to ensure an appropriate match for the year and database-specific hospital identifiers.
- In February 2026, the structure of the CCR-SID was revised. Previously, there was a combined multi-state CCR-SID file per data year (2001-2023) that included information for most SID. The previously combined multi-state CCR-SID files have been split into State-specific files. There is one CCR-SID file per SID for each data year. The unit of observation within the CCR-SID remains hospitals in the SID, identified by the HCUP hospital identification number (HOSPID). The availability of data elements within the CCR-SID continues to depend on HCUP Partner permission for data release.
- This document provides an overview of the CCR for Inpatient Files (e.g., background, file structure, and usage information), as well as information about the CCR methodology (e.g., source data, development process, and validations studies), data elements, file contents, and other considerations and recommendations for use. A separate Excel Appendix includes year specific information about the CCR for Inpatient Files.
- A separate user guide is available for the [CCR for Emergency Department Files](#).

OVERVIEW

Background

The Healthcare Cost and Utilization Project (HCUP) Cost-to-Charge Ratio (CCR) for Inpatient Files (CCR Files) are hospital-level files that can be linked to HCUP inpatient databases to facilitate the conversion of total charges into hospital costs (expenses) for providing care. The files are designed to supplement the data elements in the HCUP inpatient databases, which contain data on total charges for each hospital stay. *Charges* represent the amount a hospital billed for the case; *costs* reflect the expenses incurred in the production of hospital services, such as wages, supplies, and utility costs. Neither charges nor costs represent the amounts that hospitals receive in payment.

Constructed from appropriate cost centers in the hospital cost reports obtained from the Centers for Medicare & Medicaid Services (CMS) Healthcare Cost Report Information System (HCRIS),¹ the CCR for Inpatient Files are annual datasets that provide hospital-specific CCRs based on all-payer inpatient costs for nearly every hospital in each year's collection of the HCUP Central Distributor State Inpatient Databases (SID) starting in data year 2001, National (Nationwide) Inpatient Sample (NIS) starting in data year 2001, Kids' Inpatient Database (KID) starting in data year 2003, and Nationwide Readmissions Database (NRD) starting in data year 2010.

See [Appendix A](#) for information about the history of CCRs and CMS cost reports.

General File Structure

The HCUP CCR for Inpatient Files provide an estimate of all-payer, inpatient CCRs for hospitals in corresponding HCUP databases. The publicly available files are provided as comma-separated value (CSV) text files, which use a comma to separate values on each record. Records are included for all community hospitals from the corresponding HCUP database that match with both the American Hospital Association (AHA) Annual Survey Database and the CMS HCRIS file for the corresponding fiscal year.

Separate CCR Files are released for each data year and should be used with the corresponding year of the SID, NIS, KID, or NRD to ensure an appropriate match of the year-specific hospital identifiers. In February 2026, the structure of the CCR-SID files was revised. Previously, there was one combined multi-state CCR-SID file per data year (2001-2023) that included information for all States with available data. The previously combined multi-state CCR-SID files have been split into State-specific files. There is one CCR-SID file per SID in each data year. The structure of the CCR Files for the NIS, KID, and NRD remains one file per data year.

¹ For more information, visit www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Cost-Reports.

Usage

Linkage Between the CCR for Inpatient Files and the HCUP Inpatient Databases

The CCR Files can be linked to discharge records in the HCUP databases using the HCUP hospital identification number, which is a unique hospital number exclusive to the HCUP data. The name of the data element representing the hospital identification number varies by file and data year, as summarized in Table 1.

Table 1. Linkage and CCR Data Elements by CCR File and Data Year

CCR File	Data Years	Linkage Data Element	CCR Data Element(s)
CCR-SID	2001+	HOSPID	APICC, GAPICC
CCR-NIS	2001–2011	HOSPID	APICC, GAPICC
CCR-NIS	2012+	HOSP_NIS*	CCR_NIS
CCR-KID	2001–2011	HOSPID	APICC, GAPICC
CCR-KID	2012+	HOSP_KID*	CCR_KID
CCR-NRD	2010+	HOSP_NRD*	CCR_NRD

Abbreviations: APICC, all-payer inpatient cost-to-charge ratio; CCR, cost-to-charge ratio; GAPICC, group average all-payer inpatient cost-to-charge ratio; KID, Kids' Inpatient Database; NIS, National (Nationwide) Inpatient Sample; NRD, Nationwide Readmissions Database; SID, State Inpatient Databases.

Note: Beginning with the 2012 data, the CCRs for the NIS and KID were modified to enhance the confidentiality of the databases. The CCR variables were renamed to indicate that they are designed to be used exclusively with data years 2012 and later. These changes did not affect statistical reliability of the estimates.

* HOSP_NIS, HOSP_KID, and HOSP_NRD are reassigned each year and do not (1) link to other HCUP databases or to external databases or (2) track hospitals over years.

For the CCR Files for the nationwide databases (CCR-NIS, CCR-KID, and CCR-NRD), the CCR records can be merged directly with the discharge records in the corresponding database using the HCUP hospital identification number listed in Table 1 under Linkage Data Element.

For the CCR-SID Files, the linkage data element is HOSPID, but HOSPID is not always on the SID Core File. The following explains how to link the CCR-SID to the SID Core file for three different scenarios:

- **For States that release an HCUP AHA Linkage File,** HOSPID is not on the SID Core. Linkage between the CCR File and the SID is achieved in two steps. First, link the AHA Linkage File to the SID Core file by the data elements HOSPST and DSHOSPID to add the data element HOSPID. Second, link the resulting file with the CCR File for the SID by the data element HOSPID. The AHA Linkage Files can be downloaded from the HCUP [AHA Linkage Files](#) page on the HCUP User Support (HCUP-US) website.
- **The AHA Linkage file for four States (Iowa, Minnesota, Nebraska, and North Dakota)** are discharge-level files that are available by request from the HCUP Central Distributor to purchasers whose organizational affiliation and ownership meet the

Partner's eligibility criteria. HOSPID is not on the SID Core file. Linkage between the CCR-SID for these States is achieved in two steps. First, link records in the AHA Linkage File to the SID by KEY to add the data element HOSPID. Second, link the resulting file to the CCR-SID by HOSPID.

- **For States that do not release an HCUP AHA Linkage File**, HOSPID is included on the SID Core file. For these States, the data elements from the CCR File can be merged onto the SID by HOSPID.

The HCUP hospital identifier (HOSPID, HOSP_NIS, HOSP_KID, HOSP_NRD) on the CCR CSV text file is enclosed in quotations to preserve leading zeros. As a result, some software applications may interpret the data element as a character variable, which in turn would not match the numeric version of the hospital identifier on the SID, NIS, KID, or NRD. Users should load the hospital identifier data element on the CCR Files as numeric or convert it to numeric prior to merging it with HCUP database files.

Cost Computation

The cost of inpatient care for a discharge is estimated by multiplying TOTCHG (total charges reported on the discharge record) by the CCR. The data element representing the CCR varies by file and data year, as summarized in Table 1.

- **For the CCR-SID and through data year 2011 for the CCR-NIS and CCR-KID**, the hospital-specific all-payer inpatient CCR (data element APICC) and the group average all-payer inpatient CCR (data element GAPICC) are included, with some exceptions. The values of APICC are not available if either the underlying data needed to create the ratio is missing in the HCRIS files or the release of the hospital-specific CCR is not permitted by the HCUP Partner organization. Analysts can use the APICC, when available, and can otherwise use the weighted group average, GAPICC.
- **For all available data years of the CCR-NRD and beginning with the 2012 CCR-NIS and CCR-KID**, a single CCR is provided (CCR_NIS, CCR_KID, CCR_NRD), with values based on the APICC when available or the GAPICC otherwise. The change to the CCR data element in the 2012 CCR-NIS and CCR-KID was intended to enhance the confidentiality of the databases. The CCR variables were renamed to indicate that they are designed to be used exclusively with data years 2012 and later. These changes did not affect statistical reliability of the estimates. In addition, beginning in 2012, CCRs in the CCR-NIS, CCR-KID, and CCR-NRD are perturbed slightly to further protect hospital and Partner identity.

Additional Data Elements

In addition to the linkage and CCR data elements summarized above, the CCR Files contain supplemental data elements that may be of interest to users. These data elements are summarized in the [Data Elements](#) section.

CCR METHODOLOGY

Development of the CCR Files

Source Data

The CCRs are constructed from cost and charge information contained in hospital cost reports obtained from the CMS HCRIS; this information is delineated by hospital cost center. HCRIS covers Medicare-reimbursable facilities, including hospitals.

Hospital-Specific Cost-to-Charge Ratios

The HCRIS hospital cost reports are downloaded for use by HCUP after most hospitals have filed them. The HCUP convention has been to obtain the publicly available HCRIS cost reports after the first quarter of the second year following the HCRIS data year. For example, the HCRIS 2017 data files were downloaded in April 2019.

Inpatient charges, outpatient charges, and total costs are extracted from HCRIS data by hospital identifier/provider number (CMS Certification Number, or CCN) and HCRIS standard cost center. Additional financial and hospital characteristic data are also extracted at this time.

After the CMS extract has been prepared, cost centers are organized into the following HCUP service groups:

- Routine Care Group
- Specialty Care Group
- Labor & Delivery Services Group
- Intermediate Care Services (Ancillary Services Group 1)
- All Other Non-Accommodation Cost Centers (Ancillary Services Group 2)
- Emergency Services Group

The Routine Care, Specialty Care, Labor & Delivery, and Ancillary Services Groups are used for calculation of the inpatient CCR. The Emergency Services Group is used to calculate the emergency department CCR.

For a complete mapping of HCRIS cost centers to HCUP service groups, see [Appendix B](#).

There are several reasons why the service groupings are used in the calculations. First, grouping standard cost centers can lessen the impact of data entry errors at the hospital level and limit the effect of any misalignment in the mapping of cost and charge data from the hospital accounting systems to the HCRIS cost centers. Second, the proportion of charges attributed to inpatient stays is used to calculate costs, and this proportion varies markedly across service groups. As such, inpatient charge proportions based on service groups should produce more accurate cost estimates than those based on all cost centers. Third, the creation of service-group level CCRs allows for more sensitive data quality checks (i.e., outlier identification).

Calculation of the service group and hospital-wide CCRs proceeds as follows:

- For each hospital and service group (Routine, Specialty, Labor & Delivery, Ancillary 1, and Ancillary 2), inpatient charges, outpatient charges, and total costs are summed.
- Next, by hospital and service group, total costs are transformed to estimated inpatient costs by multiplying the proportion of inpatient charges and total costs. (Note that Ancillary Services Group 2 is the only service group with outpatient charges and is thus the only service group for which estimated inpatient costs are in practice calculated.)
- Following this, Ancillary Services Groups 1 and 2 are combined into one Ancillary Services Group.
- Service group-level inpatient CCRs are calculated as the ratio of estimated inpatient costs to inpatient charges.
- Hospital-level inpatient CCRs are calculated by summing the service group inpatient costs and then dividing by the sum of the service group charges.

Hospital-specific CCRs calculated in this way are not included in the CCR Files when there is no cost information in the HCRIS data.

Both operating costs and capital-related costs are included in the calculation of hospital-specific CCRs.

Group Average Cost-to-Charge Ratios

The group average all-payer inpatient CCR (data element GAPICC) is a weighted average for the hospitals in peer groups (defined by four dimensions: State, urbanicity, ownership, and bed size), using the proportion of each hospital's beds relative to its peer group as the weight for each hospital.

These averages are based on clean observations from all hospitals in the SID maintained by AHRQ, including SID that are not released through the HCUP Central Distributor. Clean records are defined as HCUP hospitals that have records in both the AHA and CMSdata, when the CMS files are acquired. These records have a matching hospital in the CMS cost report, have availability of certain completed data items in the report, and pass certain quality checks. Note that a group average can be based on only one hospital in the peer group (defined by State and hospital type). The group average may incorporate non-HCUP hospitals. Both operating costs and capital-related costs are included in the calculation of GAPICC.

The hospital type for grouping peer hospitals (data element HTYPE) is calculated within State, using hospital characteristics obtained from the AHA Annual Survey. These include hospital urban/rural location, type of ownership/control, and bed size. The GAPICC is calculated within State and for each of these groupings.

Urban is defined as being part of a Metropolitan Statistical Area. For type of ownership/control, State and local nongovernment hospitals are included in the *not-for-profit* categories. *Beds* are the total hospital beds set up (as reported in each year's AHA Annual Survey Database). *Teaching status*, which is often used for grouping HCUP hospitals, was not incorporated into the definition of HTYPE. This indicator is not present in the CMS hospital cost reports. A proxy measure, the ratio of interns and residents per bed, was tested in regression analyses, and the

cost ratios by the proxy for teaching status were not significantly different. Therefore, only ownership and bed size were used for defining HTYPE. (See [Table 2](#) for a summary of HTYPE values.)

Outliers

HCUP inpatient CCR outliers are identified using upper and lower limits for hospital-wide, Routine Care, Specialty Care, Labor & Delivery, and Ancillary Services CCRs. The hospital-specific CCR is set to missing if any of these conditions are met:

- The Routine Care Group inpatient CCR is less than 0 or greater than 4.
- The Labor & Delivery Group inpatient CCR is greater than 4.
- The Specialty Care Group inpatient CCR is greater than 4.
- The Combined Ancillary Services Group CCR is less than 0 or greater than 4.
- The hospital-wide inpatient CCR is less than .05 or greater than 2.

The inpatient CCR upper limit of 2.0 identifies about 2.5 percent of hospitals as outliers. Note that upper limit of the CCR in the CCR-NIS is set at 1.87 to further protect hospital confidentiality.

See the [HCUP CCR Outlier Methodologies document](#) on the HCUP-US website for more information.

DATA ELEMENTS

[Table 2](#) provides a summary of data elements included on the CCR for Inpatient Files.

Common Data Elements

As reviewed in Table 1, linkage variables (HOSPID, HOSP_NIS, HOSP_KID, or HOSP_NRD) allow users to merge the CCR Files with HCUP databases. The CCR variables (APICC, GAPICC, CCR_NIS, CCR_KID, and CCR_NRD) can be used to convert hospital charges to hospital costs. CCR Files also include data year (data element YEAR) and area wage index (data elements WAGEINDEX or WI_X), which is an index computed by CMS to indicate the relative hospital wage level in a geographic area compared with the national average hospital wage level (see [Appendix C](#) for more information). The wage index data element is called WI_X in the CCR-SID and WAGEINDEX in the CCR-NRD. Through data year 2011, this data element is called WI_X in the CCR-NIS and CCR-KID. Beginning in 2012, it was modified to enhance confidentiality of the NIS and renamed as WAGEINDEX. Statistical reliability of the estimates was not affected.

Data Elements Available on a Subset of Files

Additional data elements are available on only some CCR for Inpatient Files.

The CCR-SID may also include hospital type for grouping peer hospitals (data element HTYPE). The GAPICC is calculated within State and for each of these groupings. Although HTYPE is not provided on the CCR-NIS, CCR-KID, and CCR-NRD Files, it is helpful to know how this variable is defined to create peer groups using all hospitals within each State. The values of HTYPE are

missing if the HCUP Partner organization restricted release of this type of information. The [Group Average Cost-to-Charge Ratios](#) development section provides more information about how HTYPE is used to calculate GAPICC.

The CCR-SID (for all years), as well as the CCR-NIS and CCR-KID prior to 2012, include State postal code (data element Z013).

The CCR-SID (beginning with 2009), the CCR-NIS (2001–2011), and the CCR-KID (2009 only) also include the geographic adjustment factor (data element GAF), which represents the capital cost adjustment index for Core-Based Statistical Areas (CBSAs). GAF is used in calculating the Medicare reimbursement payments for capital costs. This data element may prove useful in regression calculations. However, analysts should note that values of GAF are missing if the HCUP Partner organization restricted the release of the data element. See [Appendix C](#) for more information.

Table 2. Data Elements on the CCR for Inpatient Files

Data Element Category	Data Element	Data Type	Coding Notes	CCR Files and Data Years
Hospital ID Number	HOSPID	Character*	HCUP hospital identification number	SID 2001+ NIS 2001–2011 KID 2001–2011
	HOSP_NIS	Character*	NIS hospital identification number	NIS 2012+
	HOSP_KID	Character*	KID hospital identification number	KID 2012+
	HOSP_NRD	Character*	NRD hospital identification number	NRD 2010+
Cost-to-Charge Ratio	APICC	Numeric (decimal values)	Hospital-specific all-payer inpatient CCR. Set to missing when there is no cost information in the HCRIS (PPS) data or the calculated CCR value is deemed an outlier.	SID 2001+ NIS 2001–2011 KID 2001–2011
	GAPICC	Numeric (decimal values)	Group average all-payer inpatient CCR, which is a weighted average for the hospitals in peer groups (see HTYPE variable), using the proportion of each hospital's beds relative to its peer group as the weight for each hospital.	SID 2001+ NIS 2001–2011 KID 2001–2011

Data Element Category	Data Element	Data Type	Coding Notes	CCR Files and Data Years
	CCR_NIS	Numeric (decimal values)	NIS-specific CCR populated with the hospital-specific, all-payer inpatient CCR (APICC) when available and hospital group average CCR (GAPICC) when the APICC is not available.	NIS 2012+
	CCR_KID	Numeric (decimal values)	KID-specific CCR populated with the hospital-specific, all-payer inpatient CCR (APICC) when available and hospital group average CCR (GAPICC) when the APICC is not available.	KID 2012+
	CCR_NRD	Numeric (decimal values)	NRD-specific CCR populated with the hospital-specific, all-payer inpatient CCR (APICC) when available and hospital group average CCR (GAPICC) when the APICC is not available.	NRD 2010+
Hospital Characteristics	HTYPE	Numeric	Hospital type for grouping peer hospitals, calculated within State, using bed size, ownership/control, and urban/rural location. 1 = investor-owned, under 100 beds 2 = investor-owned, 100 or more beds 3 = not-for-profit, rural, under 100 beds 4 = not-for-profit, rural, 100 or more beds 5 = not-for-profit, urban, under 100 beds 6 = not-for-profit, urban, 100–299 beds 7 = not-for-profit, urban, 300 or more beds.	SID 2001+
	Z013	Character	Two-character State postal code (from AHA)	SID 2001+ NIS 2001–2011 KID 2001–2011

Data Element Category	Data Element	Data Type	Coding Notes	CCR Files and Data Years
Area Wage Index	WI_X	Numeric	Area wage index computed by CMS to measure the relative hospital wage level in a CBSA compared with the national average hospital wage level.	SID 2001+ NIS 2001–2011 KID 2001–2011
	WAGEINDEX	Numeric	Area wage index computed by CMS to measure the relative hospital wage level in a CBSA compared with the national average hospital wage level.	NIS 2012+ KID 2012+ NRD 2010+
Geographic Adjustment Factor	GAF	Numeric (decimal values)	Capital cost adjustment factor for CBSAs	SID 2009+ NIS 2001–2011 KID 2009 only
Year	YEAR	Numeric	Data year	SID 2001+ NIS 2001+ KID 2001+ NRD 2010+

Abbreviations: AHA, American Hospital Association; CBSA, Core-Based Statistical Area; CCR, cost-to-charge ratio; CMS, Centers for Medicare & Medicaid Services; HCRIS, Healthcare Cost Report Information System; HCUP, Healthcare Cost and Utilization Project; KID, Kids' Inpatient Database; NIS, National (Nationwide) Inpatient Sample; NRD, Nationwide Readmissions Database; PPS, Prospective Payment System; SID, State Inpatient Databases.

* The HCUP hospital identifier (HOSPID, HOSP_NIS, HOSP_KID, HOSP_NRD) on the CCR CSV text file is enclosed in quotations to preserve leading zeros. As a result, some software applications may interpret the data element as a character variable, which in turn would not match the numeric version of the hospital identifier on the SID, NIS, KID, or NRD. Users should load the hospital identifier data element on the CCR Files as numeric or convert it to numeric prior to merging it with HCUP database files.

CONSIDERATIONS

Revised Versions of the CCR Files for the NIS

In August 2013, AHRQ released a revised version of the 2010 CCR-NIS to incorporate updated 2010 cost reports from CMS.

Revised Versions of the CCR Files for the SID

In August 2013, AHRQ released a revised version of the combined multi-state 2010 CCR-SID to incorporate updated 2010 cost reports from CMS.

In September 2021, AHRQ released revised versions of the combined multi-state 2010–2018 CCR-SID. These files were updated to accord with current Partner restrictions and to add State data that were not permissible at the time of the original release.

In February 2026, the structure of the CCR-SID was revised. Previously, there was one combined multi-state CCR-SID file per data year (2001-2023) that included information for all States with available data. The most recent combined multi-state CCR-SID files have been split into State-specific files. There is one CCR-SID file per SID for each data year. The unit of observation within the CCR-SID remains hospitals in the SID, identified by the HCUP hospital identification number (HOSPID). The availability of data elements within the CCR-SID continues to depend on HCUP Partner permission for data release.

See the [Appendix D](#) for additional information on the CCR-SID available *prior to March 2026*.

Data Notes and Recommendations

Due to factors such as changes to the hospital universe and variation in State participation in the 2001–2011 NIS databases, users may consider making some adjustments to cost estimates derived from these databases. [Appendix E](#) provides more detailed data notes and recommendations for users of the CCR-NIS Files.

FILE-SPECIFIC INFORMATION

CCR for the SID

Almost all States participating in the HCUP Central Distributor SID have an accompanying CCR-SID. For most states the CCR-SID is available for purchasers of the corresponding SID. The CCR-SID for four States—Iowa, Minnesota, Nebraska, and North Dakota—are available by request from the HCUP Central Distributor to purchasers whose organizational affiliation and ownership meet the Partner's eligibility criteria. Information on the availability of the CCR-SID by State and data year is listed in a separate Appendix to this User Guide (in Excel format).

Starting in March 2026, the CCR-SID are State-specific files and have the filename of CCR_SID_<YYYY>_<SS>, where <YYYY> is the data year and <SS> is the 2-character State abbreviation. The filenames of the CCR-SID acquired before March 2026 are listed in a separate Appendix to this User Guide (in Excel format).

CCR for the NIS

The number of records (i.e., hospitals) in the CCR-NIS and the availability of data elements in the CCR-NIS varies by data year.

- **Starting in data year 2012**, there is one record for each hospital (identified by the data element HOSP_NIS) in the CCR-NIS. All hospitals have a nonmissing value for the CCR (data element CCR_NIS).
- **In data years 2001–2011**, the CCR-NIS contains a record for each hospital (identified by the data element HOSPID) in the NIS only if the HCUP Partner organization permitted release of their CCRs. In addition, one or more Partners did not provide permission to include their hospital-specific CCRs, APICC, in the CCR-NIS.

Details on the number of hospitals included in each year of the CCR-NIS and the inclusion of the APICC (prior to data year 2012) are provided in the separate Appendix to this User Guide (in Excel format).

CCR for the KID

The number of records (i.e., hospitals) in the CCR-KID and the availability of data elements in the CCR-KID varies by data year.

- **Starting in data year 2012**, there is one record for each hospital (identified by the data element HOSP_KID) in the CCR-KID. All hospitals have a nonmissing value for the CCR (data element CCR_KID).
- **Prior to data year 2012**, the CCR-KID contains a record for each hospital (identified by the data element HOSPID) in the KID only if the HCUP Partner organization permitted release of their CCRs. In addition, one or more Partners did not provide permission to include their hospital-specific CCRs, APICC, in the CCR-KID.

Details on the number of hospitals included in each year of the CCR-KID and the inclusion of the APICC (prior to data year 2012) are provided in the separate Appendix to this User Guide (in Excel format).

CCR for the NRD

There is one record for each hospital (identified by the data element HOSP_NRD) in the CCR-NRD. All hospitals have a nonmissing value for the CCR (data element CCR_NRD). Details on the number of hospitals included in each year of the CCR-NRD are provided in the separate Appendix to this User Guide (in Excel format).

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APPENDIX A: ORIGINS OF COST-TO-CHARGE RATIOS AND COST REPORTS

CCRs have likely been used on an ad hoc basis by hospitals for estimating treatment costs for a considerable time. The impetus for creating a national database of hospital accounting data was Medicare prospective payment, which was established by the Social Security Amendments Act of 1983, with implementation starting in 1984. At that time, CMS, then known as the Health Care Financing Administration (HCFA), established the inpatient prospective payment system (PPS) as a means of controlling rapidly increasing hospital expenditures that threatened solvency of the Medicare Trust Fund. The fundamental concepts behind PPS were (1) creation of categories of inpatient encounters within which intensity of service delivery was similar (diagnosis-related groups, or DRGs) and (2) reimbursement to hospitals based on the costs of services within DRGs. This led to development of the cost reports, used by HCFA to estimate national costs of service delivery for DRGs, among other uses. DRG cost estimates relied on CCRs calculated from the cost reports and were integral to creation of DRG “relative weights,” which determine payments to hospitals based on DRGs (see Pettengill and Vertrees, 1982, for a discussion of initial development of DRGs and relative weights).

Once the cost reports became accessible to the public, CCRs began being used to estimate service delivery costs for individual hospitals, hospital systems, and peer groups. This in turn led to a focus on hospital cost-efficiency analysis and benchmarking. AHRQ developed a methodology for estimating hospital inpatient costs based on the cost reports in the early 2000s (Friedman et al., 2002). More recently, AHRQ developed a methodology for estimating the cost of treat-and-release emergency department visits (Pickens et al., 2021).

APPENDIX B: ASSIGNMENT OF HCRIS COST CENTERS TO HCUP SERVICE GROUPS

Table B.1 details the mapping between HCRIS cost centers and HCUP service groups.

Table B.1. Assignment of HCRIS Cost Centers to HCUP Service Groups

HCRIS Standard Cost Center Description	Inpatient Cost-to-Charge Ratios					Emergency Department Cost-to-Charge Ratios
	Routine Care Group	Specialty Care Group	Labor & Delivery Group	Ancillary Services Group 1	Ancillary Services Group 2	Emergency Services Group
Adults & Pediatrics (General Routine Care)	X					
Intensive Care Unit		X				
Coronary Care Unit		X				
Burn Intensive Care Unit		X				
Surgical Intensive Care Unit		X				
Other Intensive Care		X				
Inpatient Psychiatric Facility Subprovider				X		
Inpatient Rehabilitation Facility Subprovider				X		
Other Subprovider				X		
Nursery		X				
Skilled Nursing Facility				X		
Nursing Facility				X		
Other Long-Term Care				X		
Operating Room, Endoscopy, Prosthesis					X	
Recovery Room					X	
Delivery Room & Labor Room			X			
Anesthesiology & Acupuncture					X	
Radiology-Diagnostic					X	X
Radiology-Therapeutic					X	
Radioisotope					X	
CAT Scan					X	X
MRI					X	
Cardiac Catheterization Lab					X	
Laboratory					X	X
PBP Clinical Lab Service Program Only					X	
Whole Blood & Packed Red Blood Cells					X	
Blood Storing, Processing, & Transfusing					X	

HCRIS Standard Cost Center Description	Inpatient Cost-to-Charge Ratios					Emergency Department Cost-to-Charge Ratios
	Routine Care Group	Specialty Care Group	Labor & Delivery Group	Ancillary Services Group 1	Ancillary Services Group 2	Emergency Services Group
Intravenous Therapy					X	
Respiratory Therapy					X	
Physical Therapy					X	
Occupational Therapy					X	
Speech Pathology					X	
Electrocardiology					X	
Electroencephalography					X	
Medical Supplies Charged to Patients					X	
Implants Charged to Patients					X	
Drugs Charged to Patients					X	X
Renal Dialysis					X	
Ambulatory Surgery Center (Non-distinct Part)					X	
Other Ancillary					X	
Rural Health Clinic					X	
Federally Qualified Health Center					X	
Clinic					X	
Emergency Room					X	X
Observation Beds					X	X
Other Outpatient Service					X	
Home Program Dialysis					X	
Ambulance Services					X	
Durable Medical Equipment -Rented					X	
Durable Medical Equipment -Sold					X	
Other Reimbursable Cost Centers (excluding Home Health Agency and Comprehensive Outpatient Rehabilitation Facility)					X	

Abbreviations: CAT, computerized axial tomography; HCRIS, Healthcare Cost Report Information System; HCUP, Healthcare Cost and Utilization Project; MRI, magnetic resonance imaging; PRP, provider-based physician.

APPENDIX C: ADDITIONAL DATA ELEMENT INFORMATION

Area Wage Index (WAGEINDEX or WI_X)

Area wage index is provided on the file to allow researchers to analyze cost differences geographically or to control for price factors beyond the hospital's control. Multivariate studies should not assume strict proportionality. Some analysts use the area wage index to adjust the labor portion of the hospital's estimated cost to reflect local labor market conditions.

The index is computed for each urban CBSA and then linked with the AHA data before it is added to the file. If the AHA-reported CBSA does not match the CMS hospital area, then the Area Health Resources Files and other hospitals in the same county are used to find a matching CBSA. All rural areas in each State are combined for a single wage index. This information is available for download from CMS.²

For the HCUP hospitals in each year, all hospitals were matched to an area wage index using CMS files, the AHA Annual Survey, and the Area Health Resources Files in cases where the AHA Survey was incomplete.

Geographic Adjustment Factor (GAF)

GAF represents the capital cost adjustment index CBSAs and is used in calculating the Medicare reimbursement payments for capital costs. This data element may prove useful in regression calculations. However, analysts should note that for a number of States contributing hospital data in the CCR-SID, permission was not granted by the HCP Partner organization to release values of GAF. GAF values are available for download from CMS.³

² Visit www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Wage-Index-Files for more information. Navigate to the Wage Index page for the year of interest.

³ Visit www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Wage-Index-Files for more information. Navigate to the Wage Index page for the year of interest.

APPENDIX D: FILE INFORMATION FOR CCR FILES FOR THE SID THAT WERE AVAILABLE PRIOR TO MARCH 2026

Prior to March 2026, there was a combined multi-state CCR-SID file for each data year (2001-2023) that included information for most States with available data. Four States (Iowa, Nebraska, Minnesota, and North Dakota) were available in separate State-specific CCR-SID files. Starting in March 2026, all CCR-SID are State-specific files.

Table D.1 provides the number of records (hospitals) included in the combined multi-state CCR-SID (available prior to March 2026) compared with the count of all hospitals in the SID maintained by AHRQ (including SID that are not released through the HCUP Central Distributor). In addition, the table documents the change in number of hospitals in the CCR-SID when a yearly file was updated.

Table D.1. Record (Hospital) Counts by Year for CCR-SID Available Before March 2026

Year	Number of Records (Hospitals)		
	CCR-SID Distributed in Files with Multiple States ^a	CCR-SID Distributed in State-specific Files ^a	Total SID ^b
2023	2,347	348	4,542
2022	2,773	331	4,985
2021	2,878	330	4,987
2020	2,937	327	5,071
2019	2,937	332	5,077
2018 v3	2,954	No v3 files	5,078
2018 v2	2,690	No v2 files	5,078
2018 v1	2,464	333	5,078
2017 v3	2,583	No v3 files	5,115
2017 v2	2,318	No v2 files	5,115
2017 v1	2,311	333	5,115
2016 v2	2,328	No v2 files	5,110
2016 v1	2,297	332	5,110
2015 v2	2,328	No v2 files	5,122
2015 v1	2,178	336	5,122
2014 v2	2,304	No v2 files	5,025
2014 v1	2,078	337	5,025
2013 v2	2,293	No v2 files	5,025
2013 v1	1,876	336	5,025
2012 v2	2,202	No v2 files	5,058
2012 v1	2,313	336	5,058
2011 v2	2,702	No v2 files	5,039
2011 v1	2,412	332	5,039
2010 v2	2,691	334	4,995
2010 v1	2,519	217	4,995
2009	2,402	87	4,873

Year	Number of Records (Hospitals)		
	CCR-SID Distributed in Files with Multiple States ^a	CCR-SID Distributed in State-specific Files ^a	Total SID ^b
2008	2,367	87	4,798
2007	2,305	No separate files	4,453
2006	2,313	No separate files	4,426
2005	1,691	No separate files	4,264
2004	1,613	No separate files	4,099
2003	1,626	No separate files	4,216
2002	1,602	No separate files	4,063
2001	1,578	No separate files	3,816

Abbreviations: CCR, cost-to-charge ratio; SID, State Inpatient Databases.

All hospital counts in this table are the count of unique AHA ID for SID hospitals. Further, it is possible that several SID hospitals (DSHOSPID) may have been linked to a single AHA ID number. For more information about hospital identifiers can be found on the HCUP Hospital Identifiers, <https://hcup-us.ahrq.gov/db/maphosp.pdf>

^a Excludes States that did not permit AHRQ to release their CCR measures.

^b This represents the count of all hospitals in the SID maintained by AHRQ (including SID that are not released through the HCUP Central Distributor).

Table D.2 provides the count of records (hospitals) with hospital-specific and group average CCRs in the CCR-SID available prior to March 2026. Where permitted by HCUP Partner organizations, the CCR-SID includes the hospital-specific all-payer inpatient CCR, APICC. For all hospitals, there is also a weighted group average, GAPICC. Analysts can use the APICC, when available, and can otherwise use the weighted group average, GAPICC.

Table D.2. Records (Hospitals) in the CCR-SID Available Before March 2026, by Year and Presence of APICC and GAPICC

Year	Number of Records (Hospitals) With APICC	Percent With APICC	Number of Records (Hospitals) With GAPICC Only
2023	1,315	56	1,032
2022	1,702	61	1,071
2021	1,695	59	1,183
2020	1,725	59	1,212
2019	1,700	58	1,237
2018 v3	1,751	59	1,203
2018 v2	1,751	65	939
2018 v1	1,555	63	909
2017 v3	1,486	57	1,097
2017 v2	1,486	64	832
2017 v1	1,480	64	831
2016 v2	1,487	64	841
2016 v1	1,481	64	816
2015 v2	1,482	64	846

Year	Number of Records (Hospitals) With APICC	Percent With APICC	Number of Records (Hospitals) With GAPICC Only
2015 v1	1,482	68	696
2014 v2	1,493	65	811
2014 v1	1,409	68	669
2013 v2	1,471	64	822
2013 v1	1,391	74	485
2012 v2	1,373	62	829
2012 v1	1,679	73	634
2011 v2	1,799	67	903
2011 v1	1,799	75	613
2010 v2	1,863	69	828
2010 v1	1,971	78	548
2009	1,749	73	653
2008	1,865	78	502
2007	1,705	74	600
2006	1,654	72	659
2005	1,112	66	579
2004	1,091	68	518
2003	1,084	66	542
2002	972	61	630
2001	984	62	594

Abbreviations: APICC, all-payer inpatient cost-to-charge ratio; CCR, cost-to-charge ratio; GAPICC, group average all-payer inpatient cost-to-charge ratio; SID, State Inpatient Databases.

APPENDIX E: NIS DATA NOTES AND RECOMMENDATIONS

The use of CCRs with the NIS is an important application for estimating the service delivery costs of U.S. inpatient services. The CCR-NIS Files and the NIS itself have instituted design improvements over time. What follows are considerations users of the CCR-NIS Files should keep in mind when applying them to the NIS, especially in analyses involving trending. Analysts should apply the [NIS Trend Weights Files](#) when conducting analyses involving years before and after the 2012 NIS redesign (see below).

CCR-NIS Missing Data 2001–2011

The frequency of missing total charge (TOTCHG) data in the NIS between 2001 and 2019 is very small: usually 1 percent or less. However, between 2001 and 2011, there were hospitals in the NIS sample that were not included in the CCR-NIS Files. In addition, there were hospitals in the CCR-NIS Files that had the hospital-specific CCRs (APICCs) set to missing for all records; only the group average CCR (GAPICC) was provided (see the separate Appendix to this User Guide for information on the missing data). This resulted in a much larger number of missing cost estimates than the missing TOTCHG data would imply.

To obtain national cost estimates for a set of cases, for analyses involving years 2001–2011, one option is to reweight all discharges to account for cases where cost estimates are missing. The original discharge weight (DISCWT) should be multiplied by the following: total weight of original cases divided by total weights, after excluding cases with missing cost. By performing these calculations, the weights for remaining cases are increased. A second, more sophisticated approach is to use techniques for imputing missing data, as detailed in a 2015 [HCUP Methods Series Report](#) (see Houchens, 2015).

2005 Hospital Universe Change

The AHA changed the criteria defining a hospital for data year 2005. The change had the effect that long-term acute care facilities (LTACs) were reclassified as hospitals. As a result, about 285 unregistered hospitals were added to the 2005 AHA Survey Database, of which 220 were community, nonrehabilitation hospitals that became part of the NIS hospital universe. Of these, 125 were LTACs and had higher mean charges. As a result, the estimated mean cost for the 2005 NIS was approximately 2 percent higher than it would have been without the addition of the LTACs.

2012 NIS and CCR-NIS Changes

In 2012, the NIS was extensively redesigned to improve the precision of estimates produced by the database. (See the [NIS Redesign Final Report](#), Houchens et al., 2014, for details.) Among other changes, the LTACs explicitly introduced into the NIS universe in 2005 were removed in 2012 and years that followed. The CCR-NIS File was revised to contain a NIS-specific CCR (CCR_NIS) populated with the hospital-specific, all-payer inpatient CCR (APICC), when available, and hospital group average CCR (GAPICC) when the APICC was not available. This had the net effect of reducing the frequency of missing cost estimates, compared with the years 2001–2011.