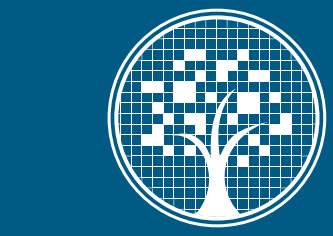

HEALTHCARE COST AND UTILIZATION PROJECT

HCUP Methods Series

Evaluation of the State Ambulatory Surgery Databases, Available through the HCUP Central Distributor, 2008

Report # 2011-02

Agency for Healthcare Research and Quality

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EXECUTIVE SUMMARY

Overview

This report provides an overview of the contents and uses of the Healthcare Cost and Utilization Project (HCUP) Central Distributor (CD) 2008 State Ambulatory Surgery Database (SASD) and compares the SASD-CD database to the 2008 American Hospital Association (AHA) Annual Survey. The 16 States that provided data for the 2008 SASD-CD are included in this comparison: California, Colorado, Florida, Iowa, Kentucky, Maine, Maryland, Michigan, Nebraska, New Jersey, New York, North Carolina, South Carolina, Utah, Vermont, and Wisconsin. This report provides information about the volume of records coming from hospital-based and non-hospital based facilities and also explores the types of procedures performed that qualify as ambulatory surgery and the use of ICD-9-CM and CPT coding systems in the 2008 SASD-CD.

Key Findings

The 2008 SASD-CD files contain 23,531,769 records from 16 HCUP States. Discharges with indications of outpatient surgery, according to AHRQ criteria, were classified as ambulatory surgeries. Of the total records contained in the SASD-CD, 67.0% (15,760,446) represent discharges for ambulatories per AHRQ criteria described in the "Defining Ambulatory Surgery in the SASD" section of this report. The total number of ambulatory surgery procedures increased 12% from the 2007 total (14,039,110).

There are a total of 3,025 ambulatory surgery facilities in the SASD files. A majority (62.9% or 1,902) of the facilities contributing data to the SASD-CD are hospital-based. The States with the greatest number of facilities were California (831 or 27.4% of the total) and Florida (587 or 19.4% of the total).

Comparisons between the SASD-CD and the AHA Annual Survey for these 16 States demonstrate that the SASD-CD contains a greater number of facilities and surgical visits. The AHA data contain information on hospital-based ambulatory surgery facilities, whereas the SASD-CD includes data from non-hospital based facilities as well as hospital-based facilities. A clear advantage of the SASD-CD is that it contains information from both hospital-based and some non-hospital based facilities.

Another clear advantage of the SASD-CD over the AHA Annual Survey data is the ability to identify the types of surgical procedures performed during a surgical visit. This report demonstrates that the majority of ambulatory surgery is performed in one of five body systems: 47.4% of the total procedures in hospital-based facilities are performed on the digestive, integumentary, musculoskeletal, cardiovascular, or eye systems (based on the ICD-9-CM coding system).

Two different coding systems are used in the SASD-CD; five States use only CPT codes, one State uses only ICD-9-CM codes, and 10 States employ both codes. On average, the number of CPT procedure codes is higher (3.2 in the core file and 5.3 in the charge detail file) than the number of ICD-9-CM procedure codes (1.9) per record. Although there was general agreement between Clinical Classifications Software (CCS) categories for both systems, analysts should use caution when combining data across States which use different procedure coding systems.

INTRODUCTION

Motivation

The last two decades have witnessed a steep rise in the number of surgical centers performing ambulatory surgeries: these facilities have increased from 336 in 1985 to 5,174 in 2008.[1] In addition, ambulatory surgeries have become more common over the past two decades, with the number of ambulatory surgical centers in the U.S. rising in accord. For example, between 1988 and 2008, the number of ambulatory surgeries reported by Colorado, New Jersey, and New York rose from 0.9 million to 2,720,834.[2] This dramatic growth in ambulatory surgeries and surgical centers was fueled by concern over rising health care costs and emerging medical technologies that made ambulatory surgery more practical.

Ambulatory surgery is defined herein as any surgical procedure performed on the same day a patient is admitted and released from a facility.[3] Ambulatory surgery facilities incorporate both hospital-based or non-hospital based surgical facilities.

In 1997, the Agency for Healthcare Research and Quality (AHRQ) began collecting ambulatory surgery (AS) data as part of the Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") and making public versions of these databases available via the HCUP Central Distributor (CD). The State Ambulatory Surgery Databases (SASD) are a powerful set of databases, from data organizations in participating States, that capture surgeries performed on the same day in which patients are admitted and released. The SASD-CD contains the ambulatory surgery encounter abstracts in participating States, translated into a uniform format to facilitate multi-State comparisons and analyses. All of the databases include abstracts from hospital-affiliated ambulatory surgery sites. Some contain the universe of ambulatory surgery encounter abstracts for that State, including records from both hospital-affiliated and non-hospital based facilities. This report also describes the composition of the 2008 SASD-CD with respect to ambulatory surgical facilities performing ambulatory surgery, both hospital-based and non-hospital based.

The SASD-CD contain a core set of clinical and non-clinical information on all patients, regardless of payer, including persons covered by Medicare, Medicaid, private insurance, and the uninsured. The SASD-CD is well-suited for research that requires complete enumeration of hospital-based ambulatory surgery within market areas or States. Researchers and policymakers use the SASD-CD to compare inpatient surgery data with ambulatory surgery data, conduct market area research or small area variation analyses, and identify State-specific trends in ambulatory surgery utilization, access, charges, and outcomes.

The first part (Part I) of this report contains an overview of the 2008 SASD-CD and focuses on the contents of the database. This part includes a comparison of the records captured in both the SASD-CD and State Emergency Department Databases (SEDD). Part I also presents information about the origins of records defined as ambulatory surgery and an analysis of the types of procedures defined as ambulatory surgery. The second part (Part II) includes an evaluation of the completeness of the 2008 SASD-CD with respect to ambulatory surgical

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[1] Centers for Medicare & Medicaid Services. *2009 CMS Data Compendium*. March 2010. Accessed at http://www.cms.gov/DataCompendium/15_2009_Data_Compendium.asp#TopOfPage on October 7, 2010.

[2] Number of visits in HCUP SASD files 2008. Accessed at http://www.hcup-us.ahrq.gov/. Data from author's calculations on August 19, 2010.

[3] State Ambulatory Surgery Databases. Accessed at http://www.hcup-us.ahrq.gov/sasdoverview.jsp on August 19, 2010.

facilities. The method used to accomplish this evaluation was to compare the SASD-CD with the American Hospital Association (AHA) Annual Survey data. This part also discusses the coding systems used, including the frequencies of ambulatory surgeries contained in the SASD-CD by body system. The report concludes with recommendations regarding the usefulness and potential research value of the 2008 SASD-CD.

PART I: OVERVIEW OF THE SASD-CD

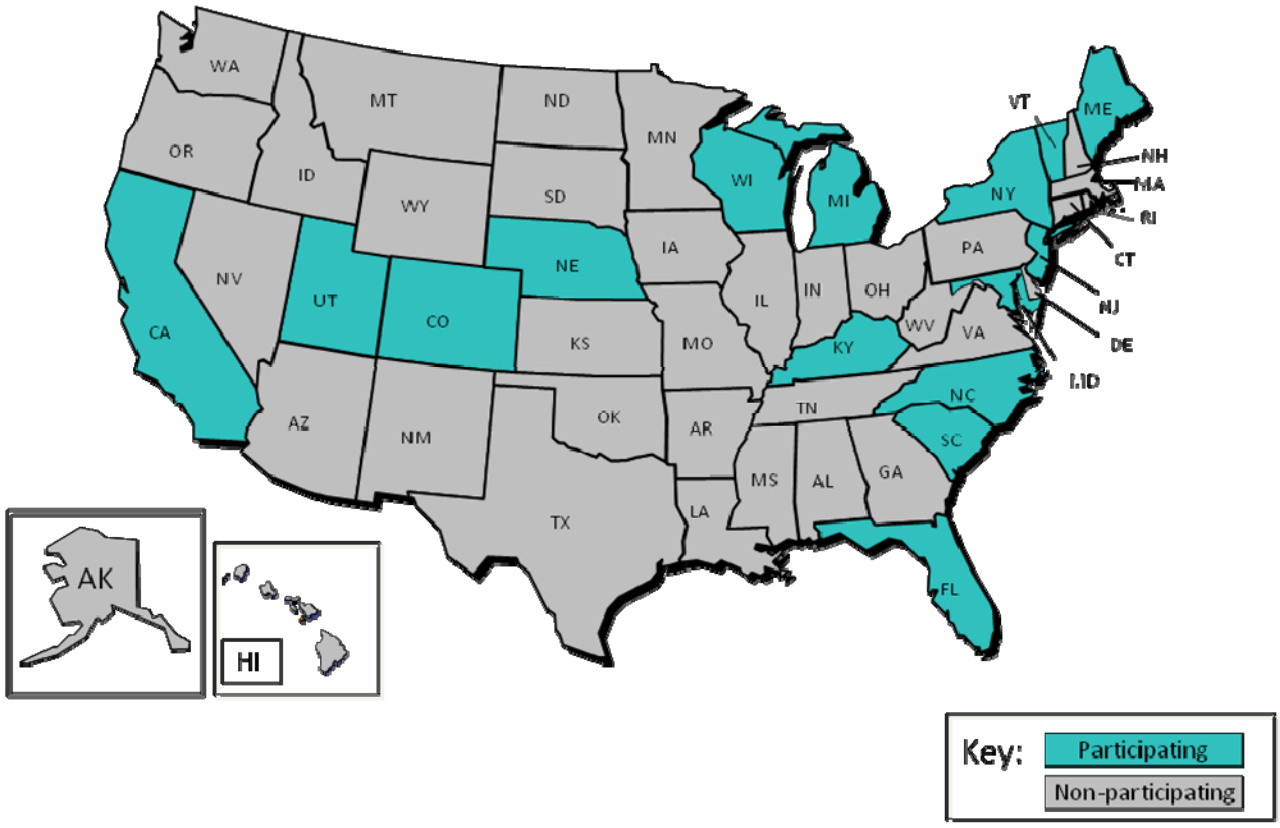
Introduction

Part I discusses how the SASD-CD is constructed and its contents, including data sources, the definition of ambulatory surgery (not all of the records in the SASD-CD meet the criteria for ambulatory surgery), and comparisons of procedures performed in hospital-based and non-hospital based facilities. This section concludes with an analysis of the most common procedure categories that did not meet the ambulatory surgery criteria.

Data Sources

For 2008, 16 standardized State databases were constructed and are available to the researchers via the HCUP Central Distributor. The 16 States that contributed data to the 2008 SASD-CD were California, Colorado, Florida, Iowa, Kentucky, Maine, Maryland, Michigan, Nebraska, New Jersey, New York, North Carolina, South Carolina, Utah, Vermont, and Wisconsin (Figure 1). Twelve States—Connecticut, Georgia, Hawaii, Indiana, Kansas, Minnesota, Missouri, New Hampshire, Ohio, Oklahoma, South Dakota, and Tennessee—participated in the 2008 SASD but did not release the data to the Central Distributor. Several other States currently collect AS data but did not participate in the 2008 SASD-CD: Illinois, Louisiana, Montana, Nevada, Oregon, Pennsylvania (supplied data for 1999-2001), Texas, Virginia, and Wyoming.

Figure 1: HCUP States with 2008 SASD Databases Available through the HCUP Central Distributor



Defining Ambulatory Surgery in the SASD-CD

Many States submit files that include a range of outpatient services, including but not limited to ambulatory surgery. For example, emergency department data is often combined with ambulatory surgery data. Records in the 2008 SASD-CD are defined in the same way as data in the 2004-2007 SASD-CD, which differs substantially from previous years. In an attempt to create uniformly defined outpatient databases, AHRQ approved, starting with the 2004 data, screening the outpatient data provided by the HCUP Partners and assigning records to the SASD-CD or State Emergency Department Databases (SEDD) based on information coded on the record. Records identified as having emergency department services[4] were placed in the SEDD. All other records were placed in the SASD-CD. Therefore, the SASD file can contain both records for ambulatory surgeries as well as records for other outpatient services. As this report indicates, States can vary greatly in the content of their outpatient file and the extent to which non-ambulatory surgery outpatient records are provided. The variable HCUP_AS is used to identify ambulatory surgery records within the SASD files.

In addition, to ensure that all ambulatory surgery records were included in the SASD-CD, records satisfying the criteria for an ambulatory surgery were included in the SASD-CD files without regard to their origin in an ambulatory surgery or emergency department file. Those records that satisfied both ambulatory surgery and emergency department criteria were included in the SASD-CD files, as well as the SEDD files.

The types of facilities contained in the SASD varied across States. All States supplied ambulatory surgery records from hospital-based and hospital-affiliated ambulatory surgery facilities, while select States included records from non-hospital based facilities. Additional facilities can include (but are not limited to) rehabilitation and osteopathic hospitals, radiation therapy centers, lithotripsy centers, cardiac catheterization laboratories, and providers of radiation therapy. In addition, States included both surgical and non-surgical procedures in their data files.

Records included in the 2008 SASD-CD are derived from the UB04/CMS1450 forms for hospital-based ambulatory centers and the CMS 1500 form for freestanding ambulatory surgery centers. Ambulatory surgery records (HCUP_AS>0) are defined based on at least one of the following criteria:

1) ICD-9-CM ranges included codes 00.50-86.99 (excluded were procedure codes in the range 88.4-88.59),
2) CPT procedures codes indicating surgery (yearly updates can be downloaded from Centers for Medicare and Medicaid Services (CMS) and generally include 10121-69930, G0105, G0121, and G0260),
3) Presence of at least one revenue center code in the following range 036x (operating room services), 037x (anesthesia), or 049x (ambulatory surgical care), or
4) Presence of a UB04 bill type of 83 indicating outpatient services.

All records in the SASD-CD not meeting the criteria for ambulatory surgery were designated with HCUP_AS=0.

[4] Emergency department services met at least one of the following criteria: 1) emergency department revenue code of 450-459, 2) positive emergency department charge, when revenue center codes were not available, or 3) emergency department CPT code of 99281-99285.

Hospital-Based and Non-Hospital Based Facilities

The method used to identify hospital-based and non-hospital based facilities was to compare the facility identifiers in the SASD-CD to the 2008 American Hospital Association (AHA) Annual Survey Database.

The AHA Annual Survey Database identifies hospital-associated ambulatory surgery facilities. These survey-based data include hospital descriptors and counts of outpatient surgeries from nearly all hospital-affiliated facilities nationwide. Annual updates are generally available toward the end of the year following the survey. AHA data do not include facilities such as freestanding outpatient surgical facilities lacking hospital affiliations and facilities originating from other sites such as physician offices.

The AHA Annual Survey database contains only summarized, facility-level data and does not contain visit-level data, but it does provide information on several types of ambulatory surgery facilities, as shown in Table 1. In this table, ambulatory surgery facilities are defined as *hospital-based* only if they are physically connected to main hospital facilities.

Table 1: Types of Ambulatory Surgery (AS) Facilities in the AHA Database

Type of Facility	AHA
AS facility – hospital-based and controlled	Yes
AS facility – hospital-based with third-party control	Yes
AS facility – non-hospital based with hospital affiliation	Yes
AS facility – non-hospital based with no hospital affiliation	No
Services originating at other sites, such as physician offices	No

Facilities in the SASD-CD were categorized as either hospital-based or non-hospital based (lacking a hospital affiliation). Facilities classified as hospital-based, including freestanding facilities with a hospital affiliation, were matched to a facility in the 2008 AHA Annual Survey Database. Facilities not matched to the AHA Survey were classified as non-hospital based, as they do not have a hospital indicator in the AHA survey data. AHRQ recommends caution when using the SASD-CD to investigate ambulatory surgery records in non-hospital based facilities because the data may not contain the universe of records from these types of facilities. In addition, some procedures included in the non-hospital affiliated facilities do not meet definitions of ambulatory surgeries.

Using the AHRQ definition of ambulatory surgery, in the 2008 SASD-CD, there were 1,902 (62.9%) ambulatory surgical facilities that were hospital-based and 1,123 (37.1%) that were non-hospital based facilities (Table 2). Consistent with 2007, the two States with the greatest number of non-hospital based ambulatory surgical facilities in the 2008 SASD-CD were California and Florida; and the two States with the greatest number of hospital-based ambulatory surgical facilities in the 2008 SASD-CD were California (368 or 19.3% of the total) and New York (228 or 12.0% of the total).

As is observable in Table 2, the States included in the SASD-CD contributed a range of facilities and number of records. California had the largest number of contributing facilities (831) and Vermont the fewest (14).

While Maine contributes only 53 facilities, all of which are hospital-based, it provided the largest number of records (4,017,413). All of the records provided are from these 53 facilities. However, only 7.7% were ambulatory surgeries. As noted previously, SASD files may contain hospital outpatient records beyond ambulatory surgery. Maine's data includes a large number of outpatient services/procedures that occur in hospital-based facilities but do not meet the HCUP criteria for ambulatory surgery. Vermont contributed the fewest records with 113,944, of which 96.9% met the ambulatory surgery definition.

Of the hospital-based facilities included in the 2008 SASD-CD, 61.4% of records met the criteria for ambulatory surgeries (HCUP_AS>0), with the rest of the records not meeting the criteria for ambulatory surgeries (HCUP_AS=0).

However, the proportion of records from hospital-based facilities that qualified as ambulatory services varied by state. In 13 States: California, Colorado, Florida, Iowa, Michigan, Nebraska, New Jersey, New York, North Carolina, South Carolina, Utah, Vermont, and Wisconsin, over 90% of the records from hospital-based facilities met the criteria for ambulatory surgery.

In contrast, the percentage of AS qualifying records from non-hospital based facilities was consistently high (>95%) across all States that contributed non-hospital based data, with the exception of Kentucky.

Table 2: Number of Hospital-Based and Non-Hospital Based Facilities by State Available through the HCUP Central Distributor, 2008 SASD-CD

All SASD			Hospital-Based Facilities				Non-Hospital Based Facilities			
State	Total Number of Facilities	Number of Records	% of Total records	% records HCUP_AS = 0*	% records HCUP_AS > 0*	Total Number of Facilities	% of Total Records	% records HCUP_AS = 0*	% records HCUP_AS > 0*	Total Number of Facilities
California	831	2,852,294	64.7%	9.6%	90.4%	368	35.3%	2.9%	97.1%	463
Colorado	78	379,883	100.0%	2.6%	97.4%	78	0.0%	0.0%	0.0%	0
Florida	587	3,133,026	52.8%	6.2%	93.8%	223	47.2%	0.8%	99.2%	364
Iowa	117	418,668	100.0%	7.5%	92.5%	117	0.0%	0.0%	0.0%	0
Kentucky	105	1,421,668	99.0%	43.2%	56.9%	102	1.0%	33.1%	66.9%	3
Maine	53	4,017,413	100.0%	92.3%	7.7%	53	0.0%	0.0%	0.0%	0
Maryland	52	3,331,111	100.0%	81.5%	18.5%	52	0.0%	0.0%	0.0%	0
Michigan	138	1,656,340	97.4%	7.8%	92.2%	138	2.6%	1.7%	98.3%	0
Nebraska	85	157,104	100.0%	2.1%	98.0%	85	0.0%	0.0%	0.0%	0
New Jersey	79	434,844	100.0%	7.0%	93.0%	79	0.0%	0.0%	0.0%	0
New York	308	2,101,508	82.6%	8.9%	91.1%	228	17.4%	0.0%	100.0%	80
North Carolina	176	1,507,807	87.5%	2.5%	97.5%	117	12.5%	0.0%	100.0%	59
South Carolina	156	735,330	72.2%	0.0%	100.0%	71	27.8%	0.0%	100.0%	85
Utah	62	299,957	79.6%	0.3%	99.7%	46	20.5%	3.6%	96.4%	16
Vermont	14	113,944	100.0%	3.2%	96.9%	14	0.0%	0.0%	0.0%	0
Wisconsin	184	970,872	80.8%	2.5%	97.5%	131	19.2%	0.6%	99.4%	53
Total	**3,025**	**23,531,769**	**84.9%**	**38.6%**	**61.4%**	**1,902**	**15.1%**	**1.4%**	**98.6%**	**1,123**

*These percentages are within group (e.g., records from hospital-based facilities or non-hospital based facilities).

Note: This table includes all records contained in the SASD-CD, including records meeting the definition for ambulatory surgery (HCUP_AS>0) and those not meeting the definition for ambulatory surgery (HCUP_AS=0).

Table 3 compares the number of records from both hospital-based and non-hospital based facilities that were found both in the SASD-CD and the SEDD, which represents 6.5% of the total SASD-CD records. All of the records in both databases came from hospital-based facilities. Of the records that were found both in the SASD-CD and SEDD, 66.3% overall were classified as ambulatory surgery records. This percent varied by state; the records from Colorado, Nebraska, North Carolina, Utah, and South Carolina were almost entirely ambulatory surgeries. However, fewer records (50% or fewer) from Iowa, Maine, Maryland, New Jersey, and Vermont were ambulatory surgeries.

Table 3: Number of Records in Both the 2008 SASD-CD and SEDD by State and Proportion of Ambulatory Surgeries in Both Databases

State	Total Number of Records in Both SASD and SEDD		Percent of Total Records from Hospital-Based Facilities Matched to SEDD in the SASD	Number of both SASD and SEDD Records Identified with AS Surgeries*	Percent of Records Identified as AS Surgeries* in Both SASD and SEDD
	Number of Records from Hospital-Based Facilities	Number of Records from Non-Hospital Based Facilities			
California	6,740	0	0.3%	3,219	47.8%
Colorado	88,381	0	23.9%	87,936	99.5%
Florida	34,400	0	1.1%	26,696	77.6%
Iowa	53	0	0.0%	19	35.9%
Kentucky	271,541	0	33.5%	231,477	85.3%
Maine	45,729	0	14.8%	5,550	12.1%
Maryland	233,052	0	37.7%	59,223	25.4%
Michigan	306,158	0	20.0%	220,194	71.9%
Nebraska	3,998	0	2.6%	3,758	94.0%
New Jersey	14,017	0	3.5%	6,142	43.8%
New York	63,247	0	3.2%	40,620	64.2%
North Carolina	309,744	0	21.0%	305,385	98.6%
South Carolina	62,154	0	8.5%	62,148	100.0%
Utah	5,221	0	1.8%	5,217	99.9%
Vermont	2,156	0	2.0%	553	25.7%
Wisconsin	76,366	0	8.0%	60,035	78.6%
Total	**1,522,957**	**0**	**11.4%**	**1,118,172**	**66.3%**

*HCUP_AS>0

Understanding Records Not Classified as Ambulatory Surgery

Understanding the types of procedures that are not classified as ambulatory surgery is important for research using the SASD-CD data. Table 4 is an analysis of the top procedure categories for records not classified as ambulatory surgery according to the aforementioned definition of ambulatory surgery[5] (coded as HCUP_AS=0) which was conducted to learn more about these procedures. Because some States use both the ICD-9-CM and CPT coding system, AHRQ's Clinical Classification Software (CCS) was employed in this analysis. The two versions of the CCS classifications, one for ICD-9-CM procedure codes and another for CPT procedure codes, are reported. The ICD-9-CM CCS program aggregates procedure codes into 231 mutually exclusive procedure categories. The CPT CCS program aggregates procedure codes into the same 231 categories plus 13 additional, CPT-specific categories.

Table 4 presents the top CCS procedure categories, coded using the ICD-9-CM coding system, that did not qualify as ambulatory surgeries (HCUP_AS=0) by type of facility. The top CCS procedure categories for non-ambulatory surgery in hospital-based facilities were: 231: *Other therapeutic procedures,* 182: *Mammography*, 198: *Magnetic resonance imaging*, 180: *Other CT scan*, and 179: *CT scan abdomen*. The CCS procedure category 231: *Other therapeutic procedures* includes miscellaneous diagnostic or therapeutic procedures such as therapeutic ultrasounds, insulin injections, allergy immunizations, light therapy, and acupuncture.

[5] Ambulatory surgery services met at least one of the following criteria: 1) ICD-9-CM ranges included codes 00.50-86.99 (excluded were procedure codes in the range 88.4-88.59), 2) CPT procedures codes indicating surgery (yearly updates can be downloaded from Centers for Medicare and Medicaid Services (CMS) and generally include 10121-69930, G0105, G0121, and G0260), 3) presence of at least one revenue center code in the following range 036x (operating room services), 037x (anesthesia), or 049x (ambulatory surgical care), or 4) presence of a UB04 bill type of 83 indicating outpatient services.

Table 4: Top 20 Procedure Categories (CCS) from ICD-9-CM Codes for Non-Ambulatory Surgeries in Hospital-Based and Non-Hospital Based Facilities, 2008 SASD-CD

CCS Procedure Category	Number Occurring in Hospital-Based Facilities	Number Occurring in Non Hospital-Based Facilities
231: Other therapeutic procedures	680,205	2,453
182: Mammography	149,691	1,610
198: Magnetic resonance imaging	125,509	1,579
180: Other CT scan	89,236	605
179: CT scan abdomen	77,021	498
193: Diagnostic ultrasound of heart (echocardiogram)	69,745	93
227: Other diagnostic procedures (interview; evaluation; consultation)	69,379	71
178: CT scan chest	55,539	345
177: Computerized axial tomography (CT) scan head	47,015	497
211: Therapeutic radiology for cancer treatment	40,448	0
226: Other diagnostic radiology and related techniques	31,305	439
202: Electrocardiogram	30,559	3
183: Routine chest X-ray	28,608	38
206: Microscopic examination (bacterial smear; culture; toxicology)	28,558	14
197: Other diagnostic ultrasound	19,428	53
209: Radioisotope scan and function studies	18,356	6
210: Other radioisotope scan	10,505	0
201: Cardiac stress tests	9,761	5
217: Other respiratory therapy	9,035	2
188: Cerebral arteriogram	7,387	34

Note: Non-ambulatory surgery records are records where HCUP_AS=0. The Invalid or Inconsistent and HCPCS CCS procedure categories are not included. Data are based on all States providing ICD-9-CM procedures codes. A list of these States can be found in Appendix A: Table A-1.

Similar to Table 4, Table 5 presents the top CCS procedure categories by frequency, coded using the CPT coding system, that did not qualify as ambulatory surgeries (HCUP_AS=0). The CPT coded records tended to differ from those coded by the ICD-9-CM coding system. The top procedure categories for CPT coding in hospital-based facilities were: 233: *Laboratory – Chemistry and Hematology*, 227: *Other diagnostic procedures (interview; evaluation; consultation)*, 231: *Other therapeutic procedures*, which includes miscellaneous diagnostic or therapeutic procedures such as therapeutic ultrasounds, insulin injections, allergy immunizations, light therapy, and acupuncture. 235: *Other laboratory*, and 206: *Microscopic examination (bacterial smear; culture; toxicology*). Appendix A contains a more detailed description of the ICD-9-CM and CPT coding systems as well as further comparisons.

The top procedure categories in non-hospital based facilities were: 47: *Diagnostic cardiac catheterization; coronary arteriography*, 226:*Other diagnostic radiology and related techniques*, 240: *Medications (Injections, infusions and other forms)*, 243: *DME and supplies*, and 182: *Mammography.*

Some of the top CCS procedure categories found in the ICD-9-CM codes did not appear in the CPT codes, such as 201: *Cardiac stress tests*, 188: *Cerebral arteriogram*, 180: *Other CT scan*, 178: *CT scan chest*, 177: *CT scan head*, 209: *Radioisotope scan and function studies*, 210: *Other radioisotope*, and 217: *Other respiratory therapy*. Likewise, some of the top CCS procedure categories coded using the CPT coding system did not appear in the top procedure categories captured by the ICD-9-CM coding system.

Table 5: Top 20 Procedure Categories (CCS) from CPT Codes for Non-Ambulatory Surgeries in Hospital-Based and Non-Hospital Based Facilities, 2008 SASD-CD

CCS Procedure Category	Number Occurring in Hospital-Based Facilities	Number Occurring in Non-Hospital Based Facilities
233: Laboratory - Chemistry and Hematology	7,305,940	350
227: Other diagnostic procedures (interview; evaluation; consultation)	2,773,416	248
231: Other therapeutic procedures	2,032,046	879
235: Other laboratory	1,661,559	56
206: Microscopic examination (bacterial smear; culture; toxicology)	1,153,850	18
213: Physical therapy exercises; manipulation; and other procedures	908,036	0
226: Other diagnostic radiology and related techniques	898,939	9,056
240: Medications (Injections, infusions and other forms)	660,324	3,635
182: Mammography	530,786	1,930
47: Diagnostic cardiac catheterization; coronary arteriography	493,490	38,391
218: Psychological and psychiatric evaluation and therapy	436,925	420
211: Therapeutic radiology for cancer treatment	376,020	0
197: Other diagnostic ultrasound	373,253	186
179: CT scan abdomen	346,473	927
243: DME and supplies	343,686	2,837
202: Electrocardiogram	318,931	416
228: Prophylactic vaccinations and inoculations	310,733	3
193: Diagnostic ultrasound of heart (echocardiogram)	305,639	136
183: Routine chest X-ray	287,540	39
198: Magnetic resonance imaging	263,507	1,605

Note: Non-ambulatory surgery records are records where HCUP_AS=0. The Invalid or Inconsistent and HCPCS CCS procedure categories are not included. Data are based on all States providing CPT codes. A list of these States can be found in Appendix A: Table A-1.

PART II: UNDERSTANDING AMBULATORY SURGERY RECORDS AND FACILITIES CONTAINED IN THE 2008 SASD-CD

Introduction

Part II presents comparisons between the SASD-CD and AHA Annual Survey Database and examines the types of procedure categories that are captured in the 2008 SASD-CD, limited to ambulatory surgeries only. This section also investigates the most common types of procedure categories in hospital-based facilities and in non-hospital based facilities and the extent to which the two coding systems (ICD-9-CM and CPT) are used in the States contributing to the 2008 SASD-CD. Additionally, this section demonstrates the research utility of AHRQ's Clinical Classification Software (CCS) for aggregating ICD-9-CM or CPT procedure codes into mutually exclusive procedure categories. In the 2008 SASD-CD, the most common procedures tend to be concentrated in a few major body system procedure categories.

Comparative Ambulatory Surgery Database

In order to describe the completeness of the 2008 SASD-CD, the database was compared with the Annual Survey Database, fielded and maintained by the American Hospital Association (AHA). This database contains only summarized, facility-level data and does not contain visit-level data. The AHA Annual Survey Database provides information on several types of ambulatory surgery facilities, as discussed in Part I and shown in Table 1.

Comparisons between the SASD-CD and the AHA Annual Survey Data

Table 6 compares 2008 SASD-CD surgical visit[6] counts from the 2008 AHA data for 16 States. These counts are limited to the subset of visits that meet the criteria for ambulatory surgery (HCUP_AS>0). For each state, the table presents the number of facilities and the number of surgical visits for each combination of data sources, stratified by type of facility.[7] The facility types considered are based on the AHA definitions of hospital-based facilities and freestanding facilities with a hospital affiliation (Table 1). Facilities not matched to the AHA Annual Survey data were classified as non-hospital based facilities (Table 6).

Note that Table 6 separately identifies hospital-based facilities and freestanding facilities with a hospital affiliation. Further, hospital-based facilities include both of the following AHA categories: 1) hospital-based and controlled and 2) hospital-based with third party control. In contrast, Table 2 combines hospital-based facilities and freestanding facilities with a hospital affiliation into the hospital-based facilities category. See Table 1 for the complete list of AHA categories.

As an example, for California, the first row shows that 217 hospital-based facilities were present in both data sources, while 77 were present in the AHA database only. Of the freestanding facilities with a hospital affiliation, 144 were present in both data sources and 10 were in the AHA database only. There were 461 non-hospital based facilities in CA in the SASD-CD. For hospital-based facilities in California, the SASD-CD reported 737,937 surgical visits, and the AHA reported 689,568 surgical visits, of which 46,779 (6.8%) were reported in the AHA

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[6] The term "surgical visit" is used instead of surgeries because multiple surgeries may be performed in one ambulatory surgery visit.

[7] Matching between facilities in the SASD-CD and AHA was not necessarily one-to-one, and many-to-many matching may have occurred. Each facility in the AHA is assigned an IDNUMBER, while hospital identifiers in the SASD-CD (DSHOSPID) are provided by the data source. In rare occasions, multiple DSHOSPIDs in the SASD-CD may be matched to the same AHA IDNUMBER, such as hospitals in a health system, or multiple AHA IDNUMBERs may also be corresponding to the same SASD-CD DSHOSPID due to hospital mergers and divisions.

database only. For freestanding facilities with a hospital affiliation, 918,084 surgical visits were reported in the SASD-CD, and the AHA reported 678,698, with 4,309 (less than one percent) of the reported surgical visits only recorded by AHA. The SASD-CD reported 989,934 surgical visits from non-hospital based facilities in California.

The "Total" portion of Table 6 also demonstrates how the SASD-CD and the AHA files compare. For hospital-based facilities matched between these two files (the row labeled "SASD+AHA" within the "Total" section at the bottom of the table), a greater number of SASD-CD surgical visit counts (3,656,673) than AHA surgical visit counts (2,854,137) were noted. Again, for freestanding facilities with hospital affiliations, the matched SASD-CD surgical visit counts (7,545,906) were greater than the matched AHA surgical visit counts (4,804,072). Table 6 shows a total of 3,757,257 ambulatory surgical visits from non-hospital-based facilities were recorded in the SASD-CD. Nebraska and New Jersey had more AHA surgical visit counts than the SASD-CD counts in hospital-based facilities, and New York had more AHA surgical visit counts than the SASD-CD counts in freestanding facilities with a hospital affiliation.

Between SASD-CD and AHA, 1,044 hospital-based and 815 freestanding facilities matched for a total of 1,859 matching facilities. Within the SASD-CD, 1,044 facilities were hospital-based (35%), 815 were freestanding with hospital affiliations (27%) and 1,126 were non-hospital based facilities (38%). Within the SASD-CD, 24% (3,656,673) of the surgical visits came from hospital-based facilities. The freestanding facilities with a hospital affiliation performed 50% of the surgical visits contained in the SASD-CD (7,545,906), and non-hospital based facilities provided 25% (3,757,257) of the ambulatory surgical visits. Of the 14,959,836 ambulatory surgical visits in the SASD-CD, 75% were contained in the 1,859 facilities matched to the AHA file (Table 6).[8] It is important to note that, while records in the SASD-CD can be categorized based on the HCUP_AS>0 ambulatory surgery definition, the AHA provides aggregate counts of surgeries.

The total number of facilities reported in Table 6 (3,488) exceeds the number of SASD-CD facilities reported in Table 2 (3,025), since there are three types of facilities: those that match between SASD-CD and the AHA (1,859), those in the SASD-CD only (1,126), and those in the AHA only (503). It is also important to recognize that the facility and discharge totals might possibly double-count some units contained in both files that could not be matched for an unknown reason.

[8] For the remaining 34 States plus Washington D.C. and the U.S. territories, the AHA survey contained 4,571 AS facilities and 8,064,957 ambulatory surgical visits.

Table 6: Number of Facilities and Surgical Visits by State and Data Source Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries

		Total Number of Facilities			Number of SASD Surgeries			Number of AHA Surgeries		
State	Data Source	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based
California	SASD + AHA	217	144	0	737,937	918,084	0	642,789	674,389	0
	SASD only	0	0	461	0	0	989,934	0	0	0
	AHA only	77	10	0	0	0	0	46,779	4,309	0
	Total	*294*	*154*	*461*	*737,937*	*918,084*	*989,934*	*689,568*	*678,698*	*0*
Colorado	SASD + AHA	40	36	0	82,002	288,025	0	60,200	138,754	0
	SASD only	0	0	0	0	0	0	0	0	0
	AHA only	24	0	0	0	0	0	15,094	0	0
	Total	*64*	*36*	*0*	*82,002*	*288,025*	*0*	*75,294*	*138,754*	*0*
Florida	SASD + AHA	118	102	0	601,118	946,414	0	397,123	442,658	0
	SASD only	0	0	364	0	0	1,471,609	0	0	0
	AHA only	61	5	0	0	0	0	32,726	5,924	0
	Total	*179*	*107*	*364*	*601,118*	*946,414*	*1,471,609*	*429,849*	*448,582*	*0*
Iowa	SASD + AHA	98	19	0	190,544	196,547	0	159,607	178,025	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	7	1	0	0	0	0	3,327	2,392	0
	Total	*105*	*20*	0	*190,544*	*196,547*	0	*162,934*	*180,417*	0
Kentucky	SASD + AHA	68	34	0	371,056	429,314	0	192,443	190,693	0
	SASD only	0	0	3	0	0	9,285	0	0	0
	AHA only	25	5	0	0	0	0	9,769	5,003	0
	Total	*93*	*39*	*3*	*371,056*	*429,314*	*9,285*	*202,212*	*195,696*	*0*
Maine	SASD + AHA	30	21	0	122,001	186,442	0	51,420	79,288	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	3	2	0	0	0	0	0	2,613	0
	Total	*33*	*23*	0	*122,001*	*186,442*	0	*51,420*	*81,901*	0

		Total Number of Facilities			Number of SASD Surgeries			Number of AHA Surgeries		
State	Data Source	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based
Maryland	SASD + AHA	12	37	0	82,286	533,334	0	59,605	295,606	0
	SASD only	0	0	1	0	0	1,987	0	0	0
	AHA only	20	5	0	0	0	0	3,734	3,231	0
	Total	*32*	*42*	*1*	*82,286*	*533,334*	*1,987*	*63,339*	*298,837*	*0*
Michigan	SASD + AHA	52	79	0	309,231	1,178,368	0	143,797	549,822	0
	SASD only	0	0	7	0	0	42,668	0	0	0
	AHA only	40	12	0	0	0	0	29,448	6,096	0
	Total	*92*	*91*	*7*	*309,231*	*1,178,368*	*42,668*	*173,245*	*555,918*	*0*
Nebraska	SASD + AHA	75	10	0	78,631	75,251	0	78,364	58,075	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	10	1	0	0	0	0	7,774	0	0
	Total	*85*	*11*	0	*78,631*	*75,251*	0	*86,138*	*58,075*	0
New Jersey	SASD + AHA	33	41	0	143,769	258,640	0	137,784	239,549	0
	SASD only	0	0	5	0	0	1,817	0	0	0
	AHA only	33	2	0	0	0	0	8,640	0	0
	Total	*66*	*43*	*5*	*143,769*	*258,640*	*1,817*	*146,424*	*239,549*	*0*
New York	SASD + AHA	104	118	0	514,233	841,581	0	467,444	871,185	0
	SASD only	0	0	84	0	0	590,682	0	0	0
	AHA only	50	11	0	0	0	0	17,227	10,793	0
	Total	*154*	*129*	*84*	*514,233*	*841,581*	*590,682*	*484,671*	*881,978*	*0*
North Carolina	SASD + AHA	57	58	0	306,397	972,472	0	146,890	412,633	0
	SASD only	0	0	61	0	0	195,817	0	0	0
	AHA only	25	8	0	0	0	0	10,509	19,810	0
	Total	*82*	*66*	*61*	*306,397*	*972,472*	*195,817*	*157,399*	*432,443*	*0*

		Total Number of Facilities			Number of SASD Surgeries			Number of AHA Surgeries		
State	Data Source	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based	Hospital-Based	Freestanding with Hospital Affiliation	Non-Hospital Based
South Carolina	SASD + AHA	35	35	0	144,565	386,335	0	103,563	187,088	0
	SASD only	0	0	86	0	0	204,407	0	0	0
	AHA only	23	5	0	0	0	0	4,315	7,578	0
	Total	*58*	*40*	*86*	*144,565*	*386,335*	*204,407*	*107,878*	*194,666*	*0*
Utah	SASD + AHA	30	15	0	103,688	130,585	0	55,959	94,905	0
	SASD only	0	0	17	0	0	62,679	0	0	0
	AHA only	11	2	0	0	0	0	5,383	1,954	0
	Total	*41*	*17*	*17*	*103,688*	*130,585*	*62,679*	*61,342*	*96,859*	*0*
Vermont	SASD + AHA	10	4	0	48,554	61,800	0	24,482	22,919	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	1	2	0	0	0	0	0	1,269	0
	Total	*11*	*6*	0	*48,554*	*61,800*	0	*24,482*	*24,188*	0
Wisconsin	SASD + AHA	65	62	0	191,717	572,028	0	132,667	368,483	0
	SASD only	0	0	54	0	0	186,372	0	0	0
	AHA only	15	7	0	0	0	0	12,162	0	0
	Total	*80*	*69*	*54*	*191,717*	*572,028*	*186,372*	*144,829*	*368,483*	*0*
Total	SASD + AHA	*1,044*	*815*	*0*	*3,656,673*	*7,545,906*	*0*	*2,854,137*	*4,804,072*	*0*
	SASD only	*0*	*0*	*1,126*	*0*	*0*	*3,757,257*	*0*	*0*	*0*
	AHA only	*425*	*78*	*0*	*0*	*0*	*0*	*206,887*	*70,972*	*0*
	Total	***1,469***	***893***	***1,126***	***3,656,673***	***7,545,906***	***3,757,257***	***3,061,024***	***4,875,044***	***0***

Note: This table represents only HCUP_AS>0 records. Therefore, the counts of facilities may not be the same as those presented in Table 2, which includes facilities that contribute HCUP_AS=0 records.

Types of Procedure Categories Defined as Ambulatory Surgery in the 2008 SASD-CD by Coding System

An important consideration when using the SASD-CD is the alignment of surgeries reported using two different coding systems, ICD-9-CM and CPT. Tables 7 and 8 address this consideration, using the 16 major body systems. As discussed above, this classification was accomplished using AHRQ's Clinical Classification Software (CCS). There are two versions of the software, one for ICD-9-CM procedure codes and another for CPT procedure codes. As mentioned previously, the ICD-9-CM CCS program aggregates procedure codes into 231 mutually exclusive procedure categories. The CPT CCS program aggregates procedure codes into the same 231 categories plus 13 additional, CPT-specific categories. For this table, these categories were grouped into 16 major body systems for records in the SASD-CD that met the HCUP_AS>0 ambulatory surgery criteria. For both coding systems, all listed procedures are examined, specifically, this table includes *all* procedures on any record in which at least one procedure meets the HCUP definition for an ambulatory surgery. Therefore, the table includes procedures that, alone, would not qualify as an ambulatory surgery (e.g., diagnostic procedures). Missing values are ignored.

As shown in Table 7, the rank orderings of the surgery categories for hospital-based facilities were similar. However, the *Miscellaneous Diagnostics and Therapeutic* procedures category, represented 32.9% of the ICD-9-CM procedures compared to 63.9% of the CPT procedures. Note, however, that the CPT coding system contains a greater number of procedures as well as greater granularity. Therefore, it is expected that a higher percentage of records with CPT codes would not meet the HCUP criteria for ambulatory surgery and may have co-occurred on the records. For example, lab tests associated with an ambulatory surgery may be included in the record as a CPT code. Also, the number of *Invalid or Inconsistent* category was less for ICD-9-CM CCS codes (0.0%) compared to CPT CCS (3.5%). Appendix A contains a more detailed description of the ICD-9-CM and CPT coding systems as well as further comparisons.

Table 7 also demonstrates that ambulatory surgery was concentrated in treatments for only a few body systems in hospital-based facilities. For instance, digestive system-related surgeries accounted for 16.2% of the ICD-9-CM based procedures and 8.4% of the CPT based procedures. The top three body systems, not counting the *Miscellaneous Diagnostics and Therapeutic* category, *Digestive System, Integumentary System, and Musculoskeletal System* accounted for 35.6% of the ICD-9-CM based procedures and 17.3% of all CPT based procedures, and the top five *Digestive, Integumentary, Musculoskeletal, Cardiovascular and Eye* systems accounted for 47.5% of procedures with ICD-9-CM based procedures and 23.4% of the CPT coded procedures.

Table 7: Number of ICD-9-CM and CPT Procedure Codes by CCS Hospital-Based Facilities, 2008 SASD-CD Ambulatory Surgery Records

CCS Description	ICD-9-CM Number of Procedure Codes		CPT Number of Procedure Codes	
	Count	Percent	Count	Percent
Miscellaneous Diagnostics and Therapeutic*	4,834,969	32.9%	29,528,551	63.9%
Digestive System	2,374,465	16.2%	3,887,734	8.4%
Integumentary System	1,483,163	10.1%	2,167,512	4.7%
Musculoskeletal System	1,364,390	9.3%	1,933,246	4.2%
Cardiovascular System	1,039,357	7.1%	1,956,847	4.2%
Eye	700,289	4.8%	862,015	1.9%
Nervous System	677,878	4.6%	1,085,510	2.4%
Nose, Mouth, and Pharynx	520,573	3.6%	645,629	1.4%
Female Genital System	489,468	3.3%	759,362	1.6%
Urinary System	471,069	3.2%	623,442	1.4%
Ear	200,480	1.4%	234,455	0.5%
Respiratory System	156,486	1.1%	304,706	0.7%
Obstetrical	118,239	0.8%	230,506	0.5%
Male Genital System	114,112	0.8%	192,162	0.4%
Heme and Lymphatic System	86,538	0.6%	115,984	0.3%
Endocrine System	45,570	0.3%	45,768	0.1%
Invalid or Inconsistent**	4,557	0.0%	1,604,014	3.5%
HCPCS***	0	0.0%	70,606	0.2%
Total	**14,681,603**	**100.0%**	**46,248,049**	**100.0%**

*This category refers to codes that have CCS values of 176 to 231. Such procedures captured in this range include other organ transplant, mammography, magnetic resonance imaging, blood transfusion, and cancer chemotherapy.
**A validation algorithm is used to identify invalid codes based on logic identifying all valid codes in a certain time period. Inconsistent codes are identified when comparing the nature of the codes to patient demographic characteristics.
***Refers to CPT/ Healthcare Common Procedure Coding System (HCPCS) Level I codes that cannot be classified using the CCS system.
Note: Healthcare Common Procedure Coding System (HCPCS) National Level II codes are often used with CPT codes to enhance their scope. They are not used to categorize procedures in this table because no mapping to CCS exists at the present time.

As seen in Table 8, the rank orderings of surgery categories between coding systems for non-hospital based facilities were different than those for hospital-based facilities. The category *Miscellaneous Diagnostics and Therapeutic* was utilized in 4.6% of the ICD-9-CM procedures and 5.6% of the CPT procedures. Between the coding systems, the percentages of records for each CCS procedure category were more similar than in hospital-based facilities.

Similar to the hospital-based facilities, the top ranked surgery category was the *Digestive System* in non-hospital based facilities. However, the ensuing categories differed from the hospital-based facilities. For hospital-based facilities, *Integumentary System, Musculoskeletal System, Cardiovascular System,* and *Eye* were the second through fifth ranked surgery categories for the major organ systems in that order. However, for the non-hospital based facilities, *Eye, Nervous System, Musculoskeletal System,* and the *Nose, Mouth, and Pharynx* made up the second through fifth ranked surgery categories for the major organ systems. It appears that non-hospital based facilities were more focused on a small proportion of body systems, since overall, the top five most common surgical categories in non-hospital based

facilities accounted for 82.4% of all ICD-9-DM based procedures and 84.6% of all CPT based procedures.

Table 8: Number of ICD-9-CM and CPT Surgeries by CCS Procedure Category in Non-Hospital Based Facilities, 2008 SASD-CD Ambulatory Surgeries

CCS Description	ICD-9-CM Number of Procedure Codes		CPT Number of Procedure Codes	
	Count	Percent	Count	Percent
Digestive System	673,559	32.8%	1,630,179	32.9%
Eye	332,491	16.2%	777,993	15.7%
Nervous System	299,729	14.6%	853,405	17.2%
Musculoskeletal System	290,409	14.2%	650,514	13.1%
Miscellaneous Diagnostics and Therapeutic*	94,015	4.6%	277,460	5.6%
Nose, Mouth, and Pharynx	92,742	4.5%	155,213	3.1%
Integumentary System	78,279	3.8%	209,387	4.2%
Urinary System	57,114	2.8%	83,592	1.7%
Ear	45,241	2.2%	63,406	1.3%
Female Genital System	31,749	1.6%	67,113	1.4%
Male Genital System	20,968	1.0%	33,611	0.7%
Invalid or Inconsistent**	17,863	0.9%	104,381	2.1%
Cardiovascular System	9,732	0.5%	33,342	0.7%
Respiratory System	5,366	0.3%	6,312	0.1%
Heme and Lymphatic System	2,677	0.1%	4,242	0.1%
Endocrine System	307	0.0%	369	0.0%
Obstetrical	78	0.0%	225	0.0%
HCPCS***	0	0.0%	30	0.0%
Total	**2,052,319**	**5.6%**	**4,950,774**	**5.6%**

*This category refers to codes that have CCS values of 176 to 231. Such procedures captured in this range include other organ transplant, mammography, magnetic resonance imaging, blood transfusion, and cancer chemotherapy.
**A validation algorithm is used to identify invalid codes based on logic identifying all valid codes in a certain time period. Inconsistent codes are identified when comparing the nature of the codes to patient demographic characteristics.
***Refers to CPT/ Healthcare Common Procedure Coding System (HCPCS) Level I codes that cannot be classified using the CCS system.
Note: Healthcare Common Procedure Coding System (HCPCS) National Level II codes are often used with CPT codes to enhance their scope. They are not used to categorize procedures in this table because no mapping to CCS exists at the present time.

Comparisons between ICD-9-CM Codes and CPT Codes

Appendix A provides additional information for analysts who are interested in working with SASD-CD data. Comparisons are made between the ICD-9-CM and CPT procedure codes, including direct, record-level comparisons for States that use both systems. The States that use each coding system are identified, and the numbers of SASD-CD surgical visit records (meeting the HCUP_AS>0 ambulatory surgery criteria) using each system are presented. Similarities and differences between the ICD-9-CM and CPT procedure coding systems are illustrated by comparing CCS categories for both coding systems. The level of agreement between the two systems based on data from States that use both procedure coding systems is also evaluated. Therefore, the information presented in Appendix A also provides important information regarding which coding system to use to study ambulatory surgery and the extent to which ambulatory surgeries are dually coded in States that use both coding systems.

The number of procedure codes reported on a record depends on the file type from which they were obtained. The lowest average number of procedure codes on a surgical visit record was reported using the ICD-9-CM coding system. Overall, more CPT procedure codes were used on a surgical visit record, with the average number being higher for the States where these codes were included in the line item charge detail files. These consist of files with surgical visit records providing detailed information about individual charges. For these States, there is no upper limit on the number of procedure codes per surgical visit record.

To obtain a complete view of the procedures performed during a visit, it is generally necessary to refer to both the ICD-9-CM and CPT procedure codes. In some States, almost every surgical visit record with ICD-9-CM procedure codes also provides CPT procedure codes. For the remainder of the States providing codes in both systems, the coding frequencies are mixed: some surgical visit records contain only ICD-9-CM procedure codes or only CPT procedure codes, while some records contain both types of procedure codes.

When ICD-9-CM and CPT procedure codes are both present on a surgical visit record, they often provide different information. The frequency with which the information provided in the two systems translates to the same set of CCS categories varies widely, ranging from 3.3% to 72.7% based on the CPT coding system, depending on the State (Table A-3).

For surgical visit records with only a single ICD-9-CM and CPT procedure code, the CCS categories matched more than 75% of the time for seven of 10 States and 64.2% of the time in the State with the lowest match rate (Wisconsin) (Table A-4). The CPT CCS matched the ICD-9-CM CCS more than 90% of the time in eight of 10 categories, and the ICD-9-CM CCS matched the CPT CCS over 90% of the time in six of 10 categories (Appendix A).

Appendix B contains a table presenting CCS statistics derived from the ICD-9-CM and CPT procedures for records meeting the HCUP_AS>0 ambulatory surgery criteria in all of the HCUP SASD-CD States by body system. In Table B-1, the procedure range captured by each CCS category is shown under each column heading, denoting the major body system, for HCUP_AS>0 records only. Two additional CCS categories are also presented as columns: *HCPCS* codes, which are only encountered in conjunction with CPT codes, and the *Invalid or Inconsistent* category, capturing records that were found to include values that are inconsistent or invalid with the patient demographic characteristics available. This latter category includes only those surgical visit records with no valid procedure codes and one or more invalid or inconsistent codes. The rows of this table, organized by state, present the number of records for each CCS procedure category coded using the ICD-9-CM and CPT coding systems. Because a single record can have more than one procedure, it is important to note that more than one body system code can appear on a single record. The percentages represent the proportion of surgeries from a specific State that included one or more body system codes in a category in relation to the total number of records for that state. Because there may be more than one procedure code per ambulatory surgery record, the sum of the percentages for each State does not add to one hundred.

States that use ICD-9-CM procedure codes on more than half their records, such as Wisconsin, generally have a greater number of observations for ICD-9-CM than CPT procedure codes for a particular body system.[9] For the digestive system (CCS 68-99), for example, Wisconsin has 332,151 procedure codes using the ICD-9-CM coding system compared to 244,020 codes using the CPT coding system (Table B-1). Other States, such as Nebraska, have more CPT codes than ICD-9-CM codes; more than 88.7% of Nebraska records use only the CPT coding system

[9] See Table A-2 in Appendix A for a report on the percent of records with each type of coding system.

(Table A-2). Nebraska has more CPT codes than ICD-9-CM codes for all 16 body system categories.

The influence of the reporting practices and capabilities of the States may be seen by comparing the percentages reported between coding systems for a single category. For example, in North Carolina where the ICD-9-CM and CPT systems each have 20 fields on a record, the percentage of records with digestive codes are nearly equal (23.8% ICD-9-CM vs. 23.7% CPT). By way of contrast, in Florida where there are five ICD-9-CM fields and 10 CPT fields, the percentage of records with digestive codes exhibits a larger difference between the two systems (21.8% ICD-9-CM vs. 34.4% CPT). See Table B-1.

Appendix B also reflects the variation in the use of both ICD-9-CM and CPT procedure coding by State in the SASD-CD. South Carolina uses only ICD-9-CM procedure coding in their SASD-CD data. Conversely, California, Iowa, Maine, Maryland, and New York use only CPT coding. Hence, some States presented in Appendix B do not have observations for a particular procedure coding system. Analysts should be aware of the utilization of different procedure coding systems during their analyses of SASD-CD data.

CONCLUSION

The types of facilities providing ambulatory surgery records to the 2008 SASD-CD vary substantially across States, while the proportion of records in the 2008 SASD-CD meeting the definition of ambulatory surgery is higher (98.6%) among non-hospital based facilities than hospital-based facilities (61.4%).

By matching SASD-CD facilities with those reported in the AHA Survey, it was possible to classify the SASD-CD facilities as either hospital-based or non-hospital based. The SASD-CD from some States appear to be limited mainly to hospital-based facilities, while the SASD-CD from other States also includes a substantial number of non-hospital based facilities.

The SASD-CD has several advantages over the AHA database. The SASD-CD uses discharge-level data and does not rely on surveys with aggregate counts provided on the AHA Survey. In addition, the SASD-CD contains information from both hospital-based and non-hospital based facilities; the AHA survey only includes hospital-based facilities. This difference enables the SASD-CD to include more facilities and surgeries than the AHA Survey data.

In terms of the types of surgeries recorded in the SASD-CD files, the greatest proportions of ambulatory surgeries are related to the digestive, musculoskeletal, and integumentary systems.

Overall, the pattern of use by body system appears relatively consistent among States. However, for States that use both coding systems such as Nebraska, which have low amounts of overlap between ICD-9-CM and CPT procedure coding, reporting of use is split between the two systems. In these cases, it is particularly important to use information from both procedure coding systems to obtain a complete picture of the procedures performed. Alternatively, researchers must be cautious when analyzing ambulatory surgeries in States that use both coding systems to ensure that surgeries are not counted twice in States in which a surgery is coded twice per record.

Substantial variability exists in the utilization of procedures for particular body systems. A notable example is found in the particularly high utilization of procedures on the digestive system and on the musculoskeletal system. Such variability in healthcare needs could serve as an interesting research application of the SASD-CD. Additionally, assessing differences in the volume of ambulatory surgeries across body systems or States could also be a valuable research application of the SASD-CD data.

The oftentimes wide disparity in utilization displayed for the category *Miscellaneous Diagnostic and Therapeutic* procedures (Table B-1), which might be expected given the different emphasis of this category of procedures that includes organ transplant, mammography, magnetic resonance imaging, blood transfusion, and cancer chemotherapy by the coding systems, was evident in the data. The percentage of codes reported using the ICD-9-CM coding system occurred between 1.8% to 58.2%, while CPT procedure codes ranged from 2.5% to 91.6%. Even those States with substantial coding in both systems, such as North Carolina, the *Miscellaneous Diagnostic and Therapeutic* category was coded 25.0% of the time using ICD-9-CM codes and 27.4% of the time using the CPT coding system (Table B-1). This analysis demonstrated that, although a substantial amount of information is duplicated between the two coding systems, there is still an appreciable amount of information that is unique to one or the other set of codes. This is especially important for the *Miscellaneous Diagnostic and Therapeutic* category.

Employing the CCS as a means to compare and combine information from the ICD-9-CM and CPT procedure codes proved to be a fruitful approach albeit with limitations as noted. Using it

as a grouper allowed consistent comparisons without encountering the problems associated with attempting to translate directly between incompatible coding systems.

In conclusion, the 2008 SASD-CD is a rich source of ambulatory surgery data, providing information on 15,760,446 ambulatory surgery visits in a total of 3,025 facilities in 16 States. The SASD-CD is also an important resource for studying ambulatory surgery in non-hospital based facilities, despite not having a comparison source of information. As this report demonstrates, over 98% of records from these facilities are ambulatory surgeries, concentrated in a small number of body systems, which may have implications for research involving those body systems (e.g., the number of surgeries may be underestimated if non-hospital based facilities are not included). These files can be useful to a broad range of researchers and policy analysts, particularly for state-specific analyses.

APPENDIX A

APPENDIX A: COMPARISON OF ICD-9-CM AND CPT PROCEDURE CODE USE BY SELECT STATE

This appendix makes comparisons between ICD-9-CM procedure codes and CPT procedure codes among States that employ both coding systems.

The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) coding system was originally developed as a modification of the World Health Organization (WHO) ICD system for statistical and epidemiological research. Eventually they became a means to calculate diagnosis related groups (DRGs) for inpatient prospective payment systems. The ICD-9-CM procedure codes are used to classify surgical procedures and some diagnostic procedures in the inpatient setting. The procedures are organized by body system (e.g., nervous, endocrine, respiratory, digestive, obstetrical procedures, musculoskeletal, etc.). Procedures are coded using approximately 3,800 codes comprised of two main digits followed by a decimal and one or two additional digits.

Current Procedural Terminology (CPT), developed by the American Medical Association (AMA), is a collection of terms and codes to describe medical, surgical, and diagnostic services and procedures performed by physicians in the outpatient setting. Because they were created for physician billing purposes, the CPT codes are significantly more detailed than the ICD-9-CM codes. In addition to a surgery section which parallels the ICD-9-CM procedure codes, the CPT codes are also used for evaluation and management, anesthesia, radiology, lab and pathology, and medicine. CPT codes are Level I of the Healthcare Common Procedure Coding System (HCPCS) and comprise a major portion of the Healthcare Common Procedure Coding System (HCPCS). Procedures are coded using approximately 9,000 codes comprised of five digits, to which two-digit modifiers may be added to explain unusual circumstances. CPT or HCPCS codes are becoming the standard for outpatient data because they are required for ambulatory patient classification systems, such as the Ambulatory Payment Classification (APC) and the Ambulatory Surgery Classification (ASC) systems, both of which are part of CMS' Outpatient Prospective Payment System.

A general description of the CPT coding system can be found on the AMA website at http://www.ama-assn.org/ama/pub/physician-resources/solutions-managing-your-practice/coding-billing-insurance/cpt.shtml. There are also a number of third party CPT coding manuals available.

Table A-1 lists the States that use each coding system. There are two types of records that contain CPT codes: the "core" files and the "charge detail" files. The core file supplies a fixed number of CPT code variables on a single record for each surgical visit. In contrast, the charge detail file may include a CPT code for each individual charge. A single surgical visit is represented by as many records as necessary to supply all of the charge information. As shown in Table A-1, most States that supply CPT codes provide a core file along with diagnostic and demographic information.

For States with CPT codes on both the "core" and "charge detail" files in 2008, analysts should use both files to identify all CPT codes related to the surgery.

States that use both coding systems include: Colorado, Florida, Kentucky, Michigan, Nebraska, New Jersey, North Carolina, Utah, Vermont, and Wisconsin. For users of the SASD-CD, understanding which coding system a State uses is important because there are subtle differences between the two systems.

Table A-1: Use of ICD-9-CM Procedure Codes and the CPT Procedure Codes Available through the HCUP Central Distributor, by State

State	ICD-9-CM Procedures	Core File CPT Variables	Charge Detail File CPT Records
California	N/A	✓	N/A
Colorado	✓	✓	N/A
Florida	✓	✓	N/A
Iowa	N/A	✓	✓
Kentucky	✓	✓	✓
Maine	N/A	✓	✓
Maryland	N/A	✓	✓
Michigan	✓	✓	N/A
Nebraska	✓	✓	✓
New Jersey	✓	✓	✓
New York	N/A	✓	✓
North Carolina	✓	✓	N/A
South Carolina	✓	N/A	N/A
Utah	✓	✓	N/A
Vermont	✓	✓	✓
Wisconsin	✓	✓	✓

For States that use both procedure coding systems, the average number of ICD-9-CM procedure codes is 1.9 compared to 3.2 CPT codes in the core file and 5.3 CPT codes in the charge detail file. Thus, there tend to be more CPT codes than ICD-9-CM codes, especially if the CPT codes are derived from the charge detail file.

Among States that employ both procedure coding systems, Table A-2 shows the percentage of records that have 1) both CPT procedure codes and ICD-9-CM procedure codes, 2) only ICD-9-CM procedure codes, and 3) only CPT procedure codes. For example, in Colorado, 77.6% of the records employ both coding systems, and 22.3% employ only the ICD-9-CM procedure coding system. Nebraska had a very low percentage of records that used both systems (11.3%).

Table A-2: Percent of Surgical Visit Records by Coding System, ICD-9-CM and CPT Available through the HCUP Central Distributor, by State, 2008 SASD-CD, Among All Surgery Visits

State	Number of Records	Percent with Both ICD-9-CM and CPT Codes	Percent ICD-9-CM Codes Only	Percent CPT Codes Only	Neither
Colorado	370,027	77.6%	22.3%	0.1%	0.0%
Florida	3,019,141	68.4%	0.0%	31.6%	0.0%
Kentucky	809,655	95.4%	4.5%	0.1%	0.0%
Michigan	1,530,267	91.2%	8.7%	0.1%	0.0%
Nebraska	153,882	11.3%	0.0%	88.7%	0.0%
New Jersey	404,226	71.6%	0.4%	28.0%	0.0%
North Carolina	1,474,686	100.0%	0.0%	0.0%	0.0%
Utah	296,952	76.5%	5.3%	18.2%	0.0%
Vermont	110,354	95.1%	2.7%	2.1%	0.0%
Wisconsin	950,117	91.9%	7.6%	0.5%	0.0%

Note: This table includes surgical visit records meeting the HCUP_AS>0 ambulatory surgery definition.

From this point forward, the comparisons between the ICD-9-CM and CPT coding systems are performed by comparing CCS categories. This approach is used because it is not possible to directly compare, or even unambiguously map codes, between the ICD-9-CM and CPT coding systems. The CCS categories serve as a bridge because the categories have the same meaning regardless of the coding system.

Table A-3 shows the percentage of CCS categories that match between the two systems among surgical visits that code procedures using both coding systems (dual coding). For all States, the match rates are higher for the ICD-9-CM CCS categories than the CPT CCS categories regardless of the number of ICD-9-CM codes or number of CPT codes for each state. For example, Nebraska contains six ICD-9-CM codes and two CPT codes per surgical record, and the match rate is higher for ICD-9-CM CCS codes (69.4%) than CPT CCS codes (3.3%). For Colorado, the number of ICD-9-CM codes and CPT codes are the same, 15 each per surgical record, and the ICD-9-CM CCS codes match rate is still higher (57.1%) than the CPT CCS codes match rate (39.5%). Lastly, Florida contains five ICD-9-CM codes and 10 CPT codes per surgical record, and the match rate is again higher for the ICD-9-CM CCS codes (73.5%) than the CPT CCS codes match rate (34.1%).

These percentages indicate the extent to which the procedure information overlaps between the two coding systems. For example, New Jersey and Utah collect dual-coded data from their hospitals and show similar match rates between the two systems. Other States mandate the submission of only CPT codes; consequently, there is often not a matching ICD-9-CM procedure code for each CPT procedure code.

Table A-3: Percent of Records with Matching CCS Categories Among All Surgical Visit Records with Dual Coding Available through the HCUP Central Distributor, by State, 2008 SASD-CD Ambulatory Surgeries

State	Percent of ICD-9-CM Codes CCS Matched	Percent of CPT Codes CCS Matched
Colorado	57.1%	39.5%
Florida	73.5%	34.1%
Kentucky	65.1%	45.9%
Michigan	66.1%	46.0%
Nebraska	69.4%	3.3%
New Jersey	77.1%	72.7%
North Carolina	60.3%	14.8%
Utah	72.1%	67.4%
Vermont	59.6%	30.6%
Wisconsin	57.0%	27.9%

Note: This table includes surgical visit records meeting the HCUP_AS>0 ambulatory surgery definition.

To reiterate, among surgical visit records that contain both types of codes, the number of codes differs between the two systems, especially when the CPT codes are derived from the charge detail file. Because no standards exist for the ordering of outpatient procedure codes, from this point forward, all of the comparisons between the ICD-9-CM procedure coding system and the CPT system are based on the subset of surgical visits that contain exactly one CPT procedure code and one ICD-9-CM procedure code. This subset of surgical visit records was selected to eliminate as much ambiguity as possible when comparing the consistency of procedure coding between the two systems. Although this simplification is necessary to allow direct comparisons of codes, the conclusions reached may not apply to observations where multiple ICD-9-CM and CPT procedure codes appear on a surgical visit record.

Table A-4 gives the rates of CCS matches among only those surgical visit records that have a single ICD-9-CM code and a single CPT code. The CCS categories match when the ICD-9-CM CCS category matches the CPT CCS category for that record.

Of the 10 States in Table A-4, seven States have match rates greater than 75%: Colorado, Florida, Michigan, Nebraska, New Jersey, North Carolina, and Utah.

Table A-4: Percent of Surgical Visit Records with Matching CCS Categories from Among Surgical Visit Records with a Single Procedure Code of Each Type Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries

State	Number of Records	Percent Records with Matching CCS
Colorado	84,648	82.1%
Florida	746,993	82.5%
Kentucky	99,384	72.3%
Michigan	546,076	80.9%
Nebraska	1,442	85.9%
New Jersey	14,543	76.7%
North Carolina	752,265	77.2%
Utah	126,086	83.6%
Vermont	13,485	74.5%
Wisconsin	175,926	64.2%

Note: This table includes surgical visit records meeting the HCUP_AS>0 ambulatory surgery definition.

The nature of the agreement between the ICD-9-CM procedure codes and the CPT procedure codes on single-procedure surgical visit records were investigated further by comparing the CPT CCS categories that were paired with the 10 most frequent ICD-9-CM CCS categories.

For each of the top 10 ICD-9-CM CCS groups, Table A-5 presents the top 10 CPT CCS groups that are paired with it. For example, the most common ICD-9-CM CCS group was CCS 76: *Colonoscopy and biopsy*. The same CPT CCS category, CCS 76, was paired with it 94.4% of the time. Several of the other paired CPT CCS groups were: 92: *Other bowel diagnostic procedures* (2.0%), 77: *Proctoscopy and anorectal biopsy* (1.9%), 234: *Pathology* (less than one percent), 240: *Medications (Injections, infusions and other forms)* (less than one percent), 232: *Anesthesia* (less than one percent), 233: *Laboratory – Chemistry and Hematology* (less than one percent), and 227: *Other diagnostic procedures* (less than one percent).

Of the 10 most frequent ICD-9-CM CCS groups, eight were paired with the matching CPT CCS category over 90% of the time. This implies that, despite the difficulty of directly translating between the two procedure coding systems, there is some agreement between the two systems based on the broader CCS classes. The largest discrepancies occurred within two of the 10 most frequent ICD-9-CM CCS groups paired with the matching CPT CCS categories: 160: *Other therapeutic procedures on muscles and tendons* (73.9%) and 174: *Other non-OR therapeutic procedures on skin and breast* (32.6%).

Table A-5: Pairing Between CCS ICD-9-CM and CCS CPT Categories for Top 10 ICD-9-CM Categories, Surgical Visit Records with a Single ICD-9-CM Code and a Single CPT Code Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries

CCS ICD-9-CM				CCS CPT			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS CPT Code	CCS CPT Code	Description	Percent
1	424,959	76	76: Colonoscopy and biopsy	1	76	76: Colonoscopy and biopsy	94.4%
				2	92	92: Other bowel diagnostic procedures	2.0%
				3	77	77: Proctoscopy and anorectal biopsy	1.9%
				4	234	234: Pathology	0.8%
				5	240	240: Medications (Injections, infusions and other forms)	0.5%
				6	232	232: Anesthesia	0.1%
				7	233	233: Laboratory - Chemistry and Hematology	0.1%
				8	227	227: Other diagnostic procedures (interview; evaluation; consultation)	0.1%
				9	97	97: Other gastrointestinal diagnostic procedures	0.0%
				10	70	70: Upper gastrointestinal endoscopy; biopsy	0.0%
2	196,930	70	70: Upper gastrointestinal endoscopy; biopsy	1	70	70: Upper gastrointestinal endoscopy; biopsy	98.2%
				2	234	234: Pathology	0.7%
				3	232	232: Anesthesia	0.3%
				4	240	240: Medications (Injections, infusions and other forms)	0.2%
				5	69	69: Esophageal dilatation	0.2%
				6	233	233: Laboratory - Chemistry and Hematology	0.1%
				7	206	206: Microscopic examination (bacterial smear; culture; toxicology)	0.1%
				8	76	76: Colonoscopy and biopsy	0.1%
				9	202	202: Electrocardiogram	0.0%
				10	71	71: Gastrostomy; temporary and permanent	0.0%

CCS ICD-9-CM				CCS CPT			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS CPT Code	CCS CPT Code	Description	Percent
3	157,118	95	95: Other non-OR lower GI therapeutic procedures	1	76	76: Colonoscopy and biopsy	93.2%
				2	96	96: Other OR lower GI therapeutic procedures	2.6%
				3	234	234: Pathology	2.2%
				4	77	77: Proctoscopy and anorectal biopsy	0.9%
				5	240	240: Medications (Injections, infusions and other forms)	0.4%
				6	71	71: Gastrostomy; temporary and permanent	0.3%
				7	70	70: Upper gastrointestinal endoscopy; biopsy	0.2%
				8	95	95: Other non-OR lower GI therapeutic procedures	0.1%
				9	73	73: Ileostomy and other enterostomy	0.1%
				10	232	232: Anesthesia	0.1%
4	132,992	171	171: Suture of skin and subcutaneous tissue	1	171	171: Suture of skin and subcutaneous tissue	96.1%
				2	227	227: Other diagnostic procedures (interview; evaluation; consultation)	3.7%
				3	19	19: Other therapeutic procedures on eyelids; conjunctiva; cornea	0.1%
				4	174	174: Other non-OR therapeutic procedures on skin and breast	0.0%
				5	175	175: Other OR therapeutic procedures on skin and breast	0.0%
				6	231	231: Other therapeutic procedures	0.0%
				7	240	240: Medications (Injections, infusions and other forms)	0.0%
				8	228	228: Prophylactic vaccinations and inoculations	0.0%
				9	177	177: Computerized axial tomography (CT) scan head	0.0%
				10	172	172: Skin graft	0.0%
5	110,283	15	15: Lens and cataract procedures	1	15	15: Lens and cataract procedures	99.7%
				2	20	20: Other intraocular therapeutic procedures	0.2%
				3	227	227: Other diagnostic procedures (interview; evaluation; consultation)	0.1%

CCS ICD-9-CM				CCS CPT			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS CPT Code	CCS CPT Code	Description	Percent
				4	240	240: Medications (Injections, infusions and other forms)	0.0%
				5	14	14: Glaucoma procedures	0.0%
				6	233	233: Laboratory - Chemistry and Hematology	0.0%
				7	19	19: Other therapeutic procedures on eyelids; conjunctiva; cornea	0.0%
				8	243	243: DME and supplies	0.0%
				9	202	202: Electrocardiogram	0.0%
				10	231	231: Other therapeutic procedures	0.0%
6	71,988	5	5: Insertion of catheter or spinal stimulator and injection into spinal canal	1	5	5: Insertion of catheter or spinal stimulator and injection into spinal canal	92.9%
				2	226	226: Other diagnostic radiology and related techniques	4.1%
				3	1	1: Incision and excision of CNS	2.1%
				4	240	240: Medications (Injections, infusions and other forms)	0.4%
				5	8	8: Other non-OR or closed therapeutic nervous system procedures	0.2%
				6	3	3: Laminectomy; excision intervertebral disc	0.1%
				7	227	227: Other diagnostic procedures (interview; evaluation; consultation)	0.0%
				8	9	9: Other OR therapeutic nervous system procedures	0.0%
				9	63	63: Other non-OR therapeutic cardiovascular procedures	0.0%
				10	181	181: Myelogram	0.0%
7	59,631	160	160: Other therapeutic procedures on muscles and tendons	1	160	160: Other therapeutic procedures on muscles and tendons	73.9%
				2	170	170: Excision of skin lesion	11.7%
				3	169	169: Debridement of wound; infection or burn	5.3%
				4	162	162: Other OR therapeutic procedures on joints	3.5%
				5	164	164: Other OR therapeutic procedures on musculoskeletal system	1.8%
				6	154	154: Arthroplasty other than hip or knee	0.8%

CCS ICD-9-CM				CCS CPT			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS CPT Code	CCS CPT Code	Description	Percent
				7	168	168: Incision and drainage; skin and subcutaneous tissue	0.6%
				8	234	234: Pathology	0.5%
				9	240	240: Medications (Injections, infusions and other forms)	0.5%
				10	171	171: Suture of skin and subcutaneous tissue	0.4%
8	52,184	30	30: Tonsillectomy and/or adenoidectomy	1	30	30: Tonsillectomy and/or adenoidectomy	97.8%
				2	32	32: Other non-OR therapeutic procedures on nose; mouth and pharynx	0.8%
				3	234	234: Pathology	0.6%
				4	33	33: Other OR therapeutic procedures on nose; mouth and pharynx	0.5%
				5	240	240: Medications (Injections, infusions and other forms)	0.1%
				6	233	233: Laboratory - Chemistry and Hematology	0.0%
				7	26	26: Other therapeutic ear procedures	0.0%
				8	31	31: Diagnostic procedures on nose; mouth and pharynx	0.0%
				9	27	27: Control of epistaxis	0.0%
				10	227	227: Other diagnostic procedures (interview; evaluation; consultation)	0.0%
9	51,240	169	169: Debridement of wound; infection or burn	1	169	169: Debridement of wound; infection or burn	95.3%
				2	227	227: Other diagnostic procedures (interview; evaluation; consultation)	2.4%
				3	214	214: Traction; splints; and other wound care	1.2%
				4	175	175: Other OR therapeutic procedures on skin and breast	0.6%
				5	212	212: Diagnostic physical therapy	0.2%
				6	170	170: Excision of skin lesion	0.1%
				7	243	243: DME and supplies	0.0%
				8	226	226: Other diagnostic radiology and related techniques	0.0%
				9	240	240: Medications (Injections, infusions and other forms)	0.0%

CCS ICD-9-CM				CCS CPT			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS CPT Code	CCS CPT Code	Description	Percent
				10	172	172: Skin graft	0.0%
10	49,132	174	174: Other non-OR therapeutic procedures on skin and breast	1	54	54: Other vascular catheterization; not heart	32.6%
				2	174	174: Other non-OR therapeutic procedures on skin and breast	26.9%
				3	63	63: Other non-OR therapeutic cardiovascular procedures	18.1%
				4	175	175: Other OR therapeutic procedures on skin and breast	6.3%
				5	170	170: Excision of skin lesion	5.9%
				6	165	165: Breast biopsy and other diagnostic procedures on breast	3.1%
				7	227	227: Other diagnostic procedures (interview; evaluation; consultation)	1.9%
				8	168	168: Incision and drainage; skin and subcutaneous tissue	1.8%
				9	172	172: Skin graft	0.9%
				10	231	231: Other therapeutic procedures	0.7%

For each of the top 10 CPT CCS categories, Table A-6 presents the top 10 ICD-9-CM CCS categories that are paired with it. Once again, this table includes only those surgical visit records with a single ICD-9-CM code and a single CPT code. In Table A-6, six of the top 10 CPT CCS classifications were paired with the same ICD-9-CM CCS classifications at least 90% of the time. The largest discrepancies occurred within four of the top 10 CPT CCS categories, 76: *Colonoscopy and biopsy* (72.7%), 171: *Suture of skin and subcutaneous tissue* (87%), 170: *Excision of skin lesion* (64.2%), and 169: *Debridement of wound; infection or burn* (87.9%).

Seven of the top 10 CPT CCS categories shown in Table A-6 are also in the top 10 ICD-9-CM CCS categories shown in Table A-5. Both tables have categories 76: *Colonoscopy and biopsy*, and 70: *Upper gastrointestinal endoscopy; biopsy listed as first and second, respectively*. The three of the top 10 CPT CCS categories shown in Table A-6 that do not appear in the top 10 ICD-9-CM CCS categories shown in Table A-5 are 170: *Excision of skin lesion*, 169: *Debridement of wound; infection or burn*, and 231: *Other therapeutic procedures*.

Table A-6: Pairing Between CCS CPT and CCS ICD-9-CM Categories for Top 10 CPT Categories, Surgical Visit Records with a Single ICD-9-CM Code and a Single CPT Code Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries

CCS CPT				CCS ICD-9-CM			
Rank of CPT CCS Group	N	CCS CPT Code	CCS Description	Rank of CCS for ICD Group	CCS ICD Code	Description	Percent
1	551,530	76	76: Colonoscopy and biopsy	1	76	76: Colonoscopy and biopsy	72.7%
				2	95	95: Other non-OR lower GI therapeutic procedures	26.5%
				3	77	77: Proctoscopy and anorectal biopsy	0.5%
				4	92	92: Other bowel diagnostic procedures	0.2%
				5	70	70: Upper gastrointestinal endoscopy; biopsy	0.0%
				6	96	96: Other OR lower GI therapeutic procedures	0.0%
				7	79	79: Local excision of large intestine lesion (not endoscopic)	0.0%
				8	227	227: Other diagnostic procedures (interview; evaluation; consultation)	0.0%
				9	231	231: Other therapeutic procedures	0.0%
				10	163	163: Other non-OR therapeutic procedures on musculoskeletal system	0.0%
2	199,483	70	70: Upper gastrointestinal endoscopy; biopsy	1	70	70: Upper gastrointestinal endoscopy; biopsy	96.9%
				2	93	93: Other non-OR upper GI therapeutic procedures	2.3%
				3	229	229: Nonoperative removal of foreign body	0.3%
				4	95	95: Other non-OR lower GI therapeutic procedures	0.1%
				5	92	92: Other bowel diagnostic procedures	0.1%
				6	94	94: Other OR upper GI therapeutic procedures	0.1%
				7	76	76: Colonoscopy and biopsy	0.1%
				8	110	110: Other diagnostic procedures of urinary tract	0.0%
				9	69	69: Esophageal dilatation	0.0%
				10	96	96: Other OR lower GI therapeutic procedures	0.0%

CCS CPT				CCS ICD-9-CM			
Rank of CPT CCS Group	N	CCS CPT Code	CCS Description	Rank of CCS for ICD Group	CCS ICD Code	Description	Percent
3	146,929	171	171: Suture of skin and subcutaneous tissue	1	171	171: Suture of skin and subcutaneous tissue	87.0%
				2	19	19: Other therapeutic procedures on eyelids; conjunctiva; cornea	5.3%
				3	32	32: Other non-OR therapeutic procedures on nose; mouth and pharynx	4.2%
				4	28	28: Plastic procedures on nose	1.3%
				5	26	26: Other therapeutic ear procedures	1.1%
				6	175	175: Other OR therapeutic procedures on skin and breast	0.3%
				7	160	160: Other therapeutic procedures on muscles and tendons	0.2%
				8	118	118: Other OR therapeutic procedures; male genital	0.2%
				9	132	132: Other OR therapeutic procedures; female organs	0.1%
				10	33	33: Other OR therapeutic procedures on nose; mouth and pharynx	0.1%
4	109,897	15	15: Lens and cataract procedures	1	15	15: Lens and cataract procedures	99.5%
				2	17	17: Destruction of lesion of retina and choroid	0.3%
				3	20	20: Other intraocular therapeutic procedures	0.2%
				4	21	21: Other extraocular muscle and orbit therapeutic procedures	0.0%
				5	14	14: Glaucoma procedures	0.0%
				6	19	19: Other therapeutic procedures on eyelids; conjunctiva; cornea	0.0%
				7	8	8: Other non-OR or closed therapeutic nervous system procedures	0.0%
				8	229	229: Nonoperative removal of foreign body	0.0%
				9	231	231: Other therapeutic procedures	0.0%
				10	67	67: Other therapeutic procedures; hemic and lymphatic system	0.0%
5	71,126	5	5: Insertion of catheter or spinal stimulator and injection into spinal canal	1	5	5: Insertion of catheter or spinal stimulator and injection into spinal canal	94.0%
				2	8	8: Other non-OR or closed therapeutic nervous system procedures	4.1%
				3	9	9: Other OR therapeutic nervous system procedures	1.0%
				4	163	163: Other non-OR therapeutic procedures on musculoskeletal system	0.3%

CCS CPT				CCS ICD-9-CM			
Rank of CPT CCS Group	N	CCS CPT Code	CCS Description	Rank of CCS for ICD Group	CCS ICD Code	Description	Percent
				5	174	174: Other non-OR therapeutic procedures on skin and breast	0.2%
				6	231	231: Other therapeutic procedures	0.2%
				7	226	226: Other diagnostic radiology and related techniques	0.1%
				8	3	3: Laminectomy; excision intervertebral disc	0.0%
				9	4	4: Diagnostic spinal tap	0.0%
				10	155	155: Arthrocentesis	0.0%
6	55,567	169	169: Debridement of wound; infection or burn	1	169	169: Debridement of wound; infection or burn	87.9%
				2	160	160: Other therapeutic procedures on muscles and tendons	5.6%
				3	142	142: Partial excision bone	2.8%
				4	172	172: Skin graft	1.0%
				5	132	132: Other OR therapeutic procedures; female organs	0.6%
				6	99	99: Other OR gastrointestinal therapeutic procedures	0.5%
				7	26	26: Other therapeutic ear procedures	0.4%
				8	214	214: Traction; splints; and other wound care	0.4%
				9	118	118: Other OR therapeutic procedures; male genital	0.2%
				10	148	148: Other fracture and dislocation procedure	0.2%
7	51,105	30	30: Tonsillectomy and/or adenoidectomy	1	30	30: Tonsillectomy and/or adenoidectomy	99.9%
				2	33	33: Other OR therapeutic procedures on nose; mouth and pharynx	0.1%
				3	25	25: Diagnostic procedures on ear	0.0%
				4	76	76: Colonoscopy and biopsy	0.0%
				5	94	94: Other OR upper GI therapeutic procedures	0.0%
				6			
				7			
				8			
				9			

CCS CPT				CCS ICD-9-CM			
Rank of CPT CCS Group	N	CCS CPT Code	CCS Description	Rank of CCS for ICD Group	CCS ICD Code	Description	Percent
				10			
8	50,087	170	170: Excision of skin lesion	1	170	170: Excision of skin lesion	64.2%
				2	160	160: Other therapeutic procedures on muscles and tendons	13.9%
				3	166	166: Lumpectomy; quadrantectomy of breast	8.4%
				4	174	174: Other non-OR therapeutic procedures on skin and breast	5.8%
				5	26	26: Other therapeutic ear procedures	1.5%
				6	19	19: Other therapeutic procedures on eyelids; conjunctiva; cornea	1.2%
				7	33	33: Other OR therapeutic procedures on nose; mouth and pharynx	1.2%
				8	132	132: Other OR therapeutic procedures; female organs	0.8%
				9	32	32: Other non-OR therapeutic procedures on nose; mouth and pharynx	0.7%
				10	96	96: Other OR lower GI therapeutic procedures	0.6%
9	46,292	160	160: Other therapeutic procedures on muscles and tendons	1	160	160: Other therapeutic procedures on muscles and tendons	95.2%
				2	162	162: Other OR therapeutic procedures on joints	2.5%
				3	99	99: Other OR gastrointestinal therapeutic procedures	0.9%
				4	161	161: Other OR therapeutic procedures on bone	0.2%
				5	42	42: Other OR Rx procedures on respiratory system and mediastinum	0.2%
				6	170	170: Excision of skin lesion	0.2%
				7	230	230: Extracorporeal shock wave other than urinary	0.2%
				8	150	150: Division of joint capsule; ligament or cartilage	0.1%
				9	174	174: Other non-OR therapeutic procedures on skin and breast	0.1%
				10	154	154: Arthroplasty other than hip or knee	0.1%
10	44,627	231	231: Other therapeutic procedures	1	231	231: Other therapeutic procedures	97.7%
				2	174	174: Other non-OR therapeutic procedures on skin and breast	0.8%
				3	156	156: Injections and aspirations of muscles; tendons; bursa; joints and soft tissue	0.6%

CCS CPT				CCS ICD-9-CM			
Rank of CPT CCS Group	N	CCS CPT Code	CCS Description	Rank of CCS for ICD Group	CCS ICD Code	Description	Percent
				4	197	197: Other diagnostic ultrasound	0.1%
				5	58	58: Hemodialysis	0.1%
				6	54	54: Other vascular catheterization; not heart	0.1%
				7	171	171: Suture of skin and subcutaneous tissue	0.1%
				8	94	94: Other OR upper GI therapeutic procedures	0.0%
				9	62	62: Other diagnostic cardiovascular procedures	0.0%
				10	168	168: Incision and drainage; skin and subcutaneous tissue	0.0%

Appendix A: Summary

Ten States in the SASD-CD employ both ICD-9-CM and CPT procedure codes. Five States (California, Iowa, Maine, Maryland, and New York) use only CPT procedure codes, while one State (South Carolina) uses only ICD-9-CM procedure codes. Among States that employ both coding systems, varying levels of agreement exist between the two. CPT codes may be supplied in the core file or in the charge detail file. On average, the number of CPT procedure codes is higher (3.2 in the core file and 5.3 in the charge detail file) than the number of ICD-9-CM procedure codes (1.9). Also, the average number of CPT codes in the charge detail file is higher than the average number of CPT codes in the core file.

Among surgical visit records with a single ICD-9-CM procedure code and a single CPT procedure code, there tends to be a high level of agreement between the CCS categories generated by the two coding systems. However, there are subtle differences between the two systems that result in different classifications for some procedures using the two types of codes. Consequently, analysts should exercise care when combining SASD-CD data across States that use different procedure coding systems.

APPENDIX B

APPENDIX B: COMPARISON OF ICD-9-CM AND CPT PROCEDURE CODE USE BY BODY SYSTEM BY STATE

Appendix B contains counts of surgical visits by body system for each state. Ambulatory surgery records (classified as HCUP_AS>0) were used to construct Table B-1.

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries

	Nervous System (1-9)	Nervous System (1-9)	Endocrine System (10-12)	Endocrine System (10-12)
State	ICD-9-CM	CPT	ICD-9-CM	CPT
California	N/A	277,447	N/A	2,594
Percent of State Total	N/A	10.5%	N/A	0.1%
Colorado	28,289	23,369	3,425	1,641
Percent of State Total	7.7%	6.3%	0.9%	0.4%
Florida	203,307	299,602	14,919	11,556
Percent of State Total	6.7%	9.9%	0.5%	0.4%
Iowa	N/A	33,613	N/A	1,867
Percent of State Total	N/A	8.7%	N/A	0.5%
Kentucky	53,328	33,907	3,065	2,275
Percent of State Total	6.6%	4.2%	0.4%	0.3%
Maine	N/A	15,845	N/A	713
Percent of State Total	N/A	5.1%	N/A	0.2%
Maryland	N/A	44,159	N/A	3,082
Percent of State Total	N/A	7.2%	N/A	0.5%
Michigan	85,357	80,211	5,971	3,218
Percent of State Total	5.6%	5.2%	0.4%	0.2%
Nebraska	1,919	16,996	128	949
Percent of State Total	1.3%	11.0%	0.1%	0.6%
New Jersey	20,288	24,340	1,431	1,790
Percent of State Total	5.0%	6.0%	0.4%	0.4%
New York	N/A	155,424	N/A	5,265
Percent of State Total	N/A	8.0%	N/A	0.3%
North Carolina	121,511	123,245	6,043	4,143
Percent of State Total	8.2%	8.4%	0.4%	0.3%
South Carolina	62,231	N/A	2,731	N/A
Percent of State Total	8.5%	N/A	0.4%	N/A
Utah	16,971	23,516	1,531	1,183
Percent of State Total	5.7%	7.9%	0.5%	0.4%

State	Nervous System (1-9) ICD-9-CM	Nervous System (1-9) CPT	Endocrine System (10-12) ICD-9-CM	Endocrine System (10-12) CPT
Vermont	9,759	10,103	583	244
Percent of State Total	8.8%	9.2%	0.5%	0.2%
Wisconsin	118,469	100,971	2,926	2,139
Percent of State Total	12.5%	10.6%	0.3%	0.2%
Total	1,144,925	1,480,993	79,496	50,658
Percent of Grand Total	5.2%	6.7%	0.4%	0.2%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Eye (13-21) ICD-9-CM	Eye (13-21) CPT	Ear (22-26) ICD-9-CM	Ear (22-26) CPT
California	N/A	346,287	N/A	38,626
Percent of State Total	N/A	13.1%	N/A	1.5%
Colorado	17,203	11,337	6,099	4,074
Percent of State Total	4.7%	3.1%	1.7%	1.1%
Florida	189,327	405,313	36,429	40,000
Percent of State Total	6.3%	13.4%	1.2%	1.3%
Iowa	N/A	37,851	N/A	10,455
Percent of State Total	N/A	9.8%	N/A	2.7%
Kentucky	32,620	20,340	13,589	10,007
Percent of State Total	4.0%	2.5%	1.7%	1.2%
Maine	N/A	13,445	N/A	5,985
Percent of State Total	N/A	4.4%	N/A	1.9%
Maryland	N/A	25,892	N/A	7,434
Percent of State Total	N/A	4.2%	N/A	1.2%
Michigan	86,094	69,689	27,707	23,481
Percent of State Total	5.6%	4.6%	1.8%	1.5%
Nebraska	918	6,382	382	5,291
Percent of State Total	0.6%	4.2%	0.3%	3.4%
New Jersey	19,917	23,802	5,842	7,038
Percent of State Total	4.9%	5.9%	1.5%	1.7%
New York	N/A	233,357	N/A	30,796
Percent of State Total	N/A	12.0%	N/A	1.6%
North Carolina	132,693	126,595	32,056	29,943
Percent of State Total	9.0%	8.6%	2.2%	2.0%
South Carolina	71,252	N/A	15,575	N/A
Percent of State Total	9.7%	N/A	2.1%	N/A
Utah	14,954	22,665	9,014	10,020
Percent of State Total	5.0%	7.6%	3.0%	3.4%
Vermont	8,687	7,293	2,185	1,714
Percent of State Total	7.9%	6.6%	2.0%	1.6%
Wisconsin	83,567	66,490	18,362	12,069
Percent of State Total	8.8%	7.0%	1.9%	1.3%
Total	950,937	1,590,811	288,586	291,748
Percent of Grand Total	4.3%	7.2%	1.3%	1.3%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Nose, Mouth, and Pharynx (27-33) ICD-9-CM	Nose, Mouth, and Pharynx (27-33) CPT	Respiratory System (34-42) ICD-9-CM	Respiratory System (34-42) CPT
California	N/A	91,489	N/A	27,688
Percent of State Total	N/A	3.5%	N/A	1.1%
Colorado	26,273	17,379	6,858	4,442
Percent of State Total	7.1%	4.7%	1.9%	1.2%
Florida	75,989	79,539	39,561	47,406
Percent of State Total	2.5%	2.6%	1.3%	1.6%
Iowa	N/A	18,374	N/A	11,299
Percent of State Total	N/A	4.8%	N/A	2.9%
Kentucky	21,860	14,673	8,176	9,512
Percent of State Total	2.7%	1.8%	1.0%	1.2%
Maine	N/A	6,831	N/A	5,464
Percent of State Total	N/A	2.2%	N/A	1.8%
Maryland	N/A	19,988	N/A	25,220
Percent of State Total	N/A	3.2%	N/A	4.1%
Michigan	71,812	54,984	27,474	35,225
Percent of State Total	4.7%	3.6%	1.8%	2.3%
Nebraska	1,192	9,249	256	4,529
Percent of State Total	0.8%	6.0%	0.2%	2.9%
New Jersey	17,360	18,346	3,690	5,611
Percent of State Total	4.3%	4.5%	0.9%	1.4%
New York	N/A	67,407	N/A	26,933
Percent of State Total	N/A	3.5%	N/A	1.4%
North Carolina	64,925	57,525	18,965	19,350
Percent of State Total	4.4%	3.9%	1.3%	1.3%
South Carolina	36,480	N/A	13,084	N/A
Percent of State Total	5.0%	N/A	1.8%	N/A
Utah	21,819	22,765	2,566	2,698
Percent of State Total	7.4%	7.7%	0.9%	0.9%
Vermont	3,663	2,291	1,479	1,289
Percent of State Total	3.3%	2.1%	1.3%	1.2%
Wisconsin	37,393	24,654	11,394	10,963
Percent of State Total	3.9%	2.6%	1.2%	1.2%
Total	625,513	606,218	226,615	285,124
Percent of Grand Total	2.8%	2.8%	1.0%	1.3%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Cardiovascular System (43-63) ICD-9-CM	Cardiovascular System (43-63) CPT	Heme and Lymphatic System (64-67) ICD-9-CM	Heme and Lymphatic System (64-67) CPT
California	N/A	90,190	N/A	21,132
Percent of State Total	N/A	3.4%	N/A	0.8%
Colorado	19,702	15,360	4,457	2,659
Percent of State Total	5.3%	4.2%	1.2%	0.7%
Florida	115,155	204,682	23,032	21,632
Percent of State Total	3.8%	6.8%	0.8%	0.7%
Iowa	N/A	20,162	N/A	2,779
Percent of State Total	N/A	5.2%	N/A	0.7%
Kentucky	48,122	57,396	4,349	3,131
Percent of State Total	5.9%	7.1%	0.5%	0.4%
Maine	N/A	16,857	N/A	1,905
Percent of State Total	N/A	5.5%	N/A	0.6%
Maryland	N/A	51,521	N/A	7,296
Percent of State Total	N/A	8.3%	N/A	1.2%
Michigan	112,029	98,711	14,880	11,648
Percent of State Total	7.3%	6.5%	1.0%	0.8%
Nebraska	938	10,699	206	1,577
Percent of State Total	0.6%	7.0%	0.1%	1.0%
New Jersey	16,491	27,764	3,972	3,655
Percent of State Total	4.1%	6.9%	1.0%	0.9%
New York	N/A	86,019	N/A	13,039
Percent of State Total	N/A	4.4%	N/A	0.7%
North Carolina	66,745	78,539	12,033	9,103
Percent of State Total	4.5%	5.3%	0.8%	0.6%
South Carolina	55,228	N/A	4,066	N/A
Percent of State Total	7.5%	N/A	0.6%	N/A
Utah	13,422	13,176	2,417	2,284
Percent of State Total	4.5%	4.4%	0.8%	0.8%
Vermont	2,921	4,885	927	737
Percent of State Total	2.7%	4.4%	0.8%	0.7%
Wisconsin	44,858	49,163	7,479	4,560
Percent of State Total	4.7%	5.2%	0.8%	0.5%
Total	836,997	1,021,083	134,573	126,108
Percent of Grand Total	3.8%	4.6%	0.6%	0.6%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Digestive System (68-99) ICD-9-CM	Digestive System (68-99) CPT	Urinary System (100-112) ICD-9-CM	Urinary System (100-112) CPT
California	N/A	980,345	N/A	82,635
Percent of State Total	N/A	37.1%	N/A	3.1%
Colorado	82,766	63,807	18,149	13,058
Percent of State Total	22.4%	17.2%	4.9%	3.5%
Florida	656,539	1,039,798	99,586	115,494
Percent of State Total	21.8%	34.4%	3.3%	3.8%
Iowa	N/A	127,823	N/A	13,240
Percent of State Total	N/A	33.0%	N/A	3.4%
Kentucky	178,524	127,275	42,568	27,014
Percent of State Total	22.1%	15.7%	5.3%	3.3%
Maine	N/A	84,012	N/A	14,500
Percent of State Total	N/A	27.2%	N/A	4.7%
Maryland	N/A	103,542	N/A	29,290
Percent of State Total	N/A	16.8%	N/A	4.7%
Michigan	414,063	387,460	85,890	76,950
Percent of State Total	27.1%	25.3%	5.6%	5.0%
Nebraska	6,987	55,246	574	7,044
Percent of State Total	4.5%	35.9%	0.4%	4.6%
New Jersey	73,949	98,969	17,457	19,865
Percent of State Total	18.3%	24.5%	4.3%	4.9%
New York	N/A	652,352	N/A	67,644
Percent of State Total	N/A	33.5%	N/A	3.5%
North Carolina	350,513	349,676	66,855	63,510
Percent of State Total	23.8%	23.7%	4.5%	4.3%
South Carolina	227,299	N/A	35,277	N/A
Percent of State Total	30.9%	N/A	4.8%	N/A
Utah	95,690	105,078	7,134	8,863
Percent of State Total	32.2%	35.4%	2.4%	3.0%
Vermont	35,429	32,164	4,057	3,481
Percent of State Total	32.1%	29.2%	3.7%	3.2%
Wisconsin	332,151	244,020	35,527	22,233
Percent of State Total	35.0%	25.7%	3.7%	2.3%
Total	3,995,249	5,102,066	643,126	679,461
Percent of Grand Total	18.1%	23.2%	2.9%	3.1%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Male Genital System (113-118) ICD-9-CM	Male Genital System (113-118) CPT	Female Genital System (119-121, 123-132) ICD-9-CM	Female Genital System (119-121, 123-132) CPT
California	N/A	41,076	N/A	125,748
Percent of State Total	N/A	1.6%	N/A	4.8%
Colorado	5,569	4,246	19,214	15,590
Percent of State Total	1.5%	1.2%	5.2%	4.2%
Florida	40,219	50,224	88,252	102,700
Percent of State Total	1.3%	1.7%	2.9%	3.4%
Iowa	N/A	3,586	N/A	16,189
Percent of State Total	N/A	0.9%	N/A	4.2%
Kentucky	6,544	4,635	30,662	21,731
Percent of State Total	0.8%	0.6%	3.8%	2.7%
Maine	N/A	3,739	N/A	14,520
Percent of State Total	N/A	1.2%	N/A	4.7%
Maryland	N/A	9,274	N/A	38,446
Percent of State Total	N/A	1.5%	N/A	6.2%
Michigan	19,515	19,240	73,690	71,380
Percent of State Total	1.3%	1.3%	4.8%	4.7%
Nebraska	140	1,879	752	7,147
Percent of State Total	0.1%	1.2%	0.5%	4.6%
New Jersey	7,899	8,989	36,532	41,760
Percent of State Total	2.0%	2.2%	9.0%	10.3%
New York	N/A	30,757	N/A	137,592
Percent of State Total	N/A	1.6%	N/A	7.1%
North Carolina	15,522	15,041	58,774	57,687
Percent of State Total	1.1%	1.0%	4.0%	3.9%
South Carolina	9,871	N/A	28,806	N/A
Percent of State Total	1.3%	N/A	3.9%	N/A
Utah	3,612	4,066	10,815	9,794
Percent of State Total	1.2%	1.4%	3.6%	3.3%
Vermont	1,395	1,067	3,848	3,613
Percent of State Total	1.3%	1.0%	3.5%	3.3%
Wisconsin	11,585	7,985	32,292	23,585
Percent of State Total	1.2%	0.8%	3.4%	2.5%
Total	196,469	237,844	674,471	802,951
Percent of Grand Total	0.9%	1.1%	3.1%	3.6%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Obstetrical (122, 133-141) ICD-9-CM	Obstetrical (122, 133-141) CPT	Musculoskeletal System (142-164) ICD-9-CM	Musculoskeletal System (142-164) CPT
California	N/A	11,193	N/A	376,764
Percent of State Total	N/A	0.4%	N/A	14.2%
Colorado	7,930	4,725	51,102	39,962
Percent of State Total	2.1%	1.3%	13.8%	10.8%
Florida	21,914	58,848	230,887	271,874
Percent of State Total	0.7%	2.0%	7.7%	9.0%
Iowa	N/A	7,899	N/A	41,063
Percent of State Total	N/A	2.0%	N/A	10.6%
Kentucky	8,923	7,284	122,820	44,534
Percent of State Total	1.1%	0.9%	15.2%	5.5%
Maine	N/A	13,873	N/A	40,082
Percent of State Total	N/A	4.5%	N/A	13.0%
Maryland	N/A	44,128	N/A	66,645
Percent of State Total	N/A	7.1%	N/A	10.8%
Michigan	46,787	28,035	195,394	174,264
Percent of State Total	3.1%	1.8%	12.8%	11.4%
Nebraska	16	339	2,437	19,088
Percent of State Total	0.0%	0.2%	1.6%	12.4%
New Jersey	642	1,452	42,168	48,103
Percent of State Total	0.2%	0.4%	10.4%	11.9%
New York	N/A	11,486	N/A	249,965
Percent of State Total	N/A	0.6%	N/A	12.8%
North Carolina	18,697	18,290	204,252	168,175
Percent of State Total	1.3%	1.2%	13.9%	11.4%
South Carolina	1,909	N/A	85,859	N/A
Percent of State Total	0.3%	N/A	11.7%	N/A
Utah	285	0	48,183	57,889
Percent of State Total	0.1%	0.0%	16.2%	19.5%
Vermont	4,054	3,628	13,320	10,417
Percent of State Total	3.7%	3.3%	12.1%	9.4%
Wisconsin	1,106	1,017	140,616	90,479
Percent of State Total	0.1%	0.1%	14.8%	9.5%
Total	235,899	277,631	1,771,547	1,957,529
Percent of Grand Total	1.1%	1.3%	8.0%	8.9%

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	Integumentary System (165-175) ICD-9-CM	Integumentary System (165-175) CPT	Miscellaneous Diagnostics and Therapeutic (176-231)* ICD-9-CM	Miscellaneous Diagnostics and Therapeutic (176-231)* CPT
California	N/A	199,625	N/A	473,012
Percent of State Total	N/A	7.5%	N/A	17.9%
Colorado	93,043	76,786	36,085	148,148
Percent of State Total	25.1%	20.8%	9.8%	40.0%
Florida	236,207	294,175	267,996	1,016,249
Percent of State Total	7.8%	9.7%	8.9%	33.7%
Iowa	N/A	37,419	N/A	306,146
Percent of State Total	N/A	9.7%	N/A	79.1%
Kentucky	150,014	99,781	471,551	657,223
Percent of State Total	18.5%	12.3%	58.2%	81.2%
Maine	N/A	44,888	N/A	254,255
Percent of State Total	N/A	14.6%	N/A	82.4%
Maryland	N/A	103,915	N/A	519,603
Percent of State Total	N/A	16.8%	N/A	84.1%
Michigan	304,839	289,870	170,272	542,671
Percent of State Total	19.9%	18.9%	11.1%	35.5%
Nebraska	1,618	16,476	2,713	123,787
Percent of State Total	1.1%	10.7%	1.8%	80.4%
New Jersey	33,235	40,224	34,572	370,109
Percent of State Total	8.2%	10.0%	8.6%	91.6%
New York	N/A	160,353	N/A	1,264,770
Percent of State Total	N/A	8.2%	N/A	65.0%
North Carolina	224,159	254,249	368,203	403,856
Percent of State Total	15.2%	17.2%	25.0%	27.4%
South Carolina	113,449	N/A	290,767	N/A
Percent of State Total	15.4%	N/A	39.5%	N/A
Utah	6,642	4,035	9	7,322
Percent of State Total	2.2%	1.4%	0.0%	2.5%
Vermont	10,118	10,087	22,202	89,832
Percent of State Total	9.2%	9.1%	20.1%	81.4%
Wisconsin	79,127	43,576	87,235	652,989
Percent of State Total	8.3%	4.6%	9.2%	68.7%
Total	1,977,262	2,005,845	2,481,782	9,280,104
Percent of Grand Total	9.0%	9.1%	11.3%	42.1%

*Such procedures captured in this range include other organ transplant, mammography, magnetic resonance imaging, blood transfusion, and cancer chemotherapy.

Table B-1: Number of Procedure Codes by State and Body System, ICD-9-CM CCS and CPT CCS Procedure Classification Available through the HCUP Central Distributor, 2008 SASD-CD Ambulatory Surgeries (continued)

State	HCPCS* ICD-9-CM	HCPCS* CPT	Invalid or Inconsistent** ICD-9-CM	Invalid or Inconsistent** CPT	Total Records
California	N/A	0	N/A	0	2,645,955
Percent of State Total	N/A	0.0%	N/A	0.0%	100.0%
Colorado	0	85	0	2	370,027
Percent of State Total	0.0%	0.0%	0.0%	0.0%	100.0%
Florida	0	327	25	1	3,019,141
Percent of State Total	0.0%	0.0%	0.0%	0.0%	100.0%
Iowa	N/A	2,613	N/A	10	387,091
Percent of State Total	N/A	0.7%	N/A	0.0%	100.0%
Kentucky	0	948	9	946	809,655
Percent of State Total	0.0%	0.1%	0.0%	0.1%	100.0%
Maine	N/A	2,164	N/A	10	308,443
Percent of State Total	N/A	0.7%	N/A	0.0%	100.0%
Maryland	N/A	4,380	N/A	117	617,607
Percent of State Total	N/A	0.7%	N/A	0.0%	100.0%
Michigan	0	281	12	28	1,530,267
Percent of State Total	0.0%	0.0%	0.0%	0.0%	100.0%
Nebraska	0	116	0	0	153,882
Percent of State Total	0.0%	0.1%	0.0%	0.0%	100.0%
New Jersey	0	1,771	2	223	404,226
Percent of State Total	0.0%	0.4%	0.0%	0.1%	100.0%
New York	N/A	6,460	N/A	915	1,946,496
Percent of State Total	N/A	0.3%	N/A	0.1%	100.0%
North Carolina	0	77	3	1,041	1,474,686
Percent of State Total	0.0%	0.0%	0.0%	0.1%	100.0%
South Carolina	0	N/A	119	N/A	735,307
Percent of State Total	0.0%	N/A	0.0%	N/A	100.0%
Utah	0	17	4	0	296,952
Percent of State Total	0.0%	0.0%	0.0%	0.0%	100.0%
Vermont	0	315	0	33	110,354
Percent of State Total	0.0%	0.3%	0.0%	0.0%	100.0%
Wisconsin	0	408	241	5,257	950,117
Percent of State Total	0.0%	0.0%	0.0%	0.6%	100.0%
Total	0	27,988	424	22,289	22,038,133
Percent of Grand Total	0.0%	0.1%	0.0%	0.1%	100.0%

*Refers to CPT/ Healthcare Common Procedure Coding System (HCPCS) Level I codes that cannot be classified using the CCS system.
Note: Healthcare Common Procedure Coding System (HCPCS) National Level II codes are often used with CPT codes to enhance their scope. They are not used to categorize procedures in this table because no mapping to CCS exists at the present time.
**A validation algorithm is used to identify invalid codes based on logic identifying all valid codes in a certain time period. Inconsistent codes are identified when comparing the nature of the codes to patient demographic characteristics.

Appendix B: Summary

The State variation in the use of the two coding systems is apparent when comparing the number of codes available by body system in the CCS Procedure Classification software available through the HCUP Central Distributor for records in the 2008 SASD-CD that qualified as ambulatory surgery (HCUP_AS>0). At times, the variation in codes available between coding systems can be large. Thus, researchers interested in studying ambulatory surgery for particular diagnosis or procedure areas should select States with sufficient procedure codes available for analysis.