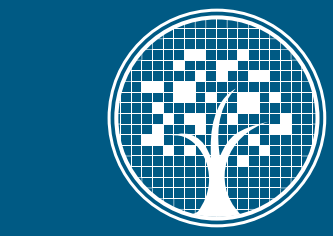


HCUP Methods Series

Evaluation of the State Ambulatory Surgery Databases Available Through the HCUP Central Distributor, 2006

Report # 2009-03

U.S. Department of Health and Human Services
Agency for Healthcare Research and Quality

Contact Information:
Healthcare Cost and Utilization Project (HCUP)
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850
http://www.hcup-us.ahrq.gov

For Technical Assistance with HCUP Products:

Email: hcup@ahrq.gov

or

Phone: 1-866-290-HCUP

Recommended Citation: Gibson T, Steiner C. *Evaluation of the State Ambulatory Surgery Databases Available through the HCUP Central Distributor, 2006.* HCUP Methods Series Report # 2009-03. Online September 25, 2009. U.S. Agency for Healthcare Research and Quality. Available: http://www.hcup-us.ahrq.gov/reports/methods.jsp.

TABLE OF CONTENTS

INDEX OF TABLES

EXECUTIVE SUMMARY

Overview

This report provides an overview of the contents and uses of the Healthcare Cost and Utilization Project (HCUP) Central Distributor (CD) 2006 State Ambulatory Surgery Database (SASD) and compares the SASD-CD database to the 2006 American Hospital Association (AHA) Annual Survey. The 16 states that provided data for the 2006 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 2006 SASD-CD.

Key Findings

The 2006 SASD-CD files contain 19,306,717 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, 73.0% (14,094,046) represent discharges for ambulatory surgery procedures.

A majority (64.3% or 1,893) of the facilities contributing data to the SASD-CD are hospital-based. California and Florida contained the greatest number of ambulatory surgery facilities in the 2006 SASD-CD.

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: 59% of the total procedures in hospital based facilities are performed on the digestive, musculoskeletal, integumentary, cardiovascular, or eye systems (based on the ICD-9-CM coding system).

Two different coding systems are used in the SASD-CD; four states use only CPT codes, three states use only ICD-9-CM codes, and nine states employ both codes. On average, the number of CPT procedure codes is higher (2.2 in the core file and 4.4 in the charge detail file) than the number of ICD-9-CM procedure codes (1.6) 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 4,707 in 2006.[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 2006, the number of ambulatory surgeries reported by Colorado, New Jersey, and New York rose from 0.9 million to just over 2.3 million.[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 2006 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 2006 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 2006 SASD-CD with respect to ambulatory surgical 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

---

[1] Centers for Medicare & Medicaid Services. *2007 CMS Data Compendium*. December 2006. Accessed at http://www.cms.hhs.gov/DataCompendium/17_2007_Data_Compendium.asp on October 13, 2008.

[2] Number of visits in HCUP SASD files 2006. Accessed at http://www.hcup-us.ahrq.gov/. Data from author's calculations on October 13, 2008.

[3] State Ambulatory Surgery Databases. Accessed at http://www.hcup-us.ahrq.gov/sasdoverview.jsp on February 6, 2008.

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 2006 SASD-CD.

PART I: OVERVIEW OF THE SASD-CD

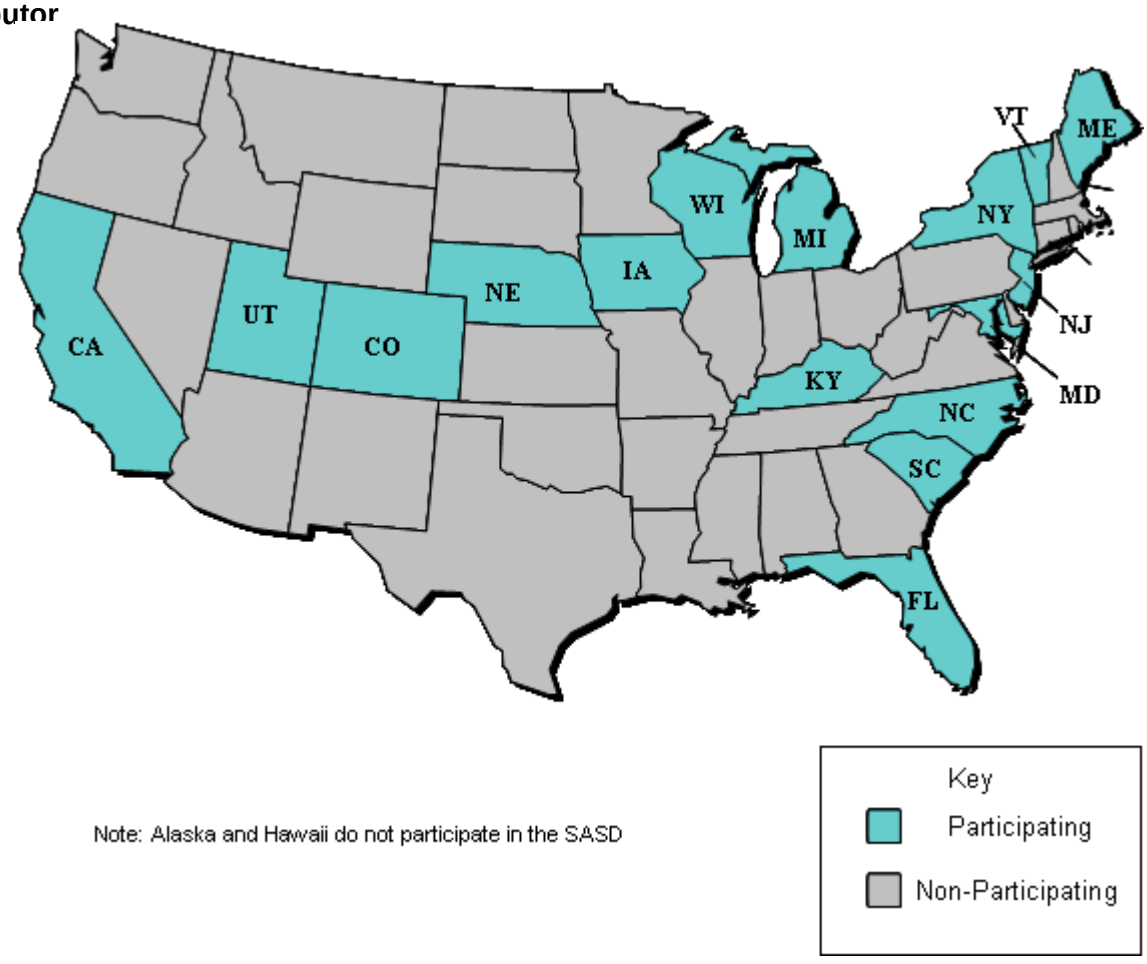
Introduction

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 2006, 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 2006 SASD were California, Colorado, Florida, Iowa, Kentucky, Maine, Maryland, Michigan, Nebraska, New Jersey, New York, North Carolina, South Carolina, Utah, Vermont, and Wisconsin (Figure 1). Eleven states—Connecticut, Georgia, Indiana, Kansas, Minnesota, Missouri, New Hampshire, Ohio, Oklahoma, South Dakota, and Tennessee—participated in the 2006 SASD but did not release the data to the Central Distributor. Several other states currently collect AS data but did not participate in the 2006 SASD: Hawaii, Illinois, Louisiana, Montana, Oregon, and Pennsylvania (supplied data for 1999-2001).

Figure 1: HCUP States with 2006 SASD Databases Available Through the HCUP Central Distributor



Note: Alaska and Hawaii do not participate in the SASD

Defining Ambulatory Surgery in the SASD-CD

Records in the 2006 SASD-CD are defined in the same way as data in the 2004 and 2005 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. 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.

Records included in the 2006 SASD-CD are derived from the UB92 and the CMS 1500 form (which are the standard billing forms used by most hospitals). 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 UB92 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.

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 2006 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.

[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.

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 2006 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.

The types of facilities contained in the SASD-CD 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 included 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.

Using the AHRQ definition of ambulatory surgery, in the 2006 SASD-CD, there were 1,893 (64.3%) ambulatory surgical facilities that were hospital-based and 1,049 (35.7%) that were non-hospital based facilities (Table 2). Consistent with 2005, the two states with the greatest number of hospital-based and non-hospital based ambulatory surgical facilities in the 2006 SASD-CD were California and Florida.

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 (837) and Vermont the fewest (14). Maine provided the most records with 3,392,332, and Vermont the fewest with 102,937. Of the hospital-based facilities included in the 2006 SASD-CD, 67.9% 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 services in the hospital-based facilities that qualified as ambulatory services varied by state. In eight states (Colorado, Michigan, New Jersey, New York, South Carolina, Utah, Vermont, and Wisconsin), over 90% of the records from hospital-based facilities met the criteria for ambulatory surgery, whereas 5.5% (lowest proportion) of records from hospital-based facilities in Maine qualified as ambulatory services. California, Florida, Kentucky, Michigan, New York, North Carolina, South Carolina, Utah, and Wisconsin provided data from non-hospital based facilities. For these states, over 93% of the records from non-hospital based facilities met the criteria for an ambulatory surgery.

Table 2: Number of Hospital-Based and Non-Hospital Based Facilities by State Available through the HCUP Central Distributor, 2006 SASD-CD

All SASD-CD			Hospital-Based Facilities				Non-Hospital Based Facilities			
State	Total Number of Facilities	Number of Records	% of Total SASD-CD Records	% records HCUP_AS = 0	% records HCUP_AS > 0	Total Number of Facilities	% of Total SASD-CD Records	% records HCUP_AS = 0	% records HCUP_AS > 0	Total Number of Facilities
California	837	2,874,982	61.5%	19.8%	80.2%	374	38.5%	4.7%	95.3%	463
Colorado	74	373,447	100.0%	0.3%	99.7%	74	0.0%	0.0%	0.0%	0
Florida	555	2,945,270	53.3%	15.7%	84.3%	217	46.7%	1.6%	98.4%	338
Iowa	119	429,183	100.0%	11.9%	88.1%	119	0.0%	0.0%	0.0%	0
Kentucky	104	804,279	98.6%	24.5%	75.5%	101	1.4%	5.1%	94.9%	3
Maine	50	3,392,332	100.0%	94.5%	5.5%	50	0.0%	0.0%	0.0%	0
Maryland	48	980,422	100.0%	58.3%	41.7%	48	0.0%	0.0%	0.0%	0
Michigan	137	1,667,870	97.9%	6.8%	93.2%	135	2.1%	2.3%	97.7%	2
Nebraska	86	194,366	100.0%	18.0%	82.0%	86	0.0%	0.0%	0.0%	0
New Jersey	84	395,188	100.0%	4.3%	95.7%	84	0.0%	0.0%	0.0%	0
New York	292	1,568,838	82.9%	0.9%	99.1%	226	17.1%	0.0%	100.0%	66
North Carolina	154	1,623,440	91.1%	17.8%	82.2%	119	8.9%	0.3%	99.7%	35
South Carolina	147	707,025	72.6%	0.1%	99.9%	70	27.4%	3.9%	96.1%	77
Utah	64	304,435	79.3%	2.8%	97.2%	46	20.7%	6.2%	93.8%	18
Vermont	14	102,937	100.0%	2.9%	97.1%	14	0.0%	0.0%	0.0%	0
Wisconsin	177	942,703	81.8%	7.6%	92.4%	130	18.2%	0.5%	99.5%	47
Total	**2,942**	**19,306,717**	**82.5%**	**32.1%**	**67.9%**	**1,893**	**17.5%**	**2.6%**	**97.4%**	**1,049**

*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 only 4.8% of the total SASD-CD records. The majority of the records in both databases came from hospital-based facilities; however, the SEDD from North Carolina also contained some records from non-hospital based facilities. Of the records that were found both in the SASD-CD and SEDD, 65% overall were classified as ambulatory surgery records. This percent varied by state; the records from Colorado, Kentucky, South Carolina, and Utah were almost entirely ambulatory surgeries, while fewer records (40.7% or fewer) from Iowa, Maine, New York, and Vermont were ambulatory surgeries.

Table 3: Number of Records in Both the 2006 SASD-CD and SEDD by State and Proportion of Ambulatory Surgeries in Both Databases

State	Total Number of Records in Both the SASD-CD and SEDD		Percent of Total Records from Hospital-Based Facilities Matched to SEDD in the SASD-CD	Number of Both SASD-CD and SEDD Records Identified as AS Surgeries*	Percent of Records Identified as AS Surgeries* in Both SASD-CD and SEDD
	Number of Records from Hospital-Based Facilities	Number of Records from Non-Hospital Based Facilities			
California	3,646	0	0.2%	1,832	50.2%
Colorado	65,218	0	17.5%	65,073	99.8%
Florida	31,866	0	2.0%	20,849	65.4%
Iowa	54	0	0.0%	22	40.7%
Kentucky	73,149	0	9.2%	68,472	93.6%
Maine	28,209	0	0.8%	1,199	4.3%
Maryland	6,433	0	0.7%	5,459	84.9%
Michigan	253,027	0	15.5%	188,406	74.5%
Nebraska	6,587	0	3.4%	3,485	52.9%
New Jersey	17,164	0	4.3%	9,665	56.3%
New York	35,579	1	2.7%	12,270	34.5%
North Carolina	399,111	1,166**	27.0%	207,341	51.8%
South Carolina	42,742	0	8.3%	42,641	99.8%
Utah	4,679	0	1.9%	4,639	99.1%
Vermont	1,220	0	1.2%	307	25.2%
Wisconsin	58,893	0	7.6%	38,161	64.8%
Total	**1,027,577**	**1,167**	**6.4%**	**669,821**	**65.2%**

*HCUP_AS>0

**Records are from a stand-alone, full-service ED.

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 on 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) 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 "182: Mammography" and "231: Other therapeutic procedures," which captures 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 UB92 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, 2006 SASD-CD

CCS Procedure Category	Number Occurring in Hospital-Based Facilities	Number Occurring in Non-Hospital Based Facilities
182: Mammography	201,697	594
231: Other therapeutic procedures	200,168	483
227: Other diagnostic procedures (interview, evaluation, consultation)	96,740	11
193: Diagnostic ultrasound of heart (echocardiogram)	50,436	0
222: Blood transfusion	33,388	0
214: Traction, splints, and other wound care	22,551	83
228: Prophylactic vaccinations and inoculations	19,160	70
202: Electrocardiogram	15,868	0
224: Cancer chemotherapy	15,516	0
226: Other diagnostic radiology and related techniques	15,408	7,513
107: Extracorporeal lithotripsy, urinary	15,083	1,658
163: Other non-O.R. therapeutic procedures on musculoskeletal system	7,592	11
217: Other respiratory therapy	7,523	0
229: Nonoperative removal of foreign body	6,937	122
206: Microscopic examination (bacterial smear, culture, toxicology)	6,548	1
201: Cardiac stress tests	6,353	0
183: Routine chest X-ray	6,048	1
225: Conversion of cardiac rhythm	5,688	6
191: Arterio- or venogram (not heart and head)	5,234	0
197: Other diagnostic ultrasound	4,454	1

Note: Non-ambulatory surgery records are records where HCUP_AS=0. The Invalid or Inconsistent and HCPCS CCS procedure categories are not included.

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” and “227: Other diagnostic procedures (interview, evaluation, consultation)” while “47: Diagnostic cardiac catheterization, coronary arteriography” and “226: Other diagnostic radiology and related techniques” were the most common procedure categories in non-hospital based facilities. Some of the top CCS procedure categories found in the ICD-9-CM codes did not appear in the CPT codes, such as “222: blood transfusion,” “214: traction, splint and other wound care,” “224: cancer chemotherapy,” “107: extracorporeal lithotripsy, urinary,” “163: other non-O.R. therapeutic procedures on musculoskeletal system,” “217: other respiratory therapy,” “229: non-operative removal of foreign body,” “201: cardiac stress tests,” “183: routine chest X-ray,” and “225: conversion of cardiac rhythm.” 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, 2006 SASD-CD

CCS Procedure Category	Number Occurring in Hospital-Based Facilities	Number Occurring in Non-Hospital Based Facilities
233: Laboratory - Chemistry and Hematology	4,320,595	412
227: Other diagnostic procedures (interview, evaluation, consultation)	1,768,021	1,066
231: Other therapeutic procedures	1,505,038	877
235: Other laboratory	1,008,893	2
206: Microscopic examination (bacterial smear, culture, toxicology)	697,588	5
213: Physical therapy exercises, manipulation, and other procedures	520,823	0
47: Diagnostic cardiac catheterization, coronary arteriography	380,021	53,292
240: Medications (Injections, infusions and other forms)	354,792	5,359
226: Other diagnostic radiology and related techniques	313,321	18,533
193: Diagnostic ultrasound of heart (echocardiogram)	295,041	9
182: Mammography	236,345	0
202: Electrocardiogram	179,027	1,521
218: Psychological and psychiatric evaluation and therapy	156,484	0
197: Other diagnostic ultrasound	155,831	40
228: Prophylactic vaccinations and inoculations	154,517	69
200: Nonoperative urinary system measurements	149,832	11
234: Pathology	145,371	553
183: Routine chest X-ray	143,237	5
243: DME and supplies	129,151	3,715
237: Ancillary Services	111,429	1,227

Note: Non-ambulatory surgery records are records where HCUP_AS=0. The Invalid or Inconsistent and HCPCS CCS procedure categories are not included.

PART II: UNDERSTANDING AMBULATORY SURGERY RECORDS CONTAINED IN THE 2006 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 2006 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 2006 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 2006 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 2006 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 2006 SASD-CD surgical visit[6] counts from the 2006 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 association (Table 1). Facilities not matched to the AHA Annual Survey data were classified as non-hospital based facilities (Table 6).

As an example, for California, the first row shows that 230 hospital-based facilities were present in both data sources, while 77 were present in the AHA database. Of the freestanding facilities with a hospital affiliation, 134 were present in both data sources and nine were in the AHA. There were 464 non-hospital based facilities in the SASD-CD. For hospital-based facilities in California, the SASD-CD reported 669,755 surgical visits, and the AHA reported 699,152 surgical visits, of which 46,859 (6.7%) were only reported in the AHA database. For freestanding facilities with a hospital affiliation, 732,785 surgical visits were reported in the SASD-CD, and the AHA reported 594,836, with 9,980 (1.7%) of the reported surgical visits only recorded by AHA. The SASD-CD reported 1,070,455 surgical visits from non-hospital based facilities in California.

---

[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.

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 (4,030,098) than AHA surgical visit counts (3,025,222) were noted. Again, for freestanding facilities with hospital affiliations, the matched SASD-CD surgical visit counts (6,766,003) were greater than the matched AHA surgical visit counts (4,463,823). Table 6 shows a total of 3,297,945 ambulatory surgical visits from non-hospital-based facilities were recorded in the SASD-CD. New Jersey and New York had more AHA surgical visit counts than the SASD-CD counts in hospital-based and freestanding facilities with a hospital affiliation. Colorado, Michigan, North Carolina, and Vermont exhibited more than twice the number of SASD-CD surgical visits than AHA surgical visits for hospital-based and freestanding facilities with a hospital affiliation combined.

Between SASD-CD and AHA, 1,080 hospital-based and 785 freestanding facilities matched for a total of 1,865 matching facilities. Within the SASD-CD, 1,080 facilities were hospital-based (37.2%), 785 were freestanding with hospital affiliations (27.1%) and 1,036 were non-hospital based facilities (35.7%). Within the SASD-CD, 28.6% (4,030,098) of the surgical visits came from hospital-based facilities. The freestanding facilities with a hospital affiliation performed nearly half of the surgical visits contained in the SASD-CD (6,766,003), and non-hospital based facilities provided 23.4% (3,297,945) of the ambulatory surgical visits. Of the 14,094,046 ambulatory surgical visits in the SASD-CD, 10,796,101 (76.6%) were contained in the 1,865 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 (3,408) exceeds the number of SASD-CD facilities reported in Table 2 (2,942), since there are three types of facilities: those that match between SASD-CD and the AHA (1,865), those in the SASD-CD only (1,036), and those in the AHA only (507). 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 3,841 AS facilities and 10,699,717 ambulatory surgical visits.

Table 6: Number of Facilities and Surgical Visits by State and Data Source Available through the HCUP Central Distributor, 2006 SASD-CD Ambulatory Surgeries

State	Data Source	Total Number of Facilities			Number of SASD-CD Surgeries			Number of AHA Surgeries		
		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	230	134	0	669,755	732,785	0	652,293	584,856	0
	SASD only	0	0	464	0	0	1,070,455	0	0	0
	AHA only	77	9	0	0	0	0	46,859	9,980	0
	Total	*307*	*143*	*464*	*669,755*	*732,785*	*1,070,455*	*699,152*	*594,836*	*0*
Colorado	SASD + AHA	43	29	0	137,635	234,838	0	76,935	95,662	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	19	4	0	0	0	0	7,464	6,129	0
	Total	*62*	*33*	*0*	*137,635*	*234,838*	*0*	*84,399*	*101,791*	*0*
Florida	SASD + AHA	128	88	0	597,495	726,038	0	395,683	388,896	0
	SASD only	0	0	324	0	0	1,353,608	0	0	0
	AHA only	59	6	0	0	0	0	31,609	4,699	0
	Total	*187*	*94*	*324*	*597,495*	*726,038*	*1,353,608*	*427,292*	*393,595*	*0*
Iowa	SASD + AHA	97	22	0	196,985	181,221	0	167,390	167,977	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	7	1	0	0	0	0	2,220	2,211	0
	Total	*104*	*23*	*0*	*196,985*	*181,221*	*0*	*169,610*	*170,188*	*0*
Kentucky	SASD + AHA	63	36	0	230,273	367,342	0	141,820	227,190	0
	SASD only	0	0	3	0	0	12,170	0	0	0
	AHA only	28	6	0	0	0	0	13,599	5,931	0
	Total	*91*	*42*	*3*	*230,273*	*367,342*	*12,170*	*155,419*	*233,121*	*0*
Maine	SASD + AHA	26	17	0	87,304	99,146	0	62,543	62,422	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	4	1	0	0	0	0	2,744	0	0
	Total	*30*	*18*	*0*	*87,304*	*99,146*	*0*	*65,287*	*62,422*	*0*

State	Data Source	Number of Facilities			Number of SASD-CD Surgeries			Number of AHA Surgeries		
		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	13	35	0	68,619	340,434	0	68,689	280,338	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	23	3	0	0	0	0	19,322	1,624	0
	Total	*36*	*38*	*0*	*68,619*	*340,434*	*0*	*88,011*	*281,962*	*0*
Michigan	SASD + AHA	55	79	0	326,979	1,195,241	0	143,149	594,035	0
	SASD only	0	0	3	0	0	34,289	0	0	0
	AHA only	42	10	0	0	0	0	28,828	11,854	0
	Total	*97*	*89*	*3*	*326,979*	*1,195,241*	*34,289*	*171,977*	*605,889*	*0*
Nebraska	SASD + AHA	75	11	0	84,043	75,337	0	81,708	55,004	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	10	1	0	0	0	0	6,588	0	0
	Total	*85*	*12*	*0*	*84,043*	*75,337*	*0*	*88,296*	*55,004*	*0*
New Jersey	SASD + AHA	39	43	0	155,362	222,982	0	157,854	246,008	0
	SASD only	0	0	1	0	0	15	0	0	0
	AHA only	29	2	0	0	0	0	11,797	0	0
	Total	*68*	*45*	*1*	*155,362*	*222,982*	*15*	*169,651*	*246,008*	*0*
New York	SASD + AHA	107	118	0	545,148	744,194	0	560,643	782,478	0
	SASD only	0	0	66	0	0	268,004	0	0	0
	AHA only	53	9	0	0	0	0	17,735	12,583	0
	Total	*160*	*127*	*66*	*545,148*	*744,194*	*268,004*	*578,378*	*795,061*	*0*
North Carolina	SASD + AHA	63	56	0	347,349	868,910	0	172,687	384,907	0
	SASD only	0	0	35	0	0	143,717	0	0	0
	AHA only	33	2	0	0	0	0	22,483	5,461	0
	Total	*96*	*58*	*35*	*347,349*	*868,910*	*143,717*	*195,170*	*390,368*	*0*

State	Data Source	Number of Facilities			Number of SASD-CD Surgeries			Number of AHA Surgeries		
		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	37	33	0	193,549	319,336	0	112,713	172,262	0
	SASD only	0	0	75	0	0	186,201	0	0	0
	AHA only	26	5	0	0	0	0	6,228	4,867	0
	Total	*63*	*38*	*75*	*193,549*	*319,336*	*186,201*	*118,941*	*177,129*	*0*
Utah	SASD + AHA	31	15	0	119,537	115,042	0	63,397	84,177	0
	SASD only	0	0	18	0	0	59,169	0	0	0
	AHA only	11	1	0	0	0	0	5,180	1,830	0
	Total	*42*	*16*	*18*	*119,537*	*115,042*	*59,169*	*68,577*	*86,007*	*0*
Vermont	SASD + AHA	11	3	0	46,628	53,374	0	24,057	19,229	0
	SASD Only	0	0	0	0	0	0	0	0	0
	AHA only	1	2	0	0	0	0	0	4,611	0
	Total	*12*	*5*	*0*	*46,628*	*53,374*	*0*	*24,057*	*23,840*	*0*
Wisconsin	SASD + AHA	62	66	0	223,437	489,783	0	143,661	318,382	0
	SASD only	0	0	47	0	0	170,317	0	0	0
	AHA only	17	6	0	0	0	0	8,276	1,057	0
	Total	*79*	*72*	*47*	*223,437*	*489,783*	*170,317*	*151,937*	*319,439*	*0*
Total	SASD + AHA	1,080	785	0	4,030,098	6,766,003	0	3,025,222	4,463,823	0
	SASD only	0	0	1,036	0	0	3,297,945	0	0	0
	AHA only	439	68	0	0	0	0	230,932	72,837	0
	Total	***1,519***	***853***	***1,036***	***4,030,098***	***6,766,003***	***3,297,945***	***3,256,154***	***4,536,660***	***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 1, which includes facilities that contribute HCUP_AS = 0 records.

Types of Procedure Categories Defined as Ambulatory Surgery in the 2006 SASD-CD

An important consideration when using the SASD-CD is the 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. Missing values are ignored.

As shown in Table 7, the rank orderings of the surgery categories for hospital-based facilities are similar, with notable exceptions. One exception, *Miscellaneous Diagnostics and Therapeutic* procedures, represented 13.9% of the ICD-9-CM procedures compared to 52.6% of the CPT procedures. Also, the number of *Invalid or Inconsistent* category was less for ICD-9-CM CCS codes (0.5%) compared to CPT CCS (2.9%).

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 about 21.8% of the ICD-9-CM based procedures and 12.1% of the CPT based procedures. The top three body systems, not counting the *Miscellaneous Diagnostics and Therapeutic* category, (digestive, musculoskeletal, and integumentary) accounted for 43.9% of ICD-9-CM based procedures and 24% of all CPT based procedures, and the top five (digestive, musculoskeletal, integumentary, eye, and cardiovascular) systems accounted for 59.0% of procedures with ICD-9-CM based procedures and 31.6% of the CPT coded procedures.

Table 7: Number of ICD-9-CM and CPT Surgeries by CCS Procedure Category in Hospital-Based Facilities, 2006 SASD-CD Ambulatory Surgeries

CCS Description	Number of ICD-9-CM Procedure Codes		Number of CPT Procedure Codes	
	Count	Percent	Count	Percent
Digestive System	2,980,157	21.8%	3,363,333	12.1%
Miscellaneous Diagnostics and Therapeutic*	1,896,431	13.9%	14,662,825	52.6%
Musculoskeletal System	1,513,962	11.1%	1,670,052	6.0%
Integumentary System	1,504,618	11.0%	1,653,628	5.9%
Cardiovascular System	1,080,047	7.9%	1,331,603	4.8%
Eye	979,942	7.2%	780,885	2.8%
Nervous System	843,530	6.2%	932,794	3.3%
Female Genital System	697,540	5.1%	655,180	2.3%
Nose, Mouth, and Pharynx	692,388	5.1%	591,533	2.1%
Urinary System	503,695	3.7%	472,223	1.7%
Ear	273,512	2.0%	218,879	0.8%
Respiratory System	177,761	1.3%	237,460	0.9%
Male Genital System	147,904	1.1%	168,872	0.6%
Obstetrical	143,028	1.0%	103,782	0.4%
Heme and Lymphatic System	103,534	0.8%	89,345	0.3%
Invalid or Inconsistent**	74,222	0.5%	805,287	2.9%
Endocrine System	43,869	0.3%	30,994	0.1%
HCPCS***	0	0.0%	126,975	0.5%
Total	**13,656,140**	**100.0%**	**27,895,650**	**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 3.7% of the ICD-9-CM procedures and 4.5% 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, the musculoskeletal system, integumentary system, cardiovascular system, and the eye were the second through fifth ranked surgery categories in that order. However, for the non-hospital based facilities, the eye, the musculoskeletal system, nervous system and the nose, mouth and pharynx made up the second through fifth ranked surgery categories. 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 82.8% of all surgeries performed, according to the ICD-9-CM coding system.

Table 8: Number of ICD-9-CM and CPT Surgeries by CCS Procedure Category in Non-Hospital Based Facilities, 2006 SASD-CD Ambulatory Surgeries

CCS Description	Number of ICD-9-CM Procedure Codes		Number of CPT Procedure Codes	
	Count	Percent	Count	Percent
Digestive System	708,871	31.1%	1,496,209	33.9%
Eye	440,914	19.3%	718,907	16.3%
Musculoskeletal System	340,544	14.9%	596,887	13.5%
Nervous System	298,858	13.1%	720,608	16.3%
Nose, Mouth, and Pharynx	100,027	4.4%	139,193	3.2%
Integumentary System	97,862	4.3%	214,975	4.9%
Miscellaneous Diagnostics and Therapeutic*	84,435	3.7%	199,222	4.5%
Female Genital System	62,946	2.8%	91,893	2.1%
Urinary System	52,477	2.3%	72,756	1.6%
Ear	50,944	2.2%	57,727	1.3%
Male Genital System	22,025	1.0%	32,854	0.7%
Cardiovascular System	8,430	0.4%	15,580	0.4%
Respiratory System	6,477	0.3%	7,124	0.2%
Heme and Lymphatic System	3,110	0.1%	4,197	0.1%
Obstetrical	645	0.0%	2,914	0.1%
Invalid or Inconsistent**	331	0.0%	45,842	1.0%
Endocrine System	272	0.0%	391	0.0%
HCPCS***	0	0.0%	4	0.0%
Total	**2,279,168**	**100.0%**	**4,417,283**	**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.

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, including New York and North Carolina, 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.

Appendix A presents a comparison of the two coding systems by body system within each state to demonstrate which coding system or states should be used in a research project, depending on the body system or states of interest. Appendix A also contains additional details on the states that use both coding systems.

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 2.3% to 74.8%, 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 nine states but 64.8% of the time in the state with the lowest match rate (Table A-4). Seven of the top 10 CCS categories were the same for both coding systems, and there was agreement between the CCS categories derived from both coding systems. The CPT CCS matched the ICD-9-CM CCS more than 90% of the time in six of 10 categories, and the ICD-9-CM CSS matched the CPT CCS over 90% of the time in seven 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.

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 327,008 procedure codes using the ICD-9-CM coding system compared to 243,165 codes using the CPT coding system (Table B-1). Other states, such as Nebraska, have more CPT codes than ICD-9-CM codes for a particular body system category: more than 93.3% of Nebraska records use only the CPT 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 12 fields on a record, the percentage of records with digestive codes are nearly equal (27.2% ICD-9-CM vs. 26.9% CPT). In 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 (23.9% ICD-9-CM vs. 36.2% CPT).

Appendix B also reflects the variation in the use of both ICD-9-CM and CPT procedure coding by state in the SASD-CD. Kentucky, New Jersey, and South Carolina, use only ICD-9-CM procedure coding in their SASD-CD data. Conversely, California, Iowa and Maryland use only CPT coding. Hence, some states presented in Appendix B do not have observations for a particular procedure coding system. In addition, the high percentage of HCPCS codes in some states, for example New York and Wisconsin, means that using both ICD-9-CM and CPT codes may not completely characterize care provided in these states. 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 2006 SASD-CD vary substantially across states, while the proportion of records in the 2006 SASD-CD meeting the definition of ambulatory surgery is higher (97.4%) among non-hospital based facilities than hospital-based facilities (67.9%).

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,

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

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 imagining, 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 within the less than one percent to 36.2% range, while CPT procedure codes ranged from less than one percent to 80%. Even those states with substantial coding in both systems, such as North Carolina, the *Miscellaneous Diagnostic and Therapeutic* category was coded 20.4% of the time using ICD-9-CM codes and 16.1% 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. 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 2006 SASD-CD is a rich source of ambulatory surgery data, providing information on 14,094,046 ambulatory surgery visits in a total of 2,901 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 97% 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

Comparison of ICD-9-CM and CPT Procedure Code Use by Select State

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) codes 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 3,500 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 Health Care Procedure Coding System (HCPCS) and comprise a major portion of the Health Care Procedure Coding System (HCPCS). Procedures are coded using approximately 8,800 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 Patient Grouper (APG).

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. Three states, Iowa, New York, and Wisconsin supply CPT codes solely through the charge detail file.

States that use both coding systems include: Colorado, Florida, Michigan, Nebraska, New York, 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	N/A	✓
Kentucky	✓	N/A	N/A
Maine	N/A	✓	✓
Maryland	N/A	✓	✓
Michigan	✓	✓	N/A
Nebraska	✓	✓	✓
New Jersey	✓	N/A	N/A
New York	✓	N/A	✓
North Carolina	✓	✓	N/A
South Carolina	✓	N/A	N/A
Utah	✓	✓	N/A
Vermont	✓	✓	N/A
Wisconsin	✓	N/A	✓

For states that use both procedure coding systems, the average number of ICD-9-CM procedure codes is 1.6 compared to 2.2 CPT codes in the core file and 4.4 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 22.4% employ only the ICD-9-CM procedure coding system. Nebraska had very low correspondence between the two coding systems.

Table A-2: Percent of Surgical Visit Records by Coding System, ICD-9-CM and CPT Available through the HCUP Central Distributor, by State, 2006 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	372,473	77.6	22.4	0.0	0.0
Florida	2,677,141	72.7	0.0	27.3	0.0
Michigan	1,556,509	85.8	14.2	0.0	0.0
Nebraska	159,380	6.7	0.0	93.3	0.0
New York	1,557,346	98.3	1.2	0.5	0.0
North Carolina	1,359,976	100.0	0.1	0.0	0.0
Utah	293,748	79.8	5.7	14.6	0.0
Vermont	100,002	94.7	3.4	1.8	0.1
Wisconsin	883,537	91.8	8.0	0.2	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). As an example, in Colorado 56.7% of the ICD-9-CM CCS categories had matching CPT CCS categories on dually coded records. Conversely, 62.8% of the CPT CCS categories had matching ICD-9-CM CCS categories on dually coded records in Colorado. The numerator (number of matches) is the same for both coding systems. However, there are fewer CPT procedure codes than ICD-9-CM procedure codes in Colorado. Therefore, the denominator (number of CPT CCS categories) is smaller, causing a higher match rate for CPT CCS categories compared with ICD-9-CM CCS categories. All other states had higher match rates for the ICD-9-CM CCS categories. For example, the effect is evident for Vermont, where each surgical visit record accommodates 25 CPT codes and 20 ICD-9-CM codes.

These percentages indicate the extent to which the procedure information overlaps between the two coding systems. For example, Michigan and North Carolina 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, 2006 SASD-CD Ambulatory Surgeries

State	Percent of ICD-9-CM Codes CCS Matched	Percent of CPT Codes CCS Matched
Colorado	56.7	62.8
Florida	74.4	38.4
Michigan	61.5	58.6
Nebraska	74.8	2.3
New York	69.0	39.4
North Carolina	71.8	71.6
Utah	74.1	70.8
Vermont	60.4	35.3
Wisconsin	54.0	28.4

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 nine states in Table A-4, seven states have match rates greater than 75%: Colorado, Florida, Michigan, Nebraska, New York, Utah, and Vermont.

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, 2006 SASD-CD Ambulatory Surgeries

State	Number of Records	Percent Records with Matching CCS
Colorado	142,464	82.4
Florida	751,462	83.5
Michigan	639,205	80.9
Nebraska	1,284	88.7
New York	378,064	84.3
North Carolina	788,417	70.2
Utah	132,589	83.8
Vermont	14,244	79.2
Wisconsin	142,560	64.8

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 94.0% of the time. Several of the other paired CPT CCS groups were *Other bowel diagnostic procedures* (2.6%), *Proctoscopy and anorectal biopsy* (1.9%), *Pathology* (less than one percent), *Medications (Injections, infusions and other forms)* (less than one percent) and *Upper gastrointestinal endoscopy, biopsy* (less than one percent).

Of the 10 most frequent ICD-9-CM CCS groups, six 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.

A significant discrepancy occurred for ICD-9-CM CCS category 95: *Other non-O.R. lower GI therapeutic procedures,* which was paired with CPT CCS category 76: *Colonoscopy and biopsy* 92.6% of the time and the matching CCS category less than one percent of the time. Likewise, the ICD-9-CM CCS category 214: *Traction, splints, and other wound care*, was paired with the matching CPT CCS category less than one percent of the time and was paired with the CPT CCS category 144: T*reatment, facial fracture or dislocation* 96.3% of the time. Also, the ICD-9-CM CCS category 174: *Other non-O.R. therapeutic procedures on skin and breast* was paired with the matching CPT CCS category 27.4% of the time and CPT CCS category 61: *Other O.R. procedures on vessels other than head and neck* 32.3% of the time.

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, 2006 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	548,402	76	76: Colonoscopy and biopsy	1	76	76: Colonoscopy and biopsy	94.0%
				2	92	92: Other bowel diagnostic procedures	2.6%
				3	77	77: Proctoscopy and anorectal biopsy	1.9%
				4	234	234: Pathology	0.5%
				5	240	240: Medications (Injections, infusions and other forms)	0.3%
				6	70	70: Upper gastrointestinal endoscopy, biopsy	0.2%
				7	233	233: Laboratory - Chemistry and Hematology	0.2%
				8	232	232: Anesthesia	0.1%
				9	97	97: Other gastrointestinal diagnostic procedures	0.0%
				10	231	231: Other therapeutic procedures	0.0%
2	231,083	70	70: Upper gastrointestinal endoscopy, biopsy	1	70	70: Upper gastrointestinal endoscopy, biopsy	98.2%
				2	234	234: Pathology	0.6%
				3	232	232: Anesthesia	0.2%
				4	69	69: Esophageal dilatation	0.2%
				5	206	206: Microscopic examination (bacterial smear, culture, toxicology)	0.2%
				6	240	240: Medications (Injections, infusions and other forms)	0.2%
				7	233	233: Laboratory - Chemistry and Hematology	0.1%
				8	98	98: Other non-O.R. gastrointestinal therapeutic procedures	0.1%
				9	76	76: Colonoscopy and biopsy	0.1%
				10	94	94: Other O.R. upper GI therapeutic procedures	0.0%
3	184,790	95	95: Other non-O.R. lower GI therapeutic procedures	1	76	76: Colonoscopy and biopsy	92.6%
				2	77	77: Proctoscopy and anorectal biopsy	4.3%
				3	234	234: Pathology	2.2%

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	96	96: Other O.R. lower GI therapeutic procedures	0.3%
				5	70	70: Upper gastrointestinal endoscopy, biopsy	0.2%
				6	240	240: Medications (Injections, infusions and other forms)	0.1%
				7	95	95: Other non-O.R. lower GI therapeutic procedures	0.1%
				8	232	232: Anesthesia	0.1%
				9	233	233: Laboratory - Chemistry and Hematology	0.0%
				10	231	231: Other therapeutic procedures	0.0%
4	160,692	15	15: Lens and cataract procedures	1	15	15: Lens and cataract procedures	99.5%
				2	20	20: Other intraocular therapeutic procedures	0.3%
				3	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.1%
				4	240	240: Medications (Injections, infusions and other forms)	0.0%
				5	14	14: Glaucoma procedures	0.0%
				6	19	19: Other therapeutic procedures on eyelids, conjunctiva, cornea	0.0%
				7	243	243: DME and supplies	0.0%
				8	16	16: Repair of retinal tear, detachment	0.0%
				9	233	233: Laboratory - Chemistry and Hematology	0.0%
				10	241	241: Visual aids and other optical supplies	0.0%
5	157,543	171	171: Suture of skin and subcutaneous tissue	1	171	171: Suture of skin and subcutaneous tissue	99.2%
				2	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.5%
				3	19	19: Other therapeutic procedures on eyelids, conjunctiva, cornea	0.1%
				4	175	175: Other O.R. therapeutic procedures on skin and breast	0.1%
				5	174	174: Other non-O.R. therapeutic procedures on skin and breast	0.1%
				6	231	231: Other therapeutic procedures	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
				7	226	226: Other diagnostic radiology and related techniques	0.0%
				8	214	214: Traction, splints, and other wound care	0.0%
				9	168	168: Incision and drainage, skin and subcutaneous tissue	0.0%
				10	237	237: Ancillary Services	0.0%
6	73,564	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	94.3%
				2	1	1: Incision and excision of CNS	2.6%
				3	226	226: Other diagnostic radiology and related techniques	2.5%
				4	8	8: Other non-O.R. or closed therapeutic nervous system procedures	0.2%
				5	9	9: Other O.R. therapeutic nervous system procedures	0.1%
				6	240	240: Medications (Injections, infusions and other forms)	0.1%
				7	3	3: Laminectomy, excision intervertebral disc	0.0%
				8	181	181: Myelogram	0.0%
				9	4	4: Diagnostic spinal tap	0.0%
				10	155	155: Arthrocentesis	0.0%
7	70,885	160	160: Other therapeutic procedures on muscles and tendons	1	160	160: Other therapeutic procedures on muscles and tendons	80.0%
				2	170	170: Excision of skin lesion	4.7%
				3	162	162: Other O.R. therapeutic procedures on joints	4.1%
				4	169	169: Debridement of wound, infection or burn	4.0%
				5	164	164: Other O.R. therapeutic procedures on musculoskeletal system	2.2%
				6	154	154: Arthroplasty other than hip or knee	1.0%
				7	234	234: Pathology	0.8%
				8	142	142: Partial excision bone	0.7%
				9	168	168: Incision and drainage, skin and subcutaneous tissue	0.6%

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	171	171: Suture of skin and subcutaneous tissue	0.5%
8	59,949	30	30: Tonsillectomy and/or adenoidectomy	1	30	30: Tonsillectomy and/or adenoidectomy	97.5%
				2	234	234: Pathology	0.9%
				3	32	32: Other non-O.R. therapeutic procedures on nose, mouth and pharynx	0.9%
				4	33	33: Other O.R. therapeutic procedures on nose, mouth and pharynx	0.4%
				5	240	240: Medications (Injections, infusions and other forms)	0.2%
				6	200	200: Nonoperative urinary system measurements	0.0%
				7	231	231: Other therapeutic procedures	0.0%
				8	54	54: Other vascular catheterization, not heart	0.0%
				9	26	26: Other therapeutic ear procedures	0.0%
				10	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.0%
9	58,931	214	214: Traction, splints, and other wound care	1	144	144: Treatment, facial fracture or dislocation	96.3%
				2	148	148: Other fracture and dislocation procedure	2.3%
				3	214	214: Traction, splints, and other wound care	0.7%
				4	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.2%
				5	226	226: Other diagnostic radiology and related techniques	0.1%
				6	147	147: Treatment, fracture or dislocation of lower extremity (other than hip or femur)	0.1%
				7	169	169: Debridement of wound, infection or burn	0.1%
				8	175	175: Other O.R. therapeutic procedures on skin and breast	0.0%
				9	162	162: Other O.R. therapeutic procedures on joints	0.0%
				10	233	233: Laboratory - Chemistry and Hematology	0.0%
10	54,993	174	174: Other non-O.R. therapeutic procedures on skin and breast	1	61	61: Other O.R. procedures on vessels other than head and neck	32.3%
				2	174	174: Other non-O.R. therapeutic procedures on skin and	27.4%

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
						breast	
				3	63	63: Other non-O.R. therapeutic cardiovascular procedures	16.9%
				4	170	170: Excision of skin lesion	6.5%
				5	175	175: Other O.R. therapeutic procedures on skin and breast	5.2%
				6	168	168: Incision and drainage, skin and subcutaneous tissue	3.3%
				7	165	165: Breast biopsy and other diagnostic procedures on breast	2.9%
				8	227	227: Other diagnostic procedures (interview, evaluation, consultation)	1.4%
				9	172	172: Skin graft	1.0%
				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, seven 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 discrepancy occurred for CPT CCS category 144: *Treatment, facial fracture or dislocation*, which was paired with ICD-9-CM CCS category 214: *traction, splints, and other wound care* 91.5% of the time and its pair 1.7% of the time. For the remaining two categories, the CPT CCS category matched the ICD-9-CM CCS category the majority of the time.

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. However, the third most frequent CPT CCS category, 171: *Suture of skin and subcutaneous tissue* was the fifth most common ICD-9-CM CCS category in Table A-5. IDC-9-CM groups 95: *Other non-O.R. lower GI therapeutic procedures*, 214: *Traction, splints, and other wound care*, and 174: *Other non-O.R. therapeutic procedures on skin and breast* are in the top 10 categories for IDC-9-CM CCS codes but not for CPT CCS codes. Conversely, CPT CCS categories 144: *Treatment, facial fracture or dislocation*, 6: *Decompression peripheral nerve*, and 139: *Fetal monitoring* are in the top 10 categories for CPT CCS but not for ICD-9-CM CCS codes.

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, 2006 SASD-CD Ambulatory Surgeries

CCS CPT				CCS ICD-9-CM			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS ICD Code	CCS ICD Code	Description	Percent
1	691,992	76	76: Colonoscopy and biopsy	1	76	76: Colonoscopy and biopsy	74.5%
				2	95	95: Other non-O.R. lower GI therapeutic procedures	24.7%
				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	79	79: Local excision of large intestine lesion (not endoscopic)	0.0%
				7	96	96: Other O.R. lower GI therapeutic procedures	0.0%
				8	94	94: Other O.R. upper GI therapeutic procedures	0.0%
				9	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.0%
				10	99	99: Other O.R. gastrointestinal therapeutic procedures	0.0%
2	234,087	70	70: Upper gastrointestinal endoscopy, biopsy	1	70	70: Upper gastrointestinal endoscopy, biopsy	96.9%
				2	93	93: Other non-O.R. upper GI therapeutic procedures	1.8%
				3	76	76: Colonoscopy and biopsy	0.5%
				4	92	92: Other bowel diagnostic procedures	0.4%
				5	95	95: Other non-O.R. lower GI therapeutic procedures	0.1%
				6	229	229: Nonoperative removal of foreign body	0.1%
				7	94	94: Other O.R. upper GI therapeutic procedures	0.0%
				8	194	194: Diagnostic ultrasound of gastrointestinal tract	0.0%
				9	110	110: Other diagnostic procedures of urinary tract	0.0%
				10	69	69: Esophageal dilatation	0.0%
3	183,039	171	171: Suture of skin and subcutaneous tissue	1	171	171: Suture of skin and subcutaneous tissue	85.4%
				2	19	19: Other therapeutic procedures on eyelids, conjunctiva, cornea	6.2%

CCS CPT				CCS ICD-9-CM			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS ICD Code	CCS ICD Code	Description	Percent
				3	32	32: Other non-O.R. therapeutic procedures on nose, mouth and pharynx	4.9%
				4	28	28: Plastic procedures on nose	1.5%
				5	26	26: Other therapeutic ear procedures	1.1%
				6	175	175: Other O.R. therapeutic procedures on skin and breast	0.2%
				7	160	160: Other therapeutic procedures on muscles and tendons	0.2%
				8	132	132: Other O.R. therapeutic procedures, female organs	0.1%
				9	118	118: Other O.R. therapeutic procedures, male genital	0.1%
				10	33	33: Other O.R. therapeutic procedures on nose, mouth and pharynx	0.1%
4	160,582	15	15: Lens and cataract procedures	1	15	15: Lens and cataract procedures	99.6%
				2	17	17: Destruction of lesion of retina and choroid	0.3%
				3	20	20: Other intraocular therapeutic procedures	0.1%
				4	19	19: Other therapeutic procedures on eyelids, conjunctiva, cornea	0.0%
				5	14	14: Glaucoma procedures	0.0%
				6	32	32: Other non-O.R. therapeutic procedures on nose, mouth and pharynx	0.0%
				7	21	21: Other extraocular muscle and orbit therapeutic procedures	0.0%
				8	76	76: Colonoscopy and biopsy	0.0%
				9	69	69: Esophageal dilatation	0.0%
				10	96	96: Other O.R. lower GI therapeutic procedures	0.0%
5	75,038	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	92.5%
				2	8	8: Other non-O.R. or closed therapeutic nervous system procedures	5.2%
				3	9	9: Other O.R. therapeutic nervous system procedures	1.2%
				4	231	231: Other therapeutic procedures	0.4%

CCS CPT				CCS ICD-9-CM			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS ICD Code	CCS ICD Code	Description	Percent
				5	174	174: Other non-O.R. therapeutic procedures on skin and breast	0.2%
				6	163	163: Other non-O.R. therapeutic procedures on musculoskeletal system	0.1%
				7	226	226: Other diagnostic radiology and related techniques	0.1%
				8	156	156: Injections and aspirations of muscles, tendons, bursa, joints and soft tissue	0.1%
				9	6	6: Decompression peripheral nerve	0.0%
				10	175	175: Other O.R. therapeutic procedures on skin and breast	0.0%
6	62,019	144	144: Treatment, facial fracture or dislocation	1	214	214: Traction, splints, and other wound care	91.5%
				2	32	32: Other non-O.R. therapeutic procedures on nose, mouth and pharynx	5.8%
				3	144	144: Treatment, facial fracture or dislocation	1.7%
				4	33	33: Other O.R. therapeutic procedures on nose, mouth and pharynx	0.9%
				5	9	9: Other O.R. therapeutic nervous system procedures	0.0%
				6	28	28: Plastic procedures on nose	0.0%
				7	164	164: Other O.R. therapeutic procedures on musculoskeletal system	0.0%
				8	231	231: Other therapeutic procedures	0.0%
				9	170	170: Excision of skin lesion	0.0%
				10	148	148: Other fracture and dislocation procedure	0.0%
7	59,883	160	160: Other therapeutic procedures on muscles and tendons	1	160	160: Other therapeutic procedures on muscles and tendons	94.7%
				2	162	162: Other O.R. therapeutic procedures on joints	2.8%
				3	99	99: Other O.R. gastrointestinal therapeutic procedures	0.8%
				4	154	154: Arthroplasty other than hip or knee	0.3%
				5	170	170: Excision of skin lesion	0.2%
				6	42	42: Other O.R. therapeutic procedures on respiratory system	0.2%

CCS CPT				CCS ICD-9-CM			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS ICD Code	CCS ICD Code	Description	Percent
				7	150	150: Division of joint capsule, ligament or cartilage	0.2%
				8	161	161: Other O.R. therapeutic procedures on bone	0.1%
				9	149	149: Arthroscopy	0.1%
				10	174	174: Other non-O.R. therapeutic procedures on skin and breast	0.1%
8	58,521	30	30: Tonsillectomy and/or adenoidectomy	1	30	30: Tonsillectomy and/or adenoidectomy	99.8%
				2	33	33: Other O.R. therapeutic procedures on nose, mouth and pharynx	0.2%
				3	9	9: Other O.R. therapeutic nervous system procedures	0.0%
				4	20	20: Other intraocular therapeutic procedures	0.0%
				5	227	227: Other diagnostic procedures (interview, evaluation, consultation)	0.0%
				6	35	35: Tracheoscopy and laryngoscopy with biopsy	0.0%
9	52,118	6	6: Decompression peripheral nerve	1	6	6: Decompression peripheral nerve	95.9%
				2	9	9: Other O.R. therapeutic nervous system procedures	2.8%
				3	149	149: Arthroscopy	1.2%
				4	148	148: Other fracture and dislocation procedure	0.1%
				5	162	162: Other O.R. therapeutic procedures on joints	0.0%
				6	160	160: Other therapeutic procedures on muscles and tendons	0.0%
				7	218	218: Psychological and psychiatric evaluation and therapy	0.0%
				8	163	163: Other non-O.R. therapeutic procedures on musculoskeletal system	0.0%
				9	61	61: Other O.R. procedures on vessels other than head and neck	0.0%
				10	16	16: Repair of retinal tear, detachment	0.0%
10	51,779	139	139: Fetal monitoring	1	139	139: Fetal monitoring	100.0%
				2	161	161: Other O.R. therapeutic procedures on bone	0.0%
				3	110	110: Other diagnostic procedures of urinary tract	0.0%

CCS CPT				CCS ICD-9-CM			
Rank of CCS Code	N	CCS Group	CCS Description	Rank of CCS ICD Code	CCS ICD Code	Description	Percent
				4	108	108: Indwelling catheter	0.0%
				5	137	137: Other procedures to assist delivery	0.0%
				6	92	92: Other bowel diagnostic procedures	0.0%
				7	131	131: Other non-O.R. therapeutic procedures, female organs	0.0%
				8	134	134: Cesarean section	0.0%
				9	141	141: Other therapeutic obstetrical procedures	0.0%
				10	224	224: Cancer chemotherapy	0.0%

Appendix A: Summary

Nine states in the SASD-CD employ both ICD-9-CM and CPT procedure codes. Four states (California, Iowa, Maine and Maryland) use only CPT procedure codes, while three states (Kentucky, New Jersey, and South Carolina) use 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 (2.2 in the core file and 4.4 in the charge detail file) than the number of ICD-9-CM procedure codes (1.6). 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

Comparison of ICD-9-CM and CPT Procedure Code Use by Body System by State

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, 2006 SASD-CD Ambulatory Surgeries

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
California	N/A	287,834	N/A	736
Percent of state total	N/A	11.6	N/A	0.0
Colorado	30,929	26,610	2,677	1,237
Percent of state total	8.3	7.1	0.7	0.3
Florida	205,993	281,802	12,130	9,561
Percent of state total	7.7	10.5	0.5	0.4
Iowa	N/A	34,671	N/A	1,451
Percent of state total	N/A	9.2	N/A	0.4
Kentucky	48,752	N/A	3,211	N/A
Percent of state total	8.0	N/A	0.5	N/A
Maine	N/A	12,827	N/A	607
Percent of state total	N/A	6.2	N/A	0.3
Maryland	N/A	36,728	N/A	1,321
Percent of state total	N/A	9.0	N/A	0.3
Michigan	90,513	76,245	4,548	2,421
Percent of state total	5.8	4.9	0.3	0.2
Nebraska	960	18,209	47	1,020
Percent of state total	0.6	11.4	0.0	0.6
New Jersey	24,278	N/A	1,152	N/A
Percent of state total	6.4	N/A	0.3	N/A
New York	109,323	100,334	4,866	3,720
Percent of state total	7.0	6.4	0.3	0.2
North Carolina	111,539	111,162	6,061	3,718
Percent of state total	8.2	8.2	0.4	0.3
South Carolina	63,071	N/A	1,883	N/A
Percent of state total	9.0	N/A	0.3	N/A
Utah	21,352	27,035	1,430	1,170
Percent of state total	7.3	9.2	0.5	0.4
Vermont	10,833	10,067	493	233
Percent of state total	10.8	10.1	0.5	0.2
Wisconsin	100,229	81,953	2,859	1,539
Percent of state total	11.3	9.3	0.3	0.2
Total	817,772	1,105,477	41,357	28,734
Percent of grand total	3.0	4.0	0.1	0.1

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, 2006 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	331,551	N/A	40,314
Percent of state total	N/A	13.4	N/A	1.6
Colorado	20,368	13,100	5,685	3,892
Percent of state total	5.5	3.5	1.5	1.0
Florida	190,250	378,445	36,217	38,895
Percent of state total	7.1	14.1	1.4	1.5
Iowa	N/A	36,175	N/A	10,848
Percent of state total	N/A	9.6	N/A	2.9
Kentucky	36,616	N/A	15,977	N/A
Percent of state total	6.0	N/A	2.6	N/A
Maine	N/A	12,224	N/A	2,595
Percent of state total	N/A	5.9	N/A	1.3
Maryland	N/A	23,272	N/A	5,938
Percent of state total	N/A	5.7	N/A	1.5
Michigan	95,038	74,855	29,983	23,784
Percent of state total	6.1	4.8	1.9	1.5
Nebraska	640	8,374	270	6,052
Percent of state total	0.4	5.3	0.2	3.8
New Jersey	25,982	N/A	9,548	N/A
Percent of state total	6.9	N/A	2.5	N/A
New York	200,022	190,451	31,116	26,544
Percent of state total	12.8	12.2	2.0	1.7
North Carolina	120,051	106,692	30,516	27,491
Percent of state total	8.8	7.8	2.2	2.0
South Carolina	62,160	N/A	15,139	N/A
Percent of state total	8.9	N/A	2.2	N/A
Utah	19,810	26,497	9,497	9,823
Percent of state total	6.7	9.0	3.2	3.3
Vermont	7,053	5,848	2,100	1,628
Percent of state total	7.1	5.8	2.1	1.6
Wisconsin	81,927	66,311	18,277	11,432
Percent of state total	9.3	7.5	2.1	1.3
Total	859,917	1,273,795	204,325	209,236
Percent of grand total	3.1	4.6	0.7	0.8

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, 2006 SASD-CD Ambulatory Surgeries (continued)

State	Nose, Mouth, and Pharynx (27-33)	Nose, Mouth, and Pharynx (27-33)	Respiratory System (34-42)	Respiratory System (34-42)
	ICD-9-CM	CPT	ICD-9-CM	CPT
California	N/A	88,937	N/A	26,222
Percent of state total	N/A	3.6	N/A	1.1
Colorado	24,850	14,246	7,238	4,397
Percent of state total	6.7	3.8	1.9	1.2
Florida	75,715	78,802	37,421	41,251
Percent of state total	2.8	2.9	1.4	1.5
Iowa	N/A	20,434	N/A	16,012
Percent of state total	N/A	5.4	N/A	4.2
Kentucky	28,644	N/A	9,513	N/A
Percent of state total	4.7	N/A	1.6	N/A
Maine	N/A	5,314	N/A	4,260
Percent of state total	N/A	2.6	N/A	2.1
Maryland	N/A	17,734	N/A	17,918
Percent of state total	N/A	4.3	N/A	4.4
Michigan	73,183	51,297	25,520	26,314
Percent of state total	4.7	3.3	1.6	1.7
Nebraska	574	10,541	72	5,037
Percent of state total	0.4	6.6	0.0	3.2
New Jersey	25,288	N/A	4,543	N/A
Percent of state total	6.7	N/A	1.2	N/A
New York	79,303	65,165	18,259	21,071
Percent of state total	5.1	4.2	1.2	1.4
North Carolina	69,396	59,394	19,135	17,848
Percent of state total	5.1	4.4	1.4	1.3
South Carolina	33,138	N/A	12,804	N/A
Percent of state total	4.7	N/A	1.8	N/A
Utah	21,511	21,803	2,604	2,519
Percent of state total	7.3	7.4	0.9	0.9
Vermont	3,272	2,530	1,322	1,154
Percent of state total	3.3	2.5	1.3	1.2
Wisconsin	36,967	22,414	11,282	9,455
Percent of state total	4.2	2.5	1.3	1.1
Total	471,841	458,611	149,713	193,458
Percent of grand total	1.7	1.7	0.5	0.7

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, 2006 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	60,611	N/A	16,158
Percent of state total	N/A	2.5	N/A	0.7
Colorado	19,261	11,523	4,386	2,503
Percent of state total	5.2	3.1	1.2	0.7
Florida	89,370	134,280	21,097	18,596
Percent of state total	3.3	5.0	0.8	0.7
Iowa	N/A	14,674	N/A	3,391
Percent of state total	N/A	3.9	N/A	0.9
Kentucky	35,660	N/A	4,908	N/A
Percent of state total	5.8	N/A	0.8	N/A
Maine	N/A	7,976	N/A	1,397
Percent of state total	N/A	3.9	N/A	0.7
Maryland	N/A	22,851	N/A	5,373
Percent of state total	N/A	5.6	N/A	1.3
Michigan	98,306	75,706	13,848	10,068
Percent of state total	6.3	4.9	0.9	0.6
Nebraska	573	7,193	96	1,433
Percent of state total	0.4	4.5	0.1	0.9
New Jersey	18209	N/A	5353	N/A
Percent of state total	4.8	N/A	1.4	N/A
New York	77979	105,248	17,145	11,765
Percent of state total	5.0	6.8	1.1	0.8
North Carolina	66380	77,572	11,436	8,205
Percent of state total	4.9	5.7	0.8	0.6
South Carolina	44,639	N/A	3,273	N/A
Percent of state total	6.4	N/A	0.5	N/A
Utah	11,072	9,960	2,573	2,203
Percent of state total	3.8	3.4	0.9	0.7
Vermont	2,791	3,771	814	652
Percent of state total	2.8	3.8	0.8	0.7
Wisconsin	39,429	43,131	7,167	4,067
Percent of state total	4.5	4.9	0.8	0.5
Total	503,669	574,496	92,096	85,811
Percent of grand total	1.8	2.1	0.3	0.3

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, 2006 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	954,550	N/A	63,956
Percent of state total	N/A	38.6	N/A	2.6
Colorado	83,950	69,809	14,845	10,704
Percent of state total	22.5	18.7	4.0	2.9
Florida	638,744	969,141	88,081	103,720
Percent of state total	23.9	36.2	3.3	3.9
Iowa	N/A	126,586	N/A	12,959
Percent of state total	N/A	33.5	N/A	3.4
Kentucky	199,956	N/A	23,903	N/A
Percent of state total	32.8	N/A	3.9	N/A
Maine	N/A	78,460	N/A	8,672
Percent of state total	N/A	38.0	N/A	4.2
Maryland	N/A	107,332	N/A	23,757
Percent of state total	N/A	26.2	N/A	5.8
Michigan	449,070	388,291	78,939	63,332
Percent of state total	28.9	24.9	5.1	4.1
Nebraska	3,723	58,012	320	6,795
Percent of state total	2.3	36.4	0.2	4.3
New Jersey	87,129	N/A	23,704	N/A
Percent of state total	23.0	N/A	6.3	N/A
New York	483,637	458,955	63,107	57,012
Percent of state total	31.1	29.5	4.1	3.7
North Carolina	369,723	365,184	50,137	47,724
Percent of state total	27.2	26.9	3.7	3.5
South Carolina	227,062	N/A	31,970	N/A
Percent of state total	32.5	N/A	4.6	N/A
Utah	98,896	109,992	6,227	6,892
Percent of state total	33.7	37.4	2.1	2.3
Vermont	34,236	31,173	3,186	3,037
Percent of state total	34.2	31.2	3.2	3.0
Wisconsin	327,008	243,165	33,657	21,644
Percent of state total	37.0	27.5	3.8	2.4
Total	**3,003,134**	**3,960,650**	**418,076**	**430,204**
Percent of grand total	**10.8**	**14.3**	**1.5**	**1.6**

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, 2006 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	38,655	N/A	122,789
Percent of state total	N/A	1.6	N/A	5.0
Colorado	5,165	4,105	16,975	14,101
Percent of state total	1.4	1.1	4.6	3.8
Florida	38,117	47,831	88,923	102,800
Percent of state total	1.4	1.8	3.3	3.8
Iowa	N/A	3,651	N/A	16,541
Percent of state total	N/A	1.0	N/A	4.4
Kentucky	7,397	N/A	31,060	N/A
Percent of state total	1.2	N/A	5.1	N/A
Maine	N/A	3,104	N/A	8,809
Percent of state total	N/A	1.5	N/A	4.3
Maryland	N/A	8,889	N/A	36,161
Percent of state total	N/A	2.2	N/A	8.8
Michigan	19,971	18,290	77,743	70,734
Percent of state total	1.3	1.2	5.0	4.5
Nebraska	80	1,899	405	6,682
Percent of state total	0.1	1.2	0.3	4.2
New Jersey	10,347	N/A	45,020	N/A
Percent of state total	2.7	N/A	11.9	N/A
New York	30,783	30,012	138,561	127,059
Percent of state total	2.0	1.9	8.9	8.2
North Carolina	14,245	13,621	59,687	71,550
Percent of state total	1.0	1.0	4.4	5.3
South Carolina	9,284	N/A	27,240	N/A
Percent of state total	1.3	N/A	3.9	N/A
Utah	3,136	3,575	11,625	9,594
Percent of state total	1.1	1.2	4.0	3.3
Vermont	1,213	952	4,180	3,541
Percent of state total	1.2	1.0	4.2	3.5
Wisconsin	11,829	8,219	31,858	23,441
Percent of state total	1.3	0.9	3.6	2.7
Total	151,567	182,803	533,277	613,802
Percent of grand total	0.5	0.7	1.9	2.2

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, 2006 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	1,556	N/A	366,145
Percent of state total	N/A	0.1	N/A	14.8
Colorado	7,968	4,808	49,538	39,497
Percent of state total	2.1	1.3	13.3	10.6
Florida	25,437	26,161	223,394	250,179
Percent of state total	1.0	1.0	8.3	9.3
Iowa	N/A	963	N/A	42,480
Percent of state total	N/A	0.3	N/A	11.2
Kentucky	16,864	N/A	61,893	N/A
Percent of state total	2.8	N/A	10.1	N/A
Maine	N/A	158	N/A	19,230
Percent of state total	N/A	0.1	N/A	9.3
Maryland	N/A	1,376	N/A	54,856
Percent of state total	N/A	0.3	N/A	13.4
Michigan	53,058	29,845	190,695	161,317
Percent of state total	3.4	1.9	12.3	10.4
Nebraska	15	282	2,147	22,118
Percent of state total	0.0	0.2	1.3	13.9
New Jersey	964	N/A	59,614	N/A
Percent of state total	0.3	N/A	15.8	N/A
New York	1,864	4,035	219,837	211,208
Percent of state total	0.1	0.3	14.1	13.6
North Carolina	26,336	25,757	154,338	220,130
Percent of state total	1.9	1.9	11.3	16.2
South Carolina	1,953	N/A	85,537	N/A
Percent of state total	0.3	N/A	12.2	N/A
Utah	285	0	45,770	52,675
Percent of state total	0.1	0.0	15.6	17.9
Vermont	3,665	2,298	12,037	10,093
Percent of state total	3.7	2.3	12.0	10.1
Wisconsin	1,213	1,048	116,539	81,407
Percent of state total	0.1	0.1	13.2	9.2
Total	139,622	98,287	1,221,339	1,531,335
Percent of grand total	0.5	0.4	4.4	5.5

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, 2006 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	166,796	N/A	362,857
Percent of state total	N/A	6.7	N/A	14.7
Colorado	96,929	78,265	36,835	58,386
Percent of state total	26.0	21.0	9.9	15.7
Florida	226,966	272,277	200,423	821,321
Percent of state total	8.5	10.2	7.5	30.7
Iowa	N/A	35,444	N/A	280,857
Percent of state total	N/A	9.4	N/A	74.3
Kentucky	96,409	N/A	100,992	N/A
Percent of state total	15.8	N/A	16.6	N/A
Maine	N/A	17,213	N/A	157,648
Percent of state total	N/A	8.3	N/A	76.3
Maryland	N/A	55,533	N/A	327,428
Percent of state total	N/A	13.6	N/A	80.0
Michigan	302,299	270,994	170,833	340,952
Percent of state total	19.4	17.4	11.0	21.9
Nebraska	793	15,976	1,687	121,348
Percent of state total	0.5	10.0	1.1	76.1
New Jersey	42,095	N/A	40,736	N/A
Percent of state total	11.1	N/A	10.8	N/A
New York	127,108	119,668	162,019	946,770
Percent of state total	8.2	7.7	10.4	60.8
North Carolina	204,136	231,673	277,433	219,049
Percent of state total	15.0	17.0	20.4	16.1
South Carolina	100,151	N/A	253,418	N/A
Percent of state total	14.3	N/A	36.2	N/A
Utah	6,369	4,697	17	1,962
Percent of state total	2.2	1.60	0.0	0.7
Vermont	8,670	8,631	20,459	75,460
Percent of state total	8.7	8.6	20.5	75.5
Wisconsin	71,458	40,853	99,828	603,771
Percent of state total	8.1	4.6	11.3	68.3
Total	1,283,383	1,318,020	1,364,680	4,317,809
Percent of grand total	4.6	4.8	4.9	15.6

*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, 2006 SASD-CD Ambulatory Surgeries (continued)

State	HCPCS*	HCPCS	Invalid or Inconsistent**	Invalid or Inconsistent
	ICD-9-CM	CPT	ICD-9-CM	CPT
California	N/A	1	N/A	0
Percent of state total	N/A	0.0	N/A	0.0
Colorado	0	2,228	1	13
Percent of state total	0.0	0.6	0.0	0.0
Florida	0	1,751	33	13
Percent of state total	0.0	0.1	0.0	0.0
Iowa	N/A	7,632	N/A	9
Percent of state total	N/A	2.0	N/A	0.0
Kentucky	0	N/A	255	N/A
Percent of state total	0.0	N/A	0.0	N/A
Maine	N/A	3,210	N/A	58
Percent of state total	N/A	1.6	N/A	0.0
Maryland	N/A	112	N/A	98
Percent of state total	N/A	0.0	N/A	0.0
Michigan	0	1,332	7	124
Percent of state total	0.0	0.1	0.0	0.0
Nebraska	0	5,016	280	0
Percent of state total	0.0	3.1	0.2	0.0
New Jersey	0	N/A	0	N/A
Percent of state total	0.0	N/A	0.0	N/A
New York	0	25,829	66	977
Percent of state total	0.0	1.7	0.0	0.1
North Carolina	0	97	1	1872
Percent of state total	0.0	0.0	0.0	0.1
South Carolina	0	N/A	4	N/A
Percent of state total	0.0	N/A	0.0	N/A
Utah	0	0	88	2
Percent of state total	0.0	0.0	0.0	0.0
Vermont	0	814	0	10
Percent of state total	0.0	0.8	0.0	0.0
Wisconsin	0	25,408	4	3,303
Percent of state total	0.0	2.9	0.0	0.4
Total	0	73,430	739	6,479
Percent of grand total	0.0	0.3	0.0	0.0

*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 2006 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.