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INTRODUCTION

The Agency for Healthcare Research and Quality (AHRQ) sponsors the Healthcare Cost and Utilization Project (HCUP) databases, which are developed through a Federal-State-Industry partnership. HCUP databases bring together the data collection efforts of State data organizations, hospital associations, private data organizations, and the Federal government to create a national information resource of health care data. HCUP State Emergency Department Databases (SEDD) include information on emergency department (ED) visits that do not result in an admission to the same hospital (i.e., treat-and-release ED visits). The SEDD contain more than 100 clinical and nonclinical data elements included on a hospital discharge abstract such as diagnoses, procedures, patient demographic characteristics (e.g., sex, age, and, race/ethnicity), expected payment sources, and total charges.

In data year 2013, there were two possible types of procedure codes reported in the SEDD: International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and Healthcare Common Procedure Coding System (HCPCS) Current Procedural Terminology (CPT®). HCUP processes the data as collected from the Partner organizations, and does not prescribe which type of procedure codes are to be included by Partner organizations providing the outpatient data. Some of the SEDD contain ICD-9-CM procedure codes (HCUP data elements PR1–PRn), some contain HCPCS/CPT codes (HCUP data elements CPT1–CPTn), and some include both ICD-9-CM and HCPCS/CPT codes. In addition, the number of HCPCS/CPT and/or ICD codes per record included in each data file varies by State.

Information is needed about these differences in data coding to facilitate analyses using the 2013 SEDD. This report describes the reporting of procedure codes in the SEDD and examines differences in the type and variation of procedure codes provided to HCUP. The objectives of this report include the following:

- Describe the differences in the origin and type of information reported by ICD-9-CM and HCPCS/CPT procedure codes
- Document the variability in the number and type of procedures included in the SEDD in 2013
- Detail the difference in procedures reported in the SEDD that contain both ICD-9-CM and HCPCS/CPT procedure codes.

On October 1, 2015, the United States transitioned from the reporting of procedures using ICD-9-CM to the International Classification of Diseases, Tenth Revision, Procedure Coding System (ICD-10-PCS). We briefly describe this revised coding system and discuss its implication for future records in the SEDD.

PROCEDURE CODING SYSTEMS

The differences observed in SEDD procedure codes can be explained in part by the origins and intended purposes of the coding systems and by how they are used in the health care provider and physician reimbursement processes. Therefore, before exploring the distribution of procedure code types, we provide a brief introduction to the major procedure coding schemes in the HCUP SEDD.

International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)

The ICD coding system is developed, monitored, and copyrighted by the World Health Organization (WHO). WHO created this system for classifying diseases to enhance international efforts for tracking communicable diseases (e.g., cholera, plague, yellow fever) and other global health problems (e.g., cardiovascular disease, tobacco consumption, traffic-related deaths). ICD-9-CM is based on WHO's ICD-9 for use in the United States and consists of three separate volumes of codes. Volumes 1 and 2 contain the tabular list and alphabetical index to the disease entries. ICD-9-CM diagnosis codes are the transaction code set mandated by Health Insurance Portability and Accountability Act (HIPAA) for the reporting of diagnoses by all healthcare providers and facilities. Volume 3 contains both the alphabetic index and tabular list for surgical, diagnostic & other therapeutic procedures. ICD-9-CM procedure codes are the transaction code set mandated by HIPAA for inpatient facility reporting of procedures and services. The National Center for Health Statistics (NCHS) and the Centers for Medicare & Medicaid Services (CMS) are responsible for overseeing all changes and modifications to the ICD-9-CM. ICD-9-CM was updated annually on a Federal fiscal year basis (October through September) until the implementation of ICD-10-CM/PCS became effective on October, 1, 2015.

Healthcare Common Procedure Coding System / Current Procedural Terminology (HCPCS/CPT)

HCPCS is the transaction code set mandated by HIPAA for reporting of medical services and procedures provided by physicians and other healthcare professional. HCPCS is made up of two levels. HCPCS Level I, commonly referred to as CPT codes, represent approximately 80 percent of the HCPCS codes and are copyrighted and published by the American Medical Association (AMA). The services and procedures include but are not limited to evaluation and management services, diagnostic and therapeutic surgical and nonsurgical procedures, radiological procedures, laboratory tests, and rehabilitative procedures. With the exception of codes for dental services, which are maintained by the American Dental Association, HCPCS Level II codes are developed and maintained by CMS to describe and identify products, supplies, and services not found in the HCPCS/CPT code set. HCPCS Level II codes include but are not limited to descriptions for ambulance services, dental service drugs, infusion additives, devices, durable medical equipment, prosthetics, orthotics, ancillary surgical supplies, nonphysician services, and health care supplies. HCPCS/CPT are updated on a calendar year basis with an extensive update effective on January 1 and a limited "early release" of codes effective on July 1. HCPCS Level II codes are updated quarterly in January, April, July, and October.

Differences in Reporting Methodology Between ICD-9-CM and HCPCS/CPT Codes

Major structural differences exist between the HCPCS/CPT and ICD-9-CM procedure code systems, in part because of the services they are trying to capture, the setting in which those services are provided, and what organization is responsible for development. These differences are highlighted below.

- HCPCS/CPT codes are more granular, as evidenced by the number of codes.
 - There are almost 4 times as many HCPCS codes as ICD-9-CM procedure codes with over 9,000 HCPCS/CPT codes and 6,000 HCPCS Level II codes. In addition, HCPCS/CPT codes can have two-digit modifiers that provide additional specificity.
 - There are approximately 4,000 ICD-9-CM procedure codes.
- Related HCPCS/CPT codes are not always sequenced together.
 - When assigning new HCPCS/CPT codes, the value may be set outside of the numerical sequence of related codes because there is no unused value within the range. The new HCPCS/CPT code then is identified in coding manuals as part of the original sequence (even if it is not in sequence numerically). This practice is called resequencing.
 - ICD-9-CM codes add a different third digit or an additional fourth digit to create new codes within the range of related codes.
- CPTs include codes specific to the reporting of physician services for the evaluation and management (E/M) of the patient.
 - CPT codes for E/M (99281-99288) are specific to the location of the service (e.g., physician office, hospital, emergency room), the level of care needed for decision making (brief, limited, intermediate, or extended service), and whether the visit was for initial or subsequent care.
 - The ICD-9-CM coding system does not have a comparable set of E/M codes.

Additional differences in the ICD-9-CM and HCPCS/CPT codes arise from their functional use in the billing and reimbursement process. The SEDD is composed of records from hospital billing systems for treatment of the patient in the emergency department. The National Uniform Billing Committee is responsible for the design of the CMS-1450 Uniform Billing Form 04 (UB-04) used by institutional providers. Data elements in the UB-04 were specified in the electronic claims standard as part of HIPAA. The UB-04 specifies that ICD procedure codes (UB-04 Form Locator 74) are required on inpatient claims when a procedure is performed, and HCPCS codes (UB-04 Form Locator 44) are applicable to outpatient claims for hospital-owned departments.

CMS uses the UB-04 as the basis for Form 1450 for institutional providers. CMS requires ICD diagnosis and procedure codes to be reported on inpatient claims from institutional providers because this coding scheme is used to assign the Medicare Severity-diagnosis related group (MS-DRG) that is integral to the CMS Inpatient Prospective Payment System. In contrast, CMS requires the reporting of HCPCS procedure codes on claims submitted by institutional outpatient providers for reimbursement under the CMS Outpatient Prospective Payment System. CMS stated that hospitals could capture the ICD-9-CM procedure codes for internal tracking purposes

and for monitoring hospital outpatient services, but HCPCS/CPT codes were required for standard billing transactions.¹

International Classification of Diseases, Tenth Revision, Clinical Modification and Procedure Coding System (ICD-10-PCS)

In the United States, a change in coding systems from ICD-9-CM to ICD-10-CM/PCS was implemented on October 1, 2015. Volumes 1 and 2 of the ICD-9-CM codes were replaced with ICD-10-CM, which is based on the WHO's ICD-10. Volume 3 of the ICD-9-CM was replaced by ICD-10-PCS, a system developed by CMS for the reporting of inpatient procedures.² CMS continues to require HCPCS/CPT procedure codes for outpatient institutional claims. This report does not include a discussion of ICD-10-PCS codes in the SEDD because the report focused on 2013 data.

STATE EMERGENCY DEPARTMENT DATABASES

The SEDD are a powerful set of databases that capture discharge information on all ED visits that do not result in an admission. The SEDD contain records for visits to hospital-owned EDs in participating States. The records are translated into a uniform format to facilitate multistate comparisons and analyses. They contain a core set of clinical and nonclinical information on all patients regardless of payer, including those covered by Medicare, Medicaid, and private insurance as well as patients who are uninsured. Researchers and policymakers use the SEDD to investigate access to health care in a changing health care marketplace; identify State-specific trends in ED utilization, access, charges, and outcomes; and conduct market-area research and small-area variation analyses.

The SEDD are annual, State-specific files that share a common structure and common data elements. The SEDD files for data year 2013 came from 30 HCUP Partner organizations (Appendix A). About 20 of the HCUP Partner organizations that participate in HCUP have agreed to release their SEDD through the HCUP Central Distributor under the auspices of AHRQ.

Based on information from the American Hospital Association (AHA) Survey of Hospitals, 96 percent of the EDs in the 2013 SEDD were part of general medical/surgical hospitals. Another 1.1 percent of EDs were from children's general medical/surgical hospitals. The other three percent were EDs from specialty hospitals such as surgical, heart, and psychiatric hospitals.

¹ Centers for Medicare & Medicaid Services. Frequently Asked Questions; FAQ1827. <https://questions.cms.gov/faq.php?id=5005&faqId=1827>. Accessed July 12, 2016.

² For a more broadly focused and detailed discussion on ICD-10-CM/PCS, please see HCUP Methods Series Report #2016-02, Impact of ICD-10-CM/PCS on Research Using Administrative Databases, available at <http://hcup-us.ahrq.gov/reports/methods/2016-02.pdf>

METHODS

We used descriptive statistics to examine the procedure codes available in the 2013 SEDD by State. We examined variation in the codes available by State and the most frequent procedures reported by the type of code(s) on the record. We also examined the reporting of five procedures that are routinely performed in the ED that can be reported with either ICD-9-CM or HCPCS/CPT procedure codes. Our analyses used all EDs included in the 2013 SEDD, which totaled 2,857 in 2013. Ninety-eight percent of these EDs were associated with community hospitals, as identified by the American Hospital Association. *Community hospitals* include non-Federal, short-term hospitals whose facilities are available to the public. *Short-term* is defined as hospitals with an average length of stay less than 30 days. Information by State on the number of community hospitals included (and not included) in the SEDD is available on the HCUP User Support Web site at http://hcup-us.ahrq.gov/db/state/sedddist/sedddist_hospital.jsp.

FINDINGS

Variations in Procedure Coding by Hospital-Owned Emergency Departments

Table 1 presents the percentage of EDs by State recording procedures with HCPCS/CPT, ICD-9-CM, or both types of codes, as well as the percentage of EDs that have not reported procedure codes.

Table 1. Distribution of Number of Emergency Departments by State and Type of Procedure Codes Reported, 2013

State	EDs, N	EDs With HCPCS/CPT and ICD-9-CM Codes, %	EDs With HCPCS/CPT Codes Only, %	EDs With ICD-9-CM Codes Only, %	EDs With No Procedures Reported, %
All States	2,857	31.9	48.7	17.4	2.0
States with both HCPCS/CPT and ICD-9-CM procedure codes					
All States	1,112	81.8	14.9	2.8	0.4
AR	74	55.4	8.1	32.4	4.1
AZ	65	90.8	9.2	0.0	0.0
FL	190	91.6	8.4	0.0	0.0
GA	132	92.4	2.3	5.3	0.0
HI	22	95.5	4.5	0.0	0.0
MA	61	65.6	34.4	0.0	0.0
NJ	66	84.8	15.2	0.0	0.0
VT	14	100.0	0.0	0.0	0.0
WI	128	98.4	0.0	0.0	1.6
States with HCPCS/CPT procedure codes only					
All States	1,227	NA	99.9	NA	0.1
IA	117	NA	100.0	NA	0.0
KY	102	NA	100.0	NA	0.0
MD	49	NA	98.0	NA	2.0

State	EDs, N	EDs With HCPCS/CPT and ICD-9-CM Codes, %	EDs With HCPCS/CPT Codes Only, %	EDs With ICD-9-CM Codes Only, %	EDs With No Procedures Reported, %
NC	106	NA	100.0	NA	0.0
NE	85	NA	100.0	NA	0.0
NV	33	NA	100.0	NA	0.0
NY	176	NA	100.0	NA	0.0
RI	13	NA	100.0	NA	0.0
States with ICD-9-CM procedure codes only					
All States	518	NA	NA	90.0	10.0
SC	58	NA	NA	100.0	0.0
UT	46	NA	NA	91.3	8.7

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department, HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

In States where both HCPCS/CPT and ICD-9-CM procedure codes were available in the SEDD, 81.8 percent of the 1,112 EDs reported both types of codes. In contrast, 14.9 percent of the EDs reported HCPCS/CPT codes only and 2.8 percent reported ICD-9-CM procedure codes only. Five EDs (0.4 percent) did not report any procedures on any of their records.

Among the 11 States that only provided HCPCS/CPT procedure codes in the SEDD, almost 100 percent of the 1,227 EDs reported HCPCS/CPT codes. Among the six States that only provided ICD-9-CM procedure codes, 90.0 percent of the 518 EDs reported ICD-9-CM codes. The other 10.0 percent of EDs did not report any procedures on SEDD records.

Differences in the Availability of ICD-9-CM and HCPCS/CPT Procedure Codes in the 2013 HCUP SEDD

Table 2 presents information on the reporting of HCPCS/CPT and ICD-9-CM procedure codes on SEDD records in 2013.

Table 2. Count and Distribution of SEDD Records by Type of Procedure and State, 2013

State	SEDD Records, N	Records With No Procedures, %	Records With Procedures, %	Among Records With Procedures		
				Only HCPCS/CPT Procedures Reported, %	Only ICD-9-CM Procedures Reported, %	HCPCS/CPT and ICD-9-CM Procedures Reported, %
All States	76,317,649	23.5	76.5	88.4	5.9	5.8
Both HCPCS/CPT and ICD-9-CM procedure codes						
AR	1,162,854	44.0	56.0	84.8	7.0	8.2
AZ	2,076,295	0.1	99.9	89.6	0.0	10.4
FL	7,575,490	0.0	100.0	89.5	0.0	10.5
GA	3,931,039	13.6	86.4	88.4	1.3	10.3
HI	400,269	3.3	96.7	72.4	3.0	24.6
MA	2,486,170	0.9	99.1	89.5	0.0	10.5

State	SEDD Records, N	Records With No Procedures, %	Records With Procedures, %	Among Records With Procedures		
				Only HCPCS/CPT Procedures Reported, %	Only ICD-9-CM Procedures Reported, %	HCPCS/CPT and ICD-9-CM Procedures Reported, %
NJ	3,101,469	0.0	100.0	84.3	0.0	15.7
VT	242,626	0.0	100.0	84.9	0.0	15.1
WI	1,704,181	73.6	26.4	0.4	0.0	99.6
HCPCS/CPT procedure codes only						
IA	1,035,325	0.0	100.0	100.0	0.0	0.0
KY	2,036,780	0.0	100.0	100.0	0.0	0.0
MD	2,224,180	0.1	99.9	100.0	0.0	0.0
NC	4,054,188	3.1	96.9	100.0	0.0	0.0
NE	480,749	0.1	99.9	100.0	0.0	0.0
NV	859,781	0.7	99.3	100.0	0.0	0.0
NY	6,764,100	3.0	97.0	100.0	0.0	0.0
RI	416,304	8.5	91.5	100.0	0.0	0.0
ICD-9-CM procedure codes only						
SC	2,060,719	2.3	97.7	0.0	100.0	0.0
UT	683,415	87.8	12.2	0.0	100.0	0.0

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

Thirteen States provided both HCPCS/CPT and ICD-9-CM procedure codes. The Wisconsin SEDD included at least one procedure on only 26.4 percent of records; however, among the records that included procedures, 99.6 percent contained both ICD-9-CM and HCPCS/CPT codes. The overall mean for including procedures for the other 12 States using both coding systems was 93.9 percent of SEDD records. For those 12 States, the overall mean for using only HCPCS/CPT coding systems was 87.4 percent of those records, and both HCPCS/CPT and ICD-9-CM were reported on another 11.6 percent of SEDD records, on average. Only 0.9 percent of records in these 12 States contained only ICD-9-CM codes.

Among the 11 States that provided only HCPCS/CPT codes on the SEDD, at least one procedure was reported on an average of 94.5 percent of SEDD records, with a range of 57.2 to 100.0 percent. Of the six States that provided ICD-9-CM codes only, the South Carolina SEDD included at least one procedure on 97.7 percent of records. Among the other five States with ICD-9-CM codes only, procedures were reported on an average of only 13.9 percent of records.

In the HCUP Annual Data Assessment for data year 2015, HCUP Partner organizations were asked what factors determined the coding system used to collect information on procedures. Eighty-one percent of the Partners who responded said State or national coding requirements determined their coding scheme. The other 19 percent said that facility requirements and preferences were the determining factors.

Table 3 displays the mean and maximum number of procedure codes available in the Core file of the 2013 SEDD by State. The SEDD Core file includes all HCPCS/CPT codes for at least 99 percent of the records. Any additional HCPCS/CPT codes are stored in the Charge Detail file.

As expected because of the increased specificity of HCPCS/CPT codes, in most instances there were more HCPCS/CPT than ICD-9-CM procedure codes when both were included in the SEDD.

Table 3. Mean and Maximum Number of Procedure Codes in the SEDD by State, 2013

State	HCPCS/CPT Codes per Record in the SEDD Core File		ICD-9-CM Codes per Record in the SEDD Core File		Charge Detail File Available ^b
	Mean	Maximum	Mean	Maximum	
Both HCPCS/CPT and ICD-9-CM procedure codes					
AR	2.70	51	0.10	8	N
AZ	5.61	12	0.13	12	N
FL	6.01	34	0.13	5	N
GA	5.25	50	0.14	28	Y
HI	6.00	105	0.34	10	N
MA	6.50	114	0.14	4	N
NJ	6.22	50	0.20	23	Y
VT	5.81	50	0.21	11	Y
WI	0.39	50	0.39	50	N
HCPCS/CPT procedure codes only					
IA	7.49	50	NA	NA	Y
KY	6.89	50	NA	NA	Y
MD	6.62	50	NA	NA	Y
NC	6.07	20	NA	NA	N
NE	6.68	50	NA	NA	Y
NV	6.92	50	NA	NA	N
NY	5.55	50	NA	NA	Y
RI	4.58	11	NA	NA	N
ICD-9-CM procedure codes only					
SC	NA	NA	2.74	10	N
UT	NA	NA	0.13	6	N

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

^a Not a Central Distributor State.

^b The Charge Detail file includes HCPCS/CPT codes that are not included in the Core file and not used for the analyses in this report. For these States, the number of HCPCS/CPT codes available in the Core file is set to retain at least 99 percent of the HCPCS/CPT codes on all records.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

There also was variation within EDs in the type and number of procedure codes reported on each record. The next set of tables will explore variation in the procedures reported at the record level.

Procedures Reported on SEDD Records That Included Both HCPCS/CPT and ICD-9-CM Procedure Codes

In 2013, a total of 3.4 million SEDD records included both HCPCS/CPT and ICD-9-CM procedure codes. This represented 5.8 percent of all SEDD records with procedures reported that year (from Table 2). Table 4 lists the top 10 types of HCPCS/CPT procedures on these records. Table 5 lists the top 10 types of ICD-9-CM procedures on these records.

Table 4. Most Frequent HCPCS/CPT Procedures Reported on SEDD Records That Included Both HCPCS/CPT and ICD-9-CM Codes, 2013

Rank	HCPCS/CPT Procedure Code Ranges	Number of Records	Percentage of Total SEDD Records With Both HCPCS/CPT and ICD-9-CM Codes (N = 3,365,452)
1	99281–99285 Evaluation and management codes for physician services during the ED visit	2,773,853	82.4
2	96370–96379 Therapeutic, prophylactic, and diagnostic injections	1,522,148	45.2
3	80047–80053 Metabolic laboratory panel	961,420	28.6
4	85025–85027 Complete blood count	929,383	27.6
5	81000–81005 Urinalysis	528,895	15.7
6	36410–36416 Blood draw	508,808	15.1
7	71010–71035 Chest X-ray	492,041	14.6
8	93000–93010 Electrocardiogram	426,341	12.7
9	29105–29131, 29505–29515 Splint for finger, forearm, or leg	363,211	10.8
10	J2400–J2045 Injection, hydrochloride	325,103	9.7

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The majority of the SEDD records (82.4 percent) had a HCPCS/CPT procedure code indicating physician services for the ED visit. The E/M codes 99281–99285 on the hospital bill are not used for physician billing; instead they set the facility payment for patient use of the ED.³ The ED physician either will bill their professional services separately or will have fees included in revenue center codes 0960–0989 indicating the professional fees component of a UB-04 hospital bill. Separate ED physician bills are not included in the SEDD. The reporting of professional fees by revenue center code is available in some but not all States. Almost one-half of the records included a HCPCS/CPT code for therapeutic, prophylactic, and diagnostic injections (45.2 percent). More than one-quarter of the records included a code for metabolic laboratory panel (28.6 percent) or a complete blood count (27.6 percent). Other procedure

³ American College of Emergency Physicians. Clinical Practice and Management; FAQ9. Available at [https://www.acep.org/Clinical---Practice-Management/APC-\(Ambulatory-Payment-Classifications\)-FAQ/](https://www.acep.org/Clinical---Practice-Management/APC-(Ambulatory-Payment-Classifications)-FAQ/). Accessed July 12, 2016.

codes included urinalysis (15.7 percent), blood draw (15.1 percent), chest X-ray (14.6 percent), and electrocardiogram (12.7 percent).

Table 5. Most Frequent ICD-9-CM Procedures Reported on SEDD Records That Included Both HCPCS/CPT and ICD-9-CM Codes, 2013

Rank	ICD-9-CM Procedure Codes	Number of Records	Percentage of Total SEDD Records With Both HCPCS/CPT and ICD-9-CM Codes (N = 3,365,452)
1	9929: Injection or infusion of other therapeutic or prophylactic substance	773,456	23.0
2	8659: Closure of skin and subcutaneous tissue of other sites	616,895	18.3
3	9354: Application of splint	393,151	11.7
4	8604: Other incision with drainage of skin and subcutaneous tissue	196,046	5.8
5	3899: Venous puncture not elsewhere classified	125,689	3.7
6	8901–8905: Interview and evaluation	110,125	3.3
7	8744: Routine chest x-ray	76,840	2.3
8	5794: Insertion of indwelling urinary catheter	73,260	2.2
9	9918: Injection or infusion of electrolytes	55,729	1.7
10	9938: Administration of diphtheria-tetanus-pertussis, combined	54,489	1.6

Abbreviations: CPT, Current Procedure Type; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

Twenty-three percent of the records had an ICD-9-CM code for injection or infusion of therapeutic or prophylactic substance (Table 5), compared with 45.2 percent that had a similar HCPCS/CPT code (Table 4). Both coding systems were used to report interview and evaluation; the ICD-9-CM code was included on only 3.3 percent of records, whereas the HCPCS/CPT code was included on 82.4 percent of records. Chest x-rays also were reported using both coding systems; the ICD-9-CM code was included on only 2.3 percent of records, whereas the HCPCS/CPT code was included on 14.6 percent of records. Application of a splint was reported using a similar percentage of ICD-9-CM codes (11.7 percent) and HCPCS/CPT codes (10.8 percent).

Procedures Reported on SEDD Records That Included Only HCPCS/CPT Procedure Codes

In 2013, a total of 51.6 million SEDD records included only HCPCS/CPT procedure codes (and no ICD-9-CM procedure codes). This represented 88.4 percent of all SEDD records with procedures reported that year (from Table 2). Table 6 lists the 10 most common types of HCPCS/CPT procedures on these records.

Table 6. Most Frequent HCPCS/CPT Procedures Reported on SEDD Records That Included Only HCPCS/CPT Procedure Codes, 2013

Rank	HCPCS/CPT Procedure Codes	Number of Records	Percentage of Total SEDD Records With HCPCS/CPT Codes Only (N = 51,583,135)
1	99281–99285 Evaluation and management codes for physician services during the ED visit	51,481,588	99.8
2	96370–96379 Therapeutic, prophylactic, and diagnostic injections	18,111,405	35.1
3	85025–85027 Complete blood count	16,790,479	32.6
4	80047–80053 Metabolic laboratory panel	16,492,322	32.0
5	81000–81005 Urinalysis	11,482,672	22.3
6	36410–36416 Blood draw	9,723,142	18.8
7	71010–71035 Chest X-ray	8,860,893	17.2
8	93000–93010 Electrocardiogram	8,369,739	16.2
9	84480–84485 Blood chemistry for triiodothyronine, troponin, or trypsin	4,969,837	9.6
10	83690–83698 Blood chemistry for lipase or lipoprotein	4,293,894	8.3

Abbreviations: CPT, Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

Almost all SEDD records (99.8 percent) that included HCPCS/CPT procedure codes included a code for physician services for the ED visit. About one-third of the records included a code for therapeutic, prophylactic, and diagnostic injections (35.1 percent), a complete blood count (32.6 percent), or a metabolic laboratory panel (32.0 percent). About one-fifth of the records included a HCPCS/CPT code for urinalysis (22.3 percent) or for a blood draw (18.8 percent). A chest X-ray or electrocardiogram was reported on 17.2 percent and 16.2 percent of SEDD records, respectively.

The top eight categories of HCPCS/CPT codes were the same in Table 4 (common HCPCS/CPT procedures for records that included both HCPCS/CPT and ICD-9-CM codes) and Table 6 (common HCPCS/CPT procedures for records that included only HCPCS/CPT codes). With the exception of therapeutic, prophylactic, and diagnostic injections, the percentages of records with one of these procedures in States with both HCPCS/CPT and ICD-9-CM codes available (Table 4) were lower than the corresponding percentages when only HCPCS/CPT codes were available in the State. However, these percentages were not markedly different.

Procedures Reported on SEDD Records That Included Only ICD-9-CM Procedure Codes

In 2013, a total of 3.4 million SEDD records included only ICD-9-CM procedure codes (and no HCPCS/CPT procedure codes). This represented 5.9 percent of all SEDD records with procedures reported that year (from Table 2). Table 7 lists the top 10 ICD-9-CM procedures on these records.

Table 7. Most Frequent ICD-9-CM Procedures Reported on SEDD Records That Included Only ICD-9-CM Procedure Codes, 2013

Rank	ICD-9-CM Procedure Codes	Number of Records	Percentage of Total SEDD Records With ICD-9-CM Codes Only (N = 3,435,234 million)
1	8901–8905: Interview and evaluation	2,013,523	58.6
2	9929: Injection or infusion of other therapeutic or prophylactic substance	851,376	24.8
3	8744: Routine chest x-ray	375,018	10.9
4	3899: Venous puncture not elsewhere classified	356,070	10.4
5	8952: Electrocardiogram	343,420	10.0
6	9139: Microscopic examination of urine specimen	320,598	9.3
7	8659: Closure of skin and subcutaneous tissue of other sites	308,151	9.0
8	9354: Application of splint	174,827	5.1
9	8703: Computerized axial tomography of head	156,149	4.5
10	9928: Antineoplastic immunotherapy	136,849	4.0

Abbreviations: ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

Among the 3.4 million records with only an ICD-9-CM code, the codes for interview and evaluation (8901–8905) were used most frequently. These codes occurred on 58.6 percent of records. This percentage was higher than the 3.3 percent of records for these codes when both ICD-9-CM and HCPCS/CPT procedure codes were reported (Table 5). Five other top 10 ICD-9-CM codes appear in both Tables 5 and 7 (i.e., venous puncture, closure of skin, chest x-ray, application of splint, and injection or infusion of other therapeutic or prophylactic substance), although the percentages of records containing each code varied and showed no consistent pattern of always being higher or lower.

Comparisons of Reporting by Specific Procedures

This section contains a comparison of the reporting of five procedures routinely performed in the ED for which there are equivalent codes in the HCPCS/CPT and ICD-9-CM coding systems.

The five procedures are as follows:

1. Routine chest x-ray,
2. Computerized axial tomography (CT) scan of the head,
3. Suture of skin and subcutaneous tissue,
4. Measurement of arterial blood gases, and
5. Diagnostic spinal tap.

A *routine chest x-ray* is identified by ICD-9-CM code 87.44 and by HCPCS/CPT codes 0174T–0175T and 71010–71035. Table 8 compares the percentages of ED visits that involved a routine chest x-ray by the procedure coding system used by the ED.

Table 8. Variation in Reporting a Routine Chest X-Ray During an ED Visit Across Emergency Departments Using Different Procedure Coding Systems, 2013

Routine Chest X-Ray Procedure Identified by the Following	EDs Reporting HCPCS/CPT and ICD-9-CM Procedures (N = 25,973,833)		EDs Reporting HCPCS/CPT Procedures Only (N = 35,951,990)		EDs Reporting ICD-9-CM Procedures Only (N = 14,248,052)	
	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits
HCPCS/CPT procedure code	4,367,767	16.8	4,934,488	13.7	NA	NA
ICD-9-CM procedure code	76,840	0.3	NA	NA	375,018	2.6
Either type of procedure code	4,369,918	16.8	NA	NA	NA	NA

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The percentage of SEDD records in which a chest x-ray is reported is higher in EDs reporting a combination of HCPCS/CPT and ICD-9-CM codes (16.8 percent) than EDs reporting only HCPCS/CPT codes (13.7 percent) or only ICD-9-CM codes (2.6 percent).

A *CT scan of the head* is identified by the ICD-9-CM code 87.03 and the HCPCS/CPT codes 70450–70496. Table 9 compares the percentage of ED visits that involved a CT scan of the head by the procedure coding system used by the ED.

Table 9. Variation in Reporting a Routine CT Scan of the Head During an Emergency Department Visit Across Emergency Departments Using Different Procedure Coding Systems, 2013

CT Scan Procedure Identified by the Following	EDs Reporting HCPCS/CPT and ICD-9-CM Procedures (N = 25,973,833)		EDs Reporting HCPCS/CPT Procedures Only (N = 35,951,990)		EDs Reporting ICD-9-CM Procedures Only (N = 14,248,052)	
	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits
HCPCS/CPT procedure code	1,863,300	7.2	2,076,385	5.8	NA	NA
ICD-9-CM procedure code	21,639	0.1	NA	NA	154,636	1.1
Either type of procedure code	1,865,263	7.2	NA	NA	NA	NA

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The percentage of SEDD records in which a CT scan of the head is reported was higher in EDs reporting a combination of HCPCS/CPT and ICD-9-CM codes (7.2 percent) than EDs reporting only HCPCS/CPT codes (5.8 percent) or only ICD-9-CM codes (1.1 percent).

Suture of skin and subcutaneous tissue is identified by the ICD-9-CM codes 86.51 and 86.59 and by HCPCS/CPT codes 12001–13133 and 13160–13300. Table 10 compares the percentage of ED visits that involved suturing of skin and subcutaneous tissue by the procedure coding system used by the ED.

Table 10. Variation in Reporting a Suture of Skin and Subcutaneous Tissue During an ED Visit Across Emergency Departments Using Different Procedure Coding Systems, 2013

Suture of Skin and Subcutaneous Tissue Procedure Identified by the Following	EDs Reporting HCPCS/CPT and ICD-9-CM Procedures (N = 25,973,833)		EDs Reporting HCPCS/CPT Procedures Only (N = 35,951,990)		EDs Reporting ICD-9-CM Procedures Only (N = 14,248,052)	
	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits
HCPCS/CPT procedure code	777,487	3.0	1,095,402	3.0	NA	NA
ICD-9-CM procedure code	623,813	2.4	NA	NA	301,268	2.1
Either type of procedure code	853,099	3.3	NA	NA	NA	NA

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The percentage of SEDD records in which suturing of skin and subcutaneous tissue is reported was similar in EDs reporting a combination of HCPCS/CPT and ICD-9-CM codes (3.3 percent) and EDs reporting only HCPCS/CPT codes (3.0 percent). The percentage was lower in EDs reporting only ICD-9-CM procedures (2.1 percent).

A procedure for the *measurement of arterial blood gases* is identified by the ICD-9-CM codes 89.60 and 89.65 and by HCPCS/CPT codes 82790–82817 and 94700–94710. Table 11 compares the percentage of ED visits that involved the measurement of arterial blood gases by the procedure coding system used by the ED.

Table 11. Variation in Reporting the Measurement of Arterial Blood Gases During an ED Visit Across Emergency Departments Using Different Procedure Coding Systems, 2013

Measurement of Arterial Blood Gases Procedure Identified by the Following	EDs Reporting HCPCS/CPT and ICD-9-CM Procedures (N = 25,973,833)		EDs Reporting HCPCS/CPT Procedures Only (N = 35,951,990)		EDs Reporting ICD-9-CM Procedures Only (N = 14,248,052)	
	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits
HCPCS/CPT procedure code	170,534	0.66	269,281	0.75	NA	NA
ICD-9-CM procedure code	1,851	0.01	NA	NA	14,159	0.10
Either type of procedure code	170,733	0.66	NA	NA	NA	NA

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The percentage of SEDD records in which a procedure for the measurement of arterial blood gases is reported was higher in EDs reporting only HCPCS/CPT codes (0.75 percent) than in EDs reporting a combination of HCPCS/CPT and ICD-9-CM codes (0.66 percent) or EDs reporting only ICD-9-CM codes (0.10 percent).

Diagnostic spinal tap is identified by the ICD-9-CM code 03.31 and by the HCPCS/CPT codes 62270–62272. Table 12 compares the percentage of ED visits that involved a spinal tap by the procedure coding system used by the ED.

Table 12. Variation in Reporting a Spinal Tap Procedure During ED Visits Across Emergency Departments Using Different Procedure Coding Systems, 2013

Spinal Tap Procedure Identified by the Following	EDs Reporting HCPCS/CPT and ICD-9-CM Procedures (N = 25,973,833)		EDs Reporting HCPCS/CPT Procedures Only (N = 35,951,990)		EDs Reporting ICD-9-CM Procedures Only (N = 14,248,052)	
	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits	Number of Records	Percent of Total ED Visits
HCPCS/CPT procedure code	27,146	0.10	39,693	0.11	NA	NA
ICD-9-CM procedure code	22,500	0.09	NA	NA	10,691	0.08
Either type of procedure code	30,117	0.12	NA	NA	NA	NA

Abbreviations: CPT, Current Procedural Terminology; ED, emergency department; HCPCS, Healthcare Common Procedure Coding System; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; NA, not applicable.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Emergency Department Databases (SEDD), 2013.

The percentage of SEDD records in which a spinal tap procedure is reported was similar in EDs reporting a combination of HCPCS/CPT and ICD-9-CM codes (0.12 percent), EDs reporting only HCPCS/CPT codes (0.11 percent), and EDs reporting only ICD-9-CM codes (0.08 percent).

RECOMMENDATIONS FOR STUDIES THAT EXAMINE PROCEDURES PERFORMED IN THE EMERGENCY DEPARTMENT

This report details (1) the types of procedures that frequently are reported on SEDD records using HCPCS/CPT and ICD-9-CM procedure codes and (2) the wide variation in the percentage of records with similar procedures reported. Almost all EDs in the 2013 SEDD (98 percent) report HCPCS/CPT or ICD-9-CM procedure codes. Eighty-one percent of EDs report HCPCS/CPT procedures for a total of 58 million SEDD records. Common procedures identified by HCPCS/CPT codes include physician services, injections (therapeutic, prophylactic, and diagnostic), diagnostic radiology (e.g., chest x-ray, electrocardiogram) and blood chemistries. In contrast, only 6.8 million SEDD records include ICD-9-CM procedure codes. The types of procedures captured by the ICD-9-CM procedure codes were similar (e.g., injection or infusion of therapeutic or prophylactic substance, chest x-rays), but the percentages of records including these services were generally lower than percentages based on HCPCS/CPT codes.

There are differences in the origins and intended purposes of HCPCS/CPT and ICD-9-CM procedure codes, in the ways hospital billing systems use these coding systems to report ED services, and in coding guidelines. These inconsistencies are not likely to end with the transition to ICD-10-PCS. In the HCUP Annual Data Assessment for data year 2015, the six HCUP Partner organizations that only report ICD-9-CM procedure codes in the SEDD were asked whether they will switch to reporting HCPCS/CPT codes because of the transition to the ICD-10-PCS coding system that started on October 1, 2015. Four organizations responded that they are switching to HCPCS/CPT codes. The other two did not respond.

HCUP recommends that researchers interested in analysis of specific procedures occurring in outpatient hospital encounters consult with a clinical coding specialist to determine all relevant ICD-9-CM and HCPCS/CPT codes to be included.

- When only HCPCS/CPT codes are included in the SEDD, this report indicates that there is reasonable reporting of procedures commonly performed in the ED, but possible variation in the completeness of reporting across EDs. Researchers conducting analysis specific to procedures performed in the ED should check the reporting of procedure codes in each ED and then should exclude EDs that report no procedure codes in the data year.
- When only ICD-9-CM procedure codes are included in the SEDD, caution should be used as the percentage of records with procedure codes recorded appears to be substantially lower in these SEDD.
- When both ICD-9-CM and HCPCS/CPT codes are included in the SEDD, a specific procedure of interest should be identified using both ICD-9-CM and HCPCS/CPT procedure codes. It is unknown whether a procedure reported under both coding systems should be interpreted as two different occurrences (e.g., two different chest x-rays occurring during the ED visit) or as duplicate coding of one occurrence (e.g., one chest x-ray occurring during the ED visit and reported using both ICD-9-CM and

HCPCS/CPT procedure codes). In addition, researchers conducting analysis specific to procedures performed in the ED should check the reporting of procedure codes in each ED and then should exclude EDs that report no procedure codes in the data year.

Any cross-State analysis of procedures performed in the ED should limit the analysis to States with the same type of procedure codes (e.g., only SEDD with HCPCS/CPT procedure codes).

This report used procedure coding information from the 2013 SEDD. In data years 2014 and 2015, HCPCS/CPT procedure codes are available in many of the SEDD that did not have HCPCS/CPS in 2013.

APPENDIX A. HCUP PARTNER ORGANIZATIONS

Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health and Hospitals
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association (provides data for Minnesota and North Dakota hospitals)
Mississippi Department of Health
Missouri Hospital Industry Data Institute
Montana MHA - An Association of Montana Health Care Providers
Nebraska Hospital Association
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Office of Health Analytics
Oregon Association of Hospitals and Health Systems
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
South Dakota Association of Healthcare Organizations

Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association