

**MAINTAIN AND EXPAND
THE HEALTHCARE COST AND UTILIZATION PROJECT (HCUP)
Contract No. HHS-290-2006-00009-C**



H·CUP
HEALTHCARE COST AND UTILIZATION PROJECT

**NATIONWIDE EMERGENCY DEPARTMENT SAMPLE
FEASIBILITY STUDY**

**Updated:
October 19, 2008**

Submitted to:

Jenny Schnaier, Project Officer
Agency for Healthcare Research and Quality
540 Gaither Road
Rockville, MD 20850

Submitted by:

Thomson Reuters
(formerly Thomson Healthcare)
5425 Hollister Ave, Suite 140
Santa Barbara, CA 93111

NATIONWIDE EMERGENCY DEPARTMENT SAMPLE FEASIBILITY STUDY

Teresa B. Gibson, PhD, Marguerite Barrett, MS, Amy G. Mell, MPH, Julia Nisbet, BS,
Pamela Owens, PhD

EXECUTIVE SUMMARY

Emergency departments serve a dual role in the United States health infrastructure: as a point of entry for approximately 50% of inpatient admissions and as a treatment setting for treat and release outpatient visits (Merrill and Owens 2007). It is becoming evident that emergency departments are a critical part of the medical infrastructure in the United States. A recent Institute of Medicine (IOM) report, *Hospital-Based Emergency Care: At the Breaking Point* (2007), highlights many issues pertinent to U.S. hospital-based emergency care, such as overcrowding, boarding (i.e., holding patients until an inpatient bed is available), uncompensated care, inadequate disaster preparedness, inadequate staffing, and rural care. Addressing systematic issues with emergency care requires data-based analyses to assess the effectiveness of interventions and investments.

To aid in understanding and improving this vital component of the nation's health infrastructure, the Agency for Healthcare Research and Quality (AHRQ) and Thomson Reuters (TR) launched a study of the feasibility, practicability, and usefulness of constructing a Nationwide Emergency Department Sample (NEDS). Under the AHRQ Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup"), there are two databases—the State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID)—that constitute the building blocks for the NEDS. The SEDD capture discharge information on emergency department visits that do not result in an admission (e.g., treat and release or transfer to another hospital). The SID contain information on patients initially seen in the emergency room and then admitted to the same hospital. These databases provide a unique resource to support health researchers, policy makers, and decision makers in epidemiology, environmental planning, policy analysis, health organization, public health, health planning, and disaster planning. The HCUP family of administrative longitudinal databases is created by AHRQ through a Federal-State-Industry partnership.

There are 24 HCUP Partner states that provided both inpatient source and treat and release ED data to HCUP for 2005 and are candidates for participation in the NEDS. States include AZ, CA, CT, FL, GA, HI, IA, IN, KS, MA, MD, MN, MO, NE, NH, NJ, NY, OH, SC, SD, TN, UT, VT, and WI. The 24 states are representative of the nation in terms of both population and number of ED visits. The 24 states include 54.8% (65,981,713) of the ED visits recorded in the 2005 American Hospital Association (AHA) Annual Survey Database. Twenty-three states participated in the NEDS feasibility study (HCUP ED states).¹

An ED record was identified in the SEDD and SID by the following criteria:

- Services to ED revenue center codes 450-459 reported on discharge record
- Positive ED charge, when revenue center codes were not available

¹ ED data from New York was not available to include in the NEDS feasibility study.

- CPT code of 99281-99285 indicating ED physician services reported on record
- Admission source of ED
- Source-defined ED record (not standardized across data sources)

Some criteria are better for outpatient data, such as the use of CPT codes, while other criteria are suited for inpatient data (e.g., admission source).

A stratified sample of 20% of U.S. hospital-based EDs was drawn from the 23 HCUP Partner states. By stratifying on important hospital characteristics, the NEDS represents the experience of U.S. EDs. Stratifiers included:

- Census Region (Northeast, Midwest, South, and West)
- Trauma center designation
- Urban-rural location of the hospital (large metropolitan, small metropolitan, micropolitan, and non-urban residual)
- Teaching hospitals in metropolitan areas
- Hospital control (public, voluntary, and proprietary).

After stratifying, a random sample of 20% of the total number of hospital-based EDs in the U.S. was selected within each stratum. Hospital and discharge-level weights were calculated to provide national estimates from the NEDS. The resulting NEDS for 2005 included 972 hospital-based EDs, over 27 million records, and over 100 data elements.

The 2005 NEDS was comparable to other ED sources. It was consistent in terms of the total number of ED visits, included a slightly higher percentage of inpatient admissions, had a larger number of diagnostic and procedure codes available (on average), and produced similar estimates for injury rates. The NEDS demonstrated that it is useful for disease tracking using the example of Influenza-like illness (ILI) and has potential to address ED-specific policy issues mentioned in the IoM report and Healthy People 2010.

While the 2005 NEDS has proven to be a valuable resource for examining ED services, there is room for improvement. About half of the strata (37 of 65) use 50% or more of the frame hospitals for the NEDS, indicating that a larger sampling frame of states would be desirable. Future investigation of the trauma designation is also warranted to determine methods to identify trauma centers and if all levels of trauma centers (versus a trauma/non-trauma indicator) should be included as a stratifier. In addition, the NEDS has relatively sparse information for a few key data elements:

- Patient Race – 18% of the ED visits in the NEDS are missing information on race because only 20 of 23 HCUP ED states report race.
- ED charges – 50% of the ED visits are missing ED-specific charge information.
- Total charge – 12% of the ED visits in the NEDS are missing total charge. The problem is concentrated in the West with 65% of the records missing total charge.

To separate ED services from inpatient services in the SID, it is critical to have line item detail – revenue codes, charges and procedures. Only five of the 23 HCUP ED states provide revenue code level detail for the SID.

At present, we expect to produce the NEDS once a year with the timing dependent on the availability of data in the SID and SEDD. We will also work with AHRQ and the HCUP Partners to release a version of the NEDS through the HCUP Central Distributor.

A nationwide version of the ED services represented in the SID and SEDD databases provides an exceptional resource for high-profile emergent health delivery issues. Using a sample of ED hospitals from the HCUP Partner states, the NEDS is "generalizable" to the target universe—U.S. hospital-based EDs. One of the most distinctive features of the NEDS is the large sample size allowing for the study of relatively uncommon disorders, procedures, and hospital types.

TABLE OF CONTENTS

INTRODUCTION	4
Background and Motivation	4
U.S. Hospital-Based Emergency Departments	4
Overview and Report Organization	6
DATABASE DESIGN	6
Identification of HCUP Records with Emergency Department Services	7
Selection of Hospitals within the States	8
Limiting HCUP Hospitals to Those that are Included in the AHA	8
Section of Community, Non-Rehabilitation Hospitals	9
Minimum Requirement Concerning the Reporting of ED Events	9
Comparison of HCUP and AHA ED Visits	9
File Structure	11
Recommended Variables	11
Data Standards and Values	11
Missing Data and Variables	12
WEIGHTING AND STRATIFICATION	12
Universe of Hospital-Based Emergency Departments	12
Sampling Frame	13
Description of Sampling Methods	13
Possible Stratification Variables	14
U.S. Census Region	15
Trauma Hospitals	16
Urban-Rural Location	18
Teaching Status	20
Hospital Ownership	25
Bed Size	29
Selection of Stratifiers	29
Final Sample Design	31
Weights	35
Hospital Weights	35
Discharge Weights	35
Limitations of the NEDS	36
EXISTING FEDERAL AND NON-FEDERAL ED DATA SOURCES	37
VALIDITY AND RELIABILITY OF THE NEDS	39
Assessment of Bias	39
Comparison of ED Data Sources	39
Variance Contributions	48
Future Variance Studies	51
POLICY ASSESSMENT	52
ED Issues from the Institute of Medicine Report	53
ED Issues in Healthy People 2010	56

ED Stakeholder Analysis	59
DISEASE TRACKING	63
Simulated disease tracking activity (Influenza-like Illness).....	63
TIMING AND COST.....	70
Building Blocks for the NEDS	70
Creation of the NEDS	72
Publicly-Released NEDS.....	72
SUMMARY AND RECOMMENDATIONS	73
APPENDIX A: HCUP PARTNERS WITH EMERGENCY DEPARTMENT DATA PARTICIPATING IN THE 2005 NEDS FEASIBILITY STUDY	A-1
APPENDIX B: RECOMMENDED DATA ELEMENTS FOR THE NEDS.....	B-1
APPENDIX C: EMERGENCY DEPARTMENT DATA SOURCES.....	C-1
Federal Data Sources	C-1
BioSense	C-1
Drug Abuse Warning Network (DAWN).....	C-2
HCUPnet.....	C-2
National Electronic Injury Surveillance System (NEISS).....	C-3
National Hospital Ambulatory Medical Care Survey (NHAMCS).....	C-4
National Health Interview Survey (NHIS).....	C-5
National Electronic Injury Surveillance System All-Injury Program (NEISS-AIP, WISQARS)	C-6
Sources of Trauma Data	C-7
National Trauma Data Bank (NTDB)	C-7
Trauma Information Exchange Program (TIEP)	C-8
Other Sources of Emergency Department Data.....	C-8
American Hospital Association Annual Survey of Hospitals.....	C-8
Emergency Department Internet Query System (EDIQS)	C-9
EMS Ambulance Run Report System.....	C-9
National Emergency Department Inventory (NEDI-USA)	C-10
Timely Data Resources, Inc. Emergency Room Database	C-10
Verispan Hospital Market Profiling Solution©.....	C-11
Verispan Healthcare Market Index©	C-11
ED Information Systems Clearinghouse.....	C-12
General Healthcare Sources	C-12
Area Resource File (ARF)	C-12
Community Tracking Study (CTS).....	C-13
EMERGENCY ID NET.....	C-13
Medical Expenditure Panel Survey (MEPS).....	C-14
National EMS Information Agency Project (NEMSIS)	C-15
APPENDIX D: VALIDITY AND RELIABILITY OF NEDS COMPARISON TABLES	D-1

INDEX OF TABLES

TABLE 1. PERCENTAGE OF U.S POPULATION AND AHA ED VISITS CAPTURED IN THE 23 HCUP ED STATES PARTICIPATING IN THE NEDS, 2005 **6**

Table 2. Percentage of Records in the 2005 SEDD with ED Services Using the HCUP Criteria	8
Table 3. Comparison of HCUP and AHA ED Visit Counts for Community, Non-Rehabilitation Hospitals	10
Table 4. States in U.S. Census Regions	15
Table 5. Regression Results	30
Table 6. NEDS Stratifiers	31
Table 7. NEDS Sampling Rates, 2005	33
Table 8. Sources of Emergency Department Data and Usage in Feasibility Study	38
Table 9. Description of 2005 ED Data Sources	39
Table 10. 25 Principal CCS Diagnosis Code for NHAMCS and NEDS, 2005	45
Table 11. Resampling Results (1000 samples) of ED Visit Counts by Age Category, 2005	50
Table 13. Healthy People 2010 Objectives	57
Table 14. Hospital-Based Emergency Department Stakeholder Groups in the U.S.	59
Table D-1a. Estimates of Emergency Department Visits, Total U.S., 2005 – Discharge Data	D-1
Table D-1b. Estimates of Emergency Department Visits, Total U.S., 2005 – Facility-Based Surveys	D-1
Table D-1c. Estimates of Emergency Department Visits, Total U.S., 2005 – Household Based Surveys	D-1
Table D-2a. Estimates of Emergency Department Visits by Geographic Region, 2005 – Discharge Data	D-2
Table D-2b. Estimates of Emergency Department Visits by Geographic Region, 2005 – Facility-Based Surveys	D-3
Table D-2c. Estimates of Emergency Department Visits by Geographic Region, 2005 – Household Based Surveys	D-4
Table D-3. Estimates of Emergency Department Visits by Patient Characteristics, 2005	D-5
Table D-4. Estimates of Emergency Department Visits by Hospital Characteristics, 2005	D-7
Table D-5. Most Common Reasons for All Emergency Department Visits, 2005	D-9

Table D-6. Most Common Reasons for Treat and Release Emergency Department Visits, 2005	D-11
Table D-7. Most Common Reasons for Emergency Department Visits that Resulted in an Admission, 2005	D-13
Table D-8a. Focus on Chronic and Acute Conditions seen in Emergency Departments, 2005. D-15	
Table D-8b. Definitions for Chronic and Acute Conditions seen in Emergency Departments, 2005	D-16
Table D-9a. Focus on Injuries seen in Emergency Departments, 2005	D-19
Table D-9b. Definitions (Injury Surveillance Workgroup 2003) for Injuries seen in Emergency Departments, 2005	D-20

INDEX OF FIGURES

Figure 1. HCUP States with Emergency Department Data, 2005	5
Figure 2. Distribution of Annual ED Visits between HCUP ED and Other States, 2005	13
Figure 3. Percentage of ED Visits in HCUP ED States, by Region, 2005	14
Figure 4. Number of Hospitals in HCUP ED States, by Region, 2005	15
Figure 5. Percentage of Hospitals in HCUP ED States, by Region, 2005	16
Figure 6. Percentage of Trauma Hospitals in HCUP ED States, by Region, 2005	17
Figure 7. Percentage of Hospitals in HCUP ED States, by Urban-Rural Location, 2005	18
Figure 8. Percentage of Trauma Hospitals in HCUP ED States, by Urban-Rural Location, 2005	19
Figure 9. Percentage of All U.S. Hospitals that are Trauma Facilities, by Urban-Rural Location, 2005	20
Figure 10. Number of Hospitals in the Northeast Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005	21
Figure 11. Number of Hospitals in the Midwest Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005	22
Figure 12. Number of Hospitals in the South Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005	23
Figure 13. Number of Hospitals in the West Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005	24

Figure 14. Number of Hospitals in the Northeast Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005.....	25
Figure 15. Number of Hospitals in the Midwest Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005.....	26
Figure 16. Number of Hospitals in the South Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005.....	27
Figure 17. Number of Hospitals in the West Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005.....	28
Figure 18. Emergency Department Visit Counts (in thousands) in the United States, 2005.....	41
Figure 19. ED Visit Counts (in thousands) by Census Region, 2005	42
Figure 20. Percentage of Treat and Release and Inpatient Admission ED Visits, 2005	42
Figure 21. Distribution of Primary Payer for ED Visits, 2005	43
Figure 22. Acute and Chronic Conditions for ED Visits (in thousands), 2005.....	44
Figure 23. Unintentional Injuries (in thousands) Treated in the ED, 2005	46
Figure 24. Intentional Injuries (in thousands) Treated in the ED, 2005.....	47
Figure 25. Bootstrapping Estimates for Ages 0-17, 2005	48
Figure 26. Bootstrapping Estimates for Ages 18-44, 2005	49
Figure 27. Bootstrapping Estimates for Ages 45-64, 2005	49
Figure 28. Bootstrapping Estimates for Ages 65+, 2005	50
Figure 29. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, January 1, 2005 – October 1, 2005	65
Figure 30. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, Northeast Region, January 1, 2005 – October 1, 2005	66
Figure 31. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, Midwest Region, January 1, 2005 – October 1, 2005.....	67
Figure 32. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, South Region, January 1, 2005 – October 1, 2005.....	68
Figure 33. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, West Region, January 1, 2005 – October 1, 2005.....	69
Figure 34. Estimated and Actual Arrival of 2006 HCUP Emergency Department Data Based on Percentage of Total U.S. Census Regions	71

INTRODUCTION

Background and Motivation

Emergency departments serve a dual role in the United States health infrastructure: as a point of entry for approximately 50% of inpatient admissions and as a treatment setting for treat and release outpatient visits (Merrill and Owens 2007). It is becoming evident that emergency departments are a critical part of the medical infrastructure in the United States. A recent Institute of Medicine (IOM) report, *Hospital-Based Emergency Care: At the Breaking Point* (2007), highlights many issues pertinent to U.S. hospital-based emergency care, such as overcrowding, boarding (i.e., holding patients until an inpatient bed is available), uncompensated care, inadequate disaster preparedness, inadequate staffing, and rural care. Addressing systematic issues with emergency care requires data-based analyses to assess the effectiveness of interventions and investments.

To aid in understanding and improving this vital component of the nation's health infrastructure, the Agency for Healthcare Research and Quality (AHRQ) and Thomson Reuters (TR) launched a study of the feasibility, practicability, and usefulness of constructing a Nationwide Emergency Department Sample (NEDS). Under the AHRQ Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup"), there are two databases—the State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID)—that constitute the building blocks for the NEDS. The SEDD capture discharge information on emergency department visits that do not result in an admission (e.g., treat and release or transfer to another hospital). The SID contain information on patients initially seen in the emergency room and then admitted to the same hospital. These databases provide a unique resource to support health researchers, policy makers, and decision makers in epidemiology, environmental planning, policy analysis, health organization, public health, health planning, and disaster planning. The HCUP family of administrative longitudinal databases is created by AHRQ through a Federal-State-Industry partnership.

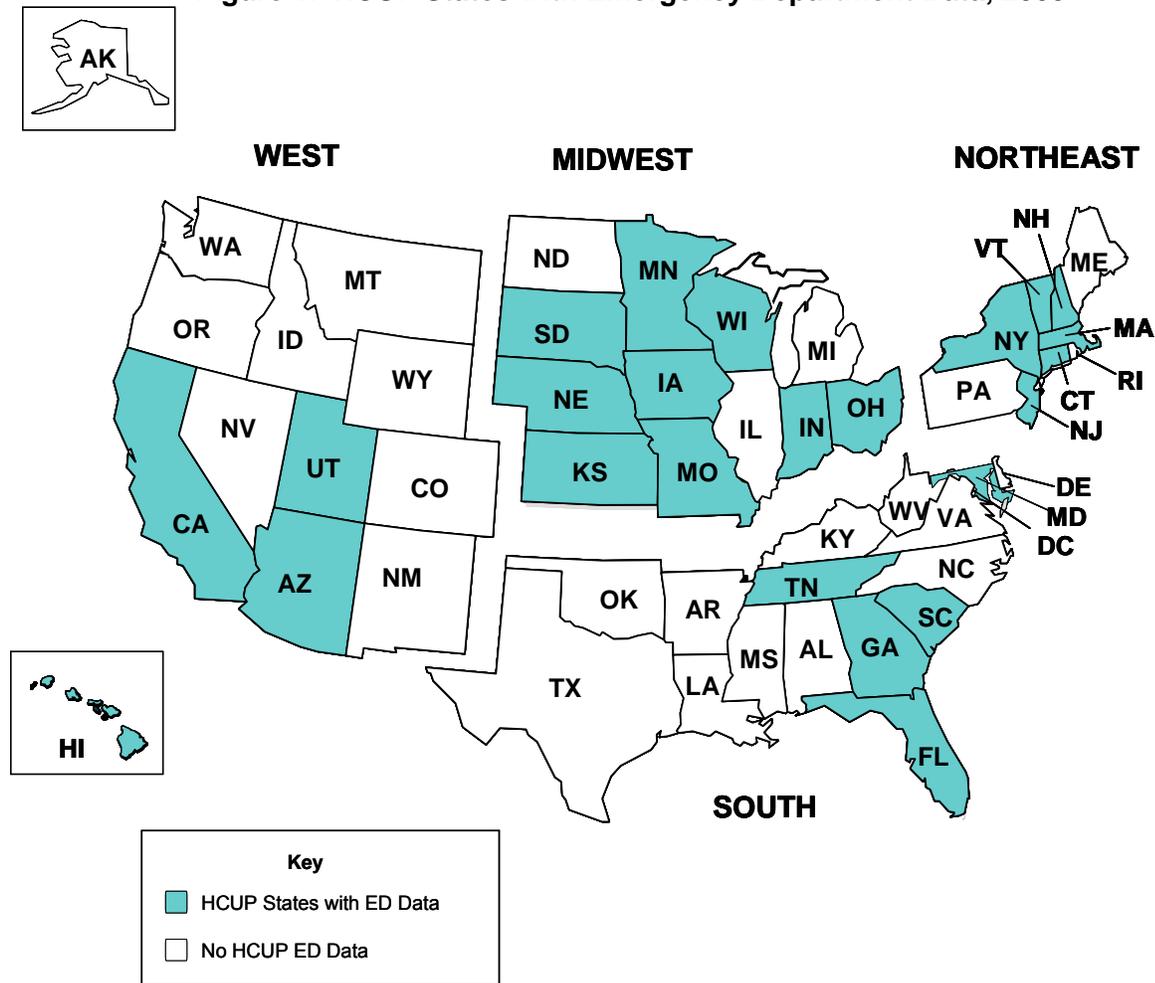
U.S. Hospital-Based Emergency Departments

In 2005, there were 3,795 hospital-based emergency departments (EDs) in the United States (Nawar, Niska et al. 2007), employing 25,500-32,000 emergency room physicians (Moorhead, Gallery et al. 2002; Institute of Medicine 2007) and a large non-physician workforce. Although the largest proportion of ambulatory health care in the U.S. occurs in physician offices, approximately 10% of all ambulatory medical care visits occur in the ED (Nawar, Niska et al. 2007). A wide variety of patients receive unscheduled health care in EDs for conditions ranging from accidental injuries and life-threatening conditions to illnesses that could be treated in a primary care setting.

There are 24 HCUP Partner states that provided both inpatient source and treat and release ED data to HCUP for 2005 and are candidates for participation in the NEDS. Appendix A contains the list of these HCUP Partner data organizations. The 24 states (Figure 1) are representative of the nation in terms of both population and number of ED visits. The 24 states include 54.8% (65,981,713) of the ED visits recorded in the 2005 American Hospital Association (AHA) Annual Survey Database.

Twenty-three states participated in the NEDS feasibility study (HCUP ED states).² By region, the HCUP ED states contain 36.7%, 38.3%, 64.8%, and 61.8% of the ED visits in the Northeast, South, Midwest, and West regions, respectively (Table 1). Based on 2005 U.S. Census Bureau data, the HCUP ED states include 51.1% (151,508,109) of the U.S. population (U.S. Census Bureau 2005). Regionally, the HCUP ED states comprise 37.6%, 39.7%, 64.4%, and 67.1% of the population in the Northeast, South, Midwest, and West regions, respectively.

Figure 1. HCUP States with Emergency Department Data, 2005



² New York submitted both inpatient source and treat and release ED data to HCUP for 2005 but was not available to participate in the NEDS feasibility study.

Table 1. Percentage of U.S Population and AHA ED Visits Captured in the 23 HCUP ED States Participating in the NEDS, 2005

Region	U.S. Population in HCUP ED States	Percentage of U.S. Population in HCUP ED States (%)	AHA ED Visits in HCUP ED States	Percentage of AHA ED Visits in HCUP ED States (%)
Northeast	20,559,955	37.6	8,390,417	36.7
South	42,680,870	39.7	18,373,753	38.3
Midwest	42,451,066	64.4	17,976,008	64.8
West	45,816,218	67.1	13,460,009	61.8
Nation	151,508,109	51.1	58,200,187	48.3

Emergency department visits from these 23 states are aggregated into a multi-state database containing over 54 million ED visits in 2005. However, this aggregated multi-state database is representative of the ED states and not the nation as a whole. Like the Nationwide Inpatient Sample (NIS), sampling techniques may be applied to the multi-state data to create a nationwide sample of ED visits.

A nationwide version of the ED services represented in the SID and SEDD databases would provide an exceptional resource for high-profile emergent health delivery issues. One of the most distinctive features of the NEDS is that its large sample size will allow for the study of relatively uncommon disorders, procedures, and hospital types.

Overview and Report Organization

This report is intended to provide a comprehensive overview of the feasibility of creating a NEDS from the HCUP data. The report is divided into seven sections: Database Design, Weighting and Stratification, Existing Federal and Non-Federal Data Sources, Validity and Reliability of the NEDS, Policy Assessment, Disease Tracking, and Timing and Cost.

DATABASE DESIGN

In this section we describe the design considerations for building a NEDS from HCUP data. Information on patients with ED events are contained in two HCUP databases:

- SEDD capture discharge information on all emergency department visits that do not result in an admission (e.g., treat and release or transferred to another hospital).
- SID contain information on patients initially seen in the emergency room and then are admitted to the same hospital.

Both HCUP databases contain a core set of clinical and non-clinical information defined in a uniform scheme for all patients, regardless of payer, making it possible to combine records across data types.

This feasibility study used the 2005 SEDD and SID from the 23 HCUP Partner states that provided both types of data. This section on database design discusses the identification of ED records in the HCUP databases, the selection of hospitals for possible inclusion in the NEDS,

the agreement between the HCUP databases and AHA Annual Survey Database on the number of ED visits, and a recommended file structure and variable list.

Identification of HCUP Records with Emergency Department Services

In creating the NEDS, special consideration needed to be given to the identification of ED records because not all HCUP data sources provide sufficient information to clearly identify these records. In the SID, discharges for patients initially seen in the ED were identified by any one of the following criteria:

- Services to emergency department revenue center codes 450-459 reported on discharge record
- Positive emergency department charge, when revenue center codes were not available
- CPT code of 99281-99285 indicating emergency department physician services reported on record
- Admission source of ED.

The above criteria are listed in hierarchical order, but any one criterion was acceptable to identify an ED record. The percentage of inpatient records identified as having ED services typically ranged from 30%-50%.

The same criteria were used for the SEDD, but the percentage of records identified varied considerably from 16% to 100%. Table 2 lists the percentage of 2005 SEDD records not identified as ED records using the above HCUP criteria. Six of the 23 states (AZ, CA, HI, OH, MA, and WI) with 2005 SEDD data did not provide ED charge information (either in revenue codes or a separate charge field). This limited the ability to clearly identify ED records. Therefore, the identification of ED records in the six states that did not provide ED charge information was evaluated on a state-by-state basis.

- AZ, CA, WI, HI, and MA: In each case, the HCUP Partner provided a source file that contained only ED records. Because the data source uniquely identified ED records, all of the SEDD records were considered to be ED records, even though they did not satisfy HCUP criteria.
- OH: The HCUP Partner provided a large outpatient database that combined records for ED services with other outpatient visits, such as ambulatory surgery, outpatient clinic, lab, etc. Each record contained a state-defined indicator of ED and fast-track ED services. Ohio outpatient records with either designation were considered to be ED records, even though they did not satisfy the HCUP criteria.

Table 2. Percentage of Records in the 2005 SEDD with ED Services Using the HCUP Criteria

State	Percentage of records in the 2005 SEDD identified as ED by HCUP criteria (HCUP_ED > 0)	Percentage of records in the 2005 SEDD <u>not</u> identified as ED by HCUP criteria (HCUP_ED =0)	Data elements available on the SEDD to apply HCUP criteria for identifying ED records		
			ED charge information	CPT codes	Admission source
AZ	16%	84%	--	Y	--
CA	39%	61%	--	Y	--
OH	66%	34%	--	--	Y
WI	70%	30%	--	Y	Y
KS	88%	12%	Y	--	Y
MN	90%	10%	Y*	Y	Y
HI	93%	7%	--	Y	Y
MA	95%	5%	--	Y	Y
MO	98%	2%	Y	Y	Y
CT	99%	1%	Y	--	Y
FL	99%	1%	Y	Y	--
VT	100%	0%	Y*	Y	Y
UT	100%	0%	Y	--	Y
MD	100%	0%	Y*	Y	Y
SD	100%	0%	Y*	Y	--
IA	100%	0%	Y*	Y	--
TN	100%	0%	Y*	--	Y
NE	100%	0%	Y*	Y	Y
SC	100%	0%	Y	--	Y
GA	100%	0%	Y	Y	Y
NJ	100%	0%	Y*	--	Y
IN	100%	0%	Y	Y	--
NH	100%	0%	Y	--	--

“Y” indicates data element is available on the SEDD; “--” indicates data element is not available.
 * indicates the eight states that provide line-item detail with revenue codes and associated charges.

Selection of Hospitals within the States

There were various considerations in the selection of hospitals for inclusion in a NEDS. Was hospital-level information such as type of hospital, ownership, etc. available? Should hospitals in the database be limited to a specific type of acute-care hospital? Should hospitals in the SID and SEDD be excluded because of the availability of different types of ED data (inpatient admissions or treat and release)? These issues are addressed below.

Limiting HCUP Hospitals to Those that are Included in the AHA

Most HCUP Partners provide information on all acute care hospitals in the respective state. At times, small or rural hospitals are exempt from reporting to state government data

organizations. In other cases, private data organizations are restricted to member hospitals and may not provide information on all hospitals in the state.

For consistency across states, HCUP defined hospitals in accordance with the AHA Annual Survey Database (Health Forum, LLC © 2007). The AHA data include demographic, utilization, financial, and other characteristics of hospitals in the U.S. and U.S. territories. Hospitals were limited to those that were included in the AHA data to ensure that there was consistency in the definition of the type of hospital and the availability of information on important hospital characteristics. More than 99% of the hospitals in the 23 HCUP states with 2005 ED data (accounting for more than 99% of the total discharges) could be linked to the AHA data. Data from the remaining hospitals that could not be linked were excluded from consideration in the NEDS.

Section of Community, Non-Rehabilitation Hospitals

Various types of hospitals were included in the HCUP databases. Because of the focus on ED events, hospitals were limited to community hospitals, defined by the AHA as "all non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of institutions." Included among community hospitals were specialty hospitals such as obstetrics-gynecology, ear-nose-throat, short-term rehabilitation, orthopedic, and pediatric institutions. Also included were public hospitals and academic medical centers. Excluded were long-term hospitals, psychiatric hospitals, and alcoholism/chemical dependency treatment facilities.

Included in the AHA definition of community hospitals are short-term rehabilitation hospitals. Only four hospitals in the 2005 AHA file were identified as short-term rehabilitation hospitals and reported having an emergency department. Two of the hospitals had no ED visits; the other two were not included in HCUP ED states. Therefore, for the NEDS, community hospitals that are also short-term rehabilitation hospitals were excluded.

Minimum Requirement Concerning the Reporting of ED Events

There were over 100 hospitals in the 23 HCUP states that reported only inpatient ED events. Because the database was intended to represent all types of ED events, hospitals with more than 90% of their ED events expressed as inpatient records were excluded.

Comparison of HCUP and AHA ED Visits

The AHA data includes the number of ED visits for each hospital. Similar to HCUP, the AHA count of emergency room visits reflects the number of visits to the emergency unit, including those admitted to the inpatient areas of the hospital.

Table 3 lists the number of ED visits reported in the AHA and the HCUP SID and SEDD for the 23 states. On average, the ED visit counts in HCUP were about 3% less than the AHA ED counts. In 10 of 23 HCUP states, the total number of ED visits in the 2005 HCUP SID and SEDD were within 5% of the ED visits reported in the 2005 AHA data. An additional six states had a difference between 5% and 10%. The remaining seven states differed by 10% to 27%. After accounting for hospitals missing from HCUP database, but reported in the AHA, the average difference narrowed to almost 1%, though large differences in some states still existed.

Table 3. Comparison of HCUP and AHA ED Visit Counts for Community, Non-Rehabilitation Hospitals

State	2005 HCUP ED visits	2005 AHA ED visits	Percent difference	ED visits from hospitals in AHA but not in HCUP	Adjusted HCUP ED visits (including missing hospitals)	Adjusted Percent Difference
CA	10,083,643	9,537,119	5.7%	177,446	10,261,089	7.6%
NJ	3,204,622	3,095,648	3.5%	14,251	3,218,873	4.0%
MD	2,222,277	2,160,010	2.9%	0	2,222,277	2.9%
GA	3,774,318	3,728,781	1.2%	22,160	3,796,478	1.8%
HI	342,050	340,095	0.6%	4,742	346,792	2.0%
FL	7,055,080	7,020,512	0.5%	23,148	7,078,228	0.8%
CT	1,428,416	1,452,412	-1.7%	43,113	1,471,529	1.3%
TN	3,005,537	3,105,850	-3.2%	144,693	3,150,230	1.4%
AZ	2,028,027	2,101,490	-3.5%	93,616	2,121,643	1.0%
MO	2,527,570	2,621,877	-3.6%	1,775	2,529,345	-3.5%
MA	2,762,061	2,891,408	-4.5%	42,136	2,804,197	-3.0%
VT	240,116	256,116	-6.2%	0	240,116	-6.2%
NH	579,481	621,217	-6.7%	0	579,481	-6.7%
SC	1,634,180	1,756,187	-6.9%	54,487	1,688,667	-3.8%
IN	2,404,156	2,615,562	-8.1%	30,465	2,434,621	-6.9%
UT	745,893	820,248	-9.1%	18,677	764,570	-6.8%
IA	999,415	1,118,233	-10.6%	13,067	1,012,482	-9.5%
WI	1,801,930	2,015,906	-10.6%	46,010	1,847,940	-8.3%
OH	4,904,293	5,660,787	-13.4%	236,048	5,140,341	-9.2%
MN	1,484,858	1,718,517	-13.6%	119,713	1,604,571	-6.6%
SD	186,267	226,774	-17.9%	21,012	207,279	-8.6%
NE	415,558	564,912	-26.4%	18,189	433,747	-23.2%
KS	697,184	963,044	-27.6%	51,149	748,333	-22.3%
Total for 23 states	54,526,932	56,392,705	-3.3%	1,175,897	55,702,829	-1.2%

To test if the AHA ED visit counts included both ED and urgent care visits, the number of ED visits were calculated in the HCUP Ohio databases with and without urgent care visits. Ohio is the only state that clearly identifies these records in their HCUP data. The HCUP ED visits for Ohio were about 10% lower than the AHA counts. The addition of the urgent care visits did not bring the HCUP ED visit count up to the AHA count, so urgent care did not explain the difference.

Differences in state-level ED counts can be explained by differences in the definition of an ED visit and the type of information collected in HCUP and the AHA data. The HCUP databases are based on discharge abstract data, and we have required that the ED visit record include evidence of an ED service (i.e., emergency department charge, physician CPT code, or admission source). In contrast, the AHA Annual Survey data is collected directly from health care facilities by survey. Data are estimated for non-reporting hospitals and for incomplete responses according to the missing hospital's most recent information, statistical models, or data obtained from similar hospitals.

We concur with Sullivan and colleagues (2006) who stated, “To date, no single, consistent definition of an ED exists. An ED is commonly understood to mean a `hospital room or area staffed and equipped for the reception and treatment of persons with conditions (as illness or trauma) requiring immediate medical care.’ However, legal and administrative definitions vary widely” (Sullivan, Richman et al. 2006).

File Structure

Because of the size of the database and the difference in information collected on SEDD and SID records, the NEDS is divided into five different file types:

- Core file with discharge-level records
- Supplemental *ED* file with CPT-4 and ICD-9-CM procedures performed in the ED
- Supplemental *inpatient* file with data elements that are not specific to the emergency department such as total charge, length of stay, and procedures from a SID record
- Hospital file with hospital characteristics
- Data development file with dates.

Recommended Variables

After analyzing fields available from the HCUP Partner states and the AHA, a minimum set of common fields to be included on the NEDS was determined. The NEDS contains more than 100 clinical and non-clinical variables included in a hospital discharge abstract, such as:

- ICD-9-CM diagnoses and external cause of injury codes
- ICD-9-CM and CPT procedures
- Patient demographics (e.g., gender, age, median household income quartile, and, for some states, race)
- Expected payment source (e.g., Medicare, Medicaid, private insurance, self-pay; for some states, additional discrete payer categories, such as managed care)
- Total charges and ED charges
- Urban-rural location of the patient (e.g. large metropolitan, small metropolitan, micropolitan, and non-core).

Appendix B contains the complete list of recommended NEDS variables. Special consideration is given to the differences in definitions of data elements from the SEDD and SID. For example, the data element TOTCHG contains the total charge for ED services if the record was from the SEDD, but contains the total charge for ED *and* inpatient services if the record was from the SID. We have renamed or revised traditional HCUP data elements as appropriate for clarity.

Data Standards and Values

The data elements in the NEDS are consistent with the other HCUP databases. The following objectives guided the definition of data elements included in all HCUP databases:

- Ensure usability without extensive editing by analysts.
- Retain the largest amount of information available from the original sources, while still maintaining consistency among sources.

- Structure the information for efficient storage, manipulation, and analysis.

More information on the coding of HCUP data elements is available on HCUP User Support (HCUP-US) Website (<http://www.hcup-us.ahrq.gov/db/coding.jsp>).

Missing Data and Variables

Some data elements are not available for all states. However, because of their importance, we recommend including these data elements in the NEDS whenever available. The following special SAS missing values are used for HCUP data elements to indicate details of data availability and quality:

- Missing Data (.): When the information is not available from the HCUP Partner.
- Invalid Data (.A): When the source data contain undocumented, out-of-range, or invalid values (e.g., an invalid date or an alpha character in a numeric field).
- Inconsistent Data (.C): Related data elements within the same record were checked for logical consistency (e.g., a procedure of hysterectomy reported with a sex of male is inconsistent). More information on HCUP quality control procedures is available on the HCUP-US Website (<http://www.hcup-us.ahrq.gov/db/quality.jsp>).

WEIGHTING AND STRATIFICATION

While it would be ideal to have information from all payers for all ED visits in the U.S. to create national estimates of ED services and visits, no such data source exists. Akin to the NIS, national estimates can be created using the information from the 23 HCUP Partner states by utilizing weighting and stratification methods. The weighting and sampling strategies are described and assessed in this section.

Universe of Hospital-Based Emergency Departments

The first issue in creating a nationally representative sample was the identification of the universe of hospital-based emergency departments in the United States. Possible sources were the AHA Annual Survey, Verispan, LLC databases, and the Centers for Medicare and Medicaid (CMS) Hospital Cost Reports. The AHA Annual Survey Database was the best application for a number of reasons. First, the crosswalk linkage from the HCUP databases to the AHA data is already established and the AHA data provides the necessary hospital characteristics such as teaching status. Second, the AHA Annual Survey Database is also used as the universe for the HCUP NIS.

Originally, the universe was defined as any community, non-rehabilitation hospital reported in the AHA within the 50 states and the District of Columbia which was identified as having emergency department services (HCUP AHA variable S500 = 1) and reporting ED visits (HCUP AHA variable V010 > 0). However, when comparing the indicator of ED services with the number of ED visits reported in the AHA, there were inconsistencies. In the HCUP states, 63 hospitals, mostly from California, but also from eight other states, reported a positive number of ED visits (V010>0), yet indicated that the hospital did not have ED services (S500=0). An Internet search was conducted on this sample of HCUP hospitals, which confirmed the presence of an emergency department using information from the hospital's Website. A concern associated with including the criteria that the hospital reported having an ED was that a biased group of ED hospitals would be dropped (e.g., too many CA hospitals and possibly some

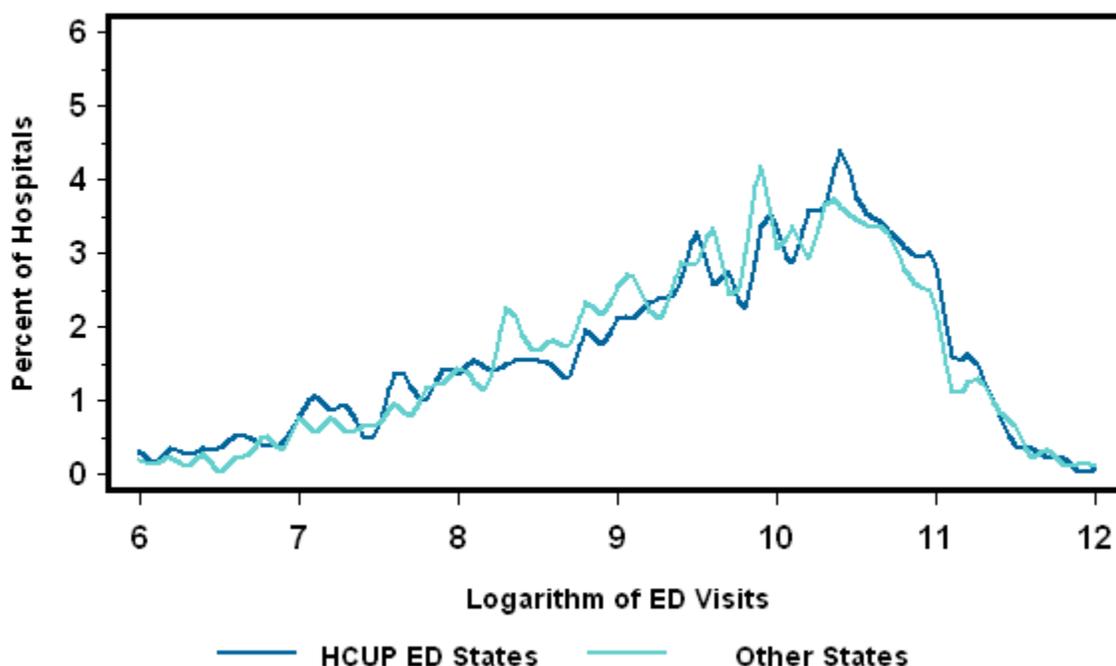
rural hospitals). Given the evidence, the ED universe was redefined as AHA community, non-rehabilitation hospitals with ED visits (V010 > 0). The AHA universe of ED hospitals included 4,884 hospitals.

Sampling Frame

The sampling frame was limited to a subset of the universe: hospital-based ED units in the states for which HCUP ED data is available. Using the 2005 AHA data as a universe, the representation of ED hospitals and visits in the 2005 HCUP ED data was examined.

Figure 2 displays the distribution of ED visits (HCUP AHA Variable V010) between HCUP ED states and other states. The figure shows that the annual distribution of hospitals by volume of visits is similar between HCUP ED (dark blue) and other states (teal).

Figure 2. Distribution of Annual ED Visits between HCUP ED and Other States, 2005



Description of Sampling Methods

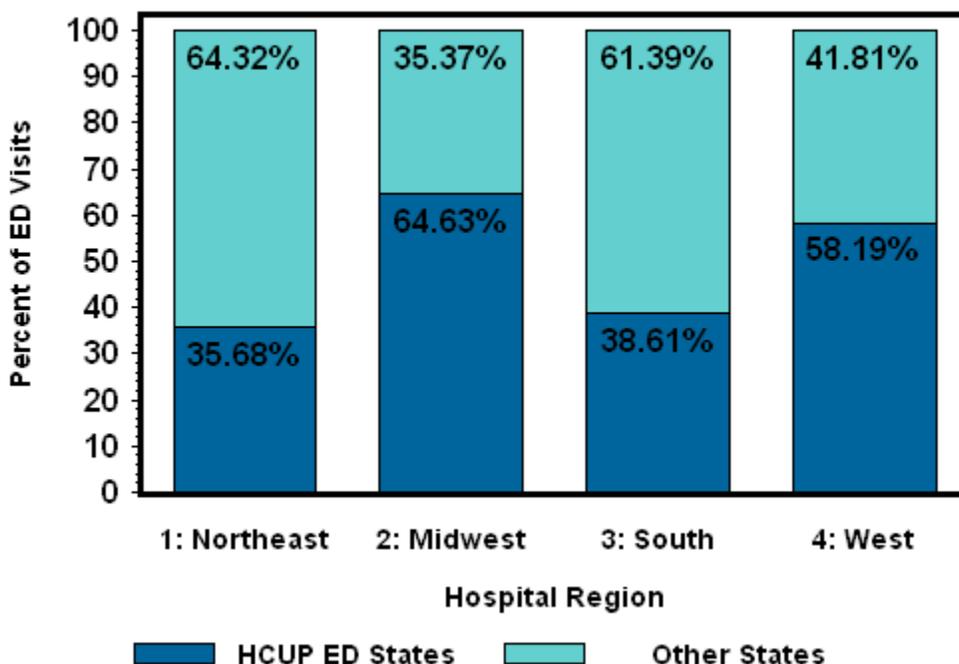
One particularly salient issue was the sampling method to employ when creating the NEDS. In this case, there were two approaches to consider. The first approach was to take a stratified sample of EDs and select all patients within the sample of EDs. This is similar to the HCUP NIS design. The second approach was to draw a sample of patients from all of the EDs in HCUP ED states. This is similar to the design of the HCUP Kids' Inpatient Database (KID).

The main objective of a stratified sample is to ensure that the sample is representative of the target universe which, in this case, is derived from the AHA inventory of ED hospitals. Since the universe was hospital-derived, a sample of EDs (similar to the NIS) was selected.

Stratification becomes advantageous when the sampling frame (HCUP ED states) differs substantially from the target universe (all states). Using the 2005 AHA data as a universe, analyses were run to determine whether or not there were differences by region for HCUP ED states compared with other states.

Figure 3 shows that the percentage of ED visits represented by HCUP ED states within each region are sufficient to draw a sample from each region. HCUP ED visits are well represented in the Midwest and West and less so in the Northeast and South.

Figure 3. Percentage of ED Visits in HCUP ED States, by Region, 2005



One way to minimize the differences across regions is to draw a sample of ED hospitals from the HCUP ED states that is representative of ED hospitals across the U.S. This can be accomplished by stratifying on other important hospital characteristics, so that the NEDS represents a “microcosm” of U.S. EDs. For example, one goal of the sampling strategy would be to achieve about the same percentage of trauma hospitals in the NEDS as trauma hospitals in the entire U.S.

Possible Stratification Variables

The following hospital characteristics were investigated as possible sample stratification variables: region, designation as a trauma hospital, urban-rural location, ownership, teaching

status, and bed size. The representation of HCUP ED states and other states for each possible stratifier was examined.

U.S. Census Region

This is an important potential stratification variable because practice patterns may vary substantially by region. Table 4 lists the Census regions.

Table 4. States in U.S. Census Regions

Region	States
Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

Figure 4 and Figure 5 compare the number and percentage of ED hospitals for HCUP ED and other states by region. Similar to Figure 3 (the number of ED visits by region), the HCUP ED states are well represented in the Midwest and comprise a smaller percentage of hospitals in the Northeast and South.

Figure 4. Number of Hospitals in HCUP ED States, by Region, 2005

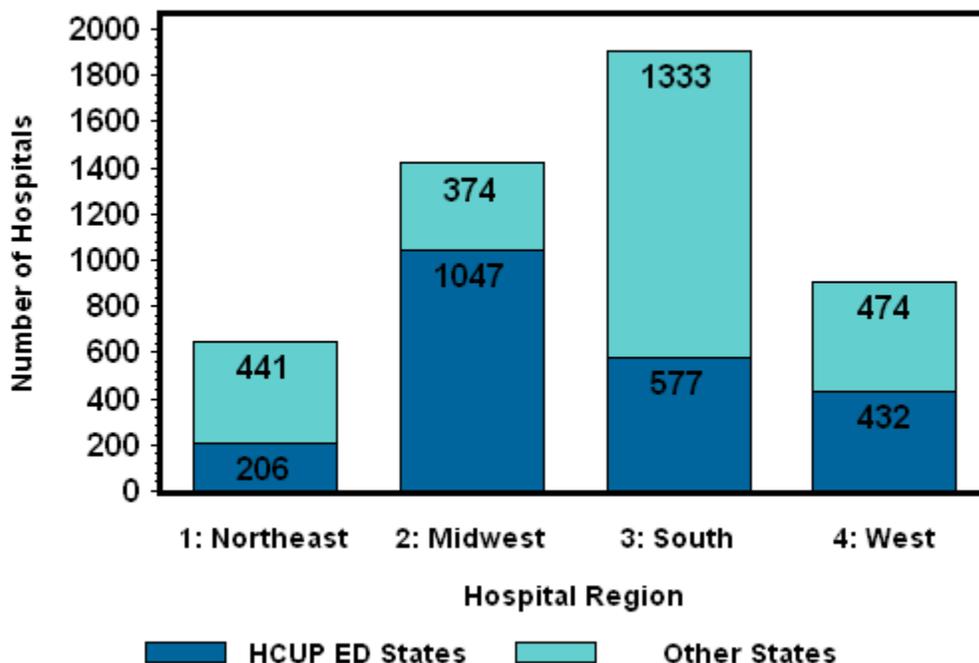
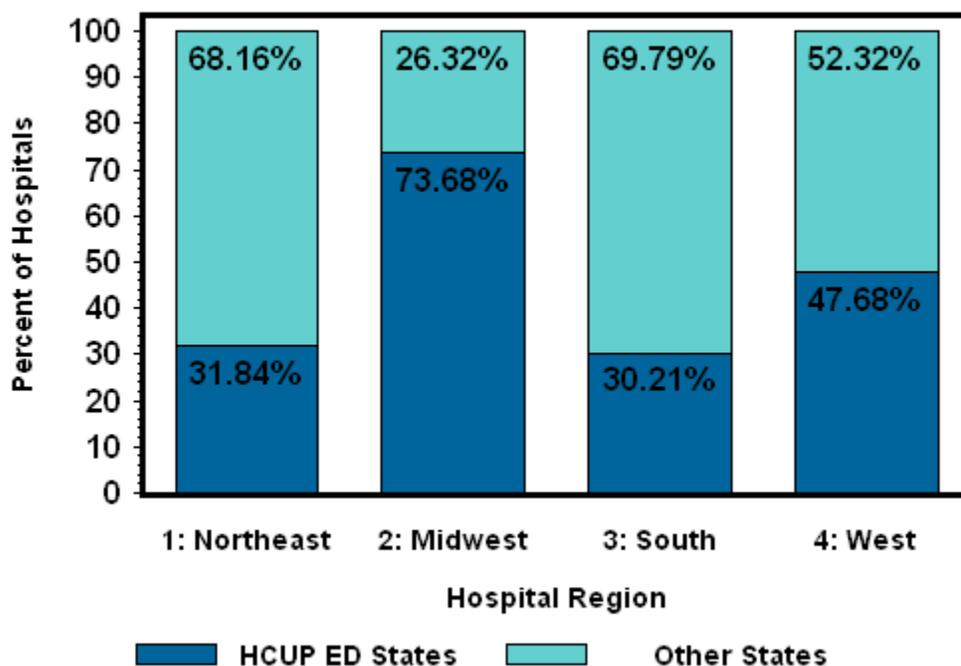


Figure 5. Percentage of Hospitals in HCUP ED States, by Region, 2005



Trauma Hospitals

A trauma center is a hospital equipped to provide comprehensive emergency medical services 24 hours a day, 365 days per year to patients suffering traumatic injuries. Hospitals are designated by a state or local authority or verified by the American College of Surgeons. There are five levels of trauma centers:

- Level I: Full range of specialists/equipment 24 hours a day. Has a surgical residency program, research programs, and serves as a referral resource for communities in nearby regions. These centers have a minimum of 1,200 admissions a year.
- Level II: Comprehensive trauma care in collaboration with a Level I center with essential specialties/equipment available 24 hours a day. These centers are not required to have teaching and research program.
- Level III: Resources for resuscitation, surgery and intensive care available but not full availability of specialists. These centers have transfer agreements with Level I and II centers
- Level IV/V: Resources are available for advanced trauma life support in remote areas.

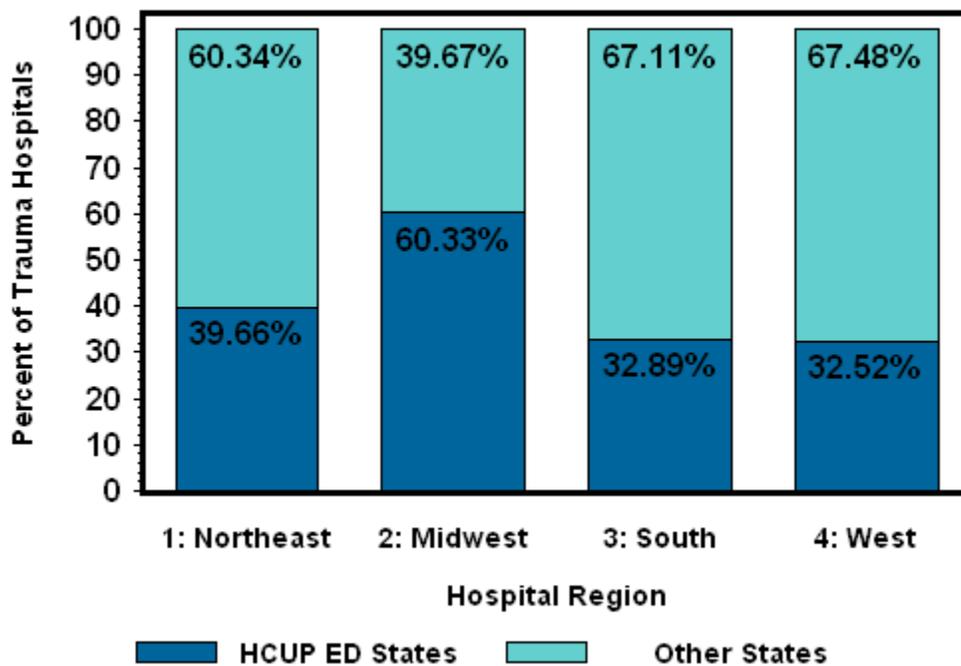
Trauma centers in urban-suburban America have been shown to be the most effective in treating complex injuries.

For this analysis, trauma centers were identified through the Trauma Information Exchange Program database (TIEP), a national inventory of trauma centers in the U.S. Information is collected by the American Trauma Society and the Johns Hopkins Center for Injury Research and Policy and funded by the Centers for Disease Control.

Hospital information from TIEP was matched to the AHA via the corresponding AHA hospital identifier and then added to the HCUP ED data. While TIEP does classify facilities by different levels of trauma care, we did not utilize this differentiation.

As shown in Figure 6, trauma hospitals are well represented among HCUP ED states.

Figure 6. Percentage of Trauma Hospitals in HCUP ED States, by Region, 2005



Urban-Rural Location

The urban-rural location of the EDs was assigned via the county of the hospital. This categorization is a simplified adaptation of the 2003 version of the Urban Influence Codes (UIC) (United States Department of Agriculture Economic Research Service 2007). The 12 categories of the UIC are combined into four broader categories that differentiate between large and small metropolitan, micropolitan, and non-urban residual:

- Large metropolitan area – areas with at least one million residents
- Small metropolitan area – areas with less than one million residents
- Micropolitan area – non-metropolitan area with at least 10,000 people or more
- Non-urban residual.

Figure 7 displays the percentage of hospitals represented by HCUP ED states within urban-rural location and verifies that HCUP hospitals are well represented in all categories.

Figure 7. Percentage of Hospitals in HCUP ED States, by Urban-Rural Location, 2005

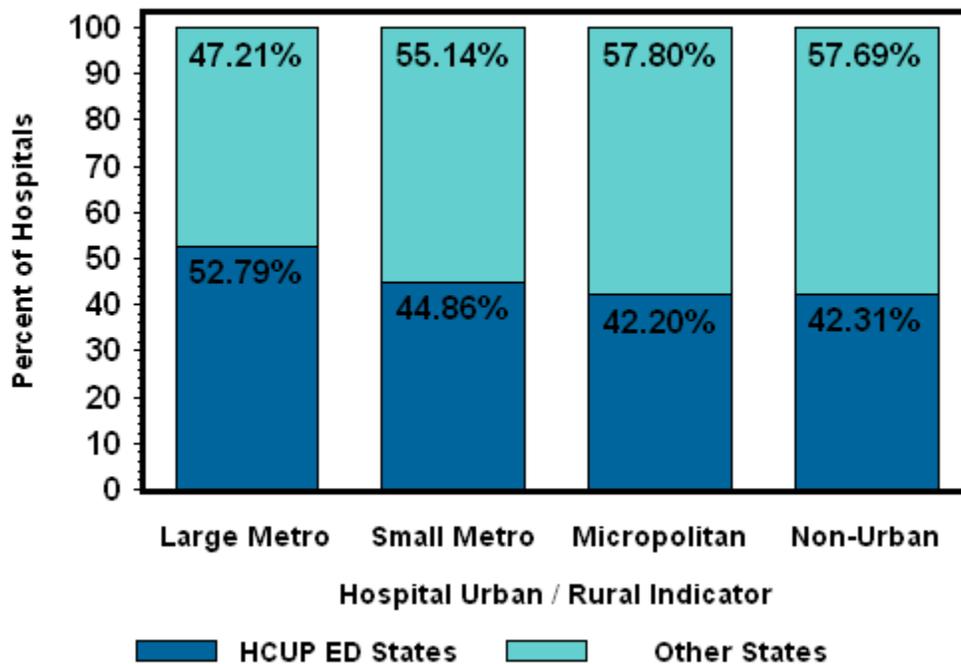
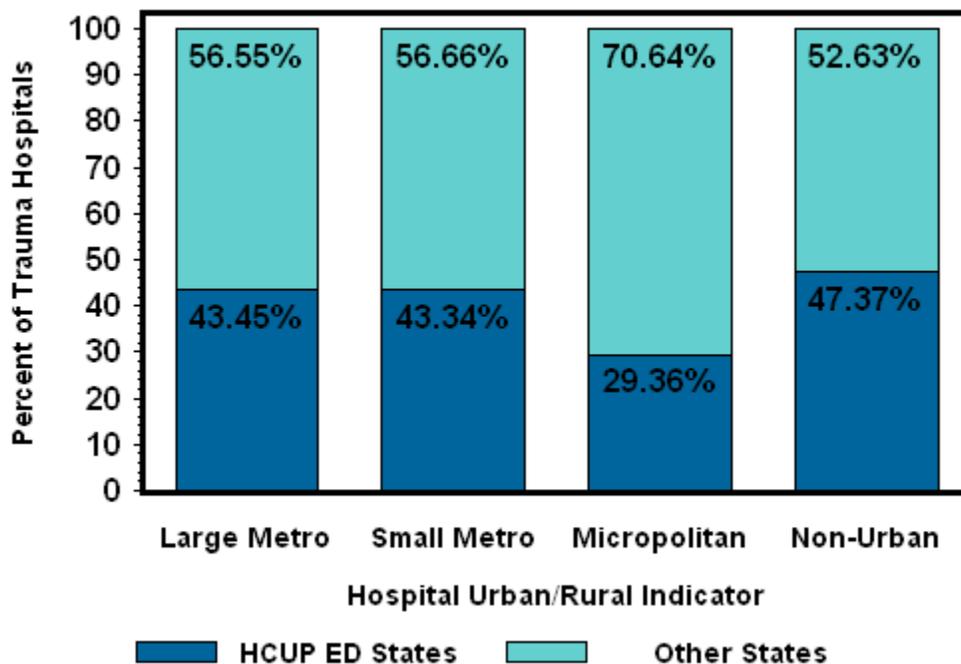


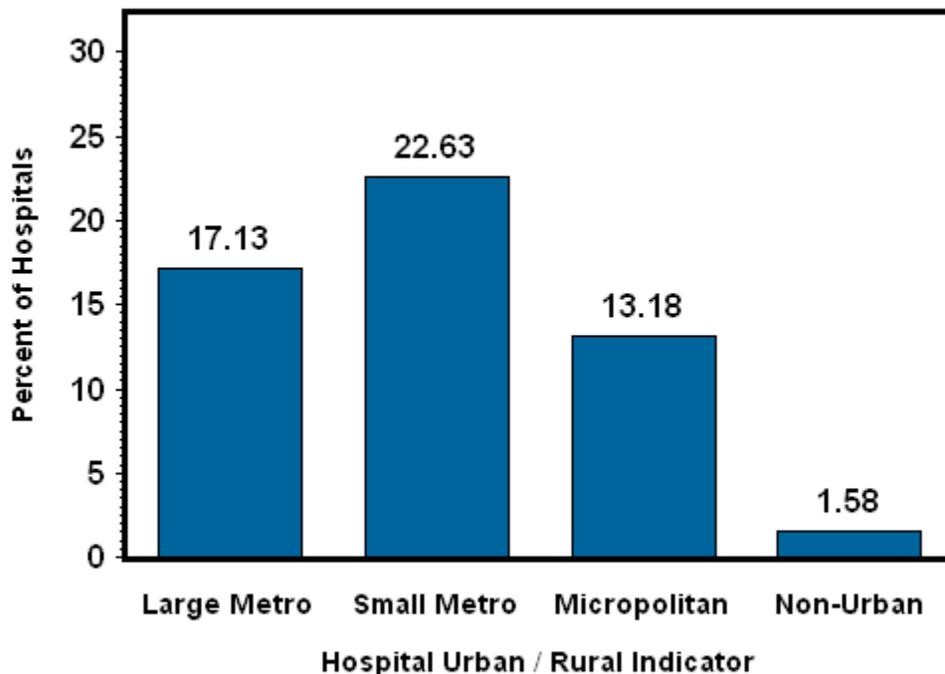
Figure 8 shows the percentage of trauma hospitals represented by HCUP ED states within urban-rural location.

Figure 8. Percentage of Trauma Hospitals in HCUP ED States, by Urban-Rural Location, 2005



While there is good representation of trauma hospitals in the HCUP states for all regions, there are very few non-urban trauma hospitals. Figure 9 displays the percentage of all hospitals that are trauma facilities by urban-rural location. Less than 2% of non-urban hospitals are designated as trauma centers. Because of small sample sizes in the universe of hospital-based EDs in the Northeast, South, and West, trauma hospitals were stratified by a combined category of micropolitan and non-urban. Detailed urban-rural stratification was possible in the Midwest.

Figure 9. Percentage of All U.S. Hospitals that are Trauma Facilities, by Urban-Rural Location, 2005



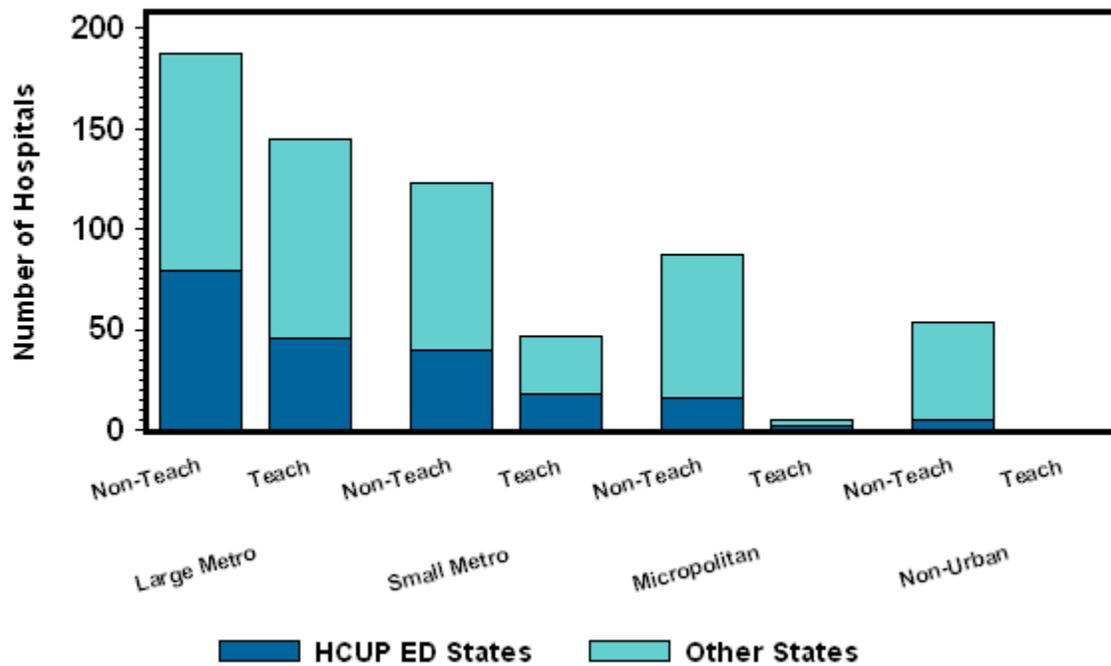
Teaching Status

A hospital-based emergency department is considered to be a teaching facility if the associated hospital has an American Medical Association (AMA) approved residency program, is a member of the Council of Teaching Hospitals (COH), or has a ratio of full-time equivalent interns and residents to beds of 0.25 or higher according to the AHA Annual Survey Database.

The distributions of U.S. hospitals by teaching status are shown for each region and urban-rural location in Figures 10-13. Please note that the scales of the charts vary by region.

Figure 10 displays information for the Northeast. In this region, teaching hospitals are concentrated in the large and small metropolitan areas.

Figure 10. Number of Hospitals in the Northeast Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005



Similar to the Northeast, the teaching hospitals in the Midwest are mostly in the metropolitan areas (Figure 11). HCUP ED states contain the majority of teaching hospitals in the Midwest.

Figure 11. Number of Hospitals in the Midwest Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005

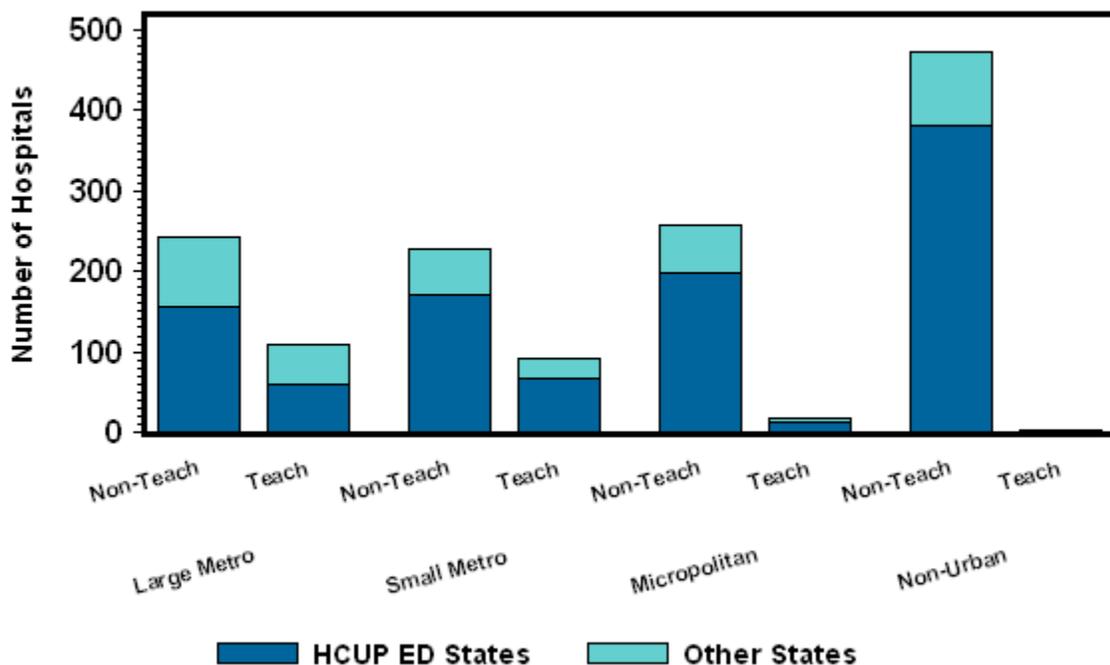


Figure 12 displays the number of teaching hospitals in HCUP ED states for the South. Again, there are very few teaching hospitals in the micropolitan and non-urban areas.

Figure 12. Number of Hospitals in the South Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005

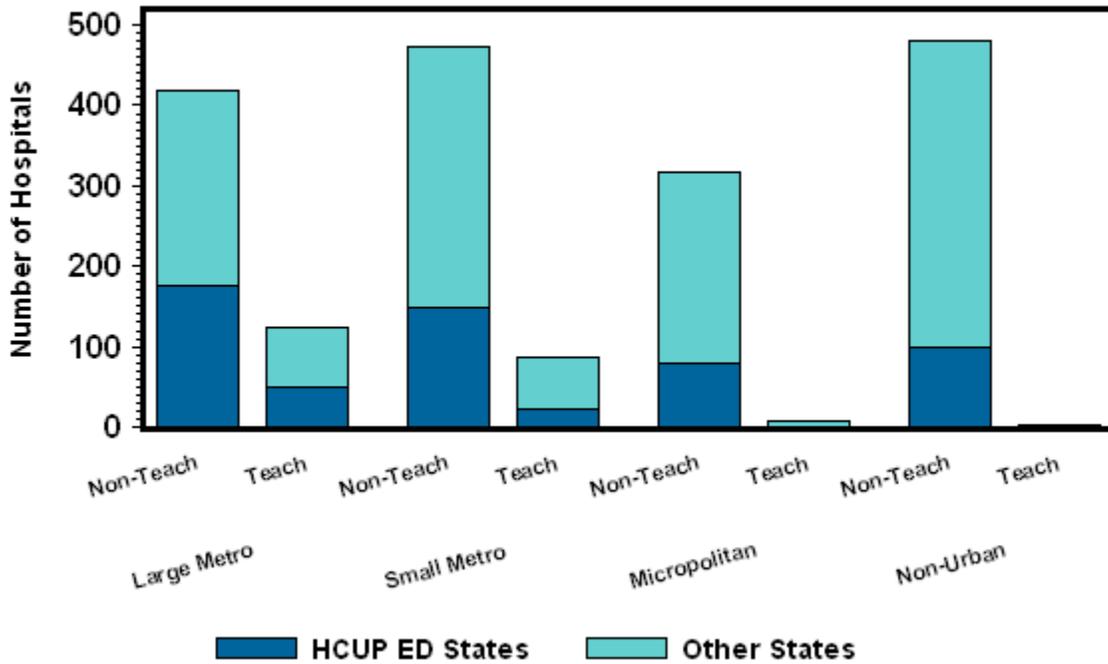
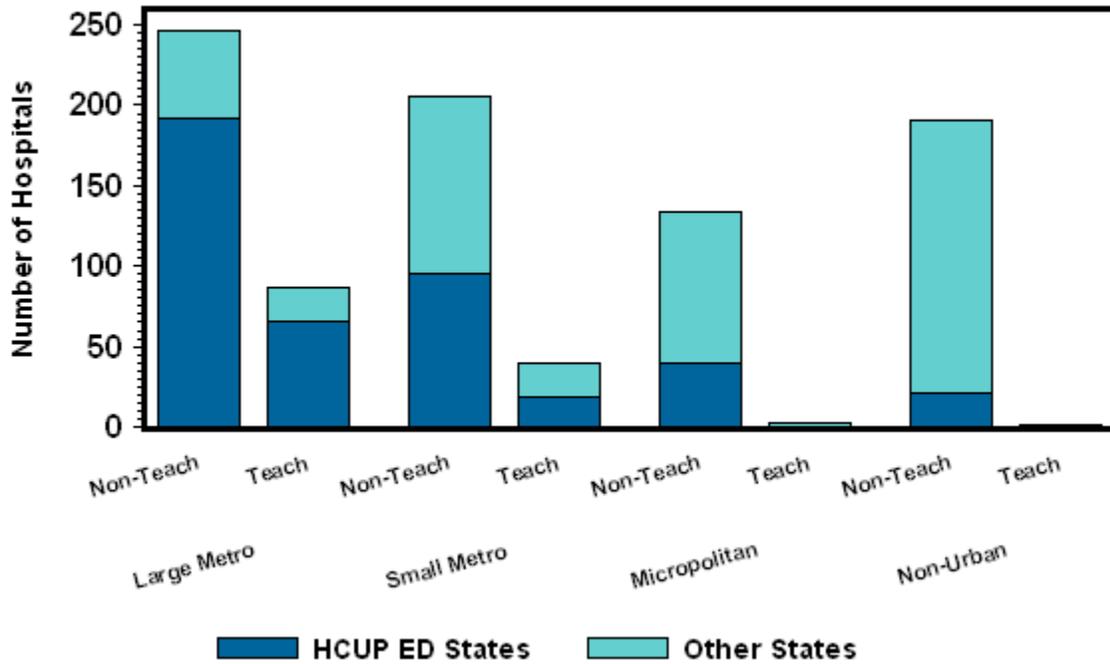


Figure 13 displays information for the West. Because all of the regions have very few teaching hospitals in the non-metropolitan areas, stratification by teaching status was reserved for large and small metropolitan areas only.

Figure 13. Number of Hospitals in the West Captured by HCUP ED States, by Teaching Status and Urban-Rural Location, 2005



Hospital Ownership

Hospital ownership was categorized according to information reported in the AHA Annual Survey Database. Ownership categories include:

- Public – government, non-Federal
- Voluntary – private, not-for-profit
- Proprietary – private, investor-owned/for-profit.

The distributions of U.S. hospitals by type of ownership (public, voluntary, and proprietary) are shown for each region and urban-rural location in Figures 14-17

Figure 14 displays information for the Northeast. Because the Northeast region is comprised almost entirely of voluntary hospitals, there is little to be gained by stratifying hospitals by ownership in the Northeast.

Figure 14. Number of Hospitals in the Northeast Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005

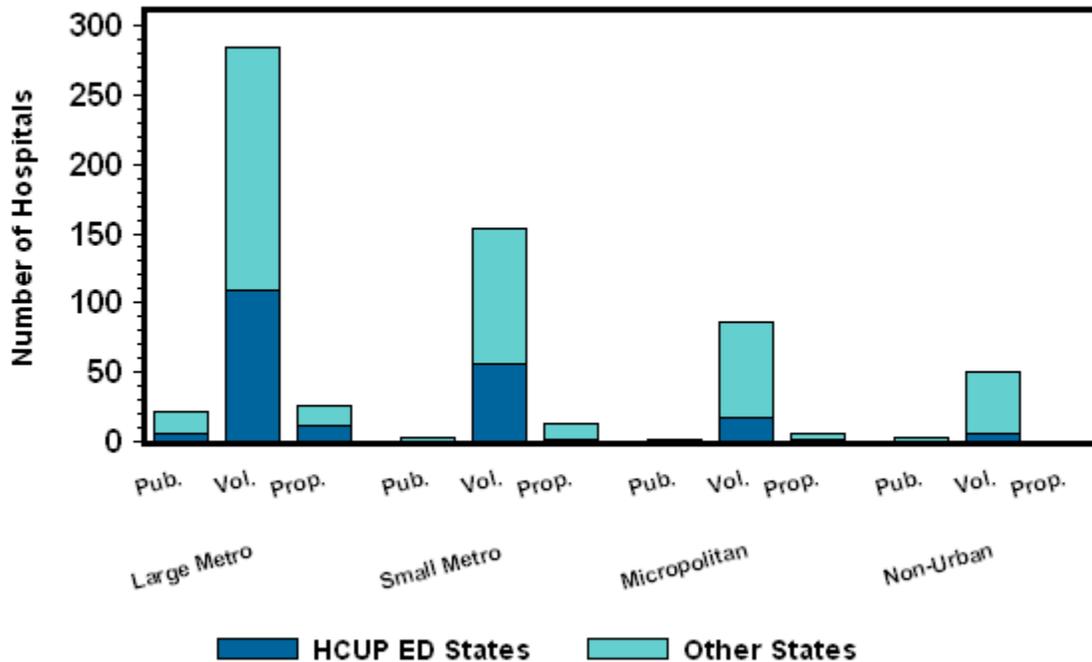


Figure 15 displays information for the Midwest. The metropolitan areas of the Midwest are dominated by voluntary hospitals. The non-metropolitan areas have a mixture of public and voluntary hospitals. Stratification by ownership is best suited for the non-metropolitan areas.

Figure 15. Number of Hospitals in the Midwest Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005

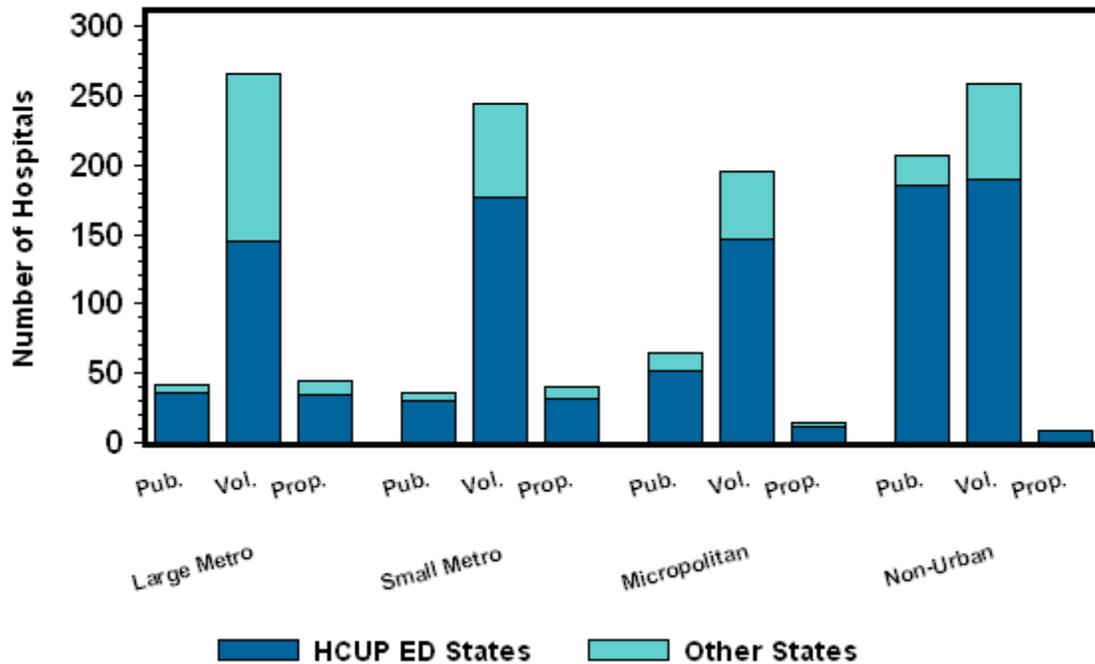


Figure 16 displays hospital ownership for the South. The South is comprised of a mixture of public, voluntary, and proprietary hospitals. It is clear that there is an advantage to stratifying hospitals by ownership in the South.

Figure 16. Number of Hospitals in the South Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005

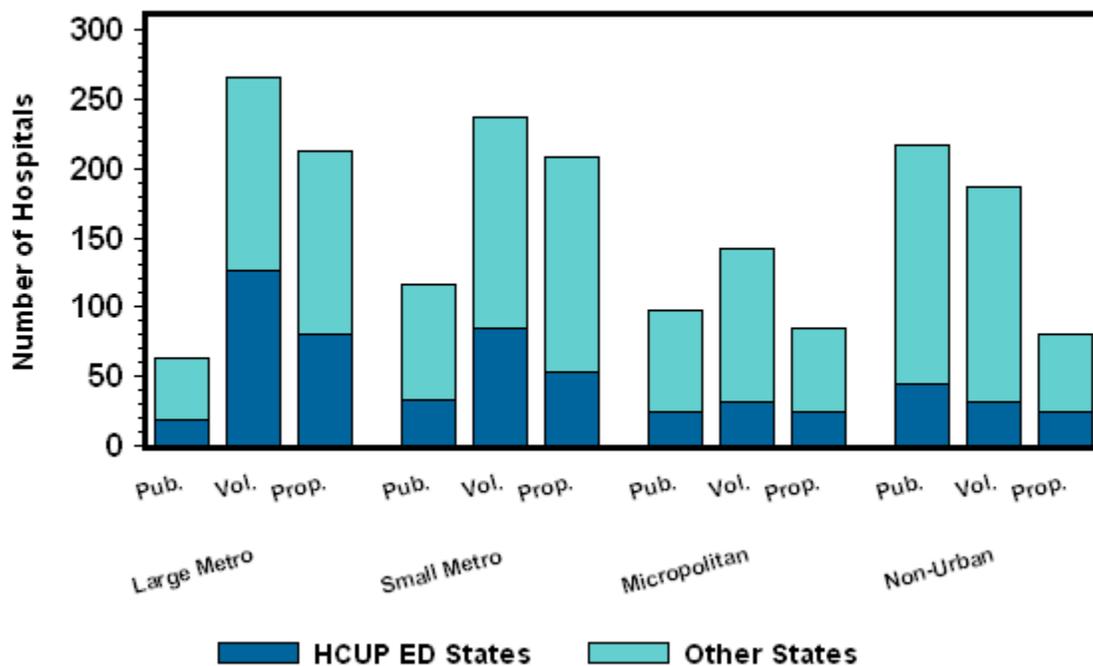
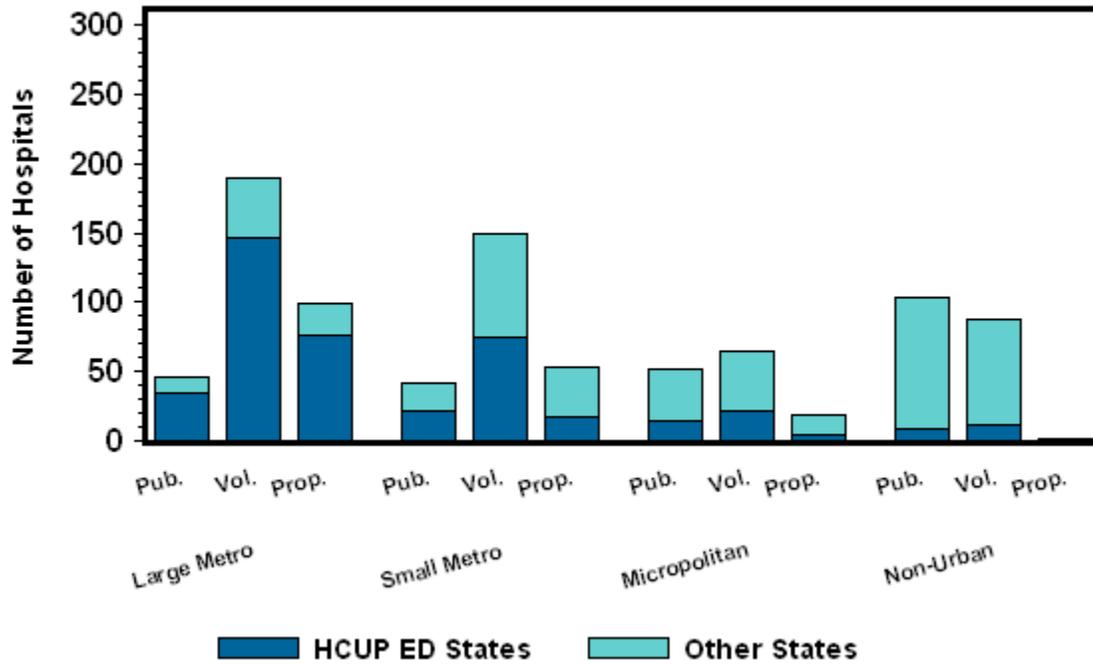


Figure 17 displays hospital ownership for the West. The West is also comprised of a mixture of public, voluntary, and proprietary hospitals. It is clear that there is an advantage to stratifying hospitals on ownership in the West.

Figure 17. Number of Hospitals in the West Captured by HCUP ED States, by Ownership and Urban-Rural Location, 2005



Bed Size

After an exhaustive search of data sources, information on the bed size of the EDs was not available at this time. The AHA reports on the bed size of the hospital, but does not distinguish between inpatient and ED beds. Therefore, ED bed size was not used as a possible stratifier.

Selection of Stratifiers

To investigate the possible stratifiers, general linear regression models were estimated for four different ED outcomes using the five possible stratifiers (e.g., region, trauma, urban-rural location, teaching status, and ownership) on the 2005 AHA data. The AHA file was limited to community, non-rehabilitation hospitals reporting ED visits in the U.S.

The SAS procedure PROC REG was used with the MAXR option. The MAXR option is similar to a stepwise regression except that it first finds the "best" one-variable model, then the "best" two-variable model, then the "best" three-variable model, and so forth. In contrast, a stepwise model finds the "best" first variable, and then selects the second, third, etc. from the remaining variables. In both cases, "best" is defined as the model specification with the largest variance explained.

The outcomes of interest were the following:

- Logarithm of ED visits [Log(ED visits)]
- Proportion of ED visits to all hospital records, including ED events and other inpatient stays (ED visits/Total visits)
- Ratio of ED visits to inpatient stays (ED visits/Inpatient stays)
- Proportion of ED treat and release visits to all ED visits (ED treat and release/ED visits).

We only used utilization outcomes because no national data source was available on ED bed size or occupancy rate. Information on time in the ED was only available for a small number of states, so it was excluded also as an outcome for this analysis.

In all four regressions, urban-rural location explained the greatest variation in the outcomes of interest. In the two regressions that included inpatient stays in the dependent variable, teaching status was included with urban-rural location in the two-variable model. In the model for ED visits alone, trauma was included in the two-variable model with urban-rural location, and teaching status was added in the three-variable model. In most cases, hospital control was also significant. Table 5 provides the results of the regressions and the R-Squared values for each model.

Table 5. Regression Results

	Log (ED visits)	ED Visits		ED Treat/Release
		Total visits	Inpatient stays	ED visits*
One-variable model	Urban-rural	Urban-rural	Urban-rural	Urban-rural
R-Squared	0.1628	0.0916	0.0065	0.0254
Two-variable model	Urban-rural Trauma	Urban-rural Teaching	Urban-rural Teaching	Urban-rural Region
R-Squared	0.2282	0.1173	0.0095	0.0284
Three-variable model	Urban-rural Trauma Teaching	Urban-rural Teaching Control	Urban-rural Teaching Control	Urban-rural Region Trauma
R-Squared	0.2555	0.1287	0.0112	0.0312
Four-variable model	Urban-rural Trauma Teaching Control	Urban-rural Teaching Control Trauma	Urban-rural Teaching Control Trauma	Urban-rural Region Trauma Control
R-Squared	0.2596	0.1318	0.0125	0.0316
Five-variable model	Urban-rural Trauma Teaching Control Region	Urban-rural Teaching Control Trauma Region	Urban-rural Teaching Control Trauma Region	Urban-rural Region Trauma Teaching
R-Squared	0.2602	0.1320	0.0138	0.0321

* For non-HCUP ED states, treat-and-release counts were estimated using the regional average calculated on HCUP ED states.

Given the results of the exploration of the representation of HCUP ED states for each possible stratifier and the regression results, all five stratifiers were selected for the NEDS. Table 6 summarizes the stratifiers.

Table 6. NEDS Stratifiers

Stratifier	Values
Region	1: Northeast 2: Midwest 3: South 4: West
Trauma	0: Not a trauma center 1: Trauma center
Urban-Rural	1: Large metropolitan 2: Small metropolitan 3: Micropolitan 4: Non-urban residual 5: Non-metropolitan (used for combining micropolitan and non-urban location for trauma hospitals in all regions except the Midwest)
Teaching	0: Metropolitan non-teaching 1: Metropolitan teaching 2: Non-metropolitan teaching and non-teaching
Control	0: All (used for combining public, voluntary, and private) 1: Public – government, non-Federal 2: Voluntary – private, non-profit 3: Proprietary – private, investor-owned/for-profit 4: Private (used for combining private voluntary and proprietary) When there were enough hospitals of each type, hospitals were stratified as public, voluntary, and proprietary. If necessary, because of small strata size in the universe, a collapsed stratification of public versus private was used, with the voluntary, non-profit and proprietary/for-profit hospitals combined to form a single 'private' category. No stratification based on control was advisable in some areas because of the dominance of one type of hospital.

Final Sample Design

The target universe for the NEDS included all hospital-based ED events from community, non-rehabilitation hospitals in the United States that were included in the 2005 AHA Annual Survey Database. Excluded were a handful of non-rural hospitals that reported less than 10 ED visits in a year. In 2005, the target universe contained 4,884 hospital-based EDs.

The NEDS sampling frame included hospital-based ED events from community, non-rehabilitation hospitals in the 23 HCUP Partner states that provide discharge abstracts on patients admitted to the hospital through the ED and patients treated and released or transferred to another hospital from the ED. The HCUP hospitals were required to be represented in the AHA data and have no more than 90% of their ED visits resulting in admission. Based on data from the 23 HCUP ED states, there were 2,086 EDs and 54,237,268 ED visits in the 2005 sampling frame.

The NEDS is a stratified probability sample of hospitals in the frame, with sampling probabilities calculated to select 20% of the universe contained in each stratum, defined by region, trauma

designation, urban-rural location, teaching status, and hospital control. The overall objective was to select a sample of hospitals "generalizable" to the target universe, including hospitals outside the frame, which have a zero probability of selection. A sample size of 20 percent was based on previous experience with similar research databases. A larger sample would be cumbersome for data users given that at 20% sample includes over 25 million records. A 20% sample also enables the user to split the NEDS into two 10% subsamples for estimation and validation of models.

To further ensure accurate geographic representation, hospitals were implicitly stratified by state and three-digit ZIP Code (the first three digits of the hospital's five-digit ZIP Code). This was accomplished by sorting by three-digit ZIP Code within each stratum prior to drawing a systematic random sample of hospitals. Within the three-digit ZIP Code, hospitals were sorted by a random number to ensure further geographic generalizability of hospitals within the frame states, as well as random ordering of hospitals within three-digit ZIP Codes. Generally, three-digit ZIP Codes that are proximal in value are geographically near one another within a state. Furthermore, the U.S. Postal Service locates regional mail distribution centers at the three-digit level. Thus, the boundaries tend to be a compromise between geographic size and population size.

Using the universe of U.S. hospital-based EDs, there were 86 strata defined by region, trauma designation, urban-rural location, teaching status, and hospital control. Twenty-one strata had less than two hospitals in the universe and were collapsed with adjacent stratum based on urban-rural location, teaching status, or control. We did not collapse strata across trauma designation. The 21 small strata were collapsed into seven strata, resulting in a total of 65 stratum for sampling.

After stratifying and sorting the universe of hospitals, a random sample of up to 20% of the total number of hospital-based EDs in the U.S. was selected within each stratum. If a stratum contained too few frame hospitals, then all were selected for the NEDS. The resulting sample for 2005 included 972 hospital-based EDs and 27,011,634 records.

Of the 65 strata, there were seven strata for which there was a shortfall of hospital-based EDs in the frame (Table 7). A shortfall is defined as an insufficient number of EDs in the frame to meet the threshold of 20% of the universe. Shortfalls were insignificant in the Northeast and Midwest (one stratum in the Northeast with a shortfall of one hospital and no strata in the Midwest). In the South and West, there are three strata each that have shortfalls (three strata in the South with shortfalls of two, 11, and three hospitals, and three strata in the West with shortfalls of nine, one, and five hospitals). In strata with shortfalls, the sampling rate from the universe is less than 20%. In two strata, the sampling rate from the universe is substantially larger than 20% because a minimum of two sampled EDs were required in each stratum.

Another consideration when evaluating the NEDS is the sampling rate from the frame (Table 7). Even though only seven strata have shortfalls, about half of the strata (37 of 65) use 50% or more of the frame hospitals for the NEDS. This is mostly an issue in the South, but affects the Northeast and West (20 strata in the South, eight strata in the Northeast, seven strata in the West, and two strata in the Midwest).

Table 7. NEDS Sampling Rates, 2005

NEDS Stratum	Number of Hospital-Based EDs					Sampling Rate	
	AHA Universe	20% of Universe	Frame (23 HCUP ED States)	Frame Shortfall	NEDS	NEDS to Universe	NEDS to Frame
All Regions							
Total	4,884	1,004	2,086	32	972	21.3%	58.5%
Northeast							
10100	174	35	65	--	35	20.1%	53.8%
10110	92	19	30	--	19	20.7%	63.3%
10200	113	23	32	--	23	20.4%	71.9%
10210	20	4	5	--	4	20.0%	80.0%
10320	80	16	16	--	16	20.0%	100.0%
10420	52	11	10	1	10	19.2%	100.0%
11100	13	3	5	--	3	23.1%	60.0%
11110	53	11	15	--	11	20.8%	73.3%
11200	10	2	5	--	2	20.0%	40.0%
11210	27	6	14	--	6	22.2%	42.9%
11520	13	3	8	--	3	23.1%	37.5%
Midwest							
20100	206	42	112	--	42	20.4%	37.5%
20110	73	15	34	--	15	20.5%	44.1%
20200	193	39	116	--	39	20.2%	33.6%
20210	44	9	32	--	9	20.5%	28.1%
20321	62	13	46	--	13	21.0%	28.3%
20324	190	38	123	--	38	20.0%	30.9%
20421	206	42	163	--	42	20.4%	25.8%
20424	263	53	172	--	53	20.2%	30.8%
21100	37	8	10	--	8	21.6%	80.0%
21110	36	8	17	--	8	22.2%	47.1%
21200	35	7	24	--	7	20.0%	29.2%
21210	48	10	30	--	10	20.8%	33.3%
21321	3	2	3	--	2	66.7%	66.7%
21324	20	4	13	--	4	20.0%	30.8%
21420	5	2	5	--	2	40.0%	40.0%
South							
30101	40	8	11	--	8	20.0%	72.7%
30102	165	33	78	--	33	20.0%	42.3%
30103	190	38	65	--	38	20.0%	58.5%
30110	77	16	30	--	16	20.8%	53.3%
30201	80	16	21	--	16	20.0%	76.2%
30202	152	31	53	--	31	20.4%	58.5%
30203	184	37	37	--	37	20.1%	100.0%
30210	38	8	6	2	6	15.8%	100.0%

NEDS Stratum	Number of Hospital-Based EDs					Sampling Rate	
	AHA Universe	20% of Universe	Frame (23 HCUP ED States)	Frame Shortfall	NEDS	NEDS to Universe	NEDS to Frame
30321	81	17	20	--	17	21.0%	85.0%
30322	122	25	30	--	25	20.5%	83.3%
30323	78	16	22	--	16	20.5%	72.7%
30421	217	44	45	--	44	20.3%	97.8%
30422	181	37	26	11	26	14.4%	100.0%
30423	80	16	21	--	16	20.0%	76.2%
31100	23	5	8	--	5	21.7%	62.5%
31110	46	10	18	--	10	21.7%	55.6%
31201	12	3	6	--	3	25.0%	50.0%
31202	30	6	14	--	6	20.0%	42.9%
31203	16	4	4	--	4	25.0%	100.0%
31210	49	10	16	--	10	20.4%	62.5%
31321	16	4	4	--	4	25.0%	100.0%
31524	33	7	4	3	4	12.1%	100.0%
West							
40101	20	4	15	--	4	20.0%	26.7%
40102	115	23	91	--	23	20.0%	25.3%
40103	84	17	59	--	17	20.2%	28.8%
40110	56	12	38	--	12	21.4%	31.6%
40201	27	6	17	--	6	22.2%	35.3%
40202	85	17	60	--	17	20.0%	28.3%
40203	47	10	20	--	10	21.3%	50.0%
40210	19	4	15	--	4	21.1%	26.7%
40321	44	9	13	--	9	20.5%	69.2%
40324	61	13	28	--	13	21.3%	46.4%
40421	101	21	12	9	12	11.9%	100.0%
40424	84	17	18	--	17	20.2%	94.4%
41100	28	6	13	--	6	21.4%	46.2%
41110	31	7	23	--	7	22.6%	30.4%
41200	46	10	9	1	9	19.6%	100.0%
41210	20	4	8	--	4	20.0%	50.0%
41520	38	8	3	5	3	7.9%	100.0%
Stratum: 1 st digit – region: (1) Northeast, (2) Midwest, (3) South, (4) West 2 nd digit – trauma: (1) trauma center level I, II, or III, (0) non-trauma center 3 rd digit – urban-rural location: (1) Large metropolitan, (2) Small metropolitan, (3) Micropolitan, (4) Non-urban residual, (5) Non-metropolitan 4 th digit – teaching: (0) Metropolitan non-teaching, (1) Metropolitan teaching, (2) Non-metropolitan teaching and non-teaching 5 th digit – control: (0) All, combines public, voluntary, and private, (1) Public – government, nonfederal, (2) Voluntary – private, non-profit, (3) Proprietary – private, investor-owned/for-profit, (4) Private, combines private voluntary and proprietary							

The sampling rate for ED events was 100% for each hospital-based ED drawn into the NEDS. The advantage of including all ED events from each of the sampled EDs is that patient outcomes from individual EDs can be estimated without sampling error. For example, it allows researchers to:

- adjust the case-mix for an entire institution
- analyze the volume of services performed in each ED
- create other hospital-level variables such as the percentage of ED events in each hospital that are uninsured.

Weights

To obtain nationwide estimates, weights were developed using the AHA universe as the standard. These were developed separately for analyses of hospital-based EDs and ED visits. Hospital-level weights were developed to extrapolate NEDS sample EDs to the universe of hospital-based EDs. Similarly, discharge-level discharge weights were developed to extrapolate NEDS sample ED visits to the universe ED visits.

Hospital Weights

Hospital weights to the universe were calculated by post-stratification. Hospital-based EDs were stratified on the same variables that were used for sampling: geographic region, trauma designation, urban-rural location, teaching status, and control. The strata that were collapsed for sampling were also collapsed for sample weight calculations. Within each stratum, s , each NEDS sample ED received a weight:

$$\text{HOSPWT} = W_s(\text{universe}) = N_s(\text{universe}) \div N_s(\text{sample})$$

where $W_s(\text{universe})$ was the ED universe weight, and $N_s(\text{universe})$ and $N_s(\text{sample})$ were the number of hospital-based EDs within stratum s in the universe and sample, respectively. Thus, each hospital's universe weight (HOSPWT) is equal to the number of universe hospitals it represents during that year. Because 20% of the hospitals in each stratum were sampled when possible, the hospital weights were usually near 5.

Discharge Weights

The calculations for discharge-level sampling weights were similar to the calculations for hospital-level sampling weights. The discharge weights were usually constant for all records within a stratum. The only exceptions were in strata with sample hospitals that, according to the AHA files, were open for the entire year but contributed less than a full year of data to the NEDS. For those hospitals, the number of observed ED visits was adjusted by a factor of $4 \div Q$, where Q was the number of calendar quarters for which the hospital contributed ED visits to the NEDS. For example, when a sample hospital contributed only two quarters of ED visits to the NEDS, the adjusted number of ED visits was double the observed number. This adjustment was performed only for weighting purposes. The NEDS data set includes only the actual (unadjusted) number of observed ED visits. With that minor adjustment, each discharge weight is essentially equal to the number of AHA universe ED visits that each sampled ED visit represents in its stratum. This calculation was possible because the number of total ED visits was available for every hospital-based ED in the universe from the AHA files.

Discharge weights to the universe were calculated by post-stratification. Hospitals were stratified in a manner similar to universe hospital weight calculations. Within stratum, s , for hospital, i , each NEDS sample visit's universe weight was calculated as:

$$\text{DISCWT} = \text{DW}_{is}(\text{universe}) = [\text{DN}_{s}(\text{universe}) \div \text{ADN}_{s}(\text{sample})] * (4 \div Q_i)$$

where $\text{DW}_{is}(\text{universe})$ was the discharge weight; $\text{DN}_{s}(\text{universe})$ represented the number of ED visits from community, non-rehabilitation hospitals in the universe within stratum s ; $\text{ADN}_{s}(\text{sample})$ was the number of adjusted ED visits from sample hospitals selected for the NEDS; and Q_i represented the number of quarters of ED visits contributed by hospital i to the NEDS (usually $Q_i = 4$). Thus, each discharge's weight (DISCWT) is equal to the number of universe ED visits it represents in stratum s during that year. Because all ED visits from 20% of the hospitals in each stratum were sampled when possible, the discharge weights are usually near 5.

Limitations of the NEDS

The NEDS contains more than 100 clinical and non-clinical variables included in a hospital discharge abstract, such as:

- Up to 15 diagnoses and four external cause of injury codes
- Up to nine ICD-9-CM and 15 CPT procedure codes
- Patient demographics (e.g., gender, age, national quartile of the median household income of the patient's ZIP Code)
- Expected payment source (e.g., Medicare, Medicaid, private insurance, self-pay; for some states, additional discrete payer categories, such as managed care)
- Total and ED-specific charge
- Hospital identifiers that permit linkage to the AHA Annual Survey
- Hospital county codes that allow permit linkage to the Area Resource File.

While these data elements allow for a multitude of research studies, there are some limitations.

Because the NEDS is a sample of hospitals, following an individual patient across all hospital-based EDs is not possible. Some of the HCUP state databases include a synthetic person-specific identifier, but this data element was not retained for the NEDS. If the information had been retained, it would have been missing on 53% of NEDS records (35% in the Northeast, 29% in the Midwest, 64% in the South, and 80% in the West). At this point in time, studies on multiple ED visits per patient should be limited to the HCUP SEDD.

While 20 of the 23 states in the NEDS provide information on the patient's race, 18% of the NEDS records, weighted, are missing information on race. The three states that do not report the patient's race account for 10% of all records, while the remaining 8% is distributed across the other 20 states. By region, the percentage of records missing race is 13% in the Northeast, 50% in the Midwest, 1% in the South, and 20% in the West. Studies using the NEDS to report by race/ethnicity will be limited by missing data.

Total charge is reported by all states in the NEDS, but 12% of the ED visits, weighted, are missing the information. The problem is concentrated in the West with 65% of the ED visits

missing total charge. Only 1% of the records in the Northeast, Midwest, and South are missing total charge. Fifteen of the 23 HCUP Partner states report information on the charge specific to the ED, but almost 50% of the NEDS records are missing this information. The South has 10% of the ED visits missing ED charge, but the other regions have a higher percentage (Northeast 44%, Midwest 81%, and West 90%). Analyses of total and ED charges would be best limited to regional comparisons when sufficient data are available.

EXISTING FEDERAL AND NON-FEDERAL ED DATA SOURCES

To aid in understanding the feasibility of creating a Nationwide Emergency Department sample, TR analyzed the existing, non-HCUP sources of ED data in the U.S. The list was compiled using a variety of resources. First, the Institute of Medicine's "Hospital-Based Emergency Care: At the Breaking Point" (Institute of Medicine 2007) was surveyed for potential databases. AHRQ and TR staff also contributed recommendations to the list of databases. In addition, a targeted literature search was conducted for 2005-2007 using the keywords *emergency* and *trauma* in a key health policy journal. The remainder of the data sources were found using an Internet search with the keywords *emergency*, *trauma*, and *databases*. A detailed description of the 22 data sources, including cost and years available, appears in Appendix C. Each ED data source has potential for use in research addressing ED utilization and policy. However, several were selected for use within the NEDS pilot feasibility study.

Three categories of data sources were selected for inclusion in the pilot study (Table 8). The first category was a universe for the sampling frame, which required an inventory of all ED facilities in the U.S., along with sufficient facility characteristics to develop sampling stratifiers. In order to be consistent with the NIS, the AHA database was selected as the universe for the sampling frame of the NEDS. The second category included data sources that may be linked via a facility identifier to the NEDS in order to augment the data contained within the NEDS. One ED data source was selected for linkage, the Trauma Information Exchange Program (TIEP) inventory of trauma centers in the United States. The TIEP provided the trauma designation (trauma/non-trauma) for each facility. The third category included data sources that can serve as a comparison to the NEDS. Each of the comparison data sources were selected on three criteria:

- all-payer
- national (versus regional or local)
- availability of ED visit counts

Six data sources were used to validate ED visit counts produced from the NEDS: AHA Annual Survey Database, National Emergency Department Inventory (NEDI – US), National Electronic Injury Surveillance System (NEISS), National Hospital Ambulatory Medical Care Survey (NHAMCS), National Health Interview Survey (NHIS), and Verispan Hospital Market Profiling Solution.

Table 8. Sources of Emergency Department Data and Usage in Feasibility Study

ED Data Source	Description	Universe for Sampling Frame	Linkage	Comparison
AHA - American Hospital Association Annual Survey of Hospitals	Characteristics and descriptions of U.S. hospitals reported via hospital survey. (American Hospital Association)	X		X
NEDI – USA - National Emergency Department Inventory	Comprehensive database of non-Federal, non-specialty hospitals in the U.S. with an ED. [Emergency Medicine Network (EMNet) Coordinating Center]			X
(NEISS-AIP) – National Electronic Injury Surveillance System All-Injury Program	A national probability sample of non-fatal injuries treated in hospital EDs in the U.S. It is based on experience in a probability sample of 66 of the 100 hospitals with EDs with a minimum of six beds and a 24-hour ED in the NEISS. [US Consumer Product Safety Commission and Centers for Disease Control and Prevention (CDC)]			X
NHAMCS - National Hospital Ambulatory Medical Care Survey	National probability sample survey on utilization and provision of ambulatory services in hospital emergency and outpatient departments. It is a, “national sample of visits to the emergency departments and outpatient departments of noninstitutional general and short-stay hospitals, exclusive of Federal, military, and Veterans Administration hospitals, located in the 50 States and the District of Columbia.” (CDC)			X
NHIS - National Health Interview Survey	Cross-sectional household interview survey consisting of two parts: core questions and Supplements (Household, Family, Sample Adult, and Sample Child).			X
Verispan - Hospital Market Profiling Solution,	Commercially available data set containing information on hospitals in the U.S., Puerto Rico, and the Virgin Islands. Collected through surveying federal and state agencies, data from Centers for Medicare & Medicaid Services, and direct contact with hospitals.			X
TIEP - Trauma Information Exchange Program	A national inventory of trauma centers in the U.S. (The American Trauma Society and the Johns Hopkins Center for Injury Research and Policy funded by the CDC)		X	

VALIDITY AND RELIABILITY OF THE NEDS

Assessment of Bias

Comparison of ED Data Sources

To assess bias, 2005 ED visit counts from the NEDS were compared to ED visit counts produced from seven other ED data sources. One source is discharge-based (HCUP multi-state ED data file from 23 states), two sources collect data from a sample of EDs (NHAMCS and NEISS-AIP), and one source collects data from a sample of patients (NHIS). Finally, ED visit counts from three national inventories of ED facilities, the National ED Inventory (NEDI-USA), the AHA Annual Survey, and the Verispan Hospital Market Profiling Solution were also compared to the NEDS. Table 9 provides a more detailed description of each data source.

Table 9. Description of 2005 ED Data Sources

ED Data Source	Description
American Hospital Association Annual Survey	In 2005, the inventory contained data on 6,349 hospital facilities, including 4,884 hospital-based EDs (National Center for Health Statistics 2007).
HCUP multi-state ED data file	Consists of over 58 million treat and release ED visits and admissions with an ED admission source from 23 states providing ED data to HCUP.
National ED Inventory (NEDI-USA)	Contains data from 4,828 emergency departments in the United States in 2005. Combines information from the AHA survey and Verispan database (Emergency Medicine Network 2008).
Verispan Hospital Market Profiling Solution	In 2005, contains information on hospital utilization and services from over 6,900 hospitals in the U.S., Puerto Rico, and the Virgin Islands.
National Electronic Injury Surveillance System All-Injury Program (NEISS-AIP)	The sampling frame is 66 hospitals of the 100 hospitals in the NEISS (at least six beds and provide 24-hour emergency care) (Centers for Disease Control and Prevention 2008).
National Health Interview Survey (NHIS)	In 2005, the interviewed sample consisted of 38,509 households (98,649 persons in 39,284 families). The interviewed sample for the Sample Child component (children under 18 years of age) was 12,523 children and the sample for the Sample Adult component was 31,428 persons 18 years of age and older (Centers for Disease Control and Prevention 2008).
National Hospital Ambulatory Medical Care Survey (NHAMCS)	In 2005, 352 EDs participated and provided information on 33,605 patient visits (Nawar, Niska et al. 2007).

ED visit counts were compared across the geographic, patient demographic, hospital, and type of service categories (common reasons, chronic and acute conditions, and injuries). Each alternative data source had a variety of comparison categories. For example, NHAMCS ED visit counts were available for all categories except for a few patient demographic and facility characteristics. In contrast, the AHA Annual Survey provided ED visits counts by hospital facility characteristics and the NEISS-AIP provided ED visit counts for injuries. All categories are detailed below.

Geographic characteristics included ED visit counts for the total United States and regional counts by U.S. Census region. Total visit counts were produced, as were counts of the number of ED visits that were treated and released, including transferred to another hospital, versus the number of ED visits that resulted in an inpatient admission to the same hospital.

Patient Characteristics included age categories (0-17, 18-44, 45-64, 65+), gender, primary payer/insurance coverage (e.g., Medicare, Private, Medicaid, Self-Pay), location of patient residence (large metropolitan, small metropolitan, micropolitan, non-urban residual) and national income quartiles (based on median household income of the patient's ZIP Code).

Hospital Characteristics included volume of visits (less than 10,000 visits, 10,000 - 19,999 visits, 20,000 - 29,999 visits, 30,000 - 39,999 visits, 40,000 - 49,999 visits, 50,000 or more visits), trauma/non-trauma designation for ED, hospital location (large metropolitan, small metropolitan, micropolitan, non-urban residual). Total visit counts were produced as were counts of the number of ED visits that were treated and released, including transferred to another hospital, versus the number of ED visits that resulted in an inpatient admission to the same hospital.

Common Reasons included the average number of diagnoses reported per visit, maximum number of diagnoses reported, top all-listed diagnoses, and top all-listed E-codes. Total visit counts were produced, as were counts of the number of ED visits that were treated and released, including transferred to another hospital, versus the number of ED visits that resulted in an inpatient admission to the same hospital.

Chronic and Acute Conditions included visit counts for respiratory conditions, asthma, diabetes, heart disease, gastrointestinal illnesses, and Methicillin-Resistant *Staphylococcus Aureus* (MRSA). Total visit counts were produced, as were counts of the number of ED visits that were treated and released, including transferred to another hospital, versus the number of ED visits that resulted in an inpatient admission to the same hospital.

Injuries included the total number of ED visits that were injury-related, counts of unintentional injuries (e.g., falls, motor vehicle traffic, cut/pierce), and counts of intentional injuries (e.g., assault, self-inflicted).

The full set of comparisons is presented in Appendix D.

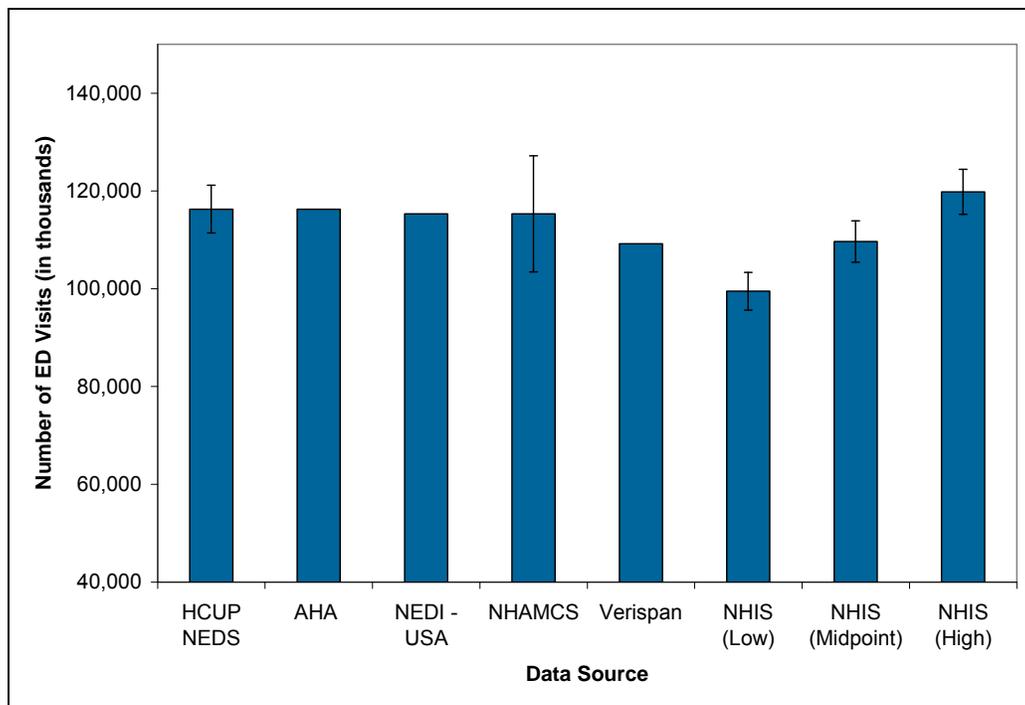
Figure 18 reveals that total U.S. ED visit counts are relatively consistent, with approximately 116 million ED visits between four of the data sources: NEDS, AHA, NEDI-USA, and NHAMCS. Note that AHA visit counts and NEDS visit counts match when compared in total and across sampling stratifiers such as Census region and teaching status, since the NEDS is weighted to represent the AHA universe within each of these strata.

Visit counts for NEDI-USA and NHAMCS all fall within the 95% confidence interval for the NEDS. Verispan counts at approximately 109 million ED visits are lower than NEDS, AHA, NEDI-USA and NHAMCS. Interestingly, the NEDI-USA combines ED visit count information from Verispan, AHA and collection and validation of data (and resolves some of the differences between these two data sources) and at approximately 115 million visits most closely resembles AHA.

Also, the 95% confidence intervals are smaller for the NEDS than the NHAMCS since the NEDS is drawn from 2,196 facilities and 54 million ED visits that are represented in the HCUP multi-state ED data file. NHAMCS estimates are based on a sample of 458 hospitals, of which 352 completed the survey accounting for 33,605 ED visits. This difference in volume affects the precision of the estimates.

The NHIS counts are understandably low. The NHIS collects data on the number of ED visits per person in nine categories (0, 1, 2-3, 4-5, 6-7, 8-9, 10-12, 13-15, and 16 or more). In order to produce an estimate of total ED visits for comparison to other sources, the lowest value of each category in the NHIS question was used to estimate the actual number of visits. Using the lowest value, the estimate of total ED visits was about 99 million. Had we used the mid-point or maximum value within each category, then the estimates would have increased to 110 million and 120 million, respectively.

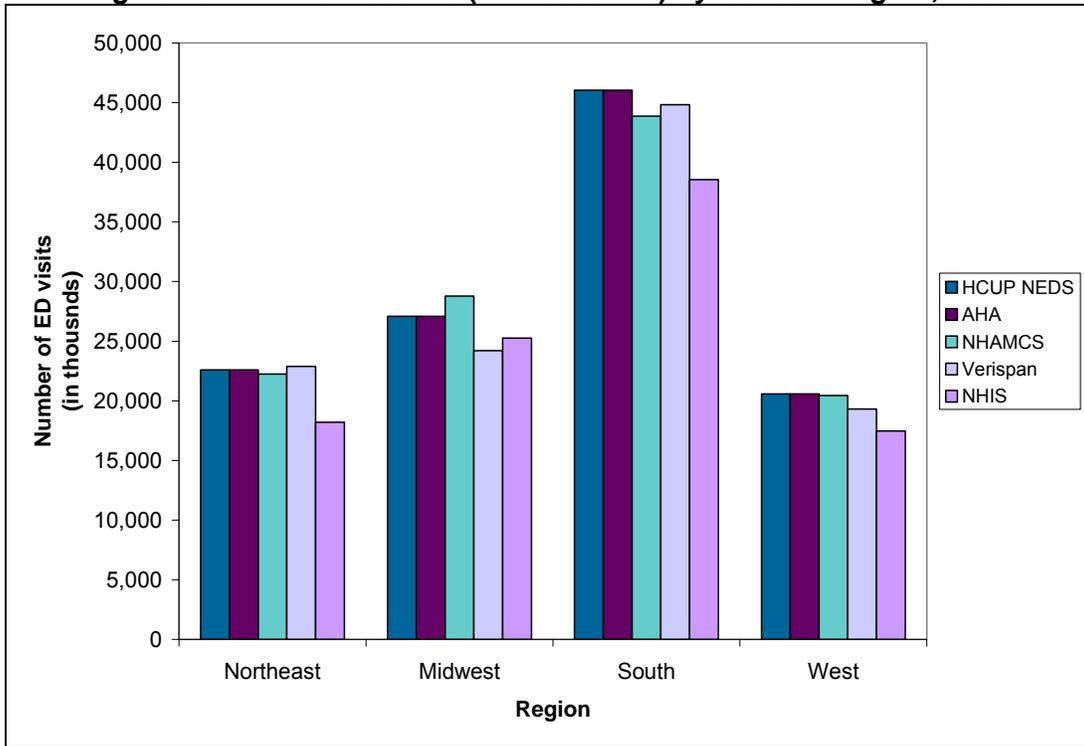
Figure 18. Emergency Department Visit Counts (in thousands) in the United States, 2005



Note: Error bars represent 95% confidence intervals. NHIS (Low) is the estimate of ED visits using the lowest value in the category range of the survey question. NHIS (Midpoint) is the estimate of ED visits using the mid-point of the range. NHIS (High) is the estimate of ED visits using the maximum value.

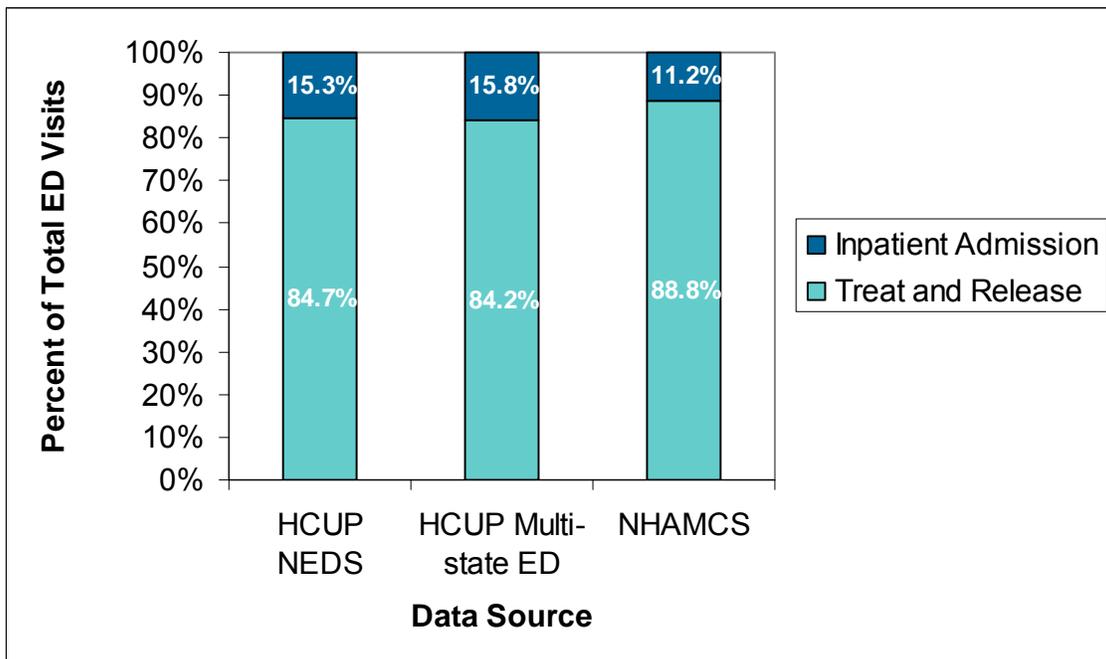
Across the five data sources (NEDS, AHA, NHAMCS, Verispan, and NHIS (Low)), the South consistently had the highest number of ED visits and the West had the lowest number of ED visits (Figure 19).

Figure 19. ED Visit Counts (in thousands) by Census Region, 2005



The two HCUP databases, NEDS and HCUP multi-state ED data file, had a higher percentage of ED visits resulting in inpatient admission (Figure 20).

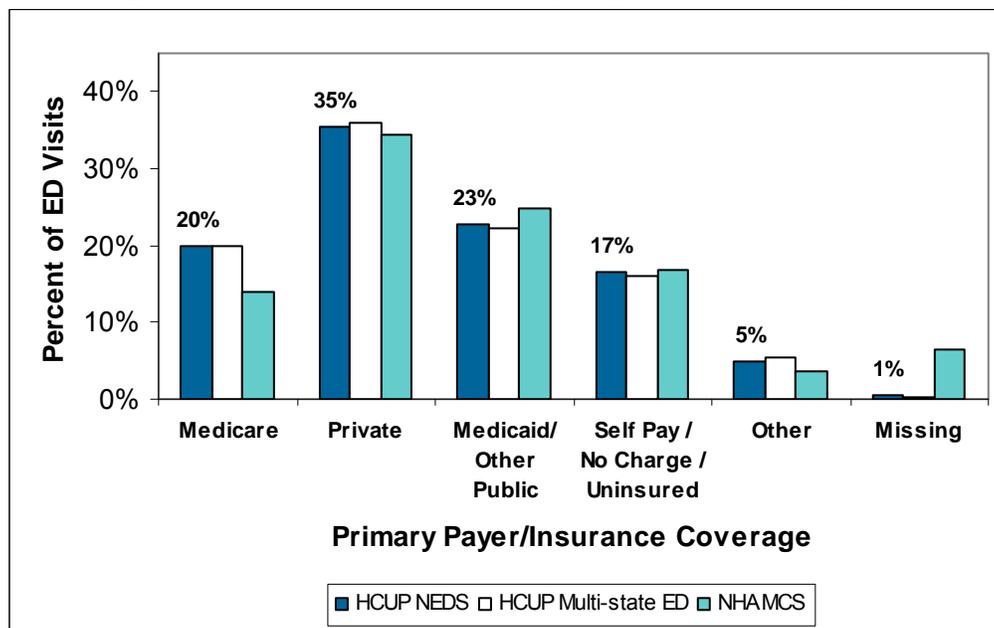
Figure 20. Percentage of Treat and Release and Inpatient Admission ED Visits, 2005



Note: Treat and release visits can include transfers to another facility, which may result in a subsequent admission.

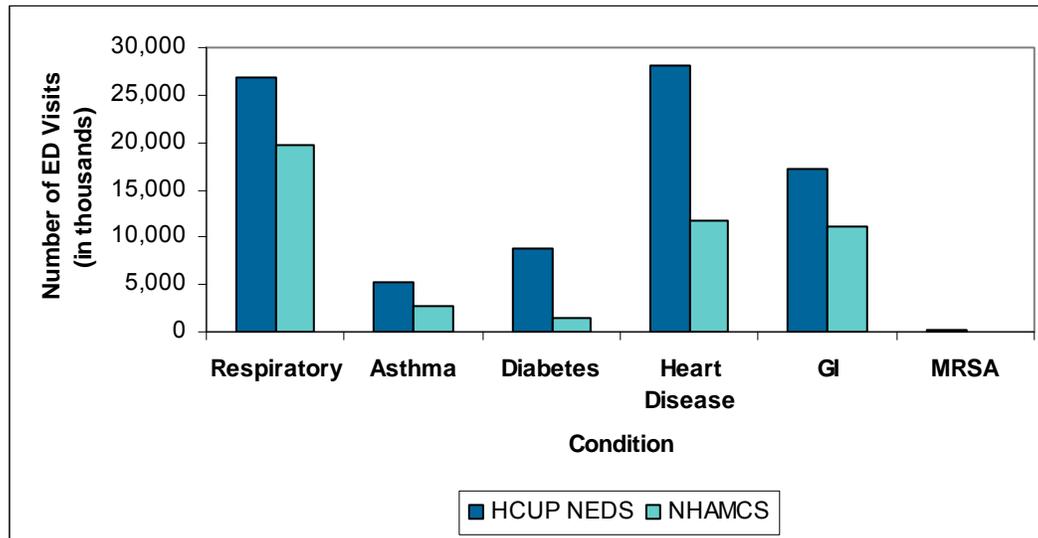
Private insurers were the primary payer for over one-third of ED visits in three data sources: HCUP NEDS, HCUP multi-state ED data file, and NHAMCS (Figure 21). NHAMCS had a higher percentage missing payer and a lower percentage Medicare payer than the HCUP NEDS and the HCUP multi-state ED data file.

Figure 21. Distribution of Primary Payer for ED Visits, 2005



After classifying visits via the available diagnosis codes (see Table D-8b In Appendix D for a definition of each condition), the HCUP NEDS had a higher number of visits attributable to each condition than NHAMCS (Figure 22). Most likely, this is due to a number of available diagnosis codes, up to 15 for each ED visit in the NEDS, compared to up to three available on the NHAMCS. The number of diagnosis codes available can affect condition counts for all types of conditions, although the difference becomes considerable when studying relatively rare events, such as Methicillin-resistant *Staphylococcus aureus* (MRSA) infection. In the HCUP NEDS, MRSA infection was reported in approximately 290 thousand ED visits. In contrast, MRSA infection was coded in approximately 50 thousand ED visits in NHAMCS.

Figure 22. Acute and Chronic Conditions for ED Visits (in thousands), 2005



Note: Asthma is a subset of the conditions included in Respiratory, GI – Gastrointestinal, MRSA – Methicillin-resistant *Staphylococcus aureus*

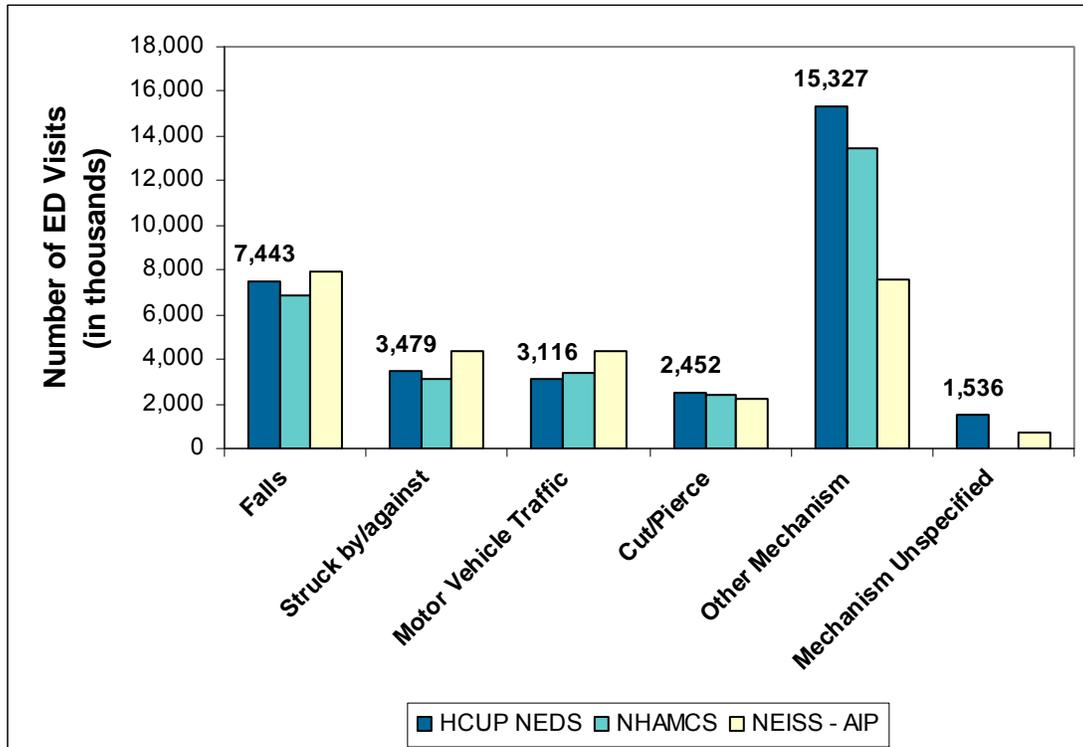
To investigate the coding differences between NEDS and NHAMCS, a comparison was made using AHRQ’s Clinical Classifications Software (CCS) diagnosis category for first-listed NEDS and first-listed NHAMCS diagnosis codes. Diagnosis coding of the first-listed condition was relatively consistent in NEDS and NHAMCS, with six of the top eight conditions in NHAMCS also listed in the top eight conditions in NEDS. One major difference was the degree of missing diagnosis in NHAMCS (3.4%, Rank 5), compared with 0.1% missing in NEDS (Rank 141). Consistency in coding held throughout the top 25 conditions. Of the top 25 first-listed conditions in NHAMCS, 23 of those conditions also appeared in the top 25 first-listed NEDS conditions.

Table 10. 25 Principal CCS Diagnosis Code for NHAMCS and NEDS, 2005

CCS Diagnosis Code	Description	NHAMCS			NEDS		
		Weighted Frequency	Percent	Rank	Weighted Frequency	Percent	Rank
239	Superficial injury; contusion	6,481,277	5.6%	1	6,141,061	5.3%	2
232	Sprains and strains	6,293,274	5.5%	2	6,293,845	5.4%	1
126	Other upper respiratory infections	5,607,438	4.9%	3	5,592,047	4.8%	3
251	Abdominal pain	4,641,208	4.0%	4	4,179,444	3.6%	4
0	Missing	3,903,573	3.4%	5	63,803	0.1%	141
102	Nonspecific chest pain	3,783,057	3.3%	6	3,572,737	3.1%	6
235	Open wounds of head; neck; and trunk	3,141,281	2.7%	7	2,729,676	2.3%	8
236	Open wounds of extremities	3,076,033	2.7%	8	3,695,306	3.2%	5
244	Other injuries and conditions due to external causes	3,055,541	2.6%	9	2,524,018	2.2%	12
197	Skin and subcutaneous tissue infections	2,988,303	2.6%	10	2,695,196	2.3%	10
205	Spondylosis; intervertebral disc disorders; other back problems	2,903,193	2.5%	11	3,167,315	2.7%	7
84	Headache; including migraine	2,698,379	2.3%	12	2,724,109	2.3%	9
159	Urinary tract infections	2,379,088	2.1%	13	2,530,396	2.2%	11
92	Otitis media and related conditions	2,223,279	1.9%	14	2,120,648	1.8%	13
133	Other lower respiratory disease	2,151,762	1.9%	15	1,861,154	1.6%	16
7	Viral infection	2,059,197	1.8%	16	1,576,601	1.4%	21
211	Other connective tissue disease	1,900,265	1.6%	17	1,838,783	1.6%	17
127	Chronic obstructive pulmonary disease and bronchiectasis	1,861,655	1.6%	18	1,805,736	1.6%	19
128	Asthma	1,770,327	1.5%	19	1,824,057	1.6%	18
229	Fracture of upper limb	1,659,771	1.4%	20	1,983,152	1.7%	14
136	Disorders of teeth and jaw	1,612,923	1.4%	21	1,584,001	1.4%	20
122	Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	1,559,740	1.4%	22	1,872,802	1.6%	15
246	Fever of unknown origin	1,559,576	1.4%	23	1,351,233	1.2%	26
253	Allergic reactions	1,453,588	1.3%	24	1,509,600	1.3%	22
154	Noninfectious gastroenteritis	1,356,595	1.2%	25	1,458,664	1.3%	23

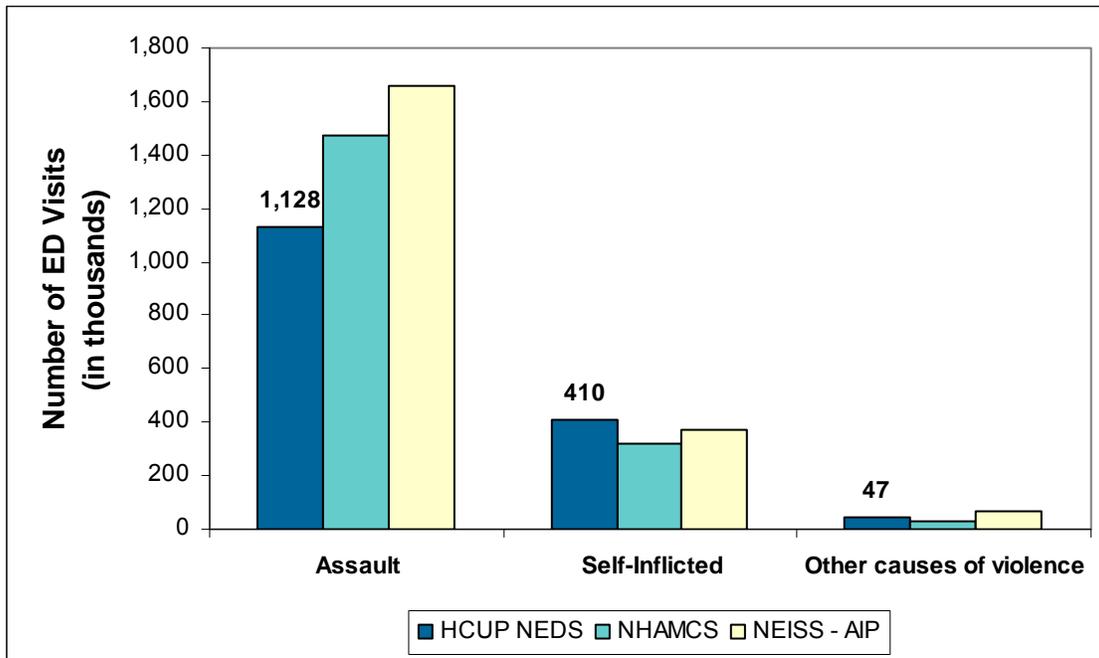
Comparisons were made between injury counts in the NEDS, NHAMCS and NEISS – AIP (Figure 23 and Figure 24).³ While NEDS and NHAMCS allow a visit to be grouped into more than one injury category, the NEISS – AIP classifies each visit into one and only one intentional or unintentional injury category. Counts were relatively consistent between the three data sources. However, perhaps due to the ability to group a single visit into multiple categories, NEDS and NHAMCS classified almost twice as many visits into Other Mechanism (unintentional injury) as the NEISS – AIP.

Figure 23. Unintentional Injuries (in thousands) Treated in the ED, 2005



³ See Table 9b in Appendix D for codes used to identify injuries treated in EDs.

Figure 24. Intentional Injuries (in thousands) Treated in the ED, 2005



Variance Contributions

To assess the reliability of the NEDS, a resampling study, using the same sample design of random sampling within each stratum, was conducted using bootstrapping. Bootstrap estimates were obtained by drawing from a large number of samples (1,000) with replacement from the original sample and then calculating each statistic of interest from each repeated sample. Estimates of bias and variance based on the resulting distribution of statistics were calculated from the repeated samples.

In particular, for each sample replication, the ED visit count in a category (i.e., Age 0-17, Age 18-44, Age 45-64, Age 65+) was collected. Histograms of the 1,000 replications for each age category are presented in Figure 25 through Figure 28.

Figure 25. Bootstrapping Estimates for Ages 0-17, 2005

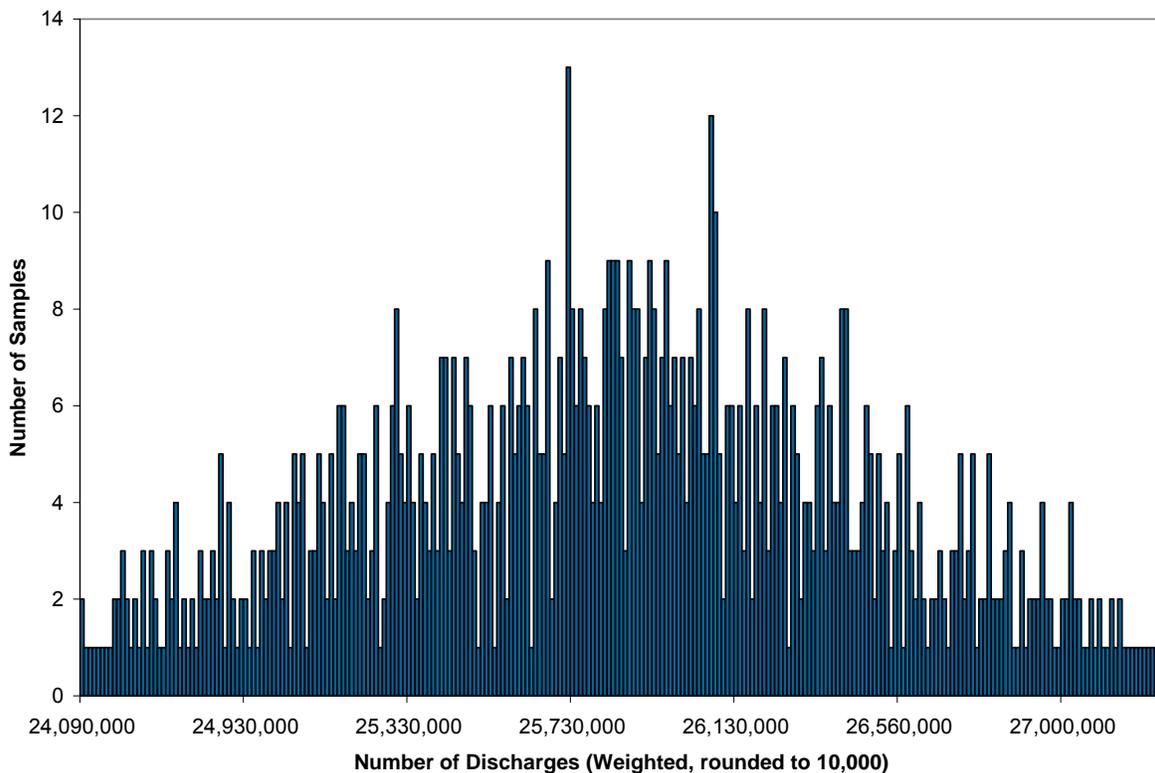


Figure 26. Bootstrapping Estimates for Ages 18-44, 2005

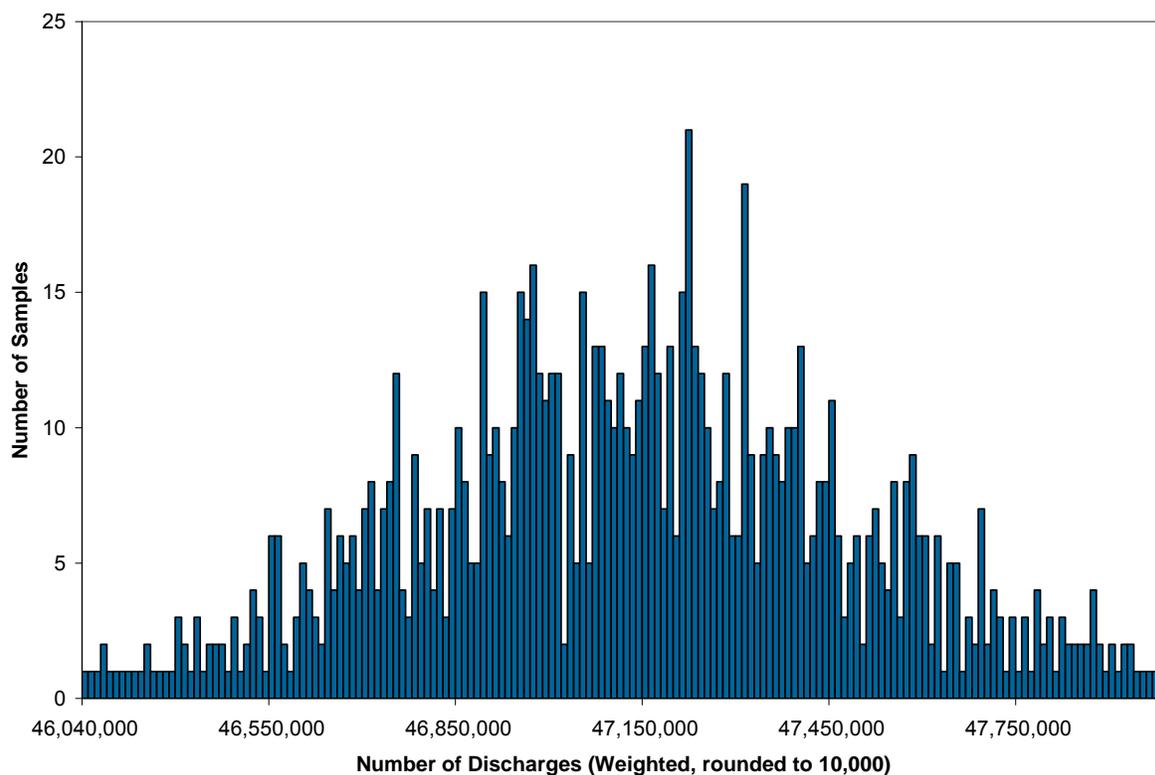


Figure 27. Bootstrapping Estimates for Ages 45-64, 2005

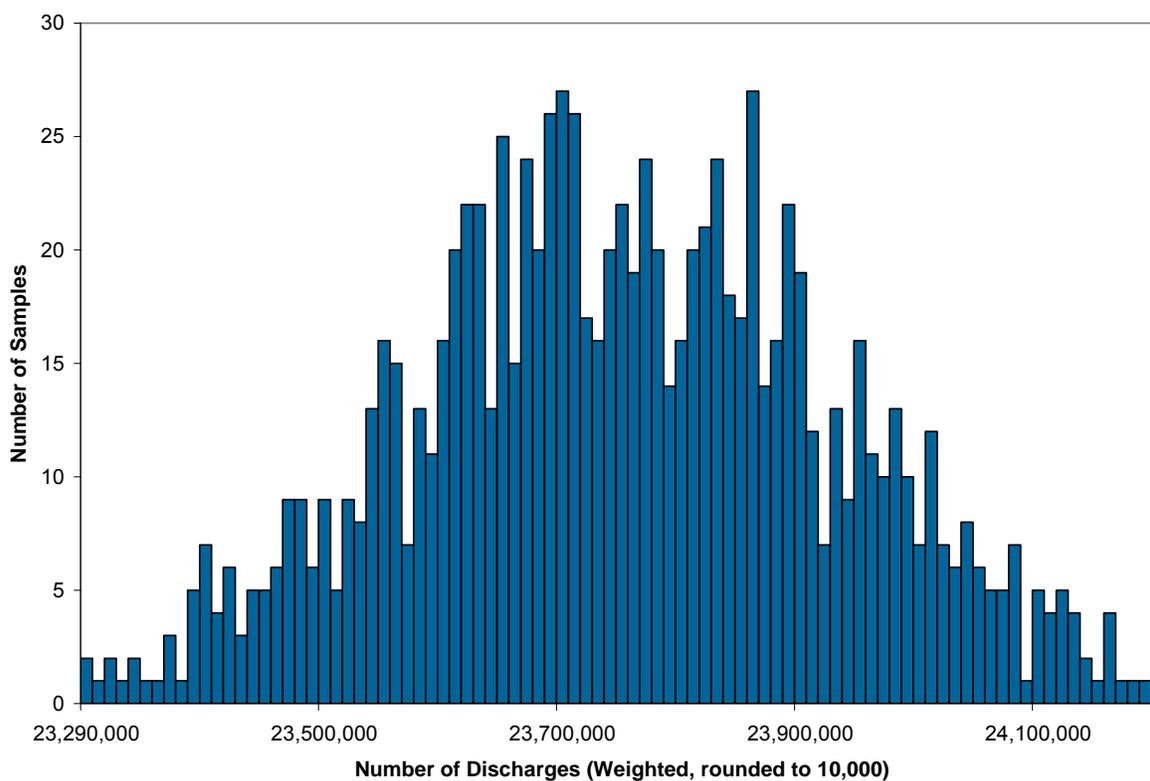
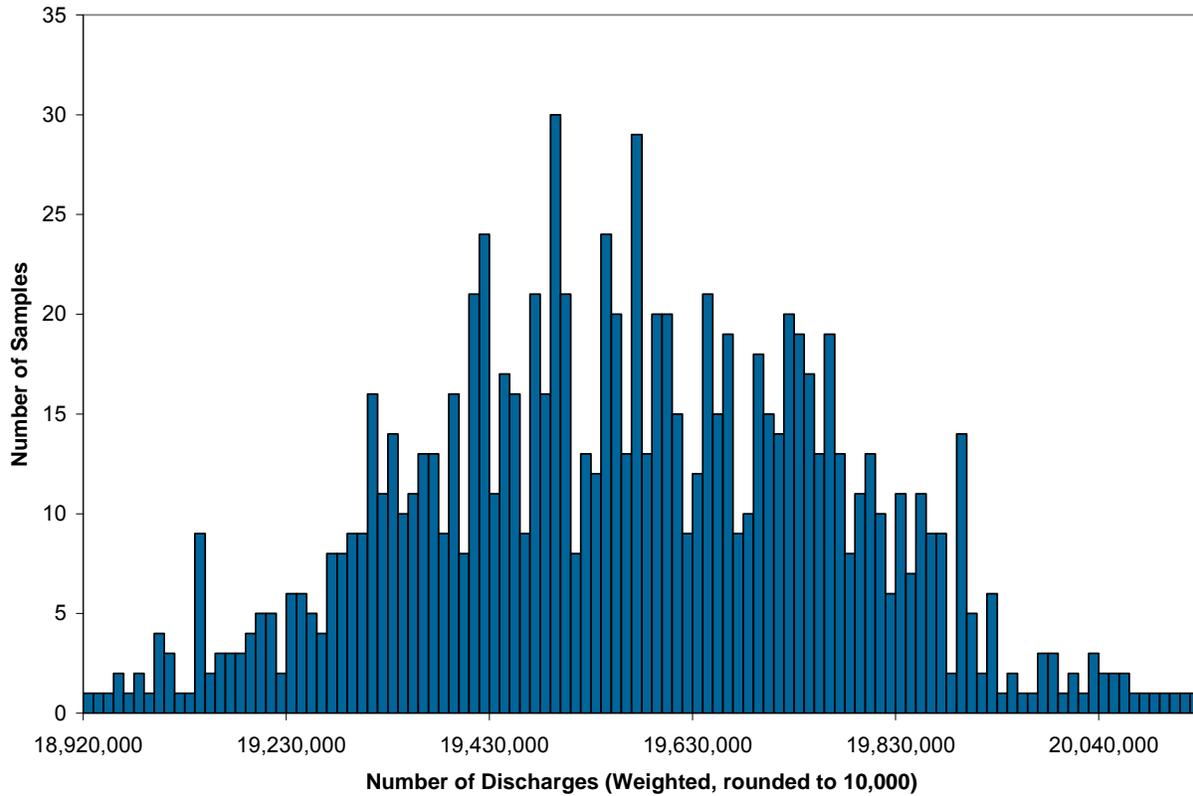


Figure 28. Bootstrapping Estimates for Ages 65+, 2005



Resampling bootstrapping results for the four age categories are summarized in Table 11. Of note, in each age category, the ED visit count from the NEDS falls into the 95% confidence interval of the 1,000 sample replications. This reveals that the NEDS results are robust to the sampling strategy, and the sampling mechanism had little effect on the statistics generated.

Table 11. Resampling Results (1000 samples) of ED Visit Counts by Age Category, 2005

Age Category	Bootstrap Mean ED Visit Count	95% CI Bootstrap	NEDS ED Visit Count
0-17 years	25,841,863	(24,605,873, 27,077,853)	26,541,919
18-44 years	47,129,711	(46,430,629, 47,828,794)	46,744,390
45-64 years	23,752,181	(23,403,328, 24,101,034)	23,516,418
65+ years	19,560,589	(19,145,962, 19,975,217)	19,483,314

Resampling was also conducted across income categories with similar results. All NEDS ED visit counts fell within the 95% confidence interval generated from this resampling study.

Future Variance Studies

In the future, variance contributions may be estimated at the state-level, county-level, facility-level, and patient-level for ED outcomes based on the pilot data (components of variance) for some ED outcomes. This information could be used to develop a weighting scheme that would overcome any imbalances (bias) that may occur between the frame and non-frame states.

Also, while population benchmarks and relatively complete data are available for some statistics (e.g., ED visits, percent treat and release visits), complete population benchmarks do not exist for others. One analysis to consider in the future is a version of the jackknife to estimate and compare the variances of outcome statistics. Traditionally, jackknife estimates are obtained by calculating a statistic n times, systematically leaving each sampled observation out of the sample once. The estimate of variance is based on the variance between actual and predicted values calculated over the n jackknife estimates. This procedure generally assumes a random sample of observations from the entire universe to produce a valid estimate of variance. Since the sampling frame for this study is much smaller than the universe (since all states are not included) this procedure may not render accurate variances for estimates of population statistics. However, it could be a useful analysis of the effects of including or eliminating states from the sampling frame. At present, this analysis is not pertinent to the pilot sample since a few of the geographic regions require all of the states available to support the sampling strategy.

POLICY ASSESSMENT

The HCUP family of health care databases has a long history of supporting policy development, analysis and research. The NEDS has the potential to play an important role in health care delivery and quality monitoring for the nation's hospital-based emergency departments. As discussed in detail in previous sections of this analysis, the NEDS provides information regarding ED admissions, ED discharges and transfers to inpatient care, locations of hospitals, distribution of hospital type, and demographics. Because of the complex and crucial nature of ED utilization, this information can illuminate needs and excessive use and inform resource allocation decisions.

We believe the NEDS will be able to advance both public health and health care goals and have assessed the ability of the database to support policy analysis and development through two resources: the Institute of Medicine (IOM) report *Hospital-Based Emergency Care: At the Breaking Point* (2007) and the Department of Health and Human Services Healthy People 2010 Initiative. The IOM has been extremely influential in health care, serving as a catalyst for initiatives and directing the nation's attention to emergent issues with such reports as *Crossing the Quality Chasm: A New Health System for the 21st Century* and *America's Health Care Safety Net: Intact but Endangered*. In *Hospital-Based Emergency Care*, the authors scrutinize the developing crises in emergency departments across the nation and make recommendations to the nation. Likewise, as DHHS manages the concerted action of federal agencies focused on public health and healthcare, its leadership on health initiatives and policy direction is symbolic and directive. Every decade, the Department of Health and Human Services Office of Disease Prevention and Health Promotion posits a set of health goals (currently Healthy People 2010) that provides a template for local to national leaders for the development of health interventions to promote health and well being and eliminate health disparities. This initiative has been used to demonstrate progress made on other national health goals, and the objectives have been incorporated into many Health Plan Employer Data and Information Set indicators. Together the IOM's recommendations and Healthy People 2010 Initiative Objectives serve as a comprehensive framework for critically assessing the data needs of health improvement initiatives. The NEDS will contain information that can support the development and evaluation of many of these initiatives.

Additionally, assessing the feasibility of implementing and utilizing the NEDS requires an analysis of stakeholder groups. We focus our stakeholder discussion on ED personnel who have a direct interest and involvement as well as on policymakers such as hospital administrators, legislators and other policymakers, and payers. The NEDS may be used by policymakers and researchers to move beyond a mere understanding of the issues at play in ED utilization to action by providing a system for monitoring and assessing points of policy intervention. Over time, the NEDS will prove to be a key resource in policy development, implementation, and assessment. By integrating information from the NEDS into the development of policy and quality initiatives, users of the NEDS will be better-positioned for answering charges from a variety of stakeholder groups (Table 14). To note, we acknowledge that ED patients have a substantial interest in the degree of quality of care and insurance coverage provided upon ED utilization. In fact, patients receiving care in EDs represent 20% of the US population. The NEDS will directly and indirectly affect and promote their interests as well.

ED Issues from the Institute of Medicine Report

In the Institute of Medicine report, many salient issues facing emergency care are described. Table 12 contains a summary of each of the issues highlighted in the IOM report and assesses the ability of the NEDS to support analysis and assessment of treatment patterns in these areas. Our analysis reveals that the NEDS will be well-equipped to support many of the solutions described in the IOM report. As is observable, the NEDS will provide information that can support efforts to redress the majority of the issues identified in the IOM report.

The NEDS could be utilized to develop accountability mechanisms; answer complex questions about the entire healthcare system, particularly regarding health financing; inform policy direction and resource allocation; track patient flow to assess efficiency or understand more about patients with specific diagnoses; and improve equity. First, the NEDS could inform the development of accountability and evidence-based indicators of emergency and trauma care performance. The authors of the IOM report call for the development of accountability mechanisms and evidence-based emergency medical care. Reporting and transparency are crucial components of accountability but depend on information technology. The NEDS will provide a means for developing performance measures and systematizing accountability.

Furthermore, the NEDS could answer complex questions about the entire healthcare system. For example, the NEDS could be used to examine reimbursement patterns from a variety of payers and to assess patterns in the utilization of nonemergency care within EDs. Additionally, the NEDS could be used to compare ED utilization with utilization of alternative sources of care. As the number of urgent care centers and retail health clinics continues to grow, patterns of utilization of emergency medical care may change; the NEDS could examine these patterns. Finally, as it incorporates payer information, the NEDS could be employed to call attention to such policy issues as uninsurance.

The NEDS could also inform decision-making regarding specific diagnoses or conditions that tend to require emergency medical care. The IOM report makes specific recommendations regarding ED patients with mental health or substance abuse conditions. The NEDS could be used to track patients with mental health or substance abuse conditions to determine patient needs, level of follow-up, and referral processes. It could also answer more complex questions regarding the relationships among payment type, receipt of care, and diagnoses. In addition, the IOM report addresses the inefficient use of resources and identifies patient flow as a specific issue. The NEDS will facilitate patient tracking to examine the outcomes of patients' emergency department encounters. This information will demonstrate how patients are moving through health systems and inform providers about inefficiencies in emergency care. Finally, the NEDS will also enable comparisons of patterns of care for patients presenting with similar conditions.

The IOM report emphasizes the importance of capacity planning in improving the efficiency, quality, and patient-centeredness of care in EDs and identifies the imbalance of demand and capacity as a contributing factor to the problems with ED efficiency and quality of care. However, in its current form, the NEDS will not be able to provide specific information about bedsize or capacity as these variables are not widely available. Albeit the NEDS can provide information about the nature of ED visits and outcomes, and patient needs per encounter can be evaluated. Thus, some conclusions about the relationship between capacity and demand could be inferred from information in the NEDS. The database will also provide information about geographic concentration of hospitals and hospital type, which could inform macro-level

decisions about resource allocation such as identifying areas of high ED utilization and thus demand.

Finally, the NEDS will highlight issues related to access to timely emergency medical care and specialists. The authors of the IOM report point out that individuals living in rural areas experience greater impediments to receiving timely emergency responses and accessing specialists. The NEDS could help answer questions regarding the extent and consequences of these issues and identify areas of need. The strengths of the NEDS will help providers and payers develop initiatives around emergency care, while they can also help policymakers and decision-makers understand the areas of need and focal points when making decisions to allocate resources or intervene on the behalf of a specific patient population.

Table 122. Summary of Emergency Care Issues (IOM Report)

Issues in Emergency Care	Specific Issues	Use of NEDS in Understanding or Addressing Issue
Lack of performance measurement and accountability	<ul style="list-style-type: none"> • No standardized measurement or reporting of ED performance • Lack of understanding of ED quality of care 	High
The emergency department as a core component of community ambulatory care	<ul style="list-style-type: none"> • Safety net • Use of the ED for nonemergency care 	High
Reimbursement for emergency and trauma care	<ul style="list-style-type: none"> • Uninsurance • Uncompensated care • Medicare • Medicaid • Private Pay 	High
Challenges of care for mental health conditions and substance abuse	<ul style="list-style-type: none"> • Care for mental health conditions • Care for substance abuse conditions 	High
Rural emergency care	<ul style="list-style-type: none"> • Availability of hospitals and equipment • Payer mix • Workforce supply • Distance and time 	High
Inadequate supply of on-call specialists	<ul style="list-style-type: none"> • Lack of available specialists, especially in high skill areas 	Medium
Inadequate surge capacity	<ul style="list-style-type: none"> • Disaster response • Mass casualty events (bioterrorism, communicable diseases) 	Medium
Inadequate research funding and infrastructure	<ul style="list-style-type: none"> • Funding stream is not well-established within NIH and other agencies 	Medium
Fragmented systems	<ul style="list-style-type: none"> • Emergency care provided by EMS, hospitals, trauma centers, public safety services and public health agencies 	Medium

	<ul style="list-style-type: none"> • Lack of coordination 	
Imbalance between demand and capacity	<ul style="list-style-type: none"> • Overcrowding • Boarding • Ambulance diversion • Balking 	Medium
Inefficient use of resources	<ul style="list-style-type: none"> • Use of information technology • Patient flow 	Medium
Medical liability	<ul style="list-style-type: none"> • Exposure to liability • Availability to assume ED call 	Low

ED Issues in Healthy People 2010

The Healthy People 2010 Initiative outlines objectives promoting the nation’s overarching health goals of quality of life and reducing disparities. The delivery and quality of emergency medical care are complicated by comorbidities, inequities, and structures of financing. Many of the Initiative’s objectives focus on preventable threats to health, and many of the events that are stretching emergency room capabilities are preventable. Thus, improvements in emergency medical care could reduce preventable injury or death. As such, the NEDS would be very important in providing information that can help policymakers understand these issues and identify points of intervention.

The current set of objectives, Healthy People 2010, contains health goals in 28 domains, each outlining a set of specific health objectives. Table 13 describes the 15 domains and associated health goals that are relevant to the information available in NEDS. Notably, nine objectives specifically address emergency medical care and processes (see bolded objectives in Table 13). The NEDS could track the progress made toward reaching the nine objectives that pertain directly to emergency medical care and may highlight impediments to the objectives. In addition, we identified additional Healthy People 2010 objectives that are relevant to condition-specific or event-specific ED utilization rates that could guide health improvement efforts.. In addition to promoting quality at the point of service, the NEDS could promote public health goals as well, as it could be used to track specific diagnoses and demographics.

Table 13. Healthy People 2010 Objectives

Objectives	Examples of Specific Objectives Addressed via NEDS
1. Access to Quality Health Services: Improve access to comprehensive, high-quality health care services.	1-10 Reduce the proportion of persons who delay or have difficulty in getting emergency medical care 1-11 Increase the proportion of people who have access to rapidly responding prehospital emergency medical services 1-14 Increase the number of States that have implemented guidelines for prehospital and hospital pediatric care
2. Arthritis, Osteoporosis and Chronic Back Conditions: Prevent illness and disability related to arthritis and other rheumatic conditions, osteoporosis, and chronic back conditions	2-10 Hospitalization for Vertebral Fractures
4. Chronic Kidney Disease: Reduce new cases of chronic kidney disease and its complications, disability, death, and economic costs.	4-1 End Stage Renal Disease 4-7 Kidney Failure Due to Diabetes
8. Environmental Health: Promote health for all through a healthy environment.	8-6 Waterborne disease outbreaks 8-27 Monitoring environmentally related diseases
9. Family Planning: Improve pregnancy planning and spacing and prevent unintended pregnancy.	9-12 Problems becoming pregnant and maintaining a pregnancy
10. Food Safety: Reduce foodborne illnesses.	10-1 Foodborne infections 10-2 Outbreaks of foodborne infections
12. Heart Disease and Stroke: Improve cardiovascular health and quality of life through the prevention, detection, and treatment of risk factors; early identification and treatment of heart attacks and strokes; and prevention of recurrent cardiovascular events.	12-5 Increase the proportion of eligible persons who witnessed out-of-hospital cardiac arrest who received their first therapeutic electrical shock within 6 minutes after collapse recognition 12-6 Heart failure hospitalizations
14. Immunization and Infectious Diseases: Prevent disease, disability, and death from infectious diseases, including vaccine-preventable diseases.	14-1 Vaccine-preventable diseases 14-2 Hepatitis B in infants and young children 14-3 Hepatitis B in adults and high-risk groups 14-4 Bacterial meningitis in young children 14-5 Invasive pneumococcal infections 14-6 Hepatitis A 14-7 Meningococcal disease 14-8 Lyme disease 14-9 Hepatitis C 14-11 Tuberculosis 14-17 Peptic ulcer hospitalizations 14-30 Adverse events from vaccinations
15. Injury and Violence Protection: Reduce injuries, disabilities, and deaths due to	15-1 Nonfatal head injuries 15-2 Nonfatal spinal cord injuries

unintentional injuries and violence.	15-5 Nonfatal firearm-related injuries 15-7 Nonfatal poisonings 15-10 Emergency department surveillance systems 15-12 Emergency department visits 15-14 Nonfatal unintentional injuries 15-17 Nonfatal motor vehicle injuries 15-18 Nonfatal pedestrian injuries 15-28 Hip fractures 15-29 Drownings 15-30 Dog bite injuries 15-33 Maltreatment and maltreatment fatalities of children 15-35 Rape or attempted rape 15-36 Sexual assault other than rape 15-37 Physical assaults
16. Maternal, Infant and Child Health: Improve the health and well-being of women, infants, children, and families.	16-5 Maternal illness and complications due to pregnancy 16-22 Medical homes for children with special health care needs
18. Mental Health and Mental Illness: Improve mental health and ensure access to appropriate, quality mental health services.	18-2 Adolescent suicide attempts 18-7 Treatment for children with mental health problems 18-9 Treatment for adults with mental disorders 18-10 Treatment for co-occurring disorders
20. Occupational Safety and Health: Promote the health and safety of people at work through prevention and early intervention.	20-2 Work-related injuries 20-6 Work-related assaults
23. Public Health Infrastructure: Ensure that Federal, Tribal, State, and local health agencies have the infrastructure to provide essential public health services effectively.	23-4 Data for all population groups 23-5 Data for Leading Health Indicators, Health Status Indicators, and Priority Data Needs at Tribal, State, and local levels 23-6 National tracking of Healthy People 2010 objectives
24. Respiratory Disease: Promote respiratory health through better prevention, detection, treatment, and education efforts	24-2 Hospitalizations for asthma 24-3 Hospital emergency department visits for asthma
25. Sexually Transmitted Disease: Promote responsible sexual behaviors, strengthen community capacity, and increase access to quality services to prevent sexually transmitted diseases (STDs) and their complications.	25-1 Chlamydia 25-2 Gonorrhea 25-3 Primary and secondary syphilis 25-4 Genital herpes 25-5 Human papillomavirus infection
26. Substance Abuse: Reduce substance abuse to protect the health, safety, and quality of life for	26-1 Motor vehicle crash deaths and injuries 26-4 Drug-related hospital emergency

all, especially children.	department visits 26-5 Alcohol-related hospital emergency department visits 26-11 Binge drinking 26-22 Increase the proportion of persons who are referred to follow-up care for alcohol problems, drug problems, or suicide attempts after diagnosis or treatment of one of these conditions in a hospital emergency department
---------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

ED Stakeholder Analysis

Finally, we believe the NEDS will be a politically and practically feasible tool to implement. A myriad of individuals and groups in the US can be considered ED stakeholders with an intense interest in ED service delivery; this list includes but is not limited to: patients, physicians, EMS service providers, and accreditation organizations. Compiled based on groups discussed in the IOM report and ancillary internet searches, Table 14 lists ED stakeholders, those who have direct interest and involvement in health care delivered in EDs. Web site addresses for the professional organizations, societies and government agencies representing each of the stakeholder groups are also include in Table 14. Clearly, the use of the NEDS to monitor, understand, and improve ED service delivery will affect each of these groups, while it also enables them to begin to answer the IOM's call for improvement. Stakeholders who are indirectly involved in emergency care and most likely to utilize the NEDS in decision-making include researchers, hospital administrators, legislators and other policymakers, and payers. Informing each stakeholder group about the information contained in the NEDS as well as the usefulness of the database may be a productive strategy in improving the nation's health. In conclusion, we believe the NEDS promotes evidence-based decision-making and addresses key components of ED utilization from quality, efficiency, and equity perspectives.

Table 14. Hospital-Based Emergency Department Stakeholder Groups in the U.S.

Stakeholder Group	Description	Examples of Organizations Representing Stakeholder Groups
Emergency Nurses	There are approximately 90,000 emergency nurses in the United States, although not all of them work in the emergency department. Their roles include patient care, education, leadership, and research.[4]	<ul style="list-style-type: none"> • Emergency Nurses Association (www.ena.org) • American Nurses Association (www.nursingworld.org)

Stakeholder Group	Description	Examples of Organizations Representing Stakeholder Groups
Patients	Approximately 60 million patients visited an emergency room in 2005, representing approximately 20 percent of the US population. (Source: www.cdc.gov , Health United States, 2007)	<p>While the organizations representing patients are numerous, detailed below are examples of these organizations.</p> <ul style="list-style-type: none"> • American Association of Retired Persons (www.AARP.org) • Robert Wood Johnson Foundation (www.RWJF.org) • Disease-specific societies such as the American Diabetes Association (www.diabetes.org), and the American Heart Association (www.americanheart.org)
ED Physicians	Studies estimate that 25,500 – 32,000 emergency physicians work in the United States.[2, 3]	<ul style="list-style-type: none"> • American College of Emergency Physicians (www.acep.org) • Association of Emergency Physicians (www.aep.org) • Society for Academic Emergency Medicine (www.saem.org) • American Academy of Emergency Medicine (www.aaem.org)
Contract Management Groups	Contract management groups or CMGs are also known as hospital-based physician outsourcing groups. “The American Academy of Emergency Medicine (AAEM) estimates that approximately half of all emergency departments are now staffed by large or national CMGs that are majority-owned by nonphysicians, although the numbers vary depending on one's definition of large or small CMGs and whether one is grouping them together.” Meyers (2004)	Refer to ED Physicians row above.
Trauma Surgeons	The American College of Surgeons estimates about 3,000 trauma surgeons in the United States.[2]	<ul style="list-style-type: none"> • American College of Surgeons (www.facs.org/trauma)

Stakeholder Group	Description	Examples of Organizations Representing Stakeholder Groups
On-Call Specialists	The specialized services that hospitals provide to inpatients must also be provided in its emergency department. These services, such as orthopedics and neurology, are often provided by on-call physicians. [2]	<ul style="list-style-type: none"> • Specialty societies such as: • American Association of Neurological Surgeons (www.aans.org) • Society of Vascular Surgery (www.vascularweb.org) • American Thoracic Society (www.thoracic.org)
Physician Assistants	Based on the 2007 American Academy of Physician Assistants, 10% work in hospital emergency rooms.[5]	<ul style="list-style-type: none"> • American Academy of Physician Assistants (www.aapa.org)
Hospitals	There are approximately 5,000 hospital-based Emergency Departments in the United States	<ul style="list-style-type: none"> • American Hospital Association (www.aha.org)
Health Services/Medical Researchers	ED researchers span the spectrum of social and clinical sciences including: health services researchers, epidemiologists, health economists, health workforce specialists, child health researchers, and clinical researchers.	<ul style="list-style-type: none"> • AcademyHealth (www.academyhealth.org) • American Public Health Association (www.apha.org) • National Institute of Mental Health (http://www.nimh.nih.gov/) • Substance Abuse and Mental Health Services Administration (www.samhsa.gov)
Payers	Payers of emergency department services include: Medicare (12%), Medicaid (25%), Private Insurers (35%), Self-Pay/Other (17%). (Source: NHAMCS 2005) All health insurers paying for hospital-based emergency services fall into this category.	<ul style="list-style-type: none"> • Centers for Medicare and Medicaid Services (www.cms.gov) • National Governors Association (www.nga.gov) • National Academy for State Health Policy (www.nashp.org) • America's Health Insurance Plans (www.ahip.org)
Emergency Medical Services (EMS)	There are approximately 127,867 first responders, 567,221 Emergency Medical Technicians (EMTs), and 154,187 paramedics. Hospital-based services employ about 15.5 percent of the EMS workers in the U.S. (National Association of Emergency Medical Technicians)	<ul style="list-style-type: none"> • Emergency Medical Services for Children (www.ems-c.org/) • National Association of Emergency Medical Technicians (www.naemt.org) • United States Emergency Medical Service (www.usemergencymedicalservice.org)

Stakeholder Group	Description	Examples of Organizations Representing Stakeholder Groups
Drug and Device Manufacturers	In 2006, pharmaceutical companies spent a record \$55.2 billion on research and investment for drugs. (PhRMA 2008) There are over 6,000 companies in the U.S. that develop medical technologies. (Advanced Medical Technology Association (AdvaMed) 2005)	<ul style="list-style-type: none"> • Pharmaceutical Research and Manufacturers of America (PhRMA) (www.phrma.org) • Medical Device Manufacturers Association (www.medicaldevices.org) • Advanced Medical Technology Association (AdvaMed) (www.advamed.org)
Other Government Organizations	Government agencies regulate, research, fund, ensure safety, coordinate, administer, and promote health in the United States.	<ul style="list-style-type: none"> • Agency for Healthcare Research and Quality (www.ahrq.gov) • National Institutes of Health (www.nih.gov) • Office of Preparedness and Emergency Operations (http://www.hhs.gov/aspr/oepo/)
Health Accreditation Organizations	Through accreditation and other initiatives, these organizations strive to improve the quality and transparency of healthcare in the U.S.	<ul style="list-style-type: none"> • The Joint Commission (www.jointcommission.org) • The Leapfrog Group (www.leapfroggroup.org) • National Committee for Quality Assurance (NCQA) (www.ncqa.org)
Information Technology Vendors	Organizations aimed at improving and developing health information technology (HIT) and management systems.	<ul style="list-style-type: none"> • Healthcare Information and Management Systems Society (www.himss.org)
Injury Community	Many ED visits are a result of intentional and unintentional injuries.	<ul style="list-style-type: none"> • Centers for Disease Control and Prevention (www.cdc.gov) • Consumer Product Safety Commission (www.cpsc.gov) • Health Resources and Services Administration (www.hrsa.gov) • National Highway Traffic Safety Administration (www.nhtsa.gov)

In conclusion, the NEDS has the capacity to inform issue-specific solutions, to elucidate systemic problems, and to support the coordination of many actors and initiatives in promoting both healthcare quality and public health goals.

DISEASE TRACKING

To assess whether the NEDS could be used for disease tracking and retrospective surveillance activities, such as measuring the spread, location, and severity of communicable diseases or outbreaks of bioterrorism, we compared NEDS estimates to readily-available information from the U.S. Centers for Disease Control and Prevention (CDC).

Simulated disease tracking activity (Influenza-like Illness)

Influenza-like illness (ILI), a communicable disease, was selected as the condition to track over time and across geographic regions to assess the strength of NEDS for disease tracking. ILI was chosen because it can be identified in the administrative data captured for the NEDS and is also reported based on clinical findings via the CDC Influenza Sentinel Providers Surveillance Network (hereby Sentinel Providers). The NEDS captures visits to emergency departments for ILI treatment, while the Sentinel Providers capture ILI visits to health care provider offices. Comparisons between these two differing sources of ILI data can reveal whether the NEDS may be used for disease tracking activities.

Approximately 2,400 Sentinel Providers collect information for about 12 million U.S. office visits annually. Information from the Sentinel Providers are closely-watched indicators of an outbreak of flu or flu-like respiratory illness. Each week, Sentinel Providers report both the total number of patients treated and the number of those patients with ILI. In this activity, ILI is defined by its clinical presentation: fever [temperature of 100°F (37.8°C) or greater] and a cough and/or a sore throat in the absence of a known cause other than influenza (CDC 2008).

The CDC reports ILI visit rates from the Sentinel Providers by the nine U.S. Census divisions. For analytic purposes, data was aggregated to the four Census regions (Northeast, South, Midwest, and West). In order to calculate regional and national ILI visit rates, the ILI visit rates were population-weighted to the region and to the nation.

ILI in the NEDS was defined using a set of ICD-9-CM codes utilized by the U.S. Department of Defense's (DoD) Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE-ILI) (Table 15). The number of NEDS ILI visits and the percentage of total ED visits meeting the ILI criteria (ILI rate) were calculated each week.

ILI visit rates were compared from January through September 2005, since the 2005 Sentinel Provider data year is October 2004 through September 2005 and the 2006 Sentinel Provider data was not yet available. Weekly ILI visit rates were compared nationally and by the four U.S. Census regions to determine whether ILI rates from the NEDS and Sentinel Provider reports move in concert.

Table 15. Influenza-like Illness ICD-9-CM Codes (ESSENCE-ILI)

ICD-9-CM Code	Description
079.89	Viral Infection, not elsewhere classified
079.99	Viral Infection, not otherwise specified
460	Acute nasopharyngitis (common cold)
462	Acute pharyngitis
464.00	Acute laryngitis, without obstruction
464.10	Acute laryngitis and tracheitis, without mention of obstruction
464.20	Acute laryngotracheitis, without mention of obstruction
465.0	Acute laryngopharyngitis

465.8	Acute upper respiratory infections of multiple sites, not elsewhere classified
465.9	Acute upper respiratory infections of multiple sites, not otherwise specified
466.0	Acute bronchitis
466.19	Acute bronchitis and bronchiolitis due to other infectious organisms
478.9	Other disease of upper respiratory tract, not elsewhere classified/not otherwise specified
484.8	Pneumonia in other infectious diseases classified elsewhere
485	Bronchopneumonia, organism not otherwise specified
486	Pneumonia, organism not otherwise specified
487.0	Influenza with pneumonia
487.1	Influenza with other respiratory manifestations, not elsewhere classified
487.8	Influenza with other manifestations, not elsewhere classified
490	Bronchitis, not otherwise specified
780.6	Fever
784.1	Throat pain
786.2	Cough

National ILI visit rates and ILI visit rates by U.S. Census region were graphed for the NEDS and the Sentinel Providers (Figures 29-33). In addition, correlation coefficients were calculated between the NEDS and Sentinel Provider time series.

Figure 29 displays the national NEDS and Sentinel Provider ILI visit rates. National ILI trends are similar with a correlation coefficient of 0.94 (Table 13). Figures 30-33 represent ILI visit rates in each of the four U.S. Census regions. Regional ILI trends are also very similar between the NEDS and Sentinel Provider data, with a positive and high correlation coefficient.

Figure 29. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, January 1, 2005 – October 1, 2005

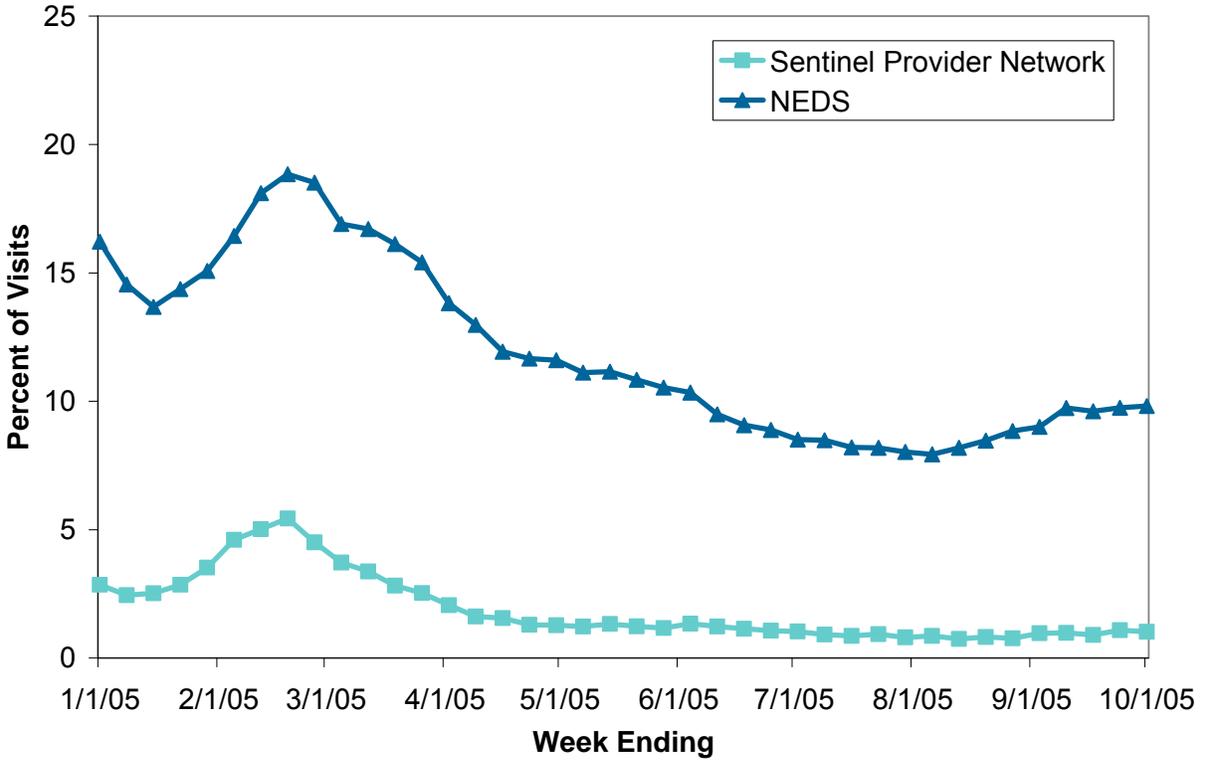


Figure 30. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, Northeast Region, January 1, 2005 – October 1, 2005

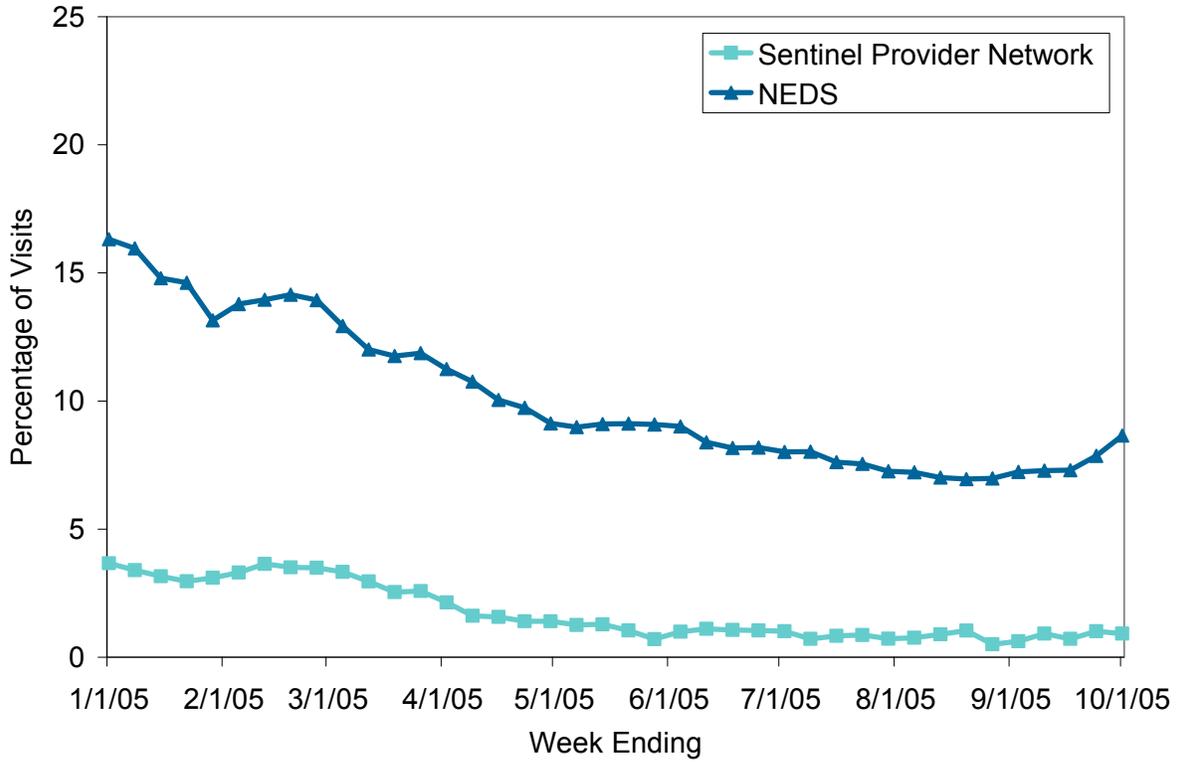


Figure 31. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, Midwest Region, January 1, 2005 – October 1, 2005

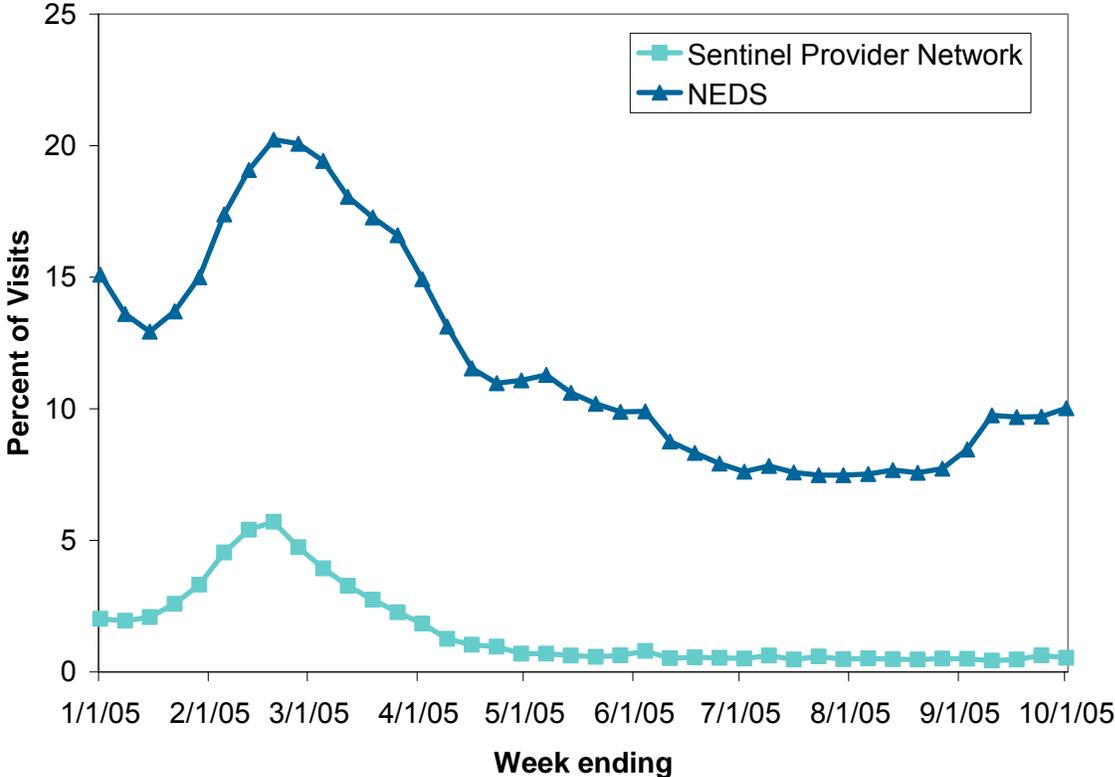


Figure 32. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, South Region, January 1, 2005 – October 1, 2005

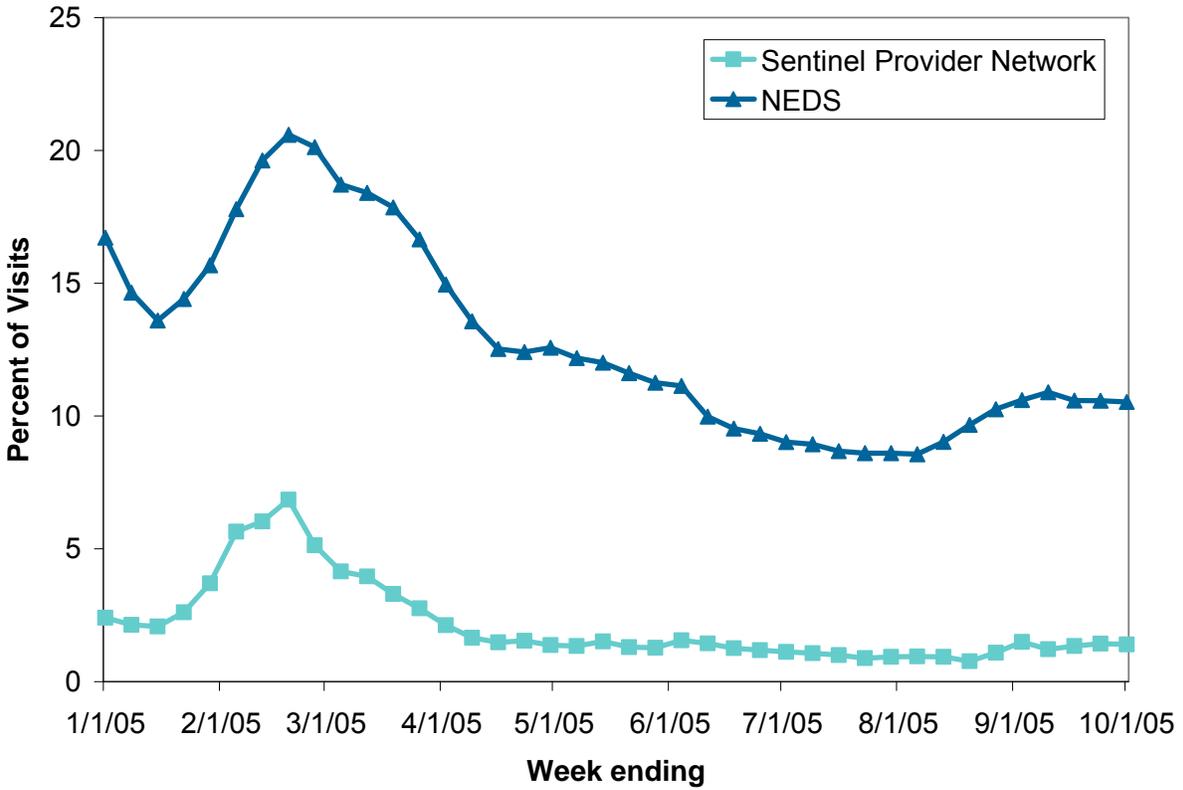


Figure 33. ILI Visit Rate in NEDS and U.S. Influenza Sentinel Providers Surveillance Network, West Region, January 1, 2005 – October 1, 2005

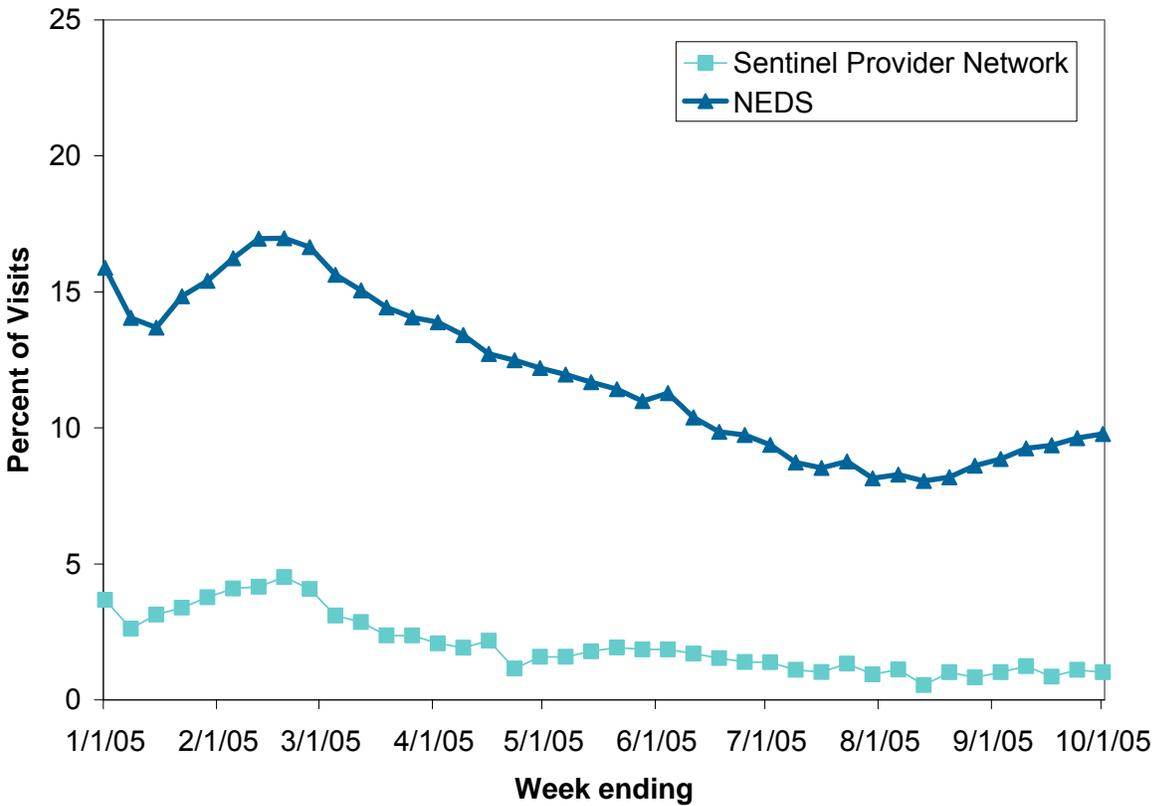


Table 16 displays the correlation coefficient for the nation and each of the four U.S. Census regions. Correlation coefficients are high and range from 0.91 in the South to 0.96 in the Northeast. Therefore, based on the results of the ILI study, disease tracking appears to be feasible with the NEDS.

Table 16. Correlation in Weekly ILI Visit Rates between NEDS and U.S. Influenza Sentinel Providers Surveillance Network, January 1, 2005 – October 1, 2005

Region	Correlation Coefficient
National	0.94
Northeast	0.96
South	0.91
Midwest	0.93
West	0.94

TIMING AND COST

One goal of this study was to determine if the nationwide data could be released at more frequent intervals, or earlier in the year. To address this issue, building blocks for the 2006 NEDS were considered:

- 2006 SID data for the HCUP ED states
- 2006 SEDD data for the HCUP ED states
- 2006 crosswalks of AHA hospital identifiers and the HCUP hospital identifiers
- 2006 multi-state ED data file
- Identification of trauma centers in 2006.

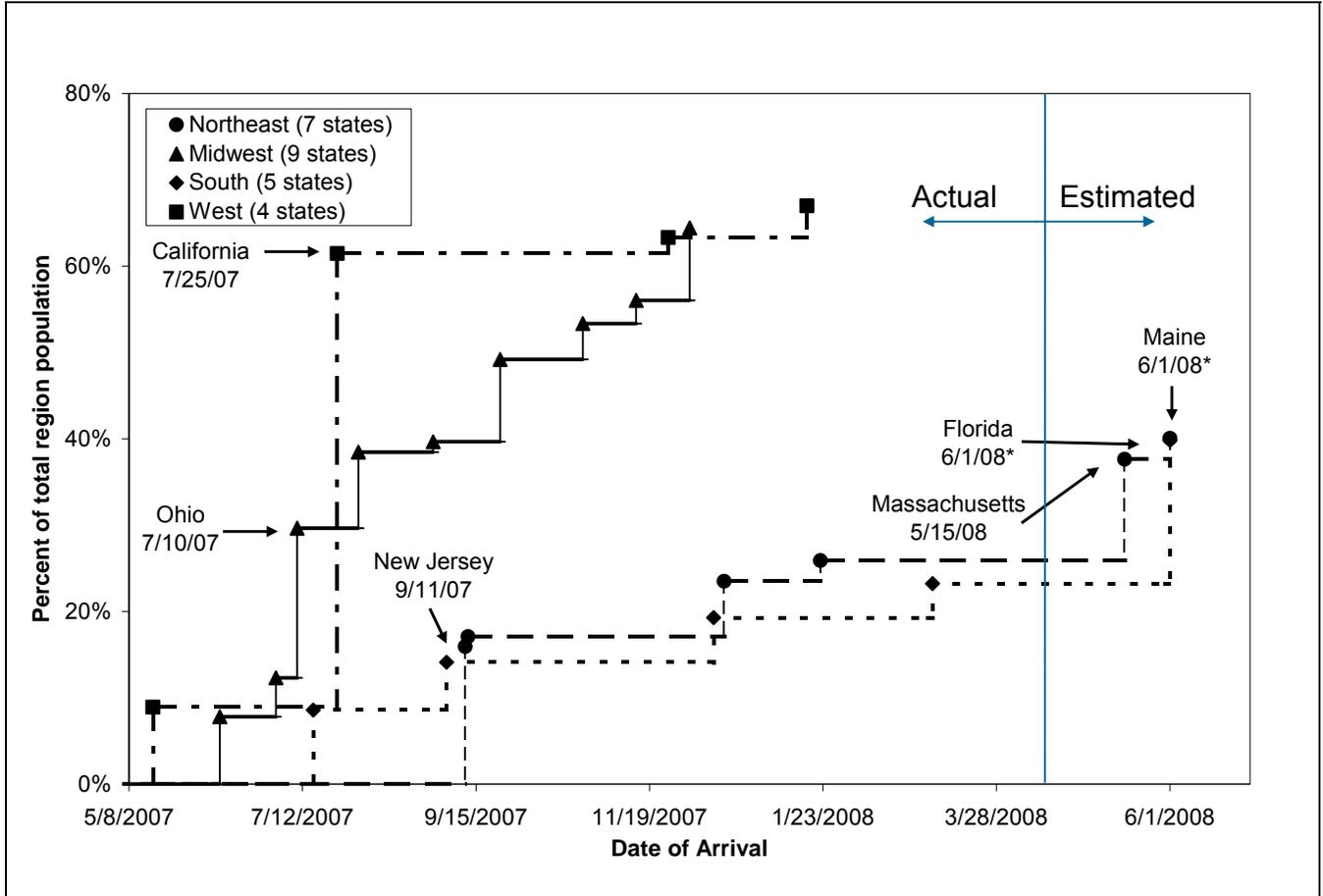
The timing for each piece is discussed separately in this section with overall guidelines for what is possible in the future.

Building Blocks for the NEDS

The 2006 SID from the 23 HCUP ED states included in the 2005 NEDS was complete by the end of March 2008. All but one state was complete by the end of January 2008. Maine data will join the 2006 SID, but is not currently available (as of the writing of this report).

Maine ED data is expected to join the SEDD for 2006. The receipt dates of the source data for the 2006 SEDD from each HCUP state were plotted and weighed by the percentage representation of the state population within each U.S. Census region (Figure 34).

Figure 34. Estimated and Actual Arrival of 2006 HCUP Emergency Department Data Based on Percentage of Total U.S. Census Regions



* Florida and Maine estimated date of arrival is unknown at the time of publication and assigned to June 1, 2008 for graphical representation.

By August 2007, almost all of the ED data was available from the West, but only about half of the data was available in the Midwest and little to no data in the South and Northeast. By January 2008, all of the data for the West and Midwest had arrived, but only half of the data in the South and Northeast were available. By March, when the 2006 SID was complete, still only half of the SEDD data was available in the South and Northeast. The South is problematic because of the delay in Florida data due to incomplete reporting by their hospitals to the data source. The Northeast is problematic because of a delay in Massachusetts and Maine. Maine would be new to the NEDS, but a useful addition to the Northeast despite its low contribution to population counts. The representation is relatively low in the South and Northeast, with the HCUP ED states covering about 40% of the population. Without Florida and Massachusetts, HCUP ED states only cover about 20% of the population. The 2006 NEDS cannot be completed without these two critical states.

An additional consideration in creating the NEDS is the timing of the AHA Annual Survey Database. The 2006 AHA database was available for purchase in November 2007 (traditionally the AHA data is not available until December). It takes about a month to load the raw data into

HCUP format. Because the AHA file uses hospital identifiers that differ from those used by the HCUP statewide data organizations, the crosswalk between the AHA hospital identifiers and the SID and SEDD hospital identifiers needs to be updated each year. The process of updating the crosswalks can take a few days to a few weeks depending on the number of hospitals in a state.

The next component of the NEDS is the multi-state ED data file which pools together ED data from the SEDD and SID. All SEDD records are included in the multi-state file, in addition to SID records with an indication of ED services. The file is used to determine frame hospitals and sampling rates.

The final component of the NEDS is the identification of trauma centers. We used the TIEP data for the 2005 NEDS. The TIEP data file is updated quarterly and needs to be obtained from Johns Hopkins Center for Injury Research and Policy. We need to investigate differences in the trauma designation that may occur across the quarters. Alternatively, we might consider a definition of Level I trauma centers supported by the American College of Surgeons Committee on Trauma requiring facilities admit more than 1,200 injured patients annually.

Creation of the NEDS

It takes approximately three months to create the NIS and its supporting documentation after the last SID and crosswalk are complete. For 2006, a shorter turn around time of two months is expected for the NEDS because this is an intramural AHRQ database that is not yet publicly released. A significant amount of time in creating the NIS is used to apply state-specified restrictions to the data, verify the results, and document the effects. The two month estimate for the NEDS includes the creation of the NEDS data file and basic database documentation. It does not include an updated design or comparison report.

At this point in time, the NEDS could not be released more than once a year. Typically, data for the previous calendar year starts arriving to HCUP in May (e.g., 2006 data starts to arrive in May 2007). In ideal circumstances, the majority of the data would arrive by January of the following year (e.g., 2006 data received by HCUP in January 2008). Unfortunately, the creation of the source data files can be problematic for HCUP Partner organizations. Each year a handful of states are delayed because of changes in data systems or slow reporting by hospitals to the participating data source. This delay often extends the inpatient data receipt until March and the outpatient data receipt into the summer.

Publicly-Released NEDS

Release of the NEDS through the HCUP Central Distributor requires that the HCUP Partners sign participation agreements that often impose state-specific restrictions on the use of data elements. Various HCUP Partners do not agree to release hospital identifiers. With the inclusion of a trauma indicator and the four-level urban-rural designation, the possible identification of hospitals even in states where the hospital identifiers have been suppressed needs to be evaluated. If some HCUP Partners opt out of participation, there is a risk for under representation in certain regions. Additionally, data users may find the size of the file, over 27 million records, cumbersome for loading on personal computing systems. With all of the complications of creating a version of the NEDS that can be publicly released, the process may initially take between six months and one year. For example, it took 15 months for the HCUP

Partners to agree to the release of the initial 1997 Kids' Inpatient Database and produce the HCUP Central Distributor version of the file. We expect the process for the NEDS to be a bit faster because the initial feedback from the HCUP Partners at the 2008 HCUP Partners' Meeting was very positive.

SUMMARY AND RECOMMENDATIONS

In summary, it is feasible to select a sample of ED hospitals for the HCUP Partner states that is "generalizable" to the target universe—U.S. hospital-based EDs. The 23 HCUP Partner states with 2005 ED data (AZ, CA, CT, FL, GA, HI, IA, IN, KS, MA, MD, MN, MO, NE, NH, NJ, OH, SC, SD, TN, UT, VT, WI) provide sufficient information to fulfill this purpose, encompassing 48% of all ED visits and 51% of the U.S. population.

Information on patients with ED events are contained in two HCUP databases:

- State Emergency Department Databases (SEDD) – ED visits that do not result in an admission (e.g., treat and release or transferred to another hospital)
- State Inpatient Databases (SID) – ED visits that result in an admission

Both HCUP databases contain a core set of clinical and non-clinical information defined in a uniform scheme for all patients, regardless of payer, making it possible to combine records across data types.

We identified an ED record in the SEDD and SID by the following criteria:

- Services to ED revenue center codes 450-459 reported on discharge record
- Positive ED charge, when revenue center codes were not available
- CPT code of 99281-99285 indicating ED physician services reported on record
- Admission source of ED
- Source-defined ED record (not standardized across data sources)

Some criteria were better for outpatient data, such as the use of CPT codes, and other criteria are suited for inpatient data (e.g., admission source).

We chose to draw a stratified sample of 20% of U.S. hospital-based EDs from the 23 HCUP Partner states. By stratifying on important hospital characteristics, the NEDS represents a "microcosm" of U.S. EDs. We stratified on the following:

- Census Region (Northeast, Midwest, South, and West)
- Trauma center
- Urban-rural location of the hospital (large metropolitan, small metropolitan, micropolitan, and non-urban residual)
- Teaching hospital in metropolitan areas
- Hospital control (public, voluntary, and proprietary).

After stratifying, a random sample of 20% of the total number of hospital-based EDs in the U.S. was selected within each stratum. Hospital and discharge-level weights were calculated to provide national estimates from the NEDS. The resulting NEDS for 2005 included 972 hospital-based EDs, over 27 million records, and over 100 data elements.

The 2005 NEDS was comparable to other ED sources. It was consistent in terms of total ED visits, included a slightly higher percentage of inpatient admissions, allowed more opportunity to pick up diagnostic and procedure information, and estimated similar for injury rates. We have also demonstrated that the NEDS is useful for disease tracking using the example of Influenza-like illness (ILI) and has potential to address ED-specific policy issues mentioned in the IoM report and Healthy People 2010.

While the 2005 NEDS has proven to be a valuable database, there is room for improvement. About half of the strata (37 of 65) use 50% or more of the frame hospitals for the NEDS. We need HCUP to actively pursue ED data sources in the South, Northeast, and West. Future investigation of the trauma designation is also warranted to determine if there are other ways to identify trauma centers and whether specific levels of trauma centers (versus trauma/non-trauma designation) should be included as a stratifier.

In addition, the NEDS has sparse information for a few key data elements:

- Patient Race – 18% of the ED visits in the NEDS are missing information on race because only 20 of 23 HCUP ED states report race.
- ED charges – 50% of the ED visits are missing ED-specific charge information.
- Total charge – 12% of the ED visits in the NEDS are missing total charge. The problem is concentrated in the West with 65% of the records missing total charge.

Clearly identifying where a procedure was performed on a SID record, either in the ED or as part of the inpatient stay, is not currently possible. To separate ED services from inpatient services in the SID, it is critical to have line item detail – revenue codes, charges and procedures. Only five of the 23 HCUP ED states provide revenue code level detail for the SID.

We expect to produce the NEDS once a year with the timing dependent on the availability of data in the SID and SEDD. We will also work with AHRQ and the HCUP Partners to release a version of the NEDS through the HCUP Central Distributor.

References

- Agency for Healthcare Research and Quality. (2006). "Medical Expenditure Panel Survey Background." Retrieved March 11, 2008, from http://www.meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp.
- American Trauma Society. "TIEP: Trauma Information Exchange Program." Retrieved March 11, 2008, from <http://www.amtrauma.org/tiep/index.html>.
- Centers for Disease Control and Prevention. (2008). "Flu Activity & Surveillance." Retrieved March 17, 2008, from <http://www.cdc.gov/flu/weekly/fluactivity.htm>.
- Centers for Disease Control and Prevention. (2008). "National Health Interview Survey (NHIS)." Retrieved March 11, 2008, from <http://www.cdc.gov/nchs/nhis.htm>.
- Centers for Disease Control and Prevention. (2008). "Welcome to WISQARS." Retrieved March 11, 2008, from <http://www.cdc.gov/ncipc/wisqars/default.htm>.
- Emergency Medicine Network. (2008). "National Emergency Department Inventory - USA." Retrieved March 11, 2008, from http://www.emnet-usa.org/nedi/nedi_usa.htm.
- Injury Surveillance Workgroup (2003). Consensus Recommendations for Using Hospital Discharge Data for Injury Surveillance. Marietta (GA), State and Territorial Injury Prevention Directors Association.
- Institute of Medicine (2007). Hospital-Based Emergency Care: At the Breaking Point (Future of Emergency Care). Washington, D.C., The National Academies Press.
- Merrill, C. T. and Owens, P. L. (2007). Hospital Admissions That Began in the Emergency Department for Children and Adolescents, 2004. HCUP Statistical Brief #32. June 2007. Agency for Healthcare Research and Quality, Rockville, MD. Retrieved June 9, 2008 from <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb32.pdf>
- Moorhead, J., M. Gallery, et al. (2002). "A study of the workforce in emergency medicine: 1999." Annals of Emergency Medicine **40**(1): 3-15.
- National Center for Health Statistics (2007). Health, United States, 2007 with Chartbook on Trends in the Health of Americans. Hyattsville, MD.
- Nawar, E., R. Niska, et al. (2007). "National Hospital Ambulatory Medical Care Survey: 2005 Emergency Department Summary." Advance Data From Vital and Health Statistics **386**.
- Nawar, E., R. Niska, et al. (2007). "National Hospital Ambulatory Medical Care Survey: 2005 Emergency Department Summary. Advance data from vital and health statistics; no. 386. ." Retrieved March 13, 2008.
- Sullivan, A., I. Richman, et al. (2006). "A profile of U.S. emergency departments in 2001." Ann Emerg Med **48**: 694-701.

Talan, D., G. Morgan, et al. (1998). "EMERGENCY ID NET: an Emergency Department-Based Emerging Infections Sentinel Network. the EMERGENCY ID NET Study Group." Ann Emerg Med **32**: 703-711.

U.S. Census Bureau (2005). Table 1: Annual Estimates of the Population for the United States and States, and for Puerto Rico: April 1, 2000 to July 1, 2005. NST-EST2005-01.

United States Department of Agriculture Economic Research Service. (2007). "Measuring Rurality: Urban Influence Codes." Retrieved April 7, 2008, from <http://www.ers.usda.gov/Briefing/Rurality/urbaninf/>.

APPENDICES

APPENDIX A: HCUP PARTNERS WITH EMERGENCY DEPARTMENT DATA PARTICIPATING IN THE 2005 NEDS FEASIBILITY STUDY

State	Data Source
Arizona	Arizona Department of Health Services
California	Office of Statewide Health Planning and Development
Connecticut	Chime, Inc.
Florida	Florida Agency for Health Care Administration
Georgia	Georgia Hospital Association
Hawaii	Hawaii Health Information Corporation
Indiana	Indiana Hospital & Health Association
Iowa	Iowa Hospital Association
Kansas	Kansas Hospital Association
Maryland	Health Services Cost Review Commission
Massachusetts	Division of Health Care Finance and Policy
Minnesota	Minnesota Hospital Association
Missouri	Hospital Industry Data Institute
Nebraska	Nebraska Hospital Association
New Hampshire	New Hampshire Department of Health & Human Services
New Jersey	New Jersey Department of Health and Senior Services
Ohio	Ohio Hospital Association
South Carolina	South Carolina State Budget & Control Board
South Dakota	South Dakota Association of Healthcare Organizations
Tennessee	Tennessee Hospital Association
Utah	Office of Health Care Statistics, Utah Department of Health
Vermont	Vermont Association of Hospitals and Health Systems
Wisconsin	Wisconsin Department of Health and Family Services

APPENDIX B: RECOMMENDED DATA ELEMENTS FOR THE NEDS

Because of the size of the database and the differences in information collected on SEDD and SID records, the data elements in the NEDS are divided into five different files:

- 1) Core file with discharge-level records
- 2) Hospital file with hospital characteristics
- 3) Supplemental *ED* file with CPT-4 and ICD-9-CM procedures performed in the ED
- 4) Supplemental *inpatient* file with data elements that are not specific to the emergency department such as total charge, length of stay, and procedures from a SID record
- 5) Data development file with dates and patient ZIP Code (for AHRQ intramural use only).

The following table lists the data elements for inclusion in the intramural and HCUP Central Distributor version of the NEDS (CD File). There are a few data elements proposed to be included in the intramural version and *future* versions of the Central Distributor NEDS (CD Future). These variables are not ready for public release at this time because of availability or Partner concerns on confidentiality.

Data Elements listed in pink are new to the HCUP databases and are created specifically for the NEDS to eliminate confusion about whether the information is specific to the ED or is a part of the inpatient stay.

NEDS Data Element	Description	Intramural File Type					CD File	CD Future	Comments
		Core	Hosp	ED	IP	DDev			
KEY_ED	HCUP NEDS record identifier	x		x	x	x	x		Replaces KEY
HCUPFILE	Source of HCUP Record (SID or SEDD)	x		x	x	x	x		New variable for NEDS identifying source of record
AGE	Age in years at admission	x					x		
AMONTH	Admission month	x					x		
AWEEKEND	Admission day is a weekend	x					x		
DIED_VISIT	Died in the ED (1), died in the hospital (2), did not die (0)	x					x		Create new multi-prong variable: DIED in the ED; DIED in the hospital; not die
DISP_ED	Disposition from ED	x					x		DISP from SEDD records. Set to "Admitted to this Hospital", value 9, for SID records
DQTR	Discharge quarter	x					x		
DX1-DX15*	Diagnoses	x					x		98.1% of the SID records and 100% of SEDD records have 15 or less DXs

NEDS Data Element	Description	Intramural File Type					CD File	CD Future	Comments
		Core	Hosp	ED	IP	DDev			
DXCCS1-DXCCS15	CCS: diagnoses	x					x		Updated to new CCS scheme with mental health categories included
CHRON1-CHRON15	Chronic condition indicators	x					x		
E_CCS1-E_CCS4	CCS: E Codes	x					x		
ECODE1-ECODE4*	E codes	x					x		100% of the SID and SEDD records have 4 or less E codes
FEMALE	Indicator of sex	x					x		
NDX	Number of diagnoses on this record	x					x		
NECODE	Number of E codes on this record	x					x		
PAY1	Primary expected payer (uniform)	x					x		
PAY1_X	Primary expected payer (as received from source)	x					x		
PAY2	Secondary expected payer (uniform)	x					x		
PAY2_X	Secondary expected payer (as received from source)	x					x		
PL_NCHS2006	Patient Location: NCHS Urban-Rural Categories	x					x		Use the NCHS_2006 urban-rural indicator for patient location
SUICIDE	Attempted suicide	x					x		New variable from DXs and E codes
TOTCHG_ED	Total charge for ED services	x					x		TOTCHG from SEDD records; ED charge from SID records
ZIPInc_Qrtl	Income Quartile	x					x		National quartile for 2005
AGEDAY	Age in days (when age < 1 year)	x						x	Growth area – work with Partners in future about clinically relevant cut-points
AGEMONTH	Age in months (when age < 11 years)	x						x	Growth area – work with Partners in future about clinically relevant cut-points
AHOUR	Admission Hour	x						x	Growth area – work with Partners on standards of times
DHOUR	Discharge Hour	x						x	Growth area – work with Partners on standards of times
RACE	Race (uniform)	x						x	Growth area – too many missing for CD version
PointOfOrigin	Point of origin for admission or visit, UB04 standard coding	x						x	Growth area – when available in 2007 SID/SEDD

NEDS Data Element	Description	Intramural File Type					CD File	CD Future	Comments
		Core	Hosp	ED	IP	DDev			
KEY	HCUP record identifier	x							Keep on intramural - link to SID/SEDD
DISCWT	Weight to ED Visits in AHA universe	x	x				x		
HOSP_ED	HCUP ED hospital identifier	x	x				x		Replaces HOSPID
HOSP_REGION	Region of hospital	x	x				x		
YEAR	Calendar year	x	x				x		
HL_UR_CAT4	Hospital location: Urban-Rural 4 Categories		x				x		Stratifier
HOSP_CONTROL	Control/ownership of hospital		x				x		Stratifier
HOSPWT	Weight to hospitals in AHA universe		x				x		
N_DISC_U	Number of AHA universe ED visits in NEDS_STRATUM		x				x		
N_HOSP_U	Number of AHA universe hospitals in NEDS_STRATUM		x				x		
NEDS_STRATUM	Stratum used to sample hospital		x				x		
S_DISC_U	Number of sample discharges in NEDS_STRATUM		x				x		
S_HOSP_U	Number of sample hospitals in NEDS_STRATUM		x				x		
TOTAL_EDVisits	Total number of ED visits from this hospital in the NEDS		x				x		
TRAUMA	Trauma Center Indicator		x				x		Stratifier
URBAN_TEACH	Teaching status of hospital (0:Non-Teaching, 1:Teaching, 2:Non-Urban)		x				x		Stratifier
DSHOSPID	Data source hospital identifier		x						Keep on intramural - link to SID/SEDD
HFIPSSTCO	Hospital FIPS state/county code		x						Keep on intramural - link to ARF
HOSPSTCO	Hospital modified FIPS state/county code		x						Keep on intramural - link to ARF
IDNUMBER	AHA hospital identifier without the leading 6		x						Keep on intramural - link to AHA
HOSPST	Hospital state postal code		x						Keep on intramural - link to SID/SEDD
CPT1-CPT15*	CPT/HCPCS procedure code			x			x		99.1% of the SEDD records contain 15 or less CPTs
NCPT	Number of CPT/HCPCS procedures on this record			x			x		11 states code CPTs
NPR_ED	Number of procedures from ED			x			x		Procedures from SEDD records

NEDS Data Element	Description	Intramural File Type					CD File	CD Future	Comments
		Core	Hosp	ED	IP	DDev			
PCLASS_ED1- PCLASS_ED9	Procedure class for ED procedure			x			x		
PR_ED1- PR_ED9*	Procedure from ED			x			x		100% of the SEDD records contain 9 or less PRs
PR_EDCCS1- PR_EDCCS9	CCS: Procedure from ED			x			x		
DISP_IP	Disposition from inpatient discharge				x		x		DISP from SID records
LOS_IP	Length of stay for inpatient admission				x		x		LOS from SID records
NPR_IP	Number of procedures from inpatient admission record				x		x		Procedures from SID records
PCLASS_IP1- PCLASS_IP9	Procedure class for inpatient procedure				x		x		
PR_IP1- PR_IP9*	Procedure from inpatient discharge record				x		x		99.4% of the SID records contain 9 or less PRs
PR_IPCCS1- PR_IPCCS9	CCS: Procedure from inpatient discharge record				x		x		
TOTCHG_IP	Total charge for ED and inpatient services				x		x		TOTCHG from SID records
ADATE	Admission date					x			
DDATE	Discharge date					x			
DOB	Date of birth					x			
ZIP	Patient ZIP Code					x			
MEDINC	Median household income for patient ZIP Code					x			

* The maximum number of diagnoses, external cause of injury codes, and procedures reported varies by state. For the NEDS we selected 15 diagnoses, four external cause of injury codes, nine ICD-9-CM codes and 15 CPT procedure codes.

The decision on the maximum number of diagnosis codes and procedure codes to include in the intramural and HCUP Central Distributor files was based on frequency distributions on the number of diagnoses, external cause of injury codes, and procedures coded on the 2005 NEDS records. The following tables present those frequency distributions.

Number of ICD-9-CM Diagnoses Reported

SID Records from the 2005 NEDS				SEDD Records from the 2005 NEDS			
NDX	Frequency	Percent	Cumulative Percent	NDX	Frequency	Percent	Cumulative Percent
0	832	0.0	0.0	0	12,396	0.1	0.1
1	167,847	4.0	4.1	1	10,339,450	45.3	45.3
2	256,930	6.2	10.2	2	6,208,958	27.2	72.5
3	303,799	7.3	17.5	3	3,008,295	13.2	85.7
4	338,368	8.1	25.6	4	1,508,848	6.6	92.3
5	358,690	8.6	34.2	5	795,464	3.5	95.8
6	364,582	8.8	43.0	6	443,560	1.9	97.7
7	357,014	8.6	51.5	7	224,919	1.0	98.7
8	380,567	9.1	60.7	8	134,856	0.6	99.3
9	745,147	17.9	78.5	9	112,941	0.5	99.8
10	392,406	9.4	87.9	10	32,838	0.1	99.9
11	90,027	2.2	90.1	11	7,290	0.0	99.9
12	77,538	1.9	92.0	12	4,527	0.0	100.0
13	66,990	1.6	93.6	13	2,897	0.0	100.0
14	64,159	1.5	95.1	14	2,022	0.0	100.0
15	125,613	3.0	98.1	15	2,800	0.0	100.0
16	16,092	0.4	98.5	16	261	0.0	100.0
17	13,592	0.3	98.8	17	131	0.0	100.0
18	10,076	0.2	99.1	18	69	0.0	100.0
19	7,951	0.2	99.3	19	53	0.0	100.0
20	6,579	0.2	99.4	20	37	0.0	100.0
21	5,063	0.1	99.5	21	15	0.0	100.0
22	4,169	0.1	99.6	22	17	0.0	100.0
23	3,843	0.1	99.7	23	13	0.0	100.0
24	3,081	0.1	99.8	24	4	0.0	100.0
25	6,438	0.2	100.0	25	11	0.0	100.0
26	343	0.0	100.0	26	1	0.0	100.0
27	335	0.0	100.0	28	1	0.0	100.0
28	341	0.0	100.0				
29	281	0.0	100.0				
30	267	0.0	100.0				

Number of External Cause of Injury Codes Reported

SID Records from the 2005 NEDS			
NECODE	Frequency	Percent	Cumulative
			Percent
0	3,423,256	82.1	82.1
1	403,238	9.7	91.8
2	289,946	7.0	98.7
3	41,491	1.0	99.7
4	9,409	0.2	100.0
5	1,535	0.0	100.0
6	76	0.0	100.0
7	8	0.0	100.0
8	1	0.0	100.0

SEDD Records from the 2005 NEDS			
NECODE	Frequency	Percent	Cumulative
			Percent
0	16,403,282	71.8	71.8
1	3,333,249	14.6	86.4
2	2,724,345	11.9	98.3
3	372,784	1.6	100.0
4	8,423	0.0	100.0
5	557	0.0	100.0
6	29	0.0	100.0
7	5	0.0	100.0

Number of ICD-9-CM Procedures Reported

SID Records from the 2005 NEDS				SEDD Records from the 2005 NEDS			
NPR	Frequency	Percent	Cumulative Percent	NPR	Frequency	Percent	Cumulative Percent
Missing (no PRs)	0	0.0	0.0	Missing (no PRs)	4,210,781	18.4	18.4
0	2,137,061	51.3	51.3	0	14,875,579	65.1	83.6
1	858,130	20.6	71.9	1	2,696,249	11.8	95.4
2	449,926	10.8	82.6	2	583,647	2.6	97.9
3	286,180	6.9	89.5	3	261,132	1.1	99.1
4	146,228	3.5	93.0	4	110,336	0.5	99.5
5	93,182	2.2	95.2	5	53,631	0.2	99.8
6	94,872	2.3	97.5	6	28,684	0.1	99.9
7	31,332	0.8	98.3	7	10,948	0.1	100.0
8	29,586	0.7	99.0	8	5,587	0.0	100.0
9	16,143	0.4	99.4	9	2,858	0.0	100.0
10	11,391	0.3	99.6	10	3,171	0.0	100.0
11	3,646	0.1	99.7	11	50	0.0	100.0
12	2,787	0.1	99.8	12	11	0.0	100.0
13	1,999	0.1	99.8	13	4	0.0	100.0
14	1,560	0.0	99.9	14	4	0.0	100.0
15	2,575	0.1	99.9	16	2	0.0	100.0
16	500	0.0	100.0				
17	386	0.0	100.0				
18	270	0.0	100.0				
19	234	0.0	100.0				
20	227	0.0	100.0				
21	575	0.0	100.0				
22	34	0.0	100.0				
23	27	0.0	100.0				
24	35	0.0	100.0				
25	73	0.0	100.0				
30	1	0.0	100.0				

Number of CPT Procedures Reported

SID Records from the 2005 NEDS				SEDD Records from the 2005 NEDS			
NCPT	Frequency	Percent	Cumulative Percent	NCPT	Frequency	Percent	Cumulative Percent
Missing (no CPTs)	4,152,988	99.6	99.6	Missing (no CPTs)	8,945,431	39.2	39.2
0	11,930	0.3	99.9	0	4,774,301	20.9	60.1
1	2,637	0.1	100.0	1	3,216,815	14.1	74.1
2	1,137	0.0	100.0	2	1,715,633	7.5	81.7
3	256	0.0	100.0	3	1,007,412	4.4	86.1
4	7	0.0	100.0	4	878,355	3.9	89.9
6	1	0.0	100.0	5	352,804	1.5	91.5
7	1	0.0	100.0	6	305,396	1.3	92.8
13	1	0.0	100.0	7	221,028	1.0	93.8
17	1	0.0	100.0	8	203,133	0.9	94.7
19	1	0.0	100.0	9	371,657	1.6	96.3
				10	381,631	1.7	98.0
				11	68,445	0.3	98.3
				12	60,893	0.3	98.5
				13	52,716	0.2	98.7
				14	45,584	0.2	98.9
				15	40,344	0.2	99.1
				16	33,037	0.1	99.3
				17	26,318	0.1	99.4
				18	21,167	0.1	99.5
				19	17,071	0.1	99.6
				20	14,020	0.1	99.6
				21	13,548	0.1	99.7
				22	8,943	0.0	99.7
				23	7,716	0.0	99.7
				24	6,283	0.0	99.8
				25	5,322	0.0	99.8
				26	5,237	0.0	99.8
				27	4,376	0.0	99.8
				28	3,157	0.0	99.9
				29	2,528	0.0	99.9
				30	22,694	0.1	100.0
				31	5,436	0.0	100.0
				32	1,417	0.0	100.0
				33	928	0.0	100.0
				34	520	0.0	100.0
				35	336	0.0	100.0
				36	255	0.0	100.0
				37	187	0.0	100.0
				38	126	0.0	100.0
				39	95	0.0	100.0
				40	73	0.0	100.0
				41	57	0.0	100.0

42	39	0.0	100.0
43	30	0.0	100.0
44	31	0.0	100.0
45	28	0.0	100.0
46	15	0.0	100.0
47	11	0.0	100.0
48	16	0.0	100.0
49	15	0.0	100.0
50	8	0.0	100.0
51	5	0.0	100.0
52	3	0.0	100.0
53	7	0.0	100.0
54	6	0.0	100.0
56	4	0.0	100.0
57	2	0.0	100.0
58	5	0.0	100.0
59	3	0.0	100.0
60	1	0.0	100.0
61	4	0.0	100.0
62	3	0.0	100.0
63	2	0.0	100.0
64	1	0.0	100.0
66	1	0.0	100.0
67	2	0.0	100.0
69	1	0.0	100.0
70	2	0.0	100.0
71	1	0.0	100.0
78	1	0.0	100.0
82	1	0.0	100.0
93	1	0.0	100.0

APPENDIX C: EMERGENCY DEPARTMENT DATA SOURCES

Federal Data Sources

Data Source:	<u>BioSense</u>
Description:	National Web-based database for tracking contagious and possibly bioterrorism-linked diseases and symptoms.
Source of Data:	Electronic clinical data at healthcare provider organizations. Real-time data is available in the United States from hospitals, state/regional surveillance systems, Department of Defense (DoD) military treatment facilities, Department of Veterans Affairs (VA) treatment facilities, and Laboratory Corporation of American (LabCorp) test orders.
Cost:	Free
Availability:	Users must contact the BioSense administrator and then apply for a digital certificate through the CDC Secure Data Network.
Variables:	Foundation : demographics, chief complaint, discharge, diagnosis, disposition, hospital utilization Clinical: vitals, triage notes, physician working diagnosis Laboratory: orders, microbiology results Pharmacy: medication orders, dispensed Radiology: orders, interpretation results
Years Available:	VA, DoD, and lab data since 2003, civilian hospitals since 2005
Sampling Unit	Patient encounter
Sampling Frame:	Hospitals and organizations who have agreed to send the data to the CDC. Currently it includes the DoD and VA, LabCorp, the American Association of Poison Control Centers, and 35 hospitals in 11 major metropolitan areas that have real-time data connections.
Website:	http://www.cdc.gov/biosense/
Organization:	Centers for Disease Control and Prevention (CDC)

Data Source:	<u>Drug Abuse Warning Network (DAWN)</u>
Description:	Surveillance system that monitors drug-related visits to a hospital emergency department. Cases include illegal drug use, adverse reactions to prescription and over-the-counter (OTC) medications, overmedication, accidental ingestions, malicious poisonings, suicide attempts, seeking detoxification, and underage alcohol use.
Source of Data:	Retrospective review of all ED medical records in 53 geographic regions.
Cost:	Annual publications available on Web
Availability:	Annual publications available on Web, member EDs can access own data
Variables:	Age, gender. Cases include illegal drug use, adverse reactions to prescription and over-the-counter (OTC) medications, overmedication, accidental ingestions, malicious poisonings, suicide attempts, seeking detoxification, and underage alcohol use.
Years Available:	1994 – 2007
Sampling Unit	Longitudinal probability sample of hospitals
Sampling Frame:	AHA Annual Survey Database
Website:	http://dawninfo.samhsa.gov/
Organization:	Office of Applied Studies (OAS), Substance Abuse and Mental Health Services Administration (SAMHSA)

Data Source:	<u>HCUPnet</u>
Description:	Free, on-line Web-based query system that uses data from the Healthcare Cost and Utilization Project (HCUP).
Source of Data:	Healthcare Cost and Utilization Project (HCUP)
Cost:	Free
Availability:	Web-based
Variables:	100 clinical and non-clinical variables including: Diagnoses Procedures Patient demographics Expected payment source Total charges Hospital identifiers
Years Available:	2000 – 2005
Sampling Unit	Patient encounters
Sampling Frame:	Twenty states: Arizona, Connecticut, Florida, Georgia, Hawaii, Indiana, Iowa, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, South Carolina, South Dakota, Tennessee, Utah, and Vermont
Website:	http://hcupnet.ahrq.gov/
Organization:	Agency for Healthcare Research and Quality (AHRQ)

Data Source:	National Electronic Injury Surveillance System (NEISS)
Description:	A national probability sample of product-related injuries treated in hospital emergency departments in the United States.
Source of Data:	Daily surveillance of ED injuries in 100 hospitals Special emergency department surveillance activities Follow-up telephone interviews with injured person Comprehensive on-site investigations with injured person and witnesses
Cost:	Free
Availability:	Download 2002 – 2006 on www.cpsc.gov/library/neiss.html in tab delimited files.
Variables:	Patient characteristics, injury diagnosis and location, products involved, and incident scenario
Years Available:	2002 – 2006
Sampling Unit:	“100 hospitals selected as a probability sample of all 5,300+ U.S. hospitals with emergency departments with a minimum of six beds and a 24-hour ED”
Sampling Frame:	SMG Marketing Group listing of hospitals and emergency departments. “The sampling frame included hospitals with 6+ beds having an emergency department; excluded were psychiatric and penal institutions. The updated sample contains five strata, four based on size (the total number of emergency room visits reported by the hospital) and one stratum consisting of children’s hospitals.”
Website:	http://www.cpsc.gov/library/neiss.html
Organization:	U.S. Consumer Product Safety Commission

Data Source:	<u>National Hospital Ambulatory Medical Care Survey (NHAMCS)</u>
Description:	National probability sample survey on utilization and provision of ambulatory services in hospital emergency and outpatient departments. It is a, "national sample of visits to the emergency departments and outpatient departments of noninstitutional general and short-stay hospitals, exclusive of Federal, military, and Veterans Administration hospitals, located in the 50 States and the District of Columbia."
Source of Data:	Encounter forms completed by physicians and hospital staff and facility and personal interviews
Cost:	Masked Data is Free on Website Unmasked Data: On site fees: \$500 per day setup charge and an additional \$500 per day for file creation and special handling and \$200 per day for programming costs (min of 2 day and max of 10) Remote access fees: \$500 per month for a single survey wave and \$250 per month for each additional survey
Availability:	Complete RDC proposal
Masked Data Variables:	Characteristics of patients visits Diagnoses and treatments Prescribing patterns Characteristics of facility
Non-masked Variables:	Design variables for use in variance estimation Hospital/ED characteristics Geographic variables (FIPS state codes) Census variables
Years Available:	1993-2005
Sampling Unit:	NHAMCS uses a "four-stage probability design with samples of geographically defined areas, hospitals within these areas, clinics within the outpatient departments and emergency service areas within the emergency departments of these hospitals, and patients visits to these clinics and emergency services areas."
Sampling Frame:	Verispan LLC's "Healthcare Market Index" and "Hospital Market Profiling Solution" (formerly known as the SMG Hospital Database)
Website:	http://www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm#Micro-data
Organization:	National Center for Health Statistics, Centers for Disease Control and Prevention

Data Source:	<u>National Health Interview Survey (NHIS)</u>
Description:	Cross-sectional household interview survey consisting of two parts: Core questions and Supplements (Household, Family, Sample Adult, and Sample Child).
Source of Data:	Personal household interviews conducted by employees of the U.S. Bureau of the Census
Cost:	Free
Availability:	Free on Web
Variables:	Core Questionnaire – basic health and demographic characteristics Household component - demographic information on all individuals living in one house or apartment Family component – demographic information on each member from each family in the house and data on health status and limitations, injuries, healthcare access and utilization, health insurance, and income and assets Sample Adult – health status, health care services, and health behaviors on one sample adult in house Sample Child – health status, health care services, and health behaviors on one sample child in house
Years Available:	1969-2007
Sampling Unit	“...multistage area probability design that permits the representative sampling of households and noninstitutional group quarters (e.g., college dormitories).”
Sampling Frame:	Civilian non-institutionalized population of the United States
Website:	http://www.cdc.gov/nchs/nhis.htm
Organization:	Centers for Disease Control and Prevention (CDC)

Data Source:	<u>National Electronic Injury Surveillance System All-Injury Program (NEISS-AIP, WISQARS)</u>
Description:	Provides national estimates of nonfatal injuries in U.S. hospital emergency departments. This is an extension of the NEISS and reported via the Web-based Injury Statistics Query and Reporting System (WISQARS).
Source of Data:	National Electronic Injury Surveillance System All-Injury Program (NEISS-AIP)-collects data about nonfatal injuries whether or not they are associated with consumer products.
Cost:	Free
Availability:	Online
Variables:	Patient characteristics Cause/mechanism of injury Diagnoses Location of injury Intent of injury (e.g., unintentional, self-harm, assault, legal intervention) Additional variables for transportation injuries and assaults
Years Available:	2000 – 2006
Sampling Unit:	NEISS hospitals
Sampling Frame:	66 hospitals of the 100 NEISS hospitals (at least six beds and provide 24-hour emergency services)-stratified probability sample
Website:	http://www.cdc.gov/ncipc/wisqars/nonfatal/datasources.htm#top
Organization:	Centers for Disease Control and Prevention

Sources of Trauma Data

Data Source:	<u>National Trauma Data Bank (NTDB)</u>
Description:	Trauma registry representing over 600 U.S. trauma centers verified by the American College of Surgeons.
Source of Data:	Trauma centers submit data to be included in the NTDB Annual Report Data originally collected from facilities using the following registry programs: National TRACS Cales/HTR/STR Digital Innovation collector Lancet/Trauma One Trauma TraumaBase Other
Cost:	Commercial: \$5000 License to use dataset for one year. Non-profit: no fees
Availability:	Fill out request form. Receive approval about 2 – 3 weeks later.
Variables:	Injury Scale Comorbidities Complications Demographics Diagnosis Events and Measurements at ED Facility information Intubation Mechanism of Injury Outcome Prehospital Procedure Safety equipment used
Years Available:	1989 – 2006
Sampling Unit	Trauma Centers
Sampling Frame:	Convenience sample. Facilities using a trauma registry to collect data and manage adult and pediatric trauma patients or state trauma registry programs are eligible to participate
Website:	http://www.facs.org/trauma/ntdb.html
Organization:	American College of Surgeons

Data Source:	<u>Trauma Information Exchange Program (TIEP)</u>
Description:	The American Trauma Society and the Johns Hopkins Center for Injury Research and Policy receive funding from the CDC to maintain a national inventory of trauma centers in the U.S.
Source of Data:	Telephone interviews with contact person
Cost:	\$3,000 – 50,000 (per e-mail communication, cost dependent on levels of access)
Availability:	Complete request form
Variables:	Designation/certification and verification Level of care for adults and pediatric Trauma care registry characteristics Key personnel
Years Available:	2002 – 2006
Sampling Unit	Trauma centers
Sampling Frame:	More than 1100 trauma centers in the U.S.
Website:	http://www.amtrauma.org/tiep/tiepabout.html
Organization:	American Trauma Society, CDC, and Johns Hopkins Center for Injury Research and Policy

Other Sources of Emergency Department Data

Data Source:	<u>American Hospital Association Annual Survey of Hospitals</u>
Description:	Database containing characteristics and descriptions of U.S. hospitals
Source of Data:	Hospitals report data via a survey
Cost:	\$6,900
Availability:	Order on-line or on the phone
Variables:	Characteristics and descriptions of U.S. hospitals Emergency department variables: Whether the hospital contains an emergency department in the hospital, system, network, or joint venture Is there a certified trauma center in the hospital, health system, network, or joint venture Level of trauma center Whether there are psychiatric emergency services Number of emergency room visits
Years Available:	1946 – 2006
Sampling Unit	Hospitals in the United States
Sampling Frame:	AHA registered and non-registered hospitals. Registered hospitals comprise 98% of survey universe.
Website:	http://www.ahadata.com/ahadata_app/index.jsp
Organization:	American Hospital Association

Data Source:	<u>Emergency Department Internet Query System (EDIQS)</u>
Description:	Statistical reports about ED visits using web-enabled data from the National Hospital Ambulatory Medical Care Survey.
Source of Data:	NHAMCS
Cost:	Free on Web
Availability:	Website
Variables:	Characteristics of patients visits Diagnoses and treatments Prescribing patterns Characteristics of facility
Years Available:	1997 – 2001
Sampling Unit	Patient visit or encounter
Sampling Frame:	Verispan LLC's "Healthcare Market Index" and "Hospital Market Profiling Solution" (formerly known as the SMG Hospital Database)
Website:	http://155.98.221.34/ediq/index1.htm
Organization:	National Association of Health Data Organizations (NAHDO) and CDC

Data Source:	<u>EMS Ambulance Run Report System</u>
Description:	Database containing information from emergency medical services across the state of Maine
Source of Data:	Ambulance medical records
Cost:	Contact Maine office of EMS
Availability:	Contact Maine office of EMS
Variables:	Medical records of patients using EMS
Years Available:	1980 – 2007
Sampling Unit:	All patient encounters with EMS system in Maine
Sampling Frame:	All 300 ambulance centers across the state of Maine
Website:	http://www.mhic.org/projects.html
Organization:	Maine Health Information Center (MHIC)

Data Source:	<u>National Emergency Department Inventory (NEDI-USA)</u>
Description:	Comprehensive database of nonfederal non-specialty hospitals in the United States with an emergency department
Source of Data:	SMG Marketing Group's Hospital Market Profiling Solution Database (Verispan) AHA Annual Survey of Hospitals Information collected by EMNet staff
Cost:	N/A
Availability:	Proprietary data
Variables:	Facility location and annual ED volume
Years Available:	2003 and 2005
Sampling Unit	Hospitals
Sampling Frame:	All U.S. Hospitals with EDs are divided into two groups Received at least 1 patient per hour, 24 hours per day, 7 days per week (≥8,760 visits/year) Fewer than 8,760 visits/year
Website:	http://www.emnet-usa.org/nedi/nedi_usa.htm
Organization:	The Emergency Medicine Network (EMNet) comprised of 181 medical centers (149 U.S. and 32 international). The EMNet Coordinating Center is at the Massachusetts General Hospital in Boston.

Data Source:	<u>Timely Data Resources, Inc. Emergency Room Database</u>
Description:	Provides a trend database to track statistics in the emergency room
Source of Data:	Extracted from the National Hospital Ambulatory Medical Care Survey (NHAMCS)
Cost:	Contact to determine
Availability:	Contact (831) 462-2510 or support@tdrdata.com for access to Website
Variables:	Prescription Drug Diagnostics Providers seen Visit characteristics Payment sources
Years Available:	1999 – 2005
Sampling Unit	NHAMCS uses a “four-stage probability design with samples of geographically defined areas, hospitals within these areas, clinics within the outpatient departments and emergency service areas within the emergency departments of these hospitals, and patients visits to these clinics and emergency services areas.”
Sampling Frame:	Verispan LLC's “Healthcare Market Index” and “Hospital Market Profiling Solution” (formerly known as the SMG Hospital Database)
Website:	http://www.tdrdata.com/default.aspx?SessionGUID=
Organization:	Timely Data Resources, Inc.

Data Source:	<u>Verispan Hospital Market Profiling Solution©</u>
Description:	Commercially available data set containing information on US hospitals
Source of Data:(Sullivan, Richman et al. 2006)	Survey from federal and state agencies, data from Centers for Medicare & Medicaid Services Direct contact with hospitals
Cost:	Approximately \$10,000 (per e-mail correspondence with sales representative)
Availability:	Contact company
Variables:	ED visit volume and other characteristics Hospital characteristics “Verispan collects more than 300 data elements for each hospital, including demographics, key contacts, number of beds by type and utilization data, hospital approval codes, types of services, facilities, and ownership.”
Years Available:	1977 – present
Sampling Unit	All U.S. Hospitals
Sampling Frame:	All U.S. Hospitals
Website:	http://www.verispan.com
Organization:	Verispan, LLC

Data Source:	<u>Verispan Healthcare Market Index©</u>
Description:	Commercially available data set containing information from more than 360,000 U.S. healthcare facilities and organizations
Source of Data:(Sullivan, Richman et al. 2006)	Survey from Federal and state agencies, Centers for Medicare and Medicaid Direct contact with hospitals
Cost:	Approximately \$55,000 for the full file About \$15,000 for each market segment such as acute care (per e-mail correspondence with sales representative)
Availability:	Contact company
Variables:	“Verispan collects more than 300 data elements for each hospital, including demographics, key contacts, number of beds by type and utilization data, hospital approval codes, types of services, facilities, and ownership”
Years Available:	1977 – present
Sampling Unit	All U.S. Hospitals
Sampling Frame:	All U.S. Hospitals
Website:	http://www.verispan.com
Organization:	Verispan, LLC

Data Source:	<u>ED Information Systems Clearinghouse</u>
Description:	A clearinghouse for states to share information and resources regarding collection, processing, and analysis of ED data. There are five modules although the web-based link does not appear to be functioning. Communications module: State-based ED information systems: profiles and contact information for state agencies Federal and national ED data initiatives: link does not work 2002 ED Data conference: transactions from meeting Technical Resources (ED Data Resource Kit) (Data based on HCUP)
Source of Data:	NHAMCS and State data partners
Cost:	Free on Web
Availability:	Website
Variables:	States' ED development tools such as: How state ED data statute is written How states define hospital peer groups
Years Available:	2006
Sampling Unit	
Sampling Frame:	
Website:	http://www.nahdo.org/ed.aspx?id=4618#
Organization:	National Association of Health Data Organizations (NAHDO)

General Healthcare Sources

Data Source:	<u>Area Resource File (ARF)</u>
Description:	The Area Resource File (ARF) is a national database containing more than 6,000 variables for each county in the U.S. It includes information on health status and activity, socioeconomic, and environmental characteristics. It also contains descriptors which can be linked to other files.
Source of Data:	More than 50 sources including American Medical Association, American Hospital Association, Centers for Medicare and Medicaid Services, National Center for Health Statistics
Cost:	\$500 for basic file and \$800 for Access version
Availability:	If using the data under government contract, contact Jim Cultice at the Bureau of Health Professions 301-443-6923, JCultice@HRSA.gov (http://www.arfsys.com/contactUS.htm)
Variables:	Details on physicians by specialty, gender, etc Characteristics and services offered by hospitals Hospital utilization including emergency room visits and discharges Hospital expenditures Population characteristics and economic data
Years Available:	1980 – 2006
Sampling Unit:	Counties
Sampling Frame:	All counties in the United States
Website:	http://www.arfsys.com/overview.htm
Organization:	Health Resources and Services Administration

Data Source:	<u>Community Tracking Study (CTS)</u>
Description:	This study researches health care systems over time in 60 communities by performing surveys and site visits.
Source of Data:	Household surveys and site visits
Cost:	Free
Availability:	Public Use File available from ICPSR. The restricted use version requires a signed data agreement.
Variables:	Number of ED visits in past year Number of hospital stays admitted through emergency room Reason for ED visit Demographics
Years Available:	1996 – 2005
Sampling Unit	Communities and Households
Sampling Frame:	60 communities were “randomly selected to provide a representative profile of change across the U.S.” and households were selected to be nationally representative of civilian, non-institutionalized populations in the US
Website:	http://www.hschange.com/index.cgi?file=about
Organization:	Center for Studying Health System Change (HSC)

Data Source:	<u>EMERGENCY ID NET</u>
Description:	“Multicenter, ED-based network for research on emerging infectious diseases.” It is based at 11 university-affiliated urban hospital emergency departments in the United States with total annual patient visits of more than 900,000 (Talan, Morgan et al. 1998).
Source of Data:	Collected during ED evaluation
Cost:	
Availability:	
Variables:	
Years Available:	1996 – 1998 (?)
Sampling Unit	Patients with specific infectious diseases
Sampling Frame:	11 university-affiliated urban hospital EDs representing more than 900,000 patient visits.
Website:	http://cdc.gov/ncidod/osr/site/sentinel/surv-sys.htm
Organization:	National Center for Infectious Diseases, CDC

Data Source:	<u>Medical Expenditure Panel Survey (MEPS)</u>
Description:	Surveys of families, medical providers, and employees in the United States. Comprised of two major components: the Household Component and the Insurance Component. The Household Component surveys families and its medical providers. The Insurance Component surveys employers that provide employer-based health insurance.
Source of Data:	Household Component: Survey of a sample of individual households and their members and is supplemented by data from their medical providers Insurance Component: survey of employers who provide data on employer-based health insurance
Cost:	Free
Availability:	Free on Web
Variables:	Demographic, income and employment characteristics of households Health conditions and status Use of medical services Charges and source of payments Access to care Satisfaction with care Health insurance coverage Detailed information about insurance plans offered through employers
Years Available:	1966 – 2005
Sampling Unit:	Household respondents
Sampling Frame:	Drawn from respondents in the prior year's National Health Interview Survey
Website:	http://www.meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp
Organization:	HHS-Agency for Healthcare Research and Quality

Data Source:	<u>National EMS Information Agency Project (NEMESIS)</u>
Description:	This is a project to create a National EMS Database for patient care received prior to reaching the hospital.
Source of Data:	States submit data
Cost:	
Availability:	
Variables:	EMS Agency demographics Call information Personnel information Patient demographics Scene/Situation/Trauma information Billing Patient Assessment (vital signs, injury, etc.) Interventions Outcomes
Years Available:	2006: at least five states 2007: 15 states
Sampling Unit	
Sampling Frame:	
Website:	www.nemesis.org
Organization:	Funded by NHTSA, HRSA, CDC

APPENDIX D: VALIDITY AND RELIABILITY OF NEDS COMPARISON TABLES

Table D-1a. Estimates of Emergency Department Visits, Total U.S., 2005 – Discharge Data

Geographic Area: Nation	Discharge Data				
	HCUP - NEDS				HCUP - MultiState
	N	SE	95% CI		N
Total number of ED visits	116,290,897	2,487,527	111,408,919	121,172,875	54,526,932
Number of ED visits that are treat and release	98,544,557	2,134,739	94,354,956	102,734,159	45,891,077
Number of ED visits that result in admission	17,746,340	445,892	16,871,240	18,621,440	8,635,855

Table D-1b. Estimates of Emergency Department Visits, Total U.S., 2005 – Facility-Based Surveys

Geographic Area: Nation	Facility-Based Surveys						
	AHA	NEDI	Verispan	NHAMCS			
	N	N	N	N	SE	95% CI	
Total number of ED visits	116,290,897	115,308,512	109,217,084	115,322,815	6,075,004	103,338,882	127,306,748
Number of ED visits that are treat and release	-	-	-	101,455,480	5,486,156	90,633,144	112,277,816
Number of ED visits that result in admission	-	-	-	13,867,335	945,899	12,001,396	15,733,275

Table D-1c. Estimates of Emergency Department Visits, Total U.S., 2005 – Household Based Surveys

Geographic Area: Nation	Household-Based Survey											
	NHIS - Low Estimates				NHIS - Midpoint Estimates				NHIS - High Estimates			
	N	SE	95% CI		N	SE	95% CI		N	SE	95% CI	
Total number of ED visits	99,495,469	1,969,148	95,635,939	103,354,999	109,654,116	2,153,377	105,433,497	113,874,735	119,812,763	2,347,146	115,212,356	124,413,170
Number of ED visits that are treat and release	0	0	0	0	0	0	0	0	0	0	0	0
Number of ED visits that result in admission	0	0	0	0	0	0	0	0	0	0	0	0

Table D-2a. Estimates of Emergency Department Visits by Geographic Region, 2005 – Discharge Data

Geographic Area	Discharge Data				
	HCUP - NEDS			HCUP - MultiState	
	N	SE	%	N	%
Nation					
Total number of ED visits	116,290,897	2,487,527	100.0	54,526,932	100.0
Number of ED visits that are treat and release	98,544,557	2,134,739	84.7	45,891,077	84.2
Number of ED visits that result in admission	17,746,340	445,892	15.3	8,635,855	15.8
Northeast					
Total number of ED visits	22,589,550	992,620	19.4	8,214,696	15.1
Number of ED visits that are treat and release	18,906,272	852,424	83.7	6,830,107	83.1
Number of ED visits that result in admission	3,683,278	182,508	16.3	1,384,589	16.9
Midwest					
Total number of ED visits	27,085,103	1,369,301	23.3	15,421,231	28.3
Number of ED visits that are treat and release	23,274,102	1,219,515	85.9	13,129,457	85.1
Number of ED visits that result in admission	3,811,001	198,214	14.1	2,291,774	14.9
South					
Total number of ED visits	46,032,225	1,643,650	39.6	17,691,392	32.4
Number of ED visits that are treat and release	38,972,166	1,375,677	84.7	14,827,265	83.8
Number of ED visits that result in admission	7,060,059	323,859	15.3	2,864,127	16.2
West					
Total number of ED visits	20,584,019	791,155	17.7	13,199,613	24.2
Number of ED visits that are treat and release	17,392,018	671,400	84.5	11,104,248	84.1
Number of ED visits that result in admission	3,192,001	146,072	15.5	2,095,365	15.9

Table D-2b. Estimates of Emergency Department Visits by Geographic Region, 2005 – Facility-Based Surveys

Geographic Area	Facility-Based Surveys								
	AHA		NEDI		Verispan		NHAMCS		
	N	%	N	%	N	%	N	SE	%
Nation									
Total number of ED visits	116,290,897	100.0	115,308,512	100.0	109,217,084	100.0	115,322,815	6,075,004	100.0
Number of ED visits that are treat and release	-	-	-	-	-	-	101,455,480	5,486,156	88.0
Number of ED visits that result in admission	-	-	-	-	-	-	13,867,335	945,899	12.0
Northeast									
Total number of ED visits	22,589,550	19.4	-	-	20,881,036	19.1	22,245,302	1,873,121	19.3
Number of ED visits that are treat and release	-	-	-	-	-	-	18,800,436	1,603,137	84.5
Number of ED visits that result in admission	-	-	-	-	-	-	3,444,866	414,485	15.5
Midwest									
Total number of ED visits	27,085,103	23.3	-	-	24,210,925	22.2	28,770,693	3,567,342	24.9
Number of ED visits that are treat and release	-	-	-	-	-	-	24,857,090	3,165,447	86.4
Number of ED visits that result in admission	-	-	-	-	-	-	3,913,603	559,192	13.6
South									
Total number of ED visits	46,032,225	39.6	-	-	44,820,258	41.0	43,870,735	4,080,386	38.0
Number of ED visits that are treat and release	-	-	-	-	-	-	39,686,194	3,770,977	90.5
Number of ED visits that result in admission	-	-	-	-	-	-	4,184,541	548,285	9.5
West									
Total number of ED visits	20,584,019	17.7	-	-	19,304,865	17.7	20,436,085	2,239,654	17.7
Number of ED visits that are treat and release	-	-	-	-	-	-	18,111,760	1,987,750	88.6
Number of ED visits that result in admission	-	-	-	-	-	-	2,324,325	376,926	11.4

Table D-2c. Estimates of Emergency Department Visits by Geographic Region, 2005 – Household Based Surveys

Geographic Area	Household-Based Surveys								
	NHIS - Low Estimates			NHIS - Midpoint Estimates			NHIS - High Estimates		
	N	SE	%	N	SE	%	N	SE	%
Nation									
Total number of ED visits	99,495,469	1,969,148	100.0	109,654,116	2,153,377	100.0	119,812,763	2,347,146	100.0
Number of ED visits that are treat and release	-	-	-	-	-	-	-	-	-
Number of ED visits that result in admission	-	-	-	-	-	-	-	-	-
Northeast									
Total number of ED visits	18,202,970	804,655	18.3	20,022,556	881,652	18.3	21,842,142	963,806	18.2
Number of ED visits that are treat and release	-	-	-	-	-	-	-	-	-
Number of ED visits that result in admission	-	-	-	-	-	-	-	-	-
Midwest									
Total number of ED visits	25,266,465	967,647	25.4	27,818,755	1,072,857	25.4	30,371,044	1,181,654	25.3
Number of ED visits that are treat and release	-	-	-	-	-	-	-	-	-
Number of ED visits that result in admission	-	-	-	-	-	-	-	-	-
South									
Total number of ED visits	38,556,005	1,302,693	38.8	42,583,203	1,416,764	38.8	46,610,400	1,536,017	38.9
Number of ED visits that are treat and release	-	-	-	-	-	-	-	-	-
Number of ED visits that result in admission	-	-	-	-	-	-	-	-	-
West									
Total number of ED visits	17,470,029	732,196	17.6	19,229,603	797,280	17.5	20,989,177	868,388	17.5
Number of ED visits that are treat and release	-	-	-	-	-	-	-	-	-
Number of ED visits that result in admission	-	-	-	-	-	-	-	-	-

Table D-3. Estimates of Emergency Department Visits by Patient Characteristics, 2005

Patient Characteristics	Discharge Data						Facility-Based Survey				
	HCUP - NEDS				HCUP – Multi-state ED		NHAMCS				
	N	SE	% of Records with Non-missing Values	% of All Records	N	% of Records with Non-missing Values	% of All Records	N	SE	% of Records with Non-missing Values	% of All Records
Total number of ED visits	116,290,897	2,487,527			54,526,932	100.0	100.0	115,322,815	6,075,004	100.0	100.0
Age (in years)											
0-17	26,541,919	973,903	22.8	22.8	12,372,307	22.7	22.7	28,915,034	2,347,830	25.1	25.1
18-44	46,744,390	1,098,907	40.2	40.2	21,852,366	40.1	40.1	47,495,929	2,568,413	41.2	41.2
45-64	23,516,418	506,789	20.2	20.2	11,029,260	20.2	20.2	22,181,714	1,108,465	19.2	19.2
65+	19,483,314	455,422	16.8	16.8	9,269,730	17.0	17.0	16,730,138	839,919	14.5	14.5
Missing	4,855	637	-	0.0	3,269	-	0.0	-	-	-	-
Sex											
Female	62,714,860	1,354,909	53.9	53.9	29,412,516	54.0	53.9	62,109,376	3,383,729	53.9	53.9
Male	53,566,542	1,150,660	46.1	46.1	25,070,516	46.0	46.0	53,213,439	2,746,852	46.1	46.1
Missing	9,495	1,868	-	0.0	43,900	-	0.1	-	-	-	-
Primary Payer / Insurance Coverage											
Medicare	23,224,751	525,338	20.1	20.0	10,871,948	20.0	19.9	16,043,343	922,492	14.9	13.9
Private	41,182,182	1,077,823	35.6	35.4	19,601,716	36.1	36.0	39,564,974	2,242,828	36.7	34.3
Medicaid/ Other Public	26,391,473	827,656	22.8	22.7	12,191,129	22.4	22.4	28,661,232	2,091,054	26.6	24.9
Self Pay / No Charge / Uninsured	19,205,057	602,135	16.6	16.5	8,712,319	16.0	16.0	19,465,974	1,540,725	18.1	16.9
Other	5,705,699	203,787	4.9	4.9	2,958,553	5.4	5.4	4,125,082	396,525	3.8	3.6
Missing	581,735	145,449	-	0.5	191,267	-	0.4	7,462,210	1,298,806	-	6.5
Location of patient residence											
Large Metropolitan	55,862,599	1,792,766	48.4	48.0	28,641,158	52.9	52.5	-	-	-	-
Small Metropolitan	36,299,506	1,315,582	31.4	31.2	16,744,197	31.0	30.7	-	-	-	-
Micropolitan	13,674,411	665,412	11.8	11.8	5,406,899	10.0	9.9	-	-	-	-
Non-Urban Residual	9,584,594	407,280	8.3	8.2	3,308,242	6.1	6.1	-	-	-	-
Missing	869,786	96,431	-	0.7	426,436	-	0.8	-	-	-	-

	Discharge Data						Facility-Based Survey				
	HCUP - NEDS				HCUP – Multi-state ED		NHAMCS				
Patient Characteristics	N	SE	% of Records with Non-missing Values	% of All Records	N	% of Records with Non-missing Values	% of All Records	N	SE	% of Records with Non-missing Values	% of All Records
Median income of patient's ZIP Code:											
First Quartile (lowest income)	33,342,906	1,284,842	29.4	28.7	17,199,212	32.3	31.5	-	-	-	-
Second Quartile	31,563,260	1,118,244	27.9	27.1	14,469,958	27.2	26.5	-	-	-	-
Third Quartile	26,915,503	959,752	23.8	23.1	12,218,413	23.0	22.4	-	-	-	-
Fourth Quartile (highest income)	21,506,352	1,001,799	19.0	18.5	9,327,181	17.5	17.1	-	-	-	-
Missing	2,962,877	138,726	-	2.5	1,312,168	-	2.4	-	-	-	-

Table D-4. Estimates of Emergency Department Visits by Hospital Characteristics, 2005

Hospital Characteristics	Discharge Data					Facility-Based Survey						
	HCUP - NEDS			HCUP – Multi-state ED		AHA		NEDI		NHAMCS		
	N	SE	%	N	%	N	%	N	%	N	SE	%
Number of ED facilities												
Total number of ED facilities	4884	-	100.0	2,196	100.0	4,884	100.0	4,828	100.0%	4,594	0	100.0
Less than 10,000 visits	1366	-	28.0	741	33.7	1,797	36.8	1,540	31.9%	0	0	0.0
10,000 - 19,999 visits	994	-	20.4	397	18.1	936	19.2	1,051	21.8%	0	0	0.0
20,000 - 29,999 visits	787	-	16.1	327	14.9	662	13.6	762	15.8%	0	0	0.0
30,000 - 39,999 visits	626	-	12.8	257	11.7	523	10.7	578	12.0%	0	0	0.0
40,000 - 49,999 visits	452	-	9.3	202	9.2	357	7.3	377	7.8%	0	0	0.0
50,000 or more visits	658	-	13.5	272	12.4	609	12.5	520	10.8%	0	0	0.0
Total number of ED visits	116,290,897	2,487,527	100.0	54,526,932	100.0	116,290,897	100.0	-	-	115,322,815	6,075,004	100
Trauma												
Trauma hospital	34,633,565	1,460,895	29.8	14,065,735	25.8	34,633,565	29.8	-	-	42,606,000	4,407,000	0
Non-trauma hospitals	81,657,332	2,013,350	70.2	40,461,197	74.2	81,657,332	70.2	-	-	71,292,000	4,744,000	0
Location of hospital												
Large Metropolitan	56,152,729	1,901,111	48.3	28,949,478	53.1	56,152,729	48.3	-	-	-	-	-
Small Metropolitan	37,873,145	1,400,316	32.6	17,503,792	32.1	37,873,145	32.6	-	-	-	-	-
Micropolitan	14,209,320	793,567	12.2	5,462,977	10.0	14,593,984	12.6	-	-	-	-	-
Non-Core	8,055,703	411,812	6.9	2,506,485	4.6	7,671,039	6.6	-	-	-	-	-
By MSA												
MSA				-	-	94,025,874	80.9			98,622,469	7,620,732	85.5
Non-MSA				-	-	22,265,023	19.2			16,700,346	4,278,299	14.5
Number of ED visits that are treat and release	98,544,557	2,134,739	84.7	45,891,077	84.2	-	-	-	-	101,455,480	5,486,156	88
Trauma												
Trauma hospital	28,539,669	1,258,704	29.0	11,474,307	25.0	-	-	-	-	-	-	-
Non-trauma hospitals	70,004,888	1,724,173	71.0	34,416,770	75.0	-	-	-	-	-	-	-
Location of hospital												
Large Metropolitan	46,292,753	1,598,356	47.0	23,770,685	51.8	-	-	-	-	-	-	-
Small Metropolitan	32,361,824	1,229,906	32.8	14,941,962	32.6	-	-	-	-	-	-	-
Micropolitan	12,525,644	704,571	12.7	4,805,302	10.5	-	-	-	-	-	-	-
Non-Urban Residual	7,364,337	370,080	7.5	2,283,994	5.0	-	-	-	-	-	-	-

Hospital Characteristics	Discharge Data					Facility-Based Survey						
	HCUP - NEDS			HCUP – Multi-state ED		AHA		NEDI		NHAMCS		
	N	SE	%	N	%	N	%	N	%	N	SE	%
By MSA												
MSA				-	-	-	-	-	-	86,306,725	6,846,946	85.1
Non-MSA				-	-	-	-	-	-	15,148,755	3,881,871	14.9
Number of ED visits that result in admission	17,746,340	445,892	15.3	8,635,855	15.8	-	-	-	-	13,867,335	945,899	12.0
Trauma												
Trauma hospital	6,093,896	267,802	34.3	2,591,428	30.0	-	-	-	-	-	-	-
Non-trauma hospitals	11,652,444	356,514	65.7	6,044,427	70.0	-	-	-	-	-	-	-
Location of hospital												
Large Metropolitan	9,859,976	368,604	55.6	5,178,793	60.0	-	-	-	-	-	-	-
Small Metropolitan	5,511,321	226,808	31.1	2,561,830	29.7	-	-	-	-	-	-	-
Micropolitan	1,683,677	106,735	9.5	657,675	7.6	-	-	-	-	-	-	-
Non-Urban Residual	691,366	55,753	3.9	222,491	2.6	-	-	-	-	-	-	-
By MSA												
MSA				-	-	-	-	-	-	12,315,744	1,048,557	88.8
Non-MSA				-	-	-	-	-	-	1,551,591	409,389	11.2

Table D-5. Most Common Reasons for All Emergency Department Visits, 2005

Reasons for ED Visits	Discharge Data						Facility-Based Survey				
	HCUP - NEDS				HCUP – Multi-state ED			NHAMCS			
	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%
Total number of ED visits	116,290,897	2,487,527		100	54,526,932	100	100	115,322,815	6,075,004		100
Average number of diagnoses reported	2.92	0.03	-	-	2.90	-	-	1.52	0.02	-	-
Maximum number of diagnoses reported	30	0	-	-	30	-	-	3.00	0.02	-	-
Top 25 All-listed Diagnoses by Clinical Classification System (CCS)											
98 : Essential hypertension	15,655,180	410,227	1	13.5	7,307,112	1	13.4	2,383,138	225,917	24	2.07
239 : Superficial injury; contusion	9,075,739	192,851	2	7.8	4,182,928	2	7.7	8,437,587	472,287	1	7.32
663 : Screening and history of mental health and substance abuse codes	8,574,328	416,212	3	7.4	3,963,014	3	7.3	396,325	71,107	83	0.34
126 : Other upper respiratory infections	8,146,616	241,558	4	7.0	3,726,307	4	6.8	7,688,700	587,817	3	6.67
232 : Sprains and strains	7,353,315	173,272	5	6.3	3,391,841	5	6.2	7,728,038	492,479	2	6.70
49 : Diabetes mellitus without complication	6,934,256	179,736	6	6.0	3,242,252	6	6.0	1,189,605	129,416	41	1.03
251 : Abdominal pain	6,551,264	171,978	7	5.6	3,056,421	9	5.6	5,712,824	424,866	4	4.95
55 : Fluid and electrolyte disorders	6,385,127	151,210	8	5.5	3,092,017	8	5.7	2,649,672	207,735	20	2.30
259 : Residual codes; unclassified	6,319,217	220,669	9	5.4	3,095,950	7	5.7	3,902,236	280,396	8	3.38
101 : Coronary atherosclerosis and other heart disease	6,091,249	175,211	10	5.2	2,880,607	10	5.3	855,387	88,030	55	0.74
205 : Spondylosis; intervertebral disc disorders; other back problems	5,766,482	143,011	11	5.0	2,654,507	11	4.9	3,691,222	208,395	10	3.20
127 : Chronic obstructive pulmonary disease and bronchiectasis	5,562,898	143,080	12	4.8	2,570,501	12	4.7	2,827,513	228,311	18	2.45
133 : Other lower respiratory disease	5,467,165	174,287	13	4.7	2,473,678	14	4.5	3,372,686	262,001	13	2.92
159 : Urinary tract infections	5,282,940	121,198	14	4.5	2,498,780	13	4.6	3,777,324	250,733	9	3.28
128 : Asthma	5,190,348	161,665	15	4.5	2,438,920	16	4.5	2,660,940	209,852	19	2.31
106 : Cardiac dysrhythmias	5,192,826	139,544	16	4.5	2,459,161	15	4.5	1,472,798	120,657	34	1.28

	Discharge Data								Facility-Based Survey			
	HCUP - NEDS				HCUP – Multi-state ED				NHAMCS			
Reasons for ED Visits	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%	
102 : Nonspecific chest pain	5,072,164	144,143	17	4.4	2,367,790	17	4.3	4,413,764	310,441	5	3.83	
53 : Disorders of lipid metabolism	4,799,530	155,994	18	4.1	2,313,337	18	4.2	131,536	31,202	137	0.11	
211 : Other connective tissue disease	4,835,283	134,051	19	4.2	2,245,657	19	4.1	2,848,534	197,386	17	2.47	
257 : Other aftercare	4,681,291	177,330	20	4.0	2,199,454	20	4.0	2,387,472	209,749	23	2.07	
84 : Headache; including migraine	4,593,753	111,688	21	4.0	2,127,775	22	3.9	3,354,121	232,393	14	2.91	
244 : Other injuries and conditions due to external causes	4,547,882	122,659	22	3.9	2,157,548	21	4.0	4,402,210	315,505	6	3.82	
155 : Other gastrointestinal disorders	4,428,325	111,073	23	3.8	2,096,336	23	3.8	2,425,271	198,415	22	2.10	
657 : Mood disorders	4,339,276	134,658	24	3.7	2,074,608	24	3.8	1,551,607	142,953	33	1.35	
236 : Open wounds of extremities	4,241,474	91,516	25	3.6	1,998,422	25	3.7	3,398,712	203,208	12	2.95	
Top 5 All-listed E-Codes ^a												
2603 : Fall	7,854,489	183,757	1	6.8	3,628,510	1	6.7	8,969,960	529,079	1	7.78	
2614 : Struck by; against	4,239,317	104,464	2	3.6	1,955,157	2	3.6	4,590,842	293,236	2	3.98	
2607 : Motor vehicle traffic (MVT)	3,475,039	89,070	3	3.0	1,593,639	3	2.9	4,237,986	278,084	3	3.67	
2612 : Overexertion	2,686,475	72,386	4	2.3	1,214,784	5	2.2	1,910,282	136,653	6	1.66	
2601 : Cut/pierce	2,666,451	63,381	5	2.3	1,230,183	4	2.3	2,887,235	190,841	4	2.50	

^a Excluding place of occurrence E-codes

Table D-6. Most Common Reasons for Treat and Release Emergency Department Visits, 2005

Reasons for ED Visits	Discharge Data						Facility-Based Survey				
	HCUP - NEDS				HCUP - Multi-state ED			NHAMCS			
	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%
Total number of treat and release ED visits	98,544,557	2,134,739	85		45,891,077	100	100	101,455,480	5,486,156	0	100
Average number of diagnoses reported	2.14	0.02	-	-	2.10	-	-	1.48	0.02	-	-
Maximum number of diagnoses reported	28	0	-	-	29	-	-	3	0.02	-	-
Top 25 All-listed Diagnoses by Clinical Classification System (CCS)											
98 : Essential hypertension	8,983,900	268,151	1	9.1	4,041,575	1	8.8	1,769,935	173,485	26	1.7
239 : Superficial injury; contusion	8,688,519	186,027	2	8.8	3,995,331	2	8.7	8,314,920	470,122	1	8.2
126 : Other upper respiratory infections	7,775,983	232,957	3	7.9	3,548,274	3	7.7	7,568,054	580,777	3	7.5
232 : Sprains and strains	7,267,467	171,891	4	7.4	3,349,552	4	7.3	7,715,283	493,173	2	7.6
251 : Abdominal pain	6,195,935	165,134	5	6.3	2,883,320	5	6.3	4,854,241	365,162	4	4.8
663 : Screening and history of mental health and substance abuse codes	5,566,340	353,125	6	5.6	2,502,946	6	5.5	340,828	63,942	79	0.3
205 : Spondylosis; intervertebral disc disorders; other back problems	4,905,510	125,660	7	5.0	2,230,745	7	4.9	3,579,072	205,318	7	3.5
133 : Other lower respiratory disease	4,677,588	161,020	8	4.7	2,093,181	8	4.6	2,781,176	232,048	16	2.7
84 : Headache; including migraine	4,222,664	104,108	9	4.3	1,944,692	9	4.2	3,246,212	226,332	10	3.2
49 : Diabetes mellitus without complication	4,111,485	119,328	10	4.2	1,867,078	12	4.1	919,301	103,597	44	0.9
236 : Open wounds of extremities	4,077,998	88,845	11	4.1	1,918,069	11	4.2	3,343,307	201,245	8	3.3
128 : Asthma	3,897,709	133,822	12	4.0	1,805,736	14	3.9	2,340,997	184,464	18	2.3
102 : Nonspecific chest pain	3,992,674	121,538	13	4.1	1,836,869	13	4.0	2,830,012	205,908	15	2.8
259 : Residual codes; unclassified	3,924,365	174,131	14	4.0	1,939,521	10	4.2	3,191,355	240,049	12	3.2
250 : Nausea and vomiting	3,877,233	134,117	15	3.9	1,752,809	15	3.8	2,091,108	195,276	23	2.1
211 : Other connective tissue disease	3,793,112	114,472	16	3.8	1,730,054	16	3.8	2,703,583	191,256	17	2.7
244 : Other injuries and conditions due to external causes	3,534,492	105,136	17	3.6	1,657,283	17	3.6	3,911,478	299,132	5	3.9
257 : Other aftercare	3,436,982	153,176	18	3.5	1,579,993	18	3.4	2,184,983	186,722	22	2.2
159 : Urinary tract infections	3,291,380	76,592	19	3.3	1,529,557	20	3.3	3,221,038	231,614	11	3.2

Reasons for ED Visits	Discharge Data							Facility-Based Survey			
	HCUP - NEDS				HCUP – Multi-state ED			NHAMCS			
	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%
246 : Fever of unknown origin	3,272,443	134,175	20	3.3	1,477,729	21	3.2	2,201,420	272,136	21	2.2
235 : Open wounds of head; neck; and trunk	3,209,007	76,636	21	3.3	1,537,704	19	3.4	3,848,620	294,292	6	3.8
92 : Otitis media and related conditions	3,013,238	102,891	22	3.1	1,404,167	22	3.1	3,171,730	324,298	13	3.1
197 : Skin and subcutaneous tissue infections	2,899,125	76,757	23	2.9	1,343,178	23	2.9	3,304,045	257,681	9	3.3
155 : Other gastrointestinal disorders	2,849,193	77,699	24	2.9	1,324,683	24	2.9	2,218,993	186,334	20	2.2
253 : Allergic reactions	2,705,057	137,628	25	2.7	1,234,134	25	2.7	1,742,128	152,885	27	1.7
Top 5 All-listed E-Codes ^a											
2603 : Fall	6,944,156	166,684	1	7.0	3,193,531	1	7.0	8,254,107	499,891	1	8.1
2614 : Struck by; against	4,158,095	103,069	2	4.2	1,916,024	2	4.2	4,523,084	291,137	2	4.5
2607 : Motor vehicle traffic (MVT)	3,199,344	83,767	3	3.2	1,461,563	3	3.2	3,954,988	262,190	3	3.9
2612 : Overexertion	2,657,276	71,900	4	2.7	1,200,573	4	2.6	1,873,081	135,371	6	1.9
2601 : Cut/pierce	2,594,925	62,355	5	2.6	1,195,665	5	2.6	2,846,795	188,720	4	2.8

^a Excluding place of occurrence E-codes

Table D-7. Most Common Reasons for Emergency Department Visits that Resulted in an Admission, 2005

Reasons for ED Visits	Discharge Data						Facility-Based Survey				
	HCUP - NEDS				HCUP – Multi-state ED			NHAMCS			
	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%
Total number of ED visits that resulted in an admission	17,746,340	445,892		15	8,635,855	100	100.0	13,867,335	945,899	0	100
Average number of diagnoses reported	7.25	0.07	-	-	7.30	-	-	1.82	0.04	-	-
Maximum number of diagnoses reported	30	0	-	-	30	-	-	3	0.04	-	-
Top 25 All-listed Diagnoses by Clinical Classification System (CCS)											
98 : Essential hypertension	6,671,280	183,448	1	37.6	3,265,537	1	37.8	613,203	82,719	7	4.4
55 : Fluid and electrolyte disorders	4,358,618	112,636	2	24.6	2,129,796	2	24.7	975,761	105,276	2	7.0
101 : Coronary atherosclerosis and other heart disease	3,971,929	118,569	3	22.4	1,923,424	3	22.3	550,998	71,326	12	4.0
106 : Cardiac dysrhythmias	3,246,296	91,834	4	18.3	1,575,256	4	18.2	564,883	62,851	10	4.1
53 : Disorders of lipid metabolism	3,186,873	99,144	5	18.0	1,564,679	5	18.1	50,307	17,240	93	0.4
108 : Congestive heart failure; nonhypertensive	3,062,849	85,032	6	17.3	1,489,668	6	17.3	745,315	80,293	5	5.4
663 : Screening and history of mental health and substance abuse codes	3,007,988	106,068	7	16.9	1,460,068	7	16.9	55,497	16,986	85	0.4
127 : Chronic obstructive pulmonary disease and bronchiectasis	2,885,286	79,823	8	16.3	1,378,675	8	16.0	568,187	82,686	9	4.1
49 : Diabetes mellitus without complication	2,822,771	77,878	9	15.9	1,375,174	9	15.9	270,304	50,613	26	2.0
59 : Deficiency and other anemia	2,740,817	76,432	10	15.4	1,364,192	10	15.8	351,959	53,617	20	2.5
259 : Residual codes; unclassified	2,394,852	78,170	11	13.5	1,156,429	11	13.4	710,881	80,615	6	5.1
657 : Mood disorders	2,138,371	66,923	12	12.0	1,045,416	12	12.1	382,671	57,280	18	2.8
138 : Esophageal disorders	2,016,318	61,895	13	11.4	977,873	13	11.3	54,609	18,068	88	0.4
159 : Urinary tract infections	1,991,560	53,400	14	11.2	969,223	14	11.2	556,286	57,261	11	4.0
122 : Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	1,861,240	46,853	15	10.5	900,508	15	10.4	952,980	92,191	3	6.9
58 : Other nutritional; endocrine; and metabolic disorders	1,736,901	53,054	16	9.8	853,967	16	9.9	125,289	25,092	53	0.9
155 : Other gastrointestinal disorders	1,579,132	45,275	17	8.9	771,653	17	8.9	206,278	33,459	34	1.5
48 : Thyroid disorders	1,547,148	45,120	18	8.7	767,285	18	8.9	24,622	9,362	124	0.2
117 : Other circulatory disease	1,471,676	42,874	19	8.3	712,571	19	8.3	260,164	36,728	27	1.9
99 : Hypertension with complications and secondary hypertension	1,439,423	47,498	20	8.1	696,160	20	8.1	52,637	17,644	90	0.4
653 : Delirium, dementia, and amnestic and other cognitive disorders	1,309,286	37,149	21	7.4	636,888	21	7.4	108,387	21,690	62	0.8
128 : Asthma	1,292,639	38,205	22	7.3	633,184	22	7.3	319,943	57,447	22	2.3
96 : Heart valve disorders	1,260,859	46,074	23	7.1	603,947	25	7.0	32,470	13,153	110	0.2

Reasons for ED Visits	Discharge Data							Facility-Based Survey			
	HCUP - NEDS				HCUP – Multi-state ED			NHAMCS			
	N	SE	Rank	%	N	Rank	%	N	SE	Rank	%
50 : Diabetes mellitus with complications	1,256,134	36,827	24	7.1	615,676	24	7.1	143,080	30,579	47	1.0
257 : Other aftercare	1,244,309	49,760	25	7.0	619,461	23	7.2	202,489	43,371	35	1.5
Top 5 All-listed E-Codes ^a											
2603 : Fall	910,333	23,893	1	5.1	434,979	1	5.0	715,853	72,180	1	5.2
2617 : Adverse effects of medical drugs	823,812	29,803	2	4.6	399,383	2	4.6	80,259	20,599	6	0.6
2616 : Adverse effects of medical care	405,630	24,729	3	2.3	190,706	3	2.2	178,350	35,746	3	1.3
2607 : Motor vehicle traffic (MVT)	275,695	13,476	4	1.6	132,076	4	1.5	282,998	70,073	2	2.0
2613 : Poisoning	262,903	7,470	5	1.5	126,436	5	1.5	136,592	28,700	4	1.0

^a Excluding place of occurrence E-codes

Table D-8a. Focus on Chronic and Acute Conditions seen in Emergency Departments, 2005

Reasons for ED Visits	Discharge Data					Facility-Based Survey		
	HCUP - NEDS			HCUP – Multi-state ED		NHAMCS		
	N	SE	%	N	%	N	SE	%
Total number of ED visits	116,290,897	2,487,527	100	54,526,932	100.0	115,322,815	6,075,004	100
Chronic Conditions								
Respiratory								
Total number of ED visits	26,783,100	631,328	23.0	12,441,722	22.8	19,677,245	1,235,766	17.1
Number of ED visits that are treat and release	20,018,200	498,056	74.7	9,174,229	73.7	17,108,045	1,135,146	86.9
Number of ED visits that result in admission	6,764,900	171,620	25.3	3,267,493	26.3	2,569,200	210,675	13.1
Asthma								
Total number of ED visits	5,190,348	161,665	4.5	2,438,920	4.5	2,660,940	209,852	2.3
Number of ED visits that are treat and release	3,897,709	133,822	75.1	1,805,736	74.0	2,340,997	184,464	88.0
Number of ED visits that result in admission	1,292,639	38,205	24.9	633,184	26.0	319,943	57,447	12.0
Diabetes								
Total number of ED visits	8,721,020	219,841	7.5	4,103,971	7.5	1,505,793	155,973	1.3
Number of ED visits that are treat and release	4,648,095	128,765	53.3	2,115,763	51.6	1,092,409	119,520	72.5
Number of ED visits that result in admission	4,072,925	111,203	46.7	1,988,208	48.4	413,384	69,293	27.5
Heart Disease								
Total number of ED visits	28,212,289	694,058	24.3	13,212,367	24.2	11,773,580	666,866	10.2
Number of ED visits that are treat and release	16,192,682	423,824	57.4	7,368,618	55.8	7,279,137	437,259	61.8
Number of ED visits that result in admission	12,019,607	321,281	42.6	5,843,749	44.2	4,494,443	318,637	38.2
Acute Conditions								
Gastrointestinal								
Total number of ED visits	17,290,291	383,761	14.9	8,124,089	14.9	11,151,439	692,601	9.7
Number of ED visits that are treat and release	10,589,695	242,576	61.2	4,856,425	59.8	9,097,884	603,224	81.6
Number of ED visits that result in admission	6,700,597	173,605	38.8	3,267,664	40.2	2,053,555	176,682	18.4
MRSA								
Total number of ED visits	290,828	8,991	0.3	144,417	0.3	49,843	14,744	0.0
Number of ED visits that are treat and release	56,161	3,367	19.3	28,634	19.8	26,062	10,305	52.3
Number of ED visits that result in admission	234,667	7,373	80.7	115,783	80.2	23,781	10,958	47.7

Table D-8b. Definitions for Chronic and Acute Conditions seen in Emergency Departments, 2005

Chronic Conditions	
Respiratory	Any of the following CCS: 122 = " 122: Pneumonia (except that caused by tuberculosis and sexually transmitted diseases)" 123 = " 123: Influenza" 124 = " 124: Acute and chronic tonsillitis" 125 = " 125: Acute bronchitis" 126 = " 126: Other upper respiratory infections" 127 = " 127: Chronic obstructive pulmonary disease and bronchiectasis" 128 = " 128: Asthma" 129 = " 129: Aspiration pneumonitis, food/vomitus" 130 = " 130: Pleurisy, pneumothorax, pulmonary collapse" 131 = " 131: Respiratory failure, insufficiency, arrest (adult)" 132 = " 132: Lung disease due to external agents" 133 = " 133: Other lower respiratory disease" 134 = " 134: Other upper respiratory disease"
Asthma	Any of the following CCS: 128 = " 128: Asthma"
Diabetes	Any of the following CCS: 49 = " 49: Diabetes mellitus without complication" 50 = " 50: Diabetes mellitus with complications"

Chronic Conditions	
Heart Disease	<p>Any of the following CCS:</p> <p>96 = " 96: Heart valve disorders"</p> <p>97 = " 97: Peri-, endo-, and myocarditis, cardiomyopathy (except that caused by tuberculosis and sexually transmitted diseases)"</p> <p>98 = " 98: Essential hypertension"</p> <p>99 = " 99: Hypertension with complications and secondary hypertension"</p> <p>100 = " 100: Acute myocardial infarction"</p> <p>101 = " 101: Coronary atherosclerosis and other heart diseases"</p> <p>102 = " 102: Nonspecific chest pain"</p> <p>103 = " 103: Pulmonary heart disease"</p> <p>104 = " 104: Other and ill-defined heart disease"</p> <p>105 = " 105: Conduction disorders"</p> <p>106 = " 106: Cardiac dysrhythmias"</p> <p>107 = " 107: Cardiac arrest and ventricular fibrillation"</p> <p>108 = " 108: Congestive heart failure, nonhypertensive"</p> <p>109 = " 109: Acute cerebrovascular disease"</p> <p>110 = " 110: Occlusion or stenosis of precerebral arteries"</p> <p>111 = " 111: Other and ill-defined cerebrovascular disease"</p> <p>112 = " 112: Transient cerebral ischemia"</p> <p>113 = " 113: Late effects of cerebrovascular disease"</p> <p>114 = " 114: Peripheral and visceral atherosclerosis"</p> <p>115 = " 115: Aortic, peripheral, and visceral artery aneurysms"</p> <p>116 = " 116: Aortic and peripheral arterial embolism or thrombosis"</p> <p>117 = " 117: Other circulatory disease"</p> <p>118 = " 118: Phlebitis, thrombophlebitis and thromboembolism"</p> <p>119 = " 119: Varicose veins of lower extremity"</p> <p>120 = " 120: Hemorrhoids"</p> <p>121 = " 121: Other disease of veins and lymphatics"</p>

Acute Conditions	
Gastrointestinal	<p>Any of the following CCS:</p> <p>135 = " 135: Intestinal infection"</p> <p>136 = " 136: Disorders of teeth and jaw"</p> <p>137 = " 137: Disease of mouth, excluding dental"</p> <p>138 = " 138: Esophageal disorders"</p> <p>139 = " 139: Gastroduodenal ulcer (except hemorrhage)"</p> <p>140 = " 140: Gastritis and duodenitis"</p> <p>141 = " 141: Other disorders of stomach and duodenum"</p> <p>142 = " 142: Appendicitis and other appendiceal conditions"</p> <p>143 = " 143: Abdominal hernia"</p> <p>144 = " 144: Regional enteritis and ulcerative colitis"</p> <p>145 = " 145: Intestinal obstruction without hernia"</p> <p>146 = " 146: Diverticulosis and diverticulitis"</p> <p>147 = " 147: Anal and rectal conditions"</p> <p>148 = " 148: Peritonitis and intestinal abscess"</p> <p>149 = " 149: Biliary tract disease"</p> <p>150 = " 150: Liver disease, alcohol-related"</p> <p>151 = " 151: Other Liver diseases"</p> <p>152 = " 152: Pancreatic disorders (not diabetes)"</p> <p>153 = " 153: Gastrointestinal hemorrhage"</p> <p>154 = " 154: Noninfectious gastroenteritis"</p> <p>155 = " 155: Other gastrointestinal disorders"</p>
MRSA	<p>Any DX:</p> <p>V09.0 Infection with microorganisms resistant to penicillins (methicillin-resistant Staphylococcus aureus infection [MRSA])</p>

Table D-9a. Focus on Injuries seen in Emergency Departments, 2005

Reasons for ED Visits	Discharge Data					Facility-Based Survey					
	HCUP - NEDS			HCUP - MultiState		NHAMCS			NEISS-AIP ^a		
	N	SE	%	N	%	N	SE	%	N ^a	SE	% ^a
Total number of ED visits	116,290,897	2,487,527	100	54,526,932	100.0	115,322,815	6,075,004	100.0	-	-	-
Total number of injury-related ED visits	30,063,261	626,477	25.9	14,027,456	25.7	29,948,345	1,574,485	26.0	29,258,834	1,687,785	-
Unintentional Injuries	26,271,677	565,141	87.4	11,969,812	85.3	23,653,097	1,213,492	79.0	27,156,734	1,652,396	92.8%
Falls	7,443,350	173,886	28.3	3,442,504	28.8	7,586,620	463,137	32.1	7,938,467	530,563	29.2%
Struck by/against	3,478,657	89,243	13.2	1,605,631	13.4	3,077,593	205,530	13.0	4,336,688	310,667	16.0%
Motor Vehicle Traffic	3,116,036	78,596	11.9	1,437,275	12.0	3,391,074	234,638	14.3	4,369,745	341,846	16.1%
Cut/Pierce	2,451,752	59,060	9.3	1,131,856	9.5	2,446,009	171,163	10.3	2,236,861	160,156	8.2%
Other Mechanism	15,326,972	433,290	58.3	7,317,758	61.1	12,793,502	652,482	54.1	7,596,006		28.0%
Mechanism Unspecified	1,535,789	55,629	5.8	653,471	5.5	33,096	10,602	0.14	678,967	77,680	2.5%
Intentional Injuries	1,583,222	48,933	5.3	743,029	5.3	1,824,685	156,784	6.1	2,102,099	150,376	7.2%
Assault	1,127,649	38,789	71.2	527,977	71.1	1,476,280	132,693	80.9	1,660,775	139,007	79.0%
Self-Inflicted	409,902	12,883	25.9	192,293	25.9	319,336	48,799	17.5	372,722	34,551	17.7%
Other causes of violence	47,435	3,101	3.0	23,645	3.2	29,069	12,494	1.59	68,603	9,465	3.3%
No external cause of injury code on injury record	2,654,666	318,780	8.8	1,566,096	11.2	4,423,446	422,367	14.8			

^a NEISS-AIP uniquely identifies an injury into one unintentional or intentional category. Counts for HCUP and NHAMCS allow a visit to be represented in multiple types of injuries if reported in the data.

Table D-9b. Definitions (Injury Surveillance Workgroup 2003) for Injuries seen in Emergency Departments, 2005

Define injury records using all diagnosis in the following range	800-909.2, 909.4, 909.9, 910-994.9, 995.5-995.59, 995.80-995.85. Exclude 909.3 and 909.5.
Intent/mechanism only counted on injury records using all available E codes	
Unintentional Injuries	E800–E869, E880–E929
Falls	E880.0–E886.9, E888
Struck by/against	E916– E917
Motor Vehicle Traffic	E810–E819
Cut/Pierce	E920
Other Mechanism	All other unintentional E codes
Mechanism Unspecified	E887, E928.9, E929.8, E929.9
Intentional Injuries	E950–E959, E960–E969, E970–E978, E990–E999
Assault	E960–E969
Self-Inflicted	E950–E959
Other causes of violence	All other intentional E codes