HEALTHCARE COST AND UTILIZATION PROJECT — HCUP
A FEDERAL-STATE-INDUSTRY PARTNERSHIP IN HEALTH DATA
Sponsored by the Agency for Healthcare Research and Quality

INTRODUCTION TO

THE HCUP NATIONWIDE EMERGENCY DEPARTMENT SAMPLE (NEDS)

2005

These pages provide introductory-level information about the NEDS.

For full documentation and notification of changes, visit the HCUP User Support (HCUP-US) Website at http://www.hcup-us.ahrq.gov.

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******* REMINDER *******

All users of the NEDS must complete the on-line Data Use Agreement (DUA) training, sign a Data Use Agreement, and send a copy to AHRQ. †

Authorized users of HCUP data agree to the following limitations: ‡

- Will not use the data for any purpose other than research or aggregate statistical reporting.
- Will not re-release any data to unauthorized users.
- Will not identify or attempt to identify any individual. **Will not report any statistics where the number of observations (i.e., individual discharge records) in any given cell of tabulated data is less than or equal to 10.**
- Will not link HCUP data to data from another source that identifies individuals.
- Will not report information that could identify individual establishments (e.g., hospitals).
- Will not use the data concerning individual establishments for commercial or competitive purposes involving those establishments.
- Will not use the data to determine rights, benefits, or privileges of individual establishments.
- Will not identify or attempt to identify any establishment when its identity has been concealed on the database.
- Will not contact establishments included in the data.
- Will not attribute to data contributors any conclusions drawn from the data.
- Must acknowledge the "Healthcare Cost and Utilization Project, (HCUP)," as described in the Data Use Agreement, in reports.

Any violation of the limitations in the Data Use Agreement is punishable under Federal law by a fine of up to $10,000 and up to 5 years in prison. Violations may also be subject to penalties under State statutes.

† The on-line Data Use Agreement training session and the Data Use Agreement are available on the HCUP User Support (HCUP-US) Website at http://www.hcup-us.ahrq.gov.
‡ Specific provisions are detailed in the Data Use Agreement for the NEDS Database.

HCUP CONTACT INFORMATION

The NEDS Data Use Agreement Training Tool and the Data Use Agreement are available on the AHRQ-sponsored HCUP User Support (HCUP-US) Website:

http://www.hcup-us.ahrq.gov

After completing the on-line training, please submit signed data use agreements to HCUP at:

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Website: http://www.ahrq.gov/data/hcup/

For technical assistance:

Visit the HCUP-US Website at

http://www.hcup-us.ahrq.gov

Or send an e-mail to HCUP User Support at

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WHAT IS THE NATIONWIDE EMERGENCY DEPARTMENT SAMPLE (NEDS)?

- The Nationwide Emergency Department Sample (NEDS) tracks information about emergency department (ED) visits across the country. Information includes geographic characteristics, hospital characteristics, patient characteristics, and the nature of visits (e.g., common reasons for ED visits, acute and chronic conditions, and injuries).
- The NEDS was constructed using the HCUP State Emergency Department Databases (SEDD) and the State Inpatient Databases (SID). The SEDD capture discharge information on ED visits that do not result in an admission (i.e., treat-and-release visits and transfers to another hospital). The SID contain information on patients initially seen in the emergency room and then admitted to the same hospital.
- The 2005 NEDS is an AHRQ intramural database.
- There are 23 HCUP Partner States that contributed 2005 ED data to HCUP to construct the NEDS: AZ, CA, CT, FL, GA, HI, IA, IN, KS, MA, MD, MN, MO, NE, NH, NJ, OH, SC, SD, TN, UT, VT, and WI.
- The NEDS describes over 116 million ED visits for 2005, an exceptional resource for conducting research on high-profile emergent health delivery issues. One of the most distinctive features of the NEDS is its large sample size, which allows for analysis across hospital types and the study of relatively uncommon disorders and procedures.
- Users must complete an on-line Data Use Agreement training prior to receiving the data.

UNDERSTANDING THE NEDS

- This document, *Introduction to the NEDS, 2005,* summarizes the content of the NEDS and describes the development of the NEDS sample and weights.
- Important considerations for data analysis are highlighted and references to further resources are provided.
- In-depth documentation for the NEDS is available on the HCUP User Support (HCUP-US) Website (www.hcup-us.ahrq.gov). Please refer to detailed documentation before using the data.

HCUP Nationwide Emergency Department Sample (NEDS)

ABSTRACT

The Nationwide Emergency Department Sample (NEDS) is part of the Healthcare Cost and Utilization Project (HCUP), sponsored by the Agency for Healthcare Research and Quality (AHRQ). The 2005 NEDS is an AHRQ intramural database.

The NEDS was created to enable analyses of emergency department (ED) utilization patterns and support public health professionals, administrators, policymakers, and clinicians in their decision-making regarding this critical source of care. The ED serves a dual role in the U.S. healthcare system infrastructure as a point of entry for approximately 50% of inpatient hospital admissions and as a setting for treat-and-release outpatient visits.[1] The NEDS has many research applications, as it contains information about geographic characteristics, hospital characteristics, patient characteristics, and the nature of visits (e.g., common reasons for ED visits, including injuries).

The NEDS is the largest all-payer ED database that is publicly available in the United States, containing information from over 27 million records for ED visits at about 1,000 hospitals that approximate a 20-percent stratified sample of U.S. hospital-based EDs. Weights are provided to calculate national estimates pertaining to over 116 million ED visits in 2005.

The NEDS is drawn from those States providing ED data to HCUP. Twenty-three HCUP Partner States participated in the 2005 NEDS. These States are AZ, CA, CT, FL, GA, HI, IA, IN, KS, MA, MD, MN, MO, NE, NH, NJ, OH, SC, SD, TN, UT, VT, and WI. See Appendix I, Table 1 for a list of the statewide data organizations participating in the NEDS.

By stratifying on important hospital characteristics, the NEDS represents a microcosm of U.S. hospital-based EDs. Stratification is based on the following five characteristics:

- Geographic region (Northeast, Midwest, South, and West)
- Trauma center designation (combining level I, II, and III together versus non-trauma)
- Urban-rural location of the hospital (large metropolitan, small metropolitan, micropolitan, and non-urban residual)
- Teaching hospitals in metropolitan areas
- Hospital ownership or control (public, voluntary, and proprietary).

Access to the NEDS is open to users who sign Data Use Agreements. Uses are limited to research and aggregate statistical reporting.

For more information on the NEDS, visit the AHRQ-sponsored HCUP User Support (HCUP-US) Website at http://www.hcup-us.ahrq.gov.

[1] Merrill and Owens, 2007

INTRODUCTION TO THE HCUP NATIONWIDE EMERGENCY DEPARTMENT SAMPLE (NEDS)

Overview of NEDS Data

The Healthcare Cost and Utilization Project (HCUP) Nationwide Emergency Department Sample (NEDS) was created to enable analyses of emergency department (ED) utilization patterns and support public health professionals, administrators, policymakers, and clinicians in their decision-making regarding this critical source of care. The ED serves a dual role in the U.S. healthcare system infrastructure as a point of entry for approximately 50% of inpatient hospital admissions and as a setting for treat-and-release outpatient visits.[2] The NEDS has many research applications, as it contains information about geographic characteristics, hospital characteristics, patient characteristics, and the nature of visits (e.g., common reasons for ED visits, acute and chronic conditions, and injuries).

Twenty-four HCUP Partner States contributed 2005 data on ED events – those visits resulting in an inpatient admission and those that did not. Twenty-three States participated in the 2005 NEDS.[3] These States include: AZ, CA, CT, FL, GA, HI, IA, IN, KS, MA, MD, MN, MO, NE, NH, NJ, OH, SC, SD, TN, UT, VT, and WI. Appendix I, Table 1 identifies the specific data organizations contributing to the NEDS.

Appendix I, Figure 1 represents the geographic distribution of the 23 participating HCUP Partner States. Based on 2005 U.S. Census Bureau data, the HCUP NEDS States account for 51.1% (151,508,109) of the U.S. population. The 23 States account for 48% (58,200,187) of the ED visits reported in the 2005 American Hospital Association (AHA) Annual Survey Database. Details on the percentage of population and ED visits by region are provided in Appendix I, Table 2.

Identification of HCUP Records with Emergency Department Services

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

- State Emergency Department Databases (SEDD) capture discharge information on all emergency department visits that do not result in an admission to that hospital (i.e., treat-and-release visits and transfers to another hospital).

- State Inpatient Databases (SID) contain information on patients initially seen in the emergency room and then admitted to the same hospital.

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

Selection of ED records from the SEDD and SID for use in the NEDS was based on evidence of ED services reported on the record. The HCUP criteria for identifying an ED record (i.e., a discharge record for a patient with an ED event) require that at least one of the following conditions is true:

[2] Merrill and Owens, 2007
[3] ED data from New York was not available to include in the 2005 NEDS.

- Revenue center code of 450-459 reported on discharge record, indicating emergency department services.

- Emergency department charge greater than zero dollars, when revenue center codes were not available.

- CPT code of 99281-99285 reported on discharge record, indicating emergency department physician services.

- Admission source of ED (used for inpatient discharges only).

Because six of the 23 Partners (AZ, CA, HI, OH, MA, and WI) did not provide ED charge information (either in revenue codes or a separate charge field) on records in the SEDD, this limited the ability to clearly identify ED visits using the HCUP criteria. Therefore, the identification of ED records in these six States 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 information was not available to determine if HCUP criteria were met.

- OH: The HCUP Partner provided a large outpatient database that combined records for ED services with records for other outpatient visits, such as ambulatory surgery, outpatient clinic, lab, etc. Each record contained a State-defined indicator of the type of outpatient service. Ohio outpatient records with an ED designation were considered to be ED records, even though information was not available to determine if HCUP criteria were met.

State-Specific Restrictions

Some sources that contributed data to the NEDS imposed restrictions on the release of certain data elements or on the number and types of hospitals that could be included in the database. In addition, because of confidentiality laws, some data sources were prohibited from providing HCUP with discharge records that indicated specific medical conditions, such as HIV/AIDS or behavioral health. Detailed information on these State-specific restrictions is available in Appendix II.

File Structure of the NEDS

Because of the size of the NEDS and the difference in information collected on records for patients admitted into the hospital directly from the ED (SID records) and for ED patients that are not admitted (SEDD records), the NEDS is divided into four different files:

- **Core File:** This file contains 100% of the ED events – whether resulting in admission or not – from the sample of hospitals in participating States. In 2005, the NEDS Core File has over 27 million ED records. Refer to Appendix III, Table 1 for a list of data elements in the NEDS Core File.

- **Supplemental ED File:** This file contains information on CPT-4 and ICD-9-CM procedures that were performed in the ED for patients who are not admitted directly to the hospital. This information came from the SEDD. In 2005, the NEDS Supplemental

ED File has almost 23 million ED records. The unique NEDS record identifier (KEY_ED) provides the linkage between the NEDS Core File and the Supplemental ED File. Refer to Appendix III, Table 2 for a list of data elements in the NEDS Supplemental ED File. For patients seen in the ED and admitted to the same hospital (SID records), information about procedures is contained in the Supplemental Inpatient File.

- **Supplemental Inpatient File:** This file contains data elements that are not specific to the emergency department, such as total charges for the inpatient stay, length of inpatient stay, and ICD-9-CM procedures from the SID record. Procedures reported on the SID records may have been performed in the ED, but currently there is no way to verify this information. In 2005, the NEDS Supplemental Inpatient File has over 4 million records. The unique NEDS record identifier (KEY_ED) provides the linkage between the NEDS Core File and the Supplemental Inpatient File. Refer to Appendix III, Table 3 for a list of data elements in the NEDS Supplemental Inpatient File.

- **Hospital Weights File:** This hospital-level file contains one observation for each hospital included in the NEDS and contains weights and variance estimation data elements. In 2005, the NEDS Hospital Weights File has almost 1,000 hospital-specific records. The HCUP ED hospital identifier (HOSP_ED) provides the linkage between the NEDS Core File and the Hospital Weights File. A list of data elements in the Hospital Weights File is provided in Appendix III, Table 4.

For restricted-access, intramural use only, – a data development file was created with dates, the patient's ZIP Code, and the median household annual income of the patient's ZIP Code. Use of this file requires explicit permission from the Government Project Officer. Refer to Appendix III, Table 5 for a list of data elements in the NEDS Data Development File.

NEDS Data Elements

The coding of data elements in the NEDS is consistent with other HCUP databases. The following three objectives guided the definition of data elements 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).

After analyzing the availability of information from the HCUP Partner States, a set of common fields to be available in the NEDS was created. The NEDS contains more than 100 clinical and non-clinical variables provided 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, urban-rural designation of residence, national quartile of the median household annual income for the patient's ZIP Code)
- Expected payment source (e.g., Medicare, Medicaid, private insurance, self-pay)
- Hospital characteristics (e.g., indicator of trauma center, urban-rural designation of county, ownership, teaching status, region of the U.S.)
- ED charges and total hospital charges for patients admitted as an inpatient through the ED.

Appendix III identifies the data elements in each NEDS file:

- Table 1 for the NEDS Core File (record = ED event)
- Table 2 for the NEDS Supplemental ED File (record = ED event with procedures known to have been performed in the ED, i.e., visit that resulted in release or transfer)
- Table 3 for the NEDS Supplemental Inpatient File (record = ED event that resulted in a direct inpatient admission to the same hospital)
- Table 4 for the Hospital Weights File (record = hospital)
- Table 5 for the NEDS Data Development File (record = ED event).

Not all data elements in the NEDS are uniformly coded or available across all States. The tables in Appendix III provide summary documentation for the data. Please refer to the NEDS documentation located on the HCUP-US Website (http://www.hcup-us.ahrq.gov) for comprehensive information about data elements and the files.

Getting Started

Comprehensive documentation for the NEDS files is available on the HCUP-US Website (http://hcup-us.ahrq.gov).

NEDS Data Files

The 2005 NEDS is an AHRQ intramural database. Contact the HCUP Project Officer for the location of the SAS data files.

NEDS Documentation

On the HCUP-US Website (http://www.hcup-us.ahrq.gov), users of the NEDS can access complete file documentation, including variable notes, file layouts, summary statistics, and related technical reports. Similarly, data users can download SAS, SPSS, and Stata load programs. Refer to these important resources to understand the structure and content of the NEDS and to aid in using the database.

To locate the NEDS documentation on HCUP-US:

- Choose “Databases” from the home page (http://www.hcup-us.ahrq.gov)
- Select the section labeled “Nationwide Emergency Department Sample (NEDS)”

Appendix 1, Table 3 details the comprehensive NEDS documentation available on HCUP-US.

SAMPLING DESIGN OF THE NEDS

Similar to the design of the NIS, the NEDS is built using a 20% stratified sample of hospital-based EDs, in which all visits within the sample of EDs are selected. The main objective of a stratified sample is to ensure that the sample is representative of the target universe. By stratifying on important hospital characteristics, the NEDS represents a “microcosm” of EDs in the U.S. For example, by including trauma center designation in the sampling strategy, the NEDS has the same percentage of trauma hospitals as the entire U.S.

Universe of Hospital-Based Emergency Departments

The universe of hospital-based EDs in the United States was built by assessing several possible data sources, including the American Hospital Association (AHA) Annual Survey Database (Health Forum, LLC © 2007); Verispan, LLC databases; and the Centers for Medicare and Medicaid (CMS) Hospital Cost Reports. The AHA Annual Survey Database is the best data to apply for a number of reasons. First, the AHA data provides the necessary hospital characteristics, such as ownership type and teaching status, and also reports total ED visits for hospitals. Second, the crosswalk linkage from the HCUP databases to the AHA data is already established. Third, the AHA Annual Survey Database is used as the target universe for the NIS. The universe of hospital-based EDs is therefore defined as AHA community, non-rehabilitation hospitals that reported total ED visits. The AHA defines community hospitals as "all non-Federal, short-term, general, and other specialty hospitals, excluding hospital units of institutions."

Sampling Frame of the NEDS

The sampling frame of the NEDS is limited to a subset of the universe: hospital-based EDs in the States for which HCUP ED data are available. The list of hospital-based EDs in the frame consists of all AHA community, non-rehabilitation hospitals that report total ED visits in each of the frame States *that could be matched to the ED data provided to HCUP*. If an ED in the AHA survey could not be matched to the ED data provided by the HCUP data source, it is eliminated from the sampling frame (but not from the target universe).

Stratification Variables

The following hospital characteristics were used for sample stratification: U.S. Census region, designation as a trauma center, urban-rural location of the hospital, ownership, and teaching status. ED bed size was not used because no data source for this information could be identified. A number of data sources report the bed size of the hospital, but no source distinguishes between inpatient and ED beds.

The NEDS stratification variables are described below and detailed in Appendix I, Table 5.

U.S. Census Region

The four Census regions – Northeast, Midwest, South, and West – were used to stratify EDs by geographic location because practice patterns may vary substantially by region. Appendix I, Figure 1 shows the NEDS States by region.

Trauma Centers

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. Trauma centers in urban-suburban America have been shown to be the most effective in treating complex injuries. For the NEDS, 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 and Prevention[4,5].

The TIEP database is updated quarterly and identifies all U.S. hospitals that are designated as trauma centers by a State or regional authority or verified by the American College of Surgeons' Committee on Trauma (ACS/COT). Designation of trauma center levels I, II, and III are based on criteria developed by the ACS/COT. Level I and II centers have comprehensive resources and are able to care for the most severely injured. Level I centers also provide leadership in education and research. Level III centers provide prompt assessment and resuscitation, emergency surgery and, if needed, transfer to a level I or II center. Level IV and V centers are State-defined and often located in remote areas. These centers resuscitate and stabilize patients and arrange transfer to an appropriate trauma facility. For the NEDS, levels I, II and III were used to identify a trauma center. Level IV and V centers were set aside within the context of these data because many states choose not to designate hospitals at these levels of trauma care and their institutional characteristics have many similarities to community (non-trauma) hospitals in other areas. It is also important to note that while all level I, II, and III trauma centers offer a high level of trauma care, that there may be differences in the services and resources offered by hospitals of different levels. Further, hospitals of different levels may be utilized in diverse ways within the context of individual state trauma systems or the geographic areas in which they operate.

For the 2005 NEDS, level I, II, and III trauma centers were grouped together (TRAUMA=1), with the level not distinguished. All other EDs, including level IV and V trauma centers, are considered non-trauma (TRAUMA=0). In the 2006 NEDS, trauma centers that are level I, II, and III are distinguished (HOSP_TRAUMA=1, 2, or 3).

An analysis of the quarterly TIEP databases for 2005 to 2006 showed little variation in trauma level across the two-year period. Only 3% of trauma hospitals indicated a change in the trauma level over the two-year period. If the trauma level of a hospital changed during the calendar year, the highest trauma level (indicating the lowest level of care) was used. For example, if a

[4] MacKenzie EJ, Hoyt DB, Sacra JC, et al. National inventory of hospital trauma centers. *JAMA.* 2003;289:1515-1522.
[5] American Trauma Society. Trauma Information Exchange Program. Available at: http://www.amtrauma.org/tiep/index.html. Accessed April 2005.

hospital-based ED was reported as trauma level 2 for two quarters of 2005 and trauma level III for two quarters of 2005, then the hospital-based ED was considered a level III trauma center for the 2005 NEDS. Alternatively, if a hospital-based ED was reported as a trauma level III for 2 quarters of 2005 and did not report for two quarters, the ED was considered a trauma level III for the 2005 NEDS.

Hospital information from TIEP was matched to the AHA via the corresponding AHA hospital identifier and then added to the HCUP ED data.

Urban-Rural Location of the ED

The urban-rural location of hospital-based EDs was determined based on the county in which the hospital is located. The categorization is a simplified adaptation of the 2003 version of the Urban Influence Codes (UIC).[6] The 12 categories of the UIC are combined into four broader categories:

- 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.

Teaching Status

A hospital-based ED 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 (COTH), 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. Because there are very few teaching hospitals in micropolitan and rural areas, teaching status was only used to stratify EDs in metropolitan areas.

Hospital Ownership

Hospital ownership or control 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.

When there were enough hospitals of each type, EDs were stratified into public, voluntary, and proprietary categories. 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. Stratification based on ownership or control was not advisable in some regions because of the dominance of one type of hospital (e.g., Northeast).

Sample 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.

[6] United States Department of Agriculture Economic Research Service, 2007

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 of ED visits.

Hospital Weights

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

$$HOSPWT = W_s(universe) = N_s(universe) \div N_s(sample)$$

where $W_s(universe)$ was the ED universe weight, and $N_s(universe)$ and $N_s(sample)$ 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 ED weights were usually near 5.

Discharge Weights

Discharge weights to the universe were calculated by poststratification. Hospital-based EDs were stratified in a manner similar to that for universe hospital weight calculations. Within stratum, *s*, for hospital, i, the universe weight for each visit in the NEDS sample was calculated as:

$$DISCWT = DW_{is}(universe) = [DN_s(universe) \div ADN_s(sample)] * (4 \div Q_i)$$

where $DW_{is}(universe)$ was the discharge weight; $DN_s(universe)$ represented the number of ED visits from community, non-rehabilitation hospitals in the universe within stratum *s*; $ADN_s(sample)$ 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.

Final NEDS Sample

The target universe for the NEDS was community, non-rehabilitation hospitals in the United States that were included in the 2005 AHA Annual Survey Database and reported total ED visits. Excluded were a handful of non-rural hospitals that reported less than 10 ED visits in a year.

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. Appendix I, Table 6 lists the final target universe and sampling frame for the NEDS.

The NEDS is a stratified probability sample of hospital-based EDs 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 ownership or control. 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 a 20% sample contains 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 (i.e., 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; otherwise, 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, strata were defined by region, trauma designation, urban-rural location, teaching status, and hospital ownership or control. Strata with less than two hospitals in the universe and frame were collapsed with adjacent stratum based on urban-rural location, teaching status, or ownership or control. Strata were not collapsed across trauma designation.

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. A shortfall was defined as an insufficient number of EDs in the frame to meet the threshold of 20% of the universe. In strata with shortfalls, the sampling rate from the universe was less than 20% and all possible EDs in the frame are selected for the NEDS. In contrast, the sampling rate is larger than 20% in some strata because protecting hospital confidentiality required a minimum of two sampled EDs in each stratum. Appendix I, Table 7 lists the sampling rates by stratum for the NEDS.

HOW TO USE THE NEDS FOR DATA ANALYSIS

This section provides a brief synopsis of special considerations when using the NEDS. For more details, refer to the comprehensive documentation on the HCUP-US Website (http://hcup-us.ahrq.gov/).

If anyone (regardless of whether they are the original recipient of the data) uses the NEDS, be sure s/he reads and signs a Data Use Agreement, after completing the on-line Data Use Agreement training available on the HCUP-US Website (http://www.hcup-us.ahrq.gov). A copy of the signed Data Use Agreements must be sent to AHRQ. See page 2 for the mailing address.

Limitations of the NEDS

The NEDS contains more than 27 million ED records and over 100 clinical and non-clinical data elements. This allows for a multitude of research studies, yet there are some limitations.

- The NEDS is an extremely large database that requires sophisticated, statistical software for analysis. In total, the comma-delimited version of the files is almost 11

gigabyte (GB); the NEDS loaded into SAS is almost 9 GB. In SAS, the largest use of space typically occurs during a sort, which requires work space about three times the size of the file. Thus, the NEDS Core File would require about 27 GB of available workspace to perform a sort. Even most SAS data steps will require twice the storage of the file so that both the input and output files can coexist. With a file this size and without careful planning, space could easily become a problem in a multi-step program. Because it is not unusual to have several versions of a file marking different steps while preparing it for analysis and more versions for the actual analyses, the amount of space required could escalate rapidly. We estimate that a researcher needs 75 to 100 GB of space to work comfortably with the NEDS files.

- In 2005, about 18% of the ED visits are missing information about ED charges. This missing information is concentrated in the West. Therefore, analyses of charges would be best limited to regional comparisons when sufficient data are available. In addition, estimates of the sum of charges should use the product of the number of cases times the average charge to account for records with missing information.

- The NEDS contains event-level records, not patient-level records. This means that individual patients who visit the ED multiple times in one year may be present in the NEDS multiple times. There is no uniform patient identifier available that allows a patient-level analysis with the NEDS. In contrast, the HCUP state databases may be used for this type of analysis.

- If a patient is directly admitted from the ED to the same hospital, one discharge record is included in the NEDS. If a patient is transferred from the ED to another ED or hospital, the resulting record may or may not be included in the NEDS because the NEDS is created from a sample of hospital-based EDs. This type of transfer only occurs in about 1% of the NEDS.

- For a patient who was directly admitted to the same hospital through the ED, clearly identifying whether a procedure was performed in the ED or as part of the inpatient stay is not currently possible. Information on procedures for ED admissions are stored in the NEDS Supplemental Inpatient File.

- The NEDS does not contain the same hospitals as the HCUP Nationwide Inpatient Sample, and cannot be used for state-level analyses.

Identifying Different Types of ED Events

- Identifying and distinguishing among the five different types of ED events involves two data elements. First, the data element HCUPFILE identifies whether the record originated in the HCUP SEDD or SID. Second, the data element DISP_ED identifies the disposition of the person at the conclusion of the ED visit. The table below details how to identify the five ED event types based on values for the two data elements. Appendix 1, Table 4 provides the number and percent of records in the 2005 NEDS for each of the five ED event types.

ED Event	Value of HCUPFILE	Value of DISP_ED
ED visit in which the patient is treated and released	"SEDD"	1: Routine 5: Transferred to other type of facility 6: Home health care 7: Against medical advice 99: Discharge alive, destination unknown
ED visit in which the patient is admitted to this same hospital	"SID"	9: Admitted as an inpatient to this hospital
ED visit in which the patient is transferred to another short-term hospital	"SEDD"	2: Transfer to short-term hospital
ED visit in which the patient died in the ED	"SEDD"	20: Died in the ED
Type of ED event unknown	"SEDD"	Missing (.) or invalid (.A)

- There may be a bias to the records in which the type of ED event is unknown. Some States have a large percent of missing information. Intramural-specific note: MD does not provide information on the disposition of the patient from the ED.

Calculating National Estimates

- To produce national estimates, use the weighting data elements provided to weight ED events in the NEDS to hospital-based ED visits from all U.S. community, non-rehabilitation hospitals. **In order to produce national estimates, weights MUST be used.**

  The **hospital weight (HOSPWT)** should be used for producing nationwide hospital-level statistics for analyses that use the *hospital-based ED* as the unit of analysis.

  The **discharge weight (DISCWT)** should be used for producing nationwide visits-level statistics for analyses that use the *ED visit* as the unit of analysis.

- Because the NEDS is a stratified sample, proper statistical techniques must be used to calculate standard errors and confidence intervals. For detailed instructions, refer to the special report *Calculating Nationwide Inpatient Sample Variances* on the HCUP-US Website (www.hcup-us.ahrq.gov). The HCUP Nationwide Inpatient Sample (NIS) uses the same stratified sample design, so techniques appropriate for the NIS are also appropriate for the NEDS.

- When creating national estimates, it is a good idea to check results against other data sources, if available. Summary benchmarks for national estimates from the NEDS are

provided in Appendix IV. Also included in Appendix IV are comparable estimates from other ED data sources. For example, the National Hospital Ambulatory Medical Care Survey (NHAMCS) has an emergency department component and publishes national health statistics annually.

- To ensure that weights are used appropriately and estimates and variances are calculated accurately, researchers can also use HCUPnet, the free online query system (http://www.hcupnet.ahrq.gov). HCUPnet is a Web-based query tool for identifying, tracking, analyzing, and comparing statistics on hospitals at the national, regional, and State levels. HCUPnet offers easy access to national statistics and trends as well as selected State statistics about hospital stays and ED visits. This tool provides step–by–step guidance, helping researchers to quickly obtain the statistics they need. HCUPnet generates statistics using the HCUP databases.

Choosing Data Elements for Analysis

- For all data elements to be used in the analysis, first perform descriptive statistics and examine the range of values, including number of missing cases. When anomalies (such as large numbers of missing cases) are detected, perform descriptive statistics by region for that variable to detect if there are region-specific differences. Sometimes performing descriptive statistics by hospital (HOSP_ED) can be helpful in detecting hospital-specific data anomalies.

- Differences exist across the State data sources in the collection of information that could not be reconciled during HCUP processing to make the data uniform. Information on State-specific data idiosyncrasies that remain can be found in the section for NEDS Description of Data Elements on the HCUP-US Website.

ICD-9-CM Diagnosis and Procedure Codes

- ICD-9-CM diagnosis and procedure codes provide valuable insights into the reasons for ED visits and hospitalizations as well as what procedures patients receive, but these codes need to be carefully used and interpreted. ICD-9-CM codes change every October as new codes are introduced and some codes are retired. See the Conversion Table at http://www.cdc.gov/nchs/datawh/ftpserv/ftpicd9/ftpicd9.htm which shows ICD-9-CM code changes over time. **It is essential to check all ICD-9-CM codes used for analysis to ensure the codes are in effect during the time period(s) studied.**

- On the records for an ED visit in which the patient is admitted to the same hosptial (identified by HCUPFILE="SID"), the first listed diagnosis (DX1) is the principal diagnosis. On all other NEDS records, the first listed diagnosis (DX1) is not necessarily the principal diagnosis.

- Diagnoses reported on an ED admission may be from both the ED and hospital setting. It may be useful to compare diagnostic-specific ED visits that do not result in hospitalization to those resulting in hospitalization.

- CPT procedure codes also provide valuable insight into the procedures performed. CPT codes can change dramatically each year. CPTs are copyrighted by the American

Medical Association. Please refer to their web site for more information about coding (http://www.ama-assn.org/ama/pub/category/3884.html). **It is essential to check all CPT procedure codes used for analysis to ensure the codes are in effect during the time period(s) studied.**

- Up to four external cause of injury codes (E codes) are retained in separate data elements (ECODE1-ECODE4). The first listed E code (ECODE1) is not necessarily the underlying or principal cause of the injury.

- The collection and reporting of E codes varies greatly across States. Some States have laws or mandates for the collection of E codes; others do not. In addition, some States do not require hospitals to report E codes in the range E870-E879--"misadventures to patients during surgical and medical care"--which means that these occurrences will be underreported.

- Although the NEDS contains fields for up to 15 diagnoses, four E codes, 15 CPT procedures, and 9 ICD-9-CM procedures per ED event, the number of code fields populated varies by State due to reporting differences. Some States provide more than the maximum code fields retained on the NEDS. To reduce the file size of the NEDS, the number of diagnosis and procedure codes retained was limited. Less than 2% of all ED records report more fields than the maximum allowed on the NEDS. Four data elements are provided which tell users exactly how many diagnoses and procedures were on the original records (NDX for diagnoses, NECODE for E codes, NCPT for CPT procedures, and NPR for ICD-9-CM procedures).

Missing Values

- Missing data values can compromise the quality of estimates. For instance, if the outcome for ED visits with missing values is different from the outcome for ED visits with valid values, then sample estimates for that outcome will be biased and inaccurately represent the ED utilization patterns. There are several techniques available to help overcome this bias. One strategy is to use imputation to replace missing values with acceptable values. Another strategy is to use sample weight adjustments to compensate for missing values. Descriptions of such data preparation and adjustment are outside the scope of this report; however, it is recommended that researchers evaluate and adjust for missing data, if necessary.

- Alternatively, if the cases with and without missing values are assumed to be similar with respect to their outcomes, no adjustment may be necessary for estimates of means and rates because the non-missing cases would be representative of the missing cases. However, some adjustment may still be necessary for the estimates of totals. Sums of data elements (such as aggregate ED charges) containing missing values would be incomplete because cases with missing values would be omitted from the calculations. Estimates of the sum of charges should use the product of the number of cases times the average charge to account for records with missing information.

Variance Calculations

It may be important for researchers to calculate a measure of precision for some estimates

based on the NEDS sample data. Variance estimates must take into account both the sampling design and the form of the statistic. The sampling design consisted of a stratified, single-stage cluster sample. A stratified random sample of hospital-based EDs (clusters) was drawn and then all ED visits were included from each selected hospital. **To accurately calculate variances from the NEDS, appropriate statistical software and techniques must be used.** For details**,** see the special report *Calculating Nationwide Inpatient Sample Variances* on the HCUP-US Website (www.hcup-us.ahrq.gov). The NIS uses the same stratified sample design, so techniques appropriate for the NIS are also appropriate for the NEDS.

If hospitals inside the sampling frame are similar to hospitals outside the frame, the sample hospitals can be treated as if they were randomly selected from the entire universe of hospitals within each stratum. Standard formulas for a stratified, single-stage cluster sample without replacement could be used to calculate statistics and their variances in most applications.

A multitude of statistics can be estimated from the NEDS data. Several computer programs that calculate statistics and their variances from sample survey data are listed in the next section. Some of these programs use general methods of variance calculations (e.g., the jackknife and balanced half-sample replications) that take into account the sampling design. However, it may be desirable to calculate variances using formulas specifically developed for certain statistics.

These variance calculations are based on finite-sample theory, which is an appropriate method for obtaining cross-sectional, nationwide estimates of outcomes. According to finite-sample theory, the intent of the estimation process is to obtain estimates that are precise representations of the nationwide population at a specific point in time. In the context of the NEDS, any estimates that attempt to accurately describe characteristics and interrelationships among hospitals and ED visits during a specific year should be governed by finite-sample theory. Examples would be estimates of expenditure and utilization patterns.

Alternatively, in the study of hypothetical population outcomes not limited to a specific point in time, the concept of a "superpopulation" may be useful. Analysts may be less interested in specific characteristics of the finite population (and time period) from which the *sample* was drawn than they are in hypothetical characteristics of a conceptual superpopulation from which any particular finite *population* in a given year might have been drawn. According to this superpopulation model, the nationwide population in a given year is only a snapshot in time of the possible interrelationships among hospital, market, and discharge characteristics. In a given year, all possible interactions between such characteristics may not have been observed, but analysts may wish to predict or simulate interrelationships that may occur in the future.

Under the finite-population model, the variances of estimates approach zero as the sampling fraction approaches one. This is the case because the population is defined at that point in time and because the estimate is for a characteristic as it existed when sampled. This is in contrast to the superpopulation model, which adopts a stochastic viewpoint rather than a deterministic viewpoint. That is, the nationwide population in a particular year is viewed as a random sample of some underlying superpopulation over time. Different methods are used for calculating variances under the two sample theories. The choice of an appropriate method for calculating variances for nationwide estimates depends on the type of measure and the intent of the estimation process.

Computer Software for Weighted and Variance Calculations

The hospital weights are useful for producing hospital-level statistics for analyses that use the

hospital-based ED as the unit of analysis. In contrast, the discharge weights are useful for producing visit-level statistics for analyses that use the *ED visit* as the unit of analysis.

In most cases, computer programs are readily available to perform these calculations. Several statistical programming packages allow weighted analyses.[7] For example, nearly all SAS procedures incorporate weights. In addition, several statistical analysis programs have been developed to specifically calculate statistics and their standard errors from survey data. Version 8 or later of SAS contains procedures (PROC SURVEYMEANS and PROC SURVEYREG) for calculating statistics based on specific sampling designs. STATA and SUDAAN are two other common statistical software packages that perform calculations for numerous statistics arising from the stratified, single-stage cluster sampling design. Examples of the use of SAS, SUDAAN, and STATA to calculate NIS variances are presented in the special report *Calculating Nationwide Inpatient Sample Variances* on the HCUP-US Website (www.hcup-us.ahrq.gov). While the examples using the NIS also apply to the NEDS, it should be noted that the NEDS is a much larger data set. Please consult the documentation for the different software packages concerning the use of large databases. For an excellent review of programs to calculate statistics from survey data, visit the following Website: http://www.hcp.med.harvard.edu/statistics/survey-soft/.

The NEDS includes a Hospital Weights File with variables required by these programs to calculate finite-population statistics. The file includes synthetic hospital identifiers (Primary Sampling Units or PSUs), stratification variables, and stratum-specific totals for the numbers of ED visits and hospitals so that finite-population corrections can be applied to variance estimates.

In addition to these subroutines, standard errors can be estimated by validation and cross-validation techniques. Given that a very large number of observations will be available for most NEDS analyses, it may be feasible to set aside a part of the data for validation purposes. Standard errors and confidence intervals then can be calculated from the validation data.

If the analytic file is too small to set aside a large validation sample, cross-validation techniques may be used. For example, ten-fold cross-validation would split the data into ten subsets of equal size. The estimation would take place in ten iterations. In each iteration, the outcome of interest is predicted for one-tenth of the observations by an estimate based on a model fit to the other nine-tenths of the observations. Unbiased estimates of error variance are then obtained by comparing the actual values to the predicted values obtained in this manner.

COMPARABLE ED DATA SOURCES

To aid in understanding of NEDS, national estimates from the NEDS are compared to available sources of similar data. Each of the following ED data sources has potential for use in research addressing ED utilization and policy.

Type of ED Data	ED Data Source	Description
ED visit	HCUP Nationwide Emergency	Nationwide sample drawn from the

[7] Carlson BL, Johnson AE, Cohen SB. "An Evaluation of the Use of Personal Computers for Variance Estimation with Complex Survey Data." *Journal of Official Statistics*, vol. 9, no. 4, 1993: 795-814.

information from a sample of EDs	Department Sample (NEDS)	HCUP SID and SEDD, stratified and weighted to be nationally representative of ED visits and facilities
	National Electronic Injury Surveillance System (NEISS)	National probability sample providing counts of injuries seen in the ED
	National Hospital Ambulatory Medical Care Survey (NHAMCS)	National probability sample survey of utilization and provision of ambulatory services in hospital emergency and outpatient departments
National inventories of ED facilities	American Hospital Association Annual Survey of Hospitals (AHA)	Database containing characteristics and descriptions of U.S. hospitals reported by hospitals via survey
	National Emergency Department Inventory (NEDI-USA)	A comprehensive database of nonfederal nonspecialty hospitals in the United States with an emergency department
	Verispan Hospital Market Profiling Solution	Data set containing information on U.S. hospitals collected through surveying government agencies and direct contact with hospitals
ED visit information from a sample of patients	National Health Interview Survey (NHIS)	A comprehensive survey of the civilian noninstitutionalized population residing in the United States at the time of the interview

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 ED data source had a variety of possible comparison categories. For example, ED visit counts were available for patient demographic and facility characteristics using the NHAMCS. In contrast, the NEISS allows for ED visit counts only for injuries.

Geographic Characteristics

Information on total ED visits in the U.S. was available from six data sources (NEDS, AHA, NHAMCS, Verispan, NHIS, and NEDI). Appendix IV, Figure 1 displays the range of total ED visits; Appendix IV, Table 1 lists the actual ED visits counts. Total U.S. ED visit counts are relatively consistent across the data sources.

ED visits counts by region are displayed in Appendix IV, Figure 2. Across the six data sources, the South consistently had the highest number of ED visits and the West had the lowest number of ED visits.

While the NEDS and NHAMCS showed a similar number of ED visits, the percentage of ED visits that resulted in admission to the same hospital as the ED is higher in the NEDS, as demonstrated in Appendix IV, Table 2. The number of ED visits that were considered “treat and

release" also includes visits in which the patient was transferred to another hospital.

Patient Characteristics

Estimates of ED visits by patient characteristics are available from two ED data sources: NEDS and NHAMCS. Estimates for age categories (0-17, 18-44, 45-64, 65+), gender, primary payer/insurance coverage (e.g., Medicare, Medicaid, private, self-pay), location of patient residence (large metropolitan, small metropolitan, micropolitan, non-urban residual) and national income quartiles (based on median household income for the patient's ZIP Code) are provided in Appendix IV, Table 3.

Hospital Characteristics

For 2005, information on the total number of hospital-based EDs and their volume of visits are available from four data sources (NEDS, AHA, NEDI, and NHAMCS) and are displayed in Appendix IV, Table 4. Information on total ED visits by trauma center designation and by hospital location is available from three data sources (NEDS, AHA, and NHAMCS) and displayed in Appendix IV, Table 5.

Common Reasons for ED Visits

Two ED data sources (NEDS and NHAMCS) can be used to examine common reasons for ED visits. Appendix IV, Table 6 includes the average number of diagnoses reported per visit, maximum number of diagnoses reported, top all-listed diagnoses, and top all-listed E codes. The NEDS had a higher number of visits attributable to each condition than NHAMCS, especially for chronic conditions. Most likely, this difference is due to the number of available diagnosis code fields, 15 for each ED visit in the NEDS, compared to three on the NHAMCS.

Injuries

Three data sources (NEDS, NHAMCS, NEISS) provided counts on the total number of ED visits that were injury related, including counts of unintentional injuries (e.g., falls, motor vehicle traffic accidents, cut/pierce) and counts of intentional injuries (e.g., assault, self-inflicted). These are listed in Appendix IV, Table 7.

Appendix I: NEDS Introductory Information

Table 1. HCUP Partners Participating in the 2005 NEDS

State	HCUP 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

Figure 1. HCUP States Participating in the 2005 NEDS

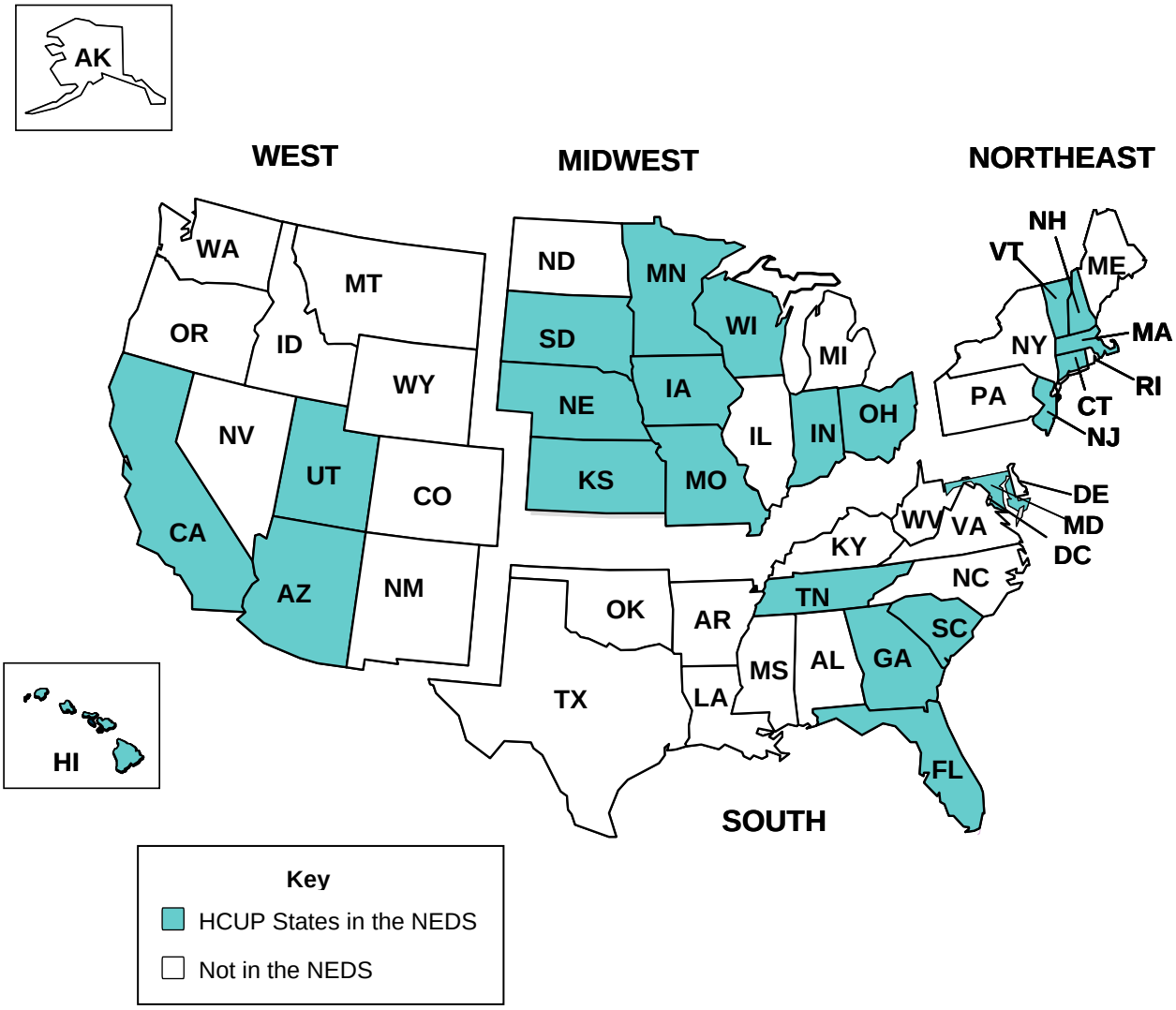


Table 2. Percentage of U.S Population and AHA ED Visits Accounted for by the 23 HCUP States Participating in the NEDS, 2005

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**

Table 3. NEDS Related Reports and Database Documentation Available on HCUP-US

Restrictions on the Use of the NEDS

- Data Use Agreement for the NEDS

Load Programs

Programs to load the ASCII data files into statistical software:

- SAS
- SPSS
- Stata

Description of the NEDS Files

- Introduction to the NEDS, 2005 – *this document*
- HCUP Quality Control Procedures – describes procedures used to assess data quality
- File Specifications – details data file names, number of records, record length, and record layout

HCUP Tools: Labels and Formats

- Overview of Clinical Classifications Software (CCS)
- Format library programs to create value labels
  - DRG formats
  - HCUP formats
  - HCUP diagnoses and procedure groups, including CCS categories
  - ICD-9-CM formats

Description of Data Elements in the NEDS

- Description of Data Elements – details uniform coding and State-specific idiosyncrasies
- Summary Statistics – lists means and frequencies on nearly all data elements
- HCUP Coding Practices – describes how HCUP data elements are coded
- HCUP Hospital Identifiers – explains data elements that characterize individual hospitals

NEDS-Related Reports

- Calculating Nationwide Inpatient Sample Variances (methods also apply to the NEDS)
- Feasibility Study of the 2005 NEDS (*intramural access only*)

SAS File Information
(intramural access only)

- Includes CD names, filenames, passwords, observation counts, number of variables, and contents for the HCUP database)

Table 4. Different Types of ED Events in the NEDS

ED Event	Value of HCUPFILE	Value of DISP_ED	Number of ED Visits	Percent of ED Visits
ED visit in which the patient is treated and released	"SEDD"	1: Routine 5: Transferred to other type of facility 6: Home health care 7: Against medical advice 99: Discharge alive, destination unknown	92,646,163	79.7
ED visit in which the patient is admitted to this same hospital	"SID"	9: Admitted as an inpatient to this hospital	17,746,340	15.3
ED visit in which the patient is transferred to another short-term hospital	"SEDD"	2: Transfer to short-term hospital	1,070,279	0.9
ED visit in which the patient died in the ED	"SEDD"	20: Died in the ED	186,793	0.2
Type of ED event unknown	"SEDD"	Missing (.) or invalid (.A)	4,641,322	4.0

Table 5. NEDS Stratifiers

Stratifier	Values
Region	1: Northeast 2: Midwest 3: South 4: West
Trauma	0: Not a trauma center 1: Trauma center (Level I, II and III 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)

Table 6. 2005 NEDS Target Universe, Sampling Frame, and Final Sample Characteristics

	Description	Number of Hospital-Based EDs	Number of ED Events
Target Universe	EDs in community, non-rehabilitation U.S. hospitals that reported total ED visits in the AHA Annual Survey Database	4,884	116,290,897
Sampling Frame	EDs in the 23 HCUP States that provide information on ED visits that result and do not result in admission	2,086	54,237,268
2005 NEDS	20% sample of target universe drawn from the sampling frame	972	27,011,634

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
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%

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
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%
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%

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
41520	38	8	3	5	3	7.9%	100.0%

Stratum:
1st digit – Region: (1) Northeast, (2) Midwest, (3) South, (4) West
2nd digit – Trauma : (1) trauma center, levels I, II, and III, (0) not a trauma center
3rd digit – Urban-rural location: (1) Large metropolitan, (2) Small metropolitan, (3) Micropolitan, (4) Non-urban residual, (5) Non-metropolitan
4th digit – Teaching: (0) Metropolitan non-teaching, (1) Metropolitan teaching, (2) Non-metropolitan teaching and non-teaching
5th 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

Appendix II: State-Specific Restrictions

The table below enumerates the types of restrictions applied to the Nationwide Emergency Department Sample. No State-specific restrictions were applied to the 2005 NEDS during construction because it is an HCUP intramural database.

Table 1. State-Specific Restrictions

Missing Discharges

The following data sources may be missing discharge records for specific populations of patients:
 	
• IA: Iowa Hospital Association
  o The Iowa Hospital Association prohibits the release of two types of discharges: HIV infections (defined by MDC of 25) and behavioral health including chemical dependency care or psychiatric care (defined by a service code of BHV). These discharges were not included in the source file provided to HCUP and were therefore not included in the NEDS.
 	
• NE: Nebraska Hospital Association
  o The Nebraska Hospital Association prohibits the release of discharge records for patients with HIV diagnoses. These discharges were not included in the source file provided to HCUP and were therefore not included in the NEDS.

Limited Reporting of External Cause of Injury Codes

The following data sources have limitations on the reporting of external cause of injury codes (E codes):
 	
• CA: Office of Statewide Health Planning and Development
  o California does not require the reporting of E codes in the range E870-E879 (medical misadventures and abnormal reactions).
 	
• GA: Georgia Hospital Association (GHA)
  o GHA removes E codes in the range E870-E879 (medical misadventures) and E930-E949 (adverse effects) from the data files supplied to HCUP.
 	
• SC: South Carolina State Budget & Control Board
  o South Carolina removes E codes in the range E870-E879 (medical misadventures and abnormal reactions) from the data files supplied to HCUP.

Appendix III: NEDS Data Elements and Codes

Table 1. Data Elements in the NEDS Core File

Data elements available only for AHRQ intramural use are indicated in italics.

Type of Data Element	HCUP Data Element	Coding Notes
Admission timing	AWEEKEND	Admission on weekend: (0) admission on Monday-Friday, (1) admission on Saturday-Sunday
	AMONTH	Admission month coded from (1) January to (12) December
	AHOUR	Admission hour coded in military time (e.g., 2:00 p.m. is represented as 1400)
Age at admission	AGE	Age in years coded 0-124 years
	AGEDAY	Age in days coded 0-365 only when the age in years is less than 1
	AGEMONTH	Age in months coded 1-131 only when the age in years is less than 11
Diagnosis information	DX1 – DX15	ICD-9-CM diagnoses
	DXCCS1 – DXCCS15	Clinical Classifications Software (CCS) category for all diagnoses
	CHRON1 – CHRON15	Chronic condition indicator for all diagnoses: (0) non-chronic condition, (1) chronic condition
	NDX	Number of diagnoses coded on the original record. A maximum of 15 codes are retained on the NEDS.
	SUICIDE	Diagnosis reported on records indicates intended self harm: (0) not intended self harm, (1) intended self harm. (Renamed INTENT_SELF_HARM in 2006.)
Discharge timing	DQTR	Coded: (1) Jan - Mar, (2) Apr - Jun, (3) Jul - Sep, (4) Oct – Dec
	DHOUR	Discharge hour coded in military time (e.g., 2:00 p.m. is represented as 1400)
	YEAR	Calendar year of ED visits
Disposition of patient from the ED	DISP_ED	Disposition from ED: (1) routine, (2) transfer to short-term hospital, (5) other transfers, including skilled nursing facility, intermediate care, and another type of facility, (6) home health care, (7) against medical advice, (9) admitted as an inpatient to this hospital, (20) died in ED, (99) discharged alive, destination unknown
	DIED_VISIT	Died in ED: (0) did not die (1) died in the ED, (2) died in the hospital
External causes of injury and poisoning	ECODE1 – ECODE4	External cause of injury and poisoning codes (ICD-9-CM).
	E_CCS1 – E_CCS4	CCS category for the external cause of injury and poisoning codes
	NECODE	Number of external cause of injury codes on the original record. A maximum of 4 codes are retained on the NEDS.

Type of Data Element	HCUP Data Element	Coding Notes
Gender of patient	FEMALE	Indicates gender: (0) male, (1) female
Urban-rural location of the patient's residence	PL_NHCS2006	Urban–rural designation for patient's county of residence: (1) large central metropolitan, (2) large fringe metropolitan, (3) medium metropolitan, (4) small metropolitan, (5) micropolitan, (6) not metropolitan or micropolitan
National quartile for median household income of patient's ZIP Code	ZIPINC_QRTL	Median household income quartiles for patient's ZIP Code. For 2005, the median income quartiles are defined as: (1) $1 - $35,999; (2) $36,000 - $44,999; (3) $45,000 - $58,999; and (4) $59,000 or more.
Race of patient	*RACE*	Race, uniform coding: (1) white, (2) black, (3) Hispanic, (4) Asian or Pacific Islander, (5) Native American, (6) other
Payer information	PAY1	Expected primary payer, uniform: (1) Medicare, (2) Medicaid, (3) private including HMO, (4) self-pay, (5) no charge, (6) other
	PAY1_X	Expected primary payer, as received from the data source
	PAY2	Expected secondary payer, uniform: (1) Medicare, (2) Medicaid, (3) private including HMO, (4) self-pay, (5) no charge, (6) other
	PAY2_X	Expected secondary payer, as received from the data source
Total ED charges	TOTCHG_ED	Total charges for ED services, edited
HCUP source file	HCUPFILE	Source of HCUP record: (SEDD) from SEDD file, (SID) from SID file
Discharge weight	DISCWT	Discharge weight used to calculate national estimates. Weights ED visits to AHA universe.
Hospital identifier, synthetic	*HOSPID*	HCUP hospital number – links to NEDS Hospital Weights file and other HCUP databases
	HOSP_ED	Unique HCUP NEDS hospital number – links to NEDS Hospital Weights file, but not to other HCUP databases
Hospital information	HOSP_REGION	Region of hospital: (1) Northeast, (2) Midwest, (3) South, (4) West
	HOSPST	State postal code for the hospital (e.g., AZ for Arizona)
	NEDS_STRATUM	Stratum used to sample hospitals, based on geographic region, trauma, location/teaching status, and control. Stratum information is also contained in the Hospital Weights file.
Record identifier, synthetic	*KEY*	Unique HCUP record number – links to NEDS Supplemental files and other HCUP databases

Type of Data Element	HCUP Data Element	Coding Notes
	KEY_ED	Unique HCUP NEDS record number – links to NEDS Supplemental files, but not to other HCUP databases

Table 2. Data Elements in the NEDS Supplemental ED File

Type of Data Element	HCUP Data Element	Coding Notes
CPT procedure information	CPT1 – CPT15	CPT/HCPCS procedures performed in the ED
	NCPT	Number of procedures coded on the original record. A maximum of 15 CPT codes are retained on the NEDS.
ICD-9-CM procedure information	PR_ED1 – PR_ED9	ICD-9-CM procedures performed in ED
	PRCCS_ED1 – PRCCS_ED9	Clinical Classifications Software (CCS) category for all ICD-9-CM procedures
	PCLASS_ED1 – PCLASS_ED9	Procedure class for all ICD-9-CM procedures: (1) Minor Diagnostic, (2) Minor Therapeutic, (3) Major Diagnostic, (4) Major Therapeutic
	NPR_ED	Number of procedures coded on the original record. A maximum of 9 ICD-9-CM procedure codes are retained on the NEDS.
HCUP source file	HCUPFILE	Source of HCUP record: (SEDD) from SEDD file, (SID) from SID file. All records in the Supplemental ED File will have HCUPFILE="SEDD".
Discharge weight	DISCWT	Discharge weight used to calculate national estimates. Weights ED visits to AHA universe.
Hospital identifier, synthetic	*HOSPID*	HCUP hospital number – links to NEDS Hospital Weights file and other HCUP databases
	HOSP_ED	Unique HCUP NEDS hospital number – links to NEDS Hospital Weights file, but not to other HCUP databases
Record identifier, synthetic	*KEY*	Unique HCUP record number – links to NEDS Supplemental files and other HCUP databases
	KEY_ED	Unique HCUP NEDS record number – links to NEDS Supplemental files, but not to other HCUP databases

Table 3. Data Elements in the NEDS Supplemental Inpatient File

Type of Data Element	HCUP Data Element	Coding Notes
Disposition of patient from the hospital	DISP_IP	Disposition from hospital admission: (1) routine, (2) transfer to short-term hospital, (5) other transfers, including skilled nursing facility, intermediate care, and another type of facility, (6) home health care, (7) against medical advice, (20) died in hospital, (99) discharged alive, destination unknown
Length of hospital inpatient stay	LOS_IP	Length of stay in the hospital, edited. Does not include time in the ED.
Total charges for inpatient stay	TOTCHG_IP	Total charges for ED and inpatient services, edited
ICD-9-CM procedure information	PR_IP1 – PR_IP9	ICD-9-CM procedures coded on ED admissions. Procedure may have been performed in the ED or during the hospital stay.
	PRCCS_IP1 – PRCCS_IP9	Clinical Classifications Software (CCS) category for all ICD-9-CM procedures
	PCLASS_IP1 – PCLASS_IP9	Procedure class for all ICD-9-CM procedures: (1) Minor Diagnostic, (2) Minor Therapeutic, (3) Major Diagnostic, (4) Major Therapeutic
	NPR_IP	Number of procedures coded on the original record. A maximum of 9 ICD-9-CM procedure codes are retained on the NEDS.
HCUP source file	HCUPFILE	Source of HCUP record: (SEDD) from SEDD file, (SID) from SID file. All records in the Supplemental Inpatient File will have HCUPFILE="SID".
Discharge weight	DISCWT	Discharge weight used to calculate national estimates. Weights ED visits to AHA universe.
Hospital identifier, synthetic	*HOSPID*	HCUP hospital number – links to NEDS Hospital Weights file and other HCUP databases
	HOSP_ED	Unique HCUP NEDS hospital number – links to NEDS Hospital Weights file, but not to other HCUP databases
Record identifier, synthetic	*KEY*	Unique HCUP record number – links to NEDS Supplemental files and other HCUP databases
	KEY_ED	Unique HCUP NEDS record number – links to NEDS Supplemental files, but not to other HCUP databases

Table 4. Data Elements in the NEDS Hospital Weights File

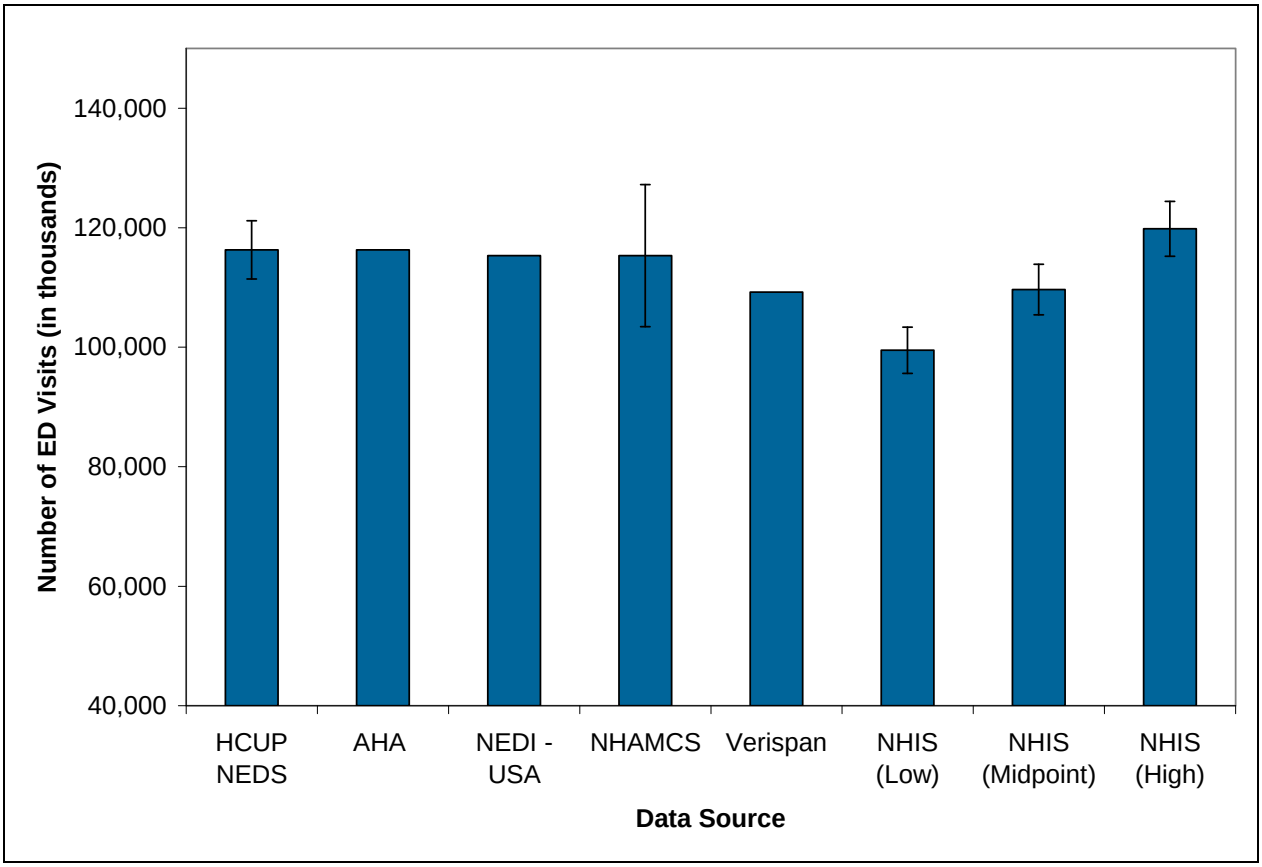
Type of Data Element	HCUP Data Element	Coding Notes
Discharge counts	N_DISC_U	Number of AHA universe ED visits in the stratum
	S_DISC_U	Number of sampled ED visits in the sampling stratum
	TOTAL_EDvisits	Total number of ED visits for this hospital in the NEDS
Discharge weights	DISCWT	Discharge weight used to calculate national estimates. Weights ED visits to AHA universe.
Discharge Year	YEAR	Discharge year
Hospital counts	N_HOSP_U	Number of AHA universe hospital-based EDs in the stratum
	S_HOSP_U	Number of sampled hospital-based EDs in the stratum
Hospital identifier	*HOSPID*	HCUP hospital number – links to NEDS Hospital Weights file and other HCUP databases
	HOSP_ED	Unique HCUP NEDS hospital number – links to NEDS Hospital Weights file, but not to other HCUP databases
	IDNUMBER	AHA hospital identifier without the leading 6
Hospital State and county	*HOSPST*	Hospital State postal code for hospital
	HOSPSTCO	Modified Federal Information Processing Standards (FIPS) State/county code
	HFIPSSTCO	Unmodified Federal Information Processing Standards (FIPS) State/county code for the hospital. Links to the Area Resource File (available from the Bureau of Health Professions, Health Resources and Services Administration)
Hospital characteristics	HL_UR_CAT4	Hospital urban-rural location: (1) large metropolitan areas with at least 1 million residents, (2) small metropolitan areas with less than 1 million residents, (3) micropolitan areas, (4) not metropolitan or micropolitan
	HOSP_CONTROL	Control/ownership of hospital: (0) government or private, collapsed category, (1) government, nonfederal, public, (2) private, non-profit, voluntary, (3) private, invest-own, (4) private, collapsed category
	HOSP_REGION	Region of hospital: (1) Northeast, (2) Midwest, (3) South, (4) West
	TRAUMA	Trauma center indicator: (1) trauma center level I, II, or III, (0) non-trauma center (Replaced by HOSP_TRAUMA in 2006)
	URBAN_TEACH	Teaching status of hospital: (0) metropolitan non-teaching, (1) metropolitan teaching, (2) non-metropolitan (Renamed HOSP_UR_TEACH in 2006.)
	NEDS_STRATUM	Stratum used to sample EDs, includes geographic region, trauma, location/teaching status, and control
Hospital weight	HOSPWT	Weight to hospital-based EDs in AHA universe (i.e., total U.S.)

Table 5. Data Elements in the NEDS Data Development File

Type of Data Element	HCUP Data Element	Coding Notes
Dates	ADATE	Admission date
	DDATE	Discharge date
	DOB	Date of birth
Patient ZIP Code	ZIP	ZIP Code of patient's residence
Median household annual income	MEDINC	Median household annual income for patient's ZIP Code
HCUP source file	HCUPFILE	Source of HCUP record: (SEDD) from SEDD file, (SID) from SID file
Discharge weight	DISCWT	Discharge weight used to calculate national estimates. Weights ED visits to AHA universe.
Hospital identifier, synthetic	HOSPID	HCUP hospital number – links to NEDS Hospital Weights file and other HCUP databases
	HOSP_ED	Unique HCUP NEDS hospital number – links to NEDS Hospital Weights file, but not to other HCUP databases
Record identifier, synthetic	KEY	Unique HCUP record number – links to NEDS Supplemental files and other HCUP databases
	KEY_ED	Unique HCUP NEDS record number – links to NEDS Supplemental files, but not to other HCUP databases

Appendix IV: Comparisons of the NEDS with Existing Sources of ED Data

Figure 1. Emergency Department Visit Counts (in thousands) in the United States, 2005



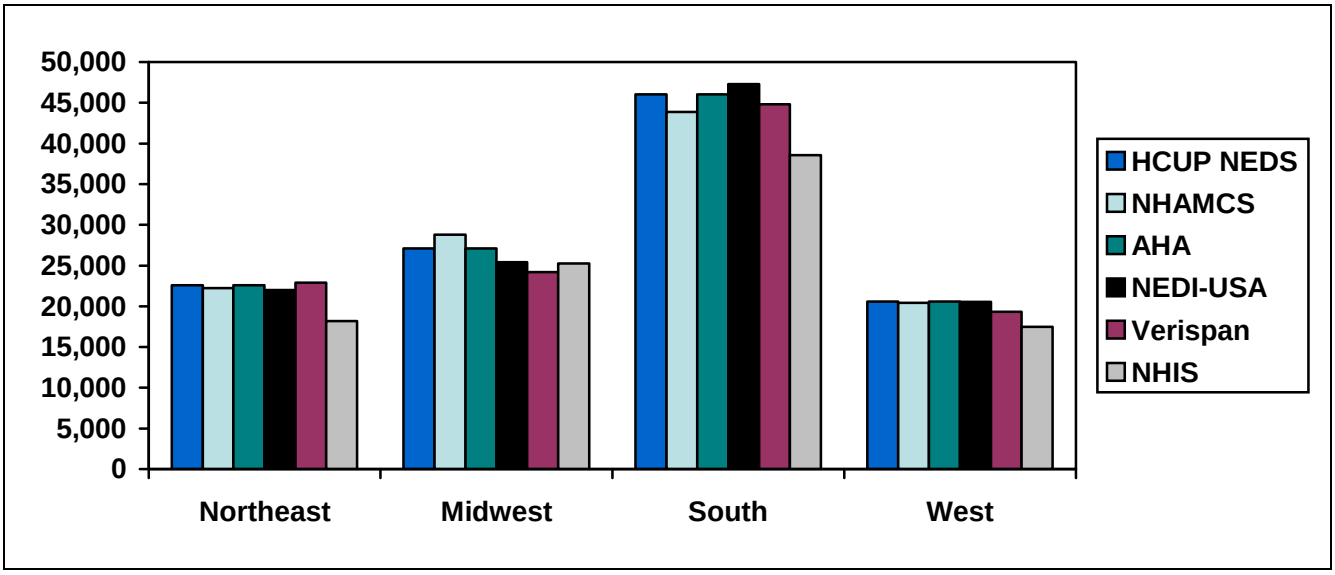
Note: Error bars represent 95% confidence intervals. The NHIS survey question regarding the number of ED visits in the past year uses the following ranges: 1, 2-3, 4-5, 6-7, 8-9, 10-12, 13-15, and 16 or more. NHIS (Low) is the estimate of ED visits using the lowest value in the category range of the 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.

Table 1. Estimates of U.S. Emergency Department Visits from Six ED Data Sources, 2005

ED Data Source	Total number of ED visits			
	N	SE	95% CI	
HCUP NEDS	116,290,897	2,487,527	111,408,919	121,172,875
AHA	116,290,897			
NEDI-USA	115,308,512			
NHAMCS	115,322,815	6,075,004	103,338,882	127,306,748
Verispan	109,217,084			
NHIS (Low Estimate)	99,495,469	1,969,148	95,635,939	103,354,999
NHIS (Midpoint Estimate)	109,654,116	2,153,377	105,433,497	113,874,735
NHIS (High Estimate)	119,812,763	2,347,146	115,212,356	124,413,170

Standard errors (SE) and 95% confidence interval (95% CI) are provided for sample databases.

Figure 2. Emergency Department Visit Counts (in thousands) by Census Region, 2005



Note: The NHIS estimates use the lowest value in the category range of the survey question.

Table 2. Estimates of U.S. Emergency Department Visits by Region and Type of Visit from Two ED Data Sources, 2005

	HCUP NEDS			NHAMCS		
Geographic Area	**N**	**SE**	**%**	**N**	**SE**	**%**
Nation						
Total number of ED visits	116,290,897	2,487,527	100.0	115,322,815	6,075,004	100.0
Number of ED visits that are treat and release	98,544,557	2,134,739	84.7	101,455,480	5,486,156	88.0
Number of ED visits that result in admission	17,746,340	445,892	15.3	13,867,335	945,899	12.0
Northeast						
Total number of ED visits	22,589,550	992,620	19.4	22,245,302	1,873,121	19.3
Number of ED visits that are treat and release	18,906,272	852,424	83.7	18,800,436	1,603,137	84.5
Number of ED visits that result in admission	3,683,278	182,508	16.3	3,444,866	414,485	15.5
Midwest						
Total number of ED visits	27,085,103	1,369,301	23.3	28,770,693	3,567,342	24.9
Number of ED visits that are treat and release	23,274,102	1,219,515	85.9	24,857,090	3,165,447	86.4
Number of ED visits that result in admission	3,811,001	198,214	14.1	3,913,603	559,192	13.6
South						
Total number of ED visits	46,032,225	1,643,650	39.6	43,870,735	4,080,386	38.0
Number of ED visits that are treat and release	38,972,166	1,375,677	84.7	39,686,194	3,770,977	90.5
Number of ED visits that result in admission	7,060,059	323,859	15.3	4,184,541	548,285	9.5
West						
Total number of ED visits	20,584,019	791,155	17.7	20,436,085	2,239,654	17.7
Number of ED visits that are treat and release	17,392,018	671,400	84.5	18,111,760	1,987,750	88.6
Number of ED visits that result in admission	3,192,001	146,072	15.5	2,324,325	376,926	11.4

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

Table 3. Estimates of U.S. Emergency Department Visits by Patient Characteristics from Two ED Data Sources, 2005

	HCUP NEDS				NHAMCS			
Patient Characteristics	N	SE	% 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	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	28,915,034	2,347,830	25.1	25.1
18-44	46,744,390	1,098,907	40.2	40.2	47,495,929	2,568,413	41.2	41.2
45-64	23,516,418	506,789	20.2	20.2	22,181,714	1,108,465	19.2	19.2
65+	19,483,314	455,422	16.8	16.8	16,730,138	839,919	14.5	14.5
Missing	4,855	637	-	0.0	-	-	-	-
Gender								
Female	62,714,860	1,354,909	53.9	53.9	62,109,376	3,383,729	53.9	53.9
Male	53,566,542	1,150,660	46.1	46.1	53,213,439	2,746,852	46.1	46.1
Missing	9,495	1,868	-	0.0	-	-	-	-
Expected Primary Payer / Insurance Coverage								
Medicare	23,224,751	525,338	20.1	20.0	16,043,343	922,492	14.9	13.9
Private	41,182,182	1,077,823	35.6	35.4	39,564,974	2,242,828	36.7	34.3
Medicaid/ Other Public	26,391,473	827,656	22.8	22.7	28,661,232	2,091,054	26.6	24.9
Self Pay / No Charge / Uninsured	19,205,057	602,135	16.6	16.5	19,465,974	1,540,725	18.1	16.9
Other	5,705,699	203,787	4.9	4.9	4,125,082	396,525	3.8	3.6
Missing	581,735	145,449	-	0.5	7,462,210	1,298,806	-	6.5
Location of Patient Residence								
Large Metropolitan	55,862,599	1,792,766	48.4	48.0	-	-	-	-
Small Metropolitan	36,299,506	1,315,582	31.4	31.2	-	-	-	-
Micropolitan	13,674,411	665,412	11.8	11.8	-	-	-	-
Non-Urban Residual	9,584,594	407,280	8.3	8.2	-	-	-	-
Missing	869,786	96,431	-	0.7	-	-	-	-
National Quartile of Median Household income of Patient's ZIP Code								
First Quartile (lowest income)	33,342,906	1,284,842	29.4	28.7	-	-	-	-
Second Quartile	31,563,260	1,118,244	27.9	27.1	-	-	-	-
Third Quartile	26,915,503	959,752	23.8	23.1	-	-	-	-
Fourth Quartile (highest income)	21,506,352	1,001,799	19.0	18.5	-	-	-	-
Missing	2,962,877	138,726	-	2.5	-	-	-	-

Note: Counts by location of patient residence and by national income quartile were not available from the NHAMCS.

Table 4. Estimates of the Number U.S. Emergency Departments from Four ED Data Sources, 2005

ED Facilities	HCUP NEDS		AHA		NEDI		NHAMCS	
	N	%	N	%	N	%	N	%
Total number of ED facilities	4,884	100.0	4,884	100.0	4,828	100.0	4,594	100.0
By ED Volume								
Less than 10,000 visits	1,366	28.0	1,797	36.8	1,540	31.9	-	-
10,000 - 19,999 visits	994	20.4	936	19.2	1,051	21.8	-	-
20,000 - 29,999 visits	787	16.1	662	13.6	762	15.8	-	-
30,000 - 39,999 visits	626	12.8	523	10.7	578	12.0	-	-
40,000 - 49,999 visits	452	9.3	357	7.3	377	7.8	-	-
50,000 or more visits	658	13.5	609	12.5	520	10.8	-	-

Note: Counts on ED facilities by size are not available from the NHAMCS.

Table 5. Estimates of U.S. Emergency Department Visits by Hospital Characteristics from Three ED Data Sources, 2005

Hospital Characteristics	HCUP NEDS			AHA		NHAMCS		
	N	SE	%	N	%	N	SE	%
Total number of ED visits	116,290,897	2,487,527	100.0	116,290,897	100.0	115,322,815	6,075,004	100
Trauma Designation[a]								
Trauma center	34,633,565	1,460,895	29.8	34,633,565	29.8	42,606,000	4,407,000	36.9
Non-trauma center	81,657,332	2,013,350	70.2	81,657,332	70.2	71,292,000	4,744,000	63.1
Location of Hospital								
Large Metropolitan	56,152,729	1,901,111	48.3	56,152,729	48.3	-	-	-
Small Metropolitan	37,873,145	1,400,316	32.6	37,873,145	32.6	-	-	-
Micropolitan	14,209,320	793,567	12.2	14,593,984	12.6	-	-	-
Non-Core	8,055,703	411,812	6.9	7,671,039	6.6	-	-	-
Metropolitan Service Area (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

[a]The definition of a trauma center may vary slightly between the HCUP NEDS, AHA, and NHAMCS.

Table 6. Estimates of U.S. Emergency Department Visits by Common Reason from Two ED Data Sources, 2005

	HCUP - NEDS				NHAMCS			
	N	SE	Rank	%	N	SE	Rank	%
Average number of diagnoses reported	2.92	0.03	-	-	1.52	0.02	-	-
Maximum number of diagnoses reported	15	-	-	-	3	-	-	-
Top 25 All-listed Diagnoses by Clinical Classification System (CCS)								
98 : Essential hypertension	15,655,180	410,227	1	13.5	2,383,138	225,917	24	2.07
239 : Superficial injury; contusion	9,075,739	192,851	2	7.8	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	396,325	71,107	83	0.34
126 : Other upper respiratory infections	8,146,616	241,558	4	7.0	7,688,700	587,817	3	6.67
232 : Sprains and strains	7,353,315	173,272	5	6.3	7,728,038	492,479	2	6.70
49 : Diabetes mellitus without complication	6,934,256	179,736	6	6.0	1,189,605	129,416	41	1.03
251 : Abdominal pain	6,551,264	171,978	7	5.6	5,712,824	424,866	4	4.95
55 : Fluid and electrolyte disorders	6,385,127	151,210	8	5.5	2,649,672	207,735	20	2.30
259 : Residual codes; unclassified	6,319,217	220,669	9	5.4	3,902,236	280,396	8	3.38
101 : Coronary atherosclerosis and other heart disease	6,091,249	175,211	10	5.2	855,387	88,030	55	0.74
205 : Spondylosis; intervertebral disc disorders; other back problems	5,766,482	143,011	11	5.0	3,691,222	208,395	10	3.20
127 : Chronic obstructive pulmonary disease and bronchiectasis	5,562,898	143,080	12	4.8	2,827,513	228,311	18	2.45
133 : Other lower respiratory disease	5,467,165	174,287	13	4.7	3,372,686	262,001	13	2.92
159 : Urinary tract infections	5,282,940	121,198	14	4.5	3,777,324	250,733	9	3.28
128 : Asthma	5,190,348	161,665	15	4.5	2,660,940	209,852	19	2.31
106 : Cardiac dysrhythmias	5,192,826	139,544	16	4.5	1,472,798	120,657	34	1.28
102 : Nonspecific chest pain	5,072,164	144,143	17	4.4	4,413,764	310,441	5	3.83
53 : Disorders of lipid metabolism	4,799,530	155,994	18	4.1	131,536	31,202	137	0.11
211 : Other connective tissue disease	4,835,283	134,051	19	4.2	2,848,534	197,386	17	2.47
257 : Other aftercare	4,681,291	177,330	20	4.0	2,387,472	209,749	23	2.07
84 : Headache; including migraine	4,593,753	111,688	21	4.0	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	4,402,210	315,505	6	3.82
155 : Other gastrointestinal disorders	4,428,325	111,073	23	3.8	2,425,271	198,415	22	2.10
657 : Mood disorders	4,339,276	134,658	24	3.7	1,551,607	142,953	33	1.35
236 : Open wounds of extremities	4,241,474	91,516	25	3.6	3,398,712	203,208	12	2.95
Top Five All-Listed External Cause of Injury Codes[a]								
2603 : Fall	7,854,489	183,757	1	6.8	8,969,960	529,079	1	7.78
2614 : Struck by; against	4,239,317	104,464	2	3.6	4,590,842	293,236	2	3.98
2607 : Motor vehicle traffic (MVT)	3,475,039	89,070	3	3.0	4,237,986	278,084	3	3.67
2612 : Overexertion	2,686,475	72,386	4	2.3	1,910,282	136,653	6	1.66
2601 : Cut/pierce	2,666,451	63,381	5	2.3	2,887,235	190,841	4	2.50

[a] **Excluding place of occurrence E-codes**

Table 7. Estimates of U.S. Emergency Department Visits for Injuries from Three ED Data Sources, 2005

	HCUP - NEDS			NHAMCS			NEISS[a]		
Type of Injury	**N**	**SE**	**%**	**N**	**SE**	**%**	**N[a]**	**SE**	**%[a]**
Total number of injury-related ED visits	30,063,261	626,477	25.9	29,948,345	1,574,485	26.0	29,258,834	1,687,785	-
Unintentional Injuries - Total	26,271,677	565,141	87.4	23,653,097	1,213,492	79.0	27,156,734	1,652,396	92.8%
Falls	7,443,350	173,886	28.3	7,586,620	463,137	32.1	7,938,467	530,563	29.2%
Struck by/against	3,478,657	89,243	13.2	3,077,593	205,530	13.0	4,336,688	310,667	16.0%
Motor Vehicle Traffic	3,116,036	78,596	11.9	3,391,074	234,638	14.3	4,369,745	341,846	16.1%
Cut/Pierce	2,451,752	59,060	9.3	2,446,009	171,163	10.3	2,236,861	160,156	8.2%
Other Mechanism	15,326,972	433,290	58.3	12,793,502	652,482	54.1	7,596,006		28.0%
Mechanism Unspecified	1,535,789	55,629	5.8	33,096	10,602	0.14	678,967	77,680	2.5%
Intentional Injuries - Total	1,583,222	48,933	5.3	1,824,685	156,784	6.1	2,102,099	150,376	7.2%
Assault	1,127,649	38,789	71.2	1,476,280	132,693	80.9	1,660,775	139,007	79.0%
Self-Inflicted	409,902	12,883	25.9	319,336	48,799	17.5	372,722	34,551	17.7%
Other causes of violence	47,435	3,101	3.0	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	4,423,446	422,367	14.8			

[a] NEISS 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.