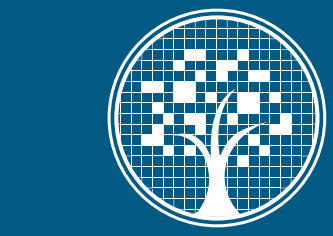

HEALTHCARE COST AND UTILIZATION PROJECT

HCUP Methods Series

2003 HCUP Kids' Inpatient Database (KID) Comparison Report

Report # 2006-03

Agency for Healthcare Research and Quality

U.S. Department of Health and Human Services
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Recommended Citation: Whalen D, Houchens R, Elixhauser A. *2003 HCUP Kids' Inpatient Database (KID) Comparison Report*. HCUP Methods Series Report # 2006-03 Online. June 23, 2006. U.S. Agency for Healthcare Research and Quality. Available:http://www.hcup-us.ahrq.gov/reports/methods.jsp

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

EXECUTIVE SUMMARY

This report compares estimates calculated from the 2003 Kids' Inpatient Database (KID) with statistics from two comparable databases – The Nationwide Inpatient Sample (NIS) and the National Hospital Discharge Survey (NHDS) – with the objective of assessing potential biases. In addition, KID statistics were contrasted with summary information from the American Hospital Association (AHA). This report focuses on important measures of inpatient hospital stays, including: total discharges, lengths of stay, in-hospital mortality rates, and average hospital charges. In addition to comparisons with national statistics, these data were also evaluated across several categories, including region, expected payer, hospital characteristics, patient demographics, diagnosis groupings, and procedure groupings.

KID Background

The 2003 KID was established as part of the Healthcare Cost and Utilization Project (HCUP) to provide data supporting analyses of pediatric hospitalizations across the United States. KID data for 2003 were sampled from most hospitals in the frame of 36 HCUP Partner states. As a result, the KID includes approximately 3 million discharges from 3,438 hospitals, with weights to facilitate national estimates. One of the most distinctive features of the KID is that its large sample size allows for the study of relatively uncommon disorders, procedures, and hospital types; in fact, KID estimates can be calculated for any number of special sub-populations. In addition, the KID contains information on hospital charges and includes all payers. The KID includes records for pediatric discharges up to age 20 years from all hospitals in HCUP with any pediatric discharges (subject to state-specific restrictions described later).

NIS Background

Like the KID, the 2003 NIS is part of HCUP. While the KID is a sample of discharges from any HCUP hospital with pediatric cases, NIS data were selected from a stratified probability sample of hospitals, drawn from a frame of 37 states, with sampling probabilities calculated to select 20 percent of the universe in each stratum defined by hospital characteristics (region, urban/rural location, number of beds, teaching status, and ownership/control). As a result, the NIS includes approximately 7.8 million discharges from 994 hospitals, with weights to facilitate national estimates. The pediatric portion of the NIS includes 1.4 million discharges. As with the KID, the large NIS sample allows for the study of relatively uncommon disorders and procedures. The NIS also contains information on hospital charges and includes all payers.

NHDS Background

In 2003, the National Center for Health Statistics drew a sample of more than 327,000 short-stay discharges from 445 hospitals, including both general and children's hospitals, for the NHDS data set. The pediatric portion of this data includes 73,038 discharges. Statistics from the NHDS are considered geographically representative because the NHDS sampling frame was relatively unrestricted. It is important to note that NHDS and KID data differed in scope: NHDS data are drawn from all 50 states plus the District of Columbia, while the KID sample is drawn from 36 states.

Methods

Statistics compared in the KID, NIS, and NHDS databases included:

- Total number of discharges
- Average length of stay
- In-hospital mortality rates
- Average total charges (KID and NIS only).

These measures of utilization and outcomes were selected because they are common in health services research and serve important roles in health policy and resource planning analyses.

All three of these databases are samples, and statistics derived from them are estimates. Therefore, comparisons with NIS and NHDS estimates utilized two-sample *t*-tests. Estimates cannot be expected to be identical when two different samples are drawn. When viewing results, readers should note that statistically significant differences between the KID and both the NIS and the NHDS can be expected for a number of reasons. These include:

- Random variation between the two samples
- Differences in sampling strategies
- The NHDS practice of reordering some diagnosis codes
- The sheer volume of tests conducted.

Considering all of these possible reasons for significant differences among the samples, data analyses revealed remarkable similarity among the estimates.

Major Findings

KID estimates of essential health care policy variables (i.e., in-hospital mortality, inpatient population size, length of stay, and charges) were accurate and precise. The estimates were drawn from states that encompass nearly 80 percent of all short-stay hospitals, nearly 85 percent of discharges in the United States, and nearly 87 percent of the U.S. population.

KID hospitals resembled typical hospitals in the AHA universe in terms of bed size and most other characteristics, although KID hospitals admit and discharge more patients than hospitals in the AHA universe. Along with the higher level of activity, staffing rates and expenditures at KID facilities were generally higher than in AHA hospitals. In addition, KID hospitals tended to provide more technical and sophisticated services than non-KID hospitals.

Key findings from this comparative analysis include:

- KID estimates of discharge count, average length of stay, in-hospital mortality rate, and average total charge measures were statistically consistent with NIS estimates.
- Overall and regional estimates of discharges and average length of stay were consistent between the KID and the NHDS.

- KID estimates of average length of stay were generally similar to NHDS estimates, although comparisons were not possible for two-thirds of the categories: it was not possible to calculate standard errors for many of the NHDS statistics because of small NHDS sample sizes.
- KID in-hospital mortality rate estimates differed significantly from NHDS statistics for most hospital categories; the KID estimates were usually smaller.
- Estimates of discharges from the KID were significantly different from NHDS numbers for most patient categories; the KID estimate was usually smaller. In one category, age group, no KID-NHDS agreement was found.

Conclusions

Each data source possesses distinct strengths and weaknesses and may be regarded as the optimum choice for answering different research questions. In general, KID estimates of essential health care policy variables are accurate and precise. The KID offers a large sample of pediatric discharges that might allow for the study of disorders, procedures, and hospital types that occur with low frequency in other databases. KID estimates can be calculated for thousands of special sub-populations that may be of interest to researchers.

The NHDS sample was drawn from all 50 states, while only 36 states were included in the KID and 37 states in the NIS. However, for 2003, KID states encompassed nearly 87 percent of the U.S. population and nearly 85 percent of all discharges in the United States. The KID contains charges for each hospital stay, all payers, and a large sample of discharges. In contrast, the NHDS has a smaller number of discharges, does not contain charges, but does sample from all 50 states. Thus, the appropriateness of each of these databases is dependent on researcher needs and institutional priorities.

In sum, the KID appears to provide reliable national estimates when compared with these other national data sources along the dimensions examined in this report.

INTRODUCTION

This report compares statistics estimated from the Kids' Inpatient Database (KID), which contains pediatric discharges from a sample of hospital discharges in the year 2003, with estimates from two other data sources. These comparisons will interest researchers who wish to make inferences about pediatric hospital outcomes using the 2003 KID. This is the second KID comparison document; the first report analyzed the 1997 release of the KID. This 2003 version represents the third KID database. Previous KID releases occurred in 1997 and 2000, with discharges sampled from 22 and 27 states, respectively.

KID coverage of United States discharges is extensive. States included in the 2003 release represent nearly 80 percent of United States community hospitals, nearly 65 percent of children's hospitals, and nearly 87 percent of the U.S. population during 2003. By region, the percentage of hospitals included in the sampling frame is highest in the Midwest (89.0%) and in the West (78.0%), while figures are lower for the Northeast (63.9%) and the South (56.9%).

There is a possibility that hospital outcomes from states in the KID sampling frame may differ from hospital outcomes in the states not represented in the KID. This report is designed to explore the representativeness of the KID in relation to the universe of hospital care in the United States.

Created as a part of the Healthcare Cost and Utilization Project (HCUP) and funded by the Agency for Healthcare Research and Quality (AHRQ), the KID target universe is all pediatric discharges from community, non-rehabilitation hospitals located in the U.S. Community hospitals are short-term, acute care, non-Federal hospitals; they exclude hospital units of other institutions (such as prisons) but include specialty hospitals. The KID sampling frame was constructed from the subset of universe hospitals that released their data to HCUP for research use. AHRQ obtained agreements with 36 HCUP Partner organizations to include their data in the 2003 KID.

The KID sample was drawn from all hospitals within the sample frame using a systematic random sample. Sampling rates encompassed

- 10 percent of uncomplicated in-hospital births
- 80 percent of complicated in-hospital births
- 80 percent of other pediatric discharges.

The final 2003 sample contained 2,984,129 discharges from 3,438 hospitals. For this report, we compare this sample with outcomes from two other hospital discharge databases: 1) the 2003 Nationwide Inpatient Sample (NIS), and 2) the 2003 National Hospital Discharge Survey (NHDS).

The NIS is the principal HCUP database, used for producing national estimates. The NIS contains all discharges from a sample of community, non-rehabilitation, short-stay hospitals stratified by geographic region, urban vs. rural characteristics, teaching status, bed size, and type of ownership. The 2003 NIS contained 7,977,728 discharges from 994 hospitals. For this report, 1.4 million pediatric discharges were extracted from the NIS.

The 2003 NHDS was created under the auspices of the National Center for Health Statistics (NCHS). In comparison with the KID and the NIS, the NHDS features a much smaller sample containing only 327,254 discharges from 445 hospitals (pediatric

discharges made up 73,038 sample records). However, this sample was drawn from a frame that included nearly all hospitals in each of the 50 states, ensuring geographic representativeness for this sample. The NHDS is a two-stage sample. The first stage samples non-Federal short-stay hospitals in the United States, while the second stage samples discharges from each of the sampled hospitals. Although the smaller sample size rendered NHDS estimates less precise than either KID or NIS estimates, the complete coverage of states and the NHDS sampling design should minimize the potential bias for national estimates of hospital outcomes. This characteristic is the reason the NHDS was used as a comparative database in this study.

We compared estimates from the 2003 KID with estimates from the 2003 NIS and the 2003 NHDS on the following inpatient outcomes:

- Total discharge counts
- Average length of stay (ALOS)
- Inpatient mortality rate
- Average total charges (only NIS comparisons).

While many other statistics can be estimated from these data, much research on hospital utilization commonly focuses on these four outcomes. To the extent that the KID generates reasonable estimates for these measures, it is likely that estimates for other, similar outcomes will also be reasonable.

Statistics from the three data sources were compared at the national level, as well as within hospital groups and patient categories. We grouped hospitals and made evaluations by geographic region, bed size, ownership, urban vs. rural location, and teaching status. We also categorized patients and made comparisons within age group, gender, race, primary payer, diagnosis category, and procedure category.

In addition, we compared frequencies between the 2003 KID sample and the 2003 American Hospital Association (AHA) Annual Survey Database. Because KID weights are based on the AHA Survey, there was close agreement between the two sources.

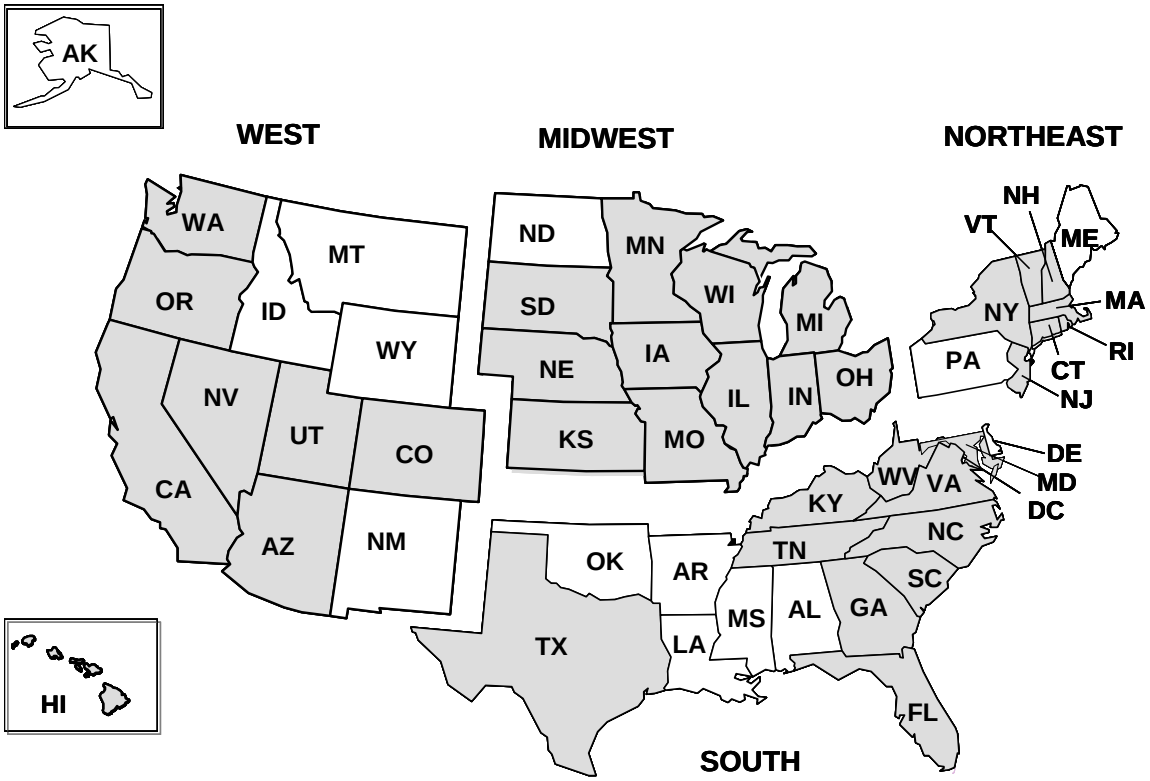
This report is divided into four sections. The first section describes characteristics of the KID, including the sampling frame, database design, and weights. The second section provides a discussion of the NIS, the NHDS, and the methodology used in the analysis. The third section presents the results, and the final section includes a discussion and posits several conclusions.

BACKGROUND INFORMATION ON HCUP AND THE KID DATABASE

HCUP is a Federal-State-Industry partnership formed to build a standardized, multi-state health data system. The 2003 KID was established as part of HCUP to provide analyses of pediatric hospital discharges across the United States.

The overall design objective was to select a sample of pediatric discharges that accurately represents the target universe of U.S. community, non-rehabilitation hospitals. The 2003 KID universe included all acute-care, pediatric discharges from all community, non-rehabilitation hospitals in the United States. The KID sampling frame, however, was constructed from the subset of universe hospitals that released discharge data for research use: HCUP Partner states that agreed to include data in the KID. For the 2003 KID, AHRQ obtained agreements from 36 HCUP State Partners to participate. This participation reflects an increase of 14 more states than the first release for 1997 and 9 more states than the second release of the KID for 2000. These 36 states represent nearly 85 percent of discharges from community hospitals and nearly 87 percent of the U.S. population. Figure 1 depicts the 36 states participating in the most recent KID. Acute-care, pediatric discharges from all hospitals in the frame were sampled for this database.

Figure 1. States Participating in the KID, 2003



For most of the 36 states, all community, non-rehabilitation hospitals were included in the sampling frame. Exceptions include Texas, Minnesota, and Michigan.

- Texas supplied data from only 73 percent of the state's hospitals (303 of 414) because some Texas hospitals, mostly small rural facilities, are exempt from statutory reporting requirements. Exempt hospitals include rural hospitals and those that do not seek insurance payment or government reimbursement.
- Minnesota supplied data to HCUP from only 88 percent of the state's hospitals because 15 Minnesota hospitals do not participate in the project.
- Thirty-two Michigan hospitals were omitted from the sampling frame because they did not report total charges; this left 68 percent of Michigan hospitals in the frame.

The KID sampling frame was subject to further restrictions. Some states excluded specific hospitals in order to protect the confidentiality of hospitals, as described below:

- Connecticut Children's Medical Center, the only stand-alone community, non-rehabilitation children's hospital in Connecticut, was dropped from the KID.
- All stand-alone children's hospitals in Georgia, as defined by the American Hospital Association (AHA) or the National Association of Children's Hospitals and Related Institutions (NACHRI), were excluded.
- Nebraska Children's Hospital and the Boys Town National Research Hospital, the two stand-alone children's hospitals were dropped from the KID.
- Three Ohio hospitals that prohibited disclosure were excluded from the KID sampling frame.
- South Carolina excluded two hospitals from the sampling frame: Greenville Memorial Hospital and Providence Hospital.

Further restrictions limited the percentage of state hospitals in the sampling frame:

- Georgia allowed no more than 60 percent of the state's hospitals, so 43 randomly-chosen Georgia hospitals were omitted from the sampling frame.
- Virginia allowed no more than 50 percent of the state's hospitals, so 35 randomly-chosen Virginia hospitals were omitted from the sampling frame.

Several states stipulated that only hospitals appearing in sampling strata with two or more hospitals from the state were to be included in the KID. When any combination of KID sampling strata contained only one state hospital within the set of hospitals supplied to HCUP, that hospital was dropped from the KID sampling frame. This limitation applies to the following states:

- Georgia, where one additional hospital was excluded
- Hawaii, where four hospitals were excluded
- Indiana, where one hospital was excluded
- Michigan, where one hospital was excluded
- Nebraska, where an additional three hospitals were excluded
- South Carolina, where five additional hospitals were excluded

- South Dakota, where two hospitals were excluded.

KID Design

The KID is a nationwide sample of pediatric discharges from HCUP State Inpatient Databases (SID). It includes discharges sampled from community, non-rehabilitation hospitals weighted to all pediatric discharges in the target universe. This target universe includes all pediatric discharges from community, non-rehabilitation hospitals in the United States that were open during any part of the calendar year.

The overall design objective was to select a sample of pediatric discharges that accurately represents the target universe. Discharges outside the frame were sampled with zero probability of selection. Moreover, this sample is geographically dispersed, yet drawn exclusively from data supplied by HCUP State Partners.

KID Sampling

Unlike the HCUP Nationwide Inpatient Sample (NIS), which includes all discharges from a sample of hospitals, the KID includes a sample of pediatric discharges (age 20 and younger) from all hospitals in the sampling frame. For the sampling, pediatric discharges were stratified by: 1) uncomplicated in-hospital birth, 2) complicated in-hospital birth, and 3) all other pediatric cases. To further ensure an accurate representation of each hospital's pediatric case-mix, the discharges were sorted by state, hospital, DRG, and a random number within each DRG. We then used systematic random sampling to select 10 percent of uncomplicated in-hospital births and 80 percent of complicated in-hospital births and other pediatric cases from each frame hospital.

KID Weights

To obtain national estimates, discharge weights were developed using the AHA universe as the standard. For these weights, hospitals were post-stratified on six characteristics contained in the AHA hospital files. These consisted of the five characteristics used to define the NIS sampling strata, plus an additional stratum for freestanding children's hospitals. Hospital stratification variables were defined as follows:

1. Geographic Region: Northeast, Midwest, West, and South.
2. Control: public, private not-for-profit, and proprietary (private or investor-owned).
3. Location: urban or rural.
4. Teaching Status: teaching or non-teaching. Rural hospitals were not separately categorized according to teaching status, because rural teaching hospitals were rare.
5. Bed Size: small, medium, and large. Bed size categories were based on hospital beds and were specific to the hospital's location and teaching status, as shown in Table 1. Bed size cut points were chosen so that approximately one-third of the hospitals in a given region/location/teaching combination would appear in each bed size category. This approach creates different divisions – small, medium, and large – for rural, urban non-teaching, and urban teaching hospitals. For example, a medium-sized urban, teaching hospital would be considered a rather large rural hospital. Further, the size distribution was different among regions for each of the urban/teaching categories. Using differing cut points in this manner avoids strata containing small numbers of hospitals.

6. Hospital Type: children's or other hospital, as defined by the National Association of Children's Hospitals and Related Institutions (NACHRI).

Table 1. Bed Size Categories

Location and Teaching Status	Hospital Bed Size		
	Small	Medium	Large
Northeast			
Rural	1-49	50-99	100+
Urban, non-teaching	1-124	125-199	200+
Urban, teaching	1-249	250-424	425+
Midwest			
Rural	1-29	30-49	50+
Urban, non-teaching	1-74	75-174	175+
Urban, teaching	1-249	250-374	375+
South			
Rural	1-39	40-74	75+
Urban, non-teaching	1-99	100-199	200+
Urban, teaching	1-249	250-449	450+
West			
Rural	1-24	25-44	45+
Urban, non-teaching	1-99	100-174	175+
Urban, teaching	1-199	200-324	325+

If there were fewer than two frame hospitals, 30 uncomplicated births, 30 complicated births, and 30 non-birth pediatric discharges sampled in a stratum, we merged that stratum with an "adjacent" stratum containing hospitals with similar characteristics. We created the discharge weights by stratum in proportion to AHA statistics for newborns and non-newborns. For more information, please refer to *Design of the HCUP Kids' Inpatient Database (KID), 2003*.[1]

[1] http://hcup-us.ahrq.gov/db/nation/kid/reports/KID_2003_Design_Edited_013006.pdf

METHODS

Statistics from the KID were compared with statistics from three other sources, each of which is described below.

American Hospital Association (AHA) Annual Survey Database

This hospital-level file contains one record for every hospital in the NIS universe, making it a convenient source for calculating various statistics based on both the population of hospitals and the NIS sample of hospitals. Data are self-reported by hospitals; the file contains hospital-level statistics for hospital reporting periods, which do not necessarily correspond to the calendar year.

For 2003, the survey included records for 4,836 community, non-rehabilitation hospitals. The AHA Survey data report discharges and inpatient days (overall, Medicare, and Medicaid), as well as hospital information such as bed counts, employment, and payroll. In addition, hospitals indicate specific services offered.

Nationwide Inpatient Sample (NIS) Data

The NIS is a stratified probability sample of hospitals, with sampling probabilities calculated to select 20 percent of the universe discharges contained in each stratum. The 2003 NIS universe included all acute-care discharges from all community, non-rehabilitation hospitals in the United States. The NIS sample featured all discharges from a sample of hospitals in this target universe. However, the NIS sampling frame was constructed from the subset of universe hospitals that released discharge data for research use. For the 2003 NIS, AHRQ had agreements with 37 Partner organizations that maintain statewide, all-payer discharge data files.

The overall sampling objective was to select a sample of hospitals that could be generalized to the target universe, including hospitals outside the frame (which had a zero probability of selection). To improve the generalizability of the NIS estimates, five hospital sampling strata were created:

1. Geographic Region – Midwest, Northeast, West, and South.
2. Ownership – public, private non-profit, and proprietary (private or investor-owned).
3. Location – urban and rural.
4. Teaching Status – teaching and non-teaching. (Rural hospitals were not separately categorized according to teaching status, because rural teaching hospitals were rare.)
5. Bed Size – small, medium, and large. Bed size categories were based on hospital beds and were specific to the hospital's location and teaching status, as shown in Table 1. Bed size cut points were chosen so that approximately one-third of the hospitals in a given region/location/teaching combination would appear in each bed size category. This approach creates different divisions – small, medium, and large – for rural, urban non-teaching, and urban teaching hospitals. For example, a medium-sized urban, teaching hospital would be considered a rather large rural hospital. Further, the size distribution was different among regions for each of the urban/teaching categories. Using differing cut points in this manner avoids strata containing small numbers of hospitals.

To further improve proportional geographic representation, hospitals were sorted by state and by the first three digits of their ZIP Code prior to systematic sampling. Refer to *Design of the Nationwide Inpatient Sample (NIS), 2003*[2] for more details on the sampling design.

The 2003 NIS included 7,977,728 discharges. For comparisons to the KID, discharges were limited to patients with an age of 20 years or younger. This resulted in 1,411,918 NIS discharges for children, infants, and newborns**.** Table 2 compares the KID, NIS, and NHDS samples.

National Hospital Discharge Survey (NHDS) Data

Conducted by the National Center for Health Statistics (NCHS), the 2003 NHDS included 327,254 discharges from 445 hospitals. The NHDS covered discharges from United States hospitals categorized as short-stay (hospitals with an average length of stay under 30 days), including both general (medical or surgical) and children's hospitals. Federal, military, and Veteran's Affairs hospitals were excluded from the survey.

The NHDS sample included with certainty the largest hospitals: those with at least 1,000 beds, or at least 40,000 discharges per year. The remaining sample of hospitals was based on a stratified, three-stage design:

1. The first stage involved selecting 112 primary-sampling units (PSUs) that comprised a probability sub-sample of PSUs utilized in the 1985-1994 National Health Interview Survey.
2. The second stage consisted of selecting non-certainty hospitals from the sampled PSUs. Electronic (purchased) data were available for approximately 40 percent of these hospitals.
3. During the third and final stage, a sample of discharges was selected by systematic random sampling techniques. At this point, electronic data were over-sampled. As a result, approximately 60 percent of NHDS discharges originated from electronic data.

Medical Coding and Edits

The medical information that was collected manually on the sample patient abstracts was recorded by NCHS staff. Up to seven diagnostic codes were assigned for each abstract. In addition, if the medical information included surgical or non-surgical procedures, up to four codes were assigned for these procedures. As with the NIS, the system currently used for coding the diagnoses and procedures on the medical abstract forms and on the commercial abstracting services data files is the *International Classification of Diseases, 9th Revision, Clinical Modification*, or ICD-9-CM.

[2] http://hcup-us.ahrq.gov/db/nation/nis/reports/NIS_2003_Design_Report_Edited_012506.pdf

Table 2. Comparison of 2003 KID, NIS, and NHDS Data Files

Characteristics	2003 KID	2003 NIS	2003 NHDS
Number of hospitals	**3,438**	**994**	**445**
Number of discharges	**2,984,129**	**7,977,728** **1,411,918 for patients 20 years or younger**	**327,254** **73,038 for patients 20 years or younger**
Intended universe	Pediatric discharges (age 20 and younger) from community hospitals, as defined by AHA: non-Federal, short-term general, or other specialty hospitals that were not a hospital unit of an institution. Short-term rehabilitation hospitals were excluded.	Discharges from community hospitals, as defined by AHA: non-Federal, short-term general, or other specialty hospitals that were not a hospital unit of an institution. Short-term rehabilitation hospitals were excluded.	Discharges from non-institutional hospitals (excludes Federal, military, and VA hospitals) located in the 50 states and the District of Columbia. Only short-stay hospitals (ALOS < 30 days) or those whose specialty is general (medical or surgical) or children's general hospitals are included in the survey.
Bed size	No restriction was placed on bed size in creating the file, but no hospitals in the sample have fewer than six beds.	No restriction was placed on bed size in creating the file, but no hospitals in the sample have fewer than six beds.	Must have at least six beds staffed for patient use to be included.
Sampling frame	36 states	37 states	50 states and the District of Columbia
Sample design – hospitals	By geographic region, control/ownership, location, teaching status, and bed size.	By geographic region, control/ownership, location, teaching status, and bed size.	Includes all hospitals with $\geq$ 1,000 beds or $\geq$ 40,000 discharges annually, plus an additional sample of hospitals in two stages. A sample of 112 PSUs was selected. These PSUs were a probability sample of the counties or metropolitan areas used in the 1985-1994 National Health Interview Survey. A sample of 445 hospitals was selected within these PSUs.

Table 2. Comparison of 2003 KID, NIS, and NHDS Data Files

Characteristics	2003 KID	2003 NIS	2003 NHDS
Number of hospitals	**3,438**	**994**	**445**
Number of discharges	**2,984,129**	**7,977,728** **1,411,918 for patients 20 years or younger**	**327,254** **73,038 for patients 20 years or younger**
Sample design – discharges	Systematic random sample from all hospitals in the sample frame.	All discharges from sampled hospitals were included.	A systematic random sample of discharges was selected from each hospital.
Reassignment of diagnosis codes	None	None	For women discharged after delivery, a code of V27 was entered as the first-listed code. If a symptom appeared as a first-listed code and a diagnosis was listed as a secondary code, the diagnosis replaced the symptom.

The NHDS usually presents diagnoses and procedures in the order in which they were listed on the abstract form or obtained from abstract services. However, there were exceptions to this practice. The general rule of reordering with the NHDS was as follows: if a symptom appeared as a first-listed code and a diagnosis appeared as a secondary code, the diagnosis replaced the symptom, which was repositioned to appear after the diagnosis. Table 2, presented below, summarizes some of the key differences in hospitals and discharges appearing in the KID and NHDS data files.

These differences portrayed in Table 2 spark several important considerations. First, sampling error exists in both the NHDS and the KID. However, the KID includes more than 40 times the number of NHDS discharges and nearly eight times the number of NHDS hospitals, so KID estimates will tend to have more precision and smaller variances. Second, both the KID and the NHDS are systematic random samples. The KID is a stratified sample of pediatric discharges; the KID sample frame included all hospitals[3] from the HCUP Partner states. In contrast, the NHDS is a two-stage sample, with discharges systematically selected from a sample of hospitals. Statistics calculated from the KID usually had much smaller standard errors than those calculated from the NHDS, and it was not always possible to calculate valid estimates of standard errors from the NHDS for statistics. Finally, NHDS statistics were assumed to be geographically representative, because the sampling frame was relatively unrestricted, encompassing all Federal, acute-care general United States hospitals with six or more beds. In contrast, the KID sampling frame for 2003 was limited to the 36 states that made their data available for research purposes.

Data Elements Compared

The following measures were selected to compare the KID to the NIS and the NHDS:

- Total number of discharges
- Average length of stay
- In-hospital mortality rate
- Average total charges (NIS only).

These measures of utilization and outcomes were selected because they are common in health services research and important for health policy and resource planning analyses. The KID-NIS comparison included total hospital charges; however, this was not possible for the NHDS because it does not report total charges.

Statistical Testing

Estimates derived from the KID, NIS, and NHDS were based on weighted discharge records from stratified samples. The SAS software PROC SURVEYMEANS was used to compute standard errors for the KID and the NIS (refer to the *Calculating KIDS' Inpatient Database (KID) Variances*[4] and *Final Report on Calculating Nationwide Inpatient Sample (NIS) Variances, 2001*[5] for details). For both the KID and NIS statistics, the appropriate

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[3]Several states imposed restrictions on which hospitals could be included, as noted previously in this report.

[4]http://www.hcup-us.ahrq.gov/db/nation/kid/reports/CalculatingKIDVariances.pdf

[5]http://www.hcup-us.ahrq.gov/reports/CalculatingNISVariances200106092005.pdf

KID or NIS stratification variable (KID_STRATUM or NIS_STRATUM) was specified for the strata, and the unique hospital identifier (HOSPID) was specified as the cluster variable. A description of the method used to calculate standard errors for the NHDS is provided in Appendix D.

KID-AHA Comparisons

For the KID-AHA comparisons, statistics were derived from the AHA Annual Survey. No significance tests were performed because the AHA is a census of hospitals and not a sample; thus the comparison statistics have no associated sampling error. Tables comparing characteristics from AHA universe hospitals and NIS hospitals appear in Appendix A (Table 12-14).

In order to assess the extent to which hospitals invested in technology, we created a high-technology index based on information from the AHA survey. This simple additive measure summarized the number of selected technologies reported by individual hospitals. The following 10 technologies were included in this index: cardiac catheterization, computerized tomography (CT) scanner, neonatal intensive care unit, magnetic resonance imaging (MRI), open heart surgery, organ transplant services, radiation therapy, extracorporeal shock wave lithotripsy, coronary angioplasty, and positron emission tomography (PET) scanner. These high technology services were identified by Spetz and Baker (1999)[6] and were used to assess the impact of managed care on the availability of medical technology.

We compared the mean number of high technology services provided among hospitals selected for the KID with non-KID hospitals, as illustrated in Table 14. Comparisons include the high-technology index, along with percentages of hospitals that offer individual services.

KID-NIS Comparisons

For each KID-NIS comparison, a statistical test determined whether the KID and NIS estimates differed significantly. Because the KID and NIS estimates were both based on samples, two-sample *t*-tests were performed. Differences were reported at the 0.01 and 0.05 significance levels. Tables comparing KID and NIS statistics (Table 15 - Table 24) appear in Appendix B.

KID-NHDS Comparisons

For each KID-NHDS comparison, a statistical test determined whether the KID and NHDS estimates differed significantly. Because the KID and NHDS estimates were both based on samples, two-sample *t*-tests were performed whenever valid estimates of the NHDS standard error could be made. Because of the limited sample size, valid estimates were not available for all breakdowns of the NHDS data. Please refer to Appendix D for a description of comparison tests and an explanation of restrictions on calculating NHDS sample errors. Differences were reported at the 0.01 and 0.05 significance levels.

Tables comparing KID and NHDS statistics (Table 25 - Table 32) appear in Appendix C.

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[6]Spetz, J. and Baker, L. *Has Managed Care Affected the Availability of Medical Technology?* Public Policy Institute of California, 1999. http://www.ppic.org/content/pubs/R_599JSR.pdf (Accessed December 16, 2004.)

Comparisons by Diagnosis and Procedure Categories

KID data were compared with both NIS and NHDS data across selected diagnosis and procedure groups. For both NIS and NHDS comparisons, the 25 diagnosis and procedure groups observed most frequently in the KID were selected. These diagnosis and procedure groups represent a majority of pertinent discharges. For both the NIS and NHDS comparisons, nearly 70 percent of all discharges were represented by the 25 diagnosis groups, while the 25 procedure groups represent more than 41 percent of discharges that include procedure codes. In addition to these common codes, outcome statistics were compared for a selection of rare diagnoses and procedures.

Grouping of diagnoses and procedures was done with Clinical Classification Software (CCS). The CCS was developed as a means to categorize diagnoses and procedures into a limited number of clinically relevant categories. Developed for health policy analysis, the CCS can be used for aggregating the thousands of ICD-9-CM diagnoses and procedures into a manageable number of meaningful categories. CCS codes were assigned based on the principal, or first-listed, diagnosis and procedure for each discharge.

RESULTS

Appendices A, B, and C present tables comparing KID estimates with statistics from the AHA, NIS, and NHDS, respectively. The results highlighted in these tables are discussed in the following sections.

We should note that estimates from different samples will not be identical because of sampling variation. Statistically significant differences can be expected for several reasons:

- Random variation between the two samples
- Differences in sampling strategies
- The NHDS practice of reordering some diagnosis codes
- The sheer volume of tests conducted.[7]

KID-AHA Comparisons

This section refers to the tables in Appendix A (Table 12-14) comparing hospitals in the KID sample – essentially all hospitals in the KID states – to the universe of U.S. hospitals. It is important to note that KID hospitals represent a subset, albeit a large subset, of the AHA universe. As such, KID averages and medians are similar to AHA statistics. In general, KID hospitals tend to accommodate more patients and perform more procedures than the universe of hospitals. These differences may be factors in the observed variations for NIS and NHDS comparisons to the KID.

General Hospital Characteristics

Table 12 compares the hospital count and percentage of total hospitals in the KID sampling frame with the number and percentage of hospitals in the AHA universe across several measures of hospital characteristics:

- Geographic region
- Hospital control
- Urban/Rural and teaching status.

There are no KID hospital weights, so KID hospital counts are not directly comparable to AHA hospital totals. Weights are not needed because the KID sample is drawn from all hospitals in the sampling frame. We can, however, compare the composition of the sample to the whole by comparing the percentage of hospitals in each category. The composition of the KID is highly reflective of the AHA universe for each of the characteristics examined, as demonstrated in Appendix A.

Although the KID includes relatively more Midwestern hospitals and fewer Southern hospitals than the AHA universe, the difference is small. The make-up of the KID is similar to the AHA universe. Relative compositions by Hospital Control and Location and Teaching Status demonstrate further similarity. Examining the composition by hospital size reveals more similarity between the KID and the AHA universe. The exception

[7]While some type of correction for the number of tests could be applied, given the large number of tests, this would greatly increase the risk of a Type II error.

occurs with rural hospitals. Rural hospitals in the KID include a smaller proportion of small hospitals and a larger proportion of large hospitals than observed for rural hospitals in the AHA universe.

Table 13 compares summary hospital attributes for KID hospitals to the overall AHA universe of U.S. community, non-rehabilitation hospitals. In general, KID hospitals were the larger and more active of AHA hospitals. While stays at KID hospitals were 9.7 percent shorter than the overall average LOS, the average occupancy rate was 3.0 percent higher in KID hospitals. In addition, KID hospitals tended to see slightly fewer Medicare patients (2.0 to 3.4 percent, depending on the measure) but slightly more Medicaid patients (2.2 to 3.3 percent, depending on the measure). Moreover, these disparities do not appear driven by large, outlier hospitals: the difference in median values for these measures is larger than the difference in mean values.

KID hospitals tended to see more activity than AHA hospitals. The average KID hospital reported more:

- Admissions and discharges (12.1 percent higher)
- Births (16.0 percent higher)
- Inpatient surgeries (11.7 percent higher).

The largest discrepancies, however, were observed in measures of size and activity. KID hospitals were larger than all AHA hospitals. On average, KID hospitals were characterized by:

- More beds (10.0 percent higher)
- More employees (11.6 percent higher)
- Higher expenses (15.2 percent higher)
- Higher payroll (15.4 percent higher).

Specialty and Technology Services

Some differences between the KID and the universe of AHA hospitals may be caused by the fact that the sampling frame for the KID is less than the universe of all U.S. hospitals. For example, the KID might include hospitals that employ more technologically-intense services. To examine this idea, we compared KID hospitals to non-KID hospitals across a number of specialty and technology-intensive services, and results are depicted in Table 14. This table includes a simple (additive) index of technologies reported by individual hospitals. The index is described in the “Methods” section of this report.

KID hospitals generally offer more high-technology services than do non-KID hospitals. The high-technology index count was 3.27 services for KID hospitals and 2.27 services for non-KID facilities (a difference of 42.7 percent). Of the 10 services that comprise the index, all were more prevalent in KID hospitals. The individual differences ranged from 22.6 percent for CT Scanners (the most common of the index services) to 77.7 percent for PET Scanners.

One of the high-technology index components is Neonatal Intensive Care Units (ICUs), present in 20.86 percent of KID hospitals and 13.90 percent of non-KID hospitals. The driving force behind this difference is the higher prevalence of these units in small hospitals in the KID, as compared with other small hospitals. As revealed in Table 3,

neonatal ICUs are found in small KID hospitals nearly four times as frequently as in non-KID hospitals.

Table 3. AHA Neonatal Units by Hospital Size

Hospital Size	KID Hospitals			Non-KID Hospitals		
	Hospitals	Neonatal ICUs	Percent	Hospitals	Neonatal ICUs	Percent
Small	1,162	84	7.2%	253	5	2.0%
Medium	1,016	195	19.2%	155	32	20.6%
Large	1,260	438	34.8%	99	37	37.4%
Total	3,438	717	20.9%	507	74	14.6%

In addition to the high-technology index, several services and units within hospitals are examined in Table 14. Emergency Departments are found more often in KID hospitals than in non-KID hospitals. In addition, a larger proportion of non-KID hospitals (2.7 percent) are designated as pediatric specialty hospitals compared with those in the KID (1.2 percent).

Kid hospitals include more than 60 percent of all Children's Hospitals (as defined by the AHA), containing nearly 72 percent of Children's Hospital beds in the United States. There are 27 states with Children's Hospitals. But the KID includes discharges from only 16 of those states: six of the states do not participate in HCUP and five HCUP states remove their Children's Hospitals from the KID. For Children's Hospitals in the 16 participating states, the KID includes 78 percent of the facilities and 94 percent of the beds.

KID-NIS Comparisons

Few differences were observed between KID and NIS estimates. This is to be expected because the source data was the same for both databases. For each of the four outcomes – discharges, average length-of-stay, in-hospital mortality, and average total charge – more than 160 comparisons were made (Table 15 through Table 24), and for each of the four measures, significant differences were found for fewer than five percent of the KID and NIS estimates. Overall and by region, no significant differences were observed between KID and NIS estimates (Table 15). Nor were any differences found for hospital characteristics such as control, type, and size (Table 16 and Table 17).

Comparisons by Patient Characteristics

There were a handful of significant outcome differences for discharges grouped by patient attribute comparisons (Table 18 and Table 19). Of the 22 patient characteristic comparisons, five differences were significant:

- Two estimates of discharges (unknown gender and other payer, Table 19)
- Two in-hospital estimates of in-hospital mortality (age group 10-14 years, Table 19, and missing payer, Table 20)
- One average estimate of total charges (age group one month to one year, Table 19).

In each case, the KID estimate was larger than the NIS estimate. The KID estimates of unknown gender discharges and in-hospital mortality rate for missing payer were more than twice as large as the corresponding NIS estimate. However, the numerical impact of this is likely to be small in any analysis because gender is unknown for only 1.3 percent of the KID sample. The sizes of the remaining three differences were of lesser magnitude. The KID estimates were larger than equivalent NIS estimates for:

- In-hospital mortality rate for age group 10-14 years (24.1 percent larger, Table 18)
- Average total charge for age group one month to one year(17.0 percent larger, Table 18)
- Total discharges for other payer (24.3 percent larger, Table 19).

Note that for both the KID and NIS, nearly 30 percent of discharges were missing information on race. Many states participating in HCUP do not collect information on this subject.

Comparisons by DRGs, Diagnoses, and Procedures

Most KID estimates were not significantly different from NIS estimates for DRG, diagnosis, and procedure category comparisons (Table 20 through Table 24). Few significant differences were observed for any of the outcomes measured, despite conducting 110 comparisons. The number of differences was highest for ALOS (eight differences) and lowest for hospital charges (no differences). Of the 110 comparisons of discharge estimates, only three significant differences were observed:

- The KID-estimated discharges for the diagnosis “other complications of pregnancy” was 9.4 percent larger than the NIS estimate (Table 21).
- The KID-estimated discharges for “cholecystectomy and common duct exploration” (relatively uncommon at 15,632 discharges) was 8.8 percent larger than the NIS estimate (Table 24).
- The KID-estimated discharges for “heart valve procedures” (relatively uncommon at 4770 discharges) was 81.4 percent larger than the NIS estimate (Table 24).

Eight differences in ALOS estimates emerged among the 110 DRG, diagnosis, and procedure comparisons. The affected categories are described below:

- KID estimates of ALOS for two DRG categories were longer than the NIS estimates (“simple pneumonia” had 3.5 percent longer stays and “cellulitis” had 3.9 percent longer stays – Table 20).
- KID estimates for three diagnosis categories were longer than the NIS estimates (“pneumonia” was 5.7 percent longer, “skin and subcutaneous tissue infections” was 3.6 percent longer, and “viral infection” was 3.6 percent longer – Table 21).
- The KID estimate for the rare diagnosis “cancer of the bone and connective tissue” was 19.7 percent longer than the NIS estimate, while the estimate for “HIV infection” was 20.5 percent shorter (Table 22).
- The KID estimate for “other diagnostic procedures” was 17.5 percent shorter than the NIS estimate (Table 23).

There were six significant differences among comparisons of in-hospital mortality rate estimates. In all but one instance, the estimates were extremely low: all KID estimated rates of in-hospital mortality were smaller than 0.05 percent (5 deaths per 10,000 discharges). Findings include the following:

- The KID estimate of in-hospital mortality for "other antepartum diagnosis with medical complications," although quite small at 0.01 percent, was significantly larger than the NIS estimate, which was essentially zero (Table 21).
- KID estimates of mortality for four diagnosis categories were larger than the NIS estimates. In each instance, the NIS estimated rate was zero, while the largest KID estimate was 0.05 percent for "viral infections" (Table 21).
- The KID estimate of mortality for "heart valve procedures" was 41.4 percent smaller than the NIS estimate (Table 24).

Significant differences between KID and NIS estimates were observed for only 17 of the 167 DRG, diagnosis, and procedure comparisons. However, few patterns emerge from these discrepancies; the 17 differences occur across 14 comparison categories. Exceptions are:

- The KID ALOS estimates for the DRG "simple pneumonia" (Table 20) and the diagnosis category "pneumonia" (Table 21) both differed from the NIS estimates.
- KID estimates of both ALOS and in-hospital mortality rates were larger than the NIS estimates for two diagnosis categories ("skin and subcutaneous tissue infections" and "viral infection," Table 21).
- The KID estimated more discharges and a lower in-hospital mortality rate for "heart valve procedures" (Table 23)

KID-NHDS Comparison

In the assessment of KID and pediatric NHDS estimates (Table 25 through Table 32), significant differences were observed for many of the discharge comparisons and most of the in-hospital mortality comparisons, while most ALOS estimates from the two samples were consistent. KID statistics varied for 40 percent of discharge measures and more than one-half of in-hospital mortality comparisons. The number of differences might have been larger, but more than half of the potential comparisons were not possible because reliable estimates of NHDS standard error were often unavailable. This was largely the result of small NHDS sample sizes; refer to Appendix D for an explanation of NHDS statistics.

Overall and Regional Comparisons

As shown in Table 25, discharge and ALOS estimates were consistent overall and for all regional categories, although only two of the four regional ALOS comparisons were possible because NHDS standard error statistics were not available. In contrast, the KID in-hospital mortality rate estimate was 17.8 percent lower than the corresponding NHDS estimate. Significant differences were also observed with the Midwest and West regional estimates, where the KID statistic was 24.0 and 30.4 percent lower than the NHDS. No comparison was possible for the South because we could not calculate a valid NHDS standard error. Table 4 demonstrates the relative sample sizes, by region, of the KID and NHDS files. The KID sample was 26 to 42 times larger than the pediatric NHDS sample.

Table 4. KID and NHDS Sample Sizes by Region, 2003

Region	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
Northeast	469,328	17,836	26.31
South	741,109	18,974	39.06
Midwest	1,044,951	24,908	41.95
West	728,741	24,908	29.26

Comparisons by Hospital Characteristics

Table 26 compares KID and NHDS estimates along categories of hospital control and size. While estimates for discharge counts or ALOS were consistent across the overall hospital control categories, several significant differences emerged within the bed size categories.

KID discharge estimates from the smaller size groups tended to be smaller than equivalent NHDS estimates:

- For public hospitals with 1-99 beds, 26.8 percent smaller
- For private, non-profit hospitals with 1-99 beds, 45.1 percent smaller
- For private, non-profit hospitals with 100-199 beds, 33.3 percent smaller
- For private, non-profit hospitals with 200-299 beds, 16.9 percent smaller
- For proprietary hospitals with 100-199 beds, 39.1 percent smaller.

In contrast, KID discharge estimates from the largest size groups tended to be larger than similar NHDS estimates:

- For public hospitals with 500+ beds, 92.5 percent larger
- For private, non-profit hospitals with 500+ beds, 94.3 percent larger.

For proprietary hospitals with 500+ beds, the KID estimates 89,000 pediatric discharges, while the NHDS estimates zero pediatric discharges. Although this suggests that the NHDS under-represents large hospitals, the 500+ bed comparison was not counted as a statistically significant difference because no NHDS standard error estimate was available and no statistical test was performed.

Only two ALOS significant differences were found for the hospital categories: public hospitals with 500+ beds and proprietary hospitals with 100-199 beds. In both cases, the KID estimate was shorter than the NHDS estimate (29.4 percent and 31.4 percent, respectively).

Differences were observed with the majority of in-hospital mortality comparisons. For the overall hospital control categories, the KID estimate was smaller than the NHDS rate for both private non-profit and proprietary hospitals (15.2 percent and 55.6 percent, respectively). Within size groupings, public and proprietary hospitals demonstrated a mix of larger and smaller KID estimates (Table 26):

- For public hospitals with 1-99 beds, the KID estimate was larger than the NHDS estimate (0.08 percent, compared with 0.00 percent).
- For public hospitals with 300-499 beds, the KID estimate was 32.6 percent larger than the NHDS estimate.
- For public hospitals with 100-199 beds, the KID estimate was 60 percent smaller than the NHDS estimate.
- For proprietary hospitals with 1-99 beds, the KID estimate was larger than the NHDS estimate (0.05 percent, compared with 0.00 percent).
- For proprietary hospitals with 200-299 beds, the KID estimate was larger than the NHDS estimate (0.19 percent. compared with 0.00 percent).
- For proprietary hospitals with 300-499 beds, the KID estimate was 84.1 percent smaller than the NHDS estimate (0.35 percent, compared with 2.20 percent).

KID estimates that were significantly different for private, non-profit hospitals were all smaller than the corresponding NHDS estimate. These differences ranged from 18.9 percent for hospitals with 500+ beds to 39.7 percent for hospitals with 300-499 beds.

The relative sample sizes for hospital characteristics are shown in Table 5. The KID sample was larger than the NHDS pediatric sample by a factor of 26 to 217. The ratio tends to be greater for large hospitals, suggesting that these hospitals are under-represented in the NHDS.

Table 5. KID and NHDS Sample Sizes by Hospital Strata, 2003

Control and Size	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
Total Public	430,249	6,145	70.02
1-99 beds	59,475	668	89.03
100-199 beds	55,836	958	58.28
200-299 beds	43,325	466	92.97
300-499 beds	112,816	3,322	33.96
500+ beds	158,797	731	217.23
Total Private, Non-Profit	2,217,284	63,485	34.93
1-99 beds	179,416	4,664	38.47
100-199 beds	375,969	14,262	26.36
200-299 beds	490,309	15,063	32.55
300-499 beds	589,035	22,585	26.08
500+ beds	582,555	6,911	84.29
Total Proprietary	336,596	3,408	98.77
1-99 beds	44,794	676	66.26
100-199 beds	114,587	1,686	67.96
200-299 beds	77,880	636	122.45
300-499 beds	61,364	410	149.67
500+ beds	37,971	0	n/a

Comparisons by Patient Characteristics

KID and NHDS comparisons by patient characteristics are illustrated in Table 27 and Table 28. While all but one of the ALOS comparisons were consistent between the two samples, significant differences were discovered for half of the mortality estimates and two-thirds of the discharge estimates. Most patient category differences occurred in the age group comparisons. Significant differences were observed with all discharge estimates and most mortality estimates. Additionally, one ALOS difference was found in the age group "up to 1 month," with the KID estimate 35.4 percent shorter than the NHDS estimate. Table 6 presents the relative sizes of the KID and NHDS samples.

For age group comparisons, one KID discharge estimate was larger than the corresponding NHDS pediatric estimate ("1-4 years"), with the KID estimate 139.3 percent larger. KID estimates were smaller for the other six age group comparisons, ranging from 12.5 percent smaller for "15-18 years" to 48.4 percent for "up to 1 month" One KID in-hospital mortality rate estimate was larger than the NHDS estimate: for age group "10-14 years," the KID estimate was 157.1 percent larger than the NHDS estimate. The KID estimate was significantly smaller in four of the remaining six categories, ranging from 23.7 percent smaller for "15-18 years" to 52.0 percent for "up to 1 month."

Of the other discharge and in-hospital mortality rate differences observed with patient characteristics, the KID estimate was always smaller than the NHDS pediatric estimate (Table 27). These included gender and racial differences as follows:

- For males, the KID discharge estimate was 11.0 percent smaller
- For males, the KID mortality rate estimate was 25.8 percent smaller
- For Whites, the KID discharge estimate was 39.3 percent smaller
- For Whites, the KID mortality rate estimate was 27.3 percent smaller
- For Blacks, the KID discharge estimate was 25.8 percent smaller.

The KID estimate of discharges for "Other" race was nearly three times larger than the corresponding NHDS statistic. Note that nearly 30 percent of discharges in the KID were missing information on race because many states participating in HCUP do not collect data on race. Similarly, about 24 percent of discharges in the NHDS are missing information on race because the data sources for the majority of records in the NHDS are the same state-level data organizations that participate in HCUP. For the remaining patient-category discharge differences (Table 27), the KID value was smaller than the NHDS estimate for three categories, as follows:

- Males, 11.0 percent smaller
- Whites, 39.3 percent smaller
- Blacks, 25.8 percent smaller.

In comparisons for categories of expected payer (Table 28), three discharge estimate differences were observed. The KID discharge estimate was smaller than the NHDS estimate for:

- Medicare (40.7 percent smaller)
- No Charge (77.4 percent smaller)

- Other (59.0 percent smaller).

These three categories represent a very small segment of pediatric discharges. Collectively, they account for less than four percent of the KID and less than nine percent of pediatric discharges in the NHDS.

Table 6. KID and NHDS Sample Sizes by Patient Strata, 2003

	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
Age Group			
Newborn	698,674	34,094	20.49
Up to 1 month	86,567	2,829	30.60
Up to 1 year	196,542	5,368	36.61
1-4 years	661,946	7,881	83.99
5-9 years	218,413	4,772	45.77
10-14 years	241,185	5,370	44.91
15-18 years	862,299	12,724	67.77
Gender			
Female	1,592,210	37,170	42.84
Male	1,354,092	35,868	37.75
Race			
White	1,078,554	35,028	30.79
Black	353,328	11,481	30.78
Other	700,378	7,181	97.53
Unknown	851,869	19,348	44.03
Principal Payer			
Medicare	7,774	163	47.69
Medicaid	1,320,961	25,348	52.11
Private Insurance	1,388,210	38,295	36.25
Self Pay	142,924	2,790	51.23
No Charge	6,627	1,206	5.50
Other	112,314	5,236	21.45
Missing	5,319	0	n/a

Comparisons by Diagnosis Category

For the comparisons in Table 29 examining the 25 most common principal diagnoses in the KID, few agreements between KID and NHDS estimates were found for any of the measures. One of the major reasons for this dearth of agreements is that valid estimates of the NHDS standard error were not possible for more than half of the ALOS and in-hospital mortality rate comparisons. Because the NHDS sample contains relatively few examples of some conditions, this is to be expected; it is particularly true for pregnancy-related discharges, such as “Prolonged pregnancy,” “Trauma to perineum and vulva,” and “Other complications of birth.” Table 7 displays the sample sizes from the KID and pediatric NHDS discharges for these relatively common diagnoses.

Table 7. KID and NHDS Sample Sizes by Diagnosis Category, 2003

Diagnosis	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
218: Liveborn (infants)	897,827	34,188	26.26
128: Asthma	102,101	2,350	43.45
122: Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	101,141	1,844	54.85
125: Acute bronchitis	91,725	1,612	56.90
55: Fluid and electrolyte disorders	73,879	1,313	56.27
193: Trauma to perineum and vulva due to childbirth (maternal)	75,071	3	25023.67
69: Affective disorders	70,443	1,280	55.03
195: Other complications of birth, puerperium affecting management of mother (maternal)	69,721	74	942.18
142: Appendicitis and other appendiceal conditions	60,899	1,000	60.90
181: Other complications of pregnancy (maternal)	57,293	360	159.15
83: Epilepsy, convulsions	44,138	553	79.82
224: Other perinatal conditions (infants)	40,574	857	47.34
196: Normal pregnancy and/or delivery (maternal)	41,735	4,605	9.06
159: Urinary tract infections	36,473	693	52.63
126: Other upper respiratory infections	34,164	663	51.53
197: Skin and subcutaneous tissue infections	30,494	767	39.76
184: Early or threatened labor (maternal)	30,397	145	209.63
7: Viral infection	27,457	544	50.47
222: Hemolytic jaundice and perinatal jaundice (infants)	27,632	452	61.13
74: Other mental conditions	27,037	548	49.34
135: Intestinal infection	25,227	472	53.45
45: Maintenance chemotherapy, radiotherapy	23,766	600	39.61
230: Fracture of lower limb	24,448	406	60.22
185: Prolonged pregnancy (maternal)	24,868	2	12434.00
154: Noninfectious gastroenteritis	22,603	414	54.60

Of the 24 possible discharge estimate comparisons, 14 significant differences were observed. For most of these differences (11 of the 14), the KID estimate was smaller than the NHDS estimate, ranging from 16.1 percent lower for “Appendicitis and other appendiceal conditions” to 89.5 percent lower for “Normal pregnancy and/or delivery.” For “Other upper respiratory infections,” the median difference was 20.8 percent lower. The discharge estimate from the KID was larger than the NHDS for three diagnoses:

- “Other complications of pregnancy” (72.2 percent larger)
- “Epilepsy, convulsions” (51.0 percent larger)
- “Early or threatened labor” (113.0 percent larger).

For diagnoses, a single significant ALOS difference was found: the KID estimate for “Normal pregnancy and/or delivery” was 21.0 percent shorter than the NHDS estimate. However, only 11 of the 25 possible categories were analyzed because it was not possible to calculate NHDS standard errors.

Of the ten comparisons of in-hospital mortality rate estimates, seven significant differences were observed. The KID estimate was larger than the NHDS estimate for four conditions (“Pneumonia,” “Acute bronchitis,” “Fluid and electrolyte disorders,” and “Other upper respiratory infections”) and smaller for three others (”Liveborn,” “Asthma,” and “Urinary tract infections”). In each of these seven diagnoses, the absolute difference between the KID and NHDS estimates was less than 0.07 percentage points.

Table 30 compares estimates for 17 important but relatively rare diagnoses. Two significant differences were observed for discharge estimates. The KID discharge estimates for “Leukemias” and “Cystic fibrosis” were smaller than the corresponding pediatric NHDS estimates by 47.4 and 48.2 percent, respectively. Comparisons were not possible for ALOS and in-hospital mortality rates because valid NHDS standard errors were unavailable.

Compared with the most frequent diagnoses listed in Table 29, the rare diagnoses constitute relatively few records. As shown in Table 8, the median sample in the KID for these diagnoses includes 2,180 unweighted discharge records, while the NHDS sample contains only 54 unweighted discharge records. The NHDS sample was too small to calculate reliable discharge estimates for seven of the 17 conditions, and valid estimates of discharge standard errors were possible for only 10 categories.

Table 8. KID and NHDS Sample Sizes by Rare Diagnosis Category, 2003

Diagnosis	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
160: Calculus of urinary tract	4,678	77	60.75
39: Leukemias	4,492	167	26.90
172: Ovarian cyst	4,301	70	61.44
56: Cystic fibrosis	3,678	138	26.65
216: Nervous system congenital anomalies	3,263	121	26.97
243: Poisoning by nonmedicinal substances	3,350	66	50.76

Diagnosis	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
66: Alcohol-related mental disorders	3,073	54	56.91
35: Cancer of brain and nervous system	2,770	87	31.84
210: Systemic lupus erythematosus and connective tissue disorders	2,180	34	64.12
21: Cancer of bone and connective tissue	1,676	54	31.04
77: Encephalitis (except that caused by tuberculosis or sexually transmitted disease)	1,378	24	57.42
227: Spinal cord injury	1,138	14	81.29
5: HIV infection	839	17	49.35
158: Chronic renal failure	813	27	30.11
96: Heart valve disorders	708	22	32.18
1: Tuberculosis	515	10	51.50
30: Cancer of testis	188	1	188.00

Comparisons by Procedure Category

The 25 most common procedures found within the KID are presented in Table 31. While most comparisons of KID and NHDS estimates by procedure agree for all measures, large numbers of ALOS and mortality rate comparisons were not possible because valid NHDS standard errors were unavailable. The relative sample sizes for the two files are shown in Table 9.

Table 9. KID and NHDS Sample Sizes by Procedure Category, 2003

Procedure	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
115: Circumcision	218,328	10,319	21.16
228: Prophylactic vaccinations and inoculations	94,064	4,391	21.42
137: Other procedures to assist delivery	140,700	1,448	97.17
220: Ophthalmologic and otologic diagnosis and treatment	35,208	979	35.96
231: Other therapeutic procedures	94,964	1,736	54.70
216: Respiratory intubation and mechanical ventilation	90,245	1,655	54.53
4: Diagnostic spinal tap	77,466	1,638	47.29
134: Cesarean section	75,368	870	86.63
140: Repair of current obstetric laceration	70,899	1,005	70.55
80: Appendectomy	61,993	1,003	61.81
133: Episiotomy	47,498	574	82.75
217: Other respiratory therapy	32,709	1,194	27.39

Procedure	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
54: Other vascular catheterization, not heart	34,317	692	49.59
135: Forceps, vacuum, and breech delivery	28,980	373	77.69
224: Cancer chemotherapy	21,664	569	38.07
223: Enteral and parenteral nutrition	15,569	341	45.66
222: Blood transfusion	14,432	320	45.10
146: Treatment, fracture or dislocation of hip and femur	13,227	240	55.11
147: Treatment, fracture or dislocation of lower extremity (other than hip or femur)	13,016	190	68.51
94: Other OR upper GI therapeutic procedures	12,418	308	40.32
227: Other diagnostic procedures (interview, evaluation, consultation)	11,742	308	38.12
148: Other fracture and dislocation procedure	12,347	235	52.54
70: Upper gastrointestinal endoscopy, biopsy	11,126	266	41.83
9: Other OR therapeutic nervous system procedures	10,149	243	41.77
33: Other OR therapeutic procedures on nose, mouth and pharynx	10,164	290	35.05

Of the 25 procedure estimate comparisons, five significant differences were found. The KID estimate was smaller than the NHDS estimate in four of these five procedures; the differences ranged from 16.8 percent smaller for “diagnostic spinal tap” to 40.0 percent smaller for “other respiratory therapy.” The KID discharge estimate was larger than the NHDS pediatric discharge estimate for one procedure category: “other procedures to assist delivery” (33.1 percent larger).

No statistically significant differences were observed for ALOS comparisons. However, testing was possible for only 12 of the 25 procedure categories because valid NHDS standard error estimates were unavailable.

Similarly, in-hospital mortality rate comparisons were possible for only 13 of the 25 categories because NHDS standard errors were unavailable. For those 13 comparisons, five significant differences were observed. In three instances, the KID estimate was larger than the NHDS estimate: “cesarean section,” “appendectomy,” and “other vascular catheterization, not heart.” The KID estimate was small in each of these groups (ranging from 0.01 percent to 0.11 percent). There were two procedures with KID estimates smaller than the NHDS estimate. Specifically, KID estimates for “other therapeutic procedures” and “diagnostic spinal tap” were 83.3 percent and 30.8 percent smaller, respectively, than the pediatric NHDS estimates.

Table 32 compares estimates for 18 rare procedures. Although this table reveals no significant differences between the KID and NHDS estimates, it also finds few agreements. Because valid NHDS standard errors were not available for most procedures, statistical tests of discharge estimates were possible for only five of the 18 procedure categories. In addition, tests were not feasible for any ALOS or in-hospital mortality rate estimates. Table 10 lists the relative discharge counts from the KID and NHDS samples for these rare procedures.

Table 10. KID and NHDS Sample Sizes by Rare Procedure Category, 2003

Procedure	Sample Size (Unweighted Records)		Relative Difference
	KID	NHDS	
84: Cholecystectomy and common duct exploration	9,590	139	68.99
219: Alcohol and drug rehabilitation/detoxification	6,744	175	38.54
144: Treatment, facial fracture or dislocation	3,614	58	62.31
172: Skin graft	3,412	248	13.76
78: Colorectal resection	3,310	78	42.44
34: Tracheostomy, temporary and permanent	3,213	58	55.40
65: Bone marrow biopsy	2,997	81	37.00
43: Heart valve procedures	2,724	70	38.91
3: Laminectomy, excision intervertebral disc	2,115	45	47.00
119: Oophorectomy, unilateral and bilateral	2,065	33	62.58
152: Arthroplasty knee	2,064	30	68.80
104: Nephrectomy, partial or complete	1,744	40	43.60
36: Lobectomy or pneumonectomy	1,694	38	44.58
66: Procedures on spleen	1,684	30	56.13
64: Bone marrow transplant	1,368	40	34.20
89: Exploratory laparotomy	1,163	17	68.41
10: Thyroidectomy, partial or complete	788	12	65.67
105: Kidney transplant	637	12	53.08

DISCUSSION

These results indicate that estimates from the 2003 KID were consistent with statistics from the 2003 NIS: significant differences were observed for fewer than five percent of the comparisons. On the other hand, in comparisons of the KID and NHDS, we found discrepancies between many of the discharge statistics and most of the in-hospital mortality rate estimates, although estimates of ALOS were generally consistent. KID estimates for discharge counts and mortality were generally smaller than NHDS estimates. Differences were detected across both hospital and patient categories.

Comparisons were made for as many as four outcomes across dozens of different categories. While NHDS differences were observed, few patterns were discernable. For example, the KID discharge estimate was often significantly smaller than the corresponding NHDS statistic. However, in most categories with KID and NHDS discrepancies, the KID was consistent with the NIS estimate.

Race and Ethnicity

The racial composition of the KID and NHDS samples differed greatly; this is reflected in the discrepancies that arose with race categories. The NHDS contains proportionally more discharges for White and Black patients than does the KID. In contrast, the relative number of discharges for "Other" race patients in the KID is considerably higher than in the NHDS. With respect to race, the NIS statistics were similar to the KID estimates. All samples include large numbers of discharges with missing race information; 28 percent of KID discharges, 27 percent of NIS discharges, and 24 percent of NHDS discharges lacked race information. Some states do not report race/ethnicity information to HCUP, so race is missing for 11 states in both the KID and the NIS.[8] Because the NHDS does not include state information, it is not possible to determine if the pattern of missing information is similar. Given that most records in the NHDS are drawn from the same types of discharge data systems that contribute data to HCUP, however, it is likely that patterns of missing data are similar.

Regional Components

The key difference between the KID and the databases with which it was compared relates to geographic scope. The NHDS data are national in coverage; NHDS data were gathered from a sampling frame of all 50 states plus the District of Columbia. In contrast, the 2003 KID was drawn from only 36 states (as shown in Figure 1), and the 2003 NIS was drawn from only 37 states. Although the KID states comprise nearly 85 percent of all community hospital discharges in the United States, the difference in geographic scope may be a consideration for researchers who require comprehensive geographic representation. Some significant differences between the states excluded and included in the KID may offer explanations for several of the observed differences.

KID states are disproportionately more densely populated. The average population density of KID states was 125.8 persons per square mile in 2003. This compares with a national average of 81.4 persons per square mile and an average population density for non-NIS states of 29.0 persons per square mile. Of the 10 most densely populated states, all but two were included in the KID. These KID states, and their rank in terms of

[8]NIS and KID states for which race was not available include Georgia, Illinois, Kentucky, Maine, Minnesota, Nebraska, Nevada, Ohio, Oregon, Washington, and West Virginia.

population density order, are: New Jersey (1), Rhode Island (2), Massachusetts (3), Connecticut (4), Maryland (5), New York (7), Florida (8), and Ohio (9). At the other end of the spectrum, only four of the 10 least densely populated states were included in the KID: Utah (41), Nebraska (42), Nevada (43), and South Dakota (46).[9]

Because of these population differences between KID and non-KID states, the KID sampling frame begins with few hospitals in sparsely populated areas. Even weighting the discharges from rural states does not adequately account for the remote areas of the country, which include a disproportionate number of the smallest hospitals. The most rural of the states included in the sample, Nevada and South Dakota, have population densities of 20.4 and 10.1 persons per square mile, respectively. This contrasts with population densities of 1.1, 5.2, and 6.3 persons per square mile in Alaska, Wyoming, and Montana, which are not included in the sample.[10]

KID Strengths

While the previous discussion focused on differences between the KID and other data sources, it should be noted that these differences are only of concern when there is a reason to expect that geographic region might relate to the variable of interest. The KID provides a large sample size that tends to yield estimates with much smaller standard errors than does a sample such as the NHDS. Without a sample of several million, as provided by the KID, estimates for less common procedures and diagnoses are unreliable and often unavailable. While the KID may over-represent urban areas, the prevalence of higher-density states in the KID yields data on atypical conditions rarely included in a smaller sample.

KID estimates are generally more precise; that is, KID estimates of standard error tend to be smaller than the corresponding standard error estimates from both the NIS and the NHDS. KID standard errors were generated for all statistics, including categories with small samples, such as rare diagnoses. In contrast, NHDS standard errors were often not available because of small sample sizes. Please refer to Appendix D for details.

KID discharge estimates were similar to all NIS numbers, regardless of the hospital characteristics. KID ALOS statistics were generally parallel to NHDS estimates, as well. Because KID estimates have greater precision – the result of the large sample size – it may be preferred for certain analyses based on relatively uncommon conditions. Furthermore, the KID contains total hospital charges, while the NHDS does not. For analysis involving charges on all payers for pediatric patients, the KID offers one of the few available options.

KID Weaknesses

KID discharge estimates vary from NHDS estimates on most dimensions, including hospital size. The KID estimates more discharges from large hospitals and fewer discharges from small hospitals than does the NHDS. This suggests that the KID may rely too heavily on large hospitals; however, a comparison of AHA and KID hospitals by

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[9]Source: Population Division, U.S. Census Bureau. Release Date: December 22, 2005. http://www.census.gov/popest/states/tables/NST-EST2005-01.xls

[10]None of these three states was eligible for HCUP inclusion because none collected all-payer hospital discharge data for the year 2003.

control and size reveals that the composition of KID hospitals is proportionally similar to the AHA universe, as demonstrated in Table 11.

Table 11. AHA and KID Hospitals by Control and Size, 2003

Hospital Control and Size	AHA Universe		KID Frame	
	Hospitals	Percent	Hospitals	Percent
Public	1,126	--	721	--
1-99 Beds	861	76.47%	524	72.68%
100-199 Beds	120	10.66%	82	11.37%
200-299 Beds	44	3.91%	33	4.58%
300-499 Beds	60	5.33%	47	6.52%
500+ Beds	41	3.64%	35	4.85%
Private, Non-Profit	2,947	--	2,221	--
1-99 Beds	1,317	44.69%	919	41.38%
100-199 Beds	661	22.43%	518	23.32%
200-299 Beds	414	14.05%	337	15.17%
300-499 Beds	372	12.62%	299	13.46%
500+ Beds	183	6.21%	148	6.66%
Proprietary	761	--	496	--
1-99 Beds	352	46.25%	189	38.10%
100-199 Beds	253	33.25%	173	34.88%
200-299 Beds	91	11.96%	79	15.93%
300-499 Beds	49	6.44%	43	8.67%
500+ Beds	16	2.10%	12	2.42%

A direct comparison between the AHA and NHDS is not possible because the AHA data does not include numbers of pediatric discharges and the NHDS does not include information on hospital counts. The NHDS does use a more geographically complete sampling frame, however, and that database might be preferable for researchers, in certain cases.

The KID also contains significant numbers of discharges for which race was missing (28 percent). The NHDS suffers from this same problem (24 percent of discharges without race), and no alternative is currently available.

Contrasting Findings from the 1997 Comparisons

KID-NIS Evaluations

As in 1997, the NIS and KID samples were remarkably similar. Whereas the Comparison Report on 1997 data found no significant differences between the KID and NIS estimates, the current analysis of 2003 data revealed a small number (less than five percent for all outcomes measured).

KID-NHDS Evaluations

The KID and pediatric NHDS samples are considerably different in composition. The KID was designed as a sample of pediatric discharges while the pediatric NHDS is a subset of pediatric discharges from a sample of all discharges. The two samples are of radically different sizes. The pediatric NHDS is less than 4 percent the size of the KID sample and, as a result, the number of sample points in some strata may not be sufficiently large for meaningful analysis.

The 1997 Comparison Report also identified numerous differences between the KID and NHDS data. Most ALOS estimates from the KID were significantly longer than NHDS estimates. Differences with many of the discharge estimates were also observed for hospital and patient categories. There were no comparisons of in-hospital mortality rates with the 1997 data because it was not possible to calculate valid estimates of NHDS standard errors.

In contrast, the 2003 report noted few differences for ALOS estimates, and comparisons of in-hospital mortality rates were possible in only one-third of the categories. Significant differences were observed with slightly more than half of the mortality statistics.

Many differences were also observed in discharge estimates from the KID and NHDS data, as was the case with the 1997 report. However, where the 1997 data was similar with regard to age groups, no age group similarities emerged for the 2003 data. There were also more differences among the diagnosis categories for the 2003 data.

Conclusions

Each of the data sources discussed has its strengths and weaknesses, and each may be the preferred choice for addressing different research questions. The KID offers a large sample designed to reflect pediatric discharges. This enables the study of low incidence disorders and less common procedures; KID estimates can be calculated for literally thousands of special sub-populations that may be of interest to researchers. In addition, KID hospitals accurately reflect the universe of United States hospitals, particularly the relative mix of large and small hospitals. Thus, the KID may be more appropriate when hospital type and size are important considerations.

The NIS offers many of these same advantages; however, it was designed to reflect the general universe of hospital discharges. While it does include pediatric discharges, sample weights were not created to specifically reflect this population. The pediatric component of the NIS includes millions of records, but it is still smaller than the KID database.

In contrast to the KID (and NIS), the NHDS offers data drawn from all 50 states, rather than the 36 states that comprise the 2003 KID or the 37 states in the 2003 NIS. In cases where comprehensive geographic representation is more important than a large sample size, and when the question under study requires all age groups, the NHDS might be preferable.

The KID is not without bias: specifically, it over-represents large hospitals and urban states and under-represents smaller hospitals and rural/frontier states. It does, however, provide a useful data source for answering many research questions concerning infants and children. The causes of the differences that do exist between the KID and the NHDS, particularly with regard to in-hospital mortality rate estimates, warrant further investigation. The relationship between hospital size and treatment patterns is one example.

When considering which of the data sources discussed is preferable or better, the answer depends on the needs of the researcher. The intended use of the data is the most critical factor in determining which data source will be most valuable. In general, the KID estimates of variables essential to health care policy – including in-hospital mortality, inpatient population size, length of stay, and costs – are accurate and precise. Statistics can be calculated for large groups, ranging from the inpatient population of the United States to small subsets featuring specific conditions. The characteristics documented in this report suggest that the 2003 KID is a valuable tool for researchers and policy makers alike.

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APPENDIX A: KID-AHA TABLES

Table 12. Number of Hospitals in KID Frame and Universe, 2003

	2003 AHA Universe		2003 KID Frame[1]	
	Hospitals	**Percent[2]**	**Hospitals**	**Percent[2]**
U.S.	4,836	100.0%	3,438	100.0%
Region				
Northeast	657	13.6%	420	12.2%
Midwest	1,404	29.0%	1,250	36.4%
South	1,878	38.8%	1,068	31.1%
West	897	18.5%	700	20.4%
Hospital Control				
Public	1,128	23.3%	721	21.0%
Not for-profit	2,947	60.9%	2,221	64.6%
Proprietary	761	15.7%	496	14.4%
Location / Teaching Status				
Rural	2,171	44.9%	1,412	41.1%
Small	1,333	*61.4%*	558	*39.5%*
Medium	469	*21.6%*	360	*25.5%*
Large	369	*17.0%*	494	*35.0%*
Urban, non-teaching	1,858	38.4%	1,414	41.1%
Small	685	*36.9%*	440	*31.1%*
Medium	613	*33.0%*	456	*32.2%*
Large	560	*30.1%*	518	*36.6%*
Urban, teaching	807	16.7%	612	17.8%
Small	232	*28.7%*	164	*26.8%*
Medium	235	*29.1%*	200	*32.7%*
Large	340	*42.1%*	248	*40.5%*

Note: All values are from the AHA Annual Survey.

Significance tests were not performed because AHA numbers are not sample statistics.

[1]The 2003 frame contains 36 states.

[2]Percentages were calculated based on total hospital count, except for hospital size categories (in italics), which were calculated based on location/teaching-status totals.

Table 13. KID Hospitals and AHA Universe Comparisons, 2003

	Universe Mean	KID Mean	Universe Median	KID Median
Hospital Admissions	7,094.24	7,955.39	3,766.00	4,824.50
Hospital Discharges	7,094.24	7,955.39	3,766.00	4,824.50
Hospital Discharges (adjusted)[1]	7,905.85	8,897.26	4,162.00	5,360.50
Average Length of Stay	5.47	4.94	4.41	4.39
Average Length of Stay (adjusted)[1]	5.09	4.54	4.03	3.98
Births	811.61	941.87	310.00	425.50
Percent Medicare Days	54.06	52.99	54.96	54.20
Percent Medicare Discharges	47.90	46.66	47.82	47.05
Percent Medicare Discharges (adjusted)[1]	44.55	43.02	43.26	42.38
Percent Medicaid Days	14.59	15.07	12.37	12.74
Percent Medicaid Discharges	15.74	16.20	14.84	15.04
Percent Medicaid Discharges (adjusted)[1]	14.25	14.56	13.43	13.52
Hospital Beds	152.16	167.31	91.00	108.00
Occupancy Rate	51.88	53.45	53.05	55.32
Inpatient Surgeries	2,058.35	2,298.37	1,002.00	1,263.50
FTE[2]	845.20	947.44	415.00	500.25
FTE[2] per Bed	5.25	5.48	4.86	5.07
RN FTE[2] per 1000 Patient Days	3.07	3.11	2.90	2.98
Intern-Resident FTE[2] per 100 Beds	5.72	6.56	0.00	0.00
Total Hospital Expenses [dollars]	91,972,824	105,911,469	40,065,398	53,147,277
Hosp. Expenses per Bed [dollars]	524,797	567,716	483,930	519,516
Total Hospital Payroll [dollars]	37,813,037	43,641,726	16,630,975	21,795,757
Hosp. Payroll per Bed [dollars]	215,407	233,016	196,206	213,271

Note: All values are from the AHA Annual Survey.

Significance tests were not performed because AHA numbers are not sample statistics.

[1]Adjusted to include well newborns.

[2]Full-time equivalents.

Table 14. KID and Non-KID Hospital Comparisons, 2003

	Non-KID	KID
High Tech Index (mean)	2.27	3.24
High Tech Index (median)	1.00	2.00
Percent with Unit, Service, or Designation		
Components of the High Tech Index		
Neonatal ICUs	13.90	20.86
Cardiac Catheterization	24.43	38.92
CT Scanners	66.28	81.24
MRIs	40.47	57.45
Open Heart Surgeries	15.83	22.05
Transplant Services	5.44	7.94
X-Ray Radiation Therapy	16.86	27.43
Extracorporeal Shock Wave Lithotripsy	16.04	22.89
Coronary Angioplasty	18.65	28.53
PET Scanners	9.22	16.38
Percent with Other Services and Facilities		
Burn Units	3.44	4.65
Rehabilitation Units	22.30	26.85
Alcoholism/Chemical Dependency Services	6.54	10.41
Trauma Centers	28.29	30.54
Emergency Departments	72.68	84.21
Percent Designated as Pediatric Specialty Hospitals	2.68	1.19

Note: All values are from the AHA Annual Survey.

Significance tests were not performed because AHA numbers are not sample statistics.

APPENDIX B: KID-NIS TABLES

Table 15. KID and NIS Comparisons Overall and by Region, 2003

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
Overall	7,409 (119)	7,358 (224)	3.58 (0.03)	3.50 (0.06)	0.37 (0.01)	0.35 (0.01)	$10,190 (239)	$9,851 (444)
Region								
Northeast	1,266 (56)	1,270 (90)	3.89 (0.08)	3.87 (0.15)	0.32 (0.02)	0.33 (0.03)	$11,103 (644)	$12,829 (1,564)
South	1,664 (59)	1,642 (100)	3.52 (0.08)	3.33 (0.15)	0.38 (0.02)	0.31 (0.04)	$8,906 (486)	$7,297 (762)
Midwest	2,788 (89)	2,787 (145)	3.53 (0.06)	3.57 (0.10)	0.38 (0.02)	0.39 (0.02)	$8,893 (457)	$9,079 (516)
West	1,689 (63)	1,657 (105)	3.39 (0.08)	3.25 (0.13)	0.39 (0.02)	0.35 (0.03)	$13,063 (743)	$11,492 (1,061)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

Table 16. KID and NIS Comparisons by Control and Bed Count, 2003

Control and Size	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
Total Public	1,081 (73)	1,125 (145)	3.66 (0.11)	3.83 (0.24)	0.43 (0.03)	0.48 (0.05)	$9,710 (619)	$10,284 (1,123)
1-99 Beds	183 (11)	198 (19)	2.09 (0.02)	2.07 (0.04)	0.08 (0.01)	0.08 (0.01)	$2,910 (76)	$2,762 (100)
100-199 Beds	163 (16)	159 (26)	2.59 (0.12)	2.73 (0.09)	0.14 (0.02)	0.16 (0.01)	$4,966 (494)	$4,684 (291)
200-299 Beds	134 (23)	72 (33)	3.07 (0.12)	3.43 (0.56)	0.19 (0.03)	0.14 (0.04)	$6,809 (1,172)	$6,656 (1,253)
300-499 Beds	239 (28)	236 (55)	4.13 (0.17)	3.99 (0.30)	0.65 (0.06)	0.61 (0.08)	$12,808 (1,194)	$15,015 (4,306)
500+ Beds	360 (42)	458 (84)	4.84 (0.24)	4.95 (0.42)	0.69 (0.06)	0.76 (0.06)	$14,526 (1,463)	$13,648 (1,315)
Total Private Non-Profit	5,442 (121)	5,252 (236)	3.62 (0.04)	3.49 (0.08)	0.39 (0.01)	0.35 (0.02)	$10,408 (299)	$9,718 (585)
1-99 Beds	479 (20)	508 (35)	2.44 (0.07)	2.30 (0.10)	0.11 (0.01)	0.08 (0.02)	$4,673 (432)	$4,714 (845)
100-199 Beds	960 (47)	962 (84)	2.98 (0.10)	2.95 (0.20)	0.22 (0.02)	0.19 (0.05)	$6,995 (646)	$6,769 (1,184)
200-299 Beds	1,189 (73)	943 (120)	3.67 (0.10)	3.32 (0.19)	0.40 (0.03)	0.31 (0.06)	$11,550 (903)	$8,749 (1,606)
300-499 Beds	1,458 (87)	1,665 (163)	3.68 (0.09)	3.64 (0.14)	0.38 (0.02)	0.37 (0.04)	$10,225 (814)	$9,398 (742)
500+ Beds	1,354 (88)	1,172 (162)	4.39 (0.08)	4.35 (0.17)	0.60 (0.03)	0.59 (0.05)	$14,001 (644)	$15,532 (1,661)
Total Proprietary	884 (49)	980 (105)	3.03 (0.07)	3.17 (0.15)	0.20 (0.01)	0.25 (0.04)	$9,460 (545)	$10,038 (1,097)
1-99 Beds	126 (13)	131 (24)	2.41 (0.08)	2.47 (0.11)	0.05 (0.00)	0.03 (0.00)	$6,325 (597)	$5,707 (664)
100-199 Beds	310 (20)	312 (42)	2.51 (0.05)	2.48 (0.10)	0.12 (0.01)	0.13 (0.02)	$6,636 (385)	$6,260 (878)
200-299 Beds	206 (26)	250 (50)	3.11 (0.13)	3.14 (0.24)	0.19 (0.03)	0.25 (0.05)	$9,549 (1,074)	$10,511 (2,096)
300-499 Beds	150 (22)	205 (37)	3.73 (0.17)	4.32* (0.21)	0.35 (0.05)	0.48 (0.06)	$14,958 (1,631)	$16,112 (1,730)
500+ Beds	89 (26)	79 (11)	4.35 (0.22)	4.19 (0.39)	0.50 (0.04)	0.44 (0.04)	$14,240 (1,430)	$14,862 (3,159)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

Table 17. KID and NIS Comparisons by Hospital Type and Size, 2003

Hospital Type	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
Rural	1,010 (26)	973 (46)	2.41 (0.03)	2.32 (0.04)	0.12 (0.01)	0.10 (0.01)	$3,810 (147)	$3,394* (108)
Small	211 (10)	208 (15)	2.04 (0.01)	2.04 (0.03)	0.07 (0.00)	0.07 (0.01)	$3,356 (308)	$2,944 (82)
Medium	267 (15)	304 (27)	2.21 (0.02)	2.18 (0.02)	0.07 (0.00)	0.05 (0.01)	$3,393 (95)	$3,311 (127)
Large	532 (28)	460 (51)	2.66 (0.06)	2.53 (0.08)	0.16 (0.02)	0.15 (0.02)	$4,200 (242)	$3,653 (202)
Urban, Non-Teaching	2,811 (69)	2,877 (129)	2.97 (0.04)	2.98 (0.07)	0.19 (0.01)	0.19 (0.01)	$7,250 (248)	$7,232 (462)
Small	292 (19)	307 (35)	2.55 (0.09)	2.53 (0.17)	0.12 (0.02)	0.10 (0.03)	$5,764 (540)	$6,296 (1,382)
Medium	841 (35)	881 (74)	2.65 (0.06)	2.79 (0.19)	0.14 (0.01)	0.15 (0.03)	$5,932 (394)	$6,505 (1,110)
Large	1,677 (59)	1,688 (117)	3.21 (0.05)	3.16 (0.08)	0.23 (0.01)	0.22 (0.02)	$8,169 (342)	$7,782 (488)
Urban, Teaching	3,586 (102)	3,507 (177)	4.33 (0.05)	4.25 (0.11)	0.59 (0.01)	0.56 (0.03)	$14,362 (438)	$13,929 (785)
Small	628 (57)	561 (101)	4.13 (0.13)	3.48 (0.31)	0.51 (0.04)	0.38 (0.09)	$15,853 (1,206)	$11,139 (2,467)
Medium	865 (70)	998 (132)	4.09 (0.11)	4.18 (0.22)	0.51 (0.03)	0.53 (0.06)	$12,887 (981)	$13,261 (1,405)
Large	2,091 (105)	1,946 (181)	4.50 (0.08)	4.50 (0.14)	0.64 (0.02)	0.63 (0.03)	$14,520 (634)	$14,988 (1,078)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

Table 18. KID and NIS Comparisons by Age Group, Gender, and Race, 2003

Age Group	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
Newborn	2,918 (64)	3,177 (129)	3.33 (0.04)	3.23 (0.07)	0.39 (0.01)	0.37 (0.02)	$6,764 (203)	$6,475 (430)
Up to 1 month	144 (6)	133 (11)	6.05 (0.17)	5.94 (0.33)	0.98 (0.07)	0.82 (0.11)	$21,984 (1,099)	$19,474 (1,507)
1 month to 1 year	326 (12)	314 (26)	4.06 (0.08)	3.81 (0.14)	0.46 (0.03)	0.40 (0.04)	$14,954 (653)	$12,786* (891)
1-4 years	1,797 (69)	1,656 (118)	3.46 (0.07)	3.57 (0.13)	0.37 (0.02)	0.38 (0.04)	$9,262 (436)	$9,503 (600)
5-9 years	370 (11)	355 (25)	3.55 (0.05)	3.41 (0.09)	0.27 (0.01)	0.25 (0.02)	$14,488 (439)	$13,699 (668)
10-14 years	406 (12)	383 (25)	4.47 (0.08)	4.35 (0.17)	0.36 (0.01)	0.29* (0.02)	$17,130 (457)	$16,787 (822)
15-20 years	1,405 (20)	1,337 (38)	3.52 (0.03)	3.50 (0.08)	0.29 (0.01)	0.27 (0.01)	$12,839 (214)	$13,326 (510)
Gender								
Female	3,857 (61)	3,840 (113)	3.40 (0.03)	3.36 (0.06)	0.30 (0.00)	0.28 (0.01)	$9,443 (214)	$9,220 (413)
Male	3,477 (58)	3,485 (112)	3.75 (0.03)	3.66 (0.07)	0.46 (0.01)	0.43 (0.02)	$10,999 (277)	$10,517 (493)
Unknown	73 (4)	33** (4)	2.33 (0.04)	2.23 (0.09)	0.12 (0.01)	0.26 (0.10)	$11,310 (479)	$13,790 (1,191)
Race								
White	2,746 (72)	2,727 (127)	3.48 (0.04)	3.45 (0.08)	0.32 (0.01)	0.32 (0.02)	$9,740 (307)	$9,423 (549)
Black	807 (34)	852 (71)	4.30 (0.06)	4.34 (0.13)	0.57 (0.02)	0.57 (0.03)	$12,194 (388)	$13,175 (893)
Other	1,770 (69)	1,764 (125)	3.55 (0.06)	3.44 (0.10)	0.38 (0.01)	0.35 (0.02)	$11,772 (498)	$11,418 (791)
Unknown	2,084 (82)	2,012 (159)	3.37 (0.06)	3.25 (0.13)	0.36 (0.02)	0.31 (0.03)	$8,693 (384)	$7,683 (608)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

Table 19. KID and NIS Comparisons by Principal Payer, 2003

Principal Payer	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
Medicare	16 (1)	11 (1)	6.21 (1.64)	4.49 (0.41)	0.51 (0.09)	0.63 (0.15)	$17,335 (1,944)	$16,695 (2,362)
Medicaid	3,139 (67)	3,143 (135)	3.72 (0.04)	3.64 (0.08)	0.37 (0.01)	0.35 (0.02)	$10,400 (290)	$10,196 (526)
Private Insurance	3,610 (74)	3,632 (142)	3.42 (0.03)	3.38 (0.05)	0.33 (0.01)	0.31 (0.01)	$9,883 (255)	$9,350 (451)
Self Pay	359 (15)	336 (27)	2.89 (0.06)	2.79 (0.12)	0.60 (0.03)	0.65 (0.06)	$7,765 (300)	$8,085 (816)
No Charge	14 (3)	16 (9)	3.72 (0.17)	3.92 (0.18)	0.31 (0.06)	0.36 (0.10)	$11,308 (987)	$10,760 (793)
Other	256 (18)	206* (17)	4.16 (0.14)	4.45 (0.44)	0.55 (0.04)	0.62 (0.09)	$14,802 (1,011)	$15,190 (2,286)
Missing	11 (2)	10 (2)	4.85 (1.00)	3.57 (0.81)	0.97 (0.18)	0.36** (0.14)	$10,801 (1,641)	$11,377 (4,031)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

Table 20. KID and NIS Comparisons by DRG, 2003

DRG	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
391: Normal newborn	2,975 (52)	3,081 (100)	2.07 (0.00)	2.06 (0.01)	0.00 (0.00)	0.00 (0.00)	$1,860 (32)	$1,861 (62)
390: Neonate w other significant problems	527 (11)	551 (23)	2.69 (0.01)	2.69 (0.03)	0.00 (0.00)	0.00 (0.00)	$3,853 (82)	$3,849 (173)
373: Vaginal delivery w/o complicating diagnoses	425 (8)	397 (15)	2.13 (0.00)	2.12 (0.01)	0.00 (0.00)	0.00 (0.00)	$6,148 (84)	$6,399 (256)
98: Bronchitis & asthma age 0-17	326 (9)	322 (19)	2.56 (0.01)	2.49 (0.03)	0.00 (0.00)	0.00 (0.00)	$7,405 (178)	$7,459 (397)
388: Prematurity w/o major problems	178 (4)	184 (7)	5.99 (0.06)	6.15 (0.15)	0.00 (0.00)	0.00 (0.00)	$12,017 (327)	$12,936 (786)
389: Full term neonate w major problems	172 (4)	171 (7)	5.63 (0.06)	5.62 (0.12)	0.00 (0.00)	0.00 (0.00)	$16,652 (495)	$16,611 (888)
91: Simple pneumonia & pleurisy age 0-17	162 (3)	161 (7)	2.94 (0.02)	2.84* (0.03)	0.06 (0.01)	0.06 (0.01)	$8,464 (215)	$7,952 (351)
298: Nutritional & misc metabolic disorders age 0-17	132 (3)	132 (7)	2.38 (0.03)	2.29 (0.05)	0.05 (0.00)	0.04 (0.01)	$5,819 (173)	$5,456 (271)
430: Psychoses	132 (7)	131 (12)	7.94 (0.23)	7.45 (0.35)	0.02 (0.01)	0.00 (0.00)	$11,461 (392)	$11,885 (723)
184: Esophagitis	131 (4)	127 (8)	2.32 (0.02)	2.29 (0.06)	0.03 (0.00)	0.03 (0.01)	$6,569 (168)	$6,608 (412)
371: Cesarean section w/o cc	87 (1)	83 (3)	3.40 (0.01)	3.38 (0.03)	0.00 (0.00)	0.00 (0.00)	$11,461 (193)	$11,989 (410)
385: Neonates	83 (2)	82 (4)	5.89 (0.25)	5.63 (0.39)	18.80 (0.68)	19.76 (1.01)	$30,005 (1,372)	$28,289 (2,073)
386: Extreme immaturity or respiratory distress syndrome	80 (2)	84 (5)	34.01 (0.47)	34.11 (1.01)	0.00 (0.00)	0.00 (0.00)	120,393 (3,046)	123,775 (6,649)
26: Seizure & headache age 0-17	75 (3)	69 (6)	2.55 (0.04)	2.45 (0.08)	0.13 (0.01)	0.09 (0.02)	$10,265 (337)	$9,936 (630)
422: Viral illness & fever of unknown origin age 0-17	73 (2)	72 (4)	2.42 (0.02)	2.36 (0.03)	0.03 (0.01)	0.03 (0.01)	$6,777 (173)	$6,544 (308)
387: Prematurity w major problems	66 (1)	69 (3)	16.69 (0.19)	16.59 (0.38)	0.00 (0.00)	0.00 (0.00)	$48,368 (1,333)	$49,954 (2,835)
167: Appendectomy w/o complicated principal diag w/o cc	65 (1)	61 (2)	1.80 (0.01)	1.77 (0.02)	0.00 (0.00)	0.00 (0.00)	$12,563 (159)	$12,690 (334)

DRG	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
70: Otitis media & uri age 0-17	62 (1)	61 (3)	2.29 (0.02)	2.26 (0.04)	0.03 (0.01)	0.00 (0.00)	$6,166 (140)	$5,827 (233)
372: Vaginal delivery w complicating diagnoses	62 (1)	57 (2)	2.79 (0.01)	2.78 (0.03)	0.00 (0.00)	0.01 (0.01)	$8,097 (117)	$8,564 (371)
322: Kidney & urinary tract infections age 0-17	51 (1)	49 (2)	3.12 (0.04)	3.03 (0.04)	0.00 (0.00)	0.01 (0.01)	$8,159 (196)	$7,701 (294)
383: Other antepartum diagnoses w medical complications	44 (1)	41 (1)	2.82 (0.03)	2.80 (0.05)	0.01 (0.00)	0.00* (0.00)	$7,424 (127)	$7,904 (426)
295: Diabetes age 0-35	42 (1)	40 (3)	2.63 (0.03)	2.61 (0.05)	0.09 (0.01)	0.06 (0.02)	$8,694 (193)	$9,013 (449)
279: Cellulitis age 0-17	40 (2)	39 (3)	2.94 (0.02)	2.83* (0.04)	0.00 (0.00)	0.00 (0.00)	$7,679 (215)	$7,325 (413)
370: Cesarean section w cc	35 (0)	35 (1)	4.41 (0.03)	4.45 (0.07)	0.04 (0.01)	0.04 (0.02)	$14,510 (257)	$15,768 (701)
396: Red blood cell disorders age 0-17	29 (1)	28 (3)	4.00 (0.09)	3.84 (0.17)	0.14 (0.02)	0.06 (0.03)	$13,701 (565)	$12,695 (915)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

Note: “DRG” refers to Diagnosis Related Groups.

Table 21. KID and NIS Comparisons by Most Frequent Principal Diagnosis, 2003

Top 25 Principal Diagnoses (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
218: Liveborn	3,932 (69)	4,084 (132)	3.17 (0.02)	3.20 (0.06)	0.31 (0.00)	0.33 (0.01)	$5,779 (144)	$6,099 (318)
128: Asthma	173 (5)	171 (12)	2.32 (0.02)	2.24 (0.03)	0.01 (0.00)	0.02 (0.00)	$7,650 (216)	$7,639 (461)
122: Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	170 (4)	167 (8)	3.52 (0.06)	3.33* (0.07)	0.24 (0.02)	0.20 (0.03)	$12,046 (492)	$10,832 (544)
125: Acute bronchitis	155 (4)	153 (8)	2.99 (0.02)	2.93 (0.04)	0.04 (0.00)	0.02 (0.00)	$8,488 (232)	$8,433 (457)
55: Fluid and electrolyte disorders	123 (3)	125 (6)	2.10 (0.01)	2.05 (0.03)	0.06 (0.00)	0.04 (0.01)	$5,229 (127)	$5,003 (235)
193: Trauma to perineum and vulva	120 (2)	111 (4)	2.08 (0.01)	2.05 (0.01)	0.00 (0.00)	0.00 (0.00)	$6,016 (87)	$6,199 (266)
69: Affective disorders	112 (6)	114 (11)	7.19 (0.22)	6.88 (0.31)	0.02 (0.01)	0.00 (0.00)	$10,198 (344)	$10,737 (620)
195: Other complications of birth, puerperium affecting management of mother	112 (2)	108 (4)	2.59 (0.01)	2.60 (0.03)	0.00 (0.00)	0.01 (0.00)	$7,981 (109)	$8,495 (326)
142: Appendicitis and other appendiceal conditions	99 (2)	94 (3)	2.97 (0.03)	2.91 (0.04)	0.00 (0.00)	0.00 (0.00)	$16,073 (239)	$16,068 (476)
181: Other complications of pregnancy	93 (1)	85* (3)	2.45 (0.01)	2.47 (0.03)	0.02 (0.00)	0.01 (0.00)	$7,173 (102)	$7,805 (330)
83: Epilepsy, convulsions	74 (3)	68 (6)	2.81 (0.06)	2.75 (0.13)	0.17 (0.01)	0.12 (0.02)	$12,548 (492)	$12,156 (1,041)
224: Other perinatal conditions	68 (3)	61 (7)	7.43 (0.15)	7.31 (0.22)	1.67 (0.12)	1.40 (0.13)	$27,604 (978)	$25,666 (1,564)
196: Normal pregnancy and/or delivery	67 (1)	62 (3)	1.96 (0.01)	2.02 (0.07)	0.00 (0.00)	0.00 (0.00)	$5,850 (114)	$5,895 (226)
159: Urinary tract infections	61 (1)	58 (2)	3.13 (0.03)	3.04 (0.04)	0.01 (0.00)	0.02 (0.01)	$8,521 (189)	$8,083 (283)
126: Other upper respiratory infections	57 (1)	57 (3)	2.13 (0.03)	2.11 (0.06)	0.02 (0.01)	0.00** (0.00)	$6,716 (199)	$6,435 (323)

Top 25 Principal Diagnoses (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
197: Skin and subcutaneous tissue infections	51 (2)	49 (3)	3.13 (0.02)	3.02* (0.04)	0.01 (0.00)	0.00* (0.00)	$8,772 (211)	$8,321 (427)
184: Early or threatened labor	49 (1)	47 (2)	3.03 (0.04)	3.16 (0.08)	0.00 (0.00)	0.01 (0.01)	$7,983 (164)	$9,211 (687)
7: Viral infection	46 (1)	47 (2)	2.56 (0.02)	2.47* (0.03)	0.05 (0.01)	0.00** (0.00)	$7,471 (185)	$7,123 (321)
222: Hemolytic jaundice and perinatal jaundice	45 (1)	42 (2)	2.10 (0.02)	2.07 (0.04)	0.04 (0.01)	0.05 (0.02)	$4,504 (124)	$4,228 (221)
74: Other mental conditions	44 (2)	44 (5)	5.92 (0.23)	6.64 (0.69)	0.05 (0.03)	0.01 (0.01)	$9,259 (513)	$11,065 (1,286)
135: Intestinal infection	42 (1)	39 (2)	2.45 (0.02)	2.40 (0.05)	0.02 (0.00)	0.00* (0.00)	$6,368 (167)	$6,244 (304)
45: Maintenance chemotherapy, radiotherapy	41 (2)	32 (5)	3.92 (0.09)	3.95 (0.14)	0.13 (0.02)	0.06 (0.02)	$19,777 (931)	$20,772 (1,586)
230: Fracture of lower limb	40 (1)	38 (2)	3.66 (0.06)	3.63 (0.11)	0.02 (0.00)	0.03 (0.01)	$21,596 (533)	$22,939 (1,150)
185: Prolonged pregnancy	39 (1)	37 (1)	2.43 (0.01)	2.42 (0.02)	0.00 (0.00)	0.00 (0.00)	$7,279 (115)	$7,753 (362)
154: Noninfectious gastroenteritis	38 (1)	40 (3)	1.94 (0.02)	1.96 (0.03)	0.02 (0.01)	0.01 (0.01)	$5,554 (173)	$5,628 (389)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

Note: “CCS” refers to Clinical Classifications Software.

Table 22. KID and NIS Comparisons by Rare Principal Diagnosis, 2003

Rare Principal Diagnosis (CCS)	Number of Discharges in (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
160: Calculus of urinary tract	7,776 (195)	7,868 (383)	2.06 (0.04)	2.00 (0.05)	0.00 (0.00)	0.00 (0.00)	$10,390 (325)	$10,077 (505)
39: Leukemias	7,733 (553)	6,937 (1,013)	15.67 (0.67)	13.54 (1.28)	4.58 (0.37)	4.17 (0.59)	$96,924 (5,093)	$87,875 12,643)
172: Ovarian cyst	7,090 (162)	6,935 (301)	1.96 (0.02)	1.91 (0.04)	0.02 (0.02)	0.00 (0.00)	$10,842 (183)	$10,670 (335)
56: Cystic fibrosis	6,431 (576)	4,939 (943)	9.66 (0.28)	9.75 (0.41)	0.91 (0.16)	0.91 (0.28)	$36,354 (1,953)	$38,011 (3,656)
216: Nervous system congenital anomalies	5,623 (426)	5,103 (1,179)	7.02 (0.37)	6.65 (1.28)	1.16 (0.20)	1.19 (0.44)	$34,391 (1,818)	$31,278 (5,559)
243: Poisoning by nonmedicinal substances	5,612 (202)	5,077 (377)	2.27 (0.07)	2.55 (0.18)	0.57 (0.12)	0.27 (0.15)	$10,667 (485)	$12,403 (1,216)
66: Alcohol-related mental disorders	4,914 (261)	4,444 (561)	4.10 (0.37)	4.43 (0.86)	0.00 (0.00)	0.00 (0.00)	$6,974 (490)	$7,249 (630)
35: Cancer of brain and nervous system	4,785 (385)	3,887 (704)	9.61 (0.34)	9.84 (0.88)	4.52 (0.43)	4.58 (0.83)	$59,635 (2,478)	$60,581 (4,424)
210: Systemic lupus erythematosus and connective tissue disorders	3,664 (296)	3,140 (452)	5.76 (0.27)	6.46 (0.43)	0.94 (0.22)	0.94 (0.37)	$28,021 (1,881)	$30,523 (3,351)
21: Cancer of bone and connective tissue	2,854 (227)	2,446 (336)	7.95 (0.30)	6.64* (0.48)	2.12 (0.37)	1.28 (0.51)	$51,124 (2,648)	$45,200 (3,779)
77: Encephalitis (except that caused by tuberculosis or STD)	2,325 (124)	2,022 (236)	9.20 (0.42)	9.08 (0.78)	2.32 (0.38)	1.16 (0.46)	$40,849 (2,405)	$44,132 (4,556)
227: Spinal cord injury	1,844 (103)	1,698 (194)	13.00 (0.62)	13.06 (1.08)	1.37 (0.37)	2.32 (0.95)	$89,122 (4,391)	$95,524 (8,235)
5: HIV infection	1,452 (148)	1,422 (306)	8.62 (0.42)	10.84* (0.92)	4.03 (0.60)	4.01 (0.98)	$35,043 (2,482)	$47,669 (6,097)
158: Chronic renal failure	1,392 (149)	965 (191)	7.40 (0.41)	7.66 (0.75)	0.93 (0.31)	1.53 (0.89)	$56,455 (4,543)	$48,505 (4,169)
96: Heart valve disorders	1,234 (107)	985 (190)	6.44 (0.38)	7.00 (0.68)	1.27 (0.43)	1.46 (0.75)	$68,951 (3,844)	$71,054 (9,495)
1: Tuberculosis	858 (66)	807 (113)	11.24 (0.58)	13.41 (1.39)	0.58 (0.33)	1.22 (0.87)	$39,709 (3,221)	$45,255 (5,191)
30: Cancer of testis	307 (29)	229 (44)	5.89 (0.48)	5.89 (0.63)	0.00 (0.00)	0.00 (0.00)	$33,226 (3,101)	$41,642 (6,859)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

Note: “CCS” refers to Clinical Classifications Software.

Table 23. KID and NIS Comparisons by Most Frequent Principal Procedure, 2003

Top 25 Principal Procedures (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
115: Circumcision	1,070 (22)	1,090 (43)	2.60 (0.01)	2.59 (0.03)	0.00 (0.00)	0.00 (0.00)	$3,064 (72)	$3,113 (195)
228: Prophylactic vaccinations and inoculations	470 (28)	550 (59)	2.41 (0.02)	2.47 (0.06)	0.00 (0.00)	0.00 (0.00)	$2,874 (116)	$3,490 (622)
137: Other procedures to assist delivery	229 (5)	212 (10)	2.21 (0.01)	2.21 (0.02)	0.00 (0.00)	0.00 (0.00)	$6,350 (94)	$6,490 (235)
220: Ophthalmologic and otologic diagnosis and treatment	187 (18)	217 (36)	2.50 (0.03)	2.50 (0.05)	0.00 (0.00)	0.00 (0.00)	$2,940 (174)	$2,589 (181)
231: Other therapeutic procedures	172 (7)	184 (18)	5.44 (0.10)	5.42 (0.24)	0.14 (0.01)	0.12 (0.02)	$13,765 (411)	$13,589 (832)
216: Respiratory intubation and mechanical ventilation	147 (4)	143 (8)	17.90 (0.30)	18.59 (0.68)	6.76 (0.16)	6.59 (0.32)	$72,666 (1,713)	$76,637 (3,842)
4: Diagnostic spinal tap	129 (4)	120 (8)	4.09 (0.05)	4.00 (0.09)	0.09 (0.01)	0.10 (0.02)	$13,208 (388)	$12,861 (643)
134: Cesarean section	122 (2)	118 (4)	3.69 (0.02)	3.70 (0.04)	0.01 (0.00)	0.00 (0.00)	$12,350 (198)	$13,121 (473)
140: Repair of current obstetric laceration	112 (3)	105 (5)	2.19 (0.01)	2.16 (0.02)	0.00 (0.00)	0.00 (0.00)	$6,260 (100)	$6,636 (351)
80: Appendectomy	101 (2)	95 (3)	2.85 (0.02)	2.82 (0.04)	0.01 (0.00)	0.00 (0.00)	$15,723 (226)	$15,855 (448)
133: Episiotomy	75 (2)	70 (3)	2.21 (0.01)	2.19 (0.02)	0.00 (0.00)	0.00 (0.00)	$6,645 (120)	$7,140 (349)
217: Other respiratory therapy	63 (6)	67 (11)	3.53 (0.12)	3.44 (0.18)	0.11 (0.01)	0.13 (0.03)	$9,745 (736)	$10,170 (895)
54: Other vascular catheterization, not heart	55 (2)	53 (4)	13.24 (0.29)	13.15 (0.70)	2.59 (0.14)	2.42 (0.29)	$50,221 (1,872)	$49,866 (4,002)
135: Forceps, vacuum, and breech delivery	46 (1)	45 (2)	2.29 (0.01)	2.30 (0.02)	0.00 (0.00)	0.02 (0.01)	$6,975 (127)	$7,265 (328)
224: Cancer chemotherapy	37 (2)	30 (4)	3.96 (0.07)	4.19 (0.14)	0.17 (0.02)	0.23 (0.06)	$19,671 (775)	$21,286 (1,783)
223: Enteral and parenteral nutrition	25 (1)	21 (2)	12.81 (0.29)	13.61 (0.46)	1.07 (0.11)	0.84 (0.16)	$40,683 (1,770)	$46,476 (4,773)

Top 25 Principal Procedures (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
222: Blood transfusion	24 (1)	23 (2)	6.22 (0.15)	6.31 (0.35)	1.80 (0.14)	1.52 (0.18)	$26,349 (877)	$25,751 (1,778)
146: Treatment, fracture or dislocation of hip and femur	22 (0)	20 (1)	4.20 (0.08)	4.13 (0.16)	0.17 (0.03)	0.28 (0.08)	$25,797 (718)	$26,358 (1,487)
147: Treatment, fracture or dislocation of lower extremity (other than hip or femur)	21 (0)	20 (1)	2.86 (0.05)	2.89 (0.11)	0.06 (0.02)	0.11 (0.05)	$18,529 (429)	$19,806 (972)
94: Other OR upper GI therapeutic procedures	21 (1)	19 (2)	7.93 (0.24)	8.19 (0.51)	0.46 (0.06)	0.69 (0.15)	$34,507 (1,219)	$32,929 (2,357)
227: Other diagnostic procedures (interview, evaluation, consultation)	21 (1)	17 (3)	4.00 (0.17)	4.85* (0.39)	0.21 (0.05)	0.18 (0.07)	$15,204 (1,008)	$17,104 (1,475)
148: Other fracture and dislocation procedure	20 (1)	19 (2)	2.16 (0.05)	2.23 (0.08)	0.01 (0.00)	0.02 (0.02)	$15,044 (472)	$15,793 (1,363)
70: Upper gastrointestinal endoscopy, biopsy	18 (0)	17 (1)	4.68 (0.14)	5.01 (0.40)	0.24 (0.04)	0.22 (0.07)	$17,983 (647)	$20,032 (1,975)
9: Other OR therapeutic nervous system procedures	17 (1)	14 (2)	7.75 (0.21)	7.93 (0.50)	2.43 (0.19)	2.83 (0.46)	$49,698 (1,576)	$51,998 (4,191)
33: Other OR therapeutic procedures on nose, mouth and pharynx	17 (0)	14 (1)	3.07 (0.10)	2.81 (0.14)	0.07 (0.02)	0.03 (0.03)	$16,841 (647)	$15,646 (938)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

Note: “CCS” refers to Clinical Classifications Software.

Table 24. KID and NIS Comparisons by Rare Principal Procedure, 2003

Rare Principal Procedure (CCS)	Number of Discharges in (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)		Average Total Hospital Charge (Standard Error)	
	KID	NIS	KID	NIS	KID	NIS	KID	NIS
84: Cholecystectomy and common duct exploration	15,632 (330)	14,363* (541)	3.53 (0.05)	3.55 (0.10)	0.06 (0.02)	0.06 (0.04)	$20,808 (393)	$21,511 (871)
219: Alcohol and drug rehabilitation/detoxification	10,895 (1,292)	9,592 (1,793)	7.13 (0.60)	6.36 (0.93)	0.06 (0.04)	0.05 (0.05)	$9,384 (992)	$8,341 (864)
144: Treatment, facial fracture or dislocation	5,905 (244)	5,426 (422)	3.08 (0.07)	3.07 (0.13)	0.00 (0.00)	0.00 (0.00)	$23,011 (1,086)	$25,356 (1,508)
172: Skin graft	5,609 (562)	4,331 (614)	10.72 (0.48)	10.55 (0.52)	0.24 (0.08)	0.32 (0.18)	$54,327 (2,622)	$59,819 (5,286)
78: Colorectal resection	5,521 (287)	5,011 (473)	13.96 (0.45)	14.43 (0.78)	2.26 (0.27)	2.54 (0.48)	$61,472 (2,270)	$60,132 (3,998)
34: Tracheostomy, temporary and permanent	5,341 (281)	4,703 (480)	50.65 (1.49)	54.36 (3.19)	7.08 (0.48)	5.74 (0.90)	249,822 (6,197)	258,625 13,173)
65: Bone marrow biopsy	5,145 (352)	4,659 (630)	9.47 (0.33)	9.31 (0.43)	1.40 (0.22)	1.05 (0.33)	$49,983 (2,647)	$50,107 (3,480)
43: Heart valve procedures	4,770 (496)	2,630** (487)	8.81 (0.30)	9.21 (0.57)	2.92 (0.33)	4.98* (0.84)	$92,037 (4,064)	$90,337 (6,812)
3: Laminectomy, excision intervertebral disc	3,469 (164)	3,424 (362)	4.19 (0.38)	5.01 (1.12)	0.19 (0.09)	0.26 (0.18)	$26,650 (1,280)	$29,094 (3,240)
119: Oophorectomy, unilateral and bilateral	3,376 (100)	2,993 (173)	3.14 (0.05)	2.96 (0.08)	0.05 (0.05)	0.00 (0.00)	$16,443 (464)	$15,269 (582)
152: Arthroplasty knee	3,366 (190)	3,164 (362)	1.99 (0.11)	1.90 (0.13)	0.00 (0.00)	0.00 (0.00)	$20,123 (623)	$25,167 (4,052)
104: Nephrectomy, partial or complete	2,960 (198)	2,403 (300)	5.89 (0.30)	5.59 (0.54)	1.38 (0.34)	1.57 (0.71)	$34,350 (1,867)	$33,901 (3,569)
36: Lobectomy or pneumonectomy	2,832 (138)	2,447 (255)	8.74 (0.35)	9.00 (0.90)	0.99 (0.25)	0.98 (0.43)	$47,548 (2,357)	$46,632 (4,823)
66: Procedures on spleen	2,798 (120)	2,723 (225)	6.06 (0.24)	6.25 (0.37)	5.63 (0.58)	5.76 (0.95)	$40,280 (1,815)	$45,397 (3,530)
64: Bone marrow transplant	2,385 (353)	1,318 (466)	37.21 (2.26)	38.02 (3.53)	5.86 (0.88)	8.78 (2.20)	243,833 18,023)	270,272 40,765)
89: Exploratory laparotomy	1,920 (94)	1,740 (148)	10.02 (0.72)	8.25 (0.81)	15.08 (1.18)	15.37 (2.01)	$55,152 (4,221)	$54,438 (6,100)
10: Thyroidectomy, partial or complete	1,298 (69)	1,135 (118)	1.83 (0.06)	1.69 (0.08)	0.00 (0.00)	0.00 (0.00)	$14,765 (526)	$14,424 (1,110)
105: Kidney transplant	1,067 (115)	781 (155)	10.54 (0.55)	10.34 (0.87)	0.16 (0.16)	1.11 (0.72)	115,363 (6,753)	101,959 (7,967)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

Note: “CCS” refers to Clinical Classifications Software.

APPENDIX C: KID-NHDS TABLES

Table 25. KID and NHDS Comparisons Overall and by Region, 2003

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
Overall	7,409 (119)	8,052 (365)	3.56 (0.03)	3.73 (0.26)	0.37 (0.01)	0.45* (0.02)
Region						
Northeast	1,266 (56)	1,504 (128)	3.89 (0.08)	4.24[1] (c)	0.32 (0.02)	0.34 (0.04)
South	1,664 (59)	1,576 (181)	3.52 (0.08)	3.26[1] (c)	0.38 (0.02)	0.29[1] (c)
Midwest	2,788 (89)	3,006 (194)	3.53 (0.06)	3.83 (0.40)	0.38 (0.02)	0.50* (0.04)
West	1,689 (63)	1,965 (159)	3.39 (0.08)	3.55 (0.45)	0.39 (0.02)	0.56* (0.06)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(c) A valid standard error could not be calculated.

Table 26. KID and NHDS Comparisons by Control and Bed Count, 2003

Control and Size	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
Total Public	1,081 (73)	1,043 (51)	3.66 (0.11)	3.66 (0.27)	0.43 (0.03)	0.36 (0.02)
1-99 Beds	183 (11)	250** (15)	2.09 (0.02)	1.86 (0.18)	0.08 (0.01)	0.00** (0.00)
100-199 Beds	163 (16)	174 (11)	2.59 (0.12)	2.45 (0.26)	0.14 (0.02)	0.35** (0.03)
200-299 Beds	134 (23)	129 (9)	3.07 (0.12)	2.70 (0.31)	0.19 (0.03)	0.26 (0.02)
300-499 Beds	239 (28)	301 (17)	4.13 (0.17)	4.29 (0.37)	0.65 (0.06)	0.49* (0.04)
500+ Beds	360 (42)	187** (12)	4.84 (0.24)	6.86** (0.63)	0.69 (0.06)	0.73 (0.06)
Total Private Non-Profit	5,442 (121)	6,005 (273)	3.62 (0.04)	3.77 (0.26)	0.39 (0.01)	0.46* (0.03)
1-99 Beds	479 (20)	872** (43)	2.44 (0.07)	2.56 (0.20)	0.11 (0.01)	0.10 (0.00)
100-199 Beds	960 (47)	1,440** (69)	2.98 (0.10)	3.58* (0.26)	0.22 (0.02)	0.22 (0.01)
200-299 Beds	1,189 (73)	1,430* (68)	3.67 (0.10)	4.24 (0.31)	0.40 (0.03)	0.60** (0.04)
300-499 Beds	1,458 (87)	1,564 (74)	3.68 (0.09)	3.98 (0.29)	0.38 (0.02)	0.63** (0.04)
500+ Beds	1,354 (88)	697** (35)	4.39 (0.08)	4.23 (0.33)	0.60 (0.03)	0.74* (0.05)
Total Proprietary	884 (49)	1,002 (49)	3.03 (0.07)	3.56 (0.27)	0.20 (0.01)	0.45** (0.03)
1-99 Beds	126 (13)	154 (10)	2.41 (0.08)	3.00 (0.32)	0.05 (0.00)	0.00** (0.00)
100-199 Beds	310 (20)	509** (27)	2.51 (0.05)	3.66** (0.30)	0.12 (0.01)	0.14 (0.01)
200-299 Beds	206 (26)	166 (11)	3.11 (0.13)	3.17 (0.33)	0.19 (0.03)	0.00** (0.00)
300-499 Beds	150 (22)	171 (11)	3.73 (0.17)	4.14 (0.41)	0.35 (0.05)	2.20** (0.21)
500+ Beds	89 (26)	0[1] (a)	4.35 (0.22)	0.00[1] (a)	0.50 (0.04)	0.00[1] (a)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.

Table 27. KID and NHDS Comparisons by Age, Gender, and Race, 2003

Age Group	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
Newborn	2,918 (64)	3,875** (178)	3.33 (0.04)	3.25 (0.23)	0.39 (0.01)	0.38 (0.02)
Up to 1 month	144 (6)	279** (16)	6.05 (0.17)	9.37** (0.79)	0.98 (0.07)	2.04** (0.17)
1 month to 1 year	326 (12)	553** (29)	4.06 (0.08)	4.03 (0.32)	0.46 (0.03)	0.69** (0.05)
1-4 years	1,797 (69)	751** (38)	3.46 (0.07)	3.07 (0.24)	0.37 (0.02)	0.36 (0.02)
5-9 years	370 (11)	465** (25)	3.55 (0.05)	3.59 (0.29)	0.27 (0.01)	0.45** (0.03)
10-14 years	406 (12)	520** (27)	4.47 (0.08)	5.17 (0.41)	0.36 (0.01)	0.14** (0.01)
15-18 years	1,405 (20)	1,605* (76)	3.52 (0.03)	3.67 (0.27)	0.29 (0.01)	0.38** (0.02)
Gender						
Female	3,857 (61)	4,143 (190)	3.40 (0.03)	3.59 (0.25)	0.30 (0.00)	0.28 (0.01)
Male	3,477 (58)	3,909* (179)	3.75 (0.03)	3.87 (0.27)	0.46 (0.01)	0.62** (0.04)
Unknown	73 (4)	0[1] (a)	2.33 (0.04)	0.00[1] (a)	0.12 (0.01)	0.00[1] (a)
Race						
White	2,746 (72)	4,526** (302)	3.48 (0.04)	3.62 (0.37)	0.32 (0.01)	0.44** (0.04)
Black	807 (34)	1,087** (78)	4.30 (0.06)	4.42 (0.51)	0.57 (0.02)	0.59 (0.06)
Other	1,770 (69)	514** (71)	3.55 (0.06)	3.71[1] (c)	0.38 (0.01)	0.65[1] (c)
Unknown	2,084 (82)	1,923 (247)	3.37 (0.06)	3.60[1] (c)	0.36 (0.02)	0.31[1] (c)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(c) A valid standard error could not be calculated.

Table 28. KID and NHDS Comparisons by Principal Payer, 2003

Principal Payer	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
Medicare	16 (1)	27** (3)	6.21 (1.64)	4.96[1] (c)	0.51 (0.09)	0.41[1] (c)
Medicaid	3,139 (67)	3,187 (268)	3.72 (0.04)	3.89[1] (c)	0.37 (0.01)	0.37 (0.04)
Private Insurance	3,610 (74)	3,780 (312)	3.42 (0.03)	3.63[1] (c)	0.33 (0.01)	0.44* (0.05)
Self Pay	359 (15)	369 (28)	2.89 (0.06)	2.90 (0.35)	0.60 (0.03)	0.79* (0.08)
No Charge	14 (3)	62** (6)	3.72 (0.17)	5.04[1] (c)	0.31 (0.06)	0.46 (0.06)
Other	256 (18)	625** (43)	4.16 (0.14)	3.79 (0.42)	0.55 (0.04)	0.67 (0.06)
Missing	11 (2)	0[1] (a)	4.85 (1.00)	0.00[1] (a)	0.97 (0.18)	0.00[1] (a)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.
(c) A valid standard error could not be calculated.

Table 29. KID and NHDS Comparisons by Most Frequent Principal Diagnosis, 2003

Top 25 Principal Diagnoses (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
218: Liveborn	3,932 (69)	3,885 (178)	3.17 (0.02)	3.26 (0.23)	0.31 (0.00)	0.38* (0.02)
128: Asthma	173 (5)	236** (14)	2.32 (0.02)	2.25 (0.22)	0.01 (0.00)	0.04** (0.00)
122: Pneumonia (except that caused by tuberculosis or sexually transmitted disease)	170 (4)	210** (13)	3.52 (0.06)	3.41 (0.33)	0.24 (0.02)	0.18* (0.01)
125: Acute bronchitis	155 (4)	175 (11)	2.99 (0.02)	2.89 (0.30)	0.04 (0.00)	0.00** (0.00)
55: Fluid and electrolyte disorders	123 (3)	154** (10)	2.10 (0.01)	2.28 (0.25)	0.06 (0.00)	0.02** (0.00)
193: Trauma to perineum and vulva	120 (2)	--[1] (a)	2.08 (0.01)	--[1] (a)	0.00 (0.00)	--[1] (a)
69: Affective disorders	112 (6)	186** (12)	7.19 (0.22)	7.46 (0.69)	0.02 (0.01)	0.00 (0.00)
195: Other complications of birth, puerperium affecting management of mother	112 (2)	9** (2)	2.59 (0.01)	3.95[1] (c)	0.00 (0.00)	0.00[1] (c)
142: Appendicitis and other appendiceal conditions	99 (2)	118* (9)	2.97 (0.03)	3.41 (0.38)	0.00 (0.00)	0.00 (0.00)
181: Other complications of pregnancy	93 (1)	54** (5)	2.45 (0.01)	4.10[1] (c)	0.02 (0.00)	0.00[1] (c)
83: Epilepsy, convulsions	74 (3)	49** (5)	2.81 (0.06)	3.55[1] (c)	0.17 (0.01)	2.28[1] (c)
224: Other perinatal conditions	68 (3)	86* (7)	7.43 (0.15)	6.36 (0.73)	1.67 (0.12)	1.65 (0.19)
196: Normal pregnancy and/or delivery	67 (1)	640** (33)	1.96 (0.01)	2.48* (0.20)	0.00 (0.00)	0.00 (0.00)
159: Urinary tract infections	61 (1)	80** (7)	3.13 (0.03)	3.11 (0.40)	0.01 (0.00)	0.03** (0.00)
126: Other upper respiratory infections	57 (1)	72* (6)	2.13 (0.03)	2.07[1] (c)	0.02 (0.01)	0.00** (0.00)
197: Skin and subcutaneous tissue infections	51 (2)	55 (5)	3.13 (0.02)	2.90[1] (c)	0.01 (0.00)	0.00[1] (c)
184: Early or threatened labor	49 (1)	23** (3)	3.03 (0.04)	2.61[1] (c)	0.00 (0.00)	0.00[1] (c)
7: Viral infection	46 (1)	58* (5)	2.56 (0.02)	2.65[1] (c)	0.05 (0.01)	0.00** (0.00)
222: Hemolytic jaundice and perinatal jaundice	45 (1)	48 (5)	2.10 (0.02)	1.95[1] (c)	0.04 (0.01)	0.00[1] (c)

Top 25 Principal Diagnoses (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
74: Other mental conditions	44 (2)	66** (6)	5.92 (0.23)	7.05 (0.87)	0.05 (0.03)	0.02 (0.00)
135: Intestinal infection	42 (1)	51 (5)	2.45 (0.02)	2.25[1] (c)	0.02 (0.00)	0.00[1] (c)
45: Maintenance chemotherapy, radiotherapy	41 (2)	36 (4)	3.92 (0.09)	3.54[1] (c)	0.13 (0.02)	0.21[1] (c)
230: Fracture of lower limb	40 (1)	48 (5)	3.66 (0.06)	3.61[1] (c)	0.02 (0.00)	0.00[1] (c)
185: Prolonged pregnancy	39 (1)	--[1] (a)	2.43 (0.01)	--[1] (a)	0.00 (0.00)	--[1] (a)
154: Noninfectious gastroenteritis	38 (1)	46 (5)	1.94 (0.02)	1.90[1] (c)	0.02 (0.01)	0.00[1] (c)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.
(c) A valid standard error could not be calculated.

Note: “CCS” refers to Clinical Classifications Software.

Table 30. KID and NHDS Comparisons by Rare Principal Diagnosis, 2003

Rare Principal Diagnoses (CCS)	Number of Discharges in (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
160: Calculus of urinary tract	7,776 (195)	10,104 (2,186)	2.06 (0.04)	1.47[1] (c)	0.00 (0.00)	0.00[1] (c)
39: Leukemias	7,733 (553)	14,705* (2,663)	15.67 (0.67)	14.65[1] (c)	4.58 (0.37)	0.63[1] (c)
172: Ovarian cyst	7,090 (162)	6,365 (1,721)	1.96 (0.02)	1.70[1] (c)	0.02 (0.02)	0.00[1] (c)
56: Cystic fibrosis	6,431 (576)	12,420* (2,436)	9.66 (0.28)	11.82[1] (c)	0.91 (0.16)	0.51[1] (c)
216: Nervous system congenital anomalies	5,623 (426)	8,789 (2,033)	7.02 (0.37)	5.02[1] (c)	1.16 (0.20)	4.23[1] (c)
243: Poisoning by nonmedicinal substances	5,612 (202)	8,365 (1,982)	2.27 (0.07)	3.24[1] (c)	0.57 (0.12)	0.00[1] (c)
66: Alcohol-related mental disorders	4,914 (261)	7,653[1] (b)	4.10 (0.37)	.[1] (b)	0.00 (0.00)	.[1] (b)
35: Cancer of brain and nervous system	4,785 (385)	7,030 (1,811)	9.61 (0.34)	13.92[1] (c)	4.52 (0.43)	1.89[1] (c)
210: Systemic lupus erythematosus and con. tissue disorders	3,664 (296)	2,201[1] (b)	5.76 (0.27)	--[1] (b)	0.94 (0.22)	--[1] (b)
21: Cancer of bone and connective tissue	2,854 (227)	6,878[1] (b)	7.95 (0.30)	--[1] (b)	2.12 (0.37)	--[1] (b)
77: Encephalitis (except that caused by tuberculosis or STD)	2,325 (124)	--[1] (a)	9.20 (0.42)	--[1] (a)	2.32 (0.38)	--[1] (a)
227: Spinal cord injury	1,844 (103)	--[1] (a)	13.00 (0.62)	--[1] (a)	1.37 (0.37)	--[1] (a)
5: HIV infection	1,452 (148)	--[1] (a)	8.62 (0.42)	--[1] (a)	4.03 (0.60)	--[1] (a)
158: Chronic renal failure	1,392 (149)	--[1] (a)	7.40 (0.41)	--[1] (a)	0.93 (0.31)	--[1] (a)
96: Heart valve disorders	1,234 (107)	--[1] (a)	6.44 (0.38)	--[1] (a)	1.27 (0.43)	--[1] (a)
1: Tuberculosis	858 (66)	--[1] (a)	11.24 (0.58)	--[1] (a)	0.58 (0.33)	--[1] (a)
30: Cancer of testis	307 (29)	--[1] (a)	5.89 (0.48)	--[1] (a)	0.00 (0.00)	--[1] (a)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.
(b) The NHDS estimate was reported but is not considered reliable; the standard error was not reported.
(c) A valid standard error could not be calculated.

Note: “CCS” refers to Clinical Classifications Software.

Table 31. KID and NHDS Comparisons by Most Frequent Principal Procedure, 2003

Top 25 Principal Procedures (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
115: Circumcision	1,070 (22)	1,066 (52)	2.60 (0.01)	2.67 (0.20)	0.00 (0.00)	0.00 (0.00)
228: Prophylactic vaccinations and inoculations	470 (28)	523 (28)	2.41 (0.02)	2.45 (0.20)	0.00 (0.00)	0.00 (0.00)
137: Other procedures to assist delivery	229 (5)	172** (11)	2.21 (0.01)	2.20 (0.24)	0.00 (0.00)	0.00 (0.00)
220: Ophthalmologic and otologic diagnosis and treatment	187 (18)	159 (11)	2.50 (0.03)	2.78 (0.29)	0.00 (0.00)	0.00 (0.00)
231: Other therapeutic procedures	172 (7)	177 (11)	5.44 (0.10)	5.60 (0.53)	0.14 (0.01)	0.84** (0.08)
216: Respiratory intubation and mechanical ventilation	147 (4)	169 (11)	17.90 (0.30)	16.63 (1.50)	6.76 (0.16)	7.47 (0.72)
4: Diagnostic spinal tap	129 (4)	155* (10)	4.09 (0.05)	3.65 (0.37)	0.09 (0.01)	0.13* (0.01)
134: Cesarean section	122 (2)	124 (9)	3.69 (0.02)	3.73 (0.41)	0.01 (0.00)	0.00** (0.00)
140: Repair of current obstetric laceration	112 (3)	129 (9)	2.19 (0.01)	2.14 (0.25)	0.00 (0.00)	0.00 (0.00)
80: Appendectomy	101 (2)	114 (8)	2.85 (0.02)	2.91 (0.34)	0.01 (0.00)	0.00** (0.00)
133: Episiotomy	75 (2)	83 (7)	2.21 (0.01)	2.22[1] (c)	0.00 (0.00)	0.00 (0.00)
217: Other respiratory therapy	63 (6)	105** (8)	3.53 (0.12)	3.60 (0.42)	0.11 (0.01)	0.00** (0.00)
54: Other vascular catheterization, not heart	55 (2)	70* (6)	13.24 (0.29)	13.18 (1.51)	2.59 (0.14)	2.31 (0.29)
135: Forceps, vacuum, and breech delivery	46 (1)	52 (5)	2.29 (0.01)	2.23[1] (c)	0.00 (0.00)	0.00[1] (c)
224: Cancer chemotherapy	37 (2)	35 (4)	3.96 (0.07)	3.63[1] (c)	0.17 (0.02)	0.22[1] (c)
223: Enteral and parenteral nutrition	25 (1)	28 (3)	12.81 (0.29)	13.15[1] (c)	1.07 (0.11)	0.09[1] (c)
222: Blood transfusion	24 (1)	29 (3)	6.22 (0.15)	7.86[1] (c)	1.80 (0.14)	0.57[1] (c)
146: Treatment, fracture or dislocation of hip and femur	22 (0)	25 (3)	4.20 (0.08)	3.63[1] (c)	0.17 (0.03)	0.00[1] (c)
147: Treatment, fracture or dislocation of lower extremity (other than hip or femur)	21 (0)	24 (3)	2.86 (0.05)	3.01[1] (c)	0.06 (0.02)	0.00[1] (c)

Top 25 Principal Procedures (CCS)	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
94: Other OR upper GI therapeutic procedures	21 (1)	23 (3)	7.93 (0.24)	9.09[1] (c)	0.46 (0.06)	0.33[1] (c)
227: Other diagnostic procedures (interview, evaluation, consultation)	21 (1)	23 (3)	4.00 (0.17)	4.55[1] (c)	0.21 (0.05)	0.00[1] (c)
148: Other fracture and dislocation procedure	20 (1)	24 (3)	2.16 (0.05)	1.77[1] (c)	0.01 (0.00)	0.00[1] (c)
70: Upper gastrointestinal endoscopy, biopsy	18 (0)	28* (3)	4.68 (0.14)	6.74[1] (c)	0.24 (0.04)	0.00[1] (c)
9: Other OR therapeutic nervous system procedures	17 (1)	22 (3)	7.75 (0.21)	8.68[1] (c)	2.43 (0.19)	2.61[1] (c)
33: Other OR therapeutic procedures on nose, mouth and pharynx	17 (0)	23 (3)	3.07 (0.10)	3.06[1] (c)	0.07 (0.02)	0.00[1] (c)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.
(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.
(c) A valid standard error could not be calculated.

Note: “CCS” refers to Clinical Classifications Software.

Table 32. KID and NHDS Comparisons by Rare Principal Procedure, 2003

Rare Principal Procedures (CCS)	Number of Discharges in (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate Percent (Standard Error)	
	KID	NHDS	KID	NHDS	KID	NHDS
84: Cholecystectomy and common duct exploration	15,632 (330)	13,569 (2,552)	3.53 (0.05)	3.19[1] (c)	0.06 (0.02)	0.00[1] (c)
219: Alcohol and drug rehabilitation/detoxification	10,895 (1,292)	12,001 (2,392)	7.13 (0.60)	8.21[1] (c)	0.06 (0.04)	0.00[1] (c)
144: Treatment, facial fracture or dislocation	5,905 (244)	8,509[1] (b)	3.08 (0.07)	--[1] (b)	0.00 (0.00)	--[1] (b)
172: Skin graft	5,609 (562)	42,039** (4,751)	10.72 (0.48)	6.48[1] (c)	0.24 (0.08)	0.41[1] (c)
78: Colorectal resection	5,521 (287)	7,845 (1,917)	13.96 (0.45)	9.63[1] (c)	2.26 (0.27)	1.24[1] (c)
34: Tracheostomy, temporary and permanent	5,341 (281)	5,702[1] (b)	50.65 (1.49)	--[1] (b)	7.08 (0.48)	--[1] (b)
65: Bone marrow biopsy	5,145 (352)	5,052[1] (c)	9.47 (0.33)	7.98[1] (c)	1.40 (0.22)	0.00[1] (c)
43: Heart valve procedures	4,770 (496)	7,592 (1,885)	8.81 (0.30)	6.95[1] (c)	2.92 (0.33)	0.76[1] (c)
3: Laminectomy, excision intervertebral disc	3,469 (164)	4,056[1] (b)	4.19 (0.38)	--[1] (b)	0.19 (0.09)	--[1] (b)
119: Oophorectomy, unilateral and bilateral	3,376 (100)	2,968[1] (b)	3.14 (0.05)	--[1] (b)	0.05 (0.05)	--[1] (b)
152: Arthroplasty knee	3,366 (190)	6,738[1] (b)	1.99 (0.11)	--[1] (b)	0.00 (0.00)	--[1] (b)
104: Nephrectomy, partial or complete	2,960 (198)	2,588[1] (b)	5.89 (0.30)	--[1] (b)	1.38 (0.34)	--[1] (b)
36: Lobectomy or pneumonectomy	2,832 (138)	2,951[1] (b)	8.74 (0.35)	--[1] (b)	0.99 (0.25)	--[1] (b)
66: Procedures on spleen	2,798 (120)	2,626[1] (b)	6.06 (0.24)	--[1] (b)	5.63 (0.58)	--[1] (b)
64: Bone marrow transplant	2,385 (353)	2,180[1] (b)	37.21 (2.26)	--[1] (b)	5.86 (0.88)	--[1] (b)
89: Exploratory laparotomy	1,920 (94)	--[1] (a)	10.02 (0.72)	--[1] (a)	15.08 (1.18)	--[1] (a)
10: Thyroidectomy, partial or complete	1,298 (69)	--[1] (a)	1.83 (0.06)	--[1] (a)	0.00 (0.00)	--[1] (a)
105: Kidney transplant	1,067 (115)	--[1] (a)	10.54 (0.55)	--[1] (a)	0.16 (0.16)	--[1] (a)

*Significant at a 5 percent level.
**Significant at a 1 percent level.

[1]A significance test was not performed because a valid standard error was not available.

(a) Because of a small sample size, the NHDS estimate and standard error were unreliable and not reported.
(b) The NHDS estimate was reported but is not considered reliable; the standard error was not reported.
(c) A valid standard error could not be calculated.

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APPENDIX D: ESTIMATES OF STANDARD ERROR FOR NHDS STATISTICS

Estimates of Standard Error for NHDS Statistics

A variety of statistics were estimated based on these NHDS variables:

1. Total number of discharges
2. In-hospital mortality
3. Average length of stay (calculated as the difference between discharge and admission dates).

The standard errors were calculated as follows:

Total Numbers of Discharges

From the NHDS Documentation (National Center for Health Statistics, 2004), constants *a* and *b* were obtained for 2003. The relative standard error for the estimate of total discharges was approximated by:

$$RSE(W_{TD}) = \sqrt{a + b/W_{TD}}$$

Where W_{TD} was the weighted sum of total discharges (i.e., the estimate of total discharges).

The standard error was then calculated as:

$$SE = RSE \times W_{TD}$$

Percent Mortality

Let *p* be the estimated proportion of in-hospital deaths (with the number of deaths estimated as the numerator and the discharge estimate as the denominator). The relative standard error of this proportion expressed as a percent was approximated by:

$$RSE(p) = \sqrt{b(1-p)/(p \times W_{TD})}$$

The standard error was then calculated as:

$$SE = RSE \times p$$

Where *b* was the parameter in the formula for approximated $RSE(W_{TD})$ given by the NHDS documentation (i.e., the same parameter used in the formula for calculating the standard error for number of discharges).

Average Length of Stay

Let average length of stay be the estimated average length of stay based on a weighted number of discharges equal to TD. If the weighted sum of patient length of stay was TLOS, and

$$ALOS = \frac{W_{TLOS}}{W_{TD}}$$

then the relative standard error is:

$$RSE(ALOS) = RSE(W_{TLOS}/W_{TD}) = \sqrt{[RSE(W_{TLOS})^2] + [RSE(W_{TD})^2]}$$

The estimate of the relative standard error was valid only if:

1. The relative standard error of the denominator (estimated discharges) was smaller than five percent.

   - or -

2. Both the relative standard error of the numerator (estimated total stay days) and the denominator (estimated discharges) were smaller than 10 percent.

For all parameter estimates, when values of *a* and *b* were available in the NHDS documentation (i.e., for procedures, gender, region, race, and diagnoses), the appropriate values for *a* and *b* were used. When a variable represented the sum of more than one NHDS category, as recommended by Korn and Graubard (1999, p. 224), the standard error for each category was calculated, and the largest of these standard errors was reported and used in significance testing. For example, the KID category of "private insurance" includes three NHDS categories: 1) Blue Cross/Blue Shield; 2) HMO/PPO; and 3) other private insurance. The standard error was calculated for all three categories, using the values of *a* and *b* provided in the NHDS documentation, and the largest value was used in computing the *t*-value to test for significant difference.

When no parameter estimates were available, the values of *a* and *b* for the total sample were used in calculating the standard errors. For example, in the hospital control X bed size comparisons, the values for the total sample were used in calculating standard errors, because the NHDS documentation provides parameter estimates by neither ownership nor bed size.

Tests of Statistical Significance

To test for a statistically significant difference between a KID estimate, *X*, and an NHDS estimate, *Y*, the following procedure was used. The difference was significant if

$$\left| \frac{(X - Y)}{\sqrt{SE_X^2 + SE_Y^2}} \right| \geq S$$

Where SE_X was the estimated standard error for the KID estimate and SE_Y was the estimated standard error of the NHDS estimate.