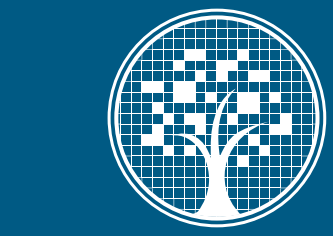

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HEALTHCARE COST AND UTILIZATION PROJECT

HCUP Methods Series

Comparative Analysis of the HCUP Nationwide Inpatient Sample Release 6 (1997)

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Agency for Healthcare Research and Quality

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COMPARISON ANALYSIS FOR THE HCUP NATIONWIDE INPATIENT SAMPLE, RELEASE 6 (CALENDAR YEAR 1997)

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EXECUTIVE SUMMARY

This report assesses potential biases of statistics calculated from the Nationwide Inpatient Sample (NIS), Release 6 of the Healthcare Cost and Utilization Project (HCUP). The NIS, Release 6 includes hospital discharge data from a sample of community hospitals for calendar year 1997. Statistics for discharge- and hospital-level characteristics of the NIS data are compared with the National Hospital Discharge Survey (NHDS), Medicare Provider Analysis and Review (MedPAR) data, and American Hospital Association (AHA) Hospital Survey data. By design, NIS hospitals closely resemble the AHA universe of hospitals, although the average NIS hospital tended to be slightly larger and use more resources than the average hospital reported in the AHA data. NIS estimates, in general, also are comparable to NHDS and MedPAR statistics.

Comparisons with NHDS. Most statistics calculated from the NIS are consistent with those from the NHDS. NIS discharge count estimates agree with NHDS estimates overall and by region. In comparisons by patient characteristics and procedure categories, very few meaningful differences were found. There were more differences found in comparisons by hospital characteristics and diagnosis categories, although most estimates generally agree. For the differences found, the NIS estimates were larger than the NHDS estimates slightly more often than they were lower. Many of these differences occurred for payer-specific comparisons. The NIS contains relatively complete payer information, less than ½ percent of the NIS discharges were missing payer information, while nearly 9 percent of the NHDS discharges were without payer information. Consequently, the NIS is probably preferable to the NHDS for analyses using expected payer.

Virtually all estimates for average length of stay were consistent between the NIS and the NHDS. No significant differences were found overall, by region, by patient characteristics, or by diagnosis category. Only one significant difference was found by hospital characteristic, and most comparisons by procedure category agree. For the few differences found, the NIS average length of stay estimate was longer than the NHDS estimate slightly more often than it was shorter.

Overall, the NIS estimate for in-hospital mortality was higher than the NHDS estimate. Very few statistically significant differences were found in the various breakdowns, although the NIS estimate was significantly higher for both the South and the West. The higher NIS estimates may be due to differences in the makeup of hospitals included in each sample. Relative to the NHDS sample, the NIS is constructed with more discharges from larger hospitals (300-499 beds and 500+ beds) and fewer discharges from smaller hospitals (6-99 beds and 100-199 beds). Large hospitals tend to have more complex cases and cases with higher in-hospital mortalities. Statistical comparisons of in-hospital mortality estimates between the NIS and the NHDS samples were not possible for diagnosis groups, procedure groups, and other small subgroups because valid standard errors could not be calculated for the NHDS data owing to very small sample sizes. Therefore, we recommend the NIS over the NHDS for research that focuses on

smaller subgroups of discharges. Overall, the NIS represents an excellent all-payer hospital discharge database that includes hospital charge information not available from the NHDS.

In addition, there are particular situations where the relative strengths of the NIS stand out. These include all-payer analyses based on payers, race, large hospitals, and analyses focusing on small segments of the data such as specific diagnoses or procedures.

Comparisons with MedPAR. Nearly all NIS discharge count estimates exceed the MedPAR counts. Most of the difference can be explained by the underreporting of managed care patients in the MedPAR data. Areas where the NIS estimates do not exceed MedPAR estimates are within some racial categories. The NIS race classifications are better than those in the MedPAR, as described in the Discussion Section. Using census data, it is shown that the NIS more closely resembles the racial makeup of the United States than does MedPAR.

The overall average length of stay estimate from the NIS is lower than the MedPAR average. This is also true for comparisons by most breakdowns on patient characteristics, although only a small number of significant differences were found for other breakdowns. In-hospital mortality rates and average total charge estimates from the NIS mostly agree with MedPAR statistics with few differences found between the two data sources.

There are several factors that may cause inconsistencies between NIS estimates and statistics from the MedPAR. The largest factor is that the MedPAR data exclude most discharges for enrollees in managed care programs. This exclusion causes MedPAR to undercount discharges by approximately 10 percent. A second factor that may contribute to inconsistencies is that the MedPAR data include all discharges from special units (psychiatric, rehabilitation, alcohol/drug) of hospitals. The NIS data, however, do not contain all discharges from special units because reporting varies among hospitals and states. Some hospitals include discharges from special units and some do not. Usually, it is not possible to identify NIS discharges from special units. Finally, a third factor is the difference between expected and actual payer of a claim. The NIS Medicare data represent discharges where Medicare is the *expected* payer. MedPAR data represent claims where Medicare is the *actual* payer.

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INTRODUCTION

This report assesses potential biases of statistics calculated from the Nationwide Inpatient Sample (NIS), Release 6 of the Healthcare Cost and Utilization Project (HCUP). The NIS, Release 6 includes hospital discharge data from a sample of community hospitals for the calendar year 1997. Statistics for discharge- and hospital-level characteristics of the NIS data are compared with the National Hospital Discharge Survey (NHDS), the Medicare Provider Analysis and Review (MedPAR), and the American Hospital Association (AHA) Annual Survey data.

The NIS, Release 6 was established to provide analyses of hospital utilization across the United States. For each calendar year, the NIS *universe* of hospitals was established as all community hospitals located in the U.S. However, the NIS *sampling frame* was constructed from the subset of universe hospitals that released their discharge data for research use. Currently, the Agency for Healthcare Research and Quality (AHRQ) has agreements with 22 data sources that maintain statewide, all-payer discharge data files to include their data in the HCUP database. All 22 of these states were included in Release 6. These 22 states represent the addition of three states more than Release 5, and eleven states more than Release 1. The NIS, Release 6 is composed of all discharges from a sample of hospitals from these frame states.

Table A: States in the Frame for the NIS, Release 6

Calendar Years	States in the Frame
1988 (Release 1)	California, Colorado, Florida, Illinois, Iowa, Massachusetts, New Jersey, and Washington
1989-1992 (Release 1)	Add Arizona, Pennsylvania, and Wisconsin
1993 (Release 2) 1994 (Release 3)	Add Connecticut, Kansas, Maryland, New York, Oregon, and South Carolina
1995 (Release 4) 1996 (Release 5)	Add Missouri and Tennessee
1997 (Release 6)	Add Georgia, Hawaii, and Utah

Creation of the NIS was subject to certain restrictions.

- The Illinois Health Care Cost Containment Council stipulated that no more than 40 percent of Illinois discharge data could be included in the database for any calendar quarter. Consequently, approximately 55 percent of the Illinois community hospital universe was randomly selected for the frame each year.

- Hospitals in Missouri were allowed to withhold their data from the NIS. Thirty-five Missouri hospitals, from a state total of 110 that provided data to HCUP for 1997, chose not to participate in the NIS.

- Georgia, Hawaii, South Carolina and Tennessee each imposed "small strata/cell restrictions," requiring the NIS to exclude hospitals, when only one state hospital appears in a sampling strata. As a result, the NIS is not representative of hospitals in a few strata from these states.

To improve the generalizability of the NIS estimates, five hospital sampling strata were used:

1. *Geographic Region* — Midwest, Northeast, West, and South.

2. *Ownership* — government, investor-owned, and nonprofit nongovernment.

3. *Location* — urban and rural.

4. *Teaching Status* — teaching and non-teaching.

5. *Bedsize* — small, medium, and large, specific to the hospital's location and teaching status as shown in Table B.

Table B: Bedsize Categories

Location and Teaching Status	Bedsize		
	Small	Medium	Large
Rural	1-49	50-99	100+
Urban, non-teaching	1-99	100-199	200+
Urban, teaching	1-299	300-499	500+

To ensure geographic representativeness, hospitals were sorted by state and by the first three digits of their zip code prior to systematic sampling.

The NIS is a stratified probability sample of hospitals in the frame, with sampling probabilities calculated to select 20 percent of the universe contained in each stratum. The overall objective

was to select a sample of hospitals "generalizable" to the target universe, including hospitals outside the frame (which had a zero probability of selection). See *Design of the HCUP Nationwide Inpatient Sample, Release 6,* for more details on the design of the sample.

Sample weights were developed for the NIS to obtain national estimates of hospital and inpatient parameters. For example, with these weights it should be possible to estimate DRG-specific average lengths of stay over all U.S. hospitals, using weighted average lengths of stay based on averages or regression estimates from the NIS. Ideally, relationships among outcomes and their correlates estimated from the NIS should generally hold across all U.S. hospitals. However, since only 22 states contributed data to this sixth release, some estimates may be biased. In this report, we compare estimates based solely on the NIS against estimated quantities from other sources of data.

This report compares both discharge- and hospital-level statistics. Discharge statistics include discharge counts, inpatient charges, in-hospital mortality, and average lengths of stay. Hospital statistics include items such as number of beds, occupancy rates, and staffing levels.

This report is divided into four sections. The first section includes a discussion of the data sources used in the analysis. The second section explains the methodology used to compare the NIS with the NHDS and MedPAR. The third section includes a presentation of the results: tables for this section are included at the end of the report. The final section offers some conclusions and recommendations for analyses of the NIS, Release 6.

DATA SOURCES

Benchmark statistics for 1997 from several data sources were compared. The NIS, Release 6, 1997 data were drawn from a frame of 22 states and include approximately 7.1 million discharges from 1,012 hospitals. NIS statistics were compared with those calculated from these three data sources:

1. *National Hospital Discharge Survey (NHDS), 1997*. Conducted by the National Center for Health Statistics, the NHDS includes about 300 thousand discharges sampled from 474 hospitals. To be part of the NHDS, hospitals must have six or more beds staffed for patient use. The NHDS covers discharges from short-stay U.S. hospitals (hospitals with an average length of stay under 30 days), general-specialty (medical or surgical) hospitals, and children's hospitals. Federal, military, and Veterans Affairs hospitals are excluded from the survey. The NHDS sampling frame includes very few specialty hospitals such as psychiatric, maternity, alcohol/chemical dependency, orthopedic, and head-injury hospitals.

   Statistics calculated from the NHDS do have sampling error. However, the statistics are assumed to be unbiased because the sampling frame is relatively unrestricted, encompassing all nonfederal, acute-care, general U.S. hospitals with six or more beds.

2. *Medicare Provider Analysis and Review (MedPAR), 1997*. The MedPAR data obtained from the Health Care Financing Administration (HCFA) include all records for each fee-for-service Medicare discharge from a Medicare-certified, short-stay U.S. hospital. Federal fiscal year files for 1997 and 1998 were used to create a calendar-year 1997 MedPAR file with over 11 million discharge records. Medicare discharge statistics from this source have no sampling error associated with them, because this file represents a census of 1997 fee-for-service Medicare discharges. The data suggest, however, that the MedPAR data underreport total Medicare discharges by omitting most discharges for HMO enrollees. Only 3.2% of calendar year 1997 MedPAR discharges were for HMO enrollees, while HCFA data for 1997 indicate HMO enrollment at over 13.3%. This suggests that the MedPAR data underreport total discharges by approximately 10%.

   To ensure that the hospital makeup of the MedPAR file was consistent with the NIS universe, community hospitals as defined by the American Hospital Association (AHA) were identified and selected. Only AHA-defined community hospitals within the 50 states and the District of Columbia were kept in the derived MedPAR file used for this study. In addition, MedPAR stays that were not covered by Medicare or that represent some adjustment/correction (where the number of covered days is zero) were eliminated.

   In the MedPAR data, same-day stays (admission and discharge on the same day) were assigned a length of stay of one day. Consequently, in comparisons of average lengths of stay between the NIS and MedPAR data, same-day stays in the NIS were recoded from zero to one for this analysis.

3. *AHA Annual Survey of Hospitals, 1997*. 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. The file contains hospital-level statistics for hospital reporting periods, which do not necessarily correspond to the calendar year.

Table 1 summarizes some of the key differences in hospitals and discharges represented by the NIS and NHDS data files.

METHODS

Comparisons with NHDS

The following measures were chosen to compare the NIS and NHDS databases:

- Total number of discharges
- Average length of stay (ALOS)
- In-hospital mortality rate

These measures of utilization and outcomes were selected because they are typically used in health services research.

For each statistic, a test was performed to determine whether a difference was statistically significant between the NIS and NHDS estimates. Since the NHDS estimate was based on a sample, two-sample t-tests were used, where valid estimates of the NHDS standard error could be made. Due to size constraints, valid estimates were not available for all breakdowns of the NHDS data. Refer to the Appendix for a description of the comparison tests and an explanation of restrictions on calculating NHDS standard errors. Differences were reported at the one and five percent significance levels.

To assess their reliability, the statistics listed above were compared within the following types of strata:

- Geographic regions (Midwest, Northeast, West, and South)
- Hospital characteristics (ownership, rural location, teaching status, and bedsize)
- Patient characteristics (age, race, gender, and payer)
- Diagnosis groups (The principal diagnosis code for each discharge was assigned to a diagnosis group defined by the Clinical Classifications for Health Policy Research (CCHPR), Version 2 algorithm — see Elixhauser and McCarthy, 1996).
- Procedure groups (The principal procedure code for each discharge was assigned to a procedure group defined by the CCHPR, Version 2 algorithm — see Elixhauser and McCarthy, 1996).

All NIS statistics used sample weights and accounted for the sample design using the SUDAAN microcomputer statistical software to calculate finite sample statistics and their variances. All NHDS statistics were calculated with Statistical Analysis System (SAS) microcomputer software. Standard errors can not be calculated directly from the NHDS data. Instead, NHDS documentation provides formulas for calculating relative standard error (RSE) estimates based on discharge counts. The formulas are described in the Appendix. However, the RSE estimates are valid only for sufficiently large discharge estimates. Consequently, statistical comparisons could not be made for some small group comparisons such as DRGs, diagnosis groups, and procedure groups. These restrictions are explained in the Appendix.

Comparisons with MedPAR

The comparisons with MedPAR used all NIS discharges with Medicare listed as the expected primary payer. This is consistent with previous comparison reports, and ignores the questionable secondary payer listings of Medicare. It is important to distinguish that the NIS sample is based on Medicare as the *expected* payer while the MedPAR file is based on claims actually paid by Medicare. MedPAR data also contain discharges from special units (psychiatric, rehabilitation, alcohol/drug). Some NIS hospitals report discharges from special units and some do not.

The following measures were chosen to compare the NIS and MedPAR databases:

- Total number of discharges
- Average length of stay (ALOS)
- In-hospital mortality rate
- Average total hospital charge

As with the NHDS comparisons, these measures of utilization and outcomes were selected because they are typically used in health services research.

For each statistic, a test was performed to determine whether a difference was statistically significant between the NIS estimate and the appropriate MedPAR statistic using standard t-tests. The MedPAR is not a sample, so there are no standard errors associated with MedPAR statistics. Refer to the Appendix for a description of the comparison tests. Differences were reported at the one and five percent significance levels.

To assess their reliability, the statistics listed above were compared within the following types of strata:

- Geographic regions (Midwest, Northeast, West, and South)
- Hospital characteristics (ownership and bedsize)
- Patient characteristics (age, race, and gender)
- Diagnosis Related Groups (DRGs)
- Diagnosis groups (The principal diagnosis code for each discharge was assigned to a diagnosis group defined by the Clinical Classifications for Health Policy Research (CCHPR), Version 2 algorithm — see Elixhauser and McCarthy, 1996).
- Procedure groups (The principal procedure code for each discharge was assigned to a procedure group defined by the CCHPR, Version 2 algorithm — see Elixhauser and McCarthy, 1996).

RESULTS

Comparisons Between the NIS and the NHDS

Since the NIS and the NHDS represent different samples of the same universe of hospitals, some differences are expected, and can be attributed to statistical "noise." Moreover, because of the large number of comparisons, some of the statistically significant differences will not be real differences using 0.05 level of significance. While bias could be present in either sample, the NHDS estimates are less likely to be biased because the hospital sampling frame is far less restricted than that for the NIS. The following sections describe results of statistical comparisons by region, hospital characteristics, patient characteristics, diagnosis, and procedure.

Comparisons by Region

Table 2 compares estimates of discharges, average lengths of stay, and in-hospital mortality generated from NIS and NHDS data. Comparisons are presented by total and by region for 1997. The NIS and NHDS estimates of national and regional discharges and average length of stay do not differ significantly. NIS in-hospital mortality rate estimates are significantly higher in total (7 percent) for the South and West (7 and 17 percent respectively).

Comparisons by Hospital Characteristics

Table 3 compares estimates of discharges, average lengths of stay, and in-hospital mortality between the NIS and NHDS for 1997, by hospital ownership categories (private/investor-owned, private/nonprofit, and government/nonfederal) and bedsize categories (6-99, 100-199, 200-299, 300-499, and 500+).

Overall, there were few differences by hospital control: no differences in discharges, average length of stay, or in-hospital mortality for Private/Investor-owned and Private/Nonprofit hospitals. Significant differences were found, however, for discharges and in-hospital mortality estimates from Government/Nonfederal hospitals (30 and 22 percent respectively). Additional significant differences were found in bedsize breakdowns. For discharges, significant differences were found for 13 of the 15 categories – the NIS estimates were significantly higher in six cases and significantly lower in seven categories. The NIS data estimated more discharges from "large hospitals" (300-499 beds and 500+ beds), and fewer discharges from "small hospitals" (6-99 beds and 100-199 beds), than did the NHDS. This generalization holds for Private/Nonprofit and Government/Nonfederal hospitals but not for Private/Investor-owned hospitals.

For Private/Nonprofit hospitals, which represent the vast majority of discharges, the trend of fewer discharges from small hospitals and more from large hospitals holds true. Significant differences found for discharge estimates were:

- 6-99 beds – the NIS estimate was 42 percent lower than the NHDS estimate,
- 100-199 beds – the NIS estimate was 31 percent lower than the NHDS estimate,
- 200-299 beds – the NIS estimate was 24 percent lower than the NHDS estimate,
- 300-499 beds – the NIS estimate was 34 percent higher than the NHDS estimate,
- 500+ beds – the NIS estimate was 73 percent higher than the NHDS estimate.

Hospitals owned by Private/Investor-owned reversed the general trend with NIS estimates for large hospitals lower than the NHDS estimates. Significant differences found for discharges were:

- 6-99 beds – the NIS estimate was 50 percent lower than the NHDS estimate,
- 100-199 beds – the NIS estimate was 149 percent higher than the NHDS estimate,
- 200-299 beds – the NIS estimate was 329 percent higher than the NHDS estimate,
- 300-499 beds – the NIS estimate was 36 percent lower than the NHDS estimate.

NIS estimated discharges for Government/Nonfederal hospitals were higher for large hospitals than the NHDS estimates. Significant differences found for discharge estimates were:

- 100-199 beds – the NIS estimate was 36 percent lower than the NHDS estimate,
- 300-499 beds – the NIS estimate was 94 percent higher than the NHDS estimate,
- 500+ beds – the NHDS did not estimate any discharges for this category.

One significant difference (out of 14 measurable categories) was found for average length of stay estimates from Government/Nonfederal hospitals with 300-499 beds. In-hospital mortality estimates were comparable in five categories and the NIS estimate was significantly higher for Private/Nonprofit hospitals with 6-99 beds.

Comparisons by Patient Characteristics

Table 4 compares estimates of discharges, average lengths of stay, and in-hospital mortality between the NIS and NHDS for 1997 — by primary payer, age group, gender, and race. NIS estimates are generally consistent with the NHDS estimates. Exceptions are described below.

Discharge estimates show no significant differences between the NIS and NHDS for Medicare, Medicaid, no charge, all age groups, males, females, and three categories of race (White, Black, and missing). Significant differences however, are found for the payer categories of private insurance, self-pay, other, and missing. The NIS discharge estimate for private insurance was 33 percent higher than the NHDS estimate, while the NIS estimates for self-pay and other payer patients were 8 and 28 percent lower than the NHDS estimates. The NIS estimate for “other” race is higher than the NHDS estimate by 99 percent, primarily due to differences between the two samples in recording race. The Discussion section, below, examines the coding of race.

Average length of stay estimates from the two sources were not statistically different, with the exception of other payer patients. The NIS average length of stay estimate for other payer patients is 15 percent higher than the NHDS estimate. Estimates of in-hospital mortality rates from the NIS tend to be higher than the NHDS estimates. Of the 17 strata, the NIS estimates are larger than the NHDS estimates for 15 strata, although only three differences are statistically significant. The NIS estimates are significantly larger than NHDS estimates for the categories of Medicaid, (17 percent), other payer (43 percent), and females (8 percent). Comparisons were not possible in four of the 17 strata due to the inability to calculate valid relative standard error estimates (see the Appendix).

Comparisons by Diagnosis Category

Table 5 compares the NIS and NHDS by the 25 most frequent primary diagnosis categories, ranked according to the NIS estimates of number of discharges for each category. CCHPR code categories (version 2) are assigned based on the first-listed diagnosis. The NIS discharge estimates differ significantly from the NHDS estimates for 16 of the 25 CCHPR categories; NIS estimates are significantly higher for six diagnosis categories and significantly lower for ten categories.

Some of the discrepancies found in the estimated number of discharges may be explained by differences in the assignment of primary diagnosis for the NIS and NHDS databases. In building the NIS, there was no reordering of diagnoses. The first diagnosis listed for each discharge was assigned as the primary diagnosis (although the state organizations that supply NIS data may have assigned the principal diagnoses to the primary diagnosis position prior to supplying data for the NIS). Under certain conditions, the NHDS reordered diagnoses, moving the first-listed diagnosis to the second position and moving a secondary diagnosis to the first-listed position. Thus, comparisons in these categories are not necessarily meaningful. In Table 5, these rows are shaded to reflect categories where NHDS codes have been modified.

For example, differences in the number of delivery-related discharges could be explained by the reordering of diagnosis codes in the NHDS. For women discharged after a delivery, a code of V27 (Outcome of Delivery) from the supplemental classification is entered as the first-listed code. A code designating normal or abnormal delivery is then listed in the second position. This could explain differences in the number of discharges counted in the diagnosis group for normal pregnancy and/or delivery (rank 10), trauma to the perineum and vulva (rank 6), fetal distress and abnormal forces of labor (rank 18), other complications of birth affecting mother (rank 23), and other complications of pregnancy (rank 24). Furthermore, the NIS may estimate fewer normal delivery discharges because the NIS has a higher number of estimated discharges from hospitals with more than 500 beds, which usually have a more complicated case-mix.

As another example of diagnosis reordering in the NHDS, if the first-listed diagnosis was a symptom, it was reassigned as a secondary diagnosis. Specifically, a secondary diagnosis of Acute myocardial infarction listed with other circulatory diagnoses was reordered to the first-listed code. This may have affected estimates for the 11th ranked diagnosis category: nonspecific chest pain. Taking into account the differences in ordering of diagnoses reduces the number of significant differences in estimated discharges between the two data sources from 16 to 10 of the 25 categories.

Comparisons of average length of stay and in-hospital mortality rates by diagnosis category (also shown in Table 5) indicate few significant differences between NIS and NHDS estimates. Significant differences are found for only one average length of stay estimate: Normal pregnancy/delivery (26 percent lower). The in-hospital mortality rates yielded no valid significance tests. This is due to the fact that valid NHDS standard errors for in-hospital mortality could not be calculated for any of the diagnosis categories (see Appendix for validity criteria).

Comparisons by Procedure Category

Table 6 lists the top 25 procedure categories, ranked according to the NIS estimates of number of discharges for each category. Similar to the diagnosis groups, CCHPR codes are assigned based on the first-listed procedure for each discharge. The NIS discharge estimates differ significantly from the NHDS estimates for eight of the 25 CCHPR categories; NIS estimates are significantly higher for two procedure categories, and significantly lower for six categories.

Procedures for which the NIS discharge estimates were significantly higher than the NHDS estimates were Percutaneous coronary angioplasty and Colorectal resection. Procedure categories with NIS estimates significantly lower than the NHDS estimates include: Circumcision, Repair of current obstetric laceration, Prophylactic vaccinations & inoculations, Other therapeutic procedures, and Forceps/breech delivery.

Comparisons of average length of stay estimates by procedure category show nine significant differences between NIS and NHDS estimates. Five of these significant differences were NIS estimates higher than the NHDS estimates and four were NIS estimates lower than the NHDS estimates. The in-hospital mortality rates yielded no valid significance tests. This is due to the fact that valid NHDS standard errors for in-hospital mortality could not be calculated for any of the procedure categories (see Appendix for validity criteria).

Comparisons Between the NIS and MedPAR

Estimates of NIS discharges were generally higher than those for MedPAR usually to a significant degree. Overall, the NIS estimate of Medicare discharges was 14 percent higher than the MedPAR count. Three factors contribute to this surfeit and should be considered for all NIS vs. MedPAR comparisons:

1. The MedPAR under-reports Medicare managed care claims by slightly over 10 percent. This accounts for over two-thirds of the difference between the NIS and MedPAR numbers.

2. The MedPAR analysis data contain discharges from special units. The NIS does not exclude discharges from special units, but NIS states and individual NIS hospitals report such discharges inconsistently.

3. The MedPAR data contain the discharges for claims actually paid by Medicare, while the NIS Medicare data contains discharges for which the patient expects Medicare to pay.

Comparisons by Region

Table 7 compares 1997 NIS and MedPAR data on four measures: discharges, average length of stay, in-hospital mortality, and average total charge. Comparisons were made in total and by region. Significant differences in the number of discharges were found overall and in all four census regions. NIS estimates were 11 to 22 percent higher than MedPAR totals. The NIS overall estimate of discharges, based on AHA data, exceeds the MedPAR figure by 14 percent. This discrepancy could be explained, in part, by the undercount of managed care enrollees from the MedPAR data (an undercount of approximately 10 percent).

Four average length of stay significant differences were found in total and for three of the four regions. Average length of stay estimates overall and for the Northeast and South were lower than the MedPAR averages, while the NIS estimate for the West was higher than MedPAR statistics. In-hospital mortality estimates were significantly different from the MedPAR rates only in the Midwest, where the NIS estimate was higher than MedPAR. No significant differences were found for Total Hospital Charges.

Comparisons by Hospital Characteristics

Table 8 compares the NIS and MedPAR for 1997, by hospital characteristics. While the NIS estimate of discharge exceeded the MedPAR counts for all hospital categories, most of the other NIS statistics were in agreement with the MedPAR numbers and few significant differences were found for most other statistics.

NIS discharge estimates were significantly higher than MedPAR totals for all 15 comparison categories.

- NIS discharge estimates were significantly higher than the MedPAR counts for all three ownership categories, ranging from 10 percent for Government/nonfederal to 24 percent for Private/investor owned.
- NIS discharge estimates for rural hospitals were significantly higher overall and for all three bedsize categories – exceeding the MedPAR totals by 9 percent overall. Overestimation ranged from 6 percent for large rural hospitals (100+ beds) to 13 percent for small rural hospitals (1-49 beds).
- For urban teaching hospitals, the NIS discharge estimates were significantly higher than the MedPAR totals, ranging from 17 percent for large urban teaching hospitals (500+ beds) to 29 percent for small urban teaching hospitals (1-299 beds).
- Estimates of NIS discharges for urban nonteaching hospitals were 16 percent higher than the MedPAR totals overall, ranging from 14 percent higher for large hospitals (200+ beds) to 23 percent higher for small hospitals (1-99 beds). As stated above, these discrepancies could be explained, in part, by the undercount of managed care enrollees from the MedPAR data.

Comparisons of average length of stay, in-hospital mortality, and average total charges, estimates from the NIS generally agreed with the MedPAR statistics. Few significant differences were found in any of the measures.

- Average length of stay differences were found in three of the 15 categories. The NIS estimate was shorter than MedPAR for private/investor-owned hospitals and small (1-99 beds) urban nonteaching hospitals. For medium (100-199 beds), urban, nonteaching hospitals, the NIS estimate was lower than MedPAR.
- In-hospital mortality rate differences were found in only two of the 15 hospital categories. The NIS estimates for small rural hospitals (1-49 beds) and small, urban nonteaching hospitals (1-99 beds) were both significantly higher than MedPAR.
- Average total hospital charge differences were found in only two of the 15 categories. For both government/nonfederal hospitals and medium (100-199 beds), urban nonteaching hospitals, the NIS estimate was higher than MedPAR.

Comparisons by Patient Characteristics

Table 9 compares the NIS and MedPAR for 1997, by patient categories (age group, gender and race). All discharge estimates and most average length of stay estimates were significantly different from the MedPAR figures for each patient category.

Discharge estimates from the NIS were significantly higher than MedPAR counts for all age group categories, ranging from 6 percent for 0-64 years to 18 percent for 75-84 years. By gender, NIS estimates were 14 percent higher than the MedPAR discharge counts for males and females. The NIS discharge estimates for Whites and Blacks were significantly lower than the MedPAR counts, while the estimates for other and missing race were significantly higher. The racial mix of the NIS data is much different from the MedPAR mix. The race categories of other and missing represent 25% of the NIS data, but only a small portion of the MedPAR data – 4%. The race category of White represents 67% of the NIS data but 85% of the MedPAR data. The discussion section, later in the report examines racial classifications in all the data.

Average length of stay estimates from the NIS were generally longer than the MedPAR average. In six of the ten patient categories, the NIS estimate was significantly shorter than MedPAR. The NIS estimates were significantly different for two age groups (0-64 years and 65-74 years), both genders, and two race categories (Black and missing).

NIS in-hospital mortality estimates were not significantly different from MedPAR for nine of the ten categories. Only with the age group 65-74 years was a significant difference found. With this category, the NIS estimate was 3 percent lower than the MedPAR statistic for the same age group. Only two average total hospital charge estimates differed significantly from the MedPAR average. The racial categories of White and other yielded NIS estimates 3 to 7 percent higher than MedPAR.

Comparisons by Diagnosis Related Groups (DRGs)

Table 10 lists the top 20 DRG categories ranked according to the NIS estimated number of discharges for each category. NIS discharge estimates were significantly higher than the MedPAR count for 15 of the 20 DRG groups. The majority of these differences were 6 to 16 percent higher than the MedPAR count, although very large differences were found for "Psychosis" and "Rehabilitation" DRGs. Average length of stay estimates from the NIS were significantly lower than the MedPAR statistics for four of the 20 groups. NIS estimates of in-hospital mortality were significantly different from the MedPAR statistics for 6 of the 20 DRGs. One estimate was higher than MedPAR, while the other 5 significant differences were lower than MedPAR. NIS total hospital charge estimates were significantly higher than the MedPAR averages for nine of the 20 DRG groups and significantly lower for one group.

Comparisons by Diagnosis Category

Table 11 lists the top 25 diagnosis categories ranked according to the NIS estimated number of discharges for each category. NIS discharge estimates were significantly higher than the MedPAR count for all 25 of the diagnosis groups. Most estimates exceeded the MedPAR count by 10 to 25 percent, although larger differences were found in the "Psychosis" and "Rehabilitation" groups. Average length of stay estimates from the NIS were significantly different from the MedPAR average for four diagnosis groups: the estimate was higher for two diagnosis groups (Septicemia and Complications of surgical procedures) and lower for two groups (Rehabilitation care and Affective disorders). NIS in-hospital mortality estimates were significantly higher for three diagnosis groups (Pneumonia, Rehabilitation care, and Secondary malignancies), and significantly lower for two groups (Nonspecific chest pain and Intestinal obstruction without hernia). NIS average total hospital charge estimates were generally higher than the MedPAR averages (23 out of 25), and significantly so for ten diagnosis groups. In addition, the NIS estimate for one diagnosis group was significantly lower than the MedPAR average resulting in eleven groups with significant differences in average hospital charge.

Comparisons by Procedure Category

Table 12 lists the top 25 procedure categories ranked according to the NIS estimated number of discharges for each category. By procedure category, most NIS discharge estimates were larger than the MedPAR numbers. However, NIS estimates for average length of stay, in-hospital mortality, and average total hospital charge generally agree with the MedPAR statistics, with few significant differences found. NIS discharge estimates were significantly higher than the MedPAR counts for 21 of the 25 procedure groups. Most of the significant differences were 11 to 23 percent higher than the MedPAR count. Larger differences were found in the group "Hemodialysis".

The NIS average length of stay estimates were significantly different from the MedPAR statistics in only four of the 25 procedure groups. The NIS estimates were significantly higher than MedPAR for “Percutaneous coronary angioplasty” and “Insertion/removal of pacemaker/defibrillator”, and significantly lower than MedPAR for “Arthroplasty knee” and “Endarterectomy”. In-hospital mortality estimates from the NIS were significantly different for seven of the 25 procedure groups. In six of these differences, the NIS estimate was lower than MedPAR. The NIS estimate of total hospital charges was significantly different than the MedPAR average in seven of the 25 procedure groups, with six of those NIS estimates higher than MedPAR.

Comparison with AHA Data

Table 13 demonstrates that hospital weights associated with the NIS yield hospital counts consistent with AHA universe counts for various categories of hospital types. This is expected because the sample of NIS hospitals was stratified on most of these variables, and sample hospital weights were calculated within strata based on AHA data.

AHA data suggest that there were 12.3 million Medicare discharges in 1997 (not shown in table). This contrasts with 12.9 million Medicare discharges estimated by the NIS, 12.3 million Medicare discharges estimated by the NHDS, and 11.3 million discharges counted in the MedPAR data. These numbers also highlight the differences in the data. The MedPAR data represents hospital discharges paid by the Medicare system after adjudication (although it excludes most discharges for managed care enrollees). The NIS, NHDS and AHA data in contrast are based upon the expected primary payer, as recorded during the patient’s hospital stay - or prior to processing the claim.

Table 14 compares the universe (AHA) and weighted frame (NIS) means and medians for selected hospital-level measures defined in the 1997 AHA Annual Survey. It is important to recognize that Table 14 compares the hospital universe to the 22-state hospital frame, not to estimates for the entire hospital universe. The average hospital in the NIS sampling frame was larger than the average for the universe of AHA hospitals. When comparing the frame and universe averages:

- Hospital admissions and discharges were 22 percent higher,
- Total hospital expenses and payroll were 23 percent higher,
- Full-time equivalent employees were 21 percent higher.

Differences were even larger when comparing median numbers between the frame and universe:

- Hospital admissions and discharges were over 40 percent higher,
- Total hospital expenses and payroll were 45-49 percent higher,
- Full-time equivalents (FTEs) were 33 percent higher.

Frame hospitals also tended to use more resources per bed than hospitals in the universe. The average frame hospital, as compared with the average universe hospital had higher:

- Expenses per bed (16 percent),
- Payroll per bed (17 percent),
- FTEs per bed (16 percent).

These differences also applied to the median frame and universe hospitals, although the differences were not as extreme. Compared to universe, the median frame hospital had higher:

- Expenses per bed (14 percent),
- Payroll per bed (12 percent),
- FTEs per bed (5 percent).

Length of stay in frame hospitals tended to be shorter (by nearly 12 percent) than the average stay at universe hospitals, although the median average stay length was nearly identical for frame and universe.

Hospitals in the frame tended to have slightly fewer Medicare days and discharges than the universe:

- Average Medicare days were 1 percent lower,
- Median Medicare days were nearly 4 percent lower,
- Average Medicare discharges were 3 percent lower,
- Median Medicare discharges were 4-5 percent lower.

Hospitals in the frame also tended to have fewer Medicaid days and discharges than the universe:

- Average Medicaid days were nearly 4 percent lower,
- Median Medicaid days were 4 percent lower,
- Average Medicaid discharges were 7 percent lower,
- Median Medicaid discharges were 3-7 percent lower.

DISCUSSION

In general, for many types of estimates, the NIS performs very well. Some differences emerge when the NIS is compared to specific data sets. Sometimes, these variations are caused by differences in definitions (e.g., NIS and NHDS coding schemes). In some cases, differences are due to certain shortcomings in the NIS. In other cases, differences may be attributed to slightly dissimilar populations. For example, the MedPAR data do not include all HMO enrollees. Consequently, if a study's target population is HMO enrollees over 64 years of age, the NIS may be a better analysis file.

Analysis by Race and Ethnicity

Careful attention is necessary for any analysis of discharge data by race and ethnicity. All data used in this report originates with hospitals who collect race/ethnicity information primarily from the patients or by the registrar through observation. There are no validity checks, and for most hospitals, race/ethnicity is not a service delivery issue. For example, some hospitals report "other" race for all non-white patients, resulting in over-reporting for this race category. Reliability is consequently an underlying issue whenever dealing with race and ethnicity.

In addition to the underlying problems with race/ethnicity data described above, there are additional, specific problems of availability of information and recording of information. Availability and coding of race/ethnicity information varies between the NIS and the two comparison data sources. The NIS and NHDS contain significant numbers of discharges without race/ethnicity information, and all three sources code Hispanic ethnicity differently. These differences are described below.

Missing race/ethnicity information affects one in five NIS discharges, and one in four NHDS discharges. Less than 1 percent of MedPAR records, however, are without race/ethnicity. While the NIS contains uniform values for race, there is variation in source data from the participating states. Three NIS states (Illinois, Oregon, and Washington) do not report race/ethnicity data, while a fourth state (Utah) reports race/ethnicity on only 20 percent of discharges. Together, these four states represent over 11 percent of NIS discharges. To a lesser degree, other NIS states also contributed discharges with missing race/ethnicity information.

The NIS, NHDS, and MedPAR data record race/ethnicity in different ways. For this report, the race/ethnicity information for all three data sources was re-classified as *White*, *Black*, *other*, or *missing* as shown in Table C.

Table C: Reclassification of Race and Ethnicity - NIS, NHDS, and MedPAR Data

Report	NIS	NHDS	MedPAR
White	White	White	White
Black	Black	Black	Black
other	Asian/Pacific Islander Hispanic Native American other race	Asian/Pacific Islander Native American other race	Asian Hispanic Native American other race
missing	unavailable & invalid	missing	missing

The NIS, NHDS, and MedPAR data files deal with Hispanic ethnicity differently. The NIS treats Hispanic ethnicity as a separate racial category while the NHDS ignores ethnicity. MedPAR data contain an Hispanic racial category, but for practical purposes ignore the category. Table D, below, compares the three data files with the U.S. Census Bureau estimates of the 1997 population. The Census Bureau treats Hispanic ethnicity as a classification separate from race, so it is possible to look at racial distribution with and without considering Hispanic ethnicity. Despite the availability of an Hispanic race category, Table D shows that the racial demographics of the MedPAR data closely resemble the racial distribution, ignoring ethnicity, estimated by the population Census. When considering Hispanic ethnicity, then NIS most closely reflects the racial makeup of the country, particularly when the "missing" category is disregarded.

Table D: Racial Distribution of Data and Nation, 1997

	Hospital Discharges			**Population Census**	
	NIS	**NHDS**	**MedPAR**	**with Hispanic**	**without Hispanic**
White	72.8%	75.0%	84.6%	72.7%	82.7%
Black	13.6%	17.8%	10.9%	12.1%	12.7%
other	13.6%	7.1%	3.9%	15.2%	4.7%
missing	20.5%	25.1%	0.6%	----	----

Comparisons to NHDS Estimates

Based on comparisons between statistics calculated from the NIS and the NHDS, it appears that most statistics calculated from the two data sources are similar. Overall, when compared with the NHDS, the NIS seems to estimate higher discharges for certain types of hospitals

(government hospitals and large hospitals) and higher in-hospital mortality rates. The higher mortality estimates may be in part because the NIS tends to have higher estimates of discharges for "large" hospitals, and these patients may represent a somewhat different severity of illness than those in other hospitals.

Estimates of LOS and mortality by diagnosis and procedure groups show few significant differences. However, several estimates of discharges by diagnosis and procedure groups are significantly different. These differences of LOS and mortality could be attributable to differences in data handling — the NIS takes all diagnosis and procedure codes as they are recorded, while the NHDS has specific rules for what is considered a valid first-listed diagnosis.

Comparisons to MedPAR Estimates

Based upon comparisons between statistics calculated from the NIS and the MedPAR, most statistics calculated from the NIS appear different for the Medicare population. When compared to the MedPAR, NIS Medicare estimates seem to have:

- discharge counts approximately 17 percent higher,
- average lengths of stay approximately 2 percent higher,
- in-hospital mortality rates approximately 3 percent lower, and
- hospital charges slightly higher but not significantly so.

Some differences may arise from differences in the underlying composition of the NIS and MedPAR data. One difference noted earlier is the absence of most managed care discharges from the MedPAR data. A second difference is the exclusion from the MedPAR data of special unit discharges. All MedPAR discharges from: 1) psychiatric units, 2) rehabilitation units, and 3) alcohol/drug units were excluded from these comparisons. NIS discharge estimates for psychosis and rehabilitation discharges were far larger than statistics for similar groupings of MedPAR discharges. This may be due to the possible inclusion in the NIS of discharges from special hospital units such as psychiatric, long-term care, and rehabilitation. NIS hospitals vary in their reporting of discharges from these special units, and no attempt was made to delete records from special units within hospitals. If information about such reporting is available, it is documented in *File Composition For The HCUP Nationwide Inpatient Sample*.

Conclusion

In summary, the NIS estimates of average length of stay appear to be unbiased in most contexts. The NIS estimates of discharge counts differ under some conditions from the NHDS estimates but not in any consistent direction. NIS estimates for Medicare discharges exceed MedPAR statistics, although this is likely due to the omission of managed care discharges and the exclusion of discharges from special units of hospitals. The NIS estimates for in-hospital mortality are higher than estimates from the NHDS, overall and for the South and West. Based on comparisons with AHA data, NIS frame hospitals tend, on average, to be larger than the universe of community hospitals and use more resources. This higher percentage of weighted NIS discharges coming from "large" hospitals — and the more complex case mix of those

hospitals — may contribute to the higher in-hospital mortality estimates when compared to the NHDS.

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APPENDIX

Estimates of Standard Error for NHDS Statistics

A variety of statistics were estimated based on these data: 1) total number of discharges, 2) in-hospital mortality, and 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, constants a and b were obtained for 1997. The relative standard error for the estimate of total discharges is approximated by:

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

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

Percent Mortality

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

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

Where *b* is the parameter *b* in the formula for approximating $RSE(W_{TD})$ given by the NHDS documentation. This estimate of the relative standard error is valid only if:

(1) the relative standard error of the denominator (estimated discharges) is less than 5 percent, or

(2) both the relative standard error of the numerator (estimated number of deaths) and the denominator (estimated discharges) are less than 10 percent.

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 is TLOS, and

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

then the relative standard error is:

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

This estimate of the relative standard error is valid only if:

(1) the relative standard error of the denominator (estimated discharges) is less than 5 percent, or

(2) both the relative standard error of the numerator (estimated total stay days) and the denominator (estimated discharges) are less than 10 percent.

Tests of Statistical Significance

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

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

where SE_X is the estimated standard error for the NIS estimate and SE_Y is the estimated standard error of the NHDS estimate. S is equal to 1.96 for significance at the .05 level and S is equal to 2.576 for significance at the .01 level.

If a valid estimate of either standard error, SE_X or SE_Y, could not be obtained, then a significance test was not performed.

Table 1: Differences Between NIS – Release 6 and NHDS Files Used in This Analysis

Table 1: Differences Between NIS – Release 6 and NHDS Files Used in This Analysis (continued)

CHARACTERISTIC	DATABASE	
	NIS - Release 6	**NHDS**
Intended Universe	Discharges from community hospitals as defined by the AHA – nonfederal, short-term general, or other special hospitals that are not a hospital unit of an institution.	Discharges from short-stay hospitals (hospitals with an average length of stay of less than 30 days), general-specialty (medical or surgical) hospitals, or children's hospitals. The NHDS does not include federal, military, and Veterans Affairs hospitals, nor does it include hospital units of institutions (i.e., prison hospitals).
Specialty hospitals and units	AHA community hospitals may be specialty hospitals. Some AHA community hospitals include specialty units – obstetrics/ gynecology; short-term rehabilitation; and ear, nose, and throat.	Includes discharges from a few specialty hospitals (i.e., psychiatric, maternity, alcohol/chemical dependency, orthopedic, and head injury rehabilitation hospitals).
HMO enrollees	Included	Included
Bedsize	No restriction on bedsize.	Must have at least six beds staffed for patient use.
Sample or Universe	Sample	Sample
Sampling Frame	22 states	50 states and the District of Columbia
Sample Design	By geographic region, control/ownership, location, teaching status, and bedsize (bedsize categories are specific to the hospital's location and teaching status). 1012 hospitals.	Includes all hospitals with at least 1,000 beds or more than 40,000 discharges annually - plus an additional sample of hospitals based on a stratified three-stage design. Approximately 474 hospitals.
Discharges Included In database	All discharges from sampled hospitals: approximately 7.1 million discharges.	A sample of discharges from sampled hospitals: approximately 300,000 discharges.
Charges	Reported charges missing for some HMO enrollees.	Not reported

CHARACTERISTIC	DATABASE	
	NIS - Release 6	NHDS
Reassignment of diagnosis codes	None	Myocardial infarctions are reassigned to the principal diagnosis when other circulatory diagnoses are present. For women discharged after a delivery, a code of V27 (Outcome of Delivery) from the supplemental classification is entered as the second-listed code, with a code designating normal or abnormal delivery in the first-listed position. If the first-listed diagnosis was a symptom and a secondary code was a diagnosis, the diagnosis replaced the symptom which was moved back.

Table 2: NIS and NHDS Comparisons by Region, 1997

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
U.S.	35,408 (559)	34,704 (1811)	4.94 (0.04)	4.84 (0.35)	2.45 ** (0.02)	2.29 (0.05)
Census Region						
Northeast	7,405 (263)	7,284 (562)	5.80 (0.11)	5.71 (0.69)	2.67 (0.06)	2.51 (0.09)
Midwest	8,332 (290)	8,085 (748)	4.81 (0.06)	4.56 (0.60)	2.35 (0.04)	2.33 (0.07)
South	13,099 (330)	12,868 (716)	4.78 (0.05)	4.86 (0.46)	2.55 * (0.04)	2.38 (0.08)
West	6,553 (223)	6,467 (464)	4.43 [a] (0.11)	4.17 (b)	2.16 ** (0.06)	1.84 (0.10)

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

[b] *The NHDS sample size was too small to calculate a valid estimate of standard error.*

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 3: NIS and NHDS Comparisons by Hospital Characteristics, 1997

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Control/Bedsize						
Private/ Investor-owned						
Total	4,572	4,122	4.63	4.81	2.54	2.25
	(228)	(219)	(0.09)	(0.35)	(0.07)	(0.15)
6-99 beds	722 **	1,442	4.52	3.80	2.31 [a]	2.46
	(45)	(79)	(0.25)	(0.29)	(0.10)	(b)
100-199 beds	1,540 **	618	4.64	4.15	2.58 [a]	1.86
	(81)	(36)	(0.13)	(0.33)	(0.10)	(b)
200-299 beds	1,133 **	264	4.43	4.96	2.50 [a]	2.15
	(142)	(17)	(0.17)	(0.43)	(0.20)	(b)
300-499 beds	814 *	1,268	4.83	5.78	2.70 [a]	2.33
	(198)	(70)	(0.24)	(0.43)	(0.17)	(b)
500+ beds	362	529	5.06	5.88	2.62 [a]	1.96
	(171)	(31)	(0.31)	(0.47)	(0.23)	(b)

Table 3: NIS and NHDS Comparisons by Hospital Characteristics, 1997 (continued)

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Private/ Nonprofit						
Total	25,821	26,715	4.96	4.87	2.45	2.34
	(447)	(1395)	(0.04)	(0.35)	(0.03)	(0.06)
6-99 beds	2,536 **	4,362	4.21	4.41	2.53 *	2.17
	(75)	(231)	(0.11)	(0.32)	(0.06)	(0.14)
100-199 beds	4,997 **	7,231	4.74	4.77	2.47	2.49
	(166)	(381)	(0.09)	(0.34)	(0.06)	(0.12)
200-299 beds	4,277 **	5,664	4.97	4.66	2.45	2.21
	(304)	(299)	(0.09)	(0.34)	(0.07)	(0.13)
300-499 beds	8,153 **	6,080	4.96	5.06	2.31	2.34
	(425)	(321)	(0.08)	(0.37)	(0.05)	(0.13)
500+ beds	5,856 **	3,378	5.47	5.67	2.57	2.50
	(427)	(180)	(0.09)	(0.41)	(0.06)	(0.18)

Table 3: NIS and NHDS Comparisons by Hospital Characteristics, 1997 (continued)

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Government/ Nonfederal						
Total	5,010 **	3,867	5.10	4.66	2.42 **	1.98
	(245)	(205)	(0.12)	(0.34)	(0.07)	(0.15)
6-99 beds	1,240	1,255	4.19	4.59	2.68 [a]	2.29
	(37)	(69)	(0.10)	(0.35)	(0.05)	(b)
100-199 beds	883 **	1,375	4.88	4.65	2.24 [a]	1.72
	(82)	(76)	(0.27)	(0.35)	(0.12)	(b)
200-299 beds	470	601	4.56	5.00	2.03 [a]	2.38
	(127)	(35)	(0.22)	(0.39)	(0.14)	(b)
300-499 beds	1,231 **	636	5.27 *	4.51	2.39 [a]	1.55
	(95)	(37)	(0.15)	(0.35)	(0.10)	(b)
500+ beds	1,186 **	0	6.26 [a]	0.00	2.48 [a]	0.00
	(231)	(0)	(0.27)	(b)	(0.25)	(b)

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

[b] *The NHDS sample size was too small to calculate a valid estimate of standard error.*

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 4: NIS and NHDS Comparisons by Patient Characteristics, 1997

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Primary Payer						
Medicare	12,924	12,263	6.41	6.40	4.74	4.56
	(208)	(491)	(0.04)	(0.44)	(0.04)	(0.11)
Medicaid	5,754	5,603	4.67	4.35	1.03 *	0.88
	(167)	(347)	(0.10)	(0.46)	(0.02)	(0.07)
Private Insurance	13,643 **	10,274	3.80	3.74	1.12	1.04
	(316)	(54)	(0.03)	(0.02)	(0.02)	(0.05)
Self-pay	1,590 *	1,720	4.07	3.93	1.53	1.46
	(49)	(15)	(0.12)	(0.03)	(0.06)	(0.10)
No charge	118	113	4.79	4.41	1.17 [a]	1.10
	(16)	(7)	(0.24)	(0.26)	(0.13)	(b)
Other payer	1,282 **	1,773	4.47	4.34	1.45 **	1.11
	(131)	(0)	(0.15)	(0.00)	(0.07)	(0.00)
Missing	98 **	2,957	5.54 [a]	3.92	1.35 [a]	1.17
	(19)	(419)	(1.25)	(b)	(0.19)	(b)

Table 4: NIS and NHDS Comparisons by Patient Characteristics, 1997 (continued)

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Age Group						
0-15 years	5,830	6,101	3.44 [a]	3.42	0.42 [a]	0.42
	(155)	(777)	(0.06)	(b)	(0.02)	(b)
15-44 years	10,158	10,030	3.70	3.68	0.51	0.49
	(211)	(394)	(0.04)	(0.24)	(0.02)	(0.04)
45-64 years	6,255	6,377	5.24	5.19	2.11	1.96
	(118)	(347)	(0.04)	(0.40)	(0.02)	(0.11)
65+ years	13,165	12,196	6.42	6.31	5.02	4.89
	(216)	(468)	(0.06)	(0.41)	(0.04)	(0.12)
Gender						
Male	14,519	14,199	5.26	5.12	2.97	2.79
	(233)	(661)	(0.04)	(0.37)	(0.03)	(0.09)
Female	20,885	20,505	4.71	4.64	2.10 [**]	1.95
	(339)	(735)	(0.04)	(0.29)	(0.02)	(0.05)

Table 4: NIS and NHDS Comparisons by Patient Characteristics, 1997 (continued)

	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
	NIS	NHDS	NIS	NHDS	NIS	NHDS
Race						
White	20,328	22,133	5.07	4.92	2.73	2.49
	(515)	(1325)	(0.05)	(0.45)	(0.03)	(0.06)
Black	3,853	4,151	5.42	5.31	2.19	1.91
	(210)	(301)	(0.06)	(0.62)	(0.05)	(0.10)
Other	3,678 **	1,847	4.41 [a]	4.36	1.62 [a]	1.37
	(230)	(236)	(0.11)	(b)	(0.07)	(b)
Missing	7,549	6,574	4.60 [a]	4.39	2.26 [a]	2.14
	(452)	(931)	(0.06)	(b)	(0.05)	(b)

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

[b] *Unable to calculate a valid estimate of the NHDS standard error for this level of aggregation.*

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 5: NIS and NHDS Comparisons by Principal Diagnoses Ranked by NIS Data, 1997

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
1	218: Liveborn	2,474 ** (66)	3,797 (142)	3.24 (0.07)	2.93 (0.18)	0.39 [a] (0.02)	0.34 (b)
2	101: Coronary atherosclerosis	1,269 (38)	1,296 (51)	4.26 (0.06)	4.15 (0.27)	0.93 [a] (0.02)	1.22 (b)
3	122: Pneumonia (except that caused by tuberculosis and sexually transmitted diseases)	1,132 ** (16)	1,325 (52)	6.47 (0.05)	6.42 (0.41)	6.20 [a] (0.08)	6.02 (b)
4	108: Congestive heart failure, nonhypertensive	932 (17)	978 (40)	5.89 (0.05)	5.84 (0.38)	4.93 [a] (0.07)	4.75 (b)
5	100: Acute myocardial infarction	706 (17)	757 (32)	5.90 (0.06)	6.00 (0.40)	8.83 [a] (0.10)	9.20 (b)
6	193: Trauma to perineum and vulva	669 ** (21)	2 (1)	1.82 [a] (0.01)	0.97 (b)	0.00 [a] (0.00)	0.00 (b)
7	109: Acute cerebrovascular disease	602 (10)	621 (27)	7.61 (0.13)	6.83 (0.46)	10.78 [a] (0.13)	9.78 (b)
8	106: Cardiac dysrhythmias	556 * (11)	615 (26)	3.80 (0.04)	4.08 (0.28)	1.21 [a] (0.03)	0.87 (b)
9	127: Chronic obstructive pulmonary disease and bronchiectasis	522 ** (9)	634 (27)	5.75 (0.05)	5.45 (0.37)	2.70 [a] (0.06)	2.35 (b)
10	196: Normal pregnancy and/or delivery	521 ** (15)	3,821 (143)	1.79 ** (0.01)	2.42 (0.15)	0.00 [a] (0.00)	0.01 (b)

Table 5: NIS and NHDS Comparisons by Principal Diagnoses Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
11	102: Nonspecific chest pain	519 ** (13)	61 (5)	1.93 [a] (0.02)	1.47 (b)	0.06 [a] (0.01)	0.00 (b)
12	69: Affective disorders	507 ** (21)	661 (28)	8.86 (0.14)	8.49 (0.56)	0.07 [a] (0.01)	0.06 (b)
13	205: Spondylosis, intervertebral disc disorders, other back problems	504 (14)	547 (24)	3.38 (0.04)	3.27 (0.23)	0.15 [a] (0.01)	0.34 (b)
14	237: Complication of device, implant or graft	478 (15)	450 (20)	5.97 (0.05)	5.92 (0.41)	1.88 [a] (0.05)	1.32 (b)
15	55: Fluid and electrolyte disorders	450 ** (8)	574 (25)	4.45 (0.07)	4.50 (0.31)	2.88 [a] (0.07)	2.70 (b)
16	149: Biliary tract disease	445 (8)	490 (22)	4.23 (0.04)	4.06 (0.28)	0.76 [a] (0.02)	0.70 (b)
17	128: Asthma	412 ** (12)	484 (21)	3.38 (0.04)	3.35 (0.24)	0.30 [a] (0.02)	0.30 (b)
18	190: Fetal distress and abnormal forces of labor	408 ** (15)	2 (1)	2.59 [a] (0.03)	1.26 (b)	0.01 [a] (0.00)	0.00 (b)
19	2: Septicemia (except in labor)	398 * (8)	356 (17)	8.19 (0.07)	8.02 (0.57)	14.29 [a] (0.16)	12.84 (b)
20	50: Diabetes mellitus with complications	399 (8)	428 (19)	5.99 (0.07)	6.07 (0.42)	1.56 [a] (0.05)	1.17 (b)

Table 5: NIS and NHDS Comparisons by Principal Diagnoses Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
21	159: Urinary tract infections	395 ** (6)	450 (20)	4.99 (0.09)	5.33 (0.37)	1.59 [a] (0.05)	1.15 (b)
22	203: Osteoarthritis	392 (11)	410 (19)	4.82 (0.07)	5.24 (0.37)	0.23 [a] (0.01)	0.21 (b)
23	195: Other complications of birth, puerperium affecting management of the mother	388 ** (14)	55 (5)	2.31 [a] (0.02)	2.25 (b)	0.03 [a] (0.01)	0.05 (b)
24	181: Other complications of pregnancy	358 ** (12)	157 (9)	2.39 (0.04)	2.56 (0.23)	0.03 [a] (0.01)	0.01 (b)
25	254: Rehabilitation care, fitting of prostheses, and adjustment of devices	281 ** (17)	208 (11)	14.12 (0.27)	14.01 (1.05)	1.08 [a] (0.11)	0.72 (b)

[1] *NIS rank is based on number of discharges.*

[2] *Diagnoses classified according to Clinical Classifications for Health Policy Research, Version 2 (see Elixhauser and McCarthy, 1996).*

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

[b] *The NHDS sample size was too small to calculate a valid estimate of standard error.*

[*] *Difference is significant at the 0.05 level.*

[**] *Difference is significant at the 0.01 level.*

Table 6: NIS and NHDS Comparisons by Principal Procedures Ranked by NIS Data, 1997

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
1	137: Other procedures to assist delivery	1,063 (41)	1,122 (63)	4.95 ** (0.02)	2.00 (0.16)	0.00 [a] (0.00)	0.03 (b)
2	115: Circumcision	966 ** (31)	1,154 (65)	2.45 (0.03)	2.37 (0.18)	0.01 [a] (0.00)	0.00 (b)
3	134: Cesarean section	733 (22)	812 (46)	3.79 (0.03)	3.77 (0.29)	0.03 [a] (0.00)	0.01 (b)
4	47: Diagnostic cardiac catheterization, coronary arteriography	638 (22)	590 (35)	3.95 (0.04)	3.76 (0.30)	1.00 [a] (0.03)	2.06 (b)
5	70: Upper gastrointestinal endoscopy, biopsy	607 (10)	626 (37)	5.85 (0.04)	6.05 (0.47)	2.20 [a] (0.04)	2.14 (b)
6	133: Episiotomy	548 (22)	614 (36)	1.97 (0.02)	2.09 (0.17)	0.00 [a] (0.00)	0.00 (b)
7	45: Percutaneous coronary angioplasty (PTCA)	534 ** (22)	391 (24)	1.92 ** (0.02)	3.55 (0.29)	0.00 [a] (0.00)	1.02 (b)
8	124: Hysterectomy, abdominal and vaginal	528 (12)	578 (34)	3.15 (0.02)	3.12 (0.25)	0.11 [a] (0.10)	0.06 (b)
9	140: Repair of current obstetric laceration	470 ** (26)	582 (34)	3.59 ** (0.05)	1.97 (0.16)	1.00 [a] (0.04)	0.00 (b)

Table 6: NIS and NHDS Comparisons by Principal Procedures Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
10	216: Respiratory intubation and mechanical ventilation	470 (10)	430 (26)	11.10 (0.20)	11.12 (0.88)	30.77 [a] (0.35)	28.85 (b)
11	84: Cholecystectomy and common duct exploration	380 (7)	390 (24)	4.71 (0.07)	4.47 (0.37)	0.81 [a] (0.03)	0.57 (b)
12	228: Prophylactic vaccinations and inoculations	347 ** (19)	464 (28)	9.20 ** (0.13)	2.26 (0.19)	2.97 [a] (0.08)	0.00 (b)
13	3: Laminectomy, excision intervertebral disc	342 (36)	305 (19)	5.62 ** (0.10)	3.07 (0.27)	2.31 [a] (0.12)	0.32 (b)
14	231: Other therapeutic procedures	353 ** (12)	468 (28)	2.13 ** (0.02)	5.27 (0.42)	0.00 [a] (0.00)	2.45 (b)
15	44: Coronary artery bypass graft (CABG)	258 * (19)	326 (20)	5.28 ** (0.19)	9.09 (0.74)	0.14 [a] (0.02)	3.93 (b)
16	219: Alcohol and drug rehabilitation/detoxification	263 (27)	324 (20)	2.41 ** (0.06)	6.80 (0.56)	0.01 [a] (0.00)	0.02 (b)
17	135: Forceps, vacuum, and breech delivery	311 ** (11)	383 (23)	3.13 ** (0.05)	2.12 (0.18)	0.19 [a] (0.01)	0.00 (b)
18	152: Arthroplasty knee	301 (8)	311 (19)	4.38 (0.03)	4.58 (0.39)	0.22 [a] (0.02)	0.26 (b)

Table 6: NIS and NHDS Comparisons by Principal Procedures Ranked by NIS Data, 1997 (continued)

Table 7: NIS and MedPAR Comparisons by Region, 1997

Rank[1]	CCHPR Category[2]	Number of Discharges in Thousands (Standard Error)		Average Length of Stay in Days (Standard Error)		In-Hospital Mortality Rate: Percent (Standard Error)	
		NIS	NHDS	NIS	NHDS	NIS	NHDS
19	153: Hip replacement, total and partial	280 (7)	279 (18)	5.77 (0.05)	5.66 (0.48)	1.36 [a] (0.05)	1.65 (b)
20	177: Computerized axial tomography (CT) scan head	269 (18)	279 (18)	5.32 (0.12)	5.45 (0.46)	3.96 [a] (0.11)	3.49 (b)
21	146: Treatment, fracture or dislocation of hip and femur	269 (5)	258 (17)	6.51 (0.06)	6.22 (0.53)	2.07 [a] (0.05)	1.96 (b)
22	4: Diagnostic spinal tap	262 (8)	255 (16)	5.63 (0.08)	5.54 (0.47)	1.75 [a] (0.07)	1.47 (b)
23	78: Colorectal resection	249 * (5)	214 (14)	10.63 (0.09)	10.60 (0.90)	4.57 [a] (0.09)	3.22 (b)
24	76: Colonoscopy and biopsy	248 (4)	235 (15)	6.07 (0.04)	5.77 (0.50)	1.42 [a] (0.05)	1.44 (b)
25	222: Blood transfusion	243 (9)	262 (17)	6.14 (0.07)	5.93 (0.50)	7.02 [a] (0.14)	4.78 (b)

[1] *NIS rank is based on number of discharges.*

[2] *Procedures classified according to Clinical Classifications for Health Policy Research, Version 2 (see Elixhauser and McCarthy, 1996).*

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

[b] *The NHDS sample size was too small to calculate a valid estimate of standard error.*

[*] *Difference is significant at the 0.05 level.*

[**] *Difference is significant at the 0.01 level.*

	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)	
	NIS	**MedPAR**	**NIS**	**MedPAR**	**NIS**	**MedPAR**	**NIS**	**MedPAR**
U.S.	12,924 ** (208)	11,317	6.42 ** (0.04)	6.58	4.74 (0.04)	4.69	14,409 (184)	14,172
Census Region								
Northeast	2,833 ** (109)	2,331	7.67 * (0.16)	8.03	5.11 (0.12)	5.23	15,112 (526)	15,668
Midwest	3,126 ** (96)	2,817	6.21 (0.06)	6.12	4.52 ** (0.06)	4.34	13,070 (282)	12,604
South	5,025 ** (124)	4,485	6.03 ** (0.05)	6.45	4.72 (0.05)	4.74	13,456 (234)	13,285
West	1,940 ** (82)	1,683	5.92 * (0.10)	5.68	4.56 (0.08)	4.40	18,096 (571)	17,086

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 8: NIS and MedPAR Comparisons by Hospital Characteristics, 1997

	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)	
	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
Control/Ownership								
Private/ Investor-owned	1,820 ** (88)	1,468	6.09 ** (0.11)	6.56	4.56 (0.10)	4.39	16,099 (359)	16,609
Private/nonprofit	9,447 ** (178)	8,186	6.53 (0.05)	6.44	4.77 (0.04)	4.77	14,317 (224)	14,062
Government/ Nonfederal	1,658 * (61)	1,505	6.15 (0.11)	6.11	4.70 (0.08)	4.78	13,097 * (508)	11,980
Location/Teaching Status/Bedsize								
Rural								
Total	2,500 ** (46)	2,292	5.39 (0.05)	5.45	4.57 (0.04)	4.49	8,534 (114)	8,581
1-49 beds	592 ** (16)	523	4.77 (0.08)	4.63	4.47 ** (0.07)	4.24	6,274 (102)	6,206
50-99 beds	720 ** (22)	642	5.11 (0.08)	5.23	4.61 (0.09)	4.44	8,058 (252)	8,075
100+ beds	1,189 (37)	1,127	5.88 (0.09)	5.96	4.59 (0.06)	4.64	9,972 (160)	9,972

Table 8: NIS and MedPAR Comparisons by Hospital Characteristics, 1997 (continued)

	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)	
	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
Location/Teaching Status/Bedsize								
Urban teaching								
Total	3,946 **	3,283	7.02	7.02	4.78	4.83	17,657	17,392
	(146)		(0.10)		(0.09)		(454)	
1-299 beds	939 **	729	6.64	6.59	4.48	4.65	16,000	15,045
	(72)		(0.18)		(0.15)		(867)	
300-499 beds	1,467 **	1,240	6.77	6.86	4.61	4.76	18,034	17,444
	(73)		(0.11)		(0.09)		(786)	
500+ beds	1,541 *	1,314	7.50	7.41	5.12	5.00	18,257	18,645
	(105)		(0.19)		(0.19)		(710)	
Urban nonteaching								
Total	6,478 **	5,584	6.44	6.44	4.77	4.75	14,695	14,463
	(140)		(0.06)		(0.05)		(215)	
1-99 beds	698 **	568	6.11 **	6.79	4.65 **	4.13	11,281	11,540
	(27)		(0.17)		(0.10)		(311)	
100-199 beds	1,947 **	1,649	6.51 *	6.24	4.84	4.69	14,036 *	13,387
	(62)		(0.13)		(0.08)		(327)	
200+ beds	3,833 **	3,367	6.47	6.49	4.76	4.89	15,658	15,483
	(123)		(0.07)		(0.07)		(316)	

Table 9: NIS and MedPAR Comparisons by Patient Characteristics, 1997

	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)	
	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
Age Group								
0-64 years	1,681 ** (35)	1,589	6.65 ** (0.06)	7.34	2.40 ** (0.03)	2.25	14,301 (236)	14,076
65-74 years	4,346 ** (78)	3,880	6.07 ** (0.04)	6.21	3.68 * (0.04)	3.78	15,491 (209)	15,221
75-84 years	4,671 ** (79)	3,954	6.53 (0.05)	6.59	5.19 (0.04)	5.13	14,524 (189)	14,235
85+ years	2,226 ** (38)	1,894	6.67 (0.06)	6.66	7.61 (0.07)	7.69	12,150 (165)	11,969

Table 9: NIS and MedPAR Comparisons by Patient Characteristics, 1997 (continued)

	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)	
	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
Gender								
Male	5,601 ** (96)	4,918	6.37 ** (0.04)	6.60	5.18 (0.04)	5.11	15,403 (210)	15,139
Female	7,322 ** (115)	6,398	6.45 * (0.04)	6.56	4.39 (0.04)	4.37	13,652 (168)	13,428
Race								
White	8,716 ** (220)	9,600	6.40 (0.05)	6.43	4.78 (0.04)	4.71	14,373 * (222)	13,933
Black	976 ** (52)	1,245	7.34 ** (0.10)	7.60	4.82 (0.10)	4.67	15,255 (332)	15,177
Other	635 ** (53)	400	6.89 (0.13)	6.88	4.60 ** (0.11)	4.19	18,010 * (454)	16,874
Missing	2,597 ** (148)	71	6.01 ** (0.07)	6.69	4.59 ** (0.06)	5.41	13,345 (253)	13,620

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 10: NIS and MedPAR Comparisons by DRG Ranked by NIS Data, 1997

Rank[1]	DRG Category	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
1	127: Heart failure & shock	693 ** (12)	607	5.54 (0.04)	5.51	5.01 (0.07)	5.01	9,833 * (131)	9,547
2	89: Simple pneumonia & pleurisy, age > 17 with CC	442 (7)	433	6.32 (0.04)	6.29	6.16 (0.10)	6.11	10,277 * (132)	10,002
3	14: Specific cerebrovascular disorders exc TIA	385 ** (7)	363	6.64 ** (0.10)	6.91	10.82 (0.14)	10.71	11,633 (172)	11,745
4	88: Chronic obstructive pulmonary disease	361 ** (6)	330	5.50 (0.04)	5.58	1.98 (0.05)	2.00	9,192 * (116)	8,917
5	209: Major joint & limb reattachment procedures	347 (9)	336	5.31 (0.04)	5.37	0.97 (0.03)	0.98	20,956 ** (258)	19,794
6	430: Psychoses	239 ** (10)	72	12.14 ** (0.19)	13.65	0.15 ** (0.01)	0.24	11,258 (289)	10,812
7	462: Rehabilitation	181 ** (11)	12	13.48 ** (0.21)	15.36	1.11 (0.12)	1.21	14,342 ** (393)	17,432
8	174: GI hemorrhage with CC	253 ** (4)	236	4.89 (0.03)	4.92	3.61 (0.08)	3.70	9,541 * (117)	9,295
9	79: Respiratory infections & inflammations, age > 17 with CC	242 ** (5)	217	8.49 (0.07)	8.60	14.34 * (0.16)	14.00	15,789 (247)	15,420

Table 10: NIS and MedPAR Comparisons by DRG Ranked by NIS Data, 1997 (continued)

Rank[1]	DRG Category	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
10	416: Septicemia, age > 17	234 ** (5)	218	7.43 (0.06)	7.45	17.09 (0.20)	17.43	14,477 (197)	14,146
11	296: Nutritional & misc metabolic disorders, age > 17 with CC	231 (4)	226	5.41 (0.06)	5.40	4.36 * (0.10)	4.59	8,235 (114)	8,041
12	182: Esophagitis, gastroent & misc digestive disorders, age > 17 with CC	234 * (4)	226	4.37 (0.03)	4.33	1.03 * (0.04)	1.11	7,411 ** (1)	7,024
13	112: Percutaneous cardiovascular procedures	209 * (12)	179	3.93 (0.06)	3.84	1.14 (0.06)	1.22	21,104 (554)	21,462
14	138: Cardiac arrhythmia & conduction disorders with CC	213 ** (4)	198	4.01 (0.03)	4.04	2.70 (0.07)	2.78	7,571 (105)	7,499
15	320: Kidney & urinary tract infections, age > 17 with CC	180 ** (3)	171	5.53 (0.05)	5.56	2.62 (0.09)	2.61	8,479 * (134)	8,175
16	132: Atherosclerosis with CC	177 ** (4)	164	3.20 (0.03)	3.25	0.75 (0.04)	0.77	6,349 (90)	6,202
17	121: Circulatory disorders	173 ** (4)	159	6.64 (0.05)	6.60	0.00 (0.00)	0.00	15,065 (224)	14,652
18	124: Circulatory disorders exc AMI, with card cath & complex diagnosis	164 * (6)	150	4.42 (0.05)	4.46	0.80 ** (0.04)	0.94	13,213 (226)	13,048

Table 10: NIS and MedPAR Comparisons by DRG Ranked by NIS Data, 1997 (continued)

Rank[1]	DRG Category	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
19	143: Chest Pain	152 (4)	146	2.18 * (0.02)	2.24	0.11 ** (0.01)	0.14	5,130 * (76)	4,964
20	148: Major small & large bowel procedures with CC	154 ** (3)	144	12.18 (0.11)	12.21	7.83 (0.15)	8.07	33,020 * (442)	31,968

[1] *NIS rank is based on number of discharges.*

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 11: NIS and MedPAR Comparisons by Principal Diagnoses Ranked by NIS Data, 1997

Table 11: NIS and MedPAR Comparisons by Principal Diagnoses Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	Number of (Standard Error)		Average Length (Standard Error)		In-Hospital (Standard Error)		Average Total (Standard Error)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
12	201: Coronary atherosclerosis	280 ** (6)	238	4.69 ** (0.08)	4.58	1.28 (0.04)	1.27	19,243 (382)	18,924
23	158: Congestive heart failure, nonhypertensive	248 ** (4)	239	5.09 (0.06)	5.02	3.05 (0.07)	3.21	18,297 (177)	18,099
14	122: Pneumonia (except that caused by tuberculosis and sexually transmitted diseases)	237 ** (4)	194	5.82 (0.06)	5.88	2.48 * (0.08)	2.40	14,918 (212)	14,515
15	153: Gastrointestinal hemorrhage	191 ** (3)	171	5.33 (0.04)	5.37	5.11 (0.10)	5.18	11,528 (148)	11,375
4	109: Acute cerebrovascular disease	418 ** (7)	372	7.16 (0.08)	7.29	11.08 (0.14)	11.03	13,986 (204)	13,962
16	102: Nonspecific chest pain	167 ** (5)	168	2.31 (0.02)	2.34	0.14 * (0.01)	0.14	5,734 (87)	5,734
5	100: Acute myocardial infarction	399 ** (7)	351	6.56 (0.07)	6.44	12.11 (0.13)	12.22	22,584 (275)	21,883
17	50: Diabetes mellitus with complications	179 ** (4)	154	7.07 (0.08)	6.90	2.36 (0.08)	2.40	13,676 (263)	13,039
6	127: Chronic obstructive pulmonary disease and	355 ** (6)	308	6.00 (0.05)	5.93	3.15 (0.07)	3.08	11,095 (168)	10,586
18	69: Affective disorders	154 ** (7)	48	11.89 ** (0.20)	13.42	0.17 (0.02)	0.17	11,666 (304)	11,394
7	106: Cardiac dysrhythmias	360 ** (6)	312	4.18 (0.04)	4.12	1.48 (0.04)	1.48	11,360 (188)	11,158
19	149: Biliary tract disease	166 ** (3)	150	5.56 (0.05)	5.62	1.56 (0.05)	1.63	15,378 (188)	14,884
8	237: Complication of device, implant or graft	282 ** (6)	227	6.08 (0.05)	6.02	2.24 (0.06)	2.31	20,143 (369)	19,833
20	205: Spondylosis, intervertebral disc disorders, other back	159 ** (4)	144	4.70 (0.07)	4.60	0.30 (0.03)	0.37	12,780 (277)	11,859
9	203: Osteoarthritis	257 ** (7)	231	4.96 (0.09)	5.00	0.28 (0.02)	0.26	19,696 (228)	19,117
21	145: Intestinal obstruction without hernia	161 ** (4)	136	7.09 (0.09)	7.13	4.39 ** (0.09)	4.75	14,693 (294)	14,361
10	226: Fracture of neck of femur (hip)	274 (6)	236	7.11 (0.05)	7.08	3.09 (0.07)	3.12	17,116 (198)	16,823
22	99: Hypertension with complications and secondary hypertension	159 ** (4)	134	6.38 ** (0.09)	6.18	4.07 * (0.11)	3.91	14,504 (368)	14,267
11	254: Rehabilitation care, fitting of prostheses, and adjustment of devices	194 (12)	16	19.62 (0.21)	14.25 .	1.11 (0.12)	0.84	14,603 (392)	15,460

Table 11: NIS and MedPAR Comparisons by Principal Diagnoses Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	Number of (Standard Error)		Average Length (Standard Error)		In-Hospital (Standard Error)		Average Total (Standard Error)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
23	238: Complications of surgical procedures or medical care	156 ** (4)	132	7.07 * (0.07)	6.89	2.83 (0.08)	2.78	15,756 (309)	15,287
24	129: Aspiration pneumonitis, food/vomitus	143 ** (4)	110	9.23 (0.10)	9.33	20.47 (0.25)	20.51	19,440 (362)	19,504
25	42: Secondary malignancies	135 ** (3)	110	7.92 (0.08)	8.03	13.07 ** (0.24)	12.33	16,850 (290)	16,690

[1] *NIS rank is based on number of discharges.*

[2] *Diagnoses classified according to Clinical Classifications for Health Policy Research, Version 2 (see Elixhauser and McCarthy, 1996).*

* *Difference is significant at the 0.05 level.*

** *Difference is significant at the 0.01 level.*

Table 12: NIS and MedPAR Comparisons by Principal Procedures Ranked by NIS Data, 1997

Rank[1]	CCHPR Category[2]	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
1	70: Upper gastrointestinal endoscopy, biopsy	349 ** (6)	314	6.49 (0.04)	6.51	2.81 (0.06)	2.86	12,444 (156)	12,212
2	47: Diagnostic cardiac catheterization, coronary arteriography	319 ** (11)	271	4.49 (0.05)	4.53	1.43 ** (0.05)	1.60	13,890 (256)	13,905
3	45: Percutaneous transluminal coronary angioplasty (PTCA)	226 ** (13)	184	3.99 * (0.06)	3.83	1.61 (0.07)	1.63	22,929 (630)	23,216
4	216: Respiratory intubation and mechanical ventilation	213 ** (4)	180	9.70 (11.81)	9.56	43.13 * (0.32)	43.91	31,889 * (539)	30,748
5	153: Hip replacement, total and partial	201 ** (5)	181	6.00 (0.05)	6.09	1.66 (0.06)	1.73	21,647 ** (275)	20,469
6	44: Coronary artery bypass graft (CABG)	184 (11)	179	10.19 (0.17)	9.95	4.02 (0.12)	4.04	50,825 (1226)	50,026
7	152: Arthroplasty knee	183 ** (5)	160	4.65 ** (0.04)	4.75	0.28 (0.02)	0.25	21,116 ** (272)	20,163
8	146: Treatment, fracture or dislocation of hip and femur	189 ** (4)	165	6.61 (0.07)	6.67	2.54 (0.07)	2.54	16,603 ** (208)	15,846
9	48: Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	157 ** (5)	131	5.91 * (0.08)	5.71	2.64 (0.09)	2.71	27,083 (404)	26,774

Table 12: NIS and MedPAR Comparisons by Principal Procedures Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
10	177: Computerized axial tomography (CT) scan head	148 * (10)	125	6.10 (0.14)	6.11	5.18 ** (0.14)	5.55	9,786 (366)	10,371
11	76: Colonoscopy and biopsy	155 ** (3)	133	6.61 (0.05)	6.54	1.89 (0.06)	1.88	11,768 * (169)	11,383
12	222: Blood transfusion	147 ** (5)	122	6.40 (0.07)	6.42	7.99 * (0.16)	8.40	11,258 * (196)	11,695
13	78: Colorectal resection	140 ** (3)	124	11.50 (0.12)	11.54	6.52 (0.14)	6.61	31,187 (448)	30,355
14	84: Cholecystectomy and common duct exploration	134 ** (3)	124	6.34 (0.06)	6.38	1.75 * (0.07)	1.90	18,642 ** (244)	17,918
15	58: Hemodialysis	128 ** (4)	91	5.65 (0.06)	5.67	4.78 (0.12)	4.58	11,816 (200)	11,845
16	193: Diagnostic ultrasound of heart (echocardiogram)	122 (7)	122	5.73 (0.09)	5.84	2.65 ** (0.11)	2.94	11,088 (304)	11,165
17	213: Physical therapy exercises, manipulation, and other procedures	88 (9)	81	11.70 (0.47)	11.75	1.25 ** (0.15)	0.69	13,797 (772)	15,054
18	61: Other O.R. procedures on vessels other than head and neck	118 ** (4)	100	7.50 (0.11)	7.65	5.52 (0.17)	5.45	25,776 (480)	25,813

Table 12: NIS and MedPAR Comparisons by Principal Procedures Ranked by NIS Data, 1997 (continued)

Rank[1]	CCHPR Category[2]	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)	
		NIS	MedPAR	NIS	MedPAR	NIS	MedPAR	NIS	MedPAR
19	51: Endarterectomy, vessel of head and neck	107 ** (4)	89	3.54 ** (0.05)	3.75	0.70 (0.05)	0.69	14,327 (264)	14,161
20	54: Other vascular catheterization, not heart	107 ** (3)	88	9.95 (0.12)	10.01	18.26 * (0.34)	19.10	21,391 (380)	21,245
21	113: Transurethral resection of prostate (TURP)	102 ** (2)	94	3.87 (0.06)	3.87	0.48 (0.40)	0.42	8,996 * (149)	8,648
22	169: Debridement of wound, infection or burn	101 ** (2)	83	12.09 (0.19)	11.71	4.79 (0.16)	4.82	22,922 (493)	22,295
23	231: Other therapeutic procedures	90 (7)	92	6.32 (0.19)	6.26	6.06 (0.23)	6.22	11,594 (379)	11,693
24	39: Incision of pleura, thoracentesis, chest drainage	92 ** (2)	75	8.68 (0.07)	8.79	9.93 (0.20)	10.20	16,586 (240)	16,403
25	37: Diagnostic bronchoscopy and biopsy of bronchus	90 ** (3)	79	10.08 (0.12)	10.08	7.97 (0.18)	8.13	22,051 (349)	21,434

[1] *NIS rank is based on number of discharges.*

[2] *Procedures classified according to Clinical Classifications for Health Policy Research, Version 2 (see Elixhauser and McCarthy, 1996).*

Table 13: Number of Hospitals in NIS Frame and AHA Universe by Hospital Characteristics, 1997

	1997 AHA Universe	1997 Frame[1] Weighted	1997 Frame[1] Unweighted
U.S.	5,113	5113.0	1,012
Census Region			
Midwest	737	737.0	154
Northeast	1,453	1453.0	302
South	1,968	1968.0	365
West	955	955.0	191
Control/Ownership			
Private/investor-owned	830	828.4	167
Private/nonprofit	3,012	3039.4	599
Government/nonfederal	1,271	1245.1	246
Location/Teaching Status/Bedsize			
Rural			
Total	2,220	2220.0	431
1-49 beds	1,268	1268.0	241
50-99 beds	552	552.0	110
100+ beds	400	400.0	80
Urban			
Total	2,893	2893.0	581
Teaching			
Total	2,237	2237.0	440
1-299 beds	777	777.0	149
300-499 beds	771	771.0	155
500+ beds	689	689.0	136
Nonteaching			
Total	656	656.0	141
1-99 beds	271	271.0	56
100-199 beds	230	230.0	51
200+ beds	155	155.0	34

[1] *The 1997 frame contains 22 states.*

Note: Significance tests were not performed because these are not sample statistics.

Table 14: NIS 22-State Sampling Frame and AHA Universe Comparisons, 1997

	Universe Mean	Frame Weighted Mean	Universe Median	Frame Weighted Median
Hospital Admissions	6,088.70	7,441.57	3,289.00	4,758.00
Hospital Discharges	6,088.70	7,441.57	3,289.00	4,758.00
Hospital Discharges[1]	6,925.13	8,462.39	3,732.00	5,266.00
Hospital Beds	151.24	176.37	95.00	120.00
Hospital Average Length of Stay	6.12	5.40	4.76	4.78
Hospital Occupancy	0.49	0.52	0.49	0.53
Total Hospital Expenses (in dollars)	59,953,141	73,841,083	27,356,721	39,763,182
Hospital Expenses per Bed (in dollars)	337,161	391,975	304,096	345,192
Total Hospital Payroll (in dollars)	25,525,519	31,427,975	11,432,718	17,067,557
Hospital Payroll per Bed (in dollars)	142,979	167,576	128,046	143,509
% Medicare Days	53.62	53.08	54.55	52.60
% Medicare Discharges	46.53	45.21	46.85	44.33
% Medicare Discharges[1]	41.63	40.20	40.92	39.29
% Medicaid Days	13.67	13.18	11.30	11.18
% Medicaid Discharges	14.60	13.65	13.56	13.11
% Medicaid Discharges[1]	12.85	11.92	12.00	11.20
FTE[2]	736.50	889.41	374.50	497.50
FTE[2]/Bed	4.32	4.99	4.19	4.40

[1] *Adjusted for well newborns.*

[2] *Full-time equivalents.*

Note: Significance tests were not performed because these are not sample statistics.