

Supporting Statement B for Request for Clearance:

National Hospital Care Survey

OMB No. 0920-0212

(Expiration date: 10/31/11)

Contact Information:

Carol DeFrances, Ph.D.
Lead Statistician, Hospital Care Team
Ambulatory and Hospital Care Statistics Branch
Division of Health Care Statistics
National Center for Health Statistics/CDC
3311 Toledo Road, Room 3409
Hyattsville, MD 20782
301-458-4440
301-458-4032 (fax)
cdefrances@cdc.gov

April 5, 2011

National Hospital Care Survey

B. Collections of Information Employing Statistical Methods

1. Respondent Universe and Sampling Methods

In 2011, the new National Hospital Care Survey (NHCS) universe will consist of all non-institutional, non-Federal hospitals in the 50 States and District of Columbia which have six or more beds staffed for inpatient use. The new survey, which replaces the National Hospital Discharge Survey (NHDS), will no longer use average length of stay as an exclusion criterion, thus expanding the frame beyond short stay hospitals. The sampling frame for 2011 consists of the universe of hospitals listed in the 2010 spring release of the Hospital Market Profiling Solution database available from SDI (formerly known as Verispan and SMG). It is known that this database contains a number of entries that represent multiple hospitals within a single SMG ID. Also, for some hospitals, information about annual admissions or discharges as well as staffed beds is incomplete. In recognition of these problems, the frame will be reviewed, and minor changes made to reduce redundancy or supply information needed for frame stratification. The information on hospital bedsize to be used in making frame changes will be obtained from data available elsewhere in the frame for affiliated hospitals. For missing admission or discharge information, external sources such as the American Hospital Association (AHA), Hospital Blue Book files, or the web will be used to locate the data. The number eligible for the universe in the 2010 SDI/SMG file is expected to be about 6,600 hospitals based on prior experience with the SDI/SMG files.

A major difference between the 2011-2013 NHCS and the survey design for the current NHDS implemented in 1988 is that the new 2011-2013 survey is based on a list, rather than a cluster sample of hospitals. By eliminating the area PSU stage of sampling, the design implemented in 2011 will be a two stage design, with hospitals selected in the first stage and discharges within hospitals sampled in the second stage. In addition, no certainty hospitals will be defined a priori, and geographic region will not be used to define sampling strata. Also in 2013, the sampled hospitals will be asked to provide data on the utilization of health care provided in their emergency and outpatient departments (ED and OPD) and ambulatory surgery centers (ASCs), thus merging the National Hospital Ambulatory Medical Care Survey (OMB no. 0920-0278) into the National Hospital Care Survey.

The overall objective of the National Health Care Survey is to provide national estimates of the utilization of inpatient hospital care and of ambulatory medical care in hospital emergency departments and outpatient clinics and ambulatory surgery centers. In order of priority, the annual estimates for the inpatient are the following:

(1) Discharges and days of care for the following types of hospitals, all with at least 6 staffed beds, and located in the 50 States and DC:

- nonfederal, noninstitutional hospitals
- general acute care hospitals (see attached definition by service codes),
- hospitals that meet our previous criterion of nonfederal, short-stay and general/children's hospitals -- for trending purposes

(2) Discharges and days of care in the 3 types of hospitals described in (1) above, classified by their location, i.e.,

- large central cities of metropolitan areas (using NCHS classification system – see definitions at end of this document)
- fringe areas of large central cities (as above)
- other (medium and small) metropolitan areas (as above)
- non-metropolitan areas (as above)

(3) Discharges and days of care in the 3 types of hospitals described in (1) above, classified by bedsize groups, i.e.,

- Under 50 beds
- 50-199 beds
- 200-499 beds
- 500 beds or more

(4) Facility characteristics for the 3 types of hospitals described in (1) above; the following are examples of variables for which hospital level estimates are desired (in order of priority):

- Staffed beds
 - o Under 50 beds
 - o 50-199 beds
 - o 200-499 beds
 - o 500 beds or more
- Level of urbanization and metropolitan status where hospital is located (using NCHS classification system)
 - Large central city of metropolitan area
 - Fringe of large central city of metropolitan area
 - Other metropolitan area
 - Non-metropolitan area (includes micropolitan and noncore area)
- Type of ownership
 - NonProfit
 - Proprietary
 - Government
- Geographic region where hospital is located (i.e., 4 Census regions)
 - Northeast
 - Midwest
 - South
 - West

(5) Discharges and days of care in non-metro, general acute care hospitals with fewer than 50 beds

(6) Discharges and days of care in government-owned, general acute care hospitals

In order of priority, the annual estimates for the ambulatory care component are the following:

(1) ED, OPD, and hospital-based ASC visits for the following types of hospitals, all with at least 6 staffed beds, and located in the 50 States and DC:

- nonfederal, noninstitutional hospitals (see attached definition by service codes),
- hospitals that meet our previous criterion of nonfederal and general/children's hospitals -- for trending purposes

(2) ED, OPD, and hospital-based ASC visits to the 3 types of hospitals described in (1) above; the following are examples of variables for which ED, OPD, and ASC level estimates are desired (in order of priority):

- Geographic region where hospital is located
 - Northeast
 - Midwest
 - South
 - West
- Level of urbanization and metropolitan status where hospital is located (using NCHS classification system)
 - Large central city of metropolitan area
 - Fringe of large central city of metropolitan area
 - Other metropolitan area
 - Non-metropolitan area (includes micropolitan and noncore area)
- Annual ED visit volume
 - Under 20,000 visits
 - 20,000-49,999 visits
 - 50,000 visits or more
- Type of ownership
 - Nonprofit
 - Proprietary
 - Government

(3) Facility characteristics for the 3 types of hospitals described in (1) above; the following are examples of variables for which hospital, ED, OPD, and hospital-based ASC level estimates are desired (in order of priority):

- Geographic region where hospital is located
 - Northeast
 - Midwest
 - South
 - West
- Level of urbanization and metropolitan status where hospital is located (using NCHS classification system)
 - Large central city of metropolitan area
 - Fringe of large central city of metropolitan area
 - Other metropolitan area
 - Non-metropolitan area (includes micropolitan and noncore area)
- Annual ED visit volume

- Under 20,000 visits
- 20,000-49,999 visits
- 50,000 visits or more
- Type of ownership
 - Nonprofit
 - Proprietary
 - Government

(4) Annual and quarterly visits to the 3 departments (ED, OPD, and hospital-based ASC) described in (2) above by AU type:

- Emergency service areas (ESAs)
 - General/Adult
 - Pediatric
 - Urgent care/Fast track
 - Psychiatric
 - Other
- Outpatient department clinics (for the types of clinics included in each of the specialties listed below see the NHAMCS-124 Sampling and Information booklet):
 - General medicine
 - Surgery
 - Pediatrics
 - Obstetrics/Gynecology
 - Substance Abuse
 - Other
- Hospital-based ambulatory surgery center locations
 - General surgery
 - Multiple surgical specialties
 - Gastroenterology
 - Ophthalmology
 - Other

(5) Hospital ambulatory unit (AU) visits as described in (4) above by AU type; the following are examples of variables for which hospital AU level estimates are desired (in order of priority):

- Geographic region where hospital is located
 - Northeast
 - Midwest
 - South
 - West
- Level of urbanization and metropolitan status where hospital is located (using NCHS classification system)
 - Large central city of metropolitan area
 - Fringe of large central city of metropolitan area
 - Other metropolitan area
 - Non-metropolitan area (includes micropolitan and noncore area)
- Annual ED visit volume (for ESAs only)
 - Under 20,000 visits

- 20,000-49,999 visits
- 50,000 visits or more
- Type of ownership
 - Nonprofit
 - Proprietary
 - Government

(6) Annual visit estimates for key statistics based on a 10% RSE for a 10% statistic:

- Patient characteristics
 - Age (6 groups)
 - Sex
 - Race (White, Black, Other)
 - Ethnicity (Hispanic/Not Hispanic)
- Hospital characteristics
 - Geographic region
 - Metropolitan status (as described in 2)
 - Ownership
- Visit characteristics
 - Payment (Private insurance, Medicare, Medicaid, uninsured, other)
 - Triage (ED – 5 levels)
 - Injury
 - Reason for visit (ED & OPD - top 20)
 - Diagnosis (top 20)
 - Procedures (ASC – top 20)
 - Disposition (ED – admit to hospital)

(7) Monthly visits to the 3 departments (ED, OPD, and ASC) described in (2) above

(8) Expansion of the scope of the OPD to include chemotherapy and radiation oncology clinics (others?)

To satisfy prioritized survey objectives for the inpatient component and the full NHCS and to obtain a broad representation of hospitals with specific characteristics, a stratified sample of 500 hospitals will be selected. A sample of 500 hospitals taking 400 or more records per hospital will yield the following precision:

Estimated RSE's of selected discharge level statistics by total sample size when discharges are stratified by newborn status: Stratified sample with 16 hospital strata*		
		400 or more sampled records for approximately 500

Discharge Variable	Estimate**	hospitals
Number of discharges by characteristic:		
- ED admission	14,339,771	3.10
- Medicare	13,790,421	1.87
- Female aged 15-44 years	7,794,615	2.08
- Black	4,527,383	7.59
- Patient aged <15 years	6,430,038	2.78
- Delivery with C-section	1,262,156	4.27
- Depression & Bipolar	944,599	7.24
- Acute myocardial infarction	682,699	4.26
- Asthma	488,594	5.22
- C-difficile	75,769	9.24
- Newborn	3,999,112	3.81
Average length of stay in days:		
- in short stay hospitals	4.64	1.34
- in long stay hospitals	Insufficient data	Insufficient data
<p>*Data from respondent hospitals in the 2005 National Hospital Discharge Survey were used to calculate these estimates and RSE's. Strata are defined by hospital service type, area type (MSA>1 million population, MSA<1 million population, non-metro) and bed-size when feasible. ** Newborns are included in the estimates.</p>		

Sampling strata will be defined by hospital service type (general acute care, children's acute care, psychiatric, and other). In addition, the general acute care hospitals will be stratified by bed size groupings (<50 beds, 50-199 beds, 200-499 beds, and 500+ beds), urbanization level (central city of MSA with 1+ million population, fringe city of MSA with 1+ million population, MSA with < 1 million population, and non-MSA), and by whether the hospital has an emergency department (ED). Within each sampling stratum, a systematic random sample will be selected from a list in which hospitals are randomly ordered within cells defined by hospital ownership, region and whether or not the hospital would have been eligible for the 1988 redesign. Consideration of whether or not the hospital would be eligible for the 1988 design is important in order to track trends with the current NHDS.

The general acute care type stratum includes general acute care and critical access hospitals, as well as surgical, cancer, heart, maternity, orthopedic and other specialty hospitals that typically provide acute care services for adults. Hospitals classified as part of the other service type stratum include rehabilitation, long-term acute care hospitals, and inpatient facilities for drug and alcohol treatment.

Children's psychiatric hospitals are classified in the psychiatric hospital stratum, and children's long-term acute care hospitals are classified in the other stratum. Estimates will be made for stratum but not for specific service type provided.

Ideally, hospitals will remain in the survey for several years. All elements of the UB-04 administrative database for all patients during a given calendar year will be submitted electronically participating hospitals. Electronic data transmission of UB-04 claims data will be performed for four quarters of three consecutive months each during the data collection year. Data will be transmitted four times per year. In the event that a hospital prefers to schedule data transmission more or less frequently than four times per year, a mutually agreeable time frame will be negotiated.

NCHS plans to analyze all the discharges received from the UB-04 files and make these data available as widely as possible. However, it may be necessary to sample discharges for the public use files because of the sheer size of the data file and computer limitations or in the case that releasing all the UB-04 data from any hospital poses a risk of disclosing the hospital's identity. If this is the case then, from the UB-04 data files which each hospital transmits, NCHS will select a routine sample of 5,000 or more discharges annually. Systematic random sampling will be used with strata defined by patient type [observation cases (length of stay is zero), normal newborns, all others]. Before sampling, the records in each stratum will be randomly ordered within cells formed by sorting, in order of priority, (a) first two digits of the patient's primary diagnosis, (b) age groupings (<1 year, 1-14 years, 15-44 years, 45-64 years, 65-74 years, 75-84 years, 85 years and over, age unknown), (c) sex, (d) discharge month, and (e) discharge day of week.

For the 2011 pretest of a supplement on acute coronary syndrome, a convenience sample of 32 hospitals will be selected to participate. Discharges for acute coronary syndrome will be identified from the ICD-9-CM codes. Four strata will be defined by primary or secondary diagnosis as follows: acute myocardial infarction (ICD-9-CM 410); other acute and subacute ischemic heart disease (ICD-9-CM 411); old myocardial infarction, angina pectoris or other forms of chronic ischemic heart disease (ICD-9-CM 412-414); and hypertensive heart disease, cardiac dysrhythmia, heart failure, acute edema of the lung, and unspecified (ICD-9-CM 402, 427-428, 518.4).

2. Procedures for the Collection of Information

Once a hospital has been identified and selected for the new NHCS sample, contractor executive interviewers will send a letter to the hospital administrator from Edward Sondik, PhD., Director, NCHS (Attachment K). The data collection activities include hospital level data (using a facility questionnaire) and discharge-level data (obtaining the UB-04s):

1. Hospital level: Contractor staff will utilize a four-part facility questionnaire to obtain information about the facility (Attachment E). Part A is a telephone screening to verify the facility's eligibility; Part B is an interview conducted between the contractor staff and hospital personnel to obtain (among other things) systems information, general demographics, and key contacts. Part B will also collect total number of beds (both including and excluding bassinets) for use in the estimation process. Part C obtains additional information on how records are kept within the hospital; and Part D which asks

hospitals for detailed information on staffing and health information technology and payment, will be left for hospital staff to complete and then sent back to the contractor. Part D will also collect aggregate hospital statistics for use in the estimation process such as total admissions excluding newborn infants, and total live births. After a hospital is initially inducted, it will be asked to annually complete Part D of the facility questionnaire as a means of providing facility level updates (Attachment F).

2. Discharge level: Hospital staff will be asked to transmit the UB-04s for all discharges.

Data Items

Below are the discharge and facility level data elements for the new survey.

Discharge level

The inpatient discharge data to be obtained are UB-04 claims data. Selected data items are shown below. A hard-copy document capturing the all items is in Attachment L.

- Personal patient identifiers (name, address, medical record number when available, Medicare/Medicaid number, and social security number when its available)
- National Provider Identifier (NPI)
- Patient demographics (sex, birth date, race, and ethnicity when these data are available)
- Point of origin
- Status/Disposition of the patients at discharge
- Admission date
- Discharge date
- Admitting diagnosis
- Expected sources of payment
- Principal diagnoses
- Other diagnoses
- Principal procedures
- Other procedures
- Financial and billing record data (revenue codes indicating intensive care unit (ICU) utilization)

The 2011 NHCS will include a pretest of the acute coronary syndrome module and this supplement is sponsored by the National Heart, Lung, and Blood Institute. Modules may be added in the future should an outside agency or organization express an interest and provide funding sufficient to incorporate additional items.

The questions for the acute coronary syndrome abstraction module include:

- Date and time of first hospital contact
- Troponin levels
- Ischemic pain upon admission

- Elective (planned) cardiac procedure admission

Facility level

The facility questionnaire (Attachment F) is divided into four parts:

Part A is a telephone screening call to determine the hospital's eligibility and to obtain a hospital point of contact to send introductory material about the survey.

Part B is a telephone call with the hospital official sent the introductory material to ask if the official has any questions about participation in the survey and identify a primary contact for the survey.

Questions include:

- If a hospital agrees to participate, it is asked for a primary contact who will be responsible for submitting data for the new survey:
- If a hospital refuses to participate, then what are the hospital's concerns about participating and questions about its IRB process

Part C is a secondary phone interview with the hospital primary contact to obtain information on:

- Health care system information
- General hospital characteristics (e.g., bedsize and staffing)
- Records management information
 - Institutional Review Board information, if needed
 - Key hospital contacts

Part D is a self-administered questionnaire to be completed by hospital staff and it collects hospital facility information and includes questions on:

- Hospital characteristics (e.g., total number of inpatient days, hospital ownership type)
- Clinical capabilities and services (e.g., does hospital have a neonatal intensive care unit, have intensive care other than neonatal intensive care)
- Financial information (distribution of total revenue from patient care by source of payment)
- Emergency department (ED) (Does the hospital have an ED? What is the trauma level rating of the ED?)
- Electronic medical record (EMR) systems (specific characteristics, areas of direct care)

Estimation Procedures

Estimation based on the sampled discharges will involve calculating weights to be used to inflate sampled records to national statistics. Sampling weights will be derived by a multistage estimation procedure that has three basic components: (1) inflation by reciprocals of the probabilities of selection, (2) adjustment for non-response, and (3) calibration based on auxiliary information available from other sources.

For component (1), the overall probability of selection is the product of the probabilities at each stage of sampling, namely, the probability of selecting the hospital and the probability of selecting

the record from the hospital's transmitted UB-04 records. The inverse of the overall selection probability is the basic inflation weight.

Non-response adjustment will be applied to account for two types of non-response: (1) hospital non-response, which occurs when an in-scope, sampled hospital does not transmit its records for more than half of the months during which the hospital was in scope, thus rendering it a non-respondent, and (2) incomplete response within a hospital, which occurs when at least half, but not all, of the total number of records expected to be collected for a given time period are collected.

Estimates of sampling variability will be calculated using a first-order Taylor series approximation as applied in the SUDAAN software package.

Degree of Accuracy

Preliminary analyses using data from the current NHDS and assuming 80 percent of sampled hospitals participate suggest this sample size will be sufficient to produce reliable estimates of the frequency of hospitalizations for a range of important diagnoses and demographic groups. Under NHDS guidelines, an estimate is considered reliable if its percent relative standard error (RSE) is less than 30 percent and it is based on a minimum of 30 records.

Depending on the clustering of specific diagnoses or demographic groups within hospital strata, different percent statistics can be estimated at different levels of precision. Hospitalizations for asthma, 1.4% of current NHDS discharges, are likely to have a percent RSE of 9.06%. Hospitalizations for depression or bipolar disorder, 2.7% of current NHDS discharges, are likely to have a percent RSE of 10.7%. These are well within NHDS RSE guidelines for reliability. Even if fewer than expected hospitals participate, reliability would still be acceptable for many groups. The redesigned survey will also allow for making facility level estimates. At the facility level, RSEs are likely to be larger than at the discharge level. However, for larger percent statistics, we expect that facility level estimates can reliably be made.

3. Methods to Maximize Response Rates and Deal with Non-response

The credibility of analyses based on the new survey and ultimately of the programs, policies, and decision-making based on those findings rests on achieving an exceptionally high degree of cooperation on an ongoing basis among the sampled hospitals. Since 1988, the current NHDS has maintained a response rate of 89 percent or better.

Response rates will be closely monitored. If the response rate for hospitals fails to reach 80% due to refusals, a nonresponse analysis will be conducted. Standard formulae will be used to measure the proportion of eligible sampled hospitals that responding hospitals represent. This provides an indicator of potential nonresponse bias. To assess whether systematic bias exists that would threaten the quality of survey estimates, we will examine differences between responding and nonresponding hospitals based on key characteristics. Data on these characteristics will be obtained from the sampling frame (e.g., SDI universe file). Both unweighted and weighted unit (i.e., hospital) response rates will be calculated, as mandated by OMB. Weighted response rates will account for the different probabilities of selection of the sampled hospitals.

A non-responding hospital is one which either (a) refuses to participate in the survey and refusal conversion efforts are unsuccessful, or agrees to participate but fails to provide data in a timely fashion to be incorporated in the survey data set. The weights of refusal hospitals will be statistically reallocated to responding hospitals with similar characteristics. The goal of the non-response analysis is to determine whether data are missing at random, and whether unit (hospital) non-response negatively impacts survey estimation.

Unit level non-response related to discharges within hospitals will also be examined. Discharge units are considered nonresponding if the entire record is missing for an eligible discharge. Weights associated with missing discharge records will be statistically reallocated to other similar discharges within the hospital.

In addition to unit-level non-response analysis, item non-response will be examined, with particular focus on critical data items of broad research or policy significance (e.g., race, ethnicity, clinical and physiological measures). Using information from other data collected, respondents and non-respondents will be compared on key characteristics, including, but not limited to, sex, age, medical diagnoses, and length of hospital stay, when data are available.

In terms of recruitment, NCHS brings national credibility and influence by providing the introductory letter from Dr. Edward Sondik, Director, NCHS, and the NCHS Ethics Review Board approval letter. As part of the frequently asked questions developed by the Ambulatory and Hospital Care Statistics Branch, several questions and answers are presented to inform sampled hospitals that they may participate in the national survey and be in compliance with HIPAA (Attachment M).

For the 2011-2013 inpatient component, NCHS will compensate each of the 500 sampled hospitals \$500 initially to set-up the processes and procedures to transmit the data to NCHS. Subsequently hospitals will be compensated \$500 after the hospital completes each full year (12 months of transmitted data) of participation. All the hospitals will be compensated at the same rate, unless they are participating in any additional special studies. The 32 hospitals that are participating in the NHLBI sponsored supplement pretest will be compensated an additional \$500.

In addition, a continuing education module is being developed to serve as an educational and recruitment tool highlighting the National Hospital Care Survey. This web-based instrument will be added to the NHCS web page on the NCHS Internet site www.cdc.gov/nchs/nhcs.htm). If the American Health Information Management Association (AHIMA) and Healthcare Information and Management Systems Society (HIMMS) grant approval of the module, health information management and health information technology staff from the hospital-community will be able to obtain two free continuing education units by completing the NHCS module.

4. Tests of Procedures and Methods to Be Undertaken

To inform efforts to improve the survey, NCHS has conducted developmental work, carried out focused discussions with people in many Federal and private organizations, and conducted a workshop in March 2006. Using the findings of the workshop and interviews, NCHS identified key data about hospitals and information about discharges, and tested methods and tools in a feasibility

study in seven hospitals.

NCHS then conducted further developmental work for the redesigned survey, completing a pilot study during April-May of 2008 in four hospitals in the Washington, DC, area. This study tested the use of a laptop PC-based data collection tool, and the abstraction of data elements identified in our earlier developmental work. In addition to providing information about the tool itself, the pilot provided important information about the effort required on the part of the abstractors and the hospitals to conduct sampling procedures and obtain specific data elements.

Next, the pretest focused on the design and testing of the operational mechanisms to recruit a new panel of hospitals and to collect a broader spectrum of data elements. The pretest was conducted in 28 hospitals. This included a test of all aspects of the survey from hospital induction through delivery of final files and documentation to NCHS.

In addition, a pretest of a supplement on acute coronary syndrome, sponsored by the National Heart Lung and Blood Institute will be conducted in a convenience sample of 32 hospitals recruited on the East coast. These discharges will be identified from the UB-04 by ICD-9-CM codes for a diagnosis of acute coronary syndrome. Data collection for the supplement will be accomplished by abstracting relevant data from the medical record.

Finally, the data collection procedures will be monitored during the course of the new survey and appropriate evaluations will be conducted as needed.

5. Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

The statistician responsible for the current NHDS and new NHCS is:

Iris Shimizu, Ph.D.
Office of Research and Methodology
National Center for Health Statistics
(301) 458-4497
ishimizu@cdc.gov

The person responsible for the data collection aspects of the inpatient component of the NHCS is:

Susan Pedrazzani
Project Director, RTI International
3040 Cornwallis Road, Ragland 231
Research Triangle Park, NC 27709
(919) 541-6477
sdp@rti.org

The person responsible for the analytic aspects of the current NHDS and inpatient component of the NHCS is:

Carol DeFrances, Ph.D.
Lead Statistician, Hospital Care Team
Ambulatory and Hospital Care Statistics Branch
Division of Health Care Statistics
National Center for Health Statistics
(301) 458-4440
cdefrances@cdc.gov

ATTACHMENTS

- A: Legislative Authority to Collect Data on Hospital Utilization; Sections 306(a) & (b) of the Public Health Services Act
- B: Federal Register Notice for new NHDS
- C: List of Experts Consulted About the NHDS
- D. ERB Approval Notice for the NHCS
- E: Facility Questionnaire Form for the NHCS
- F: Post-Induction Annual Facility Questionnaire
- G: Survey Presentation for the NHCS
- H: Quarterly Transmission of UB-04 Data
- I: Survey Presentation for the ACS (Acute Coronary Syndrome) Module for the NHCS
- J: Abstraction and Reabstraction for the ACS (Acute Coronary Syndrome) Module of the NHCS
- K: Induction Letter for the 2011-2013 NHCS
- L: List of UB-04 Data Elements
- M: Frequently Asked Questions About the NHCS