

Supporting Statement B for Request for Clearance:

NATIONAL HOSPITAL AMBULATORY MEDICAL CARE SURVEY

OMB No. 0920-0278
(Expires 12/31/2014)

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November 14, 2014

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B. Collections of Information Employing Statistical Methods

The primary goal of the National Hospital Ambulatory Medical Care Survey (NHAMCS) is to collect data on visits to emergency departments (EDs), outpatient departments (OPDs) and hospital-based ambulatory surgery locations (ASLs). According to the 2011 NHAMCS, the estimated number of U.S. hospital ED and OPD clinic visits were 136,296,000 and 125,721,000, respectively. In 2011, there were an estimated 16,229,500 visits to hospital-based ASLs. For hospitals, NHAMCS uses a four-stage probability design based on samples of geographic Primary Sampling Units (PSUs), hospitals within PSUs, OPD clinics within hospitals, and patient visits within OPD clinics, ASLs, and ED units.

1. Respondent Universe and Sampling Methods

The NHAMCS universe and sampling design are outlined at <http://www.cdc.gov/nchs/ahcd.htm>. The universe for the NHAMCS consists of non-Federal hospitals in the 50 states and District of Columbia which have six or more beds staffed for inpatient use which are either general hospitals or have an average length of stay for all patients of less than 30 days, but are not institutional hospitals. Until 2003, the hospital sampling frame was constructed from the Strategic Marketing Group (SMG) Hospital Market Database. Beginning with 2003, the sample frame sources are the annual "Verispan Healthcare Market Index" and Verispan's "Second Quarter, Hospital Market Profiling Solution." The initial NHAMCS sample of hospitals was selected in 1991 from the 1991 SMG data file. According to the 1991 SMG file, there were about 6,250 NHAMCS-eligible hospitals of which about 5,600 had EDs.

The hospital sample has been updated every three years since 2001 by extending the sampling process to new hospitals as if they had been in the sampling frame for 1991, when the original NHAMCS hospital sample was selected. The hospital sample is typically updated using the hospital file from IMS Health, L.L.C., formerly known as the Verispan Hospital Database. This process allows for the inclusion of hospitals that would have opened or changed their eligibility status since the sample had last been updated. The NHAMCS hospital sample was last updated in 2013, using the 2012 hospital file. The 2013 updated sample is being used in 2014 and 2015, as part of the three-year schedule. A new acquisition schedule has since been adopted so that the hospital database files are now purchased only every two years in even numbered years, instead of annually. In line with this new schedule, the 2014 hospital file will be purchased and used to update the 2016 NHAMCS hospital sample. Subsequently, the 2016 file will be used to update that sample for 2017 and 2018.

The NHAMCS sample is a multi-stage design with a first stage sample of two of the four PSU panels in the 1985-94 National Health Interview Survey (NHIS). The first-stage sample consists of 112 PSUs. From the sample PSUs, a stratified sample of approximately 600 hospitals was selected for the NHAMCS with hospital strata defined by whether hospitals had either EDs or OPDs according to the sampling frame data. Sample hospitals are randomly assigned to 16 4-week reporting periods as described below. We expect approximately 542 hospitals to be in-scope. This sample is sufficient to produce estimates with relative standard errors of 30 percent or less. See discussion of NCHS standards for reliability at http://www.cdc.gov/nchs/ahcd/ahcd_estimation_reliability.htm.

Hospitals

Non-Federal, short-stay, and general hospitals in the sample PSUs are eligible for inclusion in the sample. Institutional hospitals and hospitals with fewer than 6 beds for inpatient use are excluded from the sample. Hospitals are stratified by whether they have an ED and/or OPD vs. have neither an ED nor OPD and by certainty status (self-representing vs. non self-representing) of the sample area for their location. Prior to sampling, hospitals are arrayed within PSUs by type of ownership (voluntary nonprofit, non-Federal government, proprietary) and size, where size is measured by combined volume of ED and OPD visits reported in the hospital sampling frame (constructed from SMG data through 2002, from Verispan data starting in 2003, and IMS Health data in 2012). From the arrayed hospital list, five hospitals are selected in each PSU without replacement and with probability proportional to the visit volume. If there are five or fewer hospitals, then all hospitals in the PSU are selected.

A sample of approximately 600 hospitals is randomly divided into 16 groups of hospitals (i.e., 37-38 hospitals in each group) in order to avoid hospitals participating during the same time period each year. The hospital groups are assigned to four week reporting periods on a rotating basis so that each hospital is inducted into NHAMCS approximately every 15 months. Substitution of the reporting period is not permitted. Based on the results of the 2011 NHAMCS, the projected unweighted and weighted response rates for 2015 are 80% and 81% for the ED, 67% and 68% for the OPD, and 67% and 69% for ASLs, respectively.

Outpatient Clinics, Emergency Service Areas, and Ambulatory Surgery Locations

Within each selected hospital, outpatient departments, emergency departments, and ambulatory surgery locations are inducted into the survey. For each OPD, a sample of clinics is selected if more than 5 clinics exist. Clinics are in-scope if ambulatory medical care is provided under the supervision of a physician and under the auspices of the hospital. Clinics providing only ancillary services, such as diagnostic X-rays or radiation therapy, are out-of-scope. Services provided in dental or dental surgery clinics, pharmacies, or other settings in which physician services are not typically provided are also out-of-scope. In addition, freestanding medical clinics or physician groups that are physically located within a hospital, but not affiliated with the hospital (i.e., the hospital basically serves as landlord) are out-of-scope because they are included in the National Ambulatory Medical Care Survey (NAMCS). Physician practices owned, but not directly operated by hospitals are also included in NAMCS and are, thus also, out-of-scope. Emergency services contracted by the hospital under the "hospital as landlord" arrangement, however, are eligible for the ED component of the study.

During the visit by a field representative to induct a hospital into the survey, a list of all outpatient clinics is obtained from the sample hospital. Hospitals may determine what constitutes a distinct clinic differently, for example, by physical location within the hospital, staff providing the services, specialty or subspecialty, schedules, or patients' source of payment. Because of these differences, "separate clinics" in the NHAMCS are defined as the smallest administrative units for which the hospital keeps separate patient volume statistics. Each clinic's function, specialty, and expected number of visits during the assigned reporting period are also collected. This clinic frame is stratified by specialty: general medicine, surgery, pediatrics, obstetrics/gynecology, substance abuse, and other clinics. For sampling purposes, clinics with very low volumes are combined to form clinic sampling units of a

minimum size. If a sample hospital has more than 5 clinic sampling units, then 2 units from each of the 6 specialty strata are selected with probability proportionate to the total expected number of visits to the clinics. If there are 5 or fewer clinic sampling units, then all are included in the sample. On average, hospitals in the sample have 3.6 clinics per OPD.

Within the hospital's ED, a list of all emergency service areas (ESAs) is obtained during the hospital induction interview. ESAs are defined as the smallest administrative unit of an ED where separate patient statistics are kept. It may be located on hospital grounds or operated off site by the hospital. The ED is treated as a separate stratum and all ESAs within a sample hospital are included.

Hospital-based ASLs are treated as a separate stratum. A list of ASLs within the hospital and satellite locations is obtained during the hospital induction. In-scope locations include all dedicated ambulatory surgery rooms, cystoscopy and endoscopy units, cardiac catheterization labs, laser procedure, and pain block rooms. Out-of-scope locations include those dedicated exclusively to dentistry, podiatry, abortion, births, family planning, and small procedures.

Visits in all locations

Within sampling units, patient visits are systematically selected over the 4-week reporting period assigned to hospitals. Sampling units are defined as an ambulatory care unit, such as an ESA, clinic, or ASL, from which patient visits are sampled. A visit is defined as a direct, personal exchange between an ambulatory patient and a physician, or a staff member acting under a physician's direction, for the purpose of seeking care and rendering health services. Visits solely for administrative purposes, such as payment of a bill, and visits in which no medical care is provided, such as visits to deliver a specimen, are out-of-scope.

Samples of approximately 100 visits are targeted from each hospital ED and across all ASLs in a hospital, while 200 visits are targeted from OPDs. If there are more than five clinics in a hospital, then up to 30 visits are targeted from each clinic included in the survey. In clinics with volumes higher than these desired figures, visits are sampled by a systematic procedure which selects every n^{th} visit after a random start. Sampling rates are determined from the expected number of patients to be seen during the reporting period and the desired number of sample records. This basic procedure is adapted, as necessary, to the record keeping systems of the particular hospitals. Previous studies have found that many clinics keep their own logs which are used as the sampling frame for visits.

Samples of approximately 100 ambulatory surgery visits are targeted from hospitals with ASLs. The procedures used to select ASL visits are the same as that for visits in EDs and OPDs. Sampled visits will be drawn from all in-scope locations where ambulatory surgery is performed.

2. Procedures for the Collection of Information

Training

Training in data collection procedures is conducted at different times with four different types of staff. Census Bureau Headquarters staff are responsible for training the Regional Office staff. Regional Office staff have the primary responsibility for training the field representatives and supervising hospital data collection activities. Field representative training covers the following topics: inducting facilities, ensuring confidentiality by adhering to the Health Insurance Portability and Accountability Act (HIPAA), supervising patient visit sampling, retrieving missing data, and medical record abstraction. Where the facility staff choose to perform PRF abstraction, field representatives train the staff on visit sampling and completion of the computerized Patient Record forms. However, in most cases, we anticipate that the field representative will perform PRF abstraction.

Census Bureau Headquarters staff are also responsible for writing the field manual which contains the following: the purposes of the survey; interviewing techniques; a description of the NHAMCS induction questionnaire and related forms; and the procedures for inducting hospitals, conducting hospital visits, sampling clinics, supervising patient visit sampling, and retrieving missing data.

Initial Contact

An introductory letter is sent from the Director of NCHS (Attachment F) to the chief executive officer of each sampled hospital. The letter describes the purpose of the survey, the authority for data collection, that participation is voluntary and that all collected information is confidential including the identity of the hospital [308(d) confidentiality requirements and Confidential Information Protection and Statistical Efficiency Act (PL-107-347)]. It also covers requirements related to Health Insurance Portability and Accountability Act (HIPAA). Patient consent is not required to obtain information. Letters of endorsement by the American College of Emergency Physicians (ACEP), Society for Academic Emergency Medicine (SAEM), Emergency Nurses Association (ENA), American College of Osteopathic Emergency Physicians (ACOEP), American Health Information Management Association (AHIMA), American Academy of Ophthalmology (AAO), Society for Ambulatory Anesthesia (SAMBA), and the Surgeon General (Attachment G) are included in the mailing.

Hospital Induction

The introductory letter is followed by a telephone call from the field representative to verify hospital eligibility for the survey and to arrange for an appointment with the chief executive officer, directors of the ED, OPD, and ASLs, and whoever is designated as hospital coordinator for this survey. During the meeting, the field representative explains the purpose of the survey, describes the data collection methods and length of data collection, and obtains both general descriptive information about the organization of the ED, OPD, and ASLs including specific information needed to sample ambulatory units within the hospitals. The Hospital Induction Interview (Attachment H.1) is administered to verify the hospital sampling frame information, induct the sample hospitals, and obtain ED, OPD, and ASL data.

Completion of Patient Record Forms

In order to decrease burden to facility staff and to facilitate the data collection procedures, field representatives will usually complete the Patient Record forms. We anticipate that approximately 90% of ambulatory units will allow abstraction by field representatives. The remaining 10% of facilities that choose to do the abstraction will be supplied with laptops from the Census Bureau which are outfitted with the computerized Patient Record form. The laptop will have no other applications and users will only be allowed to access the Patient Record form instrument. After abstraction is completed, the laptop will be collected by the Field Representative and the patient record data will be securely transmitted to Census Bureau data servers.

Patient visit data are recorded for each sample visit using either the ED Patient Record form (PRF) (Attachment J), OPD PRF (Attachment K), or AS PRF (Attachment L). Instructions on completing the PRFs and definitions of terms are provided in the computerized instrument through help screens.

The Patient Record forms for the NHAMCS routinely collect data on patient characteristics such as age, sex, race, and ethnicity, and visit characteristics such as date of visit, reason for visit in patient's own words, physician diagnoses, medication provided or prescribed, and expected source of payment. Periodically, specific items on diagnostic tests, procedures or non-medication therapies are added or deleted.

Monitoring Data Collection and Quality Control

Census Bureau Headquarters staff from the Demographic Surveys Division, Housing Surveys Branch, is responsible for overseeing the data collection. Census Bureau Headquarters staff, Field Division, is responsible for the supervision of staff in the Bureau's Regional Offices who in turn supervise the field representatives.

The field representative visits the sampled ESAs, clinics, and ASLs each week during the data collection period and maintains telephone contact with the staff involved in the data collection effort. An essential part of this effort is quality control which focuses on the completeness of the patient sampling frame, adherence to the sampling procedures, and assurance that a Patient Record form is completely filled out for each sampled visit. Computerization of the Patient Record form has allowed for automated edits to be built into the instrument, so that keying errors are automatically detected as the data entry person is entering data.

Once a case is completed, the survey data are encrypted and sent to a secure Census Bureau database through a secure internet connection. The data are then sent to our keying and coding contractor who will do medical and drug coding on the verbatim text fields. Keying and data entry activities are performed under contract. All medical and drug coding, as well as all data entry operations, are subject to quality control procedures—specifically, a 10-percent quality control sample of survey records are independently keyed and coded. Computer edits for code ranges and inconsistencies are also performed.

For most items, a cold deck method is used to impute missing values by randomly assigning a value from Patient Record forms with similar characteristics collected in the prior year. For the ED data,

imputations for birth year and sex are based on ED volume, geographic region, immediacy with which patient should be seen, and the three-digit ICD-9-CM code for primary diagnosis - for immediacy it is based on ED volume, region, and primary diagnosis. For the OPD data, all imputations are based on geographic region, OPD volume by clinic type, and the three-digit ICD-9-CM code for primary diagnosis. For the ambulatory surgery data, all imputations will be based on geographic region, AS volume, and the three-digit ICD-9-CM code for primary diagnosis. Starting with 2009 data, missing race information has been imputed using Census data on percent race for the patient's zip code in a regression model.

Estimation Procedures

Separate national estimates will be produced for visits to hospital EDs, OPDs, and ASLs. The estimation procedure has three basic components: (a) inflation by reciprocals of the sampling selection probabilities, (b) adjustments for nonresponse, and (c) calibration ratio adjustment. Beginning in 1997, the calibration ratio adjustment for OPD estimates was replaced by an adjustment that controls for effects of rotating hospital sample panels into and out of the sample each year. (The full NHAMCS hospital sample is partitioned into 16 panels that are rotated into the sample over 16 periods of 4 weeks each so that only 13 panels are used in any one year.) There is one probability for each sampling stage: a) the probability of selecting the PSU; b) the probability of selecting the hospital; c) the probability of selecting the emergency service area (ESA) or OPD clinic or ASL from within the hospital; and d) the probability of selecting the visit within the ambulatory unit (i.e. ESA, clinic, or ASL). The overall probability of selection is the product of the probabilities at each stage. The inverse of the overall selection probability is the basic inflation weight. Also, beginning with 1997 data, the sampling weights of some OPDs were permanently trimmed to prevent single OPDs from contributing more than 15% of their region's total to OPD visit estimates. For visits to EDs, the calibration adjustments are based on current ED visit counts recorded in the IMS Health database for hospitals in the NHAMCS universe.

National estimates for hospital-based ASCs will be produced. For the ASL component of NHAMCS, the weighting will be similar to that used for visits to EDs described above.

Beginning in 2004, the nonresponse adjustment factor was changed to account for the seasonality of the reporting period. Extra weights for nonresponding hospitals were shifted to responding hospitals in reporting periods within the same quarter of the year. The shift in nonresponse adjustment did not significantly affect any of the overall annual estimates.

Sampling Errors

The standard error is primarily a measure of the sampling variability that occurs by chance, as only a sample rather than an entire universe is surveyed. Estimates of the sampling variability were calculated using Taylor approximations in SUDAAN, which take into account the complex sample design of NHAMCS. A description of the software and its approach has been published¹.

¹ Research Triangle Institute. SUDAAN User's Manual, Release 11.0.0. Research Triangle Park, NC: Research Triangle Institute, 2012.

3. Methods to Maximize Response Rates and Deal with Nonresponse

Based on the results of the 2011 NHAMCS, the projected unweighted and weighted response rates for 2015 are 80% and 81% for the ED, 67% and 68% for the OPD, and 67% and 69% for ASLs, respectively. Endorsements were solicited from several prominent national organizations, including the American College of Emergency Physicians (ACEP), Society for Academic Emergency Medicine (SAEM), Emergency Nurses Association (ENA), American College of Osteopathic Emergency Physicians (ACOEP), American Health Information Management Association (AHIMA), American Academy of Ophthalmology (AAO), Society for Ambulatory Anesthesia (SAMBA), and the Surgeon General. NCHS developed a participant web page at www.cdc.gov/nhamcs, which gives a brief background on the NHAMCS, as well as provides information regarding selection and participation, confidentiality and privacy, the HIPAA Privacy Rule, new data components, data utilization, and contact information.

Data collection procedures are designed to minimize response burden, a major concern and influence on response rates. This survey does require commitment from a large number of persons within each hospital, including the director, clinic, ESA, and ASL directors, and medical and clerical staff. Refusals to participate may occur at any one of the stages of induction or data collection. At the time of refusal, a refusal report is completed and the Census Bureau Regional Office is notified. Reasons for refusal vary considerably, necessitating refusal conversion procedures which are flexible and responsive to individual concerns. In general, the following survey features are stressed: the data are needed by the hospital and medical professions for a variety of purposes and do not exist elsewhere; all data about facilities, ambulatory units, and patients are kept confidential; and every effort is made to minimize the disruption of facility routine. Based on earlier experiences, these features are often persuasive in converting refusals.

4. Tests of Procedures or Methods to be Undertaken

Not applicable.

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

The statistician responsible for the survey sample design is:

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ATTACHMENTS

- A. Applicable Laws and Regulations
- B. List of NHAMCS Publications
- C. Federal Register 60-Day Notice and Public Comment
- D. List of Consultants for NHAMCS
- E. CDC #2010-03 IRB Approval for Continuation of Protocol
- F. Introductory Letter to NHAMCS Hospitals
- G. NHAMCS Endorsing Letters
- H.1 Hospital Induction Form
- H.2 NHAMCS EHR Changes
- I. Ambulatory Unit Induction Form
- J. Emergency Department Patient Record form
- K. Outpatient Department Patient Record form
- L. Ambulatory Surgery Patient Record form
- M. ED Patient Record form changes for 2015
- N. OPD Patient Record form changes for 2015
- O. ASL Patient Record form changes for 2015
- P. Retrieving Medical Records
- Q. Reabstraction telephone call
- R. Retrieving Medical Records (reabstraction)