

Supporting Statement B for Request for Clearance:

National Hospital Care Survey

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National Hospital Care Survey

B. Collections of Information Employing Statistical Methods

As described in Supporting Statement A, the National Hospital Care Survey is experiencing significant recruitment issues. For the 2014 data collection, national estimates were not produced due to low response rates. For the 2015 data collection year, the following strategy is planned.

Strategy planned for 2015 estimates

As mentioned in Statement A, recruitment for NHCS has proven difficult (only 104 of 581 hospitals have agreed to participate by December 2015). In an effort to produce some reliable discharge and ambulatory visit estimates for 2015, the short-term strategy includes focusing recruitment efforts on General Medical/Surgical type hospitals that are considered “large,” meaning with 300 or more staffed beds. Such “large” hospitals are more likely to be equipped with EHRs and to have sufficient numbers of ED substance-involved encounters to meet the data needs of the Substance Abuse and Mental Health Services Administration (SAMHSA). SAMHSA’s need for such data was the reason for fielding the reserve sample of 81 hospitals from the 500+ bed stratum.

According to the 2010 sampling frame, a total of 227 (focus of the new recruitment strategy outlined in A1) of the 581 currently fielded sample of hospitals are General Acute/Medical Surgical hospitals with 300 or more beds. Appropriate adjustments will be made as needed to the 2015 estimates in order to account for any observed differences. Currently (as of April 2015), 46 of these 227 hospitals already provide data to the NHCS. The goal for the 2015 data collection is to secure participation (between the 2014 and 2015 data collections) from between 114 to 134 hospitals in order to reach a 50-60% response rate among these 227 hospitals. Targeting this category of “large” hospitals is a short-term strategy to increase response rates and to produce reliable estimates for the category of 300 or more beds, General Medical/Surgical hospitals in 2015. Because shifts in the hospital universe are possible over time, differences, if any, will be identified between the number of hospitals with these characteristics in the 2010 and 2015 IMS Health hospital sampling frames.

In addition, free-standing ambulatory surgery centers have been eliminated as part of the design of NHCS for the 2016-2018 data collection period. The primary reason behind this change is to focus data collection efforts and resources towards recruiting and securing participation from inpatient, ED and OPD settings. The inclusion of free-standing ambulatory surgery centers will be reevaluated if additional resources become available, and when success has been achieved in collecting data and producing estimates from the other settings.

The long-term strategy of NHCS is still to make national estimates for hospitals of all bed sizes and types.

Our plan for 2016-2018 is proposed in Sections B1 to B5. Sections B1 and B2 relate to the survey as originally planned. Sections B3 and B4 have been revised to provide new information on methods to improve participation and new tests of procedures.

1. Respondent Universe and Sampling Methods – Original Design

Hospitals

The National Hospital Care Survey (NHCS) hospital universe consists 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 sampling frame consists of the universe of hospitals listed in the Hospital Market Profiling Solution database available from IMS Healthcare (formerly known as SDI, Verispan and SMG). The initial NHCS hospital sample (for 2011-2013) was selected from the 2010 spring release of the IMS Healthcare file. The sampling frame is being updated for the 2016 data collection using a 2015 release of the IMS Healthcare file. The hospital sample will be updated by extending the sampling process to new hospitals as if they had been in the sampling frame for the initial sample.

For the initial NHCS sample, a stratified random sample of 1,000 hospitals was selected first and, then, that sample was split into two samples of 500 each, with half of each stratum's sample being selected by systematic random sampling for assignment to the two samples. The first or base sample was fielded starting in 2011. This clearance seeks to increase the sample size to 581 to allow for more hospitals in the strata for hospitals with 500 or more staffed inpatient beds to address SAMHSA's data needs for substance-involved ED visit data. The remaining reserve sample is being held until needed.

The NHCS uses a stratified list sample of hospitals, rather than a cluster sample of hospitals, such as that used for the NHDS and NHAMCS. Sampling strata are defined by hospital service type (general acute care, children's acute care, psychiatric, and other). In addition, the general acute care hospitals are stratified by 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 bed size. In the non-MSA stratum, the bed size strata are <50 beds, 50-199 beds, 200-499 beds, and 500+ beds. In the MSA strata, the bed size strata are <50 beds, 50-199 beds, 200-299 beds, 300-499 beds, and 500+ beds. Within each sampling stratum, a systematic random sample was selected from a list in which hospitals were randomly ordered within cells defined by hospital ownership, region and whether or not the hospital would have been eligible for the 1988 redesign of the NHDS. Consideration of whether or not the hospital would be eligible for the NHDS 1988 design was important in order to track trends with the historic NHDS data. For inpatients, all discharges in the sampled hospitals are included.

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 the general public. 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 by stratum, but not for specific service type provided.

Ideally, hospitals will remain in the survey for several years. Participating hospitals are asked to electronically submit all elements of either the UB-04 administrative database for all inpatient and ambulatory claims, a state file, or their electronic health records (EHR) data. Electronic data

transmission of all UB-04 claims data or a state file will be performed monthly with one month of data transmitted each month while transmission of EHRs will be performed quarterly with data for three consecutive months transmitted each quarter of the data collection 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.

For ambulatory visit estimates which require clinical data not included in UB-04 data or state file, a two stage sample of ambulatory visits will be used.

- At the first stage, the NHCS hospital sample is divided into five nationally representative panels by first arraying the hospitals in the order of their sampling strata and selection criteria within strata. The arrayed hospitals are then systematically assigned to the five panels so that each panel consists of every fifth hospital in the array. The panels are randomly assigned on a rotating basis to 3-month survey periods with each hospital being included in the ambulatory visit level survey three out of every 15 months. A total of about 465 hospitals will be rotated into the annual sample for ambulatory visits.
- At the second stage, a stratified sample of visits will be selected with visit strata within each hospital being defined by department (e.g., emergency, outpatient) and visit groups within department. Within emergency departments (EDs), visits will be stratified by substance-involved status while visits within outpatient departments (OPDs) will be stratified by procedure status and eligibility status.

For public use files (PUFs) of discharges/visits, NCHS plans to integrate all UB-04 claims, state file data, and EHR data (UB-04 items only) received and sample records before release, in order to make these data available as widely as possible. A sample of discharges/visits will be included in PUF because of (1) the sheer size of the data file and computer limitations it would pose for data users and (2) because inclusion of records for the complete population of a hospital's discharges/visits would likely pose an unacceptable risk of disclosing the hospital's identity. From the UB-04/state file data and EHR data files which each hospital transmits, NCHS will select at most 50 percent of the discharge/visit records annually for each hospital with the percent of each hospital's discharges/visits being reduced as needed to keep the PUF size at 500,000 discharges, 500,000 ED visits, or 500,000 OPD visits or less. For the sample from each hospital, a systematic random sample will be selected from records which are randomly sorted within cells defined, in order of priority, by:

- (a) Patient type
 - i. In discharge file, types are: observation cases (length of stay is zero), normal newborns, all others
 - ii. In ambulatory visit file, types are ED or OPD
- (b) First two digits of the patient's primary diagnosis
- (c) 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)
- (d) Sex
- (e) Discharge/visit month
- (f) Discharge day of week

Inpatient estimates

The ultimate overall objective of the NHCS is to provide national estimates of the utilization of inpatient hospital care and of ambulatory care in hospital EDs and OPDs. In order of priority, the annual inpatient estimates are the following:

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

- Non-federal, non-institutional hospitals
- General acute care hospitals (universe hospitals other than psychiatric, children's, or long term care)
- Hospitals that meet our previous criterion of non-federal, 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 the urbanization level of their location, i.e.,

- Large central cities of metropolitan areas (central city of MSA with 1+million population)
- Fringe areas of large central cities (fringe city of MSA with 1+ million population)
- Other (medium and small) metropolitan areas (MSA with < 1 million population)
- Non-metropolitan areas (non MSA)

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

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

(4) Hospital 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 inpatient bed size groups
 - Under 50 beds
 - 50-199 beds
 - 200-499 beds
 - 500 beds or more
- Level of urbanization 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

- o Midwest
- o South
- o 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

Ambulatory visit estimates

In order of priority, the annual ambulatory visit estimates are the following:

(1) ED and OPD visits for the following types of hospitals, all with at least 6 staffed inpatient beds, and located in the 50 States and the District of Columbia:

- Non-federal, non-institutional hospitals
- General acute care hospitals (see definitions below)
- Hospitals that meet our previous criterion of non-federal and general/children’s hospitals – for trending purposes

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

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

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

- Geographic region where hospital is located

- o Northeast
 - o Midwest
 - o South
 - o West
 - Level of urbanization and metropolitan status where hospital is located (using NCHS classification system)
 - o Large central city of metropolitan area
 - o Fringe of large central city of metropolitan area
 - o Other metropolitan area
 - o Non-metropolitan area (includes micropolitan and noncore area)
 - Annual ED visit volume
 - o Under 20,000 visits
 - o 20,000-49,999 visits
 - o 50,000 visits or more
 - Type of ownership
 - o Nonprofit
 - o Proprietary
 - o Government
- (4) Annual visit volume estimates for key statistics based on a 10% RSE for a 10% statistic:
- Patient characteristics
 - o Age (6 groups)
 - o Sex
 - o Race (White, Black, Other)
 - o Ethnicity (Hispanic/Not Hispanic)
 - Hospital characteristics
 - o Geographic region
 - o Urbanization level (as described in 2)
 - o Ownership type
 - Visit characteristics
 - o Payment type (Private insurance, Medicare, Medicaid, uninsured, other)
 - o Triage (ED – 5 levels)
 - o Injury
 - o Disposition (ED – admit to hospital)
- (5) Annual visit volume estimates for key statistics based on a 15% RSE for a 2% statistic:
- Substance-related visits by major substance and demographic category
- (6) Monthly visit volumes to the 3 departments (ED and OPD) described in (2) above

Ambulatory visit sampling in all locations for 2016

An ambulatory visit is defined as a direct, personal exchange between an ambulatory patient and a provider for the purpose of rendering health services. For hospitals sending UB-04 claims, a state file, or incomplete EHR data (i.e., does not include the required variables) more detailed clinical

information will be abstracted from a sample of ambulatory medical records. For hospitals sending complete EHR data (i.e., includes all required data elements) abstraction is not needed because the clinical information for all ambulatory visits is already included. Due to the burden of abstraction, a sample of visits from a 3-month period will be abstracted. Hospitals will be divided into two main categories with regard to visit sampling and data collection methods: remote access or non-remote access. Attachment C reflects the organization of the abstraction within the ambulatory data component of NHCS. These two abstraction methods are further described below.

1. Remote reporting hospitals are defined as those with full electronic medical records; that is, all parts of the chart are stored electronically, thereby allowing the contractor to remotely access the medical records from contractor headquarters. Contractor staff will perform a 100% review of all ED visits occurring at each hospital on a systematic random sample of, at most, half of the days during a 3-month reporting period to identify ALL likely substance-involved visits. The exact number of sample days for each hospital will depend on available resources and those resources typically required to accomplish the reviews, and visit selection and abstraction for individual days. The screener question, “Did any substance(s) cause or contribute to this visit?” will be used to identify substance-involved visits. In addition to the substance-involved ED visit sample of 275 visits, contractor staff will select a systematic random sample of 100 ED visits which may or may not be substance-involved, and 300 OPD visits per hospital during the same 3-month time period.
2. Non-remote reporting hospitals are those which do not permit remote access to their medical records but are able to transmit UB-04 billing data for ambulatory visits to the survey contractor. Systematic random sampling will be used to select visits occurring during a 3-month reporting period from UB-04 billing data. In 2014 and 2015, the sample for ED visits will be stratified by substance status (i.e., “likely” or “probably” substance-involved and “not” substance-involved), utilizing ICD-9-CM codes to enable oversampling of substance-involved cases. For 2016 and onward, ICD-10-CM codes will be used to define substance cases. A sample of 275 substance-involved ED visits will be selected from each hospital having at least that many during its reporting period. If the hospital has fewer than 275 such visits, all such visits in the period will be selected. Within these ED strata and within the lists of OPD visits, systematic samples will be selected from lists in which the visits are randomly ordered within cells defined (in order of priority) by procedure status in OPDs, by age, diagnostic chapter and day of week. The expected yield is 100 non-substance-involved ED and 300 OPD cases per hospital.

2. Procedures for the Collection of Information

For each hospital in the NHCS sample, contractor interviewers will send a letter to the hospital administrator addressed from Charles Rothwell, Director, NCHS (Attachment D). 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)]. The letter also covers requirements related to the Health Insurance Portability and Accountability Act (HIPAA). At no time are the patients contacted to obtain information. Letters of endorsement by the American College of Emergency Physicians, Society for Academic Emergency Medicine, Emergency Nurses Association, American College of Osteopathic Emergency Physicians, American College of Surgeons (ACS), American Health Information Management Association (AHIMA), American Academy of Ophthalmology (AAO), and Society for Ambulatory Anesthesia (SAMBA) will be sought for the mailing. In order to inform hospitals of the ambulatory data collection, another letter will be sent to hospitals from Carol DeFrances, PhD, Team Leader, Hospital Care Team (Attachment E).

Hospital Level

The introductory letters will be followed by a telephone call from contractor staff to verify hospital eligibility for the survey, and to arrange for an appointment with the chief executive officer, directors of the ED and OPD and whoever is designated as the coordinator for this survey. During this call, the Initial Hospital Intake Questionnaire (Attachment N) will be administered over the telephone or by paper to verify the hospital's eligibility, collect information on the Point of Contact for the hospital, ask about capability to transmit UB-04 and EHR data, and payment information. At this point, if the hospital requires additional information about participating in the survey, a one hour survey presentation can be presented with the Recruitment Survey Presentation (Attachment O).

For hospitals agreeing to participate in the abstraction part of NHCS (as well as the electronic component), contractor staff will conduct the Annual Ambulatory Hospital Interview (Attachment K) for which the responses are entered into a laptop PC-based data collection instrument. Information collected here includes but is not limited to:

- ED crowding
- Ambulatory unit information (expected number of ED and OPD visits)
- ED and OPD EHR capabilities

Each participating hospital will be asked to complete an Annual Hospital Interview that will be conducted by telephone or mail, whichever format is less burdensome to the respondent. A web portal may be constructed for this purpose in the future. This interview collects annual statistics needed for weighting the inpatient and ambulatory data (Attachment J). Previously, the Annual Hospital Interview collected inpatient data only, but with the integration of the ambulatory component, it is necessary to collect similar information for the outpatient visits at participating hospitals (e.g., inclusion of self-pay in outpatient visit data). Information collected here includes but is not limited to:

- Health Care Systems information
- Questions related to eligibility to reconfirm annually
- General hospital characteristics (e.g., bed size, service type, and staffing)
- Total number of staffed inpatient beds
- Hospital characteristics (e.g., total numbers of admissions, inpatient discharges and ED and OPD visits)
- Capability to transmit EHR and UB-04 claims

- Other discharge and visit related questions (e.g., inclusion of self-pay, worker's compensation, charity)

Inpatient and Ambulatory data collected electronically

Participating hospitals transmit electronic data (either UB-04 billing, a state file or EHR data) for all inpatient and all ambulatory visit-level information for the NHCS. For hospitals submitting only UB-04 claims, a state file, or incomplete EHR data, abstraction of medical records will be the source for clinical information at the ambulatory visit level. Abstraction of medical records for those hospitals submitting the required EHR data will be not be necessary, as clinical information on all ambulatory visits will already be included.

EHR Data Items:

Hospitals equipped with EHRs may participate in NHCS in one of several ways: 1) compile EHR data from existing hospital reports; 2) send Transition of Care or Continuity of Care Documents (standardized summaries exchanged between providers; 3) extract the data from their EHR system; or 4) by working with a vendor to develop and utilize an interface to submit EHR data for the NHCS.

Select data items are shown below. A hard-copy document capturing all items is in Attachments (G, H, and I).

For inpatient, ED and OPD visits:

- Personal patient identifiers (name, address, medical record number when available, Medicare/Medicaid number, and social security number when it is available)
- Date of birth
- Sex
- Date of admission and discharge
- Encounter number
- Admission diagnosis
- All other diagnoses including E codes and V codes
- Services provided or ordered during the inpatient stay or visit:
 - o Diagnostic testing (e.g., lab, imaging, EKG, audiometry, biopsy)
 - o Therapeutic procedures, including surgery, and non-medication treatments (e.g. physical therapy, speech therapy, home health care)
- Results of testing or procedures provided or ordered during the admission, as many as are available
- Medications on admission, during hospital stay and at discharge
- National Provider Identifier of physicians
- Race
- Ethnicity
- Marital Status
- Source(s) of payment
- Clinician's notes (e.g., physicians', nurses', P.A.s' and C.N.M.s' notes)

For Inpatient only:

- Priority of admission
- Source of admission (e.g., emergency room)
- Discharge disposition
- Present on Admission (POA) flags for diagnoses
- Any ICU, NICU or CCU use and number of days of care
- Height
- Weight
- Clinician notes (e.g., physicians', nurses', P.A.s', N.P.s' and C.N.M.s' notes)

For ED and OPD:

- Reason for visit
- Results of testing and procedures
- Medications and Immunizations

UB-04 Data Items/State File Items:

For those hospitals unable to send EHR data, they are asked to transmit the UB-04 data or a state file for all patients (inpatient and ambulatory). Selected data items are shown below. A hard-copy document capturing all the items is in (Attachment F).

- Personal patient identifiers (name, address, medical record number when available, Medicare/Medicaid number, and social security number when it is available)
- National Provider Identifier (NPI)
- Patient demographics (sex, birth date, race, and ethnicity when these data are available)
- Point of origin (indicates the point of patient origin for this admission or visit)
- Status/Disposition of the patients at discharge
- Admission/Start of Care date (Admission date for inpatient discharges)
- Statement Covers Period- From/Through (Inpatient Discharge date is derived from the "Through" date)
- Service Dates (Beginning and End dates of an ambulatory visit)
- Admitting diagnosis (Inpatient only)
- 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)

Data modules may be added in the future should an outside agency or organization express an interest and provide funding sufficient to capture additional items.

Ambulatory data collected through abstraction

Hospitals submitting all required EHR data will not need abstraction of their medical records, as visit-level clinical data are included. For hospitals submitting only UB-04 claims data, a state file, or incomplete EHR data, abstraction of medical records will provide visit-level clinical data for the ambulatory component of NHCS. The procedures for contractor staff to complete the Patient Record Forms vary by hospital. The priority of data collection is as follows:

(1) Remote-reporting hospitals

The sampled ED and OPD cases will be abstracted from EHRs onto a laptop PC-based data collection instrument by abstractors at the contractor's headquarters.

(2) Non-remote reporting hospitals with UB-04 billing data

The sampled ED and OPD cases will be abstracted onto a laptop PC-based data collection instrument by contractor abstractors at the hospital. Multiple abstractors will be employed to decrease the amount of time that contractor staff will spend in the hospital.

Abstractors will complete all of the electronic Patient Record forms (PRFs). Patient visit data will be entered for each sample visit using either the ED PRF (Attachment Q) or OPD PRF (Attachment R). Instructions on completing the PRFs and definitions of terms will be provided in the data collection instrument through help screens.

NCHS decided to combine the OPD and Ambulatory Surgery Location (ASL) PRFs to ensure inclusion of all OPD visits in the survey. In previous data collections, OPD visits were classified by setting, either OPD clinic or ambulatory surgery location. However, ambulatory surgeries and other procedures are increasingly being performed throughout the hospital and are no longer restricted to locations dedicated to ambulatory surgery. In addition, procedures once performed only on an inpatient basis are increasingly performed in ambulatory settings.

NHCS also previously considered certain OPD clinics to be out-of-scope, because they either only offered ancillary services, such as laboratory and radiology, or they typically did not provide physician services (e.g., chemotherapy and physical therapy). However, excluding these visits provides an incomplete picture of the range of services provided in hospitals and does not reflect hospitals' increasing reliance on non-physician providers to deliver a wide range of care.

The ambulatory data collected at the visit level include:

- Patient's ZIP Code
- Demographic information (age, gender, race, ethnicity, etc.)
- Source(s) of payment
- Reason for visit
- Cause of injury (ED)
- Substances that contributed to the ED visit
- Diagnosis
- Diagnostic services
- Procedures

- Medications
- Providers
- Disposition
- Lab test results (OPD)

Training

The contractor is responsible for training the field managers and abstractors. They are also responsible for developing training that covers the following topics: inducting hospitals, confidentiality, Health Insurance Portability and Accountability Act (HIPAA), retrieving missing data, and medical record abstraction. For 2015, contract staff will perform all abstraction. In subsequent years, where the hospital staff may insist upon performing PRF abstraction, abstractors may train the hospital staff on visit sampling and completion of the computerized PRFs.

The contractor is responsible for writing the *field manual* which contains the following: the purposes of the survey; interviewing techniques; a description of the NHCS induction questionnaire and related forms; and the procedures for inducting hospitals, conducting hospital visits, and retrieving missing data.

Estimation Procedures

Estimation based on the sampled discharges and ambulatory visits will involve calculating weights to be used to inflate sampled records to national statistics. Survey 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 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 or a state file. The sampling weight is the inverse of the overall selection probability for the sampled discharge or visit.

Non-response adjustment will be applied to account for two types of non-response: (1) complete hospital non-response, which occurs when an in-scope, sampled hospital does not transmit any of its records for the targeted time period, and (2) incomplete response within a hospital, which occurs when a hospital provides records for some, but not all, data collection periods or provides some, but not all, of the of records expected to be collected in a period. In response rate calculations, a sampled hospital will also be treated as a non-respondent if the hospital does not provide at least half of the expected number of its records for the targeted estimates.

The calibration adjustments will be based on counts recorded in the IMS Healthcare Market Index and IMS's "Second Quarter, Hospital Market Profiling Solution" for hospitals in the NHCS universe. Recorded counts of admissions and births will be used in calibrations for discharge estimates while recorded counts of ED visits will be used in calibrations for ED visit estimates.

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

Degree of Accuracy

Inpatient: Analyses using data from the NHDS, and assuming 80 percent of sampled hospitals are in-scope and participating, suggest a total sample of 581 hospitals will be sufficient to produce reliable estimates. Under NCHS guidelines, an estimate is considered reliable if the estimate's 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 NHDS discharges, are likely to have a percent RSE of 9.1; while hospitalizations for depression or bipolar disorder, 2.7% of NHDS discharges, are likely to have a percent RSE of 10.7. These margins are well within NCHS RSE guidelines for reliability. Even if fewer than expected hospitals participate, reliability would still be acceptable for many groups.

The NHCS guidelines will also allow for making hospital level estimates. At the hospital level, RSEs are likely to be larger than at the discharge level. However, for larger percent statistics, we expect that reliable hospital level estimates can be made.

Ambulatory: A primary objective in the design of the hospital sample is to produce selected estimates of 10% of ambulatory visits to hospitals with RSEs of 10% or less, especially for visits to the ED. An exception to this is substance-related ED visits, where annual visit volume estimates for this statistic will be based on a 15% RSE for a 2% statistic. Based on experience with non-response in the current NHAMCS, a total sample of fewer than 100 hospitals is needed to yield RSEs of 10% for estimates of 10% of visits for domains defined by patient characteristics (e.g., 10.3% of patients are males 45-64 years of age) or clinical characteristics (e.g., 10.0% of patients had primary diagnosis of respiratory system diseases). According the 2010 IMS Health data file, the new hospital sample includes 481 hospitals with 24-hour EDs (with an estimated 465 sampled hospitals rotated into the sample for ambulatory visits annually) and, thus, is, expected to meet the precision levels targeted for ED statistics.

Also, based on experience with the current NHAMCS, a total sample of fewer than 200 hospitals is expected to yield a RSE of 10% for an estimate of 9.5% of OPD visits (by patients who are 5-14 years of age). Because 65% of hospitals with EDs in the current NHAMCS have in-scope OPDs, the sample of ED hospitals (or estimated $0.65 \times 465 = 302$ OPD hospitals annually) is expected to satisfy the precision objective for OPDs.

Monitoring Data Collection and Quality Control

The contractor is responsible for overseeing the data collection. An essential part of the data collection 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 (PRF) is completely filled out for every sampled patient visit. Computerization of the PRF has allowed for automated edits to be built into the instrument, so that keying errors are automatically detected as the abstractor is entering data.

Once a case is completed, the survey data are encrypted and sent to the contractor through a secure

internet connection. 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 coded. Computer edits for code ranges and inconsistencies are also performed.

For some items, missing values are imputed by randomly assigning a value from PRFs with similar characteristics. Missing data for sex, age and length of stay are currently imputed using a hot deck method. Research on other imputation methods is currently being conducted and a different imputation method may be implemented in the future.

Beginning with 2015 abstracted ED data, imputations for birth year and sex will be based on ED volume, geographic region, immediacy with which patient should be seen, and the 3-digit ICD-9-CM code for primary diagnosis (specifically, imputations are based on ED volume, region, and primary diagnosis). For the OPD data, all imputations are based on geographic region and the 3-digit ICD-9-CM code for primary diagnosis.

During 2015, NHCS will be transitioning from ICD-9-CM to ICD-10-CM. For the ambulatory visit data, verbatim diagnoses, causes of injury, and procedures will be coded to ICD-9-CM for the 4th quarter of 2015; after that point converted to ICD-10-CM.

Sampling Errors

Standard errors are calculated using a first-order Taylor series approximation method as applied in SUDAAN variance software.

3. Methods to Maximize Response Rates and Address 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 ongoing cooperation among the sampled facilities.

Response rates will be closely monitored. When the response rate for hospitals is less 80% due to refusals, a nonresponse analysis will be conducted. 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. Standard formulae will be used to measure the proportion of eligible sampled hospitals that responding hospitals represent. This method 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 non-responding hospitals based on key characteristics. Data on these characteristics will be obtained from the sampling frame (e.g., IMS 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 an in-scope sample hospital which either (a) refuses to participate in the survey and refusal conversion efforts are unsuccessful, or (b) 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.

Unit level non-response related to discharges/ambulatory visits within hospitals will also be examined. Discharge/visit units are considered nonresponding if the entire record is missing for an eligible discharge/visit. Weights associated with missing discharge/visit records will be statistically reallocated to other similar discharges/visits 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, diagnosis). Using information from other data collected, respondents and non-respondents will be compared on key characteristics, including, but not limited to, sex, age, diagnoses, and length of hospital stay, when data are available.

In terms of recruitment, facilities will be mailed an introductory letter from Mr. Charles Rothwell, Director, CDC/NCHS (Attachment D). In addition, the NCHS Ethics Review Board approval letter (Attachment M) will be given to contract staff to show the respondent upon request. If the respondent is reluctant to participate due to privacy concerns, frequently asked questions and answers document will be provided to inform sampled facilities that they may participate and still be in compliance with HIPAA (Attachment S).

NCHS provides a one-time \$500 incentive to each sampled hospital to set up the electronic data transmission required to participate in the survey. In addition, NCHS provides each sampled hospital \$500 after a full year of EHR, UB-04 data, or a state file is received from that hospital by the contractor's secure network. Additional \$500 incentive is given to each hospital after the abstraction of ED and OPD visits is completed. The contractor has the primary responsibility for ensuring the monies are distributed to participating hospitals.

In addition, a continuing education module was developed to serve as an educational and recruitment tool highlighting the NHCS. This web-based instrument was added to the NHCS participant page on the NCHS Internet site (<http://www.cdc.gov/nchs/nhcs/participant.htm>). Both the American Health Information Management Association (AHIMA) and Healthcare Information and Management Systems Society (HIMSS) have granted approval of the module, so that health information management and health information technology staff from the hospital-community are able to obtain two free continuing education units by completing the NHCS module.

Recruitment has proven to be difficult. As of December 2015, 104 hospitals have agreed to participate. The 2015 survey year was especially hectic for hospitals as they adopt EHR systems and plan for the conversion from ICD-9-CM to ICD-10-CM, as well as comply with meaningful use and quality measure requirements. Many hospitals are not refusing, but rather are asking to be re-contacted in 6-8 months.

For those hospitals willing to participate, other technical or monetary issues have often posed barriers to participation. For example, although hospitals are required to submit UB-04 claims to CMS in the 837i file format, submission of the UB-04 claims 837i file format to NCHS has been challenging. First, many hospitals use clearinghouses to process and submit their claims to CMS and other providers. In many instances, the \$500 incentive for each year of data collection is not enough to offset the cost for the clearinghouse charges for constructing a file for NHCS. Second,

some hospitals who process their own UB-04 claims do not know how to output the data from their systems for submission to NHCS. Third, hospitals with many patients handle volume by archiving their claims data daily, which makes obtaining the data for this study difficult or costly. With the capabilities of the current contractor, automation of data transmission provides a resolution to the barrier of archived data. Finally, some hospitals that are able to output digital data in-house are not necessarily able to output in 837i format. Although not preferred, other file formats such as XML, Excel, and ASCII formats have been accepted.

In response to these challenges, NHCS project staff will continue to provide technical support via email or teleconference. Further, the recruitment strategy for NHCS has evolved from a telephone based approach to a site-visit strategy. This allows the contractors recruiting for NHCS to meet with key staff in the hospitals to address any obstacles or issues that are barriers to participation.

In an effort to accelerate the shift to EHR, and avoid hospitals with this technology available from starting participation by sending UB-04 and then later having to switch, NHCS has made a substantial shift towards asking for EHR data where they are available. This new strategy simplifies participation in the electronic data component since hospitals are often able to send files they have already created (e.g., Continuity of Care Document); it also eliminates the need to send abstractors onsite.

NHCS promotional and recruitment materials were given a fresh look and rebranded to appeal to hospitals not yet recruited. Project staff developed brighter, more eye-catching survey literature and fact sheets for distribution, including a white paper illustrating uses of data obtained from children's hospitals, an EHR fact sheet, and a new suite of bolder survey colors and images to enhance the materials. The logo developed to capture the aspiration of NHCS, "You care. We care. Better care." is cited on any newly printed marketing materials.

In addition, NCHS conducted a stakeholders meeting to further explore issues with participation. This meeting included key representatives of the Office of National Drug Control Policy, Office of the National Coordinator for Health IT (ONC), SAMHSA, Agency for Health Research and Quality (AHRQ), Food and Drug Administration (FDA), Assistant Secretary for Planning and Evaluation (ASPE), Centers for Medicare & Medicaid Services (CMS), and American Health Information Management Association. To illustrate the importance of NHCS, a webinar highlighting confidentiality protections promised by NCHS and potential uses of NHCS data for research was also launched earlier this year. Presenters included the NCHS Director and high-level officials from SAMHSA and FDA. The first webinar was attended by 24 hospitals and another one held in May 2015 was attended by 19 hospitals.

4. Tests of Procedures and Methods to Be Undertaken

NCHS is continuing to work with SAMHSA to improve the methods to accurately identify substance-involved ED visits, such as oversampling substance-involved ED visits and refining ICD-9-CM codes selected to flag suspected substance-involved cases. In addition, NCHS is continuing to improve methodology to identify ambulatory surgery visits, including refining claims codes (e.g., HCPCS, revenue, and type of bill) selected to flag suspected ambulatory surgery visits.

Further, NCHS has determined that the files received from some hospitals are missing visits that are “self-pay”, “charity”, or “left without being seen”; and that, in fact, these may be more likely to be substance-involved visits. NCHS is working with hospitals to obtain these missing claims as well.

Finally, the data collection procedures are and will continue to be monitored during the course of the expanded survey, and appropriate evaluations will be conducted as needed. Reliability studies will be performed on visit data abstraction. In the abstracted data component, a second abstractor re-abstracts a 10% sample of visits abstracted across all departments. Reabstraction analyses have already been completed on Panels 1, 2 and 3 of the 2013 abstracted data. Agreement on key data elements between the original and re-abstracted data has been high—for example, 98% agreement on patient age and 97% agreement on patient sex. The re-abstraction analyses have also served to identify areas where targeted training can improve the reliability of the data collected—for example, collection of names of drugs for drug-involved visits to the ED.

In addition, two pilot projects are currently being conducted by the Census Bureau to examine different aspects of the feasibility of using EHRs in data collection from EDs. The pilots include 9 hospitals each from the NHAMCS hospitals with 400 or more beds. Pilot project #1 is exploring the feasibility and process of using EHR ED modules, stand-alone ED clinical information systems, or electronic data residing in a data repository that originated from EHRs, as a source for data on ED visits. Pilot #1 hopes to identify the appropriate hospital contacts to obtain EHR data; assess the capability and willingness of hospitals to send EHRs or electronic ED data; and determine how much variability there is between EHRs.

Pilot project #2 is comparing data from UB-04 claims to data extracted from EHRs. The UB-04 data are submitted in a specified format to the Centers for Medicare and Medicaid Services and commercial payers. The focus is on the claims data and how it compares to ED data available from EHRs. Comparison of the number of ED visits will clarify whether administrative claims are capturing all visits, including self-pay and uncompensated care. Comparison of ED data elements will provide information on the differences and similarities between data elements available from claims and EHRs.

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

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ATTACHMENTS

- A: Legislative Authority to Collect Data on Hospital Utilization; Sections 306(a) & (b) of the Public Health Services Act and Section 4302 of the Patient Protection and Affordable Care Act (H.R.3590) (ACA)
- B: Federal Register Notice for NHCS
- C: NHCS Data Collection Flow Chart
- D: Introductory Letter to Hospitals
- E: Ambulatory Introductory Letter to Hospitals, EDs and OPDs
- F: Currently Approved List of UB-04 Elements
- G: BROCHURE List of Variables for EHR Extraction of Inpatient Discharges
- H: BROCHURE List of Variables for EHR Extraction of Emergency Department Visits
- I: BROCHURE List of Variables for EHR Extraction of Outpatient Department Visits
- J: Annual Hospital Interview
- K: Annual Ambulatory Hospital Interview
- L: Westat Data Security Plan for NHCS
- M: ERB Approval Notice for the NHCS
- N: Proposed Final Initial Hospital Intake Questionnaire
- O: Recruitment Survey Presentation
- P: Monthly Transmission of UB-04 Data
- Q: Proposed Final Emergency Department Patient Record Form
- R: Outpatient Department Patient Record Form
- S: Frequently Asked Questions Brochure
- T: Ambulatory Hospital Induction Interview Changes
- U: Emergency Patient Record Form Changes
- V: Outpatient Department Record Form Changes

W: Quarterly Transmission of EHR Data

X: Background and Historical Information

Y: Proposed changes to Annual Hospital Interview

Z: Proposed changes to Initial Hospital Intake Questionnaire