Supporting Statement B for Request for Clearance:

National Hospital Care Survey

OMB No. 0920-0212

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B. Collections of Information Employing Statistical Methods

1. Respondent Universe and Sampling Methods

Hospitals

In 2014, the National Hospital Care Survey (NHCS) universe will consist of all noninstitutional, nonfederal 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 2010 spring release of the Hospital Market Profiling Solution database available from IMS Healthcare (formerly known as SDI, Verispan and SMG). The sample will be updated every three years, starting with 2014.

The NHCS is based on a stratified list, rather than a cluster, sample of hospitals that was 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 will be stratified by bed size groupings (<50 beds, 50-199 beds, 200-499 beds, and 500+ beds), and 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). 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. Consideration of whether or not the hospital would be eligible for the 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 will electronically submit all elements of either the UB-04 administrative database for all inpatient and ambulatory claims or their EHR data during a given calendar year. Electronic data transmission of all UB-04 claims data 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.

To collect abstracted clinical data for ambulatory visits, the hospital sample was 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 were then systematically assigned to the

five panels so that each panel consists of every fifth hospital in the array. The panels were randomly assigned on a rotating basis to 3-month data abstraction periods with each hospital participating three out of every 15 months. A total of about 385 hospitals that have submitted UB-04 claims data for ambulatory visits will be rotated into the annual sample for abstraction of clinical data for a sample of ambulatory visits. The abstracted data component will have a two-stage sample design: 1) the selection of hospitals and 2) the selection of stratified samples of ambulatory visits within those sampled hospital. The visit strata within each hospital will be defined by department (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.

Inpatient estimates

The 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 DC:

- nonfederal, noninstitutional hospitals
- general acute care hospitals (universe hospitals other than psychiatric, children's, or long term care)
- 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 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 level 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

NCHS plans to integrate all UB-04 claims and EHR data (UB-04 items only) received and sample records before release to make these data available as widely as possible. A sample of discharges will be included in public use files (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 would likely pose an unacceptable risk of disclosing the hospital's identity. From the UB-04 and EHR data files which each hospital transmits, NCHS will select at most 50% of the discharge records annually with the percent of each hospital's discharges being reduced as needed to keep the PUF size at 500,000 records 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 [observation cases (length of stay is zero), normal newborns, all others], (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 month, and (f) discharge day of week.

<u>Ambulatory visit estimates</u>

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 DC:

- nonfederal, noninstitutional hospitals
- general acute care hospitals (see definitions below)
- hospitals that meet our previous criterion of nonfederal 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
  - 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) Hospital characteristics for the 3 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
  - 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 visit volume 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
  - Urbanization level (as described in 2)
  - Ownership type
- Visit characteristics
  - Payment type (Private insurance, Medicare, Medicaid, uninsured, other)
  - Triage (ED – 5 levels)
  - Injury
  - Disposition (ED – admit to hospital)

(5) Annual visit volume estimates for key statistic 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

NCHS plans to analyze all visits received from the UB-04 and EHR files (UB-04 items only) and make these data available as widely as possible. However, only a sample of visits will be included in public use files (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 ambulatory visits would likely pose an unacceptable risk of disclosing the hospital's identity. From the UB-04 data files which each hospital transmits, NCHS will select at most a given percentage of the ED and OPD visit records annually with the percent of each hospital's visits being reduced as needed to keep the PUF size at 800,000 records 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) 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) visit month, and (f) visit day of week.

<u>Ambulatory visit sampling in all locations</u>

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 data for ambulatory visits, more detailed clinical information will be collected abstracted from a sample of ambulatory medical records. Abstraction is not needed in hospitals sending EHR data, as the clinical information for all ambulatory visits is already included. Due to the burden of abstraction, a sample of visits will be abstracted over a 3-month period. 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 shows how the abstraction piece is organized within the ambulatory data component of NHCS. These two abstraction methods are further described below.

1. Remote reporting hospitals are defined as those with fully electronic medical records, that is, all parts of the chart are stored electronically, thereby allowing the contractor to

remotely access the medical records from their 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 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 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 300 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 do 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 ("likely" or "probably" substance-involved vs. not substance-involved) on the basis of 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 300 substance-involved ED visits will be selected from each hospital having that many during its reporting period. If the hospital has fewer than 300 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 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)]. It also covers requirements related to 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. 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 hospitals require additional information about participating in the survey, a one hour survey presentation has been designed for them in the form of a Recruitment Survey Presentation (Attachment O).

Once a hospital agrees to participate and is confirmed as eligible, the 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

Also, 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 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 ambulatory, 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)

Electronic data component

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

<u>EHR Data Items:</u>

Hospitals equipped with EHRs may participate in NHCS one of two ways: by sending a standardized minimum data set of Patient Encounter-Based data (e.g., Continuity of Care Document (CCD), Transition of Care Summary, or Discharge Summary) or by data extracted from the hospital EHR or data repository.

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 its 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:
    - Diagnostic testing (e.g., lab, imaging, EKG, audiometry, biopsy)
    - 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
- NPIs 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:

If hospitals do not send EHR data, then they are asked to transmit the UB-04s 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 its 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)

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

Abstracted data component

Hospitals submitting EHR data will not require abstraction of their medical records, as visit-level clinical data are included. For hospitals submitting only UB-04 claims 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-based sampling
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.

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), supervising patient visit sampling, retrieving missing data, and medical record abstraction. For 2014, contract staff will perform all abstraction. In subsequent years, where the hospital staff may insist upon performing PRF abstraction, abstractors may train the 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. 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 (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 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 some, but not all, of the total number of records expected to be collected. 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 -- Preliminary analyses using data from the NHDS and assuming 80 percent of sampled hospitals are in-scope and participate suggest a total sample of 500 hospitals will be sufficient to produce reliable estimates. Under NCHS 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 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 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 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 -- An 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 EDs. 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). The new hospital sample includes 481 hospitals with 24-hour EDs (with an estimated 385 sample ED hospitals rotated into the sample for ambulatory visits annually) and is, thus, 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 250 = 0.65*385 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 sample 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, if any, are imputed for the variables of sex, age and length of stay. Until research now underway on imputation for these missing data is completed, a hot deck method is being used for that imputation.

For the 2014 ED data, imputations for birth year and sex are based on ED volume, geographic region, immediacy with which patient should be seen, and the 3-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, 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 during the 4th quarter of 2015 and then 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 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 facilities.

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. 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 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 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 will be provided to inform sampled facilities that they may participate and still be in compliance with HIPAA (Attachment S).

For 2014-2016, NCHS will compensate each of the 581 sampled hospitals, not yet recruited, $500 initially to set-up the processes and procedures to transmit EHRs or UB-04s to the contractor's secure network. Subsequently, hospitals will be given $500 after the hospital completes each full year (transmits data for all months in which the hospital was in-scope for NHCS) of participation. Hospitals will also be compensated $500 annually upon completion of PRFs from the ED and OPD. Additional costs incurred as a result of participation, including labor or purchase of technology, will also be covered by NCHS on a case-by-case basis.

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 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 April 2014, 102 hospitals have agreed to participate. Hospitals are busy places providing health care services to patients. The 2014 survey year will be 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 are asking to be re-contacted in 6-8 months.

For hospitals willing to participate, other technical or monetary issues 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 compensation 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 for 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 a new 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 necessary able to output in 837 format. Although not preferred, other file formats such 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), and it also eliminates the need to send abstractors onsite.

NHCS promotional and recruitment materials were due for a fresh look and rebranding to continue to appeal to hospitals not yet recruited. As a result, project staff developed brighter, more eye-catching survey literature and fact sheets for distribute, 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.

4. Tests of Procedures and Methods to Be Undertaken

Beginning with the panel 3 (July-September 2013) data collection, multiple abstractors could be used in each hospital. This will decrease the length of time that contractor staff spends in the hospital; thereby, lessening the inconvenience to hospital staff.

NCHS is continuing to work with SAMHSA to improve the method 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 and comparing them to abstracted Panel 1 and 2 ED data. The data from panel 1 showed that when sampling from UB-04 claims, NCHS correctly identified about two-thirds of substance-involved ED visits. In addition, NCHS is continuing to improve methodology to identify ambulatory surgery visits, including refining claims codes (HCPCS, revenue, and type of bill) selected to flag suspected ambulatory surgery visits and comparing them to abstracted Panel 2 OPD data.

Further, NCHS discovered that the files received from some hospitals are missing visits that are self-pay, charity, or left without being seen and these may be more likely to be substance-involved visits. NCHS is working with these 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 reabstracts a 10% sample of visits abstracted across all departments. Reabstraction analyses have already been completed on Panels 1 and 2 of the abstracted data. Agreement on key data elements between the original and reabstracted data has been high—for example, 98% agreement on patient age and 97% agreement on patient sex. The reabstraction 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. NCHS may also test the effects of reimbursement on hospital participation in the NHCS. A nonsubstantive change package will be submitted when plans are completed.

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 hospital 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, both within and across EHR vendors, especially taking into consideration hospital-specific modifications; and assess the completeness of ED data elements from these electronic data sources.

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: List of UB-04 Elements

G: List of Variables for EHR Extraction of Inpatient Discharges

H: List of Variables for EHR Extraction of Emergency Department Visits

I: 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: Initial Hospital Intake Questionnaire

O: Recruitment Survey Presentation

P: Monthly Transmission of UB-04 Data

Q: Emergency Department Patient Record Form

R: Outpatient Department Patient Record Form

S: Frequently Asked Questions Brochure

T: Hospital Induction Interview Changes

U: Emergency Patient Record Form Changes

V: Outpatient Department Record Form Changes

W: Quarterly Transmission of EHR Data