

Supporting Statement B for Request for Clearance:

National Hospital Care Survey

**OMB No. 0920-0212
(Expiration Date (3/31/2022))**

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June 28, 2021

Table of Contents

1. Respondent Universe and Sampling Methods – Original Design.....2
2. Procedures for the Collection of Information.....5
3. Methods to Maximize Response Rates and Address Non-response.....9
4. Tests of Procedures and Methods to Be Undertaken.....13
5. Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data
14

List of Attachments:

- Attachment A: Authorizing Legislative
- Attachment B: 60-Day Federal Register Notice
- Attachment C: Annual Hospital Interview
- Attachment D: Introductory Letter to Hospitals
- Attachment E: NHCS Overview Flyer
- Attachment F: Currently Approved List of UB-04 Elements
- Attachment G: Electronic Health Record (EHR) Variable List
- Attachment H: Ethics Review Board (ERB) Approval Notice for the NHCS
- Attachment I: Initial Hospital Intake Questionnaire
- Attachment J: Recruitment Survey Presentation
- Attachment K: Monthly Transmission of UB-04 Data
- Attachment L: Quarterly Transmission of EHR Data
- Attachment M: Confidentiality Letter

National Hospital Care Survey

B. Collections of Information Employing Statistical Methods

The National Hospital Care Survey (NHCS) collects information on care and utilization in inpatient and ambulatory hospital settings from a nationally representative sample of non-institutional and non-Federal hospitals with six or more staffed inpatient beds. As described in Supporting Statement A, the NHCS is experiencing recruitment issues. For the 2019 data collection, national estimates were not produced due to low response rates. As of March 2021, about 200 of the 608 sampled hospitals have been recruited and have agreed to send data for the 2020 data collection. This number is higher than the 2019 collection in which 112 hospitals participated in NHCS. Additionally, there are plans to purchase emergency department (ED) visit data from 65 sampled non-responding hospitals from the American College of Emergency Physicians (ACEP). To identify the 65 sampled hospitals the NHCS sample will be shared with ACEP who will identify which of the hospitals are in their database. Hospitals generally state they are overburdened by competing quality requirements. The COVID-19 pandemic also took a toll on the health care system in 2020 into 2021, leaving little resources for a voluntary, albeit important, survey such as NHCS.

In response to these recruitment challenges, for the 2022 data collection year and moving forward, NCHS will focus recruitment efforts on further reducing participation burden, increasing benefits to participating hospitals, and continuing to bolster the credibility of the survey through a demonstration of its analytic capabilities.

Recruitment challenges and NCHS' plan for exploratory work and recruitment strategy for 2022-2024 are outlined and proposed in Sections B3 and B4. Both sections provide new information on methods to improve participation and new tests of procedures.

1. Respondent Universe and Sampling Methods – Original Design

Hospitals

The NHCS hospital universe consists of all non-institutional, non-federal hospitals in the 50 U.S. 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, where a stratified random sample of 1,000 hospitals was selected first, and then split into two samples of 500 hospitals each, with half of each stratum's sample being selected by systematic random sampling for assignment to these two samples. The first or base sample of 500 was fielded starting in 2011. The remaining sample of 500 hospitals was held in reserve, in case there was a need for additional hospitals for statistical or analytical reasons. Such a need arose in 2013, when 81 hospitals with 500 or more staffed beds were released from the reserve sample to help with making substance-involved ED visit estimates. The fielded sample was increased from 500

to 581 hospitals.

The sampling frame was updated in 2017 using a 2015 release of the IMS Healthcare file. The NHCS sample was updated to account for newly opened and closed or ineligible hospitals. The updated net increase to the sample was 17 hospitals (15 previously sampled hospitals that either closed or became ineligible and 32 that were selected from the newly eligible hospitals) resulting in a new sample total of 598 hospitals, which is the sample fielded for the 2018 - 2019 data years.

In 2019, the sampling frame and sample were updated, once again, using a 2018 release of the IMS IQVIA file. In this update, 5 of the 598 hospitals in the 2017 updated sample were removed due to their closing and 15 newly opened hospitals were selected, resulting in a new sample total of 608 hospitals. This 2019 updated sample was fielded in 2020 and 2021 and is also reflected in the burden table for 2022-2024.

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 (OMB No. 0920-0278, Exp. Date 09/30/2023). 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 the hospital would have been eligible for the 1988 redesign of the NHDS. Consideration of whether the hospital would be eligible for the NHDS 1988 design was important 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. Additionally, since the previous OMB approval, data submissions options have expanded to include data collected from Vizient. Vizient is a large provider-driven, health care performance improvement organization. With permission from the sampled hospital, NHCS can obtain data submitted to Vizient. Electronic data transmission of all UB-04 claims data, Vizient 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. If 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 public use files (PUFs), NCHS plans to integrate all data types received (UB-04 claims, state file data, Vizient data, EHR data [only elements matching the UB-04 items], and third party data sources that allow for the inclusion in the PUF), and to make these data available as widely as possible. The PUF will include a probability sample of discharges/visits because (1) the size of the data file containing all hospitals visits for the calendar year will require significant computer processing to analyze, 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 and/or patients' identity.

Inpatient and Ambulatory 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. Estimates for both inpatient and ambulatory care will include discharges and inpatient days of care for the NHCS universe consisting of all non-federal, non-institutional hospitals with at least 6 staffed inpatient beds, and located in the 50 U.S. states and the District of Columbia. Additionally, estimates would be made by hospital type (e.g., general acute care hospitals, psychiatric, children's, or long-term care) and patient characteristics (e.g., age and sex); and visit characteristics (e.g., payer type and discharge disposition).

National estimates will be explored for discharges and inpatient days of care in the hospital universe described above and classified by:

- Urbanization level of their location, i.e.,
 - o Large central cities of metropolitan areas (central city of MSA with ≥ 1 million population)
 - o Fringe areas of large central cities (fringe city of MSA with ≥ 1 million population)
 - o Other (medium and small) metropolitan areas (MSA with < 1 million population)
 - o Non-metropolitan areas (non MSA)
- Bed size groups, i.e.,
 - o < 50 beds
 - o 50-199 beds
 - o 200-499 beds
 - o ≥ 500 beds
- Type of ownership
 - o Nonprofit
 - o Proprietary
 - o Government
- Geographic region where hospital is located (i.e., 4 Census regions)
 - o Northeast

- o Midwest
- o South
- o West

Finally, estimates would include annual visit volume estimates for key statistics of substance-related visits by major substance and demographic category.

2. Procedures for the Collection of Information

For each new hospital in the NHCS sample, contractor interviewers will send a letter to the hospital administrator addressed from the NCHS Director (**Attachment D**) as well as an overview flyer providing information about NHCS (**Attachment E**). The letter describes the purpose of the survey, states that participation is voluntary and that all information is kept confidential and highlights the benefits of participation. The overview flyer then further describes protections to and confidentiality of participants: that collected information which would allow identification of individual hospitals or patients is not shared with anyone, and PUFs will only be available on the NHCS website once individually identifiable information is removed. The legal authority for NHCS data collection is Section 306 of the Public Health Service Act (42 U.S.C. 242k). At no time are patients contacted to obtain information.

Hospital Level

The introductory letter and overview flyer are 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 and whoever is designated as the coordinator for this survey. During this call, the Initial Hospital Intake Questionnaire (**Attachment I**) is administered over the telephone or by paper to verify the hospital's eligibility, collect information on the Point of Contact (POC) for the hospital, ask about capability to transmit UB-04 administrative claims, state files, Vizient data, or 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 J**).

Each eligible sampled hospital regardless of participation is asked to complete an Annual Hospital Interview (**Attachment C**), which is conducted via a web portal that was developed by a contractor. Any necessary follow up is conducted by telephone or mail. This interview collects annual statistics needed for weighting the inpatient and ambulatory data as well as several questions about the impact of the COVID-19 pandemic on the hospital. Information collected in the Interview 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)
- COVID-19: COVID-19 test shortages for patients and health care staff; shortages of inpatient beds for COVID-19 patients; estimates of inpatient admissions related to COVID-19.

Inpatient and Ambulatory data collected electronically

Participating hospitals transmit electronic data (either UB-04 billing or EHR data) for all inpatient and all ambulatory visit-level information for the NHCS.

EHR Data Items:

For the 2022-2024 data collection, NHCS will collect the standard and format of EHR data required by the 2015 Edition Certified Electronic Health Record Technology (CEHRT) for transmission to Public Health Agencies. Since late 2015 NHCS has been included in the CMS (EHR) Incentive Program (now called Promoting Interoperability [PI], but formerly known as Meaningful Use MU) under the Public Health Objectives. Hospitals participating in the NHCS can use submission of NHCS data as one of their options to fulfill requirements under those objectives. Multiple CMS and Office of the National Coordinator for Health Information Technology (ONC) rules require hospitals participating in the PI Incentive Program to use the 2015 Edition CEHRT in 2019 and beyond. The standard and format required by the 2015 Edition CEHRT for transmission to Public Health Agencies is the HL7 CDA National Health Care Surveys Implementation Guide (IG) Release 1.2 or Release 1 – the implementation guide created by NCHS for the National Health Care Surveys. An updated version of the IG (HL7 CDA R2 IG: National Health Care Surveys, R1 STU Release 3- 3rd HL7 Standard for Trial Use [STU] US Realm), was balloted and approved in July 2019.

NCHS continues to explore avenues to reduce participation burden. EHR submission technology is rapidly progressing, and 72 EHR vendor products based on the IG Release 1.2 and/or Release 1 have been developed. EHR vendors are continuing to work with NCHS to test the interfaces built. In January 2019, NCHS participated in the IHE Connectathon where 7 EHR vendors sent files to be tested, including major companies such as Cerner, Allscripts, athenahealth, and Rhapsody.

Selected EHR data elements collected are shown below. A hard-copy document capturing all items is in **Attachment G**.

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:
 - 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
- National Provider Identifier (physicians and health care providers only)
- Race
- Ethnicity
- Marital status
- Source(s) of payment
- Clinician's notes (e.g., physicians', nurses', physician assistants' and certified nurse midwives' notes)
- Medications and immunizations administered and prescribed at visit
- Results of testing and procedures

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

For ED and OPD:

- Reason for visit

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 ICU utilization)

Vizient:

When a hospital gives permission to NCHS to obtain their data from Vizient, the data from Vizient contain the elements provided in the noted UB-04 administrative claims above, except for patient identifiers, but it also includes:

- Medications
- Results of tests/procedures

Third Party Data Sources:

Premier and ACEP data contain similar data elements as those in UB-04 administrative claims but do not contain any identifiers. The Premier database does contain information on hospital bed size, urban/rural designation, and type of hospital that will likely enable assigning the Premier hospitals to sampling strata in the NHCS sampling frame.

Monitoring Data Collection and Quality Control

A contractor is responsible for overseeing the data collection. Contractor staff ask hospitals to submit a test file for UB-04 claims, state files, Vizient data, or EHR data. All test data will go through a pre-processing report or testing and validation procedures to ensure that essential variables are present and in suitable format for the NHCS project. Contractor staff work with hospitals to request any changes or additions to the files submitted that are not EHR. NCHS staff will work with hospitals to receive the EHR data files.

Sampling Errors

Standard errors are calculated using a first-order Taylor series approximation method¹ as applied in

¹ Research Triangle Institute. SUDAAN User’s Manual, Release 9.0.1. Research Triangle Park, NC: Research Triangle Institute, 2005

SUDAAN variance software.

3. Methods to Maximize Response Rates and Address Non-response

The credibility of analyses for the NHCS, 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 hospitals.

As noted above, although recruitment has steadily increased, NCHS still faces many challenges in gaining enough hospitals to produce a nationally representative estimate. Most hospitals are considered soft refusals, meaning that they express interest in participating but need to postpone participation until a future date when they have more resources to dedicate to NHCS. Hospitals indicate that they were already overburdened with a growing number of reporting requirements, which posed a challenge for their participation in NHCS. Partially this is due to the demand on hospitals to produce quality of care reporting which increased tremendously over the past few years. Much of this reporting is often mandatory; in contrast, the NHCS is voluntary.

The 2020 and 2021 data collection brought additional challenges (listed below) that have made it more difficult to use traditional hospital recruitment methods. The most notable challenge in the list below is, of course, the onset of the COVID-19 pandemic.

- *COVID-19*. Less hospital resources available for the data submission. Deaths among hospital staff and furloughs due to moratorium on surgeries.
- *Cyberattacks*. In the NHCS sample, 8 hospitals reported a ransomware attack as a reason for delaying participation.
- *Natural disasters*. Increases in summer wildfires in the western/mountain states and hurricanes and flooding in the south eastern states.
- *Competing government hospital data collections*. Increased public health surveillance programs due to COVID-19 are competing with hospital resources for government data submissions.

NCHS plans to respond to these challenges through a renewed recruitment strategy as well as exploration of alternative methods to produce estimates. Both strategy and exploratory work are described below.

NCHS is purchasing 2020 ED data from 65 sampled non-responding hospitals from the American College of Emergency Physicians (ACEP). The data is UB-04 or EHR data collected by ACEP and contains nearly all of the key items required in the NHCS.

In the meanwhile, response rates will be closely monitored. 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 non-responding 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 focus on critical data items of broad research or policy significance (e.g., insurance status, 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.

Exploratory Work:

NCHS is currently exploring several options to produce national estimates for the survey, which involve evaluating experimental methods to increase reliability and produce national estimates. These options are the following:

1. Purchase a full year of 2020 hospital encounter data for approximately 850 hospitals from Premier, Inc. This data will then be used to produce national estimates on hospital utilization by sampling with replacement: replace nonrespondent sampled hospitals within weighting strata with hospitals for which the Premier data are available. Premier is providing information on the number of staffed inpatient beds, urban-rural designation, and type of hospital so the hospital can be assigned to a NHCS weighting stratum. This allows for studying the impact of using sampling with replacement on the reliability of the estimates. The NCHS Division of Research and Methodology (DRM) will oversee this work and conduct an impact study on using sampling with replacement methodology. To date, DRM has conducted a literature review on the topic.

2. Build a synthetic dataset using hospital data purchased from Premier. Due to Premier not allowing their data to be released to the public through the RDC or in a public use file, synthetic data will be produced from the Premier data. The synthetic data will then be used to produce reliable 2020 NHCS national estimates that can then be shared with the public. Using the method detailed in the 2019 Annual Report from the National Forensic Laboratory Information System (<https://www.nflis.deadiversion.usdoj.gov/DesktopModules/ReportDownloads/Reports/NFLIS-Drug-AR2019.pdf>) to use convenience sample data to supplement its representative sample. This method would involve adding synthetic data to the responding NHCS data, and then evaluating reliability and bias in the estimates. These estimates will then be compared to the estimates produced by actual Premier data in option 1 to study impact on the national estimates from the synthetic data.

Recruitment Process:

In terms of recruitment, hospitals are mailed an introductory letter from NCHS Director (**Attachment D**) as well an overview flyer (**Attachment E**) that describes the NHCS and confidentiality protections. In addition, the NCHS Ethics Review Board approval letter (**Attachment H**) is given to contractor staff to show the respondent upon request. If the respondent is reluctant to participate due to privacy concerns, a Confidentiality Letter is also provided to inform hospitals of their data protections (**Attachment M**). Sometimes a hospital wants to know more about the survey or has specific questions that are better answered by a CDC staff member. At that point, the contractor may coordinate a brief call between the POC at the sampled hospital and an NCHS leader (Hospital Care Team Lead or Division Director) to discuss further.

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, Vizient data, or a state file is received. The data collection contractor has the primary responsibility for ensuring the monies are distributed to participating hospitals.

In addition, a continuing education module is available to hospitals to serve as an educational and recruitment tool highlighting the NHCS. This web-based instrument was added to the NHCS website (<https://www.cdc.gov/nchs/training/nhcs/index.html>). 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.

PI (formerly MU) credit is a continued benefit. As of January 2021, over 1,000 eligible hospitals or critical access hospitals have registered with the National Health Care Surveys Registry for PI credit, and of those 60 are in the NHCS sample. NCHS will continue to work with sampled hospitals to obtain EHR data and offer PI credit.

Additionally, NCHS offers a newly developed benefit, the Annual Hospital Report (AHR). The AHR is an interactive portal that serves as a benefit for hospitals participating in the NHCS. Hospitals that submit 12 months of data can access reports through the AHR that include descriptive statistics for encounters made at their facilities, as well as aggregate mortality data (for hospitals submitting personally identifiable information), through linkage to the National Death Index (NDI). A beta version demonstrating the capabilities of the AHR using synthetic data is now available (https://www.cdc.gov/nchs/nhcs/annual_hosp_report_portal.htm). The full version AHR will be available to participating hospitals that submitted 12-months of data in 2021.

NHCS project staff continue to provide technical support via email or teleconference to hospitals that need assistance in submitting their electronic data. 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.

Recruitment Strategy:

As mentioned above, lack of resources due to various reasons is the most common reason for recruitment refusal. Further, there is the added barrier of the COVID-19 pandemic for the 2020 and 2021 data collection. Many hospitals have either refused or delayed participation due to lack of resources and time for a voluntary survey. Furloughs and the shifting of priorities to care for the large influx of patients has left survey participation at the bottom of the priority list. To that end, NCHS plans to employ a three-pronged recruitment strategy for the 2022-2024 data collection – reduce participation burden, increase benefits, and bolster credibility. The first part of this strategy includes finding avenues to reduce hospital burden.

To reduce participation burden on hospitals, NCHS has explored alternative data sources, including identifying data collection organizations (such as ACEP, Vizient, and Premier) to obtain data either through already existing data collection agreements or through the development of new third-party relationships. NCHS was awarded \$1 million from CDC’s Data Modernization Initiative (DMI) to supplement the 2020 NHCS data collection with alternative data sources. It appears that ED data from ACEP could be used to substitute for data from approximately 65 nonrespondent hospitals in NHCS and inpatient and ED data from Premier for additional hospitals could possibly be used to further supplement NHCS data. Research is planned into the possible use of data from Premier and ACEP.

Additionally, participation burden is reduced when hospitals utilize vendor interfaces/systems to submit their EHR data. NCHS continues to encourage the use of these interfaces. In the interest of educating sampled hospitals, two recruitment webinars were held in 2020 – one in partnership with EPIC and the other with Cerner. Both webinars described how the vendor system could be utilized to submit data for NHCS.

The second part of the recruitment strategy includes increasing benefits to hospitals for participation. The usual benefits (https://www.cdc.gov/nchs/nhcs/why_participate.htm) are still offered, but now the addition of two new benefits are available, including access to the recently developed AHR portal and access to the algorithm developed by NCHS to identify opioids in EHR data. The algorithm that is available to hospitals resulted from the second of the Patient-Centered Outcomes Research Trust Fund (PCORTF) projects described in Section B4.

Finally, the third prong of the recruitment strategy involves bolstering NHCS’ credibility by continuing to demonstrate its analytic strength. This will ensure hospitals perceive value in the survey and in their participation. To demonstrate its analytic capabilities, NCHS disseminates announcements to data users through its listserv of over 1,800 data users and to hospitals in the sample via email blasts. Announcements have described the publication of papers using NHCS data, webinars, and the availability of new data files in the RDC. Additionally, roughly every other month, NCHS hosts a “Lunch and Learn” webinar, during which various topics using NHCS data are

highlighted. Each webinar ends with a request to hospitals to participate in the survey. NHCS survey staff continue to publish demonstration papers as is described in Section A and expand the availability of linkages, as highlighted in Section B4.

Finally, NHCS had an opportunity to bolster its credibility during the COVID-19 pandemic through its Hospital COVID-19 Dashboard. This dashboard illustrates how NHCS data can be used to contribute to monitoring and understanding public health crises as the survey is designed to capture emerging diseases and viruses that require hospitalizations, including COVID-19 encounters. Preliminary data collected in 2020 from approximately 50 hospitals that submitted UB-04 administrative claims are being used to produce results showing the occurrence of COVID-19 hospital encounters over time; the use of intubation and ventilators; the co-occurrence respiratory illness; in-hospital mortality; and COVID-19 screenings. These COVID-19 results using NHCS data are featured on the NCHS COVID-19 dashboard webpage (<https://www.cdc.gov/nchs/covid19/nhcs.htm>).

4. Tests of Procedures and Methods to Be Undertaken

The PCORTF has provided NCHS with funds for three projects in fiscal years (FY) 2017, 2018, and 2019, which have helped NCHS expand the analytic capability of NHCS data.

The first project funded by PCORTF added cause-specific mortality to NHCS by linking to the NDI. The goal of this project was to link the NHCS to the NDI and the Centers for Medicare and Medicaid Services Medicare Master Beneficiary Summary File (MBSF). The project produced three data files for the RDC: 2014 NHCS Data Linked to 2014/2015 NDI; 2016 NHCS Data Linked to 2016/2017 NDI; and 2014 NHCS Data Linked to 2014/2015 Medicare MBSF. The linked NDI files provide information on post-acute mortality and cause of death. Linkage of NHCS data with the CMS Medicare Data provides the opportunity to conduct a vast array of studies on health care utilization and expenditures among the elderly U.S. population and persons receiving Medicare disability benefits.

The second PCORTF project funded aimed to enhance the identification of opioid-involved health outcomes (in ED visits) using linked hospital care and mortality data. The project completed two main tasks: (1) it added information from the Drug-Involved Mortality (DIM) file to the linked 2014 and 2016 NHCS/NDI data, and (2) the study developed methods of enhanced opioid-identification in hospital and death certificate data and added results from the enhanced opioid identification algorithm to the linked 2016 NHCS/NDI/DIM file. The DIM file provides information on specific drugs, drug classes, and non-specific references to drugs mentioned in the literal text on the death certificate. The enhanced opioid-identification algorithm utilizes all structured and unstructured data collected in the UB-04 administrative claims and EHR data to improve the identification of opioid-involved and opioid overdose hospital encounters. Both data files are available in the NCHS RDC.

The third PCORTF-funded project aimed to identify co-occurring disorders among opioid users using linked hospital care and mortality data. The project served as a culmination of the second project and aimed to improve data on co-occurring substance use disorders and selected mental

health issues (anxiety and depressive disorders). The project involved conducting a study to validate algorithms to identify the use of opioids and the existence of co-occurring disorders, followed by an abstraction of 100 encounters from 9 hospitals participating in NHCS to validate the performance of the enhanced opioid-identification and co-occurring disorder algorithms. Recruitment for this validation study began in January 2021. Since then 9 hospitals have been recruited and data collection is scheduled to end in June 2021.

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

The statistician responsible for the NHCS is:

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