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

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. By employing statistical modeling techniques, dependable national estimates were successfully generated for 2020 NHCS data. Nationally representative data from the 2020 NHCS is expected to be publicly available before the end of 2024 and public use data files for 2021 is on track for development and subsequent release. As of January 2024, about 199 of the 601 sampled hospitals have been recruited and have agreed to send data for the 2023 data collection. This number is higher than the 2019 collection in which 112 hospitals participated in NHCS. Beginning in 2020, NCHS has worked with the American College of Emergency Physicians (ACEP) to receive emergency department (ED) visit data from their hospital database for 55-65 sampled non-responding hospitals (depending on the survey year). In order to determine the specific hospitals included in the sample, the NHCS sample will be shared with ACEP who will identify which hospitals are in their database. This collaboration is facilitated through the establishment of a Memorandum of Understanding (MOU) and a designated agent agreement (DAA).

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. Finally, the recurrence of cyberattacks and data breaches have resulted in a reluctance from hospitals to release patient PII and other patient data, impacting participation in the NHCS.

In response to these recruitment challenges, for the 2025 data collection year and moving forward, NCHS will focus recruitment efforts on further reducing participation burden, increasing functionality for the Annual Hospital Report portal participating hospitals, and continuing to bolster the credibility of the survey through a demonstration of its analytic capabilities. To alleviate hospital burden, NCHS is exploring partnerships with CDC's National Healthcare Safety Network (NHSN) and National Syndromic Surveillance Program (NSSP)to not only improve the efficiency of data transmission, but to supplement the NHCS data collection.

Recruitment challenges and NCHS' plan for exploratory work and recruitment strategy for 2025-2027 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

<u>Hospitals</u>

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 initial NHCS hospital sample (for 2011-2013) was a stratified random sample of 1,000 hospitals. They were subsequently divided into two samples, each consisting of 500 hospitals, 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 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. 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 through 2023 In 2022, the sample was updated. In this update, 32 hospitals were removed, and 25 newly constructed hospitals were sampled resulting in a new sample of 601.This sample was fielded in 2023 and is also reflected in the burden table for 2025-2027.

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, Discontinued 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.

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, data submissions options 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.

To further reduce hospital burden NCHS is also obtaining hospital data collected from third party entities such as the American College of Emergency Physicians (ACEP) through their Clinical Emergency Department Registry (CEDR) to supplement NHCS. ACEP collects UB-04 administrative claims and EHR data with similar data elements required by the NHCS. ACEP provided ED data from up to 55 sampled hospitals from 2020 - 2023.

For public use files (PUFs), NCHS integrated 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 allowed for the inclusion in the PUF), and to make these data available as widely as possible.

Rather than using the complete encounter data of visits and discharges, a probability sample of five percent of NHCS records were selected to create the public use data files for the following reasons: (1) inclusion of all records from inpatient discharges and ED visits from all sampled hospitals would pose unacceptable disclosure risks for the hospitals; and (2) NHCS collects a lot of records that can be difficult for statistical software to process efficiently, so public use data files are reduced to a manageable size for data users.

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 within the United States. Estimates for both inpatient and ambulatory care includes 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, in the restricted use file 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 contain information on total number of discharges and inpatient days of care for the hospital universe described above. Estimates includes annual visit volume estimates for key statistics on substance-related visits by major substances, patient conditions, and demographic categories.

2. Procedures for the Collection of Information

For each new hospital in the NHCS sample, the recruitment contractor sends an introductory letter (**Attachment D**) an overview flyer (**Attachment E**), and a region and/or topic specific infographic flyer (**Attachments F-L**) to the hospital administrator addressed from the Director of NCHS. The letter describes the purpose of the survey, states that participation is voluntary, and all information is kept confidential, and highlights the benefits of participation. The overview flyer then further describes protections to and confidentiality of participants: the collected information that would allow identification of individual hospitals or patients is not shared with anyone, and public use data files 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 P**) 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 Q**).

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 use of telemedicine. Information collected in the Interview includes, but is not limited to:

- Health Care Systems information
- Questions related to eligibility to reconfirm annually
- Hospital characteristics (e.g., total numbers of admissions, inpatient discharges, and ED and OPD visits)
- Telemedicine (e.g., use of telemedicine by setting, types of telemedicine tools used by the hospital)

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.

<u>EHR Data Items:</u>

For the 2025-2027 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 74 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 May and August 2023, NCHS participated in the HL7Connectathon to test FHIR-based interoperability between EHRs and NCHS.

NCHS is working to leverage widely used modern day standards, such as Health Level 7 (HL7®) Fast Healthcare Interoperability Resources (FHIR®), to improve the timeliness and quality of data received from EHRs for National Health Care Surveys, while also modernizing workflows and reducing the burden on health care data providers. As part of this effort, NCHS is conducting the Health Care Surveys FHIR Pilot as a part of the CDC's Making Electronic Data More Available for Research and Public Health (MedMorph) project as the Health Care Surveys use case. By employing standardized application programming interfaces for patient services, the goal is to demonstrate how burden attributed to reporting clinical data could be reduced through automated reporting and inform the resources necessary to develop sustainable FHIR-based data submission on a broader scale. On March 2024, NCHS will be presenting the Health Care Surveys (HCS) use case at the Health Information Management Systems Society (HIMSS) and in addition, will be participating in the Interoperability Showcase® demonstrating the exchange of data between EHRs such as Epic and Cerner and NCHS for hospital and ambulatory care settings.

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

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

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 M**).

- 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:

ACEP data contain similar data elements as those in UB-04 administrative claims but do not contain any identifiers.

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.

<u>Sampling Errors</u>

Standard error is primarily a measure of the sampling variability that occurs by chance because only a sample of hospitals are in NHCS, rather than the entire universe of hospitals. Standard errors and other measures of sampling variability are best determined by using a statistical software package that takes into account the sample designs of surveys to produce such measures.

For 2020 NHCS, propensity modeling was used to develop the base weight through variable selection and harmonization. Replicate calibrated weights were created to produce variance estimates, using the stratified delete-a-group jackknife (DAGJK) method.

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

NCHS collaborated with NORC at the University of Chicago to develop and implement statistical modeling techniques to generate and improve the precision and validity of national estimates.

For 2020 NHCS, the production of weights to produce national estimates involved combining data from the Premier Health Database (PHD) to the 2020 NHCS data. The PHD was then removed, and the weights were adjusted for only the 2020 NHCS data. The PHD is a commercially available hospital-based database that collects inpatient service-level data from partner hospitals. It stores information about hospital characteristics such as admitting/attending physician specialties, point of origin, admission type, and discharge status. It also collects encounter-level information on inpatient visits, such as age, sex, race/ethnicity, International Classification of Diseases (ICD) codes, Current Procedure Terminology (CPT) codes, and Healthcare Common Procedure Coding System (HCPCS) codes.

Additionally, the Healthcare Cost and Utilization Project (HCUP) nationwide samples, National Inpatient Sample (NIS) and Nationwide Emergency Department Sample (NEDS) were used as construct controls for calibrating the 2020 encounter-level weights for each setting. The calibrated weights produced nationally representative estimates on hospital discharges and ED visits in 2020. Additionally, replicate weights were developed to produce lower standard errors than the standard errors calculated based on the survey's sampling design.
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.

Although recruitment has improved over time, NHCS still faces many challenges in consistently maintaining enough hospitals to support the production of nationally representative estimates. 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 2022 and 2023 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 was a cyberattack incident, that unfortunately impacted the data from a number of participating NHCS hospitals.

- *Cyberattacks*. Hospitals have experienced data security breaches and cyberattacks in recent years.
- *Lack of Resources*. Less hospital resources available, including hospital staff, for the data submission.
- *Natural disasters*. Increases in summer wildfires in the western/mountain states and hurricanes and flooding in the southeastern 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 purchased 2022-2023 ED data from up to 55 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 approaches to supplement national estimates for the survey in the future and reduce hospital burden. With an emphasis on incorporating synthetic data, these options involve evaluating experimental methods to improve reliability and produce more precise national estimates, including race and ethnicity estimates, while minimizing participant burden. Additionally, NCHS is starting to work with several CDC surveillance programs that collects similar data from hospitals to test the viability of their data as a data source for NHCS. The following are options being considered:

1. 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.

2. To reduce hospitals burden even further, NCHS is exploring collaborations with CDC's National Healthcare Safety Network (NHSN) and National Syndromic Surveillance Program (NSSP) to transmit electronic hospital encounter data into CDC in a more efficient manner. The partnerships with NSHN and NSSP involves a proposed pilots exploring the feasibility of collecting hospital inpatient and emergency department administrative UB-04 administrative claims and EHR data through NHSN to supplement data collected by the NHCS. The data collected by NSSP will be compared to NHCS to evaluate the similarities between the two data collection systems. These collaborations have the potential to streamline hospital data collected by CDC components, reduce burden on hospitals by eliminating the need for a hospital to submit data multiple times to the CDC, allow all parties to produce better quality and more timely estimates, and build infrastructure for CDC to have national hospital utilization data for public health emergencies.

3. To reduce respondent burden and data collection cost NCHS is exploring the impact of reducing NHCS sample size. NCHS is investigating the impact on the reliability of national estimates by reducing the NHCS sample size by a third. Estimates will be calculated based on smaller sample size and they will then be compared to the estimates to the full sample to evaluate the impact on the precision of the estimates.

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 O**) 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 T**). 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.

PI (formerly MU) credit is a continued benefit. As of January 2024, over 450 eligible hospitals or critical access hospitals have registered with the National Health Care Surveys Registry for PI credit, and of those 35 are in the NHCS sample. NCHS will continue to work with sampled hospitals to obtain EHR data and offer PI credit.

Additionally, NCHS offers 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). Hospitals that submitted 12 months of data in 2019 and 2020 have access to summary results. Results on post-acute mortality from NHCS data linked to the NDI will be available in 2024.

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. 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 2025-2027 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 and Vizient) to obtain data either through already existing data collection agreements or through the development of new third-party relationships. ACEP data have been used to supplement NHCS for approximately 50 nonrespondent hospitals in NHCS ED data.

The second part of the recruitment strategy includes increasing the functionality of the AHR portal to participating hospitals. The usual benefits (https://www.cdc.gov/nchs/nhcs/why_participate.htm) are still offered, 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.

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. 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.

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 of respiratory illnesses; 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).

Building off the success of the NHCS COVID-19 dashboard, a second dashboard was developed to display information on drug-involved hospital encounters. The NHCS Drug Use dashboard (https://www.cdc.gov/nchs/dhcs/drug-use/index.htm) utilizes the same preliminary UB-04 administrative claims data that populates the NHCS COVID-19 dashboard. The NHCS Drug Use dashboard data are not nationally representative, but they provide important information on types of drugs-involved in hospital admissions and emergency department visits. The types of

drugs presented in the dashboard are opioids, benzodiazepines, cannabis, stimulants, and all drugs. Additionally, the dashboards provide trend data on overdoses and poisonings related to all opioids, fentanyl, heroin, benzodiazepines, cannabis, stimulants, and all drugs. Similar to the NHCS COVID-19 dashboard, the NHCS Drug Use dashboard is presenting information not available in other hospital reporting systems.

Finally, to boost the participation of sampled hospitals in the NHCS for year 2023 and onwards, participant recruitment materials were developed. These materials included 7 new flyers that targeted hospitals in specific regions and types of hospitals, such as children's or rural hospitals (**Attachments F-L**) . Additionally, the Survey Overview Flyer was redesigned and updated for conciseness to convey the benefits of participation, data collection procedures, and data confidentiality and trustworthiness. A new email postcard was also created to publicize updates to the NHCS COVID-19 dashboard.

4. Tests of Procedures and Methods to Be Undertaken

<u>Office of Secretary- Patient Centered Outcomes Research Trust Fund (OS-PCORTF) Projects</u>

The PCORTF has provided NCHS with funds for six projects in fiscal years (FY) 2017 thru 2022 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. The study's results have since been published in a Vital and Health Statistics Series Report titled "Validation of the Enhanced Opioid Identification and Co-occurring Disorders Algorithms."

There were two PCORTF projects that involved data linkages to additional data sources including, Transformed Medicaid Statistics Information System (T-MSIS) claims data from CMS, administrative housing assistance program data from the U.S. Department of Housing and Urban Development (HUD) to explore relationships between housing and health, and Veterans Affairs (VA) administrative data from the U.S. Department of Veterans Affairs (VA) to delve into a wide range of health topics impacting Veterans, including Veteran status and the utilization of VA benefit programs. Conducting these data linkages has resulted in the following data files: 2016 NHCS linked to 2015-2017 CMS Medicaid (T-MSIS) Enrollment and Claims Data; 2014 NHCS linked to 2013-2015 HUD Housing Assistance Program Files; 2016 NHCS linked to 2015-2017 HUD Housing Assistance Program Files; 2016 NHCS linked to VA Administrative Data Files through FY 2020.

The current and sixth PCORTF project funded (2023-2025) aims to improve data capacity to study patient outcomes associated with substance use and misuse, by developing an algorithm using NHCS data that can identify hospital encounters involving stimulants in both structured and unstructured hospital data; and to enhance access to robust, high-quality data on stimulant-associated health outcomes through the development of an interactive drug dashboard displaying hospital utilization and care related to substance-involved hospital encounters.

Nationally Weighted Estimates for 2020 NHCS – Public Use File

In collaboration with NORC at the University of Chicago, NCHS was able to broaden the analytical capabilities of the data collected from the NHCS by generating a dataset of nationally weighted estimates for the 2020 NHCS. To generate this dataset, the 2020 NHCS data were first combined with hospital records from the commercially available Premier database. After an initial set of weights were created on the combined dataset, Premier data was removed, and the weights were adjusted for only 2020 NHCS data.

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

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