# MEPS HC 254H:
# 2024 Home Health Visits

## May 2026

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# A. Data Use Agreement

Individual identifiers have been removed from the microdata contained in these files. Nevertheless, under Sections 308 (d) and 903 (c) of the Public Health Service Act (42 U.S.C. 242m and 42 U.S.C. 299a-1), data collected by the Agency for Healthcare Research and Quality (AHRQ) and/or the National Center for Health Statistics (NCHS) may not be used for any purpose other than the purpose for which they were supplied; any effort to determine the identity of any reported cases is prohibited by law.

Therefore, in accordance with the previously referenced federal statute, it is understood that

1. No one is to use the data in this dataset in any way except for statistical reporting and analysis.

2. If the identity of any person or establishment should be discovered inadvertently, then (a) no use will be made of this knowledge, (b) Director - Office of Management Services AHRQ will be advised of this incident, (c) the information that would identify any individual or establishment will be safeguarded or destroyed, as requested by AHRQ, and (d) no one else will be informed of the discovered identity.

3. No one will attempt to link this dataset with individually identifiable records from any datasets other than the Medical Expenditure Panel Survey or the National Health Interview Survey. Furthermore, linkage of the Medical Expenditure Panel Survey and the National Health Interview Survey may not occur outside the AHRQ Data Center, NCHS Research Data Center (RDC), or the U.S. Census RDC network.

By using these data, you signify your agreement to comply with the previously stated statutorily based requirements with the knowledge that deliberately making a false statement in any matter within the jurisdiction of any department or agency of the federal government violates Title 18, part 1, Chapter 47, Section 1001, and is punishable by a fine of up to $10,000 or up to 5 years in prison.

AHRQ requests that users cite AHRQ and the Medical Expenditure Panel Survey as the data source in any publications or research based on these data.

# B. Background

## 1.0 Household Component

The Medical Expenditure Panel Survey (MEPS) provides nationally representative estimates of healthcare use, expenditures, payment sources, and health insurance coverage for the U.S. civilian noninstitutionalized population. The MEPS Household Component (HC) also provides estimates of respondents' health status, demographic and socio-economic characteristics, employment, access to care, and satisfaction with care. Estimates can be produced for individuals, families, and selected population subgroups. The survey's panel design includes five rounds of interviews spanning 2 full calendar years. The interviews use computer-assisted personal interviewing (CAPI) technology or computer-assisted video interviewing (CAVI) technology to collect information about each household member, which the survey builds on from interview to interview. A single household respondent reports all data for a sampled household.

The MEPS HC was initiated in 1996. Each year, a new panel of sampled households is selected. Because the data collected are comparable to those from earlier medical expenditure surveys conducted in 1977 and 1987, it is possible to analyze long-term trends. Historically, each annual MEPS HC sample consists of up to 15,000 households. Data can be analyzed at the person, family, or event level. Data must be weighted to produce national estimates.

The set of households selected for each MEPS HC panel is a subsample of households participating in the previous year's National Health Interview Survey (NHIS) conducted by NCHS. The NHIS sampling frame provides a nationally representative sample of the U.S. civilian noninstitutionalized population. In 2006, NCHS implemented a new NHIS sample design that included households with Asian persons in addition to households with Black and Hispanic persons in minority group oversampling. In 2016, NCHS introduced another sample design that discontinued the oversampling of these minority groups.

## 2.0 Medical Provider Component

When the household CAPI instrument is completed and permission is obtained from the sampled members to contact their medical provider(s), a sample of these providers is contacted by telephone to obtain information that household respondents cannot accurately provide. This part of MEPS is called the Medical Provider Component (MPC), and it collects information on dates of visits, diagnosis and procedure codes, and charges and payments. The Pharmacy Component (PC), a subcomponent of the MPC, does not collect data on charges or on diagnosis and procedure codes, but it does collect detailed information on drugs, including the National Drug Code (NDC) and medicine name, as well as payment amounts. The MPC is not designed to yield national estimates; it is primarily used as an imputation source to supplement or replace household-reported expenditure information.

## 3.0 Survey Management and Data Collection

MEPS HC and MPC data are collected under the authority of the Public Health Service Act. The MEPS HC data are collected under contract with Westat, and the MEPS MPC data are collected under contract with RTI International. Datasets and summary statistics are edited and published in accordance with the confidentiality provisions of the Public Health Service Act and the Privacy Act. NCHS provides consultation and technical assistance.

As soon as the MEPS data are collected and edited, they are released to the public in stages of microdata files and tables via the MEPS website and AHRQ Data Tools site.

Additional information on MEPS is available from the MEPS project manager or the MEPS public use data manager at the Center for Financing, Access and Cost Trends, AHRQ, 5600 Fishers Lane, Rockville, MD 20857 (301-427-1406).

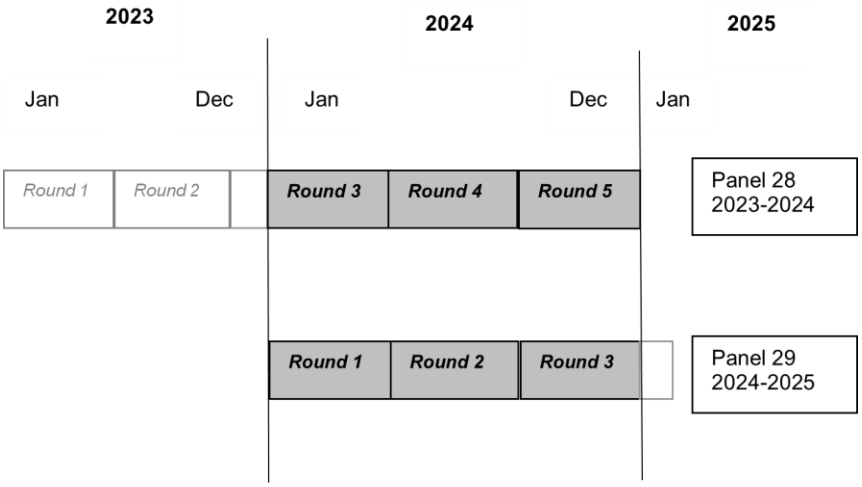
# C. Technical and Programming Information

## 1.0 General Information

This documentation describes one in a series of public use files (PUFs) from the 2024 MEPS HC and MPC. It was released as an ASCII file (with related SAS, SPSS, R, and Stata programming statements and data user information) and as a SAS dataset, SAS transport file, Stata dataset, and Excel file. The 2024 Home Health Visits PUF (hereafter referred to as the HHV PUF) provides detailed information on home health events for a nationally representative sample of the U.S. civilian noninstitutionalized population. Data from the HHV PUF can be used to estimate home health event utilization and expenditures for the calendar year 2024. The PUF contains 51 variables and has a logical record length of 205, with an additional 2-byte carriage return/line feed at the end of each record. This file consists of MEPS survey data obtained in (1) the 2024 portion of Round 3 and all of Rounds 4 and 5 for Panel 28, and (2) Rounds 1 and 2 and the 2024 portion of Round 3 for Panel 29 (i.e., the rounds for the MEPS panels covering the calendar year 2024), as illustrated in the following figure.

**Figure 1.**

***Portions of MEPS Panel 28 and Panel 29 Survey Data Included on the 2024 HHV PUF***




Counts of home health utilization are based entirely on household reports. Agency home health providers were sampled in the MEPS MPC (see Section B.2.0). Only those providers for whom the respondent signed a permission form were included in the MPC. Information from the MPC was used to supplement expenditure and payment data reported by the household and does not affect use estimates.

Data from this event PUF can be merged with other 2024 MEPS HC PUFs to append person-level data, such as demographic characteristics or health insurance coverage, to each home health record.

This PUF can also be used to construct summary variables for expenditures, sources of payment, and related aspects of home health events for the calendar year 2024. Aggregate annual person-level information on the use of home health providers and other health services is provided on the MEPS Full Year 2024 Consolidated Public Use File (hereafter referred to as the Consolidated PUF), where each record represents a MEPS sampled person.

This document offers a brief overview of the types and levels of data provided, and the content and structure of the PUF and the codebook. It contains the following sections:

- Data File Information (Section C.2.0)
- Survey Sample Information (Section C.3.0)
- Strategies for Estimation (Section C.4.0)
- Merging/Linking MEPS Data Files (Section C.5.0)
- Variable-Source Crosswalk (Appendix)

For more information on the MEPS HC sample design, see Chowdhury et al. (2019). For information on the MEPS MPC design, see RTI (2019). A copy of the survey instrument used to collect the information in this PUF is available on the MEPS website.

## 2.0 Data File Information

The 2024 HHV PUF consists of one event-level file, which contains characteristics associated with the home health event and imputed expenditure data.

Three kinds of home health providers offer the home health services represented on this PUF: formal (paid) home health agency providers, paid independent providers (self-employed), and informal providers who do not reside in the same household as the MEPS sampled person (care from informal providers who live in the same household as the sampled person are not represented on this file).

Each record on this PUF represents a household-reported home health event. A home health event represents 1 month of similar services provided to a sampled person by the same provider (i.e., an employer in the case of formal agency care and an individual in the case of paid independent and informal care providers). For example, if a person received 4 visits from a nurse, 10 visits from a homemaker, and 4 visits from a physical therapist each month during January, February, and March- all from Provider Agency A- and also received a physician visit in January and February from Provider B, there would be five event records on the file (*not* 56 records). One event record would represent all visits from Provider A in January, another record for Provider A in February, a third record for Provider A in March, a fourth record for the Provider B physician visit in January, and a fifth for the Provider B physician visit in February. Data were collected (and represented on this file) using this approach because agencies, hospitals, and nursing homes provide MEPS expenditure data in this manner. To be consistent

with the definition of a home health event on this file, this same definition (i.e., 1 month of similar services) was applied to all types of home health providers.

The 2024 HHV PUF contains 6,847 home health records; of these, 6,804 are associated with persons who have a positive person-level weight (PERWT24F). This PUF includes all records related to home health events for all household members who resided in eligible responding households and for whom at least one home health event was reported. Each record represents one household-reported home health event that occurred during the calendar year 2024. Some persons may have multiple reported events and thus will be represented in multiple records on this PUF. Conversely, other persons may have no home health events reported and thus will have no records on this PUF. These data were obtained from the MEPS HC in (1) the 2024 portion of Round 3 and all of Rounds 4 and 5 for Panel 28, and (2) Rounds 1 and 2 and the 2024 portion of Round 3 for Panel 29. The persons represented in this PUF had to meet either of the following criteria:

1. Be classified as a Key in-scope person who responded for their entire period of 2024 eligibility (i.e., persons with a positive 2024 full-year person-level weight, PERWT24F >0).

2. Be an eligible member of a family whose Key in-scope members have a positive person-level weight (PERWT24F >0). (Such a family consists of all persons with the same value for FAMIDYR.) That is, the person must have a positive full-year family-level weight (FAMWT24F >0). Note: FAMIDYR and FAMWT24F are variables on the Consolidated PUF.

Persons with no home health events for 2024 are not included on this event-level HHV PUF but are represented on the Consolidated PUF.

Home health providers include formal (i.e., paid) and informal (i.e., unpaid) providers. Formal providers include home health agencies and other paid independent providers. Informal providers include family and friends who reside outside of the sampled person's household.

For home health agencies, it is important to distinguish between a provider and a home healthcare worker. In these cases, the provider is the agency or the facility that employs the workers. The home healthcare workers are the people who administer care. Examples of home healthcare workers include nurses, physical therapists, home health aides, homemakers, and hospice workers, among others. Paid independent providers generally include companions, nursing assistants, physicians, and so forth. For each record on this file, respondents can report one or more types of workers. The respondent is asked to mention all types of home healthcare workers who provided home healthcare (because records represent 1 month of service, there can be more than one type of worker on a single record). For example, an agency that provides two types of aides that provide home health care to the same person during a specific month is represented as one event on the file, even though two workers employed at the same agency provided care. When using this file, analysts must keep in mind that a record on the file corresponds to a provider entity, not an individual worker.

Expenditure data for home health agency events are collected exclusively in the MPC. Expenditure data for other paid independent home health care events are collected from the household because these types of events are not included in the MPC. Friends, family, and volunteers providing home healthcare are considered unpaid and are not included in the MPC. No expenditure information is available for them.

Each home health record also includes the following: the month the provider visited the household; type of provider; types of services provided and whether this was a repeat event; whether care was received due to hospitalization; whether a person was taught how to use medical equipment; imputed sources of payment, total payment, and total charge for the home health event expenditure; and a full-year person-level weight.

To append person-level information, such as demographic characteristics or health insurance coverage, to each event record, data from this file can be merged with 2024 MEPS HC person-level data (e.g., Consolidated PUF) using the DUPERSID person identifier. Home health events can also be linked to HC 255: MEPS 2024 Medical Conditions PUF. Please see Section C.5.0 or HC 254I: Appendix to the MEPS 2024 Event Files (hereafter referred to as the Appendix PUF) for details on how to link MEPS data files.

## 2.1 Codebook Structure

For most variables on the HHV PUF, both weighted and unweighted frequencies are provided in the accompanying codebook. The exceptions to this are weight variables and variance estimation variables. Only unweighted frequencies of these variables are included in the accompanying codebook file. See the Weights Variables list in the appendix.

The codebook and data file list variables in the following order:

- Unique person identifier
- Unique home health event identifier
- Home health characteristic variables
- Imputed expenditure variables
- Weight and variance estimation variables

The person identifier corresponds to a unique person, and the home health event identifier corresponds to a unique event.

## 2.2 Reserved Codes

This HHV PUF contains several reserved code values (Table 1).

**Table 1**

***Reserved Code Values and Definitions***

| Value | Label | Definition |
|---|---|---|
| -1 | Inapplicable | Question was not asked due to skip pattern |
| -7 | Refused | Question was asked and respondent refused to answer question |
| -8 | Don't know | Question was asked and respondent did not know answer or the information could not be ascertained |
| -15 | Cannot be computed | Value cannot be derived from data |

The value Cannot be Computed (-15) is assigned to MEPS constructed variables in cases where there is not enough information from the MEPS instrument to calculate the constructed variables. "Not enough information" is often the result of skip patterns in the data or missing information stemming from the responses Refused (-7) or Don't Know (-8). Note that, in addition to Don't Know, reserved code -8 includes cases for which the information from the question was not ascertained.

Generally, values of -1, -7, -8, and -15 for non-expenditure variables have not been edited in this PUF. Analysts who would like to recode these values can find skip patterns in the HC survey questionnaire located on the MEPS website.

## 2.3 Codebook Format

The codebook describes an ASCII dataset (although the data are also provided in a SAS dataset, a SAS transport file, a Stata dataset, and an Excel file) and provides programming identifiers for each variable (Table 2).

**Table 2**

***Programming Identifiers for Each Variable on the HHV PUF***

| Identifier | Description |
|---|---|
| Name | Variable name |
| Description | Variable descriptor |
| Format | Number of bytes |
| Type | Type of data: numeric (indicated by NUM) or character (indicated by CHAR) |
| Start | Beginning column position of variable in record |
| End | Ending column position of variable in record |

## 2.4 Variable Source and Naming Conventions

In general, variable names reflect the variable's content. Generally, edited/imputed variables end with an "X".

As the collection, universe, or categories of variables were altered, some variable names have been appended with "_Myy", where "yy" indicates the collection year in which the alterations were made. Such alterations are described in detail throughout this document.

### 2.4.1 Variable-Source Crosswalk

Variables on this HHV PUF were derived from either the CAPI or MPC data collection instrument. The source of each variable is identified in the appendix in one of four ways:

1. Variables derived from CAPI or assigned in sampling are indicated as "CAPI derived" or "Assigned in sampling"

2. Variables from one or more specific questions have questionnaire sections and question numbers indicated in the Source column; questionnaire sections are identified as

    - EV - Event Roster section
    - HH - Home Health Event section
    - CP - Charge Payment section

3. Variables constructed from multiple questions by using complex algorithms are labeled "Constructed" in the Source column

4. Variables that have been edited or imputed are so indicated

### 2.4.2 Expenditure and Source of Payment Variables

The names of the expenditure and source of payment variables follow a standard convention, are seven characters in length, and end in an "X", indicating that they were edited/imputed. Note that imputed means that a series of logical edits, as well as an imputation process to account for missing data, were performed on the variable.

The total sum of payments and 10 sources of payment variables are named using the following approaches.

The first two characters indicate the type of event:

IP - inpatient stay

ER - emergency room visit

HH - home health visit

OM - other medical equipment

OB - office-based visit

OP - outpatient visit

DV - dental visit

RX - prescribed medicine

The third and fourth characters indicate the source of payment:

SF - self or family

MR - Medicare

MD - Medicaid

PV - private insurance

VA - Veterans Administration/CHAMPVA

OF - other federal government

SL - state/local government

WC - workers' compensation

OT - other insurance

TR - TRICARE

XP - sum of payments

In addition, the total charge variable is indicated by "TC" in the variable name.

The fifth and sixth characters (24) indicate the year. The seventh character, "X," indicates the variable was edited/imputed.

For example, HHSF24X is the edited/imputed amount paid by self or family for 2024 home health expenditures.

## 2.5 File Contents

### 2.5.1 Survey Administration Variables

#### *Person Identifiers (DUID, PID, DUPERSID)*

The definitions of dwelling units (DUs) in the MEPS Household Survey are generally consistent with the definitions employed used in NHIS. The dwelling unit identifier (DUID) is a seven-digit number consisting of a two-digit panel number followed by a five-digit random number assigned after the case was sampled for MEPS. A three-digit person number (PID) uniquely identifies each person within the DU. The variable DUPERSID is the combination of the variables DUID and PID. Identifiers begin with the two-digit panel number.

For detailed information on DUs and families, please refer to the documentation for the Consolidated PUF.

#### *Record Identifier (EVNTIDX)*

EVNTIDX uniquely identifies each event (i.e., each record on this PUF) and is the variable required to link home health events to data files containing details on conditions (MEPS 2024 Medical Conditions PUF). EVNTIDX begins with the two-digit panel number and ends with the two-digit event type number. For details on linking see Section C.5.0 or the Appendix PUF.

#### *Round Indicator (EVENTRN)*

EVENTRN indicates the round in which the home health event was reported. Please note: Rounds 3 (partial), 4, and 5 are associated with data collected from Panel 28; Rounds 1, 2, and 3 (partial) are associated with data collected from Panel 29.

#### *Panel Indicator (PANEL)*

PANEL is a constructed variable used to specify the panel number for the person. PANEL will indicate either Panel 28 or Panel 29 for each person on the PUF. Panel 28 started in 2023, and Panel 29 started in 2024.

### 2.5.2 Home Health Event Variables

This PUF contains variables describing home health events reported by household respondents in the Home Health section of the MEPS HC survey questionnaire.

#### *Date of Event (HHDATEYR, HHDATEMM)*

The date variables (HHDATEYR and HHDATEMM) indicate the year and month that the household respondent reported as the year and month of occurrence for this type of home health event. An artifact of data collection for the variable HHDATEYR is that a person may have started receiving that type of home healthcare from that provider before 2024. These variables should not be interpreted as "true" start dates.

#### *Characteristics of Event (MPCELIG-HCarWrkrNonProfNone_M18)*

The MEPS HC questionnaire asked the respondent to indicate whether the home health provider event(s) for each month's services were provided through an agency or a paid independent provider (SELFAGEN). The response to the SELFAGEN question dictated the skip pattern that CAPI followed regarding the questions in the home health section of the MEPS HC questionnaire. The questionnaire also asked respondents whether the provider was paid or whether a friend, relative, or volunteer (HHTYPE) provided the home health services. The constructed variable MPCELIG indicates whether the home health provider event was eligible for MPC data collection and describes the type of imputation process the event underwent. MPCELIG is a more accurate variable for determining whether the event was an agency, a paid independent, or an informal care event. However, SELFAGEN is a more accurate variable for

determining the home health questions asked of the respondent. For all members receiving care from an agency, hospital, or nursing home, the respondent was asked to identify the type of skilled home healthcare worker (CNA_M18- HCarWrkrProfNone_M18) and the type of non-skilled home healthcare worker (COMPANN_M18-HCarWrkrNonProfNone_M18) they saw - for example, a certified nursing assistant as the skilled worker and a home health aide as the non-skilled worker.

Analysts should keep in mind that these identifications by household respondents are subjective, are not mutually exclusive or collectively exhaustive, and should not be used to make certain estimates. For example, a person with one type of insurance coverage may identify an individual providing home healthcare services to them as a personal care attendant, whereas an individual with a different type of insurance coverage may identify that same worker as a home care aide. Making estimates for personal care attendants or home care aides based on their identification by household respondents and treating these types of workers as mutually exclusive groups will result in inaccurate estimates. Respondents may also have indicated that a person was seen by more than one home health care worker during a single event. For example, because an event is 1 month of services, a respondent may have reported that a person was seen by a nurse, a physical therapist, and/or a home health aide during a single event.

#### *Frequency of Event and Visit Details (FREQCY-VSTRELCN)*

Several variables identify the frequency and length of home health events (FREQCY-DAYSPMO) and whether the same services were received during each month (SAMESVCE). Frequency-of-event variables (FREQCY- DAYSPMO) were used as building blocks to construct the variable HHDAYS. HHDAYS indicates the number of days the person received care during that event (i.e., month of care). Frequency variables can be combined to obtain a measure of the intensity of care. Regardless of provider type, all respondents were asked whether the home health services received were due to a medical condition (VSTRELCN).

### 2.5.3 Flat Fee Variables

A flat fee is the fixed dollar amount a person is charged for a package of healthcare services provided during a defined period. Because MEPS does not collect flat fee information about home health events, no flat fee variables are included on this file.

### 2.5.4 Condition Codes

Information on household-reported medical conditions associated with each home health event is NOT provided on this PUF. To obtain complete condition information associated with an event, the analyst must link to the 2024 Medical Conditions PUF. The 2024 Appendix PUF provides details on how to link to the 2024 Medical Conditions PUF.

### 2.5.5 Expenditure Data

#### *Definition of Expenditures*

Expenditures on this PUF refer to payments for healthcare services. More specifically, expenditures in MEPS are defined as the sum of payments for care received, including out-of-pocket payments and payments made by private insurance, Medicaid, Medicare, and other sources. The definition of expenditures used in MEPS differs from its predecessors, the 1987 National Medical Expenditure Survey (NMES) and 1977 National Medical Care Expenditure Survey (NMCES), where "charges" rather than the sum of payments were used to measure expenditures. This change was adopted because charges became a less appropriate proxy for medical expenditures during the 1990s as a result of the increasingly common practice of discounting. Although measuring expenditures as the sum of payments incorporates discounts in the MEPS expenditure estimates, these estimates do not incorporate any payment not directly tied to specific medical care events, such as bonuses or retrospective payment adjustments paid by third-party payers. Currently, charges associated with uncollected liability, bad debt, and charitable care (unless provided by a public clinic or hospital) are not counted as expenditures because there are no associated payments.

Although charge data are provided in this PUF, analysts should use caution when working with these data because a charge does not typically represent actual dollars exchanged for services or the resource costs of those services, nor are the charge data directly comparable to the expenditures defined in the 1987 NMES. For details on expenditure definitions, see Monheit et al. (1999). AHRQ has developed factors to apply to the 1987 NMES expenditure data to facilitate longitudinal analysis. These factors are published in Zuvekas and Cohen (2002); they can also be accessed via the Center for Financing, Access and Cost Trends data center. For more information, see the Data Center section of the MEPS website. If examining trends in MEPS expenditures, please refer to Section C.3.5 for more information.

#### *Data Editing and Imputation Methodologies of Expenditure Variables*

The general methodology used for editing and imputing expenditure data is described in this section. Please note that the MPC included home health events provided by an agency and did not include home health care provided by paid independent providers. Although the general procedures remain the same for all home health events, there are some differences in the editing and imputation methodologies applied to events followed in the MPC and events not followed in the MPC. Of note, home health care provided by friends, family, or volunteers was assumed to be free and was not included in any imputation process. Please see the following for the differences between these editing/imputation methodologies.

Home health expenditure data for agency, hospital, and nursing home providers were collected exclusively from the MPC (i.e., household respondents were not asked to report home health expenditures from these types of providers). The MPC attempted to contact 100 percent of the agency, hospital, and nursing home health providers for whom household respondents provided consent to contact. Because paid independent home health providers were not included in the MPC, all expenditure data from these providers were collected from household respondents.

## General Data Editing Methodology

Logical edits were used to resolve internal inconsistencies and other problems in the HC and MPC data. The edits were designed to (1) preserve partial payment data from households and providers and (2) identify actual and potential sources of payment for each household-reported event. In general, these edits accounted for outliers, co-payments or charges reported as total payments, as well as reimbursed amounts that were reported as out-of-pocket payments. In addition, edits were implemented to correct for payment source misclassifications between Medicare and Medicaid and between Medicare health maintenance organizations (HMOs) and private HMOs. These edits produced a complete vector of expenditures for some events and provided the starting point for imputing missing expenditures for the remaining events.

## Imputation Methodologies

The predictive mean matching imputation method was used to impute missing expenditures. This procedure uses regression models (based on events with completely reported expenditure data) to predict total expenses for each event. Then, for each event with missing payment information, a donor event with the closest predicted payment with the same pattern of expected payment sources was used to impute the missing payment value.

A weighted sequential hot-deck procedure was used to impute the missing total charges. This procedure uses survey data from donors to replace missing data while considering the donors' weighted distribution in the imputation process, ensuring that the weighted distribution of recipients' expenditures reflects the weighted distribution of the donors' expenditures.

## Home Health Data Editing and Imputation

Expenditures for home health events were developed in a sequence of logical edits and imputations. (Analysts should note that home health care provided by friends, family, or volunteers was assumed not to have associated expenditures and was not included in any imputation process. All expenditures for home health care provided by informal care providers were assigned Inapplicable [-1] because those types of events were excluded from questions [i.e., never asked] regarding expenditures.) Household edits were applied to sources and amounts of payment for all household-reported events for paid independent providers and unmatched agency providers. MPC edits were applied to provider-reported sources and amounts of payment for records matched to household-reported events for all agency home health providers. Both sets of edits were used to correct obvious errors in expenditures reporting.

Imputations for paid independent providers and agencies were conducted separately. Logical edits were used to sort each event into a specific category for the imputations. Events with complete expenditures were flagged as potential donors, and events with missing expenditure data were assigned to various recipient categories based on the extent of their missing charge and expenditure data. For example, an event with a known total charge but no expenditure information was assigned to one category, whereas an event with a known total charge and partial expenditure information was assigned to a different category. Similarly, events without a known total charge and no or partial expenditure information were assigned to separate recipient categories.

Expenditures were imputed using a predictive mean matching method. The donor pool in these imputations includes events with complete expenditures from the HC for paid independent

providers (HHP) and restricted to the MPC for agency providers (HHA). As stated previously, home healthcare provided by friends, family, or volunteers (informal; MPCELIG = 3) was assumed to not have associated expenditures with it and was not included in any imputation process.

### *Imputation Flag Variable (IMPFLAG)*

IMPFLAG is a six-category variable that indicates whether the event contains complete HC or MPC data, was fully or partially imputed, or was imputed in the capitated imputation process (for OP and OB events only). The following list identifies how the imputation flag is coded; the categories are mutually exclusive.

IMPFLAG = 0; not eligible for imputation (includes zeroed-out events)

IMPFLAG = 1; complete HC data

IMPFLAG = 2; complete MPC data

IMPFLAG = 3; fully imputed

IMPFLAG = 4; partially imputed

IMPFLAG = 5; complete MPC data through capitation imputation (not applicable to home health)

### *Flat Fee Expenditures*

A flat fee is the fixed dollar amount a person is charged for a package of healthcare services provided during a defined period. Because MEPS does not collect flat fee information about home health events, there are no flat fee expenditure data included in this PUF.

### *Zero Expenditures*

Some respondents reported medical events for which the payments were zero. This could occur for several reasons including if (1) free care was provided, (2) bad debt was incurred, (3) follow-up events were provided without a separate charge (e.g., after a surgical procedure), or (4) the event was paid for through government or privately funded research or through clinical trials. If all medical events for a person fell into one of these categories, then the total annual expenditures for that person would be zero. All expenditures for home health care provided by informal care providers (family, friends, or volunteers; MPCELIG = 3) were assigned Inapplicable (-1) because these types of events were excluded from questions (i.e., never asked) regarding expenditures.

### *Sources of Payment*

In addition to total expenditures, variables are provided that itemize expenditures according to the following major source of payment categories:

1. Out-of-pocket by user (self or family) - includes any deductible, coinsurance, and copayment amounts not covered by other sources, as well as payments for services and providers not covered by the person's insurance or other sources
2. Medicare
3. Medicaid
4. Private insurance
5. Veterans Administration/CHAMPVA, excluding TRICARE
6. TRICARE
7. Other federal sources - includes Indian Health Service, military treatment facilities, and other care by the federal government
8. Other state and local sources - includes community and neighborhood clinics, state and local health departments, and state programs other than Medicaid
9. Workers' compensation,
10. Other unclassified sources - includes sources such as automobile, homeowner's, and liability insurance, and other miscellaneous or unknown sources

### *Home Health Expenditure Variables (HHSF24X to HHXP24X)*

Home health agency, hospital, and nursing home events are sampled at a rate of 100 percent for the MPC. Households were not asked any expenditure-related questions regarding these types of events; therefore, there are no household-reported expenditure data for these events. Conversely, paid independent providers are not included in the MPC. Household-reported responses are the only data available for these types of events. All expenditure data for paid independent providers are fully imputed from household-reported expenditures. There are no expenditure data for informal care providers. Informal care (unpaid care provided by family, friends, or volunteers; MPCELIG = 3) was assigned Inapplicable (-1) in all expenditure categories.

The constructed variable MPCELIG is provided on this file. MPCELIG indicates whether the home health provider event was eligible for MPC data collection and determines the imputation process applied to that event.

All of these expenditures have undergone an editing and imputation process and have been rounded to the nearest penny. HHSF24X to HHOT24X are the 10 sources of payment. HHXP24X is the sum of the 10 sources of payment for the home health expenditures, and

HHTC24X is the total charge. The 10 sources of payment are: self/family (HHSF24X), Medicare (HHMR24X), Medicaid (HHMD24X), private insurance (HHPV24X), Veterans Healthcare Administration/CHAMPVA (HHVA24X), TRICARE (HHTR24X), other federal sources (HHOF24X), state and local (non-federal) government sources (HHSL24X), workers' compensation (HHWC24X), and other insurance (HHOT24X). Analysts can determine whether a home health event was provided by an agency or other paid independent provider by subsetting the variable MPCELIG to the appropriate and desired value.

#### *Rounding*

Expenditure variables on the 2024 HHV PUF have been rounded to the nearest penny. Person-level expenditure information to be released on the Consolidated PUF will be rounded to the nearest dollar. It should be noted that using the 2024 MEPS event PUFs to create person-level totals will yield slightly different totals from those on the Consolidated PUF. These differences are due to rounding only. Moreover, in some instances, the number of persons with expenditures in the event PUFs for a particular source of payment may differ from the number of persons with expenditures on the person-level expenditure PUF for that source of payment. This difference is also an artifact of rounding only.

# 3.0 Survey Sample Information

## 3.1 Discussion of Pandemic Effects on Quality of MEPS Data

Like most surveys, MEPS has been substantially affected by the COVID-19 pandemic. One effect of the pandemic is significantly lower response rates (see Section C3.2 in the Consolidated PUF), which might differentially exclude households more likely to experience IP stays. The demographic shifts on MEPS between 2019 and 2022 suggest a more educated, higher-income, older MEPS sample. (For more details, see Section C3.1 of the 2020 Consolidated PUF, Section C3.1 of the 2021 Consolidated PUF, and Section C3.1.2 of the 2022 Consolidated PUF.) MEPS sample design modifications due to the COVID-19 pandemic reverted in 2022. Thus, concerns about potential bias due to these modifications no longer apply to data collected in this PUF.

To examine the quality of the MEPS FY 2024 data, analyses compared healthcare utilization and health insurance coverage for the MEPS target population between the panels fielded. These comparisons were undertaken for the full sample and three age groups: 0-17, 18-64, and 65 or older. Analysts found no abnormal differences between the two panels. Analyses across years also suggest a rebound to pre-pandemic utilization levels for most essential event types.

The development of the person-level weights for the MEPS FY 2024 data was designed to limit the potential for response bias. However, analysts of the MEPS FY 2024 data should continue to exercise caution when interpreting estimates and assessing analyses, especially for data collected from 2020 through 2022. This includes comparing estimates with those of other years and conducting corresponding trend analyses.

## 3.2 Sample Weight (PERWT24F)

A single full-year person-level weight (PERWT24F) is assigned to each record for each Key in-scope person who responded to MEPS for the entire duration that they were in scope during 2024. A Key person was either a member of a responding NHIS household at the time of the interview or joined a family associated with such a household after being out of scope at the time of NHIS (the latter circumstance includes newborns and those returning from military service, an institution, or residence in a foreign country). A person is in scope whenever they are a member of the U.S. civilian noninstitutionalized population.

## 3.3 Details on Person Weight Construction

The person-level weight PERWT24F was developed in several stages. First, a person-level weight for Panel 28 was created, including an adjustment for nonresponse over time and raking. Raking involved adjusting to several sets of marginal control totals reflecting Current Population Survey (CPS) population estimates based on six variables. The six variables used to establish the initial person-level control figures include the following:

- Educational attainment of the reference person (no degree, high school/GED only or some college, bachelor's or a higher degree)
- Census region (Northeast, Midwest, South, West)
- Metropolitan statistical area (MSA) status (MSA, non-MSA) (Note: For confidentiality reasons, the MSA status variables are no longer released for public use)
- Race/ethnicity (Hispanic; Black, non-Hispanic; Asian, non-Hispanic; other)
- Sex (male, female)
- Age (0-18, 19-25, 26-34, 35-44, 45-64, 65 or older)

The person-level weight for Panel 29 was created similarly. A composite weight was formed by multiplying each weight from Panel 28 by the factor 0.44 and each weight from Panel 29 by the factor 0.56. The choice of factors reflects the relative effective sample sizes of the two panels, helping to limit the variance of estimates obtained from pooling both samples.

Weights for the 2024 Consolidated PUF were then developed by raking the composite weight to CPS-based control totals, replacing educational attainment with poverty status while retaining the other five raking variables previously indicated. Specifically, control totals based on CPS estimates of poverty status (five categories: below poverty, from 100% - 125% of poverty, from 125% - 200% of poverty, from 200% - 400% of poverty, at least 400% of poverty) in addition to age, race/ethnicity, sex, region, and MSA status are used to calibrate weights.

### 3.3.1 MEPS Panel 28 Weight Development Process

The person-level weight for Panel 28 was developed using the 2023 full-year weight as a "base" weight for survey participants present in 2024.

For key in-scope members who joined a reporting unit (RU) at some time in 2024 after being out of scope in 2023, the initially assigned person-level weight was the corresponding 2023 family weight. The weighting process also included an adjustment for person-level nonresponse over Rounds 4 and 5, as well as raking to the population control figures for December 2024 for Key responding persons in scope on December 31, 2024. These control totals were derived by scaling back the population distribution obtained from the March 2025 CPS to reflect the December 31, 2024, estimated population total (based on census projections for January 1, 2025). The six variables listed in Section C.3.3 were also used for person-level raking: education of the reference person , census region, MSA status, race/ethnicity, sex, and age. The final weight for Key responding persons who were not in scope on December 31, 2024, but were in scope earlier in the year was the nonresponse-adjusted person weight without raking.

Note that the 2023 full-year weight that was used as the base weight for Panel 28 was derived using the 2023 MEPS Round 1 weight and reflected adjustment for nonresponse over the remaining data collection rounds in 2023, as well as raking to the December 2023 population control figures.

### 3.3.2 MEPS Panel 29 Weight Development Process

The person-level weight for Panel 29 was developed using the 2024 Round 1 person-level weight as a base weight. The Round 1 weights incorporated the following components: the original household probability of selection for NHIS and for the NHIS subsample reserved for MEPS, an adjustment for NHIS nonresponse, the probability of selection for MEPS from NHIS, an adjustment for nonresponse at the DU level for Round 1, and raking to control figures at the person level from the March CPS of the corresponding year. For Key in-scope members who joined an RU after Round 1, the Round 1 DU weight served as a base weight.

The weighting process also included an adjustment for nonresponse over the remaining data collection rounds in 2024, as well as raking to the same population control figures for December 2024 that were used for the Panel 28 weight for Key responding persons in scope on December 31, 2024. The same six variables used for Panel 28 raking (education level of the reference person, census region, MSA status, race/ethnicity, sex, and age) were also used for Panel 29 raking. Similar to Panel 28, the Panel 29 final weight for Key responding persons who were not in scope on December 31, 2024, but were in scope earlier in the year was the nonresponse-adjusted person weight without raking.

### 3.3.3 The Final Weight for 2024

The final raking of those in scope at the end of the year has been described previously. In addition, the composite weights of two groups of persons who were out of scope on December 31, 2024, were adjusted for expected undercoverage. Specifically, the weights of

those who were out of scope on December 31, 2024, but in scope at some time during the year and were residing in a nursing home at the end of the year were poststratified to an estimate of the number of persons who were residents of Medicare- and Medicaid-certified nursing homes for part of the year (approximately 3-9 months) during 2014. This estimate was developed from data on the Minimum Data Set (MDS) of the Centers for Medicare & Medicaid Services (CMS). The weights of persons who died while in scope were poststratified to corresponding estimates derived using data from the Centers for Disease Control and Prevention (CDC), NCHS, and About Provisional Mortality Statistics, 2018 through Last Week on the CDC WONDER online database (released in 2025, the latest available data at the time). Separate decedent control totals were developed for the "65 or older" and "under 65" civilian noninstitutionalized populations.

Overall, the weighted population estimate for the civilian noninstitutionalized population for December 31, 2024, is 336,022,966 (PERWT24F >0 and INSC1231 = 1). The sum of person-level weights across all persons assigned a positive person-level weight is 339,797,629.

## 3.4 Coverage

The target population associated with MEPS is the 2024 U.S. civilian noninstitutionalized population. However, the MEPS sampled households are a subsample of the NHIS households interviewed in 2022 (Panel 28) and 2023 (Panel 29). New households created after the NHIS interviews for the respective panels and consisting exclusively of persons who entered the target population after 2022 (Panel 28) or after 2023 (Panel 29) are not covered by the 2024 MEPS. Nor are previously out-of-scope persons who joined an existing household but are not related to the current household residents. Thus, persons not covered by a given MEPS panel include some members of the following groups: newborns, immigrants, persons leaving the military, U.S. citizens returning from residence in another country, and persons leaving institutions. Those not covered represent a small proportion of the MEPS target population.

## 3.5 Using MEPS Data for Trend Analysis

For analysts using the MEPS data for trend analysis, there are uncertainties associated with 2020, 2021, and 2022 data quality, as discussed in Section C.3.1. Evaluations of important MEPS estimates suggest that the estimates are of reasonable quality. Nevertheless, analysts are advised to exercise caution when interpreting these estimates, particularly for trend analyses, because the pandemic substantially affected healthcare access and related factors (e.g., health insurance coverage, employment status).

MEPS began in 1996, and the utility of the survey for analyzing healthcare trends expands with each additional year of data; however, when examining trends over time using MEPS, the duration being analyzed should be considered. In particular, large shifts in survey estimates over short periods (e.g., from one year to the next) that are statistically significant should be interpreted with caution, unless they are attributable to known factors such as changes in public policy, economic conditions, or the MEPS methodology.

With respect to methodological considerations, changes in data collection methods, such as interviewer training, were introduced in 2013 to obtain more complete information about healthcare utilization from MEPS respondents; the changes were fully implemented in 2014. This effort likely improved data quality and reduced underreporting starting in the second half of 2013 and continuing throughout the 2014 full-year files. The changes have also affected analyses involving utilization trends across years. Changes in the NHIS sample design in 2016 and 2018 could also affect trend analyses. The new NHIS sample design is based on more up-to-date information related to the distribution of housing units across the United States. As a result, it can be expected to better cover the full civilian noninstitutionalized population - the target population for MEPS - and many of its subpopulations. Improved coverage of the target population helps to reduce the potential for bias in both NHIS and MEPS estimates.

Another change with the potential to affect trend analyses involves major modifications to the MEPS instrument design and data collection process, particularly in the events sections of the instrument. These were introduced in spring 2018 and thus affected data beginning with Round 1 of Panel 23, Round 3 of Panel 22, and Round 5 of Panel 21. Because the full-year 2017 MEPS files were established from data collected in Rounds 1-3 of Panel 22 and Rounds 3-5 of Panel 21, they reflect two instrument designs. To mitigate the effect of such differences within the same full-year file, the Panel 22 Round 3 data and the Panel 21 Round 5 data were transformed to be as consistent as possible with data collected under the previous design. The changes to the instrument were designed to make data collection more efficient and easier to administer. In addition, data on some items, such as those related to healthcare events, were expected to be more complete, with the potential of identifying more events. Increases in service use reported since the implementation of these changes are consistent with these expectations. Note: Analysts should be aware of the possible impacts of these changes on data, especially trend analyses, that include the year 2018 because of the design transition.

Process changes, such as data editing and imputation, may also affect trend analyses. For example, analysts should refer to Section C2.5.11: Utilization, Expenditures, and Sources of Payment Variables in the Consolidated PUF (HC 256). For more details, refer to the documentation for the prescription drug file (HC 254A) when analyzing prescription drug spending over time. As always, before conducting trend analyses, analysts should review relevant documentation sections for descriptions of changes that might affect interpretation over time.

To smooth or stabilize trend analyses based on the MEPS data, analysts may also wish to consider statistical approaches such as comparing pooled time periods (e.g., 1996-1997 vs. 2011-2012), working with moving averages, or using modeling techniques with several consecutive years of data.

Finally, statistical significance tests should be conducted to assess the likelihood that observed trends are not attributable to sampling variation. In addition, researchers should be aware of the impact of multiple comparisons on Type I error. Without making appropriate allowance for multiple comparisons, conducting numerous statistical significance tests of trends will increase the likelihood of concluding that a change has occurred when one has not.

# 4.0 Strategies for Estimation

## 4.1 Developing Event-Level Estimates

The data on this PUF can be used to develop national 2024 event-level (i.e., monthly) estimates for the U.S. civilian noninstitutionalized population on expenditures and sources of payment for home health care medical provider visits. The weight assigned to each home health care medical provider event reported is the person-level weight of the person who was visited. If a person had several events reported, each event is assigned that individual's person-level weight. Estimates must be weighted by PERWT24F to be nationally representative. For example, the appropriate estimate for the overall mean out-of-pocket payment per month of care is computed as follows (the subscript "j" identifies each event and represents a numbering of events from 1 through the total number of events in the file):

$(\sum W_j X_j)/(\sum W_j)$, where

$W_j$ = PERWT24F$_j$ (full-year person weight for the person associated with event j) and

$X_j$ = HHSF24X$_j$ (amount paid by self/family for event j).

Estimates and corresponding standard errors (SEs) can be derived using an appropriate computer software package for complex survey analysis such as SAS, Stata, SUDAAN, R, or SPSS.

The following tables contain the event-level estimates for several key variables on this file. Informal care (MPCELIG = 3) is not included in the tables because, by definition, there are no payments for those events and, therefore, no expenditure data are collected.

**Table 3**

***Selected Event-Level Estimates - Expenditures: Home Health Agency & Paid Independents (MPCELIG = 1, 2)***

| Estimate of interest | Variable name | Estimate (SE) | Estimate excluding zero payment events (SE) |
|---|---|---|---|
| Proportion of events with expenditures > 0[a] | HHXP24X | 0.987 (0.0031) | _____ |
| Mean total payments per month of care | HHXP24X | $2,079 (180.6000) | $2,107 (183.000) |
| Mean out-of-pocket payments per month of care | HHSF24X | $85 (22.2000) | $87 (22.5000) |
| Mean proportion of total monthly expenditures paid out of pocket | HHSF24X/ HHXP24X | _____ | 0.113 (0.0155) |

[a] Zero payment events can occur in MEPS for the following reasons: (1) there was no charge for a follow-up event, (2) the provider was never paid by an individual, insurance plan, or other source for services provided, (3) the charges were

included in another bill, or (4) the event was paid for through government or privately funded research or through clinical trials.

**Table 4**

***Selected Event-Level Estimates - Expenditures: Home Health Agency Providers only (MPCELIG = 1)***

| Estimate of interest | Variable name | Estimate (SE) | Estimate excluding zero payment events (SE) |
|---|---|---|---|
| Proportion of events with expenditures > 0[a] | HHXP24X | 0.984 (0.0037) | _____ |
| Mean total payments per month of care | HHXP24X | $2,315 (205.7000) | $2,352 (208.7000) |
| Mean out-of-pocket payments per month of care | HHSF24X | $29 (12.3000) | $30 (12.6000) |
| Mean proportion of total monthly expenditures paid out of pocket | HHSF24X/ HHXP24X | _____ | 0.016 (0.0048) |

[a] Zero payment events can occur in MEPS for the following reasons: (1) there was no charge for a follow-up event, (2) the provider was never paid by an individual, insurance plan, or other source for services provided, (3) the charges were included in another bill, or (4) the event was paid for through government or privately funded research or through clinical trials.

**Table 5**

***Selected Event-Level Estimates - Expenditures: Paid Independent Providers only (MPCELIG = 2)***

| Estimate of interest | Variable name | Estimate (SE) | Estimate excluding zero payment events (SE) |
|---|---|---|---|
| Proportion of events with expenditures > 0[a] | HHXP24X | 1.000 (0.0002) | _____ |
| Mean total payments per month of care | HHXP24X | $721 (179.6000) | $721 (179.7000) |
| Mean out-of-pocket payments per month of care | HHSF24X | $409 (120.4000) | $409 (120.4000) |
| Mean proportion of total monthly expenditures paid out of pocket | HHSF24X/ HHXP24X | _____ | 0.661 (0.640) |

[a] Zero payment events can occur in MEPS for the following reasons: (1) there was no charge for a follow-up event, (2) the provider was never paid by an individual, insurance plan, or other source for services provided, (3) the charges were included in another bill, or (4) the event was paid for through government or privately-funded research or clinical trials.

## 4.2 Person-Based Estimates for Home Healthcare

To enhance analyses of home health care, analysts may link information about the home health care received by sampled persons on this file to the Consolidated PUF (which has data for all MEPS sample persons) or, conversely, link person-level information from the Consolidated PUF to this event-level file. Both this file and the Consolidated PUF may be used to derive estimates relative to persons with home healthcare and annual estimates of total expenditures. However, for estimates pertaining to those who did not receive home healthcare as well as those who did (e.g., the percentage of adults with at least 1 month in which home healthcare was provided during the past year or the mean number of home healthcare visits in the past year among those ages 65 or older), this file cannot be used. Only persons with at least 1 month in which home healthcare was provided are represented on this data file. The Consolidated PUF must be used for person-level analyses that include both those with and without home healthcare.

## 4.3 Variables With Missing Values

Analysts must examine all variables for the presence of negative values used to represent missing values. For continuous or discrete variables, where means or totals may be calculated, it may be necessary to set negative values to values appropriate to analytic needs. That is, analysts should either impute a value or set it to a value that the software package will interpret as missing. For categorical and dichotomous variables, analysts can consider whether to recode or impute a value for cases with negative values or whether to include or exclude such cases in the numerator, denominator, or both when calculating proportions.

Section C.2.5.5 describes the methodologies used for the editing/imputation of expenditure variables (e.g., sources of payment, zero expenditures).

## 4.4 Variance Estimation (VARSTR, VARPSU)

To obtain estimates of variability in MEPS estimates (e.g., the standard error of sample estimates or corresponding confidence intervals), analysts should consider MEPS's complex sample design for both person-level and family-level analyses. Several methods have been developed to estimate standard errors for surveys with complex sample designs, including the Taylor series linearization method, balanced repeated replication (BRR), and jackknife replication; various software packages can implement these methods. MEPS analysts most commonly use the Taylor series approach. Although this PUF does not contain replicate weights, analysts can use the BRR method to construct replicate weights to develop variances for more complex estimators (see Section C.4.3.2).

### 4.4.1 Taylor Series Linearization Method

The variables needed to calculate appropriate standard errors based on the Taylor series linearization method are included on this file as well as all other MEPS PUFs. Software packages that support the Taylor series linearization method include SUDAAN, R, Stata, SAS (version 8.2

or higher), and SPSS (version 12.0 or higher). For complete information on a package's capabilities, analysts should refer to the software's user documentation.

With the Taylor series linearization method, variance estimation strata and the variance estimation primary sampling units (PSUs) within these strata must be specified. The variables VARSTR and VARPSU on this HHV PUF identify the sampling strata and PSUs required by the variance estimation programs. Specifying a "with replacement" design in one of the previously mentioned software packages will provide estimated standard errors appropriate for assessing the variability of MEPS estimates. Note that the number of degrees of freedom associated with estimates of variability indicated by a package may not appropriately reflect the number available. For variables of interest distributed throughout the country (and thus across the MEPS sample PSUs), one can generally expect to see at least 100 degrees of freedom associated with the estimated standard errors for national estimates based on this MEPS database.

Before 2002, the MEPS variance strata and PSUs were developed independently from year to year, and the last two characters of the strata and PSU variable names denoted the year. Beginning with the 2002 point-in-time PUF, the approach changed with the intention that variance strata and PSUs would be developed to be compatible with all future PUFs until the NHIS design changed. Thus, when pooling data from 2002 through Panel 11 in the 2007 files, analysts can use the variance strata and PSU variables provided without modifying them for variance estimation purposes for estimates covering multiple years of data. There are 203 variance estimation strata; each stratum has either two or three variance estimation PSUs.

Beginning with Panel 12 in the 2007 files, a new set of variance strata and PSUs was developed because of the introduction of a new NHIS design. There are 165 variance strata with either two or three variance estimation PSUs per stratum. Therefore, there are a total of 368 (203 + 165) variance strata in the 2007 Consolidated PUF because it consists of two panels selected under two independent NHIS sample designs. Because both MEPS panels in the full-year files from 2008 to 2016 are based on the same NHIS design, there are only 165 variance strata. These strata (VARSTR values) have been numbered from 1001 to 1165 so they can be readily distinguished from those developed under the former NHIS sample design when pooling data across multiple years.

The NHIS sample design was changed again in 2016, effectively changing the MEPS design beginning with calendar year 2017. Beginning with Panel 22 in the 2017 files, a new set of variance strata and PSUs was developed. There are 117 variance strata with either two or three variance estimation PSUs per stratum. Therefore, there are a total of 282 (165 + 117) variance strata in the 2017 Consolidated PUF because it consists of two panels selected under two independent NHIS sample designs. To simplify data pooling across multiple years of the MEPS, the variance strata numbering system was changed. The strata associated with the new design are numbered from 2001 to 2117.

The NHIS sample design was further modified in 2018, so the MEPS variance structure for the 2019 Consolidated PUF was also modified, reducing the number of variance strata to 105. The new variance structure maintained consistency with the prior structure by assigning the 2019 variance strata to values within the same 2001 to 2117 range, though there are now some gaps in

the sequence of assigned values. Because of the modification, each stratum could contain up to five variance estimation PSUs.

For Panel 26 in the 2021 and 2022 Consolidated PUFs, an additional NHIS sample was used for MEPS to account for increasing nonresponse during the pandemic (as discussed in Section C.3.1). The additional sample was assigned to the existing variance strata, so the 2021 and 2022 Consolidated PUFs continued to have 105 variance strata, numbered 2001 to 2117, with a few gaps in the values in that range. In many cases, the additional sample was assigned to new variance estimation PSUs. Thus, in the 2021 and 2022 Population Characteristics PUFs, each stratum contained up to eight variance estimation PSUs.

Additional NHIS samples were no longer needed beginning in 2023, leading to fewer variance estimation PSUs than in the 2021 and 2022 Population Characteristics PUFs. The Consolidated PUF continues to have 105 variance strata, numbered from 2001 to 2117, with a few gaps in the values in that range. Each stratum contains up to seven variance estimation PSUs.

When pooling data across multiple years of MEPS data, analysts should note that, to obtain appropriate standard errors, it is necessary to specify a common variance structure. Before 2002, each annual PUF was released with a variance structure unique to the particular MEPS sample in that year. Starting in 2002, the annual PUFs were released with a common variance structure to allow analysts to pool data from 2002 to 2018. However, analysts can no longer do this routinely because the variance structure was modified beginning in 2019.

To ensure that variance strata are identified appropriately for variance estimation purposes when pooling MEPS data across several years, analysts should proceed as follows:

1. When pooling any year from 2002 to 2018, use the variance strata numbering as is.

2. When pooling (a) any year from 1996 to 2001 with any year from 2002 or later, or (b) the year 2019 and beyond with any earlier year, use the pooled linkage PUF HC-036, which contains the proper variance structure. The HC-036 PUF is updated every year so that appropriate variance structures are available with pooled data. Further details are included in the public use documentation for the HC-036 PUF.

### 4.4.2 Balanced Repeated Replication Method

BRR replicate weights are not provided on this MEPS HHV PUF for the purposes of variance estimation. However, a file containing a BRR structure is available so that analysts can form replicate weights, if desired, from the final MEPS weight to compute variances of MEPS estimates using either BRR or Fay's modified BRR (Fay, 1989) methods. The replicate weights are useful for computing variances of complex nonlinear estimators for which a Taylor linear form is neither easy to derive nor available in commonly used software. For instance, it is not possible to calculate the variances of a median or the ratio of two medians by using the Taylor linearization method. For these types of estimators, analysts can calculate a variance using BRR or Fay's modified BRR methods. However, it should be noted that the replicate weights are derived from the final weight through a shortcut approach. Specifically, the replicate weights are not computed from the base weight, and all adjustments made in different stages of weighting are

not applied independently in each replicate. Thus, the variances computed using this one-step BRR do not capture the effects of all weighting adjustments that would be captured in a set of fully developed BRR replicate weights. The Taylor series approach does not fully capture the effects of the different weighting adjustments either.

The dataset HC-036BRR: MEPS 1996-2024 Replicates for Variance Estimation File contains the information necessary to construct the BRR replicates. It includes a set of 128 flags (BRR1-BRR128) in the form of half sample indicators, each of which is coded 0 or 1 to indicate whether the person should or should not be included in that particular replicate. These flags can be used in conjunction with the full-year weight to construct the BRR replicate weights. For an analysis of MEPS data pooled across years, the BRR replicates can be formed in the same way by using the HC-036, MEPS 1996-2024 Pooled Linkage Variance Estimation File. For more information about creating BRR replicates, analysts can refer to the documentation for the HC-036BRR pooled linkage file on the AHRQ website.

## 5.0 Merging/Linking MEPS Data Files

Data from this PUF can be used alone or in conjunction with other PUFs for different analytic purposes. Merging characteristics of interest from other MEPS PUFs expands the scope of potential estimates. For example, the medical event PUFs can be merged with the person-level Consolidated PUF to calculate event-level estimates for persons with specific characteristics (e.g., age, race, sex, education).

Most of the event PUFs can also be linked to the Medical Conditions PUF by using the Condition-Event Link (CLNK) PUF. When using the CLNK PUF, analysts should keep in mind that (1) conditions are household reported, (2) multiple conditions may be associated with a medical event, (3) one condition may link to more than one event, and (4) not all medical events link to the Medical Conditions PUF.

In addition to linking to other MEPS PUFs, each MEPS panel can also be linked back to the previous year's NHIS PUFs. This is because the set of households selected for MEPS is a subsample of NHIS participants. For information on obtaining MEPS/NHIS link, files please see the MEPS website.

# References


Chowdhury, S. R., Machlin, S. R., & Gwet, K. L. (2019, January). *Sample designs of the Medical Expenditure Panel Survey Household Component, 1996-2006 and 2007-2016*. (Methodology Report #33). Agency for Healthcare Research and Quality.

Fay, R. E. (1989). Theory and application of replicate weighting for variance calculations. *Proceedings of the Survey Research Methods Sections of the American Statistical Association*, 212-217.

Monheit, A. C., Wilson, R., & Arnett, R. H., III. (Eds.). (1999). *Informing American health care policy*. Jossey-Bass Inc.

Zuvekas, S. H., & Cohen, J. W. (2002). A guide to comparing health care expenditures in the 1996 MEPS to the 1987 NMES. *Inquiry, 39*(1), 76-86.

# Additional Resources


Bramlett, M. D., Dahlhamer, J. M., & Bose, J. (2021, September). *Weighting procedures and bias assessment for the 2020 National Health Interview Survey*. Centers for Disease Control and Prevention.

Cohen, S. B. (1996). The redesign of the Medical Expenditure Panel Survey: A component of the DHHS survey integration plan. *Proceedings of the Council of Professional Associations on Federal Statistics Seminar on Statistical Methodology in the Public Service.*

Cox, B. G., & Cohen, S. B. (1985). *Methodological issues for health care surveys.* Marcel Dekker.

Dahlhamer, J. M., Bramlett, M. D., Maitland, A., & Blumberg, S. J. (2021, February). *Preliminary evaluation of nonresponse bias due to the COVID-19 pandemic on National Health Interview Survey estimates, April-June 2020*. National Center for Health Statistics.

Lau, D. T., Sosa, P., Dasgupta, N., & He, H. (2021). Impact of the COVID-19 pandemic on public health surveillance and survey data collections in the United States. *American Journal of Public Health, 111*(12), 2118-2121.

Rothbaum, J., & Bee, A. (2021, May). Coronavirus infects surveys, too: Survey nonresponse bias and the coronavirus pandemic. U.S. Census Bureau.

Rothbaum, J., & Bee, A. (2022, September). How has the pandemic continued to affect survey response? Using administrative data to evaluate nonresponse in the 2022 Current Population Survey Annual Social and Economic Supplement. U.S. Census Bureau.

RTI International. (2025). *Medical Expenditure Panel Survey Medical Provider Component (MEPS-MPC)* (Methodology Report 2023 Data Collection). Agency for Healthcare Research and Quality.

Shah, B. V., Barnwell, B. G., Bieler, G. S., Boyle, K. E., Folsom, R. E., Lavange, L., Wheeless, S. C., & Williams, R. (1996). *Technical manual: Statistical methods and algorithms used in SUDAAN release 7.0.* RTI International.

U.S. Census Bureau. (2021). *Current Population Survey: 2021 Annual Social and Economic (ASEC) Supplement*.

Zuvekas, S. H., & Kashihara, D. (2021). The impacts of the COVID-19 pandemic on the Medical Expenditure Panel Survey. *American Journal of Public Health, 111*(12), 2157-2166.

# Appendix
# Variable-Source Crosswalk

## FOR MEPS HC 254H: 2024 HOME HEALTH VISITS

See the Household section under Survey Components on the MEPS home page for information on the MEPS HC questionnaire sections shown in the Source column (e.g., HH) of the tables in this appendix.

### Survey Administration Variables

| Variable | Description | Source |
|---|---|---|
| DUID | Panel # + encrypted DU identifier | Assigned in sampling |
| PID | Person number | Assigned in sampling |
| DUPERSID | Person ID (DUID + PID) | Assigned in sampling |
| EVNTIDX | Event ID | Assigned in sampling |
| EVENTRN | Event round number | CAPI derived |
| PANEL | Panel number | Constructed |

### Home Health Events Variables

| Variable | Description | Source |
|---|---|---|
| HHDATEYR | Event date - year | CAPI derived |
| HHDATEMM | Event date - month | CAPI derived |
| MPCELIG | MPC eligibility flag | Constructed |
| SELFAGEN | Does provider work for agency or self | EV60 |
| HHTYPE | Home health event type | EV50 |
| CNA_M18 | Type of prof hlth care wrkr - cert nurse asst | HH10 |
| DIETICN_M18 | Type of prof hlth care wrkr - dietitian/nutrt | HH10 |
| IVTHP_M18 | Type of prof hlth care wrkr - iv or infusion therapist | HH10 |
| MEDLDOC_M18 | Type of prof hlth care wrkr - medical doctor | HH10 |

| Variable | Description | Source |
|---|---|---|
| NURPRACT_M18 | Type of prof hlth care wrkr - nurse/practr | HH10 |
| OCCUPTHP_M18 | Type of prof hlth care wrkr - occupational therap | HH10 |
| PHYSLTHP_M18 | Type of prof hlth care wrkr - physical therapy | HH10 |
| RESPTHP_M18 | Type of prof hlth care wrkr - respira therapy | HH10 |
| SOCIALW_M18 | Type of prof hlth care wrkr - social worker | HH10 |
| SPEECTHP_M18 | Type of prof hlth care wrkr - speech therapy | HH10 |
| HCarWrkrProfNone_M18 | None of the listed professional home health providers | HH10 |
| COMPANN_M18 | Type of non prof hlth care wrkr - companion | HH20 |
| HMEMAKER_M18 | Type of non prof hlth care wrkr - homemaker/house cleaner | HH20 |
| HHAIDE_M18 | Type of non prof hlth care wrkr - home health / care aide | HH20 |
| HOSPICE_M18 | Type of non prof hlth care wrkr - hospice worker | HH20 |
| NURAIDE_M18 | Type of non prof hlth care wrkr - nurse’s aide | HH20 |
| PERSONAL_M18 | Type of non prof hlth care wrkr - pers care attdt | HH20 |
| HCarWrkrNonProfNone_M18 | None of the listed non professional home health providers | HH20 |
| VSTRELCN | Any hh care svce related to hlth cond | HH70 |
| FREQCY | Provider helped every week/some weeks | HH90 |
| DAYSPWK | # days / week provider came | HH100 |
| DAYSPMO | # days / month provider came | HH110 |
| SAMESVCE_M18 | Any oth mons per received same services | HH120 |
| HHDAYS | Days per month in home health, 2024 | Constructed |

## Imputed Expenditure Variables

| Variable | Description | Source |
|---|---|---|
| HHSF24X | Amount paid, family (Imputed) | CP Section (Edited) |
| HHMR24X | Amount paid, Medicare (Imputed) | CP Section (Edited) |
| HHMD24X | Amount paid, Medicaid (Imputed) | CP Section (Edited) |
| HHPV24X | Amount paid, private insurance (Imputed) | CP Section (Edited) |
| HHVA24X | Amount paid, Veterans/CHAMPVA (Imputed) | CP Section (Edited) |
| HHTR24X | Amount paid, TRICARE (Imputed) | CP Section (Edited) |
| HHOF24X | Amount paid, other federal (Imputed) | CP Section (Edited) |
| HHSL24X | Amount paid, state & local gov (Imputed) | CP Section (Edited) |
| HHWC24X | Amount paid, workers comp (Imputed) | CP Section (Edited) |
| HHOT24X | Amount paid, other insurance (Imputed) | CP Section (Edited) |
| HHXP24X | Sum of HHSF24X - HHOT24X (Imputed) | Constructed |
| HHTC24X | Household reported total charge (Imputed) | CP Section (Edited) |
| IMPFLAG | Imputation status | Constructed |

## Weights Variables

| Variable | Description | Source |
|---|---|---|
| PERWT24F | Expenditure file person weight, 2024 | Constructed |
| VARSTR | Variance estimation stratum, 2024 | Constructed |
| VARPSU | Variance estimation PSU, 2024 | Constructed |