MEPS HC 248B:
2023 Dental Visits

May 2025

Table of Contents

A.   Data Use Agreement

Individual identifiers have been removed from the micro-data 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. 299 a-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 for 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 above 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; and

2.   If the identity of any person or establishment should be discovered inadvertently, then (a) no use will be made of this knowledge, (b) the Director Office of Management 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; and

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 above 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.

The Agency for Healthcare Research and Quality requests that users cite AHRQ and the Medical Expenditure Panel Survey as the data source in any publications or research based upon these data.

B.   Background

1.0   Household Component

The Medical Expenditure Panel Survey (MEPS) provides nationally representative estimates of health care use, expenditures, sources of payment, 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 panel design of the survey includes five rounds of interviews covering 2 full calendar years. Information about each household member is collected through computer-assisted personal interviewing (CAPI) technology, and the survey builds on this information from interview to interview. All data for a sampled household are reported by a single household respondent.

The MEPS HC was initiated in 1996. Each year, a new panel of sample 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, the family, or the event level. Data must be weighted to produce national estimates.

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

2.0   Medical Provider Component

When the household CAPI interview is completed, and permission is obtained from the sample 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 the 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 amounts of payment. The MPC is not designed to yield national estimates. It is primarily used as an imputation source to supplement/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, Inc. and the MEPS MPC data are collected under contract with Research Triangle Institute. Datasets and summary statistics are edited and published in accordance with the confidentiality provisions of the Public Health Service Act and the Privacy Act. The 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 datatools.ahrq.gov.

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, Agency for Healthcare Research and Quality, 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 event files from the 2023 MEPS HC. It was released as an ASCII data file (with related SAS, SPSS, R, and Stata programming statements and data user information) and as a SAS dataset, a SAS transport file, a Stata dataset, and an Excel file. The 2023 Dental Visits Public Use File (hereafter referred to as the Dental PUF), provides detailed information on dental events from a nationally representative sample of the U.S. civilian noninstitutionalized population. Data from the Dental PUF can be used to make estimates of dental event utilization and expenditures for calendar year 2023. This file contains 47 variables and has a logical record length of 233 with an additional 2-byte carriage return/line feed at the end of each record. This PUF consists of MEPS survey data obtained in the 2023 portion of Round 3, and all of Rounds 4 and 5 for Panel 27; and Rounds 1, 2, and the 2023 portion of Round 3 for Panel 28 (i.e., the rounds for MEPS panels covering calendar year 2023), as illustrated below.
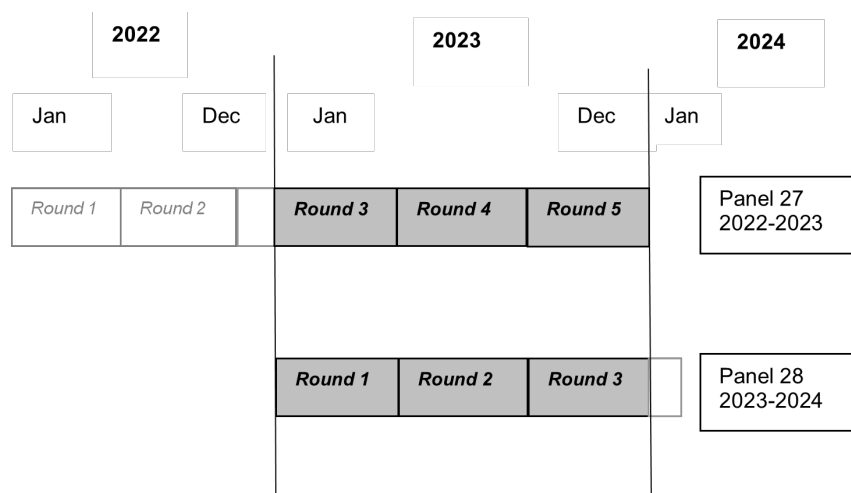
Each record in this PUF represents a unique dental event; that is, a dental event reported by the household respondent. Counts of dental event utilization are based entirely on household reports. Dental events were not included in the MPC; therefore, all expenditure and payment data in this Dental PUF are reported by the household.

Data from this event PUF can be merged with other 2023 MEPS HC PUFs for the purpose of appending person-level data such as demographic characteristics or health insurance coverage to each dental record.

This PUF can also be used to construct summary variables of expenditures, source of payment, and related aspects of the dental event. Aggregate annual person-level information on the use of dental events and other health services is provided on the MEPS 2023 Full Year Consolidated

PUF (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 2.0)

- Survey Sample Information (Section 3.0)

- Strategies for Estimation (Section 4.0)

- Merging/Linking MEPS Data Files (Section 5.0)

- Variable - Source Crosswalk (Section D)

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

2.0   Data File Information

The 2023 Dental PUF consists of one event-level file. The PUF contains characteristics associated with the dental event and imputed expenditure data.

The 2023 Dental PUF contains 19,599 dental event records; of these records, 19,476 are associated with persons having a positive person-level weight (PERWT23F). This file includes dental event (DV) records for all household members who resided in eligible responding households and reported at least one dental event. Each record represents one household-reported dental event that occurred during calendar year 2023. Dental visits known to have occurred before January 1, 2023, and after December 31, 2023 are not included in this PUF. Some household members may have multiple dental events and thus will be represented in multiple records in this PUF. Other household members may have no dental events reported and thus will have no records in this PUF. These data were collected during the 2023 portion of Round 3, and all of Rounds 4 and 5 for Panel 27 and Rounds 1, 2, and the 2023 portion of Round 3 for Panel 28 of the MEPS HC. The persons represented in this PUF had to meet either a) or b) below:

a)   Be classified as a Key in-scope person who responded for their entire period of 2023 eligibility (i.e., persons with a positive 2023 full-year person-level weight, PERWT23F > 0), or

b)   Be an eligible member of a family whose Key in-scope members have a positive person-level weight (PERWT23F > 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 (FAMWT23F > 0). Note that FAMIDYR and FAMWT23F are variables on the 2023 Consolidated PUF.

Persons with no dental events for 2023 are not included in this event-level Dental PUF but are represented on the person-level 2023 Full Year Population Characteristics PUF.

Each dental event record includes the following: date of the dental event; type of provider seen; procedure(s) associated with the dental event; flat fee information; imputed sources of payment; total payment and total charge of the dental event expenditure; and a full year person-level weight.

To append person-level information such as demographic or health insurance coverage to each event record, data from this PUF can be merged with 2023 MEPS HC person-level data (e.g. Consolidated or Population Characteristics PUFs) using the person identifier, DUPERSID. Please see Section 5.0 or the Appendix to MEPS 2023 Event Files (hereafter referred to as the Appendix PUF) for details on how to merge MEPS data files.

2.1   Codebook Structure

For most variables on the Dental 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 Section D, "Variable-Source Crosswalk".

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

- Unique person identifier

- Unique dental event identifier

- Dental characteristic variables

- Imputed expenditure variables

- Weight and variance estimation variables

Note that the person identifier corresponds to a unique person and the dental event identifier corresponds to a unique event.

2.2   Reserved Codes

This Dental PUF contains several reserved code values.

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 when there was not enough information from the instrument to calculate the constructed variables. Not having enough information is often the result of skip patterns in the data or of missing information stemming from the responses Refused (-7) or Don't Know (-8). Note that, in addition to Don't Know, reserved code -8 also 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 and provides the programming identifiers for each variable.

Table 2

Programming Identifiers for Each Variable in the Dental 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, the variable names reflect the content of the variable. All imputed/edited 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 in this Dental PUF were derived from the CAPI. The source of each variable is identified in Section D: "Variable-Source Crosswalk" 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 those questionnaire sections and question numbers indicated in the "Source" column; questionnaire sections are identified as:

   - FF - Flat Fee section

   - DN - Dental Event section

   - CP - Charge Payment section

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

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. Please 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 source of payment variables are named in the following way:

The first two characters indicate the type of event:

IP - inpatient stay   HH - home health visit

ER - emergency room visit   OM - other medical equipment

OB - office-based visit	DV - dental visit
OP - outpatient visit	RX - prescribed medicine

In the case of the source of payment variables, the third and fourth characters indicate:

SF - self or family	OF - other federal government
MR - Medicare	SL - state/local government
MD - Medicaid	WC - Workers' Compensation
PV - private insurance	OT - other insurance
VA - Veterans Administration/CHAMPVA	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 indicate the year (23). The seventh character being "X" indicates the variable is edited/imputed.

For example, DVSF23X is the edited/imputed amount paid by self or family for 2023 dental 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 for the NHIS. The dwelling unit ID (DUID) is a 7-digit number consisting of a 2-digit panel number followed by a 5-digit random number assigned after the case was sampled for MEPS. A 3-digit person number (PID) uniquely identifies each person within the DU. The variable DUPERSID is the combination of DUID and PID. IDs begin with the 2-digit panel number.

For detailed information on dwelling units and families, please refer to the documentation for the 2023 Population Characteristics PUF.

Record Identifiers (EVNTIDX, FFEEIDX)

EVNTIDX uniquely identifies each dental event (i.e., each record in this Dental PUF). EVNTIDX begins with the 2-digit panel number and ends with the 2-digit event type number. For details on linking see Section 5.0: Merging/Linking MEPS Data Files, or the MEPS 2023 Appendix PUF, HC 248I.

FFEEIDX is a constructed variable that uniquely identifies a flat fee group, that is, all events that were part of a flat fee payment. For example, a charge for orthodontia is typically covered in a flat fee arrangement where all visits are covered under one flat fee dollar amount. These events would have the same value for FFEEIDX. FFEEIDX identifies a flat fee payment that was identified using information from the HC.

Round Indicator (EVENTRN)

EVENTRN indicates the round in which the dental event was reported. Please note: Rounds 3 (partial) 4, and 5 are associated with data collected from Panel 27. Rounds 1, 2, and 3 (partial) are associated with data collected from Panel 28.

Panel Indicator (PANEL)

PANEL is a constructed variable used to specify the panel number for the person. PANEL will indicate either Panel 27 or Panel 28 for each person in the PUF. Panel 27 is the panel that started in 2022, and Panel 28 is the panel that started in 2023.

2.5.2   Dental Event Variables

This PUF contains variables describing dental events reported by household respondents in the Dental section of the MEPS HC survey questionnaire.

Date of Visit (DVDATEMM - DVDATEYR)

There are variables that indicate the month and year a dental event occurred (DVDATEMM and DVDATEYR, respectively). These variables have not been edited or imputed.

Type of Provider Seen (GENDENT_M18 - DENTYPE_M18)

Respondents were asked about the type of provider seen during the dental visit (e.g., general dentist, pediatric dentist, dental hygienist, or specialist). More than one type of provider may have been identified on an event record.

Treatment, Procedures, and Services (EXAMINEX - ORTHDONX)

Respondents reported the types of services or treatments they received during their visit, such as root canals or X-rays. It is possible to have more than one type of service or treatment to be recorded for a single visit. In some instances, instead of the selecting one of the standard categories of services or treatments, respondents provided text strings indicating the type of treatment. Where possible, these text strings were reclassified into the appropriate procedure and service categories. The DENTOTHX variable "Other specify dental procedures - edited" provides the residual text strings, i.e., treatments that could not reclassified into a standard category. Starting in 2022, only the edited procedure and service category variables, which include both the originally reported and reclassified responses, were incorporated into the PUF.

2.5.3   Flat Fee Variables (FFEEIDX, FFDVTYPE, FFBEF23, FFTOT24)

Definition of Flat Fee Payments

A flat fee is the fixed dollar amount a person is charged for a package of services provided during a defined period. Examples are an orthodontist's fee, which covers multiple visits; or a dental surgeon's fee, which covers a surgical procedure and post-surgical care. A flat fee group is the set of medical services that are covered under the same flat fee payment. The flat fee groups represented in the Dental PUF include flat fee groups where at least one of the health care events, as reported by the HC respondent, occurred during 2023. By definition, a flat fee group can span multiple years. Furthermore, a single person can have multiple flat fee groups.

Flat Fee Variable Descriptions

Flat Fee ID (FFEEIDX)
As noted in "Record Identifiers," the variable FFEEIDX uniquely identifies all events that are part of the same flat fee group for a person. On any 2023 event PUF, every event that is part of a specific flat fee group has the same value for FFEEIDX. Note that prescribed medicine and home health events are never included in a flat fee group and none of the flat fee variables are in those event PUFs.

Flat Fee Type (FFDVTYPE)
FFDVTYPE indicates whether the 2023 dental event is the "stem" or "leaf" of a flat fee group. A stem (records with FFDVTYPE = 1) is the initial dental service (event) which is followed by other dental events that are covered under the same flat fee payment. The leaves of the flat fee group (records with FFDVTYPE = 2) are those dental events that are tied back to the initial medical event (the stem) in the flat fee group. These "leaf" records have their expenditure variables set to zero. For the dental visits that are not part of a flat fee payment, the FFDVTYPE is set to Inapplicable (-1).

Counts of Flat Fee Events that Cross Years (FFBEF23, FFTOT24)
As described in "Definition of Flat Fee Payments," a flat fee payment covers multiple events and the multiple events could span multiple years. For situations where a 2023 dental visit is part of a

group of events, and some of the events occurred before or after 2023, counts of the known events are provided on the dental record. Variables that indicate events that occurred before or after 2023 are the following:

FFBEF23 - indicates total number of pre-2023 events in the same flat fee group as the 2023 dental event. This count would not include 2023 dental events.

FFTOT24 - indicates the number of 2024 medical events expected to be in the same flat fee group as the 2023 dental event record.

If there are no 2022 events in this PUF, FFBEF23 will be omitted. Likewise, if there are no 2024 events in this PUF, FFTOT24 will be omitted. If there are no flat fee data related to the records in this PUF, FFEEIDX and FFDVTYPE will be omitted as well. Please note that the Variable-Source Crosswalk in this document lists all possible flat fee variables.

Caveats of Flat Fee Groups

Analysts should note that flat fee payments are common in the dental PUF. In the 2023 PUF there are 3,335 events that are identified as being part of a flat fee payment group. In general, every flat fee group should have an initial visit (stem) and at least one subsequent visit (leaf). There are some situations where this is not true. For some of these flat fee groups, the initial visit reported occurred in 2023, but the remaining visits that were part of this flat fee group occurred in 2024. In this case, the 2023 flat fee group represented in this PUF would consist of one event (the stem). The 2024 "leaf" events that are part of this flat fee group are not represented on the file. Similarly, the household respondent may have reported a flat fee group where the initial visit began in 2022 but subsequent visits occurred during 2023. In this case, the initial visit would not be represented in this PUF. This 2023 flat fee group would then only consist of one or more leaf records and no stem. Note that the Variable-Source Crosswalk lists all possible flat fee variables.

2.5.4   Condition Codes

Conditions data are not collected for dental events; therefore, this PUF cannot be linked to the Conditions PUF.

2.5.5   Expenditure Data

Definition of Expenditures

Expenditures in this PUF refer to payments for dental 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 NMES and 1977 NMCES surveys, 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 due to the increasingly common practice of discounting. Although measuring expenditures as the sum of payments incorporates discounts in the MEPS expenditure estimates, the estimates do not incorporate any payment not directly tied to specific medical care visits, 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. While 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 they directly comparable to the resource costs of those services, nor are they directly comparable to the expenditures defined in the 1987 NMES. For details on expenditure definitions, please refer to 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), and also can be accessed via the CFACT data center. For more information see the Data Center section of the MEPS website. If examining trends in MEPS expenditures, please refer to Section 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 below. The MPC did not include dental events or other medical expenditures (such as glasses, contact lenses, and hearing devices). Therefore, although the general procedures remain the same for dental and other medical expenditures, editing and imputation methodologies were applied only to household-reported data. Please see below for details on the differences between these editing/imputation methodologies. Separate imputations were performed for flat fee and simple (non-flat fee) events.

General Data Editing Methodology

Logical edits were used to resolve internal inconsistencies and other problems in the HC data. The edits were designed to preserve partial payment data from households and providers, and to identify actual and potential sources of payment for each household-reported event. In general, these edits accounted for outliers, copayments or charges reported as total payments, and reimbursed amounts that were reported as out-of-pocket payments. In addition, edits were implemented to correct for misclassifications between Medicare and Medicaid, and between Medicare HMOs and private HMOs as payment sources. These edits produced a complete vector of expenditures for some events and provided the starting point for imputing missing expenditures in 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 as the event with missing payment was used to impute the missing payment value. The imputations for the flat fee events were carried out separately from the simple events.

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 taking into account the donors' weighted distribution in the imputation process to ensure that the weighted distribution of recipients' expenditures reflects the weighted distribution of the donors' expenditures.

Dental Data Editing and Imputation

Expenditures on visits to dentists were developed in a sequence of logical edits and imputations. The household edits were used to correct obvious errors in the reporting of expenditures, and to identify actual and potential sources of payments. Some of the edits were global (i.e., applied to all events); others were hierarchical and mutually exclusive. One of the more important edits separated flat fee events from simple events. This edit was necessary because groups of events covered by a flat fee (i.e., a flat fee bundle) were edited and imputed separately from individual events each covered by a single charge (i.e., simple events). Dental services were imputed as flat fee events if the charges covered a package of health care services (e.g., orthodontia), and all the services were part of the same event type (i.e., a pure bundle). If a bundle contained more than one type of event, the services were treated as simple events in the imputations (See Section 2.5.3 for more detail on the definition and imputation of events in flat fee bundles.)

Logical edits were also used to sort each event into a specific category for the imputations. Events with complete expenditures were flagged as potential donors for the predictive mean matching imputations, while events with missing expenditure data were assigned to various recipient categories. Each event with missing expenditure data was assigned to a recipient category based on the extent of its missing charge and expenditure data. For example, an event with a known total charge but no expenditure information was assigned to one category, while 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.

The logical edits produced nine recipient categories for events with missing data. Eight of the categories were for events with a common pattern of missing data and a primary payer other than Medicaid. Medicaid events were imputed separately because persons on Medicaid rarely know the provider's charge for services or the amount paid by the state Medicaid program. As a result, the total charge for Medicaid-covered services was imputed and discounted to reflect the amount that a state program would pay for the care.

Separate predictive mean matching imputations were used to impute missing data in each of the eight recipient categories. The donor pool included "free events" because, in some instances, providers are not paid for their services. These events represent charity care, bad debt, provider failure to bill, and third-party payer restrictions on reimbursement in certain circumstances. If free events were excluded from the donor pool, total expenditures would be over-counted because the distribution of free events among complete events (donors) is not represented among incomplete events (recipients).

Imputation Flag Variable (IMPFLAG)

IMPFLAG is a six-category variable that indicates if the event contains complete Household Component (HC) or Medical Provider Component (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 and flat fee leaf events)

IMPFLAG = 1 complete HC data

IMPFLAG = 2 complete MPC data (not applicable to DV events)

IMPFLAG = 3 fully imputed

IMPFLAG = 4 partially imputed

IMPFLAG = 5 complete MPC data through capitation imputation (not applicable to DV events)

Flat Fee Expenditures

The approach used to count expenditures for flat fees was to place the expenditure on the first visit of the flat fee group. The remaining visits have zero payments. Thus, if the first visit in the flat fee group occurred prior to 2023, all the events that occurred in 2023 will have zero payments. Conversely, if the first event in the flat fee group occurred at the end of 2023, the total expenditure for the entire flat fee group will be on that event, regardless of the number of events it covered after 2023. See Section 2.5.3 for details on the flat fee variables.

Zero Expenditures

As noted above, there are some dental events reported by respondents where the payments were zero. This could occur when (1) the visit was covered under a flat fee arrangement (flat fee payments are included only on the first event covered by the arrangement), (2) there was no charge for a follow-up visit, (3) the provider was never paid directly for services provided by an individual, insurance plan, or other source, (4) the charges were included in another bill, or (5) the event was paid through government or privately funded research or clinical trial. If all the medical events for a person fell into one of these categories, then the total annual expenditures for that person would be zero.

Sources of Payment

In addition to total expenditures, variables are provided which itemize expenditures according to major source of payment categories. These categories are:

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 Source - includes community and neighborhood clinics, state and local health departments, and state programs other than Medicaid,

9. Workers' Compensation, and

10. Other Unclassified Sources - includes sources such as automobile, homeowner's, and liability insurance, and other miscellaneous or unknown sources.

Dental Expenditure Variables (DVSF23X - DVTC23X)

DVSF23X - DVOT23X are the 10 sources of payment. DVXP23X is the sum of the 10 sources of payment for the dental expenditures, and DVTC23X is the total charge. The 10 sources of payment are: self/family (DVSF23X), Medicare (DVMR23X), Medicaid (DVMD23X), private insurance (DVPV23X), Veterans Administration/CHAMPVA (DVVA23X), TRICARE (DVTR23X), other Federal sources (DVOF23X), State and Local (non-federal) government sources (DVSL23X), Workers' Compensation (DVWC23X) and other insurance (DVOT23X).

Rounding

Expenditure variables in the 2023 Dental PUF have been rounded to the nearest penny. Person-level expenditure information to be released on the MEPS 2023 Consolidated PUF will be rounded to the nearest dollar. It should be noted that using the MEPS event PUFs to create person-level totals will yield slightly different totals than those found 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

Modification to the MEPS sample design because of the pandemic ended in 2022. Concerns of potential bias due to these modifications should no longer apply to data collected in this PUF. However, like most other surveys, MEPS has been substantially affected by the pandemic. As a result of these changes, potential bias continues to be a concern. One effect of the pandemic is the significantly lower response rates (Section 3.2), and these lower rates 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 detail, see Section 3.1 of the 2020 Consolidated PUF, Section 3.1 of the 2021 Consolidated PUF, and Section 3.1.2 of the 2022 Consolidated PUF.)

Analyses undertaken to examine the quality of the MEPS FY 2023 data compare health care utilization and health insurance coverage for the MEPS target population between the panels fielded. These comparisons were undertaken for the full sample and the three age groups of 0-17, 18-64, and 65+. These comparisons found no abnormal differences between the two panels. Analyses across years also suggest a rebound to pre-pandemic utilization levels for most key event types.

The various actions taken in the development of the person-level weights for the MEPS FY 2023 data were designed to limit the potential for response bias. However, evaluations of MEPS data quality in 2020 through 2022 suggest that analysts of the MEPS FY 2023 Population Characteristics PUF should continue to exercise caution when interpreting estimates and assessing analyses based on data collected from these three calendar years. This includes the comparison of such estimates to those of other years and corresponding trend analyses.

3.2   Sample Weight (PERWT23F)

There is a single full-year person-level weight (PERWT23F) assigned to each record for each Key, in-scope person who responded to MEPS for the full period of time that they were in scope during 2023. 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 the NHIS (the latter circumstance includes newborns as well as 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 civilian noninstitutionalized portion of the U.S. population.

3.3 Details on Person Weight Construction

The person-level weight PERWT23F was developed in several stages. First, a person-level weight for Panel 27 was created, including an adjustment for nonresponse over time and raking. The 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 in the establishment of the initial person-level control figures were: educational attainment of the reference person (three categories: no degree; high school/GED only or some college; bachelor's or a higher degree); Census region (Northeast, Midwest, South, West); MSA status (MSA, non-MSA); race/ethnicity (Hispanic; Black, non-Hispanic; Asian, non-Hispanic; and other); sex; and age (0-18, 19-25, 26-34, 35-44, 45-64, and 65 or older). (Note, however, that for confidentiality reasons, the MSA status variables are no longer released for public use.) The person-level weight for Panel 28 was created similarly. Secondly, a composite weight was formed by multiplying each weight from Panel 27 by the factor .40 and each weight from Panel 28 by the factor .60. The choice of factors reflected the relative effective sample sizes of the two panels, helping to limit the variance of estimates obtained from pooling both samples. Weights for the 2023 Population Characteristics PUF were then developed by raking the composite weight to the same set of CPS-based control totals.

The approach for establishing the 2023 Consolidated PUF weight is as follows. When poverty status information derived from MEPS income variables becomes available, a final raking is undertaken. The full sample weight appearing on the Population Characteristics PUF for a given year is re-raked, 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 to 125 percent of poverty, from 125 to 200 percent of poverty, from 200 to 400 percent of poverty, at least 400 percent of poverty) as well as age, race/ethnicity, sex, region, and MSA status are used to calibrate weights.

3.3.1 MEPS Panel 27 Weight Development Process

The person-level weight for MEPS Panel 27 was developed by using the 2022 full-year weight as a "base" weight for survey participants present in 2023.

For Key, in-scope members who joined an RU at some time in 2023 after being out of scope in 2022, the initially assigned person-level weight was the corresponding 2022 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 2023 for Key, responding persons in scope on December 31, 2023. These control totals were derived by scaling back the population distribution obtained from the March 2024 CPS to reflect the December 31, 2023 estimated population total (estimated based on Census projections for January 1, 2024). Variables used for person-level raking included: education 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); MSA status (MSA, non-MSA); race/ethnicity (Hispanic; Black, non-Hispanic; Asian, non-Hispanic; and other); sex; and age. (Note, however, that for confidentiality reasons, the MSA status variables are no longer released for public use.) The final

weight for Key, responding persons who were not in scope on December 31, 2023 but were in scope earlier in the year was the nonresponse-adjusted person weight without raking.

Note that the 2022 full-year weight that was used as the base weight for Panel 27 was derived using the 2022 MEPS Round 1 weight and reflected adjustment for nonresponse over the remaining data collection rounds in 2022 as well as raking to the December 2022 population control figures.

3.3.2   MEPS Panel 28 Weight Development Process

The person-level weight for Panel 28 was developed using the 2023 Round 1 person-level weight as a "base" weight. The Round 1 weights incorporated the following components: the original household probability of selection for the NHIS and for the NHIS subsample reserved for the MEPS, an adjustment for NHIS nonresponse, the probability of selection for MEPS from the NHIS, an adjustment for nonresponse at the dwelling unit level for Round 1, and raking to control figures at the person level obtained 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 2023 as well as raking to the same population control figures for December 2023 that were used for the Panel 27 weight for Key, responding persons in scope on December 31, 2023. The same six variables used for Panel 27 raking (education level of the reference person, Census region, MSA status, race/ethnicity, sex, and age) were also used for Panel 28 raking. Similar to Panel 27, the Panel 28 final weight for Key, responding persons who were not in scope on December 31, 2023 but were in scope earlier in the year was the nonresponse-adjusted person weight without raking.

3.3.3   The Final Weight for 2023

The final raking of those in scope at the end of the year has been described above. In addition, the composite weights of two groups of persons who were out of scope on December 31, 2023 were adjusted for expected undercoverage. Specifically, the weights of those who were out of scope on December 31, 2023, 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 Center for Medicare and Medicaid Services (CMS). The weights of persons who died while in scope were poststratified to corresponding estimates derived using data obtained from the Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Provisional Mortality Statistics, 2018 through Last Week on CDC WONDER Online Database, released in 2024, the latest available data at the time. Separate decedent control totals were developed for the "65 and older" and "under 65" civilian noninstitutionalized populations.

Overall, the weighted population estimate for the civilian noninstitutionalized population for December 31, 2023 is 330,710,135 (PERWT23F >0 and INSC1231=1). The sum of person-level weights across all persons assigned a positive person-level weight is 334,530,273.

3.4 Coverage

The target population associated with MEPS is the 2023 U.S. civilian noninstitutionalized population. However, the MEPS sampled households are a subsample of the NHIS households interviewed in 2021 (Panel 27) and 2022 (Panel 28). New households created after the NHIS interviews for the respective panels and consisting exclusively of persons who entered the target population after 2021 (Panel 27) or after 2022 (Panel 28) are not covered by the 2023 MEPS. Nor are previously out of scope persons who joined an existing household but are not related to the current household residents. Persons not covered by a given MEPS panel thus include some members of the following groups: 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, we note that there are uncertainties associated with 2020, 2021, and 2022 data quality for reasons discussed throughout Section 3. Evaluations of important MEPS estimates suggest that they are of reasonable quality. Nevertheless, analysts are advised to exercise caution in interpreting these estimates, particularly in terms of trend analyses, since access to health care was substantially affected by the pandemic, as were related factors such as health insurance and employment status for many persons.

The MEPS began in 1996, and the utility of the survey for analyzing health care trends expands with each additional year of data; however, when examining trends over time using the MEPS, the length of time being analyzed should be considered. In particular, large shifts in survey estimates over short periods of time (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 health care utilization from MEPS respondents; the changes were fully implemented in 2014. This effort likely resulted in improved data quality and a reduction in underreporting starting in the second half of 2013 and continuing throughout the 2014 full year files; the changes have also had some impact on analyses involving trends in utilization across years. The changes in the NHIS sample design in 2016 and 2018 could also potentially 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, as well as many of its subpopulations. Better 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 involved major modifications to the MEPS instrument design and data collection process, particularly in the events sections of the instrument. These were introduced in the spring of 2018 and thus affected data beginning with Round 1 of Panel 23, Round 3 of Panel 22, and Round 5 of Panel 21. Since 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 reflected 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 make them as consistent as possible with data collected under the previous design. The changes in the instrument were designed to make the data collection effort more efficient and easier to administer. In addition, expectations were that data on some items, such as those related to health care events, would 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. *Analysts should be aware of the possible impacts of these changes on the data and 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 2.5.11: Utilization, Expenditures, and Sources of Payment Variables in the Consolidated PUF (HC 251) and, for more detail, to the documentation for the prescription drug file (HC 248A) when analyzing prescription drug spending over time. As always, it is recommended that, before conducting trend analyses, analysts should review relevant sections of the documentation for descriptions of these types of changes that might affect the interpretation of changes over time.

To smooth or stabilize trend analyses based on the MEPS data, analysts may also wish to consider using statistical techniques such as comparing pooled time periods (e.g. 1996-1997 versus 2011-2012), working with moving averages, or using modeling techniques with several consecutive years of the 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 taken place when one has not.

4.0 Strategies for Estimation

4.1 Developing Event-Level Estimates

The data in this PUF can be used to develop national 2023 event-level estimates for the U.S. civilian noninstitutionalized population on dental visits as well as expenditures, and sources of payment for these visits. The weight assigned to each dental visit reported is the person-level weight of the person who visited the dentist. If a person reported several visits, each visit is assigned that individual's person-level weight. Estimates of total visits are the sum of the weight variable (PERWT23F) across relevant event records while estimates of other variables must be

MEPS HC 248B

weighted by PERWT23F to be nationally representative. For example, the appropriate estimate for the mean out-of-pocket payment per dental visit can be represented as follows (the subscript 'j' identifies each event and represents a numbering of events from 1 through the total number of events in the PUF):

$$(\sum W_j X_j)/(\sum W_j), \text{ where,}$$

$W_j = PERWT23F_j$ (full year person weight for the person associated with event j), and

$X_j = DVSF23X_j$ (amount paid by self/family for event j)

Estimates and corresponding standard errors (SE) can be derived using an appropriate computer software package for complex survey analysis such as SAS, Stata, SUDAAN, R, or SPSS. The tables below contain the event-level estimates for several key variables on this file.

Table 3

Selected Event-Level Estimates - Visits

Estimate of interest	Variable name	Estimate (SE)	Estimate excluding zero payment events (SE)
Total number of dental visits (in millions)	PERWT23F	341.0 (11.75)	294.3 (9.98)
Proportion of dental visits with expenditures > 0*	DVXP23X	0.863 (0.0068)	--------

*Zero payment events can occur in MEPS for the following reasons: (1) the visit was covered under a flat fee arrangement (flat fee payments are included only on the first event covered by the arrangement), (2) there was no charge for a follow-up visit, (3) the provider was never paid directly for services provided by an individual, insurance plan, or other source, (4) the charges were included in another bill, or (5) the event was paid through government or privately funded research or clinical trial.

Table 4

Selected Event-Level Estimates - Expenditures

Estimate of interest	Variable name	Estimate (SE)	Estimate excluding zero payment events (SE)
Mean total payments per visit	DVXP23X	$443 ($11.0)	$514 ($13.2)
Mean out-of-pocket payment per visit	DVSF23X	$200 ($8.7)	$232 ($10.4)
Mean proportion of total expenditures paid by private insurance per visit	DVPV23X/ DVXP23X	-------	0.502 (0.0085)

Table 5

Expenditures: Dental Hygienist Visits (DENTHYG = 1)

Estimate of interest	Variable name	Estimate (SE)	Estimate excluding zero payment events (SE)
Mean total payments per visit where person saw hygienist	DVXP23X	$284 ($8.1)	$293 ($8.5)
Mean out-of-pocket payment per visit where person saw hygienist	DVSF23X	$94 ($5.2)	$97 ($5.5)
Mean proportion of total expenditures per visit paid by private insurance where person saw hygienist	DVPV23X/ DVXP23X	-------	0.590 (0.0098)

4.2 Person-Based Estimates for Dental Care

To enhance analyses of dental care, analysts may link information about dental visits by sample persons in this PUF to the annual Consolidated PUF (which has data for all MEPS sample persons), or conversely, link person-level information from the Full Year Consolidated PUF to this event-level PUF (see Section 5 for more details). Both this PUF and the Full-Year Consolidated PUF may be used to derive estimates for persons with dental care and annual estimates of total expenditures. However, for estimates that pertain to those who did not visit the dentist as well as those who did (for example, the percentage of adults who visited the dentist at least once during the past year or the mean number of visits to the dentist in the past year among those 65 or older) this PUF cannot be used. Only those persons with at least one dental visit are represented in this PUF. The Full-Year Consolidated PUF must be used for person-level analyses that include both persons with and without dental care.

4.3 Variables with Missing Values

It is essential that the analyst 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 the analytic needs. That is, the analyst should either impute a value or set the value to one that will be interpreted as missing by the software package used. For categorical and dichotomous variables, the analyst may want to consider whether to recode or impute a value for cases with negative values or whether to include or exclude such cases in the numerator and/or denominator when calculating proportions.

Methodologies used for the editing/imputation of expenditure variables (e.g., sources of payment, flat fee, and zero expenditures) are described in "Data Editing and Imputation Methodologies of Expenditure Variables".

4.4 Variance Estimation (VARSTR, VARPSU)

To obtain estimates of variability in the MEPS estimates (such as the standard error of sample estimates or corresponding confidence intervals), analysts should consider the complex sample design of the MEPS for both person-level and family-level analyses. Several methodologies have been developed for estimating standard errors for surveys with a complex sample design, including the Taylor series linearization method, balanced repeated replication (BRR), and jackknife replication. Various software packages provide analysts with the capability of implementing these methodologies. MEPS analysts most commonly use the Taylor series approach. Although this PUF does not contain replicate weights, analysts can use the BRR methodology to construct replicate weights to develop variances for more complex estimators (see Section 4.4.2: Balanced Repeated Replication Method).

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 permit the use of the Taylor series linearization method include SUDAAN, R, Stata, SAS (version 8.2 and higher), and SPSS (version 12.0 and higher). For complete information on the capabilities of a package, analysts should refer to the user documentation for the software.

With the Taylor series linearization method, variance estimation strata and the variance estimation PSUs within these strata must be specified. The variables VARSTR and VARPSU on this Dental Visits PUF identify the sampling strata and primary sampling units 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 the MEPS estimates. Note that the number of degrees of freedom associated with estimates of variability indicated by such a package may not appropriately reflect the number available. For variables of interest distributed throughout the country (and thus 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 across years 2002 through Panel 11 of 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 with either two or three variance estimation PSUs.

Beginning in Panel 12 of 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 Population Characteristics PUF, as it consisted of two panels that were selected under two independent NHIS sample designs. Since both MEPS panels in the full-

year files from 2008 through 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 that they can be readily distinguished from those developed under the former NHIS sample design if data are pooled for several years.

The NHIS sample design was changed again in 2016, effectively changing the MEPS design beginning with calendar year 2017. Beginning with Panel 22 of the 2017 files, a new set of variance strata and PSUs were 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 Population Characteristics PUF, as it consisted of two panels that were selected under two independent NHIS sample designs. To make the pooling of data across multiple years of the MEPS more straightforward, the numbering system for the variance strata 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 Population Characteristics PUF was also modified, reducing the number of variance strata to 105. Consistency was maintained with the prior structure in that the 2019 variance strata were also numbered within the range of values from 2001 to 2117, although there are now gaps in the values assigned within this range. Because of the modification, each stratum could contain up to 5 variance estimation PSUs.

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

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

Some analysts may be interested in pooling data across multiple years of MEPS data. When doing so, 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 that allowed analysts to pool data from 2002 through 2018. However, analysts can no longer do this routinely because the variance structure had to be modified beginning with 2019.

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

1. When pooling any year from 2002 through 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 file is updated every year so that appropriate variance structures are available with pooled data. Further details on the HC-036 file are included in the public use documentation of the HC-036 file.

4.4.2   Balanced Repeated Replication Method

BRR replicate weights are not provided on this MEPS PUF for the purposes of variance estimation. However, a file containing a BRR replication structure is made 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 have been derived from the final weight through a shortcut approach. Specifically, the replicate weights are not computed starting with the base weight, and all adjustments made in different stages of weighting are not applied independently in each replicate. Thus, the variances computed by 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 1996-2021 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 1996-2021 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, and 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) there may be multiple conditions 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 public use files. This is because the set of households selected for MEPS is a subsample of those participating in the NHIS. For information on obtaining MEPS/NHIS link files please see the MEPS website.

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D. Variable-Source Crosswalk

FOR MEPS HC 248B: 2023 DENTAL VISITS

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
FFEEIDX	Flat fee ID	CAPI derived
PANEL	Panel number	Constructed

Dental Events Variables

Variable	Description	Source
DVDATEYR	Event date - year	CAPI derived
DVDATEMM	Event date - month	CAPI derived
GENDENT_M18	General dentist seen	DN10
DENTHYG_M18	Dental hygienist seen	DN10
DNSPCLST_M18	Dental specialist seen	DN10
PEDDENT_M18	Pediatric dentist seen	DN10
DENTYPE_M18	Other dental specialist seen	DN10
EXAMINEX	General exam, checkup or consultation - edited	DN20 (Edited)
CLENTETX	Cleaning, prophylaxis, polishing or periodontal recall - edited	DN20 (Edited)
JUSTXRYX	X-rays, radiographs or bitewings - edited	DN20 (Edited)
FLUORIDX	Fluoride treatment - edited	DN20 (Edited)
SEALANTX	Sealant application - edited	DN20 (Edited)
FILLINGX	Fillings, inlays, crowns or caps - edited	DN20 (Edited)
ROOTCANX	Root canal - edited	DN20 (Edited)

Variable	Description	Source
GUMSURGX	Periodontal scaling, root planing or gum surgery - edited	DN20 (Edited)
IMPLANTX	Implants - edited	DN20 (Edited)
ORALSURX	Extraction, tooth pulled or oth oral surgery - edited	DN20 (Edited)
BRIDGESX	Fixed or relining/repair of bridges/dentures, removable dentures - edited	DN20 (Edited)
ORTHDONX	Orthodontia, braces or retainers - edited	DN20 (Edited)
DENTPROX	Other dental procedures - edited	DN20OS (Edited)
DENTOTHX	Other specify dental procedures - edited	DN20OS (Edited)

Flat Fee Variables

Variable	Description	Source
FFDVTYPE	Flat fee bundle	Constructed
FFBEF23	Total # of visits in FF before 2023	FF50
FFTOT24	Total # of visits in FF after 2023	FF60

Imputed Expenditure Variables

Variable	Description	Source
DVSF23X	Amount paid, family (Imputed)	CP Section (Edited)
DVMR23X	Amount paid, Medicare (Imputed)	CP Section (Edited)
DVMD23X	Amount paid, Medicaid (Imputed)	CP Section (Edited)
DVPV23X	Amount paid, private insurance (Imputed)	CP Section (Edited)
DVVA23X	Amount paid, Veterans/CHAMPVA (Imputed)	CP Section (Edited)
DVTR23X	Amount paid, TRICARE (Imputed)	CP Section (Edited)
DVOF23X	Amount paid, other federal (Imputed)	CP Section (Edited)
DVSL23X	Amount paid, state & local government (Imputed)	CP Section (Edited)
DVWC23X	Amount paid, workers' comp (Imputed)	CP Section (Edited)
DVOT23X	Amount paid, other insurance (Imputed)	CP Section (Edited)
DVXP23X	Sum of DVSF23X - DVOT23X (Imputed)	Constructed
DVTC23X	Household reported total charge (Imputed)	CP Section (Edited)

Variable	Description	Source
IMPFLAG	Imputation status	Constructed

Weights Variables

Variable	Description	Source
PERWT23F	Expenditure File Person Weight, 2023	Constructed
VARSTR	Variance estimation stratum, 2023	Constructed
VARPSU	Variance estimation PSU, 2023	Constructed