2019 NATIONAL HEALTHCARE QUALITY AND DISPARITIES REPORT
Detailed Methods for the Medical Expenditure Panel Survey

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DETAILED METHODS FOR THE MEDICAL EXPENDITURE PANEL SURVEY

Background

The Medical Expenditure Panel Survey (MEPS) is designed to provide nationally representative estimates of healthcare use, expenditures, sources of payment, and insurance coverage for the U.S. civilian noninstitutionalized population. MEPS is cosponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics (NCHS). MEPS comprises three component surveys: the Household Component (HC), the Medical Provider Component (MPC), and the Insurance Component (IC). The HC is the core survey of MEPS.

The MEPS HC, a nationally representative survey of the U.S. civilian noninstitutionalized population, collects medical expenditure data at both the person and household levels. The HC collects detailed data on:

- Demographic characteristics;
- Health conditions;
- Health status, including adult disability status as measured by activity limitations;
- Use of medical care services;
- Charges and payments;
- Access to care;
- Satisfaction with care;
- Health insurance coverage;
- Income; and
- Employment.

The HC uses an overlapping panel design in which data are collected through a preliminary contact followed by a series of five rounds of interviews over a 2½-year period. Through the use of computer-assisted personal interviewing technology, data on medical expenditures and use for 2 calendar years are collected from each household. This series of data collection rounds is launched each year on a new sample of households to provide overlapping panels of survey data and, when combined with other ongoing panels, will provide continuous and current estimates of healthcare expenditures.

The sample of households selected for the MEPS HC is drawn from respondents to the National Health Interview Survey (NHIS), conducted by NCHS. NHIS provides a

nationally representative sample of the U.S. civilian noninstitutionalized population, with oversampling of Hispanics, Blacks, and Asians starting in 2006. Each new MEPS panel includes some oversampling in the NHIS sample of population groups of particular analytic interest. Since 2010 (Panel 15), the set of MEPS sample domains has included oversamples of Asians, Blacks, and Hispanics. White and other race households have been subsampled at varying rates across the years.

Beginning with the panel that began in 2011 (Panel 16), a new sample domain was created by dividing what in prior years had been a single domain, the "White/other" domain, into two domains, one consisting of NHIS "partial completes," the other of NHIS "completes." The partial completes were sampled at a lower rate than the completes.

More detailed information about MEPS and the information discussed here is in the documentation for the MEPS 2002-2017 Full Year Consolidated Data Files, available at http://www.meps.ahrq.gov.

Time Period

National healthcare estimates from MEPS for the *2019 National Healthcare Quality and Disparities Report* (NHQDR) were derived from the 2002-2017 MEPS HC survey, including the Self-Administered Questionnaire (SAQ), the Child Health and Preventive Care section, and the Diabetes Care Survey (DCS).

The SAQ is a supplement to the MEPS HC that includes:

- Healthcare quality measures taken from the health plan version of CAHPS® (Consumer Assessment of Healthcare Providers and Systems), an AHRQ-sponsored family of survey instruments designed to measure quality of care from the consumer's perspective;
- General health questions;
- Attitudes about health questions; and
- Health status questions as measured by the SF-12 and the EuroQol 5D.

The Child Health and Preventive Care section is part of the regular MEPS HC interview. It includes:

- Healthcare quality measures taken from the health plan version of CAHPS®;
- Children with Special Health Care Needs (CSHCN) Screener questions;
- Children's general health status as measured by several questions from the General Health Subscale of the Child Health Questionnaire;

- Columbia Impairment Scale questions about possible child behavioral problems; and
- Child preventive care questions.

Researchers should note that the CAHPS® and CSHCN questions changed from a self-administered parent questionnaire in 2000 to an interviewer-administered questionnaire starting in 2001.

Another supplement to the MEPS HC, the DCS, is a self-administered questionnaire given to people identified with diabetes. It questions respondents about the care they received in the treatment of their diabetes.

Population Characteristics

Estimates derived from MEPS are presented at both an aggregate level and for select subpopulations. Characteristics used to define subpopulations include:

- Age,
- Gender,
- Race,
- Ethnicity,
- Family income,
- Education,
- Employment status,
- Health insurance,
- Medicaid/Children's Health Insurance Program for people under age 65,
- Residence location,
- Employment status,
- Perceived health status,
- Children with special healthcare needs,
- Adult disability status as measured by activity limitations,
- Number of chronic conditions,
- Language spoken at home/language spoken most often at home,
- Whether U.S. born,
- Usual primary care provider,
- CAHPS® composite measure,
- Adults age 65 and over who received potentially inappropriate prescription medications in the calendar year, and
- Financial burden of healthcare costs and underinsurance.

A brief definition of each of these population characteristics follows.

Age—With the exception of analytic variables associated with round-specific questions noted below, age was defined as a person's age on December 31 of the data year.

For measures using analytic variables associated with round-specific questions (e.g., questions from the SAQ, the Child Health and Preventive Care supplement, and access-to-care measures), corresponding round-specific age variables were used to determine age.

Gender—Male or female.

Race—MEPS tables are shown starting with 2002 data, the year MEPS transitioned to the Office of Management and Budget (OMB) standards issued in 1997 for collecting racial and ethnic data. The new standards allow respondents to identify more than one racial group (https://www.govinfo.gov/app/details/FR-1997-10-30/97-28653). For all tables, race is classified into five single-race categories and a multiple-race category: (1) White, (2) Black, (3) Asian, (4) Native Hawaiian or Other Pacific Islander, (5) American Indian or Alaska Native, and (6) multiple races. Because of differences in the classification of race, racial estimates reported using MEPS data from 2002 and subsequent years is not directly comparable with estimates that use data before 2002.

Ethnicity—Ethnicity was designated as either Hispanic or non-Hispanic. People of Hispanic origin may be of any race. Estimates were derived for both Hispanic and non-Hispanic subpopulations. In addition, race was combined with ethnicity to enable estimation of data for categories that include non-Hispanic White, non-Hispanic Black, and non-Hispanic other. For 2002 and later years, non-Hispanic White and non-Hispanic Black categories excluded multiple-race individuals. Beginning with the 2019 NHQDR, non-Hispanic Asian data are also analyzed.

Family income—MEPS includes a five-level categorical variable for family income as a percentage of the federal poverty level (FPL). For construction of this variable, definitions of income, family, and poverty are taken from the poverty statistics developed by the Current Population Survey. For the purposes of analysis and reporting in the NHQDR, the near-poor and low-income categories were combined. This process resulted in a four-level categorical variable of poverty status: (1) negative or poor refers to household incomes below the FPL; (2) near poor/low income, from the FPL to just below 200 percent of the FPL; (3) middle income, 200 percent to just below 400 percent of the FPL; and (4) high income, 400 percent or more of the FPL.

Education—The education variable was constructed only for people age 18 years and over and any measure presented for the education subpopulations includes only people

in this age group. Reporting of educational attainment is based on the number of completed years of education when they first entered MEPS. For the NHQDR, this measure was grouped into three categories: (1) less than high school refers to people with less than 12 completed years of education; (2) high school graduate, people with exactly 12 completed years of education; and (3) at least some college, people with greater than 12 completed years of education. A different education question was asked in 2012-2014 and was used to produce estimates for the same three categories.

Health insurance coverage—Insurance coverage was constructed in a hierarchical manner and in relation to a person's age. For the population under age 65, those who were uninsured for the entire year were classified as "uninsured"; those who had any private coverage at any time during the year (including TRICARE/CHAMPVA) were classified as having "private insurance"; and those who had only public coverage (i.e., no private) at any time during the year were classified as "public only." The population age 65 and over was classified as "Medicare only," "Medicare and private," or "Medicare and other public assistance." A small number of people age 65 and over were found to only have private insurance or to be uninsured. This residual group is not shown in the tables.

Medicaid/CHIP for people under age 65—The Medicaid coverage variable was constructed in a hierarchical manner based on yearly and monthly insurance variables for people under age 65. First, if a person had any Medicaid or CHIP coverage for at least one month , the person was classified as "Any Medicaid/CHIP." If a person did not have any coverage in any month, the person was classified as "Uninsured all year." If a person did not have Medicaid in any month but had other insurance in at least one month, the person was classified as "Other non-Medicaid/CHIP."

Two additional subcategories were defined for people with Medicaid/CHIP coverage. "Only Medicaid/CHIP" included people with Medicaid/CHIP only, no evidence of other types of insurance. "Medicaid/CHIP with other" included people who also had other types of insurances.

People with "Only Medicaid/CHIP" were further grouped into "full year" or "part year." Full-year coverage included people whose number of months with Medicaid coverage was the same as with any type of coverage. Part-year coverage included people whose total coverage months exceeded Medicaid/CHIP coverage.

Residence location—The NCHS Urban-Rural Classification Schemes for Counties (URCSC) were used as location of residence. The 2003-2017 NHQDR used the 2006 URCSC. Beginning with the 2018 NHQDR, the 2013 URCSC is used.

The 2003 NCHS URCSC is based on the OMB December 2005 delineation of metropolitan and nonmetropolitan counties; the Rural-Urban Continuum Codes and the Urban Influence Codes developed by the Economic Research Service of the U.S. Department of Agriculture; and county-level data from Census 2000 and 2004 postcensal population estimates.

Urban-rural categories are:

1. Large central metro ("central" counties of metropolitan area of 1 million or more population).
2. Large fringe metro ("fringe" counties of a metropolitan area of 1 million or more population).
3. Medium metro (counties in metropolitan areas of 250,000 to 999,999 population).
4. Small metro (counties in metropolitan areas of 50,000 to 249,999 population).
5. Micropolitan (counties with at least one urban cluster of at least 10,000 residents).
6. Noncore (counties without an urban cluster of at least 10,000 residents).

The two nonmetropolitan levels of the NCHS classification, micropolitan and noncore, are derived directly from the differentiation of nonmetropolitan territory specified in the 2003 OMB standards for defining metropolitan and micropolitan counties. More information is available at http://www.cdc.gov/nchs/data_access/urban_rural.htm.

Employment status—MEPS includes four-level round-specific categorical variables for employment status for people age 16 years and over. For the MEPS tables, employment status variables were set for adults ages 18-64. For the NHQDR, Employment status was grouped into two categories: Employed, which refers to adults who were (1) currently employed, (2) had a job to return to, or (3) had a job but did not work during the reference period; and Not employed.

Perceived health status—MEPS includes five-level round-specific categorical variables for perceived health status; these categories include "excellent," "very good," "good," "fair," and "poor." For purposes of analyzing data in the NHQDR, these five levels were collapsed into two: (1) excellent, very good, or good; and (2) fair or poor.

Children with special healthcare needs—The Child Health and Preventive Care section identifies children with special healthcare needs (CSHCN) based on the CSHCN Screener instrument developed through a national collaborative process as part of the Child and Adolescent Health Measurement Initiative under the coordination of the Foundation for Accountability. Children whose special healthcare needs status could not

be determined were coded as "unknown." Data for individuals classified as "unknown" are not shown in the NHQDR tables.

Adult disability status as measured by activity limitations—The MEPS disability measures used in the 2018 NHQDR were for adults and have been used in the NHQDR (previously the NHQR/NHDR) since 2007. They were based on the work of an interagency Disability Working Group (DWG) that AHRQ convened to develop cross-survey comparable measures of disability for use with existing data of surveys included in the NHQDR.

For the purpose of the NHQDR, adults with disabilities are defined to be those with physical, sensory, and/or mental health conditions that can be associated with a decrease in functioning in such day-to-day activities as bathing, walking, doing everyday chores, and/or engaging in work or social activities. The DWG recommended using paired measures in displaying disability data for adults to preserve the qualitative aspects of the data.

The first measure, limitations in *basic activities*, represents problems with mobility and other basic functioning at the person level. The second measure, limitations in *complex activities*, represents limitations encountered when the person, in interaction with his or her environment, attempts to participate in community life.

Limitations in *Basic activities* include problems with mobility; self-care (activities of daily living); domestic life (instrumental activities of daily living); and activities dependent on sensory functioning (limited to people who are blind or deaf). Limitations in *Complex activities* include limitations experienced in work; and in community, social, and civic life.

These two categories are not mutually exclusive; people may have limitations in basic activities *and* in complex activities. The residual category *neither* includes adults with neither basic nor complex activity limitations.

Adult disability status - The MEPS disability variables used in the 2019 NHQDR were defined by following the methodology of the American Community Survey, which is different from the Activity Limitation used in the 2007-2018 NHQDR.

Adults age 18 and over are defined as having a disability if they reported serious difficulty in hearing, serious difficulty in vision, serious cognitive difficulty, serious difficulty in walking or climbing stairs, difficulty in dressing or bathing, or difficulty in doing errands. Adults who did not report any of the six areas were excluded.

Language spoken at home/Language spoken most often at home—From 2002 to 2013, families were asked what language was spoken in their home most of the time, with categories of English, Spanish, and Other. The categories were collapsed into two levels: English; and Other (includes Spanish and Other).

In 2014, the questionnaire changed and families were asked whether anyone age 5 and above in their family spoke a language other than English at home. The two categories with this question are: Speak only English; and Speak language other than English. Thus, only data beginning in 2014 are shown in the NHQDR tables since they are not comparable with data in previous years.

Whether U.S. born—The Access to Care section ascertains whether a person was born in the United States. This question was previously asked only if a language other than English was spoken in the home and only of those people uncomfortable speaking English. Beginning in 2007, the question has been asked of all residential unit members regardless of the language most often spoken in the home and regardless of whether all household members are comfortable speaking English. Therefore, only data beginning in 2007 are shown in the NHQDR tables.

Usual primary care provider—People are considered to have a usual primary care provider if they have a usual source of care not located in a hospital emergency room, to whom they go for new health problems; preventive healthcare such as general checkups, examinations, and immunizations; and referrals to other professionals when needed.

CAHPS® composite measure (adults and children)—This measure identified people who had a doctor's office or clinic visit in the last 12 months whose health providers listened carefully, explained things clearly, showed respect for what they had to say, and spent enough time with them.

For adults (children) who had a doctor's office or clinic visit in the last 12 months, percent distribution of how often the response categories of Always, Usually, and Sometimes or Never were selected for the four CAHPS questions asking about health providers: (1) listening carefully; (2) explaining things clearly; (3) showing respect for what they had to say; and (4) spending enough time with them. For example, if a person responded "Always" for each of the four questions, the composite measure would be 100% for Always, 0% for Usually, and 0% for Sometimes or Never. If a person did not complete all four questions, the percentage estimates were weighted by the percentage of the four questions that they completed.

Adults age 65 and over who received potentially inappropriate prescription medications in the calendar year—Prescription medications received includes all

prescribed medications initially purchased or otherwise obtained during the calendar year, as well as any refills. Inappropriate medications are defined by the implementation of the Beers criteria in MEPS.[1] According to this definition, the 11 drugs that should always be avoided for older patients include barbiturates, flurazepam, meprobamate, chlorpropamide, meperidine, pentazocine, trimethobenzamide, belladonna alkaloids, dicyclomine, hyoscyamine, and propantheline.

The 22 drugs that should often be avoided for older patients include carisoprodol, chlorzoxazone, cyclobenzaprine, metaxalone, methocarbamol, amitriptyline, chlordiazepoxide, diazepam, doxepin, indomethacin, dipyridamole, ticlopidine, methyldopa, reserpine, disopyramide, oxybutynin, chlorpheniramine, cyproheptadine, diphenhydramine, hydroxyzine, promethazine, and propoxyphene.

Financial burden of healthcare costs and underinsurance—Financial burden of healthcare costs and underinsurance are defined for people under age 65. Financial burden of healthcare costs is defined when a person's family level out-of-pocket health insurance premiums and medical expenditures are greater than 10 percent of total family income. Underinsurance is defined for people with private insurance when a person's family level out-of-pocket medical expenditures (excluding premiums) are greater than 10 percent of total family income.[2]

The following family level variables are defined for these measures.

Family. The definition of family is based on the MEPS health insurance eligibility unit (HIEU), which includes all members of the family who would typically be covered under a private insurance family plan. HIEUs include adults, their spouses, and their unmarried natural/adoptive children under age 18 and children under age 24 who are full-time students.

Nonelderly families include families in which at least one person is under age 65. In these cases, family-level expenditures include the expenditures for the elderly person as well. Elderly families in which all people are age 65 years or above are not included in this analysis.

Out-of-pocket expenditures on healthcare services. Out-of-pocket expenses include all out-of-pocket payments for deductibles, coinsurance, copayments, and payments for any noncovered services and supplies. Using the HIEU definition of family unit, we add out-of-pocket expenditures on healthcare services across all members of the family to calculate family-level out-of-pocket expenditures on healthcare services.

Out-of-pocket expenditures on health insurance premiums. MEPS collects out-of-pocket expenditures on premiums for private health insurance from household respondents. We add private out-of-pocket premium costs and (imputed) Medicare Part B premiums across all health insurance policies covering family members. For example, if there are two single policies covering the two adults of a childless couple unit, we add these together. Premiums are prorated to account for the number of months of coverage during the year. For employer-sponsored group coverage, employer contributions toward premiums are not included in this analysis.

Person-level insurance status. Results are reported by individual health insurance status, which is defined hierarchically for the categories below:

- Private, employer sponsored: people who had at least 1 month of employer-sponsored insurance and no uninsured months in the year.
- Private, nongroup: people who had least 1 month of nongroup private insurance and no uninsured months in the year.
- Public only: people who had public insurance only for all available months in MEPS during the year.
- Part-year uninsured: people whose number of uninsured months is less than the number of available months in MEPS during the year.
- Full-year uninsured: people whose number of uninsured months is equal to the number of available months in MEPS during the year.

Total family income. Total family income is the sum of person-level pretax total income, refund income, and sales income.

Round-specific variables—For analytic data collected during specific rounds, age and other population characteristics variables were also defined using the round-specific variables. In some cases, missing values were replaced with the value from the closest prior round.

MEPS Estimates

MEPS estimates were generated for each year from 2002-2017. Standard errors of the estimates were provided to permit an assessment of sampling variability. All estimates and standard errors were derived using SUDAAN statistical software, which accounts for the complex survey design of MEPS.

All estimated proportions and ratios are weighted to reflect the experiences of the U.S. civilian noninstitutionalized population at the aggregate and subpopulation levels. Person-level weights, specific to the SAQ and DCS, were used for measures derived with

data from these supplements. For other person-level measures, including those from the Child Health and Preventive Care section, the overall person-level weight was used. In analyzing data from the Child Health and Preventive Care section, the full file should be used subset to those cases eligible for this section. More information about these weights is available from the MEPS website: http://www.meps.ahrq.gov.

In analyzing data from the DCS, a "diabetes pseudo-weight" was used with the file subset to cases where the original DCS weight was positive in order to produce the same variance estimates using different statistical software. The "diabetes pseudo-weight" was defined to equal the diabetes weight when the diabetes weight was positive, to equal 1 when the diabetes weight was zero and the SAQ weight was positive; and was set as undefined when the SAQ weight was zero.

Some MEPS measures were age adjusted to the 2000 U.S. standard population. Among the measures that are age adjusted are the following pertaining to:

- Diabetes.
- Asthma.
- Adult current smokers.
- Adults with obesity.

Measures pertaining to children were not age adjusted. Table 1 lists measures that are age adjusted in the NHQDR and provides information about the age groups used for adjustment.

Table 1. Age-adjusted measures in the National Healthcare Quality and Disparities Report

Measure Title	Age Groups Used in Adjustment (Years)
Composite measure: Adults age 40 and over with diagnosed diabetes who received all four recommended services for diabetes in the calendar year (2 or more hemoglobin A1c measurements, dilated eye examination, foot examination, and flu vaccination)	40-59, 60+
Adults age 40 and over with diagnosed diabetes who received 2 or more hemoglobin A1c measurements in the calendar year	40-59, 60+
Adults age 40 and over with diagnosed diabetes who received a dilated eye examination in the calendar year	40-59, 60+
Adults age 40 and over with diagnosed diabetes who had their feet checked for sores or irritation in the calendar year	40-59, 60+
Adults age 40 and over with diagnosed diabetes who received a flu vaccination in the calendar year	40-59, 60+
People with current asthma who are now taking preventive medicine daily or almost daily (either oral or inhaler)	0-17, 18-44, 45-64, 65+
Adult current smokers with a checkup in the last 12 months who received advice to quit smoking	18-44, 45-64, 65+

Measure Title	Age Groups Used in Adjustment (Years)
Adults with obesity who ever received advice from a health professional to exercise more	18-44, 45-64, 65+
Adults with obesity who ever received advice from a health professional about eating fewer high-fat or high-cholesterol foods	18-44, 45-64, 65+
Adults with obesity who do not spend half an hour or more in moderate or vigorous physical activity at least five times a week	18-44, 45-64, 65+

Tables containing estimates from MEPS are available from the Data Query Tool on the National Healthcare Quality and Disparities Reports' website at https://nhqrnet.ahrq.gov/inhqrdr/. Consistent with the established criteria for data reporting in the NHQDR, MEPS estimates in the tables are suppressed when they are based on sample sizes of fewer than 100 or when their relative standard errors are 30% or more. In the tables, the cell value of these estimates is replaced with the notation DSU (data statistically unreliable). Records in which analytic variables have missing values were excluded for most analysis.

References

1. Zhan C, Sangl J, Bierman AS, et al. Potentially inappropriate medication use in the community-dwelling elderly: findings from the 1996 Medical Expenditure Panel Survey. JAMA 2001 Dec 12; 286(22):2823-29. https://pubmed.ncbi.nlm.nih.gov/11735757/. Accessed December 23, 2020.
2. Bernard D. Banthin J. Family-Level Expenditures on Health Care and Insurance Premiums Among the U.S. Nonelderly Populations, 2004. Research Findings No. 26. Rockville, MD: Agency for Healthcare Research and Quality; April 2007, Available at: https://meps.ahrq.gov/mepsweb/data_stats/Pub_ProdResults_Details.jsp?pt=Research+Findings&opt=2&id=812. Accessed December 23, 2020.