

Reconciling Medical Expenditure Estimates from the MEPS and NHEA, 2012

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Abstract

Objective: Our goal is to reconcile health care expenditure estimates for 2012 from the Medical Expenditure Panel Survey (MEPS) with those from the National Health Expenditure Accounts (NHEA). Reconciling these estimates serves two important purposes: it is an important quality-assurance exercise for improving and ensuring the integrity of each source's estimates, and it provides a consistent baseline of health expenditure data for policy simulations. Our results assist researchers in adjusting the MEPS to be consistent with the NHEA so that the projected impacts of any policy change, as well as budgetary and tax implications, are consistent with national health spending estimates.

Data Sources: Our two data sources are (i) the Medical Expenditure Panel Survey produced by the Agency for Healthcare Research and Quality and (ii) the National Health Expenditure Accounts produced by the Office of the Actuary at the Centers for Medicare & Medicaid Services (CMS).

Results: In this study, we focus on personal health care (PHC) spending, which includes the goods and services rendered to treat or prevent a specific disease or condition in an individual. The 2012 NHEA estimate for PHC spending is \$2,367 billion, and the MEPS estimate is \$1,351 billion. Adjusting the estimates for differences in underlying populations, covered services, and other measurement concepts reduces the NHEA estimate for 2012 to \$1,718 billion; after adjustments to the NHEA, the MEPS is \$367 billion, or 21.4 percent, less than the adjusted NHEA total in 2012.

Keywords: national health accounts, medical expenditures, health care costs, health financing, health resource

Introduction

The National Health Expenditure Accounts (NHEA) and the Medical Expenditure Panel Survey (MEPS) provide comprehensive estimates of health care spending in the U.S. The NHEA estimates are produced annually by the Office of the Actuary at the Centers for Medicare & Medicaid Services (CMS). Based on aggregate provider revenue data, administrative records of publicly administered programs, and a variety of other data sources, the NHEA provide, for the entire U.S. population, aggregate estimates for a full range of health care expenditures, including medical goods and services, government administration, net cost of insurance, public health services, and investment in research, structures, and equipment. As a result, the NHEA are typically regarded as the official source for U.S. government estimates of overall health spending, and they constitute the only comprehensive data available by type of service and source of funding. The MEPS is produced annually by the Agency for Healthcare Research and Quality (AHRQ). It, too, provides detailed estimates of health expenditures, but the MEPS estimates are based on person-level information from a nationally representative sample of households in the civilian, non-institutionalized population. Analysts often use the MEPS and the NHEA in concert, with the MEPS providing person-level data on expenditures, insurance coverage, and demographics and the NHEA providing aggregate national health spending totals that are considered the most comprehensive estimates available. Together, these two data sources can be used for microsimulation models for projecting health spending.

Study Data and Methods

In this paper we reconcile the NHEA and the MEPS for 2012 in order to make use of detailed estimates from the U.S. Census Bureau's quinquennial Economic Census. There has been three prior reconciliations of NHEA and MEPS since 1996. Reconciling the NHEA and the MEPS

estimates serves two important purposes. First, it is an important quality-assurance exercise for improving and ensuring the integrity of each source's estimates. Identifying service types and sources of payment that differ substantially between the NHEA and the MEPS helps AHRQ and CMS focus future research efforts on improving their respective expenditure estimates. Second, a detailed MEPS-NHEA reconciliation offers useful guidance to analysts seeking to align the MEPS with the NHEA to obtain a consistent baseline of health expenditure data for policy simulations and other research that requires household-level data (Bernard, Selden, and Pylypchuk, 2016; Bernard, Selden, and Pylypchuk, 2015a; Bernard, Selden, and Pylypchuk, 2015b; Heffler *et al.*, 2009; and Cohen J. *et al.*, 2009).

Although each source provides a measure of national spending on personal health care (PHC), unadjusted estimates are considerably different. We make adjustments to account for the differences in underlying populations, covered services, and other measurement concepts to reconcile the expenditure estimates. Once we adjust the NHEA for consistency with the MEPS, we compare and discuss potential reasons for the differences for each service category and source of payment. We also discuss how the expenditure estimates have changed since the 1996, 2002, and 2007 reconciliations, focusing on differences from the most recent reconciliation for 2007 (Selden *et al.*, 2001; Sing *et al.*, 2006; and Bernard *et al.*, 2012).

The NHEA

The NHEA measure the total annual dollar amount of health care consumption in the U.S., as well as the dollar amount invested in medical sector structures and equipment and non-commercial research (CMS, 2016a and 2016b). In this study, we focus on PHC, which includes the goods and services rendered to treat or prevent a specific disease or condition in an individual. The latest NHEA estimate for PHC spending in 2012 is \$2,367 billion (85 percent of

total health spending). Table 1 presents the unadjusted NHEA estimates for 2012 by service and source of payment categories.

The Office of the Actuary develops the NHEA expenditure totals by type of service using aggregate estimates of provider revenues from data sources such as the U.S. Census Bureau's Economic Census and Service Annual Survey, the American Hospital Association (AHA), IQVIA (retail prescription drug sales), and government administrative data. The Office of the Actuary does not directly collect any of the data but uses a variety of surveys and other data sources to construct the estimates. While all of these data sources may have sampling errors or biases associated with them, it is not possible to develop a single sampling error estimate for the NHEA.

Hospital care expenditures comprise revenues from all sources, including net patient revenue (gross charges less contractual adjustments, bad debts, and charity care), non-patient revenue (such as cafeteria revenue), non-operating revenue, and government appropriations. Included in the hospital care category are expenditures for hospital services, as well as revenues received for inpatient pharmacy, hospital-based nursing home care, hospital-based home health care, and fees for any other services billed by the hospital. Expenditures for physician and clinical services, dental services, other professional services, home health care, and nursing care facility and continuing care retirement community services, along with a portion of other health, residential, and personal care including private ambulance services and Intermediate Care Facilities for the Intellectually Disabled, are primarily based upon the total receipts/revenue collected by the 2012 Economic Census (CMS, 2016b). Spending for prescription drugs includes retail sales of human-use dosage-form drugs, biological drugs, and diagnostic products, and is net of rebates.

For the NHEA expenditures by source of payment, estimates of government program spending are computed by service using program data such as Medicare claims data, Medicaid CMS-64 reports from the states, and budget data. The residual of total expenditures for each good and service category minus spending on government programs is allocated, among out-of-pocket, private health insurance (PHI), and private non-patient revenue, based on a range of data sources (including the Census Bureau's Service Annual Survey, the AHA Annual Survey of Hospitals, the MEPS, and other data sources). These results are then compared with other study results (including the MEPS) for reasonableness.

Every five years the NHEA undergo a comprehensive revision that includes the incorporation of newly available source data, methodological and definitional changes, and benchmark estimates from the U.S. Census Bureau's quinquennial Economic Census. The changes that were incorporated during the more recent comprehensive revision are documented on the CMS website (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-reports/NationalHealthExpendData/Downloads/benchmark2014.pdf>).

During the most recent comprehensive revision, there was a modification of the NHEA method used to allocate Medicaid managed care premiums to goods and services. This change was incorporated for states that have a large percentage of Medicaid managed care spending. Data from the Medicaid CMS-64 submission were supplemented with data from the AHA Annual Survey and the MEPS, along with Medicaid program data from such sources as the Medicaid Analytic Extract (MAX) and the Medicaid Drug Rebate System. The net effect was a downward revision to the hospital care and home health care estimates, and upward revisions to physician and clinical services, dental services, and other professional services and nursing care facilities and continuing care retirement communities.

In addition, the Department of Defense (DOD) estimate was revised to incorporate new data for U.S.-only spending obtained directly from the DOD Medical Expense & Performance Reporting System, and part of the Veterans Health Administration hospital spending was reclassified to other health, residential, and personal care spending.

The MEPS

The MEPS is a household survey designed to support nationally representative estimates of health expenditures and use, health insurance coverage, health status, employment, and demographic and socioeconomic characteristics of the civilian, non-institutionalized U.S. population (Cohen, 1997). The MEPS is produced by AHRQ.

The MEPS expenditure data are based on household-reported information on health care use and expenditures. The survey has an overlapping panel design in which data are collected through five rounds of interviews during a two and a half-year period to cover use and expenditures over two calendar years. The MEPS sample includes data from 37,182 individuals, with a positive sampling weight in calendar year 2012 (AHRQ, 2014). Because households may have difficulty reporting third-party payments, the MEPS supplements household reports of such payments with data obtained through a follow-back survey of providers (AHRQ, 2008). Table 2 presents the unadjusted MEPS expenditure estimates for the civilian, non-institutionalized population by type of service and source of payment in 2012. The total expenditure estimate is \$1,351 billion with a 95-percent confidence interval of \$1,286 billion to \$1,415 billion.

NHEA and MEPS differences

The NHEA and MEPS differ with respect to included populations, included services, service category definitions, inclusion of payments such as grants and supplemental payments, public

health spending, and investment in medical care for future consumption. Populations that are included in the NHEA but that are out of scope for the MEPS include active duty military personnel, foreign visitors to the U.S., and people in institutions such as nursing homes and assisted living facilities.

The MEPS excludes spending on non-prescription non-durable goods (for example, over-the-counter medications) and is unlikely to capture other health, residential, and personal care (OHRPC) services. The NHEA category of OHRPC covers health services provided in non-traditional settings, including school health care, worksite health care, Medicaid home and community-based waivers, some ambulance services, and residential mental health and substance abuse facilities. The largest payer of OHRPC services is Medicaid through its home and community-based waivers. Because many of these waivers involve non-medical assistance with activities of daily living, they were deemed out of scope for the purpose of this analysis, although the MEPS may capture a small amount of personal health care.

While service categories in the NHEA are defined according to the type of establishment that collected the revenue, in the MEPS they are defined according to the type of service provided to an individual. For example, expenditures for hospital-based home health care are included in the hospital care category in the NHEA but are included in the home health category in the MEPS.

With respect to payments, the MEPS provides estimates for expenditures that are directly linked to patient care events and accordingly does not measure provider grants and lump-sum retrospective adjustments that are included in the NHEA. For instance, the MEPS does not include maternal and child health grants for public and other community health clinics, Medicaid disproportionate share hospital (DSH) payments, and certain lump-sum provider payments

associated with managed care (see discussion below). In terms of funding sources, the MEPS excludes private non-patient care revenues, such as revenues from philanthropic giving, cafeterias, and investment income. Finally, the MEPS also does not include public health programs and investments (research, structures, and equipment).

NHEA adjustments

There are four general types of adjustments that are made to the NHEA for consistency with the MEPS: (i) alignment of service categories, (ii) adjustment of the scope of included populations, (iii) adjustment for patient care services not included in the MEPS, and (iv) adjustment for expenditures not tied to specific patient events. Table 3 summarizes some of the adjustments we make to align the NHEA and MEPS service categories, and Table 4 summarizes the subtractions from, and additions to, the NHEA that make the included population and patient care expenditures more consistent with the MEPS. Whereas Tables 3 and 4 provide aggregate service-level changes, our detailed reconciliation adjusts the NHEA by type of service and source of payment. These adjustments require detailed estimates for expenditure categories and population subsets that are often difficult to measure accurately.

One of the adjustments included in Table 4 is for the acute care expenditures of the institutionalized population. In this reconciliation, we use the same methodology that we used in the 2007 reconciliation for estimating the amount that the institutionalized population spends on health care outside of the institution. Acute care expenditures for the institutionalized Medicare beneficiaries are based on the Medicare Current Beneficiary Survey (MCBS). In addition, we exclude expenditures for Medicare beneficiaries with skilled nursing facility stays that are longer than 30 days—stays that are likely to be counted as institutionalization in the MEPS. For institutionalized Medicaid enrollees without Medicare, we use the Medicaid Statistical

Information System; for institutionalized people without Medicare or Medicaid and for the prison population, we developed the estimates as we did in prior reconciliations by applying age-specific expenditure estimates from the MEPS and MCBS to population totals from a number of data sources, including the Social Security Administration and the Department of Justice. Additionally, we reduced the estimate of institutionalized acute care spending by \$22.4 billion—expenditures that were captured by the MEPS for persons who were institutionalized during the year and that occurred while these persons were in the community—so that for this reconciliation we subtract from the NHEA only the amount of spending that is outside the scope of MEPS.

Table 4 also includes adjustments to the NHEA to align with the MEPS other Federal, other State and Local, and other source of payment categories. We replace the expenditures in the NHEA other Federal and other State and Local categories with the corresponding MEPS amounts because these NHEA payment categories are dominated by spending not directly linked to individual patients. Examples include funds supporting the operation of public and other community health clinics, such as maternal and child health expenditures and some subsidies for public clinics and hospitals. With respect to the MEPS other source of payment category, which includes private non-health insurance payments (primarily property and casualty insurance) and miscellaneous payment sources, no corresponding category exists in the NHEA. We add this payment category to the adjusted NHEA, and we offset this addition by removing equal amounts from the NHEA PHI column (by service category), since property and casualty insurance payments for medical expenses are included in the NHEA PHI estimate. We remove the NHEA private non-patient revenue expenditures because these funds (which include revenues from philanthropic giving, gift shops, cafeterias, and investment income) are not directly linked to a specific patient care event and therefore are not captured by the MEPS (but can be used by

hospitals to offset costs). Due to a lack of reliable estimates, we make no adjustment for provider revenues received from uncompensated care pools or similar indigent care programs that reimburse providers in some states for care, though such payments are unlikely to have been captured by the MEPS.

Study Findings

The adjusted NHEA estimate for 2012 is \$1,717.9 billion (Table 5), compared with the unadjusted NHEA estimate of \$2,366.9 billion (Table 1). Thus, our reconciliation removes \$649 billion from the NHEA. The total MEPS expenditure estimate is \$1,350.7 billion (Table 2), or \$367.2 billion—21.4 percent—less than the adjusted NHEA total (Table 6).

Comparisons with previous reconciliations

There have been three prior reconciliations between the NHEA and MEPS. The NHEA-MEPS difference of 21.4 percent is higher than the differences found in 2007 (17.6 percent), in 2002 (13.8 percent), and in 1996 (6.7 percent). However, this apparent widening of the MEPS-NHEA gap should be interpreted with caution. As discussed by Sing *et al.* (2006), the 2002 reconciliation differed in many respects from the 1996 reconciliation; that is, estimates of acute care spending by the institutionalized were improved, Economic Census data were better aligned for use in the reconciliation due to the shift in industry coding (from the Standard Industrial Classification to the North American Industry Classification System), and in several instances the definition of what was deemed in scope for the MEPS was broadened to include certain hard-to-measure spending categories. All of these modifications in methodology had the effect of widening the apparent gap between the NHEA and MEPS between 1996 and 2002.

With respect to the difference between 2002 and 2007, once again methodological improvements complicate interpretation. One such enhancement was that, for the 2007 reconciliation, for the first time, the NHEA included ambulance expenditures beyond those paid by Medicare and Medicaid (an increase of \$7.9 billion or 0.6 percent of the adjusted NHEA). Moreover, the 2007 analysis further refined estimates of acute care spending by the institutionalized. In addition to drawing upon better data, the 2007 analysis included a \$14.7-billion adjustment, not explicitly made in 2002, for expenditures of individuals institutionalized part of the year for health care use during time they spent in the community. It is also important to note that, as is the case with any survey database, estimates in the MEPS fluctuate from year to year, in part due to random sampling variation. Relative standard errors for the MEPS aggregate expenditure estimates generally range between two and three percent, and estimates by type of service and source of payment can have larger relative standard errors. The 2002 reconciliation pooled MEPS data from 2002 and 2003, a factor that helped reduce variation but that also narrowed the overall NHEA-MEPS gap by nearly two percentage points.

The increased gap between 2007 and 2012 from 17.6 to 21.4 percent, is explained in part by three key factors. First, the MEPS experienced a sharp drop in the number of household-reported office-based visits in 2010-2012, requiring adjustments to the final weights in the full-year consolidated MEPS public use files for 2010 through 2012. This drop also led to intensive efforts to improve MEPS field procedures and interviewer behavior in 2013-2014 (Zuvekas, Beiner, and Dicks, 2017).

A second factor is that the levels subtracted from the NHEA for nursing home spending and the institutionalized population remained almost as high in 2012 as in 2007, while the levels added from prescription drug rebates were much larger. Adjusted nursing home expenditures, the

largest subtraction from the NHEA, were \$144.5 billion in 2007 (10.6 percent of adjusted NHEA) compared to \$164.7 billion in 2012 (9.6 percent). Likewise, the acute care expenditures of the institutionalized population, the third largest subtraction from the NHEA, were \$98.1 billion in 2007 (7.2 percent of adjusted NHEA) compared to \$98.7 billion in 2012 (5.8 percent). Prescription drug rebates, an addition to the NHEA, were \$17.3 billion in 2007 (1.3 percent of adjusted NHEA) versus \$33.0 billion in 2012 (1.9 percent). A third factor that explains the gap increase is the replacement of the NHEA other public expenditures with the MEPS other public expenditures, which decreased adjusted NHEA by \$1.3-billion in 2007 and increased adjusted NHEA by \$4.5 billion in 2012. The result was an additional increase of \$5.8 billion (\$1.3 billion + \$4.5 billion) in the NHEA-MEPS gap from 2007 to 2012.

In the remainder of the paper we discuss the differences between the MEPS and NHEA expenditure estimates by type of service and source of payment, focusing on the largest service and payment categories.

Comparison by service category

The adjusted NHEA expenditure estimates are greater than those from the MEPS for most service categories (Table 6). In both the NHEA and MEPS, the two largest spending categories are hospital and physician, which together account for 65.4 percent of the overall NHEA-MEPS difference. For the hospital sector, the MEPS is \$166.2 billion, or 25.2 percent, lower than the adjusted NHEA. PHI accounts for 47.1 percent of the difference in hospital expenditures, while Medicaid accounts for 24.6 percent and Medicare 22.4 percent. For out-of-pocket hospital spending, the MEPS is 6 percent, or \$1.3 billion, higher than the adjusted NHEA. A comparison between the MEPS and Truven MarketScan and OptumLabs claims data for 2008-2013 revealed that part of the shortfall in the MEPS may stem from the survey's data including too few stays

with extreme costs. Although cases with spending greater than \$100,000 in the 2013 MEPS data accounted for 13 percent of total expenditures, such cases accounted for 18.7 percent and 21.8 percent of total expenditures in Truven MarketScan and OptumLabs claims data in 2013, respectively (Zuvekas, 2017). Long hospitalizations and those that result in death, institutionalization, or a change in residence following discharge all pose difficulties for measurement by the MEPS.

The MEPS spending for physician services is \$73.9 billion, or 19.3 percent, below the adjusted NHEA spending. As mentioned previously, there was a significant drop in the number of household-reported office-based visits in MEPS in 2010-2012, requiring adjustments to the final weights in the full-year consolidated MEPS public use files for 2010 through 2012. It is important to recognize that there may be imperfections in our alignment of the NHEA and MEPS that lead to hospital expenditures being reported as physician expenditures. It may not always be clear to the MEPS respondents whether a particular ambulatory visit is to a physician office or clinic or it is to an outpatient facility owned by a hospital. In prior reconciliations, the gap for hospital expenditures was smaller than that for physician expenditures, a result that we had interpreted as the MEPS respondents being able to recall major events, such as hospitalizations or emergency room visits, more easily than office or clinic visits. However, in 2012 we find that the gap is larger for hospital than the gap for physician services in percentage terms.

Other factors may help explain the NHEA-MEPS gap for the physician sector. Although the reconciliation makes several adjustments for provider payments not linked to patient events (such as the removal from the NHEA of Medicaid DSH, Graduate Medical Education, Indirect Medical Education, and private non-patient revenues), there may be other provider payments that are not directly linked to events collected in the MEPS. For example, although the MEPS

contains event-level expenditures for capitated as well as fee-for-service (FFS) events, the MEPS misses provider payments tied to performance and global fees charged for administration—payments that are likely to be increasingly prevalent (Burwell, 2015). Duplicative payments also pose a potential problem for the NHEA insofar as these accounts rely on data collected at the office or clinic level. If revenue received by one establishment were to be paid out to other establishments (in essence as subcontractors), then double-counting would arise. We subtract \$7.9 billion from the NHEA to avoid double-counting payments that physician offices and clinics receive from hospitals for laboratory services, since these payments are already included in the NHEA hospital estimates. However, other duplicative payments have likely grown over time as integration among health care providers, such as hospitals and physician practice groups, has increased (Koch, Wendling, and Wilson, 2017).

Another factor that could be contributing to the gap in spending for physician services in the MEPS and the NHEA is the method used in the latter source to estimate physician spending for Medicaid. Specifically, the NHEA Medicaid estimates include expenditures related to managed care plans or capitated payments that are distributed by service type by first removing 12.5 percent of total payments associated with a net cost factor and then allocating the remaining paid benefit total to service categories using the distribution method described earlier in the paper. This distribution method assigns an estimated amount of managed care spending to services such as physician spending, while this spending is reported by service in the MEPS.

For the next largest spending category, prescription drugs, the MEPS expenditures are 1.7 percent, or \$4.9 billion, above the adjusted NHEA. However, there are larger differences across payment sources for this category: out-of-pocket and Medicare expenditures are larger in the MEPS, and PHI and Medicaid expenditures are greater in the adjusted NHEA.

The NHEA-MEPS difference for the other providers category in 2012 is \$36.8 billion, with the MEPS 28.6 percent below the adjusted NHEA. A major contributor to this gap is underreporting of separately billed laboratory tests in the MEPS. Such expenditures would not be captured in the provider follow-back survey.

With respect to the dental category, the 2012 NHEA-MEPS gap is \$22.7 billion, with the MEPS 21.1 percent below the adjusted NHEA. One caveat pertaining to this estimate is that some dental care is provided outside of dental establishments (for example, in clinics) so that comparing the MEPS expenditures with those in the adjusted NHEA dental category may modestly understate the true difference.

The extent to which the MEPS is below the adjusted NHEA for the Home Health category narrowed between 2007 and 2012, from 38.6 to 30.3 percent, while for other medical equipment (OME) the gap widened from 57.3 to 65.8 percent. These results should be interpreted with caution, as sampling variation can lead to year-to-year variations in the MEPS for relatively rare health care events such as those represented by these two expenditure categories. Nevertheless, it is clear that large NHEA-MEPS gaps exist in all years for these expenditure categories. The MEPS respondents likely have difficulty reporting some types of durable medical equipment (DME) and/or home help as health care goods and services. Also, 29 percent of the NHEA-MEPS gap for OME arises because the MEPS events that are reported as ambulance services amount to \$4.7 billion whereas the adjusted NHEA estimate is \$18.9 billion (not shown in tables). Reconciling the NHEA and MEPS ambulance spending, however, is complicated by the possibility that at least some ambulance expenditures in the MEPS are folded into other provider bills. Additionally, by design, the MEPS is unlikely to capture a large percentage of DME purchases. Alignment issues would also arise if not all hospice (home

health) dollars reported in the MEPS were identified as such by respondents or billing records from the medical provider survey.

Yet another factor driving the NHEA-MEPS gaps for home health and OME may be fraud and abuse. We discuss below the possible contribution of improper payments to these gaps, but it is worthwhile to note that a report by the Government Accountability Office (GAO) found that home health care and the DME portion of OME are the services that are most vulnerable to such abuses (GAO, 2012).

Comparison by source of payments

The four largest payment source categories from the adjusted NHEA are all greater than those from the MEPS, with differences of 35.2 percent for Medicaid, 21.9 percent for Medicare, 9.0 percent for out-of-pocket spending, and 20.9 percent for PHI. (Table 6).

For Medicaid and the Children's Health Insurance Program (CHIP), a likely contributor to the 35.2-percent gap is that the MEPS undercounts Medicaid enrollees. The MEPS 2012 contains 50.5 million person-years of Medicaid coverage. Based on tabulated CMS MAX estimates, an approximate benchmark for the non-institutionalized population is 59.3 million person-years, inclusive of separate state enrollment in CHIP and exclusive of enrollees with restricted benefits through emergency and family-planning eligibility (calculations based on CMS, 2018). Thus, the MEPS undercounts Medicaid enrollment in 2012 by approximately 15 percent. A portion of this MEPS undercount likely involves hard-to-survey persons who might also have above-average expenditures, such as the homeless and those residing in settings at the margins between "community" and "institution." Future research using matched administrative claims data may help clarify the distribution of MEPS underreporting by service type and determine the extent to which undercounting the Medicaid population contributes to the gap in

Medicaid spending. Another potential explanation for the NHEA-MEPS Medicaid gap is fraudulent payments. According to a GAO analysis citing CMS, such payments totaled \$22.5 billion in 2009 (GAO, 2012). In fiscal year (FY) 2015, CMS identified \$36.4 million in Medicaid overpayments, \$14.8 million of which was recovered. In addition, \$106.4 million was recovered through the Medicaid Recovery Audit Program, and \$852.9 million was recovered through the Medicaid Integrity Program (CMS, 2016c). Payments such as these that are not reported by the MEPS respondents may help to explain some of the NHEA-MEPS gap.

Our reconciliation shows the MEPS Medicare spending to be \$92.9 billion, or 21.9 percent, below the adjusted NHEA. Previous methodological investigations using the MEPS data linked to Medicare claims data found that Medicare beneficiaries systematically underreport some types of health care services and goods, such as office-based visits and DME (Zuvekas and Olin, 2009a and 2009b), while accurately reporting inpatient stays (Zuvekas and Olin, 2009a) and prescription medications (Hill, Zuvekas, and Zodet, 2011). The previous finding of larger gaps for ambulatory visits than for inpatient care is consistent with our results. One factor to consider with respect to the overall NHEA-MEPS Medicare gap—and in the case of the Home Health and OME categories in particular—is the potential for fraud and abuse. CMS estimates that program integrity activities saved Medicare \$21.2 billion in FY 2013, \$18.0 billion in FY 2014, and \$17.0 billion in FY 2015 and that prevention of improper payments and recovery of overpayments represented 84.5 percent and 15.5 percent of these savings, respectively, in FY 2015 (CMS, 2016c). While a portion of the NHEA-MEPS gap may be explained by expenditure amounts not being reported by MEPS respondents, undetected fraud and abuse may be a much larger problem.

For out-of-pocket expenditures, the MEPS is 9.0 percent below the adjusted NHEA, which is less than one-half the difference for overall expenditures. Out-of-pocket estimates are considered to be a strength of the MEPS as they are more readily reported by households. In the NHEA, out-of-pocket and PHI are residual source-of-payment categories, and the allocation of expenditures between them is sensitive to the underlying assumptions regarding total and government spending.

The MEPS estimate for PHI is \$155.1 billion, or 20.9 percent, below the adjusted NHEA. In prior reconciliations (2002 and 2007), the PHI gap was approximately twice as large in percentage terms as it was for Medicare and in 2012 the gap was similar. One might expect the gap for Medicare to be larger than for PHI given that the MEPS can miss expenditures when respondents living alone die during the year or when persons are discharged from hospital stays either to institutions or to a different residence in the community—situations that arise disproportionately for Medicare beneficiaries. Perhaps Medicare beneficiaries, notwithstanding their age and/or disability, are simply better respondents than those with private insurance, due to fewer time pressures, simpler family structures, better bookkeeping, and/or less complex insurance arrangements.

The PHI gap could also stem from our adjustment for the institutionalized population. The institutional adjustment is based on data from MCBS, and while MCBS expenditures are based on claims for Medicare, they are self-reported (and subject to potential undercounting) for PHI. If our subtraction of spending by the institutionalized population reduces the NHEA by the correct amount for Medicare, but by too little for PHI, this discrepancy could contribute to a larger PHI gap for the non-institutionalized population.

It is also noteworthy that the NHEA PHI is calculated as part of a residual. Provider survey data are used for total spending estimates, administrative data are used for government spending estimates, and then PHI, out-of-pocket, and other private expenditures are calculated by subtracting government administrative data from total spending. Consequently, if there were any conceptual or measurement differences between the provider data and the administrative data, they would be reflected partially in the PHI estimate. However, when PHI premium estimates are compared with other sources, such as the MEPS Insurance Component, the Bureau of Labor Employer Costs for Employee Compensation, and various other private health insurance surveys, the results are very similar. Finally, our estimate of a 20.9-percent NHEA-MEPS gap for PHI is approximately the same as the gap found between the MEPS and Marketscan and OptumLab claims data (Zuvekas, 2017). The MEPS was lower than Marketscan by 17.0 and 24.0 percent in 2012 and 2013, respectively. Relative to estimates from OptumLabs, MEPS, was lower by 13.0 in 2012 and 20.0 percent in 2013.

Conclusions

As has been the case historically, total health care expenditure estimates from the MEPS have been lower than the adjusted NHEA; in 2012 they differed by \$367.2 billion, or 21.4 percent. There are key factors that likely result in the MEPS being lower and other factors that lead to the adjusted NHEA being higher. However, there is also some sensitivity in these calculations since aligning the two estimates entails numerous assumptions and since the adjustments we implement are subject to error. It is difficult to test the sensitivity of the results to all the assumptions underlying the steps involved in reconciling the two sources of data because many of the assumptions are interrelated. However, we believe that the results presented here provide an adequate estimate of the relationship between the NHEA and MEPS.

The differences we observe across service types and sources of payment suggest that measurement issues in the MEPS and the NHEA may contribute to the gaps. For the MEPS, the reconciliation highlights the importance of improving methods not only for data collection from high-expenditure cases but also for corrections for survey attrition. The MEPS may also be able to enhance collection procedures for high-cost hospital and physician expenditures that occur just before the sampled persons dies or is placed in a nursing home (cases in which it is difficult for the MEPS to locate a respondent to report use and expenditures).

For the NHEA, measurement issues may explain some of the gaps in PHI and out-of-pocket expenditures. Since private expenditures in the NHEA are calculated as residual, they are subject to measurement errors associated with provider surveys and program data. Another potential issue is that improper payments due to fraud and abuse are included in the NHEA, whereas such amounts captured by the MEPS are unknown.

As a closing caveat, we note that we conducted this analysis for 2012 in order to make use of detailed estimates from the quinquennial Economic Census (available in that year). Nevertheless, researchers who wish to apply the 2012 NHEA-MEPS results presented in this paper to more recent years of the MEPS should be aware that because of sampling variation, editing changes in the MEPS, changes in the NHEA, and—in some cases—program modifications, uncritical application of factors derived from our 2012 analysis to other years of the MEPS may result in unreliable estimates by service type and source of payment. While we find a 21.4 percent gap between adjusted NHEA and MEPS, the overall growth rates in the NHEA and MEPS from 2007 and 2012 are fairly consistent (23.6 percent and 19.5 percent, respectively).

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Table 1
Unadjusted National Health Expenditure Accounts for Personal Health Care, 2012¹

Type of Service	Out-of-Pocket	Private Health Insurance	Medicare	Medicaid	Defense	Veterans Affairs	Workers' Compensation	Other Federal	Other State	Private Non-Patient	Type of Service Totals
Hospital Care	\$31.8	\$337.8	\$238.2	\$153.3	\$16.6	\$34.3	\$15.3	\$4.6	\$18.3	\$52.4	\$902.5
Physician and Clinical Services	52.0	249.2	128.1	50.2	13.8	6.6	13.2	6.0	1.2	36.9	557.1
Other Professional Services	19.4	27.9	16.9	5.2	0.0	0.0	1.5	0.3	0.7	4.6	76.4
Dental Services	45.7	51.6	0.4	9.9	1.6	0.1	0.0	0.2	0.2	0.1	109.7
Other Health, Residential, and Personal Care	5.5	10.1	5.1	76.5	0.0	0.9	0.0	6.3	17.7	17.0	139.1
Home Health Care	7.2	6.8	33.4	27.8	0.0	0.4	0.0	0.1	1.3	1.1	78.1
Nursing Care Facilities and Continuing Care Retirement Communities	39.2	11.6	34.0	47.7	0.0	4.4	0.0	0.0	3.3	7.2	147.4
Prescription Drugs	45.1	112.9	67.6	23.1	4.9	3.1	0.8	0.4	1.4	0.0	259.2
Durable Medical Equipment	22.0	7.3	8.1	5.5	0.0	0.0	0.6	0.1	0.1	0.0	43.7
Other Non-Durable Medical Products	50.5	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.7
Source of Payment Totals	318.3	815.2	534.9	399.1	36.8	49.7	31.3	18.0	44.3	119.2	2,366.9

¹In billions of 2012 U.S. dollars.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary: Data from the National Health Expenditure Accounts, 2017.

Table 2
Expenditure Estimates from the Medical Expenditure Panel Survey (MEPS), by Type of Service and Source of Payment: 2012¹

Type of Service	Out-of-Pocket	Private Health Insurance	Medicare	Medicaid	Defense	Veterans' Affairs	Workers' Compensation	Other Public	Other Sources	Type of Service Totals
Hospital	25.3 (2.9)	224.6 (15.2)	143.1 (9.1)	55.2 (5.7)	3.1 (0.6)	23.4 (12.7)	5.4 (1.6)	3.6 (0.7)	8.7 (1.0)	492.5 (23.3)
Physician	34.4 (1.3)	158.9 (6.6)	69.9 (4.1)	25.6 (1.9)	2.7 (0.4)	6.3 (0.7)	4.0 (0.8)	2.2 (0.3)	4.5 (0.6)	308.4 (10.1)
Other Providers	15.6 (0.9)	41.4 (2.3)	16.9 (1.7)	8.5 (1.3)	1.3 (0.3)	2.4 (0.6)	2.0 (0.4)	0.8 (0.1)	2.9 (0.6)	91.7 (4.2)
Dental	41.1 (2.2)	36.5 (1.8)	0.8 (0.1)	4.8 (0.5)	0.2 (0.05)	0.3 (0.1)	0.0 (0)	0.6 (0.2)	0.5 (0.1)	84.8 (3.6)
Home Health	4.9 (2.6)	3.8 (0.8)	23.9 (3.6)	21.1 (3.7)	0.0 (0)	0.3 (0.1)	0.0 (0)	0.9 (0.3)	0.0 (0)	54.9 (5.6)
Prescription Drugs	56.1 (2.1)	115.3 (8.0)	74.8 (4.3)	29.6 (3.1)	5.4 (1.0)	4.0 (0.8)	0.9 (0.2)	6.5 (3.1)	0.5 (0.2)	293.0 (12.6)
Other Medical Equipment	13.6 (1.0)	7.2 (1.2)	2.0 (0.3)	1.8 (0.3)	0.1 (0.03)	0.3 (0.1)	0.0 (0.02)	0.3 (0.1)	0.1 (0.01)	25.3 (1.8)
Source of Payment Totals	191.1 (7.0)	587.6 (25.2)	331.3 (16.1)	146.7 (10.0)	12.8 (1.7)	36.9 (13.0)	12.3 (2.1)	14.9 (3.3)	17.3 (1.5)	1,350.7 (43.4)

¹In billions of 2012 U.S. dollars.

Note: Standard errors are in parentheses.

SOURCE: Agency for Healthcare Research and Quality, Center for Financing, Access, and Cost Trends: Data from the Medical Expenditure Panel Survey Household Component, 2012.

Table 3
Selected Adjustments to Align National Health Expenditure Accounts (NHEA) Service Categories with the Medical Expenditure Panel Survey

Amount Shifted ¹	Adjustment	Initial NHEA Category	Adjusted NHEA Category
\$5.8	Hospital-Based Home Health	Hospital Care	Home Health
\$4.1	Hospital-Based Pharmacy Sales	Hospital Care	Prescription Drugs
\$1.3	Hospital-Based Personal Care	Hospital Care	Other Personal Care
\$32.4	Outpatient Care Centers Outpatient Mental Health (\$9.9) Kidney Dialysis Providers (\$8.5) Other Providers (\$13.9)	Physician and Clinical Services	Other Professional Services
\$4.2	Prescription Drugs	Physician and Clinical Services	Prescription Drugs
\$5.3	Durable Medical Equipment	Physician and Clinical Services	Other Medical Equipment
\$35.2	Independently Billed Laboratory	Physician and Clinical Services	Other Professional Services

¹In billions of 2012 U.S. dollars.

SOURCES: Calculations based on the Medical Expenditure Panel Survey (2012), NHEA (2017), and other data sources, 2018.

Table 4
Subtractions from the National Health Expenditure Accounts (NHEA) for Consistency with the Medical Expenditure Panel Survey

Amount Subtracted ¹	Health Care Service or Type of Expenditure
<i>Adjusting the Scope of Included Populations</i>	
Long-Term Care Facility Expenditures	
\$27.2	Hospital (Non-Community)
\$164.7	Nursing Home
\$7.5	Hospital (Veterans Administration)
\$1.4	Physician (Veterans Administration)
\$4.4	Physicians in Long-Term Care Hospitals
Acute Care Expenditures of Institutionalized	
\$99.2	Acute Care Services for People in Institutions
Expenditures for Active Duty Military and Foreign Visitors	
\$18.1	Active Duty Military Expenditures
\$3.1	Services for Foreign Visitors to U.S.
<i>Adjusting for Patient Care Services Not Included in MEPS</i>	
\$53.7	Non-Durable Medical products (e.g., Aspirin and Bandages)
\$121.4	Other Personal Health Care (e.g., Housekeeping Services)
\$9.4	Outpatient Care Centers not in MEPS
\$3.6	Personal Care Expenditures in Medicaid Home Health
<i>Adjusting for Expenditures not Tied to Specific Patient Events</i>	
Non-Patient Care Revenues not included in MEPS	
\$95.3	Private Non-Patient Services (e.g., Gift Shop Revenue)
\$29.4	Disproportionate Share Hospital (DSH) and Graduate Medical Education
\$12.7	Public Grants
\$20.9	Medicaid Non-DSH Supplemental payments
\$6.6	Non-Patient Revenues for Physician Services Paid by Other Federal and Other State
Previously Paid Expenditures	
\$7.9	Lab Services and Tests Paid by Other Providers

Total	\$686.6	Total Subtractions
Amounts Added		
	\$33.0	Prescription Drug Rebates
	\$4.5	Replace NHEA Other Public Expenditures with MEPS Other Public Expenditures
	\$649.0	Net Subtraction

¹In billions of 2012 U.S. dollars.

SOURCES: Available on request from Didem Bernard, Ph.D., Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857.

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Table 5
National Health Expenditure Accounts (NHEA) Adjusted to be Consistent with the Medical Expenditure Panel Survey: 2012¹

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid	Defense	Veterans' Affairs	Workers' Compensation	Other Public	Other Sources	Type of Service Totals
Hospital	\$24.0	\$302.8	\$180.3	\$96.1	\$4.1	\$24.4	\$14.6	\$3.6	\$8.7	\$658.7
Physician	27.4	193.6	95.6	36.3	8.1	3.7	11.0	2.2	4.5	382.3
Other Providers	29.8	52.1	28.1	10.1	1.0	0.5	3.2	0.8	2.9	128.6
Dental	45.2	50.5	0.4	9.8	0.5	0.1	0.0	0.6	0.5	107.5
Home Health	9.2	9.5	33.0	25.3	0.1	0.6	0.1	0.9	0.0	78.8
Prescription Drugs	44.6	116.3	71.9	38.5	6.3	2.7	0.8	6.5	0.5	288.0
Other Medical Equipment	29.9	17.9	15.0	10.0	0.0	0.0	0.8	0.3	0.1	74.0
Source of Payment Totals	210.0	742.8	424.2	226.2	20.1	32.0	30.5	14.9	17.3	1,717.9

¹In billions of 2012 U.S. dollars.

SOURCE: Calculations based on the Medical Expenditure Panel Survey (2012), NHEA (2017), and other data sources, 2018.

Table 6
Differences Between Adjusted Medical Expenditure Panel Survey and Adjusted National Health Expenditure Accounts (NHEA): 2012¹

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid	Defense	Veterans' Affairs	Workers' Compensation	Type of Service Totals	Differences as Percentage of Adjusted NHEA
Hospital	\$1.3	-\$78.2	-\$37.2	-\$40.9	-\$1.0	-\$1.0	-\$9.3	-\$166.2	-25.2
Physician	7.0	-34.7	-25.7	-10.6	-5.4	2.5	-7.0	-73.9	-19.3
Other Providers	-14.2	-10.7	-11.3	-1.6	0.3	1.8	-1.2	-36.8	-28.7
Dental	-4.0	-14.0	0.4	-5.0	-0.3	0.2	0.0	-22.7	-21.1
Home Health	-4.4	-5.7	-9.1	-4.2	-0.1	-0.3	-0.1	-23.9	0.0
Prescription Drugs	11.5	-1.1	2.9	-9.0	-0.9	1.3	0.1	4.9	1.7
Other Medical Equipment	-16.3	-10.7	-13.0	-8.2	0.1	0.3	-0.8	-48.6	-65.8
Source of Payment Totals	-18.9	-155.1	-92.9	-79.5	-7.3	4.9	-18.2	-367.2	-21.4
Differences as Percentage of Adjusted NHEA	-9.0	-20.9	-21.9	-35.2	-36.4	15.3	-59.8	-21.4	-

¹In billions of 2012 U.S. dollars.

SOURCE: Calculations based on the Medical Expenditure Panel Survey (2012), NHEA (2017), and other data sources, 2018.