Reconciling Medical Expenditure Estimates from the MEPS and the NHA, 1996

Thomas M. Selden, Ph.D., Katharine R. Levit, Joel W. Cohen, Ph.D., Samuel H. Zuvekas, Ph.D., John F. Moeller, Ph.D., David McKusick, Ph.D., and Ross H. Arnett, III

This article compares 1996 estimates of national medical care expenditures from the Medical Expenditure Panel Survey (MEPS) and the National Health Accounts (NHA). The MEPS estimate for total expenditures in 1996 was $548 billion; whereas, the NHA estimate for personal health care (PHC) in 1996 was $912 billion. Much of this apparent difference, however, arises from differences in scope between MEPS and NHA—rather than from differences in estimates for comparably-defined expenditures. We adjusted the NHA for differences in included populations and types of services covered, finding a much smaller difference between MEPS and a comparably-defined NHA.

INTRODUCTION

MEPS provides detailed data on health care use, expenditures, sources of payment, and insurance coverage for the United States civilian non-institutionalized population. Cosponsored by AHRQ and the National Center for Health Statistics (NCHS), MEPS is the only comprehensive, nationally-representative resource for researchers and policymakers seeking household-level information regarding the amount and distribution of health expenditures (Cohen et al., 1996; Cohen, 1997) . The objective of this article is to compare 1996 MEPS estimates of national medical care expenditures with the latest national estimates for 1996 from the NHA (Lazenby et al., 1992; Levit et al., 2000; Heffler et al., 200l). Please note that all numbers in this article are in 1996 U.S. dollars. NHA estimates for 1996 presented here are drawn from the 200l revision of the NHA (Heffler et al., 2001).

Those unfamiliar with the MEPS and NHA might initially be surprised at the difference between the total medical expenditure estimates generated by these two approaches. The MEPS estimate for total expenditures in 1996 is $548 billion; whereas, the NHA estimate for PHC in 1996 is $912 billion. Much of this apparent difference, however, arises from differences in scope between MEPS and NHA rather than from differences in estimates for comparably-defined expenditures. Indeed, the main conclusion from our detailed comparison is the remarkable degree of congruence between MEPS and NHA.

The objective of this article is to examine the similarities and differences between the MEPS and NHA estimates. We begin with overviews of the NHA and MEPS estimates for 1996. Next, we present a step-by-step analysis of the NHA, modifying its estimates by type of service and by source of payment in order to provide adjusted NHA estimates that are as consistent with MEPS as possible. We conclude with a discussion regarding the implications of our analysis for users of MEPS expenditure data.

Thomas M. Selden, Joel W. Cohen, Samuel H. Zuvekas, and John F. Moeller are with the Agency for Healthcare Research and Quality (AHRQ), from which Ross H. Arnett recently retired. Katharine R. Levit is with the Centers for Medicare & Medicaid Services (CMS). David McKusick is with the Actuarial Research Corporation (ARC). ARC's contributions to this research were funded by AHRQ under Contract Number 290-99-0002. The views expressed in this article are those of the authors, and do not necessarily reflect the views of the AHRQ, CMS, or ARC.

NHA OVERVIEW

The NHA estimate for total national health care spending in 1996 is $1.04 trillion. To obtain PHC expenditures, the NHA excludes administrative expenditures for public programs, the net cost of private health insurance (i.e., the difference between premiums and benefits), government public health activities, construction, and some forms of research. This yields a PHC total of $912 billion. The NHA provides estimates both by type of service and by source of payment. Table 1 presents these NHA PHC estimates for 1996.

Total expenditures by type of service (row totals) are constructed primarily using estimates of provider revenue from provider surveys.[1] Hospital expenditures are defined as facility revenues from all sources, including hospital charges (net of contractual adjustments, bad debts, and charity care) and other, non-patient revenues. The hospital total is developed using expense estimates from the Annual Survey of the American Hospital Association (AHA) (various years), scaled up by AHA-furnished estimates of revenue to expense ratios by hospital type and State. Expenditures for physician and clinical, dental, other professional, home health, and nursing home services are obtained from providers through the Service Annual Survey (SAS) (U.S. Bureau of the Census, 1997) and the quinquennial Census of Service Industries (U.S. Bureau of the Census, 2000). NHA estimates by source of payment for each of these service types are gathered from a wide range of sources, including administrative data from Medicare, Medicaid, and other public programs, as well as from provider surveys, other data sources, and even MEPS.[2]

[1] For a more detailed explanation of the NHA, refer to Lazenby et al. (1992) and http://www.hcfa.gov/stats/nhe-oact.

[2] Data sources include AHA Annual Survey, SAS, U.S. Bureau of Labor Statistics, (1998), IMS prescription drug sales data, and MEPS prescription drug expenditure data.

MEPS OVERVIEW

The MEPS expenditure estimates are constructed for individuals in the civilian non-institutionalized population of the 50 United States and the District of Columbia. MEPS expenditure data combine (1) household-reported information (primarily regarding the occurrence of medical care events during calendar year 1996) with (2) information obtained from providers (primarily on expenditures by source of payment). Provider data were obtained through a supplemental follow-back survey for all hospital events, one-half of all physician office visits, and all home health care.[3] In addition, MEPS obtained payment information for prescription medications directly from pharmacies.[4] Household-reported information on expenditures by source of payment were used in all other cases (primarily other providers, alternative treatments, and durable medical equipment). The goal in all cases was to measure actual flows of money, rather than charges (which can often exceed actual payments). In general, if no payment occurred for an event, the MEPS expenditure total for that event is zero.[5]

Table 2 presents MEPS weighted national expenditure estimates for the civilian non-institutionalized population by type of service and by source of payment.[6] The estimate for total expenditures in 1996 was approximately $548 billion. Although this appears on the surface to be much lower than the NHA total in Table 1, in fact MEPS is designed to cover only a subset of the

[3] For more on the collection and editing of the MEPS expenditure data, refer to Cohen et al. (1996) and Zuvekas and Cohen (1999).

[4] For more on the design and implementation of the Medical Provider Survey, refer to Machlin and Taylor (2000).

[5] MEPS includes health maintenance organization (HMO)-financed care, in most cases using payment flows reported by providers. MEPS also imputes expenditures care provided by public clinics and by the Department of Veterans Affairs (VA).

[6] Additional information on how estimates were produced for this article are available on request from the authors.

Table 1

Unadjusted National Health Accounts for Personal Health Care[1]

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid[2]	Defense	Veterans Affairs	Workman's Compensation[3]	Other Federal[4]	Other State[5]	Private Non-Patient Revenue	Type of Service Totals
Hospital Care	$10.4	$111.5	$117.4	$56.8	$8.9	$12.7	$7.6	$1.3	$13.5	$15.8	$355.9
Physician and Clinical Services	27.0	111.1	44.2	15.6	1.6	0.7	6.3	3.2	0.8	18.8	229.3
Dental Services	20.9	23.6	0.1	1.9	0.0	0.0	0.0	0.1	0.1	0.1	46.8
Other Professional Services	8.2	11.9	3.9	1.2	0.0	0.0	2.3	0.2	0.4	2.8	30.9
Home Health Care	6.3	4.9	14.9	4.5	0.0	0.1	0.0	0.0	1.7	1.3	33.7
Prescription Drugs	27.9	25.6	1.1	10.9	0.3	0.0	0.4	0.0	1.1	0.0	67.3
Other Non-Durable Medical Products	26.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.1
Durable Medical Products	8.1	2.8	3.9	0.0	0.0	0.3	0.1	0.1	0.1	0.0	15.4
Nursing Home Care	20.1	6.6	8.7	37.8	0.0	1.7	0.0	0.0	0.1	4.9	79.9
Other Personal Health Care	0.0	0.0	0.0	15.7	1.0	0.7	0.0	1.9	3.1	3.4	25.8
Source of Payment Totals	154.9	298.0	195.3	144.4	11.8	16.2	16.7	6.8	20.9	47.1	912.1

[1] In billions of 1996 U.S dollars.

[2] Combines State and Federal Medicaid spending.

[3] Combines State and Federal Workman's Compensation.

[4] Combines Federal Spending on non-XIX Public Assistance; Maternal/Child Health; Vocational Rehabilitation; General Hospital/Medical; Alcohol, Drug, Abuse and Mental Health Administration/Substance Abuse and Mental Health Services Administration; and Indian Health Services.

[5] Combines State and local spending on Temporary Disability, non-XIX Public Assistance, Maternal/Child Health, Vocational Rehabilitation, and State/Local Hospital Subsidies and School Health.

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary: Data from the National Health Accounts (2001 revision).

Table 2

Expenditure Estimates from Medical Expenditure Panel Survey[1]

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid	CHAMPUS/ CHAMPVA	Veterans Affairs	Workman's Compensa-tion	Other Public	Other	Type of Service Totals
Hospital	$7.2	$117.0	$72.3	$25.0	$0.3	$7.5	$1.9	$1.5	$7.0	$239.7
	(0.6)	(12.1)	(6.1)	(3.4)	(0.2)	(4.1)	(0.4)	(0.3)	(1.7)	(14.2)
Physician	21.2	72.7	22.9	9.5	0.3	1.0	2.0	0.8	2.0	132.3
	(0.8)	(3.3)	(1.2)	(0.7)	(0.1)	(0.2)	(0.2)	(0.1)	(0.4)	(4.1)
Dentist	22.2	18.7	0.1	1.3	0.0	0.2	0.0	0.1	0.6	43.1
	(1.0)	(0.8)	(0.1)	(0.2)	(0.0)	(0.1)	(0.0)	(0.0)	(0.1)	(1.7)
Other Providers	5.2	9.3	1.4	1.1	0.0	0.2	0.3	0.1	0.5	18.2
	(0.4)	(0.6)	(0.2)	(0.2)	(0.0)	(0.1)	(0.1)	(0.0)	(0.1)	(1.0)
Home Health	4.1	3.4	17.9	5.6	0.0	2.2	0.0	0.9	0.0	34.1
	(1.4)	(0.8)	(2.4)	(0.9)	(0.0)	(0.8)	(0.0)	(0.2)	(0.0)	(3.6)
Prescription Drugs	29.0	26.5	1.0	6.6	0.3	1.0	0.2	0.6	0.2	65.3
	(1.0)	(1.1)	(0.1)	(0.6)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(2.0)
Other Medical Expenditures	8.2	4.4	1.0	0.9	0.0	0.4	0.0	0.3	0.1	15.3
	(0.4)	(0.6)	(0.2)	(0.2)	(0.0)	(0.2)	(0.0)	(0.2)	(0.0)	(0.9)
Source of Payment Totals	97.1	252.0	116.7	49.8	1.0	12.5	4.4	4.2	10.4	548.0
	(3.1)	(15.0)	(7.9)	(4.4)	(0.3)	(4.3)	(0.6)	(0.5)	(2.0)	(19.3)

[1] In billions of 1996 U.S. dollars.

NOTES: CHAMPUS/CHAMPVA is Civilian Health and Medical Program Uniformed Service/Civilian Health and Medical Program for Department of Veterans Affairs. Standard errors (adjusted for the complex survey design of the Medical Expenditure Panel Survey) are presented in parentheses.

SOURCE: Agency for Healthcare Research and Quality, Center for Cost and Financing Studies: Data from the Medical Expenditure Panel Survey Household Component, 1996.

expenditure types and persons covered by the NHA, so that adjustments to the NHA must be made to obtain valid comparisons.

Creating a MEPS-Consistent NHA

Adjusting the NHA to be more closely comparable with the MEPS entails a large number of changes that can be roughly grouped into the following four broad categories:

- The first category comprises adjustments that shift NHA expenditures across types of service in order to construct service categories that align more closely with those in MEPS.
- The second category includes adjustments to remove goods and services from the NHA that are out of scope for MEPS.
- The third category of adjustments involves removing expenditures from the NHA for persons who are out of scope in MEPS.
- The fourth category adjusts the NHA to remove provider revenues that are not directly associated with patient care.

In adjusting the NHA, we are careful to adjust not only the row and column totals in our tables, but also the more detailed NHA estimates by type of service and by source of payment. We caution the reader from the outset, however, that adjusting the NHA in this manner requires detailed estimates for expenditure categories and for population subsets, and these detailed estimates are often difficult to form with a high degree of accuracy and precision. Indeed, in some instances, we were forced to make arbitrary assumptions based on discussions with health care experts. Luckily, cases relying solely on expert judgment were few in number, and the total dollar amounts at stake were small. More generally, we believe that errors stemming from our NHA adjustments are likely to be small relative to overall national medical expenditures. That being said, however, the adjustments themselves should not be deemed official estimates for specific expenditure categories or for specific subsets of the population. For this reason, we have structured our presentation to highlight the impact of the changes we make, rather than providing exhaustive details regarding the changes themselves.

Aligning Service Categories

One key difference between the NHA and the MEPS is that the former builds on estimates of revenues received by providers classified by type of establishment, whereas the latter builds on event-level expenditure flows that are classified by service type. This difference in approach leads to a number of differences in service category definitions. One of the largest definitional differences is that the NHA hospital category contains expenditure amounts not only from inpatient stays, outpatient visits, and emergency room visits (as in MEPS), but also from expenditures found elsewhere in MEPS. For this reason, we shift $10.5 billion in hospital-based home health expenditures from the hospital category to the home health category as well as $1.2 billion for hospital-based personal care from the hospital category to the other PHC service category, in each case adjusting across sources of payment in proportion to the corresponding NHA source of payment distributions (adjustments based on calculations by Office of the Actuary [OACT] staff).

For physician and clinical services, we use estimates from the SAS to estimate revenues derived from physician sales of medical equipment and prescription drugs. We remove these amounts from the NHA physician and clinical services category and shift them to other service categories.

In addition, we shift a portion of clinic expenditures from physician and clinical services (which we rename physicians) to the hospital and other provider columns to be more consistent with MEPS definitions.[7] For example, whereas renal dialysis is in the NHA's physician and clinical services category, MEPS respondents were approximately equally likely to report renal dialysis as having been provided by hospitals, office-based physicians, or other (office-based) professionals. Finally, whereas the NHA includes independently-billing laboratories in its physician and clinical services category, any independently-billed laboratory expenditures captured by MEPS would be in the other provider category. For this reason, we shift $6.8 billion in independently-billed laboratory expenditures to other provider (estimates by OACT).

Adjusting Scope of Included Services

The NHA contains expenditure amounts from non-community, non-Federal hospitals, which are out of scope for MEPS. Examples of such hospitals include mental hospitals providing long-term care of the sort not targeted by MEPS. To align the NHA more closely to the MEPS in this regard, we subtract a total of $15 billion from the NHA hospital category (based on calculations by OACT). We allocate this total across sources of payment according to patient care revenues for State and county mental hospitals and private psychiatric hospitals, using estimates from the Substance Abuse and Mental Health Services Administration (SAMHSA) (1999).

The NHA hospital category also contains hospital revenues from hospital-based nursing homes, skilled nursing facilities, and intermediate care facilities for the mentally retarded (ICF/MR), all of which are out of scope for MEPS. We remove a total of $11.8 billion from the NHA hospital category to adjust for these excluded services, distributing the total adjustment across sources of payment using a variety of data sources, including Medicare and Medicaid administrative figures, as well as estimates of ICF/MR revenue by source of payment from SAMHSA (1999).

The MEPS Household Survey does not include nursing home expenditures. For this reason, we simply delete the NHA nursing home category from Table 1. Also, the MEPS estimates do not include expenditures for non-prescription non-durable goods.[8] Thus, we remove the non-prescription portion of the NHA non-durable goods category from Table 1. Similarly, the NHA other professional care category includes alternative care (such as acupuncture, homeopathic therapy, and hypnosis); whereas, expenditures captured in the MEPS alternative care supplement are not included in the official MEPS estimates of medical care expenditures. Comparing the service categories covered in the MEPS alternative care supplement and the SAS estimates used by the NHA, we decided to remove approximately $1.7 billion from the NHA other professional care category.

The NHA category of other PHC covers two types of expenditure: private industrial in-plant services and government expenditures for health services delivered in non-health establishments (such as schools and homes). Industrial in-plant services are those provided directly by employers to their employees, such as (but not limited to) vaccinations and health screening,

[7] The physician and clinical services category includes not only individual and group practicing physicians, who cannot generally sell prescription drugs, but also clinics and some HMOs, which can.

[8] A limited amount of information is collected by MEPS regarding other non-prescription, non-durable goods, but these expenditures are not included in the official MEPS estimates.

services about which it would be difficult to obtain information in a household survey. These expenditures are not technically out of scope for MEPS, but it is highly unlikely that such visits would be reported (and no special efforts were made to collect this information). By far the largest public component of other PHC consists of Medicaid spending on other care (not elsewhere classified) and personal care services provided under home and community-based waivers. With respect to the latter, although MEPS does include some personal care in its home health estimates, some personal care services, such as help with shopping, would not be captured by MEPS. After exploring alternative methods for a more detailed reconciliation, we decided to remove the entire other PHC category from the NHA, although we recognize that this may over-correct for the NHA/MEPS misalignment.

A similar set of issues arises with respect to hospice care. Hospice care can consist of a range of service types, from home health visits to inpatient hospitalizations. The portion of hospice care provided to residents of hospice facilities is out of scope for MEPS; however, we found little available data on hospice expenditures. Medicare hospice expenditures totalled $2.0 billion in 1996 (calculations from OACT), and it is estimated that 74 percent of all hospice care is Medicare-funded.[9] We use these numbers to form a rough estimate of total hospice spending. We then subtract 20 percent of estimated hospice expenditures from the NHA home health care category reflecting the judgment that approximately this share of hospice services would be out of scope for MEPS.

[9] Estimate is from the National Hospice and Palliative Care Organization http://www.nhpco.org.

Adjusting Scope of Included Population

The MEPS Household Survey includes medical expenditures for persons in the civilian non-institutionalized population. Excluded are the expenditures of active duty military personnel, as well as the hospital, physician, prescription drug, and other medical expenditures of persons in nursing homes, ICF/MR , other long-term hospitals, and prisons. In the NHA, health expenditures on behalf of active-duty military personnel are included in the Department of Defense source of payment, along with health care expenditures through the Civilian Health and Medical Program Uniformed Service (CHAMPUS) and other programs for covered military dependents and for non-active duty personnel. In contrast, MEPS provides estimates for expenditures covered through CHAMPUS and the Civilian Health and Medical Program for Department of Veterans Affairs (CHAMPVA) for military dependents and for non-active duty personnel, with any other expenditures for this population captured (if at all) through the other public column in Table 2. To reconcile NHA and MEPS, we replace the Department of Defense column with CHAMPUS/VA expenditures estimated by OACT, subtracting CHAMPVA expenditures from the NHA VA column.

Backing out the hospital, physician, and other medical care expenditures of the institutionalized population requires detailed estimates by type of service and source of payment for this excluded group. Unfortunately, no detailed survey data exist that measure these expenditures for institutionalized persons. To remove the medical expenditures for this population, we rely on expenditure estimates developed in conjunction with the ARC. ARC

estimates combine evidence from a wide range of data sources, including the following: estimates of the point in time size of the institutionalized population by age and sex in the 1990 Census (U.S. Bureau of the Census, 1993), estimates of acute care costs for institutionalized Medicare recipients from the 1995 Medicare Current Beneficiary Survey (Health Care Financing Administration, 1998), information on the relative utilization intensity between point-in-time residents and new admissions during the year from the MEPS Nursing Home Survey (authors' calculations), and utilization estimates from provider surveys including 1996 Hospital Cost and Utilization Project (Agency for Healthcare Research and Quality, 1999), the 1996 National Hospital Ambulatory Medical Care Survey (National Center for Health Statistics, 1997a), and the 1996 National Ambulatory Medical Care Survey (National Center for Health Statistics, 1997b). In total, we remove $49 billion from the NHA to account for the institutionalized (summing adjustments across sources of payment and types of service).

In addition to institutionalized persons, persons in assisted living and in board and care homes are also out of scope for MEPS. Unfortunately, medical expenditures for these persons are even more difficult to estimate than for institutionalized persons. Widely-cited industry trade estimates put the number of persons living in assisted living at over 1 million (National Center for Assisted Living, 1998; Lewin-VHI, Inc., 1996). In contrast, Hawes, Rose, and Phillips (1999) provide a lower estimate of 558,400 at the start of 1998. We take the approximate average of these estimates, assuming that in 1996 there were 750,000 persons who were out of scope for MEPS by virtue of residing in assisted living facilities.[10] We combine this population average with Medicare Current Beneficiary Survey estimates of the expenditures for persons in assisted living. In addition, we assume that there were 300,000 persons living in board and care homes[11] and that per capita expenditures for board and care residents equalled 80 percent of those for persons in assisted living.[12] The result is a very rough estimate that medical care expenditures (as defined in MEPS) totalled approximately $8 billion for these two populations in 1996. We allocate these expenditures across services and across sources of payment in proportion to our estimates of the expenditures of institutionalized persons.

Another out-of-scope population comprises long-term stayers in VA hospital beds. Discussions with VA officials led us to assume that out-of-scope long stayers in 1996 represented 20 percent of VA hospital, physician, and clinical services expenditures in the NHA. Prison populations are also excluded from MEPS, and their expenditures would be captured by NHA other public sources of payment. We discuss our reconciliation of MEPS and NHA other public payment sources later.

Yet another adjustment for differences in the scope of included persons pertains to foreign visitors to the United States. Medical expenditures for foreign visitors to the United States would be included in the NHA (since they would be a source of provider revenue reported in the provider surveys used by the NHA). In contrast, they would be out of scope for MEPS.

[10] For additional information, refer to Mollica (1998).

[11] In 1996, the non-ICF/MR funded mentally retarded or developmentally disabled population included 259,045 persons in facilities with fewer than 16 residents and 89,348 persons in larger facilities (Lakin et al., 1999).

[12] Replacing this arbitrary choice of 80 percent with 50 or 100 percent changes the final MEPS-NHA difference by less than $1 billion.

Foreign visitors are estimated to have accounted for medical expenditures totalling just over $1 billion in 1996 (U.S. Bureau of Economic Analysis, 1999). We assume all expenditures are paid out of pocket, with 80 percent of expenditures having been for hospital care and the remainder being for physician and clinical services (the assumption being that foreign visitor care would disproportionately comprise emergency room visits and/or specialty hospital care).

Adjustments for Non-Patient Care Revenues

NHA expenditures include non-patient revenues (e.g., revenue from philanthropic giving, gift shops, cafeterias, educational programs, and investment income). These amounts are presented in the Private Non-Patient Revenue column in Table 1. In contrast to the NHA, the focus of MEPS is on expenditures that can be directly linked to patient care events. Each approach has advantages and disadvantages. On one hand, including non-patient revenues enables the NHA to capture philanthropic gifts to hospitals, which presumably help finance charity care or bad debt. On the other hand, the extent to which other non-philanthropic, non-patient revenue flows contribute to expenditures on the provision of care is uncertain. In MEPS, charity care and bad debt are both treated as zero-expenditure events (since no payments were directly linked to these events), and other non-patient revenues are not considered. In order to make the NHA more directly comparable to MEPS, we delete this source of payment from the NHA hospital expenditures (and from the total).

Non-patient revenues are an issue not only with respect to hospital expenditures, but also with respect to physician and clinical services and other service categories. For physician and clinical services, we use estimates from the SAS to back out non-patient revenues from the NHA. For the remaining types of services, we adjust for non-patient revenues by simply removing the amounts shown in the NHA's Private Non-Patient Revenue column of Table 1.

A similar set of problems arises with respect to public payment sources other than Medicare, Medicaid, and CHAMPUS/VA. The NHA captures many of these additional public funding sources in its other Federal and other State columns (Table 1). However, many of these funds tend not to be linked directly to individual patients. Rather, these funds support the operation of public and other community health clinics. For this reason, they would be unlikely to appear in MEPS. Examples include maternal and child health expenditures as well as some subsidies for public hospitals and clinics. MEPS does include some other public funding sources in the other public source of funds column in Table 2, primarily for cases in which respondents claimed that no bill was sent because the event occurred in a public clinic or hospital. Nevertheless, we believe there are fundamental differences in the expenditures comprising the NHA and MEPS other public categories, making alignment difficult or impossible. Rather we simply replace the two NHA other public funding source estimates with the MEPS other public estimates.

Yet another issue surrounds the MEPS other source of payment. This funding source comprises private non-health insurance payments (primarily automobile coverage) as well as other miscellaneous payment sources. There is no corresponding category in the NHA, and these expenditures are likely to be captured in the NHA's private health insurance (PHI) source of payment. We adjust the NHA by adding an other source of payment column to the

NHA, setting this equal to the MEPS other column and then subtracting equal amounts from the NHA PHI column.

One final adjustment is that we remove hospital revenues from the NHA that are associated with Medicaid disproportionate share payments or any of a variety of Medicare passthroughs and retrospective adjustments, including capital pass throughs as well as adjustments for direct graduate medical education, kidney acquisition, and bad debt—all of which are payment flows that MEPS is unlikely to capture.

Comparing MEPS and the Adjusted NHA

Table 3 presents the adjusted, MEPS-consistent NHA, and Table 4 presents the differences between MEPS and the adjusted NHA. We examine the overall MEPS-NHA difference before turning to differences by type of service and source of payment.

Overall, the MEPS national total is $39.5 billion (or 6.7 percent) less than the adjusted NHA total (Table 4). One initial question is whether this difference is statistically different from zero. Clearly there is statistical uncertainty surrounding both the MEPS and the NHA (the latter being constructed in large part from establishment survey estimates). It is difficult to quantify the extent of statistical uncertainty surrounding the adjusted NHA. Treating the adjusted NHA as a known constant (without variance) implies that the MEPS-NHA difference is statistically significant at the 5 percent level (but not at the 1 percent level). To the extent the adjusted NHA is also subject to statistical uncertainty, this provides an upper bound for the confidence one might place on the two estimates being statistically different.[13]

In addition to pure statistical uncertainty, the estimated MEPS-NHA difference also reflects uncertainty surrounding the adjustments we make to align the NHA with MEPS. Our reconciliation removes over $300 billion from the NHA—a large amount relative to the overall MEPS-NHA difference that remains. For this reason, we feel it would be difficult to conclude with any certainty that the overall MEPS-NHA difference is different from zero.

Assessing the statistical significance of the MEPS-NHA difference may not, however, be as important as exploring the economic significance of the 6.7 percent MEPS-NHA difference. Given that MEPS measures expenditures at the person-event level, whereas the NHA is constructed from estimates of establishment and program expenditures, we find the agreement between the two sets of estimates to be reassuringly close. That being said, it is also true that the MEPS and NHA overall totals are in greater agreement than some of the disaggregated service or payment source totals. Examining these differences yields useful insights into the relative strengths of the two approaches.

Differences by Type of Service

One of the largest differences in dollar terms occurs in the physician column of Table 4. The NHA-MEPS physician discrepancy is $10.9 billion (or 7.6 percent). Part of this difference may stem from statistical variation. The 95 percent confidence interval around the MEPS physician estimate is roughly plus or minus $8 billion, and the corresponding confidence interval around the SAS physician estimate (on which the NHA is based) is plus or minus $6 billion (U.S. Bureau of the Census, 1999). A *z*-test reveals the MEPS-NHA difference to be statistically significant at the 5 percent level, but not at the 1 percent level.

One potential explanation for the observed MEPS-NHA physician discrepancy may be downward bias in MEPS, either

Table 3

Medical Expenditure Panel Survey-Consistent National Health Accounts[1]

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid	CHAMPUS/ CHAMPVA	Veterans Affairs	Workman's Compensa-tion	Other Public	Other	Type of Service Totals
Hospital	$3.7	$97.9	$79.2	$34.9	$1.0	$9.7	$8.0	$1.5	$7.0	$242.9
Physician	17.9	79.7	24.5	11.5	1.5	0.4	4.9	0.8	2.0	143.2
Dentist	19.6	22.7	0.1	1.7	0.0	0.0	0.0	0.1	0.6	44.8
Other Providers	10.0	18.1	2.6	1.7	0.0	0.0	2.9	0.1	0.5	36.0
Home Health	7.9	6.0	18.4	4.7	0.0	0.1	0.0	0.9	0.0	37.9
Prescription Drugs	28.0	25.1	1.1	10.8	0.2	0.0	0.4	0.6	0.2	66.5
Other Medical Expenditures	8.6	2.8	4.3	0.0	0.0	0.3	0.1	0.3	0.1	16.4
Source of Payment Totals	95.6	252.3	130.2	65.2	2.8	10.5	16.2	4.2	10.4	587.6

[1] In billions of 1996 dollars.

NOTES: CHAMPUS/CHAMPVA is Civilian Health and Medical Program Uniformed Service/Civilian Health and Medical Program for Department of Veterans Affairs.

SOURCE: Authors' calculations, based on the Medical Expenditure Panel Survey, the National Health Accounts, and other data sources, 1999-2001.

Table 4

Selected Differences Between Medical Expenditure Panel Survey and the Adjusted National Health Accounts[1]

Type of Service	Out of Pocket	Private Health Insurance	Medicare	Medicaid	CHAMPUS/ CHAMPVA	Veterans Affairs	Workman's Compen-sation	Type of Service Totals	Differences as Percentages of Adjusted NHA
Hospital	$3.5	$19.1	-$6.9	-$9.9	-$0.7	-$2.1	-$6.0	-$3.1	-1.3
Physician	3.3	-7.0	-1.6	-2.0	-1.2	0.5	-2.9	-10.9	-7.6
Dentist	2.6	-4.0	0.0	-0.4	0.0	0.2	0.0	-1.6	-3.6
Other Providers	-4.8	-8.8	-1.1	-0.6	0.0	0.2	-2.6	-17.7	-49.3
Home Health	-3.7	-2.6	-0.5	0.9	0.0	2.1	0.0	-3.8	-10.0
Prescription Drugs	1.0	1.4	-0.1	-4.3	0.1	1.0	-0.2	-1.2	-1.8
Other Medical Expenditures	-0.4	1.7	-3.2	0.9	0.0	0.1	-0.1	-1.1	-6.8
Source of Payment Totals	1.4	-0.3	-13.6	-15.4	-1.8	2.0	-11.8	-39.5	-6.7
Differences as Percentages of Adjusted NHA	1.5	-0.1	-10.4	-23.7	-65.4	18.6	-73.0	-6.7	—

[1] In billions of 1996 U.S. Dollars.

NOTES: CHAMPUS/CHAMPVA is Civilian Health and Medical Program Uniformed Service/Civilian Health and Medical Program for Department of Veterans Affairs. NHA is National Health Accounts.

SOURCE: Authors' calculations based on the Medical Expenditure Panel Survey, the National Health Accounts, and other data sources, 1999-2001.

in expenditures per event or in utilization. Regarding the former, MEPS expenditures per event were in many cases obtained directly from physician billing records. There are, however, numerous complications that can arise in attempting to measure payment flows. Regarding the latter, the underreporting of utilization is certainly a potential source of concern with any household-based survey such as MEPS. However, research by the AHRQ finds no evidence that MEPS undercounts utilization. MEPS visits to offices or clinics for care supervised by a physician benchmark closely to the office and other doctor visit total in the National Health Interview Survey (1.21 billion visits in MEPS versus 1.17 billion visits) (National Center for Health Statistics, 1999). Similarly, the MEPS estimate of physician office visits exceeds the number of physician office visits estimated by the National Ambulatory Medical Care Survey (0.90 billion visits in MEPS versus 0.73 billion visits in the National Ambulatory Medical Care Survey) (Woodwell, 1997). It should be noted, however, that any such comparisons are complicated by differences in how events are defined and differences in included populations.

Perhaps at least part of the MEPS-NHA physician difference stems more fundamentally from the sheer complexity of financial arrangements in the U.S. health care system. Physicians practice in multiple locations, under a wide array of financial arrangements, and in concert with a wide array of other providers. On the one hand, because MEPS tracks expenditures at the event level, it will tend to miss physician receipts for patient care if such receipts are not linked to specific events. Examples include bonuses, withholdings, and partially capitated payments that physicians or physician groups receive from payers—all of which would be largely or completely missing from MEPS.[14] On the other hand, the NHA, by relying on data gathered at the office or clinic level, includes some non-physician expenditures (such as physical therapy) in its physician and clinical services estimates, because those services can be provided in physician offices or clinics (including HMO medical centers).[15] These expenditures would instead be captured in the MEPS other provider category. Collecting data at the office or clinic level also complicates accounting for potentially duplicated flows of payments among providers. The NHA is careful to avoid double-counting contractual payments that physician offices and clinics receive from hospitals (since these payments to physicians would already be included in the hospital expenses that form the basis of the NHA hospital estimates). However, payment flows among providers such as these are intrinsically difficult to estimate. Duplicative provider payment flows may well be less of a problem in MEPS, because MEPS focuses on payment flows for specific events, seeking to measure dollar flows at the highest possible level (as they flow from the payer). In view of all the non-comparabilities and the potential measurement problems facing both the MEPS and NHA, perhaps the more salient conclusion is that the two sets of estimates are remarkably close.

The largest difference is in the other provider category, for which the NHA estimate is $17.7 billion more than MEPS. This difference is statistically significant, and it is the largest relative discrepancy (49.3 percent) for any type of service. Part of this difference is likely due to underreporting of independently-billed laboratory

[14] Fully capitated events are imputed in MEPS from HMO-financed events that were paid on a fee-for-service basis. Of greater concern are partial capitation and other supplemental payments.

[15] The NHA relies on Standard Industrial Classification definitions, which classify establishments as physician offices and clinics if they provide a mix of physician and other services.

tests in MEPS. Event-level reporting by households only rarely identifies laboratory tests separately from the associated physician events. At the same time, it is unlikely that the laboratory billing information would be included in the physician billing records that MEPS obtained through the provider follow-back survey. Alternative strategies involving the collection of information from physician medical records and laboratory follow-back interviews were deemed too difficult and costly. As a result, we believe that MEPS is likely to miss most of the $6.8 billion in independently-billed laboratory tests contained in the NHA.

Another potential explanation for the other provider difference is that we have shifted a portion of the NHA's clinical expenditures to this category, including revenues of family planning centers, renal dialysis clinics, and outpatient drug and alcohol treatment centers. Although we believe this shift aligns NHA and MEPS as closely as possible, nevertheless it is likely that these shifted expenditures are very much undercounted in MEPS. Still another possibility is that this type of service category may contain services that are used disproportionately by persons who are out-of-scope for MEPS, thereby complicating alignment.

Turning to the remaining service types, Table 4 shows that the MEPS and NHA hospital expenditure estimates are quite similar (and the difference is not statistically significant). Similarly, dental, home health, and prescription medicines estimates in MEPS and NHA are all reasonably close in dollar and percentage terms, and none of the differences is statistically significant. In the case of prescription medicines, the similarity of the MEPS and NHA estimates may be slightly deceptive. The NHA backs out $5.3 billion in prescription drug rebates from manufacturers. If this amount were similarly subtracted from the MEPS estimate, the result would be a MEPS prescription drug total that is $6.5 billion (or 10 percent) below the NHA estimate.

Differences Across Sources of Payment

Turning to the source of payment totals (Table 4), we see that there is little difference between the NHA and MEPS totals with respect to out of pocket and PHI. These differences are not statistically significant, and in percentage terms they are smaller than the overall difference between MEPS and NHA. In contrast, there are much larger discrepancies in both dollar and percentage terms for Medicare, Medicaid, and Workman's Compensation.

The MEPS-NHA Medicare difference is $13.6 billion (10.4 percent), whereas the MEPS and NHA Medicaid difference is even larger at $15.4 billion (23.7 percent).[16] The NHA amounts in these columns come from administrative data. For some enrollees, expenditures must be disaggregated from capitated amounts recorded in administrative data—a process that could potentially be a source of error. Nevertheless, it seems likely that much of the onus for the MEPS-NHA difference must be placed on MEPS. One potential consideration in this regard is that MEPS undercounts persons with Medicaid (but not Medicare) coverage. This seems unlikely, however, to explain much of the observed MEPS-NHA difference. MEPS offers a more accurate count of Medicaid enrollees than most household surveys (Winter and Moyer, 1999). Moreover, MEPS observes Medicaid expenditures even for persons

[16] These differences are statistically significant at the 5 and 1 percent levels, respectively.

who did not report Medicaid coverage (using provider-reported information on source of payment).

Perhaps a more likely explanation is that MEPS differentially undercounts utilization and/or event-level expenditures for persons with Medicare or Medicaid coverage. The complexity of public payment arrangements may play an important role in this regard. In particular, providers may well face a growing difficulty—especially for Medicaid in waiver States—of distinguishing between public payments and payments from private health insurers (which often serve as managed care carriers). The MEPS source of payment data suggest that this may explain part of the discrepancy. Among persons in MEPS reported to have Medicaid coverage during the year and no PHI at any point during the year, PHI was reported to have paid a total of $1.9 billion in 1996. Similarly, MEPS contains $1.0 billion in Medicare-paid expenditures on behalf of persons reporting Medicaid, not Medicare coverage, suggesting that respondents may misreport/confuse coverage between these two public programs.

Still other possible explanations exist. Certainly, the adjustments undertaken in this analysis may themselves be a source of error, especially given that both Medicare and Medicaid are important payment sources for subpopulations that are out of scope for MEPS. Also, at least some forms of fraudulent billing practices may exist that would have the effect of inflating NHA estimates while leaving MEPS unchanged (e.g., cases in which billed care was never actually provided).

The remaining sources of payment exhibit large percentage differences between MEPS and NHA. The CHAMPUS/VA and VA estimates are not overly troubling, given that these are relatively small categories to begin with. One likely possibility is that some persons with CHAMPUS/VA report this coverage as private health insurance. The Workman's Compensation difference is also not surprising. Given the long lag times involved with payment of some Workman's Compensation claims, some MEPS respondents may have reported their eligible expenses as being out of pocket, and still other eligible expenses may have been missed entirely.

Table 5

Out-of-Pocket Expenditures as a Percentage of Private Health Insurance Expenditures

Type of Service	National Health Accounts	Medical Expenditure Panel Survey
	Percent	
Hospital	3.8	6.1
Physician	22.5	29.2
Dentist	86.3	118.6
Other Providers	55.2	55.3
Home Health	131.5	122.1
Prescription Drugs	111.5	109.4
Other Medical Expenditures	309.2	185.0
Source of Payment Totals	37.9	38.5

SOURCE: Authors' calculations, based on the Medical Expenditure Panel Survey, the National Health Accounts, and other data sources, 1999-2001.

Private Payment Mix

Although it is in general not useful or reliable to examine the individual cells in Table 4 too closely, Table 5 focuses on the ratio of aggregate out-of-pocket expenditures to aggregate PHI expenditures by service type. Overall, there is substantial agreement between MEPS and the adjusted NHA with respect to this private payment ratio. Moreover, differences by type of service are generally small. In part this comparison is circular in nature, however, insofar as the NHA estimates of out of pocket and PHI for prescription drugs are partially driven by MEPS results.

CONCLUSION

The main objective of this article is to compare the NHA and MEPS estimates of national health care expenditures. To facilitate this comparison, we adjust the NHA to correspond as closely as possible to MEPS. In total, we remove $334 billion of expenditures from the NHA. Expenditures on nursing homes and non-prescription drugs and expenditures for medical care received by institutionalized persons together account for more than one-half of the expenditures we remove from the NHA, with the remainder consisting of a large number of smaller adjustments. In addition, we shift substantial amounts of expenditures across service and payment categories in an effort to make the NHA-MEPS comparison more direct. Making the necessary adjustments, however, is at best an inexact science. Given the magnitude of the adjustments needed to align the NHA and MEPS, we believe that any NHA-MEPS comparisons—especially comparisons pertaining to specific services or payment sources—should be viewed more as approximations than as precise estimates.

Bearing this caveat in mind, our main conclusion is that there appears to be substantial agreement between MEPS and the NHA once one adjusts the NHA to correspond as closely as possible to MEPS. This similarity bolsters confidence in both the MEPS and NHA estimates of national medical care spending. MEPS is the Nation's sole source of household-level data on spending and utilization, combined with household-level data on insurance coverage, employment, and a wide array of household socioeconomic characteristics. Knowing that many of the MEPS expenditure estimates agree quite closely with corresponding NHA estimates should be a source of reassurance to researchers using the MEPS data for research requiring micro-level data.

The analysis does, however, point toward some areas of caution regarding the use of MEPS data. Without significant additional editing, MEPS would appear to be an inappropriate dataset for analyzing health care financed through Workman's Compensation, CHAMPUS/VA, or the VA. For some applications, researchers may prefer to create a private/employment-related health insurance category that includes PHI and CHAMPUS/ VA (and perhaps Workman's Compensation). Perhaps more troubling is that MEPS and NHA estimates of physician expenditures and other provider expenditures disagree, as do the MEPS and NHA estimates of Medicare and Medicaid expenditures.

For some applications, researchers may choose to calibrate the MEPS expenditure data to match the adjusted NHA before conducting micro-level research. Even though the adjusted NHA may itself contain errors, calibrating the MEPS to these levels may be useful especially in policy-related applications where researchers place a high value on comparability with other, NHA-based analyses. However, it would typically not be appropriate simply to scale MEPS expenditures up or down to match adjusted NHA benchmarks by type of service and source of payment. Instead, it may be preferable to align expenditures further before adjusting, or perhaps to group together expenditures across certain service or payment source categories before attempting to align MEPS with the NHA. Researchers at AHRQ are currently investigating a range of options for developing a calibrated expenditure file that preserves as many as possible of the unique strengths of the MEPS data.

ACKNOWLEDGMENTS

We appreciate the assistance and comments of Steven Cohen, Steven Machlin, Joshua Thorpe, Helen Lazenby, Cathy Cowan, and the NHA estimating team, and James Mays.

REFERENCES

Agency for Healthcare Research and Quality: *Hospital Cost and Utilization Project, 1996, Nationwide Inpatient Sample*. Internet address: http://www.ahrq.gov/data/hcup/hcupnis.htm. 1999.

American Hospital Association: *Annual Survey, 1996*. Chicago. Internet address: http://www.aha.org.

Cohen, J.W., Monheit, A.C, Beauregard, K.M., et al.: The Medical Expenditure Panel Survey: A National Health Information Resource. *Inquiry* 33(4):373-389. Winter 1996.

Cohen, S.B.: *Sample Design of the 1996 Medical Expenditure Panel Survey Household Component*. MEPS Methodology Report No. 2, Pub. No. 97-0027, Agency for Health Care Policy and Research, U.S. Government Printing Office. Washington, DC. 1997.

Hawes, C., Rose, M. and Phillips, C.D.: *A National Study of Assisted Living for the Frail Elderly: Executive Summary*. U.S. Department of Health and Human Services. Internet address: http://aspe.os.dhhs.gov/daltcp/reports/facreses.htm. 1999.

Health Care Financing Administration: *Medicare Current Beneficiary Survey, Cost and Use, 1995*. U.S. Government Printing Office. Washington, DC. Internet address: www.hcfa.gov. 1998.

Heffler, S., Levit, K., Smith, S., et al.: Health Spending Growth Up in 1999: Faster Growth Expected in the Future. *Health Affairs* 20(2):193-203, 2001.

Lakin, K.C., Anderson, L., Clayton, C., et al.: Utilization of and Expenditures for Medicaid Institutional and Home and Community-Based Services. In *Residential Services for Persons with Developmental Disabilities: Status and Trends through 1998*, eds. R. Prouty and K.C. Lakin. Report No. 52, Research and Training Center on Community Living, Institute on Community Integration, College of Education and Human Development, University of Minnesota. Minneapolis, MN. 1999.

Lazenby, H, Levit, K., Waldo, D., et al.: National Health Accounts: Lessons from the U.S. Experience. *Health Care Financing Review* 13(4):89-103, Summer, 1992. Internet address: http://www.hcfa.gov/stats/nhe-oact/lessons/httoc.htm.

Levit, K., Cowan, C., Lazenby, H., et al.: Health Spending in 1998: Signals of Change. *Health Affairs* 19(1):124-138. January/February, 2000.

Lewin-VHI, Inc.: *National Study of Assisted Living for the Frail Elderly: Literature Review Update*. Department of Health and Human Services, Internet address: http://aspe.os.dhhs.gov/daltcp/reports/98state.htm. 1996.

Machlin, S., and Taylor, A.: *Design, Methods, and Field Results of the 1996 Medical Expenditure Panel Survey Medical Provider Component*. Agency for Healthcare Research and Quality, MEPS Methodology Report No. 9, AHRQ Pub. No. 00-0028. U.S. Department of Health and Human Services. Public Health Service. U. S. Government Printing Office. Washington, DC. 2000.

Mollica, R.L.: *State Assisted Living Policy: 1998*. National Academy for State Health Policy. U.S. Department of Health and Human Services. Washington, DC. Internet address: http://aspe.os.dhhs.gov/daltcp/reports/98state.htm. 1998.

National Center for Assisted Living: *Facts and Trends: The Assisted Living Sourcebook*. American Health Care Association. Washington, DC. 1998.

National Center for Health Statistics: *1996 National Ambulatory Medical Care Survey*. Centers for Disease Control and Prevention. Public Health Service. U.S. Government Printing Office. Washington, DC. 1997a.

National Center for Health Statistics: *1996 National Hospital Ambulatory Medical Care Survey*. Centers for Disease Control and Prevention. Public Health Service. U.S. Government Printing Office. Washington, DC. 1997b.

National Center for Health Statistics: *Current Estimates from the National Health Interview Survey, 1996*. NCHS Series 10, Number 200. Centers for Disease Control and Prevention. Public Health Service. U.S. Government Printing Office. Washington, DC. 1999.

Substance Abuse and Mental Health Services Administration: *Mental Health United States 1998*, SAMHSA Publication SMA99-3285. Washington, DC. 1999.

U.S. Bureau of the Census: *1990 Census of Population and Housing*. U.S. Department of Commerce. U.S. Government Printing Office. Washington, DC. 1993.

U.S. Bureau of the Census: *1996 Service Annual Survey*. U.S. Department of Commerce. Internet address: http://www.census.gov. 1997.

U.S. Bureau of the Census: *1997 Census of Service Industries*. U.S. Department of Commerce. Internet address: http://www.census.gov/prod/ec97/97s62-us.pdf. 2000.

U.S. Bureau of Economic Analysis: U.S. International Services: Cross-Border Trade in 1998 and Sales Through Affiliates in 1997 in *Survey of Current Business: October 1999*. U.S. Department of Commerce. U.S. Government Printing Office. Washington, DC. 1999.

U.S. Bureau of Labor Statistics: *Consumer Expenditure Survey*. U.S. Department of Labor. Internet address: http://stats.bls.gov/csxhome.htm. 1998.

Winter, A., and Moyer, M.E.: Understanding Estimates of Uninsured Children: Putting the Differences in Context ASPE Research Note, Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. Washington, DC. 1999.

Woodwell, D.A.: *National Ambulatory Medical Care Survey: 1996 Summary*. Advance Data from Vital and Health Statistics, Pub.No. 295. National Center for Health Statistics. Public Health Service. U.S. Government Printing Office. Washington, DC. 1997.

Zuvekas, S.H., and Cohen, J.W.: How Prevalent is Capitation in Private and Public Health Insurance Plans? Unpublished. Agency for Healthcare Research and Quality. Rockville, MD. 1999.

Reprint Requests: Thomas M. Selden, Ph.D., Agency for Healthcare Research and Quality, 2101 E. Jefferson Street, Suite 500, Rockville, MD 20852. E-mail: tselden@ahrq.gov.