Household Consumption Expenditures for Medical Care: An Alternate Presentation

By Ana Aizcorbe, Eli B. Liebman, David M. Cutler, and Allison B. Rosen

AS HEALTH CARE spending continues to grow, the Bureau of Economic Analysis (BEA) plans to develop a satellite account containing a detailed set of macroeconomic statistics for spending on medical care. This account would provide the data needed to better assess health care spending and its effects on the U.S. economy. In particular, the new statistics would allow health economists to better analyze the returns to treatments of disease and the sources of changes in health care costs.[1]

1. See Aizcorbe, Retus, and Smith (2008) for a description of the proposed health care spending satellite account. BEA satellite accounts typically take a close look at a specific sector, providing more detailed information about the sectors and new measures based on new methodologies.

One important set of statistics would be detail on the health-related aggregates currently embedded in each of the accounts (as is done in the travel and tourism satellite accounts (Zemanek 2011)). For example, we will provide a separate income account for health-related spending (see "An Integrated View of the Health Care System").

Importantly, the medical care account will also redefine the "commodity" provided by the medical care sector as "the treatment of disease," as is advocated by health economists and public health experts. Ideally, the "disease" categories would break out four types of spending: prevention, screening, diagnosis, and treatment of disease. Within the treatment category, one

Health Care Satellite Accounts

The Centers for Medicare and Medicaid Services (CMS) estimates that health care expenditures as a share of gross domestic product (GDP) reached 17.9 percent in 2010. That share will continue to grow significantly, according to recent studies by the Congressional Budget Office. Given this trend, it is critical to develop an understanding of what those increased expenditures represent. Are the increases attributable to rising costs of providing the same service? Or are people purchasing higher quality health care services? And if people are consuming more health services today, what are the future benefits? Economists need answers to these questions in order to formulate policies that allow for society's efficient consumption of health care as well as for the improvement of the nation's overall health status.

Health economists have long advocated the construction of national health accounts that would measure the effects of the output of the medical care industry on improvements in health and use medically informed decision models to determine the productivity of different health inputs (such as medical care or the quality of the environment). For example, Rosen and Cutler (2007) describe an ongoing effort to create a health account that will provide direct measures of health, disease prevalence, and medical spending by disease for that purpose. A health account of the type consistent with the view of many health economists would be quite broad. In this view, which we share, "health" is a type of human capital that, as with other capital goods, depreciates over time and requires investment. Using standard national accounting conventions, an account that would accommodate this view of health would require capital stock measures for health as well as measures of the rate of depreciation, financial investment into health, and the flow of returns to that investment. Moreover, measuring the latter returns would require one to place a value on the improvements to health, which is typically done by combining indicators such as quality-adjusted life years with estimates for the value of a human life.

Because various types of nonmarket activity are also important inputs into health, such an account would also expand the scope of the existing accounts (which include only market activity) to include the value of the time that members of households invest in their health and in the health of others (the value of those nonmarket activities). The measurement of these activities is extremely difficult, in part because of the paucity of appropriate source data and lack of consensus among experts on the appropriate methods for measurement. However, within the broad movement to measure health as a capital good, there is some agreement that the "final good" produced by the health sector, medical care, would be better defined as "the treatment of a disease" rather than as individual products, as is usually the case in national accounts. A more analytically appropriate measure of "medical care" is the starting point of BEA's health care initiative.

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would show spending for the treatment of infectious conditions spending for the treatment of neoplasms, and so forth, rather than breaking out the treatments separately. For example, specific treatments provided in the treatment of cancer will be classified as household consumption expenditures for the treatment of cancer, rather than splintering out the individual services into existing commodities: spending on surgeries are currently shown in "hospital services," spending on prescription drugs are currently shown in "prescription drugs," and so on. This is the preferred way to define the output of this industry and is advocated by health economists and public health experts. Indeed, a recent panel of the National Academies urged statistical agencies to begin thinking in this way (National Research Council 2010).

This restatement of the commodity provided by the health sector in the spending account does not have any direct implications for how nominal spending for the sector is measured in other accounts. For example, the nominal dollar value of total production by the industries that provide these goods and services will not change in the industry accounts. Similarly, the payments to factors of production that might be reported in a production account are unchanged.

It does, however, have important implications for the price indexes one would use to translate nominal spending in current dollars into constant dollars. This issue—discussed in Aizcorbe, Retus, and Smith (2008)—is complex and will be revisited in another SURVEY article later this year. Essentially, redefining the "good" requires a different set of price indexes for the health sector in the national income and product accounts (NIPAs). BEA researchers are currently studying the full implications of this change for the price indexes we currently use in the national accounts. (See, for example, Aizcorbe and Nestoriak 2011 and Dunn, Liebman, Pack, and Shapiro 2010.)

Why redefine the "product" to spending by disease?

Existing measures for the health sector, such as those found in the NIPAs or in National Health Expenditure Accounts provided by the Centers for Medicare and Medicaid Services (CMS), provide insights into the types of medical care that individuals purchase (such as visits to a doctor's office or the purchase of a drug) and how those purchases are financed (through private insurance, government assistance, or from one's own income). Although this information is useful for tracking overall spending, these data do not provide any information about what (if any) health returns are realized from the investment (Bosworth and Triplett 2007).

The first step towards assessing whether health care spending is "worth it" is to organize spending by disease. These data, combined with information on the outcomes of treatment, would allow that assessment. Indeed, the medical literature measures the effectiveness of therapies and subsequent health outcomes on a disease-by-disease basis, making the extent to which a particular health care expenditure is beneficial dependent upon the condition being treated. Take a migraine medication as an example. Consumers pay for this medication to reduce the length and/or severity of their migraines. If a more expensive—but more effective—migraine medication became available, ideally a "quality adjustment" could be made to allow for the value of the improvement. But absent information on the disease being treated, such adjustments are not possible.

Beyond facilitating assessments of the costs and benefits of treatment, health economists have found data on spending by disease to be a useful way to better understand what factors are driving growth in health care spending. For example, Thorpe, Florence, Howard, and Joski (2004) used data from the Medical Expenditure Panel Survey (MEPS) to link the growth in spending from 1987 to 2001 to the obesity epidemic, a result of individuals' behavior that could be targeted to control costs. Similarly, Roehrig, Miller, Lake, and Bryant (2009) studied the potential impact of preventive care on the growth in spending on selected conditions since 1996. Analyses like these can begin to explore the potential effects of policy levers—such as reducing the cost of preventive care on overall spending.

Other government agencies are investigating measures of health care spending by disease. The Agency for Health Care Research (AHRQ) publishes reports on spending by disease based on their MEPS survey. The Census Bureau is exploring the feasibility of obtaining data on spending by disease from providers. They are collecting spending broken out by disease in the 2012 Census as a followup to a pilot study in the 2007 Census. Similarly, the Bureau of Labor Statistics (BLS) already reports price indexes by disease for hospital care, a category where surveys are available to break out the spending in this way. Moreover, researchers at BLS continue to study ways to construct disease-based price indexes using existing indexes from the producer price index program (Bradley, Cardenas, Ginsburg, Rozental, and Velez 2010).

Methods for allocating spending by disease

The biggest challenge to measuring health care spending by disease is the fact that patients often suffer from more than one illness; the presence of coexisting illnesses, referred to as comorbidities, makes it difficult to disaggregate and allocate spending to the individual diseases. For example, how does one allocate the cost of an office visit for a diabetic who also suffers from heart disease? This problem is particularly prevalent among the elderly, a demographic with disproportionately high spending on health care.

Attributing expenditures to diseases involves, first, categorizing diseases into a comprehensive, mutually exclusive set of disease groups at a suitable level of aggregation that, in principle, could range from highly aggregated (the 18 International Statistical Classification of Diseases and Related Health Problems book 9 (ICD9) chapters) to very detailed (the more than 16,000 ICD–9–CM diagnoses). The next step is to attribute spending to these disease groups, again selecting a suitable level of aggregation (or unit of analysis). Attributing medical costs to diseases is typically performed using one of three conceptual approaches, each with a different unit of analysis. The first is an "encounter-based approach," estimating disease-specific spending by diagnoses listed on medical claims; the unit of analysis is the individual encounter (or claim). The second is an "episode-based approach," estimating spending on all services related to the diagnosis and management of a specific condition. The unit of analysis is an episode, which may have variable lengths of time. The third is a "person-based approach," identifying all conditions a person has and using regression analysis to allocate spending to diseases.

Encounter-based approach. This approach assigns claims to disease groups based upon coded diagnoses.

The Medical Expenditure Panel Survey

The Medical Expenditure Panel Survey, which is conducted by the U.S. Department of Health and Human Services Agency for Health Care Research and Quality (AHRQ) is a nationally representative survey of the health care utilization and expenditures of the civilian noninstitutionalized U.S. population. The survey sample is drawn from the respondents to the prior year's National Health Interview Survey (NHIS). The survey uses an overlapping panel design, introducing a new panel each year. The data are collected through a series of five rounds of interviews covering a 2-year reference period; the data from the overlapping panels are then used to produce annual estimates. For each household surveyed, MEPS interviews a single respondent— the family member most knowledgeable about the entire household's health and health care use (Zuvekas and Olin 2009a). The sample includes approximately 15,000 families and 35,000 individuals each year (Cohen, Cohen, and Banthin 2009).

MEPS provides both household and patient-level data on personal health care expenditures. The survey contains data on health services used as well as the frequency with which households use them, their cost, and how they are paid for. MEPS actually consists of a family of three interrelated surveys: the Household Component (HC), the Medical Provider Component (MPC), and the Insurance Component (IC). The Household Component of the survey interviews individuals and families; the Medical Provider Component supplements the HC information by verifying prices and payments by source from medical providers and pharmacies. The final component is the Insurance Component, which collects data from employers regarding the employers' characteristics and the insurance they offer their employees (Sing, Banthin, Selden, Cowan, and Keehan 2006; Zuvekas and Olin 2009b; and Cohen, Cohen, and Banthin 2009).

As a data source, MEPS has some key advantages over insurance claims data. It is a well known sample and is generally regarded as a high-quality source of data on high-prevalence health conditions. Another important strength of the MEPS data is its ability to directly link expenditures from all services (across all types of providers) to patient care events (Mackie 2009; Sing, Banthin, Selden, Cowan, and Keehan 2006). Finally, MEPS is the only data set available to capture the expenditures of the uninsured (Cohen 2009).

However, it also has several limitations. First, it has been shown that the MEPS fails to capture some important spending. Second, the diagnoses associated with utilization events are self reported and may provide different information than would be found in actual insurance claims. Perhaps the biggest limitation is that MEPS does not cover institutionalized patients or the active military. By virtue of not covering these two groups, the MEPS will miss not just spending by these patients in institutions (including long-term care facilities). It will also miss any spending by these patients on services from other providers (for example, hospital care, physician services, and so forth) because they are not covered in the survey.

Comorbidities may pose a real problem here; attributing each spending item for a patient who is both hypertensive and diabetic is not easy. Studies frequently assign claims based on the primary diagnosis, but this may dilute the cost impact of important risk factors and/or comorbidities. For example, if a person with diabetes, hypertension, and coronary heart disease (CHD) visits a doctor, to which disease should the costs be attributed? What if only coronary heart disease is listed on the claim despite the fact that the diabetes likely contributed to the CHD? Accounting for downstream complications is also challenging for encounter-based approaches. If a person with diabetes has a heart attack several years later, is the subsequent spending a result of the diabetes or the heart attack? Most analyses would assign the downstream costs to the heart attack, which underweights the future costs of diabetes. These issues are particularly important in individuals with conditions like CHD, where multiple comorbid diseases are the norm, rather than the exception.

The principal advantage of encounter-based allocations is the ease with which costs are attributed to diseases. However, when spending does not have an associated claim or valid diagnosis code, it cannot be allocated to a disease.

Episode-based approach. Increasingly, analysts are estimating disease costs using episode groupers—software programs with algorithms that organize claims data into clinically distinct episodes of care. A treatment episode can be thought of as "a series of temporally contiguous health care services related to the treatment of a given spell of illness or provided in response to a specific request by the patient or other relevant entity" (Hornbrook, Hurtado, and Johnson 1985). Episodes are natural to examine because they group related claims regardless of where the service was provided; if a person is hospitalized for pneumonia and then seen in followup at an outpatient clinic, both sets of costs are included in the episode of pneumonia care.

Episode-based costing is not without challenges, though. Identifying the start and endpoint of an episode of treatment and the groups of specific services relating to a particular episode of care is not straightforward. Episode groupers differ in how they do this, with no clear consensus on best practice. Comorbidities and their joint costs pose challenges as well, just as with the encounter approach. Other challenges include how to handle chronic disease episodes (length is often set arbitrarily at 1 year), what to do with complications of treatment (assign to a new episode or an old one), and how to handle medical treatments that do not fall neatly into a disease category (such as a screening study). Finally, while a number of different commercial episode groupers are already widely in use, they have received little scientific evaluation to date (McGlynn 2008), and the small but growing body of research by CMS and others points to real differences in the output of different vendors' groupers (MaCurdy, Kerwin, Gibbs, Lin, Cotterman, O'Brien-Strain, and Theobald 2008; MaCurdy, Kerwin, and Theobald 2009; and Rosen, Liebman, Aizcorbe, and Cutler 2012). Pending further evaluation and standardization, it will be difficult to use these proprietary algorithms for public work.

Person-based approach. This final approach to cost estimation regresses a person's total annual health care spending on indicators for the set of conditions that person has. The coefficient on a disease dummy variable is the incremental additional cost of that condition, controlling for the other conditions the person has. A person-based approach is likely to produce more reliable estimates for patients with multiple chronic conditions, as it better accounts for spending related to comorbidities and complications. That said, a regression specification may be sensitive to how comorbidities are entered. A standard linear regression may not be right, since it imposes additivity of joint conditions. However, if one condition increases (or decreases) the costs of another, adjustment is needed to ensure that condition-specific spending does not sum to more (or less) than the total. Another empirical issue is what interaction terms to include. For the most part, clinical expertise is needed to identify the appropriate group(s) of co-occurring diseases, which may represent a limitation for policy purposes. An advantage of person-based cost estimation is that the costs of utilization events for which there are no valid claims or ICD–9 codes, such as missing ICD–9 codes on drug claims, can still be attributed. Another attractive conceptual feature of person-based cost estimates is that they can be readily matched to health outcomes, such as mortality and quality of life, thereby providing the critical link between spending and health needed to more systematically measure the value of medical services.

Which approach is best? There is no consensus on which of these methods is preferable. In the national accounts, a similar problem arises with establishments

that produce goods classified in different North American Industry Classification System (NAICS) industries. The standard way of handling this is to use the "primary NAICS industry," defined as the industry that generates most of the establishment's revenues.

The analogous concept in the current setting is to allocate the spending to the "primary diagnosis." However, in some data—notably the MEPS survey and many claims databases—many diagnoses are listed without identifying which one is "primary." In these

An Integrated View of the Health Care System—Continues

As part of its work to develop national health accounts, BEA developed a prototype production and income account that highlights the health sector in the United States. The table presented here illustrates the relationship between health care spending and the health sector's production and income flows by integrating consumer spending data and national income data from BEA's national income and product accounts (NIPAs) with industry production data from BEA's Input-Output (I-O) accounts to provide a unified look at the health sector within the broader U.S. economy.

An Integrated System

The NIPAs and the I-O accounts are part of a broader integrated system of national economic accounts that are designed to measure economic activity in the United States according to set economic principles. Together the NIPAs and the I-O accounts provide a snapshot of the numerous transactions that make up the U.S. economy. The NIPAs track the buying and selling of goods and services, the hiring of labor, the returns to capital and entrepreneurship, and the depreciation, or the using up, of capital. One of the most widely used statistics in the NIPAs is GDP, or gross domestic product, which is a measure of the unduplicated output of the country.[1] The I-O accounts trace the flow of goods and services among industries as part of their production process and show each industry's value added or contribution to overall GDP. To the extent possible, the integrated economic accounts for the United States follow guidelines set by the *System of National Accounts 1993* (SNA), which is an internationally accepted conceptual framework for designing economic accounts. Because the NIPAs and the I-O accounts are integrated through these consistent economic principles, BEA is able to bring together data from both in order to analyze the economic flows specific to the health sector. [2]

The Health Sector Account

The table presented here tracks the value of health care related goods and services produced annually in the United States for 2002–2006 and accounts for the income flows associated with that production. For this prototype, the health sector includes both private businesses and government institutions that produce or provide health-related goods or services to households. The private businesses are classified into industries based on the 2002 North American Industry Classification System (NAICS) and include both for profit businesses and not for profit businesses.[3]

Production by the health sector is derived by taking the value of health-related goods and services produced by this sector (referred to as *gross output*) and subtracting from it the value of the goods and services used in the process of producing that output (referred to as *intermediate inputs*)[4]. The difference between gross output and intermediate inputs is defined as *gross value added.* Gross value added for the health sector represents that sector's share of overall GDP for the nation and can be thought of as the value of the labor and capital used to produce health care related goods and services.

Value added can also be measured by adding up the costs incurred by the health sector during production, including any profit-like income generated by those businesses from their production. These costs include wages and salaries and benefits paid to employees for their labor services (*compensation of employees*), the taxes paid to the government as part of producing or selling the goods and services less any subsidies these businesses may receive from the government (*taxes on production and imports less subsidies (TOPI)*), and the value of the fixed capital used up during production (depreciation or *consumption of fixed capital (CFC)). Net operating surplus* represents the profit-like income accrued to the health sector businesses after subtracting CFC, compensation of employees, and TOPI from gross value added but before deducting financing costs (such as interest payments or receipts) and

1. GDP avoids double counting the value of goods and services that are used as inputs in the production of other goods and services.

2. For more information on the NIPAs, please see "A Guide to the National Income and Product Accounts of the United Stated", 2006. For more information on the System of National Accounts, please see *System of National Accounts 1993* and *System of National Accounts 2008.*

3. See footnote 1 of the accompanying table.

4. Health care gross output is defined as the primary product produced by those industries included in the health care sector plus any secondary products produced by these industries that fall within these health commodity codes, derived from unpublished data from BEA's annual industry accounts.

cases, the standard practice has been to allocate spending to the first listed diagnosis. This is the approach we take here.

Providing detail on spending by disease

All of these approaches require micro data, either at the encounter or the patient level. Moreover, the data must contain information on both the particular condition that was treated and the amount spent.

An Integrated View of the Health Care System

transfer payments (such as insurance settlements) both of which are not considered production-related revenue and expenses.

Net operating surplus can be broken down into detail that shows corporate and noncorporate business income from production in the form of corporate profits and proprietors' income as well as the current transfer payments and net interest. The latter two income flows offset the current transfer receipts and payments and the interest receipts and payments that are included as revenue and expenses in deriving the measures of corporate profits and proprietors' income.

The account shows that the goods and services produced by the health sector account for approximately 13 percent of all goods and services produced in the United Stated, as derived by taking the share of gross output on line 1 divided by total U.S. GDP in current period prices. The health sector output presented in this prototype account does not include some production that may be considered health-related but is not directly consumed by households for health care purposes. This production includes, but is not limited to, items for hospitals or medical care buildings (NAICS 23), private health insurance or medical malpractice insurance (NAICS 524), and medical equipment manufacturing (NAICS 334 and 339). Adding these components brings total spending to $1,618.7 billion, or about 15 percent of GDP. The share of labor and capital used by the health sector to produce health care goods and services is approximately 60 percent (derived as gross value added divided by gross output), with compensation of employees representing approximately 80 percent of those costs. While these measures reflect current period prices and do not remove effects of price change or inflation, these relationships remained relatively constant over the period measured. Even profitability remained reasonably steady with business margins hovering between 7 and 8.5 percent during the period, as derived by dividing corporate profits and proprietors' income (line 11) by gross output of the sector (line 1)).

While this prototype account is an important step in BEA's efforts to develop a broader health sector satellite account, significant work remains. The estimates derived for this prototype account required a number of assumptions to make up for current gaps in available data. For example, while BEA's I-O accounts provide gross output by industry at a detailed 6-digit NAICS level, BEA's estimates of CFC, corporate profits and other income measures are not currently produced at this level of detail. As a result, income estimates in this prototype relied heavily on gross output relationships in order to derive the share of corporate profits specific to the health sector. Also of note is the fact that CFC, net interest, corporate profits, and proprietors' income in the NIPAs are based on "company" data while the gross output and intermediate inputs data from the I-O accounts are based on "establishment" data, which means that the production measures and the income measures used to create this table are not completely consistent. As a result, net operating surplus recorded in this prototype account acts as a balancing item between these two different data sets.

Health Sector[1] Output, Gross Value Added, and Net Value Added

[Billions of dollars]

	Line	2002	2003	2004	2005	2006
Health output	1	**1,421.9**	**1,510.0**	**1,596.0**	**1,703.9**	**1,797.9**
Less: Intermediate goods and services consumed	2	566.3	598.5	626.9	681.4	710.9
Equals: Gross health value added	3	**857.1**	**913.1**	**971.5**	**1,024.8**	**1,089.8**
Less: Consumption of fixed capital	4	35.0	36.2	37.7	40.2	42.4
Equals: Net health value added	5	**822.1**	**876.8**	**933.8**	**984.7**	**1,047.4**
Compensation of employees	6	658.3	721.7	755.8	797.2	843.6
Taxes on production and imports, less subsidies	7	20.7	22.6	23.9	26.2	28.3
Net operating surplus	8	143.1	132.6	154.1	161.3	175.5
Net interest	9	10.4	10.0	9.9	10.5	12.7
Current transfer payments	10	10.1	12.2	11.9	13.0	12.1
Proprietors' income and corporate profits with inventory valuation	11	122.6	110.4	132.3	137.8	150.7
Proprietors' income	12	77.7	66.9	81.5	79.4	82.6
Corporate profits	13	44.9	43.5	50.8	58.4	68.1
Addenda:						
Other health-related aggregates						
Household spending on health care[2, 3]	14	1,317.1	1,405.7	1,507.5	1,605.1	1,694.5
Health care (excluding social services) industry gross output[4]	15	1,040.9	1,110.6	1,181.9	1,258.2	1,328.9
Health care (excluding social services) industry gross value added[4]	16	631.4	676.6	722.4	760.6	809.5

1. Includes NAICS subsectors for Pharmaceutical and Medicine Manufacturing (3254), Drugs and Druggists' Sundries Merchant Wholesalers (4242), Health and Personal Care Stores (4461), Consumer Goods Rental (5322), Ambulatory Health Care Services (621), Hospitals (622), Nursing and Residential Care Facilities (623), state and local government; excludes federal government.

2. Includes NIPA personal consumption expenditures (PCE) for the following spending categories: therapeutic medical equipment, corrective eyeglasses and contact lenses, pharmaceutical products, other medical products, physician services, dental services, paramedical services, hospital services, nursing home services. Excludes consumption expenditures of nonprofit institutions serving households.

3. Differences between line 1 and line 14 are attributable to many factors including: output produced by these health-related industries that is not directly paid for by households, such as spending by state and local governments and nonprofit institutions providing healthcare services; goods produced by these industries that are exported abroad and not consumed by U.S. households; and goods consumed by U.S. households that are not produced domestically.

4. From BEA's annual industry accounts—GDP by industry statistics: includes primary and secondary production of the ambulatory health care services industry and the hospitals and nursing and residential care facilities industries (NAICS 621, 622, 623).

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While many surveys contain information on prevalence (the National Health Interview Survey, for example) or on expenditures (the Consumer Expenditure Survey, for example), the MEPS survey is one of the few government-administered surveys containing information on both. Among these, the MEPS includes the broadest range of individuals. For example, another survey that contains this type of information provides it only for Medicare patients (the Medicare Beneficiary Survey); the MEPS provides it for a sample of all civilian, noninstitutionalized individuals. In this article, we use the MEPS survey to illustrate how nominal spending on medical care could be shown in the national accounts.

Table 1 lists the components of health care expenditures in gross domestic product. Personal consumption expenditures (PCE)—making up $1,428 billion of these expenditures—represent the value of services received by consumers for both medical care and other services (like health insurance). Within PCE for health, $1,317 billion of the value of goods and services—which we call "household consumption expenditures" (HCE)—are for medical care and includes direct payments by households and by insurance companies (or the government insurance programs such as Medicare and Medicaid) on behalf of households to for-profit, nonprofit, and government health care providers.

Table 1. Health Care Expenditures in Gross Domestic Product (GDP), National Income and Product Accounts (NIPAs), 2002, 2006

[Billions of current dollars]

	Table, line number	2002	2006
Selected health expenditures in GDP, total		**1,597.8**	**2,070.1**
Personal consumption expenditures (PCE), health		**1,428.4**	**1,845.8**
PCE, durable goods, therapeutic appliances and equipment	Table 2.4.5U, line 64	**34.0**	**40.2**
Eyeglasses and contact lenses		**20.3**	**24.7**
Other		**13.7**	**15.5**
PCE, nondurable goods		**200.2**	**267.1**
Pharmaceutical products	Table 2.4.5U, line 120	198.0	264.4
Prescription drugs	Table 2.4.5U, line 121	172.3	236.9
Nonprescription drugs	Table 2.4.5U, line 122	25.7	27.5
Other medical products	Table 2.4.5U, line 123	2.2	2.7
Household consumption expenditures (HCE), services		**1,194.2**	**1,538.5**
Health care	Table 2.4.5U, line 168	1,082.8	1,380.7
Physicians	Table 2.4.5U, line 170	269.3	346.8
Dentists	Table 2.4.5U, line 171	75.6	93.5
Paramedical services	Table 2.4.5U, line 172	169.8	224.7
Home health care	Table 2.4.5U, line 173	47.0	64.1
Medical laboratories	Table 2.4.5U, line 174	21.0	28.1
Other professional medical services	Table 2.4.5U, line 175	101.8	132.5
Hospitals	Table 2.4.5U, line 179	469.5	601.0
Nursing homes	Table 2.4.5U, line 183	98.6	114.7
Health insurance	Table 2.4.5U, line 269	100.9	150.6
Final consumption expenditures of non-profit health services providers		10.5	7.2
Gross output	Table 2.4.5U, line 338	403.4	515.1
Less: receipts from sales	Table 2.4.5U, line 351	392.9	507.9
Federal government consumption expenditures and gross investment in health		**58.6**	**68.8**
Federal government consumption expenditures	Table 3.17, line 17	52.8	62.8
Federal government gross investment	Table 3.17, line 114	5.8	6.0
State and local government consumption expenditures and gross investment in health		**41.8**	**58.8**
State and local government consumption expenditures	Table 3.17, line 26	32.5	47.4
State and local government gross investment	Table 3.17, line 123	9.3	11.4
Private fixed investment in health		**69.0**	**96.7**
Health care structures	Table 5.4.5U, line 5	25.2	36.0
Medical equipment and instruments	Table 5.5.5U, line 8	43.8	60.7

Source: U.S. Bureau of Economic Analysis.

For each component of HCE for medical care, we would like to further break out spending into disease categories. Two of these categories fit entirely into their respective ICD–9 chapters: spending for dental services is assigned to ICD–9 chapter 9 (diseases of the digestive system, including the mouth and teeth), and eye care—recorded in the NIPAs under corrective eyeglasses and contact lenses—is assigned to ICD–9 chapter 6, which includes diseases of the sense organs. Because the MEPS survey does not contain information on health care provided to institutionalized individuals—including those in nursing homes—we cannot split out the spending reported for nursing homes in the NIPAs. Similarly, we do not have information to allocate spending on other therapeutic appliances and equipment, nonprescription drugs, and other nondurable medical products. All told, the portion of expenditures that we can allocate is $1,176 billion, or 89 percent of household consumption expenditures on medical care.

We use the information provided in the household component of the MEPS survey to break out spending into disease categories. The MEPS provides encounter-level data with information on the place of service and the patients' diagnoses. We use the place of service information to assign each encounter to a type of service in the NIPAs. Then, we use the diagnosis codes reported for each encounter to associate spending from the encounter to particular disease categories.

Spending by service type in MEPS

The MEPS encounters are organized into eight event files: three files for hospital care encounters (inpatient, outpatient, and emergency room) and individual files for office-based medical provider visits, prescription drugs, dental visits, other medical expenses, and home health. We begin by using the structure of the MEPS files to assign encounters to prescription drugs, home health, and hospitals. We are not able to divide hospital care into the individual categories shown in the NIPAs, because the MEPS survey does not contain information on the type of hospital (for example, nonprofit versus government).

Encounters from the office visits file could fall into one of these categories: physician services, medical laboratories, or other professional medical services. We assign each encounter to one of these categories by using variables in the MEPS that describe the place of service and the type of visit.

For physician services, the underlying NAICS industries are Offices of Physicians (6211), HMO Medical Centers (621491), and Freestanding Ambulatory Surgical Centers (621493). We identify these encounters in the MEPS data using responses to questions about what type of provider it was—whether the patient saw a doctor or a specialist MD and whether the place of service had doctors—and the type of location—HMO center, group practice, and so on. Specifically, we include in this category (1) all encounters that occurred at an HMO center or ambulatory surgical center and (2) encounters at medical offices, group practices, or medical clinics where doctors were present.

The remaining encounters are either classified as other professional medical services or medical laboratories. Encounters at lab facilities are reported directly in a variable on place of service. All other encounters are assigned to other professional medical services. These include visits to providers like chiropractors, nonphysician mental health practices, physical therapists, and so forth. We cannot break out "specialty outpatient care facilities and health and allied services" from the catch-all category. The difficulty is that the MEPS variables do not allow us to identify encounters in the specialty classes: family planning centers (62141) and outpatient mental health and substance abuse centers (62142).

Table 2 compares the population estimates from the MEPS for the categories that we use with the corresponding estimates from the NIPAs and with estimates using the MEPS reported in Sing, Banthin, Selden, Cowan, and Keehan (2006).[2] The NIPA estimates are higher than both of the estimates that use the MEPS survey. This is because several populations and services in the NIPAs are out of scope of the MEPS, which does not survey institutionalized or active military individuals. Any care (hospital, physician services, medications, and so forth) used by these patients is out of scope of MEPS. With regard to the active military, the value of the care they receive from military establishments (such as U.S. Department of Defense or Veteran's hospitals) is also not recorded in HCE, so this would not explain the gaps shown in table 2. However, any care they receive from nonmilitary providers would be shown in HCE and not in the MEPS.

Table 2. Population Estimates of Selected Household Consumption Expenditures (HCE), 2002

[Millions of current dollars]

NIPA commodity categories	HCE estimates	Sing study[1]	BEA study	
			Total	Percent allocated
Goods				
Corrective eyeglasses and contact lenses	20,262			
Prescription drugs	172,260	160,200	150,615	94.9
Services				
Outpatient services				
Physician services	269,306	187,300	137,344	80.6
Dental services	75,568			
Paramedical services				
Home health care	47,032	31,000	34,817	91.1
Medical laboratories	21,024	.....	6,644	75.5
Other professional medical services	101,792	47,900	36,014	80.3
Hospitals	469,536	324,300	362,851	87.6
Total	**1,176,780**	**750,700**	**728,285**	**87.5**

1. Sing, Banthin, Seldin, Cowan, and Keehan (2006).

Focusing on the two sets of estimates that use the MEPS, the main reason that our allocations differ from Sing, Banthin, Selden, Cowan, and Keehan (2006) is that they include only facility charges in hospitals and include the value of doctors' services at hospitals in physician services. In contrast, to align the MEPS encounters with the NIPA categories, we use the NAICS categories, which include any services provided at hospitals (including services by doctors) in the hospital category.

Spending by disease in MEPS

Given these assignments of encounters to NIPA spending classes, we use the available information on the patients' diagnoses to further break out that spending by disease category. Specifically, we use a set of variables found on each event record that contain information on the patients' conditions. The variables (called CCCODEX) contain a CCS code; the CCS system (Clinical Classification Software) clusters the more than 16,000 ICD–9 codes into a manageable number (about 260) of clinically meaningful categories (Elixhauser and McCarthy 1996). Moreover, these CCS categories map directly into the 18 ICD–9 Chapters to facilitate reporting the data at a more aggregate level.

We use these CCS codes to assign each encounter to an ICD–9 chapter. Our method is the primary diagnosis method (which for this dataset boils down to the first listed diagnosis). Though admittedly arbitrary—since there is no guarantee that the first listed diagnosis is the "primary diagnosis"—only 16 percent of encounters in the MEPS contain more than one diagnosis so that applying this method to these data will yield allocations that will likely resemble

2. We do not use the dental visits or encounters for eyeglasses and corrective lenses, since those encounters do not need further breakout by disease.

those using a proportional method (where some attempt is made to use the other listed diagnoses).

The last column of table 2 gives the percentage of spending in our MEPS sample that could be allocated into disease categories. On average, about 12.5 percent of the total spending reported in MEPS cannot be allocated to disease groups. This is because many of the encounters in the MEPS survey either do not contain information on the diagnosis or the available information is not valid. This is most pronounced for encounters at medical labs (about 25 percent of spending is not allocated). In contrast, about 95 percent of spending on prescription drugs in these data can be allocated. This high allocation of prescriptions reflects the fact that the MEPS provides self-reported diagnostic information for prescription drugs, something not typically contained in most data sets (like pharmacy claims).

Table 3 reports, for each NIPA category, the spending that could be allocated to specific diseases. As is usually done, these are population estimates obtained by applying sampling weights available in the MEPS for each individual. For example, if an individual in the MEPS represents 15,000 individuals in the population, their spending is multiplied by 15,000 to obtain an estimate of spending for individuals like him.

Standard errors for these estimates—reported in parentheses—provide information on the precision of the estimate. For example, our point estimates for spending on prescription drugs to treat infectious and parasitic conditions in 2002 is $4.1 billion. We can multiply the standard error by 2 in order to form a 95

Table 3. Spending by HCE and Disease Categories, MEPS, 2002

[Millions of current dollars]

	ICD–9 chapter[1]	Household consumption expenditures categories						
		Prescription drugs	Physician services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	4,146	1,869	1,270	89	238	7,416	15,028
		(726)	(113)	(860)	(42)	(44)	(2008)	(2382)
2	Neoplasms	1,620	11,693	1,366	608	1,622	32,884	49,793
		(197)	(1345)	(388)	(127)	(516)	(3856)	(4647)
3	Endocrine	23,636	6,358	1,895	447	840	9,801	42,978
		(881)	(381)	(371)	(60)	(108)	(1448)	(1978)
4	Blood	442	734	27	47	153	2,652	4,056
		(134)	(183)	(13)	(26)	(108)	(807)	(861)
5	Mental illness	15,639	6,112	5,775	23	3,875	10,930	42,353
		(633)	(548)	(1366)	(8)	(429)	(1849)	(2691)
6	Nervous system	8,445	13,314	6,059	430	3,353	16,675	48,277
		(509)	(714)	(1528)	(90)	(431)	(1926)	(2875)
7	Circulatory system	24,516	11,723	4,959	462	1,938	63,295	106,894
		(803)	(555)	(866)	(73)	(408)	(4983)	(5806)
8	Respiratory system	17,858	10,904	1,117	330	491	23,564	54,264
		(657)	(474)	(214)	(98)	(73)	(2247)	(2612)
9	Digestive system	11,256	4,909	216	224	416	32,369	49,389
		(447)	(348)	(70)	(42)	(59)	(3490)	(3738)
10	Genitourinary system	4,826	7,160	362	561	2,974	18,878	34,762
		(241)	(683)	(148)	(183)	(682)	(1511)	(2108)
11	Complications of pregnancy	1,476	5,094	33	186	402	17,507	24,697
		(110)	(380)	(16)	(55)	(63)	(1242)	(1518)
12	Skin	2,771	4,194	851	75	547	5,547	13,984
		(173)	(363)	(348)	(27)	(132)	(1056)	(1448)
13	Musculoskeletal system	11,820	12,359	3,172	775	6,644	26,313	61,082
		(536)	(587)	(581)	(105)	(469)	(2653)	(3226)
14	Congenital anomalies	159	447	883	36	125	2,935	4,586
		(66)	(120)	(386)	(23)	(64)	(884)	(1028)
15	Certain perinatal conditions	27	83	48	.....	46	5,750	5,955
		(14)	(31)	(37)	.....	(30)	(3845)	(3871)
16	Injury and poisoning	1,809	9,165	3,257	438	4,287	34,188	53,143
		(140)	(467)	(1402)	(70)	(457)	(3655)	(4164)
17	Symptoms and ill-defined	9,930	3,070	227	234	705	4,037	18,205
		(524)	(214)	(122)	(42)	(136)	(514)	(866)
18	Residual codes and unclassified	2,597	1,522	184	50	272	3,097	7,723
		(185)	(339)	(112)	(26)	(71)	(614)	(808)
	Total	**142,973**	**110,711**	**31,702**	**5,016**	**28,929**	**317,837**	**637,168**
	Standard errors	**(3816)**	**(3097)**	**(3113)**	**(344)**	**(1425)**	**(12539)**	**(17911)**

1. International Statistical Classification of Diseases and Related Health Problems Book 9.
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percent confidence interval for the estimate: the standard error of 726 says that we can be 95 percent confident that the true population estimate lies between $2.7 and $5.5 billion, or that our estimate is $4.1 billion, give or take $1.4 billion.

Several of the estimates in table 3 have large standard errors, pointing to lack of precision in the estimate. This is particularly true for the estimates associated with relatively rare conditions, where the estimates are based on a very small number of observations. There are, for example, only 281 encounters in our data for perinatal conditions. Similarly, there are relatively few encounters for congenital anomalies (1,058) and Blood (2,561). When spending for these conditions is further broken out by NIPA spending category, the number of records used in the calculation can be quite low: 4 of them are based on less than 25 observations; 12 on less than 50; and 20 on less than 100. One of the categories does not contain any encounters at medical labs for ICD–9 class 15, certain perinatal conditions, so we show zero spending for that cell. Among NIPA categories, the MEPS data contains relatively few encounters for the categories for home health and medical labs (493 and 1,237, respectively).

Spending by disease for HCE

We use the data that could be allocated to disease groups to split out the spending reported in the NIPAs into disease categories. Specifically, for each of these six NIPA categories, we express reported spending in the MEPS as a share of total spending for that NIPA category. We then apply those MEPS percentages to the NIPA data for each of these categories to obtain our estimate of spending by disease for the NIPA data. It is important to note that we are applying spending shares for noninstitutionalized civilians (from the MEPS) to a broader population (all individuals). Because the spending patterns for patients from the MEPS are not likely to be representative of spending for patients in long-term facilities (like nursing homes) and the military, our resulting estimates for the broader population are likely distorted.

The resulting data are shown in the top of table 4. The usefulness of these data for analytical purposes is illustrated in the bottom panels. The middle panel shows, for each NIPA category, how that spending is distributed across disease categories. This provides information on how changes in the number of patients with each disease—whether stemming from changes in the population or changes in prevalence—can affect providers' revenues. For example, hospitals and prescription drugs are the two categories with the highest share of spending from circulatory conditions. This means that an increase in the number of patients treated for circulatory conditions will likely affect those two sectors (hospitals and drugs) more than the other sectors (physician services, medical labs, and so forth). This is, of course, not a prediction in any sense of the word, since it ignores any changes over time in the mix of treatments used to treat patients that could result from the arrival of new technologies (for example, Lipitor) or from changes in the severity of conditions (from, for example, the aging of the population). However, it does provide useful information, just like knowing which industries are most involved in research and development (R&D) helps one know which industries would benefit most from a bump up in the R&D tax credit.

Analyzed in another way, the bottom panel shows, for each ICD–9 chapter, how spending on that disease is distributed across providers. This gives some sense for the effect that changes in provider prices could have for patients. For example, increases in the cost of care at hospitals would have a bigger effect on patients whose care involves hospitals—for example, ICD–9 chapter 15, certain perinatal conditions—than it would on patients whose care mostly occurs at other providers—ICD–9 chapter 3, endocrine, for example.

Contributions to overall spending growth

These data on spending broken out by NIPA and disease categories can be used to measure the contribution of each cell to overall spending growth. Table 5 illustrates how this could be done. The top panel gives the distribution of overall spending by NIPA and disease categories, and the middle panel gives the growth rate of spending for each of these categories. Multiplying the two corresponding numbers from the panels gives the contribution of each cell to overall spending growth shown in the bottom panel. Some of the growth rates in the middle panel are implausible: the estimated growth rate for spending on drugs for blood conditions is over 1,000 percent. In some cases, the implausible growth rates may be related to the small number of observations used to do the calculation (among conditions, calculations for congenital anomalies and perinatal conditions are based on relatively thin cells; among the NIPA categories, home health care and medical laboratories have a similar problem). This is not the only explanation, however, since some of the apparent outliers are based on cells with reasonable coverage: for example, the 125 percent growth rate in spending on drugs for neoplasms is constructed using about 2,500 encounters in both years. In these cases, it may be that the mix of underlying conditions,

Table 4. Estimated Spending by HCE and Disease Categories, NIPAs, 2002

	ICD–9 chapters[1]	Spending (Millions, current dollars)								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	4,995		4,547		1,884	374	837	10,955	23,592
2	Neoplasms	1,952		28,443		2,027	2,548	5,708	48,579	89,257
3	Endocrine	28,478		15,466		2,812	1,874	2,954	14,479	66,064
4	Blood	532		1,786		40	199	537	3,918	7,013
5	Mental illness	18,842		14,867		8,567	98	13,637	16,146	72,156
6	Nervous system	10,175	20,262	32,387		8,989	1,802	11,800	24,634	110,048
7	Circulatory system	29,538		28,516		7,357	1,937	6,818	93,505	167,673
8	Respiratory system	21,516		26,525		1,658	1,382	1,728	34,810	87,618
9	Digestive system	13,562		11,942	75,568	320	937	1,463	47,818	151,609
10	Genitourinary system	5,815		17,416		538	2,352	10,466	27,888	64,476
11	Complications of pregnancy	1,778		12,390		49	778	1,413	25,862	42,271
12	Skin	3,339		10,201		1,263	314	1,924	8,194	25,234
13	Musculoskeletal system	14,241		30,064		4,705	3,249	23,377	38,871	114,507
14	Congenital anomalies	192		1,088		1,310	151	440	4,336	7,517
15	Certain perinatal conditions	33		203		71	0	164	8,495	8,965
16	Injury and poisoning	2,179		22,295		4,831	1,835	15,086	50,505	96,731
17	Symptoms and ill-defined	11,965		7,468		337	982	2,482	5,964	29,198
18	Residual codes and unclassified	3,129		3,703		274	211	957	4,575	12,848
	Household consumption expenditures	**172,260**	**20,262**	**269,306**	**75,568**	**47,032**	**21,024**	**101,792**	**469,536**	**1,176,780**

	ICD–9 chapters[1]	Percent of HCE category								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	2.90		1.69		4.01	1.78	0.82	2.33	2.00
2	Neoplasms	1.13		10.56		4.31	12.12	5.61	10.35	7.58
3	Endocrine	16.53		5.74		5.98	8.91	2.90	3.08	5.61
4	Blood	0.31		0.66		0.09	0.95	0.53	0.83	0.60
5	Mental illness	10.94		5.52		18.21	0.47	13.40	3.44	6.13
6	Nervous system	5.91	100.00	12.03		19.11	8.57	11.59	5.25	9.35
7	Circulatory system	17.15		10.59		15.64	9.21	6.70	19.91	14.25
8	Respiratory system	12.49		9.85		3.52	6.57	1.70	7.41	7.45
9	Digestive system	7.87		4.43	100.00	0.68	4.46	1.44	10.18	12.88
10	Genitourinary system	3.38		6.47		1.14	11.19	10.28	5.94	5.48
11	Complications of pregnancy	1.03		4.60		0.10	3.70	1.39	5.51	3.59
12	Skin	1.94		3.79		2.69	1.49	1.89	1.75	2.14
13	Musculoskeletal system	8.27		11.16		10.00	15.45	22.97	8.28	9.73
14	Congenital anomalies	0.11		0.40		2.79	0.72	0.43	0.92	0.64
15	Certain perinatal conditions	0.02		0.08		0.15	0.00	0.16	1.81	0.76
16	Injury and poisoning	1.26		8.28		10.27	8.73	14.82	10.76	8.22
17	Symptoms and ill-defined	6.95		2.77		0.72	4.67	2.44	1.27	2.48
18	Residual codes and unclassified	1.82		1.37		0.58	1.01	0.94	0.97	1.09
	Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

	ICD–9 chapters[1]	Percent of ICD-9 disease category								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	21.17		19.28		7.98	1.59	3.55	46.43	100
2	Neoplasms	2.19		31.87		2.27	2.85	6.40	54.43	100
3	Endocrine	43.11		23.41		4.26	2.84	4.47	21.92	100
4	Blood	7.59		25.47		0.58	2.84	7.66	55.86	100
5	Mental illness	26.11		20.60		11.87	0.14	18.90	22.38	100
6	Nervous system	9.25	18.41	29.43		8.17	1.64	10.72	22.39	100
7	Circulatory system	17.62		17.01		4.39	1.16	4.07	55.77	100
8	Respiratory system	24.56		30.27		1.89	1.58	1.97	39.73	100
9	Digestive system	8.95		7.88	49.84	0.21	0.62	0.97	31.54	100
10	Genitourinary system	9.02		27.01		0.83	3.65	16.23	43.25	100
11	Complications of pregnancy	4.21		29.31		0.12	1.84	3.34	61.18	100
12	Skin	13.23		40.42		5.01	1.24	7.62	32.47	100
13	Musculoskeletal system	12.44		26.25		4.11	2.84	20.42	33.95	100
14	Congenital anomalies	2.55		14.47		17.43	2.01	5.86	57.68	100
15	Certain perinatal conditions	0.37		2.26		0.79	0.00	1.82	94.76	100
16	Injury and poisoning	2.25		23.05		4.99	1.90	15.60	52.21	100
17	Symptoms and ill-defined	40.98		25.58		1.15	3.36	8.50	20.43	100
18	Residual codes and unclassified	24.35		28.82		2.13	1.65	7.45	35.61	100
	Total	**14.64**	**1.72**	**22.88**	**6.42**	**4.00**	**1.79**	**8.65**	**39.90**	**100**

NOTE. Spending for Eyeglasses and contact lenses and Dental Services is taken directly from the NIPAs.
1. International Statistical Classification of Diseases and Related Health Problems Book 9. The table lists truncated titles of ICD9 chapters.

Table 5. Calculation of Contributions to Growth in HCE Spending, 2002–2006

	ICD–9 chapters[1]	Expenditure shares, 2002 (Percent)								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	0.4		0.4		0.2	0.0	0.1	0.9	2.0
2	Neoplasms	0.2		2.4		0.2	0.2	0.5	4.1	7.6
3	Endocrine	2.4		1.3		0.2	0.2	0.3	1.2	5.6
4	Blood	0.0		0.2		0.0	0.0	0.0	0.3	0.6
5	Mental illness	1.6		1.3		0.7	0.0	1.2	1.4	6.1
6	Nervous system	0.9	1.7	2.8		0.8	0.2	1.0	2.1	9.4
7	Circulatory system	2.5		2.4		0.6	0.2	0.6	7.9	14.2
8	Respiratory system	1.8		2.3		0.1	0.1	0.1	3.0	7.4
9	Digestive system	1.2		1.0	6.4	0.0	0.1	0.1	4.1	12.9
10	Genitourinary system	0.5		1.5		0.0	0.2	0.9	2.4	5.5
11	Complications of pregnancy	0.2		1.1		0.0	0.1	0.1	2.2	3.6
12	Skin	0.3		0.9		0.1	0.0	0.2	0.7	2.1
13	Musculoskeletal system	1.2		2.6		0.4	0.3	2.0	3.3	9.7
14	Congenital anomalies	0.0		0.1		0.1	0.0	0.0	0.4	0.6
15	Certain perinatal conditions	0.0		0.0		0.0	0.0	0.0	0.7	0.8
16	Injury and poisoning	0.2		1.9		0.4	0.2	1.3	4.3	8.2
17	Symptoms and ill-defined	1.0		0.6		0.0	0.1	0.2	0.5	2.5
18	Residual codes and unclassified	0.3		0.3		0.0	0.0	0.1	0.4	1.1
	Total	**14.6**	**1.7**	**22.9**	**6.4**	**4.0**	**1.8**	**8.7**	**39.9**	**100.0**

	ICD–9 chapters[1]	Growth in spending, 2002–2006[2] (Percent)								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	6.8		40.6		–88.5	36.4	–0.9	–24.6	–8.7
2	Neoplasms	126.9		32.1		45.1	46.3	27.6	12.6	24.0
3	Endocrine	74.7		45.7		219.5	146.7	75.3	47.5	70.2
4	Blood	1104.9		16.6		885.6	–11.9	–45.2	–36.7	68.9
5	Mental illness	45.6		–2.3		19.8	193.6	31.3	–14.7	16.7
6	Nervous system	63.0	21.9	14.6		–35.5	7.1	24.5	50.5	25.3
7	Circulatory system	24.6		25.8		49.4	68.0	14.2	24.0	25.6
8	Respiratory system	12.7		–3.3		213.9	17.1	31.6	19.6	14.8
9	Digestive system	16.1		51.3	123.4	141.8	88.9	54.2	30.5	28.2
10	Genitourinary system	36.8		37.5		28.2	–14.3	30.8	28.5	30.5
11	Complications of pregnancy	42.6		54.9		1476.0	9.3	99.0	74.9	68.9
12	Skin	9.5		–3.6		15.8	10.2	7.4	14.0	5.8
13	Musculoskeletal system	23.5		46.5		–1.4	46.4	20.4	53.2	38.6
14	Congenital anomalies	39.2		–2.1		–80.8	–15.9	4.7	8.8	–8.3
15	Certain perinatal conditions	–93.2		–47.8		569.8	.....	–98.8	–31.1	–28.1
16	Injury and poisoning	–15.7		48.4		7.6	4.1	5.1	42.4	34.2
17	Symptoms and ill-defined	–11.4		11.0		–36.5	2.8	0.8	22.3	2.4
18	Residual codes and unclassified	81.7		16.5		551.4	26.5	71.2	1.0	42.5
	Total	**37.5**	**21.9**	**27.6**	**23.4**	**29.8**	**38.9**	**23.5**	**28.2**	**28.9**

	ICD–9 chapters[1]	Contributions to growth in spending (Percentage points)[3]								
		Prescription drugs	Eyeglasses and contact lenses	Physician services	Dental services	Home health	Medical labs	Other services	Hospitals	Total
1	Infectious and parasitic	0.00		0.01		0.00	0.00	0.00	0.01	0.02
2	Neoplasms	0.00		0.03		0.00	0.00	0.01	0.05	0.09
3	Endocrine	0.04		0.02		0.01	0.00	0.00	0.02	0.10
4	Blood	0.01		0.00		0.00	0.00	0.00	0.00	0.01
5	Mental illness	0.02		0.01		0.01	0.00	0.02	0.01	0.07
6	Nervous system	0.01	0.02	0.03		0.00	0.00	0.01	0.03	0.12
7	Circulatory system	0.03		0.03		0.01	0.00	0.01	0.10	0.18
8	Respiratory system	0.02		0.02		0.00	0.00	0.00	0.04	0.09
9	Digestive system	0.01		0.02	0.14	0.00	0.00	0.00	0.05	0.23
10	Genitourinary system	0.01		0.02		0.00	0.00	0.01	0.03	0.07
11	Complications of pregnancy	0.00		0.02		0.00	0.00	0.00	0.04	0.06
12	Skin	0.00		0.01		0.00	0.00	0.00	0.01	0.02
13	Musculoskeletal system	0.01		0.04		0.00	0.00	0.02	0.05	0.13
14	Congenital anomalies	0.00		0.00		0.00	0.00	0.00	0.00	0.01
15	Certain perinatal conditions	0.00		0.00		0.00	.....	0.00	0.00	0.01
16	Injury and poisoning	0.00		0.03		0.00	0.00	0.01	0.06	0.11
17	Symptoms and ill-defined	0.01		0.01		0.00	0.00	0.00	0.01	0.03
18	Residual codes and unclassified	0.00		0.00		0.00	0.00	0.00	0.00	0.02
	Total	**0.20**	**0.02**	**0.29**	**0.08**	**0.05**	**0.02**	**0.11**	**0.51**	**1.29**

1. International Statistical Classification of Diseases and Related Health Problems Book 9
2. Growth rates are calculated as ((2006 expenditures/2002 expenditures)–1)x100.
3. Contributions are calculated as shares times growth rates. Contributions sum to (2006 expenditures/2002 expenditures) for overall spending.

with possibly different spending patterns, changes over time and generates an unusually fast or slow growth rate. However, these outliers are typically associated with low spending shares (top panel) so that any distortions in the growth rates typically do not show through to the top line or to the contributions.

Using the column totals in the bottom panel, spending at hospitals contributed the most to overall spending growth (.51 percentage point) because it is the largest spending category. Similarly, spending on physician services and drugs are the second and third highest contributors. The row totals show that circulatory conditions are the spending category that contributed the most to overall growth—it is the largest disease spending category. In contrast, one of the disease categories with the fastest growth (blood) only contributed .01 percentage point to spending growth because this disease group involves relatively little spending (0.6 percent).

Recommendations of the National Academies panel: an agenda

A panel of health experts, convened by the National Academies, recently issued a report that provides a roadmap for statistical agencies to improve existing measures for this important sector. The report offers guidance on how to prioritize the work that must be done. For BEA, the issues are about how to report the inputs and outputs of this sector to facilitate assessments of productivity.

Expenditures. The report urges statistical agencies to report the dollar value of spending in terms of the diseases that are treated; essentially, they call for the redefinition of the sector's output. Table 6 compares how spending is currently reported with an alternative based on the preliminary work reported here. As recommended by the panel, BEA will continue to study (1) the alternative methods one could use to allocate spending and (2) the relative merits of alternative data sources for this purpose. This research will provide important insights into the potential sensitivity of numbers like those in table 6 to changes in the underlying methods and data.

Price indexes. Breaking out spending by disease is an important first step in calculating price indexes that are consistent with this new definition of the output. The other important piece has to do with finding ways to properly account for improvements in health outcomes that result from better treatments or finding a way to adjust price indexes for quality improvements. On this front, the panel recommended that existing statistics based on life expectancy (such as quality-adjusted life years) would be a reasonable first step.

Data sources. Much of the work currently underway at BEA has to do with assessing the relative merits of available data sources. There is some concern that the MEPS survey misses some important spending. However, for some patients—the uninsured, for example—it is the only available source data. We will continue to explore ways to leverage the representative nature of the MEPS survey with the large number of encounters provided in claims data for patients covered by commercial insurance plans and those covered by the Medicare or Medicaid programs. We will also continue to look for other data sources to fill in gaps. For example, neither claims data nor household surveys are useful in assessing how much doctors in capitated plans are paid for treating patients—they receive some payment from patients when they are treated, but they also receive funds directly from the insurance company that are not reported in these data sources. Finally, we have started compiling data from the predecessors to the MEPS survey in order to construct historical measures.

Table 6. Selected Categories of Household Consumption Expenditures for Medical Care, 2002

[Millions of dollars]

Current Presentation	
Commodity	Nominal spending
Goods	
Corrective eyeglasses and contact lenses	20,262
Prescription drugs	172,260
Services	
Outpatient services	
Physician services	269,306
Dental services	75,568
Paramedical services	
Home health care	47,032
Medical laboratories	21,024
Other professional medical services	101,792
Hospitals	469,536
Total	**1,176,780**
Proposed Presentation	
Disease	Nominal spending
Infectious and parasitic	23,592
Neoplasms	89,257
Endocrine	66,064
Blood	7,013
Mental illness	72,156
Nervous system	110,048
Circulatory system	167,673
Respiratory system	87,618
Digestive system	151,609
Genitourinary system	64,476
Complications of pregnancy	42,271
Skin	25,234
Musculoskeletal system	114,507
Congenital anomalies	7,517
Certain perinatal conditions	8,965
Injury and poisoning	96,731
Symptoms and ill-defined	29,198
Residual codes and unclassified	12,848
Total	**1,176,780**

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