

Measuring Nursing Home Price Growth between 2000-2009¹

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ABSTRACT

The proper measurement of inflation in health care is important for policymakers to understand the drivers of price growth. For this reason, the U.S. Bureau of Economic Analysis (BEA) recently released an alternate presentation of inflation for the health care sector that examines prices by disease, such as treatment of diabetes, rather than by place of service, such as a hospital stay. This account does not yet incorporate spending on nursing home care, providing an incomplete picture of inflation in the health care sector. To fill this gap, this paper calculates price indexes by disease for nursing home care for 2000-2009. We find prices in the overall nursing home sector grew at an average annual rate of only 0.9% during the period using these indexes. Price growth was slower for long-term nursing home residents (1.4%) compared to short-term residents (2.8%). Diseases of the circulatory system was the most prevalent disease category, followed by mental illness for long-term residents and diseases of the musculoskeletal system and connective tissue for short-term patients. These three categories of diseases also received the largest allocations of spending, with the bulk going towards patients diagnosed with mental conditions. Overall, nursing home price growth in the 2000s was much slower than for other health care sectors. Incorporating disease-based price indexes for nursing homes into BEA's new health care account will provide a more comprehensive picture of health care spending trends and inflation.

¹ We thank Ana Aizcorbe, Abe Dunn, and Anne Hall for useful comments. The views expressed in this paper are solely those of the authors and not necessarily those of the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce.

INTRODUCTION

Spending on nursing homes represented over 5% of all national health care expenditures, about \$149 billion in 2011² (National Center for Health Statistics, 2014). Almost 5% of all Medicare expenditures are spent on short-term nursing home stays (Medicare Current Beneficiary Survey, 2012). Over 1.4 million people were long-term residents of a nursing home in 2012 (Centers for Medicare & Medicaid Services, 2013). More than 40% of long-term care spending is paid by Medicaid, representing almost one-third of Medicaid's total annual expenditures (Paradise, 2015). The demand for long term care services is only expected to increase as the population continues to age and deal with increasingly complex conditions (U.S. Department of Health & Human Services, 2010). Given the large scale of public spending attributed to the nursing home sector and the number of people involved in this type of care, the proper measurement of inflation in the nursing home care is important to understand what is driving spending growth.

To better understand price growth in the health care sector, the U.S. Bureau of Economic Analysis (BEA) recently released a "health care satellite account" that measures medical care inflation using new methods recommended by the Committee on National Statistics (Dunn et al., 2015; National Research Council, 2010). This account estimates price growth by allocating spending to disease categories and calculating medical care expenditure (MCE) indexes. These MCE indexes redefine output in the health care sector as the treatment of disease (e.g., cancer or diabetes), the suggested method of health economists to better understand drivers of health care expenditures and the returns to spending (Berndt et al., 2000). The MCE indexes differ from

² Nursing home spending represents nearly 9% of personal consumption expenditures (PCE) on health care services (U.S. Bureau of Economic Analysis, 2015).

BEA's official method of calculating prices and spending for health care, which is measured by place of service, such as a stay in a hospital or a doctor's visit. An MCE index picks up shifts in the treatment of diseases that the official index does not. For example, MCE indexes capture the effect of substitutions between places of service that occur from changes in technology or reimbursement, such as certain procedures shifting away from expensive hospital stays to less-expensive outpatient ambulatory surgical centers (Rosenberg & Browne, 2001). Additionally, MCE indexes account for changes in insurance coverage that can impact the cost of care. This is important in the nursing home sector, where a large proportion of nursing home residents shift from paying out-of-pocket to having Medicaid coverage, which often reimburses nursing homes at lower rates (Wiener et al., 2013). An MCE index captures this shift as a drop in price, whereas the official method does not. BEA's new account covers the bulk of medical care spending in the U.S., but does not yet include spending on care in nursing homes. Incorporating this missing piece of spending will provide a more comprehensive picture of health care and the drivers of price growth in the U.S. Therefore, the objective of this paper is to calculate MCE indexes for nursing homes that can be incorporated into BEA's health care satellite account. The components of the MCE indexes are examined to identify which diseases account for the most spending and growth in prices. Finally, the MCE indexes are compared to BEA's official nursing home index, the Personal Consumption Expenditures (PCE) index.

The rest of the paper is organized as follows: the Background section explains nursing home pricing and discusses previous research on nursing home price growth. The Methods section explains the data and calculations used to estimate spending by disease and the MCE indexes. It also includes a short description of the conventional method of measuring nursing home price growth using PCE indexes. Results are presented with a discussion of the implications for adding

nursing home spending to BEA's health care satellite account and the reasons for different price growth between the MCE and PCE indexes.

Background

Most nursing home residents are Medicare beneficiaries, but the majority of overall nursing home spending comes from Medicaid (U.S. Department of Health & Human Services, 2010). Medicare only pays for short-term nursing home care when it occurs directly after an eligible hospital stay, usually one that was three days or longer. Most nursing home patients are permanent or "long-term" residents. They typically pay for nursing home care from personal funds, or use Medicaid if they do not have the resources. Medicaid pays for the majority of total spending on long-term nursing home care (National Center for Health Statistics, 2014).

Short-term or skilled nursing facility (SNF) stays represented about 30% of spending on total nursing home care in 2009 (Medicare Current Beneficiary Survey, 2012). The price for a SNF stay is determined by Medicare's Prospective Payment System (PPS). The PPS prices nursing homes stays based on the patient's condition and degree of resources expected to be utilized, similar to diagnosis-related groups used to reimburse hospital services. The first 20 days of a SNF stay is paid entirely by Medicare, while stays that last 20-100 days require a co-pay from the beneficiary, currently \$157.50 per day (Centers for Medicare & Medicaid Services, 2015). Beneficiaries typically pay out-of-pocket or are covered by Medicaid. In 2004, Medicare paid for almost two-thirds of all spending on SNF stays, while Medicaid paid for 16% and private coverage paid for 11% (Figure 1.a). When a nursing home stay reaches 101 days, Medicare no longer pays and patients either leave the nursing home or become long-term residents. When comparing daily reimbursement rates, SNF stays are generally higher-priced

than for long-term nursing home care because SNF patients are usually receiving more intensive care, such as rehabilitative services after a broken hip. While the SNF patients cost more using average daily rates, annual spending is higher for long-term patients because the nursing home stay covers a much longer period of time, often the entire year (see Figures 2.a and 2.b).

Nursing home services for long-term patients are broken into two categories: custodial and ancillary. The custodial category covers room and board. The ancillary category covers all others services, such as physical therapy and prescription medications. While nursing homes typically charge all residents the same amount for services, Medicaid usually reimburses nursing homes at lower rates than private payers (Zuckerman et al., 2009). In the 2000s, Medicaid paid nursing homes a set daily rate for custodial services for each resident. The rate varies by nursing home depending on the case mix, a value determined from the average patient severity in each nursing home. Spending for ancillary services differs by patient, depending on their condition and the payer. For example, a patient with multiple chronic conditions may have greater spending than a patient of lesser severity due to higher costs for prescription medication. The payer matters because a private patient can choose services that a Medicaid patient often cannot, such as wanting a private room or requesting a brand name medication instead of a generic.

Stewart et al. (2009) provide comprehensive estimates of nursing home price growth in the U.S. from 1977-2004. They look at changes in per diem prices for nursing home patients using data from the National Nursing Home Survey (NNHS). Stewart et al. (2009) found overall nursing home price growth slightly outpaced prices for other medical care from 1977-2004. The authors suggest the relatively fast growth in nursing home prices reflects increased costs due to investments in quality improvements, specifically, an increase in expensive specialty units for patients with cognitive impairment and an increase in full-time nursing staff ratios. They also

found prices for out-of-pocket payers grew slightly faster than Medicaid prices. This is not surprising since Medicaid payments are determined annually by each state, whereas prices for private patients are not subject to the same constraints.

There is considerable market variation in average per diem nursing home prices for patients paying out-of-pocket, ranging from \$135 to over \$520 (Northwestern Mutual, 2013). Market factors have been shown to impact private nursing home prices above and beyond the costs borne by the facility. The supply of nursing homes steadily declined in the 2000s, dropping almost 10% during the decade (Centers for Medicare & Medicaid Services, 2013). Additionally, substitutes to nursing home care have increased competition in the sector, such as home health care and adult day care (Grabowski et al., 2012). Public reporting of nursing home quality indicators has also been shown to impact nursing home prices for private payers. Clement et al. (2012) found low-quality nursing homes in Wisconsin responded to public quality reporting by increasing prices for private payers. A positive relationship between public reporting and prices was also found in a study that used a national sample of nursing homes from 2001-2006 (Mukamel et al., 2010).

METHODS

Data

Nursing home payment and utilization data were taken from the Medicare Current Beneficiary Survey (MCBS), an annual survey of Medicare beneficiaries on health care utilization and expenses. All health care utilization and spending are collected in the MCBS, not just medical expenses covered by Medicare. The MCBS also covers aspects such as patient demographics and measures of health status. The MCBS sample uses a 2-year overlapping panel

design and has a sample size of approximately 12,000 beneficiaries per year, of which about 1,200 have at least one nursing home stay (Medicare Current Beneficiary Survey, 2012).

There are three types of nursing home patients: those with only long-term stays, those with only short-term (SNF) stays, and those who had both in the year. Beneficiaries with both types of stays usually represent a patient that became a long-term resident after a short-term stay following a hospital stay. Disease information for short-term patients is available from billing claims diagnoses and also from an annual survey. Up to nine different International Classification of Disease codes (ICD-9) are available on each claim. These diagnosis codes are mapped to 260 mutually exclusive clinical classification codes using the Clinical Classification Software (CCS) from the Agency for Healthcare Research and Quality. The CCS has been used in the past to group diseases into clinically meaningful groups (Aizcorbe & Nestoriak, 2011) and is currently the classification system used to define diseases in BEA's new health care satellite account.

Information on spending and medical conditions for long-term patients in the MCBS comes from an annual patient survey. The survey asks about the prevalence of over two dozen major conditions. A nurse completes a questionnaire for each survey resident and indicates which of any of the diseases the patient has. For example, the survey asks "does the patient have dementia?" The survey diseases and conditions can be mapped to exclusive CCS codes. For a full concordance of the survey conditions and CCS categories, see Appendix Table 1 of Hall and Highfill (2013). While the survey does not cover all possible ICD-9 conditions, half of all the 18 disease chapters are represented. Two of the nine chapters excluded from the survey are related to pregnancy and children. The other seven were found to represent the minority of spending using short-term claims and to have relatively low treated prevalence rates.

Annual beneficiary spending on nursing home care is available by type of stay, either short-term or long-term. Spending is calculated from all possible sources, including Medicare, Medicaid, private insurance, and out-of-pocket spending. As discussed, the majority of spending for short-term stays is paid by Medicare, whereas spending on long-term stays is split mostly between Medicaid and out-of-pocket spending. Spending was abstracted from the MCBS personal summary file which provides total annual spending for short-term or long-term events by patient. In the MCBS, spending for long-term patients represents both custodial and ancillary costs (such as prescription drugs), though nursing home patients can still incur medical costs outside of the nursing home. Short-term spending covers all medical care that a patient received during the stay.

Spending by Disease

Past research on nursing home prices usually investigates per diem rates paid by different payers. This paper investigates nursing home price growth in the 2000s by using a disease-based price index, also known as a medical care expenditure (MCE) index. An MCE index defines the price of nursing home care as annual patient spending for treatment of individual diseases, such as total annual spending on the treatment of dementia. The best method for allocating spending to exclusive diseases has not been determined and there is very little research available in the area of nursing homes. The difference between methods is mostly driven by issues with comorbidities (Dunn et al., 2015), which is especially significant in the nursing home population. In a comprehensive analysis of U.S. spending by medical condition from 1996-2005, spending on mental disorders and heart conditions were found to contribute the most to total spending (Roehrig et al., 2009). While nursing home spending was part of the study, the public tables show spending aggregated across all places of services (hospitals, hospice, etc.) and therefore

there are no estimates of nursing home spending by disease. This paper follows the methodology in Roehrig et al. (2009) to allocate spending by disease for nursing home patients. This is done by distributing annual patient spending equally to each disease indicated on a patient's survey or SNF claim. Annual spending is then aggregated across all patients with each disease. In BEA's health satellite account, spending and patients are found using the first disease linked to each medical event (called the "primary diagnosis" method). However, this method is not feasible to allocate spending for long-term nursing home residents in the MCBS because disease information is collected in an annual survey and is not linked to specific events. Although short-term patients have individual claims diagnoses that can be used in a primary diagnosis method, most claims involve complex cases with multiple diagnoses listed. This differs from many of the medical events from the BEA account, which often listed only one diagnosis, making the primary diagnosis a reasonable method in those cases. Therefore, incorporating multiple diseases appears to be necessary for accurate estimates of spending by disease for nursing home patients. A sensitivity analysis using regression techniques is also tested.

About half of the long-term survey conditions map to more than one CCS category. For these conditions, spending is allocated using the distribution from SNF claims. For example, the survey disease "hypertension" maps to CCS codes 98 and 99. An examination of the SNF claims showed that between those two diagnoses, CCS 98 was indicated about 91% of the time. Therefore, we allocate 91% of spending for a long-term resident with "hypertension" to CCS 98 and 9% of spending to CCS 99. Not all survey diseases are represented in short-term claims each year, so in those cases the average share from all years was used for the allocation.

Events with zero spending and without diagnoses were considered incomplete and were dropped from the analysis.

Medical Care Expenditure Indexes

An MCE index is calculated using annual per-patient spending on individual diseases as the price (Aizcorbe, 2013). Estimates are aggregated to the annual level for each disease, and per patient spending (i.e., price) is found by dividing total spending by number of patients. Price growth measured with an MCE index reflects the change in patient costs for a fixed distribution of diseases, regardless of payer. This differs from the conventional method of estimating nursing homes price growth, which uses a Personal Consumption Expenditures (PCE) index. The PCE index mainly relies on the Producer Price Index (PPI) for determining nursing home price growth, available from the Bureau of Labor Statistics. In general, the PPI uses producer and employer surveys to measure changes in per diem rates and for each individual nursing home service by type of payer. Again, the advantage of measuring prices with a disease-based MCE index is that the MCE picks up the effect of substitutions between types of insurance and between different care settings. In the nursing home sector, when a home resident changes from paying out-of-pocket to having Medicaid coverage, a common occurrence called “spending down” (Wiener et al., 2013), an MCE index will capture this as a decline in price, whereas the PPI and PCE index will not.

To obtain a larger sample size for the disease-based estimates and remain consistent with the current presentation in the BEA health care satellite account (HCSA), spending and number of patients are pooled together in two-year intervals. Therefore, the 2000 estimates include 1999 and 2000 data and the 2001 estimates include 2000 and 2001. The MCE subindex that we calculate includes spending for all services at nursing homes. For each disease, d , the MCE index for nursing home services, s , is found by dividing price in year t by the base year price:

$$MCE_{d,s} = \frac{p_{d,s}^t}{p_{d,s}^1}$$

where $p_{d,s}^t$ = per patient expenditures by disease in year t (total expenditures by disease in year t divided by number of patients with disease in year t) and $p_{d,s}^1$ = per patient expenditures by disease in year 1 (total expenditures by disease in year 1 divided by number of patients with disease in year 1). The overall MCE index is found by summing the disease indexes, weighting by share of base year expenditures:

$$MCE_s = \sum(w_{d,s} * MCE_{d,s})$$

where $w_{d,s}$ = total expenditures for nursing home services for each disease in the base year divided by overall base year expenditures for nursing home services.

Including the costs of all the care received in the nursing home in our index allows us to properly account for any changes in the bundle of treatments used to treat medical conditions (utilization) as a change in the cost of care (price). Previous research has shown that these changes in utilization are potentially important in understanding the source of price growth for many conditions (Dunn et al., forthcoming). Additionally, when residents spend down from paying out-of-pocket to having Medicaid coverage, the MCE will capture this change as a price drop.

Integrating the nursing home subindex with the BEA HCSA index requires we exclude spending on services received by nursing home patients outside of the nursing home. Numerically, the disease-level estimates of nursing home spending and patients are added to the BEA estimates used to create health account index for all other medical care (physician and hospital (inpatient, outpatient, emergency department) visits, prescription drugs, and home

health). This overall MCE index that combines other medical services (ns) with nursing home care (s) is written:

$$MCE = \sum (w_{d,s+ns} * \frac{p_{d,s+ns}^t}{p_{d,s+ns}^1})$$

The combined index is essentially a weighted average of the nursing home subindex and the BEA index. To the extent that nursing home patients do receive care in hospitals for the same conditions that they report at the nursing home, we will inadvertently treat those two episodes as if they were for different patients. This will double-count the number of patients suffering from those conditions and will, thus, understate the average cost per patient. However, if this trend is stable over time, it would not affect the price indexes. The likely impact to the overall result is low given that long-term stays represent the majority of nursing home care and those residents mostly stay in a nursing home for life. The extent of this problem is uncertain without linking patients across the separate data series, an area outside of the scope of this paper.

RESULTS

The majority of nursing home spending for Medicare beneficiaries was attributable to long-term care, accounting for 71% of total nursing home spending in 2009, down from 86% in 2000. The decline in the share of spending attributable to long-term care reflects a decrease in the number of long-term nursing home residents during the period. This result corresponds with the recent movement to keep patients at home and out of relatively expensive long-term care facilities (Gleckman, 2009). Short-term nursing home care experienced a different trend as utilization increased during the period. About 44% of beneficiaries with nursing home stays in 2009 were exclusively long-term residents (down from 54% in 2000), 40% were exclusively

short-term stays (up from 32%), and 16% of beneficiaries with a nursing home stay had both a short-term and long-term stay (up from 14%). Annual average spending for long-term residents was almost twice that for short-term patients (Figures 2.a & 2.b).

Long-term residents often received care for different diseases than short-term patients. Almost half of spending for long-term residents was allocated to mental illnesses, which includes conditions such as dementia, Alzheimer's, and other mental conditions. Short-term patients had a higher share of spending assigned to acute conditions, such as diseases of the musculoskeletal system (e.g., back pain) and injury and poisoning (Table 1). For short-term residents, there were slight differences in the distribution of disease spending when diagnoses from claims were used, which contain up to nine diagnoses per event, versus when the survey was used, which contain the first three claims diagnoses. Because claims provide more comprehensive information on treated diseases than the survey, going forward results for short-term patients are reported using claims.

The MCE indexes show different price growth for long-term and short-term stays during the period. The average annual growth rate for the long-term MCE index was 1.4%, half the growth rate for short-term stays (Figure 3). Growth is even lower (0.9%) when the two series are combined into a single index. In this combined index, disease and spending information was merged into a single episode for the approximately 15% of patients with both a short-term and long-term stay. This resulted in relatively slower price growth for many conditions, picking up the effect of shifting care from a short-term to long-term setting. When these patients are excluded from the overall MCE index, price growth rises to 1.3%. In general, the slow growth in the combined index is driven by long-term care spending, which represents most nursing home spending. Price growth was slow or negative for many mental health conditions, which dominate

other disease categories in spending. Slow growth was apparent for many of the conditions with large shares of spending, with the exception of diabetes (Table 2). For example, essential hypertension, the disease with the most spending aside from mental conditions, averaged only 2.1% price growth annually in the combined index.

Adding nursing home spending to medical spending from BEA's health care satellite account (HCSA) reduces the average annual growth rates (AAGR) from 4.9% to 4.1% (Figure 4). The overall impact of incorporating nursing home spending into BEA's new HCSA reflects the slow growth in nursing home prices, driven by low and negative price growth seen in most mental health conditions (Table 2). Although these diseases were the largest contributors to driving down the growth, most conditions realized relatively slower price growth in nursing homes compared to the HCSA. For example, average price growth for many cardiovascular diseases, the most prevalent disease category in both the HCSA and among nursing home patients (Figure 5), was much lower in nursing homes.

The slow growth in spending on mental conditions during the 2000s may indicate that investments in specialized units for patients with cognitive conditions from the 1990s paid off, by reducing growth in spending the following decade (Stewart et al., 2009). Alternatively, an increased focus on nursing home quality of care through various pay-for-performance programs may have diverted spending to aspects of care measured in the programs, most of which were not directly related to treating mental conditions (Werner & Asch, 2005). Unfortunately, the MCBS survey does not provide comprehensive details on the types of services provided to long-term nursing patients. Additional research is needed to understand the specific factors leading to the flat, and sometimes negative, price growth for mental conditions.

Nursing home price growth using the official PCE index was 4 times higher than the 1.0% growth rate found using disease-based price indexes (re-basing to 2009 to match the PCE index slightly increased the growth rate). The growth rate for the nursing home PCE index is identical to growth in the producer price index (PPI) for nursing home care. The difference in growth rates between the MCE and PCE indexes reflects the different definitions of output. Specifically, the MCE index tracks growth in prices for the treatment of diseases, whereas the PCE index (and PPI) tracks prices for nursing home services by the type of payer. The PCE index relies on producer and employer surveys to determine price growth in nursing homes by type of payer, whereas an MCE index tracks the price of spending on the treatment of diseases, regardless of who pays. Aside from not capturing the Medicaid “spend down” phenomenon, the PCE index also does not capture cuts in service or shifts happening within the Medicaid program over time. In the early 2000s, many states began working with private insurers to lower spending by enrolling Medicaid recipients into managed care programs (Galewitz, 2011). If the PCE index is not picking up this movement into managed care programs by long-term Medicaid recipients it will not capture the resulting drop in price for nursing home care.

Sensitivity Analyses

The first sensitivity analysis determines if the MCBS nursing home population is a reasonable proxy for the entire universe of nursing home patients by comparing results from the MCBS with another source for nursing home data, the National Nursing Home Survey (NNHS). Data are available from the NNHS for four years: 1995, 1997, 1999, and 2004. The advantage of the NNHS is that it covered all nursing home residents, not just Medicare beneficiaries, as with the MCBS. However, the survey was changed in the late 2000s to one that covers only facility characteristics and no longer contains disaggregated resident-level information necessary to

calculate spending by disease. For the comparison, the MCBS data were transformed to per diem rates to correspond with the format of the NNHS file, which does not provide annual totals for patients. Per diem prices were relatively similar for NNHS and MCBS long-term residents for the four available years, though they diverge slightly in 2004 (Table 3). Short-term MCBS rates were much higher than the NNHS and long-term MCBS rates, but this is expected because patient severity and resources used are generally higher for care after a hospital stays. The NNHS documentation acknowledges long-term residents are over-represented due to its survey design (Centers for Disease Control and Prevention, 2009), and these results verify this bias. Spending by disease was also calculated using the NNHS data, following similar methods as with the MCBS data. The NNHS data had a similar distribution as the MCBS for most ICD-9 chapters (not shown). An important exception is that the NNHS includes all ICD-9 chapters, whereas the MCBS survey for long-term patients does not ask about less prevalent diseases and therefore is not a comprehensive distribution of diseases. As a result, the NNHS allocates about 15% of total spending to conditions not covered in the MCBS survey of long-term residents.

The second sensitivity analysis tests if the spending by disease estimates are sensitive to the method used by using another method to allocate spending. Following previous research on dividing spending to diseases in the absence of complete claims diagnoses, we use regression coefficients to allocate spending to individual conditions (Hall & Highfill, 2013). To do this, patient spending is first regressed on the conditions a patient is diagnosed with, then spending is allocated to each diagnosed conditions in proportion to the regression coefficient (Trogon et al., 2008). As with the primary method, total annual spending is found by summing across all patients for each disease. The results showed a similar pattern of spending for most diseases. However, the regression allocated a significantly larger share of spending to mental conditions.

Using this method of spending, the AAGR would be even lower than the main result. Given the relatively small sample sizes for some of the diseases, regression coefficients often fluctuate from year to year, causing issues with reliability.

Despite the care taken in designing this study, there are important caveats to consider when interpreting the results. Primarily, the data used are subject to a few limitations. The MCBS only covers those with Medicare and does not represent the entire population of nursing home patients. While the NNHS data show that 11% of nursing home patients in 2004 were under the age of 65, this may not be a good metric of Medicare coverage because those under age 65 can be covered if they have an eligible disability. About 7% of the MCBS nursing home patients in 2009 were under age 65, and the majority of those were covered by Medicaid. Since the vast majority of nursing home patients are also covered by Medicare, the MCBS appears to be a reasonable proxy for the nursing home populations. The MCBS data do not contain comprehensive details on the services provided to nursing home residents, making an examination of intensity of service difficult. Therefore, it is unclear whether the slow growth in nursing home prices reflects a decrease in the number of services for residents or if something else is occurring. Additionally, because we assume that nursing home patients do not receive non-nursing home care in our subindex, we cannot properly account for any treatment shifts between nursing homes and other settings (e.g., home health care). To the extent that these shifts are occurring to lower-cost settings, our index will overstate true costs.

While both methods for allocating spending ended up with similar overall results, it is not clear which technique is most accurate and both have strengths and weaknesses. For example, the method of dividing spending equally across patients' diagnoses allocates a large portion of spending to hypertension because that is a highly-prevalent disease among the elderly. If a

person has both Alzheimer's and hypertension, spending is allocated equally between the two diseases, even though it seems more likely that treating the Alzheimer's would be a much higher expense. On the other hand, the regression method relies on small sample sizes for many diseases and produces variable coefficient estimates from year to year. There is also some disagreement over whether it is appropriate to divide spending on nursing home care into exclusive disease categories, since so many patients are admitted due to general frailty that may not be attributable to a specific disease or condition (National Research Council, 2010). Whether or not nursing home spending will be treated separately from other medical spending in the HCSA is still not settled. Nonetheless, the contribution of this paper is to provide a first estimate of what BEA's new disease-based health care satellite account may look like when nursing home spending is included.

CONCLUSION

Including nursing home spending into BEA's health care satellite account (HCSA) provides a more comprehensive picture of the U.S. health care sector. Spending for nursing home care represents almost 9% of PCE for health care services (U.S. Bureau of Economic Analysis, 2015), but is not currently included in the HCSA. When nursing home spending is added to BEA's medical care spending estimates in the HCSA, the AAGR for the new combined MCE price index declines almost a percentage point. Additionally, the rate of overall health care spending is estimated to grow slower than originally thought when nursing home spending is included. Mental conditions are responsible for the largest share of nursing home expenditures and have much slower growth rates than in the HCSA, however most diseases showed relatively slower price growth for nursing homes. The weighted MCE index of nursing home and other medical spending provides a general idea of the impact of incorporating nursing home spending

into the HCSA, but a more rigorous method is necessary to deal with potential double-counting of patients in both surveys. An “optimal” account would follow individual patients throughout their lives to track their health service utilization over time, including conditions treated, insurance status, place of service, and spending. No single data source contains this information for a nationally-representative sample of people, though techniques using survey weights have some potential to circumvent issues with representativeness (Dunn et al., 2015).

Adding nursing home expenditures to the HCSA will provide a more comprehensive picture of health care spending in the U.S. However, significant methodological and data challenges must first be addressed before nursing homes can be fully incorporated into BEA’s new health care satellite account.

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TABLES

Table 1. Spending by Disease for Nursing Home Patients with Medicare by Type of Stay, 2004 (%)				
Disease Chapters	Long-term	Short-term, Survey Diagnoses	Short-term, Claims Diagnoses	Long-term + Short-term, Claims Diagnoses
Infectious and parasitic diseases	-	0.7	0.9	0.2
Neoplasms	1.4	2.2	1.9	1.5
Endocrine, nutritional, metabolic diseases & immunity diseases	6.7	7.4	10.0	7.4
Diseases of the blood and blood-forming organs	-	2.0	3.7	0.8
Mental illness	42.1	4.0	7.0	34.8
Diseases of the nervous system and sense organs	4.4	7.8	6.5	4.9
Diseases of the circulatory system	31.1	21.4	24.5	29.8
Diseases of the respiratory system	3.2	8.5	6.5	3.9
Diseases of the digestive system	-	4.1	6.1	1.3
Diseases of the genitourinary system	0.4	5.0	5.1	1.4
Diseases of the skin and subcutaneous tissue	-	2.4	2.4	0.5
Diseases of the musculoskeletal system & connective tissue	9.5	9.3	12.0	10.0
Injury and poisoning	1.0	14.6	8.4	2.5
Other conditions	-	9.4	2.0	0.4
Residual, unclassified, E Codes	-	1.2	2.7	0.6
Note: Pregnancy-related conditions not shown (0% of spending).				

Table 2. Medical Care Expenditure Indexes: Decomposition between 2000 & 2009 (%)

Condition	2000 Nursing Home Expenditure Share	Average Annual Growth Rate (AAGR)			
		Nursing Homes		Health Care Satellite Account*	
		Price	Prevalence	Price	Prevalence
Senility and organic mental disorder	14.2	1.1	-0.0	10.0	4.0
Other mental conditions	13.5	-2.0	2.9	1.3	0.4
Essential hypertension	9.9	2.1	2.7	3.0	5.3
Osteoarthritis	4.7	1.4	0.4	5.2	4.9
Acute cerebrovascular disease	4.5	2.7	-3.4	3.5	0.8
Congestive heart failure, non-hypertensive	4.3	1.3	0.3	4.6	0.7
Anxiety, somatoform, and dissociative disorders	3.6	-0.1	5.8	5.2	7.1
Diabetes mellitus without complication	3.6	3.0	5.8	1.0	7.4
Coronary atherosclerosis and other heart disease	3.5	1.4	0.3	2.2	1.9
Osteoporosis	3.1	1.9	3.1	5.7	2.3

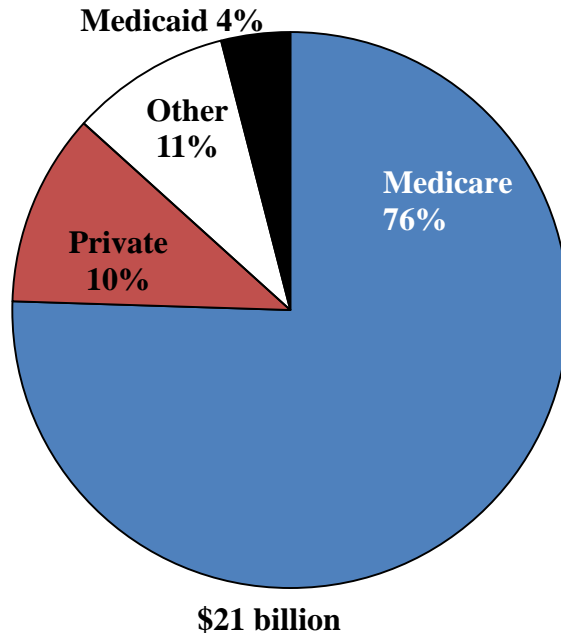
Note: Conditions where 2000 nursing home expenditure share > 3%.

*Spending on hospitals (inpatient, outpatient, and emergency department), physician services, prescription medications, and home health services.

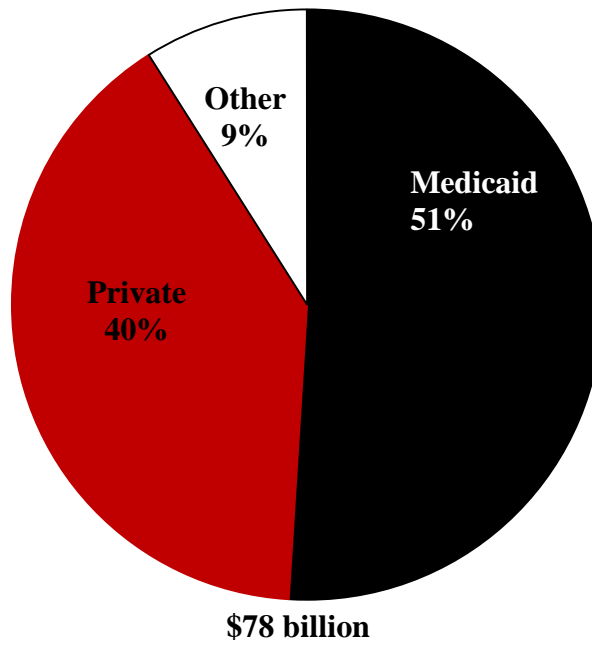
Table 3. Average Daily Spending for Nursing Home Patients: Data Source Sensitivity Analysis (\$)			
Year	Medicare Current Beneficiary Survey, Short-term Residents	Medicare Current Beneficiary Survey, Long-term Residents	National Nursing Home Survey
1995	481	105	105
1997	598	111	119
1999	541	112	129
2004	753	130	169

FIGURES

**Figure 1.a Short-term Nursing Home Spending
by Payer, 2004**



**Figure 1.b Long-term Nursing Home Spending
by Payer, 2004**



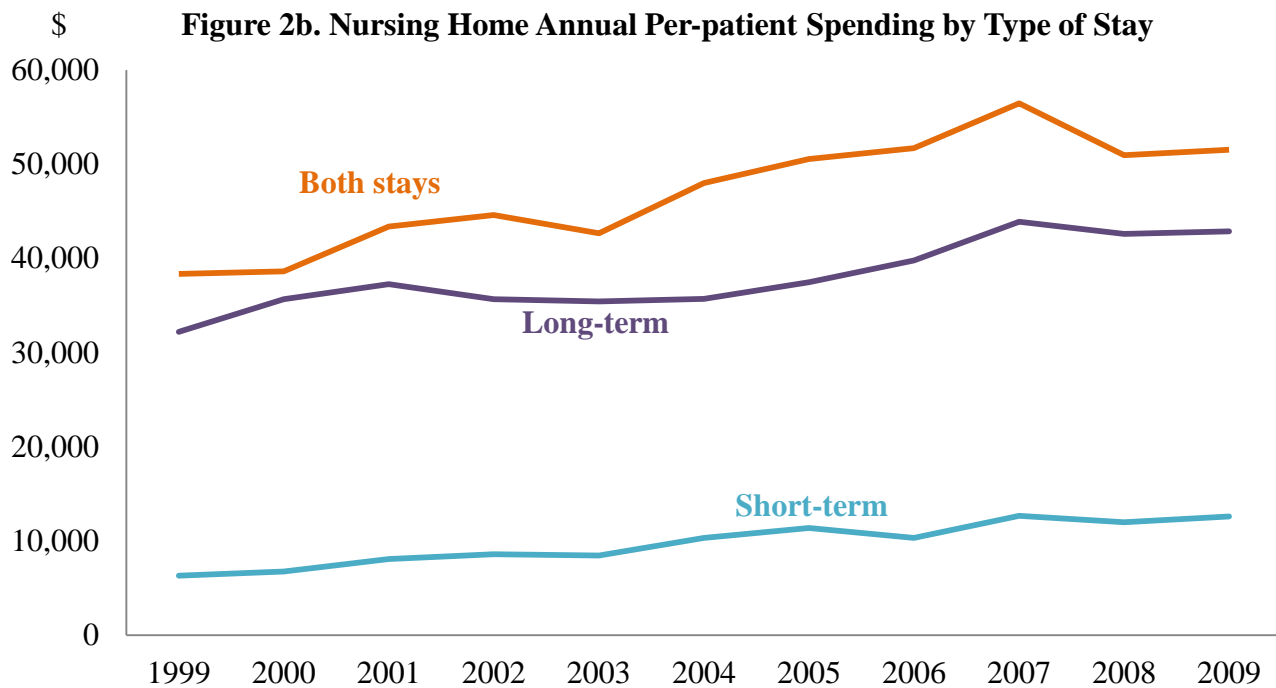
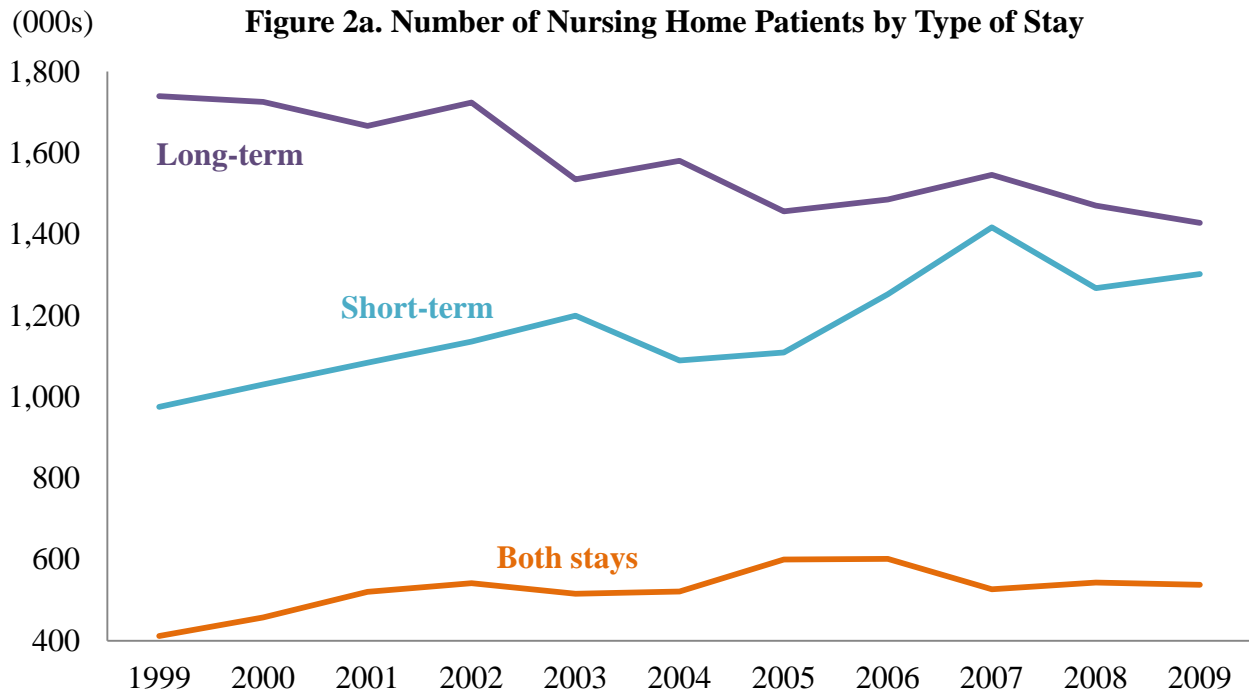


Figure 3. Nursing Home Medical Care Expenditure Indexes (Average Annual Growth Rate)

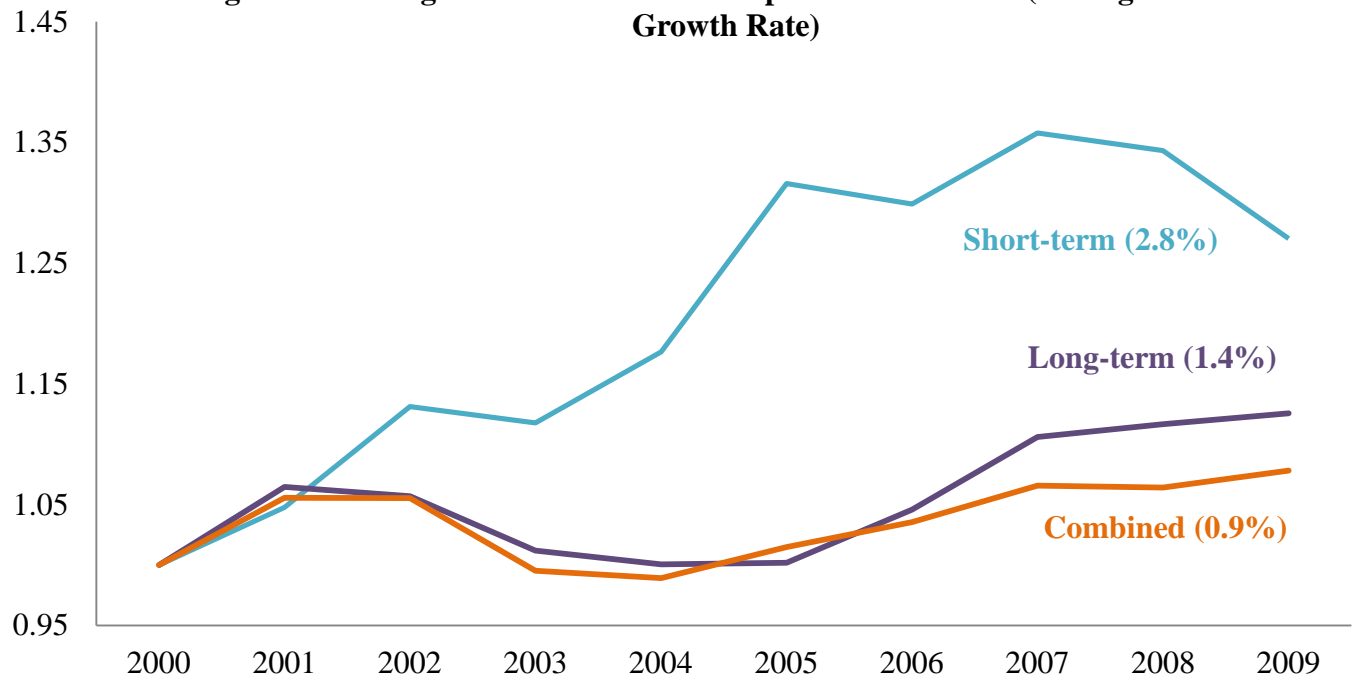


Figure 4. Medical Care Expenditure Indexes (Average Annual Growth Rate)

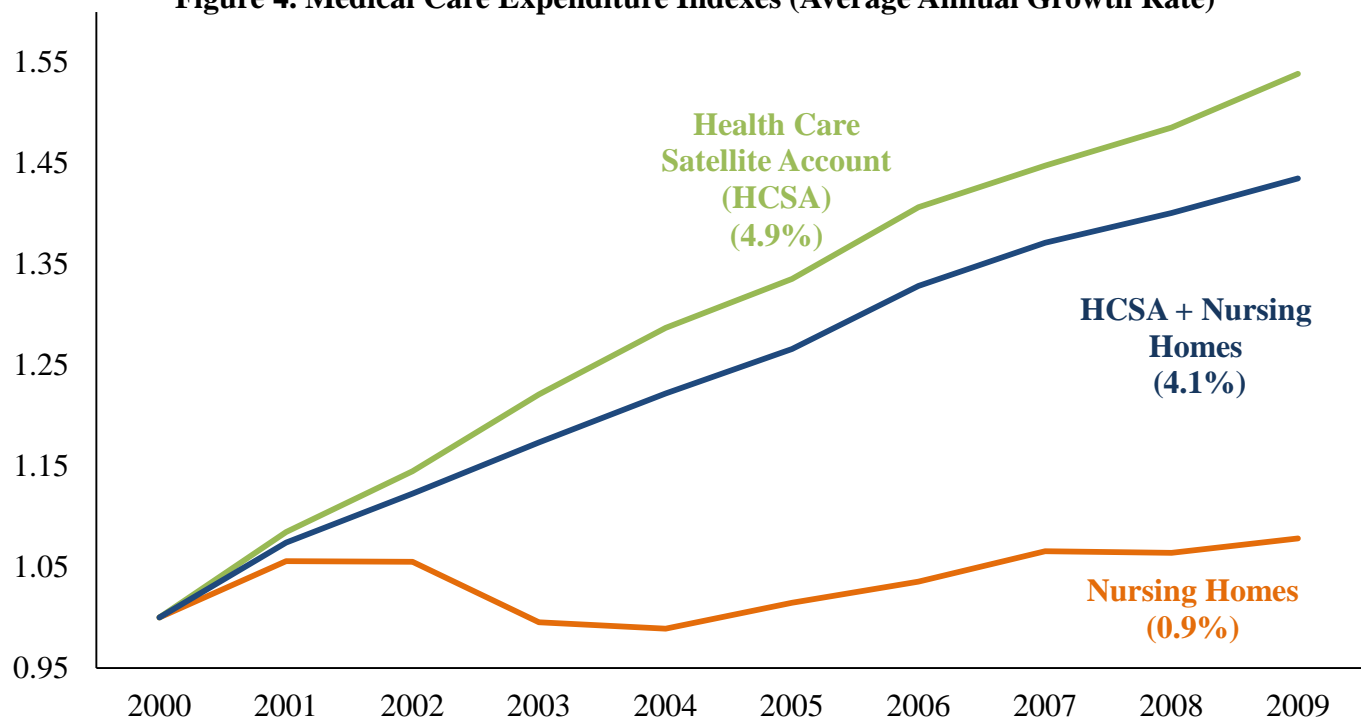


Figure 5. Prevalence for Nursing Home Patients (Average Prevalence > 5%)

