

HHS Public Access

Author manuscript Med Care. Author manuscript; available in PMC 2021 September 01.

Published in final edited form as:

Med Care. 2020 September ; 58(9): 826-832. doi:10.1097/MLR.00000000001371.

National Health Care Expenditures Associated With Disability

Olga A. Khavjou, MA^{*}, Wayne L. Anderson, PhD^{*}, Amanda A. Honeycutt, PhD^{*}, Laurel G. Bates, BS^{*}, Hilda Razzaghi, PhD[†], NaTasha D. Hollis, PhD[†], Scott D. Grosse, PhD[†]

*Social Policy, Health, and Economics Research Unit, RTI International, Research Triangle Park, NC

[†]National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, Atlanta, GA

Abstract

Background: In 2003, national disability–associated health care expenditures (DAHE) were \$398 billion. Updated estimates will improve our understanding of current DAHE.

Objective: The objective of this study was to estimate national DAHE for the US adult population and analyze spending by insurance and service categories and to assess changes in spending over the past decade.

Research Design: Data from the 2013–2015 Medical Expenditure Panel Survey were used to estimate DAHE for noninstitutionalized adults. These estimates were reconciled with National Health Expenditure Accounts (NHEA) data and adjusted to 2017 medical prices. Expenditures for institutionalized adults were added from NHEA data.

Measures: National DAHE in total, by insurance and service categories, and percentage of total expenditures associated with disability.

Results: DAHE in 2015 were \$868 billion (at 2017 prices), representing 36% of total national health care spending (up from 27% in 2003). DAHE per person with disability increased from \$13,395 in 2003 to \$17,431 in 2015, whereas nondisability per-person spending remained constant (about \$6700). Public insurers paid 69% of DAHE. Medicare paid the largest portion (\$324.7 billion), and Medicaid DAHE were \$277.2 billion. More than half (54%) of all Medicare expenditures and 72% of all Medicaid expenditures were associated with disability.

Conclusions: The share of health care expenditures associated with disability has increased substantially over the past decade. The high proportion of DAHE paid by public insurers reinforces the importance of public programs designed to improve health care for people with disabilities and emphasizes the need for evaluating programs and health services available to this vulnerable population.

Correspondence to: Olga A. Khavjou, MA, Social Policy, Health, and Economics Research Unit, RTI International, 3040 East Cornwallis Road, PO Box 12194, Research Triangle Park, NC 27709. okhavjou@rti.org.

The authors declare no conflict of interest.

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website, www.lww-medicalcare.com.

Keywords

disability costs; disability expenditures; health care; Medicare; Medicaid

Living with a disability is often associated with significant health risk factors and increased economic costs compared with not having a disability. The US Census Bureau reported that > 85 million people, representing 27.2% of the US population, had a disability in 2014.¹ The total national disability-associated health care expenditures (DAHE) were estimated to be \$398 billion in 2003 (expressed in 2006 prices), representing 27% of national health spending.² More than two thirds of DAHE were paid by public payers.²

Many chronic conditions and health risk factors, such as diabetes, obesity, cancer, hypertension, depression, and heart disease, are more prevalent among people with disabilities than among people without disabilities as a disability may be causing these conditions and, at the same time, these conditions may be precursors to disability.^{3–5} The prevalence of some of these conditions has increased steadily over the past decade among US adults.^{6–9} For example, the prevalence of adult obesity increased from 32% in 2002–2003 to 40% in 2015–2016, the prevalence of diabetes increased from 7.8% in 2006 to 9.4% in 2015, and prevalence of depression increased from 6.6% in 2005 to 7.3% in 2015.^{6–9} The increased prevalence of chronic conditions is expected to lead to higher DAHE, thus highlighting the importance of generating updated estimates of DAHE.

The high prevalence and costs of disability and related chronic conditions have led researchers and disability advocates to analyze additional factors that contribute to the impact of disability on health. These factors include lapses in health insurance coverage,¹⁰ lack of transportation to and accessibility for facilities that provide preventive and primary care services and programs, and limited training and preparation among health care and public health professionals to address the needs of people with disabilities.¹¹ Addressing these factors may lead to health improvements for people with disabilities.¹²

The purpose of this study was to estimate current annual national DAHE for US adults, to analyze spending by insurance category and for specific health care services, and to assess changes in expenditures over the past decade. In this study, disability was defined as limitations in activities of daily living (ADLs) (eg, bathing), instrumental activities of daily living (IADLs) (eg, shopping), or the ability to work, do housework, or go to school. DAHE were defined as the additional health care expenditures incurred due to disability. Updated DAHE estimates are important for increasing public awareness and for informing health planning and policy efforts to promote health, reduce health disparities, and prevent secondary conditions among people with disabilities.

METHODS

For consistency with previously published DAHE estimates, we followed the methodology employed by Anderson et al.² We used the 2013–2015 Medical Expenditure Panel Survey (MEPS) data to estimate DAHE for noninstitutionalized adults. MEPS is administered by the Agency for Healthcare Research and Quality and is a nationally representative sample of

health care expenditure data for the noninstitutionalized population. We used data from the MEPS Household Component, which contains payment data, including expenditures for physician office visits, outpatient services, emergency department (ED) visits, inpatient services, and prescription medications. In MEPS, these expenditures are obtained from the MEPS Medical Provider Component, where available, and imputed otherwise. To produce DAHE estimates using the Anderson et al² methodology, we used the same measure of disability, defined as receiving help with ADLs or IADLs or being limited in the ability to work, do housework, or go to school because of an impairment or a physical or mental health problem.

We estimated DAHE using the 6 steps outlined below.

Estimation of Disability-associated Health Care Expenditures for Noninstitutionalized Adults Using Medical Expenditure Panel Survey

We used MEPS to estimate annual DAHE per person in the noninstitutionalized population with a 2-part regression model. The first part was a logistic regression model predicting the probability that a person incurred any health care expenditures. The second part was a generalized linear model with a gamma distribution and a log link estimating annual health care expenditures for those with positive expenditures.^{13,14} Two-part models are commonly used in health services research and our specification was based on the results from the Modified Park tests and the Modified Hosmer and Lemeshow tests.^{14,15}

In addition to disability status, we controlled for sociodemographic characteristics that are expected to affect health care expenditures, including age, sex, race/ethnicity, marital status, geographic region, family income, education level, survey year, and insurance coverage category. Insurance coverage categories included Medicare, Medicaid, private insurance, other insurance, uninsured, Medicare and Medicaid combined, and Medicare and private insurance combined, as reported by the respondents. We did not control for other health conditions to capture health care spending on diseases for which disability may be a risk factor.^{4,16} All estimates were weighted using MEPS sample weights.

We predicted expenditures among adults with disability by multiplying the predicted probability of any expenditures (from part 1) by predicted expenditures among those with any expenditures (from part 2). We recoded the disability indicator to zero and repeated these calculations to predict per-person medical expenditures among adults with a disability in a counterfactual scenario assuming they had no disability but all else was constant. Per-person DAHE were calculated as the average of the difference between the 2 predictions for all people with disabilities. This approach is commonly used in studies estimating incremental medical expenditures associated with various conditions.^{17–22}

We calculated national-level DAHE by multiplying the per-person DAHE by the weighted number of people with disabilities from MEPS. We also calculated national-level DAHE by insurance category (Medicare, Medicaid, private insurance, other insurance, and uninsured). For those enrolled in >1 insurance category (Medicare and Medicaid combined or Medicare and private insurance combined), we calculated the fraction of total expenditures paid by

each insurance and used that fraction to allocate a portion of national-level DAHE to that insurance category.

We used the same 2-part modeling approach with service-specific expenditures as the dependent variable to calculate national-level DAHE by service category (inpatient services, outpatient services, ED visits, home health care, and prescription medications).

Reconciliation of Disability-associated Health Care Expenditures From Medical Expenditure Panel Survey With National Health Expenditure Accounts

National Health Expenditure Accounts (NHEA) is produced by the Office of the Actuary at the Centers for Medicare & Medicaid Services and covers the entire US population and a full range of health care expenditures, making it the most comprehensive collection of health care expenditure data for the United States. Reconciliation of MEPS estimates with NHEA was necessary to account for expenditures missing from MEPS but included in the NHEA related to differences in service categories, the scope of the included populations, and nonpatient care revenues and potential underreporting of expenditures in MEPS.^{23,24} This reconciliation ensured that the national DAHE estimates were consistent with national health spending estimates.²³

To reconcile DAHE estimates from MEPS with expenditures from NHEA, we applied a multiplier that was a ratio of total spending from the 2012 NHEA to total spending from 2012 MEPS.²³ We did this for total expenditures and expenditures by Medicare and Medicaid. We were unable to make these adjustments for other insurance and the uninsured categories because of differences in how these categories are constructed in MEPS and NHEA; however, given the relatively small size of these estimates from MEPS, the adjustment would not have greatly affected the results. Adjusted expenditures for private insurance were calculated by subtracting expenditures of all other insurers from the total expenditures.

Estimation of Disability-associated Health Care Expenditures for Institutionalized Adults

We added DAHE estimates for institutionalized adults because MEPS does not include people in institutions such as nursing homes and assisted living facilities. We used estimates for the institutionalized population derived by Bernard et al²³ from the 2012 NHEA. We assumed that all long-term care facilities expenditures were DAHE because these facilities provide care to patients needing assistance with ADLs. We then used MEPS to calculate the fraction of nonfacility health care spending among noninstitutionalized people with disabilities that were DAHE and applied that fraction (0.67) to acute care expenditures of people living in institutions to estimate acute care nonfacility expenditures of institutionalized people that were DAHE.

To allocate DAHE of institutionalized adults by insurance category, we obtained the expenditures paid by Medicaid for long-term services and supports (LTSS) for institutionalized adults from Eiken et al²⁵ and assumed that Medicare paid for acute care and hospital expenditures of people in institutions.²³ The remaining DAHE for people living in institutions were assumed to be paid by private insurance.

Estimation of Long-term Services and Supports Expenditures for Home- and Communitybased Personal Care Services

MEPS also does not capture other health, residential, and personal care services for the noninstitutionalized population, which, according to NHEA, include Medicaid-paid personal care and home- and community-based service (HCBS) waivers.²³ We obtained 2015 Medicaid expenditures for LTSS for HCBS from Eiken et al²⁵ and added those to our estimates of DAHE.

Calculation of Per-person Disability-associated Health Care Expenditures

We calculated DAHE per capita by dividing total DAHE by the sum of the number of noninstitutionalized people and the number of people living in institutions [derived from Eiken²⁶ and American Health Care Association (AHCA)²⁷]. We calculated DAHE per person with a disability by dividing total DAHE by the sum of noninstitutionalized people with disabilities and people living in institutions. For people with disabilities, we subtracted per-person DAHE from total per-person health care expenditures to estimate health care expenditures that were not associated with disability.

Adjustment of Expenditures to 2017 Medical Prices

Following recommendations by Dunn et al,²⁸ we converted DAHE based on 2013–2015 expenditure data to 2017 prices using the Personal Consumer Expenditures Health Component, which adjusts for general medical price changes. We also converted 2003 DAHE generated by Anderson et al² to 2017 medical prices using the same index to allow for comparisons with the more recent DAHE estimates.

RESULTS

MEPS prevalence of disability was 14.8% (representing 34 million noninstitutionalized adults), in 2015, a slight increase from 13.6% (or 26 million noninstitutionalized adults) in 2003.² Compared with adults not reporting a disability, adults who reported a disability were older, more often female, more likely to be White or Black than Asian or Hispanic, and less likely to be married (Table 1). Adults with disability were also more likely than adults without disability to have a high school degree or less as their highest educational attainment and have an annual family income of <\$50,000. Adults with disabilities were more likely to live in the South than in other Census regions. Finally, adults with disabilities were more likely than adults without disability to have Medicare (27.1% vs. 7.0%) and Medicaid (13.8% vs. 6.5%) and were less likely to have private insurance (16.8% vs. 59.0%). Between 2003 and 2015, the percentage of people with disabilities with Medicare increased from 19.0% to 27.1% and the percentage with private insurance decreased from 25.1% to 16.8%. Unadjusted, annual weighted average health care expenditures from MEPS in 2013–2015 were \$5452 per person at 2017 prices, with \$16,491 per person with a disability and \$3541 per person without a disability. Regression coefficients on which the MEPS portion of total DAHE was based are reported in Appendix A, Supplemental Digital Content 1, http:// links.lww.com/MLR/C43.

Total DAHE for the US adult population in 2015 were \$868 billion at 2017 prices, which is substantially higher than the 2003 DAHE of \$398 billion (\$527 billion if converted to 2017 prices). DAHE as a percentage of total health care expenditures increased from 27% in 2003 to 36% in 2015.

By service category, consistent with the earlier estimates, expenditures for institutionalized adults represented the largest category (\$291.9 billion or 34% of total DAHE) (Table 2). However, these expenditures increased by only 5% over the last decade, whereas expenditures for inpatient, outpatient services, and personal care services and prescription medications more than doubled. As a percentage of total expenditures, the largest increases occurred in inpatient (increase from 13% to 20%) and prescription medication (increase from 9% to 14%) expenditures.

In 2015, Medicare paid the largest portion of DAHE (\$324.7 billion; 37%), followed by Medicaid (\$277.2 billion; 32%) (Table 3). Together, public insurers paid 69% of DAHE. In contrast, in 2003, Medicaid paid the largest portion of total DAHE (40%).² In 2015, private insurers paid 28% of all DAHE (\$241.6 billion). Other insurance categories and patients without insurance paid about \$12 billion in DAHE, or 1%, each. In 2015, over half of total Medicare expenditures (54%) were DAHE, and almost three fourths of Medicaid expenditures (72%) were DAHE.

We found that per-capita DAHE across all insurance categories were \$3716 in 2015 (at 2017 prices), an increase from \$2438 in 2003 (at 2017 prices). Total health care expenditures per person with a disability (which consist of expenditures associated and not associated with a disability) are shown in Figure 1; expenditures associated with disability increased from \$13,395 to \$17,431 per person with a disability between 2003 and 2015, whereas per-person expenditures not associated with disability remained constant (about \$6700).

DISCUSSION

Our results provide updated estimates of adult DAHE in the United States. Using the definition of disability based on limitations in ADLs, IADLs, or in the inability to work or go to school, there were 8 million more noninstitutionalized people with disabilities in 2015 than in 2003 for a total of 34 million noninstitutionalized people with disabilities in 2015. Two thirds of the increase in the number of people with disabilities was due to population growth, and one third was due to an increase in the reported prevalence of disability from 13.6% in 2003 to 14.8% in 2015 (reported in Appendix B, Supplemental Digital Content 1, http://links.lww.com/MLR/C43). The increase in reported prevalence of disability may be driven by the aging of the population and increased prevalence of chronic conditions, but may also reflect improved surveillance or reporting systems.

We estimated total national-level DAHE of \$868 billion in 2015 (at 2017 prices), an increase of 65% from the 2003 estimate of \$527 billion (at 2017 prices).² The growth in DAHE and in the DAHE percentage of total health care expenditures was driven equally by an increase in the number of people with disabilities and higher per-person health care expenditures among people with disabilities (reported in Appendix C, Supplemental Digital Content 1,

http://links.lww.com/MLR/C43). Several factors are likely responsible for the increasing per-person DAHE, including new technology, rapid growth in spending on preventive services, the joint factors of aging and rising obesity rates, and increases in reported pain levels and the associated use of opioids.^{29–31}

The mix of DAHE by service category has also changed between 2003 and 2015. In 2003, institutionalized expenditures comprised more than half of total DAHE (53%). Although these expenditures remained the highest service category of DAHE in 2015, the percentage decreased to 34%. A relatively small increase in DAHE for institutionalized adults as compared with other services can be explained by the stable number of institutionalized adults during this period¹⁵ and cost containment strategies by state Medicaid programs. Given the push for the provision of LTSS at home and in the community through Section 1915(c) waivers and other new HCBS programs, LTSS expenditures for institutionalized people paid by Medicaid decreased between 2002 and 2007 and further in 2015.^{25,32} The distribution of Medicaid expenditures across institutionalized and HCBS categories has also changed with HCBS expenditures surpassing institutionalized expenditures in 2013.²⁵

Another major finding of this analysis is that, in 2015, DAHE paid by Medicare were higher than DAHE paid by Medicaid. In 2015, Medicare was the largest payer of DAHE. In fact, more than half of all Medicare expenditures (54%) were DAHE. We found that per-person DAHE paid by Medicare and Medicaid changed similarly between 2003 and 2015; each increased by 60%–72%. The increase in the percentage of total DAHE paid by Medicare is a result of a higher percentage of people with disabilities who have Medicare, which grew from 19% in 2003 to 27% in 2015.

The aging of the population is one of the reasons for an increased prevalence of Medicare coverage.³³ However, another contributor may be the growing number of people receiving Social Security Disability Income (SSDI) due to changing economic conditions, the Great Recession, in particular, and changes in medical reasons eligibility criteria.^{33–35} For example, Warshawsky et al³⁵ reported increases in the SSDI awards driven by rising prevalence and diagnosis of mental illnesses and musculoskeletal disease. Individuals who qualify for SSDI are automatically enrolled in Medicare 2 years later, so an increase in the number of people with SSDI leads to a higher number of people enrolled in Medicare.

Affordable Care Act implementation and Medicaid expansions may have also contributed to changes in the distribution of DAHE across insurance categories, although findings on the effect of Medicaid expansions on the number of people receiving SSDI have been mixed. ^{36–39} These policy changes may be helpful to the disabled community, enabling them to receive services outside of institutional settings. Although the proportion of total DAHE paid by Medicaid decreased between 2003 and 2015, 72% of all medical expenditures paid by Medicaid were DAHE in 2015.

DAHE paid by private insurance increased by 64% between 2003 and 2015, and the percentage of total private insurance that were DAHE increased from 12% to 19%, despite declines in the percentage of people with disabilities with private insurance. Total private insurance expenditures grew because of higher per-person DAHE paid by private insurance,

which almost tripled between 2003 and 2015 (whereas Medicare and Medicaid expenditures increased at much slower rates). Evidence suggests that private insurance reimbursement rates are higher than Medicare or Medicaid for the same services and that the gap between private and public insurance reimbursements rates for hospital care widened between 2003 and 2015.^{40–43}

Our results highlight the need for interventions that aim to improve health behaviors, prevent secondary conditions, and provide ongoing quality health care to people with disabilities. Public insurers pay 69% of DAHE, which reinforces the importance of public programs that help people with disabilities avoid complications and associated health care expenditures. Another implication of our analysis is that increased health care expenditures among adults with disability are not necessarily undesirable. If these increases are mostly driven by the use of new technologies, which are often more costly,⁴⁴ and increased utilization of preventive services, higher spending could be indicative of improvements in the quality of and access to care. The results of this study also point to the importance of evaluating programs serving this population to ensure that health care services provided to people with disabilities are evidence-based and effective in meeting their needs.

Our study is subject to several limitations. We used the same definition of disability as was used in the Anderson et al² analysis because our goal was to produce estimates of DAHE using that methodology. Our definition of disability assessed ADL and IADL deficits and general activity limitations. Although parts of this definition have been used in other studies, we acknowledge that different definitions and data would produce different results. In addition, our disability definition was based on self-reported data and is subject to self-report bias; however, self-reported data are routinely used to assess disability at the national level. 45

Other studies have also shown that self-reporting of data in MEPS leads to underreporting of ED and office visits and health care expenditures, but that underreporting is similar across demographic and behavioral characteristics.^{24,46} Reconciliation with aggregate expenditure data, such as NHEA, aligns MEPS expenditures with national estimates while preserving the relationships between expenditures and key correlates.²⁴

We did not assess severity, permanence, or duration of disability or underlying health conditions and the extent to which they might explain rising DAHE. For consistency with the earlier approach, we also did not control for underlying health conditions when estimating DAHE in adults to capture downstream cost effects of chronic conditions such as diabetes, cardiovascular disease, or obesity.^{4,16} Although our approach focused on estimating excess medical spending associated with disability, we did not attempt to disentangle causation between disability and specific health conditions. Because of the overlap between populations and expenditures among people with disability and other chronic conditions, our DAHE estimates should not be compared with estimates of chronic disease costs.

Finally, we were unable to explore whether higher spending among people with disabilities is indicative of improved access to health care or worsening health outcomes. Although we

explored changes in expenditures by service category, we did not assess whether the expenditures increased because more services were provided or because the cost per service has increased. For example, evidence suggests that increasing expenditures per person with diabetes have been driven by rising insulin prices.⁴⁷ Future research should focus on exploring more-detailed types of services on which DAHE are spent on and how that has changed over time.

To conclude, we estimated that, at 2017-adjusted prices, DAHE increased from \$527 billion in 2003 to \$868 billion in 2015. In 2015, DAHE accounted for 36% of total health care expenditures in the United States, compared with 27% in 2003. Medicare is the largest payer of DAHE, and together, Medicare and Medicaid pay for 69% of DAHE. These findings highlight the importance of public programs that address the unique needs of people with disabilities and emphasize the need for evaluating programs and health services available to this vulnerable population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

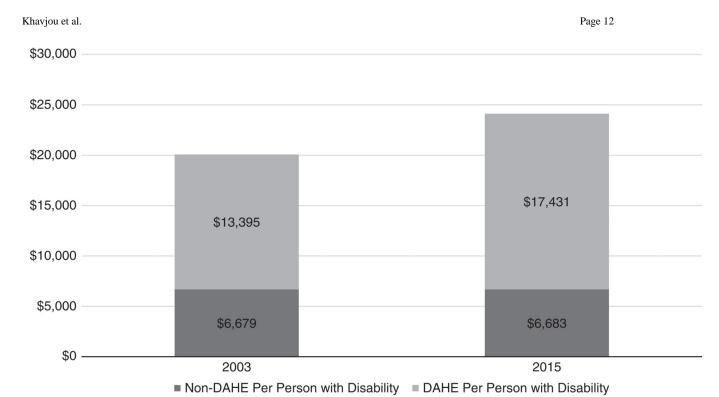
This report was prepared by RTI, under contract to the Centers for Disease Control and Prevention (CDC). The findings and conclusions of this article are those of the authors and do not necessarily represent the official position of the CDC.

REFERENCES

- 1. United States Census Bureau. Americans with disabilities: 2014. Current population reports; 2018; report number P70–15
- 2. Anderson WL, Wiener JM, Finkelstein EA, et al. Estimates of national health care expenditures associated with disability. J Disabil Policy Stud. 2011;21:230–240.
- Centers for Disease Control and Prevention. Prevalence and most common causes of disability among adults—United States, 2005. MMWR Morb Mortal Wkly Rep. 2009;58:421–426. [PubMed: 19407734]
- Dixon-Ibarra A, Horner-Johnson W. Disability status as an antecedent to chronic conditions: National Health Interview Survey, 2006–2012. Prev Chronic Dis. 2014;11:130251. [PubMed: 24480632]
- 5. Hung WW, Ross JS, Boockvar KS, et al. Association of chronic diseases and impairments with disability in older adults: a decade of change? Med Care. 2012;50:501–507. [PubMed: 22584885]
- 6. Centers for Disease Control and Prevention. National Diabetes Statistics Report, 2017. Atlanta, GA: Centers for Disease Control and Prevention, US Department of Health and Human Services; 2017.
- Cheung BM, Ong KL, Cherny SS, et al. Diabetes prevalence and therapeutic target achievement in the United States, 1999 to 2006. Am J Med. 2009;122:443–453. [PubMed: 19375554]
- Hales CM, Carroll MD, Fryar CD, et al. Prevalence of Obesity Among Adults and Youth: United States, 2015–2016 NCHS Data Brief, no 288. Hyattsville, MD: National Center for Health Statistics; 2017.
- Weinberger AH, Gbedemah M, Martinez AM, et al. Trends in depression prevalence in the USA from 2005 to 2015: widening disparities in vulnerable groups. Psychol Med. 2018;48:1308–1315. [PubMed: 29021005]

- Gulley SP, Rasch EK, Chan L. Difference, disparity, and disability: a comparison of health, insurance coverage, and health service use on the basis of race/ethnicity among US adults with disabilities, 2006–2008. Med Care. 2014;10(suppl 3):S9–S16.
- Krahn GL, Walkder DK, Correa-De-Araujo R. Persons with disabilities as an unrecognized health disparity population. Am J Public Health. 2015;105(suppl 2):S198–S206. [PubMed: 25689212]
- 12. National Council on Disability. The current state of health care for people with disabilities; 2009 Available at: https://ncd.gov/rawmedia_repository/0d7c848f_3d97_43b3_bea5_36e1d97f973d.pdf. Accessed February 24, 2020.
- Manning WG, Mullahy J. Estimating log models: to transform or not to transform? J Health Econ. 2001;20:461–494. [PubMed: 11469231]
- Deb P, Norton EC. Modeling health care expenditures and use. Annu Rev Public Health. 2018;39:489–505. [PubMed: 29328879]
- 15. Manning WG, Basu A, Mullahy J, et al. Modeling costs with generalized gamma regression; 2002.
- Fujiura GT, Li H, Magaña S. Health services use and costs for Americans with intellectual and developmental disabilities: a national analysis. Intellect Dev Disabil. 2018;56:101–118. [PubMed: 29584559]
- Kim DD, Basu A. Estimating the medical care costs of obesity in the United States: systematic review, meta-analysis, and empirical analysis. Value Health. 2016;19:602–613. [PubMed: 27565277]
- Shrestha SS, Honeycutt AA, Yang W, et al. Economic costs attributable to diabetes in each US state. Diabetes Care. 2018;41:2526–2534. [PubMed: 30305349]
- Finkelstein EA, Fiebelkorn IC, Wang G. National medical spending attributable to overweight and obesity: how much, and who's paying? Further evidence that overweight and obesity are contributing to the nation's health care bill at a growing rate. Health Aff. 2003;22(suppl 1): W3-219-26.
- Ford E, Murphy L, Khavjou OA, et al. Total and state-specific medical and absenteeism costs of chronic obstructive pulmonary disease among adults aged 18 years in the United States for 2010 and projections through 2020. Chest. 2015;147:31–45. [PubMed: 25058738]
- Trogdon JG, Murphy L, Khavjou OA, et al. Costs of chronic diseases at the state level: methodology to support the chronic disease cost calculator. Prev Chronic Dis. 2015;12:E140. [PubMed: 26334712]
- Heidenreich PA, Trogdon JG, Khavjou OA, et al. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. Circulation. 2011;123:933–944. [PubMed: 21262990]
- Bernard D, Cowan C, Selden T, et al. Reconciling medical expenditure estimates from the MEPS and NHEA, 2012; 2018 Available at: https://meps.ahrq.gov/data_files/publications/workingpapers/ wp_17003.pdf. Accessed June 26, 2020.
- Zuvekas SH, Olin GL. Accuracy of Medicare expenditures in the medical expenditure panel survey. Inquiry. 2009;46:92–108. [PubMed: 19489486]
- 25. Eiken S, Sredl K, Burwell B, et al. Medicaid expenditures for long-term services and supports in FY 2016. IBM Watson Health; 2018.
- 26. Eiken S. Medicaid long-term services and supports beneficiaries in 2013. Centers for Medicare and Medicaid Services & Truven Health Analytics: contract no. HHSM-500–2010-00026I; 2017 Available at: http://www.advancingstates.org/sites/nasuad/files/ltss-beneficiaries-2013.pdf. Accessed June 26, 2020.
- 27. American Health Care Association (AHCA). Fast facts; 2019 Available at: www.ahcancal.org/ research_data/Pages/Fast-Facts.aspx. Accessed June 26, 2020.
- Dunn A, Grosse SD, Zuvekas SH. Adjusting health expenditures for inflation: a review of measures for health services research in the United States. Health Serv Res. 2018;53:175–196. [PubMed: 27873305]
- Guy GP Jr., Zhang K, Bohm MK, et al. Vital signs: changes in opioid prescribing in the United States, 2006–2015. MMWR Morb Mortal Wkly Rep. 2017;66:697–704. [PubMed: 28683056]
- 30. Krueger AB. Where have all the workers gone? An inquiry into the decline of the US labor force participation rate. Brookings Pap Econ Act. 2017;2017:1. [PubMed: 30739945]

- Dunn A, Whitmire B, Batch A, et al. High spending growth rates for key diseases in 2000–14 were driven by technology and demographic factors. Health Aff (Millwood). 2018;37:915–924. [PubMed: 29863919]
- Wenzlow A. Improving the Balance: the Evolution of Medicaid Expenditures for Long-Term Services and Supports (LTSS), FY 1981–2014. Atlanta, GA: Truven Health Analytics for CMS; 2016.
- Burkhauser RV, Daly MC. Social security disability insurance: time for fundamental change. J Policy Anal Manage. 2012;31:454–461.
- Maestas N, Mullen KJ, Strand A. Disability insurance and the great recession. Am Econ Rev. 2015;105:177–182. [PubMed: 26306049]
- 35. Warshawsky M, Marchand R. Modernizing the SSDI eligibility criteria: are form proposal that eliminates the outdated medical-vocational grid; 2015.
- 36. Anand P, Hyde JS, Colby M, et al. The impact of Affordable Care Act Medicaid expansions on applications to federal disability programs. Forum Health Econ Policy. 2019;21.
- Chatterji P, Yue L. Early coverage expansions under the Affordable Care Act and supplemental security income participation. J Econ Ageing. 2017; 10:75–83.
- Maestas N, Mullen KJ, Strand A. Disability insurance and health insurance reform: evidence from Massachusetts. Am Econ Rev. 2014;104: 329–335. [PubMed: 29533564]
- Ayyagari P. The Impact of the Affordable Care Act on Applications for Social Security Disability Benefits. Washington, DC: Presentation at ASHEcon; 2019.
- 40. Biener AI, Selden TM. Public and private payments for physician office visits. Health Aff (Millwood). 2017;36:2160–2164. [PubMed: 29200346]
- 41. Cooper Z, Craig S, Gray C, et al. Variation in health spending growth for the privately insured from 2007 to 2014. Health Aff (Millwood). 2019;38: 230–236. [PubMed: 30715989]
- 42. Pelech D. An Analysis of Private-Sector Prices for Physicians' Services Working Paper 2018–01. Washington, DC: Congressional Budget Office; 2018.
- 43. Selden TM, Karaca Z, Decker S. Has inpatient hospital treatment before and after age 65 changed as the difference between private and Medicare payment rates has widened? Int J Health Econ Manag. 2018;18: 409–423. [PubMed: 29696508]
- 44. Callahan D. Health Care Costs and Medical Technology From Birth to Death and Bench to Clinic: the Hastings Center Bioethics Briefing Book for Journalists, Policymakers, and Campaigns. Garrison, NY: The Hastings Center; 2008:79–82.
- Stevens AC, Carroll DD, Courtney-Long EA, et al. Adults with one or more functional disabilities —United States, 2011–2014. MMWR Morb Mortal Wkly Rep. 2016;65:1021–1025. [PubMed: 27684532]
- 46. Zuvekas SH, Olin GL. Validating household reports of healthcare use in the medical expenditure panel survey. Health Serv Res. 2009;44: 1679–1700. [PubMed: 19619249]
- 47. Biniek JF, Johnson W. Spending on Individuals With Type 1 Diabetes and the Role of Rapidly Increasing Insulin Prices. Washington, DC: Health Care Cost Institute; 2019.



Annual health care expenditures per person with a disability. Expenditures based on 2013–2015 and 2002–2003 data were converted to 2017 medical prices. For each time period, the height of the stacked bar represents total annual health care expenditures per person with a disability. The light grey part of the bar represents expenditures associated with disability and the dark grey part represents health care expenditures not associated with disability. DAHE indicates disability-associated health care expenditures.

FIGURE 1.

Page 13

TABLE 1.

Summary Statistics for Regression Model Covariates by Disability Status (2013–2015 MEPS)

Regression Model Covariates	Total Sample (%)	With Disability (%)	No Disability (%)	P
Weighted sample size	232,891,535	34,359,212	198,532,323	
Average age (y)	47.6	60.0	45.5	0.000
Female	50.3%	56.6	49.2	0.000
Race/ethnicity				
White	64.6	70.1	63.6	0.000
Black	11.7	13.7	11.3	
Hispanic	15.3	10.4	16.1	
Asian	5.7	2.3	6.3	
Other race	2.8	3.6	2.6	
Married	52.4	40.4	54.4	0.000
Education level				
Less than high school degree	14.0	21.0	12.8	0.000
High school graduate	27.3	35.0	25.9	
Some college	29.5	28.0	29.7	
College graduate	28.7	15.2	31.1	
Family income (k)				
<\$25	21.1	44.7	17.0	0.000
\$25-\$50	22.2	24.3	21.8	
\$50-\$75	17.3	13.0	18.1	
>\$75	39.4	18.0	43.1	
Region				
Northeast	18.2	18.1	18.2	0.0084
Midwest	21.3	21.7	21.2	
South	37.2	39.9	36.8	
West	23.4	20.3	23.9	
Insurance coverage category				
Medicare	10.0	27.1	7.0	0.000
Medicaid	7.6	13.8	6.5	
Private insurance	52.8	16.8	59.0	
Uninsured	12.2	6.5	13.2	
Medicare and Medicaid	2.8	13.9	0.9	
Private and Medicare	9.2	17.5	7.7	
Other insurance	5.5	4.3	5.7	

Summary statistics were calculated for the entire sample and separately for adults with and without disability using 2013-2015 MEPS data. Estimates were weighted using sample weights provided by MEPS. For continuous variable (age), the *P*-value was calculated using a *t* test to estimate whether the difference in average age between adults with and without disability was statistically significant. For all other variables (which

are categorical), the *P*-values were calculated using Pearson χ^2 test to estimate whether the distribution within each category (eg, race/ethnicity) was statistically significantly different among people with and without disability.

MEPS indicates Medical Expenditure Panel Survey.

~
~
_
±
5
ō
\mathbf{U}
_
~
\geq
a
lar
Ы
nu
nus
nuscri
nuscr

Author Manuscript

TABLE 2.

Annual DAHE by Service Category for the US Adult Population (\$ Billions)

Service Category	Description	Current Analysis: 2013–2015	Anderson et al ² : 2002– 2003
Institutional	Expenditures for long-term care facilities and disability-attributable acute care expenditures of institutionalized people ²³	291.9	277.1
Inpatient	Authors' estimates of DAHE using MEPS reconciled with the NHEA data ²³	175.4	67.9
Prescription medication	Authors' estimates of DAHE using MEPS reconciled with the NHEA data ²³	120.9	48.0
Outpatient	Authors' estimates of DAHE using MEPS reconciled with the NHEA data ²³	117.9	51.8
Personal care services	Medicaid LTSS expenditures for HCBS ²⁵	88.7	41.3
Home health	Authors' estimates of DAHE using MEPS reconciled with the NHEA data ²³	57.7	37.4
Emergency department	Authors' estimates of DAHE using MEPS reconciled with the NHEA data ²³	15.6	3.8
All services	Sum of estimated expenditures across all service categories	868.0	527.4

NHEA²³, and expenditures for personal care services, specifically Medicaid expenditures for LTSS for HCBS reported by Eiken et al.²⁵

DAHE indicates disability-associated health care expenditures; HCBS, home- and community-based service; LTSS, long-term services and supports; MEPS, Medical Expenditure Panel Survey; NHEA, National Health Expenditure Accounts

Author Manuscript

TABLE 3.

Annual Disability-associated Health Care Expenditures by Insurance Category for the US Adult Population (\$ Billions)

		Current Analysis: 2013–2015	-2015		Anderson et al ² : 2002–2003	2003
Insurance Category	DAHE (\$ Billions)	Percentage of Total DAHE	Insurance Category DAHE (\$ Billions) Percentage of Total DAHE Percentage of Insurer's Total DAHE (\$ Billions) Percentage of Total DAHE Percentage of Insurer's Total Expenditures Expenditures	DAHE (\$ Billions)	Percentage of Total DAHE	Percentage of Insurer's Total Expenditures
Medicare	324.7	37	54	157.7	30	38
Medicaid	277.2	32	72	213.5	40	69
Private	241.6	28	19	147.1	28	12
Other insurance	12.5	1	30	1.6	0	23
Uninsured	12.0	1	33	7.4	1	27
All insurers	868.0	100	36	527.4	100	27

DAHE by insurance category represents spending for respondents who reported the insurance category as a primary insurer. The percentage of total DAHE is calculated by dividing DAHE for each insurance category by total DAHE across all insurance categories. The percentage of insurar's total expenditures is calculated by dividing DAHE for each insurance category by total expenditures paid by that insurance.

The percentage of the insurer's total expenditures for all insurers reflects DAHE (Disability-associated Health Care Expenditures) as a percentage of total national health spending for the year.