State Health Expenditure Accounts, 1991-2009:
Converting Estimates from
State of Provider to State of Residence

Office of the Actuary
National Health Statistics Group
December, 2011

Background

Periodically, the Office of the Actuary (OACT) estimates health spending by state of provider and by state of residence, which together provide a tool for measuring health care spending attributed to interstate border crossing.[1] The State Health Expenditure Accounts (SHEA) are an extension of the National Health Expenditure Accounts (NHEA), and are maintained by the National Health Statistics Group in OACT. The SHEA are developed by type of service and by type of payer (Total, Medicare, and Medicaid), and represent a consistent set of estimates that utilize the same methodology for all states and for all years represented in a time series.

Estimates of health spending by state were initially constructed on a state of provider basis and were more limited in scope than the estimates available today. The first state of provider estimates were published in 1975 and covered the years 1966 and 1969 (Table 1).[2] Updates to this initial set of state estimates were published in 1982 (for selected years between 1966 and 1978) and in 1985 (for selected years between 1966 and 1982).[3] In 1993, in response to a request by President Clinton's Task Force on Health Care Reform, and as more comprehensive data sources became available, a new time series of estimates by state of provider was developed for the years 1980 through 1991.[4] This new time series included estimates for hospital services, physician services, and retail purchases of prescription drugs only. In 1995, state of provider estimates were expanded to include all categories of personal health care services and three sources of funding—All Payers (Total), Medicare, and Medicaid—for the years 1980 through 1993.[5]

In response to increased demand for health spending estimates by state, and in order to provide estimates that are useful for comparing per capita expenditures among states over time and across payers, OACT increased its efforts to produce more frequent and comprehensive state health spending estimates. After first publishing 1991 Medicare health spending estimates by state of residence in 1995, OACT broadened the residence-based estimates by creating larger data sets that encompassed more years and that detailed state spending for the three payer categories of All Payers (Total), Medicare, and Medicaid. Following the last release in 2007 (with data through 2004) [6], the most recent

estimates by state of provider (for 1980 through 2009) and by state of residence (for 1991 through 2009) were published in 2011.

This paper describes how the SHEA are constructed on a state of provider basis and details the methods used to adjust the spending from a state of provider to a state of residence basis.

State of Provider vs. State of Residence estimates: What do they measure?

State of provider estimates reflect the revenues received by health care providers in a state for providing health care goods and services to both residents and non-residents. State of provider estimates measure the portion of a state's economy (or Gross Domestic Product by state) that is accounted for by health care. State of residence estimates reflect all health care expenditures made by, or on behalf of, the residents of a state, regardless of whether the care is provided in-state or out-of-state. Estimates by state of residence are useful for making comparisons of per capita spending between states. The difference between spending estimates based on state of provider and state of residence reflect the effects of border crossing, or crossing state lines to receive health care, which typically occurs when a person's residence is located near a state border or if specialized care is not available locally.[7]

How do we calculate expenditures by State of Provider?

The first step in developing expenditures by state is to estimate spending based on the location of the provider of health care services. Spending estimates by state of provider are developed for three major payer groups: All Payers (Total), Medicare, and Medicaid. Within payer groups, spending is disaggregated further into types of services: Hospital Care, Physician and Clinical Services, Freestanding Home Health Care, Freestanding Nursing Home Care, Other Professional Services, Durable Medical Products, Dental Services, Drugs and Other Medical Non-durables, and Other Health, Residential, and Personal Care Services.

The SHEA adhere to the same service and payer definitions as the NHEA; furthermore, the personal health care component of the NHEA serves as the control total for the SHEA.[8] The SHEA provider estimates utilize sources that are available for all 50 states in order to allocate total U.S. personal health care spending to the states.[9]

All Payers (Total Expenditures)

The primary data source that is used to develop state-by-state *distributions* of health care spending for all payer sources is the quinquennial Economic Census. The Economic Census contains data for all 50 states, is available every five years, and covers all health care services as defined in the North American Industrial Classification System (NAICS). The Economic Census is used to obtain state distributions of total revenue for Physician and Clinical Services, Freestanding Home Health Care, Freestanding Nursing Home Care, Other Professional Services, Durable Medical Products, Dental Services, and Drugs and Other Medical Non-durables. State distributions for Hospital Care for all years are derived from the American Hospital Association's Annual Survey of Hospitals.

Other Health, Residential, and Personal Care Services (OHRPC) includes ambulance services, residential facilities for the intellectually disabled, residential mental health and substance abuse facilities, worksite health care services, and publicly funded expenditures for medical care delivered in non-traditional settings, including senior citizen centers, schools, and military field stations. Also included in OHRPC are home and community-based waivers under the Medicaid program, which comprise a large portion of total OHRPC spending. State distributions of expenditures for ambulance services, residential facilities for the intellectually disabled, and residential mental health and substance abuse facilities are derived from the Economic Census. State distributions of expenditures for worksite health care services are estimated using employment and wage data from the U.S. Bureau of Economic Analysis and the Health Resources and Services Administration. Distributions of spending by state for home and community-based waivers under Medicaid are obtained from CMS-64 forms that are submitted to CMS by State Medicaid agencies.

For years when Census data are not available, we interpolate and extrapolate estimates of state spending using other nationally available data sets, such as those with population, wages and employment data, and IRS business receipts.[10] Once state-by-state percentage distributions are completed using the data sources described above, national personal health care spending based on the most recent NHEA figures are multiplied by these state distributions to yield all-payer provider *expenditures* for each state.

A similar process is used to generate state spending estimates for two major public payers: Medicare and Medicaid. Within each of these two payers, national totals for personal health care as published in the NHEA are distributed to the states for each type of service.

Medicare: Fee-for-service

For each Medicare service, we use internal CMS data sources to distribute national totals among states; this is done separately for fee-for-service and for managed care expenditures. The primary data source used for distributing fee-for-service Medicare expenditures among states are the National Claims History (NCH) files, which were tabulated for the years 1991-1993, 1996, 1999, 2002, 2005, and 2009. For years when NCH data was not tabulated, internal CMS data sources were used, along with interpolation and extrapolation techniques, to obtain estimates of state-level Medicare expenditures based on provider location.[11]

For estimates of Medicare hospital spending by state of provider, distributions are developed for the five pieces that comprise this estimate: inpatient hospital, outpatient hospital, hospital-based home health agencies, hospital-based skilled nursing facilities, and hospital-based hospice services. Medicare physician and clinical expenditures represent spending for physician services and End Stage Renal Dialysis (ESRD) facility services (clinics), and separate distributions by state are developed for each of these categories. The Medicare fee-for-service estimate for home health care services by state of provider is calculated in two pieces: expenditures for freestanding home health agency services and expenditures for home health-based hospice services. Likewise, for Medicare fee-for-service skilled nursing facilities, state of provider expenditures are estimated in two pieces: expenditures for freestanding SNFs and expenditures for SNF-based hospice services. Distributions of Medicare fee-for-service expenditures are also separately developed for other professional services and for ambulance services.

In estimating state-level expenditures for Medicare durable medical products, which includes retail expenditures for the purchase or rental of durable medical equipment (DME) from Medicare Part B suppliers (such as hospital beds, wheelchairs, prosthetic & orthotic devices, and payments for oxygen and oxygen-related equipment), we use distributions of DME spending by the beneficiary's state of residence to allocate national expenditure totals. This differs from our method of using state of provider data to estimate state distributions for most other Medicare services, and is because Medicare uses a different payment mechanism for durable medical products. For the years covered by the SHEA, claims for DME were processed by four durable medical equipment regional carriers (DMERCS), which service many states together and, therefore, do not accurately represent the location of the DME provider.

Medicare fee-for-service expenditures for dental services by state represent oral surgery only. In previous vintages of state estimates, Medicare dental spending by state represented spending within Medicare managed care organizations only. However,

beginning with the annual update of the National Health Expenditure Accounts for 2004, fee-for-service spending for dental services was separately estimated for the years 1991-2009. Fee-for-service dental expenditures are distributed among states using the same distributions as physician services, as Medicare spending by state for dental services is relatively small, and dental expenditures by state of provider and state of residence were not tallied using NCH data.

Similar to the estimates for dental services, vintages of spending for Medicare retail prescription drugs by state prior to the National Health Expenditure Accounts update for 1999 represented spending within Medicare managed care organizations only. In later vintages, Medicare fee-for-service Part B retail prescription drug expenditures are distributed among states according to 1999, 2002, 2005, and 2009 data obtained from the NCH files for Part B retail prescription drugs. Like the method used for durable medical products, state distributions for prescription drugs utilize state of residence, rather than state of provider, data. The items included in the Medicare Part B fee-for-service retail prescription drug category represent drugs billed by pharmacy suppliers that are administered through durable medical equipment (such as respiratory drugs given through a nebulizer), drugs billed by pharmacy suppliers that are self-administered by the patient (such as immunosuppressive drugs and oral anti-cancer drugs), and other separately billable drugs (such as Erythropoietin (EPO), which is covered for dialysis beneficiaries).

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) implemented Medicare coverage for prescription drugs, known as the Part D program. Although the MMA was enacted in December 2003, the full benefit did not begin until January 1, 2006. However, there were subsidy expenditures in 2004 and 2005 representing spending for drug cards and transitional assistance. In order to allocate spending among the states, Part D expenditures by state were obtained by state of beneficiary residence separately for fee-for-service beneficiaries (in stand-alone prescription drug plans, or PDP's) and for Medicare Advantage beneficiaries (in Medicare Advantage prescription drugs plans, or MA-PD's) for 2009. Separately for PDP's and MA-PD's, the 2009 Part D expenditures were extrapolated back to 2004 using growth in PDP and MA-PD enrollment, and the resulting distributions were controlled to national Part D totals.

Medicare fee-for-service spending for other medical non-durable products represents expenditures for medical and surgical supplies, which includes over-the-counter medicines and medical sundries with a shelf life of three years or less, and parenteral and enteral nutrients and supplies. Expenditures for other non-durable medical

products are distributed among states according to the same method as prescription drugs, that is, using 1999, 2002, 2005, and 2009 NCH data based on state of beneficiary residence.

Medicare: Managed Care

Expenditures by state for Medicare managed care services, known as "Medicare Advantage", are estimated separately from fee-for-service expenditures. Because Medicare expenditures on behalf of managed care organizations are not reported to CMS by type of service, we approximate spending by type of service and by state using data from forms that managed care plans submit annually to CMS.

Medicare Advantage plans are reimbursed a flat monthly rate per beneficiary regardless of the number of services used. Providers are not supplied with a bill; therefore, we estimate the distribution of services that are used by Medicare beneficiaries in Medicare Advantage plans using information from Adjusted Community Rating (ACR) proposals (1998-1999, 2001-2005) and from the Bid Pricing Tools (BPT's) (2007-2009). These proposals are submitted for approval of the monthly premiums that the plans intend to charge and the services they intend to deliver to Medicare Advantage enrollees for the following year. These data are the only available source from which to obtain estimates of managed care expenditures by type of service and were used in the development of both Medicare managed care national and state expenditures.

Aggregate capitated payments by type of service and by state were compiled for 1998-1999, 2001-2005, and 2007-2009 using the ACR forms and the BPT forms. For historical years (1980-1994), Part A and Part B reimbursements for group health plans were compiled. Using the above sources, a time-series of managed care expenditures by service and by state were developed and were controlled to the latest U.S. totals from the 2009 National Health Expenditure Accounts. Per enrollee spending estimates were then calculated for 1980-1994, 1998-1999, 2001-2005, and 2007-2009. For the intervening years, per enrollee estimates were interpolated. After obtaining a complete time series of per capita estimates by state and by service, we multiplied the per capita estimates by each state's enrollment to obtain aggregate managed care expenditures by state and by service. Finally, the resulting payments to managed-care organizations by state were controlled to the national level of Medicare managed care payments for each service.

Medicaid

For Medicaid, spending estimates are developed using state-based data from CMS-64 forms that are filed by the State Medicaid Agencies to CMS. The Medicaid

estimates developed for the NHEA and for the SHEA include both Federal and State expenditures. CMS-64 data are available annually for each state and detail expenditures by type of program. For purposes of the NHEA and SHEA, the CMS-64 data is mapped into NHEA defined categories. In doing so, various adjustments are made to reported program data.[12]

All Other Payers

The difference between the estimates of health spending for all payers (total expenditures) by state of provider and the estimates of Medicare and Medicaid spending by state of provider represents spending for all other payers (or the residual) by state of provider. These include payers for which individual state data are not available to accurately distribute national spending figures among all 50 states in a consistent manner over time, and include sources such as private health insurance, out-of-pocket payments, and federal and state and local health spending other than Medicare and Medicaid.

Identifying expenditure flows between states

In order to convert provider-based estimates to a residence basis, we use a data set that contains expenditures for both of these dimensions. Medicare is the only nationwide insurer with publicly available claims files containing a large pool of service-specific records upon which to base interstate flows of spending between provider and beneficiary-residence locations. Therefore, Medicare data is the primary data source used to adjust the provider data to a residence basis.

Data from the Medicare NCH files were tabulated by state of provider and by the beneficiary's state of residence for the years 1991-1993, 1996, 1999, 2002, 2005, and 2009 and were then mapped into NHEA service categories.[13] The result was a 50-by-50 matrix of total dollars spent by residents of a state and the corresponding dollars received by the providers of that state. Using the dollar levels in these matrices, resident-based expenditures were divided by provider-based revenues, which yielded ratios that represented the "net flow" of spending between states. Net flow ratios measure the extent to which states are net importers or exporters of services.

From the NCH data, ratios of resident-based to provider-based expenditures were developed for the following Medicare services: inpatient hospital, outpatient hospital, physicians, physician labs, ESRD clinics, freestanding home health, hospital-based home health, freestanding skilled nursing facilities, hospital-based skilled nursing facilities, hospice, hospital-based hospice, other professionals, ambulance services, durable medical products, prescription drugs, and other non-durables. For the years in which Medicare

expenditure data was not tabulated, we interpolated flow ratios for each type of service by using a linear statistical function.

How do we calculate expenditures by State of Residence?

Spending estimates based on the location of a state's residents are developed subsequent to estimates based on the location of the provider. To calculate spending by state of residence, adjustments are made to the provider-based estimates, which serve as the base expenditures, using the net flow ratios described above. The adjustments reflect the percentage of health care spending by persons from out-of-state (or inflows of spending) as well as the percentage of spending for a state's own residents who go out-of-state to receive health care (or outflows of spending). In general, the residence adjustment process multiplies each year's (1991-2009) state of provider spending estimate with the corresponding year's net flow ratio for each service, which produces estimates of residence-based spending.

Conversion of state of provider estimates to a state of residence basis involves two main steps: 1) adjusting Medicare expenditures and 2) adjusting Non-Medicare, Non-Medicaid expenditures. For Medicare, each service's state of provider estimates are multiplied with the corresponding service's matrix that represents spending flows between states (Table 2 provides the mapping between each Medicare category and the flow matrix used for residence adjustment). After following the same procedure for each service within Medicare for each year 1991-2009, the adjusted expenditures are then summed into NHEA categories and represent total Medicare expenditures by state of residence.

For expenditures other than those paid for by Medicare and Medicaid (the residual, or Non-Medicare, Non-Medicaid), additional adjustments are made to the Medicare flow ratios to account for patterns of consumption that vary between the over-65 and the under-65 populations. We assume that travel patterns for the Medicare and Non-Medicare populations are similar at a specific service level. However, within larger groupings of services, variation may exist due to differences in the mix of services consumed between these two groups.[14] Medicare ratios were used as the basis of adjustment for most Non-Medicare, Non-Medicaid services with the exception of inpatient hospital spending and physician and clinical services spending (Table 3).

For inpatient hospital and for physician and clinical services, travel patterns for the Non-Medicare population may vary from those for the Medicare population according to the mix of services consumed, primarily because of the age distribution of the population among states.[15] Therefore, we believe it is appropriate to re-weight the

Medicare expenditure flows between states for a differing service mix of inpatient hospital and physician services.

For inpatient hospital services, Medicare expenditure data by Diagnosis Related Group (DRG) was sorted into 30 groups according to their percentage of out-of-state expenditures. Within each DRG grouping, a similar number of claims were included in order to ensure a uniform distribution of services among groups. Next, claims for the Non-Medicare population were obtained from a private hospital discharge database and were collapsed into the same 30 DRG groupings as the Medicare data.[16] This data accounted for the distinct bundle of specific inpatient hospital services purchased by the privately insured population under age sixty-five. Separately, for both the Medicare and the Non-Medicare populations, service mix weights (the proportion of total dollar charges for each of the 30 groups relative to total dollar charges for all groups) were calculated and were applied to Medicare's expenditure flows for each DRG group. This yielded a service mix-adjusted matrix that represented inpatient hospital expenditure travel patterns for the Non-Medicare, Non-Medicaid population.[17] These expenditure flows were then used to adjust Non-Medicare, Non-Medicaid inpatient hospital spending from a state of provider to a state of residence basis.

Service mix-adjusted ratios for Non-Medicare Non-Medicaid inpatient hospital expenditures were developed for 1991-1993, 1996, 1999, 2002, and 2005. Data for intervening years were interpolated, while data for 2005 forward were not available and, therefore, the flow ratios were held constant. Service mix-adjusted inpatient hospital ratios for the Non-Medicare, Non-Medicaid population were then multiplied, for each year 1991-2009, by Non-Medicare, Non-Medicaid provider-based inpatient hospital spending in order to create estimates by state of residence.[18]

For physician and clinical services, a matrix of expenditure flows was developed using Medicare physician claims records, which were grouped into services at the 2 digit BETOS code level according to specific procedure, or HCPCS and CPT-4 codes.[19] As with inpatient hospital services, physician expenditure flows were re-weighted using a large database of the privately insured population under age sixty-five.[20] Service mix-adjusted physician ratios for the Non-Medicare, Non-Medicaid population were developed for the years 1991-1993, 1996, 1999, and 2005. Similar data were not available for 2006 and beyond; therefore, physician flow ratios for the non-elderly population were held constant, while intervening years were estimated using interpolation techniques. The service mix-adjusted ratios for Non-Medicare, Non-Medicaid physician services were then multiplied by state of provider spending for Non-Medicare, Non-

Medicaid physician and clinical services for each year 1991-2009 to yield spending estimates on a state of residence basis.

Medicaid expenditures are not adjusted, as they are based on state data provided by the agencies that pay health care costs for eligible residents. States may pay small amounts for services that occur outside of a resident's state; however, these dollars are a small proportion of all Medicaid spending. Therefore, we assume that Medicaid spending by state is identical on a provider and on a residence basis.

After all necessary Medicare and Non-Medicare, Non-Medicaid services are adjusted for border crossing, all states' expenditures for each service are summed to include residence-adjusted expenditures for Medicare, Medicaid, and all other payers (Non-Medicare, Non-Medicaid), and represent the final estimates of spending by state of residence (Table 4).

Seasonal Migration: Does it Impact the Estimates?

Seasonal migration refers to the tendency of residents in northern states to travel to southern (or other) states to maintain temporary residency during the winter months. In the Medicare data that is used to adjust expenditures to account for travel patterns between states, only the primary residence is used because Medicare does not account for a beneficiary's second residence. Therefore, seasonal migration is not incorporated in the Medicare flow ratios that represent both inflows and outflows of health care spending. Thus, because residents may consume health care in other states for a greater part of a year, and because they are not accounted for in the SHEA, expenditures for a resident's primary state may be slightly overstated. For the Non-Medicare population, seasonal migration accounts for a small percentage of overall spending.[21] Nonetheless, for both the Medicare and Non-Medicare populations, patterns of seasonal migration are not included in the SHEA.

[1] Due to data limitations, our state estimates do not adjust for imports or exports of health care spending (i.e. services consumed by U.S. residents in other countries and health care provided to non-U.S. residents of foreign countries).

[2] Cooper, B.S., Worthington, N.L., and Piro, P.A.: Personal Health Care Expenditures by State, Vol. II, Public and Private Funds, 1966 and 1969. DHEW Pub. No. (SSA) 75-11906. Social Security Administration. Washington. U.S. Government Printing Office, 1975.

[3] Levit, K.: Personal Health Care Expenditures by State, Selected Years 1966-78. Health Care Financing Review. Vol. 4, No. 2. HCFA Pub. No. 03149. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1982. and Levit, K.R.: Personal Health Care Expenditures, by State: 1966-82. Health Care Financing Review 6 (4): 1-49, Summer 1985.

[4] Levit, K.R., Lazenby, H.C., Cowan, C.A., et al.: Health Spending by State: New Estimates for Policy Making. Health Affairs 12 (3):7-26, Fall 1993.

[5] Levit, K.R., Lazenby, H.C., Cowan, C.A., et al: State Health Expenditure Accounts: Building Blocks for State Health Spending Analysis. Health Care Financing Review 17 (1): 201-254, Fall 1995.

[6] Martin, A., Whittle, L, Heffler, S. et al.: Health Spending by State Of Residence, 1991-2004. Health Affairs, web exclusive, 18 September 2007: w651-w663.

[7] Fu Associates, "Interstate Flows of Health Spending: Updates for 1996," Contract no.HCFA 500-95-0036, prepared for the Health Care Financing Administration, Baltimore, 1999.

[8] Centers for Medicare and Medicaid Services, "Definitions, Sources, Methods", 2009, http://www.cms.gov/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp#TopOfPage. Personal health care expenditures by state are controlled to estimates presented in A. Martin et al.,"Recession Contributes to Slowest Rate of Annual Increase in Health Spending in Five Decades," Health Affairs 30, no.1 (2011):11-22. Estimates of Administration and the Net Cost of Private Health Insurance, Government Public Health Activities, and Investment in Research and Structures & Equipment are not broken out by state due to source data limitations.

[9] Centers for Medicare and Medicaid Services, "State of provider definitions and methodology, 1980-2009" (December 2011), http://www.cms.hhs.gov/NationalHealthExpendData/05a_NationalHealthAccountsStateHealthAccountsProvider.asp#TopOfPage.

[10] Centers for Medicare and Medicaid Services, "State of provider definitions and methodology, 1980-2009" (December 2011), http://www.cms.gov/NationalHealthExpendData/05a_NationalHealthAccountsStateHealthAccountsProvider.asp#TopOfPage .

[11] CMS claims-based data obtained from the Medicare Provider Analysis & Review (MEDPAR) files, Current Utilization tables, the Part B Extract and Summary System (BESS), the Health Care Information System (HCIS), and the Denominator file.

[12] Centers for Medicare and Medicaid Services, "State of provider definitions and methodology, 1980-2009" (December 2011), http://www.cms.gov/NationalHealthExpendData/05a_NationalHealthAccountsStateHealthAccountsProvider.asp#TopOfPage (accessed 2 Dec 2011).

[13]Fu Associates: Expenditure Flows Related to Interstate Migration for Health Care Services, Final Report. Contract no. HCFA 500-92-0044. Prepared for the Health Care Financing Administration. Baltimore, MD. 1993; Fu Associates, "Interstate Flows of Health Spending: Updates for 1992 and 1993," Contract no. HCFA 95-061, prepared for the Health Care Financing Administration, Baltimore, 1995; Fu Associates, "Interstate Flows of Health Spending: Updates for 1996," Contract no.HCFA 500-98-0001, prepared for the Health Care Financing Administration, Baltimore, 1998; and Fu Associates, "Interstate Flows of Health Spending: Update for 2002,"{ (Memoranda dated 30 January 2004, 19 May 2006, 6 Dec 2008, and 10 Dec 2008),Contract no. CMS-03-01070, prepared for the Centers for Medicare & Medicaid Services, Baltimore, 2005.

[14] Fu Associates, "Interstate Flows of Health Spending: Updates for 1996." Contract no. RFP HCF 98-004/ELA, prepared for the Health Care Financing Administration, Baltimore, 1998.

[15] Variations in travel patterns are attributable to differences in the mix of specific procedures and services purchased by various age cohorts within broader inpatient hospital and physician service categories, rather than to differences in travel patterns exhibited by each age cohort for the same procedure. Fu Associates, "Interstate Flows of Health Spending: Updates for 1992 and 1993" (Memorandums dated 8 October 1996, 7 November 1996, and 29 January 1997, Contract no. HCFA 500-95-0036, prepared for the Centers for Medicare & Medicaid Services, Baltimore, 1996).

[16] 1991 ratios were developed using inpatient hospital discharge data from the Codman Research Group. Ratios for 1992, 1993, 1996, 2002, and 2005 were developed using data from the Healthcare Cost and Utilization Project 3 (HCUP-3), Nationwide Inpatient Sample (NIS) maintained by the Agency for Healthcare Research and Quality, obtained under contract by Fu Associations, Contract #CMS-03-01070.

[17] Fu Associates, "Interstate Flows of Health Spending: Update for 2002," (Memoranda dated 30 January 2004, 19 May 2006, 6 Dec 2008, and 10 Dec 2008), Contract no. CMS-03-01070, prepared for the Centers for Medicare & Medicaid Services, Baltimore, 2005, and Fu Associates, "Interstate Flows of Health Spending: Updates for 1996." Contract no. RFP HCF 98-004/ELA, prepared for the Health Care Financing Administration, Baltimore, 1998.

[18] Inpatient hospital expenditures by state of provider were obtained after splitting total hospital state of provider expenditures into inpatient and outpatient. This split was obtained using data from the American Hospital Association (AHA) panel survey and from the Agency for Healthcare Research and Quality's (AHRQ) Medical Expenditure Panel Survey (MEPS).

[19] BETOS stands for Berenson-Eggers Type of Service Codes and refer to similar groups of procedure codes as defined by CMS. A prior memo from Fu Associates stated that ratios calculated at the 3-digit level may not be reliable because some states were not sufficiently represented in the Medicare data. CPT-4 represents Current Procedural Terminology, 4th Version, and is maintained by the American Medical Association. HCPCS stands for Healthcare Common Procedure Coding System and is maintained by CMS, which applies CPT-4 coding terminology to Medicare services for payment purposes.

[20] 1991-1993, 1996, 1999, and 2005 physician service mix-adjusted ratios were developed using private non-Medicare physician services claims records from Medstat's Market Scan Commercial Database, obtained under contract by Fu Associations, Contract #CMS-03-01070.

[21] Basu, J.: Border Crossing Adjustment and Personal Health Care Spending by State. Health Care Financing Review 18 (1): 215-236, Fall 1996.

Table 1: History of the State Health Expenditure Accounts

Year Published	Years Covered	Types of Services Published	Sources of Funding Published	Provider or Residence-Based
1975[a]	1966, 1969	Hospital care, Physicians' services, Dentists' services, Other Professional services, Drugs and drug sundries, Eyeglasses and appliances, Nursing home care, Other health services	All Payers (Total); Private; Public	Provider
1982[b]	Selected Years 1966-1978	Hospital care, Physicians' services, Dentists' services, Other Professional services, Drugs and medical sundries, Eyeglasses and appliances, Nursing home care, Other personal health care	All Payers (Total)	Provider
1985[c]	Selected Years 1966-1982	Hospital care, Physicians' services, Dentists' services, Other Professional services, Drugs and medical sundries, Eyeglasses and appliances, Nursing home care, Other health services	All Payers (Total)	Provider
1993[d]	1980-1991	Hospital care, Physicians' services, Prescription drugs	All Payers (Total)	Provider
1995[e]	1980-1993	Hospital care, Physicians' services, Dental services, Other Professional services, Home health care, Drugs and other medical non-durables, Vision products and other medical durables, Nursing home care, Other personal health care	All Payers (Total); Medicare; Medicaid	Provider
1995[f]	1991	Inpatient hospital, Outpatient hospital, Hospital-based nursing home care, Physician services, Home health care, Nursing home care, Other Professional services, ESRD facilities, Medical durables	Medicare	Residence
1996[g]	1991	Hospital care, Physician services, Dental services, Other Professional services, Home health care, Drugs and other non-durables, Medical durables, Nursing home care, Other personal health care	All Payers (Total)	Provider & Residence
2001[h]	1980-1998	Hospital care, Physicians and Other Professionals, Dental services, Home health care, Drugs and other medical non-durables, Vision products and other medical durables, Nursing home care, Other personal care	All Payers (Total); Medicare; Medicaid	Provider
2002[i]	1991-1998	Hospital care, Physicians and Other Professionals, Home health care, Nursing home care, Drugs and other non-durables, Other	All Payers (Total); Medicare; Medicaid	Residence
2007[j]	1980-2004	Hospital services, Physician and clinical services, Other Professionals, Dental services, Home health care, Prescription drugs, Other non-durable medical products, Durable medical products, Nursing home care, Other personal health care	All Payers (Total); Medicare; Medicaid	Provider
2007[k]	1991-2004	Hospital services, Physician and clinical services, Other Professionals, Dental services, Home health care, Drugs and other medical non-durables, Durable medical products, Nursing home care, Other personal health care	All Payers (Total); Medicare; Medicaid	Residence
2011	1991-2009	Hospital services, Physician and clinical services, Other Professionals, Dental services, Home health care, Drugs and other medical non-durables, Durable medical products, Nursing home care, Other health, residential, and personal care services	All Payers (Total); Medicare; Medicaid	Residence

[a] Cooper, B.S., Worthington, N.L., and Piro, P.A.: Personal Health Care Expenditures by State, Vol. II, Public and Private Funds, 1966 and 1969. DHEW Pub. No. (SSA) 75-11906. Social Security Administration. Washington. U.S. Government Printing Office, 1975.

[b] Levit, K.: Personal Health Care Expenditures by State, Selected Years 1966-78. Health Care Financing Review. Vol. 4, No. 2. HCFA Pub. No. 03149. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1982.

[c] Levit, K.R.: Personal Health Care Expenditures, by State: 1966-82. Health Care Financing Review 6 (4): 1-49, Summer 1985.

[d] Levit, K.R., Lazenby, H.C., Cowan, C.A., et al.: Health Spending by State: New Estimates for Policy Making. Health Affairs 12 (3):7-26, Fall 1993.

[e] Levit, K.R., Lazenby, H.C., Cowan, C.A., et al: State Health Expenditure Accounts: Building Blocks for State Health Spending Analysis. Health Care Financing Review 17 (1): 201-254, Fall 1995.

[f] Basu, J., Lazenby, H., and Levit, K.: Medicare Spending by State: The Border-Crossing Adjustment. Health Care Financing Review 17 (2): 219-241, Winter 1995.

[g] Basu, J.: Border Crossing Adjustment and Personal Health Care Spending by State. Health Care Financing Review 18 (1): 215-236, Fall 1996.

[h] Martin, A.B., Whittle, L.S., and Levit, K.R.: Trends in State Health Care Expenditures and Funding: 1980-1998. Health Care Financing Review 22 (4): 111-140, Summer 2001.

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Table 2: Medicare Flow Matrices Used to Compute Medicare Fee-for-Service Flows of Personal Health Care Expenditures, by Type of Service

Medicare Categories	Medicare Flow Matrix
Hospital Services	
Inpatient	Inpatient Hospital
Outpatient	Outpatient Hospital
Hospital-based Home Health	Hospital-based Home Health
Hospital-based Hospice	Hospice
Hospital-based Skilled Nursing Facilities	Hospital-based Skilled Nursing Facilities
Physician & Clinical Services	
Physician Services	Physician
ESRD (Clinic) Services	ESRD[1]
Home Health Care (Freestanding	Home Health
Home Health-based Hospice	Hospice
Skilled Nursing Facilities (Freestanding)	Skilled Nursing Facilities
SNF-based Hospice	Hospice
Other Professional Services	Other Professionals[2]
Ambulance	Ambulance[2]
Durable Medical Products	No Adjustment
Dental Services	No Adjustment
Drugs and Other Non-Durables	No Adjustment

Note: Unless otherwise specified, Medicare fee-for-service expenditures based on state of provider were adjusted for spending by its residents using Medicare data for 1991-1993, 1996, 1999, 2002, 2005, and 2009. Provider to residence-based flow matrices were interpolated for all other years.

[1] ESRD is End Stage Renal Disease. ESRD Clinics are Kidney Dialysis Facilities.

[2] For 1991, the matrix for Other Professionals including Ambulance was used.

Table 3: Medicare Flow Matrices Used to Compute Non-Medicare, Non-Medicaid Flows of Personal Health Care Expenditures, by Type of Service

Non-Medicare Non-Medicaid Categories	Medicare Flow Matrix
Hospital Services	
Inpatient	Inpatient Hospital, Service-Mix Adjusted[1]
Outpatient	Outpatient Hospital
Physician & Clinical Services	Physician Services, Service-Mix Adjusted[2]
Home Health Care (Freestanding)	Home Health
Nursing Home Care (Freestanding)	Skilled Nursing Facilities
Other Professional Services	Other Professionals
Durable Medical Products	Other Professionals, including Ambulance
Dental Services	Other Professionals, including Ambulance
Drugs and Other Non-Durables	No Adjustment
Other Health, Residential, and Personal Care Services	No Adjustment
Ambulance	Ambulance[3]
OHRPC excluding Ambulance	No Adjustment

Note: Unless otherwise specified, Non-Medicare Non-Medicaid expenditures based on state of provider were adjusted for spending by its residents using Medicare data for 1991-1993, 1996, 1999, 2002, 2005, and 2009. Provider to residence-based flow matrices were interpolated for all other years.

[1] 2009 data was not available for adjustment of Non-Medicare Non-Medicaid Inpatient Hospital expenditures; therefore, the ratios for 2005 were held constant through 2009.

[2] The matrix for Non-Medicare Non-Medicaid Physician expenditures was not available for 2002. In addition, 2009 data was not available for adjustment of Non-Medicare Non-Medicaid Physician expenditures. Therefore, the ratios for 2005 were held constant through 2009.

[3] For 1991, the matrix for Other Professionals including Ambulance was used.

Table 4: Aggregation of Residence-Adjusted Estimates for Medicare, Medicaid, and Non-Medicare Non-Medicaid Services

State Health Expenditure Accounts Type of Service Category	Pieces within Each Service	Adjusted or Not Adjusted for Border Crossing	Medicare Matrix Used for Adjustment
Hospital Services	Medicare-Inpatient, FFS	Adjusted	Inpatient Hospital
	Medicare-Outpatient, FFS	Adjusted	Outpatient Hospital
	Medicare-Hospital-based HH, FFS	Adjusted	Hospital-based HH
	Medicare-Hospital-based SNF, FFS	Adjusted	Hospital-based SNF
	Medicare-Hospital-based Hospice, FFS	Adjusted	Hospice
	Medicare-Hospitals, HMO	Not Adjusted	———————
	Medicaid-Hospital	Not Adjusted	———————
	NonMM-Inpatient	Service-Mix Adjusted	Inpatient Hospital, Service-Mix Adjusted
	NonMM-Outpatient	Adjusted	Outpatient Hospital
Physician & Clinical Services	Medicare-Physician Services, FFS	Adjusted	Physician
	Medicare-ESRD Clinics, FFS	Adjusted	ESRD
	Medicare-Physician Services, HMO	Not Adjusted	———————
	Medicaid-Physician & Clinical Services	Not Adjusted	———————
	NonMM-Physician & Clinical Services	Service-Mix Adjusted	Physician, Service-Mix Adjusted
Home Health Care (Freestanding)	Medicare-Home Health Care, FFS	Adjusted	Home Health
	Medicare-Home Health Care, HMO	Not Adjusted	———————
	Medicare-Home Health-based Hospice, FFS	Adjusted	Hospice
	Medicaid-Home Health Care	Not Adjusted	———————
	NonMM-Home Health Care	Adjusted	Home Health
Nursing Home Care (Freestanding)	Medicare-Skilled Nursing Facilities, FFS	Adjusted	Skilled Nursing Facilities
	Medicare-SNF-based Hospice, FFS	Adjusted	Hospice
	Medicare-Skilled Nursing Facilities, HMO	Not Adjusted	———————
	Medicaid-Nursing Homes	Not Adjusted	———————
	NonMM-Nursing Homes	Adjusted	Skilled Nursing Facilities
Other Professional Services	Medicare-Other Professionals, FFS	Adjusted	Other Professionals
	Medicare-Other Professionals, HMO	Not Adjusted	———————
	Medicaid-Other Professionals	Not Adjusted	———————
	NonMM-Other Professionals	Adjusted	Other Professionals
Durable Medical Products	Medicare-Durable Medical Products, FFS	Not Adjusted	———————
	Medicare-Durable Medical Products, HMO	Not Adjusted	———————
	Medicaid-Durables	Not Adjusted	———————
	NonMM-Durable Medical Products	Adjusted	Other Professionals, including Ambulance
Dental Services	Medicare-Dental Services, FFS	Not Adjusted	———————
	Medicare-Dental Services, HMO	Not Adjusted	———————
	Medicaid-Dental Services	Not Adjusted	———————
	NonMM-Dental Services	Adjusted	Other Professionals, including Ambulance
Drugs and Other Non-Durables	Medicare-Part B Prescription Drugs, FFS	Not Adjusted	———————
	Medicare-Part D Prescription Drugs, FFS	Not Adjusted	———————
	Medicare-Part B Prescription Drugs, HMO	Not Adjusted	———————
	Medicare-Part D Prescription Drugs, HMO	Not Adjusted	———————
	Medicare-Other Non-Durables, FFS	Not Adjusted	———————
	Medicaid-Drugs and Other Non-Durables	Not Adjusted	———————
	NonMM-Drugs and Other Non-Durables	Not Adjusted	———————
Other Health, Residential, and Personal Care Services	Medicare-Ambulance	Adjusted	Ambulance
	Medicaid-Ambulance	Not Adjusted	———————
	Medicaid-OHRPC excluding Ambulance	Not Adjusted	———————
	NonMM-Ambulance	Adjusted	Ambulance
	NonMM-OHRPC excluding Ambulance	Not Adjusted	———————