WHITE PAPER

GEOGRAPHIC VARIATION IN SPENDING AND ULTILIZATION AMONG THE COMMERCIALLY INSURED

WILLIAM D. MARDER, PHD
GINGER S. CARLS, PHD
EMILY EHRLICH, MPH
RAY FABIUS, MD, CPE, FACPE

JULY 27, 2011

THOMSON REUTERS™

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Variation in healthcare utilization and spending across the United States has been carefully documented for the Medicare population. Less is known about variation among the privately insured population of the U.S. This paper uses the *Thomson Reuters MarketScan® Research Databases* to examine variation in spending for enrollees with employer-sponsored health insurance (private insurance). We found substantial spending variation across metropolitan areas for those with private insurance, but different patterns than have been described in the literature based typically on Medicare Fee-for-Service (FFS) Parts A and B. We also found the lowest medical care spending metropolitan statistical area (MSA) is Ogden-Clearfield, Utah and the highest spending MSA is Anderson, Ind. Previous research has highlighted McAllen, Texas as the *highest* medical care spending MSA for Medicare, but our research found that this MSA is among the 10 *lowest* spending MSAs for commercially insured enrollees. In conclusion, we determined that a better understanding of variation in healthcare spending among the privately insured is needed to establish the appropriate policy response and avoid unintended policy effects.

INTRODUCTION

Variation in healthcare utilization and spending across the United States is well documented. Beginning with Jack Wennberg's study of variation in the 1970s, researchers have observed variation in healthcare utilization and spending across geographic regions.[1] And although there is speculation as to why there is variation, there is general consensus in the field that unexplained geographic variation in use and healthcare spending cannot be fully explained by differences in demographics (age and gender) and available measures of health status or risk adjustment.[2] Furthermore, it is implied that regions with high spending represent overuse, creating unnecessary spending in the healthcare system. Much of the literature on geographic variation in spending and utilization is based on data from the Medicare program (Parts A and B). While it is not debated that there is considerable variation in healthcare utilization and spending in a public insurance program such as Medicare, this experience of variation may or may not be unique to seniors and/or public programs.

Making policy decisions based solely on Medicare evidence is risky since there are important differences between programs for the over-65 population and under-65 population and their healthcare needs. Evidence from private insurance and the under-65 population is needed.

This paper provides a descriptive look at geographic variation observed for the privately insured population of the U.S. We do not resolve controversies about overuse or underuse; rather, we confront the reality that patterns of variation may not be the same across different insurance arrangements. Policy responses should take this into account to avoid unintended effects. Existing explanations for geographic variation may need to be modified to account for both the patterns observed in Medicare, as well as patterns observed in commercially insured populations.

EXPLAINING VARIATION

A policy response to geographic variation in healthcare spending will depend on the source of this variation. Several explanations have been proposed to account for geographic variation in healthcare. The answer may lie in some combination of these hypotheses.

- **Supply of Healthcare**
  - **Clinical Uncertainty.** Clinical uncertainty allows for provider-driven influences on care.[1] Variations in provider-driven demand may be due to differences in local practice culture and training, as well as financial incentives.[3, 4, 5, 6]
  - **Variations in Local Delivery System Efficiency.** The availability of primary care physicians and specialists (especially under-supply of primary care physicians and over-supply of specialists), integrated delivery systems, and other aspects of the healthcare system may lead to differences in efficiency and use of healthcare resources.[7, 8]
- **Healthcare Demand.** Some level of variation may be due to differences in underlying health, health behaviors, and preferences for healthcare across regions that cannot be completely accounted for using current methods.[8]
- **Market Structure, Pricing, and Competition.** Differences in pricing mechanisms — market prices versus administrative prices — and hospital competition may explain some observed geographic patterns and differences in Medicare and commercial insurance.[9, 10]
- **Healthcare Fraud and Abuse.** Fraud and abuse may explain some of the geographic variation in the Medicare population where fraudulent billing schemes are well documented. [11]

METHODS

Using the *MarketScan Research Databases*, we explored patterns of geographic variation in 2009 spending for three age groups of enrollees with commercial insurance provided by an employer (typically large- to medium-sized firms):

- Children (age 0-17 years)
- Adults (age 18-64 years), and
- Seniors (age 65 years and over)

This analysis represents the experience of 5.7 million continuously-enrolled children, 16 million continuously-enrolled adults, and 1.8 million continuously-enrolled seniors. The seniors in our analysis are a subset of Medicare beneficiaries with supplemental insurance from their previous employers, and are more likely to be healthier and have higher incomes than the full set of Medicare enrollees.

In our analysis, we used the geographic unit of metropolitan statistical area (MSA), representing cities in the United States. We included the 382 MSAs with at least 100 enrollees in each of the age categories. Spending was measured by allowed charges, which includes spending by both patients and the insurance plan.

We explored geographic variation across MSAs and across age groups in:

- Total spending
- Medical care spending
- Inpatient medical care spending
- Outpatient medical care spending
- Outpatient prescription drug spending

We provide descriptive results unadjusted for demographic characteristics, pricing, or health status. A revised version of this paper will explore the impact of demographic and other adjustments. When available, we compare our results to similar unadjusted estimates reported in the literature.

This paper is organized as follows. First we describe geographic variation in spending by answering the following questions:

- What are the 10 highest and 10 lowest medical care spending MSAs for all age groups and how do these MSAs rank by age group?
- Is the pattern of geographic variation the same across populations and type of spending?

Since these analyses suggested that geographic spending patterns varied by age group and type of spending, we measured how different or similar patterns were by age group and type of spending. We analyzed the following correlations:

- Medical-Drug spending for all ages and by age group
- Inpatient-Outpatient medical spending for all ages and by age group
- Child-Adult total healthcare, medical, and drug spending
- Adult-Senior total healthcare, medical, and drug spending
- Child-Senior total health, medical, and drug spending

FINDINGS

SUMMARY OF FINDINGS

Our analysis revealed five main findings:

1. Significant geographic variation in total healthcare spending occurred in the under-65 population, as well as the over 65 population.
2. The location of the highest and lowest medical care spending MSAs varied significantly by age group and by type of spending and was substantively different from previously published results found in the Medicare FFS population.
3. Variation in drug spending was typically higher than variation in medical care spending, except for seniors with supplemental insurance from a previous employer.
4. Inpatient and outpatient medical spending appeared to be strongly positively correlated with each other, and medical and outpatient drug spending were weakly correlated.
5. Medical care spending was weakly correlated between age groups, while drug spending was more strongly correlated.

WHAT ARE THE 10 HIGHEST AND LOWEST MEDICAL SPENDING MSAS?

Ogden-Clearfield, Utah has the lowest medical care spending of $2,623, which was 36 percent of the spending in the highest spending MSA (Anderson, Ind. $7,231) (Table 1).

McAllen, Texas has previously been identified as *the highest medical care spending* area or among the highest medical spending areas for Medicare recipients, driven by home healthcare spending.[11,12] In the commercially insured population, we find similar high spending for seniors, but not for adults and children (Table 1). Among commercially insured seniors, McAllen, Texas had medical spending that was 129.7 percent of the national average and ranked in the 91st percentile. However, among commercially insured adults, McAllen, Texas had medical spending in *the lowest percentile*, with spending of only 70.2 percent of the national average among adults.

El Paso, Texas has been highlighted as a city with similar demographics as McAllen, Texas, but Medicare spends half as much in El Paso as in McAllen.[12] For seniors with commercial insurance, medical care spending in these two MSAs was very similar ($12,663 in El Paso and $12,484 in McAllen, both in 91st percentile). A study of Blue Cross Blue Shield, under-65, enrollees that compared medical care spending in McAllen and El Paso found that McAllen actually had lower spending in the under-65 population.[13] For adults with commercial insurance in the data reported here, we also find lower medical care spending in McAllen ($2,944) compared with El Paso ($3,644).

Miami, Fla. has also been highlighted as one of the highest medical care spending MSAs for Medicare recipients, with some speculation that this may be in part due to Medicare fraud and abuse in this region.[11] The spending in Miami among the commercially insured was mixed. For seniors, Miami's medical spending was 135.5 percent of the national average and ranked high, in the 93rd percentile. However, among commercially insured adults, Miami's medical spending was relatively lower, at 109.0 percent of the national average and ranking in the 73rd percentile. Commercially insured children in Miami had high medical spending that was 133.1 percent of the national average (95th percentile).

[i] Another commonly used geographic level of analysis is the hospital referral region (HRR), used by the Dartmouth Atlas. HRRs are based on the hospital referral regions for the Medicare population and may not be applicable to the under-65 population included in our analysis.

TABLE 1. LOWEST AND HIGHEST MEDICAL SPENDING MSAS FOR ALL AGES

10 LOWEST SPENDING MSAS

MSA	Medical Spending, Annual $	Percentile Rank for Medical Care Spending				Medical Spending as Percent of National Average			
Age Groups	All	All	Children	Adults	Seniors	All	Children	Adults	Seniors
Ogden-Clearfield, UT	$2,623	1	14	3	17	63.9%	74.8%	75.3%	77.8%
Dubuque, IA	$2,719	1	27	2	25	66.2%	81.7%	71.2%	82.6%
Fayetteville-Springdale-Rogers, AR-MO	$2,762	2	10	2	20	67.3%	73.5%	71.4%	80.4%
Fort Smith, AR-OK	$2,916	2	3	3	9	71.0%	63.7%	74.3%	70.3%
Laredo, TX	$2,919	2	10	4	73	71.1%	72.6%	77.1%	108.4%
Amarillo, TX	$2,942	2	12	5	56	71.7%	74.1%	77.4%	95.9%
McAllen-Edinburg-Mission, TX	$2,950	3	32	1	91	71.9%	83.4%	70.2%	129.7%
Salt Lake City, UT	$2,979	3	46	6	30	72.6%	89.1%	79.4%	84.4%
Fargo, ND-MN	$2,996	3	57	2	81	73.0%	93.5%	72.9%	113.5%
Sioux City, IA-NE-SD	$3,029	3	40	9	72	73.8%	86.8%	81.7%	107.7%

10 HIGHEST SPENDING MSAS

MSA	Medical Spending, Annual $	Percentile Rank for Medical Care Spending				Medical Spending as Percent of National Average			
Age Groups	All	All	Children	Adults	Seniors	All	Children	Adults	Seniors
Anderson, IN	$7,231	100	74	100	59	176.2%	102.0%	163.2%	97.2%
Punta Gorda, FL	$7,168	100	18	90	83	174.7%	77.5%	122.7%	116.6%
Racine, WI	$6,528	99	96	99	99	159.1%	135.9%	142.6%	187.8%
Naples-Marco Island, FL	$6,312	99	31	83	85	153.8%	83.4%	115.6%	119.0%
Ocean City, NJ	$6,128	99	90	84	50	149.3%	117.2%	117.0%	92.0%
Barnstable Town, MA	$6,123	99	78	90	65	149.2%	105.7%	121.3%	101.7%
Flint, MI	$6,061	98	24	80	78	147.7%	79.6%	112.5%	112.1%
Lake Havasu City-Kingman, AZ	$5,977	98	45	98	39	145.7%	89.0%	137.5%	88.0%
Ocala, FL	$5,976	98	1	85	70	145.6%	54.8%	117.7%	106.0%
Carson City, NV	$5,931	98	49	99	33	144.5%	89.9%	152.7%	85.2%

Percentile Rank is ranking from 1 to 100 where 1 = MSAs with medical care spending in the lowest 1% of MSAs and 100 is MSAs with the highest 1% in spending.
National Average Annual Medical Care spending was $4,104 overall, $1,920 children, $4,197 adults, and $9,622 seniors.
Source: *Thomson Reuters MarketScan Research Databases*, 2009

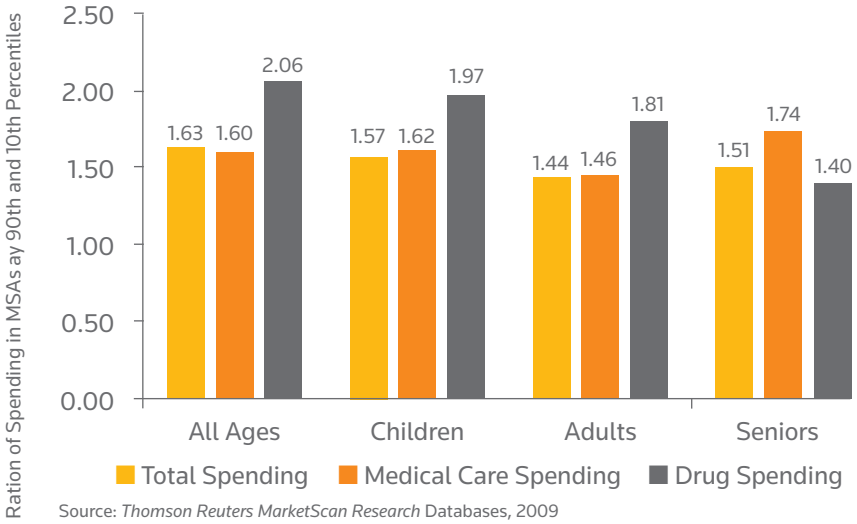
IS THE PATTERN OF GEOGRAPHIC VARIATION THE SAME ACROSS DIFFERENT AGE GROUPS AND TYPES OF SPENDING?

To further explore geographic variation in spending, we characterized spending by MSAs using a common measure of the ratio of high-spending to low-spending areas (Figure 1) as well as display annual spending for each MSA in maps for each age group (Figure 2-4).

For our ratio of high to low spending areas, high spending MSAs were at the 90th percentile and low spending MSAs were at the 10th percentile across the country (Figure 1). We found that geographic variation in drug spending was typically larger than variation in medical care spending, except for seniors.

- Drug spending for all age groups in MSAs at the 90th percentile was twice that of spending for MSAs at the 10th percentile (2.06 times as high) but medical spending was only 60 percent higher in the 90th percentile compared with the 10th (1.6 times as high).
- For seniors, this ratio was higher for medical care than drugs (1.40 for drugs, 1.74 for medical care).
- Geographic variation in medical care spending was larger among seniors with supplemental insurance than found in previous research based on seniors enrolled in Medicare (Medicare Parts A and B).
  - Previous research found that medical care spending in MSAs at the 90th percentile had spending 55 percent higher than MSAs at the 10th percentile, compared with 74 percent in these data (both unadjusted estimates).[11]

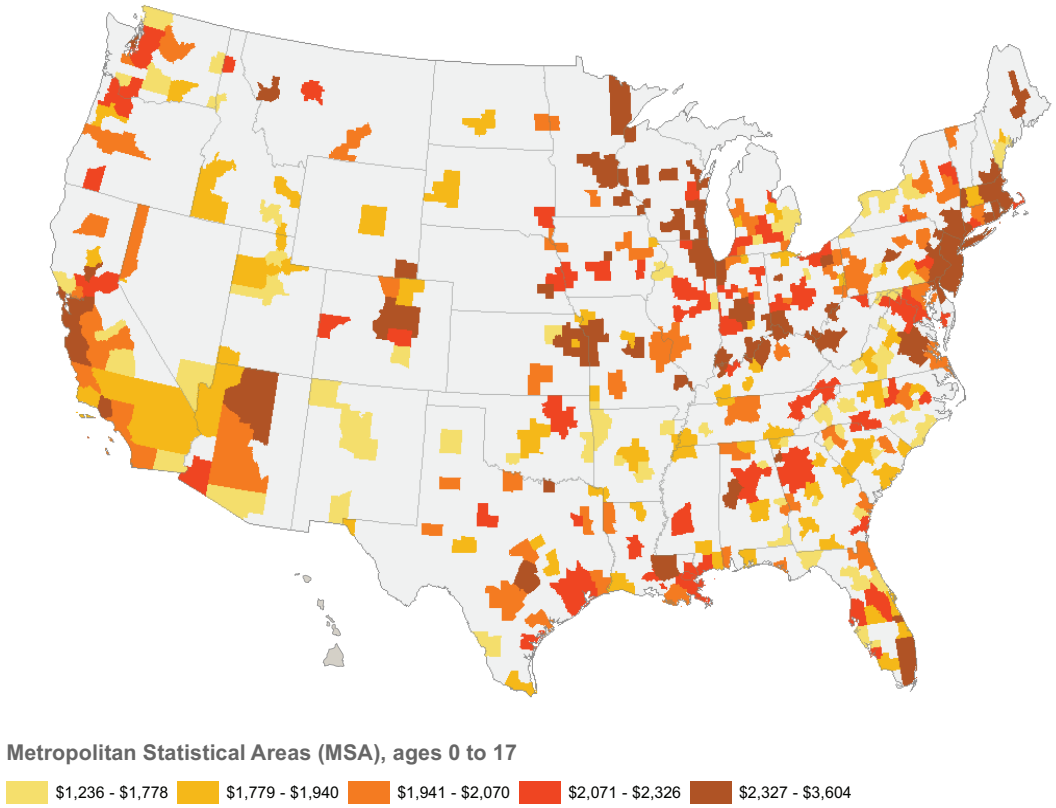
FIGURE 1. VARIATION IN TOTAL HEALTHCARE SPENDING, BY AGE GROUP



Source: *Thomson Reuters MarketScan Research* Databases, 2009

The following maps illustrate total healthcare spending (medical and drug) per enrollee with commercial health insurance for children ages 0 to 17; adults ages 18 to 64; and seniors ages 65 and older.

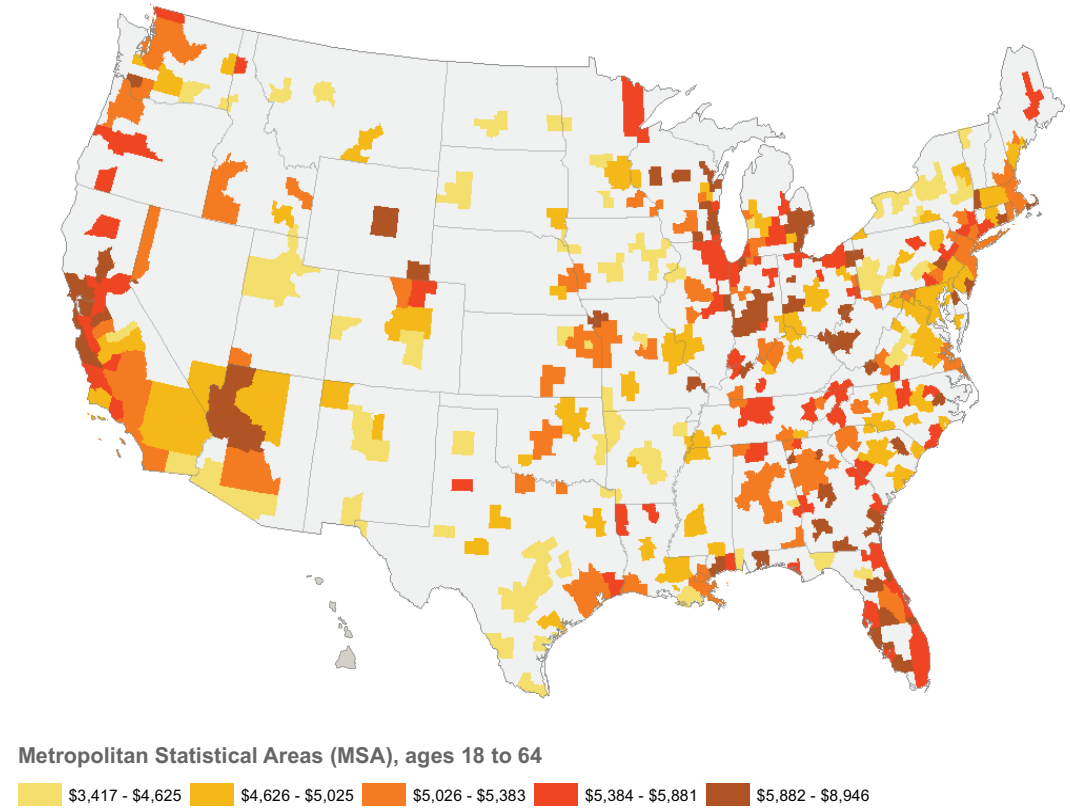
FIGURE 2. REGIONAL VARIATION IN TOTAL HEALTHCARE SPENDING, CHILDREN AGES 0 TO 17



Source: *Thomson Reuters MarketScan Research Databases*, 2009

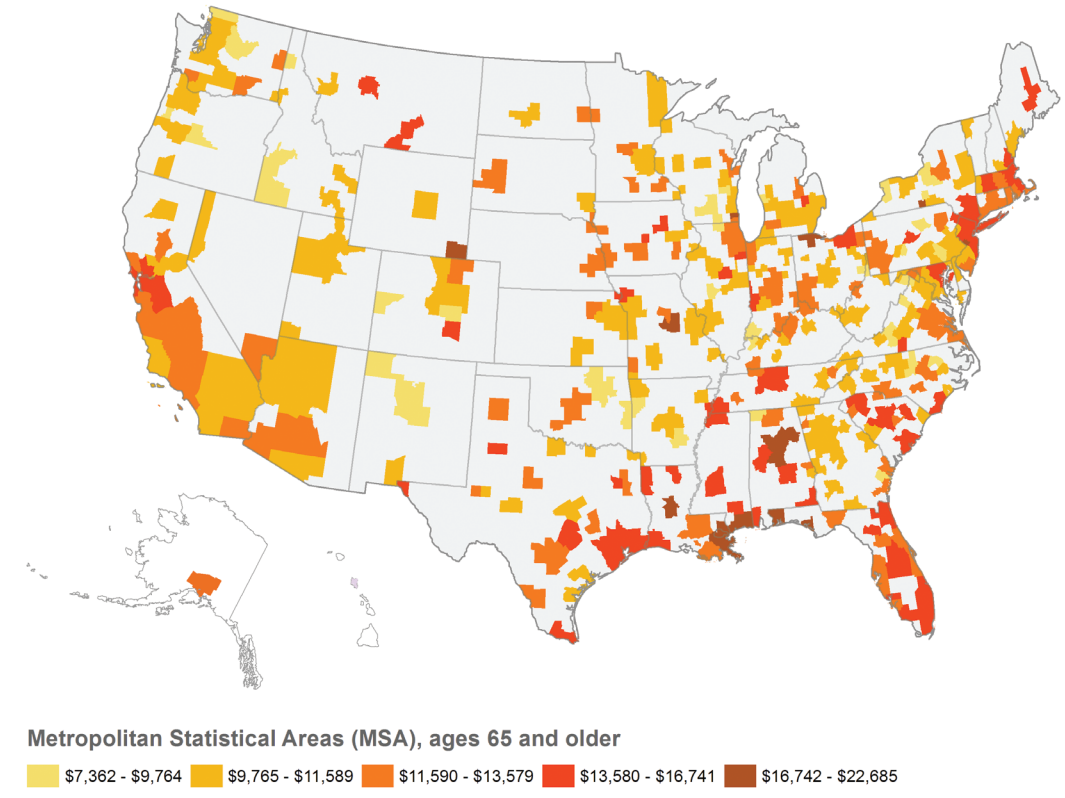
[8]The data were unadjusted and location was based on the residence of the patient. The un-shaded areas are non-metropolitan areas and metropolitan areas without data. Non-metropolitan areas include both micropolitan and non-CBSA (often called "rural") counties.

FIGURE 3. REGIONAL VARIATION IN TOTAL HEALTHCARE SPENDING, ADULTS AGES 18 TO 64



Source: *Thomson Reuters MarketScan Research Databases*, 2009

FIGURE 4. REGIONAL VARIATION IN TOTAL HEALTHCARE SPENDING, SENIORS AGE 65 AND OLDER



Source: *Thomson Reuters MarketScan Research Databases*, 2009

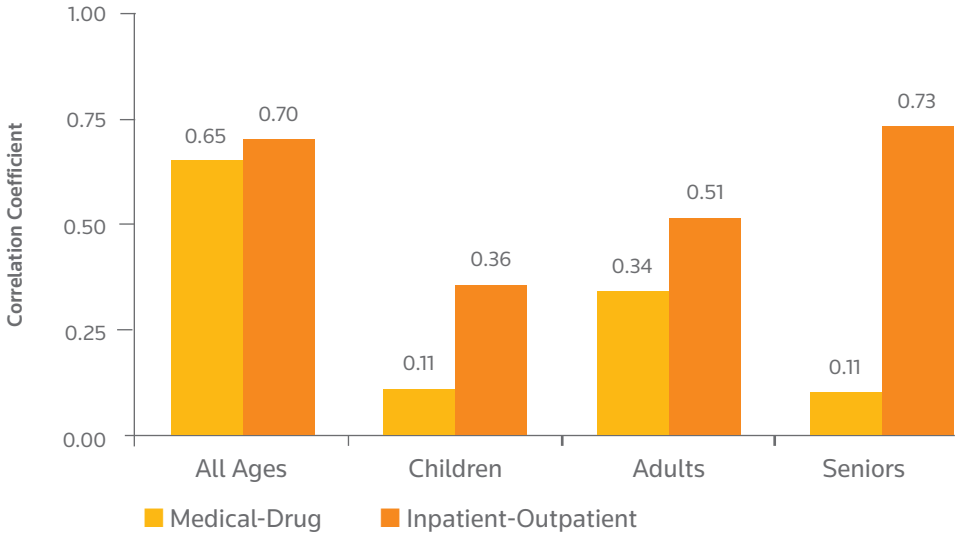
ARE HIGH MEDICAL SPENDING MSAS ALSO HIGH SPENDING FOR DRUGS, INPATIENT, AND OUTPATIENT MEDICAL CARE?

We investigated correlations between different types of medical spending (inpatient and outpatient) and medical and drug spending across MSAs. A strong correlation in spending is indicated by a correlation coefficient close to +1 or -1, and no discernable pattern of correlation is indicated by a correlation coefficient of 0.

As approaches are developed to address variation, it is important to understand whether spending across service types is a complement or substitute. Positive correlations show that service types are complements, and as spending in an MSA for one category increases, the other also increases. In this case, approaches to reduce spending in one service type may also reduce spending in the complementary service type. Negative correlations between the types of services suggest that the service types are substitutes and as spending in an MSA for one category of service increases, the other declines. We found:

- Spending for inpatient and outpatient medical care was strongly positively correlated, suggesting that they are complements (Figure 5). The correlation was strongest among seniors (correlation=0.73). This means that in areas where there is high inpatient usage there is also high outpatient usage, especially for seniors. The hypothesis that high outpatient utilization can reduce inpatient service needs is not supported by our study.
- Outpatient drug and medical spending were weakly correlated for seniors and children (correlation=0.11) suggesting that some drug and medical spending is a substitute of medical care spending, and some is a complement (Figure 5), similar to findings from an earlier study.[14] Drug and medical spending was moderately correlated among adults (correlation=0.34).

FIGURE 5. CORRELATION BETWEEN TYPES OF SPENDING, BY AGE GROUP



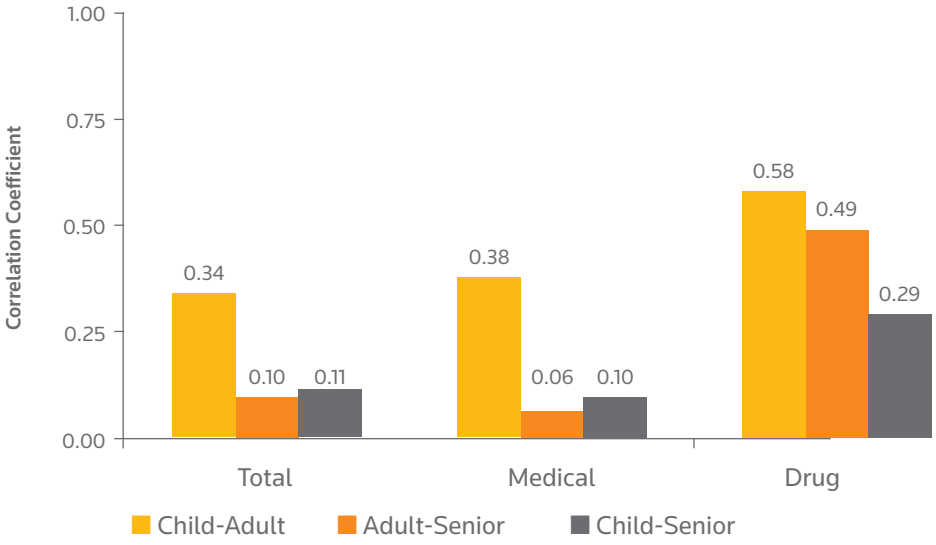
Source: *Thomson Reuters MarketScan Research Databases*, 2009

ARE HIGH SPENDING AREAS FOR SENIORS ALSO HIGH SPENDING FOR ADULTS AND CHILDREN?

Using the same correlation measure described previously, we found that medical care spending was weakly correlated between age groups, while drug spending was more strongly correlated (Figure 6). This means that MSAs that had high medical care spending in one age group were not typically high spending for other age groups.

- Medical spending by adults and seniors was weakly correlated (0.06) across MSAs, as was medical spending by children and seniors (0.10).
- Prescription drug spending by children and adults was strongly correlated across MSAs (0.58), with more moderate correlations between adults and seniors (0.49) and children and seniors (0.29).

FIGURE 6. CORRELATION IN SPENDING BETWEEN AGE GROUPS, BY TYPE OF SERVICE



Source: *Thomson Reuters MarketScan Research Databases*, 2009

CONCLUSIONS

In this analysis using the *Thomson Reuters MarketScan Research Databases*, we found that significant variation in healthcare spending exists in the commercially insured population, but not in the same way for seniors in previously published research for Medicare Parts A and B. The reasons for these differences must be understood to generate effective policies that use resources efficiently without compromising healthcare quality.

Important differences exist in variation in spending for medical services compared to outpatient drug spending, which may be driven by practice patterns, pricing, and market structure. Future research should be conducted to determine whether the patterns we observed persist after adjustments for demographic characteristics and health status have been made. What is clear is that significant variation in healthcare spending across our country exists, regardless of whether you look at age bands, medical, or drug expenditures.

APPENDIX

Two *Thomson Reuters MarketScan Research Databases* were used in this study: the *Commercial Claims and Encounters (Commercial) Database* and the *Medicare Supplemental and Coordination of Benefits (COB) Database*.

The *Thomson Reuters MarketScan Commercial Database* is composed of data contributed by medium and large employers and health plans. It contains the longitudinal administrative claims experience for tens of millions of individuals with employer-sponsored insurance annually. The data include active employees, early retirees, COBRA continues, and their dependents, covered under a variety of fee-for-service and capitated health plans: exclusive provider organizations, preferred provider organizations (PPOs), point-of-service (POS) plans, and health maintenance organizations (HMOs). More than 2000 employer-health plan combinations are represented in these data annually. The commercial database captures enrollment, inpatient, outpatient, and outpatient pharmacy information starting in the early 1990s. The commercial database contains fully adjudicated claims and full payment information, including the plan/employer liability, patient out-of-pocket costs, and any coordination of benefits, or secondary payer/payment.

The *Thomson Reuters Medicare Supplemental Database* contains the healthcare experience of individuals with Medicare supplemental insurance paid for by employers. Because it covers an older population than the Commercial database, the Medicare database is a key data source. Both the Medicare-covered portion of payment (represented as COB) and the employer-paid portion are included in this database.

REFERENCES

1 Wennberg J, Gittelsohn A. Small area variations in healthcare delivery. *Science* December 14 1973; 182(117):1102-8. PMID 4750608.

2 Gold M. Geographic variation in Medicare per capita spending: Should policymakers be concerned? *Research Synthesis Report* No 6, July 2004. Robert Wood Johnson Foundation. Last accessed May 5, 2011 at policysynthesis.org.

3 Cutler DM, Sheiner L. The Geography of Medicare. *American Economic Review* 1999; 89(2):228-233.

4 Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 1: The content, quality, and accessibility of care. *Annals of Internal Medicine* 2003; 138(4):273-287.1.

5 Leape LL, Park RE, Soloman DH, Chassin MR, Kosecoff J, Brooke RH. Does inappropriate use explain small-area variations in the use of healthcare services? *Journal of the American Medical Association* 1990; 263(5):669-672.

6 Dartmouth's Center for the Evaluative Clinical Sciences, The Dartmouth Institute for Health Policy and Clinical Practice, *http://tdi.dartmouth.edu/*, last accessed May 6, 2011

7 Baicker K, Chandra A. Medicare spending, the physician workforce, and beneficiaries' quality of care. *Health Affairs* 2004;23(3):291-304.

8 Congressional Budget Office. Geographic variation in health care spending. Washington, DC: Congressional Budget Office; February 2008.

9 Chernew ME, Sabik LM, Chandra A, Gibson T, Newhouse JP. Geographic correlation between large-firm commercial spending and Medicare spending. *The American Journal of Managed Care* 2010; 16(2):131-138.

10 Government Accountability Office. *Federal Employees with Health Benefits Program: Competition and Other Factors Linked to Wide Variation in Health Care Prices*. GAO-05-856. Washington, DC: Government Accountability Office 2005. *http://www.gao.gov/new.items/d05856.pdf*, last accessed July 27, 2011.

11 Gawande, A. The cost conundrum. *The New Yorker*. June 2009.

12 Medicare Payment Advisory Commission (MedPac). *Report to the Congress: Variation in Medicare Service Use*. January 2011. Washington, DC.

13 Franzini L, Mikhail OI, Skinner JS. McAllen and El Paso Revisited: Medicare Variations Not Always Reflected In the Under-Sixty-Five Population. *Health Affairs* December 2010; 29(12): 2302-2308.

14 Zhang Y, Baicker K, Newhouse JP. Geographic variation in Medicare drug spending. *New England Journal of Medicine* July 29, 2010; 363(5):405-409

ABOUT THOMSON REUTERS

Thomson Reuters is the world's leading source of intelligent information for businesses and professionals. We combine industry expertise with innovative technology to deliver critical information to leading decision makers in the financial, legal, tax and accounting, healthcare and science and media markets, powered by the world's most trusted news organization. With headquarters in New York and major operations in London and Eagan, Minnesota, Thomson Reuters employs 55,000 people and operates in over 100 countries.

Thomson Reuters
777 E. Eisenhower Parkway
Ann Arbor, MI 48108 USA

thomsonreuters.com

H PRO MDS 1106 9938 HFMA MC

THOMSON REUTERS™