RESEARCH BRIEF

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Impacts of the Affordable Care Act on Workers Compensation

OVERVIEW

The Patient Protection and Affordable Care Act (ACA) has dramatically changed the healthcare landscape in the United States. The ACA's individual health insurance mandate, together with the state option for Medicaid expansion, have increased the number of medically insured in America by roughly 20 million people as of early 2016, with the greatest impact occurring at the time both provisions first went into effect in 2014.[1] Another objective of the ACA is to promote population wellness, for which one point of focus is obesity reduction.

Our research addresses two questions concerning the ACA's impacts on workers compensation:

- **Access to Primary Care**—Has the increase in demand for primary care services by newly insured people under the ACA crowded out access to the same services by workers compensation claimants?
- **Obesity Reduction**—If the ACA is successful in reducing population obesity in the United States, what are the potential medical cost savings to workers compensation?

KEY FINDINGS

- The ACA has had no discernible impact on crowding out workers compensation claimants from access to primary care services through 2014, the first full year of expanded medical insurance coverage under the ACA
- 68% of primary care services provided during the first 90 days of a workers compensation claim occur during the claim's first 10 days
- A reduction in the US obesity rate from 35% to 25%, in accordance with the goals of the ACA's wellness initiative, might reduce workers compensation medical costs by 3% to 4%

INTRODUCTION

The ACA has produced fundamental changes in the provision of medical insurance for millions of Americans since its enactment in 2010. Major provisions of the ACA include its mandate for many individuals not already covered by employer-sponsored insurance programs to buy health insurance offered by private insurers through state marketplaces, and support for the voluntary expansion of Medicaid eligibility at the state level.[2]

[1] "20 Million People Have Gained Health Insurance Coverage Because of the Affordable Care Act, New Estimates Show," US Department of Health and Human Services, March 3, 2016, www.hhs.gov.

[2] In states that elect to expand Medicaid, the ACA extends Medicaid eligibility to nearly all adults with incomes at or below 138% of the federal poverty level. Expanded Medicaid coverage receives 100% federal funding for three years, gradually reducing to 90% thereafter.

The individual health insurance mandate and the state option for Medicaid expansion have increased the number of newly medically insured people in America, with the greatest impact occurring at the time both provisions first went into effect in 2014.

While the ACA does not directly address workers compensation insurance, its larger effects on healthcare delivery in the United States may nonetheless be expected to impact workers compensation as well. The ACA has increased medical insurance coverage, both via the individual mandate and Medicaid expansion. But has the resulting increase in demand for primary care services crowded out access to the same services for workers compensation claimants? To answer this question, we use medical data from workers compensation claims to compare primary care utilization per claim during different time windows from the accident date for Accident Years 2012 through 2014, which includes the first year of expanded medical insurance under the ACA.

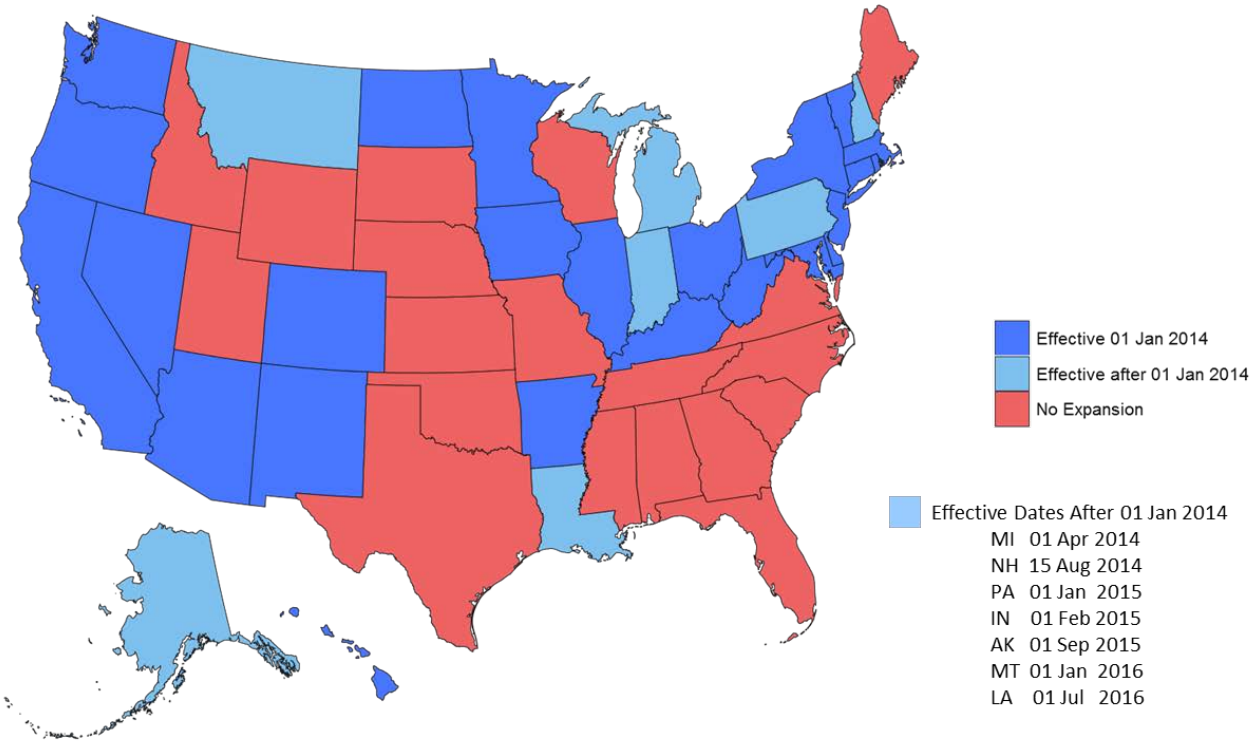
Another goal of the ACA, in addition to expanding medical insurance coverage, is to promote population wellness. The goal of wellness pertains particularly to chronic conditions such as obesity, hypertension, diabetes, and substance abuse. While these conditions by themselves do not typically form the basis of a workers compensation claim, their presence may increase injury severity by complicating recovery and return to work, and may also increase injury frequency. Of the various wellness conditions that are relevant to workers compensation, most of the quantitative research to date has focused on obesity. The second part of this research uses recent published studies on the medical costs associated with obesity to estimate the potential savings to workers compensation from obesity reduction in the general population.

THE ACA AND EXPANSION OF HEALTH INSURANCE COVERAGE

The ACA increased the medically insured population in the United States through the individual health insurance mandate, which applies to certain individuals in all states, and through the expansion of Medicaid eligibility in states that elect this option. As originally enacted, the ACA included a provision that any state opting out of Medicaid expansion could lose its preexisting federal Medicaid funding. In 2012, the US Supreme Court found this provision to be unconstitutionally coercive and severed it from the ACA, effectively giving each state the option to expand Medicaid or not without penalty.[3] Both the individual health insurance mandate and optional state expansion of Medicaid eligibility went into effect on January 1, 2014.

[3] *National Federation of Independent Business v. Sebelius* 567 U.S. ___ (2012).

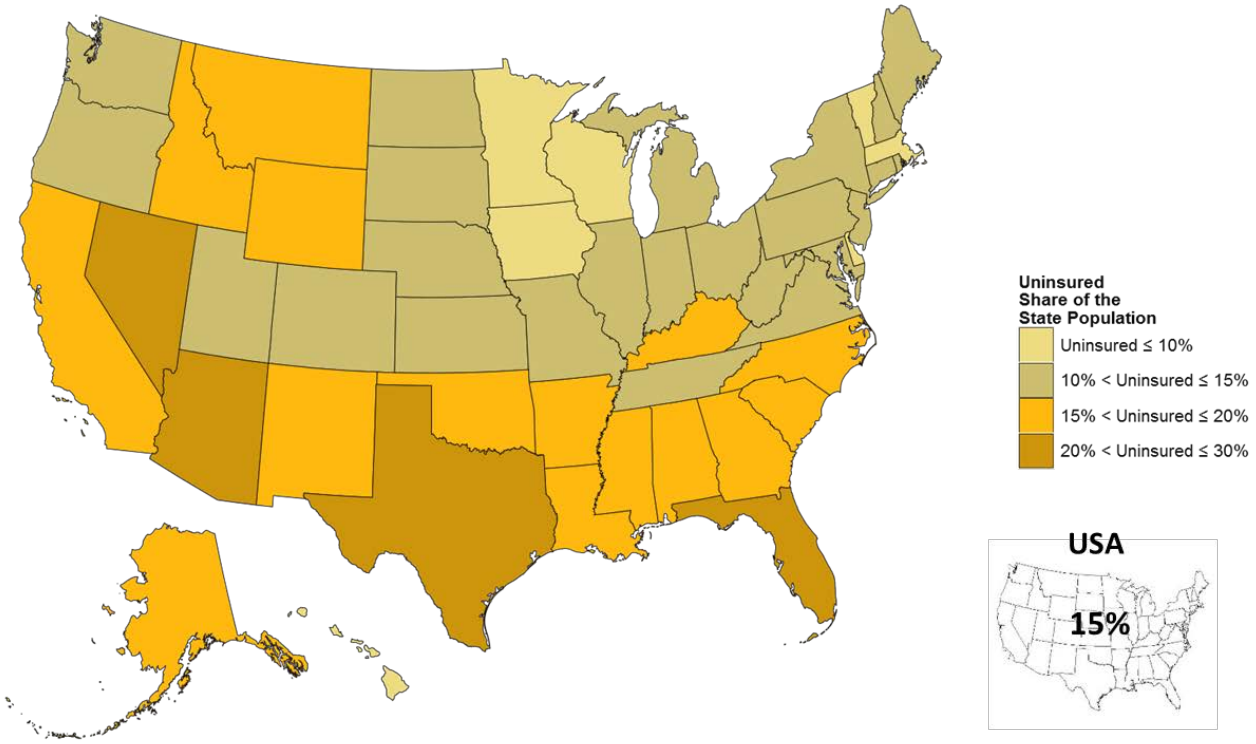
Figure 1. State Medicaid Expansion Status



Source: Status of State Action on the Medicaid Expansion Decision. The Henry J. Kaiser Family Foundation, March 14, 2016

Medicaid expansion status for all states as of March 2015 is shown in Figure 1. In 25 states (including the District of Columbia) Medicaid expansion took effect on January 1, 2014, the earliest possible date under the ACA. Seven other states have expanded Medicaid since then, with effective dates as indicated in Figure 1. No state has reversed its decision to expand Medicaid. To date, 19 states have declined to expand Medicaid.

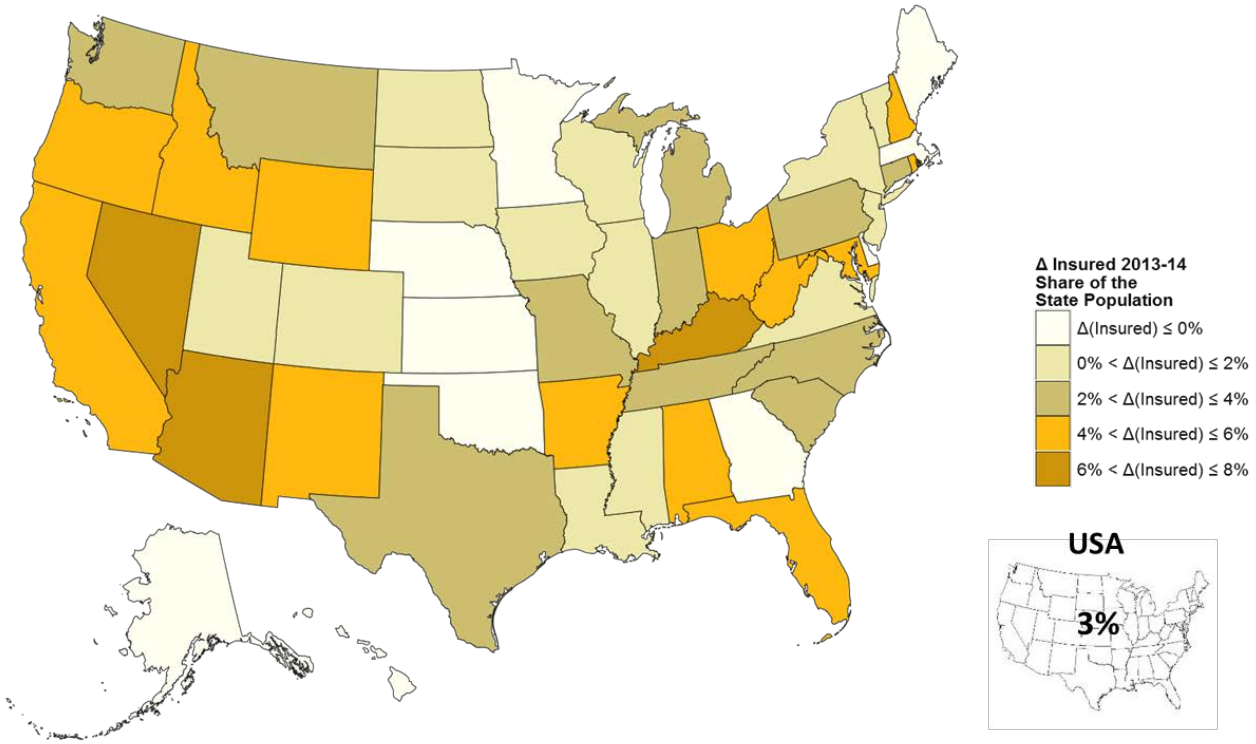
Figure 2. Medically Uninsured Nonelderly in 2013



Source: The Henry J. Kaiser Family Foundation's State Health Facts, based on data from the US Census Bureau, Current Population Survey (CPS: Annual Social and Economic Supplements), March 2014

Figure 2 shows the percentage of nonelderly persons without health insurance in 2013, the year immediately before the ACA's individual mandate and optional Medicaid expansion became effective. A nonelderly person is anyone younger than age 65. Since Medicare provides medical insurance for nearly all elderly persons 65 years of age and older, they are excluded from the calculation. Countrywide, the medically uninsured rate among the nonelderly population was 15% during 2013. In that year, the highest proportions of medically uninsured nonelderly populations, with percentages exceeding 15%, were concentrated in a band of states running across the southern tier of the country, from North Carolina to California.

Figure 3. Increase in Medically Insured Nonelderly From 2013 to 2014



Source: The Henry J. Kaiser Family Foundation's State Health Facts. Data from the US Census Bureau, Current Population Survey (CPS: Annual Social and Economic Supplements), March 2014 and March 2015

Figure 3 shows the increase in the medically insured nonelderly as a percentage of the nonelderly population[4] from 2013 to 2014, the first year of state insurance marketplaces and optional Medicaid expansion under the ACA. At the national level, the increase in the medically insured nonelderly population was 3% between these years. At the state level, several observations are pertinent:

- States with large percentage increases in their medically insured populations in 2014 (post-ACA) are not always those with the largest medically uninsured populations in 2013 (pre-ACA)
- States with large percentage increases in their medically insured populations in 2014 are those where a large percentage of the population was eligible for subsidized medical insurance through the state marketplaces, and also Medicaid expanders[5]
- None of southern tier states with medically uninsured rates above 15%—from Texas to North Carolina, with the exception of Arkansas—expanded Medicaid in 2014

[4] Equivalently, the decrease in medically uninsured nonelderly as a percentage of the state nonelderly population.
[5] The impacts of state marketplaces and Medicaid expansion in increasing health insurance coverage for low-income workers are discussed in "ACA Coverage Expansions and Low-Income Workers" by Alanna Williamson *et al.*, The Kaiser Family Foundation, June 10, 2016, www.kff.org.

THE ACA AND WORKERS COMPENSATION ACCESS TO PRIMARY CARE: DATA AND METHODOLOGY

Our study of the ACA's impact on workers compensation's access to primary care makes use of NCCI's Medical Data Call (MDC). The MDC contains transaction-level data for medical services billed as part of workers compensation claims arising under the jurisdiction of 36 states where NCCI provides ratemaking services, hereafter referred to as the NCCI states,[6] as well as several other states. Data in the MDC begins with transactions processed during the second half of 2010. This study includes transactions reported to insurers through March 2015.

Our analysis separates states into two groups. *2014 Medicaid expanders* are states that expanded Medicaid effective January 1, 2014 and *2014 Medicaid nonexpanders* are states that did not expand Medicaid at any time during 2014. For the purposes of this study, the five states—AK, IN, LA, MT, and PA—that expanded Medicaid in 2015 or later are 2014 Medicaid nonexpanders. The two states—MI and NH—that expanded Medicaid during 2014 but after January 1 are not counted in either group.

This research is limited to 35 NCCI states,[7] which we categorize as follows:

16 NCCI States—2014 Medicaid Expanders	19 NCCI states—2014 Medicaid Nonexpanders
AR, AZ, CO, CT, DC, HI, IA, IL, KY, MD, NM, NV, OR, RI, VT, WV	AK, AL, FL, GA, ID, KS, LA, ME, MO, MS, MT, NE, OK, SC, SD, TN, TX, UT, VA

In our analysis, every medical service transaction or hospital inpatient episode is assigned a relative value, or price, based on the 2013 Medicare fee schedule, but without adjustment for payment locality. For example, an MRI has a higher relative value than an X-ray, but the relative values of both services do not vary across states or from year to year. Our intent is to measure medical service utilization using a yardstick that assigns representative relative values to different types of medical services but is constant across different states and over time.

We define medical service *utilization* per claim to be the sum of medical services, at Medicare relative values, that are delivered within a certain time window following the claim's accident date. In this research, we consider time windows of 10, 30, 60, and 90 days from the accident date of a claim. The concept of medical service utilization can be refined to focus on certain categories of medical services, such as primary care services, physical therapy, surgery, and drugs. This study will focus on primary care services, as discussed below. Medical *intensity* per claim refers to the average medical service utilization per claim within the indicated time window over all relevant claims—for example, over all claims in a given state for a given accident year.

It should be noted that our measure of medical intensity is not readily interpretable *in absolute terms*—say, as a dollar amount—because it stops short of incorporating Medicare factors for geographic price differentials. However, medical service intensities are comparable across different states *in relative terms*. For example, medical service intensities of 2.5 in state X and 2.0 in state Y imply that state X provides 25% more value-weighted medical services per claim than state Y.

For this research, an accident year begins on October 3 of the preceding calendar year and ends on October 2 of the corresponding calendar year. Thus, for example, Accident Year 2014 consists of claims whose accident date fell between October 3, 2013 and October 2, 2014, inclusive. We adopt this dating convention to minimize the risk of data truncation for claims originating in Accident Year 2014, taking into account that MDC data used in this study was last updated during March 2015. As an example, a claim originating on October 2, 2014, the last day of our 2014 Accident Year, would have its 90-day window running through December 31, 2014, after which the last MDC update occurs three months later.

Because this study is concerned with the ACA's potential effect of crowding out workers compensation's access to primary care services, it is necessary to define what services are counted as primary care. In this study, we define *Primary Care*[8] services to include all medical services whose procedure codes[9] are associated with office visits, emergency room visits,

[6] The 36 NCCI states are AK, AL, AR, AZ, CO, CT, DC, FL, GA, HI, IA, ID, IL, KY, KS, LA, MD, ME, MO, MS, MT, NE, NH, NM, NV, OK, OR, RI, SC, SD, TN, TX, UT, VA, VT, WV.
[7] New Hampshire is the only NCCI state that is excluded from our analysis because it expanded Medicaid during 2014, but after January 1.
[8] When capitalized, Primary Care refers to the collection of CPT codes classified as primary care in this study.
[9] We rely primarily, though not exclusively, on CPT codes. CPT stands for Current Procedural Terminology, a comprehensive set of medical treatment codes maintained by the American Medical Association.

diagnostic imaging (such as X-rays and MRIs), and diagnostic testing. Primary Care services do not include medical services whose procedure codes indicate surgery, physical medicine, drugs, and supplies.

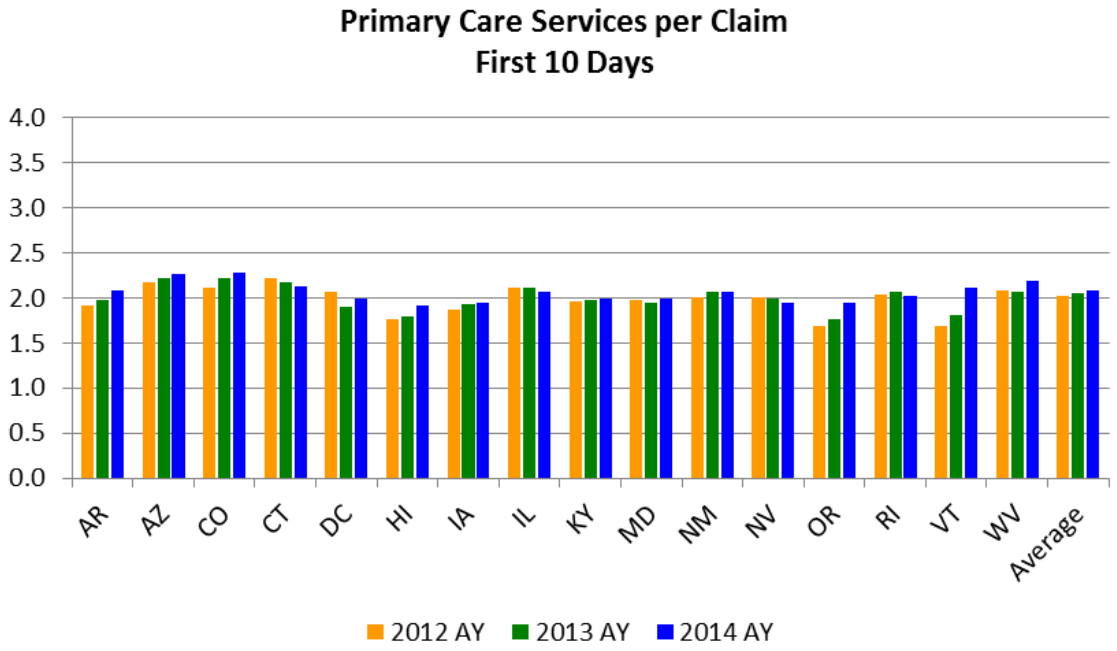
As a straightforward extension of the terminology introduced earlier, Primary Care *intensity* per claim means average Primary Care service utilization per claim within the relevant time window over all relevant claims.

As a caveat, we note that Primary Care intensity may vary in any state from year to year for a variety of reasons, including the adoption of new treatment protocols or fee schedules, different degrees of health provider network penetration, and changes in the injury mix. We are not attempting a comprehensive analysis of the various causal factors that affect interstate variations in Primary Care intensity. Rather, our maintained assumption in this analysis is that none of these factors vary systematically across the two groups of states, 2014 Medicaid expanders and 2014 Medicaid nonexpanders, in such a way as to affect the comparison between the groups.[10]

THE ACA AND WORKERS COMPENSATION PRIMARY CARE: RESULTS

Figure 4 shows Primary Care intensity during the first 10 days of a claim in Accident Years 2012, 2013, and 2014 for the 16 NCCI states that expanded Medicaid as of January 1, 2014. Within the group of 2014 Medicaid expanders, different states exhibit varying levels of Primary Care intensity. Also, Primary Care intensity decreased in some 2014 Medicaid expander states from 2012 to 2014, while increasing in other states. However, when we consider the 2014 Medicaid expanders as a group, average Primary Care intensity was identical at 2.1 (0.1)[11] in Accident Years 2013 and 2014, and statistically indistinguishable from average Primary Care intensity of 2.0 (0.2) in Accident Year 2012. At the mean/variance level, Primary Care intensity for the 2014 Medicaid expander states did not change at all over the Accident Years 2012, 2013, and 2014.

Figure 4. 10-Day Primary Care Intensity: NCCI 2014 Medicaid Expander States



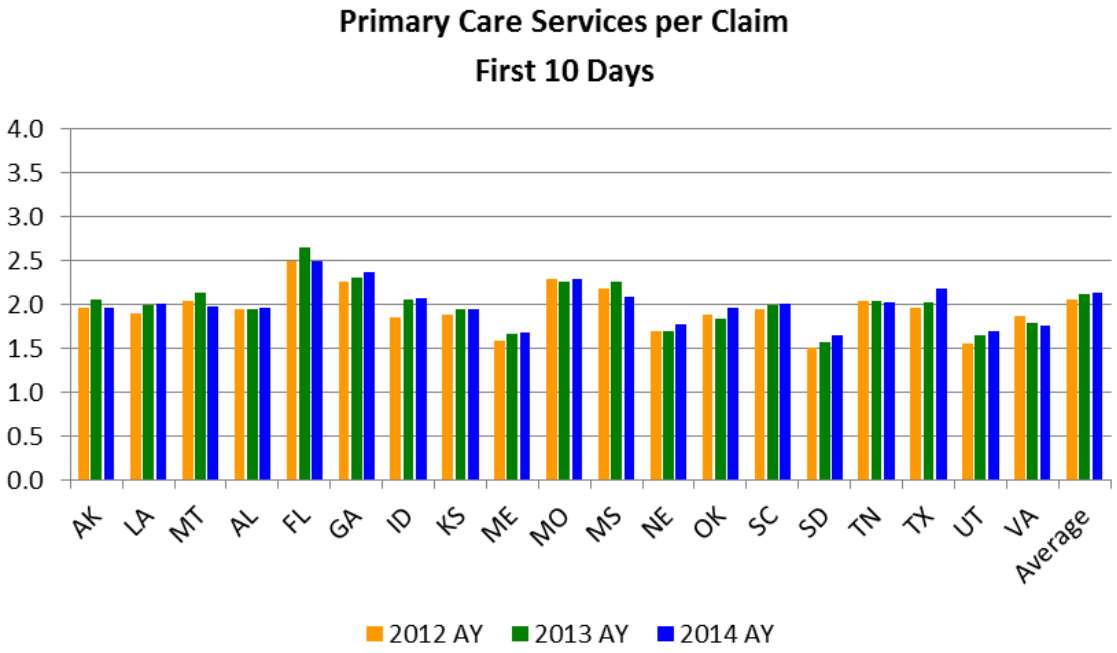
Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.

[10] In statistical terms, we are assuming that all other factors influencing Primary Care intensity are conditionally independent of a state's status as a 2014 Medicaid expander or nonexpander.

[11] Standard deviations appear in parentheses following the average Primary Care intensity for each group. Group averages for Primary Care intensity and standard deviation are obtained by clustering claims over states in the group. Average Primary Care intensity (average Primary Care service utilization per claim) obtained in this way is the same as the claim-weighted average of Primary Care intensity over all states in the group.

Figure 5 shows similar results for Primary Care intensity during the first 10 days of a claim in Accident Years 2012, 2013, and 2014 for the 19 NCCI states that did not expand Medicaid during 2014. Again, the level of Primary Care intensity varies across states, and increases or decreases over time for different states in this group. Overall for 2014 Medicaid nonexpanders, average Primary Care intensity and its standard deviation were unchanged at 2.1 (0.3) in each of the three Accident Years. As with the 2014 Medicaid expanders, Primary Care intensity for the 2014 Medicaid nonexpander states were indistinguishable at the mean/variance level over Accident Years 2012, 2013, and 2014.

Figure 5. 10-Day Primary Care Intensity: NCCI 2014 Medicaid Nonexpander States



Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.

Table 1 aggregates Primary Care intensity measures during the first 10, 30, 60, and 90 days of a claim for NCCI states in the two groups that form the focus of this study: 2014 Medicaid expanders and 2014 Medicaid nonexpanders. The Appendix provides data on Primary Care intensity for the states in each of these groups.

Table 1. Primary Care Intensity for 2014 Medicaid Expander and Nonexpander States

State Group	AY 2012		AY 2013		AY 2014	
	Within 10 Days of Accident Date					
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
NCCI 2014 Medicaid Expander States	2.0	0.2	2.1	0.1	2.1	0.1
NCCI 2014 Medicaid Nonexpander States	2.1	0.3	2.1	0.3	2.1	0.3
	Within 30 Days of Accident Date					
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
NCCI 2014 Medicaid Expander States	2.5	0.2	2.5	0.2	2.5	0.2
NCCI 2014 Medicaid Nonexpander States	2.5	0.3	2.5	0.3	2.5	0.3
	Within 60 Days of Accident Date					
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
NCCI 2014 Medicaid Expander States	2.9	0.2	2.9	0.2	2.9	0.2
NCCI 2014 Medicaid Nonexpander States	2.9	0.4	2.9	0.4	2.9	0.4
	Within 90 Days of Accident Date					
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
NCCI 2014 Medicaid Expander States	3.1	0.3	3.1	0.3	3.1	0.3
NCCI 2014 Medicaid Nonexpander States	3.1	0.4	3.1	0.4	3.1	0.4

Source: NCCI Medical Data Call. Accident years begin October 3 of the preceding year and end October 2 of the indicated year.

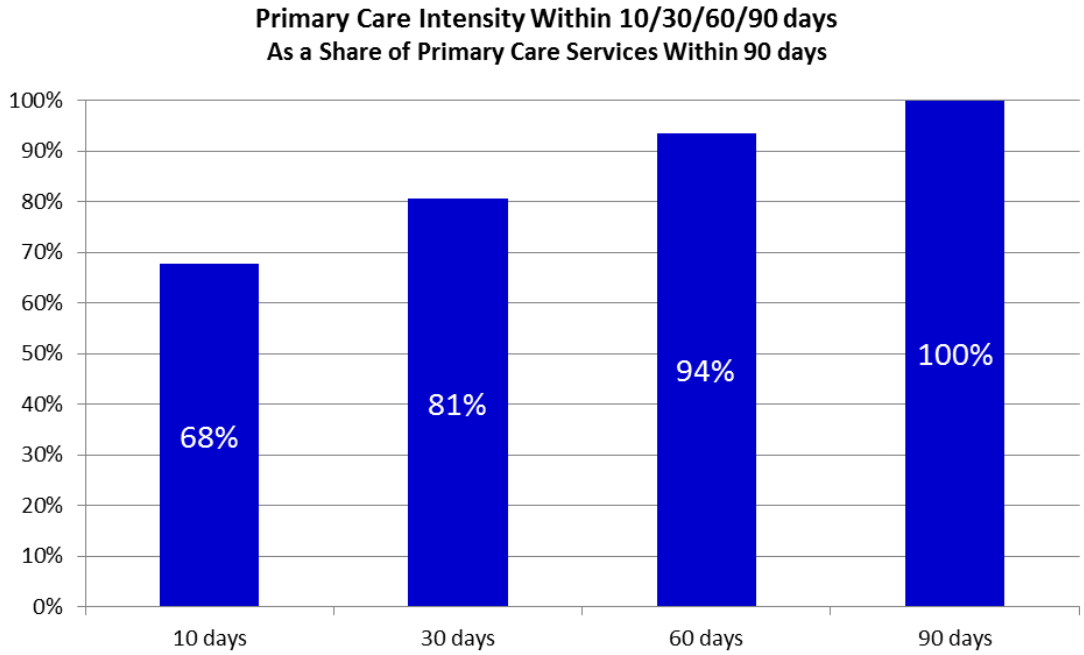
Comparing 2014 Medicaid expander states and 2014 Medicaid nonexpander states in Table 1, the observations below hold for each time window we consider in this study: 10, 30, 60, and 90 days from the accident date of a claim.

- For 2014 Medicaid expanders and 2014 Medicaid nonexpanders, Primary Care intensity was unchanged in each of the Accident Years 2012, 2013, and 2014
- Both 2014 Medicaid expanders and 2014 Medicaid nonexpanders had the same level of Primary Care intensity in every Accident Year
- 2014 Medicaid nonexpander states exhibit more within-group variation in Primary Care intensity than 2014 Medicaid expander states

From these findings, we conclude that the ACA has had no discernible impact in crowding out workers compensation claimants from access to primary care services through 2014, the first full year of expanded medical insurance coverage under the ACA.

Because Primary Care intensity is relatively invariant across both groups of states and over all Accident Years through 2014, a single value for Primary Care intensity fully characterizes each time window from the accident date of a claim. Using the 90-day window as a benchmark, Figure 6 shows the progression of Primary Care service utilization over the early life of a workers compensation claim. Not surprisingly, Primary Care services are most concentrated during the early days of a claim. Of total Primary Care services provided during the first 90 days of a workers compensation claim, fully 68% occur during the claim's first 10 days.

Figure 6. Primary Care Intensity Within 10, 30, 60, and 90 Days



Source: NCCI Medical Data Call.

Our analysis so far indicates that the ACA has had no discernible state-level impact on Primary Care intensity for workers compensation claims through Accident Year 2014. But does our state-level analysis mask regional impacts? For example, if rural regions have lower availability of medical resources per capita than urban regions, then regional crowding out may manifest itself particularly by a reduction in Primary Care intensity for workers compensation claims in rural areas, possibly offset with an increase in Primary Care intensity in urban areas. To test this hypothesis via a case study, we compare Primary Care intensity at a regional level in Kentucky and Florida. While these states are similar in several material respects, they differ in that Kentucky was a 2014 Medicaid expander, whereas Florida has not expanded Medicaid to date. Relevant points of comparison between Kentucky and Florida are summarized below.

Kentucky

- Evaluation and Management fee schedules in workers compensation are low relative to Medicare
- High proportion of medically uninsured nonelderly in 2013
- Medicaid expansion effective January 1, 2014, with state-run insurance marketplace
- Primary Care service intensity is essentially unchanged in all accident years:

  2012: 2.8 2013: 2.9 2014: 2.8

Florida

- Evaluation and Management fee schedules in workers compensation are low relative to Medicare
- High proportion of medically uninsured nonelderly in 2013
- No Medicaid expansion during 2014, with federally mediated insurance marketplace
- Primary Care service intensity is essentially unchanged in all accident years:

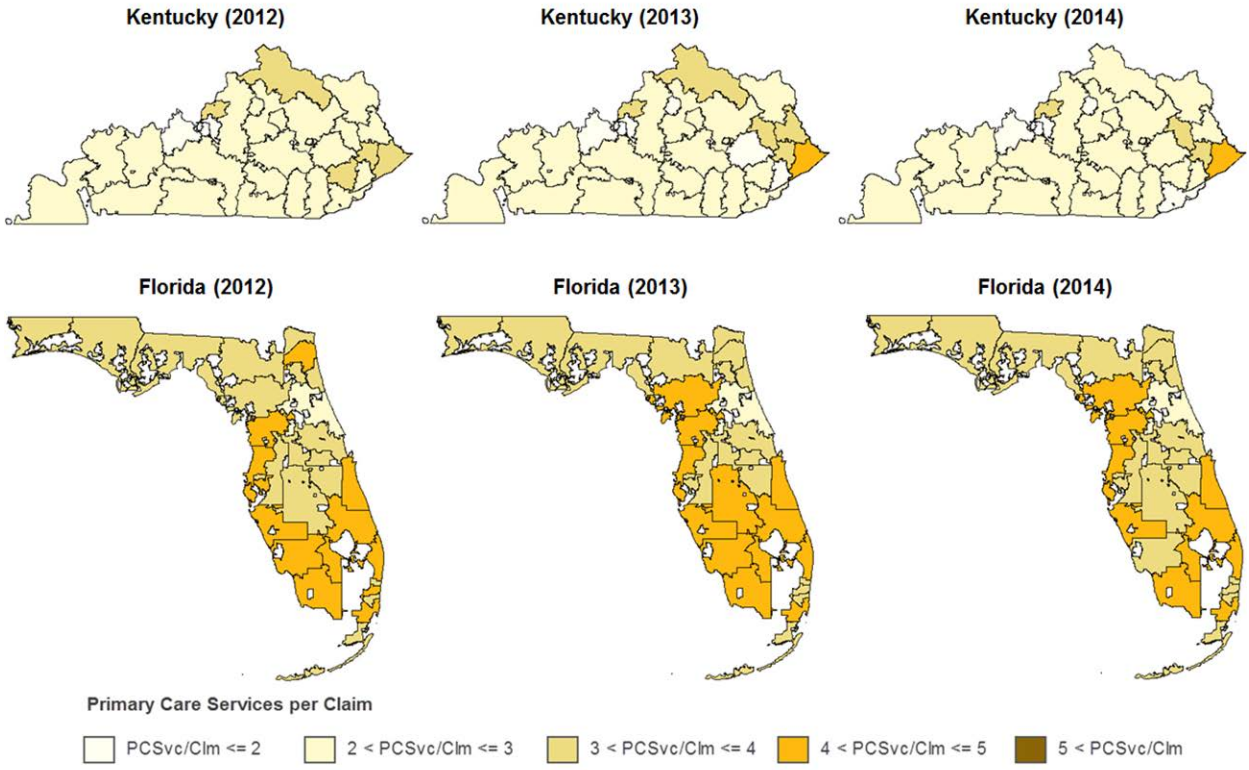
  2012: 3.9 2013: 3.9 2014: 3.8

Notes:

- Accident years begin October 3 of the preceding year and end October 2 of the indicated year.
- Data on Evaluation and Management fees in workers compensation relative to Medicare as of July 2011 are from Table 3 in Fomenko and Liu, *Designing Workers' Compensation Fee Schedules*. WCRI (June 2012).

In each of the three Accident Years in our study, Florida has higher Primary Care intensity at the state level than Kentucky.[12] However, as illustrated in Figure 7, in neither Florida nor Kentucky is there any evident pattern of intrastate shifting in Primary Care intensity during the first 90 days of a claim over Accident Years 2012 through 2014.[13] Rather, regional variations in Primary Care intensity from one Accident Year to the next are minor in both states and do not display any obvious pattern. We observed a similar lack of intrastate effects in all of the other states in this study, although these results are not presented here.

Figure 7. Regional Primary Care Intensity, AY 2012–2014: Kentucky and Florida



Source: NCCI Medical Data Call.

[12] Primary Care intensity varies across states, as may be seen from the data in the Appendix.

[13] Intrastate regions in Figure 7 are determined from the first three digits of their ZIP postal codes. The MDC includes three-digit ZIP information for the service provider identified for each transaction in the data set. To calculate Primary Care intensity at the regional level, we aggregate all Primary Care transactions for that region and divide by the total number of unique claims associated with those transactions.

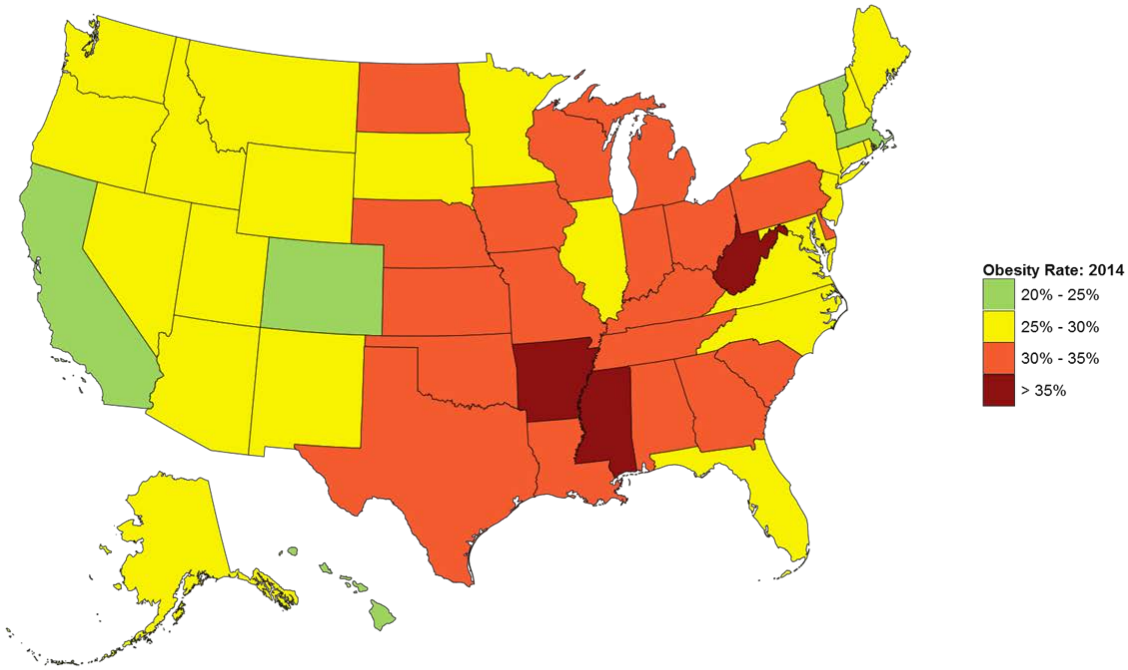
THE ACA AND OBESITY

In addition to expanding healthcare coverage, another goal of the ACA is to promote wellness in the general population. Qualifying health insurance plans under the ACA must offer a variety of preventive healthcare services without copayments or deductibles, including periodic screenings, check-ups, and counseling to prevent illness and other health problems.[14] In addition, the ACA encourages workplace wellness programs that allow employers to offer incentives to employees who complete a personal health risk assessment, biometric screening, or participate in programs aimed at reducing tobacco use or losing weight, for example.[15]

It is generally accepted that a healthier workforce is likely to have lower frequency and severity of injuries, as well as a faster return to work, thus reducing the cost of workers compensation insurance. Population wellness may be associated with certain comorbidities that are relevant to workers compensation claims. These include obesity, hypertension, diabetes, pulmonary conditions, and drug abuse.[16] Of these, obesity is by far the most studied to date in terms of quantifying its impact on medical costs.

Obesity is widespread in the United States.[17] The US adult obesity rate as estimated from clinical data was 35% in 2012.[18] Self-reported obesity rates vary substantially across states, as shown in Figure 8, but only a few states have self-reported obesity rates less than 25%.[19]

Figure 8. Obesity in the United States



Source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention.

[14] Preventive care benefits for men, women, and children are described at HealthCare.gov.
[15] See "Workplace Wellness Programs and Requirements" by Karen Pollitz and Matthew Rae, The Kaiser Family Foundation , May 19, 2016, www.kff.org.
[16] "Comorbidities in Workers Compensation" by Christopher Laws and David Colón, NCCI Research Brief, October 2012.
[17] We adopt the standard definition of obesity as a body mass index (BMI) greater than or equal to 30.
[18] "Prevalence of Childhood and Adult Obesity in the United States: 2011–2012" by Cynthia Ogden *et al*, *Journal of the American Medical Association*, 311:8 pp. 806–814, 2014.
[19] Self-reporting of medical conditions such as obesity may understate the same conditions as measured clinically. This may explain why Figure 7 indicates a national average obesity rate that is evidently less than the 35% rate in Ogden *et al* (2014).

We begin by deriving estimates of medical cost relativity for obese (BMI ≥ 30) versus non-obese populations (BMI < 30) from recent published research. Medical cost relativity is defined to be

$$\frac{\text{Average Medical Cost per Obese Person}}{\text{Average Medical Cost per Non-Obese Person}}$$

Average medical costs pertain to the obese and non-obese segments of the population under study. Medical cost relativity measures the per capita proportional increase in medical cost for the obese population relative to the non-obese population. From two recent studies of obesity with representative population samples, we derive estimates of the medical cost relativity for obesity versus non-obesity at 1.31[20] and 1.42[21], respectively. Both studies rely on medical expenditure data that is representative of the overall US population, not on data from workers compensation claims.[22] As such, the population demographics in both studies do not closely match the demographic profile of workers compensation claimants. Also, when comparing total medical expenditure for obese and non-obese persons over a given time period, cost relativity estimates derived from these studies do not distinguish frequency of medical treatment episodes from their severity. Finally, medical episodes in the data used in these studies are not limited to injuries, but also include—for example—heart disease, cancer, and other conditions not usually treated under workers compensation. Nonetheless, these studies are among the only large-sample quantitative analyses of obesity existing to date. Subject to the caveats noted here, if we assume that medical cost relativities derived from them are similar to medical cost relativities for workplace injuries, then they can provide a useful indication of potential savings in workers compensation medical costs from obesity reduction.

Given our estimated medical cost relativities and based on a 35% obesity rate in the national population, it is straightforward to estimate the overall medical cost increase associated with obesity (relative to non-obesity) as between 11% and 15%. This is the estimated percentage by which medical costs in a population with a 35% obesity rate would exceed medical costs in a population with a 0% obesity rate. However, it is implausible to suppose that the ACA's wellness initiatives will eliminate obesity entirely. As a more realistic (although still optimistic) scenario, a 10% reduction in population obesity—from 35% to 25%—would imply a 3%–4% reduction in overall medical costs in the national population. Subject to the considerations noted in the previous paragraph, we assume that a 10% obesity reduction could have a similar impact on medical costs in workers compensation as more generally at the national level. Our estimates for the impact of obesity reduction on medical costs are summarized in Table 2.

Table 2. Estimates of the Medical Cost Impact of Obesity

Source	Medical Cost Relativity Obesity vs. Non-Obesity	Medical Cost Reduction for Change in Obesity Rate	
		35% to 0%	35% to 25%
Finkelstein et al (2009)	1.42	15%	4%
Cawley and Meyerhoefer (2012)	1.31	11%	3%

In some workers compensation claims, obesity rises to the level of a *coded* comorbidity. Obesity as a coded comorbidity is very rare, but may happen, for example when surgery is indicated but entails complications relating to obesity. Most often, obesity does not rise to the level of a coded comorbidity in a workers compensation claim, even if the claimant is obese insofar as having a BMI ≥ 30.

[20] "The Medical Care Costs of Obesity: An Instrumental Variables Approach," by John Cawley and Chad Meyerhoefer, *Journal of Health Economics*, 31 pp. 219–230, 2012.

[21] "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates" by Finkelstein *et al*, *Health Affairs*, 28:5 pp. 822–831, 2009.

[22] Both Finkelstein *et al* (2009) and Cawley and Meyerhoefer (2012) rely on data from the Medical Expenditure Panel Surveys (MEPS). Finkelstein *et al* use MEPS data from 1998 and 2006 for adults excluding pregnant women. Cawley and Meyerhoefer use MEPS data from 2000 –2005 for adults with biological children, excluding pregnant women.

Using workers compensation claims data for Accident Year 2009, Laws and Colón (2012) find that obesity is a coded morbidity in only 0.3% of claims, but that medical cost relativity of coded obesity claims versus all other claims is extremely high at 9.9.[23] The very low frequency offsets the very high cost relativity, so that the overall cost impact of obesity as a coded comorbidity is 3%, far less than our 11%–15% estimate of the cost impact for general obesity (BMI ≥ 30). The important distinction between the two concepts is that general obesity (BMI ≥ 30) is rarely coded,[24] although it is still present among many claimants and likely to contribute to higher medical costs.

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[23] Laws and Colón (2012) *ibid*. Accident years align with calendar years in their research.
[24] Compare the estimated 35% US obesity rate with the 0.3% coded obesity rate in workers compensation claims.

APPENDIX

Table A1. Primary Care Intensity by State Within 10 Days of Accident Date

	AY 2012		AY 2013		AY 2014	
	Mean	Claim %	Mean	Claim %	Mean	Claim %
NCCI 2014 Medicaid Expanders						
AR	1.9	2.8%	2.0	2.6%	2.1	2.5%
AZ	2.2	9.9%	2.2	9.6%	2.3	9.1%
CO	2.1	14.7%	2.2	15.2%	2.3	15.9%
CT	2.2	4.8%	2.2	4.4%	2.1	4.1%
DC	2.1	0.3%	1.9	0.3%	2.0	0.2%
HI	1.8	2.1%	1.8	2.1%	1.9	1.9%
IA	1.9	6.9%	1.9	6.9%	1.9	7.1%
IL	2.1	19.9%	2.1	20.4%	2.1	21.3%
KY	2.0	6.8%	2.0	6.3%	2.0	6.3%
MD	2.0	8.4%	1.9	9.0%	2.0	9.2%
NM	2.0	2.3%	2.1	2.0%	2.1	1.8%
NV	2.0	3.7%	2.0	3.6%	2.0	3.4%
OR	1.7	8.7%	1.8	8.7%	1.9	8.8%
RI	2.0	3.5%	2.1	3.6%	2.0	3.4%
VT	1.7	1.3%	1.8	1.3%	2.1	1.5%
WV	2.1	4.0%	2.1	3.9%	2.2	3.6%
All 2014 Medicaid Expanders	**2.0**	100.0%	**2.1**	100.0%	**2.1**	100.0%
NCCI 2014 Medicaid Nonexpanders						
AK	2.0	1.2%	2.1	1.1%	2.0	1.0%
AL	1.9	2.8%	1.9	2.6%	2.0	2.5%
FL	2.5	17.1%	2.6	16.5%	2.5	16.4%
GA	2.3	13.1%	2.3	14.4%	2.4	16.2%
ID	1.8	3.4%	2.0	3.7%	2.1	3.3%
KS	1.9	3.3%	1.9	3.2%	1.9	3.0%
LA	1.9	2.8%	2.0	2.8%	2.0	2.6%
ME	1.6	3.2%	1.7	3.9%	1.7	4.7%
MO	2.3	5.7%	2.3	5.7%	2.3	5.5%
MS	2.2	2.2%	2.2	2.1%	2.1	1.9%
MT	2.0	1.8%	2.1	1.7%	2.0	1.7%
NE	1.7	2.7%	1.7	2.6%	1.8	2.6%
OK	1.9	5.2%	1.8	4.8%	2.0	4.5%
SC	1.9	3.2%	2.0	3.2%	2.0	3.0%
SD	1.5	1.4%	1.6	1.5%	1.6	1.6%
TN	2.0	7.1%	2.0	7.0%	2.0	6.9%
TX	2.0	13.8%	2.0	13.3%	2.2	13.0%
UT	1.6	4.5%	1.6	4.7%	1.7	4.6%
VA	1.9	5.6%	1.8	5.3%	1.8	5.0%
All 2014 Medicaid Nonexpanders	**2.1**	100.0%	**2.1**	100.0%	**2.1**	100.0%

Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.

Table A2. Primary Care Intensity by State Within 30 Days of Accident Date

	AY 2012		AY 2013		AY 2014	
	Mean	Claim %	Mean	Claim %	Mean	Claim %
NCCI 2014 Medicaid Expanders						
AR	2.3	2.8%	2.4	2.6%	2.4	2.5%
AZ	2.7	9.7%	2.7	9.5%	2.8	8.9%
CO	2.8	14.7%	2.8	15.2%	2.9	15.9%
CT	2.7	4.9%	2.6	4.6%	2.6	4.2%
DC	2.3	0.3%	2.1	0.3%	2.2	0.2%
HI	2.2	2.1%	2.3	2.1%	2.4	1.9%
IA	2.3	6.9%	2.4	6.9%	2.3	7.0%
IL	2.6	20.1%	2.5	20.5%	2.5	21.5%
KY	2.4	6.6%	2.4	6.2%	2.4	6.3%
MD	2.4	8.4%	2.4	9.0%	2.4	9.1%
NM	2.6	2.3%	2.6	2.0%	2.6	1.8%
NV	2.4	3.8%	2.4	3.8%	2.3	3.6%
OR	2.2	8.8%	2.3	8.8%	2.4	8.9%
RI	2.7	3.5%	2.7	3.5%	2.6	3.3%
VT	2.1	1.3%	2.2	1.3%	2.4	1.4%
WV	2.4	3.9%	2.4	3.9%	2.4	3.5%
All 2014 Medicaid Expanders	**2.5**	100.0%	**2.5**	100.0%	**2.5**	100.0%
NCCI 2014 Medicaid Nonexpanders						
AK	2.4	0.9%	2.5	0.9%	2.4	0.8%
AL	2.4	2.2%	2.4	2.1%	2.3	2.1%
FL	3.2	13.8%	3.2	13.3%	3.1	13.3%
GA	2.7	11.3%	2.7	12.5%	2.8	14.0%
ID	2.3	2.7%	2.6	3.0%	2.6	2.7%
KS	2.3	2.6%	2.4	2.6%	2.4	2.5%
LA	2.3	2.3%	2.4	2.3%	2.4	2.2%
ME	2.0	2.8%	2.0	3.5%	2.0	4.2%
MO	2.8	4.7%	2.7	4.7%	2.7	4.7%
MS	2.6	1.8%	2.7	1.7%	2.5	1.6%
MT	2.5	1.4%	2.5	1.4%	2.4	1.4%
NE	2.1	2.2%	2.1	2.1%	2.2	2.1%
OK	2.3	4.5%	2.3	4.2%	2.4	3.9%
SC	2.4	2.6%	2.4	2.7%	2.5	2.5%
SD	1.9	1.1%	2.0	1.2%	2.1	1.3%
TN	2.4	5.8%	2.4	5.8%	2.4	5.7%
TX	2.3	29.4%	2.4	28.0%	2.5	27.2%
UT	1.9	3.5%	2.0	3.8%	2.0	3.8%
VA	2.2	4.5%	2.1	4.4%	2.1	4.1%
All 2014 Medicaid Nonexpanders	**2.5**	100.0%	**2.5**	100.0%	**2.5**	100.0%

Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.

Table A3. Primary Care Intensity by State Within 60 Days of Accident Date

	AY 2012		AY 2013		AY 2014	
	Mean	Claim %	Mean	Claim %	Mean	Claim %
NCCI 2014 Medicaid Expanders						
AR	2.6	2.8%	2.6	2.6%	2.7	2.4%
AZ	3.0	9.7%	3.0	9.4%	3.1	8.9%
CO	3.3	14.7%	3.3	15.2%	3.4	15.9%
CT	3.1	5.0%	2.9	4.7%	2.9	4.3%
DC	2.5	0.3%	2.4	0.3%	2.3	0.2%
HI	2.6	2.0%	2.7	2.1%	2.8	1.9%
IA	2.7	6.9%	2.7	6.9%	2.7	7.0%
IL	2.9	20.3%	2.9	20.6%	2.8	21.7%
KY	2.7	6.6%	2.7	6.1%	2.7	6.2%
MD	2.8	8.3%	2.7	9.0%	2.7	9.1%
NM	3.0	2.3%	2.9	2.0%	3.0	1.8%
NV	2.8	3.8%	2.8	3.8%	2.7	3.6%
OR	2.6	8.7%	2.7	8.7%	2.9	8.8%
RI	3.1	3.4%	3.1	3.5%	3.0	3.3%
VT	2.4	1.3%	2.4	1.3%	2.7	1.4%
WV	2.6	3.9%	2.6	3.8%	2.6	3.5%
All 2014 Medicaid Expanders	**2.9**	100.0%	**2.9**	100.0%	**2.9**	100.0%
NCCI 2014 Medicaid Nonexpanders						
AK	2.8	0.9%	2.7	0.9%	2.7	0.8%
AL	2.7	2.1%	2.6	2.0%	2.6	2.0%
FL	3.7	13.7%	3.7	13.1%	3.5	13.1%
GA	3.0	11.0%	3.0	12.1%	3.1	13.6%
ID	2.7	2.6%	3.0	2.8%	3.0	2.6%
KS	2.7	2.6%	2.7	2.6%	2.6	2.5%
LA	2.7	2.2%	2.7	2.2%	2.7	2.1%
ME	2.3	2.9%	2.2	3.5%	2.2	4.3%
MO	3.1	4.6%	3.0	4.7%	3.0	4.6%
MS	3.0	1.7%	3.0	1.6%	2.9	1.5%
MT	2.9	1.3%	3.0	1.4%	2.7	1.3%
NE	2.4	2.1%	2.4	2.1%	2.5	2.1%
OK	2.7	4.4%	2.6	4.1%	2.7	3.8%
SC	2.8	2.5%	2.8	2.6%	2.8	2.4%
SD	2.2	1.1%	2.3	1.2%	2.4	1.2%
TN	2.7	5.6%	2.7	5.6%	2.7	5.6%
TX	2.8	31.2%	2.9	29.7%	3.0	28.9%
UT	2.1	3.4%	2.2	3.6%	2.3	3.6%
VA	2.5	4.3%	2.4	4.3%	2.3	4.0%
All 2014 Medicaid Nonexpanders	**2.9**	100.0%	**2.9**	100.0%	**2.9**	100.0%

Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.

Table A4. Primary Care Intensity by State Within 90 Days of Accident Date

	AY 2012		AY 2013		AY 2014	
	Mean	Claim %	Mean	Claim %	Mean	Claim %
NCCI 2014 Medicaid Expanders						
AR	2.8	2.7%	2.8	2.5%	2.8	2.4%
AZ	3.2	9.6%	3.2	9.4%	3.2	8.8%
CO	3.7	14.8%	3.6	15.1%	3.7	15.8%
CT	3.3	5.1%	3.1	4.7%	3.0	4.4%
DC	2.7	0.3%	2.5	0.3%	2.4	0.2%
HI	2.9	2.0%	3.0	2.1%	3.1	1.9%
IA	2.8	6.9%	2.9	6.9%	2.8	7.0%
IL	3.1	20.4%	3.0	20.7%	2.9	21.8%
KY	2.8	6.5%	2.9	6.1%	2.8	6.2%
MD	2.9	8.3%	2.8	8.9%	2.9	9.0%
NM	3.3	2.3%	3.2	2.0%	3.2	1.8%
NV	3.0	3.8%	3.0	3.8%	2.9	3.6%
OR	2.9	8.7%	3.0	8.7%	3.1	8.8%
RI	3.4	3.4%	3.3	3.5%	3.2	3.3%
VT	2.7	1.3%	2.6	1.3%	2.9	1.4%
WV	2.8	3.9%	2.8	3.8%	2.8	3.4%
All 2014 Medicaid Expanders	**3.1**	100.0%	**3.1**	100.0%	**3.1**	100.0%
NCCI 2014 Medicaid Nonexpanders						
AK	3.0	0.9%	2.9	0.9%	2.9	0.8%
AL	2.8	2.1%	2.8	2.0%	2.7	2.0%
FL	3.9	13.7%	3.9	13.1%	3.8	13.1%
GA	3.2	11.0%	3.2	12.0%	3.2	13.5%
ID	3.0	2.5%	3.3	2.8%	3.3	2.5%
KS	2.9	2.5%	2.8	2.6%	2.8	2.5%
LA	2.9	2.2%	3.0	2.2%	3.0	2.1%
ME	2.4	2.9%	2.4	3.6%	2.3	4.4%
MO	3.3	4.6%	3.1	4.7%	3.1	4.6%
MS	3.2	1.7%	3.2	1.6%	3.1	1.5%
MT	3.2	1.3%	3.2	1.3%	3.0	1.3%
NE	2.6	2.1%	2.6	2.0%	2.6	2.0%
OK	2.9	4.3%	2.8	4.1%	2.9	3.8%
SC	3.0	2.5%	3.0	2.6%	3.0	2.4%
SD	2.4	1.1%	2.5	1.2%	2.5	1.2%
TN	2.9	5.6%	2.8	5.6%	2.8	5.5%
TX	3.1	31.4%	3.2	30.0%	3.3	29.1%
UT	2.2	3.4%	2.3	3.6%	2.4	3.6%
VA	2.7	4.3%	2.6	4.2%	2.5	4.0%
All 2014 Medicaid Nonexpanders	**3.1**	100.0%	**3.1**	100.0%	**3.1**	100.0%

Source: NCCI Medical Data Call. Accident Years begin October 3 of the preceding year and end October 2 of the indicated year.