

Impact of Medicaid Expansion on Insurance Coverage Rates Among Adult Populations with Low Income and by Obesity Status

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Objective: This study examines insurance coverage rates among working-age adults with low income and with or without obesity before and after Medicaid expansion under the Affordable Care Act.

Methods: Individual-level data on noninstitutionalized and nonpregnant adult participants aged 18 to 64 years with household income below \$15,000 from the Centers for Disease Control and Prevention 2006-2017 Behavioral Risk Factor Surveillance System were used. A difference-in-differences design with logistic regression was used to examine the likelihood of insurance coverage before and after Medicaid expansion.

Results: Working-age adults (analytic sample $N=316,151$) who were white, female, less educated, unemployed, and living in a Medicaid-expansion state were more likely to have insurance coverage. The insurance coverage rate in Medicaid-expanded states in years after expansion increased for both subgroups with and without obesity. However, the increase was slightly lower for the subpopulation with obesity (5.59%, 95% CI: 2.35%-8.83%) compared with the subpopulation without obesity (7.35%, 95% CI: 5.35%-9.34%).

Conclusions: Increased attention should be paid to reduce insurance coverage barriers for working-age adults with low income and obesity to address potential health disparities caused by lack of access to care. This is important, as access to care provides opportunities to increase prevention and treatment-oriented services to address obesity and associated health care costs.

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Study Importance

What is already known?

- Obesity is an epidemic in the United States, and fewer barriers to accessing prevention and treatment services are needed.
- Access to prevention and treatment for obesity is governed by insurance coverage and access to health services.
- There is a gap in the literature regarding insurance coverage among individuals with low income and obesity, who may be most in need of health services.

What does this study add?

- Medicaid expansion increased insurance coverage for working-age adults with low income and with obesity or without obesity.
- Despite possibly having greater health service needs, increases in insurance coverage after the Affordable Care Act in states with expansion were lower for the population subgroup with obesity compared with the subgroup without obesity.
- The findings from this study will encourage greater efforts to reduce insurance coverage barriers among populations with low income and obesity.

Introduction

The crude prevalence of obesity in the United States is 40% (1). It is as high as 45% among subgroups with low income and it differs by sex, race, and socioeconomic status (2). The national health care expenditures for populations with obesity is as high as \$190 billion on obesity-related health care expenses (3). Lower socioeconomic status exacerbates the cost burden of obesity, and the number of people with

low income and obesity is increasing (4). Hence, there is a need to study health care access by individuals with low income and obesity.

Having access to insurance coverage, and by extension to health care services, among individuals who have obesity can make the receipt of important treatment services possible (5). Insured individuals are more likely to have a usual source of care than those without insurance (6). For obesity treatment, health care providers can use bariatric surgery,

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TABLE 1 Sample characteristics for working-age adults (age 18-64) with low income and with or without obesity in the United States, 2006-2017 Behavioral Risk Factor Surveillance System (*N*=316,151)

	Subgroup with obesity			Subgroup without obesity		
	Insured	Uninsured	<i>P</i> value*	Insured	Uninsured	<i>P</i> value*
<i>N</i> (%)	<i>n</i> = 73,265 (70.18)	<i>n</i> = 31,131 (29.82)		<i>n</i> = 148,148 (69.96)	<i>n</i> = 63,607 (30.04)	
Residence in Medicaid-expansion state ^a			<0.001			<0.001
Yes	60.84	47.75		58.26	43.97	
No	39.16	52.25		41.74	56.03	
Age (mean)	43.27 (0.07)	39.06 (0.14)	<0.001	41.27 (0.05)	37.54 (0.10)	<0.001
Age group			<0.001			<0.001
18-24	17.71	13.80		23.20	19.32	
25-34	17.96	26.61		18.69	26.05	
35-44	16.02	21.65		16.17	19.73	
45-54	22.84	22.08		20.34	20.47	
55-64	25.48	15.86		21.61	14.43	
Sex			<0.001			<0.001
Male	47.56	56.50		39.26	47.39	
Female	52.44	43.50		60.74	52.61	
Marital status			0.006			<0.001
Married	79.35	77.23		83.12	80.06	
Unmarried	20.65	22.77		16.88	19.94	
Race			<0.001			<0.001
White	41.75	32.93		46.07	36.20	
Black or African American	18.65	19.27		20.31	20.37	
Asian	2.32	1.31		2.46	2.01	
Other	37.29	46.49		31.17	41.42	
Education			<0.001			<0.001
<High school	31.98	40.51		28.62	38.63	
High school graduates	32.49	31.83		33.14	32.19	
Some college or technical school	27.31	21.85		29.73	23.03	
College graduates	8.22	5.81		8.51	6.14	
Employment status			<0.001			<0.001
Employed for wage	21.96	33.15		20.65	31.73	
Self-employed	6.54	12.89		5.13	10.00	
Unemployed ^b	71.50	53.96		74.22	58.28	
General health			<0.001			<0.001
Excellent	12.03	12.96		12.10	12.00	
Very good	18.12	17.91		18.35	16.71	
Good	32.04	35.45		29.26	35.95	
Fair	24.67	24.77		25.42	24.96	
Poor	13.14	8.91		14.87	10.38	
Cost is a barrier			<0.001			<0.001
Yes	21.71	54.72		22.29	56.89	
No	78.29	45.28		77.71	43.11	
Time from checkup			<0.001			<0.001
<12 months	71.60	39.41		73.07	40.65	
1 to <2 years	12.55	17.08		12.08	17.32	
2 to <5 years	8.00	16.80		7.55	16.65	
≥5 years or never	7.85	26.71		7.30	25.38	

**P* < 0.05 considered significant and presented in bold text.

^aStates with Medicaid expansion through 2016: Alaska, Arkansas, California, Colorado, Connecticut Delaware, District of Columbia, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, West Virginia. Nonexpansion states: Alabama, Florida, Georgia, Idaho*, Kansas, Maine*, Mississippi, Missouri, Nebraska*, North Carolina, Oklahoma, South Carolina, South Dakota, Tennessee. * indicates expansion of Medicaid in more recent years but inclusion in study as nonexpansion state.

^bIncludes homemakers, students, or retired or unable to work.

drug therapy, or behavioral therapy (7), despite the mixed results on ex ante moral hazard (8). Hence, understanding insurance coverage among individuals with obesity could inform changes in available health care coverage and services to this subgroup.

The Affordable Care Act (ACA) expanded a provision to increase access to health insurance coverage through the expansion of Medicaid. This expansion covers those with income below 133% of the federal poverty level effective January 1, 2014 (9). Previous studies have looked at the impact of Medicaid expansion on insurance coverage, but not by subpopulations with obesity (10). States have discretion over Medicaid expansion, and as of 2017, 32 states and the District of Columbia had expanded Medicaid (11). This natural experiment was used to study the impact of Medicaid expansion on health insurance coverage among the US working-age adult population with low income and with or without obesity. The study hypothesis was that Medicaid expansion would provide increased access to insurance for low-income, working-age adults, with no disparity based on obesity status.

Methods

Data from the 2006-2017 Behavioral Risk Factor Surveillance System (BRFSS) were used to select 2,757,418 nonpregnant, non-institutionalized adults 18 to 64 years of age, of whom 316,151 with a household income below \$15,000 per year were included in the analysis. BRFSS is an annual national telephone survey that collects state-level information about residents' health behaviors. The health insurance coverage question was "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or governmental plans such as Medicare, or Indian Health Service?" Subgroup analysis was done by obesity status. The BMI computed in the BRFSS data set was used to determine obesity status. Subgroups were created and categorized as with obesity (BMI ≥ 30) and without obesity (BMI < 30) on the basis of standard BMI classifications. For the purposes of this study, the overweight, normal, and underweight categories were combined into the without obesity category. Other factors that might influence health insurance coverage that were included in this study included age group, sex, race, education, employment status, marital status, and general health status. The predictors of interest were the survey year and participant's state of residence. Year was dichotomized to before (2006-2013) and after (2014-2017) states expanded Medicaid. States were divided into those that expanded Medicaid between 2014 and 2017 and those that did not.

Descriptive analyses were conducted to understand the insurance coverage rate among subgroups with and without obesity by demographic and socioeconomic characteristics. We used *t* tests for continuous variables and χ^2 tests for categorical variables to determine significant differences in characteristics by obesity status. Then two difference-in-differences (DID) analyses were conducted to assess the impact of Medicaid expansion on insurance coverage separately for subgroups with and without obesity. The "treatment" group in the DID analyses was composed of the states that expanded Medicaid between 2014 and 2017. The "control" group was composed of the states that did not expand Medicaid through 2017. All analyses used sampling weights provided with BRFSS. Data were analyzed using Stata version 15.0 (StataCorp LLC, College Station, Texas).

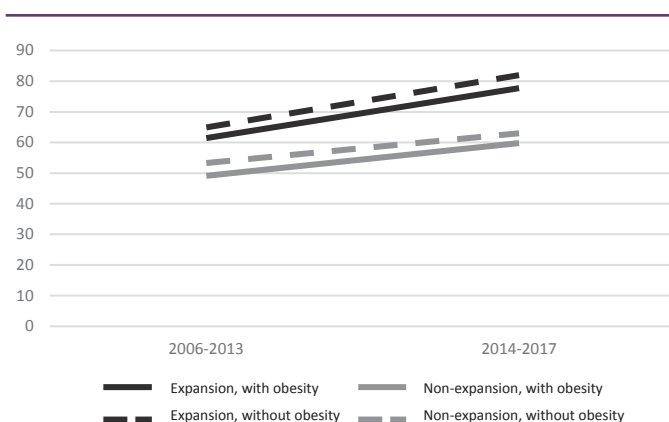


Figure 1 Insurance coverage rates among working-age adults (age 18-64) with low income and with or without obesity in Medicaid-expansion and Medicaid-nonexpansion states, Behavioral Risk Factor Surveillance System 2006-2017.

Results

Table 1 shows respondents' characteristics based on whether they were insured or uninsured, stratified by the subgroups with and without obesity. Within both subgroups, respondents who were insured were significantly more likely to be living in a Medicaid-expansion state than those who were uninsured (60.84% insured vs. 47.75% uninsured, $P < 0.001$ within the subgroup with obesity), whereas individuals without insurance were significantly more likely to be living in a state that did not expand Medicaid. A disparity in insurance status was observed by race, with insurance coverage higher among white respondents compared with black respondents. Those in the oldest age category (55- to 64-year-olds) within the subgroup with obesity were more likely to be insured. Women were more likely to be insured in both the subgroups (52.44% and 60.74% compared with 43.50% and 52.61%, $P < 0.001$). Those with less education compared with college graduates were more likely to be insured. Those who were employed for wages or unemployed were more likely to be insured than those who were self-employed. Figure 1 shows the insurance coverage rates by subgroup with and without obesity and by residence in states that expanded and in states that did not expand Medicaid. The DID results in Table 2 show that, controlling for factors that may have influenced insurance coverage in the United States, insurance coverage among the subgroup with obesity increased by 5.59% (95% CI: 2.35%-8.83%) after Medicaid expansion. Among the subgroup without obesity, insurance coverage increased by 7.35% (95% CI: 5.35%-9.34%) after Medicaid expansion. The results follow significant difference in two means despite overlapping CIs (12).

Discussion

This study evaluated the impact of Medicaid expansion under the ACA on insurance coverage of working-age adults with low income and with and without obesity. Analyses of this natural experiment found increases in coverage during the post-ACA period for all groups. However, the difference in insurance coverage between expanded states and nonexpanded states widened slightly after the ACA for the subgroup without obesity. Despite improvements for adults

TABLE 2 Impact of Medicaid expansion on insurance coverage rates among working-age adults (age 18-64) with low income and with and without obesity in the United States, 2006-2017 Behavioral Risk Factor Surveillance System

	Medicaid-expansion states	Medicaid-nonexpansion states	Marginal difference
Subgroup with obesity (N=51,409)			
2006-2013	61.47 (59.76-63.17)	49.16 (47.51-50.82)	12.31 (9.91-14.71)
2014-2017	77.72 (76.31-79.13)	59.82 (58.06-61.58)	17.90 (15.64-20.16)
DID estimate			5.59 (2.35-8.83)
Subgroup without obesity (N= 126,215)			
2006-2013	64.94 (63.84-66.04)	53.35 (52.32-54.37)	11.59 (10.08-13.10)
2014-2017	81.95 (81.17-82.74)	63.01 (61.93-64.10)	18.94 (17.60-20.28)
DID estimate			7.35 (5.35-9.34)

All analyses used sampling weights. States with Medicaid expansion through 2016: Alaska, Arkansas, California, Colorado, Connecticut Delaware, District of Columbia, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, West Virginia. Nonexpansion states: Alabama, Florida, Georgia, Idaho*, Kansas, Maine*, Mississippi, Missouri, Nebraska*, North Carolina, Oklahoma, South Carolina, South Dakota, Tennessee. * indicates expansion of Medicaid in more recent years but inclusion in study as nonexpansion state.

DID, difference-in-differences.

with low income, approximately 20% in expanded states and more than a third in nonexpanded states still do not have some form of health insurance.

States that did not expand Medicaid also tend to be states with populations potentially more in need. Results from the 2013 BRFSS data showed that among only those with low income and without insurance, nonexpansion states had higher proportions of adults with obesity and a greater number of comorbidities compared with expansion states (13). The present study focused on a segment of the population, working-age adults with low income, and adds to the literature that Medicaid expansion helped to increase coverage but that the increase was lower among population subgroups with obesity compared with subgroups without obesity. Evaluations of Medicaid expansion support that expansion has helped improve coverage, use, quality of care, and self-assessed health (14,15). Therefore, additional barriers to access among low-income populations with obesity may reinforce greater treatment needs.

This study focused on obesity as a health condition, as obesity is a risk factor for several chronic diseases, such as diabetes, coronary heart diseases, and cancers (16). Health insurance is important for entry into the health care system, and a lack of insurance leads to delayed access to health care for patients with chronic diseases when treatment is costly (8). Addressing obesity early on could decrease longer-term health care expenditures. A reduction in average adult BMI by only 5% could save \$29.8 billion in 5 years, \$158 billion in 10 years, and \$611.7 billion in 20 years (17). Furthermore, the ACA mandates coverage of obesity treatment, and Medicaid offers obesity screening and counseling for adults and children, as well as diet counseling for adults with higher risk for chronic disease (18). However, our results show lower access to the available services by subgroups with obesity.

In this study, the DID analysis approach allowed us to account for changes that would have occurred in the country in the absence of the ACA Medicaid expansion intervention. Despite the temporal nature of the data, analytic method, and controlling for additional factors, there are some study limitations. First, the data are repeated cross-sections and not true pre-ACA/post-ACA reflections of working-age adults with low income. For example, it is possible that people migrated to

Medicaid-expansion states, but this has not been empirically observed yet (19). Second, there could be maturation effects. For example, it could be that Medicaid expansion itself changed the sample composition of individuals with and without obesity (8). However, a recent study found no effect of Medicaid expansion on obesity status (20); hence, there should be no bias due to changing obesity status after Medicaid expansion. Finally, to address external validity, sampling weights were used in the analyses to make our results generalizable to the US working-age, noninstitutionalized adult population with low income.

Conclusion

This study found differences in insurance status among subgroups with and without obesity based on residency in Medicaid-expansion states. The effect of Medicaid expansion on increasing insurance coverage in both groups was significant; however, the rate was higher for the subgroup without obesity. Medicaid expansion under the ACA increased access to health care among working-age adults with low income and obesity but at a lower rate compared with the subgroup without obesity. **O**

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References

1. Hales CM, Fryar CD, Carroll MD, Freedman DS, Ogden CL. Trends in obesity and severe obesity prevalence in US youth and adults by sex and age, 2007-2008 to 2015-2016. *JAMA* 2018;319:1723-1725.
2. Ogden CL, Fakhouri TH, Carroll MD, et al. Prevalence of obesity among adults, by household income and education - United States, 2011-2014. *MMWR Morb Mortal Wkly Rep* 2017;66:1369-1373.
3. Cawley J, Meyerhoefer C. The medical care costs of obesity: an instrumental variables approach. *J Health Econ* 2012;31:219-230.
4. Bleich SN, Jarlenski MP, Bell CN, LaVeist TA. Health inequalities: trends, progress, and policy. *Annu Rev Public Health* 2012;33:7-40.
5. Katz D, Faridi Z. Health care system approaches to obesity prevention and control. In: Kumanyika S, Brownson RC, eds. *Handbook of Obesity Prevention: A Resource for Health Professionals*. Boston, MA: Springer; 2007:285-316.
6. Hoffman C, Paradise J. Health insurance and access to health care in the United States. *Ann NY Acad Sci* 2008;1136:149-160.
7. Gloy VL, Briel M, Bhatt DL, et al. Bariatric surgery versus non-surgical treatment for obesity: a systematic review and meta-analysis of randomised controlled trials. *BMJ* 2013;347:f5934. doi:https://doi.org/10.1136/bmj.f5934
8. Grossman M, Mocan N, Bhattacharya J, Bundorf MK, Pace N, Sood N. Does health insurance make you fat? In: Grossman M, Mocan NH, eds. *Economic Aspects of Obesity*. Chicago: University of Chicago Press; 2013:35-64.

9. Office of the Legislative Counsel. *Compilation of Patient Protection and Affordable Care Act*. Washington, DC: Office of the Legislative Counsel; 2010.
10. Sommers BD, Blendon RJ, Orav EJ, Epstein AM. Changes in utilization and health among low-income adults after Medicaid expansion or expanded private insurance. *JAMA Intern Med* 2016;176:1501-1509.
11. Kaiser Family Foundation. Status of state action on the Medicaid expansion decision. <https://www.kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act>. Accessed August 24, 2019.
12. Austin PC, Hux JE. A brief note on overlapping confidence intervals. *J Vasc Surg* 2002;36:194-195.
13. Akinyemiju T, Jha M, Moore JX, Pisu M. Disparities in the prevalence of comorbidities among US adults by state Medicaid expansion status. *Prev Med* 2016;88:196-202.
14. Simon K, Soni A, Cawley J. The impact of health insurance on preventive care and health behaviors: evidence from the first two years of the ACA Medicaid expansions. *J Policy Anal Manag* 2017;36:390-417.
15. Mazurenko O, Balio CP, Agarwal R, Carroll AE, Menachemi N. The effects of Medicaid expansion under the ACA: a systematic review. *Health Aff (Millwood)* 2018;37:944-950.
16. Hruby A, Manson JE, Qi L, et al. Determinants and consequences of obesity. *Am J Public Health* 2016;106:1656-1662.
17. Wang YC, McPherson K, Marsh T, Gortmaker SL, Brown M. Health and economic burden of the projected obesity trends in the USA and the UK. *Lancet* 2011;378:815-825.
18. National Academies of Sciences, Engineering, and Medicine. *The Challenge of Treating Obesity and Overweight: Proceedings of a Workshop*. Washington, DC: The National Academies Press; 2017.
19. Schwartz AL, Sommer BD. Moving for Medicaid? Recent eligibility expansions did not induce migration from other states. *Health Aff (Millwood)* 2014;33:88-94.
20. Cawley J, Soni A, Simon K. Third year of survey data shows continuing benefits of Medicaid expansions for low-income childless adults in the U.S. *J Gen Intern Med* 2018;33:1495-1497.