

Fall 2019

## Health Care Access by Weight Status in the State of Georgia

### Author Affiliations

Elizabeth Pullekines, Front Street Clinic (Americorps)

Janani Rajbhandari-Thapa, University of Georgia

### Corresponding Author

Janani Rajbhandari-Thapa (jrthapa@uga.edu)

Follow this and additional works at: <https://digitalcommons.georgiasouthern.edu/jgpha>



Part of the [Public Health Commons](#)

---

### Recommended Citation

Pullekines, Elizabeth and Rajbhandari-Thapa, Janani (2019) "Health Care Access by Weight Status in the State of Georgia," *Journal of the Georgia Public Health Association*: Vol. 7 : No. 2 , Article 5.

DOI: 10.20429/jgpha.2019.070205

Available at: <https://digitalcommons.georgiasouthern.edu/jgpha/vol7/iss2/5>

This secondary data analysis is brought to you for free and open access by the Journals at Digital Commons@Georgia Southern. It has been accepted for inclusion in Journal of the Georgia Public Health Association by an authorized administrator of Digital Commons@Georgia Southern. For more information, please contact [digitalcommons@georgiasouthern.edu](mailto:digitalcommons@georgiasouthern.edu).

# Secondary Data Analysis

## Health Care Access by Weight Status in the State of Georgia

Elizabeth Pullekines, MPH<sup>1</sup> and Janani Rajbhandari-Thapa, PhD<sup>2</sup>

<sup>1</sup>Health Outreach Coordinator, Front Street Clinic (Americorps); <sup>2</sup>Department of Health Policy and Management, College of Public Health, University of Georgia

Corresponding Author: Janani Rajbhandari-Thapa • College of Public Health, University of Georgia 211 B Wright Hall (HSC), Athens, GA 30602 • 706-713-2700 • [jrthapa@uga.edu](mailto:jrthapa@uga.edu)

### ABSTRACT

**Background:** Obesity continues to grow in prevalence in the United States and within the state of Georgia. Obesity is a risk factor for many chronic and preventable diseases. As such, obese individuals have higher demand for health care services than non-obese individuals. In addition, the health care system can play a role in preventing obesity and other conditions caused by obesity.

**Methods:** This research follows the established positive relationship between health care use and access to health care services through insurance coverage. The paper analyzes how the Affordable Care Act (ACA) affected insurance coverage and access to health care services for obese and overweight individuals. A logistic regression was used on data from the Behavioral Risk Factor Surveillance System.

**Results:** Results concluded that Georgia residents were less likely to have health insurance after the ACA was passed. Significant association between weight status and health care services through insurance coverage was not found. The results show that increased access to care including preventive services for obese and overweight post ACA is yet to be observed.

**Conclusions:** Findings present a need for lawmakers to develop policy to promote insurance enrollment for Georgian residents. This is critical as the state sees an increase in overweight and obesity that are risk factor to many chronic disease conditions.

**Keywords:** Affordable Care Act, obesity, insurance, healthcare  
<https://doi.org/10.20429/jgpha.2019.070205>

### INTRODUCTION

Obesity prevalence has been increasing in the United States (U.S.) since the 1990s. Nearly 38% of adults in the U.S. were obese in 2014. This increasing trend in adult obesity rates also applies to southern states. Though Georgia had the third lowest obesity rate among southern states after Florida (27.4%) and Virginia (29%), Georgia ranks 20<sup>th</sup> among all the state in the U.S. in obesity and overweight rate. The obesity rate in Georgia was 31.4% in 2016. The highest rate among southern states was West Virginia, with 37.7% (Centers for Disease Control and Prevention, 2017). Obesity throughout the nation and the state is pervasive across gender, ethnic origin, and socioeconomic status with some variation in trend by race and ethnicity (Flegal et al., 2012). For adults over the age of 20, men among all races, except non-Hispanic black, were more likely to be overweight. Women among all races were more likely to be obese than men (Ogden et al., 2014). Further, obesity associated comorbidities have been cited and reported in many scholarly works (Guh et al., 2009). Obesity has also been identified as a risk factor for heart disease and cancer, which are among the top five preventable causes of death (Yoon, 2014). In Georgia, heart and vascular diseases, such as stroke or hypertension, and some cancers are among the top

ten causes of deaths for adults aged 25 and older (Georgia Department of Public Health, n.d.).

Furthermore, the cost impact of obesity on the U.S. health care system is high. Annual cost of obesity was \$190 billion in 2005 (Cawley et al., 2012). In the state of Georgia alone the direct and indirect costs of obesity was \$2 billion in 2003 (Finkelstein et al., 2004). Chronic diseases that obesity is a risk factor for, such as heart disease and diabetes, account for \$2.3 trillion in health care costs annually in 2008 dollars (Oschman, 2011). Obese individuals' health care utilization rates and associated costs was also higher compared to non-obese individuals (Peterson and Mahmoudi, 2015). The median increase in mean annual healthcare costs were 12% for overweight and 36% for obese individuals, compared to individuals at healthy weight with highest percentage increase in medications, inpatient care and ambulatory care (Kent et al., 2017). Furthermore, studies have found that about 80% of heart disease, stroke, and type 2 diabetes and 40% of cancers are preventable (Gerteis et al., 2014). As such understanding factors associated with prevention and treatment of obesity, including access to health care, is critical. The focus of this study is to explore access to health care by weight status.

Health care services can play a role both in obesity prevention and treatment. To prevent obesity, hospitals may provide behavioral counseling (Katz and Faridi, 2007). Hospitals can also engage in outreach activities or have obesity prevention programs such as skill building classes for their service area. Healthcare organizations might also have spaces in their facility for small fitness centers or a healthful cooking teaching kitchen. This would be an important step towards addressing obesity as simple nutrition and weight counseling has been proven to be effective at reducing weight (McAlpine & Wilson, 2007). While this idea has been considered in the past, there have been many barriers such as access to care by obese individuals to seriously offering treatments such as obesity and nutrition counseling to tackle the obesity issue in the hospital setting (Kraschnewski et al., 2013; McAlpine & Wilson, 2007). To treat obesity, health care providers can utilize more invasive treatment options such as bariatric surgery (Gloy et al., 2013). Hence it is important to understand the health care coverage for obese and overweight individuals.

Utilization of the available obesity prevention and treatment services depends on obese individuals' access to health care through insurance coverage. Health care access and utilization is dependent on insurance coverage and insurance coverage measures access to health care. In a study exploring societal and individual determinants of medical care insurance coverage was found to affect health care utilization (Milbank, 2005). In a study, 90% of low-income uninsured adults stated costs as the main barrier to health care (Hoffman and Paradise, 2008). Over 40% of uninsured adults, compared to 18% of insured adults, did not have a routine checkup in a two-year time frame (Hoffman and Paradise, 2008). Furthermore, obesity has been found to be associated with lower socioeconomic status (Newton et al., 2017). Cost of care is a significant barrier to accessing health care. As such, utilization of health care is affected by insurance coverage. Insurance assist individuals in reducing their health care expenses. Routine checkups are important

to maintain health and avoid long-term health care costs. Because obesity is an identified risk factor for several comorbid conditions, access and utilization of health care in association with weight status is even more critical.

This study aims to analyze how the Affordable Health Care (ACA) impacted access to health care coverage and health care coverage by weight status among adults in the state of Georgia. We hypothesize that those with a higher weight status would be more likely to obtain health care coverage and access to health care would have increased post ACA. Increased access to health care would allow individuals with more than normal weight to reduce the costs of services that they receive, regardless of whether it is due specifically to their weight or a disease associated with excess weight.

## METHODS

### Data

This study used the state of Georgia's Behavioral Risk Factor Surveillance System (BRFSS) data from 2005 through 2015. BRFSS is a telephone-based survey conducted by the Centers for Disease Control and Prevention (CDC); the deidentified dataset is made publicly available on their website at [www.cdc.gov](http://www.cdc.gov). The survey collects data on U.S. residents at the state level regarding resident's health behavior, chronic health conditions, and preventative services utilization. Data also includes access to healthcare, weight status, and metropolitan status. BRFSS collects responses from participants in all 50 states, Washington D.C., and territories and provides state identifiers making studies possible at the state level. Furthermore, this study was possible as the data set for Georgia included the same questions regarding the variables of interest from 2005 to 2015. Further this research does not constitute Human Subjects Research as per the institution's policy as it is based on publicly available deidentified secondary dataset. The survey question and response option for each variable are shown in Table 1.

**Table 1. Data from 2005-2015 BRFSS Surveys**

Data	Survey question and response options in BRFSS
<b>Dependent variable</b>	
Have insurance coverage	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? Yes/ No
<b>Explanatory variables</b>	
BMI categories	Underweight or normal ( $\leq 24.9$ )/ Overweight (25-29.9)/ Obese ( $\geq 30$ )
Before and after the Affordable Care Act	2005-2015 (1 if 2005 through March 2010, 0 if April 2010 through 2015)
<b>Confounding variables</b>	
Gender	Male/ Female
Age	18-24/ 25-34/ 35-44/ 45-54/ 55-64/ 65 and above
Race	White/ Black/ American Indian or Alaskan Native (Native)/ Asian/ Native Hawaiian or Pacific Islander (Hawaiian) / Other race

Data	Survey question and response options in BRFS
Income	Less than \$15,000/ \$15,000 to \$24,999/ \$25,000 to \$34,999/ \$35,000 to \$49,999 /\$50,000 or more
Education	Did not graduate high school/ Graduated high school/ Attended college or technical school/ Graduated from College or Technical School
Metropolitan status (MSA)	In the center city of an MSA/ Outside the center city of an MSA, but inside the county containing the center city/ Inside a suburban county of the MSA/ In a MSA that has no city center/ Not in an MSA
Employment status	Employed for wages/ Self-employed/ Out of work for 1+ year/ Out of work for less than 1 year/ A homemaker/ A student/ Retired/ Unable to work
General health	Would you say that in general, your health is? Excellent/ Very Good/Good/Fair/Poor
Have poor physical health	Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good? # of days/ None
Have poor mental health	Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good? # of days/ None
Poor health preventing usual activities	During the past 30 days, for about how many days did poor physical health or mental health keep you from doing your usual activities, such as self-care, work, or recreation? # of days/ None
Checkup	About how long has it been since you last visited a doctor for a routine checkup? Within past year/ Within past 2 years/ Within past 5 years/ 5 or more years ago/ Never
Unable to receive care due to cost	About how long has it been since you last visited a doctor for a routine checkup? [A routine checkup is a general physical exam, not an exam for a specific injury, illness, or condition.]

This study assessed access to health care by weight status in Georgia using insurance coverage as a proxy to health care access, which affects utilization of obesity prevention and treatment-oriented health care services. Data from the 2005 to 2015 Behavioral Risk Factor Surveillance System surveys were compiled to create a time series data and logistic regression analysis was used. This study tested if obese and overweight individuals have a higher likelihood of having insurance coverage given the established relationship between higher weight status and chronic diseases. The model was controlled for confounding from socio-demographic variables such as age, income, education, employment status, and race along with metropolitan status. Further, prior to 2010, most states allowed insurance companies in the individual market to deny individuals' health insurance coverage based on health status and allowed rates to be set based on health status (Lee et al., 2010). Obesity was identified as a risk factor for several disease as early as the 1990s (Must et al., 1999). As a result, obese individuals may have been denied health insurance services due to health conditions that list obesity as a risk factor. The enactment of the Affordable Care Act (ACA) in 2010, prohibited insurance companies from denying individuals coverage due to pre-existing conditions. The study accounts for the post ACA period due to its potential impact on insurance coverage. Period after ACA is

also important to identify because post ACA individuals with insurance coverage would have increased access to preventive health care such as annual wellness check. This is important with respect to obesity and it could potentially help identify weight issues earlier rather than later when it has caused other health problems or treatment are costlier.

#### Data analysis

Data from each year from 2005 to 2015 were downloaded and compiled to develop a time series data. Pregnant women were excluded from the study. Variables were adjusted to accommodate variations in answers to the same questions in different years. For example, the years 2011-2015 had four categories for BMI (underweight, normal, overweight, and obese), while 2005-2010 only used three. Underweight and normal weight in 2011-2015 were combined to match data from previous years. A logistic regression model was used to predict insurance coverage as a proxy to health care access by weight status and enactment of the Affordable Care Act. As such, having any health care coverage served as the dependent variable. This was measured by the responses to the question "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?" The explanatory variables of interest included year and weight status. Year variable was

dichotomized to before and after the Affordable Care Act was passed. Prior to the Affordable Care Act ranged from 2005 to March 2010. After the Affordable Care Act ranged from April 2010 to 2015. This was due to the ACA being signed into law on March 23, 2010 (“H.R. 3590-11<sup>th</sup> Congress”, 2010). The dataset is rich and allowed adjustment for confounding from sociodemographic variables such as gender, age, race, income, and education. In addition, the model controlled for other potential confounders such as employment status, geographical location (metropolitan status), general, physical and mental health, and the state of being in poor health. Education may influence knowledge of what kind of coverage is available. Employment status can influence where individuals receive health insurance and the type of coverage they receive. Metropolitan status (MSA) can influence the number of insurance providers individuals have access to. For example, there may be more providers in a city center than a rural community. The data were analyzed using STATA version 14.2.

**RESULTS**

The demographics of the overall sample and the insured and uninsured categories within this sample is shown in Table 2.

The highest proportion of respondents in each category were white followed by African-American. The insured population had a slightly higher percentage (71%) of white individuals and slightly lower percentage of African-American respondents (22%) compared to 63% and 28% within the uninsured category. About 36% of the overall population had a college degree followed by high school or some college education. The percentage of college graduates within the insured was highest (36%), while the percentage of high school graduates was highest (35%) within uninsured category. Proportion of male respondents were higher than female. Most individuals in all three populations were between the ages of 35 and 44. About 32% of the respondents in all categories were from a suburban county. Highest proportion (35%) of the uninsured lived outside an MSA. Highest proportion (43%) of respondents in the insured category had an income above \$50,000. Only 20% of the uninsured population had an income over \$50,000. For the uninsured population, having an income between \$15,000 and \$24,999 made up the largest percentage, at about 32%. In terms of employment, employed for wages make up the largest percentage for all three categories.

**Table 2. Respondent’s demographics (%)**

		Overall n=12,437	Insured n=10,855	Uninsured n=1,582
<b>Race</b>	White	70	71	63
	Black	23	22	28
	Hispanic	3	3	4
	Asian	1	1	1
	American Indian	1	1	1
	Other Race	1	1	1
	Multiracial	1	1	2
<b>Education</b>	< High school	11	10	18
	High school graduate	27	25	35
	Some college	27	26	27
	College graduate	36	39	20
<b>Gender</b>	Male	54	54	58
	Female	46	46	42
<b>Age</b>	18-24	5	4	9
	25-34	17	16	22
	35-44	27	26	30
	45-54	14	13	18
	55-64	17	17	18
	≥ 65	20	23	3
<b>Metropolitan status</b>	Not in MSA	29	28	35
	MSA suburban county	32	32	31
	MSA county	12	13	11
	MSA city center	26	27	23
<b>Income</b>	< \$15,000	13	11	24

		Overall n=12,437	Insured n=10,855	Uninsured n=1,582
	\$15,000-24,999	19	17	32
	\$25,000-34,999	12	12	13
	\$35,000-49,999	14	15	11
	≥ \$50000	43	46	20
<b>Employment status</b>	Employed for wages	46	47	40
	Self-employed	8	7	13
	No work > 1 year	3	2	11
	No work < 1 year	3	2	7
	Homemaker	6	6	6
	Student	3	2	4
	Unable to work	12	11	13
<b>Year</b>	Retired	20	22	5
	Before ACA (Jan 2005-Mar 2010)	55	55	57
	After ACA (Apr 2010-Dec 2015)	45	45	43

Table 3 shows the demographics of respondents by weight status. Most of the respondents in each of the three categories reported being white, followed by African-American. In terms of education, most overweight and normal or underweight respondents reported having a college degree, while most obese respondents reported having a high school degree. About 49% of obese respondents reported after the Affordable Care Act was passed. This was higher than overweight and normal or underweight. Obese and overweight individuals were more likely to report being male, 54% and 63%, respectively.

About 55% of normal or underweight individuals reported being female. Most respondents in each category reported to be between the ages of 35 and 44. About 32% of obese, 33% of overweight, and 31% of normal or underweight reported living in a suburban county of a metropolitan city. Most individuals in each weight status reported having an income of over \$50,000. Nearly 45-50% of respondents in each weight category reported to be employed for wages. About 16% of obese reported being unable to work. This was about twice the percentage for each of the other two weight status.

**Table 3. Respondents' demographics by weight status (%)**

		Obese (n=4,186)	Overweight (n= 4,367)	Normal (n=3,884)
<b>Race</b>	White	65	73	74
	Black	30	21	18
	Hispanic	3	2	3
	Asian	0	1	2
	American Indian	1	1	1
	Other Race	1	1	1
	Multiracial	1	1	1
<b>Education</b>	< High school	12	10	10
	High school graduate	30	26	23
	Some college	28	26	25
	College graduate	30	38	42
<b>Gender</b>	Male	54	63	45
	Female	46	37	55
<b>Age</b>	18-24	3	3	9
	25-34	15	16	21
	35-44	27	25	29

		Obese (n=4,186)	Overweight (n= 4,367)	Normal (n=3,884)
	45-54	17	15	10
	55-64	20	19	12
	≥ 65	19	23	19
<b>Metropolitan Status</b>	Not in MSA	32	29	26
	MSA suburban county	32	33	31
	MSA county	11	13	13
	MSA city center	24	25	29
<b>Income</b>	< \$15,000	15	10	12
	\$15,000-24,999	21	18	18
	\$25,000-34,999	12	12	11
	\$35,000-49,999	14	14	14
	≥ \$50000	37	46	45
<b>Employment Status</b>	Employed for wages	45	47	45
	Self-employed	7	8	9
	No work > 1 Year	4	3	4
	No work < 1 Year	3	3	3
	Homemaker	4	5	8
	Student	2	2	4
	Unable to work	16	10	9
	Retired	19	23	19
<b>Year</b>	Before ACA (Jan 2005-Mar 2010)	51	56	59
	After ACA (Apr 2010-Dec 2015)	49	44	41

Table 4 shows the health status of respondents. Most respondents in the overall (34%) and insured categories (33%) were overweight. For the uninsured population, obese individuals had the highest percentage (36%). About 87% of the overall population reported having insurance. Finally, most individuals reported having a checkup within the past year. Most respondents reported being in good health across

all categories. About 71% of the overall and insured population and 68% of the uninsured population reported having poor physical health in the last 30 days. About 62% of the overall population and 60% of the insured reported having poor mental health in the past 30 days. Seventy one percent of the uninsured respondents reported poor mental health.

**Table 4. Respondents' health status (%)**

	Overall n=12,437	Insured n=10,855	Uninsured n=1,582
<b>Weight status</b>			
Obese	33.66	33.29	36.16
Overweight	35.11	35.63	31.54
Normal	31.23	31.07	32.3
<b>Have insurance coverage</b>	87.28	100	0
<b>Unable to receive care due to cost</b>	20.95	16.55	51.14
<b>Time Since Last Checkup</b>			
Never	0.97	0.81	2.09
Within the past year	74.41	77.52	53.03
Within 2 years	11.06	10.58	14.41
Within 5 years	6.65	5.73	12.96
5 or more years	6.91	5.36	17.51

	Overall n=12,437	Insured n=10,855	Uninsured n=1,582
<b>General health</b>			
Excellent	12.14	12.42	10.24
Very good	28.83	29.33	25.41
Good	30.19	29.96	31.8
Fair	18.37	17.84	22
Poor	10.46	10.45	10.56
<b>Have poor physical health</b>	71.02	71.52	67.64
<b>Have poor mental health</b>	61.71	60.34	71.11
<b>Poor health preventing usual activities</b>	41.61	41.02	45.64

Table 5 shows the respondents' health status by weight. Overweight respondents had the highest percentage (89%) of being insured followed by obese (86%) and normal or underweight (87%). About 26% of obese individuals reported they were unable to receive care due to costs. All three weight categories mostly reported having had a checkup within the past year. Obese had the highest percentage while normal or underweight had the lowest. In terms of general health, about 35% of obese respondents reported being in good health. About 31% of overweight and 33% of normal or underweight individuals reported

their health as very good. A higher percentage of obese individuals reported their health as being fair or poor than the other two weight categories. Obese were also less likely to report their general health as being excellent. About 77% of obese individuals reported having poor physical health in the past month. Normal or underweight respondents were the most likely to reported having poor mental health in the past month. Finally, about 47% of obese reported having poor health preventing them from engaging in their usual activities.

**Table 5. Respondents' health status by weight (%)**

	Obese (n=4,186)	Overweight (n= 4,367)	Normal (n=3,884)
<b>Have insurance coverage</b>	86.34	88.57	86.84
<b>Unable to receive care due to cost</b>	25.9	17.66	19.31
<b>Time Since Last Checkup</b>			
Never	0.72	1.03	1.18
Within the past year	77.16	73.87	72.04
Within 2 years	9.82	11.15	12.31
Within 5 years	6.24	7.01	6.69
5 or more years	6.07	6.94	7.78
<b>General health</b>			
Excellent	5.47	12.18	19.28
Very good	22.17	31.3	33.24
Good	34.5	30	25.77
Fair	24.7	16.78	13.34
Poor	13.16	9.73	8.37
<b>Have poor physical health</b>	76.59	70.74	65.35
<b>Have poor mental health</b>	61.47	59.45	64.52
<b>Poor health preventing usual activities</b>	47.37	38.68	38.7

The results of the logistic regression are shown in Table 6, reported are the odds ratio for having insurance coverage by weight status, and before and after ACA with controls for potential confounding from gender, education level, income

level, employment status, age, metropolitan status, race, checkup, unable to receive care due to cost, general health, have poor physical health, have poor mental health, and poor health preventing usual activities. No significant

differences were seen in the likelihood of having insurance plan by weight status. Finally, after the Affordable Care Act was passed, Georgians were 21% less likely to have insurance ( $p<0.01$ ). Confounding from race was not significant for any race category. However, there were significant confounding from education status. Those with less than high school education were 41% less likely to have health insurance than college graduates ( $p<0.001$ ) followed by high school graduate (32% less likely,  $p<0.001$ ) and some college (21% less likely,  $p<0.001$ ). Males were 53% less likely to have health insurance than females ( $p<0.001$ ). Each age category under the age of 65 were at least 81% less likely to have insurance than those over 65 ( $p<0.001$ ). Those between 18 and 25 were the least likely (89%,  $p<0.001$ ) to have insurance coverage. Likelihood of having insurance increased with age. Individuals living outside of the MSA were 17% less likely to have insurance than those within a city center ( $p=0.026$ ). Income revealed similar

trends to age, higher the income more likely an individual would be insured. Those with an income less than \$15,000 were 73% less likely ( $p<0.001$ ) than those with an income higher than \$50,000 to have insurance. Regarding employment, those employed for wage were 37% less likely to have insurance ( $p=0.003$ ). Students were 48% less likely to have insurance than retired ( $p=0.003$ ). Homemakers and those with no work for less than one year were just under 45% less likely to have insurance ( $p<0.001$ ). Self-employed and those without work for over a year were 71% and 74%, respectively, less likely to have insurance than the retired population ( $p<0.001$ ). Individuals unable to receive care due to cost were 43% less likely to have insurance ( $p<0.001$ ). Those who have had a longer time since their last checkup were less likely to have insurance ( $p<0.001$ ). The other health related measures were not significant.

**Table 6. Odds ratio from logistic regression**

	Odds ratio	p value	95% CI
<b>BMI</b>			
Obese	1.05	0.564	0.90-1.21
Overweight	1.12	0.125	0.97-1.31
Normal or underweight	1.00		
<b>Year</b>			
After ACA	0.79	<0.001	0.69-0.89
Before ACA	1.00		
<b>Education</b>			
< High school	0.59	<0.001	0.48-0.74
High school graduate	0.68	<0.001	0.57-0.81
Some college	0.79	0.007	0.66-0.94
College graduate	1.00		
<b>Gender</b>			
Male	0.47	<0.001	0.41-0.55
Female	1.00		
<b>Age</b>			
18-24	0.11	<0.001	0.07-0.16
25-34	0.14	<0.001	0.09-0.20
35-44	0.14	<0.001	0.10-0.20
45-54	0.18	<0.001	0.13-0.25
55-64	0.19	<0.001	0.13-0.26
≥ 65	1.00		
<b>Metropolitan status</b>			
Not in MSA	0.83	0.026	0.71-0.98
MSA suburban county	0.88	0.112	0.75-1.03
MSA county	0.97	0.795	0.78-1.20
MSA city center	1.00		
<b>Income</b>			
< \$15,000	0.27	<0.001	0.22-0.34
\$15,000-24,999	0.32	<0.001	0.27-0.39
\$25,000-34,999	0.50	<0.001	0.40-0.62
\$35,000-49,999	0.66	<0.001	0.54-0.81
≥ \$50,000	1.00		
<b>Employment status</b>			

	Odds ratio	p value	95% CI
Employed for wages	0.63	0.003	0.46-0.85
Self-employed	0.29	<0.001	0.21-0.40
No work > 1 Year	0.26	<0.001	0.18-0.37
No work < 1 Year	0.36	<0.001	0.25-0.52
Homemaker	0.38	<0.001	0.26-0.56
Student	0.52	0.003	0.34-0.81
Retired	1.00		
<b>Health</b>			
Unable to receive care due to cost	0.37	<0.001	0.33-0.42
Time Since last checkup	0.76	<0.001	0.72-0.81

Race had no significant confounding effect, hence not reported in the table.

## DISCUSSION

This study examines access to health care by weight status in the state of Georgia using insurance coverage as a proxy to health care access and thus utilization of obesity prevention and treatment-oriented health care services. Findings suggest that obese and overweight residents did not have a higher likelihood of having insurance coverage compared to non-obese individuals. The direction of the coefficients was as expected, but not significant. Further, Georgia residents were less likely to be insured after the Affordable Care Act was passed. This was not entirely expected due to the individual mandate outlined by the reform law. This result was different from another study that found that there was a 27.4% decrease in uninsured rates between 2010 and 2015. This study found larger decreases in uninsured rates for the three southern states that expanded Medicaid in 2014 than those that did not (Garret. & Gangopadhyaya, 2016). However, this study did not look at weight status. These differences could be attributed to Georgia lawmakers not expanding Medicaid. Several Georgians may have fallen in the coverage gap and were unable to afford insurance coverage. Living outside of an MSA may have influenced this association, as nearly 30% of respondents lived outside these areas. This population was the second largest of the overall respondents. This region was the only area that had a statistically significant association with having less insurance than those living in a city center. Such, rural urban gap in health care safety net program has also been previously documented in the state of Georgia (Minyard et al., 2016).

Obesity has been found to be associated with certain socioeconomic status (SES). One meta-analysis found that overall, those with lower SES were more likely to be obese (Newton et al., 2017). Though there are individual variation, there is a predictable pattern. Studies have found that those with higher incomes and higher education levels were more likely to be insured (Swinburn, 2011 and Hong et al., 2016). This is consistent with our findings. This could be because those with higher incomes may find insurance more affordable and would be more willing to purchase it. Several factors can influence the relationship between education and insurance status. Educated adults are less likely to be unemployed, as well as have higher incomes. More educated individuals may have the knowledge or social

networks to help navigate healthcare more easily. They may also live in areas where insurance is more accessible than less educated individuals (Zimmerman et al., 2015). Males having less insurance is consistent with other research (Day et al., 2015; Long et al., 2011; Hong et al., 2016; Dahlen, 2015). Each study reported similar numbers and that the percentage of men and women having insurance grew closer after the ACA was passed. Similar percentages of men and women having Medicare and private insurance were found (Day et al., 2015).

The findings of this study have policy implications at the state level. Obese and overweight individuals of Georgia not having a higher likelihood of having insurance coverage is concerning. It is further concerning that there was decrease in insurance coverage after the Affordable Care Act. Health insurance can help reduce the costs of health care services for patients, including obese patients who are at a higher risk for diseased condition. This would especially be beneficial for lower income individuals who were found to be less likely to have insurance. Therefore, Georgia lawmakers should consider expanding Medicaid. Efforts also should be made to increase the insurance rates for those who would qualify for employer-sponsored or Marketplace based plans as well. This could increase the number of individuals, including obese and overweight individuals, with health insurance, as well as the number of individuals who have access to healthcare. Special attention is also needed to increase insurance coverage among individuals with obesity and overweight in future policies developed to promote insurance coverage.

In addition to increasing the number of insured individuals, expansion of insurance coverage, specifically to low income population through Medicaid can positively influence economic activity and employment rates at the state level. One report noted that 70,343 jobs could be created statewide in Georgia because of Medicaid expansion, mostly in the healthcare sector. Real estate, food services, transit and ground passenger transportation, employment services, wholesale trade businesses, and construction would also see an increase in employment. Yearly economic output would increase by an average of \$8.2 billion because of these new jobs. State and local tax revenue would be increased by an average of \$276.5 million, annually (Custer, 2013). Another report noted that an investment of 1% of the state

budget could create \$65 billion in new economic activity over 10 years, as well as create over 56,000 jobs throughout Georgia. State and local tax revenue would increase by \$2.2 billion over the same 10-year period (Sweeney, 2013).

## CONCLUSIONS

This study aimed to look at the association between weight status and insurance coverage among Georgia residents and how the ACA influenced this association. Results concluded that obese and overweight residents in the state of Georgia did not have a higher likelihood of having insurance coverage compared to non-obese individuals. This conclusion is concerning as the literature is well established that obese and overweight individuals are at a higher risk for several preventable chronic disease conditions. Further, having access to healthcare is crucial to this population for obesity prevention and treatment. Suggested that Georgia residents were less likely to have health insurance after the ACA was passed. This study demonstrates the need to promote insurance for Georgia residents.

## Acknowledgements

There was no funding for this data.

**Statement of Student-Mentor Relationship:** The lead author for this report is Elizabeth Pullekines, a Master of Public Health student in the Department of Health Policy and Management, College of Public Health, University of Georgia. Dr. Janani Rajbhandari-Thapa, the senior author, served as her mentor.

## References

Cawley J, Meyerhoefer C. The medical care costs of obesity: an instrumental variables approach. *J Health Econ.* 2012; 31(1):219-230. Doi: 10.1016/j.jhealeco.2011.10.003.

Centers for Disease Control and Prevention. (2017). BRFSS Prevalence & Trends Data. Retrieved from <https://www.cdc.gov/brfss/brfssprevalence/index.html>.

Custer, W.S. (2013, February). The Economic Impact of Medicaid Expansion in Georgia. *Healthcare Georgia Foundation*. Retrieved from [http://www.healthcaregeorgia.org/uploads/file/Georgia\\_Medicaid\\_Economic\\_Impact.pdf](http://www.healthcaregeorgia.org/uploads/file/Georgia_Medicaid_Economic_Impact.pdf).

Dahlen, H.M. (2015). "Aging Out" of Dependent Coverage and the Effects on US Labor Market And Health Insurance Choices. *American Journal of Public Health, Supplement 105(55)*, S640-S650.

Day, J.C., O'Hara, B., Taylor, D. (2015, September 16). Another Difference Between the Sexes-Health Insurance Coverage: Men Lag Behind Women in Health Insurance Coverage. *Census*. <http://blogs.census.gov/2015/09/16/another-difference-between-the-sexes-health-insurance-coverage-3/>.

Finkelstein, E.A., Fiebelkorn, I.C., Wang, G. (2004). State-Level Estimates of Annual Medical Expenditures Attributable to Obesity. *Obesity Research, 12(1)*, 18-24. Doi: 10.1038/oby.2004.4.

Flegal, K.M., Carroll, M.D., Kit, B.K., Ogden, C.L. (2012, February 1). Prevalence of obesity And trends in the distribution of body mass index among US adults, 1999-2010. *JAMA, 307(5)*, 491-7. Doi: 10.1001/jama.2012.39.

Georgia Department of Public Health. Community Health Needs Assessment Dashboard. *Online Analytical Statistical Information System*. Retrieved from <https://oasis.state.ga.us/CHNADashboard/Default.aspx>

Garrett, B., Gangopadhyaya, A. (2016, December). Who Gained Health Insurance Coverage Under the ACA, and Where Do They Live? *The Urban Institute*. Retrieved from <https://www.urban.org/sites/default/files/publication/86761/2001041-who-gained-health-insurance-coverage-under-the-aca-and-where-do-they-live.pdf>

Gerteis, J., Izrael, D., Deitz, D., LeRoy, L., Ricciardi, R., Miller, T., Basu, J. (2014, April). Multiple Chronic Conditions Chartbook. *Agency for Healthcare Research and Quality*. Retrieved from <https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/prevention-chronic-care/decision/mcc/mccchartbook.pdf>.

Gloy, V., Briel, M., Bhatt, D.L., Kashyap, S.R., Mingrong, G., Bucher, H.C., Nordmann, A.J. (2013, October 22). Bariatric surgery versus non-surgical treatment for obesity: a Systematic review and meta-analysis of randomized controlled trials. *BMJ*. Doi: <https://doi.org/10.1136/bmj.f5934>.

Guh, D.P., Zhang, W., Bansback, N., Amarsi, Z., Birmingham, C.L., Anis, A.H. (2009, March 25). The incidence of co-morbidities related to obesity and overweight: A systematic Review and meta-analysis. *BMC Public Health*. Doi: <https://doi.org/10.1186/1471-2458-9-88>.

Hoffman, C., Paradise, J. (2008, June). Health Insurance and Access to Health Care in the United States. *Annals of the New York Academy of Sciences*. Doi: 10.1196/annals.1424.00

Hong, Y.R., Holcom, D., Bhandari, M., Larkin, L. (2016). Affordable care act: comparison of Healthcare indicators among different insurance beneficiaries with new coverage Eligibility. *BMC Health*. Doi: 10.1186/s12913-016-1362-1.act.

H.R. 3590-111<sup>th</sup> Congress: Patient Protection and Affordable Care. (2010). Retrieved from <https://govtrack.us/congress/bills/111/hr3590>.

Kraschnewski, J. L., Sciamanna, C. N., Stuckey, H. L., Chuang, C. H., Lehman, E. B., Hwang, K. O., . . . Nembhard, H. B. (2013). A silent response to the obesity epidemic: decline in US physician weight counseling. *Med Care, 51(2)*, 186-192. doi:10.1097/MLR.0b013e3182726c33

Katz, D.L., Faridi, Z. (2007). Health Care System Approaches to Obesity Prevention and Control. In Kumanyika, S., Brownson, R.C. (Eds.), *Handbook of Obesity Prevention: A Resource for Health Professionals* (285-316). New York, NY: Springer Science + Business Media, LLC.

Kent, S., Fusco, F., Gray, A., Jebb, S.A., Cairns, B.J., & Mihaylova, B. (2017, May 22). Body Mass index and healthcare costs: a systematic literature review of individual participant Data studies. *Obesity Reviews*. Doi: 10.1111/obr.12560.

Lee, J.S., Sheer, J.L.O., Lopez, N., & Rosenbaum, S. (2010, July-August). Coverage of Obesity Treatment: A State-by-State Analysis of Medicaid and State Insurance Law. *Public Health Report, 125(4)*: 596-604. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC288611/>.

Long, S.K., Stockley, K., Shulman, S. (2011). How Gender Gaps in Insurance Coverage Access to Care Narrowed under Health Reform? Findings from Massachusetts. *American Economic Review: Papers & Proceedings, 101(3)*, 640-644. Doi: 10.1257/aer.101.3640.

McAlpine, D. D., & Wilson, A. R. (2007). Trends in obesity-related counseling in primary care: 1995-2004. *Med Care, 45(4)*, 322-329. doi:10.1097/01.mlr.0000254575.19543.01

Milbank, Q. (2005, December). Societal and Individual Determinants of Medical Care Utilization in the United States. *The Milbank Quarterly*. Doi: 10.1111/j.1469-0009.2005.00428.x.

- Minyard, K., Parker, C., Butts, J. (2016). Improving rural access to care: Recommendations for Georgia's health care safety net. *Journal of Georgia Public Health Association*, 5(4), 387-396. Retrieved from [https://www.gapha.org/wp-content/uploads/2016/06/14-5.412-Improving-rural-access-to\\_care.pdf](https://www.gapha.org/wp-content/uploads/2016/06/14-5.412-Improving-rural-access-to_care.pdf).
- Must, A., Spadano, J., Coakley, E.H., Field, A.L., Colditz, G. & Dietz W.H. (1999, October 27). The Disease Burden Associated With Overweight and Obesity. *The JAMA Network*. Retrieved from <http://jamanetwork.com/journals/jama/fullarticle/192030>
- Newton, S., Braithwaite, D., Akinyemiju, T.F., Xiao, G. (Ed.) (2017, May 16). Socio-economic status over the Life course and obesity: Systematic review and meta-analysis. *PLoS One*, 12(5). Doi: 10.1371/journal.pone.0177151.
- Ogden CL, Carroll MD, Kit BK, Flegal KM. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. 311(8):806-814. Doi: 10.1001/jama.2014.732
- Oschman, J.L. (2011, April). Chronic Disease: Are We Missing Something? *Journal of Alternative Complementary Medicine*, 17(4): 283-285. Doi: 10.1089/acm.2011.0101.
- Peterson, M.D., Mahmoudi, E. (2015). Healthcare Utilization Associated with Obesity and Physical Disabilities. *American Journal of Preventative Medicine*, 48(4): 426-435. Doi: [10.1016/j.amepre.2014.11.007](https://doi.org/10.1016/j.amepre.2014.11.007).
- Sweeney, T. (2013, February). The Dollars and Sense of Expanding Medicaid in Georgia: Medicaid Expansion Yields Great Return for Georgia's Economy. *Georgia Budget & Policy Institute*. Retrieved from <https://gbpi.org/wp-content/uploads/2013/02/Cover-Georgia1.pdf>.
- Swinburn, B.A., Sacks, G., Hall, K.D., McPherson, K., Finegood, D.T., Moodie, M.L., Gortmaker, S.L. (2011, August 27). The global obesity pandemic: shaped by global Drivers and local environments. *Lancet*, 378(9793), 804-14. Doi: 10.1016/S0140-6736(11)60813-1.
- Yoon, P.W., Bastian, B., Anderson, R.N., Collins, J.L., Jaffe, H.W., & Centers for Disease Control and Prevention (CDC). (2014, May 2). Potentially preventable deaths from the five leading Causes of death – United States, 2008-2010. *Morbidity and Mortality Weekly Report*, 63(17), 369-74. Retrieved from <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6317a1.ht>.
- Zimmerman, E.B., Woolf, S.H., Haley, A. (2015, September). Population Health: Behavioral and Social Science Insights: Understanding the Relationship between Education and Health. *Agency for Healthcare Research and Quality*. Retrieved from [https://www.ahrq.gov/professionals/education/curriculum-tools/population\\_health/zimmerman.html](https://www.ahrq.gov/professionals/education/curriculum-tools/population_health/zimmerman.html).

© Elizabeth Pullekines, and Janani Rajbhandari-Thapa. Originally published in jGPHA (<http://www.gapha.org/jgpha/>) October 25, 2019. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial No-Derivatives License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work ("first published in the Journal of the Georgia Public Health Association...") is properly cited with original URL and bibliographic citation information. The complete bibliographic information, a link to the original publication on <http://www.gapha.jgpha.org/>, as well as this copyright and license information must be included.