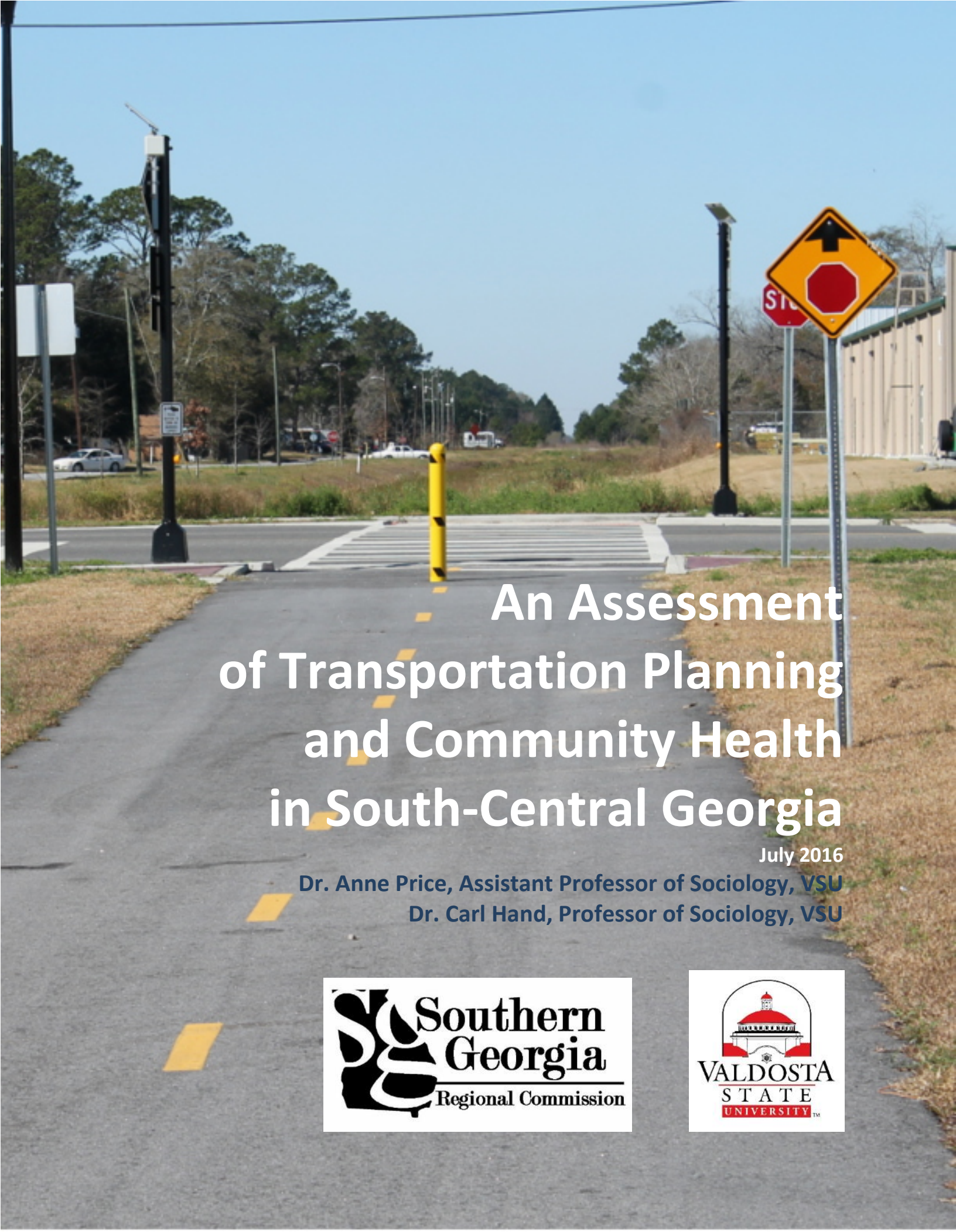

An Assessment of Transportation Planning and Community Health in South-Central Georgia

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The Transportation Planning and Health Connection

Transportation planning decisions have important health impacts for individuals living within a community. The Center for Disease Control and Prevention (CDC) calls cities where walking and bicycling are part of everyday life, "Active Community Environments" (ACEs) to highlight that creating cities where people can easily walk and bicycle for exercise is a public health issue (Roerty et al. 2010). Transportation infrastructure can facilitate or hinder people's healthy lifestyle behaviors, such as accessing healthy, affordable food, making regular doctor's visits, utilizing employment services, and obtaining good jobs. Safe street and sidewalk networks allow for walking and bicycling as exercise or active commuting. Thus, "complete streets," meaning streets designed for use by all users, including pedestrians, bicyclists, motorists, and those using mobility aides (strollers or wheelchairs for example), have positive impacts on community health. In addition, multi-use trails or "greenways" (paths restricted to bike and pedestrian travel) can be used for exercise, socializing, and relaxation.

Changes in Activity and the Health Crisis in the United States

Over the past thirty to fifty years, a decline in the amount of bicycling and walking Americans do has coincided with a dramatic rise in the percentage of the population that is overweight or obese. The incidence of overweight or obese adults rose from 47% in 1976 to 68% in 2007 (Roerty et al.). Percentages for children look similar. Because of this, obesity in the U.S. has been called a public health crisis (Ebbeling et. al. 2002, Lobstein et. al. 2004). Both the abundance of unhealthy food and the decline of physical activity are thought to have contributed to the rise of obesity in the U.S. (Marks 2004).

> "Food is available everywhere, and people are bombarded with food ads. There are fewer opportunities for exercise, and in many places, no bike paths, sidewalks, or easily accessible stairways. The poor may be especially hard hit: grocery stores in low-income neighborhoods may not be safe enough to get out and walk around in" (Marks 2004).

One study found that over the last fifty years, Americans have seen stable or slight increases in leisure-time physical activity, but declines in work-related physical activity, physical activity for transportation, and physical activity in the home. There has also been a rise of sedentary time in the home. Some of the greatest declines were noted in the rates of walking for transportation, which coincided with an increase in travel by vehicles and Americans living in the suburbs. The authors concluded that changes in availability of walking and cycling and an increase in sedentary activity has led to much of the American population not getting enough physical activity (Brownson, Boehmer, and Luke 2005). In 1969, 41% of all children either walked or biked to school, but today that has dropped to 13-17% (Roerty et al. 2010).

Proven Community Design to Improve Community Health

Studies have demonstrated that incorporating physical activity into daily life has important health benefits, and is an achievable public health alternative to scheduled sports and exercise (Anderson et al. 2000, WHO 2002, Cavill et al. 2008). Research has demonstrated that bicycling for everyday travel can be sufficient to meet recommended levels of weekly physical activity, and that "connected neighborhood streets and a network of bicycle-specific infrastructure to encourage more bicycling among adults" leads to greater physical activity for utilitarian purposes (Dill 2009: 95). However, concerns over safety discourage bicycling as commuting, particularly for women (Garrad, Rose, and Lo 2008). Previous work in the United States has demonstrated a link between sedentary transportation and the incidence of obesity and diabetes (Grammenos 2011, Godwin and Price 2012). In previous work, Godwin and Price (2012) identify a "non-active transportation belt" of the U.S. where the percentages of commuters who drive to work is highest. This region, which stretches throughout the Appalachians and the Deep South, corresponds to the region of the U.S. that other researchers have identified as having particularly high incidence of obesity and diabetes. Although a number of factors including lower college education rates and lower average income contribute to health disparities in the South, research has shown that a third of the excess diabetes risk in the region can be attributed to obesity and a sedentary lifestyle (Barker et al. 2011). Obesity and diabetes are considered by experts to be modifiable risk factors; this mean that they are health risks that can often be reduced or eliminated with lifestyle changes, such as increased physical activity. Transportation planning that allows for individuals to safely increase their daily activity levels can lead to improved community health.

Research has shown that transportation planning for physical activity has important economic benefits for communities via its role in improving public health. A meta-analysis of the literature on infrastructure changes and improved health demonstrates that "cost-benefit analyses of cycling and walking infrastructure generally produce positive benefit-cost ratios" (Cavill et al. 2008:14). In their meta-analysis, Cavill et. al. found that studies had demonstrated a number of different positive public health outcomes associated with improvements to cycling and walking infrastructure, including reduced medical costs for active people (Cavill et al. 2008). Overall, the literature demonstrates that costs involved in improving infrastructure to increase physical activity produce economic benefits in terms of reduced costs of diseases.

Summary : The Transportation & Health Relationship

1) Transportation infrastructure can facilitate or hinder people's healthy lifestyle behaviors, such as accessing healthy food & making doctor's visits (Beaulac et. al. 2009)

2) Active Transportation leads to better health

- **Incorporating physical activity into the daily commute is more achievable than scheduled sports & exercise (Anderson et al 2000, WHO 2002)**
- **Networks of bicycle specific infrastructure leads to more bicycling among adults (Dill 2009)**

3) Conversely, sedentary transportation correlates with poor health

- **At the regional level, more time in the car correlates with high obesity and diabetes rates (Godwin & Price 2012)**

4) Concerns over safety discourage bicycling as commuting, particularly for women (Garrad, Rose, and Lo 2008)

5) Improvements in walking & cycling infrastructure may pay for itself—

- **In reduced medical costs (Cavill 2008; Blincoe et al. 2015)**
- **In decreasing crashes involving pedestrians & bicyclists and the associated costs**
- **In 2010, costs of crashes were estimated at $11 billion (Blincoe et al. 2015: 226)**

Background on Transportation & Health Concerns in the Southeast USA

The southeast United States has relatively flat terrain and comfortable weather for outside activities up to nine months of the year. However, bicycling and walking commuting rates are lower in the southeast

United States than in other areas of the country). The southeast has six of the ten states with the lowest rates of bicyclist commuters and seven of the ten states with the lowest rates of pedestrian commuting in the U.S. (Godwin and Price 2016, see Figure 1). In addition, the southeast USA is more dangerous for cyclists and pedestrians, with higher crash and fatality rates. The southeast contains eight of the ten states with the highest bicycle fatality rates per bicycle commuter and five of the ten states with the highest pedestrian fatality rates per walking commuter (Godwin & Price 2016).

The region also does poorly in terms of modifiable risk factors. Five of the ten states with the highest rates of obesity are in the region and eight of the ten states with the highest rates of diabetes (Godwin and Price 2016, citing CDC 2013 data).

It is difficult to tease out exactly why active transportation rates in the southeast are so low, but there are likely a number of factors that contribute.

Geographic/Planning Factors

The southeast USA tends to have very low-density urban areas (associated with urban sprawl) and higher-density rural areas (resulting in higher traffic volumes in rural areas). These factors decrease perceived and actual safety for bicyclists and pedestrians, which several studies have shown deter walking and biking (see Godwin & Price 2016). In addition, trip distances are longer in lower-density urban areas than they are in higher-density urban areas and research has shown that longer trip distances discourage walking and biking (see Godwin and Price 2016 for references to these studies).

Demographic Factors

Demographic factors may also contribute to explaining why cycling and walking mode shares are so low in the southeast United States. The central Deep South states are among the poorest in the nation (Godwin and Price 2016). For the poor, cycling may be an "identity threat" in that it has a negative cultural association with poverty, more so than for the middle class (Aldred 2013). In poor areas, cycling and walking may be seen as behaviors of those only with no other means of transportation, rather than as a lifestyle choice.

Race may be a factor in low cycling rates. The southeast United States (particularly the Deep South) has a higher percentage of African American residents than other areas of the country. Previous research has shown that African Americans tend to use bicycling for fewer trips than whites or Latinos (Pucher 2011).

Climate

In popular conversation, the warm to hot climate of the southeast United States is often cited as a deterrent to active transportation. But, in fact, the southeast appears to have at least as many days of the year that are in the ideal temperature range for active commuting (as determined by various researchers) as other regions in the country (Godwin &Price 2016). In fact, with April through October being ideal walking and cycling temperatures in the south, the region may actually be more hospitable for outside activity than other areas of the country with high cycling mode shares, such as Minneapolis. In sum, there does not seem to be a strong case for the idea that poor climate is driving low rates of walking and cycling for commuting in the southeast.

Policies and Legislation

Although the southeast U.S. is similar to the rest of the country in terms of setting appropriate goals and legislation to improve bicycle and pedestrian safety, it does lag behind the rest of the country in promoting active transportation (Godwin & Price 2016). No states in the central Deep South region have a published goal of increasing rates of either biking or walking (Godwin & Price 2016).

Infrastructure and Funding

The southeast of the United States (excluding Florida, which is an outlier), generally has lower levels of bicycle and pedestrian funding than the rest of the country. The region also has less infrastructure for bicycling and walking (Godwin & Price 2016). The central Deep South region (the southeast excluding Florida) trails the rest of the country in terms of miles of rail trails. While the rest of the nation had an average of 7.79 miles per 1,000 people, the central Deep South had only 1.85 per 1,000 people (Godwin & Price 2016). However, Georgia fares quite well compared to the rest of the region, ranking the sixth highest in the nation for per-capita planned spending for bicycle and pedestrian-only projects (Godwin & Price 2016).

Figure 1. Percent of Commuters Who Bike or Walk by county, 2010-2014 Census Data
Figure Source: Godwin & Price. 2012

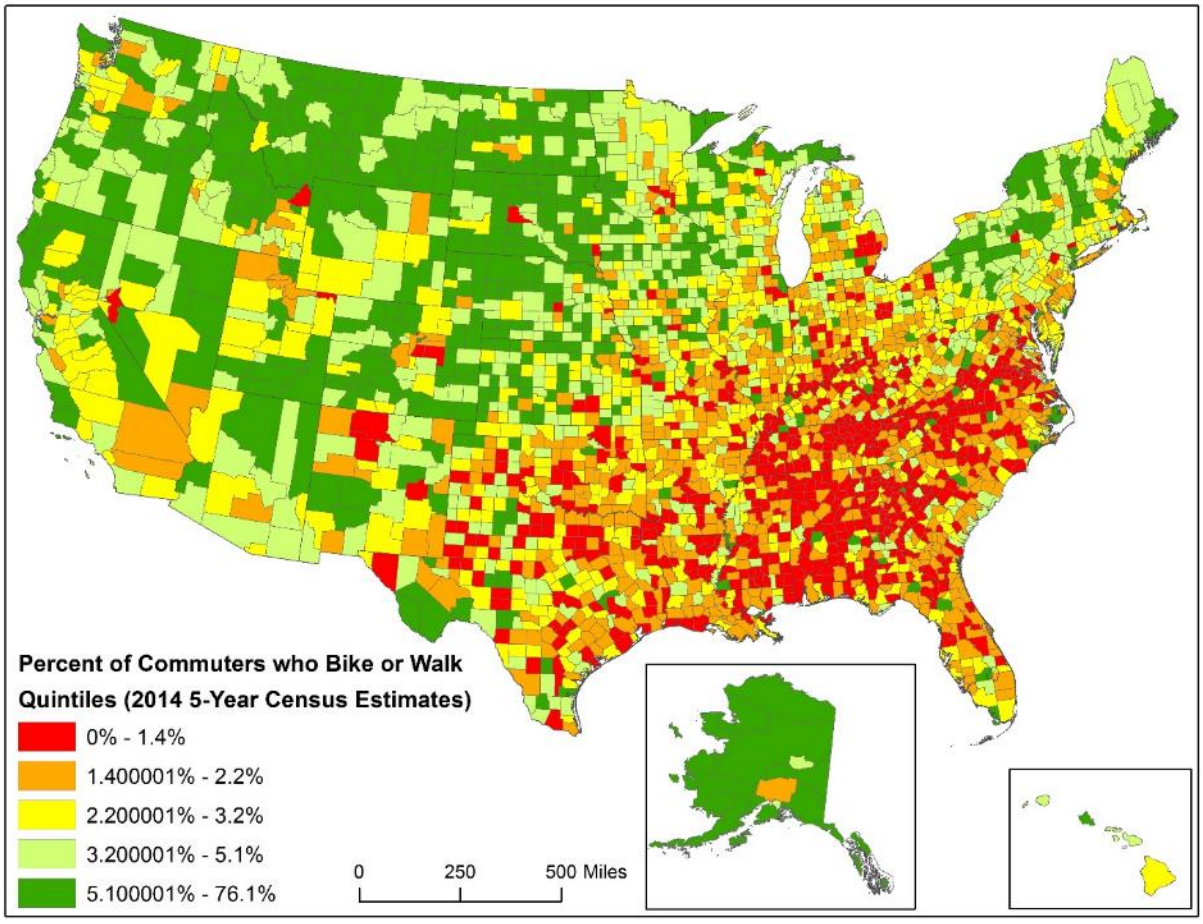
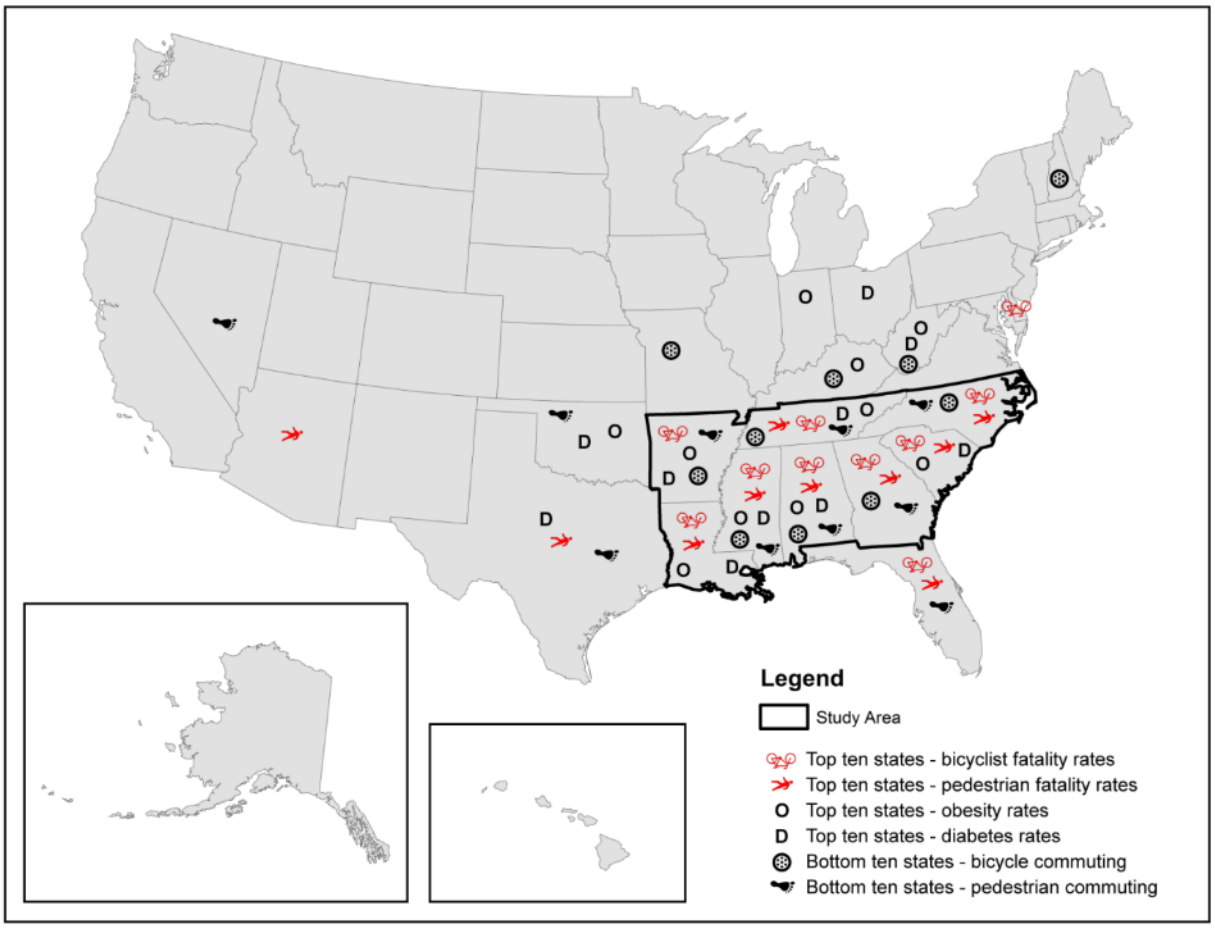


Figure 2. Top ten states for pedestrian and bicyclist fatality rates (2011-2013), obesity rates (2014), and diabetes rates (2013); bottom ten states for bicycle and pedestrian commute mode share (2011-2013). Data sources: CDC 2013, CDC 2014, NHTSA 2013, NHTSA 2013a, NHTSA 2014, NHTSA 2014a, NHTSA 2015, NHTSA 2015a, U.S. Census Bureau 2013b.
Figure Source: Godwin &Price, 2016



Purpose of the Study

The purpose of this project is to complete a quantitative and spatial analysis of health issues affecting an 18-county region in south-central Georgia. The key objectives are to provide findings that will: 1) assist in prioritizing planning projects in the region served by the Southern Georgia Regional Commission to benefit community health, and 2) inform state and local officials on how investment in active transportation can impact the health of the community. These findings will be provided in a report to the SGRC that will be available electronically and in hard copy. This analysis will also provide the baseline

data and findings to be used as part of seeking extramural funding from the Center for Disease Control for a larger-scale health assessment for the region. Secondary data for analysis will come primarily from the Robert Wood Johnson (RWJ) Foundation's County Health Rankings and Roadmap data (2015) and the Census's American Community Survey 2014 five-year estimates. In conjunction with other sources, these will be used to identify how county and census tract-level factors contribute to community health in the region. The RWJ data will be used to identify the key health concerns affecting the region at the county level. Particular attention will be given to modifiable health concerns, including obesity and diabetes rates. These are modifiable health issues, where transportation infrastructure can play a key role in decreasing incidence. The census data will be used to gather data on socio-economic status, educational attainment, and transportation options at the census tract-level. Combined, these two data sets can be used to look at the effect of transportation and other factors on health outcome rankings for each county. The findings will be used to target particular counties and neighborhoods that are 1) socio-economically disadvantaged; 2) at high risk for health issues; and 3) in need of multi-modal, alternative (bicycle and pedestrian) transportation improvements.

Study Outcomes and Deliverables

Outcomes from the proposed project include: 1) findings presented in the form of a report made available in hard and electronic copy to SGRC, as well as additional figures, tables, and data analysis not included in the final report; 2) presentations at professional meetings in 2015 and 2016 to disseminate findings and receive feedback to strengthen the project; and 3) a grant proposal seeking extramural funding for a continuation of the study. The report from this project will be structured such that the data indicators can potentially be updated in the future in order to continue tracking community health trends over time.

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Chapter 2. Demographic and Health Overview of the Region

Introduction

This chapter provides an overall demographic profile of District 11, an 18 county region in South Georgia. The chapter will first examine changes in the population since 2000 through 2014 as well as some leading health indicators for the region. Addressing improving health through enhanced transportation infrastructure requires examining how patterns of social and economic inequality might impact the planning process. Thus the second part of this chapter examines the geographic location of low incomes, minority, and disadvantaged populations within Region 11. This analysis is framed in terms of environmental justice debate. While this debate initially addressed disadvantaged groups unequal exposure to environmental hazards, it has grown to include ". . . the right for all individuals to have equal access to a safe, healthy, productive, and sustainable environment, with environment referring to both ecological factors and built infrastructure" (Lane et al 2015).

Population Change and Health Status

Table 1 examines population change for the state as a whole and the 18 counties of District 11. As the table indicates, overall state population increased 23.3 percent between 2000 and 2014. District 11 increased approximately half this number or 12.5 percent during the same period. Specific counties range significantly with highest positive growth occurring in Lanier County at 43.0 percent. Two counties, Irwin and Turner, experienced a net decline in population during this period (-4.5 percent and -10.7 percent respectively). Much of this change occurred between 2000 and 2010 as might be expected. Between 2010 and 2014, the overall district remained relatively stable, growing by only 1 percent. Population growth varied between counties ranging from a high of 7.6 percent for Charlton to a population decline of nearly 5 percent for Turner County. The average population change for the 18

county region between 2000 and 2014 was 10.8 percent while it was just .25 percent for the period between 2010 and 2014.

Table 1. Population Change from 2000 to 2014

	Population 2014	Population 2010	Population 2000	Population Change 2000-2014 (%)	Population Change 2010-2014 (%)
Georgia	10,097,343	9,687,653	8,186,453	23.3	4.2
District 11	**410601**	**406,583**	**364,925**	**12.5**	**0.99**
Atkinson	8,297	8,375	7,609	9.0	-0.93
Bacon	11,196	11,096	10,103	10.8	0.90
Ben Hill	17,547	17,634	17,484	0.4	-0.49
Berrien	19,091	19,286	16,235	17.6	-1.01
Brantley	18,463	18,411	14,629	26.3	0.28
Brooks	15,766	16,243	16,450	-4.2	-2.94
Charlton	13,098	12,171	10,282	27.4	7.62
Clinch	6,777	6,798	6,878	-1.5	-0.31
Coffee	42,947	42,356	37,413	14.8	1.40
Cook	17,061	17,212	15,771	8.2	-0.88
Echols	4,018	4,034	3,754	7.0	-0.40
Irwin	9,482	9,538	9,931	-4.5	-0.59
Lanier	10,356	10,078	7,241	43.0	2.76
Lowndes	112,515	109,233	92,115	22.1	3.00
Pierce	18,860	18,758	15,636	20.6	0.54
Tift	40,721	40,118	38,407	6.0	1.50
Turner	8,491	8,930	9,504	-10.7	-4.92
Ware	35,915	36,312	35,483	1.2	-1.09

Table 2 examines the percentages of the population who are physically inactive and the Years of Potential Life Lost Rate. The latter variable measures the number of years lost to premature causes of death prior to the age of 75 for every 100,000 members of the population (CDC 2016). The variable provides an overall indicator of the health and well-being of the population. The average rank for District 11 counties for both percent who are physically inactive, and the YPLL is at the beginning of the top third

(higher rank indicates worse health status relative to all 159 counties). The three most physically inactive counties are Bacon, Turner and Ware, while the three least physically inactive counties are Brantley, Echols and Irwin. For YPLL, the three counties in District 11 with the highest YPLL are Brantley, Clinch, and Turner while the three lost three lowest are Brooks, Echols and Coffee.

Table 3 examines another important indicator of overall health—access to health insurance. The average percentage without health insurance in District 11 went from 25.8 to 23.9 percent, a decline of 1.9 percent. Despite this decline, the average county rank in the state without health insurance increased from 125 to 128 (relative to 159 counties). The percentage without insurance varies greatly between counties in the district. For 2014 these values range between a low of 17.6 percent for Irwin County to a high of 34.6 percent for Echols County. Despite the implementation of the Affordable Care Act in 2014, Berrien, Brantley and Cook Counties saw no change or a decline in health coverage. For 2014, 8 of the 16 counties in District 11 have uninsured rank above 140.

Table 2. Percent Physically Inactive and Years of Potential Life Lost (YPLL) Rate

	Percent Physically Inactive %	Rank in State*	Rank in District 11	YPLL Rate 2010 (in Years)	Rank in State*	Rank in District 11
District 11 Average	**30.4**	108.6	___	**9899**	103	___
Atkinson	**30.1**	109	7	**10,393**	120	13
Bacon	**33.4**	152	16	**10,791**	133	14
Ben Hill	**32.6**	147	14	**9595**	95	8
Berrien	**30.9**	127	11	**8485**	85	5
Brantley	**26.5**	35	1	**11,052**	140	16
Brooks	**31.3**	137	13	**7935**	44	1
Charlton	**30.2**	112	8	**9240**	85	6
Clinch	**31.1**	133	12	**12,215**	153	18
Coffee	**30.7**	120	10	**8798**	75	3
Cook	**29.8**	103	5	**10,262**	112	11
Echols	**26.9**	41	3	**8113**	52	2
Irwin	**26.7**	37	2	**10,285**	114	12
Lanier	**29.8**	103	6	**9834**	103	9
Lowndes	**27.3**	55	4	**9260**	86	7
Pierce	**30.6**	118	9	**10,962**	139	15
Tift	**35.2**	118	17	**9189**	84	4
District 11 Average	**30.4**	108.6	___	**9899**	103	___
Turner	**35.2**	157	18	**11,778**	151	17
Ware	**33.1**	151	15	**9993**	107	10
*Higher rank indicates higher percentage or rate						

Table 3. Percent without Health Insurance and percent change between 2010 and 2014.

	No Health Insurance 2010 %	Rank in State*	Rank in District 11	No Health Insurance 2014 %	Rank in State*	Rank in District 11	Percent Change 2010-2014
District 11 Average	**25.8**	**125**	**---**	**23.9**	**128**	**---**	**1.9**
Atkinson	34.0	158	17	30.4	158	17	3.6
Bacon	26.7	148	13	20.1	98	2	6.6
Ben Hill	23.6	105	5	21.3	121	7	2.3
Berrien	25.6	139	10	25.6	150	14	0
Brantley	24.7	127	8	29.5	157	16	-4.8
Brooks	25.0	131	9	24.1	140	11	.9
Charlton	21.1	55	1	23.0	131	9	-1.9
Clinch	21.9	70	2	20.3	104	3	1.6
Coffee	25.7	137	11	23.7	135	10	2.0
Cook	26.7	149	14	27.3	155	15	-.6
District 11 Average	**25.8**	**125**	**---**	**23.9**	**128**	**---**	**1.9**
Echols	35.4	159	18	34.6	159	18	.8
Irwin	24.4	123	7	17.6	61	1	6.8
Lanier	27.2	152	16	21.6	124	8	5.6
Lowndes	24.3	120	6	20.3	104	4	4.0
Pierce	22.8	93	4	21.0	117	6	1.8
Tift	27.1	151	15	24.4	145	13	2.7
Turner	26.0	144	12	24.2	142	12	1.8
Ware	22.5	83	3	20.9	114	5	1.6
*Higher rank indicates higher percentage or rate							

Environmental Justice and Transportation Equity

Social scientists have observed for some time that environmental risks are disproportionately distributed across population subgroups as well as across geographic boundaries (Agyeman 2005). The collective recognition of this fact and the emerging social movement has had more recent origins. The evolving conversation on environmental justice has moved from identification of disproportionate environmental risks born by disadvantaged and minority communities, particularly locally unwanted

land uses (LULUs), to the inequitable effects of public policy. The Environmental Justice Movement achieved a significant milestone in public legitimacy when President Clinton signed Executive Order 12898 in 1994 creating the Office of Environmental Justice and requiring each federal agency to ". . . develop policies to reduce environmental inequity" (Agyeman 2005: 18).

The environmental justice framework has expanded beyond the question of proximity of environmental hazards to disadvantaged and minority communities to include sprawl, smart growth, global warming, environmental health, and community sustainability. One of the most salient areas of growth in this discussion is transportation policy. As Bullard (2014) argues, equitable access to transportation is essential for addressing issues of poverty, economic opportunity and is an essential component of health and quality of life. Transportation investments often benefit higher income and majority communities despite the fact that low income and minority communities are more likely to use and have greater need for public transportation. Transportation investments have fueled urban job loss, suburban sprawl, economic disinvestment and a variety of other social problems. While this particularly true for urban areas, race and class dynamics in rural areas along with inadequate transportation infrastructure and the lack of public transportation also work to isolate disadvantaged populations (Butler Flora and Flora 2013: 236-238). Lane et al (2015) argue that it is essential to identify the geographic location of disadvantaged communities to better serve their health needs through improving transportation infrastructure. Factors used in their research to identify such communities include: census tracts and block groups with disproportionately higher percentage of residents who are minority, 65 or over, or who have higher rates of poverty or low income, Spanish speakers, less than a high school education, single parent households, or residents lacking access to a vehicle. While limited to a single county, their research demonstrates the convergence of these factors for specific census tract and block

groups. Effective transportation planning and policy must account for these factors throughout the planning cycle.

The following tables examine the distribution of economic and social factors for counties in District 11 related to potential areas of social disadvantage. The report will draw out the implications of these findings in its recommendations. Table 4 examines two economic factors assessing the economic well-being of the counties in the district, the median family income and percentage of families in poverty. The median family income for District 11 is $44,329 which is $14,456 below the state median of $58,885. The range for median income between counties falls between $35,376 for Turner County to $53,103 for Charlton County. The family poverty rate for District 11 is 20.5 percent which is 6.4 percent higher than the state rate of 14.2 percent. The rate varies between counties in the district from a high of 31.6 percent for Clinch County to a low of 10.9 percent for Charlton County.

Table 4. Average Median Family Income, Percent in Poverty, and Percent Uninsured in 2014

	Median Family Income 2014	**Percentage of Families in Poverty 2014**		**Median Family Income 2014**	**Percentage of Families in Poverty 2014**
Georgia	$58885	14.2%			
District 11	$44329	20.5%			
Atkinson	$37,250	24.7%	Cook	$42,500	20.5%
Bacon	$48,700	13.7%	Echols	$45,615	21.8%
Ben Hill	$36,760	29.8%	Irwin	$47,385	16.6%
Berrien	$42,191	21.2%	Lanier	$49,518	24.1%
Brantley	$43,494	15.8%	Lowndes	$48,425	18.4%
Brooks	$42,991	21.5%	Pierce	$49,677	15.0%
Charlton	$53,103	10.9%	Tift	$46,725	22.3%
Clinch	$42,500	31.6%	Turner	$35,376	21.1%
Coffee	$42,054	18.7%	Ware	$43,653	20.4%

Census Tract Profiles

Moving from county to census tract level analysis demonstrates that wide variation exist within counties on a number of factors. Table 5 reports three economic variables by census tracts within counties--median income, average percentage of residents who are 150 percent or less of the poverty rate, percentage of residents with less than $25,000 of annual income. In addition, the other variables reported are percent 65 years or older or 5 years or younger, percent minority, percent Hispanic, percent unemployed and mean travel time to work. These factors will be examined later with respect to percentage of respondents who bike or walk to work. The wide variation in the Census Tracts within counties demonstrates that wide variation in these factors exist within counties. Figure 3 examines percent of population who are 65 years and older by census tract while Figure 4 examines the percent of each census tract with minority residents.

Table 5. Selected Demographic Factors District 11 Census Tracts

	Mean	**SD**	**Census Tract Range**
Mean Individual Median Income	$20,166	$5174	$7,881 to $36,759
Percentage less than 150% Poverty Rate	39.6%	12.9%	11.7 % to 38.7%
Percentages with less than $25,000 Income	26.9%	13.3%	11.1% to 46.6%
Percentage 65 years or older	13.3%	4.4%	5% to 26.6%
Percentage with Less than HS Grad	21.1%	7.6%	2.4% to 38.1%
Percentage Under 5 years	6.8%	2.3%	2.4% to 13.7%
Percentage Hispanic or Latino/a	7.1%	7.0%	0% to 35.3%
Percentage Minority	36.3	22.0	3.1% to 93.8%
Percentage Walked or Biked to Work	2.0%	2.7%	0% to 13.8%
Percentage Unemployed	5.0%	2.5%	<1% to 12.2%
Mean Travel Time to Work	21.5	5.1	12.4% to 35.7%

Figure 3. Population Percent 65 Years of Older

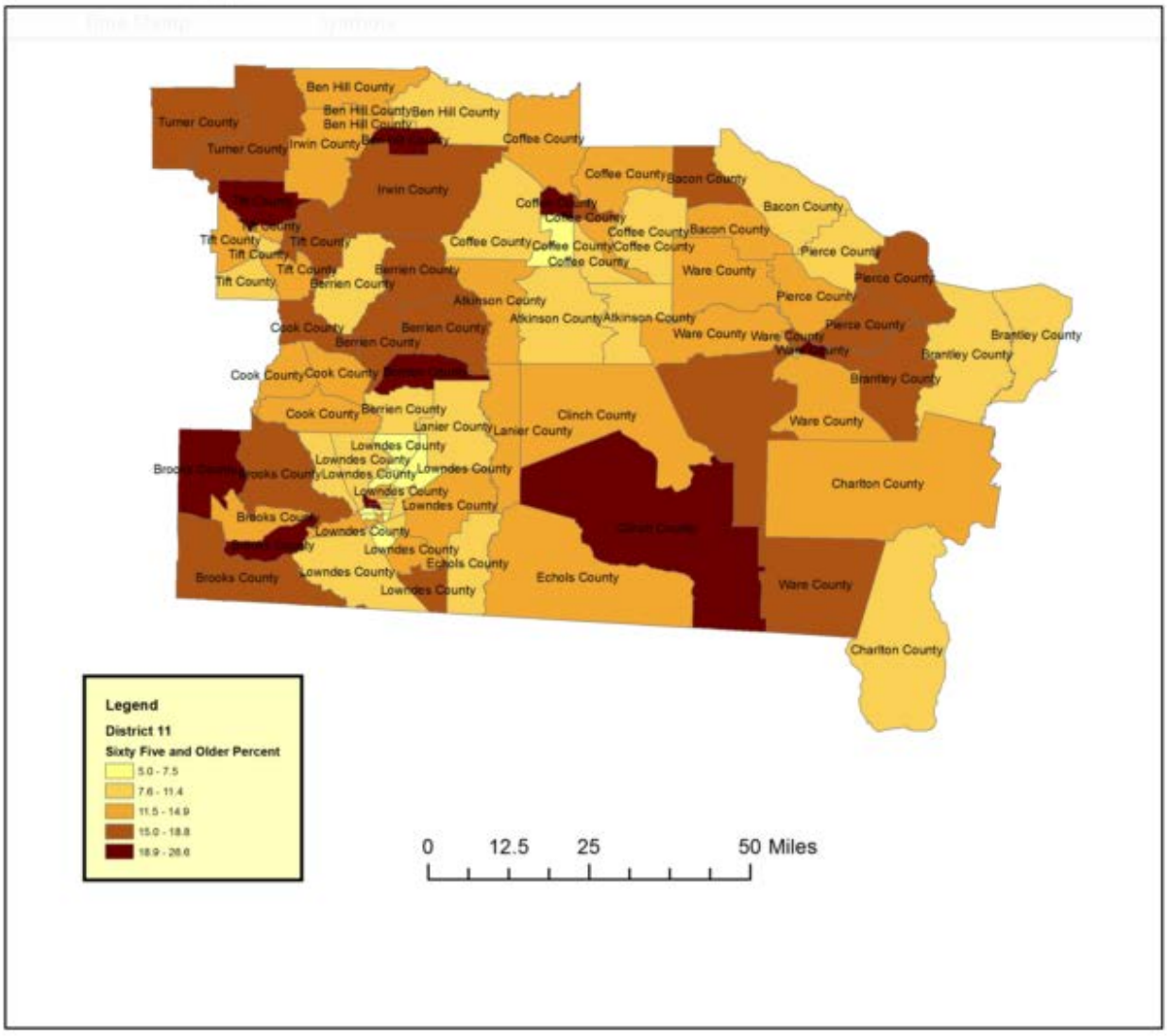


Figure 4. Minority Percentage

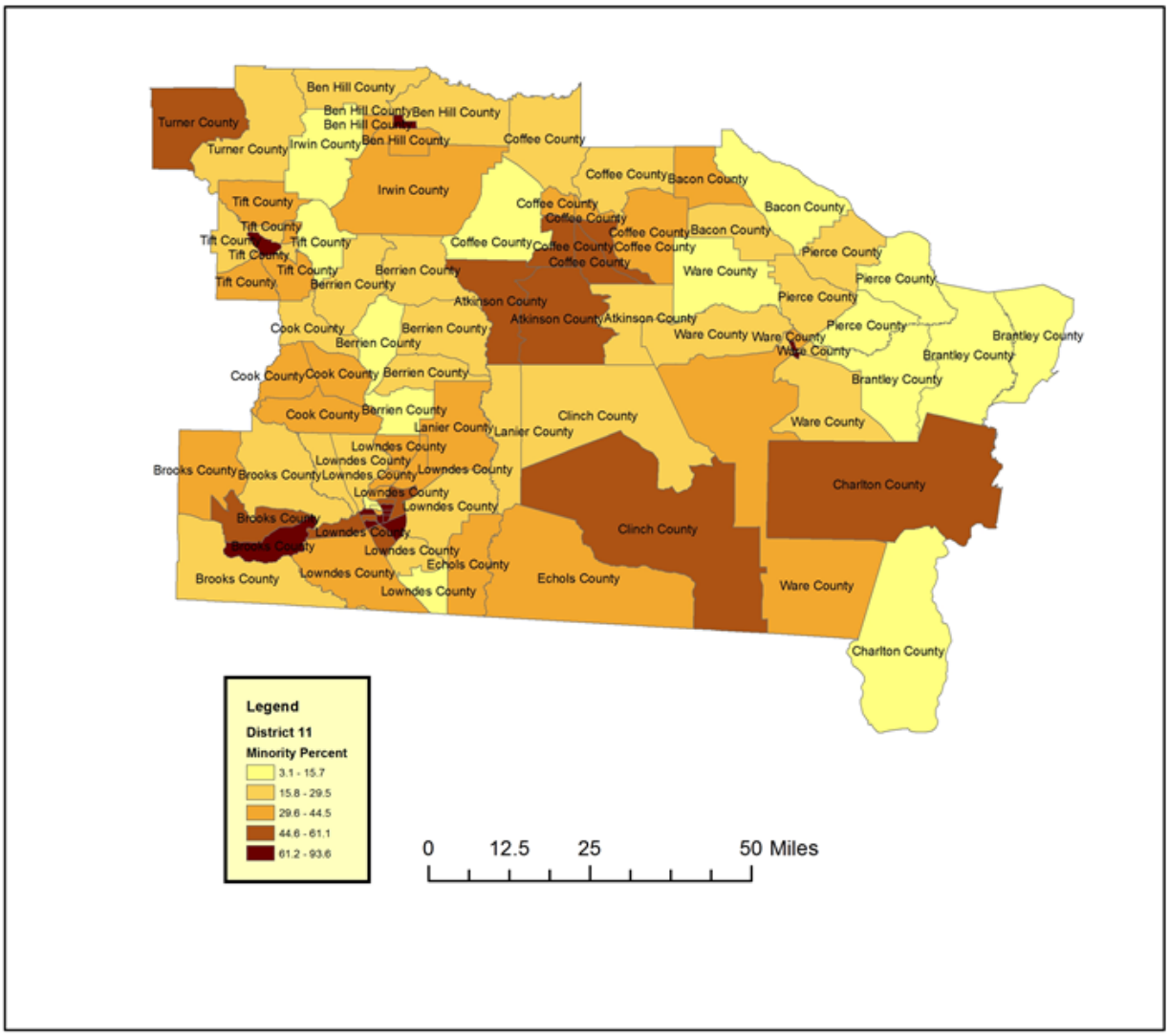


Table 6 and Figure 5 look more specifically percentage of Census Tract residents who have annual incomes at or below 150 percent of the poverty level. Approximately 40 percent of the population in District 11 has an annual income which is 150 percent or less of the poverty rate. The counties with the lowest and highest percentages respectively are Charlton and Clinch respectively. The county with both the lowest and highest Census Tract percentage is Lowndes (11.7 and 78.7 respectively).

Figure 5. Population Earning Less than 150 Percent of Poverty Threshold

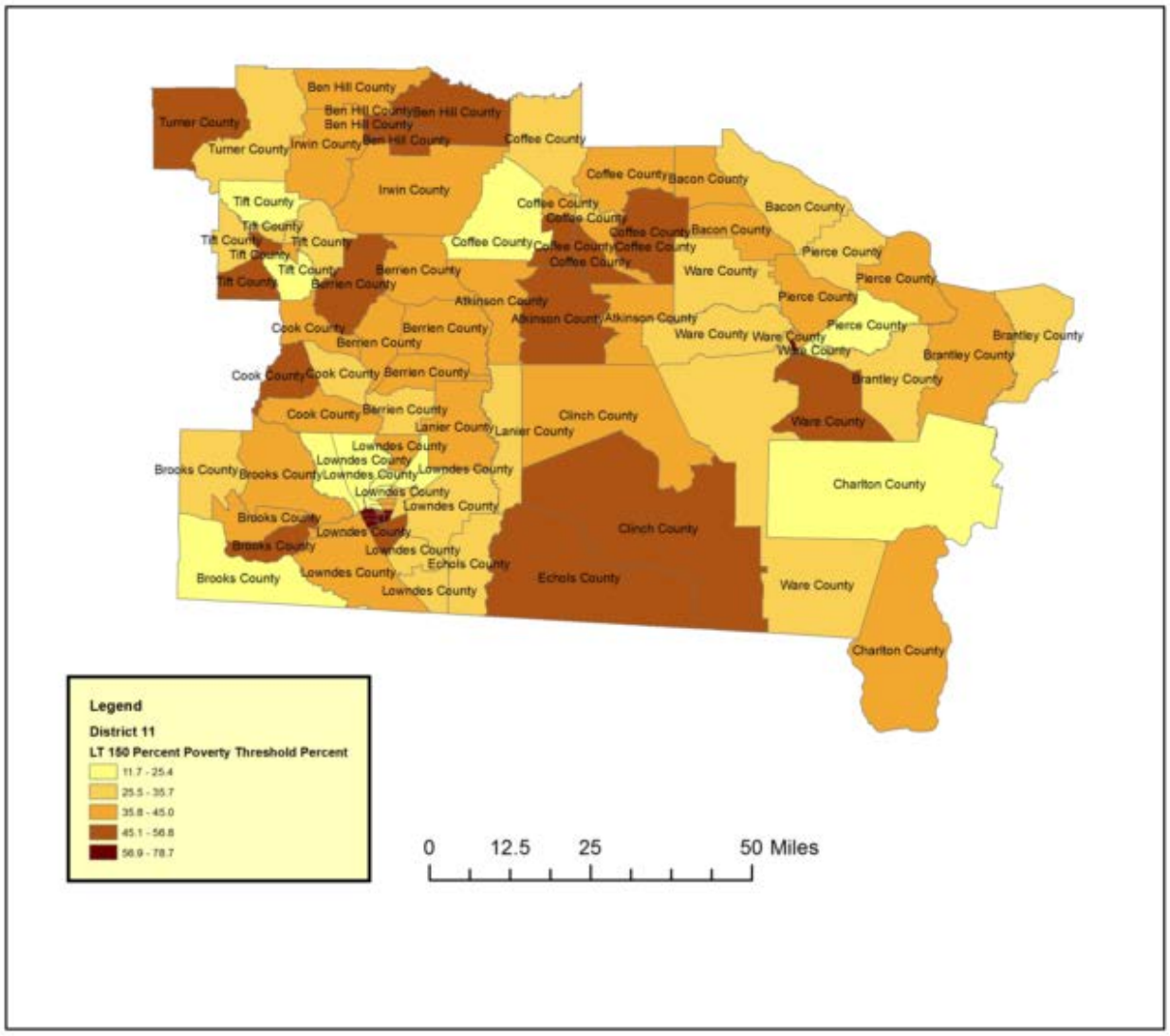


Table 6. Mean Percent of Census Tracts at 149 Percent or Less of the Poverty Threshold

County	Population	Number Of Tracts	Mean Percent 149% or Less Poverty Threshold (%)	Lowest Tract (%)	Highest Tract (%)
Atkinson	8,297	3	45.3	41.8	51.0
Bacon	11,196	3	35.4	32.5	37.4
Ben Hill	17,547	5	48.6	50.2	56.8
Berrien	19,091	6	41.1	31.3	49.7
Brantley	18,473	3	37.2	33.3	42.6
Brooks	15,766	5	37.1	25.4	48.0
Charlton	13,098	2	31.1	25.0	37.1
Clinch	6,777	2	47.7	41.6	53.7
Coffee	42,947	9	39.4	22.8	51.5
Cook	17,061	4	39.3	30.3	45.4
Echols	4,018	2	40.0	34.0	45.9
Irwin	9,482	2	40.1	37.5	44.1
Lanier	10,356	2	37.2	34.1	40.3
Lowndes	112,515	25	39.2	11.7	78.7
Pierce	18,860	4	33.1	23.8	40.5
Tift	40,721	9	38.2	23.2	68.8
Turner	8491	2	37.6	29.4	45.8
Ware	35,915	9	41.3	20.6	72.9
District Eleven	**410,601**	**97**	**39.6**	**11.7**	**78.7**

Table 7 examines the minority percent, unemployed percent, and percent without a vehicle present in the household for Census Tract reported by county for 2014. For District 11, 36.3 percent of the residents are minorities. This statistic ranges between 6.7 percent for Brantley County to 45.3 percent for Lowndes. District 11 had an unemployment rate of 5 percent overall in 2014, ranging between a low of 2.2 percent for Bacon County to a high of 7.7 percent for Brooks County. The percentage without a vehicle available for the District is approximately 4 percent with a range of .8 percent for Bacon County to a high of 6.0 percent for Ben Hill County. Figure 6 demonstrates the wide variation in the percentage of households through District 11 without a vehicle available. Figure 7 indicates that the percent of the Hispanic or Latino/Latina population varies significantly between counties as well as census tracts.

Table 7. Mean Percent Minority and No Vehicle Available

County	Number Of Census Tracts	Minority Population (Mean %)	Unemployed Population (Mean %)	No Vehicle Available in Household (Mean %)
Atkinson	3	40.3	4.0	3.8
Bacon	3	24.7	2.2	.8
Ben Hill	5	39.2	4.6	6.0
Berrien	6	18.3	6.3	4.0
Brantley	3	6.7	5.0	1.3
Brooks	5	43.1	7.7	1.6
Charlton	2	26.4	7.0	2.3
Clinch	2	39.6	3.0	1.8
Coffee	9	38.3	4.6	2.0
Cook	4	33.5	4.2	1.9
Echols	2	33.5	4.0	4.2
Irwin	2	22.4	3.9	2.1
Lanier	2	27.9	4.5	1.3
Lowndes	25	45.3	6.3	4.9
Pierce	4	16.1	3.9	1.1
Tift	9	16.1	3.4	4.5
Turner	2	40.1	5.3	2.0
Ware	9	40.2	3.8	4.8
District Eleven (mean)	**97**	**36.3**	**5.0**	**3.9**

Figure 6. Percent of Population with No Vehicle Available

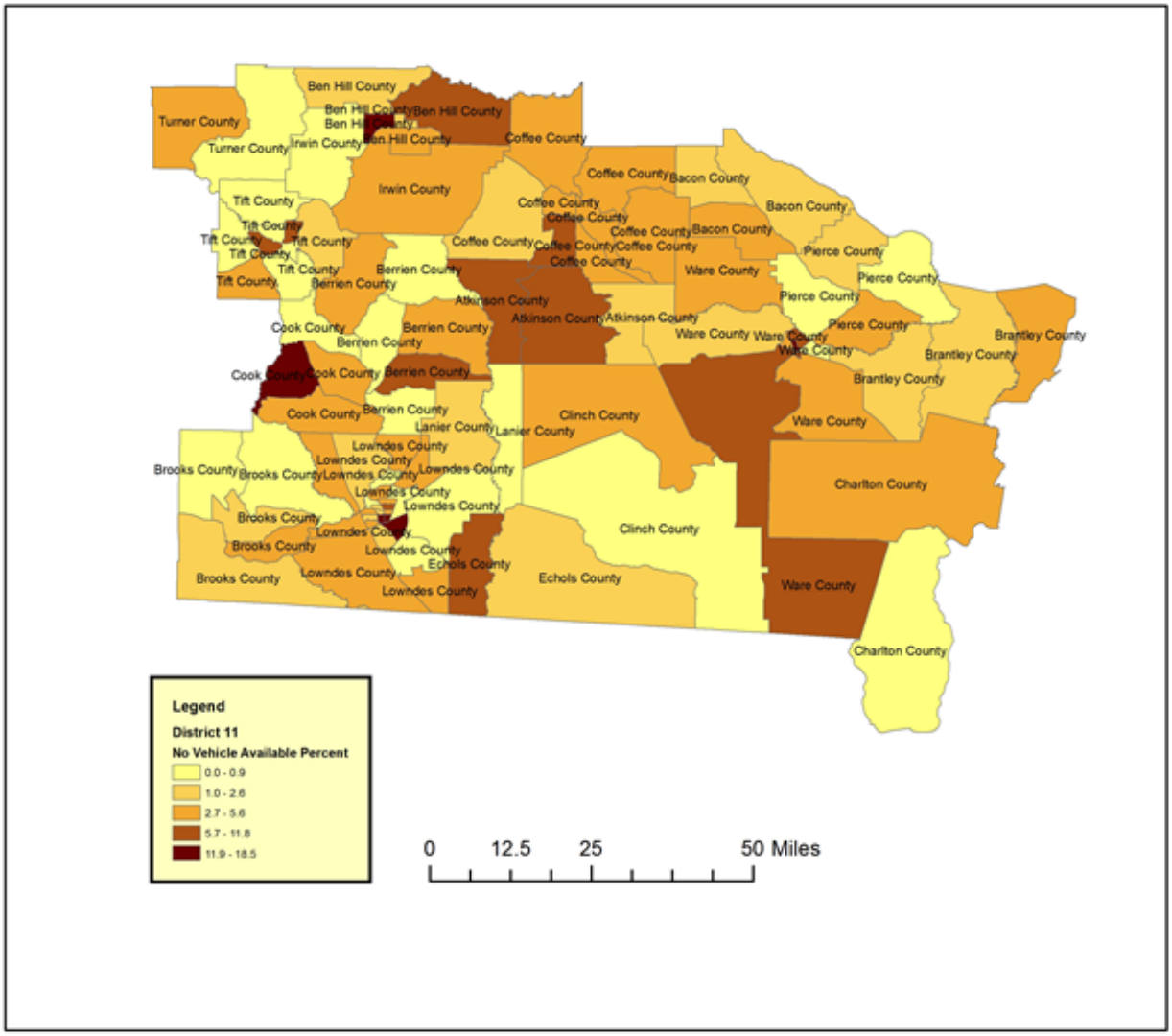
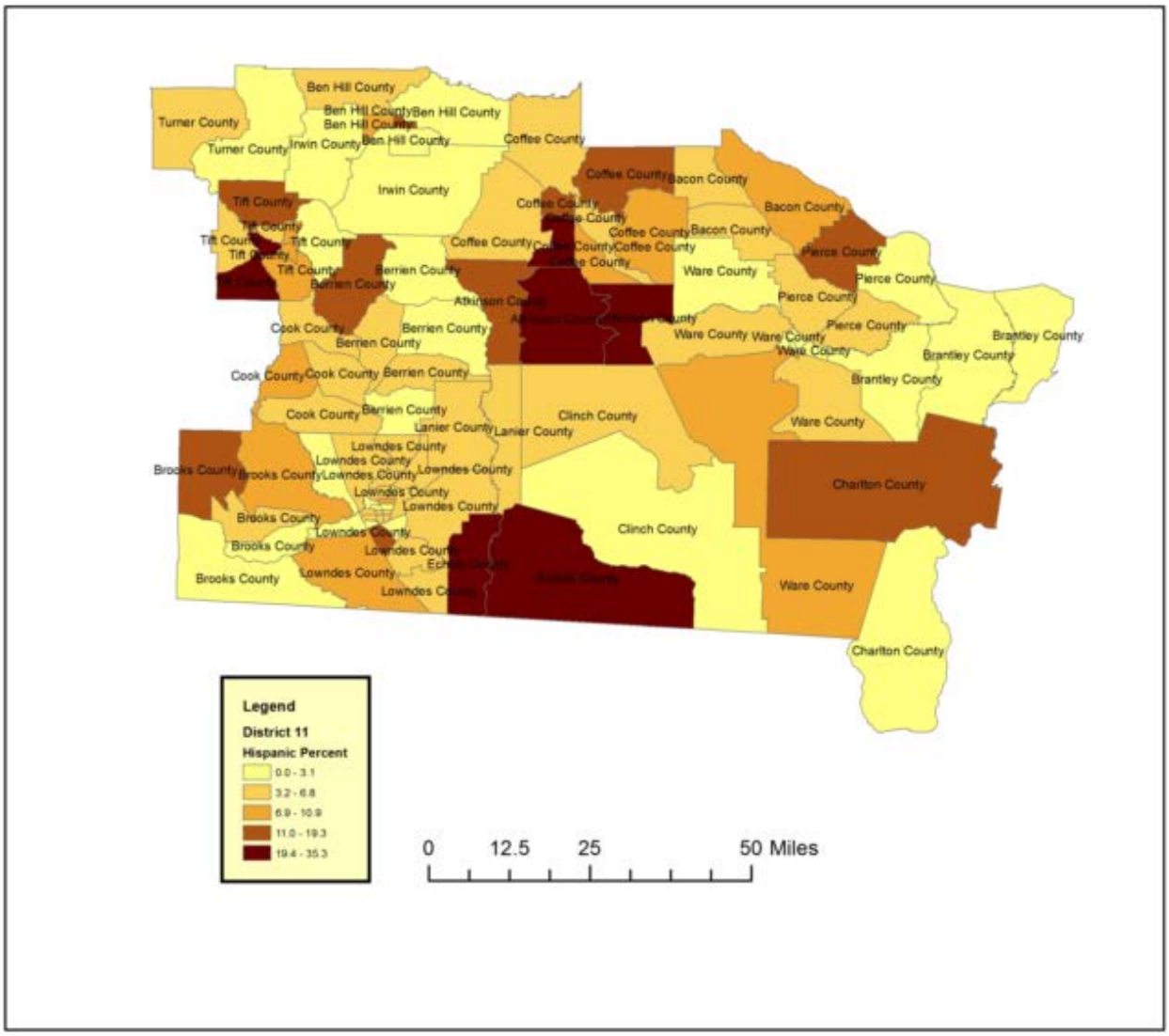


Figure 7. Hispanic or Latino/a Percent



Interrelating Health, Transportation, and Social Disadvantage

As the previous chapter demonstrates, health status, the lack of transportation infrastructure and social disadvantage correlate strongly. As Lane et al (2015) demonstrate, factors defining socially disadvantaged populations tend to overlap. Thus four factors measuring economic or social disadvantage were assigned a rank from lowest to highest for each census tract and then combined together to create an overall average rank of disadvantage. These four factors are: percentage minority,

percentage with less than a high school degree, percentage earning less than 150 percent of the poverty threshold, and percentage without a vehicle available. These factors were first analyzed to assess whether or not they measure a common dimension. The following correlation matrix indicates a moderate to strong and positive association between the ranks of factors measuring disadvantage and the lack vehicle availability.

Table 8. Correlation Coefficient for Disadvantage Rankings with No Vehicle Available (N=97)

Disadvantage Rankings	**No Vehicle Available Ranking**
Minority Percentage	.54
Earning Less than 150 Percent of Poverty	.50
Less than High School Degree	.38

These results indicate that census tract reporting a higher percentages of minority, lower income, and less educated residents are also more likely to experience transportation disadvantage. The scale analysis suggests a high degree of reliability between factors (Cronbach's Alpha=.80). The following map and bar chart reflects the distribution of scale rank across census tracts and the top quintile (highest average rank range from 71 to 95 of 97) of census tracks respectively.

Figure 8. Average Disadvantage Rank

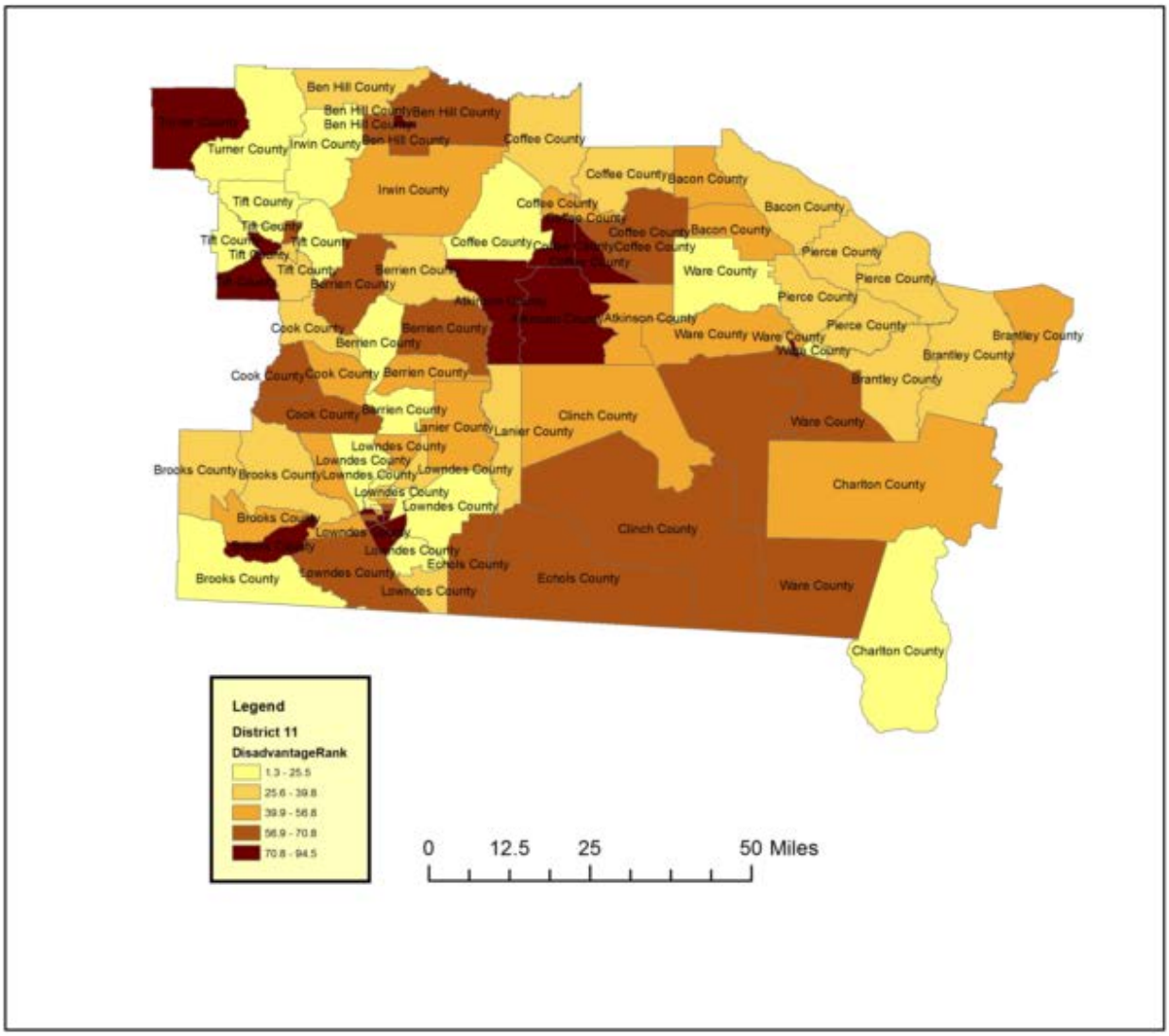
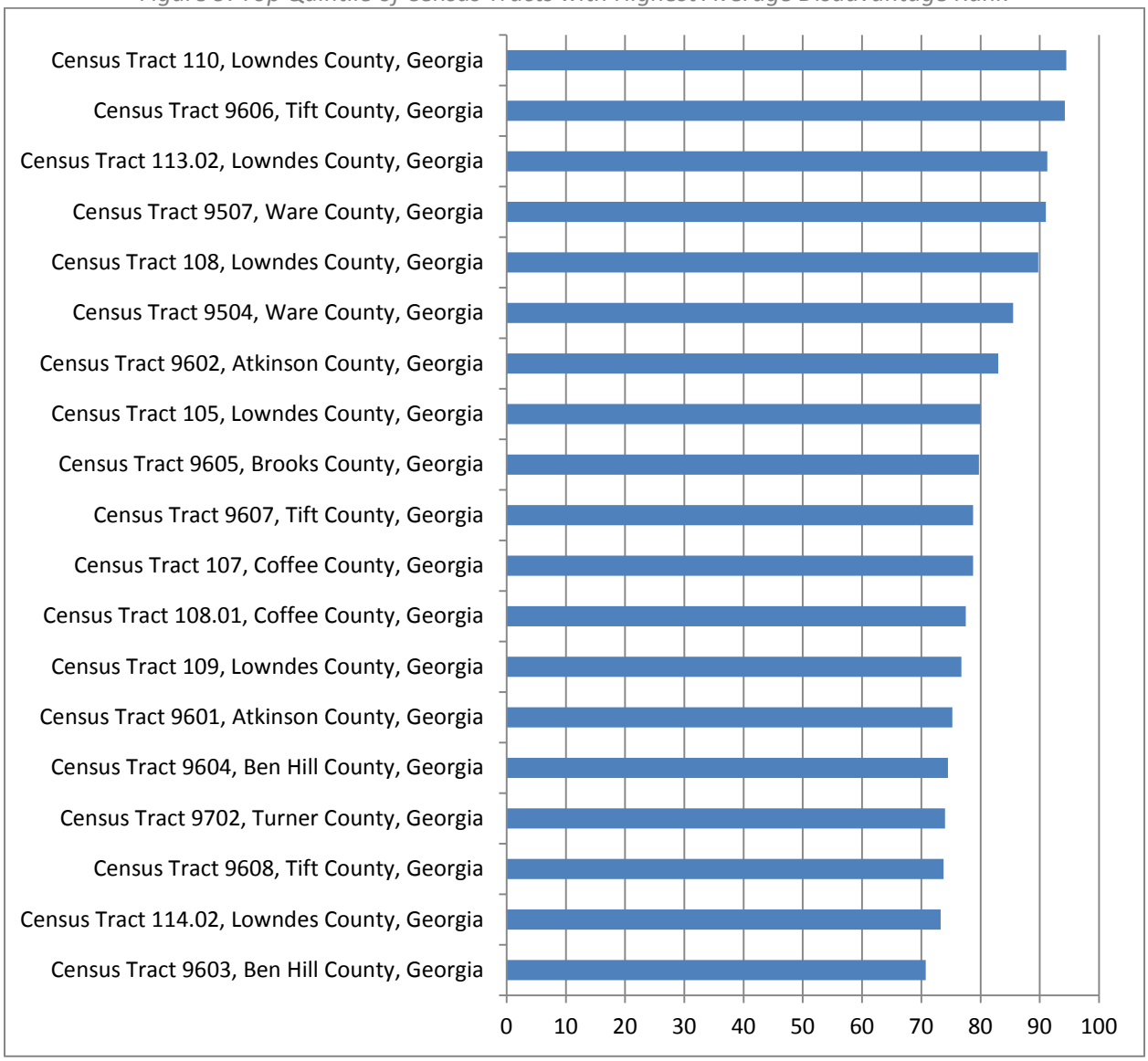


Figure 9. Top Quintile of Census Tracts with Highest Average Disadvantage Rank



Conclusion

This analysis demonstrates the significance of understanding the intersection between demographic and geographic factors when assessing transportation needs. In particular, the results indicate that:

- Population growth for District 11 has been significantly lower than the state overall; growth rates vary greatly with some counties experiencing a net decline in population.
- Health status of counties within District 11 also varies significantly and overall rank below the state.
- The Environmental Justice perspective provides a framework for understanding how transportation policy and practice can better serve community transportation and health needs.
- Social and economic disadvantage varies greatly between census tracts.
- Social and economic disadvantage and poorer health status correlate strongly with transportation disadvantage.

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Chapter 3. Walking, Bicycling, and Community Health

Summary of Previous Research

Building Bike and Pedestrian Infrastructure Leads to Increased Use

On street bike lanes increase the percentage of bike commuters (Parker et al. 2013, Dill & Carr 2003)

Building trails leads to an increase in first-time exercisers (americantrails.org)

Almost all cities adopting comprehensive programs to increase cycling experience large increases in the number of bicycle trips and the share of people bicycling (Pucher, Dill, and Handy 2010).

When new walking and biking infrastructure is put in, it is regularly used by a third of the community within two years (Goodman et. al. 2013)

Local Health Benefits of Investing in Walking and Cycling Infrastructure

Access to parks and sidewalks reduces childhood obesity: *Children with access to parks and greenspaces near their homes are more physically active than those without and are less likely to be obese (Khan 2011). Childhood obesity is higher in neighborhoods where it is not safe to walk or there are no sidewalks or parks*

More trips by walking and cycling leads to lower obesity rates in adults *(Pucher et al. 2010)*

Residents of walkable neighborhoods get more exercise: *Residents of "High-Walkable" neighborhoods get an hour more of physical activity per week (on average) and are 2.4 times more likely to meet the CDC's daily recommended activity levels*

Active commuting (walking or biking to work) is an easy way for individuals to get more exercise: *Having the infrastructure available for individuals to walk or bike to their workplace allows them to incorporate physical activity into their daily lives (MacMillian et al. 2014)*

Riding bikes saves cities money on health care: *People who ride bikes can save their cities and companies money on health insurance.*

The cost of trails is more than made up for in health care savings: *Studies of the health care savings of building trails and greenways shows that they lead to area residents being new exercisers, decrease health risks associated with lack of exercise, and help residents maintain a healthy weight (americantrails.org)*

Local Economic Benefits of Investing in Walking and Cycling Infrastructure

Walkability Raises Housing Value: *Houses and other residences tend to be have higher value in neighborhoods where residents are able to walk (Rauterkus & Miller 2011; Pivo & Fisher 2011)*

Bicycle Tourism: *People who ride bikes on vacation buy food, fuel, lodging, transportation, and other amenities to support their trip. Consumers are brought to areas of the country that they*

would otherwise never visit (Blue 2011).

Biking residents support local businesses: *People on bikes spend in business districts and are more likely than vehicular users to make return trips to local stores; bicyclists also provide work for locals in stores selling bikes and associated apparel*

Customers who arrive on bike tend to spend more money at local businesses than customers who don't *Research shows that although individuals who arrive at local businesses by bike tend to spend slightly less per trip, they are more frequent customers making the total they spend greater than those arriving by car (Clifton et al. 2012).*

Economic benefits of trails: *http://www.americantrails.org/resources/economics/*

Cycling infrastructure reduces cities' parking costs: *Cities and local businesses can save money and space by providing low-cost bike parking to supplement more expensive car parking. Studies have shown that converting parking into bike lanes has been associated, in many cases, with increased business revenues (http://www.citylab.com/cityfixer/2015/03/the-complete-business-case-for-converting-street-parking-into-bike-lanes/387595/)*

Road projects to accommodate pedestrians & cyclists create jobs: *Much of the budget for building roads goes to materials while much of the budget for pedestrian and cycling projects goes to labor, meaning that bike and pedestrian projects create more jobs per dollar.*

Reducing Modifiable Risk Factors Through Community Changes to Increase Physical Activity

Risk factors, at the individual or community level, increase the risk of developing a disease. Risk factors can be modifiable, meaning it is possible to take measures to change them, or non-modifiable, which means that they cannot be changed (UCSF Health). Factors such as age, gender, family history, and race are non-modifiable risk factors for diseases such as diabetes and heart disease. Modifiable risk factors are body weight, physical activity levels, diet, and smoking (UCSF Health). These modifiable risk factors can be reduced or eliminated by changes in individual behavior, including diet and exercise. Counties and cities can make changes that make it much easier for individuals to "modify" their lifestyles in a healthy direction. For example, making sure streets are safe for all travelers (e.g. wheelchair users, children in strollers, cyclists and pedestrians as well as vehicles), designating areas particularly restricted to biking and walking, and making sure parks are safe and appealing, are all ways in which communities can increase their residents physical activity levels, safety, and overall health. In turn, these changes save the communities money in health care, encourage residents to spend more time (and money) in

their communities, and spur local tourism. This chapter discusses: 1) modifiable health risks in the SGRC region and 2) proven changes cities and counties can make to increase safe physical activity within their communities.

Modifiable Health Risks in Georgia

Georgia has the 19th highest obesity rate in the nation, at 30.5 percent as of 2014 (Robert Wood Johnson Foundation 2014). This represents a significant increase over the past decades, from 20.6 percent in 2000 and 10.1 percent in 1990. However, Georgia has seen progress in reducing early childhood obesity in low-income families in recent years: obesity among two to four year olds fell from 14.8 percent to 13.2 percent, a statistically significant decrease, between 2008 and 2011 (Robert Wood Johnson Foundation 2015).

Georgia has high rates of obesity-related health issues. The adult diabetes rate as of 2014 was 11.6 percent, the 10th highest rate out of 51 states. The hypertension rate for adults was 35 percent in 2014, ranking Georgia 12th out of 51 states (Robert Wood Johnson Foundation 2015). Both of these represent substantial increases from 1990. Heart disease, arthritis, and some types of cancer are also linked to obesity. The percentage of cases of each of these are expected to increase substantially by 2030.

Table 9 presents the obesity and inactivity rates for each county in the SGRC region, the average for the SGRC region, and the Georgia state average. The average obesity rate for the SGRC region is substantially above the Georgia average (32.4 percent for the SGRC region versus 30.5 for the state). The inactivity rate for the region is also much higher (30.1 percent for the region versus 24 percent for the state). Government recommendations for activity state that adults should do 2.5 hours or more of moderate activity each week. Children should do sixty minutes of moderate activity each day, such as walking or bicycling (NIH Healthy Communities Study).

Table 9. Obesity and Inactivity Rates, SGRC Region

County	Obesity rate (2012)	Inactivity rate (2012)
Atkinson	35.7%	32%
Bacon	31.4%	28%
Ben Hill	36.1%	30%
Berrien	34.0%	35%
Brantley	34.6%	27%
Brooks	35.4%	29%
Charlton	30.7%	29%
Clinch	30.3%	30%
Coffee	32.3%	34%
Cook	28.7%	27%
Echols	29.2%	28%
Irwin	29.8%	30%
Lanier	32.0%	28%
Lowndes	28.3%	29%
Pierce	29.6%	33%
Tift	34.8%	30%
Turner	34.3%	33%
Ware	35.5%	30%
Regional Average	32.4%	30.1%
Georgia Average	30.5%	24%

Walking and Biking for Transportation in the SGRC Region

Bicycle and pedestrian mode shares in Georgia are some of the lowest in the nation. Georgia is in the bottom ten of all states in terms of both bicycle and pedestrian commuting. In addition, Georgia ranks in the top ten of all states in terms of pedestrian fatalities and bicycle fatalities (Godwin and Price 2016). However, Georgia policy makers are making changes that demonstrate that they recognize the economic and health benefits of investing in active transportation.

For 2012, the national average of commuters who walk was 2.8% and the percentage who bicycle was 0.6% (AARP 2014 Benchmarking Report) . ACS estimates from 2008 to 2012 show that there are significant differences in active commuting by region. The Northeast has the highest rate of walking to work (4.7%) and the West has the highest rate of biking to work (1.1%) (McKenzie 2014). This biking rate was about four times higher than the rate for the South. The South also had the lowest rates of walking to work (McKenzie 2014).

Georgia—along with 32 other state governments--has adopted a Complete Streets Policy. This demonstrates a state's commitment to implementing policies and practices that make streets are safe for people of all ages and abilities, and for a variety of uses (Smart Growth America).

Among the 52 largest U.S. cities, Atlanta does well in two measures—ranking 17th in commuter bicycling and walking levels and 15th in per capita spending on bicycle and pedestrian projects (AARP 2014 Benchmarking Report). Atlanta ranks moderately in terms of safety and physical activity: 27th in bicyclist and pedestrian fatality rates and 25th in the percentage of the residents getting the recommended levels of physical activity.

However, while active transportation rates in Atlanta are somewhat higher than the average for other large cities, Georgia as a whole fares less well when compared to the rest of the nation. In terms of the percentage of the population commuting by bicycling or walking, Georgia does very poorly, ranking 48th in the nation in terms of commuter bicycling and walking levels. Georgia scores only above Tennessee (49th) and Alabama (50th) (AARP 2014 Benchmarking Report). Georgia also fares very poorly in terms of bicycle and pedestrian safety, ranking 44th in bicyclist and pedestrian fatality rates (AARP 2014 Benchmarking Report).

Looking to Table 10, which presents bicycling and walking averages for each county in the SGRC region (District 11) for the same period, it is clear that mode share for the region is well below the national average at 1.3% for walking and 0.4% for bicycling. There is substantial variation across the 18 counties in mode share, with the percentage who walk ranging from 0.1% in Irwin County to 2.4% in Berrien County. The percentage who bike ranges from 0% to 0.9% in Coffee County and 1.2% in Cook County. (However, the differences in these percentages may not be too meaningful once margins of error are taken into account. They may reflect higher walking rates in denser areas, which is consistent with the national data. The main takeaway is that rates of walking and bicycling for transportation are very low in the 18 county region.) Figures 5 and 6 present maps of the percent of commuters who walk or bike by county for Georgia and south central Georgia, respectively.

Table 10. Percentage of Total Commuters Who Commute to Work by Bicycling or Walking, SGRC Region

Pedestrian and Bicyclist Mode Shares in SGRC Region					
County	**Total Commuters**	**Bike Commuters**	**Percent Bike**	**Walk Commuters**	**Percent Walk**
Atkinson	3125	0	0	53	1.7
Bacon	4445	0	0	9	2
Ben Hill	5829	35	0.6	111	1.9
Berrien	6549	20	0.3	124	1.9
Brantley	6413	0	0	64	1
Brooks	5508	0	0	33	0.6
Charlton	4179	0	0	38	0.9
Clinch	2263	0	0	42	1
Coffee	15257	137	0.9	122	0.8
Cook	6941	69	1.1	69	1
Echols	1748	0	0	12	0.7
Irwin	3122	0	0	6	0.2
Lanier	3504	7	0.2	11	0.3
Lowndes	47155	330	0.7	802	1.7
Pierce	7264	7	0.1	218	0.3
Tift	15283	61	0.4	260	1.7
Turner	2750	0	0	36	1.3
Ware	12867	0	0	206	1.6
Total					

Source: Census Bureau, 2010-2014 5-year ACS estimates

Figure 10. Percent of Commuters Who Bike or Walk by County, Georgia, 2014

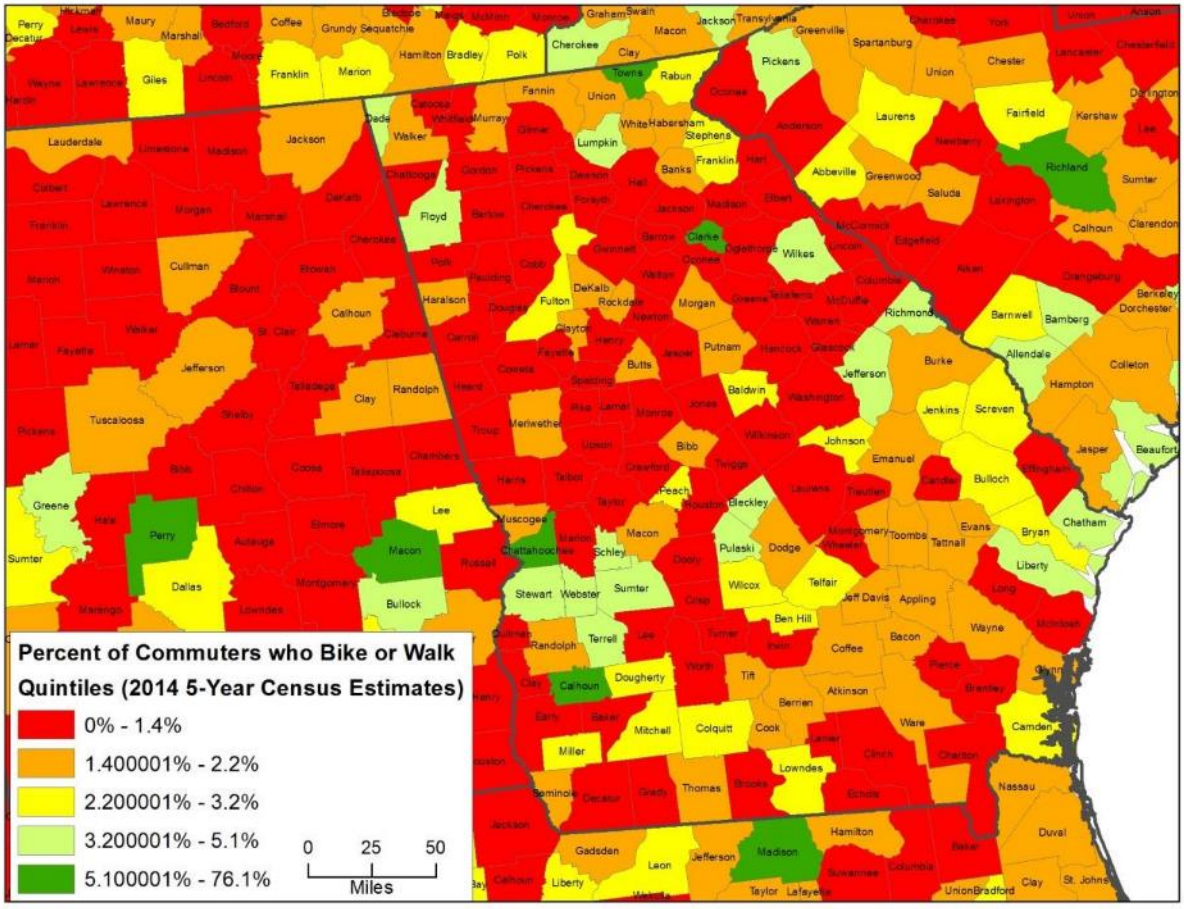
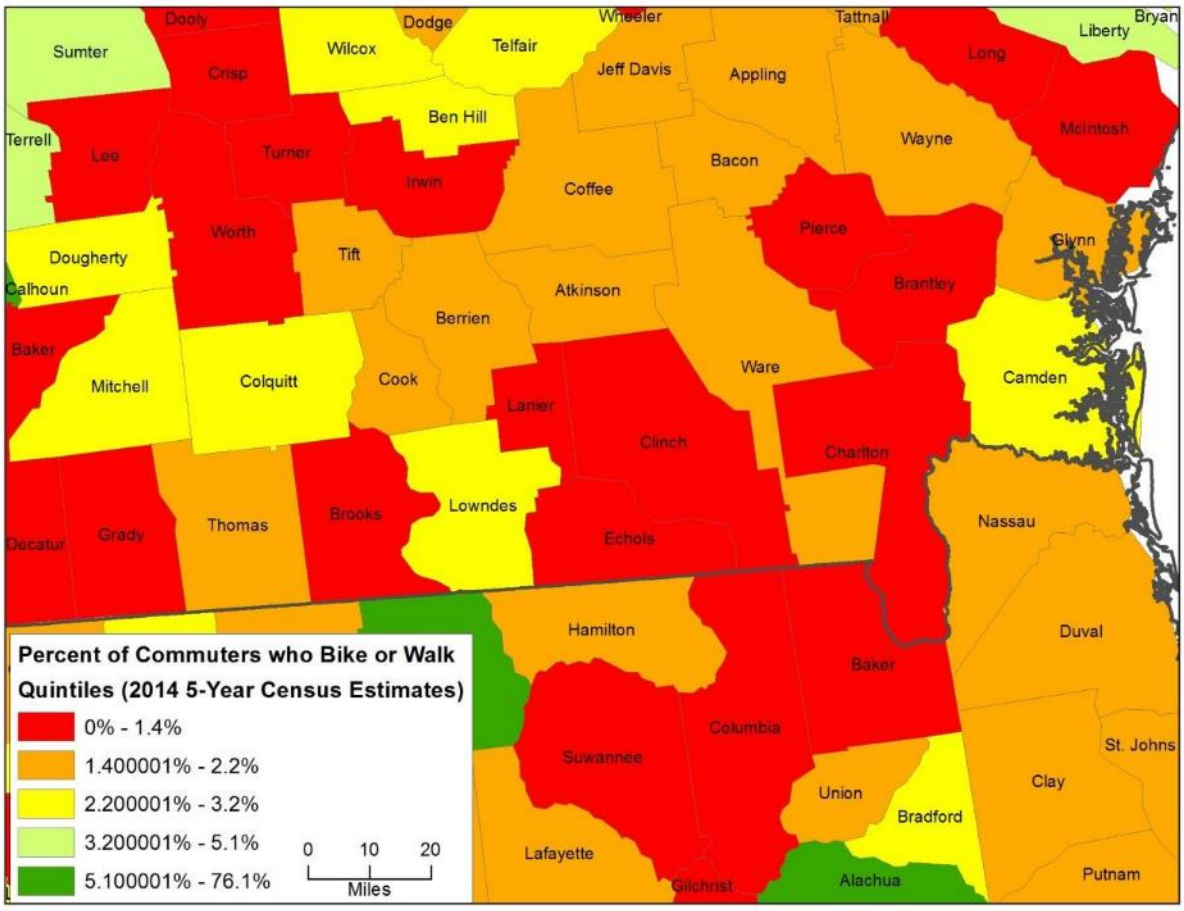


Figure 11. Percent of Commuters Who Bike or Walk by County, South Georgia. 2014.



Interventions to Increase Walking and Cycling: Evidence of Success

Increasing Cycling

In a review of the existing literature, Pucher et. al. (2010) note that there is now a strong body of evidence documenting the health benefits of bicycling, which has led many governmental agencies and public health agencies to advocate for more bicycling to improve community health. Research also suggests that a multi-dimensional approach is best to increase cycling, including bicycle education programs, traffic calming, bike paths, and bike parking (Pucher et al 2010).

The most common type of interventions to increase cycling rates are those that "aim to separate cyclists from motor vehicles" (Pucher 2010: S107). This includes but is not limited to on-street bike lanes, contra-flow bike lanes that allow bicyclists to travel in the opposite direction on one-way streets, shared bus and bike lanes, signed bicycle routes, and off-street paths. One study of 40 U.S. cities found that each additional mile of bike lane per square mile was associated with an increase of approximately one percentage point in the share of workers regularly commuting by bicycle (Pucher et.al. 2010, citing Dill and Carr, 2003). Another study found that people living within a half-mile of a bike path were more likely to bicycle at least once a week, in comparison to those who lived farther away (Pucher et. al. 2010, citing Vernez-Moudon et. al. 2005).

Studies show that availability of bicycles in households is the most important factor predicting bicycle use. There is some evidence that bike sharing programs increase bicycling use; however, it is difficult to evaluate such programs as they are often implemented at places and in times when cycling is already increasing (Pucher et. al. 2010).

Increasing Walking

Researchers note that increasing rates of walking has the potential for an important public health impact because clear health benefits to walking have been demonstrated and it is accessible and feasible without any cost or equipment (Lee and Buchner 2008). However, in the United States, it is dangerous to walk or cycle; pedestrians and cyclists are significantly more likely than drivers to be killed in a crash (Pucher and Dijkstra 2008). Sidewalks are very important in making walking safer (Pucher and Dijkstra 2000).

There are several demonstrable ways to increase walking in communities. Accessibility of destinations, which comes with denser design, increases walking. Mixed land use (meaning a mix of residential and commercial buildings) also increases walking. Aesthetic qualities also increase walking rates; individuals walk more in more attractive environments. Sidewalks (pedestrian infrastructure) also increase walking rates and safety. Street connectivity also increases walking rates, likely due to increasing variability in routes and destinations (Saelens and Handy 2008). New trails or paths designated solely for bicycle and pedestrian traffic are another good way to promote activity. Studies show that individuals are more likely to use trails in good weather and when they live within three miles of a trail (Price, Reed, and Muthukrishnan 2011).

Findings from a UK study in three different cities show that when infrastructure is added to increase walking, it does get used by about a third of the residents in a community, and an additional third of residents were aware of its existence (Goodman et al. 2013). More residents used the new infrastructure for recreation than for transportation. In surveys, the new routes were shown to appeal to a wide variety of demographic groups. Users of the routes varied in ethnicity, age, gender, and household make-up. However, those with higher education or income were more likely to use the new infrastructure. This relationship was stronger for cycling (Goodman et al. 2013). The researchers also found that the route was used more by those who already participated in some walking for exercise or recreation, meaning that there was not a large increase in participation by those who were inactive before the infrastructure was built. However, the researchers did note that their study only extended two years after the infrastructure was put in place, and it might take more time for the previously inactive to increase their activity rates (Goodman et al. 2013).

Data and Analysis of Health and Transportation Relationships, SGRC Region

We combined a number of available resources that provide data on relevant health and transportation variables for the 18 counties in the SGRC region in order to examine the relationships among these health and transportation measures in the region. We sought to determine: 1) What is the relationship between higher rates of bicycle and pedestrian commuting and obesity rates across our 18 countries?, 2) What is the relationship between higher rates of bicycle and pedestrian commuting and overall measures of public health across our 18 countries?, 3) What relationships exist among higher active commuting rates and bicycle and pedestrian crash and fatality rates in our region?

We conduct two sets of analyses. First, we examine data available at the county level and look relationships among health and transportation variables for the region. Second, we use data available at the census tract level for a more detailed examination of the relationship between transportation and health at the neighborhood level.

Findings: County level

Figure 12 presents the relationship between the percentage of individuals who bike or walk to work (y-axis) and the obesity rates by county for the SGRC's 18 county region (x-axis). Although national and international studies have shown a clear linkage between higher commuting rates and reduced obesity (CITES), this relationship is not apparent for our region. This is likely because overall levels of commuting are currently extremely low in our region, making it difficult to link commuting rates with health outcomes.

Figure 12. Scatterplot of the Relationship Between the Percentage of Commuters who Walk and Bike and the Obesity Rate by County, SGRC Region, N=18 counties

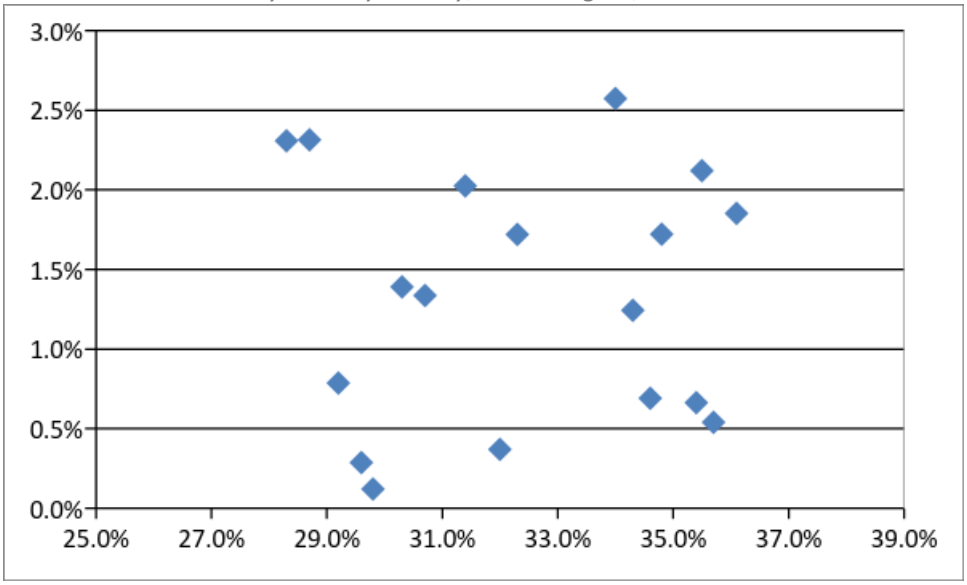


Table 11 presents the associations among a variety of health and transportation variables for the SGRC region. Results show that counties that have high bicycle fatalities also tend to have high pedestrian fatalities (r=0.867). Counties in our region with *higher* bike commuting rates also have higher bicycle crash rates (r=0.796). Similarly, counties with *higher* pedestrian commuting rates have *higher* rates of pedestrian crashes. Counties with higher proportions of individuals not having access to a vehicle have

higher bicycling and walking rates (r=0.796, r=0.956, respectively). Higher proportions of individuals not having a vehicle is also associated with higher rates of bike and pedestrian crashes (r=0.940, r=0.794, respectively). Counties that have higher food insecurity also have more individuals that commute by bicycling or walking (r=0.940, r=0.934, respectively). Counties that have higher levels of food insecurity also tend to have higher bike crash rates (r=0.908) and pedestrian crash rates (0.799). As expected, diabetes rates were associated with overall county health rankings; it is no surprise that counties that have higher diabetes rates have poorer health rankings, and diabetes is one of the health factors included in these rankings.

Table 11. Correlations Matrix for All Health and Transportation Variables, SGRC Region

N=18 counties

	bike crash	bike fatal	ped crashes	bike commute	walk commute	no vehicle	health outcomes	health factors	diabetes	food insecure
bikecrash	1									
bikefatal	0.216	1								
pedcrashes	0.867**	-0.123	1							
bikecommute	0.796**	-0.088	0.730**	1						
walkcommute	0.968**	0.206	0.863**	0.827**	1					
novehicle	0.940**	0.350	0.794**	0.796**	0.956**	1				
healthoutcomes	-0.212	0.012	0.116	-0.142	-0.194	-0.236	1			
healthfactors	-0.379	-0.058	0.425	-0.287	-0.326	-0.315	0.477*	1		
diabetes	-0.318	0.010	-0.237	-0.300	-0.333	-0.266	0.573*	0.269	1	
foodinsecure	0.908**	0.119	0.799**	0.940**	0.934**	0.910**	-0.211	-0.410	-0.325	1

*significant at the .05 level (two-tailed)

**significant at the .01 level (two-tailed)

Findings: Census Tract Level

Figure 13 presents the percent of individuals that bike or walk to work by census tract for the SGRC region. It is clear that there is considerable variation in the percentage of individuals walking or biking to work by census tract, with a range of less than 0.9 percent to 9.2 to 13.6 percent. The areas with the highest rates of walking and bicycling tend to be more disadvantaged areas of the region. This is made clearer in the correlations presented in Table 12. Figure 14 presents the mean travel time to work by census tract for the SGRC region.

Table 12 presents correlations (i.e. statistical associations) among various indicators relevant to environmental justice in planning as well as biking and walking rates by census tracts. Results show that indicators of disadvantage are positively associated with walking and bicycling rates in our region. Education is significantly related to biking and walking to work. Tracts that have a higher number of individuals with less than a high school degree also have higher walking and biking mode shares. Census tracts with higher numbers of African Americans also have higher biking and walking mode shares. Tracts with more individuals living at or below 150% of the poverty line also have higher numbers biking and walking to work. Finally, tracts with no vehicle available have higher numbers of individuals that bike or walk to work.

Figure 13. Percentage of Individuals Walking or Biking to Work by Census Tract, SGRC Region. 2014.

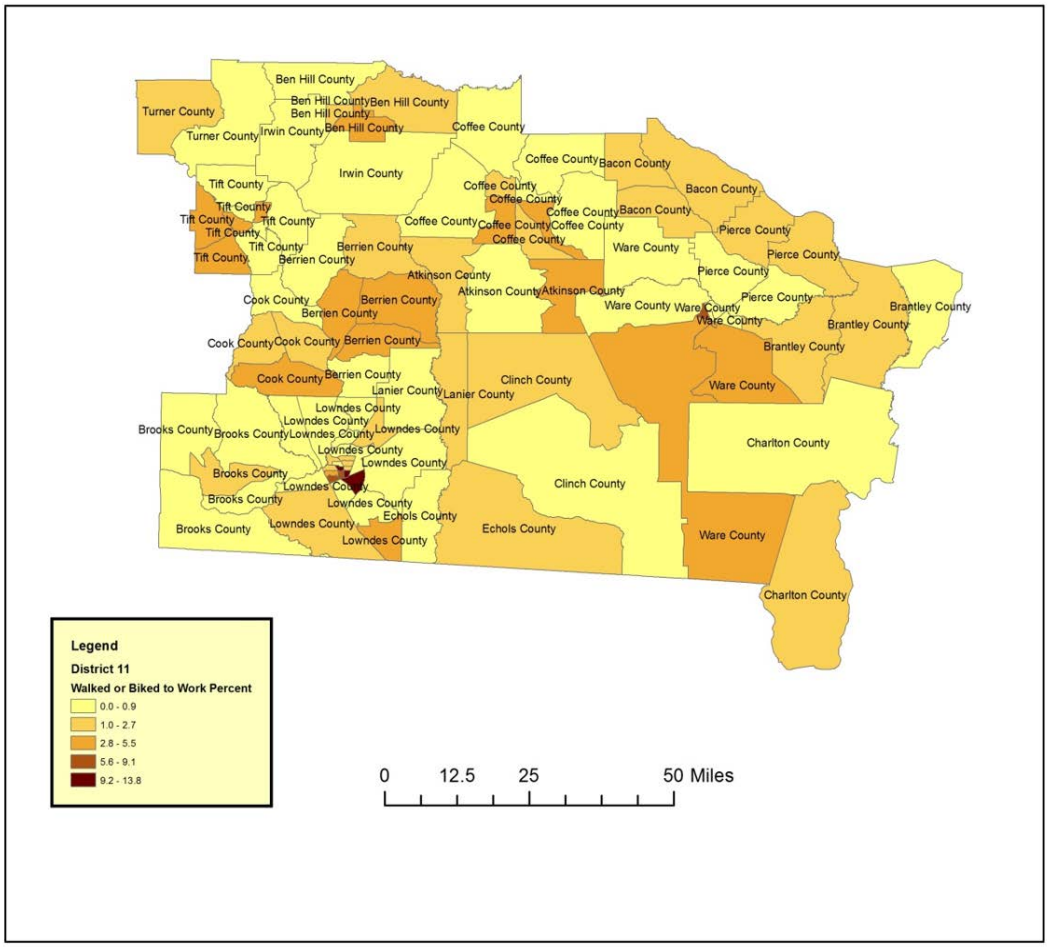


Figure 14. Mean Travel Time to Work by Census Tract, SGRC Region. 2014.

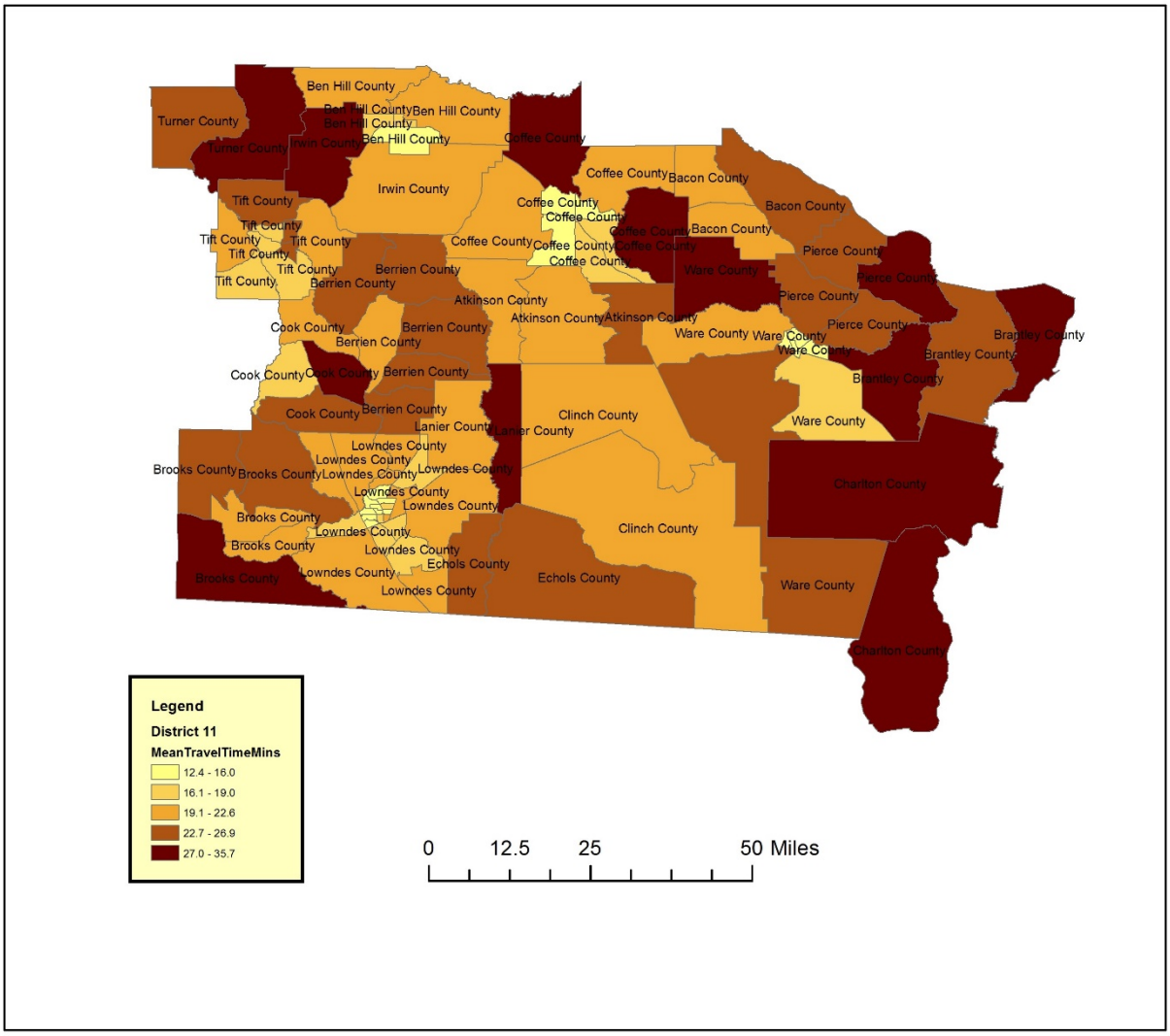


Table 12. Correlations Among Environmental Justice Indicators and Biking and Walking Mode Shares, by Census Tract, SGRC Region, 2010-2014 ACS data.

N=97

Correlations

		BikeWalk
LessThanHSGrad	Pearson Correlation	.211*
	Sig. (2-tailed)	.039
	N	96
BlackAFAMPerc	Pearson Correlation	.399**
	Sig. (2-tailed)	.000
	N	96
CitizenshipStatus	Pearson Correlation	.094
	Sig. (2-tailed)	.362
	N	96
LT150PercPovLine	Pearson Correlation	.441**
	Sig. (2-tailed)	.000
	N	96
SpeakOtherEnglish	Pearson Correlation	-.010
	Sig. (2-tailed)	.924
	N	96
HispanicPerc	Pearson Correlation	.039
	Sig. (2-tailed)	.704
	N	96
NoVehiclesAvail	Pearson Correlation	.504**
	Sig. (2-tailed)	.000
	N	96

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 15. Relationship Between Proportion Residents at or below 150% of the Poverty Line and Proportion of Bike & Walk Commuters by Census Tract, 2010-2014 ACS data. N=97

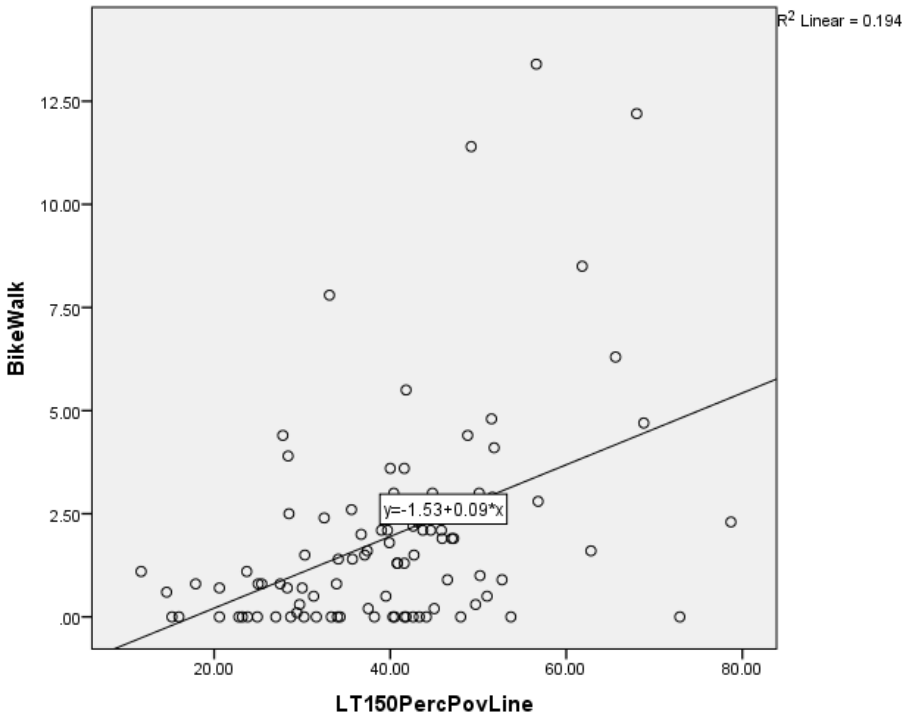


Figure 15 above shows the relationship between the percentage of the census tract at or below 150 percent of the poverty line and the percentage that uses biking or walking as a means of commuting to work. There is a clear positive linear relationship between poverty and using bicyling or walking as means of transportation to work.

Figure 16. Relationship Between Proportion of African American Residents and Proportion of Bike & Walk Commuters by Census Tract, 2010-2014 ACS data. N=97.

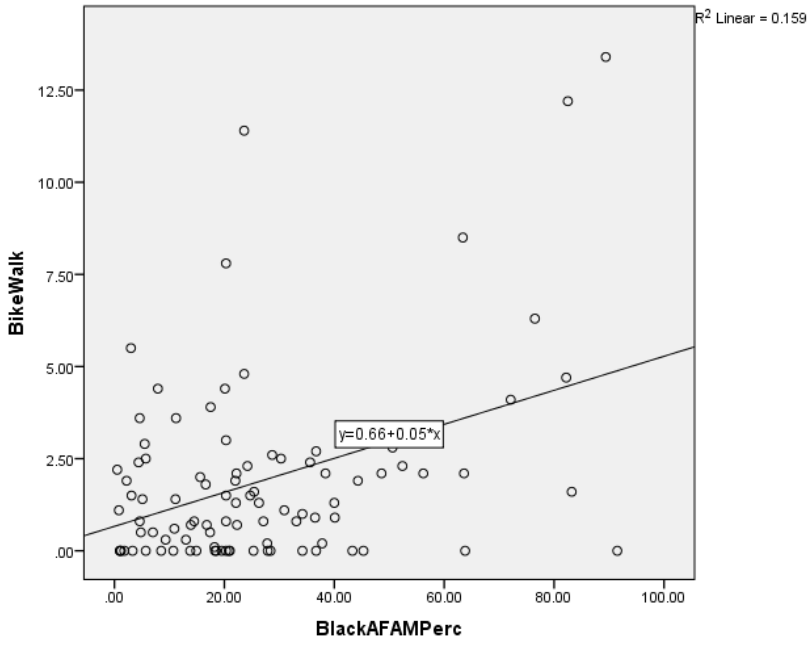


Figure 16 above shows the relationship between the percentage of a census tract that is African American and biking and walking as transportation. There is a clear positive linear relationship. Census tracts that have larger shares of African Americans also have more individuals that rely on biking or walking for transportation to work.

Conclusions and Implications

Our findings show that in the SGRC region, increased infrastructure for biking and walking is a pressing need. Analysis shows that it is the most disadvantaged groups in the region that are most likely to use bicycling and walking as a means to get to and from work. Unfortunately, the health benefits of this active commuting may be currently counteracted by the danger of bicycling and walking in the region.

The most interesting—and distressing—finding from this analysis is that counties with higher rates of bicycle and pedestrian commuting also have significantly higher rates of bicycle and pedestrian crashes. This is in direct contrast to what we find in an analysis of the relationship at the state level (see Appendix A). At the state level, states that have higher rates of bicycle and pedestrian commuting also

have better safety for these commuters, with fewer crashes and fatalities per pedestrian and cyclist. Previous research has deemed this a “safety in numbers” effect, where greater numbers of pedestrians and cyclists sharing roadways changes driver behavior.

Previous research has shown that motorists are less likely to collide with pedestrians or bicyclists in areas where there are more people walking or bicycling (Godwin and Price 2016, citing Jacobsen 2003, Robinson 2005). When bicycle and pedestrian mode shares are very low, there is no “safety in numbers.” Drivers are not accustomed to bicyclists and pedestrians, and this makes the road less safe for them. In addition, this “health hazard” is compounded by the fact that high inactivity rates in these regions are dangerous as well (Godwin and Price 2016).

Bicycling and walking infrastructure is also needed for recreational use in our region. Multi-use trails and greenways encourage cycling and walking for relaxation and pleasure. Previous research has shown that users do use new infrastructure when it is built.

Unfortunately, likely due to low pedestrian and bicycling commuting rates in the region, we were not able to find the positive associating between active commuting and health that exists at the state, national, and international level (see Hamer & Chida 2008; Shephard 2008). What is clear, is that better pedestrian and bicycling infrastructure is needed in our region so that higher rates of these types of commuting will not be associated with higher crash rates. It is a serious problem that higher rates of bicycling and pedestrian commuting (a health-promoting activity) is associated with higher crash rates, due to poor infrastructure which decreases safety.

Data Limitations

There are no representative data for available on all trips made by foot or bike in the SGRC region (including not just commuting, but trips for exercise, pleasure, or errands). The rates of bicycling and pedestrian *commuting* used in this chapter must be regarded as *low estimates* of actual bicycling and walking in the region. There are no completely accurate and reliable data sources that track all trips made by walking and bicycling for the SGRC study region. The Census Bureau’s American Community Survey (ACS) conducted every year provides “Journey to Work” information which is the only estimate of bicycling and pedestrian use that is available for the 18 counties. However, the ACS fails to completely capture bicycle and pedestrian use for a number of reasons. First, the ACS data only provides data on

commuting (trips from the home the workplace). Data at the national level show that commuting accounts for *less than one-fifth of all trips made* (The Role of Commuting in Overall Travel 2013). A second limitation of the ACS data is that it asks respondents to report on *their most common travel mode*. This means that those who bike or walk to work a few times a week, or bike or walk only for errands are not counted as cyclists or pedestrians in the data (Kazis 2010). Similarly, those who walk to a neighbor's house and carpool or walk to public transportation are only counted as pedestrians if the distance they walk is *greater* than the distance they travel by car.

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Chapter 4: Focus on Waycross and Tifton

Two cities in the region, Tifton and Waycross, are given special attention. These are used as examples to illustrate existing infrastructure for pedestrians and cyclists and improvements that can be made to improve community health. Recommendations are given for transportation project prioritization to reduce modifiable risk factors and increase community health. These recommendations are specified for each city further on, but generally involve increasing exercise and active commuting opportunities and improving safety for bicyclists and pedestrians.

Tift County

The following table examines selected demographic for Tift County (County Total) as well as statistics for each of the nine census tracts. Results indicate that 43.6 percent of the county is a racial minority but this statistic varies between 8 percent and 87.3 percent. The poverty and near poverty rate (together) is 39.8 percent for the county. This statistic varies from a low of 23.3 percent to a high of 68.8 percent. The percent of the county's 25 plus population without a high school is 22.1 with a range between 12.5 and 38.1 percent. The Hispanic population for the county is 19.0 percent varying between 1.2 and 35.3. Census tracts with the highest percentages minority and poverty also are more likely to report no vehicle in the household and biking or walking to work. The mean travel time of 20.7 minutes is similar across census tracts with the exception of 9601 which had an average commute of 26.4 minutes.

Table 1: Selected Demographic and Transportation Factors for Tift County

	Minority (%)	**LT 150% Poverty (%)**	**LT High School (%)**	**Hispanic (%)**	**No Vehicle (%)**	**Mean Travel Time (Mins)**	**Bike/Walked to Work (%)**
County Total	**43.6**	**39.8**	**22.1**	**19.0**	**4.7**	**20.7**	**2.3**
Census Tract 9601, Tift County,	31.5	24.0	18.8	17.5	.0	26.4	.0

Georgia							
	Minority (%)	**LT 150% Poverty (%)**	**LT High School (%)**	**Hispanic (%)**	**No Vehicle (%)**	**Mean Travel Time (Mins)**	**Bike/Walked to Work (%)**
Census Tract 9602, Tift County, Georgia	24.1	28.4	15.6	6.4	.6	22.6	3.9
Census Tract 9603, Tift County, Georgia	25.8	33.9	12.5	4.0	.0	18.7	.8
Census Tract 9604, Tift County, Georgia	41.9	27.5	22.7	9.9	9.4	25.0	3.0
Census Tract 9605, Tift County, Georgia	8.0	27.5	17.6	1.2	1.8	20.2	.8
Census Tract 9606, Tift County, Georgia	87.3	68.8	38.1	5.4	11.5	17.6	5.0
Census Tract 9607, Tift County, Georgia	72.3	50.1	24.3	21.5	8.3	18.2	3.3
Census Tract 9608, Tift County, Georgia	40.8	51.6	29.3	35.3	3.4	18.2	2.9
Census Tract 9609, Tift County, Georgia	38.5	23.2	16.7	10.9	.8	19.0	.0

Focus: Tifton

Tifton is a city of approximately 16,900 in Tift County in south central Georgia. The city is located on Interstate 75, between Valdosta to the south and Atlanta to the north. It is home to the University of

Georgia's Tifton campus and Abraham Baldwin Agricultural College. The city is approximately 60% non-Hispanic white, 30% African American, and 8% Hispanic or Latino of any race (City of Tifton).

Tifton has several pedestrian assets including the Downtown Veterans' Amphitheater (Figure 17), pedestrian crosswalks in downtown Tifton that can encourage residents and tourists to walk and shop downtown (Figure 18), bike parking in downtown Tifton (Figure 19), and traffic calming in downtown Tifton (Figure 20). All of this can encourage residents to spend time in a downtown park, or walk around downtown, increasing overall community health.

However, there is currently little infrastructure to strengthen connections between shops, parks and other destinations (which would increase walking options and distances walked), limited safe cycling or pedestrian options to connect the college campuses with the rest of the city, few safe pedestrian and cycling options for children to travel to school, and no Safe Routes to School Program in place. This means that Tifton still has much room for improvement in terms of transportation planning for community health. Specific recommendations are provided below.

Figure 17. Access is Restricted to Pedestrians at the Downtown Veterans' Amphitheater

Figure 18. Pedestrian Crosswalk in Downtown Tifton

Figure 19. Bike Parking in Downtown Tifton

Figure 20. Traffic Calming in Downtown Tifton

Recommendations to Increase Safety and Physical Activity in Tifton

1. Implement the recommendations of the 2011 Tift Area Greenways Master Plan and 2014 Tifton Area Greenway Best Practices Report (http://www.sgrc.us/bike---ped-planning.html).

2. Strengthen pedestrian connections between parks and other attractions, for example: install a crosswalk between the Veterans' Memorial Park and the old depot, providing more unification between these two public spaces.

3. Consider posting signs with maps showing local walking routes (typically 1-2 miles). This is a good way to encourage residents and visitors to walk, and the map provides some guidance for visitors who may not be familiar with the street layout. This has been implemented in similar-size communities (e.g. Bartow, FL).

4. Ensure safe pedestrian and bicycle connections between the main part of the City and the ABAC and UGA-Tifton campuses.

5. Encourage walk-to-school events for schools that are in potentially walkable locations, e.g. Northside Primary School. Consider implementing a Safe Routes to School program.

Below are attached two reports from the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. The first report summarizes demographic information for Tift County. The second compares Tift County to other “peer counties” on a number of primary health indicators. The health profile report shows that Tift County fares particularly poorly in terms of diabetes deaths, which is a modifiable health risk. This highlights the needs for intervention to increase physical activity and decrease inactivity and obesity in Tift County.

Demographics

Tift County, GA

Geography	Tift County, GA	
Population Size	41,064	4,990 - 123,441
Population Density (per square mile)	155	7 - 184
Median Household Income	$33,716	$31,820 - $45,787

Age Distribution	Tift County, GA	
Under 18	24.8%	22.4% - 28.4%
Age 18-64	62.1%	57.4% - 63.0%
Age Over 65	13.1%	11.4% - 17.7%

Sex Distribution	Tift County, GA	
Female	51.6%	46.5% - 53.0%
Male	48.4%	47.0% - 53.5%

Race/Ethnicity Distribution	Tift County, GA	
American Indian or Alaska Native	0.4%	0.1% - 34.3%
Asian	1.4%	0.2% - 2.8%
Native Hawaiian or Other Pacific Islander	0.1%	0.0% - 1.0%
Black or African American	30.6%	0.4% - 35.7%
White	56.4%	13.3% - 96.1%
Hispanic or Latino	10.4%	1.1% - 79.2%

Others	Tift County, GA	
Not Proficient in English	5.3%	0.5% - 12.1%
Foreign Born	5.4%	0.8% - 13.5%
With disability	14.2%	12.7% - 22.5%

CHSI INFORMATION FOR IMPROVING COMMUNITY HEALTH

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, CENTERS FOR DISEASE CONTROL AND PREVENTION

Tift County, GA

The following Summary Comparison Report provides an "at a glance" summary of how the selected county compares with **peer counties** on the full set of **Primary Indicators**. Peer county values for each indicator were ranked and then divided into quartiles.

	Better (most favorable quartile)	Moderate (middle two quartiles)	Worse (least favorable quartile)
Mortality	Cancer deaths Coronary heart disease deaths Unintentional injury (including motor vehicle)	Chronic kidney disease deaths Chronic lower respiratory disease (CLRD) deaths Female life expectancy Male life expectancy Motor vehicle deaths Stroke deaths	Alzheimer's disease deaths Diabetes deaths
Morbidity	Adult overall health status	Adult diabetes Adult obesity Cancer Older adult asthma	Alzheimer's diseases/dementia Gonorrhea HIV Older adult depression Preterm births Syphilis
Health Care Access and Quality	Cost barrier to care Primary care provider access	Older adult preventable hospitalizations	Uninsured
Health Behaviors	Adult female routine pap tests Adult physical inactivity Adult smoking	Teen Births	
Social Factors		Inadequate social support Unemployment	Children in single-parent households High housing costs On time high school graduation Poverty Violent crime
Physical Environment		Access to parks Annual average PM2.5 concentration Limited access to healthy food	Housing stress Living near highways

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC-INFO

Ware County

Table 2 reports the same statistics for Ware County overall and for the nine census tracts. Results indicate that 35.9 percent of the county is a racial minority but this statistic varies between 4.1 and 92.0 percent. The poverty and near poverty rate (together) is 38.3 percent for the county. This statistic varies from a low of 20.6 percent to a high of 72.9 percent. The percent of the county's 25 plus population without a high school is 18.2 with a range between 8.3 and 34.4 percent. The Hispanic population for the county is 3.4 percent varying between 0 and 8.6 percent. Census tracts with the highest percentages minority and poverty also are more likely to report no vehicle in the household and biking or walking to work. The mean travel time of 19.2 minutes is similar across census tracts with the exception of 9501 which had an average commute of 35.7 minutes.

Table 2: Selected Demographic Factors for Ware County

	Minority (%)	**LT 150% Poverty (%)**	**LT High School (%)**	**Hispanic (%)**	**No Vehicle (%)**	**Mean Travel Time (Mins)**	**Bike/Walked to Work (%)**
County Total	**35.9**	**38.3**	**18.2**	**3.4**	**4.5**	**19.2**	**1.7**
Census Tract 9501, Ware County, Georgia	4.1	28.7	11.9	0	2.9	35.7	0
Census Tract 9502, Ware County, Georgia	26.8	34.3	24.9	5.6	1.8	22.5	8.5
Census Tract 9503, Ware County, Georgia	21.6	33.1	14.2	0	3.2	15.5	0

	Minority (%)	LT 150% Poverty (%)	LT High School (%)	Hispanic (%)	No Vehicle (%)	Mean Travel Time (Mins)	Bike/Walked to Work (%)
Census Tract 9504, Ware County, Georgia	92.0	72.9	23.7	1.5	14.9	15.8	0
Census Tract 9505, Ware County, Georgia	40.6	41.8	12.9	.90	6.6	16.0	.70
Census Tract 9506, Ware County, Georgia	22.4	20.6	8.3	.90	0	19.4	4.1
Census Tract 9507, Ware County, Georgia	81.9	51.8	34.4	8.6	11.8	14.6	4.1
Census Tract 9508, Ware County, Georgia	44.9	39.7	16.9	5.6	5.4	19.4	2.1
Census Tract 9509, Ware County, Georgia	27.4	48.8	28.0	6.2	4.6	17.5	4.4

Focus: Waycross

Waycross is a city of approximately 15,000 in Ware County in south central Georgia. It is home to Satilla Regional Medical Center, South Georgia State College's Waycross Campus, and Coastal Pines Technical College. It is close to the Okefenokee Swamp, an important environmental area and tourist attraction. The city is approximately 44% white and 54% African American. Waycross has several pedestrian and cycling assets, including very recent investments. In 2015, the city opened a 1,800-foot multi-use trail that is closed to vehicular traffic (Figures 15-17). Under the federal Rails to Trails program, CSX transferred the railroad right of way to the city and the city converted it to a trail with the goal of

making the downtown more walkable (Dickson 2014). At the trailhead there is a small park with a shelter and benches.

Waycross has shown a commitment to encouraging walking, but has many more improvements that could be made for community health. For example, bicycle and pedestrian routes to schools in the district (where possible) and implementing a Safe Routes to School program are ways to easily increase physical activity among children, reducing childhood obesity. Posting signs downtown with information on local walking routes and distances to destinations can encourage more residents to exercise, and consider alternatives to vehicular travel. Safety can be increased for pedestrians to cross major highways by upgrading existing crosswalks to include flashing beacons, especially on the major highways that run through the center of the city and carry relatively high-speed traffic. More specific recommendations are listed below.

Recommendations to Increase Safety and Physical Activity in Waycross

1. Implement pedestrian and bicycle projects in the newly adopted 2016 Comprehensive Plan Update, including extending the multi-use trail.
2. Improve pedestrian and bicycle connectivity when implementing upcoming major transportation projects, such as the US-1 realignment
3. Prioritize pedestrian and bike connections across major highways and railroads. To improve safety and access, install flashing beacons at crosswalks on the major highways (e.g. Hwy 84).
4. On highway overpasses, either ensure safe pedestrian/bicycle access or provide clear signage for alternate routes.
5. In locations where a pedestrian crosswalk has been removed, ensure that the crosswalk striping is removed completely. There are some locations in Waycross where there used to be a crosswalk crossing at a major highway and it has been removed but some of the striping is still visible. This could confuse pedestrians by making them think they can cross there.
6. Where possible, provide pedestrian connections to parks and schools.
7. Encourage walk-to-school events for schools that are in potentially walkable locations, e.g. Waycross Middle School. Consider implementing a Safe Routes to School program.
8. Consider posting signs with maps showing local walking routes (typically 1-2 miles). This is a good way to encourage residents and visitors to walk, and the map provides some guidance for visitors who may not be familiar with the street layout. This has been implemented in similar-size communities (e.g. Bartow, FL).

9. Extend the Rail to Trails multi-use trail, as planned.

Figure 21. Rails-to-Trails Multi-Use Trail

Figure 22. Multi-Use Trail

Figure 23. Pedestrian Crossing in Multi-Use Trail

Below are attached two reports from the U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. The first report summarizes demographic information for Ware County. The second compares Ware County to other “peer counties” on a number of primary health indicators. The health profile report shows that Ware County fares particularly poorly in terms of adult diabetes rates and providing access to health foods. Both of these are health risks that can be mitigated with transportation infrastructure. The high adult diabetes rate highlights the needs for intervention to increase physical activity and decrease inactivity and obesity in Tift County. Bike lanes and sidewalks are ways to increase access to healthy food for households without access to a vehicle.

Demographic and Health Profile Reports for all counties in the region are included in Appendix A.

Demographics

Ware County, GA

Geography	Ware County, GA	
Population Size	35,821	4,990 - 123,441
Population Density (per square mile)	41	7 - 184
Median Household Income	$33,017	$31,820 - $45,787

Age Distribution	Ware County, GA	
Under 18	23.5%	22.4% - 28.4%
Age 18-64	61.0%	57.4% - 63.0%
Age Over 65	15.5%	11.4% - 17.7%

Sex Distribution	Ware County, GA	
Female	50.3%	46.5% - 53.0%
Male	49.7%	47.0% - 53.5%

Race/Ethnicity Distribution	Ware County, GA	
American Indian or Alaska Native	0.5%	0.1% - 34.3%
Asian	0.8%	0.2% - 2.8%
Native Hawaiian or Other Pacific Islander	0.1%	0.0% - 1.0%
Black or African American	29.4%	0.4% - 35.7%
White	64.7%	13.3% - 96.1%
Hispanic or Latino	3.5%	1.1% - 79.2%

Others	Ware County, GA	
Not Proficient in English	2.5%	0.5% - 12.1%
Foreign Born	3.4%	0.8% - 13.5%
With disability	19.6%	12.7% - 22.5%

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Ware County, GA

The following Summary Comparison Report provides an "at a glance" summary of how the selected county compares with **peer counties** on the full set of **Primary Indicators**. Peer county values for each indicator were ranked and then divided into quartiles.

	Better (most favorable quartile)	Moderate (middle two quartiles)	Worse (least favorable quartile)
Mortality		Alzheimer's disease deaths Cancer deaths Chronic lower respiratory disease (CLRD) deaths Coronary heart disease deaths Diabetes deaths Motor vehicle deaths Stroke deaths Unintentional injury (including motor vehicle)	Chronic kidney disease deaths Female life expectancy Male life expectancy
Morbidity	Adult overall health status Cancer Syphilis	Adult obesity Gonorrhea Older adult depression	Adult diabetes Alzheimer's diseases/dementia HIV Older adult asthma Preterm births
Health Care Access and Quality	Cost barrier to care Primary care provider access	Older adult preventable hospitalizations Uninsured	
Health Behaviors	Adult female routine pap tests	Adult physical inactivity Adult smoking	Teen Births
Social Factors		Children in single-parent households Inadequate social support On time high school graduation Violent crime	High housing costs Poverty Unemployment
Physical Environment		Access to parks Annual average PM2.5 concentration Living near highways	Housing stress Limited access to healthy food

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO

References

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Chapter 5: Conclusions and Recommendations

Conclusions

What We Know About the Transportation and Health Connection

Over the past half-century, there has been a dramatic rise in the percentage of Americans who are overweight or obese and suffer from associated health problems. Researchers believe that a decline in physical activity over the same period contributed to this rise (Marks 2004). While over the last fifty years Americans slightly increased their leisure time physical activity, there was a decline in their work-related physical activity, physical activity for transportation, and physical activity in the home (Brownson, Boehmer, and Luke 2005).This has led to many Americans not getting enough physical activity for healthy living.

Studies have shown that incorporating exercise into daily living is an achievable public health alternative to scheduled sports and exercise (Anderson et al. 2000, WHO 2002, Cavill et al. 2008). Research also shows that bicycling for everyday travel can be sufficient to meet recommended quotas for physical exercise (Dill 2009). Further, research shows that making more trips by bicycle or walking is associated with lower obesity rates in adults (Pucher et. al. 2010). Residents of walkable neighborhoods have also been shown to get more daily exercise, and when new walking or bicycling infrastructure is put in, some research has shown that it is regularly used by a third of the community within two years (Goodman et al. 2013). Almost all cities that put a comprehensive program in place to increase cycling do see large increases in the number of bicycle trips and the number of people cycling (Pucher, Dill, and Handy 2013).

Health, Walking, and Bicycling in the SGRC Region

Unfortunately, the SGRC region is part of a “non-active transportation belt” of the U.S. where the percentages of commuters who drive to work is highest (Godwin and Price 2012). This region extends throughout the Appalachians and the southeast and has significantly higher rates of obesity and diabetes than other areas of the country. Georgia has the 10th highest diabetes rate in the country and the 12th highest hypertension rate (Robert Wood Johnson Foundation 2015). Even compared to other areas of Georgia, the SGRC region fares poorly: the average obesity rate and the average inactivity rates

for the region are substantially above the state average (32.4 versus 30.5 and 30.1 versus 24 respectively).

Bicycle and pedestrian mode shares in Georgia are some of the lowest in the nation. The SGRC region has modes shares for each that are well below the national average.

What Can We Do?

Obesity, inactivity, and associated health issues are considered to be "modifiable health risks." This means that transportation planning that increases daily activity levels for individuals in the SGRC region can lead to improved public health, and a number of other benefits, such as decreased healthcare costs. Studies have examined a number of different measures of community health, such as reduced medical costs for active people, a population attributable risk for diseases associated with inactivity, and relative risk of all-cause mortality, and demonstrated that costs involved in improving infrastructure to increase physical activity generally produce economic benefits in terms of reduced costs of diseases (Cavill et al 2008).

Safety Concerns for Walkers and Cyclists in the SGRC Region

Our analyses demonstrated that the SGRC region is not currently very safe for bicyclists and pedestrians. Correlations (i.e. statistical associations) show that those counties in the region wither higher bicycling rates also tend to have higher crash rates, with a strong association between the two. Similarly, counties with higher pedestrian commuting rates have higher rates of pedestrian crashes. Higher bicycling and walking rates at the county region are also associated with various markers of disadvantage, demonstrating that much of the bicycle and walking activity in region is out of necessity. For example, there is a strong association between counties with higher proportions of individuals not having access to a vehicle and higher bicycling and walking rates. These counties also have higher bicycling and walking crash rates. Counties that have higher food insecurity also tend to have more individuals that commute by walking and cycling, and higher walking and cycling crash rates.

It may initially seem to "make sense" that counties with higher proportions of individuals walking and cycling have higher pedestrian and cyclist crash rates, but this is actually not what we see at the state level. At the state level, higher rates of bicycle and pedestrian commuting is associated with better

safety for these commuters, with fewer crashes and fatalities per pedestrian and cyclist. Previous research terms this a "safety in numbers effect," to describe the fact that more cyclists and pedestrians changes driver behavior. Motorists are less likely to collide with pedestrians or cyclists in areas where there are more people cycling or walking (Godwin and Price 2016, citing Jacobsen 2003, Robinson 2005). In the SGRC region, there is a compounded health hazard due to low cycling and walking rates: cycling and walking are associated with very real risks of collision due to the fact that there is no "safety in numbers," and not having enough of the community engaging in walking and cycling means that here are dangerously high inactivity rates in the region.

Recommendations

A. A multi-method approach is needed to increase walking and bicycling safety in our community and decrease bike/walk crash and fatality rates

1. Bike and pedestrian infrastructure in key areas used for commuting is needed to increase safety for those in our region who rely on walking and cycling to get to and from places of employment

2. Bike safety courses and free helmet distributions can lead to increased awareness of laws applicable to bicyclists and increased cyclist safety

B. A multi-method approach is needed to increase walking and cycling in our region to improve public health

1. Increased infrastructure for cycling and walking for recreation and pleasure is needed to decrease inactivity in our region and reduce our high rates of modifiable health risks

C. Efforts targeted at cultural and behavioral change are needed to promote cycling and walking as alternatives to vehicles for daily commuting

1. Promoting national events such as Bike to Work week

Creating Connections

Counties in the region must focus on building infrastructure that increases walkable and bikeable connections between various types of destinations, including shopping, schools and colleges, doctors' offices, and parks. This can include both larger projects (retro-fitting existing roadways with bicycle lanes

and sidewalks) and less expensive projects (such an installing a crosswalk between the Veterans memorial Park and the old depot in Tifton). Programs such as Safe Routes to School can promote walking and bicycling for the younger members of the community.

Signs to mark walking routes have been used with success in similar sized southern cities (such as Bartow, Florida) to show routes to easily walk one or two miles. Figure 24 shows a sign with walking routes in Cincinnati, Ohio. The small city of Brainerd, Minnesota is another example of cities establishing walking routes. The city and a local healthcare system partnered to install signage for a 1.16 miles walking route. Signs are posted along the route and in other locations such as the downtown, and include QR codes with more information on the routes (Brainerd Dispatch 2016).

Figure 24. Map of Walking Routes in Cincinnati, Ohio

Figure 25. Signage Marking Walking Route in Brainerd, Minnesota.

References

"Brainerd Walking Route: Walk for Wellness." June 27, 2016. Brainerd Dispatch. http://www.brainerddispatch.com/lifestyles/health/4062740-brainerd-walking-route-walk-wellness

Appendix A

Figure 26. Relationship between Bicycle Fatalities and Total Number of Bicycle Commuters
Data Source: Alliance for Biking and Walking 2016 Benchmarking Report