

# Does Prevalence of "Healthier" Restaurants Affect Obesity Rates?

Cartography and Poster Design: Emily Lynn, December 12, 2014  
 Projection: NAD 1983 2011 UTM Zone 19N  
 Map Data Sources: National Center for Health Statistics, ReferenceUSA, American Fact Finder, Tufts GIS Database.

Figure 4  
 LiveWell Restaurants,  
 percentage and  
 location

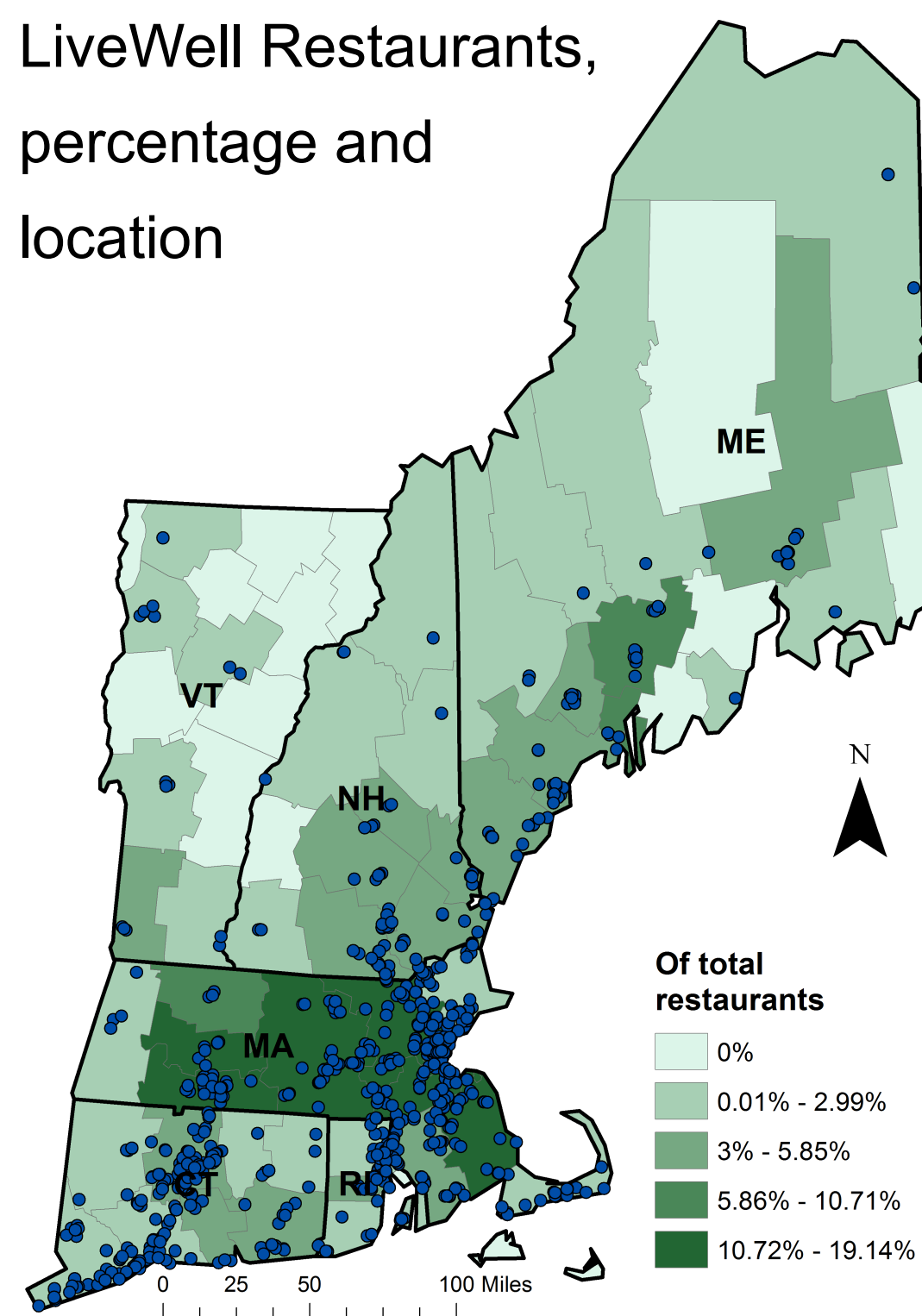


Figure 5  
 Median Income,  
 by County

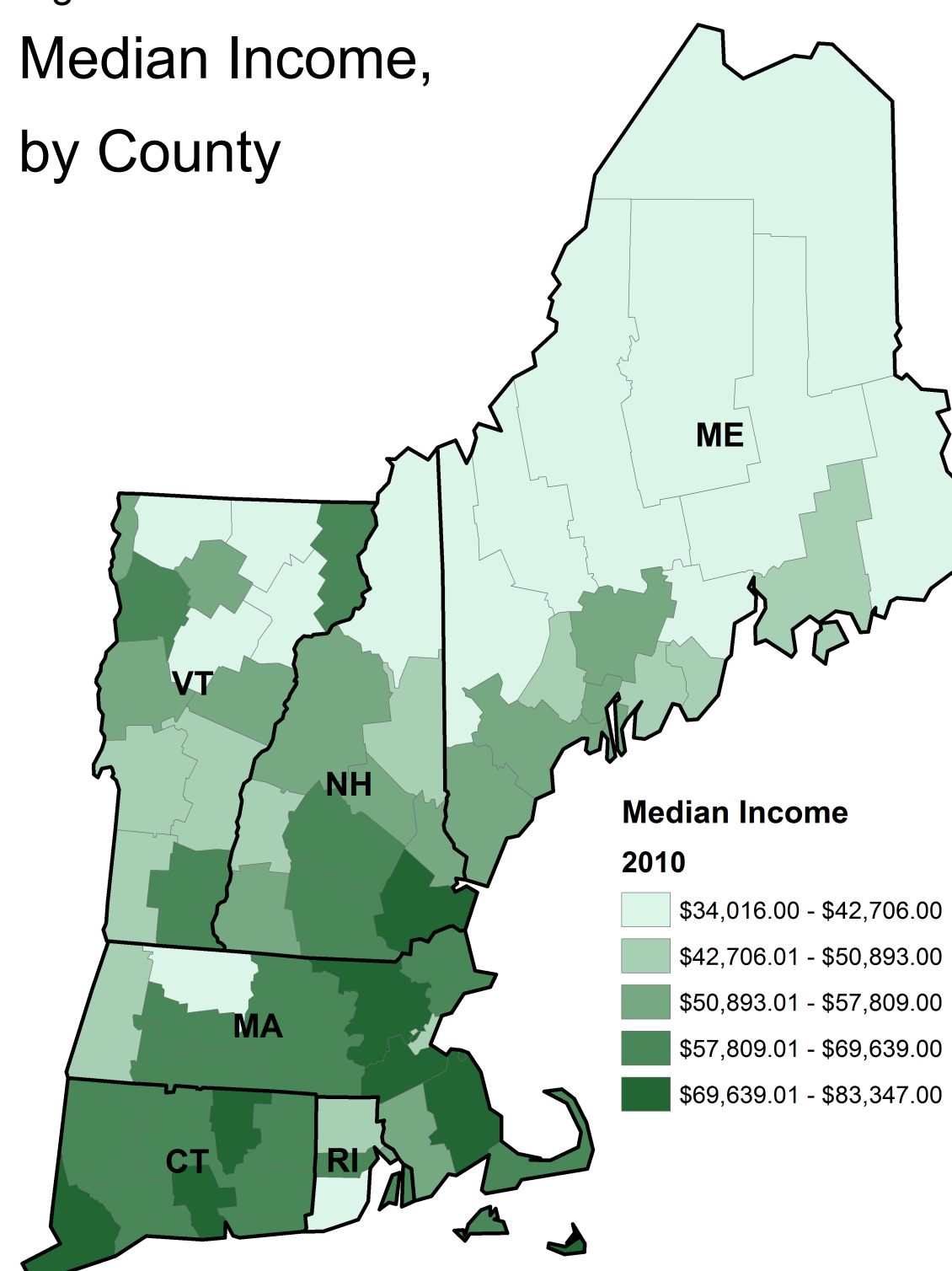
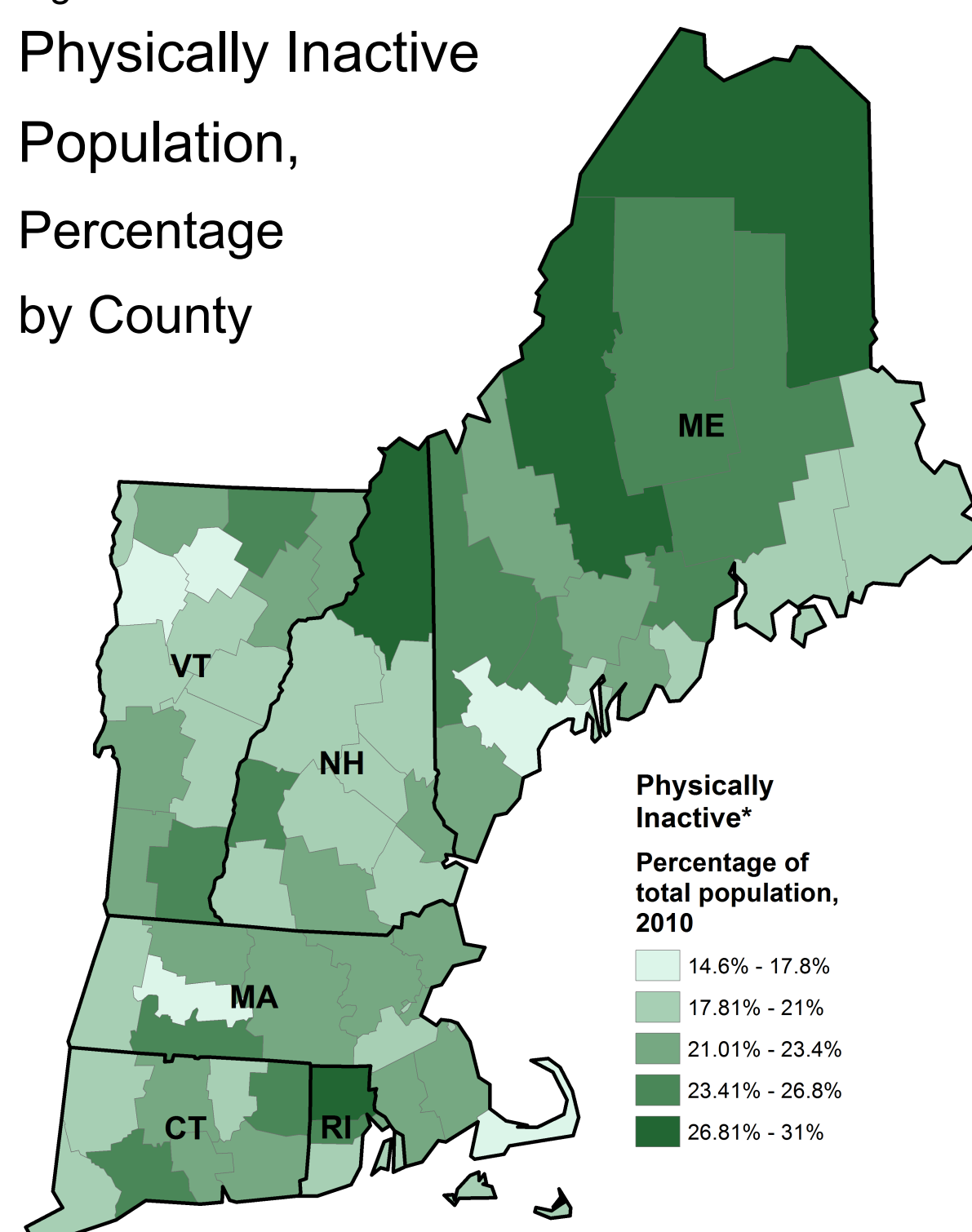


Figure 6  
 Physically Inactive  
 Population,  
 Percentage  
 by County



## Introduction

Most people are familiar with the statistic that over one third of American adults are obese (defined as having a BMI of 30 or more) and with the fact that these rates are going up.<sup>1</sup> The National Restaurant Association started the LiveWell Program to combat the rising rates of obesity in this country. Food environments are known to impact obesity rates, but the jury is still out on what part restaurants play in that relationship.<sup>2,3,4,5</sup> Of interest is the potential correlation between the increase in eating away from home and increasing rates of obesity, as well as the expansion of the fast-food sector.<sup>3</sup> I examined one aspect of this relationship, by comparing the percentage of LiveWell restaurants with the obesity rates. I focused on New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont) because I wanted to have enough counties to look at but still wanted the scope to be manageable. I also looked at median income and physical inactivity, because these are potentially confounding factors. The positive correlation between physical inactivity and obesity is well known, as is the inverse relationship between obesity prevalence and median income.<sup>2</sup> There is also evidence that low-income areas have poorer food environments, including lack of supermarkets and higher density of fast-food restaurants.<sup>2,4</sup>

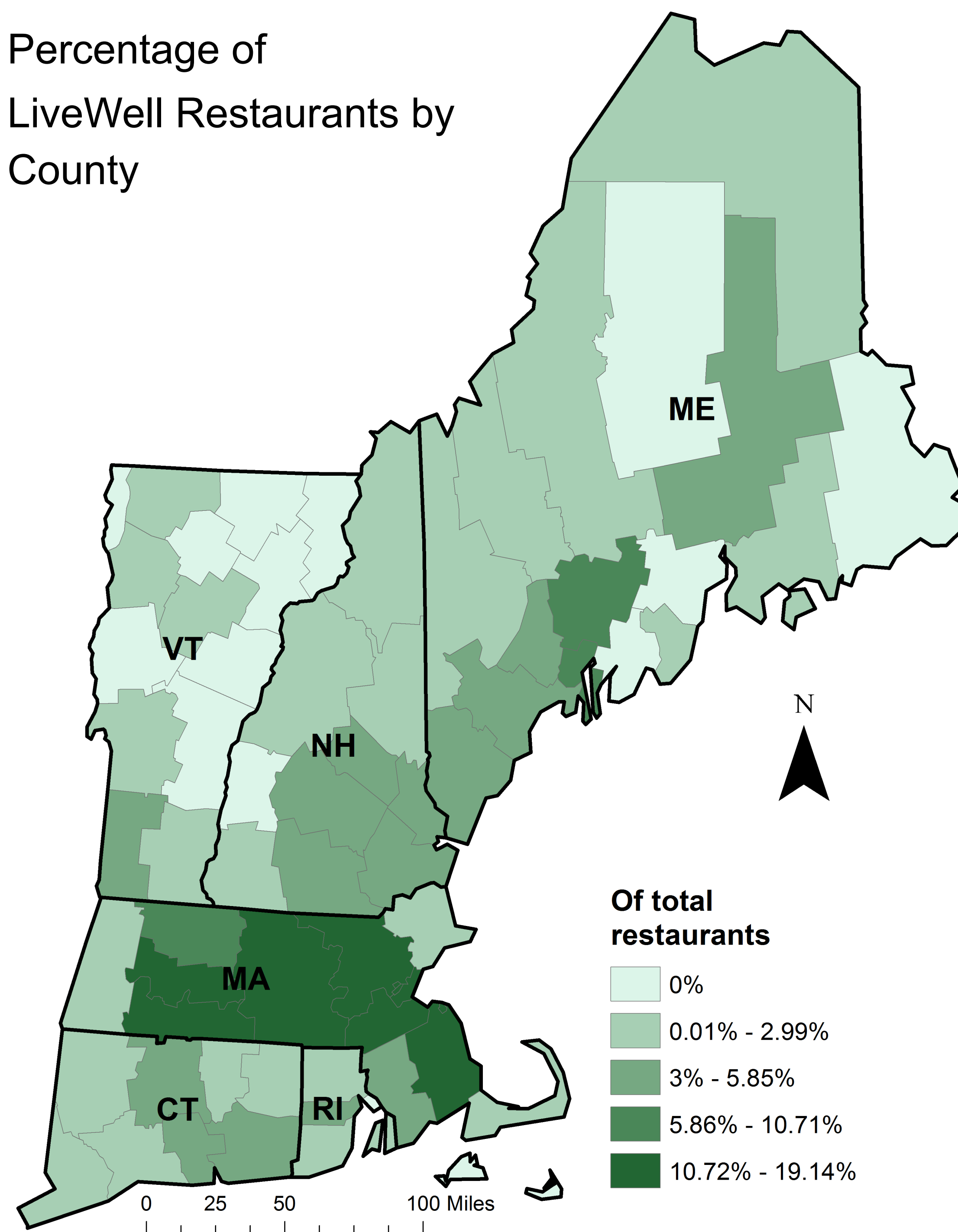
## Methodology

The restaurant data comes from Reference USA. I used the latitude and longitude for each restaurant location to plot the points in ArcGIS. I then selected the LiveWell restaurants from the general restaurants dataset and exported this selection. I used spatial joins to calculate the number of LiveWell restaurants and total restaurants in each county. I then used the field calculator to find the percentage of LiveWell restaurants in each county. I joined the data on obesity and physical inactivity\*, which came from the Centers for Disease Control and Prevention, and the data on median income to the maps for the New England Counties. I used SPSS to find the correlation coefficient between each of the four datasets.

\*Determined by survey. Respondents were classified as physically inactive if they answer no to the following: "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?"<sup>11</sup>

Figure 1

## Percentage of LiveWell Restaurants by County

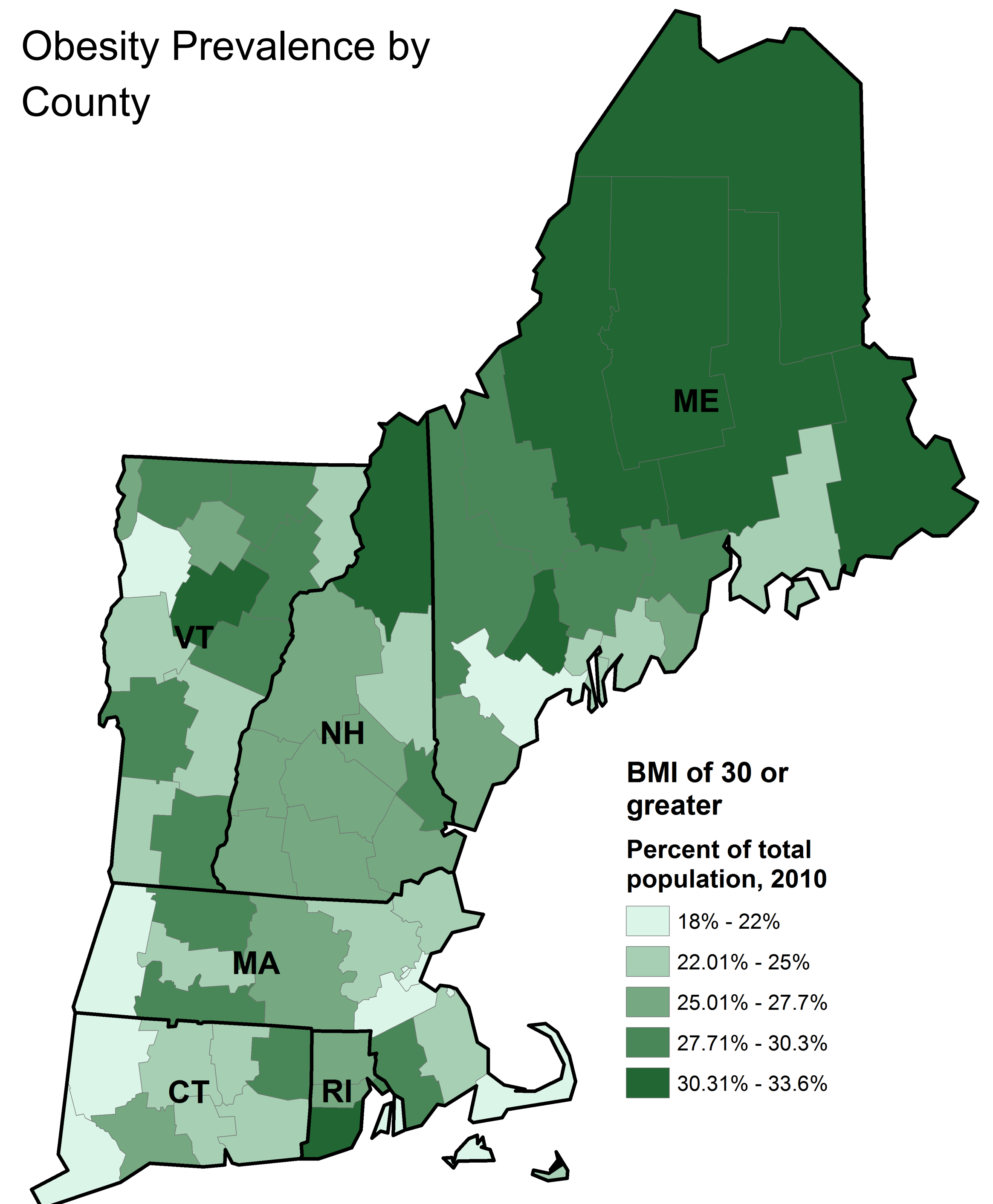


## Results

In comparing Figures 1 and 2, there does not appear to be a relationship between the percentage of LiveWell restaurants and obesity prevalence. There is a visible relationship between physical inactivity (Fig. 4) and obesity (Fig.2), as was expected. The correlation coefficient was .752 and significant ( $p < .0001$ ). There is also an inverse relationship between median income (Fig. 5) and obesity (coefficient =  $-.648$ ,  $p < .0001$ ). I had initially thought that there might be a positive correlation between median income and LiveWell restaurants, because often these types of interventions become concentrated in higher income areas, but there is not a strong relationship between income and LiveWell restaurants (Fig. 1 and 5). The correlation coefficients for LiveWell and obesity was not statistically significant ( $-.109$ ,  $p = .191$ ), and although the coefficient for LiveWell and median income was significant it was not strong ( $.206$ ,  $p = .047$ ). In looking at the locations of LiveWell restaurants (Fig.3), it is clear that they are clustered in more populated areas; along the coast, the Boston area, and Hartford areas. Another interesting dataset that could be included in future analysis would population density.

Figure 2

## Obesity Prevalence by County



## Conclusion

There are several reasons why an inverse correlation between LiveWell restaurants and obesity prevalence might be not be visible. First, the number of LiveWell restaurants is quite low. More than 10 counties have no LiveWell restaurants, and in the county with the highest percentage, LiveWell restaurants still only account for 19 percent of all restaurants. Second, although the LiveWell program is a step in the right direction, the criteria to be considered a LiveWell restaurant can be met without the restaurant making a serious change to be healthier. A restaurant has to offer one full meal that meets certain nutritional standard, and another side that meets nutritional requirements, promote these foods, and provide nutritional information. These are not onerous requirements, and even if all restaurants were to make

these changes, it might not significantly affect the eating habits of their customers, or not affect them enough to change the increase in obesity rates. Third, I used data at the county level because that was the smallest unit for which some of the information was available. All of the factors I am looking at have the potential to vary widely within counties, and an analysis that looks at smaller units might be able to pick up subtler patterns. Finally, the LiveWell program is relatively new, and it might be too early to tell whether they are impacting obesity rates. The data clearly illustrate the positive correlation between physical inactivity and obesity, and the inverse relationship between median income and obesity, which is almost as strong.

## Sources

1. Data and Statistics: Adult Obesity - DNPAO - CDC. (n.d.) Retrieved from <http://www.cdc.gov/obesity/data/adult.html>
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3. Baxter, J., Jeffery, R. W., Linde, J. & McGuire, M. (2006). Are fast food restaurants an environmental risk factor for obesity? *International Journal of Behavioral Nutrition and Physical Activity*, 3(2).
4. Foerster, S.B., Ghirardelli, A., & Quinn, V. (2010). Environmental Approaches to Obesity Prevention: Using Geographic Information Systems and Local food Store Data in California's Low-Income Neighborhoods to Inform Community Initiatives and Resources. *American Journal of Public Health*, 100(11), 2156-2162.
5. Burdette, H.L., & Whitaker, R. C. (2004). Neighborhood playgrounds, fast food restaurants, and crime: relationships to overweight in low-income preschool children. *Preventive Medicine*, 38, 57-63.