



# A STUDY OF THE RELATIONSHIP BETWEEN THE PRIMARY CARE WORKFORCE AND OBESITY PREVALENCE RATES IN MISSISSIPPI

---

Hwanseok Choi, Ph.D.



THE UNIVERSITY OF  
SOUTHERN MISSISSIPPI®



## Introduction

- Obesity is a major public health concern in the U.S.<sup>1</sup> Obesity costs US \$147 billion annually (estimated).<sup>2</sup>
- For the last decade, Mississippi has led the nation in obesity rates.<sup>1</sup> Efforts thus far have only achieved a cessation in the upward trend of obesity prevalence.
- This study focuses on the relationship of primary care physician (PCP) workforce to obesity rates.
- Recently, there have been several researches about the effectiveness of Primary Care Providers' role for reducing weight among overweight and obese patients.
- However, no research has done for illuminating the direct relationship between Primary Care Providers and obesity related outcome variables.
- Researches related to this topic have assumed that there is an effectiveness of Primary Care Providers' consults, suggestion, or communication to obese patients.



## Research Question

- Is there a direct relationship between the number of Primary Care Provider and obesity prevalence rate?  
→ No research has done this before: direct relationship between these two variables

## Method

- Linear regression model without any other variables involved
- SPSS version 23

## Data

- State-level data: AAMC 2013 State Physician Workforce Data Book - Active Primary Care Physicians (PCP's)
- County-level data in Mississippi: Mississippi State Board of Medical Licensure (Descending order by Population)



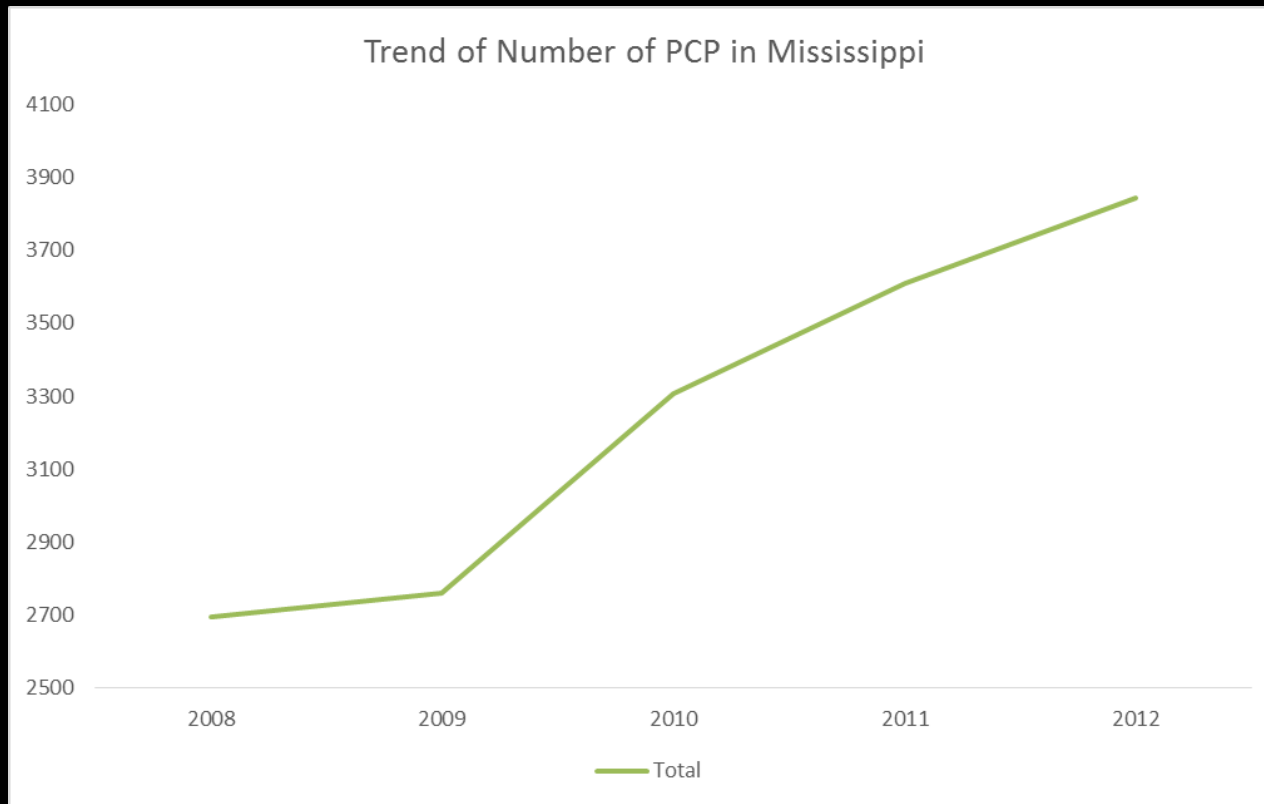
## Variables

- State-level data: Obesity Prevalence Rate (OPR), 2012
- County-level data: Obesity Prevalence Rate (OPR), 2010, 2011, and 2012
- Primary Care Providers: Physicians with MDs and DOs degrees in internal medicine, primary care, pediatrics and gerontology\*.
- PCP rate =  $\text{Number of PCP} / \text{Population (Census estimated)} * 100,000$
- Rank of Obesity Prevalence Rate: the smaller is the lower rank



## Results

- Mississippi has a dramatic increase of the number of PCP between year 2009 and 2010. → We reflect this change into the analysis (2010, 2011, and 2012 for Mississippi data)





## Results

1. State-level Data: At  $\alpha = 0.05$  level, it is statistically significant.  $R^2 = 0.22$ .

Model:

Estimated OPR =  $34.262 - 0.06 \times \text{PCP rate}$

2. County-level data: At  $\alpha = 0.05$  level, there are no statistically significant results in 2010, 2011, and 2012

| Year | Model Summary |                   |                      |         |
|------|---------------|-------------------|----------------------|---------|
|      | R-Square      | Adjusted R-Square | S.E. of the Estimate | p-value |
| 2010 | 0.018         | 0.006             | 3.29183              | 0.229   |
| 2011 | 0.002         | 0.001             | 3.1511               | 0.658   |
| 2012 | 0.000         | 0.000             | 3.11538              | 0.965   |

In a scatter plot, they have completely random scattered pattern.



## Results II: Using Rank of OPR instead of OPR

1. State-level Data: At  $\alpha = 0.05$  level, it is statistically significant.  $R^2 = 0.224$ .

Model:

Estimated OPR =  $67.612 - 0.449 \times \text{PCP rate}$

2. County-level data: At  $\alpha = 0.05$  level, there are no statistically significant results in 2010, 2011, and 2012

| Year | Model Summary |                   |                      |         |
|------|---------------|-------------------|----------------------|---------|
|      | R-Square      | Adjusted R-Square | S.E. of the Estimate | p-value |
| 2010 | 0.12          | 0.000             | 15.51                | 0.917   |
| 2011 | 0.112         | 0.012             | 23.67                | 0.318   |
| 2012 | 0.033         | 0.001             | 3.413                | 0.769   |

The results have pure random error.  $\rightarrow$  There is no meaningful variance which can be explained by the PCP rate.  
: Worse than OPR vs. PCP rate results



## Discussion

- There is a statistically significant relationship between PCP's and obesity rates at the state level at the significance level = 0.05.
- Poor modeling results of the county level could be due to uneven distribution of providers with large concentrations in few counties.
- Further exploring the addition of nurse practitioners yielded the same results at the county level.
- Increasing PCP workforce at the state level is an effective policy to combat obesity; however, policy makers should continue to monitor the distribution of PCPs.





## Future:

1. Need to further study the effect of non-physician PCP workforce:
  1. There is a recent ramp up in the number of nurse practitioners in Mississippi; combating obesity takes time; a near future repeat-study may show different results.
  2. Analysis of county-level statistics for all 50 states could potentially yield additional insight.
  3. Cost-effective model of adding physician vs. non-physician PCP workforce may be considered.
2. What kinds of approaches will be the most effective should be considered: time-length to consult, positive or negative conversation, continuity and so on