

Paper LS-197

Evaluating Sociodemographic and Geographic Disparities of Hypertension in Florida using SAS®

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ABSTRACT

There are a variety of programs currently used to map data. SAS® is a program that can also be used to map multiple types of data including data from Florida's Behavioral Risk Factor Surveillance System. This paper will demonstrate the use of SAS® to evaluate and map the influence of socio-demographic factors such as sex, race/ethnicity, age, education and income on hypertension prevalence in Florida using Behavioral Risk Factor Surveillance System (BRFSS) data. This paper is designed to teach users how to create simple choropleth and prism maps using numeric response data.

INTRODUCTION

Hypertension is one of the leading risk factors for chronic disease. Chronic conditions such as heart disease, stroke and diabetes are associated with hypertension. In 2013, the prevalence of hypertension among adults was 34.6% in Florida. As age increases the risk of hypertension increases, placing older populations at greater risk for developing chronic conditions. Florida has the second largest elderly population in the United States which places an increased burden on the health care system. This paper will discuss how to use PROC MAPIMPORT and PROC GMAP to assess the burden of hypertension in Florida.

IMPORTING MAPS

A variety of maps are provided within SAS®; however, they may not be the maps you need. By utilizing PROC MAPIMPORT you can import Esri shapefiles into SAS to create maps. The U.S. Census provides shapefiles at the different demographic levels. A Florida county shapefile with hypertension prevalence data was imported into SAS®. The most recent available county level BRFSS data are from 2013. PROC MAPIMPORT will be run twice. The first time will be to import the shapefile into SAS®, then again to specify the variable that will enable SAS® to generate the map. See the code below for the first input text:

```
Proc mapimport datafile="J:\Hsfcd\Health Systems Team\Ppresentations\SESUG-
HTN\GIS maps\HTN\All_htn.shp"
out=my_map;
run;
```

There are multiple variables in this file. To identify the names of all variables a PROC CONTENT will be used to examine all variables in this shapefile. See code below:

Proc contents

```
data=my_map;
run;
```

Output 1

Alphabetic List of Variables and Attributes			
#	Variable	Type	Len
4	Age18throu	Num	8
5	Age45through	Num	8
6	Age65andol	Num	8

Output 1. Output from a PROC CONTENT statement (Used to learn the names of the variables in the dataset)

PROC MAPIMPORT will need to be run again, this time specifying women as the ID variable. (This variable is not shown on the above output table). This will allow SAS® to detect which variable is the ID, and group the correct areas. See the below iteration:

```
proc mapimport datafile="J:\Hsfcd\Health Systems Team\Presentations\SESUG-
HTN\GIS maps\HTN\All_htn.shp"
out=my_map;
id women;
run;
```

CREATING CHOROPLETH MAPS

The next procedure will demonstrate how to create the choropleth maps. The map below shows the percentage of women in Florida who reported having hypertension in 2013. A darker color was chosen to display the higher percentage areas. The TITLE statement can be used to add a title to the map. The PATTERN statement is used for determining the color scheme of the map. The ID statement is used to specify the variable to be mapped. The CHORO statement is used to make choropleth maps. See code below:

```
title1 'Florida Women Hypertension Prevalence 2013';
Pattern1 v=s color=vlig;
proc gmap data=my_map map=my_map;
id women;
choro women / coutline=blue;
levels=1 nolegend;
run;
```

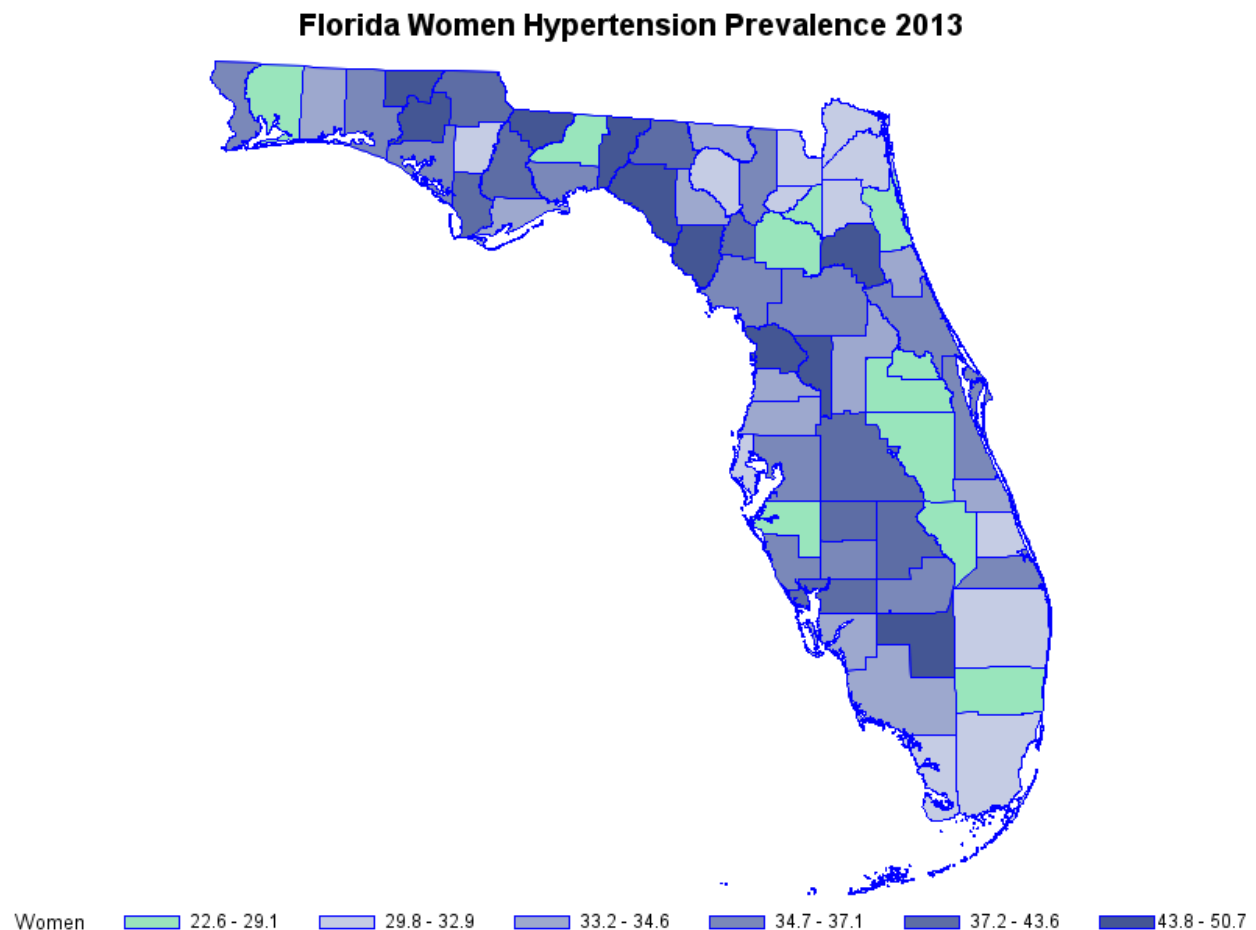


Figure 1. Hypertension prevalence of women in Florida for 2013.

The next example of a choropleth map demonstrates how to create a map that discretely shows different colors of every numerical value in the map (Figure 2). There are multiple options that can be used on the CHORO statement in PROC GMAP, but in order to control the number of colors you can use the LEVELS option with the CHORO statement or the DISCRETE option. See example code below:

```

title1 'Florida Women Hypertension Prevalence 2013';
Pattern1 v=s color=vlig;
proc gmap data=my_map map=my_map;
id women;
choro women / discrete;
run;

```

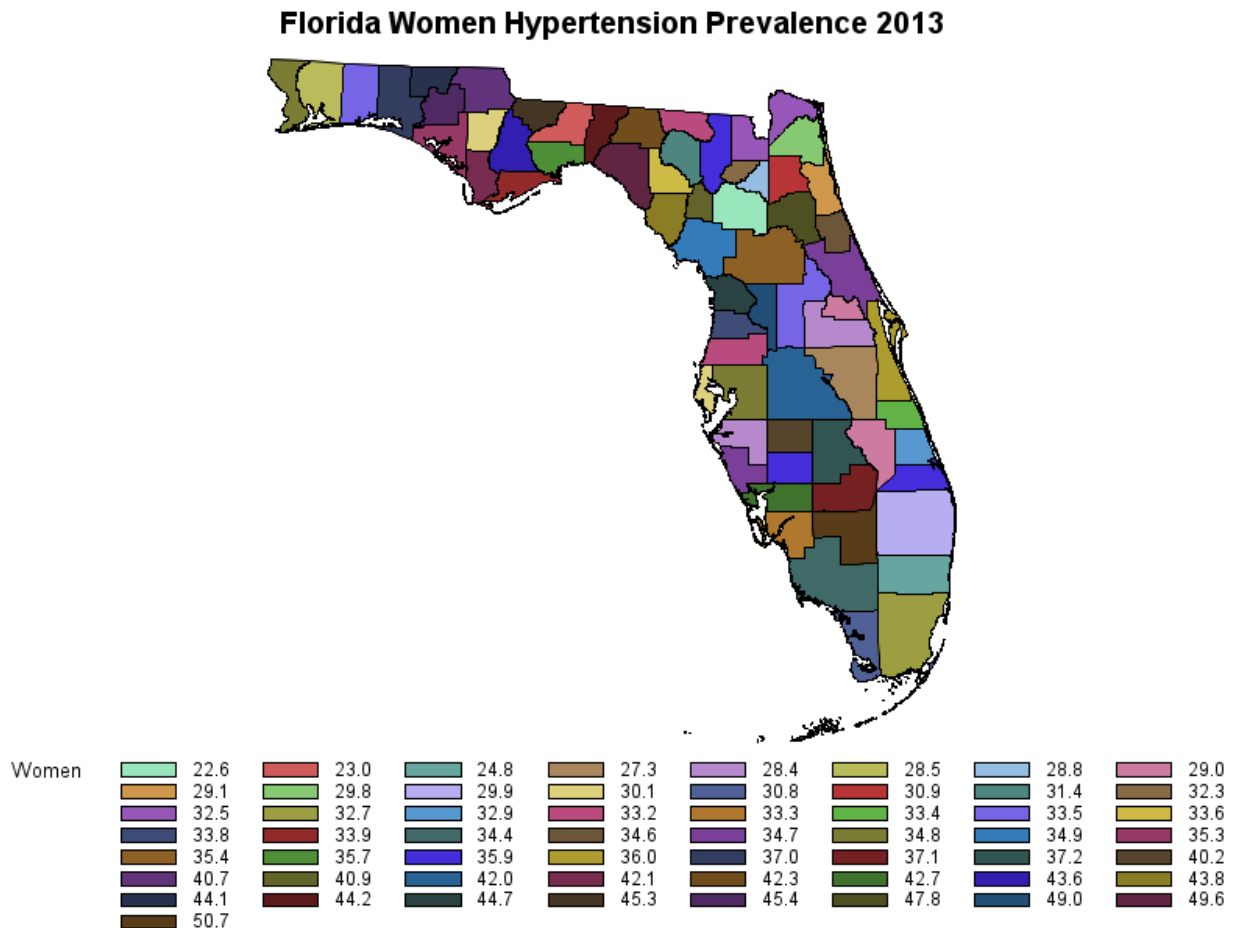


Figure 2. Hypertension prevalence of Women in Florida SAS map 2013. This example displays a choropleth map that shows the hypertension prevalence rates of women in Florida for 2013. The legend shows the percentage of women with hypertension (out of all adults with reported hypertension) for each county.

CREATING PRISM MAPS

This example will use the same data as above, but a different variable to create a prism map, a map that utilizes color and a raised area to display hypertension percentages. The difference in the code for the choropleth map and the code for the prism is the change of the word CHORO to PRISM in the GMAP procedure. See code below:

```

title1 'Florida Adults Age 65 and Older Hypertension Prevalence 2013';
Pattern1 v=s color=vlig;
proc gmap data=my_map map=my_map;
id Age65andol;
prism Age65andol;
run;
quit;
title;
footnote;

```

Florida Adults Age 65 and Older Hypertension Prevalence 2013

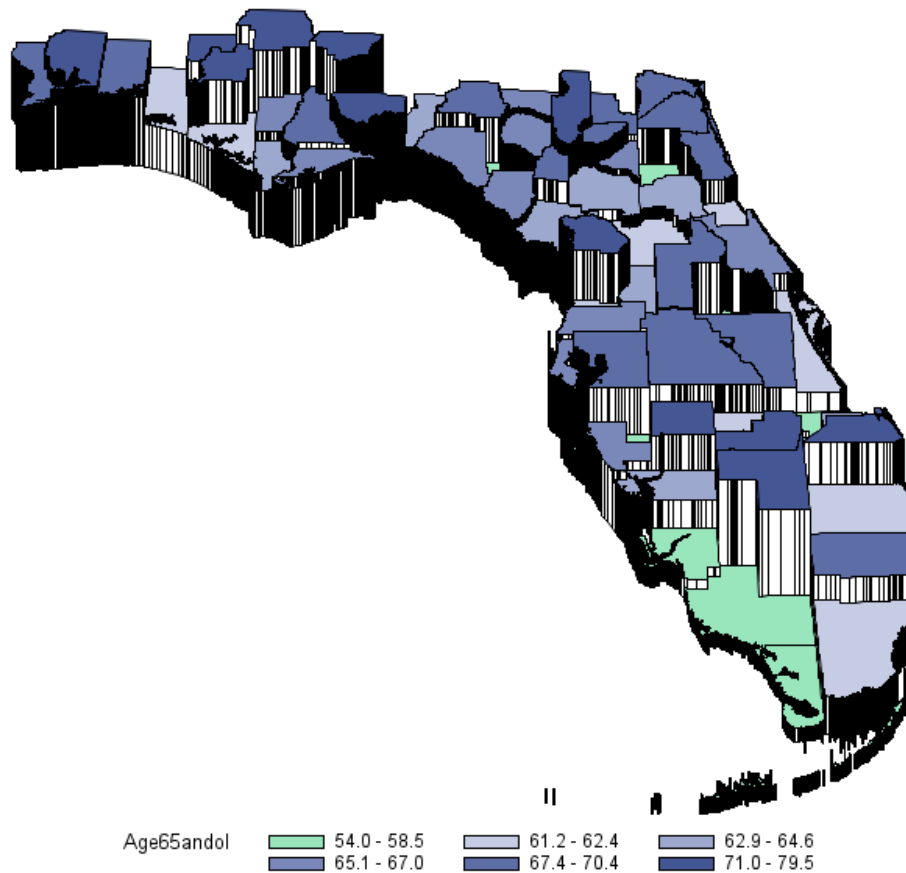


Figure 3. This example displays a prism map that shows the hypertension prevalence of adults age 65 and older in Florida for 2013. The legend shows the range of values for each level.

CONCLUSION

This paper shows examples of how to create health maps using ESRI shapefiles from the U.S. Census. SAS[®] has various procedures to create different maps such as choropleth and prism maps. These maps were used to identify geographical disparities associated with hypertension. Public health officials can use these maps to drive health related programmatic efforts and wide variety of interventions aimed at reducing disparities.

REFERENCES

1. Florida Department of Health. Behavioral Risk Factor Surveillance System; Available from: <http://www.floridahealth.gov/%5C/statistics-and-data/survey-data/behavioral-risk-factor-surveillance-system/reports/2013county/index.html>
2. Allison, R. SAS/GRAPH. 2013; Available from: http://robslink.com/SAS/book1/Chapter_05_Maps.pdf.

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