

# Diabetes Self-Management Education Programs in Florida

Adetosoye Oladokun, Florida Department of Health;

Rahel Dawit, Florida Department of Health

## ABSTRACT

Identifying areas and populations without access to Diabetes Self-Management Education programs (DSME) is important to the health of Floridians with diabetes. This paper will demonstrate how SAS® 9.4 is used to map DSME programs throughout the state. This will allow the Florida Department of Health to refer Floridians to programs within or near their county of residence to receive education and manage their diabetes. The procedures utilized for this project include PROC MAPIMPORT, PROC GMAP, PROC CONTENTS, PROC FREQ and PROC FORMAT which will assist users with creating health data maps with meaningful ranges.

## INTRODUCTION

In 2014, one out of nine Florida adults (11.2%) were diagnosed with diabetes.<sup>1</sup> The prevalence has increased for adults 65 and older, as one out of five have been told they had diabetes.<sup>2</sup> Other risk factors for diabetes include race/ethnicity, being overweight, lack of physical activity, family history of diabetes and women with gestational diabetes. The Florida Department of Health works toward improving the health of all people in Florida through integrated state, county, and community efforts. Currently there are 100 DSME programs that are recognized by American Diabetes Association (ADA) and 31 DSME programs that are accredited by the American Association of Diabetes Educators (AADE) in Florida.

This paper will demonstrate how to import shapefiles created in ArcGIS into SAS® 9.4 and also show the use of PROC MAPIMPORT, PROC GMAP, PROC CONTENTS, PROC FREQ and PROC FORMAT to showcase the number of DSME programs located in Florida. The paper will serve as a resource for the Florida Department of Health to refer people with diabetes to DSME programs located within or near their county of residence.

## IMPORTING MAPS

Using ArcGIS, a Florida county shapefile was joined with the number of ADA recognized DSME programs for the year 2014. The same procedure was conducted using ArcGIS in order to create a map of AADE accredited DSME programs. The code below will show the map created and how the shapefile was imported into SAS ® 9.4.

### DSME PROGRAMS RECOGNIZED BY AMERICAN DIABETES ASSOCIATION (ADA)

The PROC MAPIMPORT procedure below was used to import Esri shapefiles from ArcGIS into SAS® 9.4.

```
proc mapimport datafile= 'K:\DawitRX\Domain 4\SESUG\Geocoded\ADA.shp'
out= mymap;
run;
```

In order to identify the contents of the map and to ensure that the data were properly imported into SAS® 9.4, a PROC CONTENTS was conducted that produced output for the data. The code and the results are shown below.

```
proc contents
data=mymap;
run;
```

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**The Display 1: PROC CONTENTS**

| The SAS System         |                           |                      |        |
|------------------------|---------------------------|----------------------|--------|
| The CONTENTS Procedure |                           |                      |        |
| Data Set Name          | WORK.MYMAP                | Observations         | 417101 |
| Member Type            | DATA                      | Variables            | 16     |
| Engine                 | V9                        | Indexes              | 0      |
| Created                | 08/10/2016 09:49:01       | Observation Length   | 1648   |
| Last Modified          | 08/10/2016 09:49:01       | Deleted Observations | 0      |
| Protection             |                           | Compressed           | NO     |
| Data Set Type          |                           | Sorted               | NO     |
| Label                  |                           |                      |        |
| Data Representation    | WINDOWS_64                |                      |        |
| Encoding               | wlatin1 Western (Windows) |                      |        |

| Engine/Host Dependent Information |                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------|
| Data Set Page Size                | 135168                                                                                         |
| Number of Data Set Pages          | 5150                                                                                           |
| First Data Page                   | 1                                                                                              |
| Max Obs per Page                  | 81                                                                                             |
| Obs in First Data Page            | 80                                                                                             |
| Number of Data Set Repairs        | 0                                                                                              |
| ExtendObsCounter                  | YES                                                                                            |
| Filename                          | C:\Users\DawitRX\AppData\Local\Temp\SAS Temporary Files\_TD8760_CHP00MLTMD3588\_mymap.sas7bdat |
| Release Created                   | 9.0401M2                                                                                       |
| Host Created                      | X64 7PRO                                                                                       |

Running a PROC CONTENTS will also produce a table that displays all of the variables and attributes by name in alphabetical order. The table below shows which variables SAS ® 9.4 read as either a numeric type or character type. This is very important for the data set as SAS ® 9.4 could read a numeric data as character, which would prevent creating a map with accurate data.

| Alphabetic List of Variables and Attributes |            |      |     |
|---------------------------------------------|------------|------|-----|
| #                                           | Variable   | Type | Len |
| 4                                           | ADA_Num    | Num  | 8   |
| 5                                           | Address    | Char | 254 |
| 8                                           | COUNTYFIPS | Num  | 8   |
| 9                                           | COUNTY_NAM | Char | 50  |
| 6                                           | City       | Char | 254 |
| 7                                           | County     | Char | 254 |
| 10                                          | OBJECTID   | Num  | 8   |
| 3                                           | SEGMENT    | Num  | 8   |
| 11                                          | Shape_STAr | Num  | 8   |
| 12                                          | Shape_STLe | Num  | 8   |
| 13                                          | Site_Progr | Char | 254 |
| 14                                          | Sponsoring | Char | 254 |
| 15                                          | State      | Char | 254 |

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|    |     |     |   |
|----|-----|-----|---|
| 1  | X   | Num | 8 |
| 2  | Y   | Num | 8 |
| 16 | Zip | Num | 8 |

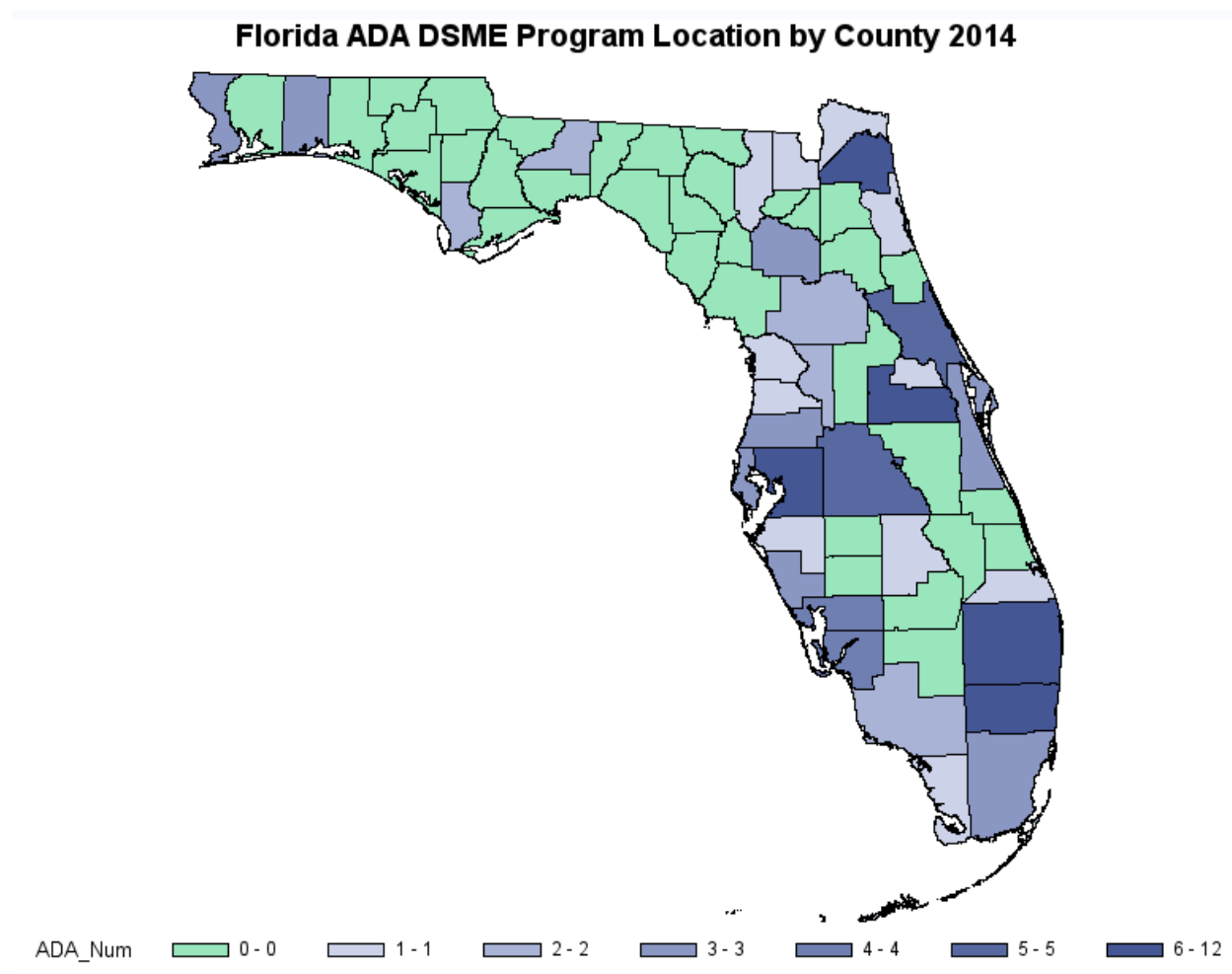
**Table1: Alphabetic List of Variables and Attributes**

The PROC GMAP statement was used to display the actual map. The PATTERN statement was used to choose the color scheme while the TITLE statement was used to add a title to the map. In addition, the ID statement was used to identify the variable that will be mapped, and the CHORO statement identifies the choropleth map based on the number of programs located in a county. The code and results are shown below.

```

title ls=1.5 'Florida ADA DSME Program Location by County 2014';
pattern1 v=s color=vlig;
proc gmap data=mymap map=mymap;
id county;
choro ADA_Num;
run;

```

**Figure 1. Florida ADA DSME Program Location by County 2014**

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Figure 1 shows the number of DSME programs recognized by the ADA with varying ranges where counties with 1-5 DSME programs have their own individual choropleth grouping and counties with 6-12 DSME programs all grouped together. In order to regroup and create a range of DSME programs with a better defined classification of the number of ADA DSME programs, the PROC FORMAT statement was utilized. PROC FORMAT statement allows the values of the table to be formatted based on the variables that are desired. A new data set mymap2 was created from the original data set of mymap which included the IF, THEN statements that assigned the values to the desired range/classification of DSME programs. The codes below were utilized

```
proc format;
value ADA_num2f 0="0" 1="1-2" 2="3-4" 3="5-7" 4="8-12";
run;

data mymap2;
set mymap;
ADA_num2=.;
if ADA_num=0 then ADA_num2=0;
if ADA_num in (1,2) then ADA_num2=1;
if ADA_num in (3,4) then ADA_num2=2;
if ADA_num in (5,6,7) then ADA_num2=3;
if ADA_num in (8,9,10,11,12) then ADA_num2=4;
run;
```

A PROC FREQ statement was also utilized to check the values of the desired variable for the number of DSME programs (ADA\_Num) based on the PROC FORMAT statement above. The codes and results are shown below.

```
proc freq data=mymap2;
tables ADA_num;
run;
```

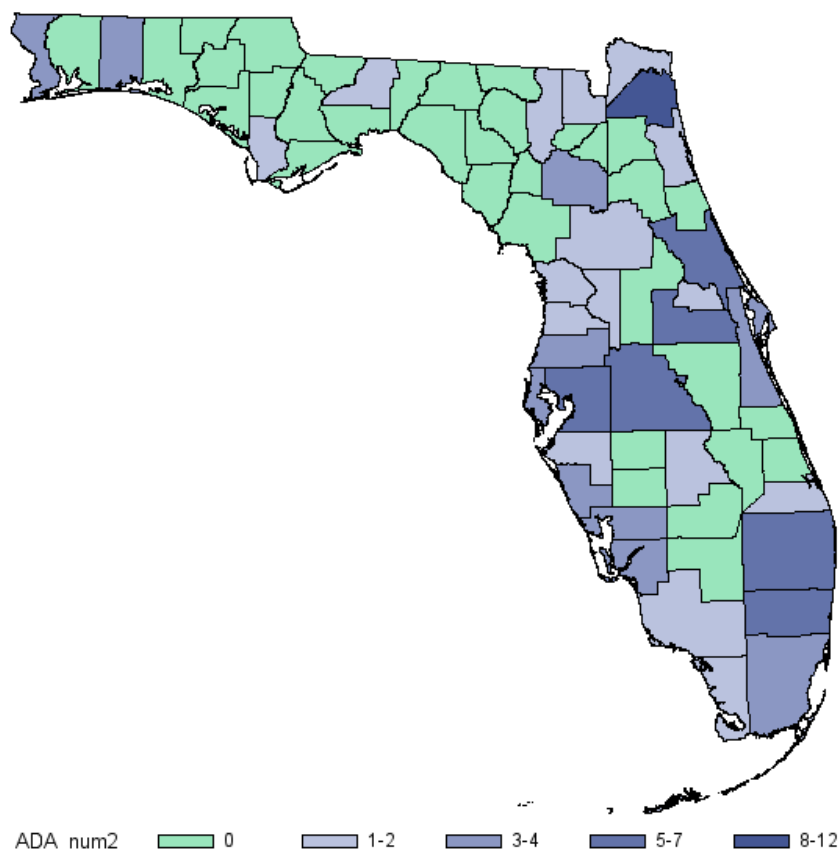
| The FREQ Procedure |           |         |                      |                    |
|--------------------|-----------|---------|----------------------|--------------------|
| ADA_Num            | Frequency | Percent | Cumulative Frequency | Cumulative Percent |
| 0                  | 88390     | 21.19   | 88390                | 21.19              |
| 1                  | 146037    | 35.01   | 234427               | 56.20              |
| 2                  | 23825     | 5.71    | 258252               | 61.92              |
| 3                  | 71627     | 17.17   | 329879               | 79.09              |
| 4                  | 52687     | 12.63   | 382566               | 91.72              |
| 5                  | 14504     | 3.48    | 397070               | 95.20              |
| 6                  | 7917      | 1.90    | 404987               | 97.10              |
| 7                  | 10217     | 2.45    | 415204               | 99.55              |
| 12                 | 1897      | 0.45    | 417101               | 100.00             |

**Table 2. Florida ADA DSME Program Location by County 2014**

Once the data were reformatted, a PROC GMAP statement could be run. The codes and results are shown below.

```
title ls=1.5 'Florida DSME Program location by county 2014';
pattern1 v=s color=vlig;
proc gmap data=mymap2 map=mymap2;
format ADA_num2 ADA_num2f.;
id county;
choro ADA_Num2;
run;
```

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**Florida ADA DSME Program Location by County 2014****Figure 2. Florida ADA DSME Program Location by County 2014****DSME PROGRAMS ACCREDITED BY AMERICAN ASSOCIATION OF DIABETES EDUCATORS (AADE)**

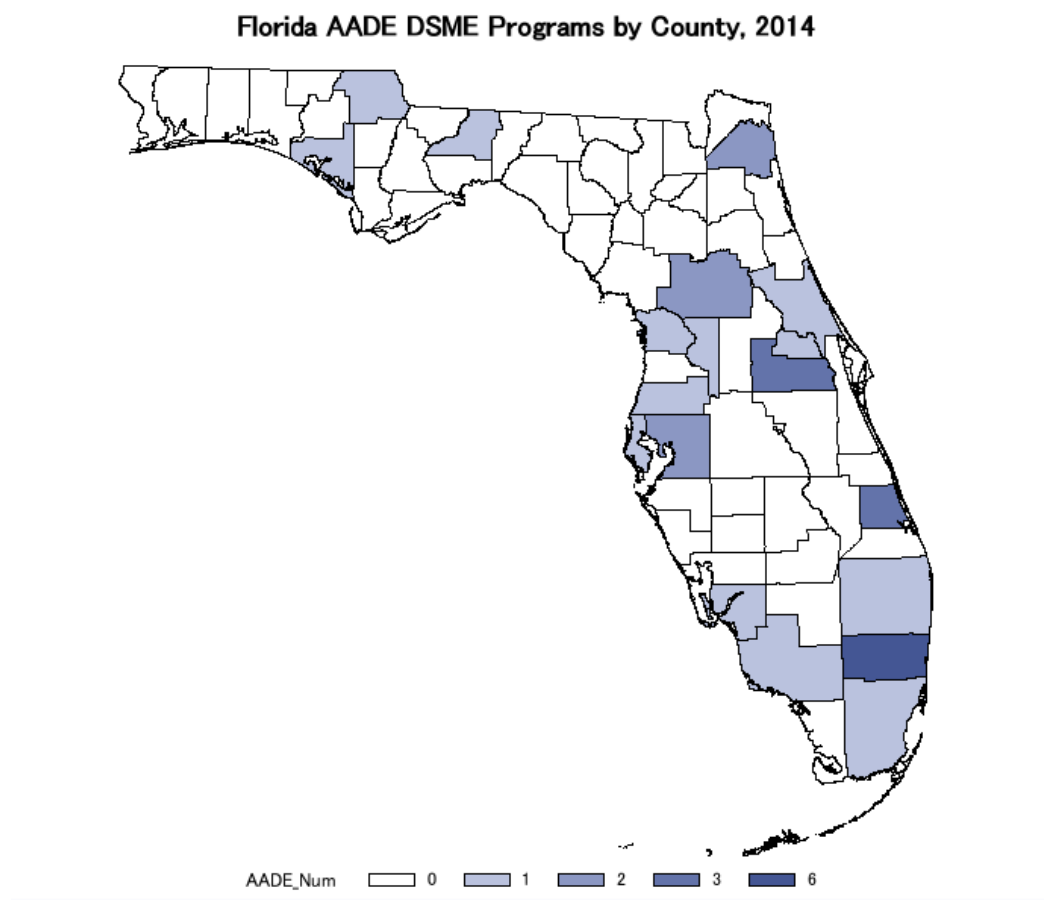
The PROC MAPIMPORT procedure below was used to import Esri shapefiles from ArcGIS into SAS ®. 9.4 for the AADE accredited DSME programs in Florida.

```
proc mapimport datafile= 'K:\DawitRX\Domain 4\SESUG\Geocoded\AADE.shp'
out= aademap;
run;
```

The PROC GMAP statement was also used to display the map in similar format as it was done for the ADA programs on the previous page. A different color scheme was chosen to differentiate between the two programs. Given the lower number of AADE accredited DSME programs in Florida, there was no need to create a range and classify the number of programs as done previously with the ADA programs. The code and results are shown below.

```
title ls=1.5 'Florida AADE DSME Programs by County, 2014';
pattern v=s color=white;
proc gmap data=aademap map=aademap;
id county;
choro AADE_Num;
run;
```

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**Figure 3. Florida AADE DSME Program Location by County 2014**

## CONCLUSION

This paper shows examples of how to create health maps using SAS® 9.4. Data regarding the number of DSME programs in Florida were gathered from the American Diabetes Association (ADA) and American Association of Diabetes Educators (AADE). This paper explains the process of importing shapefiles into SAS® 9.4 from ArcGIS and using various procedures to display a map that depicts the counties with DSME programs in Florida. Results from this paper will assist the Florida Department of Health and other partner agencies with identifying counties without DSME programs to work toward establishing new programs as well as increase referrals to DSME programs within counties that have an ADA or AADE program.

## REFERENCES

- 1. Florida Department of Health. Florida Behavioral Risk Factor Surveillance System (BRFSS) 2014 Data Book. Available from: [http://www.floridahealth.gov/statistics-and-data/survey-data/behavioral-risk-factor-surveillance-system/reports/\\_documents/2014-brfss.pdf](http://www.floridahealth.gov/statistics-and-data/survey-data/behavioral-risk-factor-surveillance-system/reports/_documents/2014-brfss.pdf) .
- 2. Baker, C., & Roberson, S. Creating Health Maps Using SAS. (2014). SESUG 2014. Myrtle Beach, South Carolina. SouthEast SAS Users Group. Available at: <http://www.sesug.org/SESUG2014/AcademicSections.php>
- 3. Statistical Analysis Software. "MAPIMPORT Procedure". Internet. August 9, 2016. <http://support.sas.com/documentation/cdl/en/graphref/67881/HTML/default/viewer.htm#p1rvpewhocha4yn1qipf920vchn3.htm>

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- 4. Statistical Analysis Software. "The FREQ Procedure". Internet. August 9, 2016.  
[http://support.sas.com/documentation/cdl/en/procstat/66703/HTML/default/viewer.htm#procstat\\_freq\\_overview.htm](http://support.sas.com/documentation/cdl/en/procstat/66703/HTML/default/viewer.htm#procstat_freq_overview.htm)

**CONTACT INFORMATION**

Your comments and questions are valued and encouraged. Contact the author at:

Name: Adetosoye Oladokun, BS, MPH  
Enterprise: Florida Department of Health  
Address: 4052 Bald Cypress Way, Bin A18  
City, State ZIP: Tallahassee, Florida 32399  
Work Phone: 850-245-4444 ext 2844  
E-mail: Adetosoye.oladokun@flhealth.gov

Name: Rahel Dawit, MPH  
Enterprise: Florida Department of Health  
Address: 4052 Bald Cypress Way, Bin A18  
City, State ZIP: Tallahassee, Florida 32399  
Work Phone: 850-245-4444 ext 3858  
E-mail: Rahel.dawit@flhealth.gov

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