

The Opioid Epidemic on the First Coast

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ABSTRACT

The nation has been focusing on the opioid epidemic for many years. Aggregate quarterly data on opioid distribution at a general level has been available through the Drug Enforcement Administration (DEA) but cannot be used to do analyses on the effects of opioids in local Areas.

Quantifying impacts of the Opioid Epidemic at the local level has not been easy: what little data was provided by the DEA was not user-friendly, overly broad and did not follow the desired timeline of data collection.

This project focuses on database exploration and uses statistical methods and Decision Tree analysis to predict the expected annual opioid saturation across defined Areas of Northeast Florida. These analyses can support the community, healthcare systems and public servants in addressing problems surrounding opioid sales and abuse in hopes of finding solutions targeted to specific Areas of the First Coast.

For the purposes of this research, the First Coast consists of Baker, Clay, Duval, Nassau, Putnam, and Saint Johns counties.



GOALS & OBJECTIVES

- 1) Database Exploration
Accessing and extracting relevant data from multiple sources
- 2) Data Cleaning
Deciphering and connecting data
- 3) Statistical Analysis
Utilizing Estimated Means and Decision Trees
- 4) Creation of an Interactive Dashboard
Providing a publicly available, downloadable resource

DATABASES

ARCOS: The DEA's Automation of Reports and Consolidated Orders System. It contains a detailed record of all individual shipments from manufacturer to local retailer by day between 2006 and 2014.

DEA Quarterly Reports: Aggregated quarterly data on controlled substance distribution first 3 zip prefix (i.e., 320, 321, 322).

US Census Bureau's American Community Survey (ACS): An annual survey that comes in 1-, 3-, and 5-year averages. The ACS provided population counts as well as the poverty status by zip code.

USDA RUCA and RUCC: US Dept. of Agriculture Rural-Urban Commuting Area Codes (RUCA) and Rural-Urban Continuum (RUCC) allow for the classification of zip codes and counties by urbanization, density, commuting, population sizes and distance to the metro- and micropolitan Areas.

DATA CLEANING & PROCEDURES

After datasets were collected from ARCOS, Python 3.7 was used to extract and Python, JMP 15.0 and SAS 9.0 were used to clean the data.

The ARCOS data was deciphered and cleaned to 1,463,222 records and 43 variables (over 68 million data points). The data was then verified to match with the aggregate DEA Quarterly Retail Drug Summary Reports (36 data points). (Fig. 3)

From the 60 zip codes that comprise the First Coast, 20 Areas (Fig. 2) were created by nearest neighbors and naming conventions. Then the Census' ACS population and poverty data, RUCA and RUCC Codes were used to create an adjusted RUCA (adjRUCA) to account for each Area's trends in each part of the Northeast Florida. (Figs. 4 & 5)

Once this data was organized and compiled, Tableau 2020.3.6 was used to map the data, provide graphical analysis and create the online dashboard.

DECISION TREE ANALYSIS by adjRUCA

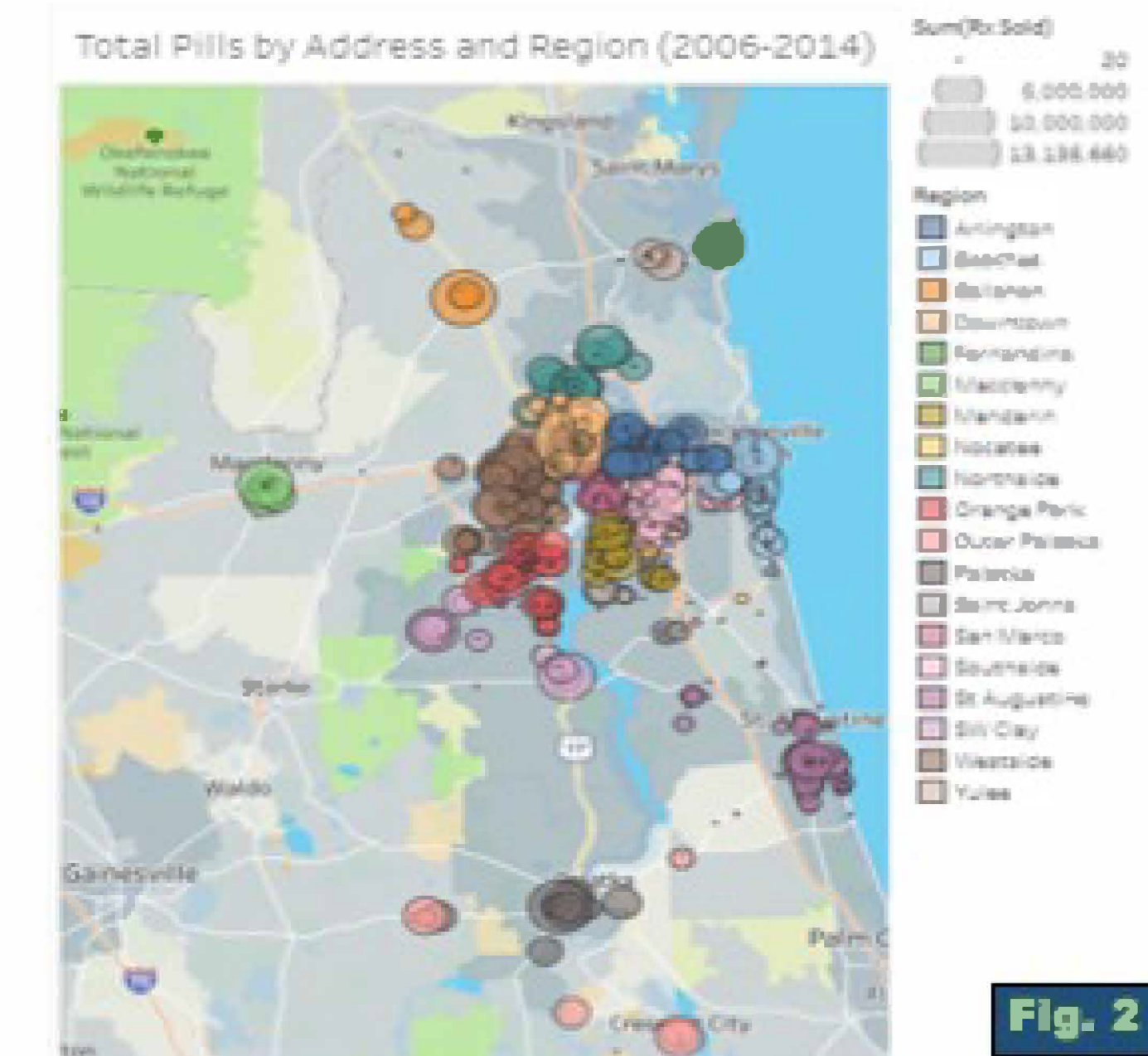
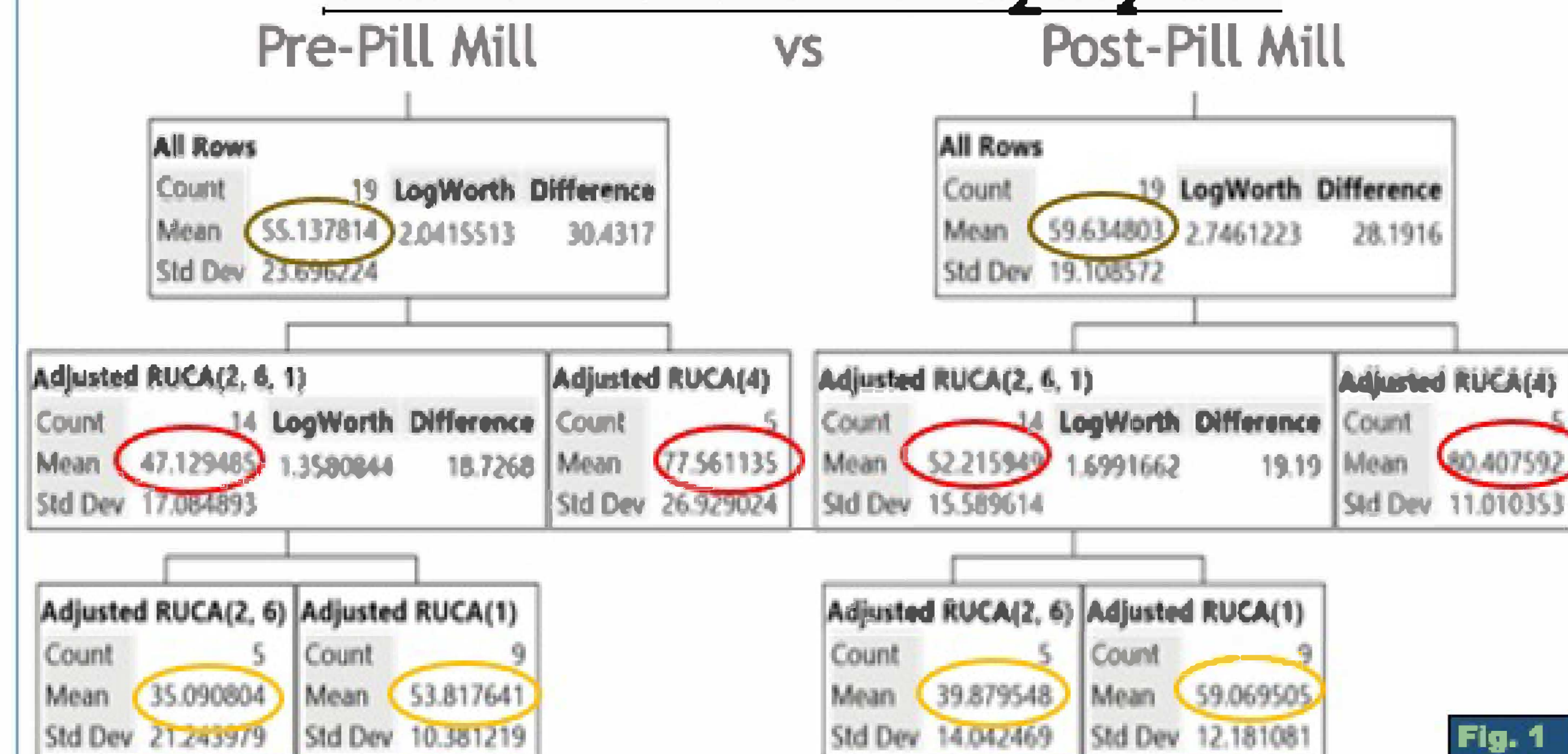


Fig. 2

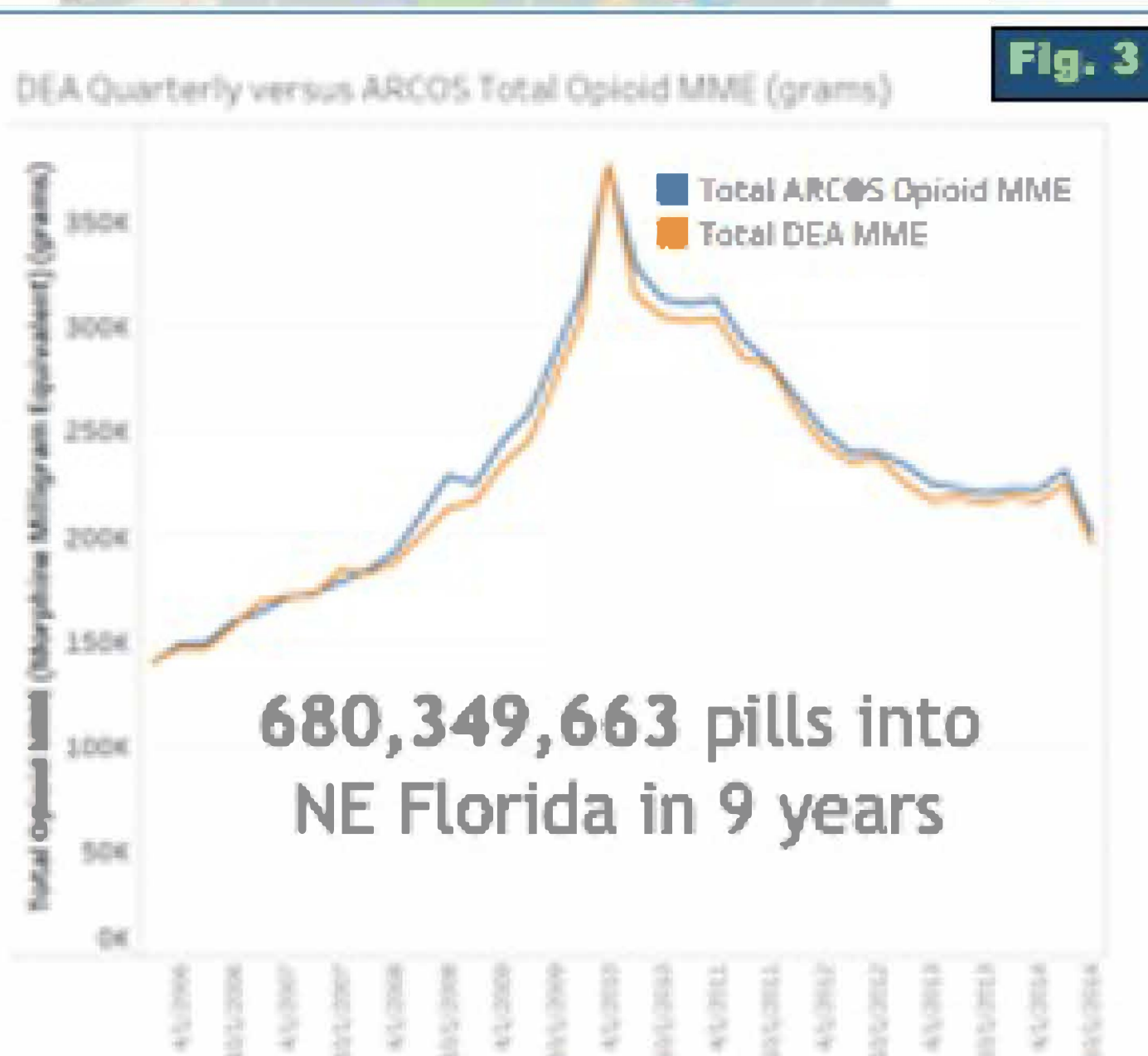


Fig. 3

adjRUCA Calculation



Fig. 4

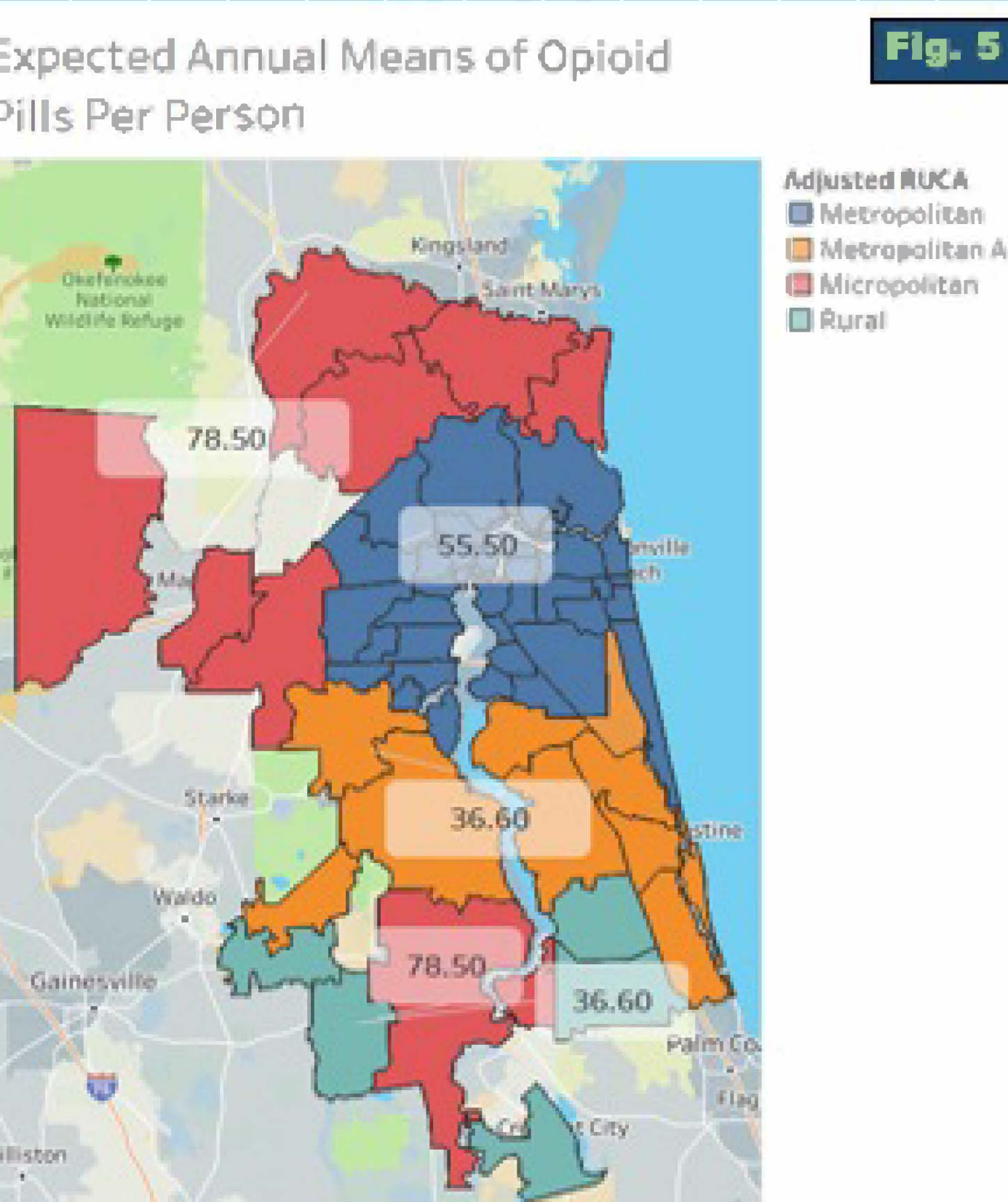


Fig. 5

ANALYSIS & RESULTS

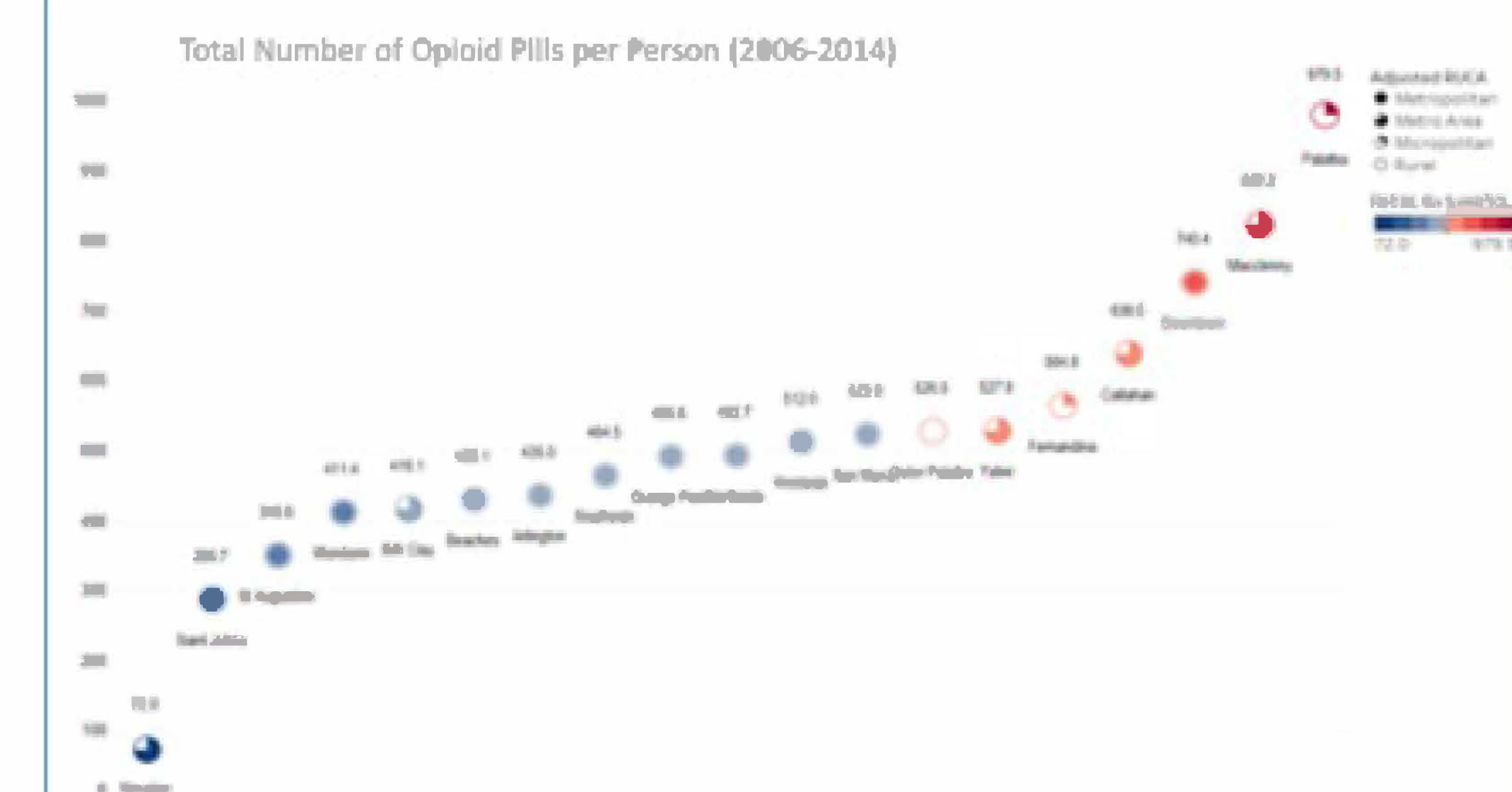
The pre-2012 analysis consists of 6 years of data while the post-2011 consists of 3 years.

Surprisingly, the estimated mean pill counts post-2011 are all higher than before the Pill Mill Law went into effect (January 1, 2012). (Fig. 4)

We conclude that although the total number of pills sold has decreased over time, the total amount of pills sold per person in Northeast Florida has not declined to pre-2009 levels.

DATA ACCESS POST-ANALYSIS

The results of this project are made available to the public to support data-driven decisions in the community via the Tableau dashboard. All data is downloadable in .csv format for public use.



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