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Analysis of Technological Adoption in Rural Healthcare among Southern States

Sujit Kunwor, Aaron Driskell, Courtney Hanson

University of Alabama

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IMAGE

Profile Photo

Sujit Kunwor

Abstract

Introduction

Methods

Results 1

Results 2

Conclusion

- Rural health trends are valuable to service providers in order to implement effective method of intervention. Technological intervention has been applied in various rural areas of United States and their effectiveness have been studied to some extent. **The objective of this research project is to examine recent trends in rural health services and whether technological implementation have made an impact on such trends.** The focus area was chosen to be Southern United States. Here, we highlight trends seen in rural health data, such as whether there is an expansion or shrinkage in Southern rural health clinics (RHC), federally qualified health centers (FQHC), and critical access hospitals (CAH). Further, we assessed how technology, specifically telemedicine, is being used in rural areas. To answer these questions, we used HCRIS cost reports, Area Health Research Files (AHRF), Medicare Provider Utilization and Payment Data, and review of current literature. Using these data, we were able to observe trends at state, clinic, and provider level in these clinics over the period of 2010-2016 and how these trends can project the future outlook of rural health. We observed that rural health in the Deep South is expanding across all measures analyzed: number of clinics, full time employees, patient visits, overall clinic costs, and cost per visit. We also saw that there is growth in technology use in these clinics, with a focus on telemedicine.

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Intro

Service providers to rural communities face many challenges and the motivation for service providers fluctuates with change in policy, population, and technology. Rural communities cover a significant area of the United States representing a large number of medically underserved populations. Over the last ten years, there have been numerous changes in government policy to nudge the integration of technology into medical practices with hopes to advance the quality of care provided to individuals throughout the United States [1, 2, 3]. Considering recent changes and anticipating more changes in the future, it is vital to understand the landscape of rural health care in America.

Abstract

Introduction

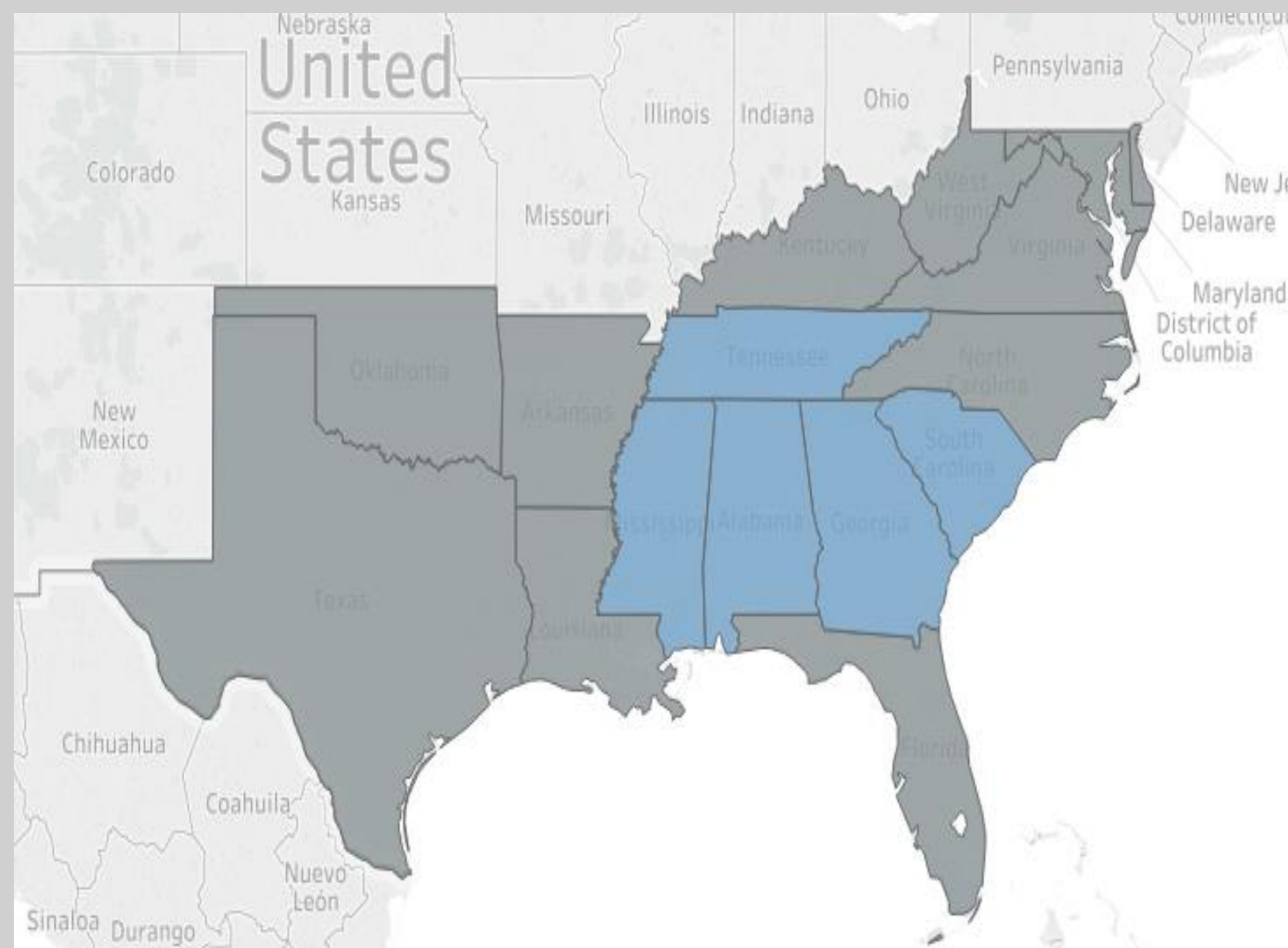
Methods

Results 1

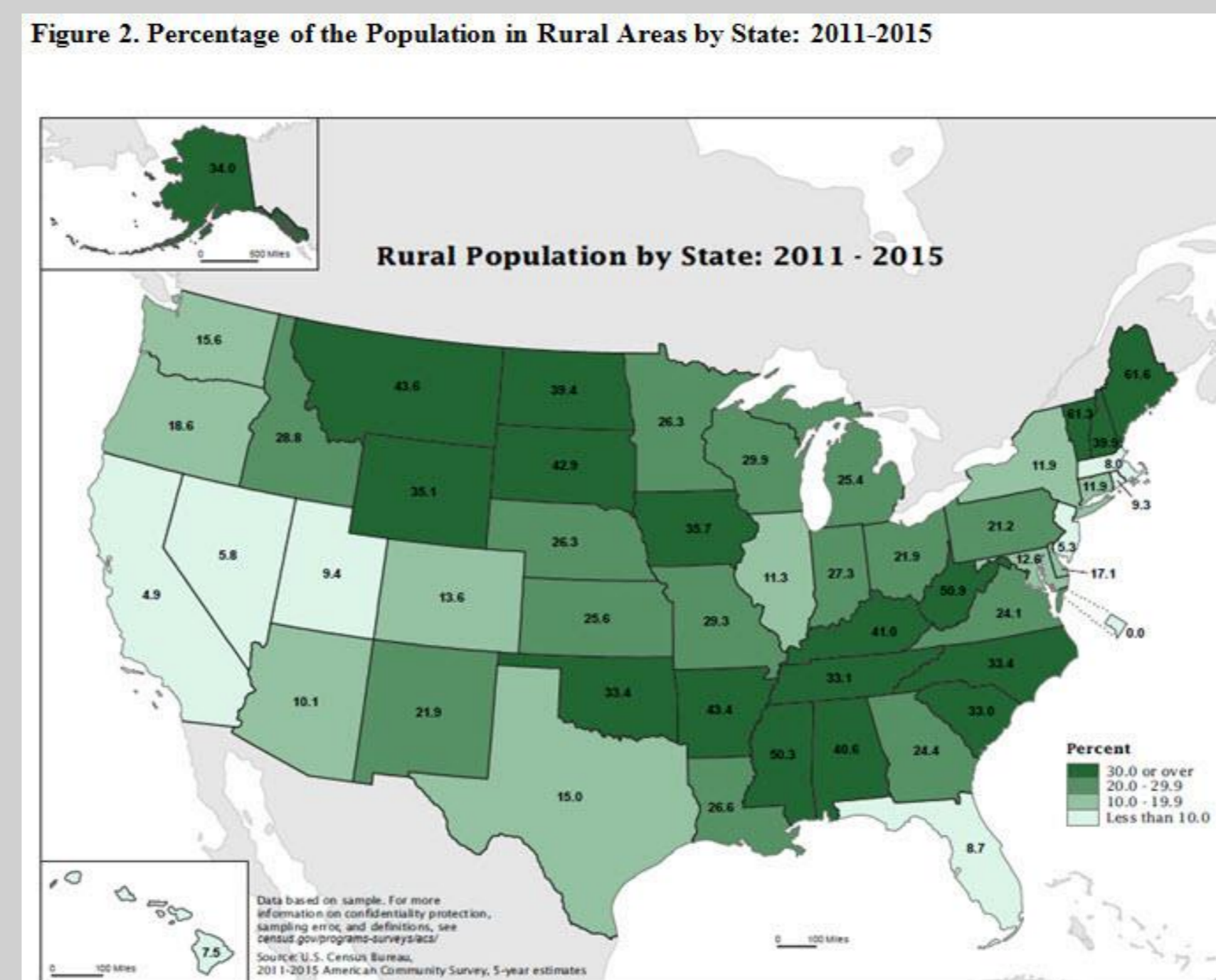
Results 2

Conclusion

Location



Rural or Urban



Objectives

1. Is rural health growing or shrinking?
2. How is technology being utilized in rural clinics, what kind of services are being provided?
3. What are trends and barriers to adoption for rural technology

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HCRIS Cost Reports and AHRF

The HCRIS cost reports contain self-reported Medicare cost report data. We used these reports that contain data from available **RHC** and **FQHCs** between 2010-2016. CMS does have cost report data for CAH's. To narrow our scope and focus on similar types of rurality, we filtered data to clinics only in states that the US census categorizes as South. Then to focus in even more, we observed trends for clinics in the Deep South including Alabama, Mississippi, Georgia, South Carolina, and Tennessee. The data from these reports were used to analyze the trends of average and total numbers from 2010-2016 for four main categories: full time employees (FTEs), patient visits, total clinic costs, and cost per visit. FTEs include Physicians, Physician assistants, and Nurse Practitioners.

The information analyzed in this data were then compared with data from the AHRF to understand regional and population trends over time and determine causes for the trends. Since HCRIS data was self-reported, the data available is not complete for all RHC and FQHCs over this time period, however, there was a high enough percentage, around 70%, to be representative of overall trends for these clinics.

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Timeline

AHRF
2010-2016

HCRIS Cost Reports
2010-2014

Medicare Provider
Utilization & Payment
Data
2012-2015

Medicare Provider Utilization and Payment data

CMS's Medicare Provider Utilization public use files (PUFs) were used to evaluate the use of telemedicine. The yearly data files are summarized to the fee-for-service provider and HCPCS level, which does not include modifiers. The provider's address was linked to a CBSA indicator to determine if the location was Metro (1), Micro (2), or Not a Statistical Area (0). The CBSA indicator controlled for rurality in a similar fashion to the AHRF data. Additionally, the data set was reduced to the Census southern states and then to the 'Deep South' delineation. Telemedicine origination claims were identified using the HCPCS code Q3014 .

Statistical Analysis

Data management and analysis for our three datasets were performed in SAS and JMP. Specifically, for the HCRIS cost reports, analysis was set up and performed by extracting the Item Value Number for each provider by matching the worksheet code with line and column numbers given by the provider's entries from the HCRIS manual provided by the CMS website. Finally, these data sets were imported into Tableau and Microsoft Excel to create visual representations of the trends shown in the data over the available years, 2010-2016 (2012-2015 for Medicare Provider Utilization and Payment data).

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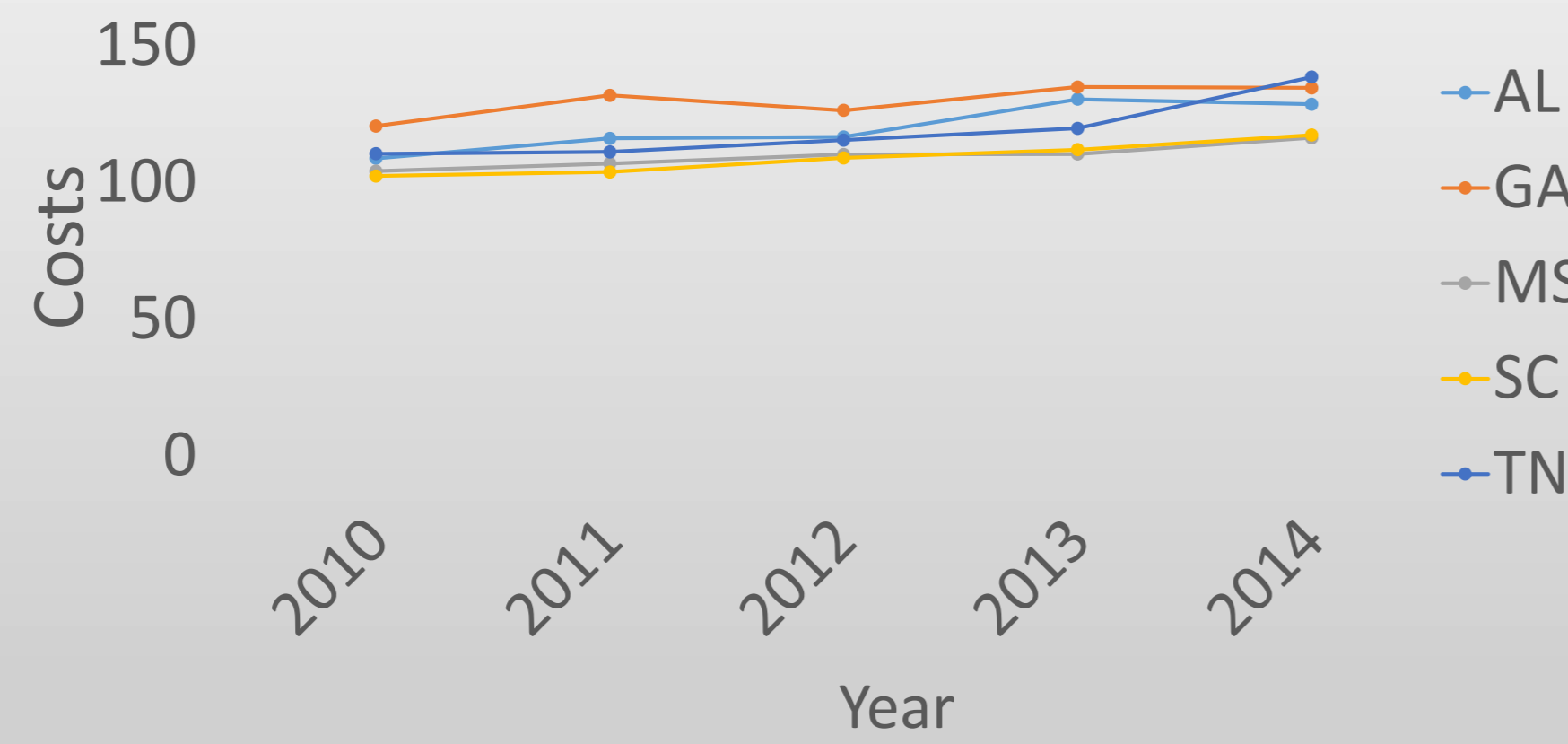
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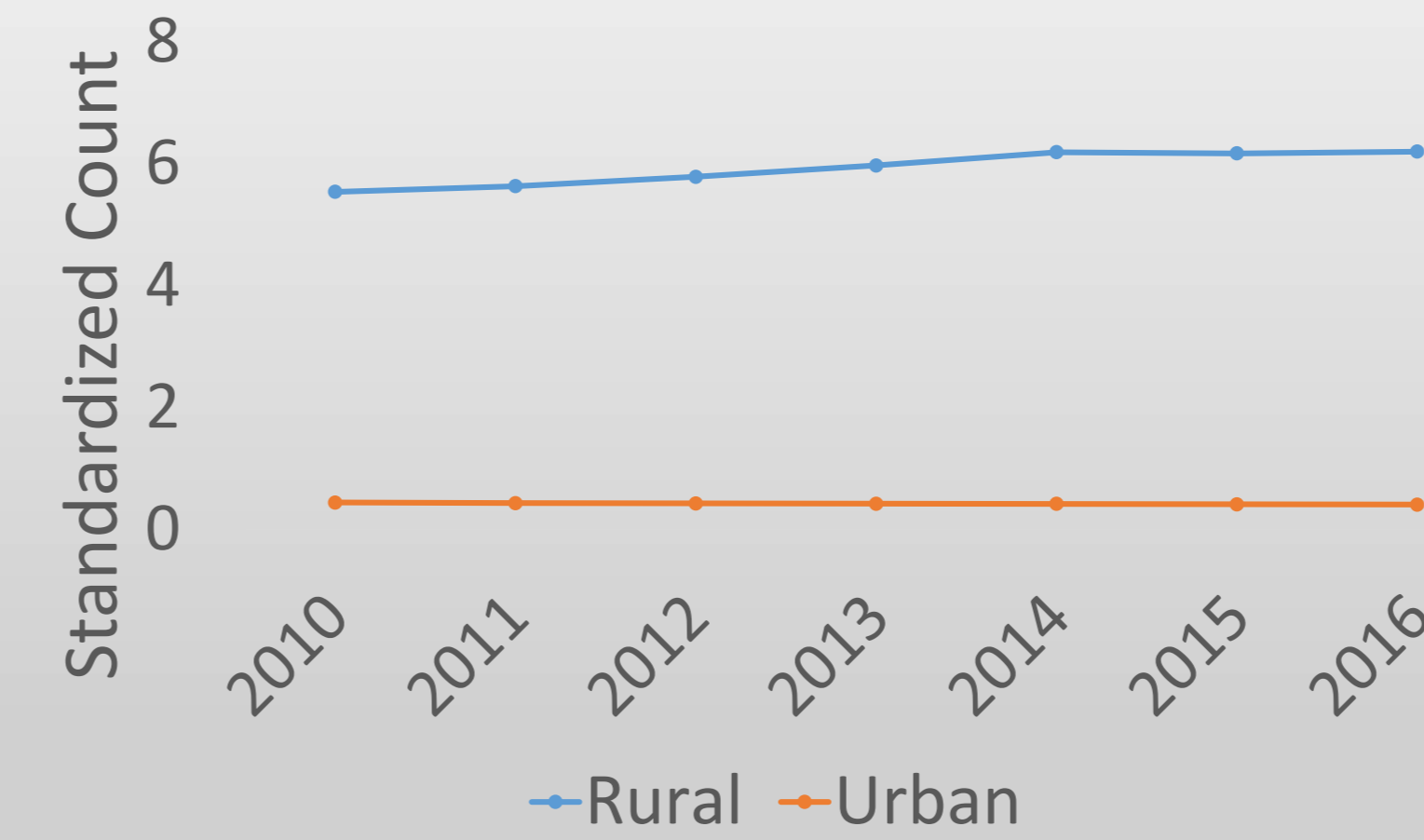
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Is rural health growing or shrinking

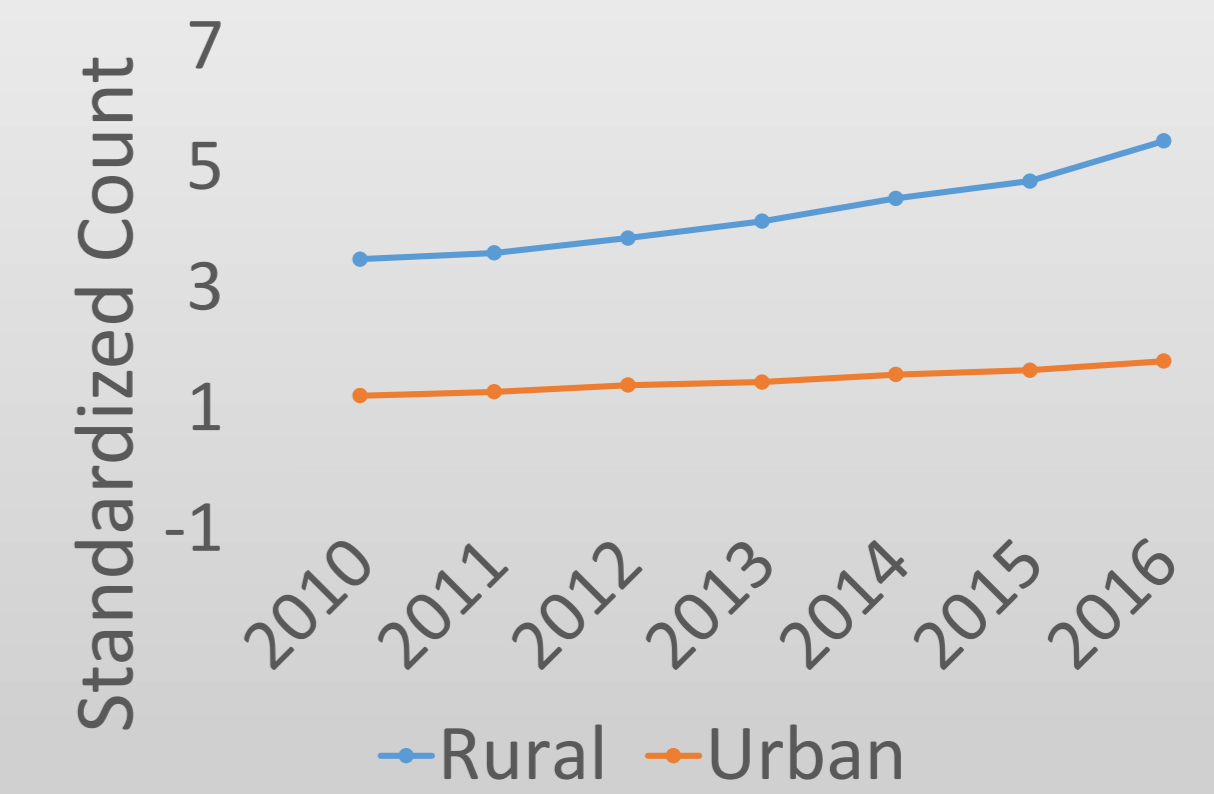
Average Cost per Visit for RHC/FQHC



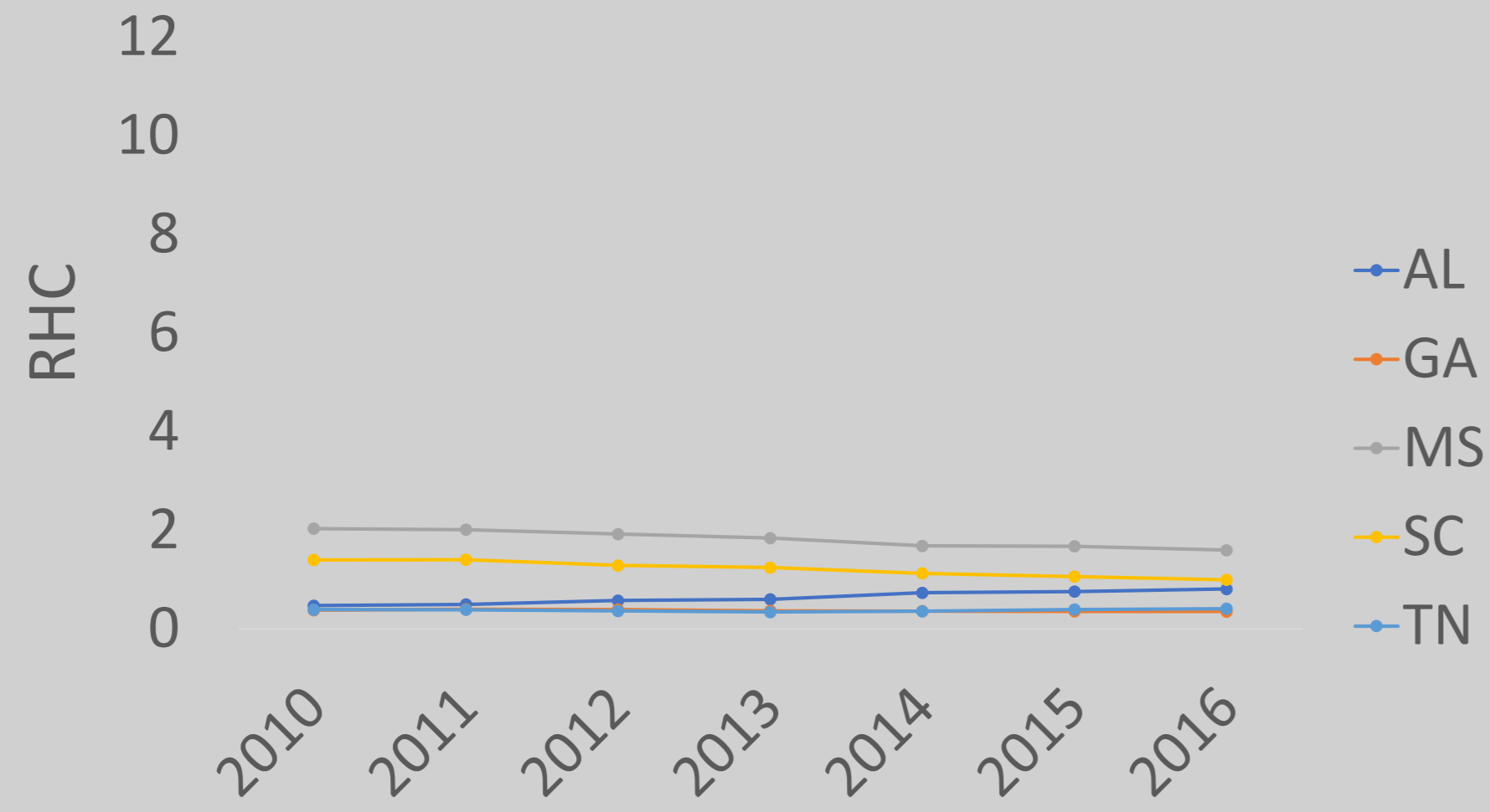
RHC overall South



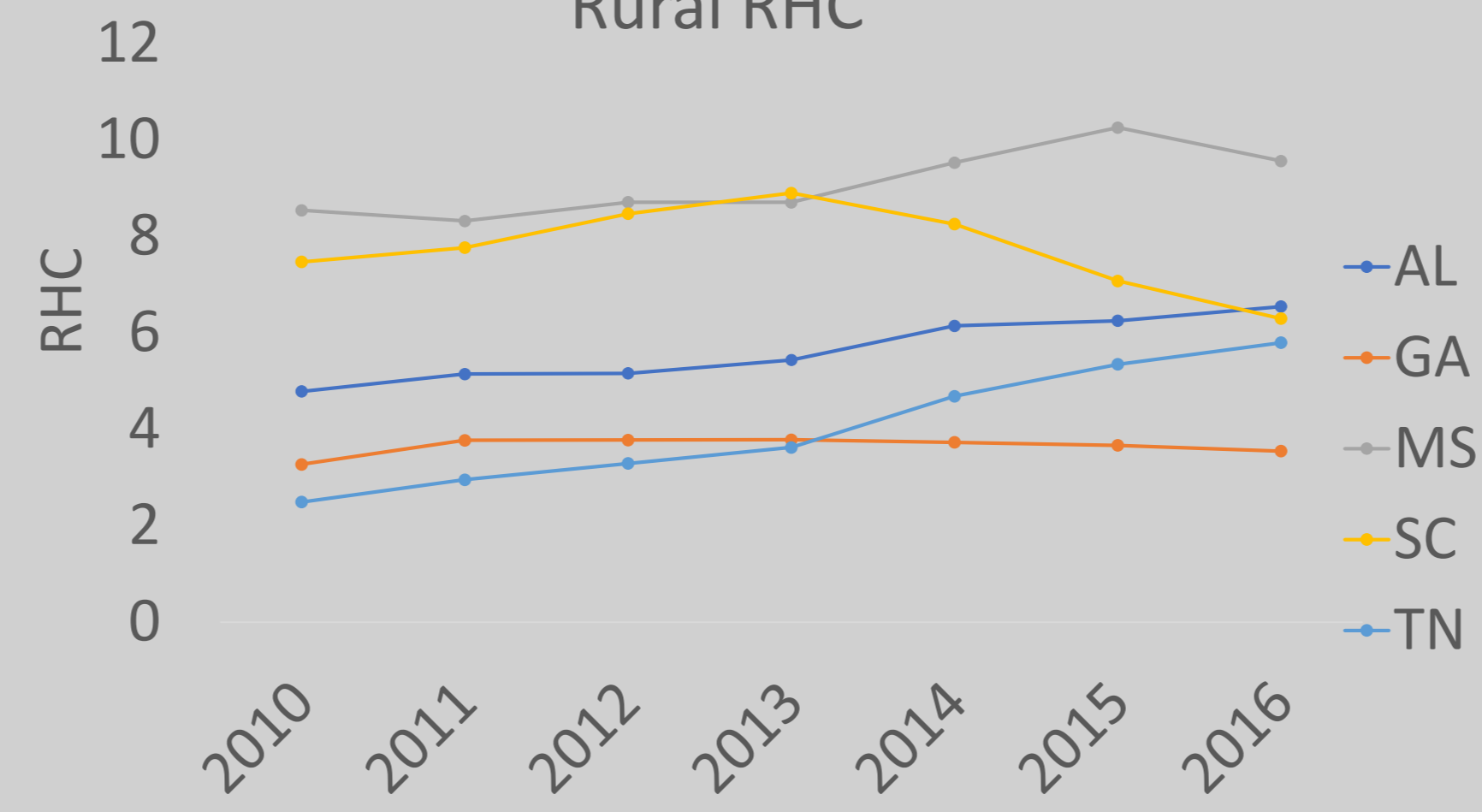
FQHC overall South



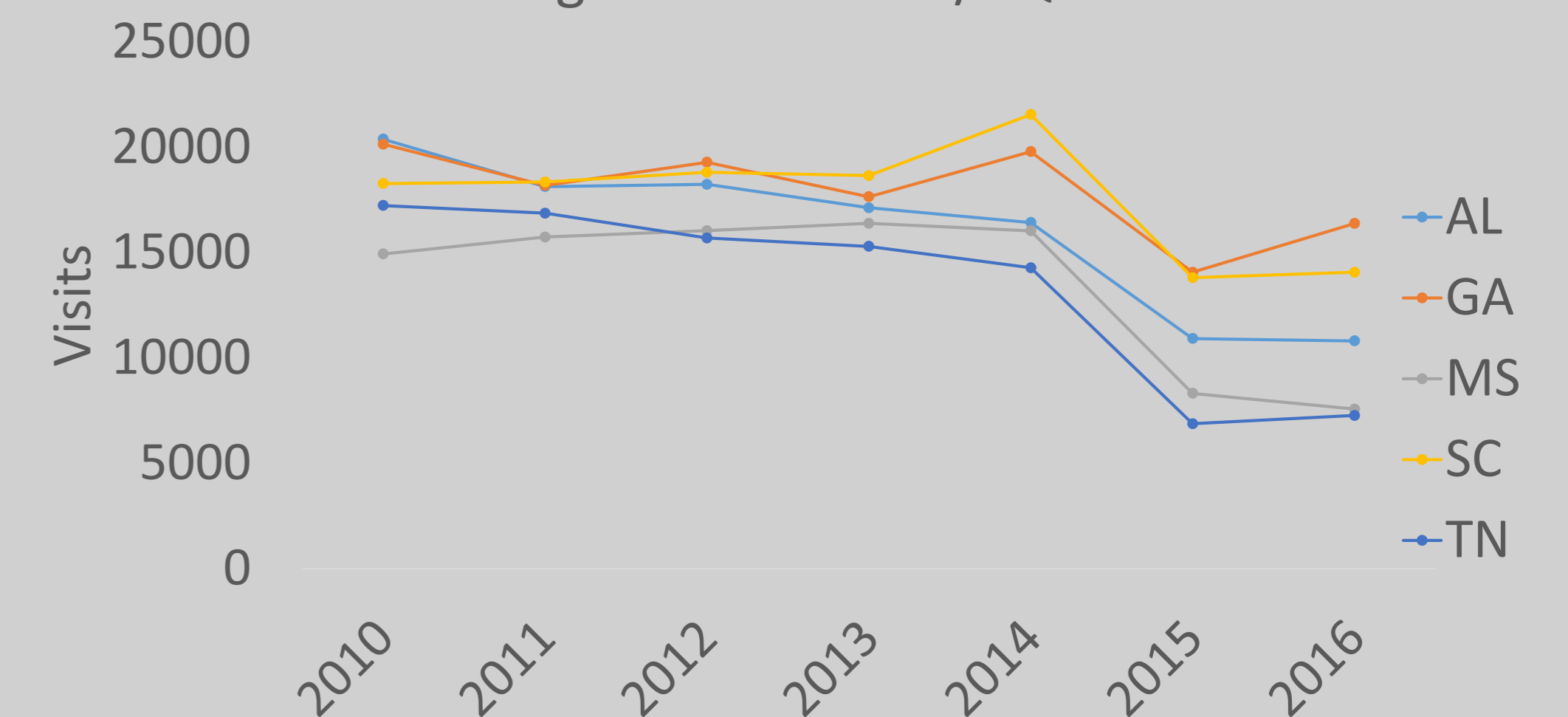
Urban RHC



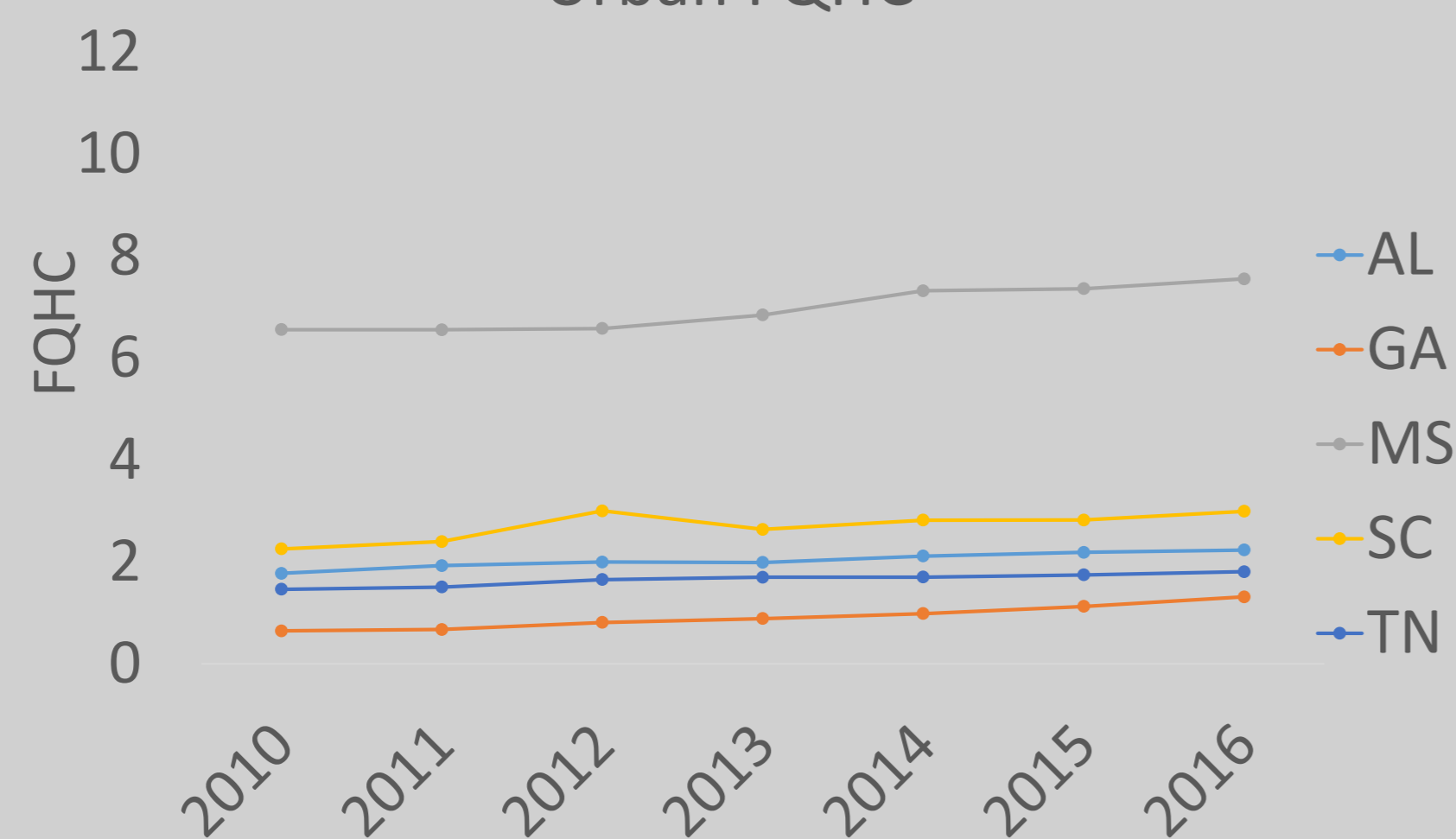
Rural RHC



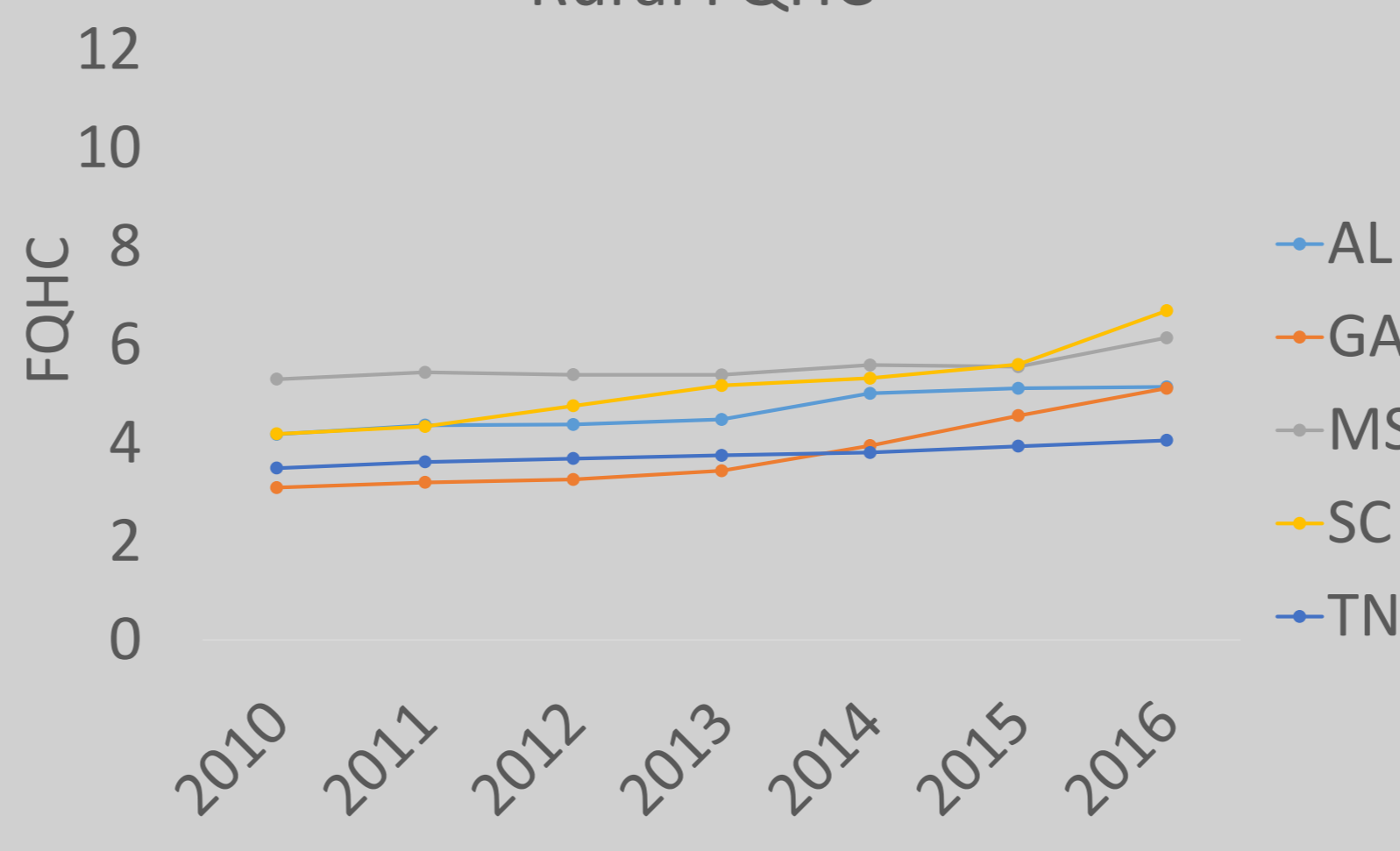
Average Visits to RHC/FQHC



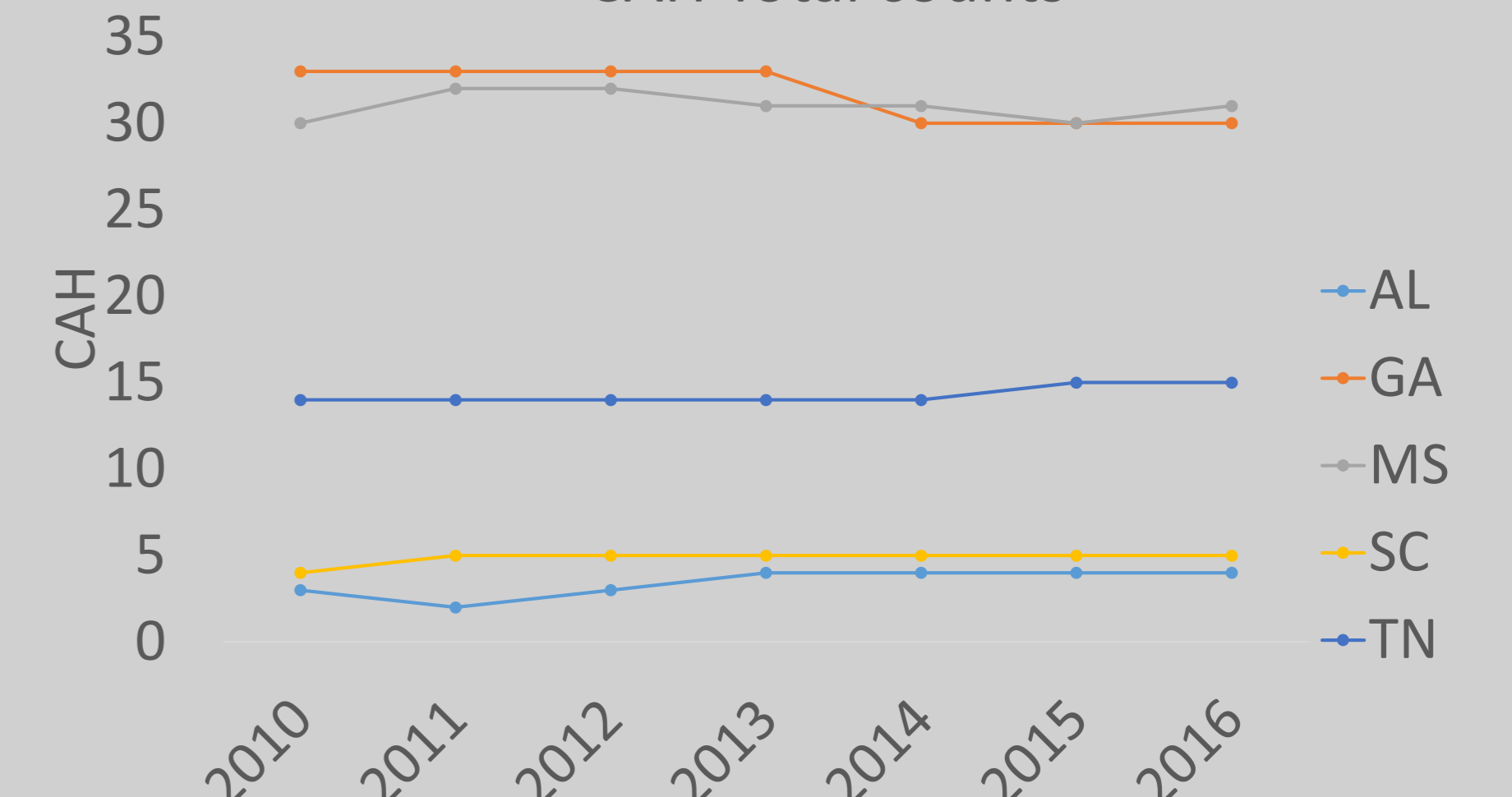
Urban FQHC



Rural FQHC



CAH Total counts



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- 11.9% growth in RHC
- 56.3% growth in FQHC
- CAH numbers stayed level
- 29.1% overall growth in South
- Standardized rural Medicare costs slightly increased
- Overall FTE's slightly increase (but AL & TN)
- 163% increase in Telemedicine originating capabilities

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Key Findings

Rural Health is growing

- Positive trends in each measure observed for clinics and technology
- Increased opportunity for reimbursement for technology

Rural Health is getting more expensive

- Clinic costs and FTEs are rising at a higher rate than Visits and population
- High upfront and maintenance costs implementing tech

Rural Health technology is increasingly lagging behind urban technology

- Rural barriers to tech adoption

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Limitations

Cost Reports

- self reported but most comprehensive

Cost report data for RHC/FQHC

- 2010-2014 ~ 70% completeness
- 2015-2016 over 50% decrease in each metric observed

Cost Report for CAH

- No more than ~20-30% complete for any year
- CAH data hard to find in general

Limitations demonstrate big picture issues

- Data quality and management issues

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Conclusions

Telemedicine is promising opportunity for rural health, but is not quite there yet

- Growth in use, yet still young
- Driven by individual clinic adoption, or pilot studies that are still collecting data
- Reimbursement policies
- Data quality and management issues

Rural Health needs more help

- Technology advances at a quicker rate than policies
- Gap in care between rural and urban health widens
- Need for proactive policies as healthcare transitions to merit and value based care

Further Research is needed

- Still need better understanding of Rural Health landscape
- Finding quantifiable ways to measure value
- Finding true cost of various tech adoptions

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References

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