



SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE

Department of Health Policy and Management

Louisiana Medicaid Expansion and Access to Care

Prepared for the Louisiana Department of Health

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Executive Summary

Medicaid Expansion and Access to Care (2013 - 2018)

Background

Currently 37 states have expanded Medicaid coverage under the Affordable Care Act (ACA), including Louisiana, which extended coverage for all adults earning up to 138% of the federal poverty level (FPL) on July 1, 2016 (Henry J. Kaiser Family Foundation, 2019). As of December 2018, more than 475,000 individuals have enrolled in Medicaid expansion in Louisiana and, as a result, the number of uninsured in the state has fallen by more than 50% (Barnes, Henderson, Terrell, & Virgets, 2018).

State ACA Medicaid expansions have been associated with increased insurance coverage, improved hospital financial performance, and improved economic outcomes.¹ For those gaining coverage under expansion, studies have reported improved access to care, increased utilization, and improved health outcomes.² While certain negative consequences of Medicaid expansion have been documented, such as increased wait times for care (Miller & Wherry, 2017), the evidence overwhelmingly supports the view that Medicaid expansion has improved access to care in adopting states. According to a recent review of Medicaid expansion studies, “Sixty-one percent [of studies] reported a significant effect of Medicaid expansion consistent with the goals of the ACA. Thirty-five percent reported no significant effect, and 4 percent reported an effect inconsistent with the ACA goals” (Mazurenko, Balio, Agarwal, Carroll, & Menachemi, 2018).

This report presents findings from our evaluation of the effect of Medicaid expansion on access to care in Louisiana. Specifically, we evaluated general measures of access including affordability of care, wait times for appointments, and time elapsed since last accessing care. We also examined changes in utilization (including emergency department use and inpatient visits) and provider participation associated with Medicaid expansion.

Data

The majority of the data used in this report was obtained from the Louisiana Medicaid Data Warehouse claims database. Information extracted from the claims data included program enrollment numbers, chronic condition status, health care use, and provider participation. In this report, we primarily focused on data from 2013 through 2018. Additional data on access to care was extracted from the Behavioral Risk Factor Surveillance System, a nationwide survey of health behaviors and care use maintained by the Centers for Disease Control and Prevention (CDC, 2019).

¹ For examples see: Blavin (2016), Dranove, Garthwaite, and Ody (2016), Nikpay, Buchmueller, and Levy (2016), and H. Allen, Swanson, Wang, and Gross (2017).

² Studies of the impacts of ACA Medicaid expansion on access to care include: Shartzter, Long, and Anderson (2015), Benjamin D Sommers, Gunja, Finegold, and Musco (2015), Joseph A Benitez, Creel, and Jennings (2016), Wherry and Miller (2016), Miller and Wherry (2017), J. A. Benitez, Adams, and Seiber (2018), and Miller and Wherry (2019). Studies examining changes in utilization associated with Medicaid expansion include: Hempstead and Cantor (2016), B. D. Sommers, Blendon, Orav, and Epstein (2016), Cunningham, Sabik, and Bonakdar Tehrani (2017), and Nikpay, Freedman, Levy, and Buchmueller (2017). Studies of Medicaid expansion and provider participation include: Tipirneni et al. (2015), Tipirneni et al. (2016), Polsky et al. (2017), Neprash, Zink, Gray, and Hempstead (2018).

Study Populations

Study populations varied depending on the outcome of interest. For analyses that focused on individuals' perception of care access including cost-related barriers, wait times for care, and time elapsed since last receiving care, the primary sample included individuals in Louisiana between the ages of 19 and 64 who earned below 138% of the FPL. For analyses of health care use, we limited our sample to Medicaid beneficiaries who became eligible for coverage as a result of expansion, enrolled in Medicaid between July 1, 2016 and December 31, 2016, and maintained continuous Medicaid enrollment for at least one full year. When examining changes in provider participation associated with Medicaid expansion, we generally focused on providers with at least 10 Medicaid claims in a given month to ensure that we captured an accurate representation of provider availability.

Results

- **Distance and travel times to care**
 - Distance traveled when seeking care declined by between 1 and 4 miles, on average, after Medicaid expansion.
 - The largest declines in travel distance were observed for gynecology/obstetric visits.
 - Reductions in travel times were present across all service lines and for most parishes.
 - Despite falling after Medicaid expansion, distances traveled for outpatient and specialty care increased slightly from December 2017 through December 2018.
- **Cost as a barrier to care access**
 - The number of low-income adults in Louisiana between the ages of 19 and 64 who reported they were unable to see a doctor in the past year due to cost decreased by 4.2 percentage points (26.6%) as a result of Medicaid expansion.
 - The number of low-income adults in Louisiana between the ages of 19 and 64 who reported they did not take medication as prescribed due to cost decreased by 6.9 percentage points (66.4%) as a result of Medicaid expansion.
 - The number of low-income adults in Louisiana between the ages of 19 and 64 who reported they were unable to get medical care “soon enough” decreased by 3.4 percentage points (58.0%) as a result of Medicaid expansion.
- **Usual source of care**
 - The number of low-income adults in Louisiana between the ages of 19 and 64 who reported they had one person that they think of as their personal doctor increased by 3.3 percentage points (4.2%) as a result of Medicaid expansion.
- **Other perceptions of care access**
 - We found no association between Louisiana's Medicaid expansion and the share of low-income adults reporting a routine checkup in the past year, the number of reported doctor visits in the past year, or the likelihood of leaving the doctor's office due to long wait times.
- **Health Care Utilization**
 - Emergency department visits per 1,000 Medicaid expansion enrollees fell from an average of 105.2 in the first six months of Medicaid expansion (July – December 2016) to 100.1 in the last six months of 2018 (May – October 2018).
 - On average, 14.2 Medicaid expansion enrollees per 1,000 experienced 2 or more emergency department visits per month in the first six months of Medicaid expansion

(July – December 2016) compared to 12.7 in the last six months of 2018 (May – October 2018).

- Inpatient stays per 1,000 Medicaid expansion enrollees fell from an average of 12.3 in the first six months of Medicaid expansion (July – December 2016) to 12.0 in the last six months of 2018 (May – October 2018).
- On average, 0.46 Medicaid expansion enrollees per 1,000 experienced 2 or more inpatient stays per month in the first six months of Medicaid expansion (July – December 2016) compared to 0.51 in the last six months of 2018 (May – October 2018).
- By the end of 2018, a total of 131,447 Medicaid expansion enrollees had at least one hospital admission and 339,058 had at least one emergency department visit.
- By the end of 2018, a total of 174,683 Medicaid expansion enrollees had at least one ambulatory or preventive care visit and 48,951 Medicaid expansion enrollees had been prescribed a statin.

- **Provider participation**

- On average, 9,730 providers filed at least 10 Medicaid claims per month in the study period prior to Medicaid expansion (January 2013 through June 2016) and this number increased to 11,035 in the post-expansion period (July 2016 to October 2018).
- On average, 5,167 PCPs filed at least 10 Medicaid claims per month prior to expansion and this number increased to 6,329 in the post-expansion period.
- Despite higher average Medicaid provider participation in the post-expansion period, participation for specialists has fallen since peaking in early 2016.
- Post-expansion growth in provider participation has been greatest for nurse practitioners and physician assistants, while MD/DO participation has remained largely stable.
- The average Medicaid provider filing at least 10 Medicaid claims in a given month treated 72 unique Medicaid beneficiaries per month prior to expansion and 86 unique Medicaid beneficiaries per month after expansion.
- Thirty-seven parishes saw more PCPs filing at least one Medicaid claim in an average month in the post-expansion period, while 39 parishes saw more specialists filing at least one Medicaid claim on average in the post-expansion period compared to the pre-expansion period.

Conclusions

Our findings indicate that access to health care has improved for those gaining coverage under Medicaid expansion in Louisiana. We found evidence of improvements on all three dimensions of access that we studied: perceived access to and availability of medical care, utilization, and provider participation. Our decision to focus on access, utilization, and provider participation in this report was motivated by earlier studies of the effects of ACA Medicaid expansions on newly eligible populations and our findings are generally consistent with the experiences of other states following Medicaid Expansion. For example, researchers at the University of Michigan concluded that ED visits and inpatient stays for the Medicaid expansion population fell from the first to the second year of expansion (Clark, Cohn, & Ayanian, 2018).

Despite the generally positive effects of Medicaid expansion in Louisiana on access to care noted throughout this report, there is some cause for concern surrounding specialist participation in the Medicaid program. Though more specialists are treating Medicaid patients since expansion, participation

rates have declined recently. Additionally, after initially falling in the post-expansion period, the average distance traveled to seek outpatient or specialty care has increased.

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Introduction

This report investigates the effects of Medicaid expansion in Louisiana on access to care across three general categories:

1. Perceptions of care access and changes in cost-related barriers to care
2. Health care utilization
3. Provider participation in the Medicaid program

Additionally, we examine several specific questions within each of these three categories that provide an overview of how access to care for low-income adults in Louisiana has changed as a result of Medicaid expansion. We begin by stating the aims and research questions to be investigated in this report and then include separate analyses for each aim. Specific reports for each aim are included as appendices.

Domain I Aims

- I. Aim IA: Access to Care
 - a. I.A.1: Analyze the impact of Medicaid expansion on distance and travel time to regular provider by major line of service.
 - b. I.A.2: Analyze the impact of Medicaid expansion on affordability of care.
 - c. I.A.3: Analyze the impact of Medicaid expansion on wait times for care.
 - d. I.A.4: Analyze the impact of Medicaid expansion on time elapsed since last accessing care.
- II. Aim IB: Health Care Utilization
 - a. I.B.1: Analyze the impact of Medicaid expansion on adjusted hospital admission rates for the Medicaid population.
 - b. I.B.2: Analyze the impact of Medicaid expansion on emergency department visit rates for the Medicaid population.
 - c. I.B.3: Analyze the impact of Medicaid expansion on preventive care utilization for the Medicaid population.
 - d. I.B.4: Analyze the impact of Medicaid expansion on the use of prescription medication.
- III. Aim IC: Provider Participation
 - a. I.C.1: Analyze the impact of Medicaid expansion on the number of providers participating in Medicaid (i.e., provider volume) including primary care providers (PCPs), specialists, nurse practitioners (NPs), and physician assistants (PAs).
 - b. I.C.2: Analyze the impact of Medicaid expansion on changes in Medicaid claims volume within a provider (i.e., intra-provider volume).
 - c. I.C.3: Analyze the impact of Medicaid expansion on changes in the number of unique Medicaid beneficiaries seen within providers (i.e., patient load).
 - d. I.C.4: Analyze differences in provider capacity across Louisiana parishes.

Aim IA: Access to Care

We estimated the causal impact of Louisiana's Medicaid expansion on average travel distance when seeking care and measures of affordability for office visits and prescription medication for Louisiana residents. Specifically, we examined two definitions of affordability: cost barriers to seeing a doctor and cost barriers to getting prescribed medication. We also estimated the causal impact of Louisiana's Medicaid expansion on the number of survey respondents who reported having a personal doctor, who were able to get an appointment "soon enough," who left a doctor's office because of a long wait time, and who had a routine checkup in the past year.

Data

Data for analyses of travel distance to care came from the Louisiana Medicaid Data Warehouse claims database from January 1, 2014 through December 31, 2018. In an effort to measure the distance traveled by Medicaid beneficiaries for service we removed duplicate service claims within a service line on a single day. For each unique combination of date, beneficiary, and service line we matched the beneficiary's home address with the service provider's address. We geocoded the address text from the claims tables using ArcGIS to transform addresses into latitude and longitude coordinates. To calculate the distance between the two addresses we used the Vincenty module in Stata 15 which calculates the ellipsoidal distance between any two points on the earth.

For the analyses of affordability and perceived access to care, we used data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2011-2017. The BRFSS is a telephone survey that collects data about health-related risk behaviors, insurance coverage, health care access, chronic health conditions, and use of preventive services covering the 50 U.S. States and the District of Columbia (CDC, 2019). Affordability of health care in the BRFSS is measured by asking respondents two questions: 1) whether they could not see a doctor due to cost in the past 12 months and 2) whether they could not get a prescribed Medication due to cost in the past 12 months. Respondents were asked about cost barriers to office visits annually but were only asked about cost barriers to prescription medications in the 2013, 2014, 2016, and 2017 BRFSS surveys. Access to health care in the BRFSS is measured by asking respondents five questions: 1) whether the respondent has a personal doctor, 2) whether the respondent had a routine checkup in the past 12 months, 3) how many times the respondent went to the doctor in the past 12 months, 4) whether the respondent could not get an appointment with a doctor "soon enough," and 5) whether the respondent left a doctor's office because of a long wait time.

We divided the data into 14 half-year time units spanning January through June and July through December of each year and then categorized survey responses from Louisiana after July 1, 2016 as affected by Louisiana's Medicaid expansion. The BRFSS does not allow us to identify which survey respondents gained Medicaid as a result of expansion. Therefore, we imputed a respondent's federal poverty level (FPL) in order to focus our analyses on those most likely to be affected by expansion. We first imputed family size by adding one if the respondent is married and then adding the reported number of children. Next, since income in the BRFSS is recorded in categories, we assigned each respondent to an income that corresponds to the midpoint of their reported category. We then divided the imputed household income by the FPL for each household size to determine each respondent's percent of the FPL.

Methods

We compared the change in mean distance traveled for all beneficiaries as well as a subsample of beneficiaries that had claims both before and after expansion (i.e., a balanced sample). Using a balanced sample eliminates any compositional effects that would mechanically lower the mean distance traveled if more urban residents with closer clinics were eligible for Medicaid after expansion. We also repeated this exercise for each parish and each service line.

Our primary estimates of the effect of Louisiana's Medicaid expansion on perceptions of care access come from regression models that compare changes in outcomes for low-income adults in Louisiana to those in other states that have yet to expand Medicaid. We also estimated models that included an additional comparison between those earning above 138% FPL and those earning below 138% FPL. See Appendix 1 for additional details on our regression model specifications.

Results

Table 1 shows that, after limiting the sample to beneficiaries that had claims both before and after expansion (columns 3 and 4), mean travel distance declined for all service lines after expansion. The distance traveled by the 95th percentile of travelers also declined for all service lines except opticians. Declines ranged from 0.09 fewer miles traveled to see an optician to 4.1 fewer miles traveled for a gynecology or obstetrics visit. The 95th percentile traveled to see an optician increased by 1.2 miles, but all other service lines saw declines in travel distance with the largest fall in the 95th percentile of distances traveled was 17.3 fewer miles traveled to see a gynecologist or obstetrician. Overall means and distance traveled by the top 5th percentile of travelers decreased for outpatient hospital services, primary care, and specialty care. We have broken down distance traveled for the aggregated service categories in the first three rows of Table 1 by parish in Appendix 1. For most parishes, distance traveled has declined for each of these measures after expansion.

Table 1: Mean Change in Distance Traveled Pre-to-Post Medicaid Expansion

	All		Balanced Sample	
	(1) Mean	(2) P95	(3) Mean	(4) P95
Outpatient Hospital Services	-0.87747	-8.97251	-0.62245	-5.28656
Primary Care	-1.55457	-5.90394	-1.47203	-5.90290
Specialty Care	-1.60385	-5.40953	-2.24074	-8.04681
General Practice	-1.64899	-10.78777	-2.43026	-8.92480
Family Practice	-2.72980	-12.74923	-2.25456	-8.90596
Internal medicine	-1.98845	-7.46152	-2.74906	-10.35373
Pediatrics	-2.23066	-18.38455	-2.54287	-15.52318
Gynecology / obstetrics	-3.95453	-21.41285	-4.06063	-17.33240
Optician	-0.45004	-3.50791	-0.08934	1.20836

Note: Data derived from billing and service addresses in Medicaid claims files from 2014-2018. Data only include one claim per patient, per service line, per day. The first two columns present averages which include newly eligible enrollees. The last two columns are limited to enrollees that had at least one claim for the service line in both the pre-expansion and post-expansion

periods. Columns 1 and 3 show the changes in mean miles driving between the pre- and post-expansion periods. Columns 2 and 4 show the changes in the 95th percentile (those driving the most) between the two periods.

The most important limitation to note in this work is that we do not have a record of the Medicaid beneficiary's address at the time of the encounter. Rather, we have the most recent enrollment address on file for the beneficiary. Thus, we are measuring distances between providers and places where Medicaid beneficiaries have lived rather than distances traveled by beneficiaries. This introduces a potential systematic bias as the distances in the post-expansion period are more accurately measured than those in the pre-expansion period. If a beneficiary moves and finds a new provider, we would be measuring the distance from the beneficiary's new location to their old provider and would overstate the change in distance traveled after expansion. As we are working with claims data, we could not address this limitation inside the database.

Figures 1 and 2 present unadjusted comparisons of the change in cost-related barriers before and after July 2016 for all adults living in Louisiana and those in non-expansion states. Figure 1 plots the shares of respondents from Louisiana and non-expansion states who were unable to see a doctor in the past 12 months because of the cost. Figure 2 is similar but examines changes in the share of respondents who failed to take their medication as prescribed in the past 12 months because of cost.

Figure 1: Share of Respondents Who Could Not See a Doctor in the Past 12 Months Because of Cost

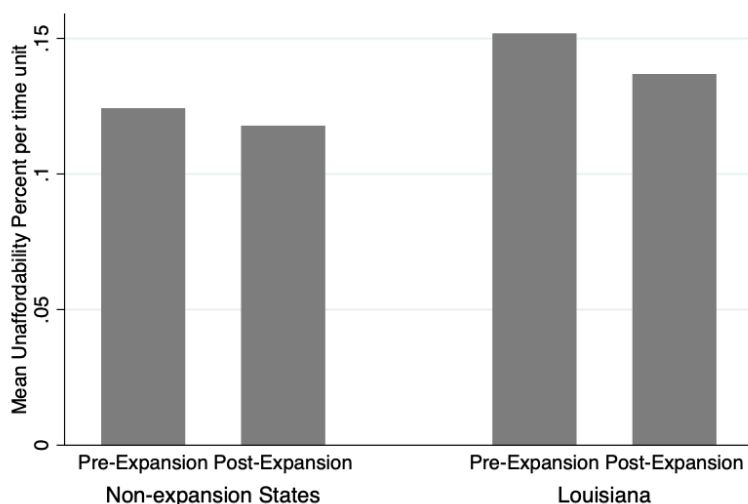
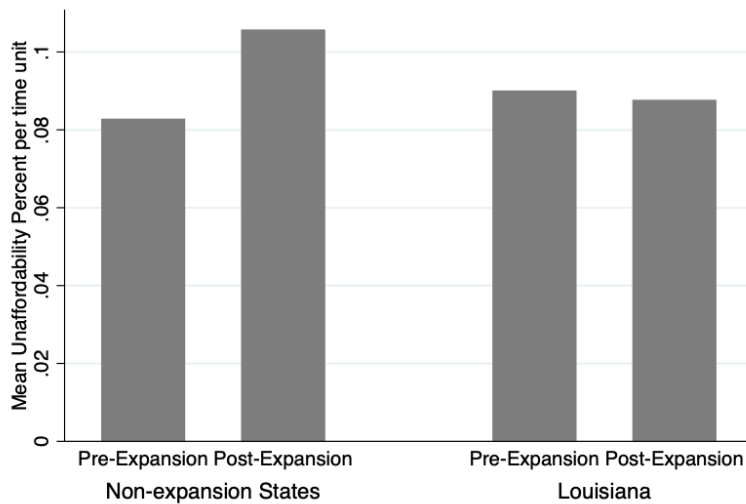


Figure 2: Share of Respondents Who Did Not Take Medication as Prescribed in the Past 12 Months Because of Cost



We found that the number of people reporting these access barriers decreased significantly due to Louisiana’s Medicaid expansion. The number of low-income adults in Louisiana under age 65 who reported that they were unable to see a doctor due to cost in the past year decreased by 4.2 percentage points (26.6%) as a result of Medicaid expansion and the number of adults under age 65 who reported that they were unable to afford prescribed medication decreased by 6.9 percentage points (66.4%) as a result of Medicaid expansion. Notably, respondents living in non-expansion states were much more likely to report cost as a barrier for prescription medication adherence post-2016 than those living in Louisiana.

Additionally, we found that Louisiana’s Medicaid expansion increased the number of low-income adults in Louisiana under age 65 who reported having a personal doctor by 3.3 percentage points (4.2%) and decreased the number who were unable to get an appointment “soon enough” by 3.4 percentage points (58.0%). We found no association between Medicaid expansion and the number of reported doctor visits in the past 12 months or the likelihood that a respondent left a doctor’s office due to a long wait time.

Aim IB: Health Care Utilization

Along with changes in perceived access to care, we examined changes in the use of health care services associated with Louisiana’s Medicaid expansion with a specific focus on emergency department (ED) and inpatient stays. Specifically, we plotted trends in ED use and inpatient stays for those newly enrolled in Medicaid as a result of expansion. We then tracked cumulative changes in ED use, hospital stays, preventive health visits, and prescriptions for statins for the expansion population.

Data & Methods

Data for our analyses of changes in health service utilization were drawn from the Louisiana Medicaid Data Warehouse claims database. To identify beneficiaries who gained Medicaid coverage as a result of expansion, we restricted our sample to those members with a recipient aid category that corresponded to “Medicaid Expansion (Adult Group).” For analyses that tracked trends in ED use and inpatient stays, we made the following further sample restrictions:

- Dropped cases where a claim’s “service date from” was greater than the “service date to”
- Restricted the sample to those gaining coverage in the first 6 months of expansion who maintained consistent coverage for a period of at least 1 year
- In accordance with HEDIS specifications, we excluded ED visits that resulted in an inpatient admission or that listed a primary mental health or substance abuse diagnosis³
- In accordance with HEDIS specifications, we excluded inpatient stays where the source of admission was a transfer from another hospital, collapsed consecutive or overlapping stays into a single admission, and dropped a small number of maternity admissions

Analyses that track cumulative changes in ED use, hospital stays, preventive health visits, and prescriptions for statins include the entire Medicaid expansion population in the denominator and those with preventive health visits or a prescription for statins in the numerator. Preventive health visits were defined in accordance with HEDIS specifications and included members age 20 years or older who had at least one ambulatory or preventive care visit in the past year. Statin use was defined using national drug codes (NDC) corresponding to statin medications. For all utilization analyses, we plotted trends in outcomes to compare changes in use rates before and after Medicaid expansion.

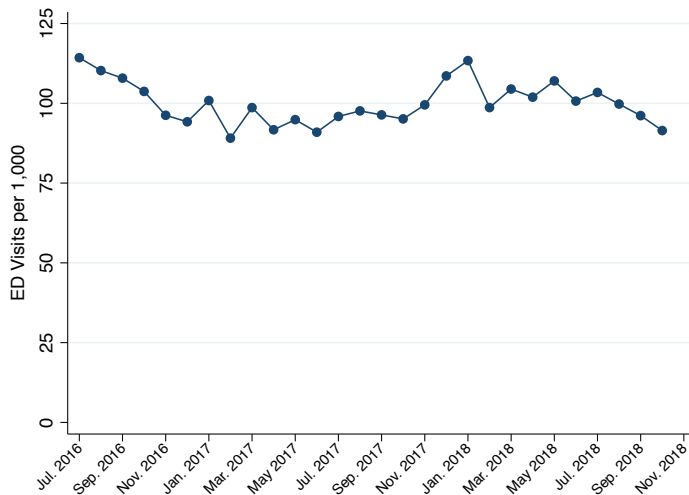
Results

Figure 3 displays trends in ED visits per 1,000 Medicaid expansion enrollees from July 2016 through October 2018.⁴

³ See Appendix Figure 1 for results that include mental health and substance use ED visits.

⁴ Due to lags in claim processing, we excluded November and December 2018 from analyses of ED visits and hospital stays.

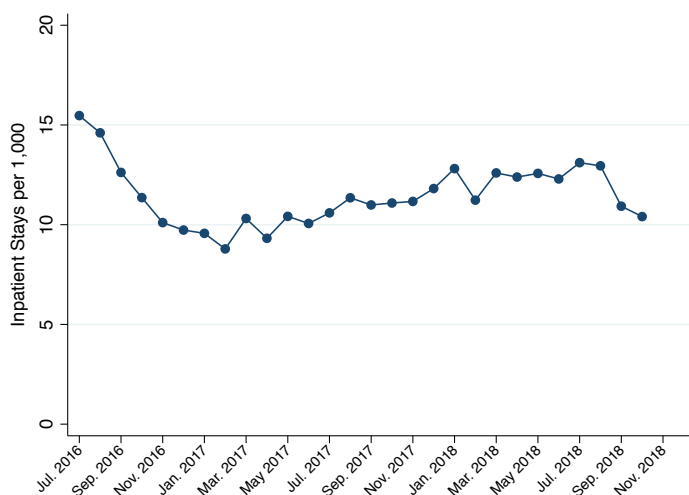
Figure 3: ED Visits per 1,000 Medicaid Expansion Enrollees



In the first month of expansion, newly eligible Medicaid beneficiaries experienced approximately 115 ED visits per 1,000 enrollees. By October 2018, that number had fallen by 20.7% to just over 90 visits per 1,000 enrollees. Keeping in mind that the population included in Figure 3 was consistently enrolled in Medicaid for at least 1 year, the results clearly indicate that ED use has fallen for the newly enrolled since expansion. Additionally, we examined changes in the intensity of ED use by calculating changes in the share of the Medicaid expansion population with at least 1 ED visit, 2 ED visits, 3 ED visits, and 4 ED visits by month. Detailed results for these subgroups are presented in Appendix Figure 2 and indicate that ED use has generally fallen since expansion among individuals with an especially strong reliance on the ED as a source of care.

Figure 4 plots trends in inpatient stays per 1,000 Medicaid expansion enrollees from July 2016 through October 2017.

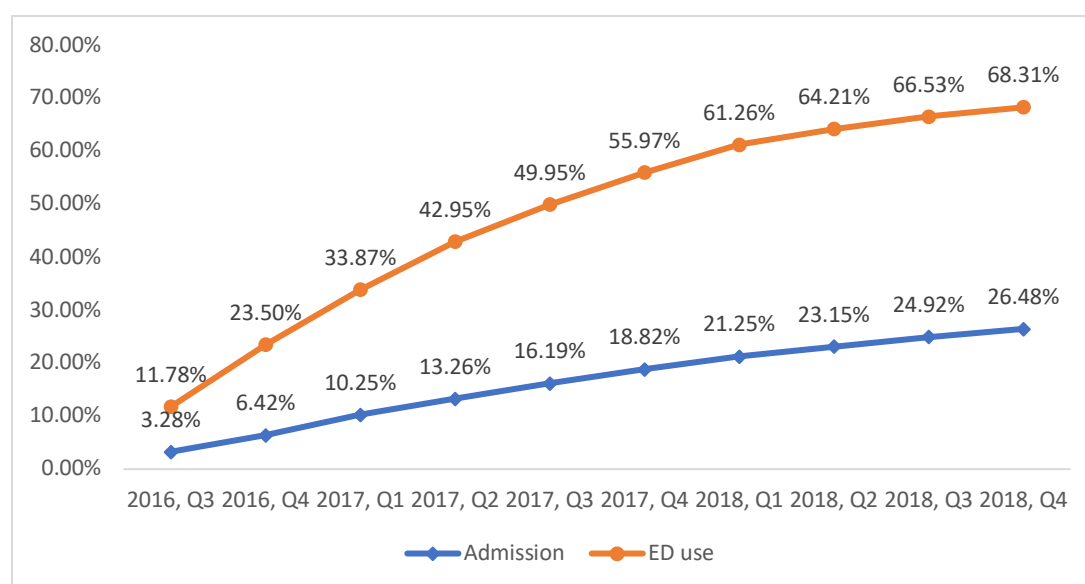
Figure 4: Inpatient Stays per 1,000 Medicaid Expansion Enrollees



Patterns of inpatient admissions in Figure 4 are consistent with those of ED visits in Figure 3. In the first month of expansion, newly eligible Medicaid beneficiaries experienced 15.5 hospital admissions per 1,000 expansion enrollees. By October 2018, that number had fallen by nearly 33% to 10.4 admissions per 1,000 enrollees. In Appendix Figure 3, we repeated the analysis focusing on newly eligible Medicaid beneficiaries with 2 or more hospital stays in a month and found that the share fell by 28%, from 0.57 per 1,000 in July 2016 to 0.41 per 1,000 in October 2017.

Figure 5 presents cumulative counts of the share of the Medicaid expansion population with an ED visit or hospital admission by year-quarter since expansion.

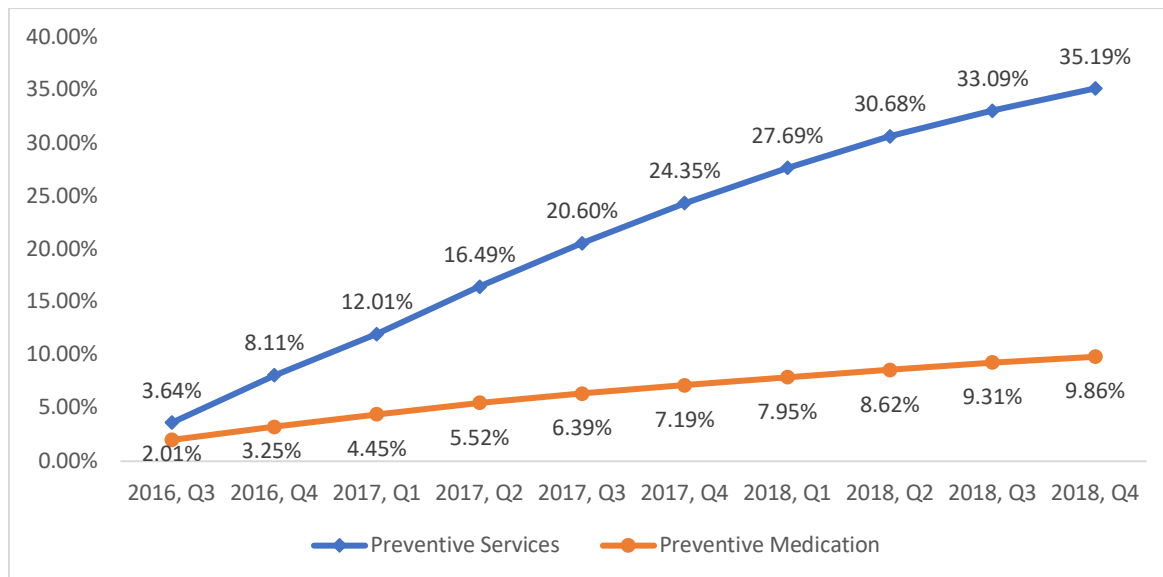
Figure 5: Cumulative Shares of ED Visits and Hospital Admissions for the Medicaid Expansion Population



By the end of 2018, approximately 68% of the expansion population had experienced at least 1 ED visit, while 26% had at least 1 hospital stay. Notably, the slope of the ED use line has flattened over time, indicating that the growth rate in ED use among the expansion population has slowed.

Finally, Figure 6 plots the cumulative counts of the share of the Medicaid expansion population with a preventive care visit or a statin prescription.

Figure 6: Cumulative Shares of Preventive Care Visits and Statin Use for the Medicaid Expansion Population



Overall, our results indicate that ED visits and inpatient stays for the Medicaid expansion population were initially quite high but have fallen considerably in the months since expansion occurred. These findings are consistent with evidence of pent-up demand among those newly eligible for Medicaid coverage (Clark et al., 2018; Fertig, Carlin, Ode, & Long, 2018). It is likely that this population represents a group that has historically been underserved by the health care system and, upon gaining insurance coverage as a result of expansion, substantially increased their utilization of health care services. However, after an initial spike in ED visits and hospital stays, use rates have fallen substantially. Finally, we note that the use of preventive care services continues to grow, though the share of the expansion population with a preventive service visit remains relatively low.

Aim IC: Provider Participation

In this section, we provide the first evidence on changes in Medicaid provider participation in Louisiana since the implementation of the Medicaid eligibility expansion in July 2016. Specifically, we examine overall Medicaid provider volume, the number of Medicaid claims generated per provider (intra-provider volume), and the number of unique Medicaid patients per provider (provider load).

Data

Information on provider Medicaid participation was obtained from the Louisiana Medicaid Claims Data Warehouse. Our analysis focused on providers grouped into four categories based on physician National Provider Identifier (NPI) numbers and Medicaid provider type codes: 1. MDs and DOs, 2. nurse practitioners, 3. physician assistants, 4. and the combination of all three provider groups (MDs/DOs, NPs, and PAs). We then used Louisiana Medicaid provider specialty codes to further categorize providers into primary care or specialty care based on the definitions listed in Appendix Table 1. We included all final adjudicated paid claims and denied claims that were not eventually paid⁵ for any service performed between January 2013 and October 2018.⁶ We describe the claims selection methodology in detail in Appendix 4. For all analyses, we initially tracked changes in participation for all providers filing at least 1 claim for providing a Medicaid service in Louisiana. We then excluded out-of-state (OOS) providers in non-border counties, all OOS providers, and all providers with fewer than 10 final adjudicated Medicaid claims in a given month/year. Finally, we dropped a total of 22,771 claims (0.03%) from our analytic sample due to a missing provider identification number.

Method

We conducted several pre/post comparisons of provider participation, intra-provider volume, and provider load for each category of provider listed above. In addition, we supplemented our basic pre/post comparisons with interrupted time-series (ITS) analyses. ITS models estimate separate linear trends for each outcome in the pre-expansion period (January 2013 through June 2016) and the post-expansion period (August 2016 through October 2018), while allowing for a discontinuous level change during the month of expansion (July 2016).⁷ Results from our ITS models quantify the average monthly growth (either positive or negative) in provider participation, intra-provider volume, and provider load and allow us to compare changes in these averages before and after Medicaid expansion.

Results

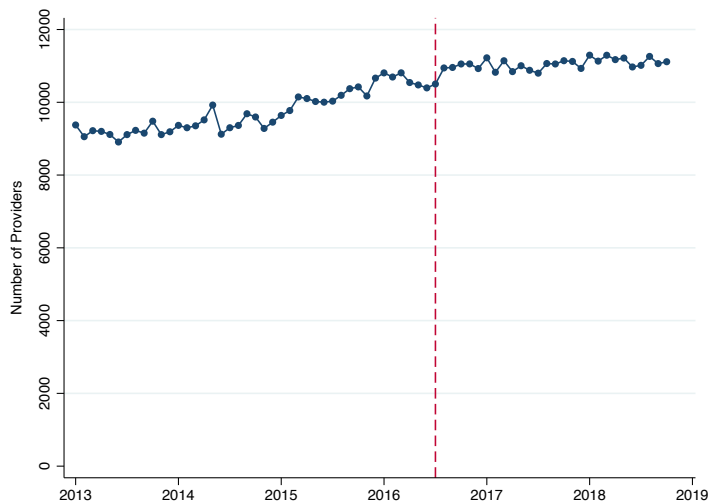
Figure 7 displays trends in the number of unique providers (MDs, DOs, NPs, and PAs) at the month/year level excluding providers with fewer than 10 final adjudicated Medicaid claims in a given month/year. The dashed vertical lines in Figure 7 and all subsequent figures in this section indicate July 2016, the month during which Medicaid expansion occurred.

⁵ We chose to include denied claims in our analysis because, despite the denied payment, these claims likely represent services received by Medicaid beneficiaries.

⁶ At the time of the analysis, claim volume for November and December 2018 indicated a significant portion of claims had yet to be filed. For that reason, we excluded November and December 2018 from this report, but will update findings through 2018 in a future report.

⁷ Appendix 4 provides technical details of our ITS models.

Figure 7: Number of Unique Providers by Month/Year, 2013 - 2018



Notes: Providers with at least 10 Medicaid claims in a given month/year.

From 2013 through early 2016, provider participation in the Medicaid program grew from an average of 9,179 providers per month in 2013 to an average of 10,770 providers per month in the first 3 months of 2016. In the pre-expansion period, participation peaked in March 2016 at 10,809 before experiencing a slight dip that occurred just before Medicaid expansion in July. However, by August 2016, provider participation had increased to 10,943 per month and continued to trend upwards through October 2018 where it reached 11,114 providers.

ITS estimates suggest that provider growth averaged 42 additional providers per month filing at least 10 Medicaid claims in the pre-expansion period and then jumped by more than 265 providers in July 2016. Provider growth has slowed since expansion, though there are still more providers treating Medicaid beneficiaries in the post-expansion period compared to the pre-expansion period.

Figure 8 further disaggregates the information presented in Figure 7 by separating providers into three categories: MDs/DOs, NPs, and PAs.

Figure 8: Number of Unique Providers by Month/Year by Provider Type, 2013 - 2018

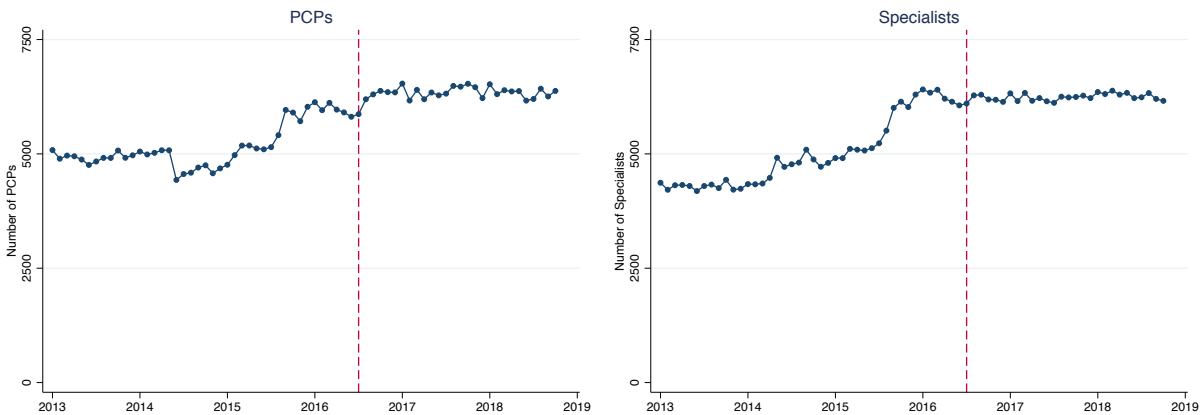


Notes: Providers with at least 10 Medicaid claims in a given month/year.

The largest growth in provider participation leading up to Medicaid expansion occurred for NPs and PAs and those growth rates have largely continued in the post-expansion period. Growth rates for MDs/DOs have leveled off since expansion, but are higher, on average, than participation rates in the pre-expansion period.

Figure 9 separates providers into primary care providers and specialists and plots changes in Medicaid participation over time.

Figure 9: Number of Unique PCPs and Specialists by Month/Year, 2013 – 2018

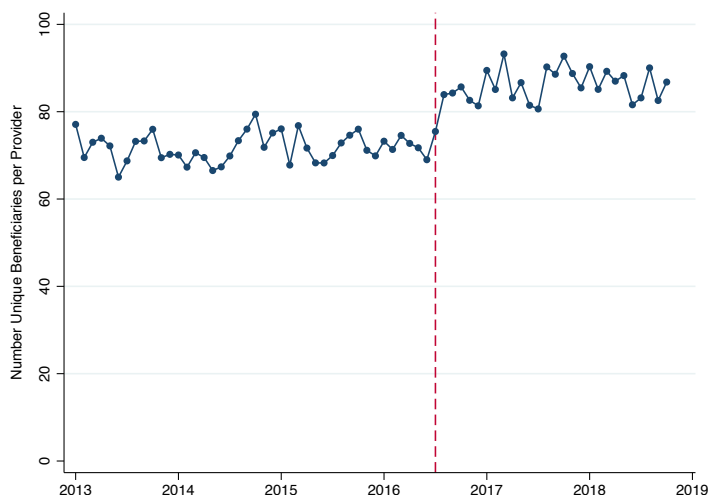


Notes: Providers with at least 10 Medicaid claims in a given month/year.

The number of PCPs filing at least 10 monthly Medicaid claims rose from approximately 4,900 in 2014 to more than 6,400 in 2018. PCP Medicaid participation grew by nearly 30 PCPs per month, on average, from January 2013 through June 2016. Medicaid expansion was associated with a jump in PCP Medicaid participation of more than 400 providers in July 2016. Post-expansion PCP participation remained relatively stable through the end of 2018. The number of specialists filing a monthly Medicaid claim grew from an average of 4,289 in 2014 to a high of 6,414 in March 2016, however, specialist participation has fallen slightly since early 2016. Specialist participation grew at a rate of 57 providers per month in the pre-expansion period and has fallen by an average of 58 providers per month since peaking in 2016.

We next examined the number of unique Medicaid beneficiaries per provider (i.e., patient load) by month/year and plotted changes in patient load over time in Figure 10.

Figure 10: Number of Unique Beneficiaries per Provider by Month/Year, 2013 - 2018

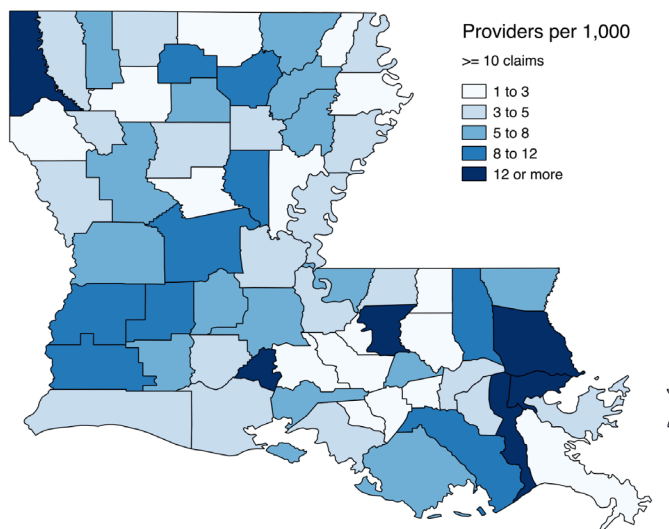


Notes: Providers with at least 10 Medicaid claims in a given month/year.

Average provider load increased immediately following Medicaid expansion. Louisiana providers with at least 10 Medicaid claims treated an average of 72 unique Medicaid beneficiaries per month from 2013 to mid-2016 compared to an average of 86 Medicaid beneficiaries per month in the post-expansion period. Patient load was stable in the pre-expansion period, increased by an average of 11 patients per provider in the month of expansion, and then continued to increase by approximately 0.1 patients per month through October 2018. The largest increase in provider load was observed for PAs who went from treating an average of 47 unique Medicaid beneficiaries per month before expansion to 59 unique beneficiaries per month after expansion, a 26% increase. Similar changes were observed for NPs and PAs, though the relative increases were smaller than the change for MDs and DOs.

We now move to an examination of geographic variation in PCP and specialist Medicaid participation and highlight changes in participation across Louisiana parishes. Figures 11 and 12 depict provider Medicaid participation by parish in 2018. To calculate estimates of provider participation, we totaled the number of unique providers in each parish with at least 10 final adjudicated Medicaid claims in 2018, divided these numbers by 2018 parish-level Medicaid enrollment figures from the Louisiana Department of Health, and then multiplied the quotients by 1,000. The resulting figures represent the number of providers per 1,000 Medicaid enrollees in each Louisiana parish in 2018.

Figure 11: Providers per 1,000 Louisiana Medicaid Beneficiaries in 2018

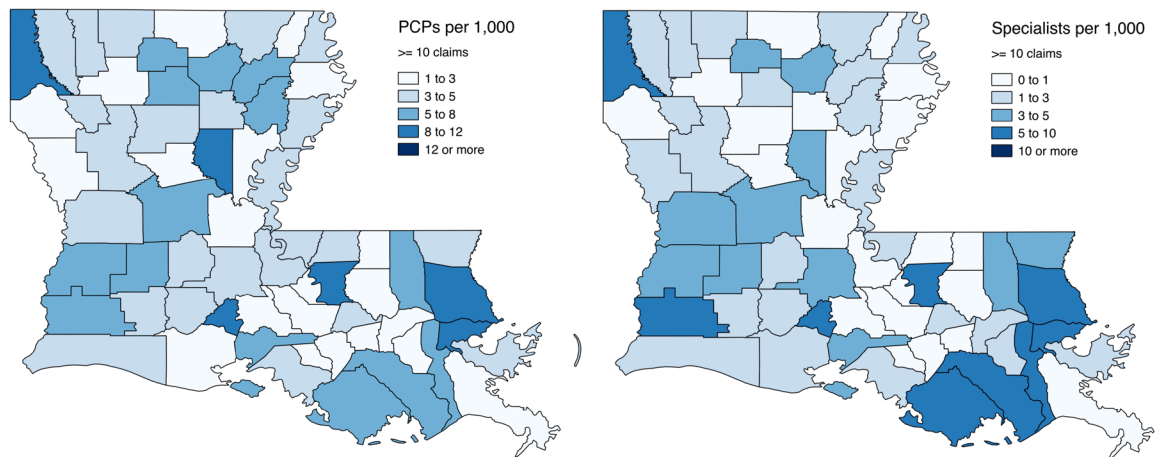


Notes: Providers with at least 10 final adjudicated Medicaid claims in 2018.

Figure 11 combines PCPs and specialists to establish an overview of the degree of variation in access to a Medicaid provider by parish. A total of 16 parishes had at least 8 providers per 1,000 Medicaid enrollees with 10 or more Medicaid claims for a service performed in 2018. We provide additional details on these parishes in Appendix 5.

Figure 12 relies on the same methodology used to generate Figure 11, but separates participation rates by whether the provider is a PCP or specialist.

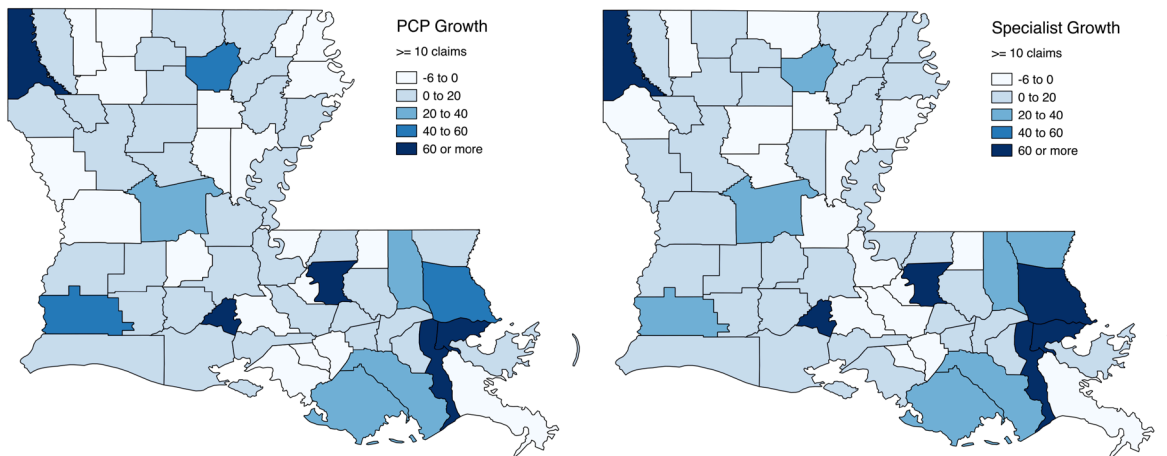
Figure 12: PCPs and Specialists per 1,000 Louisiana Medicaid Beneficiaries in 2018



Notes: Providers with at least 10 final adjudicated Medicaid claims in 2018.

Six parishes had at least 8 PCPs per 1,000 Medicaid enrollees when restricting the sample to PCPs with at least 10 claims in 2018, while another nine parishes had fewer than 2 PCPs per 1,000 Medicaid enrollees. More than half of Louisiana parishes had fewer than five specialists per 1,000 Medicaid enrollees with at least 10 Medicaid claims for a service performed in 2018.

Figure 13: Provider Participation Growth Pre-to-Post Medicaid Expansion



Notes: Providers with at least 10 final adjudicated Medicaid claims in 2018.

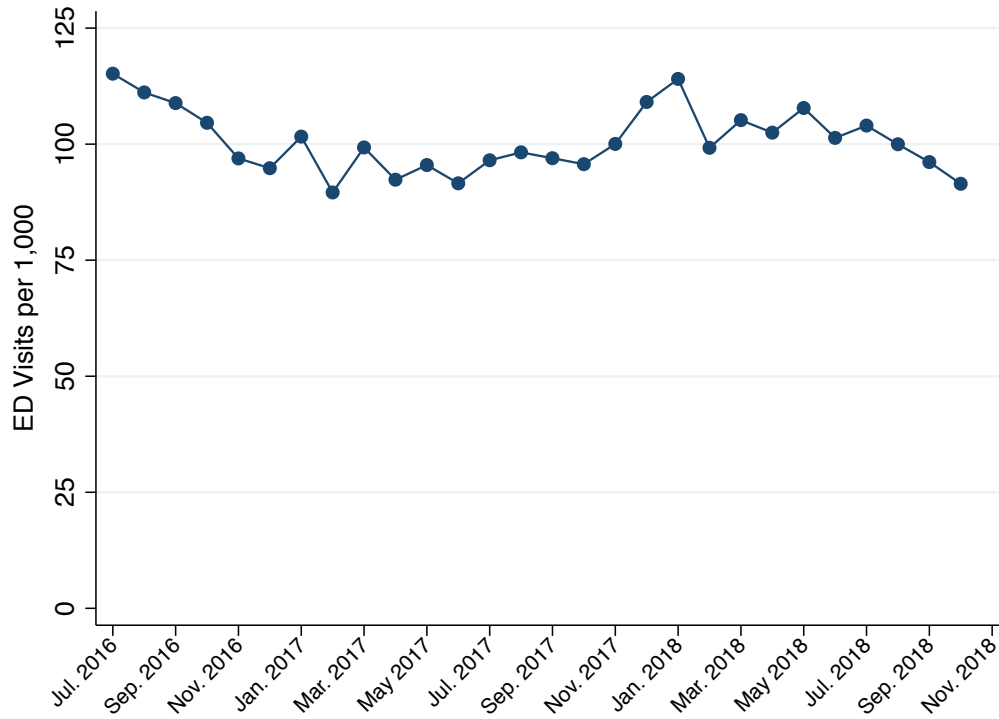
Figure 13 examines changes in PCP and specialist Medicaid participation from the pre-expansion (January 2013 to June 2016) to post-expansion periods (July 2016 to October 2018). Most parishes have seen positive growth in both PCP and specialist Medicaid participation since Medicaid expansion, however growth has been concentrated in the more urban parishes.

Conclusions

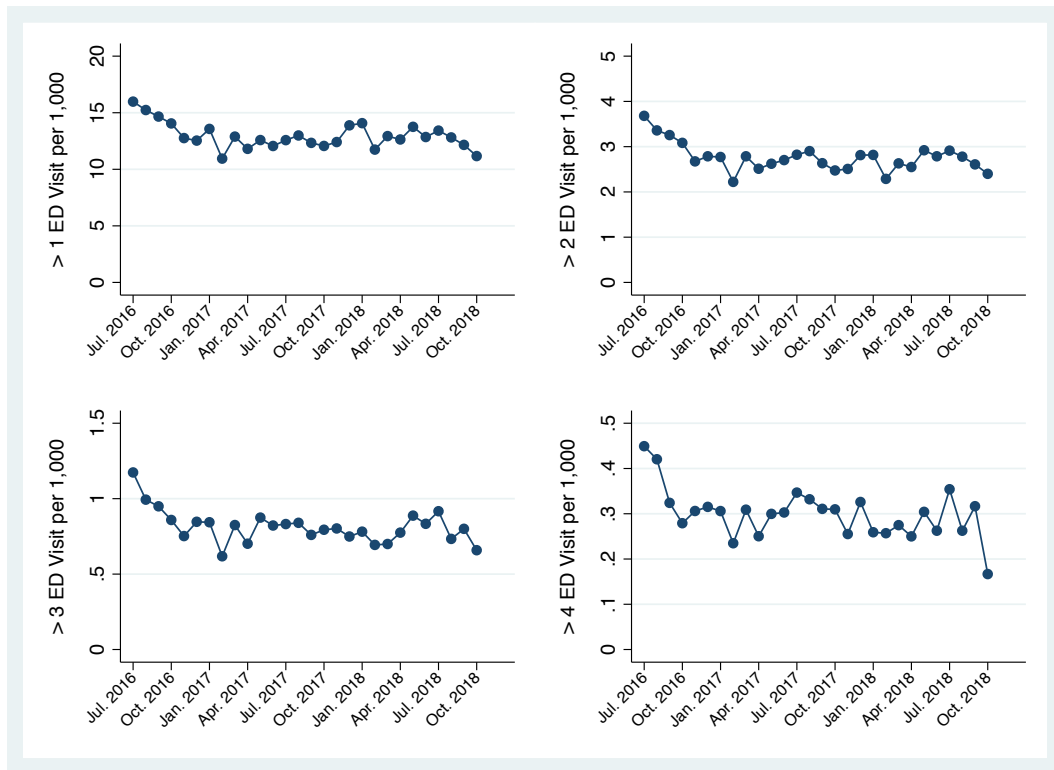
Overall our results indicate that access to care has improved as a result of Louisiana's Medicaid expansion. We found general improvements in each of our measures of care access: perceived access, provider participation, and health care utilization. Results from our study are similar to those that have analyzed effects of Medicaid expansion on access in other adopting states (Mazurenko et al., 2018). However, despite the positive impacts of expansion on access documented in this report, there are concerns related to the drop in specialist participation and the geographic distribution of providers in the state. Access to specialists is much more common in urban areas than in rural areas and, although not unique to Louisiana, this observed variation has been shown to contribute to disparities in access to care between urban and rural populations (Heidi Allen, Wright, & Broffman, 2018). Another important caveat regarding the results presented in this report is that the effects of Medicaid expansion on access to care are likely to change over time. In most cases, we focused on data from the first couple of years after Medicaid expansion in Louisiana. It will be important to continue monitoring these trends as the Medicaid expansion population continues to evolve over time.

Appendix Figures and Tables

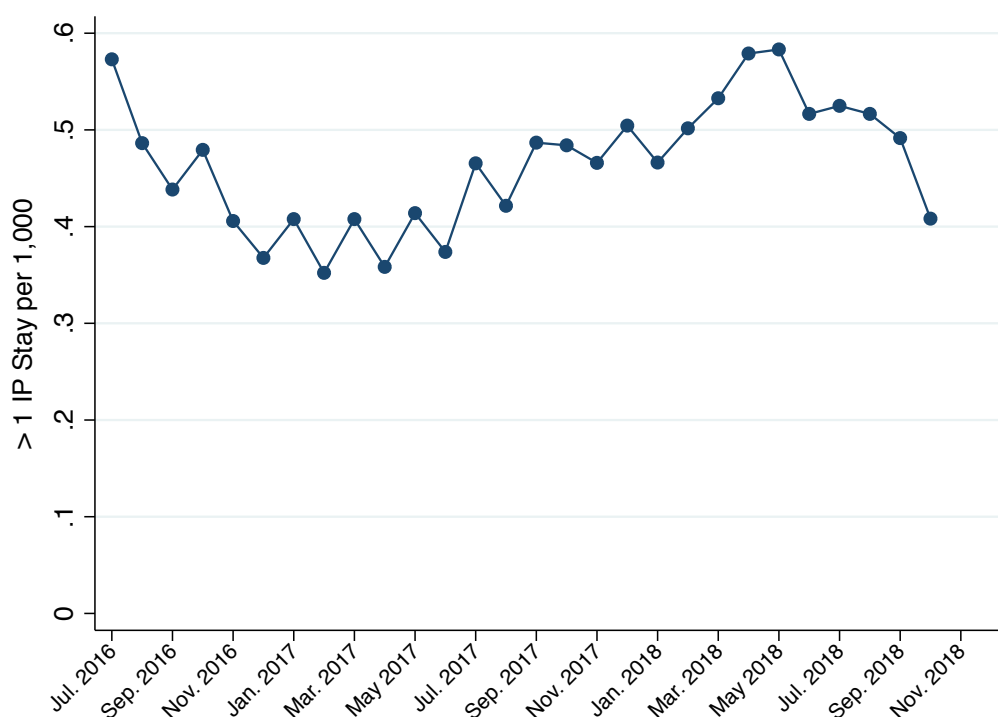
Appendix Figure 1: ED Visits per 1,000 Medicaid Expansion Enrollees (Including Mental Health and Substance Abuse Visits)



Appendix Figure 2: Share of Medicaid Expansion Enrollees with at Least 1, 2, 3, or 4 ED Visits



Appendix Figure 3: Share of Medicaid Expansion Enrollees with 2 or More Hospital Stays



Appendix Table 1: Louisiana Medicaid Provider Specialty Code Descriptions by Primary Care and Specialty Care (Excluding Dental and Laboratory)

Primary Care Designations: Primary care, family practice, pediatrics, internal medicine, nurse practitioner, physician assistant, clinic or other group practice, FQHC
Specialty Care Designations: General surgery, allergy, otology, laryngology, rhinology, anesthesiology, cardiovascular disease, dermatology, gynecology (DO only), gastroenterology, manipulative therapy (DO only), neurology, neurological surgery, obstetrics (DO only), OB/GYN, ophthalmology (DO only), otology (DO only), laryngology (DO only), rhinology (DO only), ophthalmology, orthopedic surgery, pathologic anatomy (DO only), pathology, peripheral vascular disease or surgery (DO only), plastic surgery, physical medicine rehabilitation, psychiatry, psychiatry (DO only), proctology, pulmonary diseases, radiology, radiology (DO only), radiation therapy, thoracic surgery, urology, geriatrics, nephrology, hand surgery, podiatry, neonatal perinatal medicine, pediatric cardiology, pediatric critical care medicine, pediatric emergency medicine, pediatric endocrinology, pediatric gastroenterology, pediatric hematology, pediatric infectious disease, pediatric nephrology, pediatric pulmonology, pediatric rheumatology, pediatric sports medicine, pediatric surgery, pediatric neurology, pediatric genetics, emergency medicine, pediatric developmental behavioral health, cardiac electrophysiology, critical care medicine, endocrinology & metabolism, hematology, infectious disease, medical oncology, pulmonary disease, rheumatology, surgery – critical care, surgery – general vascular, nuclear medicine, addiction specialist, gynecologic oncology, maternal & fetal medicine

Appendix 1: Final Certified Report – Travel Distance, Affordability, Wait Times, and Time Since Last Accessing Care

Overview:

This final report is a part of the overall evaluation of Medicaid Expansion in Louisiana. The evaluation is designed to provide insight into the impact of Medicaid Expansion in four broad domains:

1. Access
2. Cost
3. Quality
4. Beneficiary & Provider Perspectives

This report falls under the Access domain, which has three broad areas of evaluation: access to care, provider participation, and health care utilization. This report falls under the specific area of access to care and examines questions highlighted below:

1. Access
 - a. What is the impact of Expansion on access to care?
 - i. ***Aim I.A.1: Analyze the impact of Medicaid expansion on distance and travel time to regular provider.***
 - ii. ***Aim I.A.2: Analyze the impact of Medicaid expansion on affordability of care.***
 - iii. ***Aim I.A.3: Analyze the impact of Medicaid expansion on wait times for care by major line of service.***
 - iv. ***Aim I.A.4: Analyze the impact of Medicaid expansion on how much time has lapsed since last accessing care.***
 - b. What is the impact of Expansion on provider participation?
 - c. What is the impact of Expansion on the health care utilization?

Aim I.A.1 Analyze the impact of Medicaid expansion on distance and travel time to regular provider

Prepared by: Charles Stoecker PhD, Dimitris Karletsos MA

June 2019

Background

Distance to care has been shown to be a potentially important access indicator that impacts care utilization, follow-up rates, and whether a patient receives a timely diagnosis. The specific studies that support these statements have been conducted over diverse study populations across the United States. Patients living further from care in rural Vermont were less likely to access care (Nemet & Bailey, 2000). HIV patients in Washington, DC that lived further from outpatient clinics were more likely to be lost to follow-up and also less likely to have their viral loads suppressed (Terzian et al., 2018). Patients with myocardial infarctions who travel further to receive care were less likely to receive follow-up care and more likely to die in the following year (Piette & Moos, 1996). Other work has found that patients that travel further to their primary care physicians have higher disease burden (Billi, Pai, & Spahlinger, 2007). Patients living further from care in North Carolina are less likely to receive a timely prostate cancer diagnosis (Holmes et al., 2012) and nationwide patients living further from care are less likely to receive a timely colon cancer diagnosis (Massarweh et al., 2014). Having a nearby care provider is potentially an

important indicator for appropriate care utilization and health outcomes. Given the potential importance of distance to care we examine the change in distance traveled to health encounters before and after Louisiana's Medicaid expansion using the claims database for Louisiana Medicaid beneficiaries.

Data

This report is based on the universe of Louisiana Medicaid claims from January 1, 2014 through December 31, 2018. In an effort to measure the distance traveled by Medicaid beneficiaries for service we remove duplicate service claims within a service line on a single day. For each unique combination of date, beneficiary, and service line we match the beneficiary's home address with the service provider's address. We geocode the address text from the claims tables using ArcGIS into latitude and longitude. To calculate the distance between the two addresses we use the Vincenty module in Stata 15 which calculates the ellipsoidal distance between any two points on the earth.

Methods

We compare change in mean distance traveled for all claims as well as a subsample of beneficiaries that had claims both before and after expansion. This second, balanced, sample eliminates any compositional effects that would mechanically lower the mean distance traveled if more urban residents with closer clinics were eligible for Medicaid after expansion. We also repeat this exercise for each parish and each service line.

To complement the exploration of these raw means we also present results within a regression discontinuity framework. We use the sharp law enactment date as an exogenous break point between claims filed before July 1, 2016 and those filed afterward. We present the regression discontinuity framework graphically where we fit third order polynomials to monthly travel averages.

We also estimate a formal regression framework. We estimate a model with miles traveled as the dependent variable. The coefficient of interest is on a dummy variable equal to one for all service dates after July 1, 2016. As regression discontinuity estimates are most valid immediately around the cutoff, we limit our sample for the regression analyses to claims within 18 months of Louisiana's Medicaid expansion. In our base specification we include a linear control for the number of days on either side of the expansion date and allow this term to have different slopes on either side of that cutoff. We also include a quadratic term and allow it to vary flexibly as well.

Results

Table 1 shows that, after limiting the sample to beneficiaries that had claims both before and after expansion (columns 3 and 4), mean travel distance declined for all service lines after expansion. The distance traveled by the 95th percentile of travelers also declined for all service lines except opticians. Declines ranged from 0.9 fewer miles traveled to see an optician to 4.1 fewer miles traveled for a gynecology or obstetrics visit. The 95th percentile traveled to see an optician increased by 1.2 miles, but all other service lines saw declines in travel distance with the largest fall in the 95th percentile of distances traveled was 17.3 fewer miles traveled to see a gynecologist or obstetrician. Overall means and distance traveled by the top 5th percentile of travelers decreased for outpatient hospital services, primary care, and specialty care. We have broken down distance traveled for the aggregated service categories in the first

three rows of Table 1 by parish in the appendix. For most parishes, distance traveled has declined for each of these measures after expansion.

Table 1: Mean change in distance traveled pre/post expansion

	All		Balanced Sample	
	(1) Mean	(2) P95	(3) Mean	(4) P95
Outpatient Hospital Services	-0.87747	-8.97251	-0.62245	-5.28656
Primary Care	-1.55457	-5.90394	-1.47203	-5.90290
Specialty Care	-1.60385	-5.40953	-2.24074	-8.04681
General Practice	-1.64899	-10.78777	-2.43026	-8.92480
Family Practice	-2.72980	-12.74923	-2.25456	-8.90596
Internal medicine	-1.98845	-7.46152	-2.74906	-10.35373
Pediatrics	-2.23066	-18.38455	-2.54287	-15.52318
Gynecology / obstetrics	-3.95453	-21.41285	-4.06063	-17.33240
Optician	-0.45004	-3.50791	-0.08934	1.20836

Note: Data derived from billing and service addresses in Medicaid claims files from 2014-2018. Data only include one claim per patient, per service line, per day. The first two columns present averages which include newly eligible enrollees. The last two columns are limited to enrollees that had at least one claim for the service line in both the pre-expansion and post-expansion periods. Columns 1 and 3 show the changes in mean miles driving between the pre- and post-expansion periods. Columns 2 and 4 show the changes in the 95th percentile (those driving the most) between the two periods.

Figures 1-3 present means changes for services by type graphically. Distance between beneficiary and provider's service address are averaged within monthly buckets. After Louisiana's Medicaid expansion, mean distance traveled decreases. There is a visually identifiable break in trend as beneficiary home address and the address of the service provider gets closer. These graphs are limited to beneficiaries that utilized Medicaid services before expansion to make comparability easier. Graphs that include individuals newly eligible for Medicaid follow a similar trend and show a decline in distance traveled after expansion.

Each of the figures show a break in trend after Medicaid expansion. Generally access, as measured by distance traveled for a physician encounter, has been declining in the 18 months immediately after enactment of Medicaid expansion. These trends appear to be reversing as distance traveled to appointments has been increasing over the past 12 months for specialty care and outpatient visits. Distances traveled for primary care visits have continued to decline.

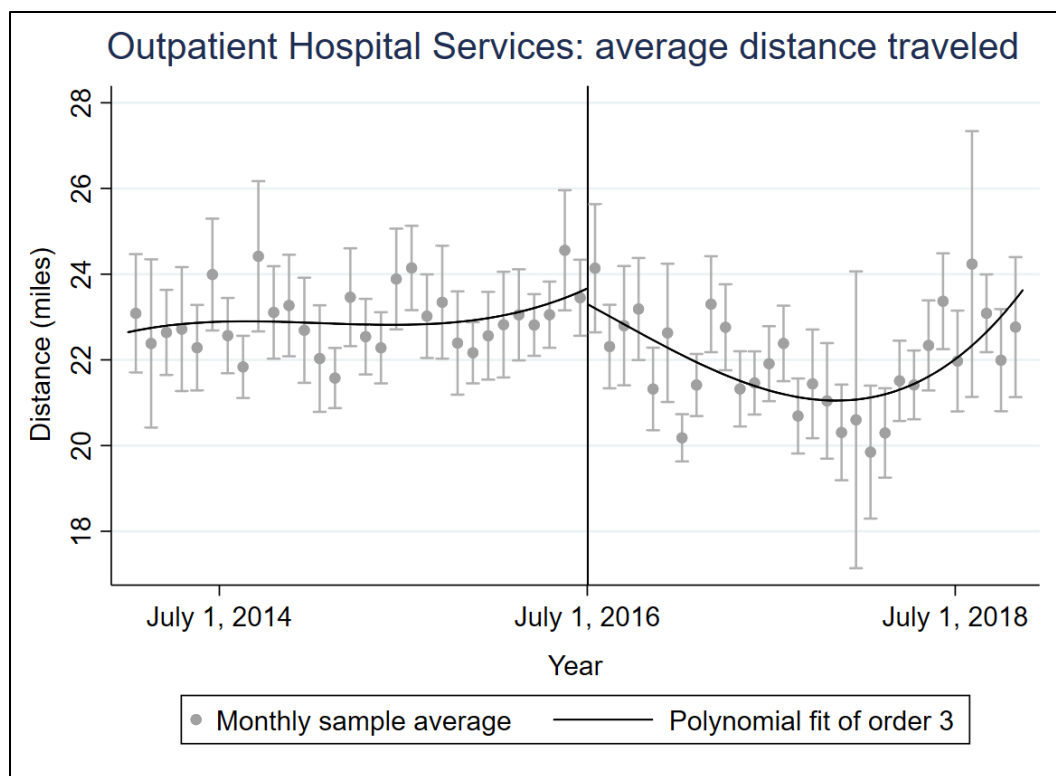


Figure 1: Mean miles between home addresses and service addresses for outpatient hospital services for Louisiana Medicaid beneficiaries. Monthly mean miles traveled are represented by dots, the 2.5th and 97.5th percentiles of the distribution are represented by the bars within each monthly window. The solid line indicates a locally fitted third order polynomial.

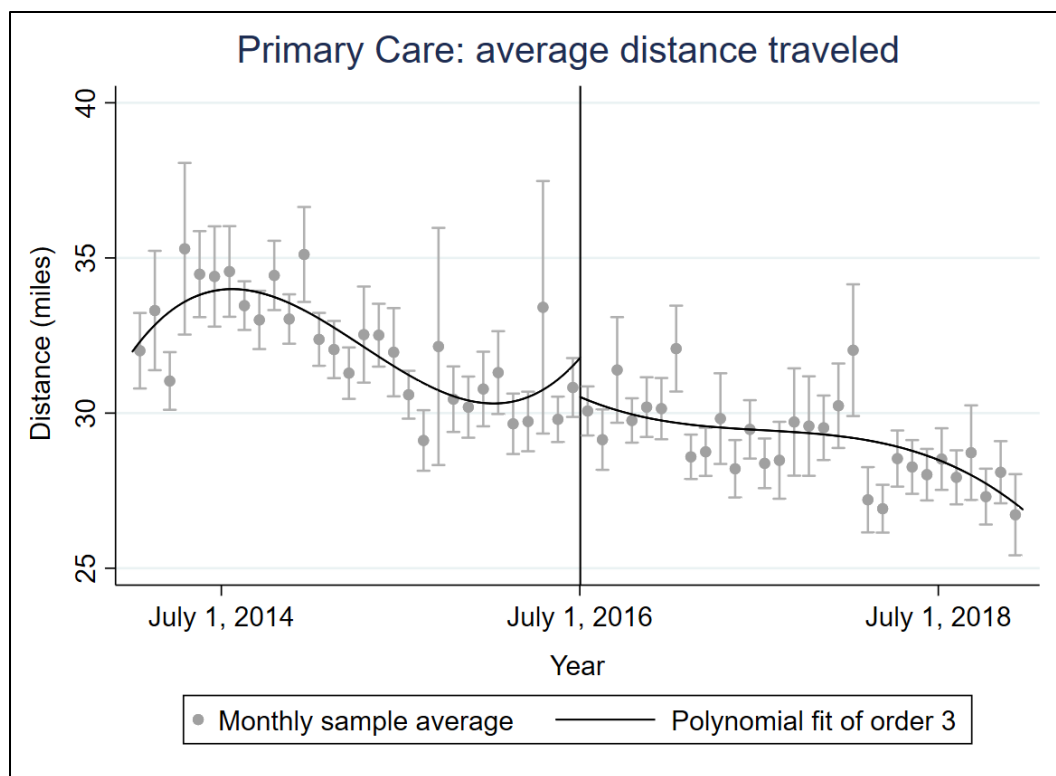


Figure 2: Mean miles between home addresses and service addresses for primary care services for Louisiana Medicaid beneficiaries.

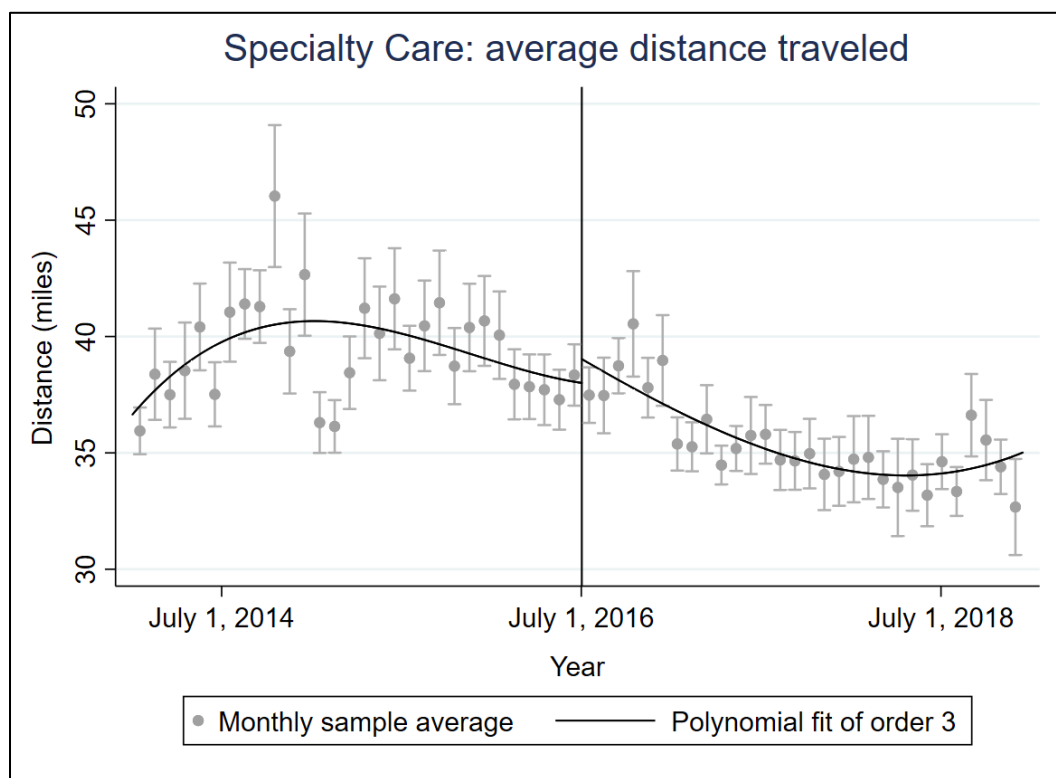


Figure 3: Mean miles between home addresses and service addresses for specialty services for Louisiana Medicaid beneficiaries.

We present regression discontinuity estimates of the impacts of expansion on distance traveled in Tables 2 and 3. The principal advantage of this approach is that it allows us to assess the statistical significance of the change in distance traveled. However, these tables measure only the immediate change in distance at the break point and do not measure the continued declines in distances traveled over the post expansion period. There was an immediate decrease in distance traveled for outpatient hospital care after expansion of 0.42 miles, which was statistically significant at the 1% significance level. Immediate declines in travel for primary and specialty care were 0.14 miles.

Table 2: Impact of expansion on distance traveled: Regression discontinuity estimates

	Outpatient Hospital Care	Primary Care	Specialty Care
Expansion Impact	-0.4169*** (0.000)	-0.1446** (0.033)	-0.1399 (0.120)
Observations	7,250,307	13,400,749	8,696,331

Note: Data derived from billing and service addresses in Medicaid claims files from 2015-2017. Coefficients indicate the regression adjusted impact of expansion on distance traveled. **=statistically significant at 5%, ***=statistically significant at 1%.

We also examined the impact of distance traveled for the most common service lines in Table 3. Distance to family practice, internal medicine, pediatrics, and gynecology / obstetrics providers all declined after expansion.

Table 3: Impact of expansion on distance traveled: Regression discontinuity estimates, Top Specialties

	Family Practice	Internal Medicine	Pediatrics	Gynecology / Obstetrics
Expansion Impact	-0.3504*** (0.003)	-0.2603 (0.085)	-0.7982*** (0.000)	-0.6822*** (0.001)
Observations	4,729,593	2,158,705	4,221,763	1,073,978

Note: Data derived from billing and service addresses in Medicaid claims files from 2015-2017. Presented are categories with more than one million beneficiaries with at least one claim in both pre- and post-expansion periods. Coefficients indicate the regression adjusted impact of expansion on distance traveled. **=statistically significant at 5%, ***=statistically significant at 1%.

Implications

Louisiana's Medicaid expansion decreased the distance between home addresses of Medicaid beneficiaries and the service provider's address. This decline is robust across service lines and also persists across most parishes. Statewide, these declines ranged from 0.9 fewer miles traveled to see an optician to 4.1 fewer miles traveled for a gynecology or obstetrics visit.

The most important limitation to note in this work is that we do not have a record of the Medicaid beneficiary's address at the time of the encounter. Rather, we have the most recent enrollment address on file for the beneficiary. Thus we are measuring distances between providers and places where Medicaid beneficiaries have lived rather than distances traveled by beneficiaries. This introduces a potential systematic bias as the distances in the post-expansion period are more accurately measured than those in the pre-expansion period. If a beneficiary moves and finds a new provider, we would be measuring the distance from the beneficiary's new location to their old provider and would overstate the change in distance traveled after expansion. As we are working with claims data, we could not address this limitation inside the database. We explored merging the claims data with historical address from credit report history, but the credit reporting company was not willing to make historical addresses available to us. We do note that the regression discontinuity estimates are robust to this limitation as they control for trends in distances. Provided that there is no substantial movement among Medicaid beneficiaries precisely coincident with Medicaid expansion, controlling for trends will account for the increasing accuracy of home addresses over the period of the claims dataset.

Other studies provide likely insight into why these declines in distance are occurring. Elsewhere we have documented that more physicians are accepting Medicaid after expansion. Additionally, among those physicians that were already accepting Medicaid, they are now accepting more Medicaid patients.

Declines in distances traveled as the result of Louisiana's Medicaid expansion have several important potential benefits. First, they directly improve the quality of life for Medicaid beneficiaries as they spend less time and money getting to needed appointments. Second, by removing these time and financial barriers to care we increase the likelihood that patients will receive appropriate screenings and follow-up.

And third, patients that are receiving appropriate screenings and follow-up as a result of the removal of these barriers are likely to have better health outcomes.

Appendix

Appendix Table 1: Miles Traveled for Outpatient Hospital Services before and after Louisiana Medicaid Expansion, by Parish

Parish	mean			95th percentile		
	Pre-	Post-	Change	Pre-	Post-	Change
Acadia	34.64	26.59	-8.06	115.42	100.38	-15.04
Allen	31.99	37.24	5.25	129.09	132.33	3.24
Ascension	21.44	19.47	-1.97	59.78	55.90	-3.87
Assumption	23.76	28.06	4.30	56.89	61.16	4.27
Avoyelles	29.57	27.77	-1.79	137.07	134.38	-2.69
Beauregard	28.06	29.17	1.11	117.47	120.16	2.69
Bienville	32.88	32.40	-0.48	97.09	84.47	-12.62
Bossier	21.02	21.22	0.20	95.06	82.47	-12.59
Caddo	17.31	16.23	-1.08	79.21	63.35	-15.87
Calcasieu	32.46	31.25	-1.21	147.14	136.11	-11.03
Caldwell	28.98	27.77	-1.21	116.83	107.46	-9.38
Cameron	32.97	29.30	-3.67	174.66	127.08	-47.58
Catahoula	40.22	38.79	-1.42	129.12	128.23	-0.89
Claiborne	26.37	28.70	2.33	64.53	94.30	29.77
Concordia	37.42	33.40	-4.02	143.11	142.12	-0.99
Desoto	26.27	27.53	1.26	63.97	70.54	6.57
East Baton Rouge	16.56	15.60	-0.96	70.26	67.87	-2.39
East Carroll	32.51	31.59	-0.92	152.46	152.46	0.00
East Feliciana	25.34	24.44	-0.90	82.21	76.28	-5.93
Evangeline	25.17	25.97	0.80	122.78	118.31	-4.48
Franklin	30.56	28.58	-1.97	126.59	126.59	0.00
Grant	32.12	33.24	1.12	113.06	112.89	-0.17
Iberia	26.85	26.69	-0.16	102.18	100.07	-2.11
Iberville	23.70	23.55	-0.15	65.76	66.68	0.92
Jackson	26.62	24.71	-1.91	87.35	99.47	12.11
Jefferson	14.91	12.97	-1.94	44.08	33.47	-10.61
Jefferson Davis	32.89	27.47	-5.42	124.91	118.72	-6.18
Lafayette	29.31	24.16	-5.14	105.56	92.35	-13.22
Lafourche	18.52	17.25	-1.27	47.71	45.39	-2.33
LaSalle	31.62	23.59	-8.03	110.00	110.37	0.37
Lincoln	29.40	32.62	3.22	161.27	163.89	2.62
Livingston	24.61	24.73	0.12	66.80	64.78	-2.03
Madison	35.40	32.82	-2.58	150.67	150.86	0.20
Morehouse	25.31	26.84	1.53	116.24	113.96	-2.28

Natchitoches	27.56	27.87	0.30	81.73	81.67	-0.06
Orleans	15.14	15.34	0.20	33.63	29.52	-4.11
Ouachita	22.31	23.19	0.88	112.73	104.73	-8.00
Plaquemines	32.46	30.69	-1.77	70.78	68.21	-2.58
Pointe Coupee	25.30	22.34	-2.96	75.94	68.82	-7.12
Rapides	24.26	23.13	-1.13	114.27	113.35	-0.92
Red River	25.78	25.58	-0.19	68.00	62.37	-5.63
Richland	28.35	28.46	0.12	132.63	131.61	-1.02
Sabine	34.95	35.51	0.56	97.06	83.68	-13.38
St Bernard	16.33	16.58	0.25	45.50	34.81	-10.69
St Charles	17.16	16.87	-0.29	41.18	35.61	-5.56
St Helena	28.26	31.48	3.22	68.88	71.13	2.26
St James	22.48	27.30	4.82	45.68	45.84	0.16
St John	31.27	28.89	-2.38	44.35	40.16	-4.19
St Landry	24.48	24.03	-0.45	101.78	98.19	-3.59
St Martin	21.00	18.51	-2.49	91.24	83.80	-7.44
St Mary	23.86	26.01	2.15	83.06	78.15	-4.91
St Tammany	27.38	27.92	0.54	54.57	49.19	-5.38
Tangipahoa	21.78	23.50	1.71	60.05	62.11	2.07
Tensas	48.24	48.19	-0.05	150.67	150.67	0.00
Terrebonne	16.58	17.46	0.89	54.34	51.18	-3.16
Union	31.43	33.50	2.07	166.69	180.32	13.63
Vermilion	20.68	20.54	-0.14	104.17	91.90	-12.27
Vernon	34.77	32.67	-2.10	116.70	119.72	3.02
Washington	22.65	23.08	0.43	70.08	69.44	-0.64
Webster	27.76	26.83	-0.93	119.02	116.40	-2.62
West Baton Rouge	21.18	21.20	0.02	75.80	76.46	0.66
West Carroll	35.45	36.97	1.52	160.18	184.80	24.63
West Feliciana	20.07	20.17	0.10	75.89	74.86	-1.03
Winn	33.99	28.75	-5.24	94.11	107.85	13.73
East Jefferson	13.84	13.19	-0.65	40.18	29.52	-10.66

Appendix Table 2: Miles Traveled for Primary Care Services before and after Louisiana Medicaid Expansion, by Parish

Parish	mean			95th percentile		
	Pre-	Post-	Change	Pre-	Post-	Change
Acadia	26.66	24.46	-2.20	108.81	103.13	-5.68
Allen	41.16	33.09	-8.06	135.30	127.43	-7.87
Ascension	22.64	20.12	-2.52	73.32	65.75	-7.57
Assumption	33.30	27.89	-5.40	99.46	75.65	-23.81
Avoyelles	32.96	28.11	-4.86	130.74	120.13	-10.61

Beauregard	37.13	41.64	4.51	142.40	153.60	11.20
Bienville	36.39	35.76	-0.64	158.16	183.21	25.06
Bossier	31.10	36.62	5.52	206.16	214.02	7.86
Caddo	31.92	34.59	2.67	206.62	211.49	4.86
Calcasieu	39.59	36.55	-3.04	150.33	154.05	3.72
Caldwell	31.23	32.25	1.03	137.22	137.20	-0.02
Cameron	41.62	47.14	5.52	189.83	199.69	9.86
Catahoula	46.98	40.17	-6.81	140.91	132.39	-8.52
Claiborne	34.12	32.69	-1.43	184.64	188.13	3.49
Concordia	33.15	33.06	-0.09	138.48	131.92	-6.56
Desoto	31.33	27.27	-4.05	140.60	119.25	-21.35
East Baton Rouge	22.82	22.77	-0.05	79.27	77.48	-1.79
East Carroll	74.78	79.68	4.90	206.86	206.97	0.11
East Feliciana	24.28	22.40	-1.88	84.85	76.14	-8.71
Evangeline	22.10	21.09	-1.01	114.72	88.72	-26.00
Franklin	33.28	30.47	-2.82	121.91	125.91	4.00
Grant	43.50	32.12	-11.38	131.15	110.88	-20.27
Iberia	24.82	23.14	-1.68	100.03	94.31	-5.72
Iberville	24.66	24.33	-0.33	83.45	79.18	-4.28
Jackson	40.09	30.93	-9.16	152.88	142.03	-10.85
Jefferson	16.80	16.35	-0.45	70.85	62.09	-8.76
Jefferson Davis	35.39	32.42	-2.97	140.69	107.91	-32.78
Lafayette	29.70	29.94	0.23	114.15	112.59	-1.56
Lafourche	22.91	20.81	-2.11	70.58	69.94	-0.64
LaSalle	43.21	26.55	-16.66	120.62	109.09	-11.53
Lincoln	30.32	26.30	-4.01	165.16	146.29	-18.86
Livingston	28.91	27.47	-1.44	85.51	73.96	-11.55
Madison	36.38	36.65	0.27	149.43	142.36	-7.08
Morehouse	27.38	24.48	-2.90	161.33	124.43	-36.90
Natchitoches	31.87	27.58	-4.29	122.14	94.79	-27.35
Orleans	22.69	19.78	-2.91	74.01	68.91	-5.09
Ouachita	28.25	25.47	-2.77	156.09	151.17	-4.91
Plaquemines	34.23	31.85	-2.38	93.58	81.64	-11.94
Pointe Coupee	34.93	36.01	1.07	98.06	94.30	-3.77
Rapides	38.59	37.20	-1.39	136.98	118.43	-18.54
Red River	26.38	24.55	-1.83	68.02	65.57	-2.45
Richland	28.21	23.19	-5.02	121.17	115.76	-5.41
Sabine	47.44	45.02	-2.42	121.72	100.38	-21.34
St Bernard	22.80	22.87	0.07	65.35	56.81	-8.53
St Charles	20.27	18.53	-1.74	53.35	48.25	-5.10
St Helena	38.58	34.45	-4.13	94.76	90.49	-4.27
St James	27.88	22.89	-4.99	60.37	55.84	-4.53
St John	27.02	28.10	1.08	54.31	60.43	6.11
St Landry	22.72	22.81	0.09	103.39	102.70	-0.70

St Martin	28.74	26.64	-2.10	106.13	106.33	0.19
St Mary	29.05	26.61	-2.44	106.12	106.75	0.63
St Tammany	27.38	28.68	1.30	89.77	82.17	-7.60
Tangipahoa	26.29	24.96	-1.33	97.85	73.18	-24.67
Tensas	55.01	47.27	-7.74	152.71	147.59	-5.12
Terrebonne	23.77	23.23	-0.54	70.57	67.28	-3.29
Union	34.43	33.19	-1.24	171.45	167.46	-3.99
Vermilion	22.61	22.02	-0.59	105.35	101.45	-3.90
Vernon	42.54	34.26	-8.29	128.36	122.74	-5.62
Washington	29.11	26.90	-2.21	86.35	74.40	-11.95
Webster	46.18	40.97	-5.21	212.70	217.48	4.77
West Baton Rouge	22.36	24.16	1.80	81.04	81.03	-0.01
West Carroll	41.18	38.98	-2.20	204.27	199.80	-4.46
West Feliciana	25.91	27.92	2.02	104.44	99.37	-5.07
Winn	50.60	33.94	-16.66	141.54	141.32	-0.22
East Jefferson	14.49	14.00	-0.48	55.12	56.58	1.45

Appendix Table 3: Miles Traveled for Specialty Care Services before and after Louisiana Medicaid Expansion, by Parish

Parish	mean			95th percentile		
	Pre-	Post-	Change	Pre-	Post-	Change
Acadia	55.28	38.36	-16.91	139.34	138.86	-0.48
Allen	58.11	52.66	-5.45	164.15	155.46	-8.69
Ascension	32.15	31.85	-0.30	118.27	118.40	0.13
Assumption	35.85	33.16	-2.69	71.29	66.95	-4.34
Avoyelles	46.28	47.97	1.69	140.39	138.78	-1.61
Beauregard	54.41	52.34	-2.07	185.92	189.58	3.66
Bienville	51.21	46.54	-4.67	174.35	161.67	-12.67
Bossier	32.16	30.52	-1.64	200.43	208.97	8.55
Caddo	29.35	24.49	-4.86	184.05	156.73	-27.32
Calcasieu	55.70	48.13	-7.57	183.31	176.97	-6.34
Caldwell	51.73	38.61	-13.12	164.03	140.32	-23.71
Cameron	47.69	37.48	-10.22	174.52	136.32	-38.20
Catahoula	58.40	56.30	-2.09	145.30	142.74	-2.56
Claiborne	55.96	59.52	3.55	186.53	235.44	48.91
Concordia	50.87	51.12	0.24	144.72	143.00	-1.72
Desoto	42.53	40.01	-2.52	152.51	125.09	-27.42
East Baton Rouge	26.30	25.48	-0.83	101.10	88.95	-12.16
East Carroll	80.12	77.18	-2.94	193.08	177.07	-16.01
East Feliciana	38.99	40.20	1.21	94.78	100.11	5.33
Evangeline	42.93	44.41	1.48	141.01	142.05	1.04
Franklin	69.02	60.51	-8.51	160.95	147.34	-13.62

Grant	50.38	50.88	0.50	169.70	167.51	-2.19
Iberia	31.16	31.75	0.59	106.12	105.36	-0.76
Iberville	32.86	33.26	0.40	98.84	112.63	13.78
Jackson	45.08	48.40	3.33	162.97	172.76	9.78
Jefferson	21.40	20.14	-1.27	73.65	72.09	-1.55
Jefferson Davis	56.79	51.16	-5.64	155.48	156.58	1.09
Lafayette	33.55	31.68	-1.87	117.97	117.55	-0.42
Lafourche	31.74	28.47	-3.27	86.20	73.84	-12.36
LaSalle	68.85	58.26	-10.59	171.00	166.55	-4.45
Lincoln	35.31	37.96	2.64	164.08	174.37	10.29
Livingston	35.23	35.78	0.55	107.73	107.96	0.23
Madison	80.64	81.90	1.26	183.27	169.72	-13.56
Morehouse	50.79	47.47	-3.33	175.00	177.53	2.52
Natchitoches	46.77	46.66	-0.11	137.57	150.27	12.70
Orleans	27.65	23.90	-3.76	103.38	79.83	-23.55
Ouachita	39.76	34.80	-4.96	182.97	159.70	-23.27
Plaquemines	36.95	36.77	-0.18	103.33	91.77	-11.56
Pointe Coupee	45.90	45.51	-0.39	100.79	100.79	0.00
Rapides	46.38	46.98	0.60	161.99	161.28	-0.71
Red River	47.14	43.76	-3.38	117.12	91.30	-25.82
Richland	54.57	52.01	-2.57	173.38	156.66	-16.72
Sabine	57.76	52.76	-5.00	143.34	153.22	9.88
St Bernard	27.93	29.81	1.88	82.09	93.15	11.07
St Charles	33.60	26.33	-7.26	100.97	62.92	-38.04
St Helena	45.19	43.99	-1.20	88.19	88.19	0.00
St James	36.86	39.68	2.82	81.58	98.96	17.37
St John	31.74	28.92	-2.82	73.50	69.92	-3.59
St Landry	34.86	36.08	1.22	123.34	125.95	2.61
St Martin	30.91	29.50	-1.41	108.29	109.60	1.31
St Mary	40.70	43.06	2.36	115.57	97.50	-18.07
St Tammany	30.07	30.59	0.52	108.93	82.32	-26.62
Tangipahoa	34.09	31.45	-2.65	95.71	91.21	-4.50
Tensas	73.24	73.17	-0.07	169.67	154.23	-15.43
Terrebonne	28.17	27.94	-0.23	82.07	78.43	-3.64
Union	56.87	49.92	-6.95	202.03	190.13	-11.91
Vermilion	33.87	29.95	-3.92	122.01	121.28	-0.73
Vernon	56.71	47.39	-9.31	169.90	170.99	1.09
Washington	36.37	34.76	-1.61	83.11	84.92	1.81
Webster	53.73	48.52	-5.21	201.16	199.84	-1.31
West Baton Rouge	28.56	27.59	-0.96	85.42	85.38	-0.05
West Carroll	68.48	66.89	-1.59	195.89	204.83	8.94
West Feliciana	40.66	44.25	3.60	99.77	98.95	-0.82
Winn	54.13	57.05	2.92	150.00	155.76	5.77
East Jefferson	19.24	18.23	-1.01	68.71	63.16	-5.55

Aim 1.A.2: Analyze the impact of Medicaid expansion on affordability of care.

Prepared by: Charles Stoecker, PhD and Yixue Shao MPH

April 2019

Executive summary

We estimated the impact of Medicaid expansion on affordability of health care. We looked at two definitions of affordability: cost barriers to seeing a doctor and cost barriers to getting prescribed medication. We found that the number of people reporting these barriers decreased significantly due to Louisiana Medicaid expansion. More specifically, the number of adults under age 65 reporting being unable to see a doctor due to cost decreased by 4.2 percentage points as a result of Medicaid expansion and the number of adults under age 65 reporting being unable to afford prescribed medication decreased by 6.9 percentage points as a result of Medicaid expansion. Overall, Medicaid expansion made care more affordable for about 24,764 Louisiana residents.

Background

The Affordable Care Act (ACA) provided support for states to expand their Medicaid benefits to provide health insurance coverage for residents whose incomes were at or below 138% of the federal poverty level (FPL) regardless of age, parental status, or disability status (Musumeci & Rudowitz, 2015). Louisiana implemented Medicaid expansion at the beginning of July 2016 to cover more lower-income, uninsured and nonelderly population.

This expansion of health insurance coverage would be expected to translate into improved affordability to health care services as insurance coverage has been found to be significantly associated with reduced challenges to affordability of health care (Obama, 2016). Millions of adults have gained insurance coverage under the Affordable Care Act Medicaid expansion (Courtemanche, Marton, Ukert, Yelowitz, & Zapata, 2017; Miller & Wherry, 2017), but less is known about how this coverage expansion translates into affordability of care. Shartz et al found improvements in the affordability of care for all nonelderly adults in expanded states using a simple regression model with Health Reform Monitoring Survey data (Shartz et al., 2015). Selden et al found adults in expansion states experienced larger reductions in out-of-pocket spending using a difference-in-difference (DID) model but found no significant difference in other health care cost, using National Health Interview Survey data (Selden, Lipton, & Decker, 2017). Although these published studies evaluated the early effect of Medicaid expansion across states on various measures of affordability, the findings were mixed. There is still no strong evidence that affordability of care would be significantly improved by Medicaid expansion. Further, this prior evidence is limited to early adopter states, and it is unclear if these mixed findings could be extrapolated outside that sample. Here we estimate the causal impact of Louisiana's Medicaid expansion on measures of affordability of office visits and medicine for Louisiana residents.

Data

We used data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2011-2017. The BRFSS is a telephone survey that collects data about health-related risk behaviors, insurance coverage, health care access, chronic health conditions, and use of preventive services, covering the 50 U.S. states and the District of Columbia (CDC, 2019). Affordability of health care in this survey was measured by asking respondents two questions: 1) whether they could not see a doctor due to cost in past 12 months

and 2) whether they could not get a prescribed medication due to cost in past 12 months. Respondents were asked about cost barriers to office visits annually. Respondents were only asked about cost barriers to prescription medications in the 2013, 2014, 2016, and 2017 BRFSS surveys. In order to more finely match trends between Louisiana and our control unit, we divided the data into 14 half-year time units spanning January-June and July-December of each year. We categorized survey responses from Louisiana in the second half of 2016 as treated observations.

Methods

We used two complementary approaches to obtain a causal estimate of the impact of Louisiana's Medicaid expansion on the affordability of care. First, we estimated a differences-in-differences (DD) analytical model using multivariable linear regression comparing trends in Louisiana to trends in states that did not expand Medicaid during the study period. To avoid directly comparing Louisiana to other non-expansion states, state-level indicators were included in our model as fixed effect. Half-year indicators were also included in the model to isolate underlying secular variation induced by policies set at the national level. We included a set of covariates to control for possible confounding by other factors, including race, sex, age, marital status, education, and the presence of chronic conditions.

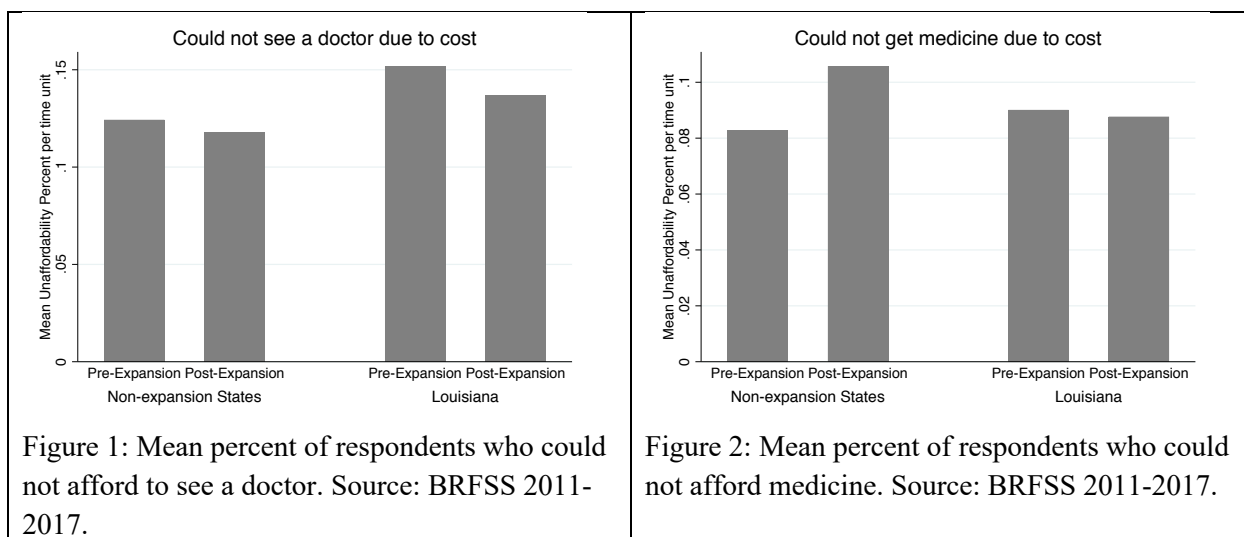
We first ran our DD model on the full sample, and then on again after limiting the sample to potentially eligible adults. Due to data constraints we were forced to estimate eligibility status using reported income, marital status, and number of children. The BRFSS only reports income in pre-specified ranges, so we assigned each respondent an income equal to the midpoint of the income range reported by the survey. To calculate family size we started with one, added one if the respondent was married, and then added the number of reported children. We compared the resulting fraction to published annual federal poverty guidelines to calculate the respondent's federal poverty level (FPL).

We also tested the assumption that trends were parallel between Louisiana and non-expansion states using a differences-in-differences-in-differences (DDD) model. The principal advantage of this model is that it allows us to specify state-by-year fixed effects. To achieve the third difference, we subtracted the impacts of Louisiana's Medicaid expansion on those over 138% FPL who should not have been directly affected from those under 138% FPL who should have been affected. All analysis used survey weights to allow us to draw conclusions about the policy at the state level.

We used a synthetic control matching strategy for our second, complementary analysis approach. We constructed a synthetic version of Louisiana by matching trends in care affordability before Medicaid expansion in Louisiana to a weighted average of other non-expansion states. As we needed a continuous series of data, we were only able to apply this method to the question asking about cost barriers to visiting a doctor. After we constructed a synthetic Louisiana, we compared the gap between synthetic Louisiana and the real data from Louisiana in the period after Medicaid expansion. To test whether this gap was statistically significant we utilized permutation testing where we constructed synthetic versions of each of the non-expansion states in the sample. We then compared the ratio of the gaps in the post period to the gaps in the pre-period. As we had 51 states, including District of Columbia, in our collection of potential donors, we considered the gap in Louisiana statistically significant at the 3.8% level if it was the largest of these ratios.

Results

Summaries of cost barriers in Louisiana and non-expansion states before and after Louisiana's expansion are shown in Figures 1 and 2. The unadjusted mean rate of people who could not see a doctor due to cost in Louisiana decreased from 0.15 percent to 0.13 percent after Medicaid expansion in July 2016. This decrease was larger than the decline in other non-expansion states. The percent of people who could not afford prescriptions decreased in Louisiana after expansion. This was in the context of a larger increase in reported cost barriers in non-expansion states.



We now turn to the DD model to isolate the causal impact of Medicaid expansion by controlling for potential confounders (Table 1). Column 1 shows that Medicaid expansion removed office visit cost barriers for 0.7 percentage point of respondents and drug cost barriers for 2.1 percentage points of respondents. Both effects were statistically significant. As mentioned in the methods sections, we are unable to directly assess a respondent's eligibility for Medicaid and instead impute their FPL from rough income data. The DD specifications that attempt to limit the sample to eligible individuals (Columns 2 and 3) are statistically significant, the point estimates indicate a diminishing of cost barriers for these groups. Our preferred specification is column 5 which implements a triple-difference strategy and limits the analysis to those not yet eligible for Medicare. We see a decline of individuals unable to see a doctor of 4.2 percentage points and a decline of individuals unable to obtain medicine of 6.9 percentage points. Both findings are statistically significant at the 1% level.

Table 1: Impact of Louisiana Medicaid Expansion on Health Care Affordability

	(1)	(2)	(3)	(4)	(5)
	DD	DD	DD	DDD	DDD
	Full Sample	Imputed ≤138% FPL	Imputed ≤138% FPL & Age <65		Age <65
Could not see a doctor due to cost (%)	-0.007** (0.003) 1215490	-0.034*** (0.008) 188521	-0.037*** (0.011) 136121	-0.035*** (0.006) 1215490	-0.042*** (0.008) 792244
Could not get medicine due to cost (%)	-0.021*** (0.004) 235615	-0.089*** (0.012) 38,476	-0.090*** (0.014) 27,960	-0.078*** (0.011) 235615	-0.069*** 0.013 153542

Notes: Coefficients indicate the impact of Louisiana Medicaid expansion on affordability of office visits or medicine. Each coefficient is from a separate regression. Standard errors and number of observations are listed below each coefficient in parenthesis. Regressions include fixed effects for half year periods, state fixed effects, and other covariates. Data are from the Behavioral Risk Factor Surveillance System 2011-2017. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We depict these estimates graphically using the synthetic control method (Figures 3 and 4). The closeness of the lines of Louisiana and synthetic Louisiana in Figure 3 in the pre-period shows we have achieved a good proxy for what Louisiana would have looked like in the post period if it had not expanded Medicaid. We integrate the gap between the two lines in the post period to see the size of the total impact of Medicaid expansion on removing barriers to accessing care in a physician's office. However, the permutation test in Figure 4 suggests the effect of Louisiana Medicaid expansion is not statistically significant as the ratio of the post-period gap to pre-period gap is 14th largest for Louisiana out of the 51 possible states (including D.C.).

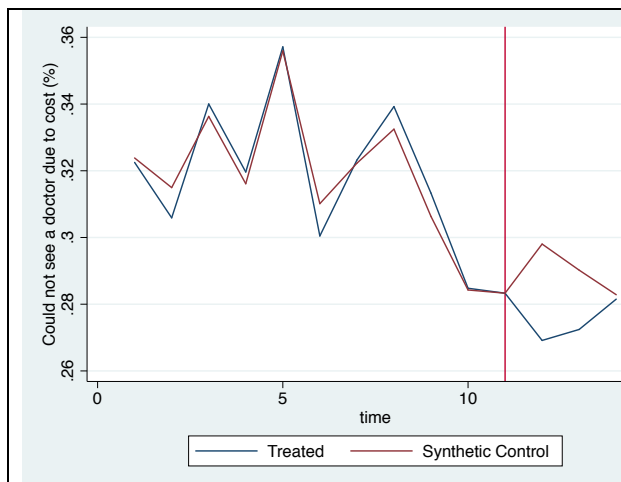


Figure 3: Synthetic control estimates of the effect of Louisiana Medicaid expansion on rate of could not afford a doctor per time unit. Louisiana was drawn in blue line. Sample limited to respondents with imputed family income below 138% FPL. Source: BRFSS 2011-2017.

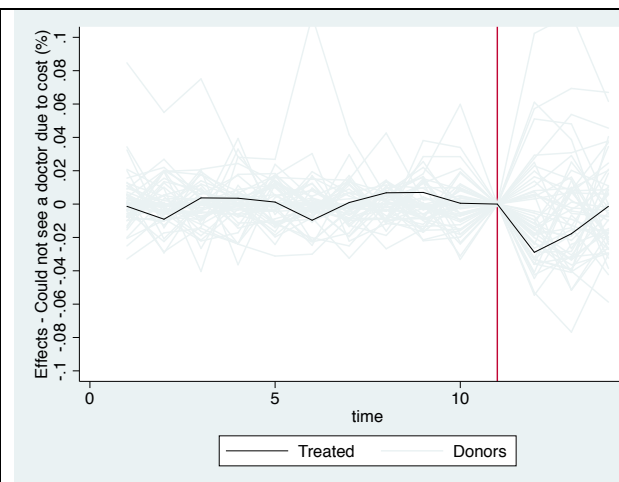


Figure 4: Differences between unaffordability rates for control states and Louisiana and their respective synthetic controls. Louisiana was drawn in black line. Sample limited to respondents with imputed family income below 138% FPL. Source: BRFSS 2011-2017.

Implications

Louisiana's Medicaid expansion improved the affordability of health care significantly, likely due to increased overall insurance coverage. There were decreases in people who could not afford to see a doctor and people who could not get prescriptions due to cost. We have verified that this result is driven by people who we expected to be Medicaid due to income eligibility limits and who are less likely to be enrolled in Medicare due to their age. Louisiana's Medicaid expansion has been successful in removing cost barriers, and this success is detectable in national survey data.

Aim I.A.3: Analyze the impact of Medicaid expansion on wait times for care.

Aim I.A.4: Analyze the impact of Medicaid expansion on how much time has lapsed since last accessing care.

Prepared by: Charles Stoecker, PhD and Yixue Shao MPH

April 2019

Executive summary

Louisiana's Medicaid Expansion increased patient's reported attachment with the medical system, with an increased number reporting having a personal doctor. Survey respondents did not report using more care nor did they report being more inconvenienced by long waits to get appointments nor did they leave the doctor's office due to long wait times. More specifically, the Medicaid expansion in Louisiana increased the number of patients who identify as having a personal doctor. There was no self-reported increase in utilization for check-ups or other types of doctor visits in survey data. And, Medicaid expansion did not have an adverse effect on wait times to get appointments or wait times once in the doctor's office.

Background

The Affordable Care Act (ACA) provided support for states to expand their Medicaid benefits to provide health insurance coverage for residents whose incomes were at or below 138% of the federal poverty level (FPL) regardless of age, parental status, or disability status. Louisiana implemented Medicaid expansion at the beginning of July 2016 to cover more lower-income, uninsured and nonelderly population.

This expansion of health insurance coverage would be expected to translate into improved access to care for the population newly eligible for this coverage. This could manifest in increased visits to the doctor or increased reporting of having a personal doctor. The impact on wait times is theoretically ambiguous. While wait times might be shorter for an individual who now has insurance, there may be many such individuals and they may overwhelm the schedules of local physicians accepting patients with Medicaid insurance. In 2011 research, the most common payor class of new patients that physicians were not accepting were those on Medicaid plans (Decker, 2012).

National estimates on states that adopted Medicaid expansion early indicate no impacts on the number of doctor visits and somewhat paradoxically more care being delayed because of increase wait times (Miller & Wherry, 2017). This effect was possibly driven by increased utilization of specialist services, but these estimates were not statistically significant. Estimates from Michigan found that state's expansion of

Medicaid increased appointment availability for Medicaid recipients while simultaneously having no adverse impacts on wait times (Tipirneni et al., 2016). This study seeks to re-estimate these effects specifically for Louisiana.

Data

We used data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2011-2017. The BRFSS is a telephone survey that collects responses on health care access as well as other health-related issues, covering the 50 U.S. states and the District of Columbia. Access to health care in this survey is covered by five key questions: 1) whether the respondent has a personal doctor, 2) whether the respondent had a routine checkup within the last year, 3) how many times the respondent went to the doctor in the last year, 4) whether the respondent could not get an appointment soon enough, and 5) whether the respondent left the doctor's office because of a long waiting time. We categorized responses from after July 1, 2016 as effected by Louisiana's Medicaid expansion. In order to maximize the comparability between Louisiana and other states we limited our comparison group to other states that have not yet expanded Medicaid. In order to be able to properly compare the adults in Louisiana newly eligible for Medicaid with similar adults before Louisiana's Medicaid expansion and in other states that had not expanded Medicaid we imputed each respondent's federal poverty level. We impute family size by adding one if the respondent is married and adding the reported number of children. While the BRFSS does not report precise income amounts, it does report income in buckets and we assign each respondent an income equal to the midpoint of the range in that bucket. We then divide the imputed household income by the federal poverty level (FPL) for each household size to determine the percent of the FPL.

Methods

We used a differences-in-differences (DD) regression model to estimate the impact of Louisiana's Medicaid expansion on access to care and wait times. This approach uses state fixed effects to avoid directly comparing levels of outcomes in Louisiana with other states. This is accomplished in the technique by essentially subtracting the state mean for each outcome across time periods from each annual average. The model relies on the assumption that trends in Louisiana would have been similar to those in non-expansion states if Louisiana had not expanded Medicaid. We also include year fixed effects to control for national level policy changes. We also control for race (white, black, or Hispanic), sex, age in buckets (18-24, 25-34, 35-44, 45-54, 55-64, 65+), marital status, college education, presence of chronic conditions (diabetes, myocardial infarction, chronic heart disease, stroke, asthma, skin cancer, chronic obstructive pulmonary disease, arthritis, depress, kidney disease, or other chronic disease), whether the respondent had smoked 100 cigarettes, and drank any alcohol in the past 30 days. The means of each of these covariates were collapsed to the state average using the survey weight, and regression was performed on state by year cells. We first ran our DD model on the full sample, then restricting to adults we imputed to be below 138% of the FPL, and then a third time restricted to adults reporting to be below age 65.

We also paired the DD model with a differences-in-differences-in-differences (DDD) model to test the validity of our assumptions that trends were parallel within states. The model relaxes the assumption that trends in Louisiana would have been similar to those in non-expansion states by comparing trends in Louisiana in those below 138% of the FPL to those above 138% of the FPL. All analysis used survey weights to allow us to draw conclusions about the policy at the state level.

Results

Our first measure of access is whether a survey respondent reports having a personal doctor. This could be interpreted as a measure of how connected the respondent views themselves to the healthcare system. The impact of Louisiana's Medicaid expansion on this measure of access is reported in Table 1. Results are fairly consistent across model specifications. After limiting the treated sample to those imputed to be below 138% FPL we find Louisiana's Medicaid expansion increased the share of respondents reporting having a personal doctor by 3.1 to 3.5 percentage points. While most respondents imputed to be in this income range reported having a personal doctor in all model specifications (69% to 84%), this still represents an increase between 3.62 and 4.98 percentage points. This increase was statistically significant in all models.

Table 1: Impact of Louisiana's Medicaid expansion on whether a respondent reports having a personal doctor

	DD	DD below 138% FPL	DD below 138% FPL & Age <65	DDD	DDD & Age < 65
LA Expansion	0.016** (0.007)	0.035** (0.014)	0.034* (0.018)	0.031*** (0.012)	0.033** (0.015)
Mean	0.84	0.75	0.69	0.84	0.79
% Impact	1.89	4.65	4.98	3.62	4.15
Obs	294	294	294	1214569	791594

Notes: Coefficients indicate the impact of Louisiana Medicaid expansion access to care. Each coefficient is from a separate regression. Standard errors are listed below each coefficient in parenthesis. Regressions include fixed effects for years, state fixed effects, and controls for race (white, black, or Hispanic), sex, age in buckets (18-24, 25-34, 35-44, 45-54, 55-64, 65+), marital status, college education, presence of chronic conditions (diabetes, myocardial infarction, chronic heart disease, stroke, asthma, skin cancer, chronic obstructive pulmonary disease, arthritis, depress, kidney disease, or other chronic disease), whether the respondent had smoked 100 cigarettes, and drank any alcohol in the past 30 days. Data are from the Behavioral Risk Factor Surveillance System 2011-2017. *= $p<0.10$, ** = $p<0.05$, *** = $p<0.01$.

Other measures of the impact on self-reported access to care were either statistically insignificant, or not robust to the choice of functional form of the estimation model. We report the impact of Louisiana's Medicaid expansion on the percent of respondents with routine checkups, who left the doctor's office because of a long waiting time, who could not get an appointment soon enough, and who had any doctor's visit in Table 2. We also report the impact on the number of doctor's visits over the previous 12 months.

Table 2: Impact of Louisiana's Medicaid expansion on other measures of access to care.

	DD	DD below 138% FPL	DD below 138% FPL & Age <65	DDD	DDD & Age < 65
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Routine checkup within 1 year (%)

LA Expansion	-0.008 (0.01)	-0.038** (0.019)	-0.024 (0.022)	0.005 (0.013)	0.022 (0.017)
Mean	0.74	0.68	0.61	0.74	0.67
% Impact	-1.03	-5.65	-3.88	0.72	3.32
Obs	294	294	294	1202971	784175

Left the doctor's office because of a long waiting time (%)

LA Expansion	0 (0.009)	-0.004 (0.023)	0.055** (0.023)	0.013 (0.01)	0.015 (0.013)
Mean	0.02	0.04	0.04	0.02	0.03
% Impact	0.26	-10.83	124.52	54.07	52.03
Obs	68	67	67	234435	152779

Could not get an appointment soon enough (%)

LA Expansion	-0.013 (0.014)	-0.017 (0.035)	-0.042 (0.028)	-0.032** (0.013)	-0.034* (0.018)
Mean	0.05	0.06	0.07	0.05	0.06
% Impact	-27.2	-29.68	-61.01	-66.24	-57.97
Obs	68	67	67	234435	152779

Number of doctor visits past 12 months

LA Expansion	0.082 (0.845)	-0.973 (1.338)	-2.693 (1.717)	0.391 (0.47)	0.758 (0.547)
Mean	5.14	6.01	5.94	5.17	4.75
% Impact	1.6	-16.19	-45.31	7.55	15.96
Obs	68	67	67	228486	150628

Whether any doctor visits past 12 months (%)

LA Expansion	0.003 (0.068)	0.136 (0.132)	0.063 (0.162)	0.001 (0.02)	-0.001 (0.026)
Mean	0.89	0.84	0.82	0.89	0.86
% Impact	0.31	16.1	7.71	0.12	-0.08
Obs	68	67	67	228486	150628

Generally, impacts are not statistically significantly different from zero even at the 10% level. The result closest to robust is the impact of Medicaid expansion on whether respondents could get an appointment soon enough. In both of the DDD models Medicaid expansion was estimated to decrease respondents who could not get timely appointments by 3.2 to 3.4 percentage points. Both of these estimates were statistically significant at least at the 10% level. In the DD model the point estimate was 4.2 percentage points and was quite close to the estimates from the DDD model, but the estimate was noisier and thus not statistically significant.

Implications

Louisiana's Medicaid expansion increased the number of survey respondents who reported having a personal doctor. This reporting of a usual source of care did not translate into increases in the number of reported doctor visits or checkups. Medicaid expansion also did not have a detectable impact on respondents leaving doctor's offices because of long wait times nor did respondents report not being able to get an appointment soon enough. Louisiana's Medicaid expansion appears to have increased respondents' attachment with the Medical system without patients reporting being inconvenienced by longer wait times or inability to get appointments.

Appendix 2: Final Certified Report – Changes in Hospital Admissions and ED Use

Aim I.B.1 & I.B.2 Final Certified Report - Report on changes in hospital admissions and ED use
(July 2016 – December 2018)

Prepared by: Lizheng Shi and Mark L. Diana

Overview:

This final report is a part of the overall evaluation of Medicaid Expansion in Louisiana. The evaluation is designed to provide insight into the impact of Medicaid Expansion in four broad domains:

1. Access
2. Cost
3. Quality
4. Beneficiary & Provider Perspectives

This report falls under the Access domain, which has three broad areas of evaluation: access to care, provider participation, and health care utilization. This report falls under the specific area of health care utilization and examines the highlighted questions below:

1. Access
 - a. What is the impact of Expansion on access to care?
 - b. What is the impact of Expansion on provider participation?
 - c. What is the impact of Expansion on the health care utilization?
 - i. **Analyze the impact of Medicaid expansion on adjusted hospital admission rates for the Medicaid population.**
 - ii. **Analyze the impact of Medicaid expansion on emergency department utilization for the Medicaid population.**
 - iii. Analyze the impact of Medicaid expansion on preventive care utilization for the Medicaid population.
 - iv. Analyze the impact of Medicaid expansion on the use of prescription medication.

Executive Summary

We analyzed the trend of hospital admissions and ED use in newly eligible beneficiaries after the implementation of Medicaid expansion in Louisiana. We focused on descriptive short-term post-expansion rates and found increases in both the number and rate of newly eligible beneficiaries in hospital admission and ED use by quarter. These results indicate that less than one-third of the expansion population had hospital admissions and two-thirds of the expansion population had ED use. The rates of hospital admissions and ED use suggest that Louisiana Medicaid expansion could provide coverage to thousands of adults who have unmet healthcare needs.

Key Findings:

1. Inpatient and hospital admissions have increased from the beginning of expansion, indicating beneficiaries have increased access to care.
2. The growth rate of inpatient hospital admissions and emergency department visits has dropped substantially since the expansion began.
 - a. The growth in inpatient admissions among this population has fallen from 15% to 2% between the third quarter of 2016 until December of 2018.
 - b. The growth rate in ED visits among this population has fallen from 30% to 8% between the third quarter of 2016 until December of 2018.

Background

Implemented in 2014, the evidence of the Affordable Care Act (ACA) showed a significant decrease in the uninsured rate from 18% to 12%, allowing millions of previously uninsured individuals to access and utilize health care (Cohen & Martinez, 2015). Understanding the effect of insurance expansion, particularly Medicaid, on hospital admissions and ED utilization are important for policy planning at both the hospital and states level.

Several studies have examined the impact of Medicaid expansion on hospital admissions and ED utilization. In particular, a study on California Medicaid expansion demonstrated an overall increasing number of inpatient admissions post-expansion (Cunningham et al., 2017). However, studies on Medicaid expansion's effect on ED utilization have been mixed. Pines et al. (2016) found no significant increase in ED utilization after ACA implementation across the United States, whereas Dresden et al. (2017) found a modest increase in ED visits in Illinois, attributable to insurance expansion under the ACA. Similarly, the Oregon Medicaid experiment showed the same results (Taubman, Allen, Wright, Baicker, & Finkelstein, 2014).

Louisiana Medicaid expansion took effect in June of 2016, and currently there is no study that examines the hospital inpatient admissions and ED use on the state Medicaid population. Thus, through this longitudinal analysis, we assessed the impact of Louisiana Medicaid expansion on hospital admissions and ED utilization in the newly insured Medicaid population.

Data

We used Medicaid claims data between July of 2016 to December of 2018.

Methods

The sample population included newly eligible Medicaid beneficiaries aged 18 to 64 years old on or after the third quarter of 2016 (as Medicaid expanded in June 2016). There are two primary outcome variables: hospital inpatients admissions and ED utilization, both of which were extracted from the Medicaid claims dataset.

The analysis found that during the post-expansion period of July 1, 2016 – December 31, 2018, the number of newly eligible beneficiaries for Medicaid (aged 18-64 years old) was 496,382. Distinct patients who had a hospital admission or ED utilization claim were counted as numerators. The rate was calculated as the numerator divided by the total new Medicaid expansion population.

Statistical Analysis

Below is a descriptive report of the counts and rates of hospital admission and ED utilization in the expansion population (N=496,382).

Results

Table 1.1 and Table 1.2 present the cumulative number of hospital admissions and ED utilization rates of the Louisiana Medicaid Expansion population by quarter. Figure 1 presents the cumulative growth trend of hospital admissions and ED use by quarter. We found that the Medicaid expansion population improved hospital admissions and ED use over the study period. By the end of the seven study quarters, the cumulative number of patients with hospital admissions suggested 131,447 patients (approximately

27% of new Medicaid Expansion Population) had at least one hospital admission. While the cumulative number of patients with ED use suggested 339,058 patients (approximately 68% of new Medicaid Expansion Population) had at least one ER visit.

Table 1.1 The Cumulative Information on the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Admission	16,303	31,888	50,880	65,832	80,371	93,413	105,497	114,896	123,699	131,447
ED use	58,482	116,672	168,148	213,201	247,936	277,825	304,063	318,749	330,263	339,058

* Adjusted 2018, Q1

Table 1.2 The Cumulative Percentage on the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Admission	3.28%	6.42%	10.25%	13.26%	16.19%	18.82%	21.25%	23.15%	24.92%	26.48%
ED use	11.78%	23.50%	33.87%	42.95%	49.95%	55.97%	61.26%	64.21%	66.53%	68.31%

* Adjusted 2018, Q1

Figure 1. The Cumulative Information on the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)

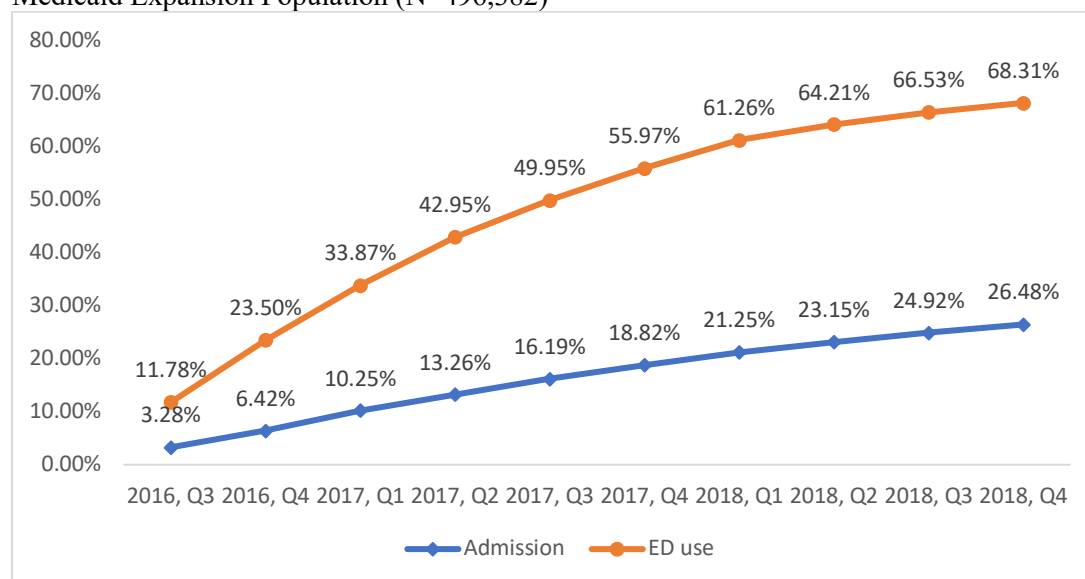


Table 2.1 and Table 2.2 present the number of hospital admissions and ED utilization rate of the Louisiana Medicaid Expansion population by quarter. Figure 2 presents the incidence rate by quarter. For the Medicaid expansion population, with hospital admissions, results showed a positive quarterly growth rate over the study period. However, from the first quarter (Q3 of 2016), the growth rate decreased gradually until Q4 of 2018. A similar pattern was shown in the quarterly growth rate of the Medicaid expansion population with ER visits.

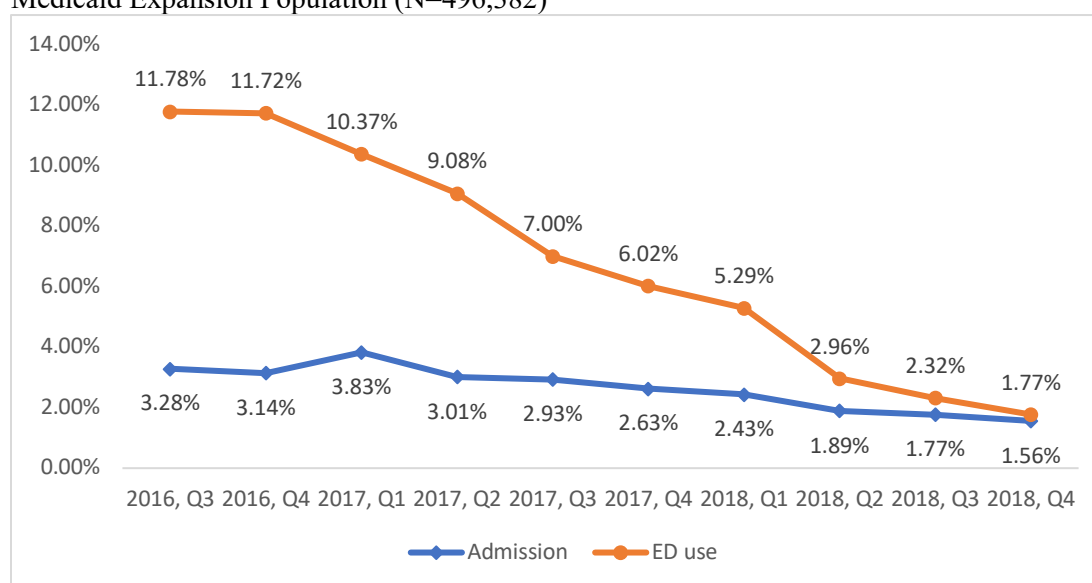
Table 2.1 The Quarterly Growth on the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)

	2016, Q3	2016, Q4	2017, Q1	2017, Q2	2017, Q3	2017, Q4	2018, Q1	2018, Q2	2018, Q3	2018, Q4
Admission	16,303	15,585	18,992	14,952	14,539	13,042	12,084	9,399	8,803	7,748
ED use	58,482	58,190	51,476	45,053	34,735	29,889	26,238	14,686	11,514	8,795

Table 2.2 The Quarterly Growth Rates of the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)

	2016, Q3	2016, Q4	2017, Q1	2017, Q2	2017, Q3	2017, Q4	2018, Q1	2018, Q2	2018, Q3	2018, Q4
Admission	3.28%	3.14%	3.83%	3.01%	2.93%	2.63%	2.43%	1.89%	1.77%	1.56%
ED use	11.78%	11.72%	10.37%	9.08%	7.00%	6.02%	5.29%	2.96%	2.32%	1.77%

Figure 2. The Quarterly Growth Rates of the Beneficiaries with hospital admissions and ED use among Medicaid Expansion Population (N=496,382)



Implications

The analysis suggested that there was an improvement in access to health care among patients who were newly eligible for Medicaid in Louisiana under expansion as indicated by the increasing numbers of inpatient admissions and emergency department visits. However, the substantial drop in the growth rate of inpatient admissions and ED visits strongly suggests that expansion beneficiaries are receiving care in more appropriate and less expensive settings than the hospital and ED. Further analysis evaluating the types of admissions and visits will shed additional light on this.

Appendix 3: Final Certified Report – Preventive Care Use and Medication Use

Aim I.B.3 & I.B.4 Final Certified Report - Report on preventive care use and prescription medication use (July 2016 – December 2018)

Prepared by: Lizheng Shi and Mark L. Diana

Overview:

This final report is a part of the overall evaluation of Medicaid Expansion in Louisiana. The evaluation is designed to provide insight into the impact of Medicaid Expansion in four broad domains:

1. Access
2. Cost
3. Quality
4. Beneficiary & Provider Perspectives

This report falls under the Access domain, which has three broad areas of evaluation: access to care, provider participation, and health care utilization. This report falls under the specific area of health care utilization and examines the highlighted questions below:

1. Access
 - a. What is the impact of Expansion on access to care?
 - b. What is the impact of Expansion on provider participation?
 - c. What is the impact of Expansion on the health care utilization?
 - i. Analyze the impact of Medicaid expansion on adjusted hospital admission rates for the Medicaid population.
 - ii. Analyze the impact of Medicaid expansion on emergency department utilization for the Medicaid population.
 - iii. Analyze the impact of Medicaid expansion on preventive care utilization for the Medicaid population.**
 - iv. Analyze the impact of Medicaid expansion on the use of prescription medication.**

Executive Summary

We analyzed the trend in utilization of preventive care services and preventive prescription medications in the newly eligible beneficiaries after Medicaid expansion in Louisiana. We focused on descriptive short-term post-expansion rates for preventive care services and medication use, including outpatient evaluation and management (E&M) visits, consultations, assisted living/home care oversight, preventive medicine, and counseling, as well as the use of statins. We found increases in both the number and healthcare encounter rate of the newly eligible beneficiaries with preventive care services and medication use by quarter. Results show that roughly 17% of the overall expansion population used preventive care services, and 8% used statins. The rates of new preventive care services and medication use suggests that Louisiana is providing needed access to preventive care, including preventive prescription medications, for the expansion population. Further analysis is planned to review the use of preventive care and statins by subgroup (e.g., chronically ill).

Key Findings:

1. The analysis suggested that there was an improvement in access to preventive care and preventive prescription medications among patients who were newly eligible for Medicaid program in Louisiana.

2. The drop in growth rates for preventive care and preventive prescription medications suggests that the provision of these services has improved since inception of expansion and that these beneficiaries are receiving improved preventive care overall.

Background

The ACA requires non-grandfathered health plans to provide coverage for certain clinical preventive services without charging copays or deductible payments (Fox & Shaw, 2015). With improved access to health care services under the ACA, it is important to evaluate whether the utilization of preventive care services and medications improve among Medicaid expansion populations. Effective clinical preventive services can reduce premature disease and deaths, yet millions of people in the USA are not using these services. Medicaid expansion could reduce barriers to preventive services and provide a set of clinical preventive services without cost-sharing (Shaw, Asomugha, Conway, & Rein, 2014).

Several studies have examined the impact of Medicaid expansion on utilization of preventive care services and prescription medications (Baicker et al., 2013; B. D. Sommers et al., 2016). A study by B. D. Sommers et al. (2016), found major improvements in access to preventive care and reductions in skipping prescription medications in two expansion states, Kentucky and Arkansas, compared with a non-expansion state, Texas. In addition, the Oregon Medicaid expansion experiment indicated that Medicaid coverage increased the use of many preventive services (Baicker et al., 2013).

Our research provided an in-depth evaluation into the utilization trend of preventive care services and prescription medications among newly eligible beneficiaries after Medicaid expansion. In this report, we examined the rates of preventive care services and medication use in the expansion population longitudinally.

Data

We used Medicaid claims data between July of 2016 to December of 2018.

Methods

Louisiana expanded Medicaid in June of 2016, thus the expansion population is identified as those newly eligible Medicaid beneficiaries aged 18 to 64 years old on or after the third quarter of 2016 that meet the specific income threshold. CPT codes, ICD-10 codes, and HCPCS codes were used to identify those who had at least one ambulatory or preventive care visit per year according to the Healthcare Effectiveness Data and Information Set (HEDIS) Quick Reference Guide provided by the Louisiana Healthcare Connections. The HEDIS Quick Reference Guide was updated to reflect NCQA HEDIS 2017 Technical Specifications (Louisiana Healthcare Connections, 2017). The measure of ambulatory/preventive services evaluates the percentage of members age 20 years and older who had at least one ambulatory or preventive care visit per year. These services include if the beneficiaries had at least one CPT code, ICD-10 code, or HCPCS code that met the ambulatory/preventive services use. Patients with these services were then flagged as “preventive care service users.”

The U.S. Preventive Services Task Force (USPSTF) recommends that statins be provided in-network and without charge for adults aged 40 to 75 years with either no history of cardiovascular disease (CVD) or one or more CVD risk factors, and a calculated 10-year CVD event risk of 10% or greater (U.S.

Preventive Services Task Force, 2016). Thus, statins were identified as the preventive prescription medication in our study. The National Drug Codes (NDC) were used to identify those who had statin therapy for CVD or diabetes according to The HEDIS 2017 NDC Lists. If the beneficiaries had at least one NDC that met the statins use, we flagged them as “preventive medication users.”

Statistical Analysis

Below is a descriptive report of the trend and growth rate of new preventive care services and statins use in the expansion population (N=496,382).

Results

Table 1.1 and Table 1.2 present the cumulative number and cumulative rate of preventive services and statins by quarter for the Medicaid expansion population. Figure 1 presents the cumulative growth trend of preventive services and statins use by quarter. Results show that the expansion population improved preventive care and preventive prescription statins over the study period. By the end of the ten study quarters, the cumulative number of patients receiving preventive services suggested 174,683 patients (approximately 35% of the Medicaid expansion population received preventive services) and 48,951 patients (approximately 10% of the Medicaid expansion population) filled statin prescriptions.

Table 1.1 The Cumulative Information on the Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preventive Services	18,054	40,237	59,628	81,872	102,249	120,871	137,464	152,269	164,247	174,683
Preventive Medication	9,974	16,155	22,068	27,414	31,725	35,705	39,446	42,772	46,232	48,951

Table 1.2 The Cumulative Percentage of Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preventive Services	3.6%	8.1%	12.0%	16.5%	20.6%	24.4%	27.7%	30.7%	33.1%	35.2%
Preventive Medication	2.0%	3.3%	4.5%	5.5%	6.4%	7.2%	8.0%	8.6%	9.3%	9.9%

Figure 1. The Cumulative Percentage of Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)

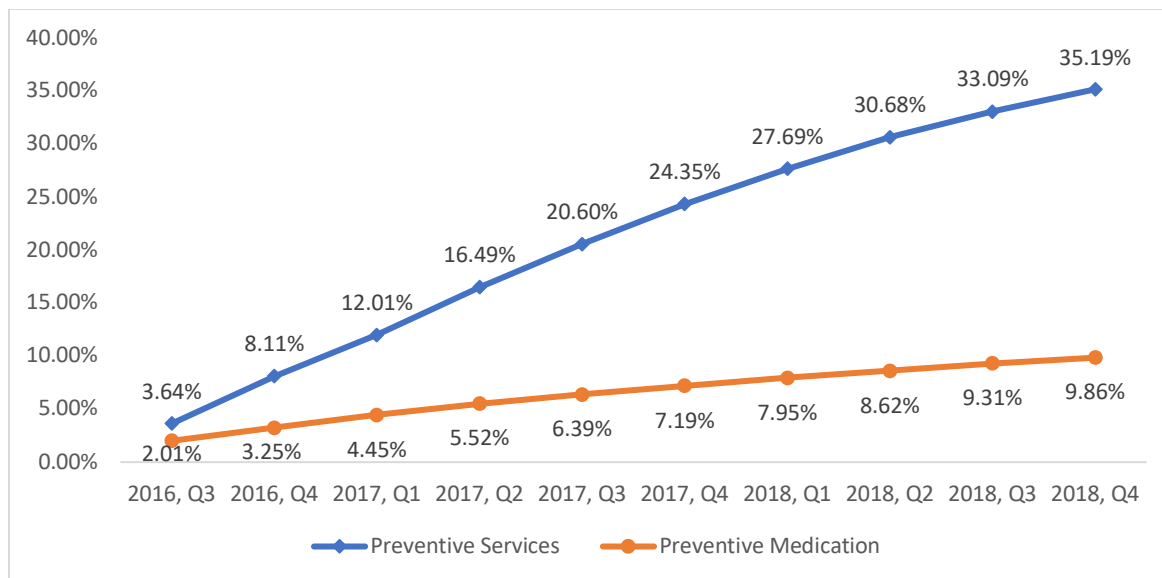


Table 2.1 and Table 2.2 present the growth (count and rate) in receiving preventive care services and statins by quarter among the Medicaid expansion population. Figure 2 presents the growth trend of preventive care services and statins use by quarter. All results showed a positive quarterly growth rate for the expansion population receiving statins over the study period. However, from the first quarter (Q3 of 2016), the growth rate decreased gradually until Q4 of 2018. There is a similar pattern in the quarterly growth rate for the expansion population using preventive services.

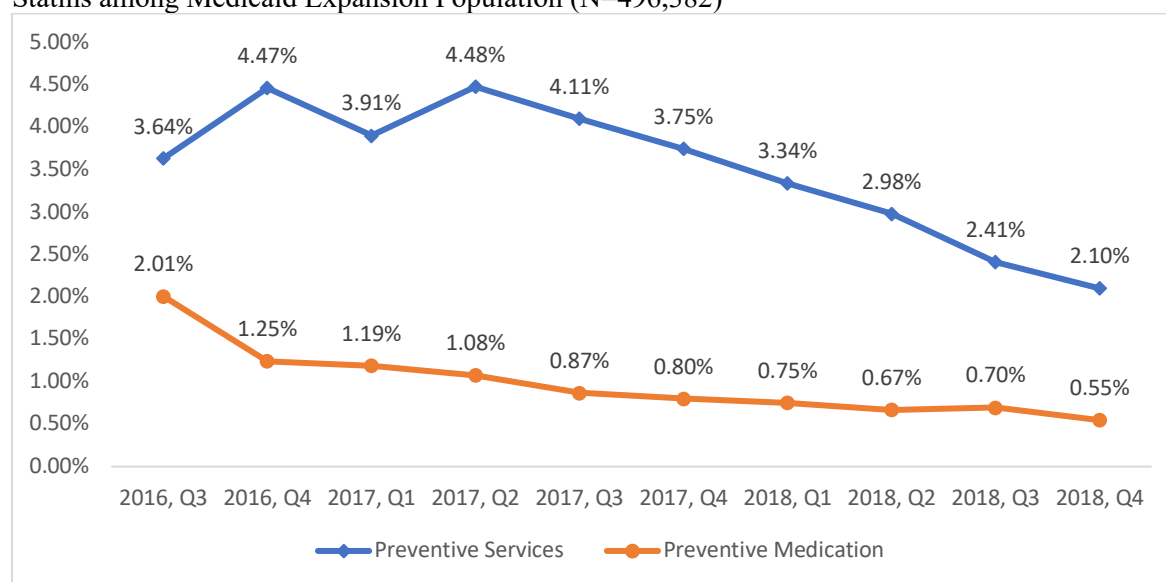
Table 2.1 The Quarterly Growth on the Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preventive Services	18,054	22,183	19,391	22,244	20,377	18,622	16,593	14,805	11,978	10,436
Preventive Medication	9,974	6,181	5,913	5,346	4,311	3,980	3,741	3,326	3,460	2,719

Table 2.2 The Quarterly Growth Rates of Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)

	2016		2017				2018			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preventive Services	18,054	40,237	59,628	81,872	102,249	120,871	137,464	152,269	164,247	174,683
Preventive Medication	9,974	16,155	22,068	27,414	31,725	35,705	39,446	42,772	46,232	48,951

Figure 2. The Quarterly Growth Percentage of Beneficiaries Receiving Preventive Care Services and Statins among Medicaid Expansion Population (N=496,382)



Implications

The analysis suggested that there was an improvement in access to preventive care and preventive prescription medications among patients who were newly eligible for Medicaid program in Louisiana. The drop in growth rates for preventive care and preventive prescription medications suggests that the provision of these services has improved since inception of expansion and that these beneficiaries are receiving improved preventive care overall.

Appendix 4: Final Certified Report – Changes in Provider Medicaid Participation

Aim I.C.1, I.C.2, & I.C.3 Final Certified Report - Changes in provider participation, primary care and specialty providers, no subgroup analysis (2013 – 2018)

June 2019

Prepared by: Kevin Callison, Rui Wang, and Mark L. Diana

Overview:

This final report is a part of the overall evaluation of Medicaid Expansion in Louisiana. The evaluation is designed to provide insight into the impact of Medicaid Expansion in four broad domains:

1. Access
2. Cost
3. Quality
4. Beneficiary & Provider Perspectives

This report falls under the Access domain, which has three broad areas of evaluation: access to care, provider participation, and health care utilization. This report falls under the specific area of provider participation and examines questions highlighted below:

1. Access
 - a. What is the impact of Expansion on access to care?
 - b. What is the impact of Expansion on provider participation?
 - i. ***Aim I.C.1: Analyze the impact of Medicaid expansion on primary care provider participation.***
 - ii. ***Aim I.C.2: Analyze the impact of Medicaid expansion on specialty provider participation.***
 - c. What is the impact of Expansion on the health care utilization?

Executive Summary

This report uses Medicaid claims data from 2013 through 2017 to examine recent changes in provider participation in the Medicaid program for MDs/DOs, nurse practitioners, and physician assistants in Louisiana. We used pre/post comparisons and an interrupted time-series methodology (ITS) to quantify changes in provider participation, intra-provider volume (i.e., the number of Medicaid claims per provider), and provider load (i.e., the number of unique Medicaid beneficiaries per provider) associated with Louisiana's Medicaid expansion in July 2016.

Key Findings:

Overall provider participation in the Medicaid program increased from January 2013 through early 2016.

- On average, 13,512 providers per month filed at least one Medicaid claim in the study period prior to Medicaid expansion (January 2013 through June 2016) and this number increased to 16,065 in the post-expansion study period (July 2016 to October 2018).
- We observed growth in participation rates for all provider types included in our report: MDs/DOs, nurse practitioners, and physician assistants.
- We observed a discontinuous jump in the trend of participation growth rates coinciding with Medicaid expansion for all provider types. The participation growth rate for MDs/DOs has leveled off since expansion, but growth rates for nurse practitioners and physician assistants remain positive.

The average number of monthly Medicaid claims per provider has increased since Medicaid expansion. The largest increases were observed for nurse practitioners, while MDs/DOs and physician assistants saw smaller, but still positive, changes in claim volume.

- Conditional on filing at least 10 Medicaid claims in a given month/year, the average Medicaid provider generated 147 Medicaid claims per month prior to expansion and 170 Medicaid claims per month after expansion.
- Average monthly Medicaid claims increased for all provider types examined (i.e., MDs/DOs, NPs, and PAs) from the pre-expansion to the post-expansion period.

The average number of unique monthly Medicaid beneficiaries per provider has increased since Medicaid expansion.

- Conditional on filing at least 10 Medicaid claims in a given month/year, the average Medicaid provider saw 72 unique Medicaid beneficiaries in an average month prior to expansion and 86 unique Medicaid beneficiaries in an average month after expansion.
- Physician assistants experienced the largest increase in provider load. The average number of unique Medicaid beneficiaries increased by 26% for PAs from the pre-expansion to the post-expansion period.

Background

Currently 37 states have expanded Medicaid coverage under the Affordable Care Act, including Louisiana which extended coverage for all adults earning up to 138% of the federal poverty level on July 1, 2016. As of December 2018, more than 475,000 individuals have enrolled in Medicaid expansion in Louisiana and, as a result, the number of uninsured in the state has fallen by more than 50% (Barnes et al., 2018). Of particular concern to policymakers prior to expansion was the ability of providers to accommodate increased demand for physician services from the newly insured (Ku, Jones, Shin, Bruen, & Hayes, 2011). Previous studies on changes in provider participation have generally concluded that capacity for Medicaid beneficiaries has improved as a result of eligibility expansions. However, much of this work has relied on small-scale surveys and has been limited in scope (Polsky et al., 2017; Tipirneni et al., 2016; Tipirneni et al., 2015). More recently, Neprash et al. (2018) used claims data from 3,820 primary care providers in expansion and non-expansion states to quantify changes in provider participation associated with Medicaid expansion. The authors reported a 3.4 percentage point increase in the Medicaid share for the average physician in an expansion state relative to a non-expansion state. While changes in patient share is suggestive of improved capacity, the study was unable to analyze any related changes in the extensive margin of provider participation (i.e., the total number of providers caring for Medicaid beneficiaries). In this report, we provide the first evidence on changes in Medicaid provider participation in Louisiana since the implementation of the Medicaid eligibility expansion in July 2016. Specifically, we examine overall Medicaid provider volume, the number of Medicaid claims generated per provider (intra-provider volume), and the number of unique Medicaid patients per provider (provider load).

Data

Information on provider Medicaid participation was obtained from the Louisiana Medicaid Claims Data Warehouse. Our analysis focused on providers grouped into four categories based on Medicaid provider type codes: 1. MDs and DOs, 2. nurse practitioners, 3. physician assistants, 4. and the combination of all three provider groups (MDs/DOs, NPs, and PAs). We included all final adjudicated paid claims and

denied claims that were not eventually paid⁸ for any service performed between January 2013 and October 2018.⁹ We describe the claims selection methodology in detail in Appendix A. Claims were aggregated to the month/year level and are plotted separately by payment status in Appendix Figure 1. Finally, we dropped a total of 22,771 claims (0.03%) from our analytic sample due to a missing provider identification number.¹⁰

Methods

We conducted several pre/post comparisons of provider participation, intra-provider volume, and provider load for each category of provider listed above. In addition, we supplemented our basic pre/post comparisons with interrupted time-series (ITS) analyses. ITS models estimate separate linear trends for each outcome in the pre-expansion period (January 2013 through June 2016) and the post-expansion period (August 2016 through October 2018), while allowing for a discontinuous level change during the month of expansion (July 2016).¹¹ Results from our ITS models quantify the average monthly growth (either positive or negative) in provider participation, intra-provider volume, and provider load and allow us to compare changes in these averages before and after Medicaid expansion.

Trends in Provider Participation

Figure 1 displays trends in the number of unique providers (MDs, DOs, NPs, and PAs) at the month/year level for four separate cases. Case 1 in the top left panel includes all providers filing at least one Medicaid claim for a service performed between January 2013 and October 2018; Case 2 in the top right panel excludes out-of-state (OOS) providers except those that are located in counties bordering Louisiana; Case 3 in the bottom left panel excludes all OOS providers; and Case 4 in the bottom right panel excludes providers with fewer than 10 final adjudicated Medicaid claims in a given month/year. The dashed vertical lines in Figure 1 and all subsequent figures indicate July 2016, the month during which Medicaid expansion occurred.

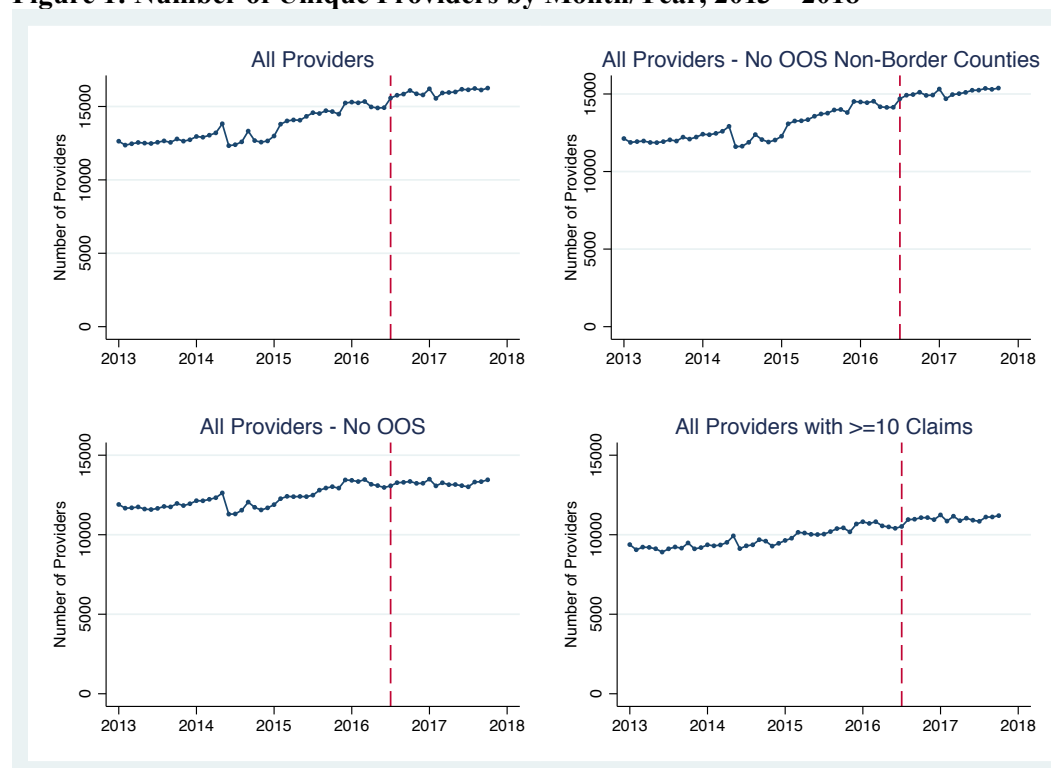
⁸ We chose to include denied claims in our analysis because, despite the denied payment, these claims likely represent services received by Medicaid beneficiaries.

⁹ At the time of the analysis, claim volume for November and December 2017 indicated a significant portion of claims had yet to be filed. For that reason, we excluded November and December 2017 from this report, but will update findings through 2018 in a future report.

¹⁰ We use the attending provider's NPI to identify unique providers in the claims sample.

¹¹ Appendix B provides technical details of our ITS models.

Figure 1: Number of Unique Providers by Month/Year, 2013 – 2018



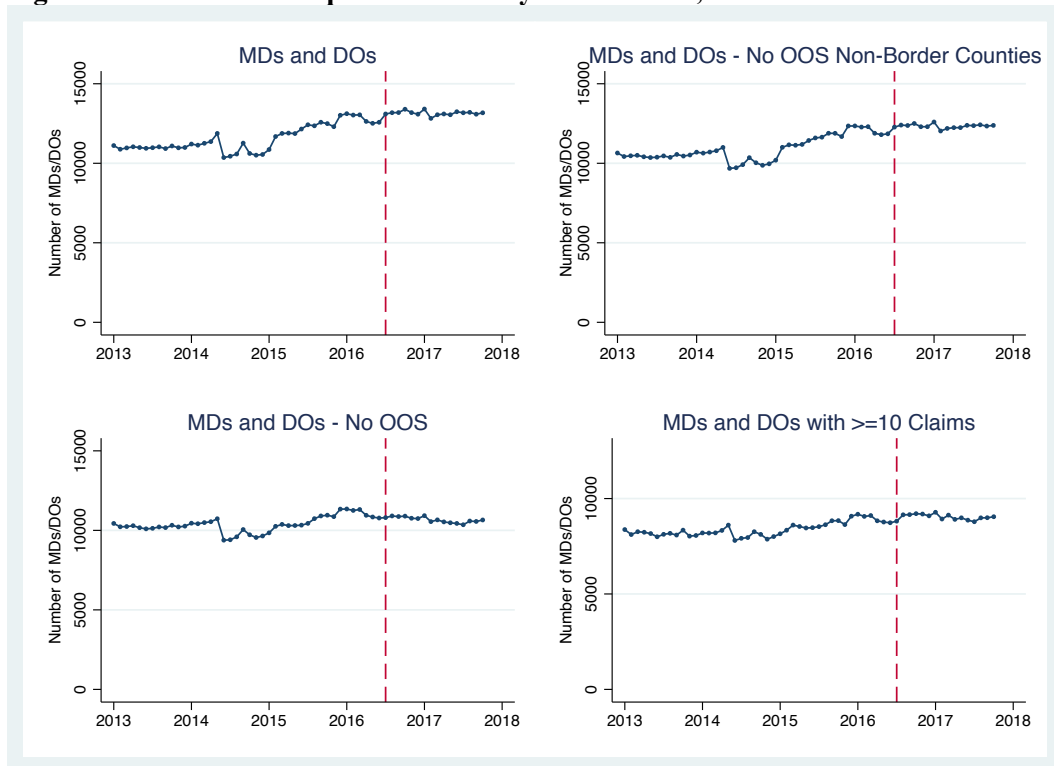
From 2013 through early 2016, provider participation in the Medicaid program grew from an average of 12,576 providers per month in 2013 to an average of 15,112 providers per month in the first 6 months of 2016. In the pre-expansion period, participation peaked in March 2016 at 15,336 before experiencing a slight dip that occurred just before Medicaid expansion in July. However, by July 2016, provider participation had increased to 15,573 per month and continued to trend upwards through October 2018. Removing OOS providers had relatively little impact on overall provider participation as the vast majority of physicians treating Louisiana Medicaid beneficiaries were located within the state. Finally, limiting the sample to providers with at least 10 Medicaid claims in a given month/year results in the same general pattern of increasing provider Medicaid participation since 2013.

In addition to a simple pre/post comparison of provider participation, we performed an interrupted time series (ITS) analysis to more formally address changes in provider trends associated with Medicaid expansion. We provide specific details on the construction of the ITS models in Appendix B, but note here that this model is intended to quantify average changes in monthly provider participation in the pre-expansion and post-expansion periods and allow for a comparison of changes in these trends. Focusing on providers with at least 10 monthly Medicaid claims, participation grew by an average of 42 providers per month from January 2013 to June 2016 before leveling off in the post-expansion period. On average, 9,730 providers per month met the 10 Medicaid claim threshold prior to July 2016 compared to 11,035 after expansion.

Figure 2 is similar to Figure 1 but restricts the analysis to MDs and DOs and omits NPs and PAs. Once again, we present trends for all MDs/DOs, MDs/DOs excluding OOS non-border county providers,

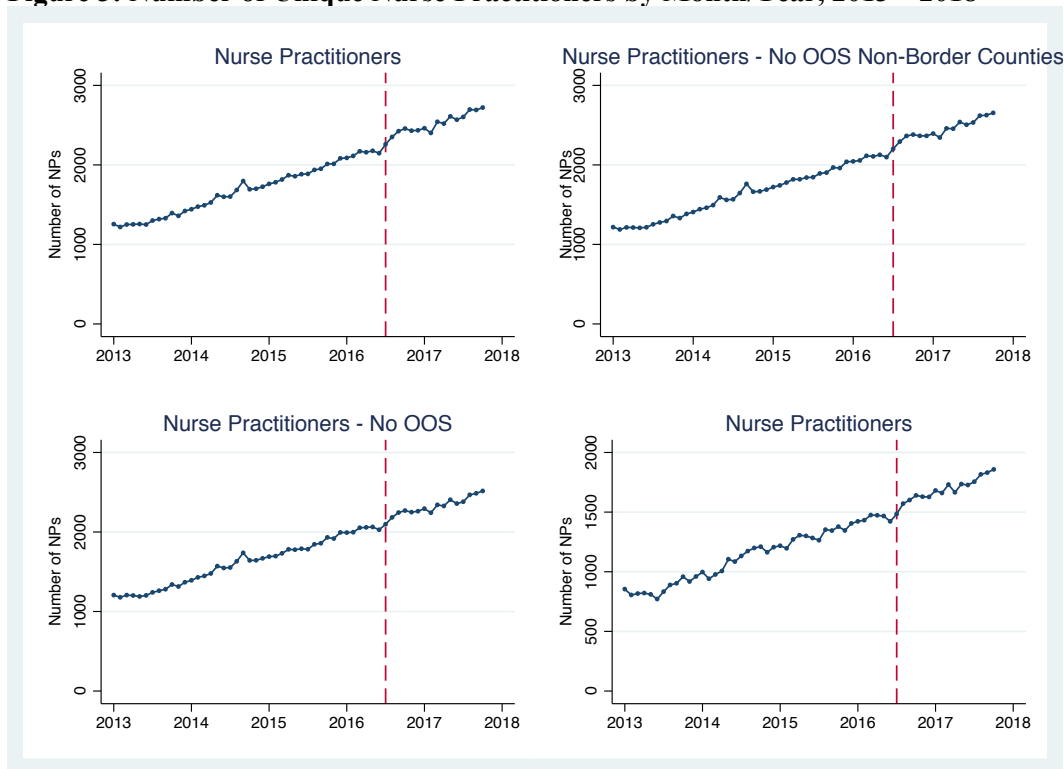
MDs/DOs excluding all OOS providers, and MDs/DOs excluding those with fewer than 10 claims in a given month/year.

Figure 2: Number of Unique MDs/DOs by Month/Year, 2013 – 2018



The same patterns observed in Figure 1 for the entire provider population are exhibited in Figure 2 when the sample is restricted to MDs/DOs. Overall MD/DO Medicaid participation increased from 2013 through early 2016, declined slightly in the three months preceding expansion, and then increased again concurrent with expansion in July 2016. ITS estimates of MD/DO participation conditional on filing at least 10 claims in a month/year indicate that, on average, provider participation was growing by 22 MDs/DOs per month through June 2016 before experiencing a jump of more than 250 MDs/DOs with at least 10 Medicaid claims filed in July 2016. MD/DO participation declined slightly since peaking at 9,264 MDs/DOs with at least 10 Medicaid claims in January 2017. As of October 2018, 8,830 MDs/DOs filed at least 10 Medicaid claims.

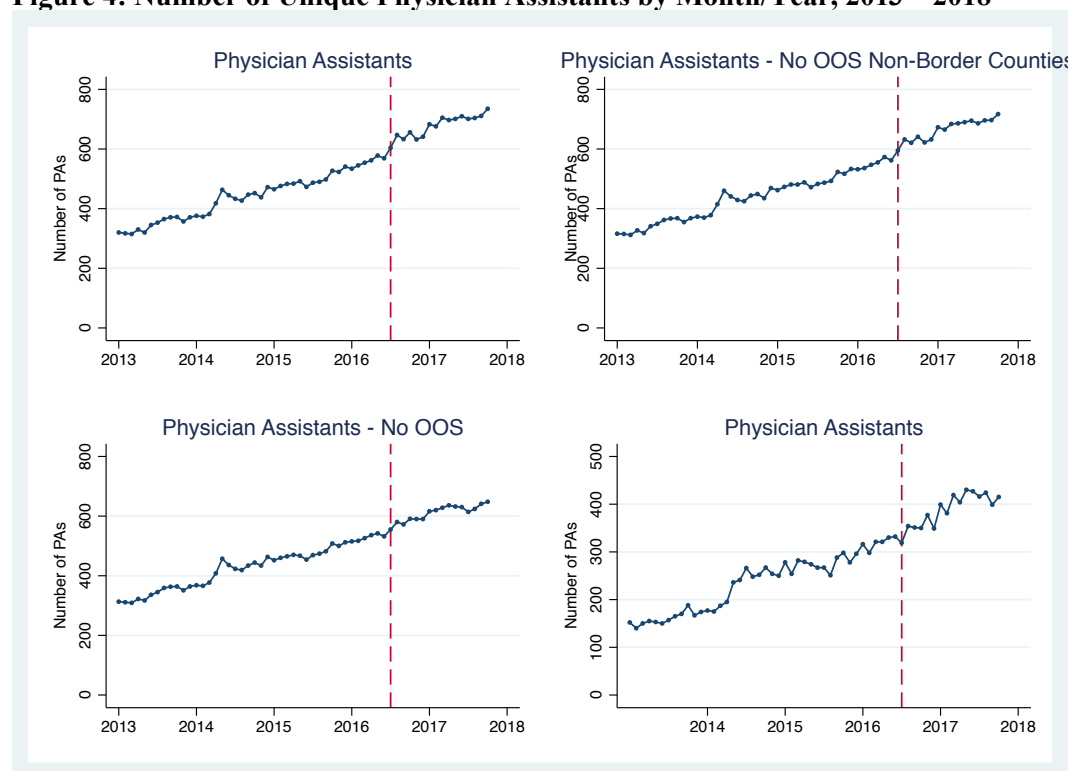
Figure 3: Number of Unique Nurse Practitioners by Month/Year, 2013 – 2018



Similar to MD/DO Medicaid participation, nurse practitioner (NP) participation was increasing leading up to Medicaid expansion. From 2013 to mid-2016, average monthly NP participation increased from 1,682 NPs filing at least one Medicaid claim to more than 2,600. Additionally, NP participation has continued to increase at a steep pace in the post-expansion period.

Limiting the sample to NPs with at least 10 Medicaid claims in a given month/year, ITS estimates indicate that participation increased by an average of 18 providers per month from January 2013 through June 2016 and then saw continued increases in the post-expansion period.

Figure 4: Number of Unique Physician Assistants by Month/Year, 2013 – 2018



Trends in PA participation mirrored those observed for NPs. From 2013 to mid-2016, average monthly PA participation increased from 442 NPs filing at least one Medicaid claim to more than 700. Restricting the sample to NPs with at least 10 Medicaid claims in a given month/year, ITS estimates indicate that participation increased by an average of 5 providers per month from January 2013 through June 2016 and then saw similar continued increases in the post-expansion period.

We next present a description of changes in the average number of Medicaid claims filed by providers over time (i.e., intra-provider volume) using the sample of providers with at least 10 Medicaid claims in a given month/year. In other words, we calculated the average number of claims generated in a month/year for each provider category and then plotted these monthly averages from January 2013 through October 2018. Examining the average number of claims filed by a participating provider can highlight changes in workload associated with Medicaid expansion. Results for all four provider classifications are presented in Figure 5.

Figure 5: Number of Final Adjudicated Claims per Provider by Month/Year, 2013 – 2017 (at least 10 claims)

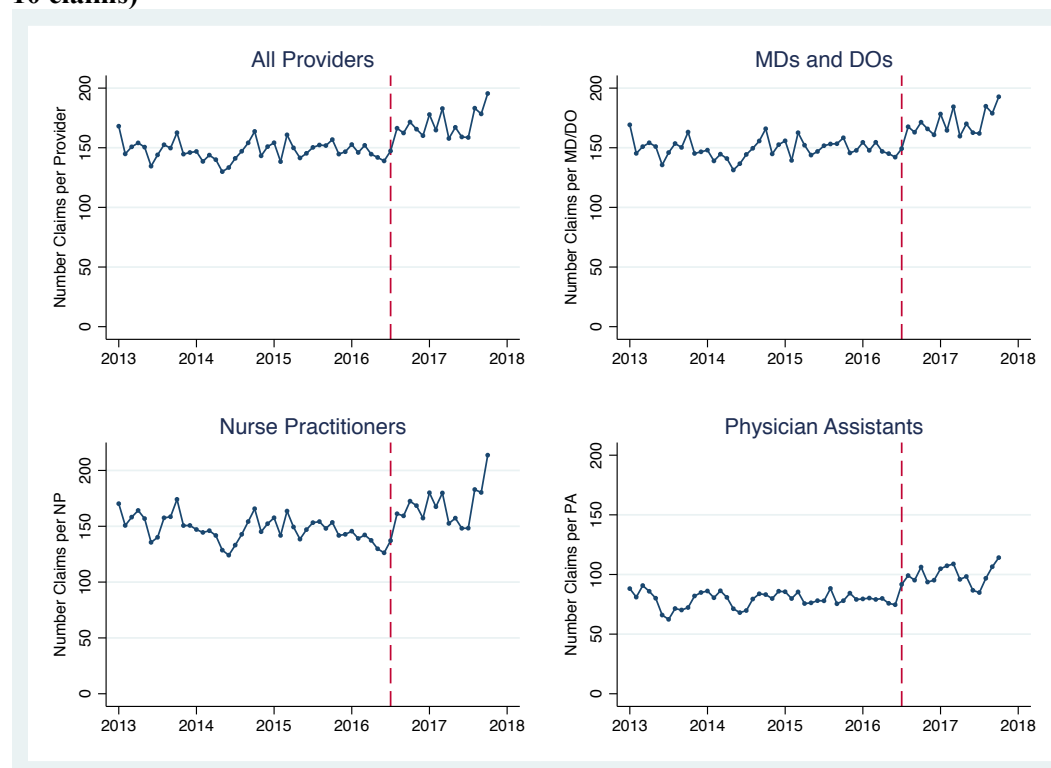
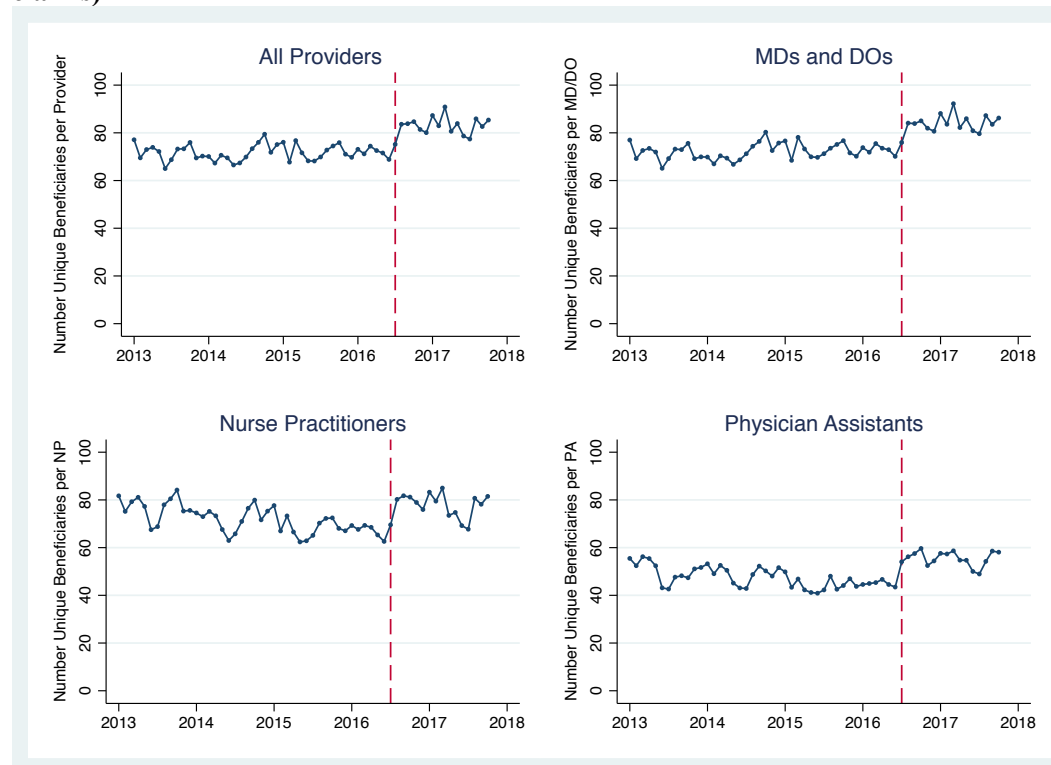


Figure 5 clearly indicates that intra-provider volume has increased for all provider classifications since 2013 and that the timing of this increase is concurrent with Medicaid expansion. On average, provider claim volume rose from 147 claims per month in the pre-expansion period to 170 in the post-expansion period. ITS estimates suggest that intra-provider volume fluctuated around 150 claims prior to Medicaid expansion, but the trend was essentially flat. Intra-provider volume experienced an immediate increase of 11 claims per provider in July 2016, and has grown by an average of 0.9 claims per provider per month in the post-expansion period. PAs saw the largest relative gains in intra-provider volume associated with Medicaid expansion; an increase of 29% per month, on average, compared to the pre-expansion period. The magnitude of the increase in monthly Medicaid claims was slightly smaller for MDs/DOs at 14.1% and NPs at 17.6%.

Lastly, we examined the number of unique Medicaid beneficiaries per provider (i.e., patient load) by month/year in Figure 6. Once again, we focused on providers who filed at least 10 claims in a given month/year and provided separate figures for all providers, MDs/DOs, NPs, and PAs.

Figure 6: Number of Unique Beneficiaries per Provider by Month/Year, 2013 – 2017 (at least 10 claims)



Similar to the patterns observed in Figure 5 for intra-provider volume, average provider load increased immediately following Medicaid expansion. Louisiana providers with at least 10 Medicaid claims treated an average of 72 unique Medicaid beneficiaries per month from 2013 to mid-2016 compared to an average of 86 Medicaid beneficiaries per month in the post-expansion period. ITS estimates indicate that patient load was stable in the pre-expansion period, increased by an average of 11 patients per provider in the month of expansion, and then continued to increase by approximately 0.1 patients per provider per month through 2018. The largest increase in provider load was observed for PAs who went from treating an average of 47 unique Medicaid beneficiaries per month before expansion to 59 unique beneficiaries per month after expansion, a 26% increase. Similar changes were observed for NPs and PAs, though the relative increases were smaller than the change for MDs and DOs.

Implications

Taken together, these findings indicate that Medicaid provider participation has increased since Louisiana's Medicaid expansion in mid-2016. Not only is the total number of Medicaid providers larger post-expansion, but on average, providers are seeing more Medicaid patients and generating more Medicaid claims. Combining the results from Figure 1 and Figure 6 can further illustrate the overall change in provider Medicaid participation associated with expansion for providers filing at least 10 Medicaid claims in a given month/year. In an average pre-expansion month, 9,730 providers had a patient load of 72 Medicaid beneficiaries, generating 700,560 unique monthly patient-provider encounters. After expansion, an average month saw 11,035 providers with a patient load of 86 Medicaid beneficiaries for a total of 949,010 unique patient-provider encounters, representing a 35% increase from the pre-expansion period.

Appendix A: Method for Calculating Final Adjudicated Paid and Denied Claims

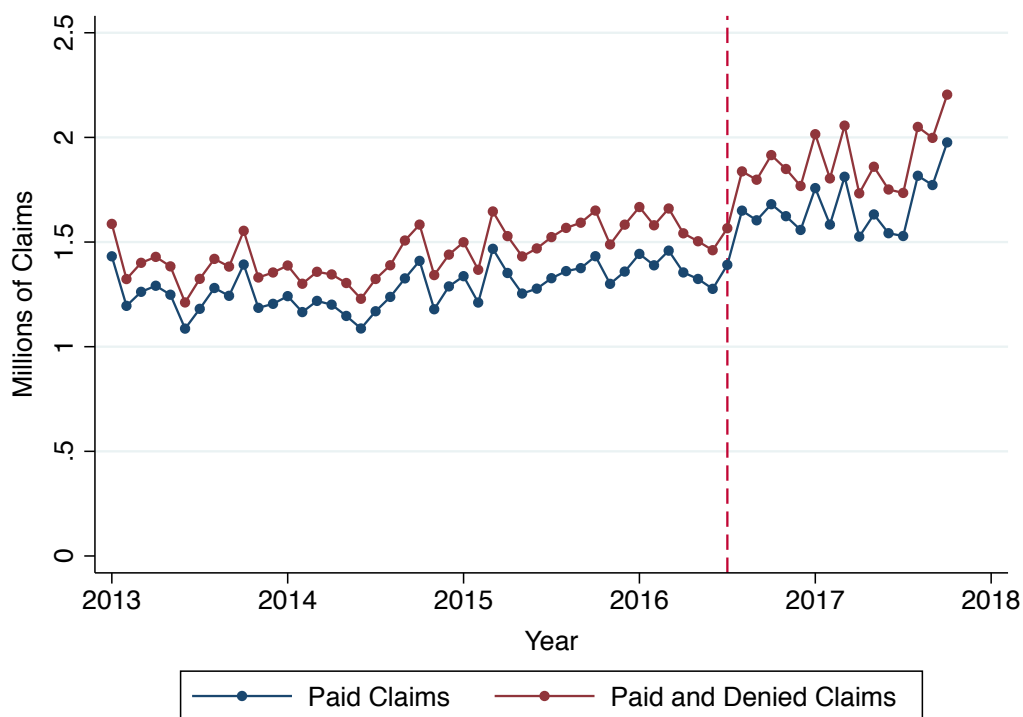
To calculate final adjudicated paid claims, we first combine two categories of claims:

1. Those that were paid and never adjusted
2. The last adjusted claim in cases where the original claim was adjusted

To these categories, we append denied claims with no corresponding paid claim for the same patient/provider/claim type/service date combination. In other words, we attempt to exclude any claims that were originally denied, but later paid. Failure to include denied claims risks underestimating the number of services provided to Medicaid beneficiaries, while including claims that were originally denied and later paid risks overestimating the service count.

Appendix Figure 1 plots counts of final adjudicated paid claims and the sum of paid and denied claims.

Appendix Figure 1: Final Adjudicated Claims by Month/Year, 2013 – 2018



Appendix B: Interrupted Time-Series Model Description

The methodology that we employ for determining the effect of Louisiana’s Medicaid expansion on provider participation is a research design known as an interrupted time-series (ITS). An ITS model fits a linear trend that is “interrupted” by an intervention that is thought to impact the slope or level of the existing trend in the outcome. The ITS model can be expressed formally as follows:

$$Y_t = \beta_0 + \beta_1 Time_t + \beta_2 PostExpand_t + \beta_3 Time_t \times PostExpand_t + \varepsilon_t$$

Where Y_t represents an outcome related to provider participation (e.g., number of providers, intra-provider volume, or provider load) in year/month t . $Time$ is a continuous measure of time in year/month

increments beginning with January 2013. The coefficient β_1 captures the pre-Medicaid Expansion trend in each outcome. *PostExpand* is an indicator for the year/month of Medicaid Expansion in Louisiana (July 2016) and accounts for any immediate level change in each outcome. The interaction between *Time* and *PostExpand* captures any change in the slope of the outcomes by year/month that occurs in the period after Medicaid Expansion. Finally, ε is an error term that captures unobserved factors associated with the outcome of interest. We estimate the ITS model using ordinary least squares estimation and employ Newey-West standard errors to account for serial correlation of the error terms.

Appendix 5: Final Certified Report – Changes in Provider Medicaid Participation – Subgroup Analyses

Aim I.C.4 Final Certified Report - Changes in provider participation, primary care and specialty providers, with subgroup analyses (2013 – 2018)

June 2019 Prepared by Kevin Callison, Rui Wang, and Mark L. Diana

Overview:

This final report is a part of the overall evaluation of Medicaid Expansion in Louisiana. The evaluation is designed to provide insight into the impact of Medicaid Expansion in four broad domains:

1. Access
2. Cost
3. Quality
4. Beneficiary & Provider Perspectives

This report falls under the Access domain, which has three broad areas of evaluation: access to care, provider participation, and health care utilization. This report falls under the specific area of provider participation and examines questions highlighted below:

1. Access
 - a. What is the impact of Expansion on access to care?
 - b. What is the impact of Expansion on provider participation?
 - i. ***Aim I.C.1: Analyze the impact of Medicaid expansion on primary care provider participation.***
 - ii. ***Aim I.C.2: Analyze the impact of Medicaid expansion on specialty provider participation.***
 - c. What is the impact of Expansion on the health care utilization?

Executive Summary

This report uses Medicaid claims data from 2013 through 2018 to examine recent changes in provider participation in the Medicaid program for MDs/DOs, nurse practitioners, and physician assistants in Louisiana. We used a pre/post methodology to compare changes in provider participation, intra-provider volume (i.e., the number of Medicaid claims per provider), and provider load (i.e., the number of unique Medicaid beneficiaries per provider) associated with Louisiana's Medicaid expansion in July 2016. We divided providers into two sub-categories, primary care providers (PCPs) and specialists, and examined changes in provider participation by parish. Results indicate that provider participation in Louisiana's Medicaid program has generally increased since Medicaid expansion though the number of specialists providing Medicaid care has declined slightly since early 2016.

Key Findings:

PCP participation in the Medicaid program increased leading up to the eligibility expansion in July 2016 and continued to increase through October 2018. Specialist participation rose from 2013 through early 2016 and has since declined.

- On average, 7,604 PCPs per month filed at least one Medicaid claim prior to expansion and this number increased to 9,589 in the post-expansion period.

- On average, 7,331 specialists per month filed at least one Medicaid claim prior to expansion and this number increase to 9,275 in the post-expansion period.
- Specialist participation fell from a high of 9,679 providers filing at least one Medicaid claim in March 2016 to 8,689 providers filing at least one Medicaid claim in October 2018.

The average number of monthly Medicaid claims per PCP fell from January 2013 through June 2016 before increasing in July 2016. The decline in average monthly PCP Medicaid claims can be explained by greater PCP participation in the Medicaid program over the same period of time. Medicaid claims per specialist had fallen leading up to expansion, but have increased since July 2016. A similar pattern was observed for the number of unique Medicaid beneficiaries treated by PCPs and specialists.

Most parishes saw increases in the average number of PCPs and specialists filing at least one monthly Medicaid claim in the post-Medicaid expansion period compared to the pre-Medicaid expansion period. However, substantial geographic variation in access to providers remains a concern.

- 37 parishes saw more PCPs filing at least one Medicaid claim in an average month in the post-expansion period, while 39 parishes saw more specialists filing at least one Medicaid claim on average in the post-expansion period compared to the pre-expansion period.
- In 2018, 7 parishes had fewer than 2 PCPs filing at least one Medicaid claim per 1,000 Medicaid enrollees in an average month and 10 had fewer than 2 PCPs filing at least 10 Medicaid claims per 1,000 Medicaid enrollees in an average month.
- In 2018, 16 parishes had fewer than 1 specialist filing at least one Medicaid claim in an average month per 1,000 Medicaid enrollees and 21 had fewer than 1 specialist filing at least 10 Medicaid claims per 1,000 Medicaid enrollees in an average month.

Background

Currently 37 states have expanded Medicaid coverage under the Affordable Care Act, including Louisiana which extended coverage for all adults earning up to 138% of the federal poverty level on July 1, 2016. As of December 2018, more than 475,000 individuals have enrolled in Medicaid expansion in Louisiana and, as a result, the number of uninsured in the state has fallen by more than 50% (Barnes et al., 2018). Of particular concern to policymakers prior to expansion was the ability of providers to accommodate increased demand for physician services from the newly insured (Ku et al., 2011). Previous studies on changes in provider participation have generally concluded that capacity for Medicaid beneficiaries has improved as a result of eligibility expansions. However, much of this work has relied on small-scale surveys and has been limited in scope (Polsky et al., 2017; Tipirneni et al., 2016; Tipirneni et al., 2015). More recently, Neprash et al. (2018) used claims data from 3,820 primary care providers in expansion and non-expansion states to quantify changes in provider participation associated with Medicaid expansion. The authors reported a 3.4 percentage point increase in the Medicaid share for the average physician in an expansion state relative to a non-expansion state. While changes in patient share is suggestive of improved capacity, the study was unable to analyze any related changes in the extensive margin of provider participation (i.e., the total number of providers caring for Medicaid beneficiaries). In this report, we provide evidence on changes in Medicaid provider participation in Louisiana since the implementation of the Medicaid eligibility expansion in July 2016. Specifically, we examined primary care provider (PCP) and specialty care provider participation, intra-provider volume (i.e., the number of Medicaid claims generated per PCP and specialist), and provider load (i.e., the number of unique

Medicaid patients per PCP and specialist). We also examined geographic variation in provider participation across Louisiana's parishes.

Data

Information on provider Medicaid participation was obtained from the Louisiana Medicaid Claims Data Warehouse. Our sample selection process began by limiting claims to those generated by one of four provider categories based on Medicaid provider type codes: 1. MDs, 2. DOs, 3. nurse practitioners, and 4. physician assistants. We then used Louisiana Medicaid provider specialty codes to further categorize providers into primary care or specialty care based on the definitions listed in Appendix Table 1. We included all final adjudicated paid claims and denied claims that were not eventually paid¹² for any service performed between January 2013 and October 2018.¹³ We describe the claims selection methodology in detail in Appendix A. Claims were aggregated to the month/year level and are plotted separately by payment status in Appendix Figure 1. Finally, we dropped a total of 22,771 claims (0.03%) from our analytic sample due to a missing provider identification number.¹⁴

Methods

We conducted several pre/post comparisons of provider participation, intra-provider volume, and provider load for PCPs and specialists. In addition, we supplemented our basic pre/post comparisons with interrupted time-series (ITS) analyses. ITS models estimate separate linear trends for each outcome in the pre-expansion period (January 2013 through June 2016) and the post-expansion period (August 2016 through October 2018), while allowing for a discontinuous level change during the month of expansion (July 2016).¹⁵ Results from our ITS models quantify the average monthly growth (either positive or negative) in provider participation, intra-provider volume, and provider load and allow us to compare changes in these averages before and after Medicaid expansion.

Trends in PCP and Specialist Participation

Figure 1 displays trends in the number of unique PCPs at the month/year level for four separate cases. Case 1 in the top left panel includes all PCPs with at least one final adjudicated Medicaid claim in a given month/year for a service performed between January 2013 and October 2018; Case 2 in the top right panel excludes out-of-state (OOS) PCPs except those that are located in counties bordering Louisiana; Case 3 in the bottom left panel excludes all OOS providers; and Case 4 in the bottom right panel excludes providers with fewer than 10 final adjudicated Medicaid claims in a given month/year. The dashed vertical lines in Figure 1 and all subsequent figures indicate July 2016, the month during which Medicaid expansion occurred.

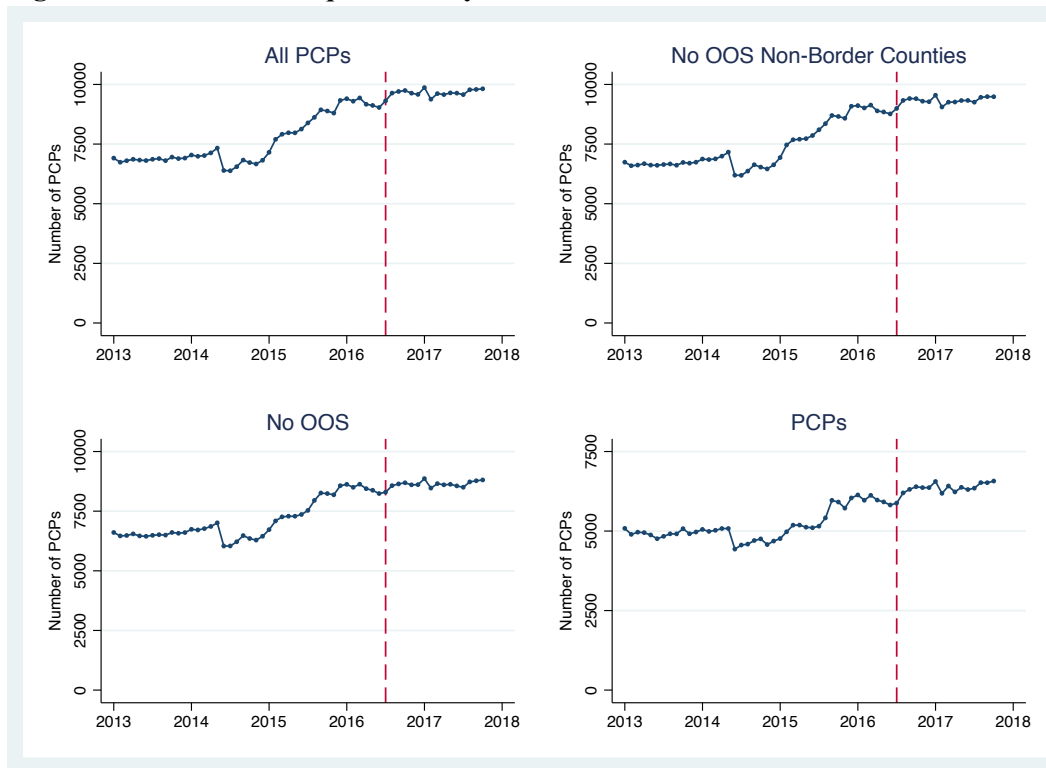
¹² We chose to include denied claims in our analysis because, despite the denied payment, these claims likely represent services received by Medicaid beneficiaries.

¹³ At the time of the analysis, claim volume for November and December 2018 indicated a significant portion of claims had yet to be filed. For that reason, we excluded November and December 2018 from this report, but will update findings through 2018 in a future report.

¹⁴ We use the attending provider's NPI to identify unique providers in the claims sample.

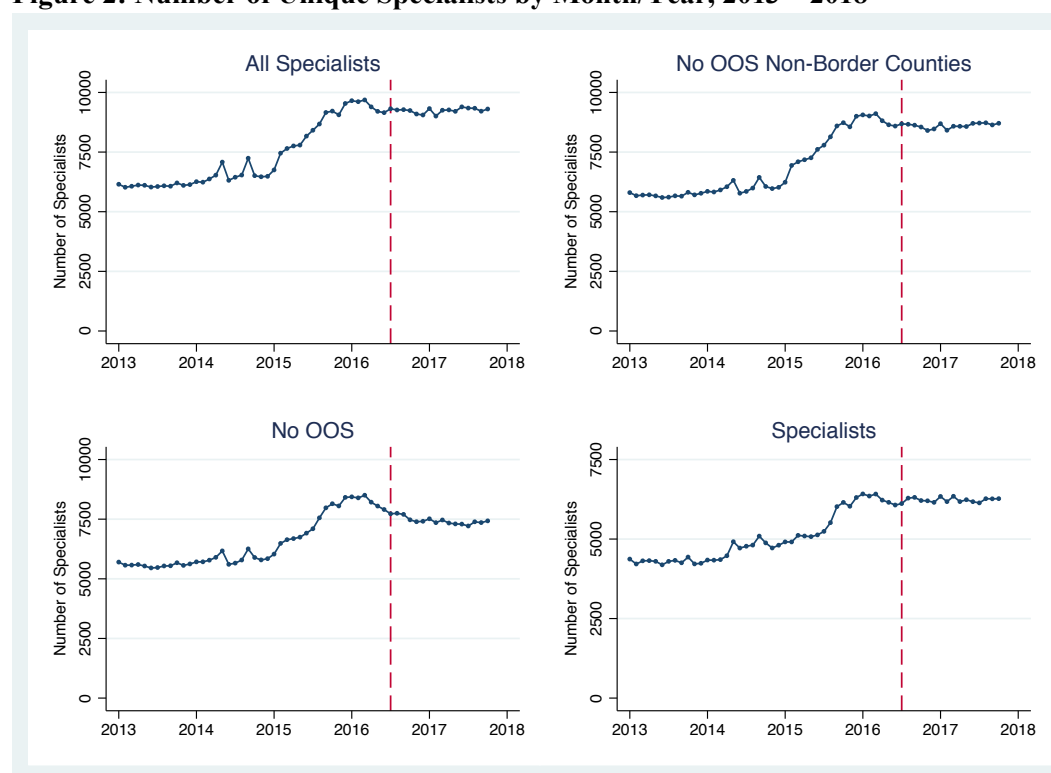
¹⁵ Appendix B provides technical details of our ITS models.

Figure 1: Number of Unique PCPs by Month/Year, 2013 – 2018



The number of PCPs filing a monthly Medicaid claim rose from approximately 6,855 in 2013 to more than 9,500 in 2018. ITS estimates indicate that, on average, PCP Medicaid participation grew by 71 PCPs per month from January 2013 through June 2016. Post-expansion PCP participation remained relatively stable through the end of 2018. Removing OOS providers had only a slight impact on overall PCP Medicaid participation as the vast majority of PCPs treating Louisiana Medicaid beneficiaries were located within the state. Restricting the sample to PCPs with at least 10 final adjudicated claims resulted in a similar overall pattern of participation, though the average number of PCPs in the sample was reduced by approximately one-third.

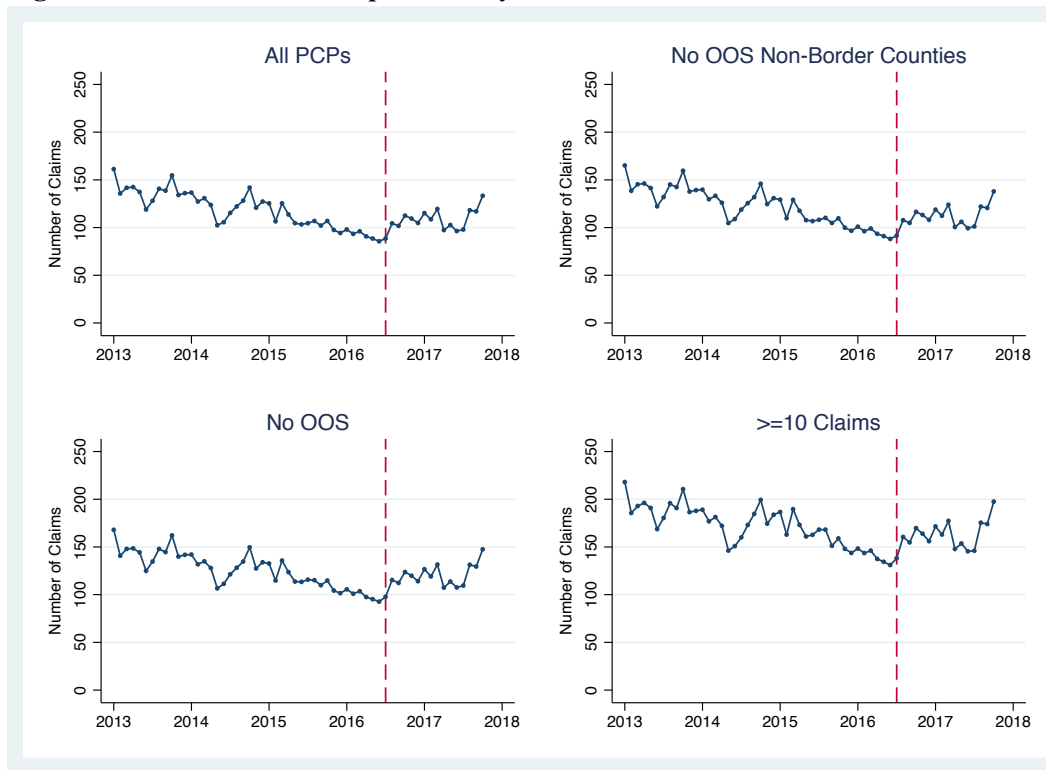
Figure 2: Number of Unique Specialists by Month/Year, 2013 – 2018



The number of specialists filing a monthly Medicaid claim grew from an average of 6,096 in 2013 to a high of 9,679 in March 2016, before dropping slightly from March 2016 through June 2016. Specialist participation in Medicaid remained relatively stable from July 2016 through October 2018. According to our ITS model, specialist participation grew at a rate of 101 providers per month in the pre-expansion period and has fallen by an average of 99 providers per month since Medicaid expansion occurred. However, the post-expansion decline in specialist participation is greatly reduced when we restrict the sample to specialists with at least 10 Medicaid claims in a given month/year. Using this provider sample, specialist participation has fallen by an average of 58 providers per month since expansion occurred.

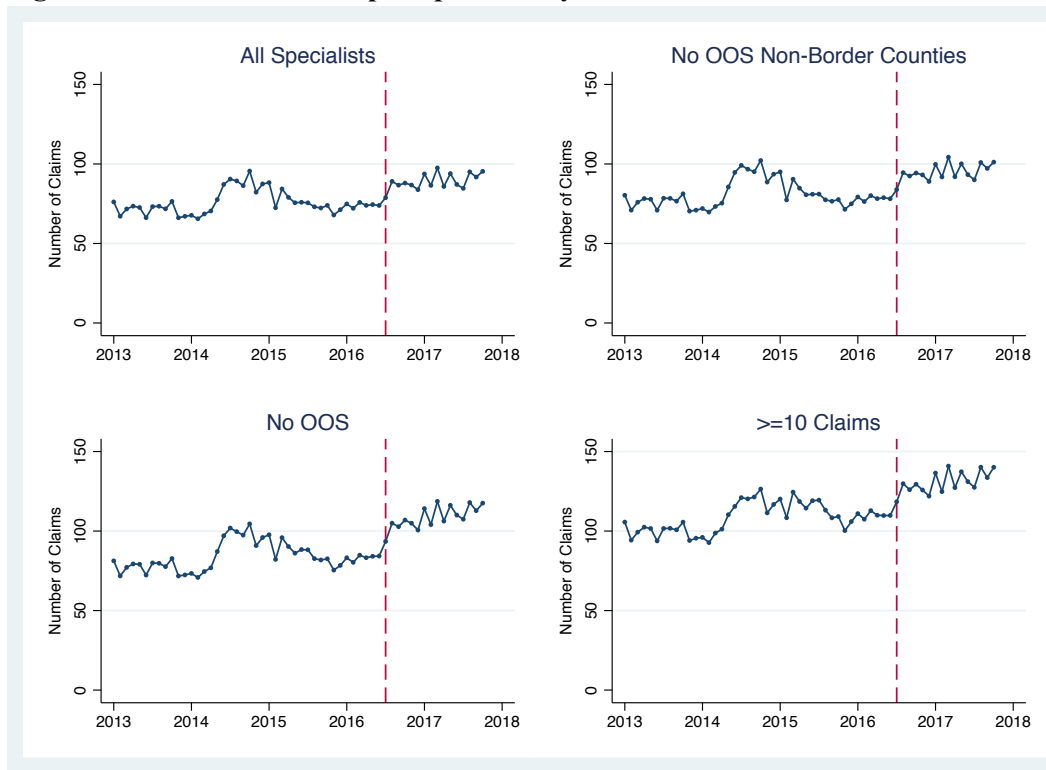
We next describe changes in the average number of Medicaid claims filed by PCPs and specialists over time (i.e., intra-provider volume). In other words, we calculated the average number of claims generated in a month/year for PCPs and specialists and then plotted these monthly averages from January 2013 through October 2018. Examining the average number of claims filed by a participating provider can highlight changes in workload associated with Medicaid expansion. Figure 3 includes results for PCPs, while Figure 4 focuses on specialists.

Figure 3: Number of Claims per PCP by Month/Year, 2013 – 2018



As the number of PCPs filing Medicaid claims increased (Figure 1), the average number of Medicaid claims per provider fell from January 2013 through June 2016 (Appendix Figure 2 separately plots intra-provider volume for each individual category of PCP). Between 2013 and 2014, PCPs who treated Medicaid beneficiaries were filing, on average, approximately 130 claims per month. However, by early 2016, that number had fallen to fewer than 95 before jumping discontinuously with expansion in July 2016. ITS estimates indicate that average monthly PCP claims increased by 8% in July 2016. Since expansion, intra-provider volume for PCPs has remained above immediate pre-expansion levels and shows signs of continued growth.

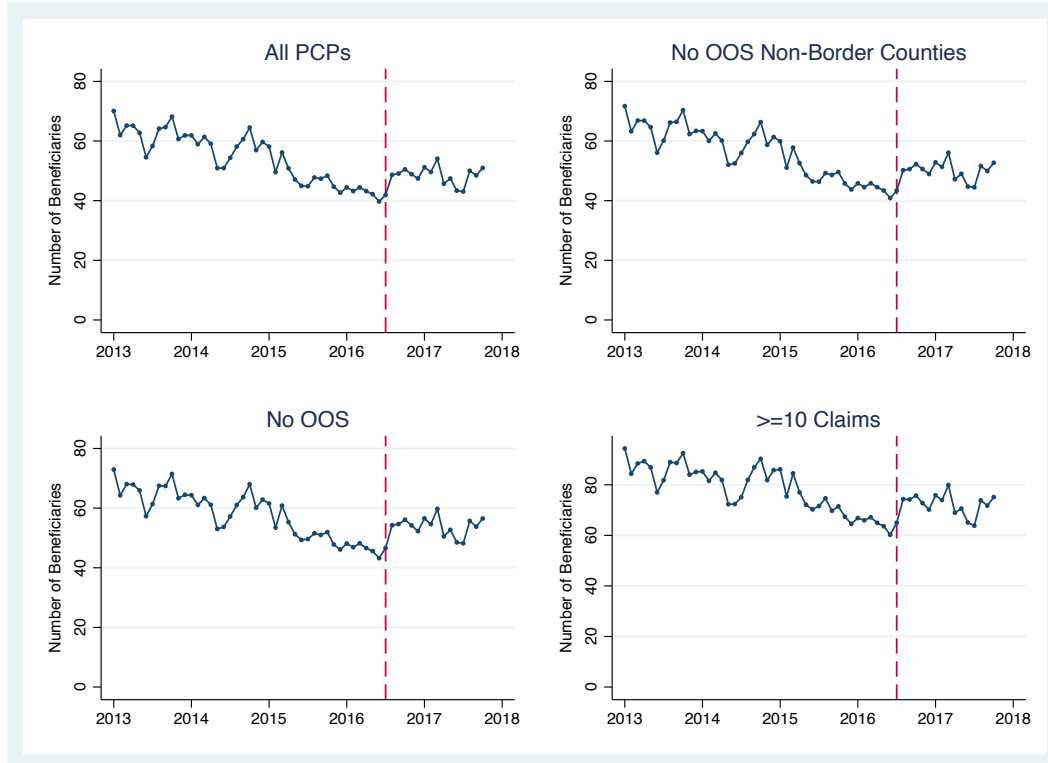
Figure 4: Number of Claims per Specialist by Month/Year, 2013 – 2018



Intra-provider volume for specialists increased rapidly in early 2014 before declining through early 2016. At its pre-expansion peak, the average specialist in our sample generated 90 claims per month, however by June 2016, that number had fallen to 74. As was the case for PCPs, intra-provider volume for specialists spiked with Medicaid expansion and, in a reversal of the pre-expansion trend, increased through October 2018. Since mid-2016, specialists who treat Medicaid patients have filed approximately 89 Medicaid claims per month. When we limit the sample to specialists with at least 10 Medicaid claims in a given month, that number increases to more than 130.

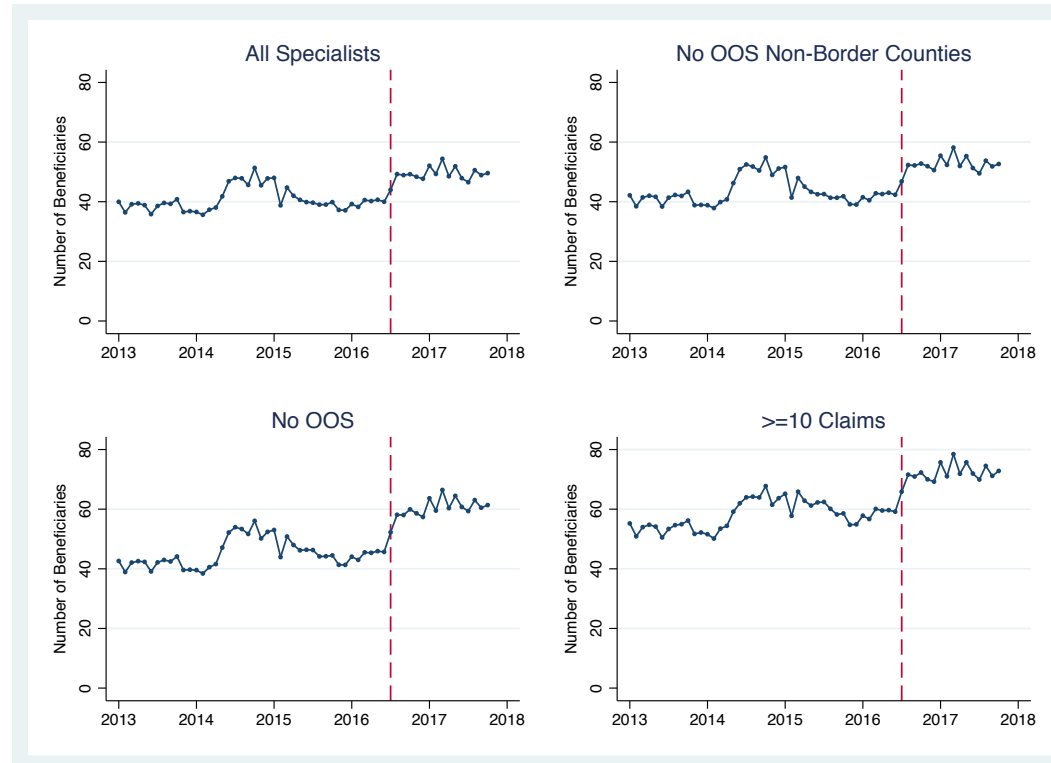
Figures 5 and 6 plot the number of unique Medicaid beneficiaries per PCP and specialist by month/year from 2013 through 2018. While Figures 1 and 2 provided data on the total number of PCPs and specialists treating Medicaid patients in Louisiana, Figures 5 and 6 focus on the number of patients treated by each provider (i.e., patient load).

Figure 5: Number of Unique Beneficiaries per PCP by Month/Year, 2013 – 2018



Prior to Medicaid expansion, the average number of beneficiaries treated by a PCP in a given month/year had fallen from 63 in 2013 to approximately 40 in June 2016. However, similar to the patterns observed for intra-provider volume, average provider load increased immediately following Medicaid expansion for PCPs. ITS estimates indicate that the average number of monthly PCP Medicaid beneficiaries increased by 5.8 in July 2016 and, despite some fluctuation, remained largely stable through October 2018.

Figure 6: Number of Unique Beneficiaries per Specialist by Month/Year, 2013 – 2018

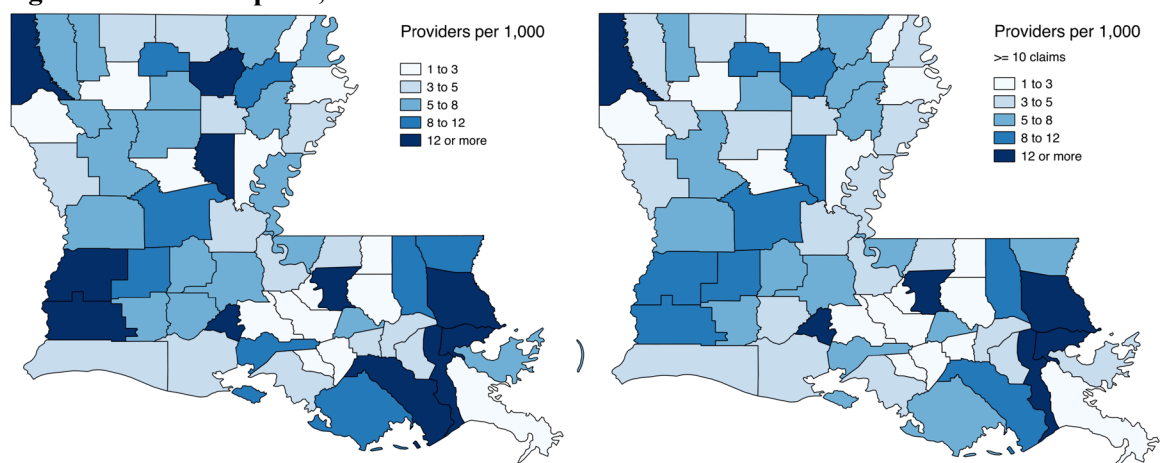


Specialists saw even greater growth in patient volume moving from approximately 40 unique Medicaid beneficiaries per month, on average, in the pre-expansion period to nearly 50 unique beneficiaries per month post-expansion. Focusing on the sub-sample of specialists with at least 10 Medicaid claims in a given month/year shows even greater growth in provider load. The average number of unique Medicaid beneficiaries per specialist increased by nearly 25% from pre- to post-expansion. So while specialist Medicaid participation has declined slightly since expansion (Figure 1), specialists who continue to treat Medicaid patients have increased their load of Medicaid beneficiaries.

Geographic Variation in Provider Participation

We now move to an examination of geographic variation in PCP/specialist Medicaid participation and highlight changes in participation across Louisiana parishes. Figures 7 through 9 depict provider Medicaid participation by parish in 2018. To calculate estimates of provider participation, we totaled the number of unique providers in each parish with at least one final adjudicated Medicaid claim or at least 10 final adjudicated Medicaid claims in 2018, divided these numbers by 2018 parish-level Medicaid enrollment figures from the Louisiana Department of Health, and then multiplied the quotients by 1,000. The resulting figures represent the number of providers per 1,000 Medicaid enrollees in each Louisiana parish in 2018 (see Appendix Tables 2 and 3 for the average number of monthly unique PCPs and specialists by parish in the pre-expansion and post-expansion periods).

Figure 7: Providers per 1,000 Louisiana Medicaid Beneficiaries in 2018



We begin by combining PCPs and specialists in Figure 1 to provide an overview of the degree of variation in access to a Medicaid provider by parish. The map on the left includes all providers with at least one final adjudicated paid or denied claim for a Medicaid service performed in 2018, while the map on the right restricts the sample to providers with at least 10 Medicaid claims in a given month/year. A total of 14 parishes had at least 10 providers per 1,000 Medicaid enrollees with one or more Medicaid claims for a service performed in 2018. These included Allen (10.3 providers per 1,000 enrollees), Beauregard (12.7 providers per 1,000 enrollees), Caddo (19.9 providers per 1,000 enrollees), Calcasieu (12.3 providers per 1,000 enrollees), East Baton Rouge (18.1 providers per 1,000 enrollees), Jefferson (14.3 providers per 1,000 enrollees), Lafayette (19.7 providers per 1,000 enrollees), Lafourche (12.1 providers per 1,000 enrollees), LaSalle (14.1 providers per 1,000 enrollees), Lincoln (11.4 providers per 1,000 enrollees), Orleans (17.6 provider per 1,000 enrollees), Ouachita (13.0 providers per 1,000 enrollees), Rapides (12.0 providers per 1,000 enrollees), and St. Tammany (18.1 providers per 1,000 enrollees).

Restricting the sample to providers with at least 10 claims in a given month/year leaves 10 parishes with at least 10 providers per 1,000 Medicaid enrollees: Caddo (15.3 providers per 1,000 enrollees), Calcasieu (10.4 providers per 1,000 enrollees), East Baton Rouge (15.3 providers per 1,000 enrollees), Jefferson (12.3 providers per 1,000 enrollees), Lafayette (15.9 providers per 1,000 enrollees), Lafourche (10.2 providers per 1,000 enrollees), LaSalle (10.2 providers per 1,000 enrollees), Orleans (14.5 providers per 1,000 enrollees), Ouachita (10.9 providers per 1,000 enrollees), and St. Tammany (15.3 providers per 1,000 enrollees).

Alternatively, 13 parishes had fewer than 3 providers per 1,000 Medicaid enrollees with at least one Medicaid claim for a service performed in 2018: Assumption (2.0 providers per 1,000 enrollees), Bienville (2.8 providers per 1,000 enrollees), Catahoula (1.8 providers per 1,000 enrollees), DeSoto (2.0 providers per 1,000 enrollees), Grant (1.9 providers per 1,000 enrollees), Iberville (2.5 providers per 1,000 enrollees), Livingston (1.9 providers per 1,000 enrollees), Madison (2.0 providers per 1,000 enrollees), Plaquemines (2.6 providers per 1,000 enrollees), St. Helena (2.1 providers per 1,000 enrollees), St. Martin (2.6 providers per 1,000 enrollees), West Baton Rouge (1.6 providers per 1,000 enrollees), and West Carroll (2.9 providers per 1,000 enrollees).

Restricting the sample to providers with at least 10 claims in a given month/year results in 15 parishes with fewer than 3 providers per 1,000 Medicaid enrollees: Assumption (1.9 providers per 1,000 enrollees), Bienville (2.7 providers per 1,000 enrollees), Catahoula (1.4 providers per 1,000 enrollees), DeSoto (1.7 providers per 1,000 enrollees), Grant (1.8 providers per 1,000 enrollees), Iberville (2.3 providers per 1,000 enrollees), Livingston (1.9 providers per 1,000 enrollees), Madison (1.9 providers per 1,000 enrollees), Plaquemines (2.6 providers per 1,000 enrollees), St. Helena (1.2 providers per 1,000 enrollees), St. James (2.7 providers per 1,000 enrollees), St. Martin (2.3 providers per 1,000 enrollees), Union (2.7 providers per 1,000 enrollees), West Baton Rouge (1.5 providers per 1,000 enrollees), and West Carroll (2.1 providers per 1,000 enrollees).

Figure 8: PCPs per 1,000 Louisiana Medicaid Beneficiaries in 2018

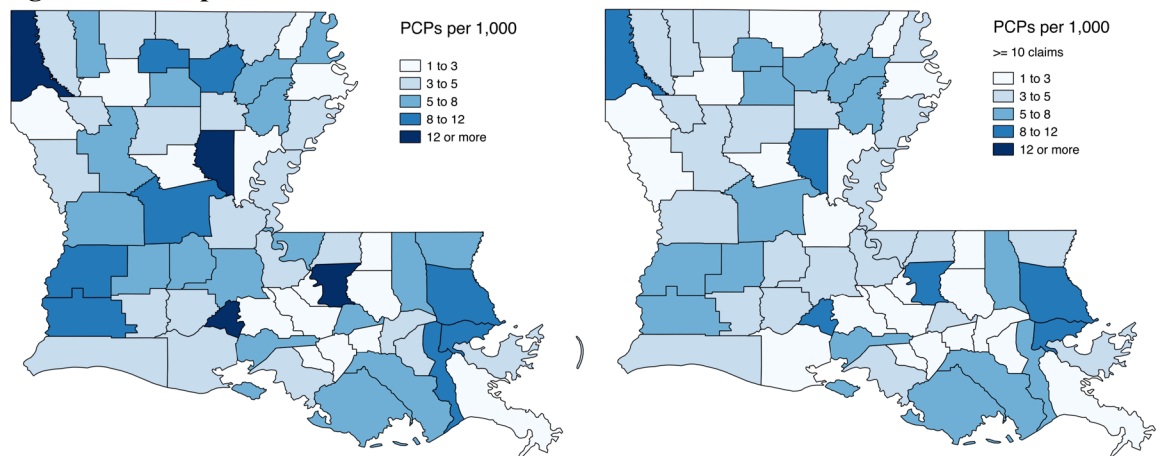


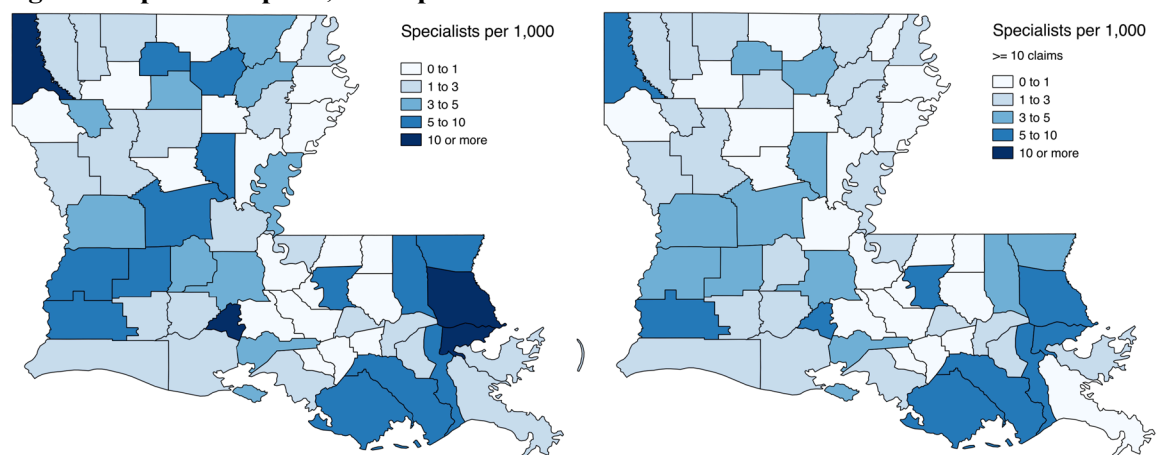
Figure 8 relies on the same methodology used to generate Figure 7, but is limited to PCPs. A total of 12 parishes had at least 8 PCPs per 1,000 Medicaid enrollees with one or more Medicaid claims for a service performed in 2018 including: Caddo (12.7 PCPs per 1,000 enrollees), Calcasieu (9.0 PCPs per 1,000 enrollees), Beauregard (10.0 PCPs per 1,000 enrollees), East Baton Rouge (13.1 PCPs per 1,000 enrollees), Jefferson (8.6 PCPs per 1,000 enrollees), Lafayette (12.6 PCPs per 1,000 enrollees), LaSalle (12.5 PCPs per 1,000 enrollees), Lincoln (8.2 PCPs per 1,000 enrollees), Orleans (10.8 PCPs per 1,000 enrollees), Ouachita (9.8 PCPs per 1,000 enrollees), Rapides (8.8 PCPs per 1,000 enrollees), and St. Tammany (12.0 PCPs per 1,000 enrollees).

Six parishes had at least 8 PCPs per 1,000 Medicaid enrollees when restricting the sample to PCPs with at least 10 claims in a given month/year. These parishes included Caddo (8.9 PCPs per 1,000 enrollees), East Baton Rouge (10.4 PCPs per 1,000 enrollees), Lafayette (10.0 PCPs per 1,000 enrollees), LaSalle (8.6 PCPs per 1,000 enrollees), Orleans (8.5 PCPs per 1,000 enrollees), and St. Tammany (9.6 PCPs per 1,000 enrollees).

Alternatively, 7 parishes had fewer than 2 PCPs per 1,000 Medicaid enrollees with at least one 2018 Medicaid claim in an average month: Catahoula (1.8 PCPs per 1,000 enrollees), DeSoto (1.9 PCPs per 1,000 enrollees), Grant (1.9 PCPs per 1,000 enrollees), Livingston (1.7 PCPs per 1,000 enrollees), Madison (1.7 PCPs per 1,000 enrollees), St. Helena (1.5 PCPs per 1,000 enrollees), and West Baton

Rouge (1.6 PCPs per 1,000 enrollees). Assumption, St. Martin, and West Carroll parishes also have fewer than two PCPs per 1,000 Medicaid enrollees in 2018 when restricting the sample to PCPs with 10 or more Medicaid claim

Figure 9: Specialists per 1,000 Population in 2018



Finally, Figure 9 depicts geographic variation in specialist Medicaid participation by parish. Specialist concentration is noticeably higher in urban parishes relative to rural parishes. More than one third of Louisiana parishes had fewer than two specialists per 1,000 Medicaid enrollees with at least one Medicaid claim for a service performed in 2018. That number rises to more than half of all parishes when the sample is restricted to specialists with at least 10 Medicaid claims. The highest concentration of specialists per enrollee with at least 10 Medicaid claims were found in Caddo parish (9.5 specialists per 1,000 enrollees), East Baton Rouge parish (7.8 specialists per 1,000 enrollees), Jefferson parish (7.4 specialists per 1,000 enrollees), Lafayette parish (9.6 specialists per 1,000 enrollees), Orleans parish (9.3 specialists per 1,000 enrollees), and St. Tammany parish (8.8 specialists per 1,000 enrollees).

Implications

As previously reported in an earlier version of this report, our findings indicate that Medicaid provider participation has increased since Louisiana's Medicaid expansion in mid-2016. The average number of PCPs with at least 10 Medicaid claims in a given month/year has increased by approximately 22% from the pre-expansion period (January 2013 through June 2016) to the post-expansion period (July 2016 through October 2018). PCP Medicaid participation saw significant growth in the lead-up to expansion and continued growth at a slightly slower rate through 2018. Specialist growth followed a similar pattern in the pre-expansion period before beginning to decline in early 2016. The reduction in the number of specialists has leveled off since expansion occurred.

We also documented extensive variation in provider Medicaid participation by parish for both PCPs and specialists. While the majority of Louisiana parishes had at least 4 PCPs treating Medicaid patients per 1,000 Medicaid enrollees in 2018, specialist access was much more geographically concentrated. We plan to investigate potential causes for these patterns as part of our qualitative work with physician surveys and to update this report with claims data from 2019 to determine whether these trends have continued.

Appendix A: Method for Calculating Final Adjudicated Paid and Denied Claims

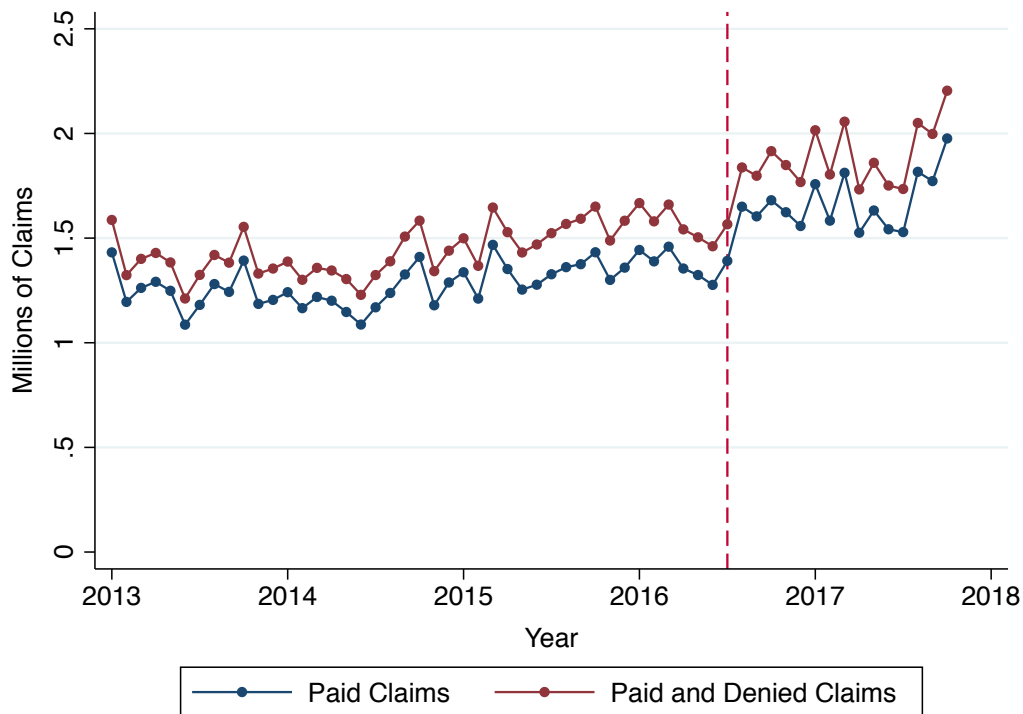
To calculate final adjudicated paid claims, we first combine two categories of claims:

1. Those that were paid and never adjusted
2. The last adjusted claim in cases where the original claim was adjusted

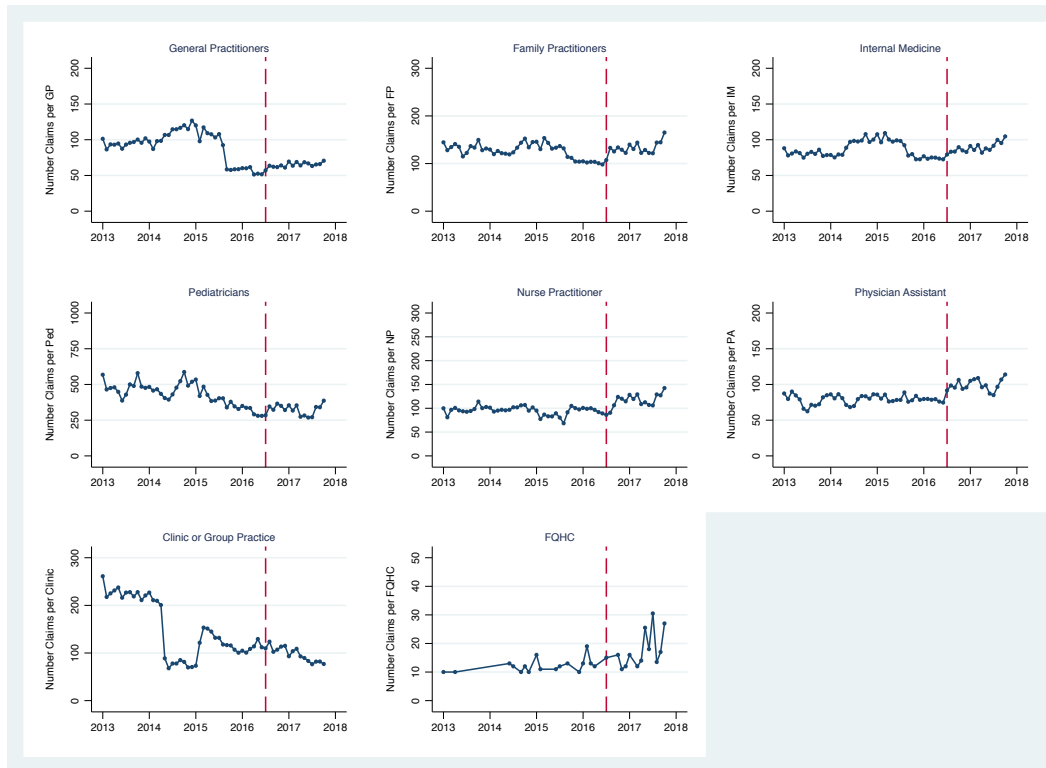
To these categories, we append denied claims with no corresponding paid claim for the same patient/provider/claim type/service date combination. In other words, we attempt to exclude any claims that were originally denied, but later paid. Failure to include denied claims risks underestimating the number of services provided to Medicaid beneficiaries, while including claims that were originally denied and later paid risks overestimating the service count.

Appendix Figure 1 plots counts of final adjudicated paid claims and the sum of paid and denied claims.

Appendix Figure 1: Final Adjudicated Claims by Month/Year, 2013 – 2018



Appendix Figure 2: Number of Final Adjudicated Claims per PCP Type by Month/Year, 2014 – 2018



Appendix Table 1: Louisiana Medicaid Provider Specialty Code Descriptions by Primary Care and Specialty Care (Excluding Dental and Laboratory)

Primary Care Designations: Primary care, family practice, pediatrics, internal medicine, nurse practitioner, physician assistant, clinic or other group practice, FQHC
Specialty Care Designations: General surgery, allergy, otology, laryngology, rhinology, anesthesiology, cardiovascular disease, dermatology, gynecology (DO only), gastroenterology, manipulative therapy (DO only), neurology, neurological surgery, obstetrics (DO only), OB/GYN, ophthalmology (DO only), otology (DO only), laryngology (DO only), rhinology (DO only), ophthalmology, orthopedic surgery, pathologic anatomy (DO only), pathology, peripheral vascular disease or surgery (DO only), plastic surgery, physical medicine rehabilitation, psychiatry, psychiatry (DO only), proctology, pulmonary diseases, radiology, radiology (DO only), radiation therapy, thoracic surgery, urology, geriatrics, nephrology, hand surgery, podiatry, neonatal perinatal medicine, pediatric cardiology, pediatric critical care medicine, pediatric emergency medicine, pediatric endocrinology, pediatric gastroenterology, pediatric hematology, pediatric infectious disease, pediatric nephrology, pediatric pulmonology, pediatric rheumatology, pediatric sports medicine, pediatric surgery, pediatric neurology, pediatric genetics, emergency medicine, pediatric developmental behavioral health, cardiac electrophysiology, critical care medicine, endocrinology & metabolism, hematology, infectious disease, medical oncology, pulmonary disease, rheumatology, surgery – critical care, surgery – general vascular, nuclear medicine, addiction specialist, gynecologic oncology, maternal & fetal medicine

Appendix Table 2: Average Number of Monthly Unique Medicaid Providers by Parish

Parish	PCPs		Specialists	
	Pre	Post	Pre	Post
Acadia	72.2	78.1	32.1	39.4
Allen	39.0	44.6	20.2	37.4
Ascension	113.9	123.2	40.7	45.2
Assumption	14.3	11.2	4.6	4.4
Avoyelles	47.0	44.2	22.3	15.5
Beauregard	52.0	62.9	30.6	36.4
Bienville	16.5	13.1	5.0	4.2
Bossier	95.7	106.2	60.0	57.0
Caddo	596.5	752.8	694.5	825.9
Calcasieu	401.3	437.1	318.6	321.8
Caldwell	15.8	13.3	4.1	2.6
Cameron	2.2	2.5	1.3	1.3
Catahoula	9.0	6.8	2.0	1.2
Claiborne	22.0	17.1	4.0	5.9
Concordia	19.6	27.4	11.7	24.4
Desoto	14.3	13.5	3.6	2.1
East Baton Rouge	930.7	1238.4	892.9	921.7
East Carroll	14.6	13.3	4.1	3.8
East Feliciana	20.3	18.0	5.4	4.6
Evangeline	65.1	60.6	32.0	37.2
Franklin	41.8	41.4	11.1	14.0
Grant	5.8	10.8	2.1	1.1
Iberia	128.2	131.8	92.6	99.3
Iberville	23.7	23.2	5.8	5.1
Jackson	20.1	25.8	6.3	10.9
Jefferson	876.5	898.9	1027.9	1072.3
Jefferson Davis	40.3	42.1	17.0	17.1
Lafayette	506.3	612.1	574.8	622.4
Lafourche	131.6	165.4	147.9	157.0
LaSalle	45.3	39.5	20.8	20.4
Lincoln	76.3	92.1	51.5	55.6
Livingston	46.0	46.9	9.4	9.9
Madison	11.2	8.4	2.1	2.5
Morehouse	43.2	49.8	20.9	33.3
Natchitoches	59.3	60.8	23.1	24.0
Orleans	762.6	1087.0	913.0	1240.6
Ouachita	366.2	438.6	275.4	285.5
Plaquemines	13.5	12.1	5.5	3.9
Pointe Coupee	23.0	21.9	3.3	2.5

Rapides	287.5	315.5	222.9	226.8
Red River	9.1	9.7	5.6	8.0
Richland	51.7	54.7	21.4	29.0
Sabine	30.2	21.8	11.9	10.0
St. Bernard	27.3	50.3	16.5	32.7
St. Charles	31.2	31.1	26.6	27.9
St. Helena	13.0	6.0	5.0	2.6
St. James	17.5	15.2	6.2	6.9
St. John	29.0	39.7	31.6	31.9
St. Landry	145.5	151.3	103.6	114.5
St. Martin	29.6	24.9	14.9	7.2
St. Mary	67.4	61.7	34.6	32.9
St. Tammany	452.3	526.1	452.4	498.6
Tangipahoa	199.5	238.1	199.1	213.6
Tensas	5.2	5.7	2.7	2.0
Terrebonne	154.7	189.4	183.2	198.5
Union	21.0	22.1	7.7	5.1
Vermillion	51.5	59.6	28.3	30.2
Vernon	44.0	46.4	31.4	33.6
Washington	67.1	85.8	82.9	93.2
Webster	64.1	63.1	23.9	23.2
West Baton Rouge	11.4	9.4	2.3	2.3
West Carroll	12.9	9.4	1.4	1.9
West Feliciana	16.7	13.9	6.3	5.6
Winn	17.4	17.4	5.5	4.6

Notes: Pre-expansion period includes January 2013 through June 2016. Post-expansion period includes July 2016 through October 2018.

Appendix Table 3: Average Number of Monthly Unique Medicaid Providers with >= 10 claims by Parish

Parish	PCPs		Specialists	
	Pre	Post	Pre	Post
Acadia	51.8	64.4	19.9	29.9
Allen	29.5	36.3	11.5	24.5
Ascension	88.5	101.9	27.6	38.6
Assumption	10.7	8.9	4.2	4.1
Avoyelles	35.1	35.6	13.1	11.8
Beauregard	35.4	43.7	19.9	25.7
Bienville	11.9	11.3	2.8	3.3
Bossier	66.0	76.5	43.3	47.9
Caddo	379.7	499.0	504.1	668.2
Calcasieu	273.5	313.8	233.7	265.0
Caldwell	12.0	11.9	2.9	2.5
Cameron	1.8	2.2	1.0	1.3
Catahoula	7.0	5.3	1.8	1.0
Claiborne	19.0	15.4	2.6	4.4
Concordia	15.1	20.8	6.4	16.8
Desoto	11.8	12.8	3.1	1.8
East Baton Rouge	619.5	834.3	664.8	775.5
East Carroll	10.6	10.3	2.6	2.8
East Feliciana	15.8	16.1	3.1	3.4
Evangeline	50.8	50.1	23.5	28.8
Franklin	29.2	34.3	7.2	10.9
Grant	4.6	8.9	2.1	1.0
Iberia	99.8	110.1	66.3	75.5
Iberville	17.7	18.6	3.9	3.2
Jackson	15.1	20.7	3.4	7.1
Jefferson	548.2	611.2	722.4	832.9
Jefferson Davis	28.9	31.5	11.5	13.8
Lafayette	340.9	410.2	414.2	494.0
Lafourche	87.3	115.3	109.3	130.6
LaSalle	30.7	29.3	11.9	13.3
Lincoln	61.6	74.9	38.8	46.1
Livingston	34.4	38.2	6.0	7.0
Madison	10.0	7.9	1.4	1.4
Morehouse	31.0	37.8	13.4	22.5
Natchitoches	43.9	51.4	15.6	20.1
Orleans	502.1	724.3	670.6	973.5
Ouachita	259.2	316.6	205.7	235.0
Plaquemines	9.9	9.2	3.9	2.8
Pointe Coupee	17.9	19.8	2.3	1.7

Rapides	198.0	223.8	170.2	190.6
Red River	7.3	7.8	4.2	7.3
Richland	40.4	43.9	14.0	21.8
Sabine	21.2	16.0	6.0	6.9
St. Bernard	20.2	35.9	10.7	23.9
St. Charles	20.6	22.3	16.5	21.5
St. Helena	9.3	4.5	3.0	2.0
St. James	11.0	11.8	4.5	5.5
St. John	19.7	25.7	22.8	24.5
St. Landry	116.8	120.3	82.0	98.9
St. Martin	22.2	18.6	10.2	4.9
St. Mary	55.6	53.9	24.2	29.3
St. Tammany	298.0	350.9	306.3	376.9
Tangipahoa	142.7	181.5	151.3	184.3
Tensas	4.0	5.1	2.1	1.7
Terrebonne	107.0	140.9	131.0	160.8
Union	15.1	16.7	4.7	2.9
Vermillion	37.5	49.2	19.6	21.9
Vernon	32.8	32.2	22.0	26.9
Washington	45.7	65.5	59.6	80.5
Webster	51.9	50.5	16.9	16.4
West Baton Rouge	9.0	6.9	1.7	1.4
West Carroll	11.1	8.3	1.0	1.4
West Feliciana	12.8	11.5	3.9	4.5
Winn	14.3	14.7	4.6	4.2

Notes: Pre-expansion period includes January 2013 through June 2016. Post-expansion period includes July 2016 through October 2018.

Appendix B: Interrupted Time-Series Model Description

The methodology that we employ for determining the effect of Louisiana’s Medicaid expansion on provider participation is a research design known as an interrupted time-series (ITS). An ITS model fits a linear trend that is “interrupted” by an intervention that is thought to impact the slope or level of the existing trend in the outcome. The ITS model can be expressed formally as follows:

$$Y_t = \beta_0 + \beta_1 Time_t + \beta_2 PostExpand_t + \beta_3 Time_t \times PostExpand_t + \varepsilon_t$$

Where Y_t represents an outcome related to provider participation (e.g., number of providers, intra-provider volume, or provider load) in year/month t . $Time$ is a continuous measure of time in year/month increments beginning with January 2013. The coefficient β_1 captures the pre-Medicaid Expansion trend in each outcome. $PostExpand$ is an indicator for the year/month of Medicaid Expansion in Louisiana (July 2016) and accounts for any immediate level change in each outcome. The interaction between $Time$ and $PostExpand$ captures any change in the slope of the outcomes by year/month that occurs in the period after Medicaid Expansion. Finally, ε is an error term that captures unobserved factors associated with the outcome of interest. We estimate the ITS model using ordinary least squares estimation and employ Newey-West standard errors to account for serial correlation of the error terms.

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