Medicaid and the Mental Health of Minority Populations: Evidence from Administrative Data

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Abstract: We investigate the impact of the Affordable Care Act (ACA) on under-served populations using claims data from the period 2005-2021. These panel data on the universe of American Indian and Alaska Native (AIAN) Medicare and Medicaid populations and a twenty percent random sample from the rest of the US which allows us to trace out enrollments and utilization of various health care services that can be attributed to the ACA. We focus on AIAN individuals and the utilization of mental health and substance abuse treatment services in particular. In general, AIAN young adults are several times more likely to commit suicide than in the general population and the prevalence of substance dependence is also higher than for the general population. Little is known about the effects of expanded insurance availability and access to care (due to the ACA) on this population. We find a striking increase in the enrollment in Medicaid by between 5-13% for the AIAN population aged 18-65 depending upon the base population considered. We also find, using ICD-10 codes for visit categories, that there is a large increase in mental health and substance abuse prevention visits. Our preliminary analysis indicates how Medicaid expansion may result in improved mental health and reductions in substance abuse for an at-risk population.

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Introduction

American Indians and Alaska Natives have the highest rates of suicide and substance abuse in the US. In 2023, one in four AIAN over the age of 12 had substance use disorder. They also have the highest overdose mortality, at 6.5 deaths per 10000, as of 2023. The suicide rate in the same year was at almost 2.4 per 10000 (Centers for Disease Control and Prevention, 2024)

Background

[To be completed]

Data

We use Medicaid claims data from the Centers for Medicare and Medicaid Services (CMS) accessed through the Research Data Assistance Center (ResDAC). Our sample includes all claims for American Indians and Alaska Natives (AIAN) and a 20% random sample of non-AIAN patients from 1999 through 2021. In most of our analyses, we restrict our analysis to 2019 and earlier to avoid issues arising from the COVID-19 pandemic.

We study the following outcomes: number of unique enrollees in Medicaid by race and year; number of unique visits to any facility by race and year; number of visits to an inpatient facility by race and year; number of visits to an outpatient facility by race and year. We further distinguish between patients who are newly enrolled (were not enrolled in Medicaid in the previous year) and those who have never been enrolled in Medicaid. Finally, we specifically examine visits for mental health (ICD-10 codes F000-F489, F900-F989 and ICD-9 codes 2900-3169) and substance abuse (ICD-10 codes F100-F199 and ICD-9 codes 3050-3059, 2920-2929). We also identify visits that were emergency departments or used an ambulance for outpatient outcomes.

Table 1 includes summary statistics for our sample in 1999, 2009, and 2019. We observe that the sample has an increasing proportion of AIAN patients over time (1.4% in 1999 and 1.6% in 2019) as well as older (average age of 26 in 1999 and 29 in 2019) and more male (60% female in 1999 and 55% in 2019). However, the counts of all groups are increasing in this time period, which includes Medicaid Expansion. We aggregate these outcomes to the state-year level. Our data includes 51 states (including DC) observed in all years 1999-2019.

We define states' Medicaid Expansion status as in Maclean and Saloner (2019) and the Kaiser Family Foundation (2025). We consider the adoption year the first year a state has a six-month period of having expanded Medicaid. We use population data from the National Cancer Institute's Surveillance, Epidemiology, and End Results Program (SEER) to create rates and to weight regressions.

Table 1: Summary Statistics

	1999	2009	2019
%AIAN	1.4	1.4	1.6
%Black	27.7	23.3	21.6
%White	47.5	44.1	43.6
%Female	60.0	58.5	55.1
Mean Age	26	26	29
N AIAN	556,202	877,717	1,248,678
N Black	11,001,094	14,437,974	16,694,300
N White	18,896,489	27,384,046	33,769,750
N Female	25,589,970	39,097,574	53,048,075
N Total	39,756,433	62,025,657	77,429,629

Note: Percentages are calculated excluding observations for which race and sex are unknown. Those observations are included in the total number of observations in the bottom row. Additionally, the bottom row includes Asian race and Hispanic ethnic categories which are not shown separately above.

Empirical Methodology

We estimate treatment effects of Medicaid Expansion on enrollment and utilization outcomes discussed above. Let Y_{st} be an outcome in state s in year t; $Y_{st}(0), Y_{st}(1)$ be the potential outcomes for non-expansion and expansion in in state s in year t; and Exp_{st} be a binary indicator for state s having expanded Medicaid in year t. Then,

$$Y_{st} = Y_{st}(0) + [Y_{st}(1) - Y_{st}(0)] \times Exp_{st}$$

We are interested in estimating the treatment effect of expansion, $\tau = Y_{st}(1) - Y_{st}(0)$.

Many of the first papers on Medicaid expansion used a generalized difference-in-differences (DD) with a two-way fixed effects model as below.

$$Y_{st} = \beta Exp_{st} + \theta_s + \phi_t + \epsilon_{st}$$

β is then the estimate for treatment effect τ which is the increase in Medicaid enrollment due to the start of the ACA.

However, Goodman-Bacon et al. (2018) outlines the problem with using a generalized DD method. They point out that a generalized DD is a weighted sum of all the possible 2x2 DD possible in the sample. However, the earlier adopters become control units for the later adopters. For example, Massachusetts, which expanded in 2014, is a control unit in the 2x2 DD for Missouri which expanded in 2021. If treatment effects are heterogenous, this creates a bias for the generalized DD estimator so that $\beta \neq \tau$.

Therefore, we implement a staggered adoption differences-in-differences (DD) design, using the Callaway Sant'anna (CS) method (Callaway and Sant'anna 2021). We separate our sample into treatment timing groups based on when each state expanded Medicaid. Let G_s be the first year state s expands Medicaid; let $G_s = 0$ for all states that never expanded Medicaid; and G_{st} be a binary variable that indicates whether state s first expanded Medicaid in year t. The CS method

offers several estimates for the average treatment effects of each group of expanding states in each year, $ATT(g,t)$ that excludes the problematic control groups from Goodman-Bacon (2018). We use only the never treated units as controls and inverse probability weighting as below:

$$ATT_{ipw}^{nev}(g,t) = E\left[\left(\frac{G_{st}}{E(G_{st})} - \frac{p_g(X) \times 1(G_s = 0)\Big/1 - p_g(X)}{E\left[p_g(X) \times 1(G_s = 0)\Big/1 - p_g(X)\right]}\right) \times \left(Y_t - Y_{g-1}\right)\right]$$

where $p_g(X) = P(G_{st} = 1 \mid X)$, the probability of state s being first treated in year t conditional on covariates X.

We can then calculate weighted sums which aggregate treatment effects in various ways as shown in the equation below. We specifically aggregate to a simple average which is analogous to the β in the generalized DD as well as aggregate by event time (5 years before and 5 years after treatment) which is analogous to an Event Study Design.

$$\theta = \sum_{g \in G_s} \sum_{t \in T} w(g,t) \times ATT(g,t)$$

Now, let $Y_{st}(g)$ be the potential outcome of state s in year t if it expanded with group g. We make the following assumptions for θ to be an unbiased estimate of τ. First, we assume that, for each group g, there is no anticipation ahead of expansion so that:

$$E\left[Y_{st}(g)\middle|X, G_{sg} = 1\right] = E\left[Y_{st}(0)\middle|X, G_{sg} = 1\right] \forall t: t < g.$$

Second, for each group g and time period t, conditional parallel trends holds so that:

$$E\left[Y_{st}(0) - Y_{st-1}(0)\middle|X, G_{sg} = 1\right] = E[Y_{st}(0) - Y_{st-1}(0)|X, G_s = 0].$$

We provide evidence for these two assumptions with our Event Study results.

Finally, since we use the inverse-probability weighting version of the CS method, we assume overlap, such that for all time periods and groups:

$$\exists\ some\ \epsilon > 0\ such\ that\ P\left(G_{sg} = 1\right) > \epsilon\ and\ p_{g,t}(X) < 1 - \epsilon.$$

Results

In Table 2 we first check whether the ACA expansions resulted in increases in Medicaid enrollment. Existing studies using data from the American Community Survey (ACS) have demonstrated increased probability of Medicaid coverage for AIAN following the ACA expansions. In the first three columns of Table 2 we report the impact of ACA expansions within a state on total AIAN Medicaid enrollment (column 1), the total number of enrollees above the age of 65 (column 2), and total number of enrollees aged 18 through 65 (column 3). We find that the number of AIAN adults ages 18-65 enrolled in Meidicaid is positive and statistically significant; the average effect size is about 11,000 per state. Across the whole US, this would imply about 500,000 more AIAN individuals were enrolled in Medicaid. For comparison, the

2020 US Census estimated that there are less than 4 million American Indians or Alaska Natives in the US in total who identify as AIAN alone; expanding to individuals who identify as AIAN alone or in combination with another race, this number increases to slightly less than 10 million in total. This means that the ACA has either increased Medicaid enrollment by about either 5 or 13% overall depending upon the underlying base population considered.

We find no significant effects on the total number of enrollees though, which is driven by a decrease in the number of enrolled children (aged younger than 18). In columns (4) and (5) we show the impact on the number of new enrollees only. These are Medicaid enrollees that we do not see previously enrolled in Medicaid. For each state and year, we calculate the number of new enrollees, which by construction is smaller than the total number of enrollees in that state-year cell; for the country as a whole, this would suggest an increase of approximately 150,000 new AIAN enrollees. Again, we find that the increase in AIAN enrollment post-ACA expansion is driven by new enrollees who are aged 18-65.

Table 2: AIAN Enrollment in Medicaid

	(1)	(2)	(3)	(4)	(5)
	Total Enrollment	65+	18-65	New 65+	New 18-65
ATT	-661.4	68.5	11,625**	-17.38	3,306***
	(9,651)	(295.8)	(4,893)	(65.24)	(865.6)
Obs	780	780	780	780	780

Note: Observations are State-by-year counts of AIAN Medicaid enrollees. Columns (1)-(3) show effects on the total enrollment; columns (4) and (5) show effects on new enrollees, i.e. those who have not been observed in the Medicaid data before the ACA expansion. All coefficients estimated with the staggered difference in differences estimator by Callaway and Sant'Anna's (2021)

Table 3 demonstrates the impact of ACA expansions on AIAN Medicaid utilization – number of visits -- by individuals who were already enrolled in Medicaid before the expansions. We focus on this group because their utilization is less likely to be driven by unmet demand for health care due to lack of health insurance in the pre-expansion period. In the first three columns we study the impact on the total number of outpatient visits by pre-ACA enrollees. The number of visits by adults aged 18-65 increased by over 1300 per 1000 people, which implies an extra 1.3 visits per person per year. Among adults older than 65, the increase is much smaller, but still significant at about 0.286 extra visits per person per year. We note that those over 65 are most likely dual eligible, with Medicare covering at least part of their health care expenses.

In columns (4), (5) and (6) we test whether the increase in outpatient care utilization translates into lower utilization of emergency rooms. We use the information on place of care to create an indicator for whether the care was delivered in an emergency room setting or following an ambulance visit. We then sum up the number of ER and ambulance visits per demographic group, state and calendar year. Table 3 demonstrates that the ACA expansion is associated with an increase in care delivered on an urgent basis for adults aged 18-65, but not for younger or older individuals. For AIAN children, the ACA expansions lead to a significant decrease in the number of such visits of 17 per thousand individuals (aged younger than 18). Working age adults

who were enrolled in Medicaid before the ACA expansions are more likely to utilize emergency room care, with an average increase of about 33 extra visits per 1000 individuals in the age group-state cell.

Table 3: Utilization by existing enrollees – total number of visits

	All visits per 1000			ER and Ambulance per 1000		
	(1)	(2)	(3)	(4)	(5)	(6)
	Child	Adult 18-65	65+	Child	Adult 18-65	65+
ATT	-202.4	1,355***	285.8**	-16.99**	33.09***	2.472
	(267.5)	(227.1)	(133.7)	(7.229)	(9.999)	(1.882)
Observations	984	984	984	984	984	984

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Note: Observations are State-by-year measures of various types of visits per 1000 visits of pre-existing AIAN Medicaid enrollees All coefficients estimated with the staggered difference in differences estimator by Callaway and Sant'Anna's (2021)

In Table 4 we focus on specific types of health visits for either mental health or substance abuse treatments (as indicated by ICD-10 codes). Our results indicate that a large proportion of the increase in utilization noted in Table 3 is accounted for by an increase in mental health-related visits and in particular substance-abuse related visits. We take this to mean that the ACA expansions lead to increases of 285 per thousand mental health visits for adults aged 18-65. The associated increase for those aged over 65 is about 20 per thousand visits. We see no significant increase in the mental health visits of children.

In the last three columns of Table 4 we focus on the utilization of treatments for substance abuse. Almost the entire increase in mental health visits for those aged 18-65 is due to substance disorder-related visits. This proportion is significantly smaller, though not insignificant, for the age group over 65.

Table 4: Utilization by existing enrollees - mental health and substance abuse- treatment related visits

	Mental Health Visits per 1000			Substance Abuse Visits per 1000		
	(1)	(2)	(3)	(4)	(5)	(6)
	Child	Adults	65+	Child	Adult	65+
ATT	46.37	284.5***	19.73**	-0.298	265.0***	5.142***
	(62.29)	(79.84)	(8.911)	(2.113)	(65.47)	(1.082)
Obs	984	984	984	984	984	984

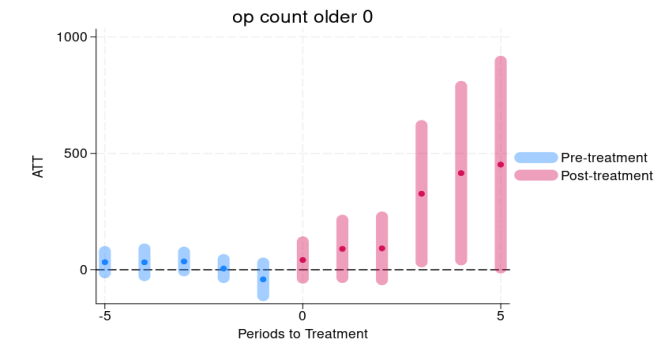
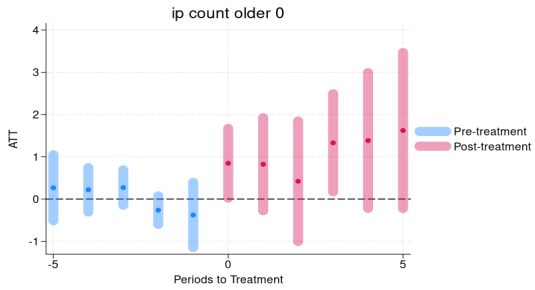
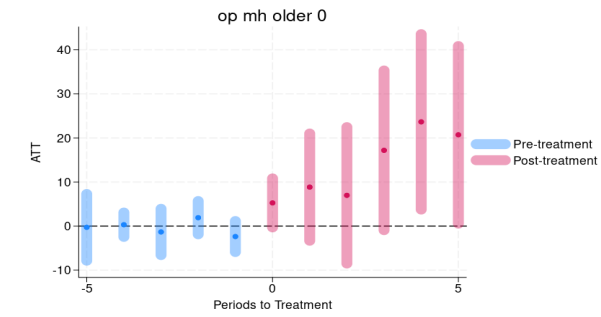
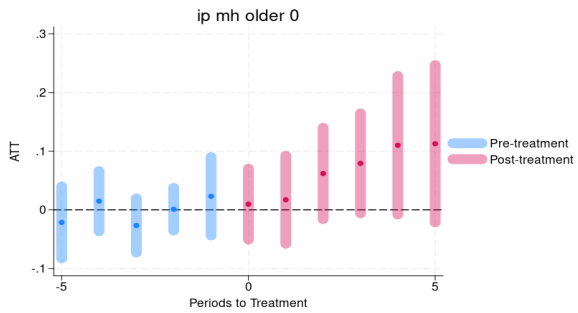
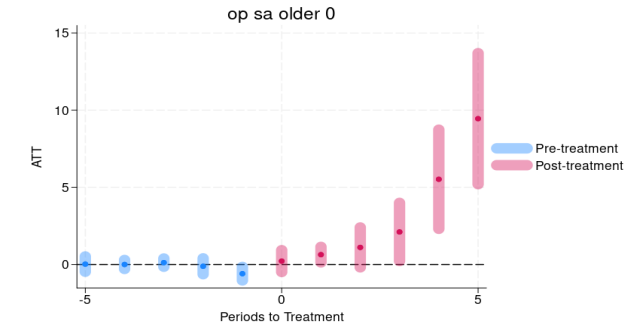
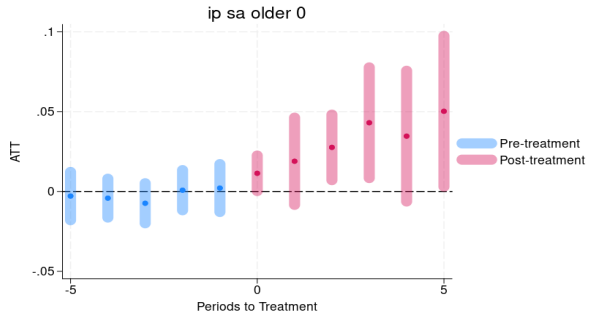
Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Note: Observations are State-by-year measures of various types of mental health or substance abuse visits per 1000 visits of all pre-existing AIAN Medicaid enrollees. All coefficients estimated with the staggered difference in differences estimator by Callaway and Sant'Anna's (2021)

In the figures below, we plot event-study graphs based on Callaway and Sant'Ana's staggered difference in differences estimator. Different plots demonstrate the evolution of utilization by different demographic groups before and after the ACA expansions.

First, in Figure 1 Panels A-D, we focus on elderly AIAN individuals who are newly enrolled in Medicaid. They are less likely to have been affected by the ACA Medicaid expansions because most of them are covered by Medicare. However, we still find small but positive effects on total utilization, and in particular the utilization of outpatient mental health and substance abuse-related care. As Figure 1 Panel F demonstrates, there is a sizeable increase in elderly utilization of inpatient services for substance disorder as well.

Figure 1: Event study figures for newly enrolled patients:

<table>
<tr><td>A: Total Outpatient Utilization per 1000 65+</td><td>B: Total Inpatient Utilization per 1000 65+</td></tr>
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<tr><td>C: Outpatient Utilization / 1000 65+ Mental Health</td><td>D: Inpatient Utilization /1000 65+ Mental Health</td></tr>
<tr><td>
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<tr><td>E: Outpatient Utilization per 1000 65+ Substance Disorder</td><td>F: Inpatient Utilization per 1000 65+ Substance Disorder</td></tr>
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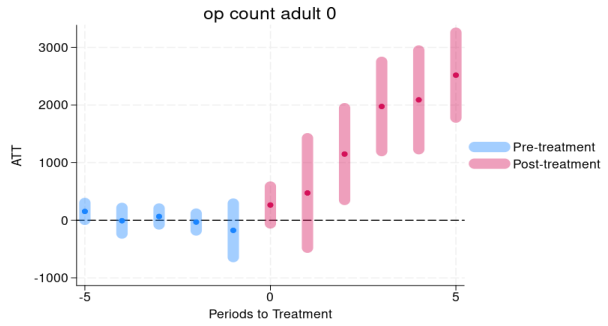
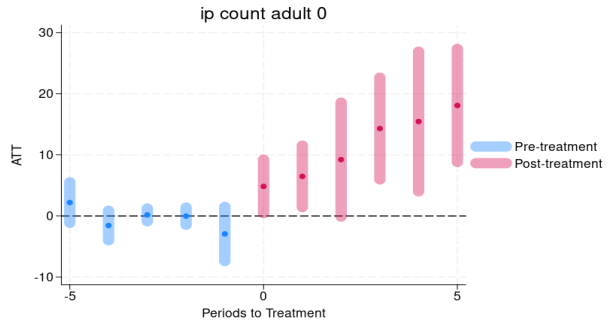
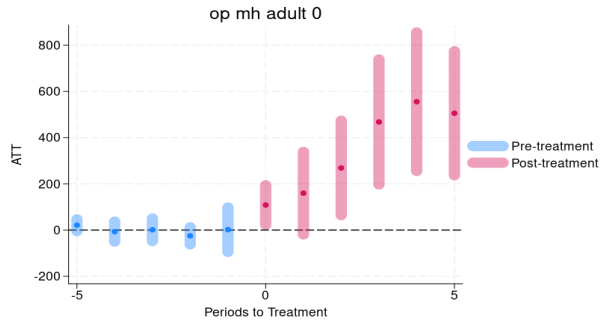
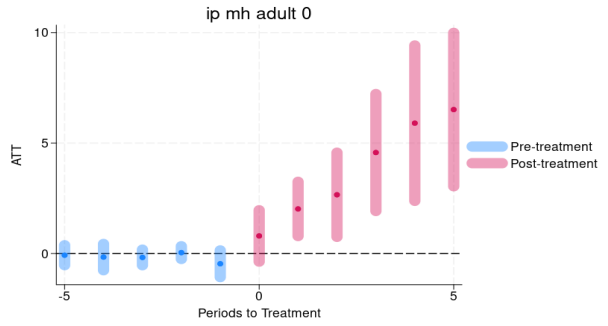
Note: All event study plots present coefficients from Callaway and Sant'Anna's (2021) staggered difference in differences estimator.

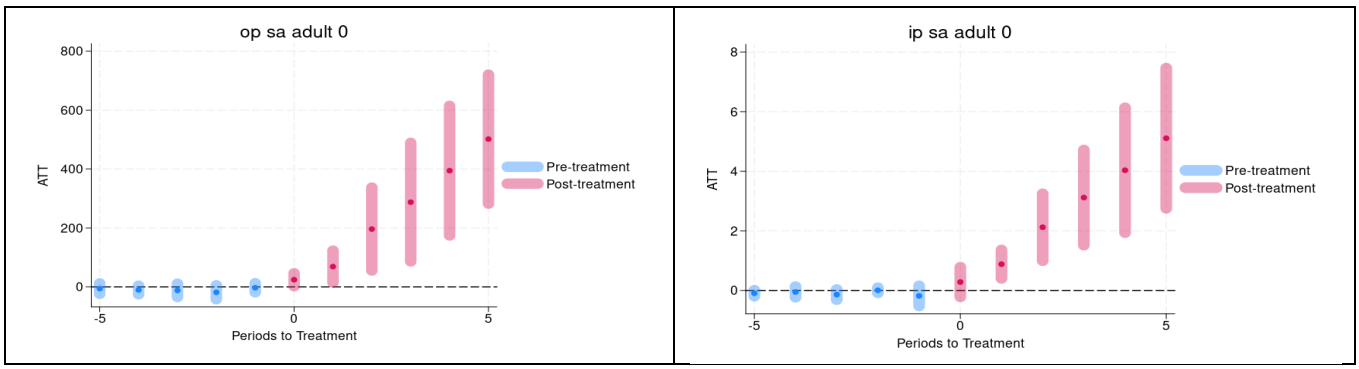
Figure 2 shows the corresponding graphs for the group of newly enrolled AIAN working adults. In this group the impact of ACA expansions are much stronger. It is likely that this group of individuals were not eligible for Medicare given their age; so this population differs dramatically from the population shown in Figure 1. We see large increases in both inpatient and outpatient utilization, reaching up to two additional outpatient visits each year three years after the ACA expansions in the state. The increase in inpatient utilization is smaller, as we would expect from the nature of the medical care involved. Still, we see strong increases in inpatient care utilization for mental health related issues, and for substance abuse, starting immediately after the expansions.

The effects are much larger in outpatient utilization. We see immediate jumps in mental health related care, and in particular in substance abuse-related care. Notably, the analysis compares newly enrolled patients before and after the ACA expansions. The difference before and after the expansions cannot be explained by pent up demand for mental health among new enrollees. There is clear evidence that the expansions, rather than the ability to enroll in Medicaid, are associated with these large jumps in the utilization of specific services.

We find no evidence that the ACA expansions significantly affected the inpatient or outpatient utilization of care for newly enrolled AIAN children.

Figure 2: Event study figures for health care utilization of newly enrolled patients aged 18-65:

A: Total Outpatient Utilization per 1000 18-65	B:Total Inpatient Utilization per 1000 18-65
	
C:Outpatient Utilization /1000 18-65 Mental Health	D: Inpatient Utilization/ 1000 18-65 Mental Health
	
E: Outpatient Utilization per 1000 18-65 SD	F: Inpatient Utilization per 1000 18-65 SD



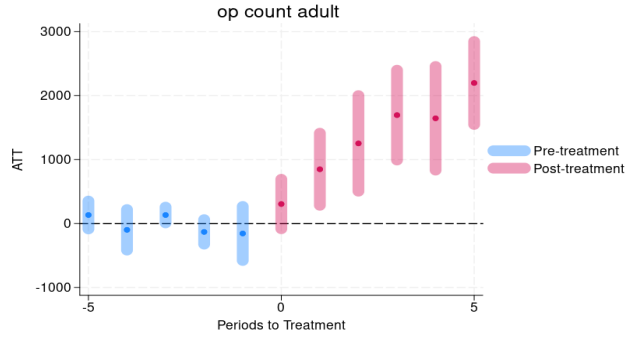
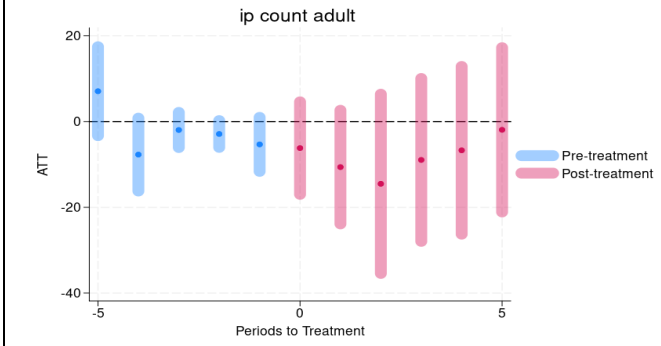
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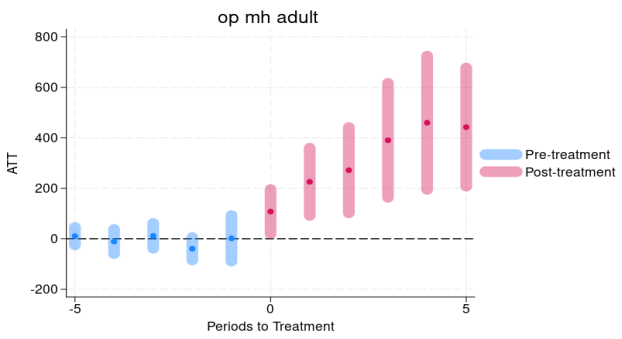
A plausible explanation for the growth in utilization by newly enrolled Medicaid patients is selection into enrollment after the expansions by those who needed the care the most. If the increase in demand is driven by an influx of new patients who are catching up on their health utilization, we should see relatively little change in the utilization patterns of existing patients. Further, if supply is fixed, existing patients might find it harder to obtain necessary care because of the increase in new patient demand.

In Figure 3 we plot the patterns in health care utilization for patients aged 18-65 who were already enrolled in Medicaid at the time of the expansions. On the right we plot inpatient utilization and on the left outpatient utilization. There is no significant increase in total inpatient care delivered, and no evidence that mental health and substance abuse inpatient services increased for existing patients.

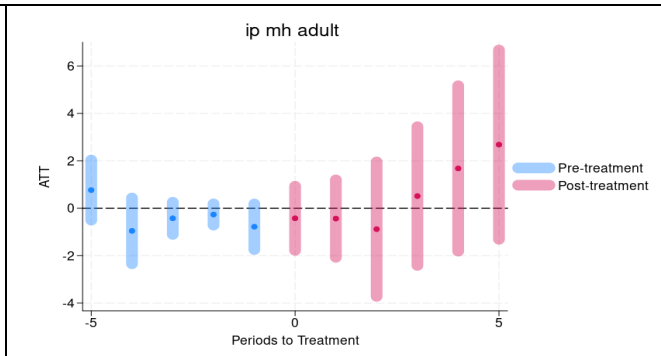
The outpatient sector shows a different pattern. The total amount of care delivered sharply increases one year after the ACA expansions and continues to rise over the next 4 years. In Panel C and D we show that this increase is also present for mental health and substance abuse treatment utilization.

Figure 3: Event study figures utilization by existing patients:

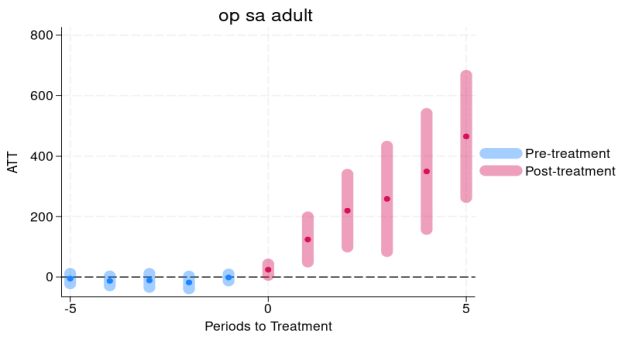
A: Total Outpatient Utilization per 1000 18-65	B: Total Inpatient Utilization per 1000 18-65
	
C: Outpatient Utilization / 1000 18-65 Mental Health	D: Inpatient Utilization / 1000 18-65 Mental Health

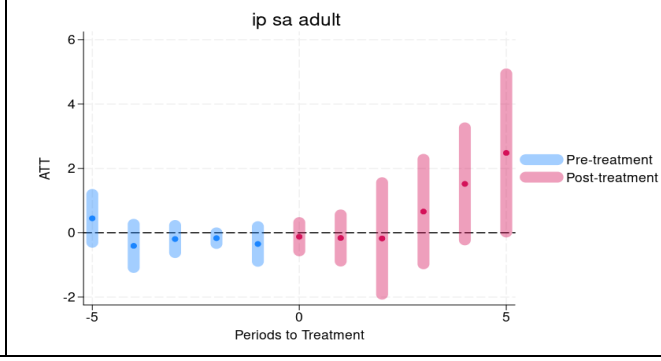


E: Outpatient Utilization / 1000 18-65 SD



F: Inpatient Utilization / 1000 18-65 SD



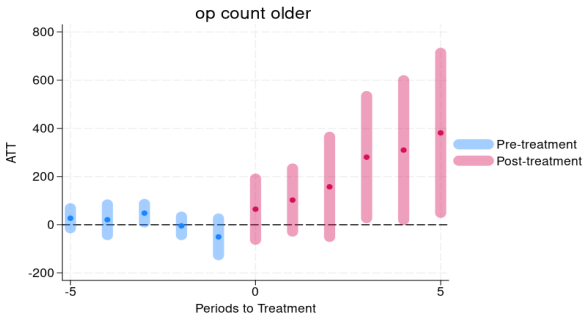


Note: All event study plots present coefficients from Callaway and Sant'Anna's (2021) staggered difference in differences estimator.

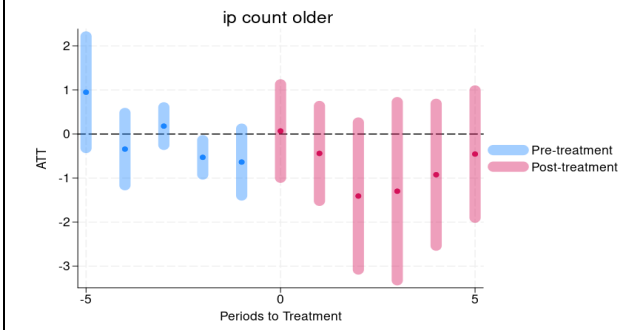
We next turn to the group of AIAN over the age of 65 who were enrolled in Medicaid before the ACA expansions. Figure 4 presents the results. Although there is no appreciable change in inpatient utilization, we do see an increase in total outpatient visits. There is also an increase in mental health related outpatient utilization, but the most striking increase is in substance dependency treatment on an outpatient basis. These increases are much smaller than what we report in Figure 3 for the younger group of AIAN Medicaid enrollees. Still, they indicate that the ACA lead to improvements in the availability of outpatient services for adult AIAN patients. These improvements appear to be most pronounced for substance abuse related treatments.

Figure 4: Event study figures for existing patients aged 65+:

A: Total Outpatient Utilization per 1000 65+

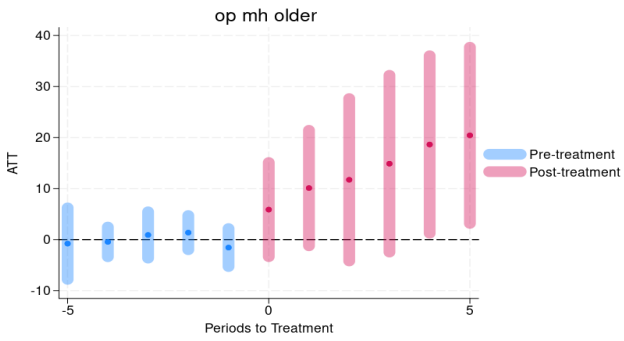


B: Total Inpatient Utilization per 1000 65+

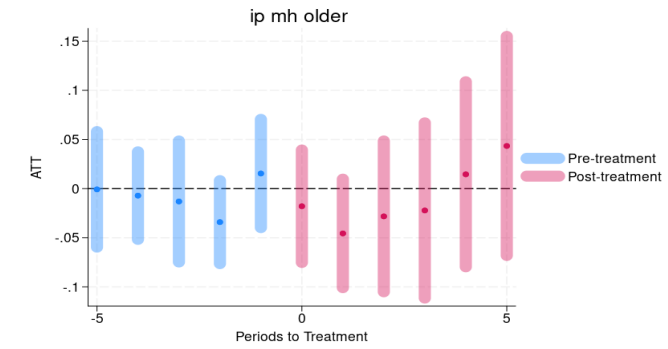


C: Outpatient Utilization per 1000 65+ Mental Health

D: Inpatient Utilization per 1000 65+ Mental Health



E: Outpatient Utilization per 1000 65+ SD



F: Inpatient Utilization per 1000 65+ SD

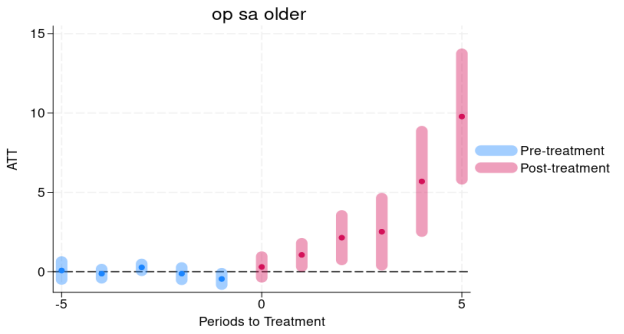
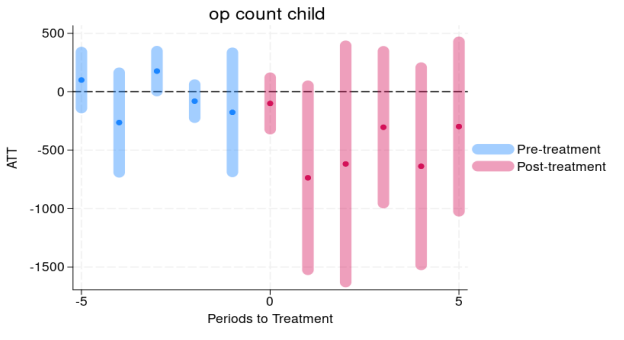




Figure 5 repeats the exercise for existing enrollees under the age of 18. Children are rarely affected by substance abuse disorder, although some may be accidentally exposed to opioids and some may have been born with the disorder due to exposure in utero. Although none of the trends attain statistical significance, we see a decrease in utilization of outpatient and inpatient services, mental health and substance dependency treatments for this group. As opposed to the group of 18-65 year olds, children who were previously enrolled in Medicaid are not significantly impacted by the expansion of the ACA.

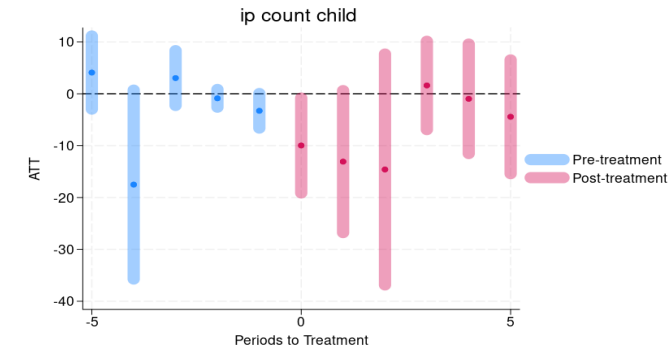
Figure 5: Event study figures for existing patients - children

A: Total Outpatient Utilization per 1000 < 18

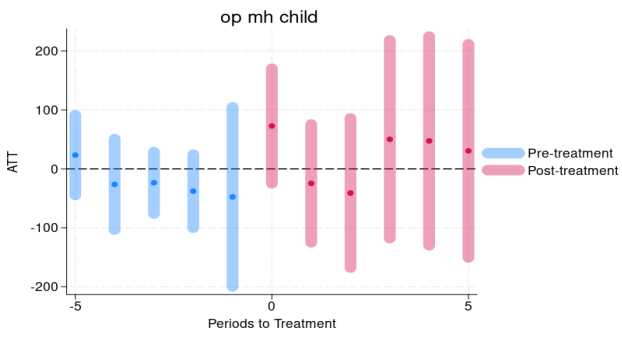


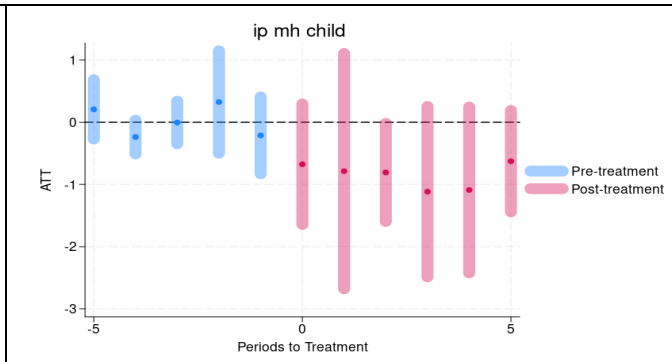
Outpatient Utilization per 1000 < 18 Mental Health

B: Total Inpatient Utilization per 1000 < 18



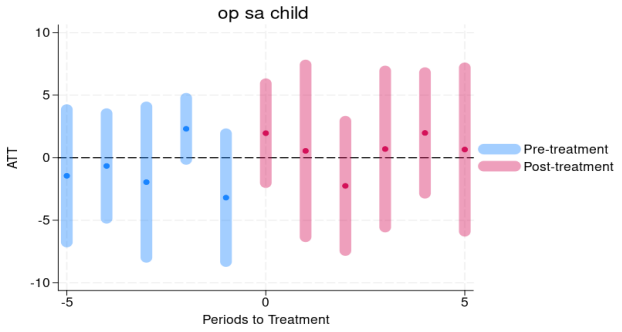
Inpatient Utilization per 1000 < 18 MH

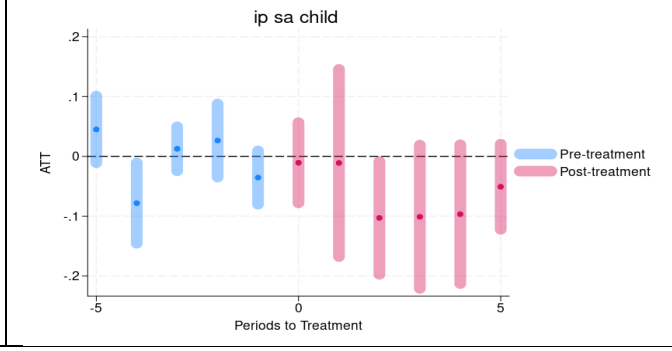




Outpatient Utilization per 1000 < 18 SD

Inpatient Utilization per 1000 < 18 SD





Emergency department utilization

Discussion and Conclusion

[To be completed]

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