

Preventive Care Utilization among Justice-Involved and Non-Justice-Involved Youth

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Abbreviations: justice-involved youth (JIY), non-justice-involved youth (NJIY), well child (WC), emergency department (ED), Indiana Office of Medicaid Policy and Planning (IOMPP)

Table of Contents Summary: Eight years of administrative health and criminal records of publicly-insured adolescents provide an unprecedented look at preventive care utilization by juvenile justice system involvement.

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What's Known on This Subject

Adolescents involved in the justice system are at risk for significant health problems when compared to non-justice-involved youth. Increased preventive care may improve the health of justice-involved youth by allowing physicians to screen for common causes of preventable morbidity.

What This Study Adds

In this retrospective cohort study of administrative health and criminal records, justice-involved youth were significantly less likely to utilize preventive care when compared to non-justice-involved youth. Justice-involved youth also experienced significantly more and longer gaps in Medicaid coverage.

Contributors' Statement:

Dr. Aalsma was responsible for the conception and design of the project, as well as the acquisition of administrative health and criminal records analyzed herein. He reviewed and revised the manuscript, and he approved the final manuscript as submitted.

Dr. Anderson and Ms. Schwartz contributed to the design of the project, drafted and critically revised the manuscript, and approved the final manuscript as submitted.

Ms. Ouyang, Dr. Tu, Dr. Rosenman, and Dr. Wiehe contributed to the analysis and interpretation of the data, critically revised the manuscript, and approved the final manuscript as submitted.

ABSTRACT

Background and Objective

Youth involved in the juvenile justice system (i.e., arrested youth) are at risk for health problems. Though increasing preventive care utilization by justice-involved youth is one approach to improving their wellbeing, little is known about their access to and utilization of care. The objective of this study was to determine how rates of well child and emergency department visits, as well as public-insurance enrollment continuity, differed between youth involved in the justice system and youth who have never been in the system. We hypothesized that justice-involved youth would exhibit less frequent well child and more frequent emergency service utilization than non-justice-involved youth.

Methods

This was retrospective cohort study of administrative medical and criminal records of all youth (ages 12-18) enrolled in Medicaid in Marion County between January 1, 2004, and December 31, 2011.

Results

The sample included 88,647 youth; 20,668 (23%) were involved in the justice system. Justice-involved youth had lower utilization rates of well child visits and higher utilization rates of emergency services in comparison to non-justice-involved youth. Justice-involved youth had more and longer gaps in Medicaid coverage compared to non-justice-involved youth. For all youth sampled, both preventive and emergency services utilization varied significantly by Medicaid enrollment continuity.

Conclusions

Justice-involved youth experienced more and longer gaps in Medicaid coverage, and rely more on emergency services than non-justice-involved youth. Medicaid enrollment continuity was associated with differences in well-child and emergency service utilization among justice-involved youth, with policy implications for improving preventive care for these vulnerable youth.

A significant number of youth are arrested, thereby beginning their involvement in the juvenile justice system. In a national survey of youth (ages 8-23 years old) from 1997-2008, roughly 1 in 3 respondents reported being arrested by age 23.¹ Justice-involved youth (JIY; i.e., youth who have been arrested) tend to suffer significant health problems when compared to youth who have never been involved in the system (non-justice-involved youth; NJIY). JIY, compared to NJIY, are at increased risk for sexually transmitted infections including HIV, mental health and substance use problems, and injury.²⁻⁶ To combat this heightened risk for physical and behavioral health problems, there have been national calls for improved access to, and quality of, medical and behavioral health services for JIY.⁷⁻⁹ Increasing utilization of preventive primary care services is one approach offered to improve the health of vulnerable populations, including JIY.¹⁰ Well child (WC) visits provide an opportunity for primary care physicians to screen for common causes of preventable morbidity among adolescents, such as substance use, risky sexual behavior, and episodes of violence.^{11,12} However, the actual rate at which JIY utilize preventive primary care services has rarely been studied, much less in direct comparison to an equivalent group of NJIY.

The study's purpose was to address this gap in the research by determining the annual rate of WC visits by Medicaid-enrolled JIY. We compared the JIY rate to that of Medicaid-enrolled NJIY from the same Midwestern county and time period. Because preventive healthcare utilization was the focus of our study, it was important to consider two other relevant variables: continuity of health insurance coverage and utilization of emergency department (ED) services over the same time period. First, transitions on or off of public health insurance rolls (i.e., "churning") are common,^{13,14} creating gaps in patients' ability to pay for health care, especially non-urgent, preventive care. Past research confirms that lack of health insurance coverage is

associated with deficits in primary care utilization.^{15,16} Disenrollment in public health insurance is also related to a host of risk factors – financial instability, minority race/ethnicity, and low parental education attainment – that are highly associated with justice system involvement,^{17,18} which makes it difficult to compare JIY care utilization to that of NJIY without accounting for insurance status. Second, it has often been hypothesized that patients without meaningful access to primary care services rely more heavily on ED services.¹⁹ Indeed, patients who can identify a usual source of care, and those who regularly utilize quality primary care services, are less likely to visit the ED.^{20,21} Given the complex relationships among variables related to preventive care utilization, we compared JIY and NJIY in three ways: Medicaid enrollment continuity (including number and length of gaps in coverage); rates of WC visits; and rates of ED visits.

METHODS

We conducted a retrospective cohort study of youth (ages 12-18) who resided in Marion County, Indiana, and were enrolled in Medicaid at any time between January 1, 2004, and December 31, 2011. The Indiana Office of Medicaid Policy and Planning (IOMPP) granted access to all electronic health records and monthly insurance enrollment tables. These records are stored in the Indiana Network for Patient Care, a health information exchange repository with clinical/hospital and payer data. The Marion County Juvenile Superior Court provided access to juvenile criminal records for youth over the same time period. The study was approved by the Indiana University Institutional Review Board and the Indiana Supreme Court.

Youth criminal records were linked to healthcare payer records using a probabilistic matching algorithm, which paired records using identifying information (e.g., name, gender, birthdate). The research team reviewed the algorithm's output (possible matches) and identified a threshold above which it was estimated that a true match occurred. To improve match accuracy,

we developed a program to identify false positive matches (e.g., two youth in the Medicaid records matched to a single criminal record) and to help correctly link multiple Medicaid or criminal records belonging to one youth. We conducted a one-by-one review of all automated matches that had linked multiple individuals with multiple records until all sample youth could be assigned a unique study identifier.

Measures

Demographic information. Youth gender, age, and race/ethnicity (white, black, Hispanic, or other/unknown) were gathered from electronic health records. Youth age was calculated as of the date of first Medicaid enrollment during the study period (2004-2011).

Medicaid enrollment. Monthly Medicaid enrollment tables were gathered from IOMPP to assess enrollment (dis)continuity, expressed as the number and length of any gaps in enrollment. Youth enrollment by each study period month was characterized as a dichotomous (yes/no) variable, beginning with the youth's first month of enrollment in Medicaid during the study period. If any youth was first enrolled in Medicaid during the study period but before age 12, the Medicaid enrollment start date was imputed at the youth's 12th birthday. Right censoring occurred when youth reached age 19 during the study period.

Juvenile justice system involvement. Arrest typically marks the beginning of an individual's involvement in the justice system. Because this is a cohort study of all Marion County youth from 2004-2011, JIY represent youth at various stages of system involvement: arrested youth, youth on probation, youth court-ordered to services, or youth detained or incarcerated in juvenile or adult facilities.

Healthcare utilization. Service utilization was identified using Medicaid claims data. Well child visits were identified using ICD-9 codes: V20.2, V20.3, V70.0, V70.3, V70.5, V70.6,

V70.8, and V70.9. Healthcare encounters with the care location “emergency department” were considered ED visits in the analyses.

Analysis

Descriptive statistics for all youth were calculated using demographic characteristics recorded at participants’ first Medicaid enrollment during the study period. Differences between JIY and NJIY were evaluated with Chi-square for categorical variables and Student’s t-test for continuous variables. Zero-inflated negative binomial models were used to estimate rates of WC visits and ED visits per person year for JIY and NJIY. Logarithmic transformed lengths of observation for individual subjects were incorporated into the analysis as offset parameters.

We assessed Medicaid enrollment continuity in several ways. First, we described the number and average length of gaps in Medicaid coverage. Second, we compared the average Medicaid enrollment length for JIY and NJIY by t-test. Lastly, we calculated the average annual proportion of Medicaid enrollment and compared JIY and NJIY enrollment by t-test.

Lastly, multivariable logistic regression models were conducted to investigate the association between WC and ED visits and youth involvement in the justice system. These models were adjusted for youth age at first Medicaid enrollment, race/ethnicity, gender, time in the study period, and average annual proportion of Medicaid enrollment.

RESULTS

The sample included 88,647 adolescents enrolled in Medicaid in Marion County, Indiana at any time during the study period (January 1, 2004 – December 31, 2011). The majority of these youth ($n = 67,985$, 76.7%) were not involved in the juvenile justice system (NJIY) during the study period. JIY, compared to NJIY, were more likely to be male, black, and older at the time of their first enrollment in Medicaid during the study period (see Table 1). During the study

period, JIY contributed 86,130.94 person-years of Medicaid enrollment, 35,357 WC visits and 35,077 ED visits. NJIY contributed 221,228.14 person-years of Medicaid enrollment, 110,983 WC visits and 69,848 ED visits. Rates per person year of WC and ED visits were calculated using zero-inflated negative binomial regression. The rate of WC visits per person year was lower for JIY compared to NJIY (JIY:0.46 vs. NJIY: 0.56 per person year; $p \leq 0.01$; see Table 2). The rate of ED visits per person year, however, was higher for JIY compared to NJIY (JIY: 0.44 vs. NJIY: 0.37 per person year; $p \leq 0.01$).

Medicaid enrollment continuity differed greatly between NJIY and JIY. Once enrolled in Medicaid, NJIY were more likely than JIY to have zero gaps in Medicaid coverage during the study period (46.2% of NJIY vs. 33.1% of JIY; $p < 0.0001$), meaning that nearly half of NJIY were continuously enrolled in Medicaid during the study period. In contrast, we found that NJIY were also enrolled in Medicaid for a greater annual proportion (NJIY: 9.6 ± 3.3 months per year vs. JIY: 9.2 ± 3.2 months per year; $p \leq 0.01$). NJIY also experienced fewer gaps than JIY, and their gaps in coverage were shorter (average gap length for NJIY: 8.3 ± 14.2 months vs. JIY: 9.5 ± 13.4 months; $p < 0.0001$). In contrast, when the longest period of Medicaid enrollment per person was assessed (which included youth who were continuously enrolled), on average, JIY had longer individual periods of enrollment in Medicaid in comparison to NJIY (JIY: 27.9 ± 21.8 months vs. NJIY: 24.3 ± 20.2 months; $p < 0.0001$).

In light of the differences in Medicaid enrollment continuity between JIY and NJIY, we explored the relationships between Medicaid coverage and the outcomes of interest: WC and ED visit utilization (see Figure 1). For WC visits, NJIY had significantly greater annual rates of utilization than JIY ($p < .01$), if they were continuously covered by Medicaid. For ED visits, JIY had significantly greater annual utilization rates than NJIY ($p < .01$), regardless of Medicaid

enrollment continuity. These results (see Figure 1a) largely echo those presented in Table 2. When considering JIY and NJIY separately (see Figure 1b), Medicaid enrollment continuity significantly impacted both WC and ED service utilization rates.

Results of two multivariable logistic regression models (see Table 3) predicting WC and ED visits confirmed that NJIY were more likely than JIY to have WC visits (adjusted odds ratio (AOR): 1.095; 95% CI: 1.053-1.138, $p < 0.001$) and were less likely to have ER visits (AOR: 0.604; 95% CI: 0.582-0.626, $p < 0.001$), after controlling for youth age, race/ethnicity, gender, average annual proportion of Medicaid enrollment, and total time in the study. Greater proportions of Medicaid coverage were generally associated with increased WC and ED visits. Further examination showed significant interactions between Medicaid coverage and justice system involvement for both WC and ED visits. For both types of visits, proportions of time of Medicaid coverage were positively associated with increased likelihood of WC and ED visits. Magnitudes of Medicaid-coverage associations with WC visits ranged from 1.027 (95% CI: 1.026-1.028) in NJIY to 1.030 (95% CI: 1.028-1.031) in JIY; magnitudes of Medicaid-coverage associations with ED visits ranged from 1.026 (95% CI: 1.025-1.027) in JIY to 1.020 (95% CI: 1.020-1.021) in NJIY.

DISCUSSION

The purpose of this study was to compare the preventive healthcare utilization of JIY and NJIY along three interrelated indicators: rates of WC visits, ED visits, and Medicaid coverage continuity. JIY, compared to NJIY, comprise an especially vulnerable population characterized by risk factors (i.e., poverty, minority race/ethnicity) associated with both gaps in insurance coverage and low rates of preventive care utilization.²² However, comparisons of actual health insurance coverage and care utilization rates between comparable groups of JIY and NJIY have

rarely been documented. The results of this study fill this gap in the literature. The study design allowed us to account for several risk factors - potential confounds – associated with low rates of preventive care utilization; internal validity was bolstered by our focus on one cohort of Medicaid-enrolled youth from a single county. JIY evidenced poorer preventive care along all three indicators when compared to NJIY. Namely, JIY exhibited more disrupted health insurance coverage, fewer WC visits, and greater use of ED services. These findings support our hypotheses, which were drawn from previous research on the relationships among insurance status, preventive primary care utilization, and ED services utilization.

Medicaid enrollment continuity. JIY, on average, were enrolled in Medicaid for longer continuous stretches than NJIY. However, insurance coverage among JIY youth was significantly more fractured, with JIY more likely than NJIY to experience two or more gaps in coverage. Compared to NJIY, the average length of a gap in insurance coverage was also longer for JIY. More and longer gaps in insurance coverage experienced by JIY is evidence of “churning,” or frequent movement between publicly insured, privately insured, and uninsured status.²³ Reasons for churning include changes in insurance eligibility (e.g., increased income, incarceration), acquisition of insurance from another source, or drop-out of eligible recipients (e.g., failing to complete required re-enrollment applications). Churning for Medicaid enrollees most often reflects drop-out, meaning that individuals move from public insurance rolls to uninsured status, despite continued eligibility for coverage.¹³ That JIY have more and longer periods without health insurance coverage is particularly problematic for this vulnerable group, since uninsured youth are less likely to utilize recommended preventive primary care services.^{15,16,24} Indeed, findings from the present study follow expected patterns of preventative primary care utilization when comparing JIY and NJIY.

Well child visits. A smaller proportion of JIY (46%) utilized a WC visit when compared to NJIY (56%). This finding remained even after controlling for youth demographics (i.e., age, gender, race/ethnicity) and annual proportion of Medicaid enrollment. Studying WC visit rates is important because other research has shown that youth who have access to preventive services with a primary care physician are less likely to rely on the ED for non-urgent care.^{20,21} For example, in a one-year study of children's healthcare utilization in Yuma County, Arizona, youth who received a visit with a primary care doctor had significantly decreased odds of utilizing ED services within the same year, especially if the youth were uninsured.²⁵ Studies conducted among adult patients have similarly found that those who face barriers to utilizing primary care are more likely to rely on ED services.²⁶

Emergency department visits. JIY in the current sample were more likely than NJIY to visit the ED (44% vs. 37%), providing empirical support for the hypothesis that JIY underutilize preventive primary care while over-utilizing ED services. One of the few previous studies comparing ED utilization by JIY and NJIY revealed that JIY are more likely to be hospitalized for ED visits related to intentional injuries,⁶ but recent public health research has identified similar patterns of ED use among victims and perpetrators of violence.²⁷

Limitations. This study is unique in that rates of Medicaid coverage, WC visits, and ED visits have not been assessed among JIY populations, especially not in comparison to a community-based sample of NJIY. Our use of eight years of administrative health and criminal records provides exceptional breadth to our understanding of JIY health and should guide future efforts to understanding healthcare utilization patterns using existing records. However, the current study is not without limitations. As we relied on administrative data for our findings, we did not attempt to assess how individual-level factors, such as family dysfunction, contribute to

utilization differences. Similarly, without any way to account for different policing strategies across the county, the risk of being JIY may not be consistent across the sample, even after controlling for youth demographics. The data were also extracted from one county only, meaning that these findings may not account for potential variation found across other geographic regions, especially since Medicaid administration is determined on a state-by-state basis. Other unmeasured correlates of preventive health care access and utilization – including availability of health care providers, access to alternate sources of care, and local or state health policy – may contribute to observed utilization differences between JIY and NJIY. For example, this study only included youth with access to public health insurance, and health care utilization rates may be different among privately insured youth. We were not able to capture the reasons for disenrollment from Medicaid, which could also have bearing on utilization patterns. Information about changes in Medicaid eligibility, different benefits of Medicaid enrollment for JIY, and out of home placements, are some factors that may have improved our understanding of why JIY and NJIY differed in health insurance coverage. Finally, since these data were gathered before the Affordable Care Act was implemented, future research must consider the impact of federal policy change on insurance coverage and retention.

Conclusions and future directions. The findings reported here suggest that, as expected, JIY fair worse than NJIY on three interrelated health indicators: WC visits, ED services utilization, and insurance status. Thus, interventions to improve preventive healthcare utilization, which specifically target JIY, are needed. Just as the three health indicators are related but distinct, the targets of current interventions to improve youth utilization of preventive primary care are often multifaceted. School health centers and similar school-based health initiatives are among such efforts, with promising implications for youth health.²⁸⁻³⁰ School health centers

typically provide preventive care, offerings services such as immunizations, testing for pregnancy and sexually transmitted infections, asthma management, and basic mental health counseling.³⁰ In a retrospective cohort study of adolescent healthcare utilization in Denver, youth who had received care at a school based health center (regardless of insurance status) were both more likely to utilize primary care and less likely to utilize ED services, when compared to youth who utilized only urgent care clinics.³¹

Other interventions are designed to improve the quality of, and access to, preventive primary care. Though the current study showed that JIY utilized fewer WC visits than NJIY, JIY are still accessing preventive care. Thus, interventions aimed at improving the *quality* of primary care for this group of high-risk youth may be feasible and impactful. One such intervention is use of collaborative care related to adolescent depression and substance use,³² two disorders that are common among JIY. To address access to care, several states have expanded eligibility for Medicaid or auto-enrolled eligible patients, which should reduce churning and provide greater access to affordable care.^{14,23} Efforts to improve access to primary care for individuals in the justice system have targeted offenders' release from secure confinement, enrolling prisoners in Medicaid or connecting them to a primary care physician as part of standard facility discharge planning.^{33,34} Given the dramatic impact of continuous Medicaid coverage on preventive care utilization among JIY (Figure 1b), and in light of previous calls to improve Medicaid coverage for individuals involved in the justice system,^{33,34} policy change to increase Medicaid enrollment for JIY remains a priority.

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Table 1. Sample demographics at youth's first enrollment in Medicaid, January 1, 2004 – December 31, 2011, by justice system involvement (N=88,647)

	Justice-Involved Youth (N=20,668)	Non-Justice-Involved Youth (N=67,985)
Gender		
Male	12,263 (59.4%)	31,014 (45.6%)
Female	8,374 (40.5%)	36,971 (54.4%)
Unknown	25 (0.1%)	0 (0.0%)
Race		
Black	12,235 (59.2%)	32,438 (47.1%)
White	6,686 (32.4%)	25,694 (37.8%)
Hispanic	847 (4.1%)	7,669 (11.3%)
Other/Unknown	894 (4.3%)	2,184 (3.2%)
Mean (SD) age		
	13.9 (1.9)	13.3 (1.8)

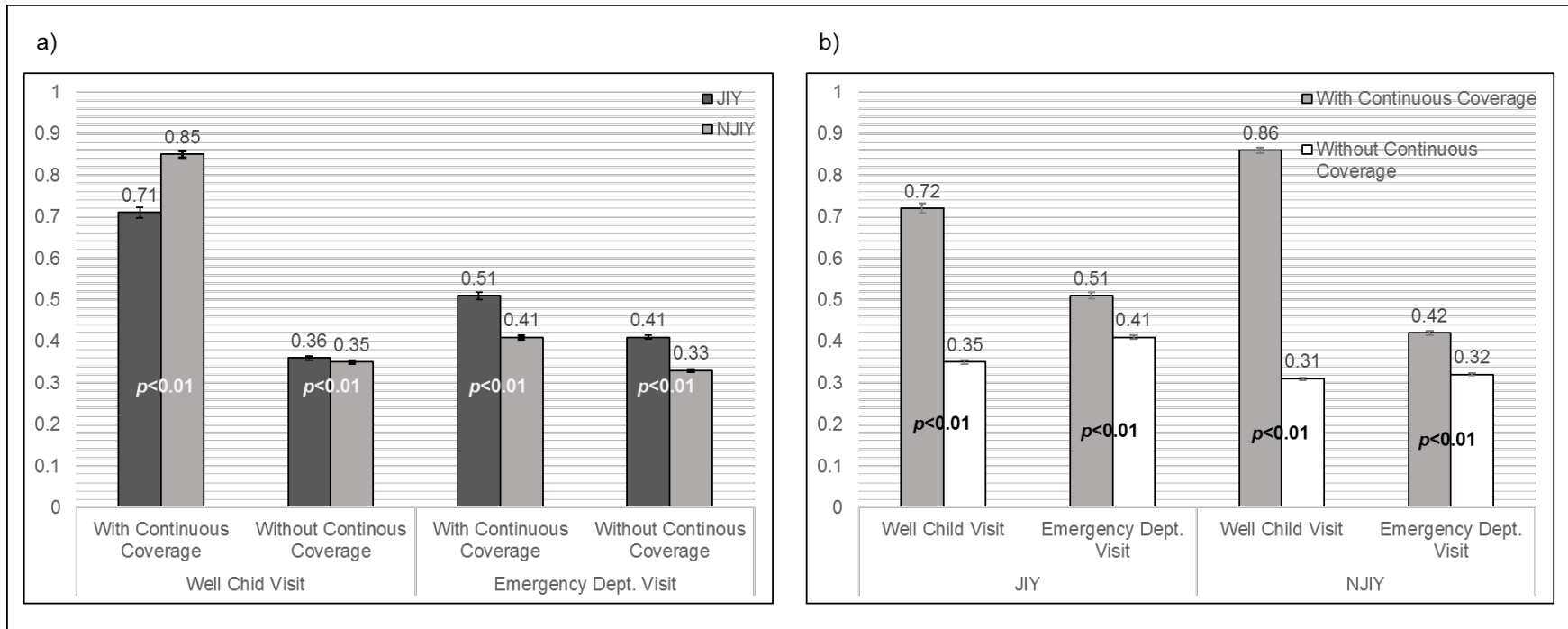
Table 2. Yearly rate (SD) of well-child and emergency department utilization by justice system involvement

	Justice-Involved Youth (N=20,668)	Non-Justice- Involved Youth (N=67,985)	p-Value
Well-child visit			< .01
	0.46 (0.005)	0.56 (0.003)	
Emergency department visit			< .01
	0.44 (0.005)	0.37 (0.003)	

Table 3. Multivariable logistic regression analyses predicting well child and emergency department visits (N = 88,647)

Characteristics	Well Child Visits		Emergency Department Visits	
	Adjusted Odds ratio (95% CI)	p-Value	Adjusted Odds ratio (95% CI)	p-Value
Youth age at first Medicaid enrollment (years)	0.762 (0.755,0.769)	0.019	0.972 (0.964,0.81)	< 0.001
Race (vs. White)				
Black/African American	1.294 (1.252,1.337)	<0.001	0.620 (0.600,0.640)	< 0.001
Hispanic/Latino	0.774 (0.733,0.817)	<0.001	0.485 (0.46,0.51)	< 0.001
Other/Unknown	1.807 (1.659,1.968)	<0.001	0.552 (0.50,0.60)	< 0.001
Male (vs. Female)	1.032 (1.001, 1.064)	0.044	1.008 (0.979, 1.038)	0.603
Time in Study (Years)	1.030 (1.029,1.031)	<0.001	1.031 (1.031,1.032)	< 0.001
Proportion of Medicaid Coverage (%)	1.027 (1.027,1.028)	<0.001	1.022 (1.021,1.022)	<0.001
NJIY (vs. JIY)	1.095 (1.053,1.138)	<0.001	0.604 (0.582,0.626)	< 0.001

Figure 1. Annual rates of well child and emergency department visits



a) Comparison of annual rates of well child and emergency department visits between justice-involved youth (JIY) and non-justice involved youth (NJIY) stratified by Medicaid enrollment continuity (N=88,647).

b) Comparison of annual rates of well child and emergency department visits between youth with continuous Medicaid coverage and non-continuous coverage among JIY (N=20,668) and NJIY (N=67,985).