

# Preventive Care Use Among Justice-Involved and Non–Justice-Involved Youth

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abstract

**BACKGROUND AND OBJECTIVES:** Youth involved in the juvenile justice system (ie, arrested youth) are at risk for health problems. Although increasing preventive care use by justice-involved youth (JIY) is 1 approach to improving their well-being, little is known about their access to and use of care. The objective of this study was to determine how rates of well-child (WC) 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 JIY would exhibit less frequent WC and more frequent emergency service use than non–justice-involved youth (NJIY).

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

**RESULTS:** The sample included 88 647 youth; 20 668 (23%) were involved in the justice system. JIY had lower use rates of WC visits and higher use rates of emergency services in comparison with NJIY. JIY had more and longer gaps in Medicaid coverage compared with NJIY. For all youth sampled, both preventive and emergency services use varied significantly by Medicaid enrollment continuity.

**CONCLUSIONS:** JIY experience more and longer gaps in Medicaid coverage, and rely more on emergency services than NJIY. Medicaid enrollment continuity was associated with differences in WC and emergency service use among JIY, with policy implications for improving preventive care for these vulnerable youth.

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**WHAT'S KNOWN ON THIS SUBJECT:** Justice-involved youth (JIY) are at greater risk for health problems when compared with non–justice-involved youth. Increased preventive care may improve the health of JIY, 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, JIY were significantly less likely to use preventive care when compared with non–justice-involved youth. JIY experienced significantly more and longer gaps in Medicaid coverage.

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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) from 1997 to 2008, ~1 in 3 respondents reported being arrested by age 23.<sup>1</sup> Justice-involved youth (JIY; ie, youth who have been arrested) tend to suffer significant health problems when compared with youth who have never been involved in the system (non-justice-involved youth [NJIY]). JIY, compared with NJIY, are at an increased risk for sexually transmitted infections, including HIV; mental health and substance use problems; and injury.<sup>2–6</sup> 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.<sup>7–9</sup> Increasing use of preventive primary care services is 1 approach offered to improve the health of vulnerable populations, including JIY.<sup>10</sup> 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.<sup>11,12</sup> However, the actual rate at which JIY use preventive primary care services has rarely been studied, much less in direct comparison with 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 health care use was the focus of our study, it was important to consider 2 other relevant variables: continuity of health insurance coverage and use of emergency department (ED) services over the same time period. First, transitions on or off of public health

insurance rolls (ie, “churning”) are common,<sup>13,14</sup> creating gaps in patients' ability to pay for health care, especially nonurgent, preventive care. Past researchers have confirmed that a lack of health insurance coverage is associated with deficits in primary care use.<sup>15,16</sup> Disenrollment in public health insurance is also related to a host of risk factors (financial instability, minority race and/or ethnicity, and low parental education attainment) that are highly associated with justice system involvement,<sup>17,18</sup> which makes it difficult to compare JIY care use 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.<sup>19</sup> Indeed, patients who can identify a usual source of care, and those who regularly use quality primary care services, are less likely to visit the ED.<sup>20,21</sup> Given the complex relationships among variables related to preventive care use, we compared JIY and NJIY in 3 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 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 and/or 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 health care payer records by using a probabilistic matching algorithm, which paired records by using identifying information (eg, name, sex, and birth date). 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 (eg, 2 youth in the Medicaid records matched to a single criminal record) and to help correctly link multiple Medicaid or criminal records belonging to 1 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 sex, age, and race and/or ethnicity (white, African American, Hispanic, or other/unknown) were gathered from electronic health records. Youth age was calculated by using the date of first Medicaid enrollment during the study period (2004–2011).

### *Medicaid Enrollment*

Monthly Medicaid enrollment tables were gathered from the Indiana Office of Medicaid Policy and Planning 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 to 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.

### Health Care Use

Service use was identified by using Medicaid claims data. WC visits were identified by using *International Classification of Diseases, Ninth Revision* codes: V20.2, V20.3, V70.0, V70.3, V70.5, V70.6, V70.8, and V70.9. Health care encounters with the care location "emergency department" were considered ED visits in the analyses.

### Analysis

Descriptive statistics for all youth were calculated by using demographic characteristics recorded at participants' first Medicaid enrollment during the study period. Differences between JIY and NJIY were evaluated with  $\chi^2$  tests for categorical variables and Student's *t* tests 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.

**TABLE 1** Sample Demographics at Youth's First Enrollment in Medicaid, January 1, 2004–December 31, 2011, by Justice System Involvement (*N* = 88 647)

	JIY ( <i>N</i> = 20 668)	NJIY ( <i>N</i> = 67 985)
Sex (%)		
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 (%)		
African American	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 age (SD)	13.9 (1.9)	13.3 (1.8)

Second, we compared the average Medicaid enrollment length for JIY and NJIY by using *t* tests. Lastly, we calculated the average annual proportion of Medicaid enrollment and compared JIY and NJIY enrollment by using *t* tests.

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 and/or ethnicity, sex, time in the study period, and average annual proportion of Medicaid enrollment.

### RESULTS

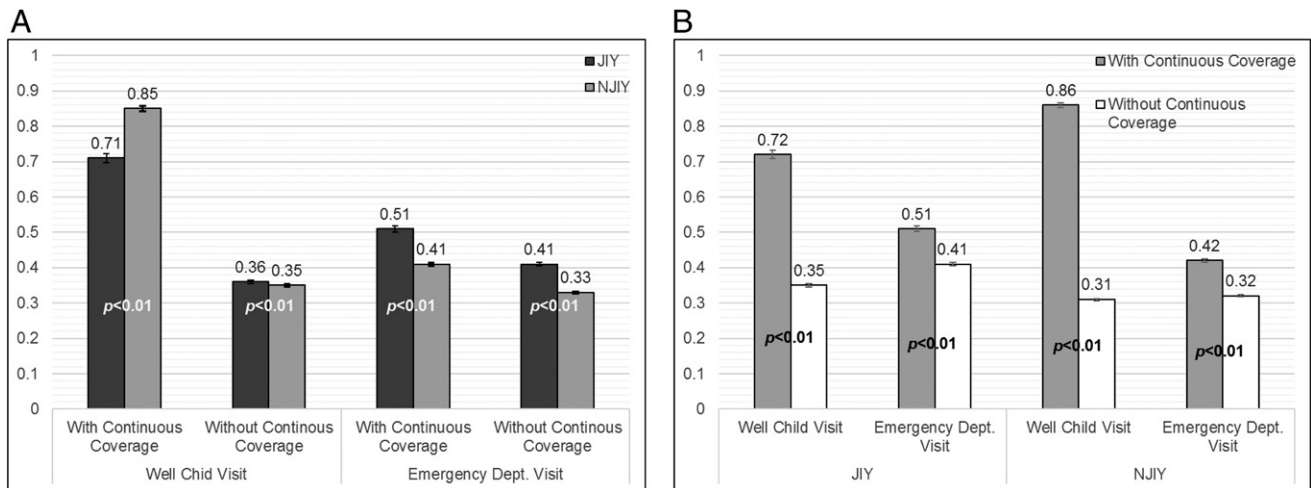
The sample included 88 647 adolescents enrolled in Medicaid in Marion County, Indiana, at any time during the study period (January 1, 2004–December 31, 2011). The majority of these youth (*n* = 67 985, 76.7%) were not involved in the juvenile justice system during the study period. JIY, compared with NJIY, were more likely to be male, African American, 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

**TABLE 2** Yearly Rate (SD) of WC and ED Use by Justice System Involvement

	JIY ( <i>N</i> = 20 668)	NJIY ( <i>N</i> = 67 985)	<i>P</i>
WC visit	0.46 (0.005)	0.56 (0.003)	<.01
ED visit	0.44 (0.005)	0.37 (0.003)	<.01

visits. Rates per person year of WC and ED visits were calculated by using zero-inflated negative binomial regression. The rate of WC visits per person year was lower for JIY than for NJIY (JIY: 0.46 versus NJIY: 0.56; *P* ≤ .01; see Table 2). The rate of ED visits per person year, however, was higher for JIY than for NJIY (JIY: 0.44 versus NJIY: 0.37; *P* ≤ .01).

Medicaid enrollment continuity differed greatly between NJIY and JIY. Once enrolled in Medicaid, NJIY were more likely than JIY to have 0 gaps in Medicaid coverage during the study period (46.2% of JIY versus 33.1% of NJIY; *P* < .0001), meaning that nearly half of NJIY were continuously enrolled in Medicaid during the study period. We found that NJIY were also enrolled in Medicaid for a greater annual proportion (NJIY: 9.6 ± 3.3 months per year versus JIY: 9.2 ± 3.2 months per year; *P* ≤ .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 versus JIY: 9.5 ± 13.4 months; *P* < .0001). In contrast, when the longest period of Medicaid enrollment per person was assessed (which included youth who were continuously enrolled),



**FIGURE 1** Annual rates of WC and ED visits. A, Comparison of annual rates of WC and ED visits between JIY and NJIY stratified by Medicaid enrollment continuity ( $N = 88\,647$ ). B, Comparison of annual rates of WC and ED visits between youth with continuous Medicaid coverage and noncontinuous coverage among JIY ( $N = 20\,668$ ) and NJIY ( $N = 67\,985$ ).

on average, JIY had longer individual periods of enrollment in Medicaid in comparison with NJIY (JIY:  $27.9 \pm 21.8$  months versus NJIY:  $24.3 \pm 20.2$  months;  $P < .0001$ ).

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 use (see Fig 1). For WC visits, NJIY had significantly greater annual rates of use than JIY ( $P < .01$ ), if they were continuously covered by Medicaid. For ED visits, JIY had significantly greater annual use rates than NJIY ( $P < .01$ ), regardless of Medicaid enrollment continuity. These results (Fig 1A) largely echo those presented in Table 2. When considering JIY and NJIY separately (Fig 1B), Medicaid enrollment continuity significantly impacted both WC and ED service utilization rates.

Results of 2 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: 1.095; 95% confidence interval [CI]: 1.053–1.138,  $P < .001$ ) and were less likely to have ED visits (adjusted odds ratio: 0.604; 95%

**TABLE 3** Multivariable Logistic Regression Analyses Predicting WC and ED Visits ( $N = 88\,647$ )

Characteristics	WC Visits		ED Visits	
	Adjusted Odds Ratio (95% CI)	<i>P</i>	Adjusted Odds Ratio (95% CI)	<i>P</i>
Youth age at first Medicaid enrollment, y	0.762 (0.755–0.769)	.019	0.972 (0.964–0.81)	<.001
Race (versus white)				
African American	1.294 (1.252–1.337)	<.001	0.620 (0.600–0.640)	<.001
Hispanic	0.774 (0.733–0.817)	<.001	0.485 (0.46–0.51)	<.001
Other/unknown	1.807 (1.659–1.968)	<.001	0.552 (0.50–0.60)	<.001
Male (versus female)	1.032 (1.001–1.064)	.044	1.008 (0.979–1.038)	.603
Time in study, y	1.030 (1.029–1.031)	<.001	1.031 (1.031–1.032)	<.001
Proportion of Medicaid coverage, %	1.027 (1.027–1.028)	<.001	1.022 (1.021–1.022)	<.001
NJIY (versus JIY)	1.095 (1.053–1.138)	<.001	0.604 (0.582–0.626)	<.001

CI: 0.582–0.626,  $P < .001$ ), after controlling for youth age, race and/or ethnicity, sex, 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 an 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 health care use of JIY and NJIY along 3 interrelated indicators: rates of WC visits, ED visits, and Medicaid coverage continuity. JIY, compared with NJIY, make up an especially vulnerable population characterized

by risk factors (ie, poverty, minority race and/or ethnicity) associated with both gaps in insurance coverage and low rates of preventive care use.<sup>22</sup> However, comparisons of actual health insurance coverage and care use 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 use; internal validity was bolstered by our focus on 1 cohort of Medicaid-enrolled youth from a single county. JIY evidenced poorer preventive care along all 3 indicators when compared with 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 use, and ED services use.

### Medicaid Enrollment Continuity

JIY were, on average, 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 2 or more gaps in coverage. Compared with 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.<sup>23</sup> Reasons for churning include changes in insurance eligibility (eg, increased income, incarceration), acquisition of insurance from another source, or dropout of eligible recipients (eg, failing to complete required reenrollment applications). Churning for Medicaid enrollees most often

reflects dropout, meaning that individuals move from public insurance rolls to uninsured status, despite continued eligibility for coverage.<sup>13</sup> That JIY have more and longer periods without health insurance coverage is particularly problematic for this vulnerable group, because uninsured youth are less likely to use recommended preventive primary care services.<sup>15,16,24</sup> Indeed, findings from the current study follow expected patterns of preventive primary care use when comparing JIY and NJIY.

### WC Visits

A smaller proportion of JIY (46%) used a WC visit when compared with NJIY (56%). This finding remained even after controlling for youth demographics (ie, age, sex, and race and/or ethnicity) and annual proportion of Medicaid enrollment. Studying WC visit rates is important because other researchers have shown that youth who have access to preventive services with a primary care physician are less likely to rely on the ED for nonurgent care.<sup>20,21</sup> For example, in a 1-year study of children's health care use in Yuma County, Arizona, youth who received a visit with a primary care doctor had significantly decreased odds of using ED services within the same year, especially if the youth were uninsured.<sup>20</sup> The authors of studies conducted among adult patients have similarly found that those who face barriers to using primary care are more likely to rely on ED services.<sup>25</sup>

### ED 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 underuse preventive primary care while overusing ED services. One of the few previous studies comparing ED use by JIY and NJIY revealed that JIY are more likely to be hospitalized for ED visits related to

intentional injuries,<sup>6</sup> but the authors of recent public health research have identified similar patterns of ED use among victims and perpetrators of violence.<sup>26</sup>

### 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 with a community-based sample of NJIY. Our use of 8 years of administrative health and criminal records provides exceptional breadth to our understanding of JIY health and should guide future efforts to understanding health care use patterns by 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 use differences. Similarly, without any way to account for different policing strategies across the county, the risk of being a JIY may not be consistent across the sample, even after controlling for youth demographics. The data were also extracted from 1 county only, meaning that these findings may not account for potential variation found across other geographic regions, especially because Medicaid administration is determined on a state-by-state basis. Other unmeasured correlates of preventive health care access and use (including availability of health care providers, access to alternate sources of care, and local or state health policy) may contribute to observed use differences between JIY and NJIY. For example, this study only included youth with access to public health insurance, and health care use 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 use 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, because these data were gathered before the Affordable Care Act was implemented, future researchers must consider the impact of federal policy change on insurance coverage and retention.

## CONCLUSIONS

The findings reported here suggest that, as expected, JIY fair worse than NJIY on 3 interrelated health indicators: WC visits, ED services use, and insurance status. Thus, interventions to improve preventive health care use, which specifically target JIY, are needed. Just as the 3 health indicators are related but distinct, the targets of current interventions to improve youth use 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.<sup>27–29</sup> School health centers typically provide preventive care, offering services

such as immunizations, testing for pregnancy and sexually transmitted infections, asthma management, and basic mental health counseling.<sup>29</sup> In a retrospective cohort study of adolescent health care use in Denver, youth who had received care at a school-based health center (regardless of insurance status) were both more likely to use primary care and less likely to use ED services than youth who used only urgent care clinics.<sup>30</sup>

Other interventions are designed to improve the quality of, and access to, preventive primary care. Although the current study showed that JIY used 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,<sup>31</sup> 2 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.<sup>14,23</sup> 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.<sup>32,33</sup> Given the dramatic impact of continuous Medicaid coverage on preventive care utilization among JIY (Fig 1B), and in light of previous calls to improve Medicaid coverage for individuals involved in the justice system,<sup>32,33</sup> policy change to increase Medicaid enrollment for JIY remains a priority.

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## ABBREVIATIONS

CI: confidence interval  
ED: emergency department  
JIY: justice-involved youth  
NJIY: non-justice-involved youth  
WC: well child

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