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Lack of health insurance among juvenile offenders: a predictor of inappropriate health care use and reincarceration?

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Authors' contributions: SB conceived and design the study, analysed data and drafted the manuscript. All other co-authors interpreted the data, revised it critically for important intellectual content. All authors approved the final version of the manuscript to be submitted.

Abstract

Objectives. Relationships between health insurance status and health care use among justice-involved youths transitioning into adulthood is an under-explored topic, even if transition to adulthood is a crucial time period for health care outcomes. To fill in these knowledge gaps, this study had two aims: 1) to examine trajectories of health insurance coverage and health care use among serious juvenile offenders transitioning into adulthood and 2) to explore associations between lack of health insurance, health care use, and re-incarceration.

Study design. We conducted a secondary analysis on the data of the US longitudinal Pathways to Desistance study between ages 20 and 23 (2000-2010).

Methods. Participant data on health insurance coverage, health care use, reincarceration, and sociodemographic variables (n=1,215) were extracted and analysed using descriptive statistics, generalized linear regressions, and cross-lagged panel models.

Results. About half of young offenders had no health insurance coverage or intermittent coverage between age 20 and 23. Emergency services were used (≥17.4%) notably more by insured participants and were increasingly used over time. Being uninsured at 20 was associated with re-incarceration at 23 (b=-.052, p=.014, odd-ratio=0.95), but incarceration at age 20 did not predict insurance status at age 23 (b=.009, p=.792).

Conclusions. Serious juvenile offenders, especially if uninsured, faced major barriers to accessing health care and often reported an inappropriate health care use. This likely led to reincarceration. The lack of continuity of care and of access to health care may therefore increase health disparities, and efforts are needed in order to mitigate detrimental outcomes, by effective in and out of detention coordination of health insurance coverage and among health services.

Keywords: health care; health insurance; re-arrest; longitudinal; youths

Highlights

- Justice-involved youths experience health care challenges.
- These challenges include being uninsured or lack/inadequate health care use.
- Lack of health insurance may lead to detrimental outcomes such as reincarceration.
- Transition into adulthood is a risky period for health care access and use.

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Introduction

Justice-involved youths bear a heavy burden of diseases when compared to the general population [1]. These health disparities are compounded by a lack of access to health care over time. Health insurance coverage (defined by the Health Insurance Association of America as "coverage that provides for the payments of benefits as a result of sickness or injury") and health care use (defined as utilization of health care services) are indeed lower among justice-involved people as compared to the general population [1]. Being uninsured, especially after release from detention, is a barrier to accessing health services [2] and time gaps in insurance coverage are associated with delayed health care seeking behaviours and poorer health outcomes [3]. Even during detention, being uninsured before incarceration is associated with lower use of nursing care and mental health services during detention [4], although access to care is offered to all people living in detention even if they do not have health insurance. Furthermore, former inmates are more likely to visit the Emergency Department (ED) for health services than the general population [5]. The reasons for using ED are multi-factorial: limited access to primary care services [6, 7], social and mental health instability [8], or lack of health insurance [9].

Few studies investigated access to care of justice-involved youths, although they have high rates of acute and chronic physical and mental illnesses [10]. A minority of incarcerated adolescents (13-18 years) had health insurance before and after detention (17%) or intermittent health insurance over time (6-10% of adolescents with multiple detention stays) [2]. Furthermore, adolescents with justice involvement (12-17 years) reported high rates of ED use or

hospitalizations [11]. However, these cross-sectional studies focused on adolescents and did not investigate transition into adulthood.

Young adulthood (18-25 years) is a period during which young people start to endorse adult responsibilities [12], including care of their own health. This period is risky as young people transitioning into adulthood are likely to forgo health care [13] and have the lowest rate of health insurance [14, 15]. In addition, young adults with special health care needs are likely to experience health care access challenges [15-17]. To our knowledge, there was no study on health insurance coverage and health care use among individuals involved in the justice system as adolescents as they transition into adulthood. Serious juvenile offenders, defined as adolescents and young adults convicted for severe or violent offenses, are more likely to continue their criminal path into adulthood and require early preventive interventions [18]. Thus, the research gap is important to address; and data on health care coverage and health care use among this risky subgroup of young people are needed.

Risk factors for re-arrest and reincarceration have been extensively studied and include demographics (being male or from an ethnic minority), family and social background (e.g., social support, family history of incarceration, low socioeconomic status), peers' relationships (e.g., history of peer offending and incarceration), mental health (e.g., antisocial behaviour, psychopathy), and substance use [18, 19]. Few studies have investigated associations of health insurance coverage with reincarceration; those that did showed inconsistent results. Being insured after release appeared as an important factor for a healthy and stable life that protects against reincarceration in two samples of ex-detainees benefiting from interventions designed to promote community reintegration [20] and in a sample of released offenders living with HIV [21]. However, the association between lack of insurance and recidivism was not supported by evidence in another prospective study [22]. Achieving a healthy and stable life includes taking care of one's own healthcare needs, which includes being insured and seeking timely and

appropriate access to care. Long-term, a healthy and stable life also involves integration into society, which includes current employment or being enrolled in an education program, having a stable relationship, being a parent, and having familial support [23]. These factors and interrelated with stable healthcare access; for example, in many instances, health insurance can be obtained through employment.

In order to better understand the relationship between healthcare and incarceration trajectories, the aims of this research were twofold. First, we examined the trajectories of health insurance coverage and health care use in the USA among serious juvenile offenders transitioning into adulthood (20-23 years). Second, we explored whether the lack of health insurance was associated with reincarceration.

Methods

Participants and procedures

The data source was the Pathways to Desistance study, a longitudinal multi-site study designed to investigate transition into adulthood of serious juvenile offenders [24, 25]. Serious offences include mostly felonies, but also property, sexual and weapon offences. Adjudicated youths (n=1,354, refusal rate=20%) aged 14 to 17 at the time of the offences were enrolled between November 2000 and January 2003 in the juvenile and adult court systems of Maricopa County (Phoenix, Arizona, n=654) and Philadelphia County (Pennsylvania, n=700). Participants received a baseline interview and ten follow-ups over a period of seven years. All participants provided informed consent and data were collected by trained interviewers using computer-assisted interviews.

The current analysis focused on follow-up interviews on data collected in waves 8 to 11 (respectively 4, 5, 6, and 7 years after baseline) when participants were aged 20, 21, 22, and 23

years on average. We focused on these waves because questions related to health care were not included in other time points. We included all available participants: n=1,215 at wave 8 (age 20, 89.7% of the initial sample), n=1,207 at wave 9 (age 21, 89.1%), n=1,179 at wave 10 (age 22, 87.1%), and n=1,134 at wave 11 (age 23, 83.8%). There were few missing values at each time point: 2.5% at wave 8, 1.3% at wave 9, < 0.1% at waves 10 and 11.

Measures

Health insurance coverage. Participants answered whether they had health insurance using the following categories: "yes, on my own", "yes, through college", "yes, through my job", "yes, through my parents' plan", "yes, through my spouse's plan", "yes, qualified for medical assistance" (Medicaid), "no", and "do not know" (recorded as missing value). We recoded this variable into two categories: having a health insurance "yes/no". For descriptive purposes, we also created a "health insurance over time" variable, categorized as follows: participants who always had health insurance, participants who never had health insurance, and participants who had intermittent health insurance. For the health insurance over time variable, we included participants having at least two follow-ups (n=29 participants with a single time point were excluded because no trajectory could be computed).

Health care use. The participants were asked where they went when they needed medical care to assess health care use and appropriate health care use. They answered using one of the following categories: "Hospital Emergency room", "private doctor office", "student health centre", "hospital clinic", "another clinic", "any place to go", and "in secure setting the whole recall period". We recoded these categories as: "ED", "private doctor", "hospital, clinic, or health centre", "nowhere", and "secure setting". The last category was not used in the analyses because detained participants accessed prison health services and could not choose other health care options. For each category (except secure setting), we computed the utilization frequency

(number of times they reported each category as their health care source over the four time points, score ranging from 0 to 4).

Incarceration history. Participants were asked about the time (duration) spent in secure settings with no community access, which was recoded as being incarcerated "yes/no" for each period.

We also assessed numerous variables susceptible to be potential confounders for lack of access to health care and reincarceration:

Health-related variables. Self-reported rate of overall health (1 "poor", 2 "fair", 3 "good", 4 "excellent") was used in addition to the Substance Use/Abuse Inventory, which assesses adolescents' use of illicit drugs and alcohol, social consequences, dependency, treatment, and parental substance use in a single scale [26, 27].

Psychosocial variables. Participants answered questions on their antisocial behaviour and social support. Antisocial behaviour was measured using the antisocial behaviour items from the Rochester Youth Study [28]. We computed a mean score on a five-point Likert scale. Social support was assessed using the Contact with Caring Adults Inventory [29], for which a total score from 0 to 8 across eight domains of social support was computed. Incarceration history of family and closest friends was also assessed ("yes/no" for both).

Demographics. Information on age, gender, race/ethnicity, parental level of occupation (higher, intermediate, lower, or don't know/no answer), education status (enrolled in school versus not enrolled in school), employment (work versus does not work), living with a significant other ('yes', 'no', or 'skipped because participants were in secure settings or placement'), having children (yes versus no), and study location (Phoenix or Philadelphia) were collected.

All variables except for age, gender, and race/ethnicity were collected at each follow-up.

Statistical analyses

We performed descriptive statistics for the sample followed by two sets of analyses. First, we investigated rates of health insurance coverage and health care use, and their relationships to each other. Second, we tested relationships between incarceration history and health insurance coverage.

Health insurance coverage and health care use

We computed descriptive statistics to provide an overview of health insurance coverage and health care use over time. We tested whether health insurance coverage and health care use changed over time using Cochran's Q tests. We explored the relationship between health care use and health insurance coverage using negative binomial regressions with the number of health care services as dependent variables and being insured at 20 and 23 as independent variables (n=1,028). The model was controlled for demographics, health-related and psychosocial variables at 20 and 23 (no model selection).

Health insurance coverage and incarceration history

To provide evidence regarding the direction of the relationship between health insurance coverage and incarceration history, we used a cross-lagged panel model between ages 20 and 23 (n=1,044). Cross-lagged panel models indicate the predominant causal influences between variables measured across time. The "causal winner" is the variable that predicts the other without being predicted in return [30]. The model included autoregressions (regression between the same variables over time), synchronous correlations (correlations between different variables at the same time point), causal paths (between being insured at 20 and incarceration at 23), and reverse-causal paths (between incarceration at 20 and being insured at 23). Since variables were dichotomous, a robust weighted least squares estimator (WLSMV) with delta parameterization was used. Standardized loadings (b_z) are reported. The model controlled for

demographics and all health-related and psychosocial variables at age 20 and 23 (no model selection and no model modification).

Statistical analyses were performed using SPSS 24 and the cross-lagged panel model Mplus 7.

Results

Descriptive statistics for demographics, psychosocial, and health-related variables are reported in Table 1. Between ages 20 and 23, 65.9% (n=838) of all participants reported having been incarcerated at least once. A majority were male (85.6%), of non-Caucasian origin (41.4% African-American, 33.5% Hispanic). Few participants lived with a significant other (18.2% at age 20, 25.5% at age 23 – not shown in Table 1) and worked (14.6% at age 20, 14.8% at age 23 – not shown in Table 1). More than a third of the participants were engaged in school at age 20 (37.8%) and had at least one child (36.6%). The proportion of participants engaged in school decreased at age 23 (18.0%, not shown in Table 1) whereas the proportion of participants having children increased (54.6%, not shown in Table 1). A total of 72.1% were not enrolled in school and did not work at age 23. Among participants who had children at age 23, 35.1% lived with a significant other.

Health insurance coverage and health care use

Descriptive statistics for health insurance coverage and health care use are reported in Table 2. Between 46.2% (age 20) and 53.3% (age 23) of the participants had no health insurance. The significant Cochran's Q test ($p<.001$) suggests that the proportion of uninsured participants increased over time in comparison with the proportion of insured participants. From 20 to 23, 22.9% (n=285) of all participants had no health insurance, 21.4% (n=266) were continuously insured, and 55.6% (n=691) were intermittently insured (not reported in Table 2).

Around a quarter of participants consulted private doctors (24.2% to 26.8%). Use of hospitals, clinics or health centres decreased over time as compared to other sources of care (Cochran's Q test, p=.001), whereas private doctor use remained stable (p=.451). Participants reporting having nowhere to go for health care represented the lowest but a non-negligible proportion (6.4% to 14.0%), which decreased over time (p<.001). ED was used by 17.4% to 27.6% participants and increased over time (p<.001). Between 15.1% and 21.3% of the participants could not choose the source of health care as they were incarcerated during the whole recall period.

Table 3 reports associations between health care use over time and health insurance at ages 20 and 23. Insured participants were more likely to use the ED at both ages 20 and 23 (p≤.004). Uninsured participants, both at aged 20 and 23, were more likely to report "nowhere to go" for health care (p<.001). Use of private doctors was higher among insured participants at both ages 20 and 23 (p<.001). Use of hospital, clinic, and health centres was not associated with insurance status (age 20: p=.568, age 23: p=.476). Most of the control variables had no significant effect, except ethnicity for having nowhere to go (p=.021, black reported less having nowhere to go), and study location (participants had less often nowhere to go in Phoenix, p=.021; and went more often in hospital, clinic, and health centres in Phoenix, p<.001).

Health insurance coverage and incarceration history

Figure 1 reports the results of the cross-lagged panel model. There was a significant reverse-causal pathway between health insurance coverage at age 20 and incarceration at age 23 (b_z=-.052, p=.014, odd-ratio=0.95), but no significant causal pathway between incarceration at age 20 and health insurance coverage at age 23 (b_z=.009, p=.792).

Some variables had a significant effect on insurance coverage at age 23 (males were more likely to be insured, b_z=.014, p<.001; participants enrolled in school were more likely to be

insured, b_z=.117, p=.003) and being incarcerated at age 23 (black were more likely to be incarcerated, b_z=.095 ,p=.036; males were more likely to be incarcerated, b_z=.086, p=.006; participants with substance dependence at age 20 were more likely to be incarcerated, b_z=.058, p=.032; participants with antisocial behaviour at age 20 were more likely to be incarcerated, b_z=.105, p=.001; participants having friends with a history of incarceration at age 20 were more likely to be incarcerated, b_z=.063, p=.029; and participants who worked at age 23 were more likely to be incarcerated, b_z=.234, p=.004).

Discussion

Health insurance coverage and health care use

Approximately half of all participants were uninsured at ages 20 and 23, with a slight increase between both ages. During the study period, more than half were intermittently insured, that is to say, being insured at some time point and not insured at others. This high proportion of uninsured youths concords with the proportions described in previous studies among individuals released from detention, i.e., between 40% and 90% [31], but higher than the proportions reported among justice-involved youths (e.g., 8.2% of 12-17 year-old adolescents, [11] and 17% of 12-18 year-old adolescents, [2], and among 18-24 year-old non-offenders (e.g., 25.9% [32]). Several reasons may explain the high proportion in our study sample. First, young adults from lower income and underserved families are less likely to be insured [32]. Second, our sample was composed of older young people (20-23 years) who were transitioning into adulthood, and therefore they may have lost coverage from their parental health insurances when they turned 18 or 19 (data collection for the Pathways to Desistance survey ended in 2010, before the 2014 Affordable Care Act). Third, adolescents from low-income backgrounds, such as juvenile offenders, who are on Medicaid or a Children's Health Insurance Program (CHIP) lost their benefits at age 19. Fourth, they may have not yet secured formal employment

that offers health benefits or sufficient income to purchase such benefits. As this age group has the lowest proportion of health insurance coverage [14, 15], the transition into adulthood has been indeed described as a fragile period.

Around half of all participants reported seeing a private doctor or going to hospitals, clinics, and health centres as usual sources of care. The ED was a usual source of health services for 17.4% to 27.6% of the participants, whereas 6.4% to 14% reported no usual health care access at all. For this substantial proportion of youths, the lack of continuity of care and of access to health care for those having nowhere to go may increase health disparities. A previous study reported that, after involvement with the justice system, adolescents used the ED (47.2%) to a large extent as well as hospital services (12.2%) [11]. Our study confirmed these findings, even if ED use was lower. The proportion we found was similar to the one reported by Frank et al. [6] among former adult detainees (23.7%). In our study, justice-involved youths tended to visit the ED more often with older age, while a decreasing number reported having nowhere to go – those without access to care may have shifted their health-seeking behaviour toward using ED services.

Being insured influenced the choice of health care services. Insured justice-involved youths were more likely to report visiting private doctors, whereas the uninsured were more likely to report having no access to care. These results were expected. However, the ED was also a common choice for insured justice-involved youths, which is a departure from the idea that ED use is associated with having no health insurance [9]. That said, young adults without an offending history are known to be high users of acute care: in 2011, 35.9 % of publicly-insured young adults, 25.1 % of uninsured young adults, and 18.3 % of privately-insured young adults reported at least one visit to the ED in the past year [32]. Therefore, visiting the ED may be a pattern of health care use among young people no matter their insurance status and history of offending. Possible reasons may include the fact that young people are less prone to chronic

conditions requiring continuity of care with a primary-care provider or poor access to regular care in the community [6]. Since we controlled for perceived health and substance use in the generalized linear models, there was probably no confounding effect with acute health problems. Further studies should explore in-depth this important result. Meanwhile, this finding suggested that justice-involved youths had an inappropriate health care use.

Taken together, these results highlight the fact that juvenile offenders with a history of incarceration may face important barriers to accessing health care services and that transition into adulthood could be a critical period for different reasons. First, many justice-involved youths were uninsured and likely to have nowhere to go when they needed care. The lack of health insurance is a fundamental issue because it is associated with decreased access to care and worse health outcomes [33]. Second, many justice-involved youths with insurance used the ED as a source of care. Even if the ED provides high-quality services, these focus on curative and crisis care, and not on primary health care, where the focus is mainly chronic mental and physical conditions, health promotion, and education. Primary health care is a key to help this vulnerable population to develop health literary, self-efficacy, and a sense of empowerment to nurture healthy choices in addition to ensure continuity of care. Special efforts should be made to ensure access to primary care services and adequate use of ED services of former inmates. Furthermore, coordination between correctional and community health services is essential for continuity of health coverage and services [22]. For example, young detainees should be screened for Medicaid eligibility or other specific post-detention reintegration programs prior to their release, as most are eligible for Medicaid [2].

Health insurance coverage and incarceration history

Longitudinal pathways between health insurance coverage and incarceration history showed that health insurance status at 20 should be considered as a predictor of reincarceration at 23, as shown by the significant reverse-causal pathway between being insured at 20 and incarceration at 23. There was no significant causal pathway between incarceration at 20 and being insured at 23. It is already known that incarceration history is associated with disparities in health care use and health insurance coverage [1]; however previous findings on the relationship between incarceration history and health insurance coverage were inconsistent. One study reported no relationship between use of primary care services and reincarceration within the first twelve months after release [22], whereas two others identified protective effects of being insured on recidivism [20, 21]. An explanation may be that health insurance coverage represents a key resource for achieving life stabilization, including care of substance use disorders, mental health problems, essential reproductive and physical health care [21]. Even if these results should be interpreted cautiously, they suggest that health insurance coverage is important not only for accessing health care services, but also to prevent re-arrest and reincarceration. However, the effect size was small (odd-ratio=0.95), meaning that even this variable had a significant effect, other factors should be considered as well.

Factors related to stable lifestyle

Factors related to having a stable life (being enrolled in school, being employed, having a stable relationship, and having children) did not appear as major protective factors against reincarceration. These factors were not associated with a reduced risk of being incarcerated at age 23 or a reduced risk of being uninsured at age 23 in the cross-lagged panel model.

However, a stable life did not seem to characterize the life of these young people. Indeed, 72.1% were not enrolled in school nor work at age 23, and if more than half of them had children (54.6%), only a 35.1% lived with a significant other. Therefore, it seemed that justice-

involved youths are at risk of being disengaged from school and work and having a precarious lifestyle. Young adulthood is associated with specific risk factors, such as substance use and health care-related problems [13, 14, 15, 34, 35]. Young adults with a history of justice involvement should be a specific focus for this at-risk life period. For example, interventions should be designed to avoid that these youths become 'youths not in employment, education or training', a situation that may have deleterious long-lasting consequences [36]. In future studies, health insurance status should be considered as a possible factor of stable lifestyle.

Limitations

This study has several limitations. First, this study took place before the implementation of the Affordable Care Act (ACA) in 2014. Recent studies reported that the rate of previously incarcerated individuals without insurance decreased after the implementation of the ACA [31, 37]. However, this study filled in an important knowledge gap on health care use among justice-involved youths. Indeed, despites the improvement in the US health care system, the proportion of the uninsured among previously incarcerated individuals remains higher in comparison with the general population, and the ED remains a regular source of care at the expense of primary health care [11]. Moreover, this study would be an interesting starting point for comparison with more recent data in the USA with the ACA or expansion of Medicaid coverage or in countries with universal health care coverage. Such comparisons would help to achieve a better understanding of the potential importance of the health care system to protect against reincarceration. In addition, our findings provided arguments against the repeal and replacement of the ACA. Second, our study relied on self-reported data for outcomes for which participants may have misreported information (recall bias, social desirability bias). A previous study concluded that participants discharged from an acute general rehabilitation were likely to overreport visits to general practitioners by 16% over twelve months [38]. However, the recall

bias varies according to the length of the recall period, with a longer period resulting in less accurate estimates [39]. Third, our findings should be replicated in other samples of older adults and other offenders to provide robust evidence of the longitudinal associations between health insurance coverage, health care use, and reincarceration. Finally, future studies should focus on more complete somatic and psychiatric comorbidities, as our study only included substance use and health self-evaluation. Further investigations should also add a measure of income, as our study only controlled for parental level of occupation as a proxy of socio-economical level and of frequency of ED use, because the Pathways to Desistance study included a binary variable of use or non-use.

Conclusions

Serious juvenile offenders transitioning into adulthood posed complex challenges as they were at increased risk of not being insured and not benefiting from continuity of primary health care services and because being uninsured increased their odds of reincarceration. Findings suggested that justice, policymakers, and systems leaders should plan for and implement effective coordination mechanisms to ensure health insurance coverage and continuity of care for these most vulnerable young people who are moving in and out of detention and transitioning into adulthood. Such coordinated efforts would contribute to increase health equity as we strive towards achieving the principle of equivalence of care between detainees and the general population [40, 41].

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Table 1. Descriptive statistics for demographics, psychosocial, and health-related variables of 20-year-old serious juvenile offenders

Variables		Descriptive statistics at age 20
Demographics	Age[1]	20.03 ± 1.15
	Gender[2]	
	Male	85.8 (1,042)
	Female	14.2 (173)
	Ethnicity[2]	
	Caucasian	20.2 (274)
	African-American	41.4 (561)
	Hispanic	33.5 (454)
	Other	4.8 (65)
	Education[2]	
	Engaged in school	62.2 (755)
	Not engaged in school	37.8 (458)
	Employment[2]	
	Work	85.4 (1,038)
	Do not work	14.6 (177)
	Living with a significant other[2]	
	Yes	52.6 (638)
	No	18.2 (221)
	In secure setting/placement	29.1 (353)
	Having children[2]	
	Yes	36.6 (445)
	No	63.4 (770)
	Parental level of occupation (at wave 1)[2]	
	Lower	35.5 (481)
	Intermediate	38.8 (526)
	Higher	12.3 (167)
	Don't known, never work, don't answer	13.3 (180)
	Study site[2]	
	Philadelphia	51.7 (700)
	Phoenix	48.3 (654)
Incarceration history	Participant's incarceration[2]	
	Wave 8 (age 20)	48.8 (593)
	Wave 9 (age 21)	48.1 (581)
	Wave 10 (age 22)	44.9 (529)
	Wave 11 (age 23)	46.6 (528)
	Familial incarceration history[2]	
	Yes	15.9 (192)
	No	84.1 (1,012)
	Friends' incarceration history[2]	
	Yes	46.3 (563)
	No	53.7 (612)
Psychosocial variables	Social support (0-8)[1]	5.20 ± 3.85
	Antisocial behavior (1-5)[1]	1.17 ± 0.78
	Health evaluation (1-4)[1]	3.17 ± 0.71

Health-related variables	Number of symptom of substance dependence[1]	0.71 ± 1.81

[1] Means and standard deviations are reported.

[2] Percentages and n are reported.

Table 2. Descriptive statistics (%, n) for health care variables of serious juvenile offenders at ages 20 to 23

	Wave 8 (ag 20) n=1,215	Wave 9 (age 21) n=1,207	Wave 10 (age 22) n=1,179	Wave 11 (age 23) n=1,134
Health insurance (%, n)				
No	46.2 (552)	50.6 (605)	52.6 (620)	53.3 (602)
Yes	53.8 (664)	49.4 (591)	47.8 (558)	46.7 (528)
Private	25.7 (307)	22.2 (266)	21.2 (250)	18.0 (203)
Medicaid	28.2 (337)	27.2 (325)	26.1 (308)	28.8 (325)
Health care use (%, n)				
Emergency Department	17.4 (209)	23.3 (281)	25.2 (297)	27.6 (313)
Private doctor	26.3 (316)	26.8 (323)	25.5 (300)	24.2 (274)
Hospital, clinic, health centre	27.2 (327)	22.2 (267)	21.1 (248)	20.6 (233)
Nowhere	14.0 (168)	10.7 (129)	9.4 (111)	6.3 (72)
Incarcerated	15.1 (182)	17.0 (205)	18.8 (221)	21.3 (241)

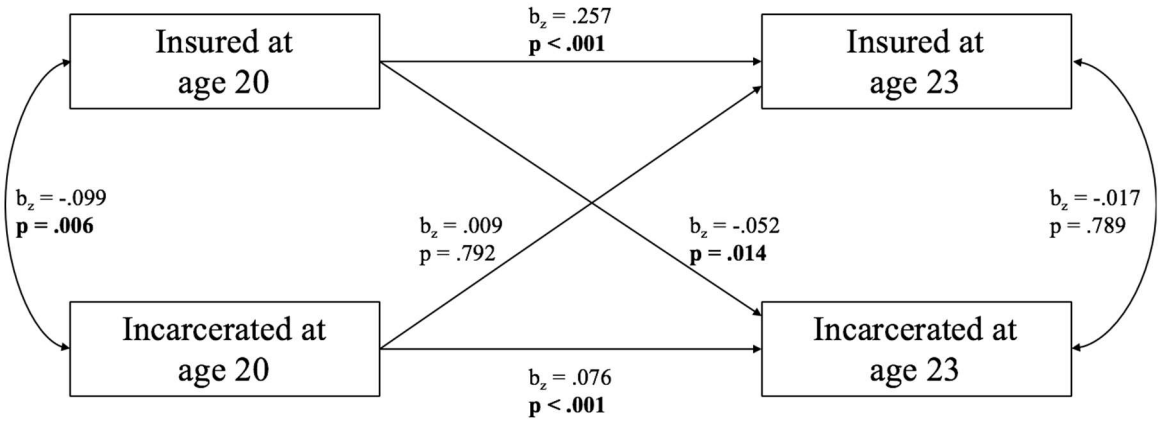
Table 3. Negative binomial regression models of different sources of health care on health insurance coverage at ages 20 and 23

	Health insurance Wave 8 (age 20)		Health insurance Wave 11 (age 23)	
Dependent variables	Yes	No	Yes	No
Emergency Department use				
Adjusted means	1.84	1.26	1.72	1.34
Wald $\chi 2$	17.36		8.30	
p-value	<.001		.004	
Private doctors				
Adjusted means	0.97	0.47	0.89	0.51
Wald $\chi 2$	42.91		28.68	
p-value	<.001		<.001	
Hospital, clinic, health centre				
Adjusted means	0.70	0.66	0.66	0.71
Wald $\chi 2$	0.33		0.51	
p-value	.568		.476	
Nowhere to go				
Adjusted means	0.13	0.34	0.15	0.30
Wald $\chi 2$	38.68		21.44	
p-value	<.001		<.001	

Dependent variables: Number of time participants used the corresponding service over the four time points (0-4).

Models controlled for demographics (age, gender, ethnicity, education, employment, living with a significant other, having children, parental level of occupation, and study location), psychosocial variables (social support, antisocial behaviour, and incarceration history of family and friends), and health-related variables (overall rating of health status and Substance Use/Abuse Inventory at ages 20 and 23).

Figure 1. Cross-lagged panel model between incarceration history and health insurance coverage among serious juvenile offenders at ages 20 and 23



Standardized coefficients are reported.

The model also controlled for demographics (age, gender, ethnicity, education, employment, living with a significant other, having children, parental level of occupation, and study site), psychosocial variables (social support, antisocial behaviour, and incarceration history of family and friends), and health-related variables (overall rating of health status at ages 20 and 23 and Substance Use/Abuse Inventory at ages 20 and 23).