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Authors

Barnert, Elizabeth S

Abrams, Laura S

Dudovitz, Rebecca

et al.

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What is the Relationship Between Incarceration of Children and Adult Health Outcomes?

Elizabeth S Barnert, MD, MPH, MS[a,b], **Laura S. Abrams, PhD, MSW**[c], **Rebecca Dudovitz, MD, MSHS**[a,b], **Tumaini R. Coker, MD, MBA**[d], **Eraka Bath, MD**[e], **Lello Tesema, MD, MSHS**[f], **Bergen B. Nelson, MD, MS**[g], **Christopher Biely, MS**[a,b], and **Paul J Chung, MD, MS**[a,b,h,i]

[a]Department of Pediatrics, UCLA David Geffen School of Medicine

[b]UCLA Children's Discovery & Innovation Institute, Mattel Children's Hospital UCLA

[c]Department of Social Welfare, UCLA Luskin School of Public Affairs

[d]Department of Pediatrics, University of Washington, Seattle Children's Research Institute

[e]Department of Psychiatry and Biobehavioral Sciences, UCLA David Geffen School of Medicine

[f]UCLA Robert Wood Johnson Foundation Clinical Scholars Program

[g]Department of Pediatrics, Virginia Commonwealth University

[h]Department of Health, Policy, & Management, UCLA Fielding School of Public Health

[i]RAND Health, RAND Corporation

Abstract

Objective—We sought to quantify the association between child incarceration in the U.S. and subsequent adult health outcomes.

Methods—We analyzed National Longitudinal Study of Adolescent to Adult Health data from 1,727 adult (Wave IV) participants first incarcerated at age <25. Using Chi-squared tests and multivariate logistic regression models, we compare adult health outcomes (mobility limitations, depressive symptoms, suicidal thoughts) among those first incarcerated at age ≤14, 15–17, and 18–20, with 21–24 as the reference group.

Results—Of the 1,727 participants, 105 (6.7%) were first incarcerated at age ≤14 ("child incarceration category"), 315 (19.3%) at age 15–17, 696 (38.5%) at age 18–20, and 611 (35.6%) at age 21–24. Those incarcerated as children (age ≤14) were disproportionately black or Hispanic compared to those incarcerated at age 15–24. Compared with first incarceration at age 21–24, child incarceration independently predicted adult mobility limitations (adjusted odds ratio

Corresponding Author: Elizabeth Barnert, UCLA Department of Pediatrics, 10833 Le Conte Ave., 12-476 MDCC, Los Angeles, CA, 90095, [ebarnert@mednet.ucla.edu], 310-794-4365.

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[OR]=3.74; p=0.001), adult depression (OR=1.98; p=0.034), and adult suicidal thoughts (OR= 4.47; p=0.005).

Conclusions—Child incarceration displays even wider sociodemographic disparities than incarceration generally and is associated with even worse adult physical and mental health outcomes.

Keywords

child incarceration; youth incarceration; juvenile incarceration; incarcerated youth

INTRODUCTION

Children in conflict with the law, defined here at those age 14 and under, are an under-discussed but important segment of the pediatric population.[1] The United States (U.S.) is the world leader in youth incarceration.[2] In 2015, U.S. law enforcement arrested 920,000 youth less than 18 years old,[3] the majority of whom are arrested for non-violent charges such as drug offenses or truancy.[4] The U.S. juvenile justice population is disproportionately comprised of young men of color; approximately 85% are male, 40% are black, and 23% are Hispanic.[4]

In the U.S., there is no federal statute specifying a minimum age of juvenile justice jurisdiction. As a result, thousands of children are arrested each year.[1] Currently, fewer than half of U.S. states have laws establishing a minimum age of juvenile justice jurisdiction.[5] Current minimum age boundaries across the U.S. range from 6 to 11 years old, indicating that even in states with minimum age laws, children as young as 6 years old can be processed in the juvenile justice system for a “delinquent” act.[5] Further complicating the wide variation in state practices regarding how young children in the justice system are processed is the lack of publicly available information on this group. The data gap on child incarceration is wide.

Youth who are first incarcerated as children may be especially medically vulnerable, although specific data on this population is generally lacking.[6] Incarcerated youth across child and adolescent ages have extremely high rates of unmet mental, physical, developmental, and social health needs.[7,8] A landmark study on youth in custody found that upon their intake health exam, 46% of newly-detained youth had health needs requiring immediate medical attention.[9] Additionally, 70% of incarcerated youth meet diagnostic criteria for at least one psychiatric disorder, with many experiencing multiple psychiatric conditions.[10]

Youth incarceration is believed to have long-term negative effects on health, a concept highly salient to individuals first incarcerated as children. In a prior study using the National Longitudinal Study of Adolescent to Adult Health (Add Health) data, we found that young people’s incarceration duration was associated with worse adult general health and higher rates of mobility limitations, depressive symptoms, and suicidal thoughts.[11] Other studies have similarly found any youth incarceration to be associated with worse adult general health,[11] higher rates of mobility limitations,[11] depressive symptoms,[11] obesity,[12] and

hypertension and other stress-related illness.[13] Unfortunately, none of these studies, including our previous publication, have provided data to understand how incarceration of individuals during childhood compared to incarcerated at other young adult ages may be associated with their health outcomes in adulthood. We postulate that individuals first incarcerated as children might be even more vulnerable to incarceration's potential negative downstream health effects. To test whether younger age at first youth incarceration predicts worse health, we extended our prior longitudinal analysis on youth incarceration and adult health outcomes.

As a first step, in an immediate prior study, we described sociodemographic characteristics of individuals first incarcerated as children compared to individuals never incarcerated.[6] Using Add Health data, we found that individuals first incarcerated as children were disproportionately of color, more likely to be from lower socioeconomic backgrounds, and more likely to have been raised in single parent households.[6] In the currently presented study, we examined whether associations between age at first incarceration and worse adult health outcomes are stronger among individuals first incarcerated as children compared to individuals first incarcerated later, controlling for adolescent health status and contextual characteristics.

METHODS

We analyzed National Longitudinal Study of Adolescent to Adult Health (Add Health) data from 1,727 adult (Wave IV) participants first incarcerated at age <25. Add Health is a nationally representative longitudinal survey of U.S. youth.[14] The Wave I survey, conducted in 1994, included 20,745 youth participants in grades 7 to 12. Wave IV, conducted in 2008, included 15,701 adult participants between the ages of 24 to 32 years of age. Parent/guardian consent and adolescent assent was obtained for all participants. The Wave I survey included measures of health status and social determinants of health. The Wave IV follow-up survey, conducted in participants' homes and in correctional settings, included measures on history of incarceration, including age at first incarceration, and adult health status.[14]

To examine whether associations between incarceration and adult health outcomes are stronger among individuals first incarcerated as children than among individuals incarcerated at age 15–24, we included only individuals with a history of incarceration before age 25 and complete data on the primary predictor, primary outcome (adult general health), and sample weight. The resulting analytic sample included 1,727 individuals.

Age at First Incarceration Predictor Measure

To examine the longitudinal relationship between child incarceration and adult health relative to incarceration at adolescent and young adult ages, we constructed a primary predictor that examined age of first incarceration prior to Wave IV. To determine the age of first incarceration, we combined the Wave IV questions asking whether participants had ever spent time in a correctional facility with participant self-reports of their age at first incarceration. Variable categories were defined as: child incarceration (first incarceration at age ≤14); middle adolescent incarceration (first incarceration at age 15–17 years), and later incarceration (first incarceration at age 18–20 years), with first incarceration age at 21–24

years as the reference category. Individuals first incarcerated at age ≥25 were excluded as age 25 is commonly used to mark the end of early adulthood. Age 14 served as the cut-point for child incarceration because age 14 is when most U.S. youth transition to high-school, signifying an important social, developmental, and academic milestone.

Adult Health Outcomes

We selected four adult health outcomes that encompass important aspects of physical and mental health. These outcomes were adult general health, mobility limitations, depressive symptoms, and suicidal thoughts.

Adult General Health—Self-reported general health is a well-studied measure associated with disease burden and mortality risk.[15] At Wave IV, participants were asked to describe their health as being either excellent, very good, good, fair, or poor. We used a dichotomous measure of Wave IV low self-rated health for responses of fair or poor (versus excellent, very good, or good). This cut-point was chosen based on the response distributions in the relatively young and healthy Add Health population. A sensitivity analysis using an alternate cut-point (low self-related health as poor, fair, or good) revealed similar results.

Adult Mobility Limitations—We constructed a dichotomous measure of adult mobility limitations by combining responses to the two Wave IV Add Health questions that asked whether health problems created limitations with the following activities: 1) climbing flights of stairs and 2) moderate activities such as moving a table. Individuals who reported either of these limitations were categorized as having mobility limitations.

Adult Depressive Symptoms—In Wave IV, Add Health participants completed the short-form Center for Epidemiologic Studies Depression Scale (CESD-10), which measures depressive symptoms in the prior week.[16] We constructed a adult depressive symptoms variable using Wave IV CESD-10 data. Consistent with the recommended clinical cut-off for this tool, we categorized scores ≥11 as a dichotomous measure of adult depressive symptoms.[17]

Adult Suicidal Thoughts—The Wave IV single-item response that asked particpants if they had seriously considered suicide in the previous 12 months was used to create a dichotomous measure of adult suicidality.

Covariates

We applied an ecological framework[18] to identify potential covariates, including Wave I: (1) health variables, (2) socio-demographic variables, and (3) other variables associated with both youth incarceration and adult health in the literature.[7,13,19,20] We selected covariates with confirmed associations between the main predictor (age at first incarceration) and main outcome (adult general health). The Wave I health variables were Wave I general health (in the general health model), Wave I mobility limitations (mobility limitations model), Wave I depressive symptoms (depressive symptoms model), and Wave I suicidal thoughts (suicidal thoughts model). For Wave I general health, depressive symptoms, and suicidal thoughts, questions asked were identical to the corresponding Wave IV variables. For Wave I mobility

limitations, as identical questions were not available, we used the question asking participants if they had difficulty using their limbs because of a permanent physical condition. The youth Wave I self-reported socio-demographics variables were gender; race/ethnicity (white, black, Hispanic, other); age; and highest level of parental education. Parents' reported household income was constructed from parent responses on the Wave I in-home parent survey.

For selecting the third category of covariates (i.e., other variables associated with incarceration and health), we applied an ecological framework[18] in reviewing relevant literature[7,13,19,20] to identify potential individual, family, and community-level factors potentially associated with both youth incarceration and health. Potential individual youth-level covariates that we examined were: school connectedness (measured via 5-item scale, [Cronbach's alpha 0.83[21]]; high-school grade point average (based on most recent grades)[11]; perceived likelihood of attending college (measured via single-item 5-point scale); delinquent behaviors (measured via 12-item Serious Delinquency Scale, [Cronbach's alpha 0.81][22]); regular alcohol use (defined as drinking alcohol ≥2 days per month); cigarette use (defined as cigarette use once or more during the prior 30 days; marijuana use (defined as marijuana use at least once in the prior 30 days); and other drug use (defined as using "other drugs" such as cocaine once or more in the prior 30 days). Candidate family-level covariates were family household structure (categorized per Add Health as 2 biological parents, 2-parent [≥1 non-biological], single parent, other); parental incarceration (measured via single-item response); and family connectedness (measured via 3-item scale, Cronbach's alpha 0.77[23]). Candidate community-level covariates were perceived neighborhood safety, (measured via single-item response querying youths' perceived neighborhood safety); neighborhood unemployment (1990 census unemployment rate by block group); and proportion of neighborhood adults without high-school diploma (proportion of community adults age ≥25 without a high-school diploma or equivalent designation). All covariates were constructed based on self-report items from the youth in-home Wave I interviews except for household income (in-home parent surveys), history of parental incarceration (in-home parent surveys), neighborhood unemployment (census data), and neighborhood high-school graduation rate (census data). Of these covariates, family structure, family connectedness, perceived neighborhood safety, neighborhood unemployment, and neighborhood high-school graduation rate demonstrated significant associations with the incarceration predictor and general health outcome variable at the 0.05 significance level and were thus included in the multivariate models. Those that did not have any association with incarceration or health outcome were not included in the final models.

Data Analysis

To examine the relationship between child incarceration, we first computed descriptive statistics of Wave I social determinants of health and adult health outcomes. F-test and chi-square analyses compared covariates and adult health outcomes among individuals with a history of incarceration by young adulthood across the different youth incarceration age categories. Multivariate logistic regressions then evaluated the relationship between age at first youth incarceration and subsequent adult health outcomes (self-reported general health, mobility limitations, depressive symptoms, and suicidal thoughts) in Wave IV, controlling

for the covariates described above. To ensure findings were not driven by frequency or duration of incarceration, models were also run controlling for cumulative frequency of incarceration (dichotomized as once versus more than once) and cumulative duration of incarceration (continuous variable) by Wave IV. We conducted analyses in Stata version 12.0 (StataCorp LP, College Station, TX) using the "svy" suite of commands to account for the Add Health survey design elements of stratification, clustering, and weighting. The study was approved by UCLA's Institutional Review Board.

RESULTS

Among the sample of 14,689 adult Add Health participants, 2,248 (16.5%) reported any incarceration, including 1,727 (13.1%) first incarcerated at age <25. Of the 1,727 participants first incarcerated as youth, 105 (6.7%) were first incarcerated at age ≤14, 315 (19.3%) at age 15–17, 696 (38.5%) at age 18–20, and 611 (35.6%) at age 21–24. The 105 adult participants who reported child incarceration (age≤14) were first incarcerated at age 7 (n=1), 10 (n=1), 11 (n=9), 12 (n=8), 13 (n=37), and 14 (n=49); up to 95 of these were first incarcerated prior to their Wave I interview.

Sociodemographics (Table 1)

Most individuals in the child incarceration category were male, although a lower proportion than those first incarcerated at age 15–17 (p=0.06). Significant racial/ethnic differences were observed by age of incarceration (p<0.001). Specifically, white participants were comparatively less represented in the child incarceration category than at other ages, while black, Hispanic, and "other" youth were comparatively more represented. A trend towards lower household income was observed for youth first incarcerated at younger ages (p=0.051). Differences across family household structure type were significant (p=0.003), with individuals in the child incarceration category more likely to be from single parent households (40.7%) compared to two-biological parent households (17.7%).

Wave I Health (Table 1)

At Wave I, individuals in the child incarceration category were more likely to report worse general health (21.5% for child incarceration category [≤14 years] vs. 8% for older incarceration age categories; p=0.008) and more depressive symptoms (34.3% child incarceration category vs. 17.3–25.0% for older incarceration age categories; p=0.003), compared to individuals incarcerated at later ages. Differences were not statistically significant for Wave 1 mobility limitations or suicidal thoughts.

Wave I Ecological Factors

Family connectedness was lowest among individuals in the child incarceration category (10.2 vs. 10.7–11.0; p=0.013). The community-level factors of perceived neighborhood safety, neighborhood unemployment, and neighborhood graduation rates did not significantly differ by age of first incarceration; however, notable trends were present with highest risk consistently seen in the child incarceration category.

Child Incarceration and Adult Health

In the child incarceration category, unadjusted results demonstrated statistically significant differences for the adult health outcomes of mobility limitations (odds ratio= 3.07; 95% confidence interval, 1.46–6.44; p= 0.003), adult depressive symptoms (OR= 2.35; 95% confidence interval, 1.28–4.28; p=0.006), and adult suicidal thoughts (OR=4.22; 95% confidence interval, 1.72–10.34; p=0.002).

Multivariate analyses demonstrated that younger ages of first incarceration remained significantly associated with higher odds of having adult mobility limitations, depressive symptoms, and suicidality, after adjusting for covariates (Table 2). Child incarceration predicted subsequent adult mobility limitations (adjusted odds ratio=3.74; 95% confidence interval, 1.69–8.31; p=0.001), depressive symptoms (OR=1.98; 95% CI 1.05–3.72; p=0.034), and suicidality (OR= 4.47; 95% CI 1.59–12.52; p=0.005) and was the highest risk category in each of these models. Child incarceration was not a significant predictor of adult general health. Results showed similar trends in multivariate models that controlled for frequency and duration of incarceration with the exception that the child incarceration category was no longer significant in the depressive symptoms model (Table 2). Results were also sustained in sensitivity analyses of the adult general health multivariate model adjusted for Wave I depressive symptoms and suicidal thoughts. We also examined the predictor age of incarceration as a continuous variable; our findings were sustained.

DISCUSSION

Our findings indicate that younger age at first incarceration independently predicts worse adult health, controlling for relevant sociodemographic and ecological factors. Compared to incarceration at later adolescent and young adult ages, child incarceration has wider sociodemographic disparities and is more strongly associated with poor physical and mental health outcomes during adulthood. Our findings align with prior longitudinal studies that have found an association between youth incarceration and worse long-term health.[11–13,20] Our study is unique in its focus on the youngest subset, children ≤ 14 years old. Given the wide variation in juvenile justice policies and age thresholds, including the current absence of a minimum age law in most U.S. states,[5] understanding how young age at first incarceration may impact adult health is critical.

Our analyses reinforce that individuals with a history of child incarceration were more likely to be from racial/ethnic minorities and from single parent households.[6] They were also more likely to have worse adolescent health. It is unclear whether the worse health measured in the Wave I Add Health survey was a predisposing factor that heightened youths' risks to early incarceration in childhood, was an effect of child incarceration (at least for those whose incarceration preceded the Wave I survey), or a combination of both. Regardless, it is evident that individuals with a history of child incarceration should be considered a medically vulnerable population and warrant identification as children and youth with special health care needs. [24] These children may potentially benefit more from health and psychosocial-focused interventions rather than the more punitive[25] and potentially harmful approach of incarceration.[11]

The observed relationship between child incarceration and subsequent adult depressive symptoms and suicidality is striking, although not surprising. Suicide is the leading cause of death for youth in confinement.[26,27] Rates of self-injurious and suicidal behaviors in juvenile justice populations are high, as are mental health conditions such as depression and substance use disorder which, independently potentiate the risk of suicidal behaviors.[10]

Roughly one-third of incarcerated youth report exposure to five or more adverse childhood experiences (ACEs).[28] Further, youth incarceration itself can signify an adverse exposure as it can be traumatic to both youth and their families, creating a state of toxic stress that disrupts healthy brain development.[29] Experiencing just one ACE can increase the risk of suicide two to five times.[30] The extent to which ACEs act as a precursor for child incarceration, depression, and suicidal thoughts—or, alternatively, the extent to which child incarceration itself is the ACE that predicts worse adult mental health—is unclear. Understanding the relationship between ACEs and child incarceration is relevant to determining best practices for pediatric health providers serving young children exposed to trauma, and determining whether the justice system, as opposed to health and child welfare systems, are most appropriate for serving these vulnerable children. Solving this under-discussed ethical and child health problem is critical.

Our findings have important implications for pediatrics. Child health professionals should be aware that child incarceration exists. Pediatric providers can take steps to provide needed treatments to troubled children in order to prevent cycles of incarceration. This may involve explicitly addressing underlying health needs and social determinants of health that put children at risk for incarceration. For the special population of children in conflict with the law, pediatric health providers can also work to reduce negative downstream health effects of child incarceration by providing close follow-up and care of children and adolescents following incarceration.

Results also suggest that a new policy approach may be needed—one in which justice system involvement is prohibited for the very young, avoided whenever possible for those slightly older, and intentionally buffered by health-protective interventions for those ultimately incarcerated. Several states are actively considering legislative proposals to raise or establish a minimum age of juvenile delinquency jurisdiction; Nebraska recently passed a minimum age of 11.[1,31,32] The Society of Adolescent Health and Medicine[33] and the United Nations Convention on the Rights of the Child[34] both recommend a minimum age of criminal responsibility of at least 12 years old. Regardless of juvenile justice minimum age statutes, our results indicate an urgent need for the health arena to proactively care for these vulnerable children and adults with life histories of child incarceration.

Our study has limitations. The Wave I Add Health survey was a school-based sample, which may have introduced a selection bias; however, we noted that the observed Wave IV incarceration rate is consistent with national figures.[35] In addition, we postulate that any selection bias would underestimate associations between child incarceration and adult health, as higher risk individuals with worse adult health would have been less likely to participate in the Wave IV Add Health survey. Wave I participants spanned 7th–12th grade, which may have introduced differences between youth of different ages; to account for this,

models controlled for age at Wave I. Also, data was collected by self-report and cannot be verified, and recall bias may have been an issue, as participants were asked to recall as adults their age at first incarceration. There is also concern that the observed association between child incarceration and worse adult health was due solely to a child having poor mental or physical health prior to their first incarceration that was not captured by the Wave I health measures; this is a limitation of the dataset as the youngest participants in the Wave I survey were 12 years old. However, it is reassuring that sensitivity analyses of the adult general health model adjusted for Wave I depressive symptoms and suicidal thoughts yielded similar results. Further, our study does not intend to establish causality and, regardless of this limitation, the observed association between child incarceration and worse adult health has public health importance. It is notable that we had significant results, despite the relatively small number of individuals first incarcerated as children (n=105). Since we examined age as a categorical variable with a cutoff for child incarceration of ≤14, differences by year within the child age group and, for example, between adolescents ages 14 and 15 are unclear. Finally, youth who are incarcerated often have pre-existing risk factors such as exposure to child maltreatment or mental health problems. In our ecological framework, we examined several potential covariates that may influence both youth incarceration and adult health. We accounted for potential confounding by frequency and duration of incarceration and found similar results. However, other potentially relevant factors, such as region or charge severity, remain unmeasured. Despite these study limitations, our findings suggest that child incarceration is a signal for adult health risk and mechanisms directly linking child incarceration and worse downstream adult health may exist.

CONCLUSION

Incarcerated children should be viewed as a medically vulnerable population. By meeting the unmet health needs of this highly vulnerable group of children, child health professionals have the opportunity to lead in solving a major pediatric health issue while simultaneously addressing an under-discussed aspect of racial, ethnic, and socio-economic disparities. Youths' trajectories and life courses have the potential to be positively re-shaped by such a change.

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What's New

Child incarceration by age 14 independently predicts worse adult health, compared to first incarceration at older adolescent and young adult ages. Findings suggest that individuals first incarcerated as children are medically vulnerable, indicating an important role for the health arena.

Table 1

Characteristics of the Study Sample by Age at First Incarceration*

	First incarceration at age 7–14 (%) or mean (SD) (n= 105)	First incarceration at age 15–17 (%) or mean (SD) (n= 315)	First incarceration at age 18–20 (%) or mean (SD) (n= 696)	First incarceration at age 21–24 (%) or mean (SD) (n= 611)	P-Value (chi- squared)
Gender					
Female	24.6	17.2	20.6	26.2	0.058
Male	75.4	82.8	79.4	73.8	
Race/ethnicity					
White	35.7	60.2	66.9	61.1	**<0.001**
African-American	33.1	23.1	17.3	21.0	
Hispanic	17.7	13.7	13.6	10.4	
Other	13.6	3.0	2.3	7.5	
Age at Wave I	14.9 (1.5)	15.2 (1.7)	15.5 (1.8)	15.3 (1.8)	0.089
Highest level of parental education					
Less than high school	15.7	17.8	15.7	10.0	0.235
High school diploma	41.8	37.2	37.3	36.7	
Some college	23.8	22.4	20.8	23.1	
College degree or more	18.8	22.6	26.1	30.3	
Household income (amount/year)					
0 – $24,999	46.1	33.3	29.0	26.3	0.051
$25,000–$49,999	14.2	28.4	27.0	28.4	
$50,000–$74,999	6.4	12.7	13.9	15.4	
$75,000 or more	2.0	5.6	6.7	7.6	
Missing	31.3	20.0	23.4	22.2	
Family household structure					
Two biological parents	17.7	34.3	40.8	44.6	**0.003**
Two parents (≥1 non-bio parent)	31.8	20.7	21.7	24.2	
Single parent	40.7	36.7	28.8	26.0	
Other	9.9	8.4	8.8	5.3	

	First incarceration at age 7–14 (%) or mean (SD) (n= 105)	First incarceration at age 15–17 (%) or mean (SD) (n= 315)	First incarceration at age 18–20 (%) or mean (SD) (n= 696)	First incarceration at age 21–24 (%) or mean (SD) (n= 611)	P-Value (chi- squared)
Family connectedness	10.2 (2.3)	10.9 (2.4)	10.7 (2.5)	11.0 (2.2)	**0.013**
Perceived neighborhood safety					0.401
Yes	83.0	85.2	89.0	87.3	
No	17.1	14.8	11.0	12.8	
Neighborhood unemployment	0.09 (0.06)	0.09 (0.06)	0.08 (0.06)	0.08 (0.06)	0.386
Neighborhood high-school graduation rate	0.28 (0.14)	0.29 (0.15)	0.30 (0.15)	0.29 (0.15)	0.864
Wave I (adolescent) health status					
Worse general health**	21.5	8.4	8.6	8.9	**0.008**
Mobility limitations	4.7	3.6	4.6	3.2	0.771
Depressive symptoms	34.3	25.0	24.5	17.3	**0.003**
Suicidal thoughts	24.2	18.0	16.4	14.1	0.215
Wave IV (adult) health status					
Worse general health**	16.9	16.6	12.8	11.0	0.322
Mobility limitations	21.5	16.2	10.9	8.2	**0.016**
Depressive symptoms	36.9	25.6	26.0	20.0	0.087
Suicidal thoughts	21.6	9.0	11.6	6.1	**0.013**

*Percentages are weighted to account for survey design. P-values are for chi-squared tests; bolded p-values indicate statistical significance. SD= standard deviation. N's for individual variables may not sum to full analytic sample (1,727) because of missing data.

**"Worse" refers to self-report of poor or fair health compared to excellent, very good, or good.

Table 2

Results from Multivariate Analyses Showing the Relationship between Child Incarceration Compared to Incarceration at Other Young Adult Ages for the Adult Health Outcomes of Adult General Health, Adult Mobility Limitations, Adult Depressive Symptoms, and Adult Suicidality (n=1,727)

	Odds ratio (95% Confidence interval)							
	Model 1*				Model 2*			
	Worse adult general health**	Adult mobility limitations	Adult depressive symptoms	Adult suicidality	Worse adult general health	Adult mobility limitations	Adult depressive symptoms	Adult suicidality
Age at first incarceration								
Age 7–14	0.97 (0.36–2.58)	**3.74 (1.69–8.31)**	**1.98 (1.05–3.72)**	**4.47 (1.59–12.52)**	1.32 (0.45–3.88)	**3.70 (1.39–9.87)**	1.59 (0.80–3.18)	**4.48 (1.58–12.71)**
Age 15–17	1.47 (0.85–2.55)	**1.84 (1.05–3.22)**	1.17 (0.72–1.90)	1.34 (0.56–3.19)	1.54 (0.87–2.72)	1.66 (0.92–3.02)	1.04 (0.61–1.80)	1.36 (0.56–3.29)
Age 18–20	1.27 (0.72–2.24)	1.52 (0.89–2.57)	1.44 (0.94–2.20)	**1.90 (1.15–3.14)**	1.35 (0.74–2.45)	1.51 (0.87–2.62)	1.42 (0.92–2.21)	**1.94 (1.16–3.25)**
Age 21–24	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Gender								
Female	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Male	0.94 (0.62–1.44)	0.82 (0.51–1.33)	0.83 (0.59–1.16)	1.24 (0.77–2.01)	1.17 (0.76–1.80)	0.85 (0.52–1.39)	0.79 (0.56–1.10)	1.28 (0.76–2.13)
Race/ethnicity								
White	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Black	1.43 (0.86–2.35)	0.92 (0.51–1.66)	**1.63 (1.04–2.55)**	0.94 (0.50–1.77)	1.36 (0.77–2.41)	0.88 (0.48–1.61)	**1.69 (1.10–2.61)**	1.13 (0.59–2.18)
Hispanic	**2.54 (1.51–4.28)**	0.56 (0.30–1.05)	1.13 (0.59–2.18)	0.83 (0.40–1.72)	**2.50 (1.48–4.22)**	0.61 (0.33–1.13)	0.95 (0.46–1.95)	0.92 (0.44–1.95)
Other	**2.79 (1.24–6.25)**	**0.23 (0.07–0.76)**	1.0 (0.45–2.23)	0.56 (0.16–1.91)	**3.26 (1.46–7.31)**	**0.24 (0.07–0.80)**	1.09 (0.49–2.42)	0.62 (0.19–2.03)
Age at Wave I	0.92 (0.82–1.03)	0.96 (0.86–1.08)	0.92 (0.83–1.03)	0.99 (0.86–1.14)	0.93 (0.82–1.04)	0.96 (0.86–1.09)	0.93 (0.84–1.04)	0.98 (0.85–1.13)
Highest level of parental education								
Less than high school	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
High school diploma	0.95 (0.51–1.78)	0.96 (0.43–2.12)	1.19 (0.67–2.14)	1.28 (0.60–2.73)	0.99 (0.52–1.86)	0.92 (0.42–2.00)	1.41 (0.76–2.62)	1.25 (0.56–2.78)
Some college	0.64 (0.30–1.35)	0.81 (0.35–1.87)	1.09 (0.56–2.10)	1.10 (0.51–2.37)	0.57 (0.27–1.23)	0.73 (0.32–1.64)	1.24 (0.63–2.44)	1.02 (0.46–2.28)
College degree or more	0.88 (0.43–1.82)	0.73 (0.32–1.66)	0.78 (0.41–1.46)	0.72 (0.30–1.74)	0.85 (0.41–1.77)	0.66 (0.30–1.47)	0.91 (0.47–1.76)	0.70 (0.29–1.71)
Household income (amount/year)								
$0–$24,999	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
$25,000–$49,999	**2.18 (1.18–4.04)**	0.77 (0.42–1.43)	1.28 (0.79–2.08)	1.43 (0.74–2.77)	**2.30 (1.24–4.29)**	0.75 (0.39–1.46)	1.16 (0.70–1.92)	1.40 (0.72–2.73)
$50,000–$74,999	1.68 (0.71–3.94)	1.18 (0.47–2.96)	1.39 (0.71–2.72)	1.52 (0.58–3.95)	1.68 (0.72–3.94)	1.21 (0.47–3.12)	1.35 (0.68–2.68)	1.54 (0.59–4.01)

	Odds ratio (95% Confidence interval)							
	Model 1*				Model 2*			
	Worse adult general health**	**Adult mobility limitations**	**Adult depressive symptoms**	**Adult suicidality**	**Worse adult general health**	**Adult mobility limitations**	**Adult depressive symptoms**	**Adult suicidality**
$75,000 or more	0.98 (0.35–2.72)	1.34 (0.44–4.11)	1.61 (0.83–3.14)	1.14 (0.35–3.69)	0.96 (0.34–2.70)	1.36 (0.44–4.13)	1.60 (0.82–3.12)	1.13 (0.34–3.71)
Missing	1.84 (0.97–3.49)	0.99 (0.58–1.70)	0.98 (0.62–1.55)	0.99 (0.53–1.85)	1.72 (0.89–3.36)	1.00 (0.58–1.74)	0.88 (0.54–1.43)	0.90 (0.47–1.72)
Family household structure								
Two biological parents	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Two parents (≥1 non-biological parent)	1.05 (0.56–1.95)	1.43 (0.79- –2.59)	1.22 (0.81–1.83)	0.92 (0.47–1.79)	1.12 (0.58–2.15)	1.42 (0.76–2.64)	1.25 (0.82–1.91)	0.93 (0.48–1.80)
Single parent	1.26 (0.73–2.19)	1.37 (0.79–2.38)	1.27 (0.83–1.93)	0.80 (0.42–1.54)	1.36 (0.75–2.47)	1.40 (0.79–2.48)	1.22 (0.77–1.92)	0.82 (0.41–1.63)
Other	1.70 (0.79–3.64)	1.24 (0.48–3.16)	1.0 (0.48–2.10)	1.39 (0.52–3.72)	1.84 (0.82–4.11)	1.34 (0.52–3.49)	1.08 (0.51–2.27)	1.10 (0.38–3.19)
Family connectedness	0.93 (0.85–1.01)	0.99 (0.92–1.06)	0.96 (0.90–1.04)	0.96 (0.89–1.04)	0.93 (0.85–1.02)	0.98 (0.91–1.05)	0.95 (0.88–1.03)	0.96 (0.88–1.05)
Perceived neighborhood safety	1.57 (0.90–2.73)	0.88 (0.42–1.84)	1.33 (0.69–2.55)	**1.97 (1.10–3.52)**	1.74 (0.98–3.09)	0.94 (0.45–1.97)	1.37 (0.69–2.73)	1.56 (0.84–2.91)
Neighborhood unemployment	**1.36 (1.04–1.77)**	1.15 (0.80–1.66)	1.20 (0.95–1.53)	1.15 (0.81–1.62)	**1.36 (1.01–1.81)**	1.19 (0.80–1.76)	1.21 (0.96–1.53)	1.12 (0.80–1.57)
Neighborhood high-school graduation rate	1.02 (0.79–1.31)	1.12 (0.81–1.54)	0.91 (0.77–1.08)	0.91 (0.62–1.32)	1.00 (0.76–1.32)	1.06 (0.75–1.49)	0.91 (0.77–1.09)	0.92 (0.62–1.37)
Wave I general health	**3.11 (1.87–5.16)**	--	--	--	**3.32 (2.00–5.50)**	--	--	--
Wave I mobility limitations	--	1.91 (0.79–4.58)	--	--	--	1.95 (0.80–4.73)	--	--
Wave I depressive symptoms	--	--	**2.25 (1.59–3.17)**	--	--	--	**2.24 (1.55–3.23)**	--
Wave I suicidal thoughts	--	--	--	**3.45 (1.93–6.16)**	--	--	--	**3.91 (2.19–6.96)**
Cumulative incarceration frequency	--	--	--	--	0.92 (0.56–1.52)	0.78 (0.47–1.29)	1.26 (0.85–1.86)	0.80 (0.51–1.25)
Cumulative incarceration duration	--	--	--	--	0.99 (0.98–1.00)	1.00 (0.99–1.01)	1.01 (1.00–1.01)	1.01 (1.00–1.02)

*Model 1 represents the full model adjusted for covariates. Model 2 represents the full model adjusted for covariates and cumulative frequency and duration of incarceration. Odds ratios shown in bold were statistically significant.

**"Worse general health" refers to self-report of poor or fair health compared to excellent, very good, or good.