

Unmet Health Care Needs among Children Exposed to Parental Incarceration

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Abstract *Objectives* The incarceration rate in the United States has increased rapidly since the mid-1970s and, accordingly, a large number of children are exposed to parental incarceration. Research finds that parental incarceration is associated with deleterious physical and mental health outcomes among children, but little is known about these children's health care access. *Methods* I used data from the 2011–2012 National Survey of Children's Health (N=95,531), a population-based and nationally representative survey of non-institutionalized children ages 0–17 in the United States, to estimate the association between exposure to parental incarceration and children's unmet health care needs. *Results* In logistic regression models that adjust for an array of demographic and socioeconomic characteristics, children exposed to parental incarceration, compared to their counterparts, have 1.26 (95% CI 1.02–1.54) times the odds of having any unmet health care need. Analyses that disaggregate by type of unmet health care need (mental, dental, vision, mental health, or other) suggest this association is driven by a greater likelihood of unmet mental health care needs (OR 1.60; 95% CI 1.04–2.46). *Conclusions* Children exposed to parental incarceration, a vulnerable group especially at risk of physical and mental health problems, face challenges to health care access, especially mental health care access. Given that parental incarceration is concentrated among those children most in need of health care, parental incarceration may exacerbate existing inequalities in unmet health care needs.

Keywords Health care access · National Survey of Children's Health · Parental incarceration · Unmet health care needs

Significance

Children exposed to parental incarceration, a vulnerable group especially at risk of physical and mental health problems, also face challenges to health care access. Given that parental incarceration is concentrated among those children most in need of health care, parental incarceration may exacerbate existing inequalities in unmet health care needs.

Introduction

The incarceration rate in the United States, though recently stabilized, has increased dramatically since the mid-1970s (Wakefield and Uggen 2010). In 2013, 478 per 100,000 individuals in the population were imprisoned (Carson 2014). Accordingly, a sizeable number of children—about 2.6 million—have a parent currently incarcerated in local jails, state prisons, or federal prisons (Pettit 2012). Parental incarceration has emerged as a childhood risk factor, especially among poor and minority children. For example, of those children born in 1990, 25% of Black children and 50% of Black children with fathers who did not complete high school, compared to just 4% of White children, experienced paternal incarceration by age 14 (Wildeman 2009).

The growth and unequal distribution of parental incarceration has generated a burgeoning literature on the intergenerational health consequences of parental incarceration. Children exposed to parental incarceration, compared to their counterparts who are not exposed, have a greater

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likelihood of infant mortality; are more likely to have fair or poor overall health; and are more likely to experience specific health conditions including high cholesterol, asthma, sexually transmitted infections (STIs), migraines, learning disabilities, speech or language problems, and biological risks such as low-grade inflammation (Wildeman 2012; Lee et al. 2013; Turney 2014; Boch and Ford 2015). Longitudinal data suggest parental incarceration is associated with greater body mass index among women (Roettger and Boardman 2012). Additionally, behavioral and mental health problems are more common among children exposed to parental incarceration (Lee et al. 2013; Turney 2014; Geller et al. 2012; Turney and Wildeman 2015). More broadly, children exposed to parental incarceration experience more social exclusion (including a lack of health insurance) than their counterparts (Foster and Hagan 2007).

Despite the growing literature that documents inequalities in childhood health by exposure to parental incarceration, little is known about the association between parental incarceration and health care access among children (Foster and Hagan 2007; Sykes and Pettit 2015). Good reasons exist to expect that exposure to parental incarceration may impede children's health care access. In this study, data from the 2011–2012 National Survey of Children's Health (NSCH), a large population-based and nationally representative sample of non-institutionalized children ages 0–17 in the United States, is used to examine the association between exposure to parental incarceration and children's unmet health care needs, an important indicator of health care access (Newacheck et al. 2000). Access to and utilization of health care is consequential for short- and long-term functioning and is linked to health disparities across the life course (Newacheck et al. 2000; Ross and Mirowsky 2000). Therefore, the results have implications for the mechanisms through which parental incarceration increases disparities in population health (Turney 2014; Massoglia 2015).

Methods

Participants

Data come from the 2011–2012 NSCH, a cross-sectional probability sample of 95,677 non-institutionalized children in households ages 0–17 in the United States. The telephone survey was conducted between February 28, 2011 and June 25, 2012. Survey researchers used list-assisted random-digit dialing to identify eligible households, those households with children ages 0–17, that were stratified by state and telephone type (landline or cell phone). Interviewers randomly selected one focal child per household (and, when only one child in the household, designated that child

the focal child). Next, the household member with the most information about the focal child was interviewed (and, as this person could be a non-parental caregiver, children with two incarcerated parents could be in the study). The survey completion rate was 54.1% for the landline sample and 41.2% for the cell phone sample. Sampling weights adjust for the complex sampling design (e.g., stratification by state and telephone type) and non-response, and the resulting non-response biases are minimal (Centers for Disease Control and Prevention et al. 2011–2012). The large sample size of the NSCH allows for an examination of a typically difficult-to-reach population, children exposed to parental incarceration, and allows for meaningful statistical comparisons between children who were and were not exposed to parental incarceration. The analytic sample includes all but the 134 observations with incomplete information on children's unmet health care needs (N=95,531).

Measures

Unmet Health Care Needs

The main dependent variable is a binary variable indicating the respondent reported that, during the past 12 months (or, for children less than 1 year old, since birth), the focal child needed health care that was delayed or not received. Additional dependent variables consider the following specific (not necessarily mutually exclusive) binary indicators of unmet needs: medical care, dental care, vision care, mental health care, and/or other health care. Unmet health care needs represent a common outcome variable in health services research (Newacheck et al. 2000a, b; Baggett et al. 2010; Everett and Mollborn 2014; Silver and Stein 2001; Toomey et al. 2013).

Exposure to Parental Incarceration

A binary variable indicates the focal child ever lived with a parent or guardian who served time in jail or prison after the child was born. This variable has three important features. First, the variable captures both current parental incarceration and previous parental incarceration, but these two types cannot be differentiated. Second, this measure only captures the incarceration of a residential parent, which almost certainly underestimates parental incarceration (Turney 2014). Other data sources that include information about parental incarceration, including the National Longitudinal Survey of Adolescent to Adult Health and the Fragile Families and Child Wellbeing Study, capture residential and non-residential parent incarceration (Roettger and Boardman 2012; Geller et al. 2012). However, examining residential parent incarceration is especially important because prior research suggests these children suffer more

deleterious consequences than their counterparts who experience the incarceration of a non-residential parent (Geller et al. 2012; Turney and Wildeman 2013). Third, because the measure captures exposure to parent or guardian incarceration, it can include the incarceration of a non-parental guardian (e.g., grandmother).

Additional Covariates

Following Andersen's health care utilization framework (Andersen 1995; Andersen and Newman 2005), the multivariate analyses adjust for pre-disposing, enabling, and need-based characteristics that may render spurious the association between parental incarceration and children's unmet health care needs. Pre-disposing characteristics include child age (0–6 years [reference], 7–12 years, 13–17 years), gender (1=female), low birth weight status (1=born low birth weight [less than 2500 grams]), race/ethnicity (non-Hispanic White [reference], non-Hispanic Black, Hispanic, non-Hispanic other race), generation status (1=first- or second-generation immigrant), and household language (1=English). Additional pre-disposing characteristics include mother's age at the child's birth, parent's educational attainment (less than high school [reference], high school diploma, post-secondary education, referencing the most highly educated parent), parent's marital status (1=married to child's other biological parent), parent's relationship quality (1=completely happy in relationship) and a binary variable indicating no relationship, mother's self-rated overall health (1=fair or poor), father's self-rated overall health (1=fair or poor), mother's self-rated overall emotional health (1=fair or poor), father's self-rated overall emotional health (1=fair or poor), and parent's relationship to child (mother [reference], father, other).

The multivariate analyses also adjust for enabling and need-based characteristics. Enabling characteristics include parent's employment status (1=employed), household income (1=below the federal poverty level), child's health insurance (private insurance [reference], public insurance, no insurance), and child's usual source of health care (1=has usual source of health care). Need-based characteristics include child's overall health (1=fair or poor), child's activity limitations (1=child is limited in ability to do things because of medical, behavioral, or other health conditions), and child's chronic conditions [1=child has brain injury or concussion; diabetes; epilepsy or seizure disorder; depression; anxiety; autism; developmental delays; behavioral or conduct problems; bone, joint, or muscle problems; hearing problems; vision problems; Tourette syndrome; Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD); speech or other language problems; asthma; intellectual disability or mental retardation; or cerebral palsy].

Statistical Analyses

First, descriptive statistics document the prevalence of exposure to parental incarceration by race/ethnicity and age. Second, descriptive statistics document the frequencies and/or means of all variables by exposure to parental incarceration. Third, logistic regression models estimate unmet health care needs as a function of parental incarceration exposure (with Model 1 adjusting for pre-disposing characteristics, Model 2 adjusting for enabling characteristics, and Model 3 adjusting for need-based characteristics). Finally, logistic regression models, adjusting for all control variables, estimate the five specific unmet health care needs: medical care, dental care, vision care, mental health care, and other care. Supplemental analyses estimate unmet health care needs separately for children with and without special health care needs (defined elsewhere) (Newacheck et al. 2000, 1998) and for non-Hispanic White, non-Hispanic Black, and Hispanic children.

Missing covariate values are preserved with multiple imputation (using the multivariate normal method). All variables used in the analyses are used in the imputation model and analyses are robust to listwise deletion. Analyses include sampling weights and corresponding stratum and primary sampling units, which correct for survey design effects and non-response; therefore, the analyses represent the population of non-institutionalized children in households ages 0–17 in the United States. All analyses were conducted in Stata 14.1. The secondary data analysis was deemed exempt from institutional review board review at the University of California, Irvine.

Results

Prevalence of Parental Incarceration

Table 1 presents the frequency of exposure to parental incarceration, by race/ethnicity and age group. Overall, about 6.9% of children experienced the incarceration of

Table 1 Weighted frequencies of exposure to parental incarceration, by race/ethnicity and age: 2011–2012 National Survey of Children's Health

	Ages 0–6	Ages 7–12	Ages 13–17	N
Non-Hispanic White	4.3%	7.2%	6.8%	62,663
Non-Hispanic Black	7.6%	12.9%	14.0%	9105
Hispanic	4.9%	7.5%	7.6%	13,043
Non-Hispanic other race	4.7%	8.6%	8.8%	10,720
N	34,981	31,790	28,760	95,531

Analyses weighted to account for the sampling design

a residential parent (descriptives not shown). This table suggests two important findings, both consistent with previous research and expectations (Wildeman 2009; Turney 2014). First, across all three age groups, non-Hispanic Black children are more likely than non-Hispanic White children to experience parental incarceration (7.6% compared to 4.3% among children ages 0–6, 12.9% compared to 7.2% among children ages 7–12, and 14.0% compared to 6.8% among children ages 13–17). These differences are more muted than prior research (Wildeman 2009), likely because the NSCH only captures residential parent incarceration (compared to prior estimates that capture both residential and non-residential parent incarceration). Second, as expected, the prevalence of exposure to parental incarceration increases as children age.

Table 2 presents weighted descriptive statistics, by exposure to parental incarceration. Children exposed to parental incarceration were about twice as likely as children not exposed to parental incarceration to have unmet health care needs (12.2% compared to 6.3%, $p < .001$). These children were also about twice as likely to experience the specific types of unmet needs including medical care (6.4% compared to 3.2%, $p < .001$), dental care (4.8% compared to 2.5%, $p < .001$), vision care (1.8% compared to 0.8%, $p < .001$), mental health care (2.3% compared to 0.7%, $p < .001$), and other care (1.1% compared to 0.5%, $p < .01$).

Children exposed and not exposed to parental incarceration are also disadvantaged across a number of pre-disposing, enabling, and need-based characteristics. For example, children exposed to parental incarceration, compared to those children not exposed, are less likely to be non-Hispanic White (45.6% compared to 53.1%, $p < .001$) and more likely to be non-Hispanic Black (22.1% compared to 12.8%, $p < .001$). They are less likely to be first- or second-generation immigrants (12.3% compared to 27.2%, $p < .001$). They have parents with less education (for example, 39.8% have at least one parent with post-secondary education compared to 46.9% of their counterparts, $p < .001$). Children exposed to parental incarceration are less likely to have married biological parents (15.2% compared to 62.1%, $p < .001$), are more likely to live in households with income below the federal poverty threshold (40.6% compared to 21.0%, $p < .001$), and are more likely to have parents in fair or poor health (for example, 21.8% have a mother in fair or poor health compared to 11.4% of their counterparts not exposed to parental incarceration, $p < .001$). Finally, children exposed to parental incarceration are more likely to be in fair or poor health (4.9% compared to 3.0%, $p < .001$), have an activity limitation (8.4% compared to 4.7%, $p < .001$), and have a chronic condition (38.3% compared to 21.2%, $p < .001$).

Table 2 Weighted descriptive statistics of all variables included in analyses, by exposure to parental incarceration: 2011–2012 National Survey of Children’s Health

	Exposure to parental incarceration	
	Yes	No
Outcome variables		
Any unmet health care needs	12.2%	6.3%***
Unmet medical care	6.4%	3.2%***
Unmet dental care	4.8%	2.5%***
Unmet vision care	1.8%	0.8%***
Unmet mental health care	2.3%	0.7%***
Unmet other care	1.1%	0.5%**
Covariates		
Child age		
0 to 6 years old	27.2%	39.2%***
7 to 12 years old	39.5%	33.0%***
13 to 17 years old	33.2%	27.9%***
Child female	49.1%	48.8%
Child born low birth weight	11.3%	9.4%*
Child race/ethnicity		
Non-Hispanic White	45.6%	53.1%***
Non-Hispanic Black	22.1%	12.8%***
Hispanic	21.8%	23.7%
Non-Hispanic other race	10.5%	10.3%
Child first- or second-generation immigrant	12.3%	27.2%***
Household language is English	93.4%	83.9%***
Mother age at child’s birth	25.59	28.78***
Parent educational attainment		
Less than high school	24.6%	21.0%**
High school diploma	35.6%	32.1%*
Post-secondary education	39.8%	46.9%***
Parent married to child’s biological father	15.2%	62.1%***
Parent reports being completely happy in relationship	14.5%	28.1%***
Parent in no relationship	48.5%	22.0%***
Mother in fair or poor health	21.8%	11.4%***
Father in fair or poor health	17.2%	9.1%***
Mother in fair or poor emotional health	16.5%	7.0%***
Father in fair or poor emotional health	10.9%	4.2%***
Parent respondent		
Mother	63.5%	70.5%***
Father	16.7%	24.5%***
Other	19.8%	5.0%***
Parent employed	73.5%	84.9%***
Household income below the federal poverty level	40.6%	21.0%***
Child health insurance		
Private insurance	23.8%	59.7%***
Public insurance	70.1%	34.8%***
No insurance	6.1%	5.5%
Child has usual source of health care	93.2%	93.8%

Table 2 (continued)

	Exposure to parental incarceration	
	Yes	No
Child in fair or poor health	4.9%	3.0%***
Child has activity limitation	8.4%	4.7%***
Child has chronic condition	38.3%	21.2%***
N	5728	89,803

Asterisks compare children exposed to parental incarceration and children not exposed to parental incarceration (based on Chi square tests or t-tests, depending on the distribution of the outcome variable). Analyses weighted to account for the sampling design

* $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests)

Logistic Regression Models Estimating Any Unmet Health Care Needs

Table 3 presents results from logistic regression models that estimated any unmet health care needs as a function of exposure to parental incarceration. Model 1, which adjusted for an array of pre-disposing characteristics, shows that children exposed to parental incarceration, compared to their counterparts not exposed to parental incarceration, have 1.41 (95% CI 1.14–1.75) times the odds of having any unmet health care needs. The greater likelihood of having any unmet health care needs persisted in Model 2 (OR 1.30; 95% CI 1.07–1.59), which adjusted for enabling characteristics, and in Model 3 (OR 1.26; 95% CI 1.02–1.54), which adjusted for need-based characteristics.

The full logistic regression analyses adjusted for need-based characteristics such as the presence of a chronic condition. But the relationship between parental incarceration and unmet health care needs may vary by these need-based characteristics, and supplemental analyses considered these associations. In the full model (the equivalent of Model 3 of Table 3), the magnitude of the association between parental incarceration exposure and children's unmet health care needs was similar for children with special health care needs (OR 1.21; 95% CI 0.90–1.64) and children without special health care needs (OR 1.30; 95% CI 0.99–1.71).

Additionally, the association between parental incarceration and children's unmet health care needs may vary by race/ethnicity, and supplemental analyses considered these associations. In the full model (the equivalent of Model 3 of Table 3), the association between parental incarceration exposure and children's unmet health care needs was similar across groups (non-Hispanic Whites: OR 1.08; 95% CI 0.84–1.39; non-Hispanic Blacks: OR 1.22; 95% CI 0.77–1.94; Hispanics: OR 1.10; 95% CI 0.65–1.88).

Logistic Regression Models Estimating Specific Unmet Health Care Needs

Table 4 presents results from logistic regression models that estimated each of the five specific measures of unmet health care needs: medical care, dental care, vision care, mental health care, and other care. Across all five outcome variables, the parental incarceration coefficient is in the expected direction. But parental incarceration exposure is only statistically significantly associated with unmet mental health care (OR 1.60; 95% CI 1.04–2.46). Figure 1 displays predicted probabilities of all outcome variables.

Discussion

Unmet health care needs remain a prevalent problem for children, especially economically disadvantaged children or children with special health care needs (Newacheck et al. 2000a, b; Silver and Stein 2001). Understanding the social determinants of disparities in unmet health care needs is critically important. In the short-term, children with unmet health care needs may experience delayed treatment, an increased reliance on emergency room departments, and the development of chronic conditions. In the long-term, unmet health care needs can increase disparities in population health (Ross and Mirowsky 2000; Ayanian et al. 2000; Starfield et al. 2005).

In this article, using data from the 2011–2012 National Survey of Children's Health, analyses show that exposure to parental incarceration, an acute stressor disproportionately experienced by vulnerable children (Wakefield and Uggen 2010; Turney 2014), is positively associated with children's unmet health care needs. After adjusting for an array of pre-disposing background characteristics (e.g., children's race/ethnicity, age), enabling characteristics (e.g., income, health insurance), and need-based characteristics (e.g., chronic health conditions), children exposed to parental incarceration are 26% more likely than their counterparts to have any unmet health care need. These results extend prior research by showing that the associations are similar across race/ethnic groups (Sykes and Pettit 2015). These results also extend prior research by showing that exposure to parental incarceration is only statistically significantly associated with children's unmet mental health care (and is not statistically significantly associated with medical, dental, vision, or other care) (Sykes and Pettit 2015). Children exposed to parental incarceration are 60% more likely than their counterparts to have unmet mental health care needs. The fact that children exposed to parental incarceration are less likely than their counterparts to receive mental health care is especially troubling given the large body of research documenting the behavioral and

Table 3 Estimating children’s unmet health care needs as a function of exposure to parental incarceration: 2011–2012 National Survey of Children’s Health

	Model 1 (predisposing characteristics)	Model 2 (Model 1 + enabling characteristics)	Model 3 (Model 2 + need-based characteristics)
	Odds ratio (95% CI)	Odds ratio (95% CI)	Odds ratio (95% CI)
Exposure to parental incarceration	1.41 (1.14–1.75)	1.30 (1.07–1.59)	1.26 (1.02–1.54)
Child age (reference = 0 to 6 years old)			
7–12 years old	1.24 (1.07–1.43)	1.26 (1.09–1.46)	1.12 (0.96–1.30)
13–17 years old	1.52 (1.31–1.77)	1.58 (1.36–1.84)	1.40 (1.20–1.63)
Child female	0.89 (0.79–1.01)	0.91 (0.81–1.02)	0.98 (0.87–1.11)
Child born low birth weight	1.20 (0.99–1.47)	1.14 (0.93–1.39)	1.04 (0.85–1.28)
Child race/ethnicity (reference = non-Hispanic White)			
Non-Hispanic Black	1.24 (1.02–1.50)	1.13 (0.94–1.36)	1.15 (0.96–1.39)
Hispanic	1.24 (0.99–1.55)	1.13 (0.90–1.42)	1.14 (0.91–1.43)
Non-Hispanic other race	1.18 (0.98–1.42)	1.16 (0.96–1.39)	1.15 (0.95–1.39)
Child first- or second-generation immigrant	1.04 (0.82–1.32)	0.98 (0.77–1.24)	1.05 (0.82–1.34)
Household language is English	1.55 (1.13–2.12)	2.00 (1.43–2.79)	1.81 (1.29–2.53)
Mother’s age at child’s birth	0.98 (0.97–0.99)	0.99 (0.98–1.00)	0.99 (0.98–1.00)
Parent educational attainment (reference = less than high school)			
High school diploma	1.03 (0.85–1.25)	1.09 (0.90–1.33)	1.11 (0.91–1.35)
Post-secondary education	1.11 (0.91–1.35)	1.26 (1.03–1.54)	1.27 (1.03–1.56)
Parent married to child’s other biological parent	0.85 (0.71–1.01)	0.95 (0.80–1.14)	0.98 (0.82–1.17)
Parent reports being completely happy in relationship	0.86 (0.73–1.02)	0.86 (0.73–1.02)	0.87 (0.74–1.03)
Parent in no relationship	1.07 (0.89–1.28)	1.03 (0.86–1.24)	1.04 (0.86–1.25)
Mother in fair or poor health	1.64 (1.34–2.02)	1.51 (1.24–1.85)	1.37 (1.13–1.67)
Father in fair or poor health	1.17 (0.90–1.52)	1.06 (0.83–1.36)	1.04 (0.81–1.34)
Mother in fair or poor emotional health	1.62 (1.27–2.08)	1.64 (1.29–2.09)	1.52 (1.19–1.94)
Father in fair or poor emotional health	1.42 (1.05–1.92)	1.37 (1.00–1.89)	1.34 (0.96–1.87)
Parent respondent (reference = mother)			
Father	0.61 (0.51–0.72)	0.60 (0.50–0.71)	0.63 (0.53–0.75)
Other	0.72 (0.55–0.95)	0.68 (0.52–0.90)	0.68 (0.51–0.91)
Parent employed		0.93 (0.79–1.11)	0.94 (0.79–1.12)
Household income below the federal poverty level		0.91 (0.76–1.09)	0.89 (0.74–1.07)
Child health insurance (reference = private insurance)		1.90 (1.60–2.25)	1.74 (1.46–2.06)
Public insurance		6.44 (5.24–7.91)	6.78 (5.49–8.37)
No insurance		0.69 (0.53–0.89)	0.67 (0.52–0.86)
Child has usual source of health care			1.22 (0.95–1.55)
Child in fair or poor health			2.17 (1.76–2.68)
Child has activity limitation			1.77 (1.54–2.03)
Child has chronic condition			
Intercept	0.06	0.03	0.04
F-test	20.40	28.64	31.63
N	95,531	95,531	95,531

Analyses weighted to account for the sampling design

mental health disadvantages experienced by these children (Turney 2014; Geller et al. 2012; Turney and Wildeman 2015).

A number of possible explanations exist for the positive association between parental incarceration exposure and children’s unmet health care needs. First, formerly

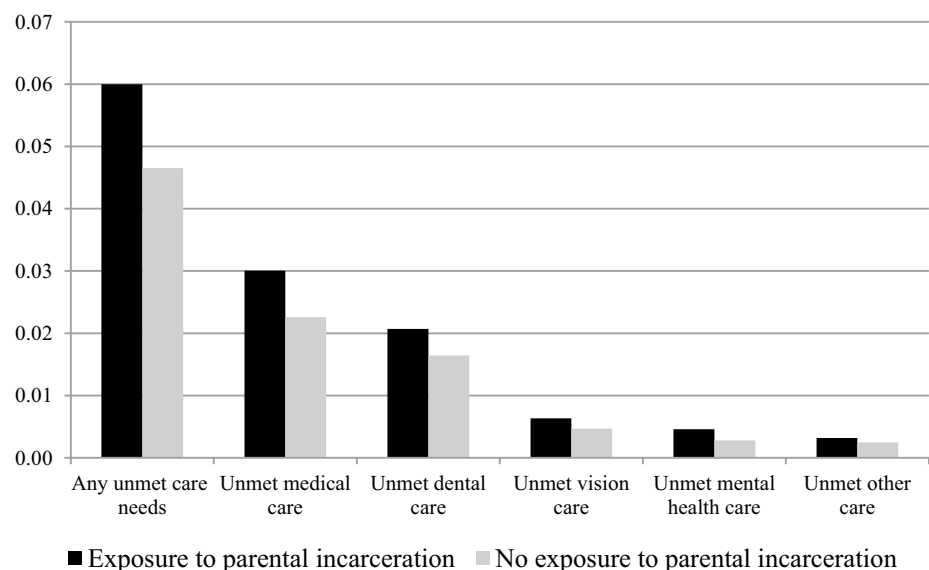
incarcerated parents may avoid health care settings because of the stigma associated with a criminal record or because they fear being arrested (Pager 2003; Goffman 2009). Additionally, incarceration may impair parenting behaviors of the formerly incarcerated and their romantic partners (Turney and Wildeman 2013); these impairments

Table 4 Estimating children's specific unmet health care needs as a function of exposure to parental incarceration: 2011–2012 National Survey of Children's Health

	Unmet medical care Odds ratio (95% CI)	Unmet dental care Odds ratio (95% CI)	Unmet vision care Odds ratio (95% CI)	Unmet mental health care Odds ratio (95% CI)	Unmet other care Odds ratio (95% CI)
Exposure to parental incarceration	1.25 (0.95–1.64)	1.27 (0.93–1.72)	1.35 (0.90–2.03)	1.60 (1.04–2.46)	1.39 (0.74–2.62)
Intercept	0.00	0.01	0.00	0.00	0.01
F-test	21.80	18.78	11.92	18.62	10.61
N	95,531	95,531	95,531	95,531	95,531

Analyses adjust for all covariates in Model 3 for Table 3. Analyses weighted to account for the sampling design

Fig. 1 Predicted probabilities of children's unmet health care needs. Predicted probabilities based on Model 3 of Tables 3 and 4 (and averaged across all five imputed data sets). All values held constant at their mean



(e.g., neglectful behaviors) may mean that parents delay or forego health care for their children. Incarceration is also associated with family instability and reductions in social support (Massoglia et al. 2011; Turney et al. 2012), both of which could link parental incarceration to children's unmet health care needs. Future research should use longitudinal data to understand these pathways and other pathways.

These findings also have implications for policymakers and practitioners. Policymakers should be attuned to the unintended collateral consequences of incarceration, including those consequences for children of the incarcerated, and consider alternatives to incarceration when possible. Practitioners should recognize that children of formerly incarcerated parents are an especially vulnerable population. These children are the same children who are vulnerable to physical and mental health problems and, thus, have an increased need for care (Lee et al. 2013; Turney 2014). Physicians in communities with high incarceration rates should screen for parental incarceration, working carefully to reduce the stigma associated with incarceration, and may consider community outreach efforts. More generally,

reducing barriers to care (e.g., making physicians accessible to families who lack transportation, reducing stigma associated with incarceration) may help alleviate children's unmet health care needs.

Limitations

Several limitations exist. First, the cross-sectional data preclude causal conclusions. Children may be disadvantaged long before exposure to parental incarceration and, accordingly, an unmeasured variable (e.g., father's criminal behaviors, family instability, children's living arrangements before or during incarceration) could render spurious the association between parental incarceration and children's unmet health care. Relatedly, the cross-sectional data mean that some covariates (i.e., household poverty, parent's marital status) are likely measured after parental incarceration exposure (as parental incarceration could have occurred any time since the child's birth). Therefore, the analyses likely adjust for some of the mechanisms linking parental

incarceration exposure to children's unmet health care needs.

The measures also have some limitations. The measure of parental incarceration makes it impossible to distinguish between maternal and paternal incarceration, prison and jail incarceration, or the timing or frequency of parental incarceration, and understanding how these complexities are related to children's unmet health care needs remains an important direction for future research. Also, the measure of residential parent incarceration produces, compared to other research, a lower risk of parental incarceration and smaller race/ethnic disparities in the risk of parental incarceration (Turney 2014). However, prior research suggests that the consequences of incarceration for children and families more generally are stronger among families in which fathers are living with children prior to incarceration (Geller et al. 2012; Turney and Wildeman 2013). Additionally, all measures are reported by adults living in children's households (specifically, the adult with the most knowledge about the child). Adults may under-report incarceration and may under- or over-report children's health or children's unmet health care needs, and the binary measures of unmet health care needs do not allow for a differentiation between levels of care (Geller et al. 2012). Relatedly, the measurement of the dependent variables, which conflate children with no health care needs and children with met health care needs, may mean the results are underestimated. Finally, these data were collected prior to the Affordable Care Act (ACA), which was designed to increase the affordability and quality of health insurance, and the association between parental incarceration exposure and children's unmet health care needs may differ after the ACA due to reduced barriers to care. This analysis is an important direction for future research.

Conclusion

This study, using a population-based sample of children in the United States, extends prior research on the social exclusion and severe deprivation of children exposed to parental incarceration by considering any unmet health care needs among children, by disaggregating by type of unmet health care needs, and by considering race/ethnic variation in the association between parental incarceration exposure and children's unmet health care needs (Turney 2014; Sykes and Pettit 2015). A large literature documents that incarceration has implications for population health and growing evidence shows that parental incarceration has implications for offspring health (Lee et al. 2013; Turney 2014; Massoglia 2015). This study extends this research by documenting that children exposed to parental incarceration are more likely than their counterparts to experience

unmet health care needs, especially unmet mental health care needs, and adds to our knowledge about the correlates of unmet health care needs and the consequences of parental incarceration. Given that parental incarceration is concentrated among the most disadvantaged children, those children most in need of health care, parental incarceration may exacerbate existing inequalities in unmet health care needs.

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