



Parental Offending and Child Physical Health, Mental Health, and Drug Use Outcomes: A Systematic Literature Review

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Abstract

Objectives A growing body of evidence suggests that parental offending may be linked to poor physical health, mental health, and drug use problems in offspring. However, previous systematic reviews have limited their scope to the association between parental incarceration and child substance use and mental health problems. We extend this research by conducting a systematic literature review on the impact of any parental offending, more broadly, on child physical and mental health outcomes, including drug use problems.

Methods We searched relevant electronic databases and the reference lists of previous reviews for research examining the relationship between parental offending, excluding studies focused on incarceration alone, and health outcomes in offspring less than 18 years of age. Our search identified 1279 unique studies, 19 of which met the criteria for inclusion.

Results Across this literature, associations were found between parental offending and poor physical health outcomes in young children and, more robustly, drug use in adolescence. The associations between parental offending and child health outcomes, particularly for child mental health, were found to be at least partially explained by other factors, such as child maltreatment and abuse. However, owing to methodological limitations, conclusions regarding the causal impact of parental offending on child health could not be confidently made.

Conclusion Parental offending may be useful marker for identifying children at risk of poor health outcomes who may benefit from intervention.

Keywords Parental offending · Child physical health · Child mental health · Child drug use · Systematic literature review

The children of parents with a history of criminal offending are more likely to experience a range of negative outcomes, including aggressive behaviors (Tzoumakis et al. 2017), cognitive difficulties (Latvala et al. 2014), maltreatment (Austin 2016), and poor educational performance (Murray and Farrington 2008). Some evidence also suggests that these children may be at a higher risk of adverse health outcomes (Boch and Ford 2015; Lee et al. 2013; Turney 2014, 2017). To date, the link between parental offending

and the health outcomes of offspring less than 18 years of age have been explored in two systematic reviews. The focus of these reviews, however, was on the effect of parental incarceration on offspring substance use and mental health problems, and other non-health related outcomes. For example, Murray and Farrington (2008) reviewed five studies on parental incarceration and child mental health problems (which were limited to symptoms of internalizing disorders) and drug use, and cross referenced these findings with their own from the Cambridge Study in Delinquent Development. Based on the evidence available, they concluded that parental incarceration was not consistently associated with drug use in offspring, but appeared to be associated with child mental health problems, at least in quasi-experimental studies of general population-based samples. A later meta-analysis by the same authors established that the association between parental incarceration and child mental health and substance use problems was tenuous across 25 reviewed studies, and non-existent across the most methodologically rigorous studies (Murray et al. 2012). Both

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reviews highlighted that any association between parental imprisonment and negative child health outcomes were unlikely to be causal, and instead, were probably due to pre-existing social disadvantages and family adversities common to the children of prisoners.

Drawing conclusions about the association between parental history of offending and child health outcomes from research on parental incarceration is likely to be limited by the fact that those who have been incarcerated are not representative of the wider population of individuals who offend (Farrington et al. 2013; Gomes et al. 2018). Although similar negative offspring health outcomes are sometimes observed amongst those with parental history of incarceration and criminal offending not resulting in incarceration (e.g., Bell et al. 2018), the underlying mechanisms explaining any associations found may differ, such as might be the case for the intermediate effect of parental absenteeism in regard to parental incarceration (Murray and Farrington 2008). With this context in mind, we have conducted a systematic literature review with the aim of determining the strength of the evidence regarding the relationship, and possible causal association, between parental history of offending and offspring physical and mental health problems and drug use throughout childhood and adolescence. For the purpose of this review, we use the term *physical health problems* to refer to any illness, injury, or other outcome related to physical functioning and well-being. Consistent with previous systematic reviews (Murray and Farrington 2008; Murray et al. 2012), we define *mental health problems* as symptoms or diagnoses of internalizing (but not externalizing) disorders, mental illness, and other indicators of poor mental health. *Drug use* includes the consumption or abuse of cigarettes, alcohol, and illicit or non-prescribed substances.

Method

Search Strategy

The electronic databases and search engines *Criminal Justice Abstracts*, *Google Scholar*, *ProQuest*, *PsychInfo*, and *Web of Science* were used to search for studies written in English and published in a peer-reviewed journal any time before 1st June 2018. Searches were conducted using the following key terms: (*conviction** or *arrest** or *court** or *crim** or *offend** or *antisocial* or *delinquen** or *devian** or *criminal justice contact* or *violen**) and (*offspring** or *child** or *son** or *daughter** or *parent** or *mother** or *father** or *caretaker*) and (*health* or *mental health* or *illness* or *injur** or *disorder** or *internaliz** or *depress** or *anxiety* or *anxious* or *psychological** or *mood disorder** or *affective disorder** or *psycho** or *schizo** or *bipolar* or *addict** or

substance or *physical health* or *disab** or *injur** or *birth complications* or *accident** or *drug** or *alcohol* or *cigarette** or *smok** or *drink**).

Eligibility Criteria

Studies were deemed eligible if they included: (1) A quantitative analysis of the association between parental (biological, foster, or other primary caregiver) offending and the relevant health outcomes for offspring under the age of 18 years; (2) parental offending data measured by self-report, collateral-report, and/or official records of criminal offending (including arrests and convictions), that occurred before offspring reached 18 years of age, and; (3) self-report, collateral-report, or official records of physical health problems, mental health problems, and/or drug use in offspring under the age of 18 years. Studies were excluded if they focused exclusively on parental incarceration as the exposure, or externalizing behaviors as the sole outcome of interest.

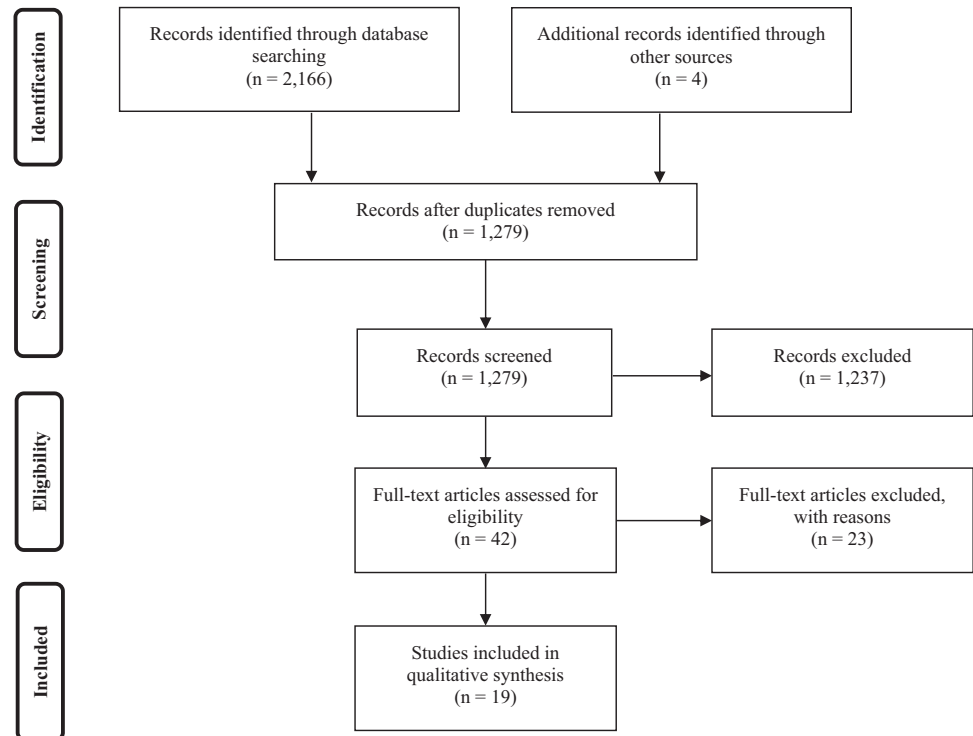
Study Selection Process

Our electronic search strategy identified 2166 studies, 1275 of which were unique. Four additional studies were found by manually searching the bibliographies of prior systematic literature reviews and meta-analyses on the impact of *parental offending* or *incarceration* on offspring outcomes (Austin 2016; Besemer et al. 2017; Murray and Farrington 2008; Murray et al. 2012). The titles, abstracts, and tables of 1279 studies were reviewed separately by two of the authors (TW and MB) according to the eligibility criteria described; 1237 articles were deemed ineligible. The full texts of the remaining 42 unique studies were read in-depth (TW and MB), and 19 of these articles met the full criteria for inclusion. A flowchart detailing this study selection process is detailed below (Fig. 1).

Data Extraction

For each reviewed study, a standardized form was developed to describe key characteristics, methodological quality and results of each study, including: data source, study population, sample size, measure of parental offending and child health outcome, covariates, key results, and study limitations. Data for each of the three outcomes of interest were extracted separately, meaning a single study could provide information on more than one outcome. Information on the timing of parental offending in relation to offspring health outcomes was also obtained to assess if parental offending preceded children's poor health outcomes.

Fig. 1 Flowchart detailing study selection process (adapted from Moher et al. 2009)



Quality Assessment

The methodological quality of each study was assessed using the Cambridge Quality Checklists (CQC). The CQC examines the methodological quality of correlates, risk factors, and causal risk factors in studies on offending (Jolliffe et al. 2012; Murray et al. 2009). According to the CQC, correlates are variables associated with one another, and need not precede or be causally related to the outcome of interest (Murray et al. 2009). Risk factors are correlates that precede, and therefore predict, the outcome of interest, although correlation and precedence are not entirely sufficient to establish causality. Causal risk factors, on the other hand, are risk factors that directly, and independently, increase the risk of the outcome.

The CQC comprises three checklists (correlates, risk factors, and causal risk factors), with higher scores across each conferring greater methodological quality. The CQC for correlates is conducted by assigning each study a score out of five, according to the number of the following criteria met: (1) the sampling method was either total population sampling or random sampling method; (2) cross sectional studies have response rates $\geq 70\%$, whereas longitudinal studies have response and retention rates $\geq 70\%$, and differential attrition $\leq 10\%$; (3) sample size was ≥ 400 ; (4) a reliable measure of parental offending was used, such as official criminal records or parental self-reports (child reported parental offending was not considered to be a reliable measure [see: Murray et al. 2012]), and; (5) child

physical health, mental health, and drug use outcomes were based on measures with a reliability coefficient of $\geq .75$ and reasonable face validity, or criterion validity coefficient of $\geq .3$, or were derived from multiple instruments or sources of information.

The CQC assesses risk factor quality by providing a score out of three, as determined by the data's suitability for establishing precedence between the risk factor and outcome of interest. Study's using cross sectional data are scored as 1; retrospective data as 2, and; prospective data or study of fixed risk factor as 3. Similarly, causal risk factor quality is scored out of seven, with scores dependent on the extent to which a study investigates within-individual change, includes a comparison group, and controls for confounding variables that precede the risk factor (studies controlling for confounding variables that do not precede the risk factor are coded as inadequately controlled [see: Murray et al. 2009]). Studies with no comparison group and no analysis of change are scored as 1; studies that have a comparison group, but include no or inadequate control of confounding factors and no analysis of change are scored as 2; studies that include an analysis of change but omit a comparison group are scored as 3; studies that include a comparison group and an analysis of change, but have no or inadequate control of confounding factors, are scored as 4; studies that have adequate control of confounding factors but include no analysis of change are scored as 5; non-experimental studies that include adequate control of confounding factors and analysis of change are scored as 6,

and; randomized experimental studies that include adequate control of confounding factors and analysis of change are scored as 7.

Results

The 19 studies included in this review collectively observed a total of 742,173 children (samples of children range from 24 to 505,367) and 1,349,279 parents (samples of parents range from 14 to 925,348). Over half of the studies ($n = 10$) were published after the year 2010, possibly reflecting increasing interdisciplinary interest on this topic. Most studies were from the U.S. ($n = 14$), used self-reported measures of parental offending ($n = 13$), and/or examined samples of disadvantaged or at-risk offspring ($n = 11$). Six studies reported on more than one relevant child outcome (i.e., physical health, mental health, or drug use). Almost half of the studies considered the timing of parental offending in relation to child outcomes ($n = 8$).

The quality assessment outcomes of the reviewed literature are presented in Table 1. On average, the methodological quality was high for correlates ($\bar{x} = 4$), moderate for risk factors ($\bar{x} = 1.84$), and low for causal risk factors

($\bar{x} = 2.21$). According to the 2017 SCImago journal rankings (<https://www.scimagojr.com/>), all 19 studies were published in journals ranked in the first or second quartile of their field, which, for most journals, corresponded to medicine; specifically, to the ‘Psychiatry and Mental Health’ category. Journal h -indices, defined as the number of articles in a journal (h) that have received at least h citations, ranged from 21 to 308

Parental Offending and Child Physical Health Problems

Five studies examined the association between parental offending and child physical health outcomes, and are summarized in Table 2. The correlate quality for these studies were very high ($\bar{x} = 4.6$), although the methodological quality for risk factors ($\bar{x} = 1.4$) and causal risk factors ($\bar{x} = 2$) were relatively low. All studies were published in journals ranked in the top quarter of their field, and had an average h -index of 170.6. Three studies drew data from large, longitudinal record linkage projects representative of the wider population, whilst one study was based on a small sample of juvenile offenders, and another on a large sample of low-income children, most of whom had a history of

Table 1 Quality assessment of reviewed literature

Study	Cambridge quality checklist			Journal quality	
	Correlates	Risk factor	Causal risk factor	Field	Quartile H-index
Arthur et al. (2018)	5	3	2	Medicine; family practice	Q1 95
Ashrafouin et al. (2011)	2	1	2	Medicine; psychiatry and mental health	Q2 60
Bell et al. (2018)	5	1	2	Psychology; developmental and educational psychology	Q1 182
Coley et al. (2011)	4	3	4	Medicine; psychiatry and mental health	Q1 115
Fröjd et al. (2009)	4	1	2	Medicine; psychiatry and mental health	Q2 41
Keller et al. (2002)	3	2	2	Medicine; psychiatry and mental health	Q2 60
Kim et al. (2009)	4	3	2	Medicine; psychiatry and mental health	Q2 41
Kinner et al. (2007)	4	2	2	Medicine; psychiatry and mental health	Q1 174
Lanier et al. (2009)	5	1	2	Psychology; developmental and educational psychology	Q1 98
Laurens et al. (2017)	5	1	2	Medicine; psychiatry and mental health	Q1 170
Lewis et al. (1979)	3	1	2	Medicine; psychiatry and mental health	Q1 308
Lucenko et al. (2015)	5	3	2	Medicine; psychiatry and mental health	Q1 114
Miller et al. (2013)	5	1	2	Social sciences; sociology and political sciences	Q2 40
Murray et al. (2012)	5	3	2	Social Science; law	Q1 105
O’Callaghan et al. (2006)	4	3	2	Medicine; psychiatry and mental health	Q1 158
Phillips et al. (2004)	5	1	2	Medicine; psychiatry and mental health	Q2 75
Roberts et al. (2014)	2	1	2	Psychology; developmental and educational psychology	Q2 57
Shaw et al. (1998)	3	3	4	Medicine; psychiatry and mental health	Q1 204
Shlafer et al. (2012)	3	1	2	Psychology; clinical psychology	Q1 109

Table 2 Studies on parental offending and child physical health outcomes

Study	Sample characteristics		Measures		Results	
	Children	Parents	Parental offending	Child physical health		Covariates
Lewis et al. (1979); U.S.A	Random sample of 105 children referred to juvenile court at 16 years of age	20 (19%) children had a parent with a criminal record (mothers = 5; fathers = 15)	State police records	Hospital records for any reason, accidents and injuries, head or face injuries, and respiratory infections, from birth to 16 years of age	None	T-test total hospital visits for any reason - Before age 4: 6.8 vs. 2.4, $t = 2.68$, $p < .01$ - Before age 12: 12.6 vs. 5.92, $t = 2.37$, $p = .02$ - Through age 16: 15.9 vs. 8.97, $t = 1.94$, $p = .06$ T-test total hospital visits for accident, injury, or respiratory illness - Before age 4: 7.6 vs. 2.5; $t = 2.77$, $p < .01$ - Before age 12: 14.0 vs. 6.06; $t = 2.52$, $p = .01$ - Through age 16: 18.27 vs. 8.96, $t = 2.34$, $p = .02$
Lanier et al. (2009); U.S.A	Record linkage of 6282 children followed from 12 to 18 years of age. Most (61.2%) had a history of abuse or neglect	Greater than 98% of parents were mothers. 813 (12.9%) of children had a parent with a criminal record	State records of parental arrest and incarceration	ICD-9 coded hospital treatment for asthma, non-asthma cardio-respiratory disease, and other infections from birth to 18 years	None	Chi-square differences in proportion of children with parental criminal record - No disease (9.9%), asthma (11.1%), cardio-respiratory (9.9%), and infections (9.4%), $p > .05$
Laurens et al. (2017); Australia	Representative record linkage study of 66,477 children enrolled in pre-primary in 2009 (around 5 years of age)	29.8% of children had a parent with a history of offending (mothers = 5775; fathers = 17,631; both = 3598)	Official court appearances for any and violent crimes from January 1, 1994, to December 31, 2009	Physical health and wellbeing subscale of the 2009 Australian Early Development Census (AEDC)	Child sex and age, English as a second language, maternal age, developmental vulnerability, and socio-economic status	Adjusted multinomial logistic regression OR (95% CI) - Maternal offending: any = 1.27 (1.18–1.36); violent = 1.41 (1.28–1.55) - Paternal offending: any = 1.57 (1.42–1.73); violent = 1.47 (1.25–1.74) - Both parents offending: any = 1.60 (1.42–1.81); violent = 1.52 (1.22–1.89)
Arthur et al. (2018); U.S.A	Retrospective record linkage of 505,367 children aged < 5 (35.7%) and 5–17 (64.3%) years with Medicaid coverage	925,348 biological parents. 44% of children aged < 5 years and 40.4% of children aged 5–17 years had a parent with a criminal record	Recorded arrest or court filings for any crime category from July 1, 2003, to June 30, 2008	Number of ED presentations not resulting in an inpatient admission from July 1, 2008, to June 30, 2009	Child sex, age, race/ethnicity, medical complexity, and length of Medicaid coverage	Adjusted Poisson regression IRR (95% CI) - < 5 years = 1.11 (1.09–1.13) - 5–17 years = 1.02 (1.00–1.04)
Bell et al. (2018); Australia	Representative record linkage of 19,071 children born in Western Australia enrolled in pre-primary in 2009 (around 5 years of age)	1402 (7.35%) children had a convicted parent (mothers = 555; fathers = 1089; both = 242)	Official convictions resulting in serious sanctions from 12 months prior to the child's birth until the end of 2009	Physical health and wellbeing subscale of the 2009 AEDC	Aboriginality, parent age, mother's marital status, English as a second language, and socio-economic status and remoteness	Adjusted logistic regression OR (95% CI) - Maternal conviction only = 1.49 (1.16–1.92) - Paternal conviction only = 1.54 (1.32–1.81) - Maternal conviction only vs paternal conviction only = 97 (.72–1.29) - Both parents = 2.28 (1.74–3.00)

maltreatment. Measures of child physical health varied across studies, and included clinical reports of specific illness or injury, Emergency Department (ED) presentations not resulting in an inpatient admission, and indicators of broad physical health development and well-being (e.g., gross and fine motor skills, physical independence, and physical readiness for school). Because the findings of cross-sectional studies may differ from those that incorporate temporal ordering into their methodology, we review separately studies that take into account the timing of parental offending in relation to child health outcomes.

Studies with temporal ordering

Only one study considered the timing of parental offending in relation to child physical health outcomes. Sourcing government data for over half a million children, Arthur et al. (2018) examined the association between parental history of criminal justice involvement in the last five years and rates of child Emergency Department (ED) presentations over the following year that did not result in an inpatient admission. ED presentation rates were significantly higher among children younger than 5 years of age, and children aged 5 to 17 years, who had parents with a history of criminal justice involvement. These results remained significant despite adjusting for other relevant risk factors, such as poverty and child abuse, which also appeared to have a greater effect on ED presentations.

Studies with no temporal ordering

Inconsistent findings were produced from the two studies utilizing samples of disadvantaged offspring. The first study by Lewis et al. (1979) examined the hospital admissions among 105 adolescents referred to juvenile court at 16 years of age. T-tests revealed that the offspring of parents with a police record had significantly more hospital visits any time before the age of 4 and 12, but not before 16 years. Limiting subsequent analyses to paternal offending resulted in the exposed offspring groups having significantly more hospital visits across all ages (Lewis et al. 1979). In contrast, Lanier et al. (2009) examined the hospital care records of 6282 low-income children from ages 12 to 18 years, 61.2% of whom had a history of maltreatment. No bivariate association was found between parents' criminal record and offspring hospital care for any of the outcomes examined. Instead, children's history of maltreatment was the strongest predictor of child hospital care, after adjusting for covariates.

More consistent evidence arises from the studies of large, representative cohorts derived from administrative records. Drawing data from a large Australian record linkage project, Laurens et al. (2017) found that, after adjustment for socio-

demographic covariates, children's risk of poor physical health development at five years of age was highest if their father, mother, or both parents had a history of offending. Greater risk was observed for parents with a history of violent offending, and the magnitude of the association was higher for maternal than paternal offending. Similarly, Bell et al. (2018) found that, in another representative birth cohort of 19,071 children from Australia, parental history of conviction was also significantly associated with children's risk of poor physical health development at five years of age, independent of socio-demographic covariates. However, the likelihood of children's poor health development was not greater for mothers or fathers with a history of conviction.

Parental Offending and Child Mental Health Problems

There were 13 studies that examined the association between parental offending and child mental health outcomes. Amongst these studies, the average methodological quality was high for correlates ($\bar{x} = 4.2$), moderate for risk factors ($\bar{x} = 1.85$), and low for causal risk factors ($\bar{x} = 2.31$). Slightly more than half of the studies were published in journals ranked in the top quarter of their field ($n = 6$), and had an average *h*-index of 106. Seven studies were based on samples of children from low-income families or who had a history of maltreatment. Only five studies considered the timing of parental offending relative to offspring mental health; all but one of which were based on samples of disadvantaged children. Mental health was most commonly measured by the internalizing subscale of the Child Behavior Checklist (CBCL); a reliable and reputable measure that covers many symptoms of child emotional problems (Achenbach 1992).

Studies with temporal ordering

Evidence is mixed regarding the potential for associations to reflect a causal relationship between parental offending and child mental health outcomes, with supporting evidence limited to small samples of children from low income backgrounds. For example, in their examination of the impact of chronic family adversity on 302 boys from low-income families, Shaw et al. (1998) found a positive association between parental offending when the boys were 18 months of age and child internalizing problems at 42 months of age. No such relationship was found for parental offending at 24 months of age and child internalizing problems at 24 or 42 months. Multivariate analysis was not conducted in this study, making it impossible to discern if these findings are independent of other potentially explanatory covariates Table 3.

Table 3 Studies on parental offending and child mental health outcomes

Study	Sample characteristics			Measures		Results
	Children	Parents	Parental offending	Child mental health	Covariates	
Shaw et al. (1998); U.S.A	302 ethnically diverse male children from low-income families followed from 18 to 42 months of age	302 disadvantaged mothers interviewed when infants were 18, 24, and 42 months of age	Mother reported criminal behavior by either parent when child was 18 and 24 months of age	Internalizing scale of the CBCL measured at 24 and 42 months of age	None	Bivariate correlations - Family crime at 18-months: internalizing problems at 24-months ($r = .03, p > .05$) and 42-months ($r = .17, p < .001$). - Family crime at 24-months: internalizing problems at 24-months ($r = -.08, p > .05$) and 42-months ($r = .05, p > .05$) <i>n.s results not presented</i>
Phillips et al. (2004); U.S.A	5504 children involved with Child Welfare Services (CWS) and were the subject of a maltreatment investigation	12.5% of children had a parent with a recent arrest, and in 90.7% of cases the arrested parent was the mother	Self-reported arrest 6 months prior to CWS case. CWS case-worker also reported arrest during case investigation	Internalizing scale of the CBC	None	
Kinner et al. (2007); Australia	Birth cohort of 2399 offspring followed from birth to 14 years of age	7.6% of fathers had a history of arrest	Mother reported if partner ever arrested	Internalizing scale of the CBCL at age 5. Internalizing scale of the YSR at age 14	Maternal age and education, family income, maternal mental illness, maternal drinking and smoking, dyadic adjustment, domestic violence and parenting style	Unadjusted OR (95% CI) - Partner arrest and internalizing problems at age 5: male = 1.11 (.49–2.48); female = .93 (.42–2.07); all = 1.00 (.57–1.77) - Partner arrest and internalizing problems at age 14: male = 1.07 (.45–2.54); female = .52 (.21–1.32); all = .72 (.38–1.35)
Kim et al. (2009); U.S.A	230 children aged 13–14 to 17–18 years of age	206 parents followed over 20 years	Self-reported delinquent behaviors and official arrest records	Composite measure of the Child Depression Ratings Scale, Epidemiologic Studies Depression Scale, and CBCL	Parent internalizing problems	Bivariate correlations - Paternal history of offending = .23, $p < .05$ - Maternal history of offending = .20, $p < .01$ Path analysis = <i>n.s</i>
Fröjd et al. (2009); Finland	Representative cohort of 3242 children in ninth-grade	73 children had a parent suspected, arrested, or convicted of a crime	Adolescent reported if parent was accused, arrested, or convicted of a crime in the last 12 months	Beck Depression Inventory (BDI)	Family structure, socioeconomic status, comorbid depression and alcohol use, and other family life events	Adjusted logistic regression OR (95% CI) - Controlling for family structure, SES, and comorbid alcohol use = 3.0 (1.7–5.4) - Also controlling for other family events = <i>n.s</i>
Ashrafoun et al. (2011); U.S.A	24 children aged between 4–17 years of age	Convenience sample of 14 opioid dependent parents (9 mothers) admitted to rehabilitation	Self-reported history of arrest and current court involvement	Need for mental health services measured by the Brief Impairment Scale (BIS)	None	Unadjusted linear regression - Parental arrest and mean (SD) BIS score = 18.6 (10.8) vs. 8.0 (3.9); $F = 10.51, p < .01$ - Parental court involvement and mean BIS score = 22.5 (11.1) vs. 12.0 (8.4) $F = 5.69, p < .05$
Coley et al. (2011); U.S.A	261 children from low income families followed from age 3 (wave 1) to age 5 (wave 2) and 9 years (wave 3)	261 mothers and fathers who had been in contact with focal child in the last year. 52% fathers, and nearly half as many mothers, engaged in criminal behavior	Self-reported engagement in 9 illegal activities in past 12 months at wave 1	Internalizing scale of the Child Behavior Checklist (CBCL) at waves 2 and 3	Parent education, father in household, mother's marital status, household income, father/mother harsh discipline and warmth	Bivariate correlation - Age 3 = .02, $p > .10$ - Age 5 = .23, $p < .01$ - Age 9 = -.06, $p > .10$ Adjusted lagged OLS regression β - Age 5 = 0.82, $p < .05$ - Age 9 = 0.78, $p < .10$ <i>n.s</i>
Murray et al. (2012); U.S.A	1009 randomly selected boys in first and seventh grade followed for 12 years	84 (8.3%) of children had a convicted parent, and 41 (4.1%) had a parent arrested without conviction	Self-reported criminal justice involvement at any time when the youngest and oldest samples were around 14 and 17 years of age, respectively	Depression symptoms from the Mood and Feelings Questionnaire (MFQ) assessed annually	None	

Table 3 (continued)

Study	Sample characteristics		Measures		Results
	Children	Parents	Parental offending	Covariates	
Miller et al. (2013); U.S.A	1735 children aged 5–15 years with child welfare involvement	1735 biological mothers; 22.5% of mothers had contact with the criminal justice system	Self-reported involvement with the criminal justice system after child's birth	Maternal mental illness, child age, race, income, community adversity, violence exposure, child sex, abuse or neglect, and maternal drug abuse	Bivariate correlation - Maternal justice involvement = .03, $p > .05$
Lucento et al. (2015); U.S.A	125,123 youths aged 12–17 years served by the Washington State Department of Social and Health Services	217,263 biological parents; 47,775 (38.2%) children had a parent with an arrest or conviction	Recorded arrest or court filings for any crime category in the last five years	Any mental health diagnosis, service encounters, or psychotropic medication claims	Adjusted logistic regression OR (95% CI) - Arrest or conviction, either parent = .97 (.94–1.00) Adjusted Incident Rate Ratio (95% CI) - Arrest or conviction, either parent = .97 (.93–1.00)
Roberts et al. (2014); U.S.A	306 male children aged 0–11 years seeking mental health and development services	306 caregivers; 65 (21.2%) children exposed to parental arrest	Exposure to parental arrest (Traumatic Events Screening Inventory Parent Report Revised)	Internalizing scale of the Child Behavior Checklist (CBCL)	Adjusted linear regression β - Any age = .18, $p = .005$ - Age 0–3 = .25, $p = .049$ - Age 4–6 = .20, $p = .047$ - Age 7–11 = .17, $p = .19$
Laurens et al. (2017); Australia	Representative sample of 66,477 children born in New South Wales and enrolled in pre-primary in 2009 (around 5 years of age)	Data on 66,477 mothers and fathers; 19,808 (29.8%) children had a parent with a history of offending (mothers = 5775; fathers = 17,631; both = 3598)	Official court appearance for any and violent crimes from January 1, 1994, to December 31, 2009	Emotional maturity subscale of the 2009 AEDC	Adjusted multinomial logistic regression OR (95% CI) - Maternal offending: any = 2.01 (1.83–2.21); violent = 2.64 (2.29–3.06) - Paternal offending: any = 1.57 (1.47–1.68); violent = 1.83 (1.68–2.00) - Both parents offending: any = 2.15 (1.92–2.40); violent = 2.69 (2.21–3.28)
Bell et al. (2018); Australia	Representative sample of 19,071 children born in Western Australia during 2003–2004 and enrolled in pre-primary in 2009	1402 (7.35%) children had a convicted parent (mothers = 555; fathers = 1089; both = 242)	Official convictions resulting in serious sanctions from 12 months prior to the child's birth until the end of 2009	Emotional maturity subscale of the 2009 AEDC	Adjusted logistic regression OR (95% CI) - Maternal conviction only = 1.37 (1.06–1.76) - Paternal conviction only = 1.66 (1.42–1.94) - Maternal conviction only vs paternal conviction only = .82 (.62–1.10) Both parents = 1.51 (1.14–1.98)

Note: *n.s.* = not significant results not displayed

Kim et al. (2009) examined the intergenerational transmission of internalizing problems in 230 boys and their parents residing in high crime neighborhoods over twenty years. A positive association was found between children with a history of maternal and paternal offending before 12 years of age and internalizing problems between 13 and 18 years of age. However, path analysis revealed that no such association existed when maternal and paternal internalizing problems and the boys externalizing problems were included in the model. In contrast, evidence of an independent effect of parental offending after adjustment for parental and socio-demographic factors is provided by Coley et al. (2011), who investigated the effect of self-reported parental offending on the internalizing problems of 261 children from low-income neighborhoods. It was found that paternal, but not maternal, offending measured when children were around three years of age had a direct effect on child internalizing problems at age five, but not at age nine years, after adjusting for other familial risk factors.

Convincing evidence of a causal relationship between parental offending and child mental health outcomes were not found in two studies based on larger, more representative cohorts. Drawing data from the Pittsburgh Youth Study, Murray et al. (2012) examined the impact of parental involvement with the criminal justice system on the development of depression in 1009 inner-city boys from seven to 18 years of age. No evidence was found to indicate that parental arrest or conviction predicted offspring depression. Alternatively, Lucenko et al. (2015) used administrative records to examine the impact of parental offending on the mental health problems of 125,123 youths aged between 12 and 17 years. They found parental arrest or conviction in the previous five years to be associated with adolescents' mental disorder diagnosis, service encounter, or psychotropic medication prescription, as recorded in medical claims and publicly funded mental health records. However, this association disappeared after adjusting for other adverse childhood experiences, particularly childhood abuse and neglect, which was the strongest predictor of adolescent mental health problems.

Studies with no temporal ordering

Many of the studies employing a cross-sectional methodology found some evidence of an association between parental offending and child mental health outcomes. In a convenience sample of 14 opioid dependent parents and their 24 children, Ashrafioun et al. (2011) found that the children of parents with a self-reported history of arrest or current court involvement were significantly more likely to have an unmet need for mental health services. No additional analyses were conducted to determine if this finding could be explained by other factors. Fröjd et al.

(2009) also found that, in a representative sample of 3242 Finnish ninth-grade students, self-reported parental offending was significantly associated with offspring depression (as measured by the BDI), including after adjusting for family structure, socioeconomic status, gender, and frequent alcohol use. However, this relationship became non-significant when adjusting for negative family life events.

Roberts et al. (2014) found that children who experienced or were aware of their parent's arrest were significantly more likely to report internalizing problems, independent of other negative life events, socio-demographic factors, and parental education and functioning. This finding is based on an examination of 326 children aged 0 to 11 years whose parents were seeking mental health and development assessment, and/or intervention services for their children. Subsequent analysis also revealed that parental arrest had the strongest association with children's internalizing problems at age 0 to 3 years and 4 to 6 years, but not at age 7 to 11 years.

Laurens et al. (2017; reviewed above) also found that, after adjustment for sociodemographic factors and the offending history of the other parent, both maternal and paternal offending was significantly associated with offspring emotional vulnerabilities at five years of age. The strength of this association was highest for violent and maternal offending. Bell et al. (2018; reviewed above) also found that parental conviction was associated with child emotional vulnerabilities at age 5 years. Both maternal and paternal conviction conferred an increased likelihood of children's emotional vulnerabilities after adjustment for socio-demographic factors. This effect was not influenced by the gender of the parent. Conflicting results were found by Kinner et al. (2007), who drew data from another Australian longitudinal study. Based on a sample of 2399 adolescents, paternal arrest was found to have no univariate association with child internalizing problems at five or 14 years of age. Paternal offending was, however, measured by mother's reporting if their current partner had ever been arrested for an offense.

Significant associations between parental offending and poor mental health outcomes in children have not been found in studies based on offspring who have had prior involvement with child welfare services. Indeed, Phillips et al. (2004) found no significant relationship between self and interviewer-reported parental arrest and child internalizing problems amongst a sample of 5504 children aged 0 to 15 years involved with child welfare services. Furthermore, Miller et al. (2013) did not find a significant association between mother's self-reported involvement with the criminal justice system and the internalizing problems of 1735 offspring aged 5 to 15 years who had contact with child welfare services.

Parental Offending and Offspring Drug Use

Table 4 details the seven studies examining the association between parental offending and offspring drug use, which, across all studies, was measured during adolescence. The methodological quality for these studies were high in regards to correlates ($\bar{x} = 4.0$) and risk factors ($\bar{x} = 2.5$), but low for causal risk factors ($\bar{x} = 2$). Most studies were published in journals ranked in the top quarter of their field ($n = 5$), and had an average *h*-index of 108.7. Most studies were based on large longitudinal data sets, and four considered the timing of parental offending. Alcohol consumption, followed by cigarette smoking, was the most common measures of offspring drug use. All studies, bar one (Lucenko et al. 2015), were based on self-reported measures of parental offending and adolescent substance use.

Studies with temporal ordering

Research findings are mixed regarding a time-ordered association between parental offending and later adolescent substance use. In a sample of 4542 offspring from an Australian birth cohort, O'Callaghan et al. (2006) found a bivariate association between mother's, and their partner's, history of arrest when children were five years of age, and any cigarette smoking by offspring at 14 years of age. While maternal history of arrest was not included in the subsequent analyses, multivariate analysis indicated that the children of mothers whose partner had a history of arrest were more likely to smoke during adolescence after adjusting for family and socio-demographic covariates. Lucenko et al. (2015; reviewed above) also found parent's history of arrest to predict adolescent substance abuse problems, as recorded by official medical claims and service records for publicly funded chemical dependency or substance abuse services or diagnoses.

Keller et al. (2002) examined 67 offspring to predominantly low-income parents, primarily mothers, receiving methadone treatment. Most parents reported they had a history of criminal conviction at the baseline interview (66%). Two years later, around half (51%) of the offspring indicated that they had reportedly used alcohol or drugs within the last six months. However, no significant association was found between parental criminal conviction and adolescent alcohol or drug use after adjusting for child age, gender, parent figure transition, parental depression, and family conflict. The small sample size is likely to have limited the study's ability to identify significant multivariate associations. Murray et al. (2012; reviewed above) also found no significant association between boy's marijuana use from ages seven to 18 and parental involvement with the criminal justice system.

Studies with no temporal ordering

Somewhat consistent findings were observed amongst the three studies that employed a cross-sectional methodology. Specifically, Kinner et al. (2007; reviewed above) found a bivariate association between paternal arrest and offspring alcohol and tobacco use at age 14 years, although this association was only significant for boys, and remained significant after adjusting for demographic and family factors, and stratifying for gender. In a similarly representative sample, Fröjd et al. (2009; reviewed above) also found parental offending to be significantly associated with offspring drunkenness after adjusting for family structure, socioeconomic status, and depression. Contrary to Kinner et al. (2007) findings, the strength of this association was greater for adolescent girls than for adolescent boys. However, the association became non-significant when adverse family events were included in the model.

Shlafer et al. (2012) examined the association between mother's self-reported convictions and arrests since the child's birth, and offspring self-reported alcohol, cigarette, and drug use at 15 years of age. The 320 mothers and their first-born children included in this study were drawn from the Nurse Family Partnership program, which recruited first-time mothers who were under the age of 19 years, unmarried, or of low socioeconomic status. The study was based on an experimental design, with participants randomly assigned to receiving nurse-visitation during pregnancy or infancy. After adjustment for socio-demographic factors and prenatal smoking, both maternal conviction and arrest were found to be significantly associated with adolescent smoking, and drug and alcohol use problems.

Discussion

This paper systematically reviewed 19 studies examining the relationship between parental offending and offspring physical and mental health problems and drug use. Most studies were published in the last decade and in the fields of medicine and psychiatry, reflecting an increasing interdisciplinary interest on this topic. Associations were generally found between parental offending and poor physical health outcomes in young children, and more consistently, drug use in adolescence. The relationship between parental offending and child mental health outcomes was more inconsistent, and appeared to be explained by other explanatory factors, particularly child maltreatment and abuse. However, based on the quality checklist used, there were important methodological limitations in the studies reviewed that hindered their capability to provide conclusive evidence regarding the causal effect of parental offending on child health outcomes. Instead, due to the

Table 4 Studies on parental offending and child substance use

Study	Sample characteristics			Measures		Results
	Children	Parents	Parental offending	Child substance use	Covariates	
Keller et al. (2002); U.S.A	67 children from a family-based intervention interviewed over 2 years	All parents were receiving methadone treatment at study baseline	Self-reported history of criminal conviction	Self-reported drug and alcohol use within 6 months preceding the interview	Parental figure transitions, child baseline drug use, parent baseline depressive symptoms, family conflict, and child gender	Adjusted OR -Parent baseline criminal history = 2.05, $p > .05$
O'Callaghan et al. (2006); Australia	Birth cohort of 4541 children followed from birth to 14 years of age	4451 mothers. 138 (3%) children had mothers with a history of arrest. 708 (15.6%) children had mothers whose partner had a history of arrest	Mother reported self and partner history of arrest	Self-reported smoking at age 14	Prenatal smoking, maternal alcohol consumption, income, children in household, and child aggression	Bivariate χ^2 -Maternal arrest = 14.5 ($p < .001$) -Partner arrest = 27.9 ($p < .001$) Unadjusted OR (95% CI) -Partner arrest = 1.7 (1.3–2.1) Adjusted OR (95% CI) -Partner arrest = 1.5 (1.2–1.9)
Kinner et al. (2007); Australia	Birth cohort of 2399 offspring followed from birth to 14 years of age	7.6% of fathers had a history of arrest	Mother reported if partner ever arrested	Self-reported alcohol and smoking at age 14	Maternal age and education, family income, maternal anxiety and depression, maternal alcohol and tobacco consumption, dyadic adjustment, domestic violence and parenting style	Unadjusted OR (95% CI) -Male: alcohol consumption = 1.98 (1.22–3.22); smoking = 2.36 (1.37–4.06) -Female: alcohol consumption = 1.43 (82–2.45); smoking = 1.11 (.56–2.21) -All: alcohol consumption = 1.70 (1.18–2.44); smoking = 1.70 (1.11–2.59) Adjusted OR (95% CI) -Male: alcohol consumption = 1.79 (1.09–2.95); smoking = 1.83 (1.03–3.25) -Female: alcohol consumption = 1.13 (64–2.01); smoking = .85 9.41–1.74) -All: alcohol consumption = 1.46 (1.01–2.12); smoking = 1.31 (.84–2.04)
Fröjd et al. (2009); Finland	Representative cohort of 3242 children in ninth-grade	73 children had a parent suspected, arrested, or convicted of a crime	Adolescent reported if parent was accused, arrested, or convicted of a crime in the last 12 months	Self-reported binge drinking frequency	Family structure, socioeconomic status, comorbid depression and alcohol use, and other adverse family life events	Adjusted OR (95% CI) -Controlling for family structure, SES, and comorbid alcohol use = 3.6 (1.8–7.5); boys = 2.6 (1.0–2.8); girls 4.8 (1.4–16.8). -Also controlling for other family events = $n.s$
Murray et al. (2012); U.S.A	1009 randomly selected boys in first and seventh grade followed for 12 years	84 (8.3%) of children had a convicted parent, and 41 (4.1%) had a parent arrested without conviction	Self-reported criminal justice involvement at any time	Self-reported number of days using marijuana	None	$n.s$
Shlafer et al. (2012); U.S.A	320 first born children observed from birth to 15 years of age in the Nurse-family Partnership intervention program	320 low-income, first time mothers randomly assigned to a nurse home visiting program. 15.5% of mothers had a conviction, and 8.1% of mothers had an arrest	Self-reported arrest or conviction since child's birth to 15 years later	Self-reported alcohol, cigarette, and drug use in the last 6-months	Treatment group, maternal marital status, maternal education, maternal age, prenatal primary care visit, prenatal smoking, and child gender	Adjusted OR (95% CI): conviction -Smoking: conviction = 2.22 (1.07–4.58); arrest = 3.50 (1.26–9.71) -Drug/alcohol: conviction = 1.53 (.77–3.04); arrest = 1.15 (.42–3.10) -Problems with drug/alcohol: conviction = 2.84 (1.35–5.98); arrest = 4.22 (1.48–12.05)
Luценко et al. (2015); U.S.A	125,123 youths aged 12–17 years served by the Washington State Department of Social and Health Services	217,263 biological parents. 47,775 (38.2%) children had a parent with an arrest or conviction	Recorded arrest or court filings for any crime category in the last five years	Records of publicly funded chemical abuse services or diagnoses over the two year study period	Age, gender, ethnicity, poverty status, domestic violence, parent mental health problems, child abuse/neglect, and homelessness	Adjusted OR (95% CI) -Parental arrest or conviction = 1.22 (1.16–1.29) Adjusted IRR (95% CI) -Parental arrest or conviction = 1.22 (1.16–1.29)

Note: $n.s$ = not significant results not displayed

quality of the evidence, studies were better suited to demonstrating the association between parental offending and child health with some consideration of temporal ordering and confounding factors. With these limitations in mind, we suspect there to be some sort of relationship between parental offending and adverse health outcomes in offspring, although it is yet to be determined if a direct effect will explain much of the association found. Nonetheless, the current evidence indicates that parental offending may be a useful marker for identifying children at risk of poor health outcomes who may benefit from intervention.

It is possible that the association between parental offending and child health outcomes may, at least partially, be explained by child maltreatment. Foremost, multivariate studies often found child abuse, neglect, or maltreatment to have a similar or greater effect on child physical health (Arthur et al. 2018; Lanier et al. 2009), mental health (Coley et al. 2011; Phillips et al. 2004), and substance use outcomes (Lucenko et al. 2015) than parental offending. A previous systematic literature review also found child maltreatment to be closely associated with parental offending, with some evidence indicating that the risk of maltreatment increased following parental contact with the criminal justice system (Austin 2016). Further evidence also indicates that similar familial risk factors are experienced by the children who are exposed to parents with a history of offending and are also the subject of maltreatment and abuse (Miller et al. 2013; Phillips et al. 2004; Phillips and Dettlaff 2009). Hence, there appears to be considerable overlap in the effect of parental offending and child maltreatment on offspring health, raising the possibility that child maltreatment is one of the underlying mechanisms driving the association between parental offending and adverse child health outcomes.

Parental offending is associated with numerous economic and social stressors, either predating or resulting from their criminal behavior, that indirectly impact in offspring well-being (Turney 2014, 2017). This systematic literature review highlights the importance of interdisciplinary research by demonstrating that parental offending's pervasive influence may extend to various health outcomes in offspring. However, additional research on this topic is needed. Foremost, more research is required regarding the effect of prior parental offending on child physical injury and emergency department visitations. Future research should also explore parental offending's role as a causal risk factor for child health. An example of one such study would be to explore the within-individual changes in child health outcomes before and after parent's contact with the criminal justice system, while also controlling for other potentially confounding variables measured prior to the exposure of the risk factor. Finally,

research should also consider the role of potential confounding and mediating factors (e.g., child maltreatment, abuse, and traumatic experiences), as well as the influence of specific types and patterns of parental offending on types of physical illness and injury in children, and the role of child age and stage of development at the time of exposure.

There are several general limitations pertaining to research exploring the effect of parental offending on child health outcomes. First, the external validity of research may be limited, as most studies employed non-representative samples of disadvantaged offspring, or were conducted within the U.S, which has a unique health care policy to other western countries. Second, few studies considered the timing of parental offending in relation to child health. Establishing temporal ordering is fundamental for determining parental offending's status as a risk factor for adverse health outcomes in offspring. Finally, there were many disparate measures of child physical health and drug use, which prevented us from conducting a meta-analysis, and may have also led to considerable variations regarding the association with parental offending across studies.

In summary, there is an increasing interdisciplinary interest in the health and social sciences on the health outcomes of children to parents with a history of offending (Akers and Lanier 2009; Jackson and Vaughn 2018). Whilst studies generally demonstrate an association between parental offending and child health outcomes, other confounding factors, such as child maltreatment, may account for some of this relationship, particularly in regards to child mental health. Nonetheless, parental offending may be symptomatic of serious familial adversity that, as a whole, increases the risk of children's adverse health events, and therefore may be useful for identifying children at risk of negative outcomes. We suggest future research more closely investigate this possible causal association, as well as improve the generalizability of research findings by focusing on large longitudinal data sets representative of the wider population.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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