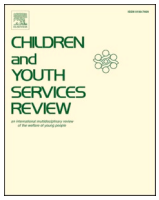
Children and Youth Services Review 161 (2024) 107609

Contents lists available at ScienceDirect

Children and Youth Services Review

journal homepage: www.elsevier.com/locate/childyouth



Untangling risky discourse with evidence: A scoping review of outcomes for teen mothers' offspring

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ARTICLE INFO

Keywords:
Outcome studies
Adolescent mothers
Teen mothers
Teenage mothers
Teen pregnancy

ABSTRACT

Concerns for the long-term health and social well-being of teen mothers and their children arose in the 1970s as early childbearing was depicted as a public health problem. Early researchers identified the high-risk nature of teen mothering and a host of unfavorable maternal-child outcomes. The purpose of this study is to review the research published since 2010 on the outcomes for teen mothers' offspring ≥ 6 years of age; to examine trends in the types of studies conducted; and to identify the strengths and limitations of this research.

Method: We conducted a systematic search of 8 databases to identify studies that examined outcomes for offspring ≥ 6 years from high-income countries. We grouped studies by offspring age (child ≥ 6 years of age, adolescents, and adults) and outcomes in the domains of mental health, physical health, education, sexual activity, delinquency/crime, and substance use. Child outcomes were examined in 16 studies, adolescent outcomes in 31, and adult outcomes in 14.

Findings: Of the 53 studies published between 2010 to November 2022, 32 originated in the U.S.; 9 in Sweden; 2 each in Canada and Taiwan; and 8 elsewhere. Since 2010, researchers have increasingly used national samples and sibling and cousin comparisons to control for selection into teen mothering. These studies have reduced, and in some cases, eliminated young maternal age as a predictor, suggesting that poor outcomes are largely due to factors related to teen mothers' preexisting disadvantage.

Conclusions: The results of this scoping review echo a chorus of scholars who have long argued that the poor outcomes attributed to teen mothering disregard the systemic inequities that predispose youth to become teen parents. Because these upstream conditions are baked into the social worlds that most teen mothers and their children inherit, delaying childbearing in the absence of mitigating these conditions is unlikely to improve maternal-child outcomes. We urge researchers to adjust for selection into teen mothering; examine heterogeneity in samples; adjust for birth year when multiple birth cohorts are combined in a study; place findings in historical context; consider variables that align with the perspectives of teen mothers; and study the intergenerational effects of adverse childhood experiences. Doing so would improve our understanding not only of causal relationships but the context and temporality of maternal-child outcomes.

1. Introduction

Researchers were quick to identify the adverse effects of young maternal age once teen mothering was identified as a public health problem (Luker, 1996). The risky scientific discourse that began in the 1970s proliferated as studies reported that teen mothers and their children fared poorly compared to older mothers and their children (Coley & Chase-Landsdale, 1998; SmithBattle, 2018a). In a very early review, Chilman (1980) noted that study findings were likely skewed by selection into teen mothering for which few researchers adjusted. That is, the preexisting factors that predispose teens to early childbearing also contribute to poor maternal-child outcomes. Compared to adult mothers, teen mothers are more likely to be of color, grow up in disadvantaged families, and reside in neighborhoods of concentrated poverty with inferior schools and high rates of unemployment and crime. These risky ecologies contribute to childhood adversities (Crouch, Probst, Radcliff, Bennett, & McKinney, 2019) which predispose youth into early sex and teen mothering (Furstenberg, 2016). Such

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https://doi.org/10.1016/j.childyouth.2024.107609
Received 28 July 2023; Received in revised form 20 January 2024; Accepted 15 April 2024
Available online 26 April 2024

contexts also contribute to poor maternal-child outcomes regardless of maternal age.

In a more recent review, Coyne and D'Onofrio declared "some (but not much) progress toward understanding teen mothering" (2012, p. 113). While most of their reviewed studies on child outcomes relied on correlational and cross-sectional designs, researchers who accounted for selection into teen mothering significantly advanced the understanding by estimating causal relationships. Because this review was conducted more than a decade ago and the search process was not described, we reasoned that a scoping review based on a systematic search of studies published since 2010 was warranted. Our review was guided by three aims consistent with scoping review guidelines (Munn et al., 2018): to review the research on outcomes for teen mothers' offspring who are 6 years old and older; to examine trends in the types of studies conducted; and to appraise the strengths and limitations of the available evidence.

2. Material and methods

2.1. Literature search

The third author conducted a systematic search with the assistance of a medical librarian to identify eligible studies (Fig. 1: PRISMA diagram). The original search was conducted across 8 databases in July 2020 with the following keywords: "child* of" OR "child*" AND "born to" AND "teen*" OR "adolescen* mother" AND "teen* OR "adolescen* parent" that appeared in the title, abstract or keywords. We updated the search to identify studies published to November 2022. We also identified studies from reference lists and from the first author's automated searches. We included studies if they were published in English; conducted in high-income countries; and reported on outcomes for offspring ≥ 6 years of age. Child age was restricted because of extensive research on teen mothers' young children. Dissertations, meta-analyses, and studies that did not specify offspring age were excluded. A total of 53 studies met the criteria.

2.2. Data extraction

We initially read the studies to develop a table for archiving extracted data. The third author independently entered the following data for each study to the table: study characteristics, sample description, offspring age, and study aims. The first and second authors reviewed the studies to revise entries for accuracy and completeness and to identify major findings. Minor differences were resolved by consensus. The second aim required that we retain all eligible studies, regardless of quality.

2.3. Analysis

We grouped studies into three offspring age groups (child ≥ 6 years of age, adolescent, and adult) and 6 outcome domains: mental health, physical health, education, sexual activity, delinquency/crime, and substance use. Domains were derived from study results and prior reviews. We noted the trends in the types of studies conducted and the strengths and limitations of the evidence after study samples, procedures, and key findings were identified.

3. Findings

Of the 53 eligible studies, 32 were conducted in the U.S.; nine in Sweden; two each in Canada and Taiwan; and one each in 8 other countries (Table 1 here). Researchers examined child outcomes in 17 studies, adolescent outcomes in 31, and adult outcomes in 14 (Table 2 here). Eight research teams spanned age groups and 14 research teams examined outcomes in more than one domain. Mental health outcomes

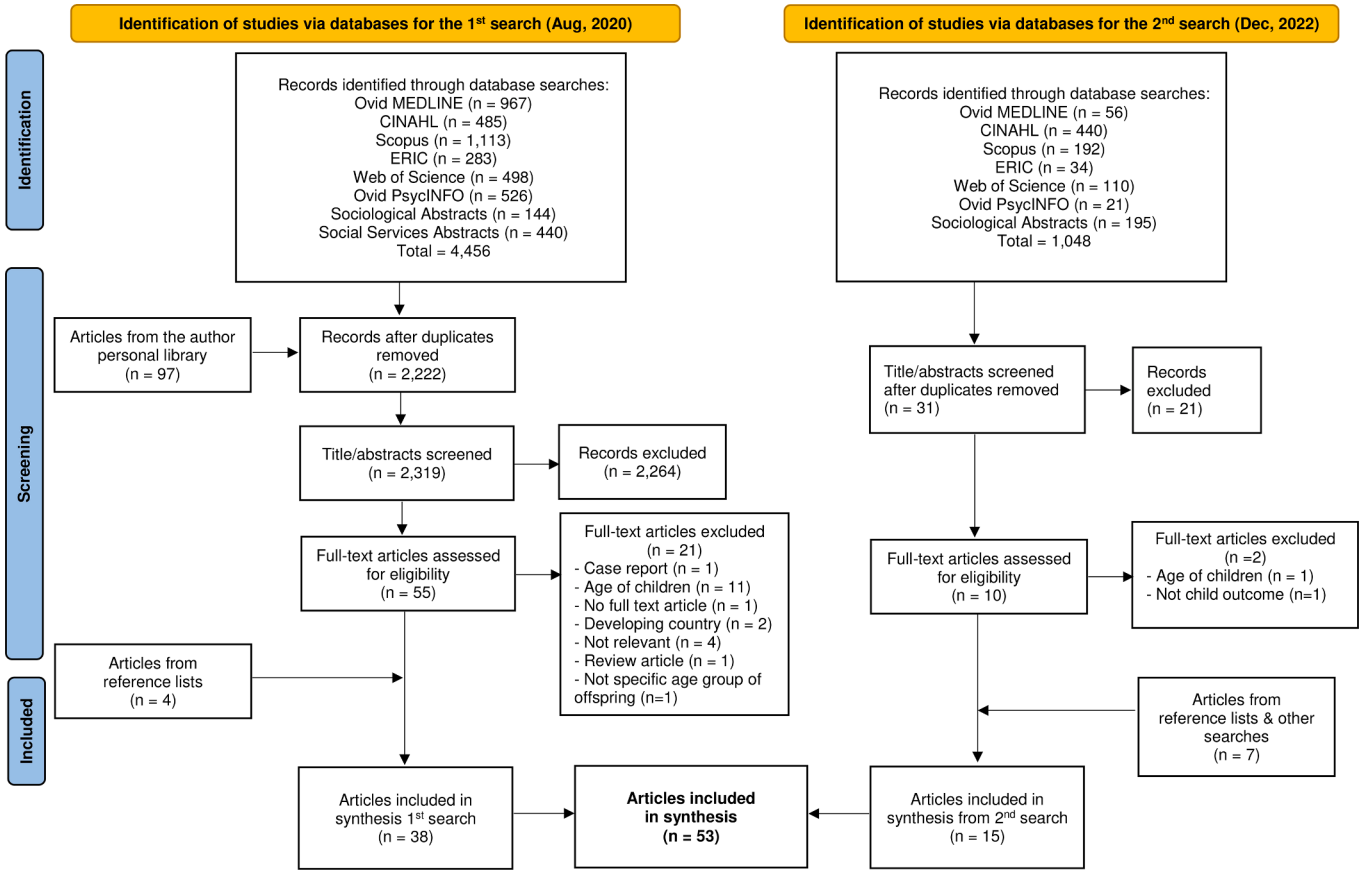

Fig. 1. PRISMA diagram

Table 1
Overview of Studies (N = 53).

Author/Year/(F – funded, NF – not funded, no funding indicated)	Data Source	Total Sample		Offspring Age & Timing of Assessments	Aims of Study
		Description of offspring or their teen mothers	Description of offspring or their adult mothers		
Addo et al. (2016) (F)	NLSY79 & NLSY79CY * USA	2,865 mother- child dyads (firstborn offspring born between 1972–1990) Mothers < 17 yrs = 15.8 % Mothers 18–19 yrs = 20.5 %	20–22 yrs = 18.8 % 22–24 yrs = 21.0 % > 25 yrs = 23.8 %	Offspring ≥ 20 yrs	Examine the association between maternal age at first birth, marital status, and youth high school completion.
Aizer et al. (2022) (NFI)	Population Registries Norway	303,085 firstborn, singleton children of mothers born from 1950 to 1980 who had at least one full sister 42,432 (14 %) offspring	no further description	Offspring age varied per outcome (16–30 yrs)	Examine the impact of young maternal age on a host of outcomes from childhood to adulthood using sister fixed effects to control for negative selection into teen mothering
Barclay and Myrskyla (2016a) (F)	Population Registries Sweden	1,591,613 offspring from birth cohorts 1960–1991 15–19 yrs = 5.5 %	20–24 yrs = 30.8 % 25–29 yrs = 37.6 % 30–34 yrs = 19.3 % 35–39 yrs = 5.9 % 40–44 = 1.0 %	Offspring age varied per outcome (16–30 yrs)	Examine the relationship between maternal age and educational outcomes, physical fitness, and height in youth and adult offspring
Barclay and Myrskyla (2016b) (F)	LIFINCON Survey & Population Registries Sweden	1,236 offspring born in 1990 to Swedish parents < 20 yrs = 2.4 %	20–24 yrs = 21.8 % 25–29 yrs = 34.0 % 30–34 yrs = 29.6 % 35–39 yrs = 10.1 % >40 yrs = 2.0 %	Offspring age 19 yrs	Examine the relationship between maternal age at first birth and health behaviors and health measures of 19-year-old offspring
Barclay and Myrskylä (2018) (F)	Population Registries Sweden	1,899,314 men & women from birth cohorts 1938–1960 & their siblings No further description	No further description	Offspring age 30–74 yrs	Examine the relationship between parental age and offspring mortality, including the effect of secular trends
Barnes and Morris (2012) (NF)	Add Health ** USA	17,700 youth recruited in 1994–1995 Maternal age at first birth ranged from 12 to 54 yrs of age Mean maternal age at birth = 24.29; SD = 5.07 No further description		Youth in grades 7–12	Examine the relationship between maternal age and delinquent youth behavior, and identify the factors that mediate this relationship
Basu and Gorry (2021) (NF)	NLSY79 & NLSY79CY * USA	3,836 first-born, singleton offspring 966 children of mothers who were pregnant before age 19 755 gave birth 57 had a miscarriage 154 had an abortion	2870 children of mothers who avoided teen pregnancy	Offspring age varied by outcome up to young adulthood	Examine the effects of having a teen mother on offspring health outcomes to young adulthood
Bert (2011) (F)	Notre Dame Adolescent Parenting Project (NDAPP), USA	110 low-income teen mother–child dyads (firstborns) Mean maternal age = 17.12 yrs; Black = 66.9 %; White = 26.5 % Hispanic = 6.6 %		Offspring age 14; assessed prenatally & 3, 5, 8 & 14 yrs	Examine relationships among religiosity and spirituality of mother and child and the child's internalizing and externalizing behavior and IQ at age 14
Brady et al. (2016) (NF)	Growing Up in Ireland Study	8,459 mother–child dyads n = 233 (2.8 %) offspring of teen mothers	n = 8,222 (97.2 %) offspring of adult mothers	Offspring age 9 yrs	Determine relationships between young maternal age and internalizing/ externalizing behavior of 9-year-old offspring
Carslake et al. (2017) (F)	Population Registries Sweden	3,653,938 offspring (1,873,803 sons & 1,780,135 daughters from birth cohorts 1951–1987). Most analyses limited to male offspring No further description		Offspring at 18.3 yrs	Examine associations of maternal and paternal age with health and social outcomes in male offspring aged 18.3 years
Carslake et al. (2019) (F)	Population Registries Sweden	5,204,433 offspring born between 1932—1987 Not described in paper or supplementary materials	Not described in paper or supplementary materials	offspring age 18–80.75 yrs (mean age = 43.1)	Examine associations between parental age and all-cause and cause-specific mortality of offspring
Chang et al. (2014) (F)	Population Registries Sweden	1,495,543 offspring of 896,389 mothers, born between 1988–2003; 30,674 offspring with ADHD Full siblings = 988,389; Full cousins = 383,511		Offspring age 4–15 yrs	Examine associations between maternal age and ADHD in offspring
Chudal et al. (2015) (F)	Finnish Prenatal Study of ADHD National Registries Finland	10,409 offspring with ADHD & 39,125 matched controls without ADHD		Offspring ≤ age 20 yrs	Determine relationships between maternal and paternal age and offspring's risk of ADHD
		With ADHD 696 (6.7 %)	Controls 950 (2.4 %)	With ADHD 9713 (93.3 %)	Controls 38,173 (97.7 %)
Cornelius et al. (2010) (F)	Teen Mother Study, Urban hospital in Pittsburgh, PA USA	290 teen mother–child dyads (firstborns) Mean maternal age = 16 yrs Black = 72 % White = 28 %		Offspring at age 10; assessed prenatally, at birth, & at 6 & 10 yrs	Determine relationships between change in IQ scores (age 6–10 yrs) and maternal and environmental characteristics
Cornelius et al. (2011) (F)		330 teen mother–child dyads (first-borns) mean maternal age = 16.3 yrs <15 yrs = 25 %		Offspring at age 10; assessed prenatally, at birth, & at 6 & 10 yrs	Examine the association between prenatal cigarette smoke exposure

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Table 1 (*continued*)

Author/Year/(F – funded, NF – not funded, no funding indicated)	Data Source	Total Sample		Offspring Age & Timing of Assessments	Aims of Study
		Description of offspring or their teen mothers	Description of offspring or their adult mothers		
		16–18 yrs = 75 % Black = 69 %; White = 31 % Single = 99 %; Mean education = 12.6 yrs			(PCSE) and offspring behavioral outcomes at age 10
Cornelius et al. (2012) (NF) mean maternal age = 16 yrs Black = 69 %; White = 31 % Single = 72 %; Mean education = 12.8 yrs			318 teen mother–child dyads (firstborns) Examine the long-term effects of PCSE on behavioral outcomes in 14-year-old offspring		Offspring at age 14 yrs; assessed prenatally, at birth, and at 6, 10, & 14 yrs
Coyne, Långström, and Lichtenstein et al. (2013) (F)	Population Registries Sweden	1,658,256 offspring born between 1960–1989 & 485,259 siblings 220,723 (11 %); mean maternal age = 18.5 (<13 yr olds excluded)	1,606,269 (88 %); mean maternal age at birth = 26.7	Offspring age varies by outcome up to age 35 yrs	Explore change in associations between teen mothering and offspring outcomes (convictions by age 35, use of substances by age 25, and academic performance in Grade 9). Determine if the above associations are due to social influence or social selection
Coyne, Långström, Rickert, et al. (2013) (NF)		**Full sample**: 1,084,939 offspring of 535,779 mothers **Sister offspring subsample**: 337,880 offspring of 79,545 sister pairs; 14,896 sister pairs discordant for teen mothering **Twin offspring subsample**: 3,870 children of 1,840 identical twin sisters 3,172 children of 1,512 fraternal twin sisters 58,488 (9.74 %) Mean maternal ag = 18.7 yrs	541,404 (90.25 %) maternal age = 26.1 yrs	Offspring age 15–25 yrs	Determine the extent to which maternal age at first birth is causally related to criminal convictions in offspring and confounded by genetic or environmental factors
De Genna et al. (2011) (NF)	Teen Mother Study Urban hospital in Pittsburgh, PA USA.	318 teen mother–child dyads (first-borns) Mean maternal age = 16.3 yrs Black = 71 % White = 29 %		Offspring age 14 yrs; assessed prenatally, at delivery, & at 6, 10, & 14 yrs	Examine the relationships among race, sex, and perceived pubertal timing in the first-born offspring of teen mothers
De Genna et al. (2013) (NF)		318 teen mother–child dyads (first-borns) Mean maternal age = 16.3 yrs Black = 71 % White = 29 %		Offspring age 14 yrs; assessed as above	Determine if childhood "dysregulation profile" at ages 6 and 10 predicts cannabis use at age 14, after controlling for covariates
De Genna et al. (2015) (F)		324 teen mother–child dyads (first-borns) Mean maternal age = 16.3 yrs Black = 79.79 % White = 32.21 %		Offspring age 16 yrs; assessed prenatally, at birth, & at 6, 10, 14, & 16 yrs	Describe trajectories of maternal marijuana use and their associations with early sexual behavior in offspring
De Genna and Cornelius (2015) (F)		334 teen mother–child dyads (first-borns) Mean maternal age = 16.3 yrs Black = 71 %; White-=29 %		Offspring age 16 yrs; assessed as above	Determine if maternal substance use is associated with risky sexual behavior and pregnancy in offspring
Duncan et al., 2018 (F)	NLSY79 & NLSY79CY * (1980–2002) USA	7,738 offspring (5380 for educational outcome; 5673 for mental health outcome); 2,437 (cousin sample); 6,978 (sibling sample) Maternal age 16–20 yrs = 48.8 %	21–25 = 28.7 % 26–30 = 15.0 % 31–35 = 5.9 % 36–40 = 1.4 % 41 and over = 0.2 %	Offspring age 10–13 yrs	Examine relationships between children's math & reading scores and behavior problems at age 10–13 and maternal age at birth and maternal human capital
Farris et al. (2011) (F)	NDAPP USA	170 teen mother–child dyads (first-borns) from at-risk community-based sample Mean maternal age = 17.07 yrs Black = 67.06 %; White = 26.06 %; Latina = 5.88 % Low SES = 55.37 %		Offspring age 14 yrs; assessed prenatally & at 1, 3, 5, 8, 10, & 14 yrs	Determine onset and prevalence of symptomatology of mental health disorders among high-risk offspring of teen mothers. Determine sex differences, stability, and co-occurrence of disruptive behavior problems
Fishman and Min (2018) (F)	ADDHealth** USA	13,530 offspring (about half were first borns) & 1518 full (non-twin) siblings Maternal age (15–20) = 20 %	21–25 = 35 % 26–30 = 29 % 31–35 = 13 % 36–40 = 3 % 41–45 = 1 %	Offspring mean age 29 yrs	Examine associations between maternal age at birth and highest educational attainment of adult offspring
Gorry (2022) (NF)	NLSY79 & NLSY79CY * USA	**Sample for ordinary least squares regression**: 3,773 offspring: 742 of teen births (mean maternal age = 16.8) & 3,031 of non-teen births (mean maternal age = 25.56) **Main Sample**: 947 first-born children of women who were pregnant as teens (<age 19) 742 children born to teens (mean maternal age = 16.84) 56 children born to mothers who miscarried as a teen (mean maternal age for miscarriage group = 19.64 yrs) 149 children born of mothers after having a teenage		Offspring age varied by outcome up to age 30	Does teen mothering adversely affect academic, labor market, criminal convictions, early childbearing, and behavioral outcomes among teen mothers' offspring, compared to the offspring of teen mothers' siblings and offspring who are born to mothers after having a miscarriage or abortion during their teen years?

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Table 1 (*continued*)

Author/Year/(F – funded, NF – not funded, no funding indicated)	Data Source	Total Sample		Offspring Age & Timing of Assessments	Aims of Study
		Description of offspring or their teen mothers	Description of offspring or their adult mothers		
		abortion (mean maternal age for abortion group = 23.53 yrs) **Sibling comparison sample**: 1,150 Mean maternal age teen births = 16.91 Mean maternal age non-teen births = 26.03			
Groth et al. (2017) (F)	New Mothers Study Memphis, TN, USA	295 Black teen mother-firstborn dyads <16 yrs = 31.5 % 16 – 17 yrs = 42.7 % 18—19 yrs = 31.2 %		Offspring mean age 18 yrs (timing of prior waves not described)	Examine the link of teen mothers' gestational weight gain and pre-pregnancy BMI with risk for being overweight/obese at child age 18
Hendrick and Maslowsky (2019) (F)	NLSY79 & NLSY79CYA* (1979–2014) USA	1,817 mother-female child dyads (firstborns) Female offspring born to teen mothers = 323 (17.78 %)	Female offspring born to adult mothers = 1,494 (82.22 %)	Offspring age < 19 yrs	Examine mechanisms by which maternal education is associated with offspring risk for teen mothering, and whether mechanisms and magnitudes vary by maternal age.
Jutte et al. (2010) (F)	Manitoba Population Health Research Data Repository (and other registries) Manitoba, Canada	32,179 mother–child dyads (first and higher order births) from 1979 to 1984 birth cohorts Teen mothers = 1964 (mean maternal age = 17.9) prior teen mothers = 3350 (mean maternal age = 24.9 yrs	Adult mothers = 26,865 mean maternal age at birth = 28.1 yrs	Offspring age varied by outcome up to age 17 yrs	Examine relationships between teen mothering and health, education, and sexual debut and activity among first- and later-born offspring, with reference to adult mothers
Khatun et al. (2017) (F)	Mater University Study of Pregnancy (1981–1983) Brisbane,Australia	2,643 mother–child dyads (child age 21) 2591 father-child dyads (child age 21) Teen mothers = 13.7 % (363) Teen fathers = 2.81 % (73)	86.27 % = adult mothers 97.18 % = adult fathers	Offspring age 21 yrs; assessed at pregnancy, 3–5 days, 6 mos, & 5, 14, 21 yrs	Examine the association between teenage parenthood and offspring IQ at age 21
Kim et al. (2020) (F)	Elementary students screened for ADHD Korea	N = 28,973 offspring offspring of teen mothers = 97	Offspring of adult mothers = 28,876	Offspring age 6–12 years	Examine the association between parental age at birth and ADHD symptoms in their children
Lee et al. (2017) (NF)	Elementary students from one school district in Taiwan	N = 218 mother–child dyads Offspring of teen mothers = 49.08 % (107) Mean maternal age = 18.3 yrs Married mothers = 76.6 %	Offspring of adult mothers = 51 % (111) Mean maternal age = 27.1 yrs Married mothers = 100 %	Offspring age 13–15 yrs, assessed at 6–8 yrs; 10–12 yrs & 13–15 yrs	Examine child behavioral problems in offspring born to teen and adult mothers. Determine if child behavior problems persist over time
Lee, Gilchrist, et al. (2017) (F)	Young Women & Child Development Study (1988–89) Northwestern WA USA	N = 184 teen mother–child dyads (firstborns) Mean age teen mothers = 16.5yrs White = 52.9 % Black = 27.1 % mixed or other = 20.1 %		Offspring age 17 yrs (timing of prior waves not described)	Determine if heterogeneity exists across an array of outcomes of teen mothers' offspring. Examine the association between teen mothers' life-course adjustment with heterogeneity in offspring development
Liang et al. (2021) (F)	National Health Insurance Research Database Taiwan	N = 4,138,151 offspring born from 1991 to 2004		Offspring age 7–20 yrs	Examine the effects of parental age and parental mental disorder on the risk of neuro-developmental and mood disorders in offspring
Lipman et al. (2011) (NF)	Ontario Child Health Study Canada	N = 2,355 offspring 154 of teen mothers 106 of prior teen mothers	2095 of adult mothers	Offspring age 22–34 yrs	Examine young adult outcomes for children born to teen mothers, children born to prior teen mothers, and children born to adult mothers
Menard et al. (2015) (NF)	NLSY79* USA	4620 first-born offspring of mothers who had given birth prior to 1979 teen mothers ≤ 18 yrs = 1,713 (31.7 %)	1,676 mothers (age 19–23 yrs) (36.3 %) 1,231 mothers (age 24–33 yrs) (26.6 %)	Offspring age 11–14 yrs	Determine if teen mothering is an independent risk factor for child's antisocial behavior and examine persistence of behavior problems into adolescence.
Menon et al. (2020) (NF)	Home visiting program for teen mothers USA	331 first-born children of teen mothers < 21 yrs of age Non-Hispanic White = 32.7 % African American = 21.8 %; Hispanic = 38.2 %; Other = 7.30 % Single = 52.6 % Partnered/married = 47.4 %		Offspring age 6 yrs (timing of prior waves not described)	Examine attachment relationships and executive functioning among children of teen mothers
Mok et al. (2017) (F)	Danish Civil Registration System (births from 1966 to 1996) Denmark	1,793,681 mother–child dyads & 1,793,681 father-child dyads Teen mothers (12–19 yrs) = 5.2 % (92,713) Teen fathers (12–19 yrs)= 1.3 % (23,578)	Age of adult mothers: 20–24 = 29.4 % (527,405) 25–29 = 37.9 % (679,557) 30–34 = 20.2 %	Offspring age 40 yrs	Examine associations between younger & older maternal age and offspring risk of suicide, premature death, psychiatric morbidity, and criminality

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Table 1 (*continued*)

Author/Year/(F – funded, NF – not funded, no funding indicated)	Data Source	Total Sample		Offspring Age & Timing of Assessments	Aims of Study
		Description of offspring or their teen mothers	Description of offspring or their adult mothers		
			(362,975) 35–39 = 6.3 % (112,550) 40–44 = 1.0 % (17,654) 45 + = 0.05 % (827)		
Myrskyla and Fenelon (2012) (NF)	Health & Retirement Study (HRS) USA	18,335 offspring from 5 cohorts born from before 1924–1953 Offspring of teen mothers = 16.6 % 71.8 % White 24.3 % Black 3.0 % Other	Offspring of adult mothers 20–24 yrs = 29.9 % 25–34 yrs = 41.4 % 35–39 yrs = 8.3 % 40–44 yrs = 3.0 % 45–49 yrs = 0.8 % 81 % White; 15.3 Black; 3.7 % Other	Offspring mean age 56.3 yrs at first interview, followed 8.2 yrs on average)	Examine associations between advanced maternal age and negative health outcomes (frailty, obesity, mortality, self-rated health) in middle aged offspring. Examine if selection (by maternal SES) and lifespan overlap (age at which a child loses a mother) may explain results
Oberlander and Black (2011) (F)	Home visiting intervention, Baltimore, MD USA	N = 120 teen mother–child dyads (firstborns) Mean age at birth = 16.4 yrs Received welfare = 97 % Mean grade level = 10.2 Primarily Black		Offspring age 7 yrs; assessed at delivery; at 6, 13, & 24 mos; & 7 yrs	Examine the effects of teen mother-grandmother caregiving in the child's first 2 yrs of life on child behavior and academics at age 7
Pasalich et al. (2016) (F)	Puget Sound, WA, USA	112 teen mother–child dyads Mean maternal age at birth = 17.3 yrs White = 78.57 % Black = 9.82 % Native American = 5.36 % Hispanic/Latina = 1.79 % Other: 4.46 % On welfare = 38 %		Offspring age 9 yrs: assessed at 1, 4.5, & 9 yrs	Examine direct and indirect effects of teen mothers' child abuse history on infant attachment security (at 1 yr), maternal hostility (at 4.5 yrs), and externalizing behavior in offspring at age 9 yrs
Russotti, Rogosch, et al. (2021) (F)	Greater Boston & Rochester, MA USA	384 disadvantaged mother–child dyads; 201 offspring who had been maltreated, 183 had not been maltreated 237 (62.0 %) offspring of teen mothers: (118 born to mother < 19 yrs and 119 born to mothers ≥ 20 yrs who had prior child as a teen)	147 (38.0 %) offspring of never-teen mothers	Offspring age 18–20 yrs: assessed at 10–12 & 18–20 yrs	Examine the mediating role of chronic child maltreatment in the relationship between teen mothering and offspring internalizing symptoms from late childhood (age 10–12 yrs) to young adulthood (age 18–20 yrs)
Russotti, Warminham et al. (2021) (F)		378 disadvantaged mother–child dyads; 214 offspring had been maltreated, 164 had not been maltreated 70.5 % Black 10.5 % Hispanic 14.6 % White 4.4 % other 236 (62.4 %) of teen mother (<20 yrs)	142 (37.6 %) of never-teen mother	Offspring age 10–12 yrs	Examine the independent and cascading effects of exposure to teen mothering, maternal history of being maltreated as a child, current maternal depression, and childhood exposure to chronic maltreatment on child's internalizing and externalizing symptoms
Stargel and Easterbrooks (2020) (F)	Healthy Families Massachusetts (home visiting intervention & state agency data) USA	407 teen mother–child dyads (firstborns) Mean maternal age = 18.8 yrs White = 34.9 %; Hispanic = 36.1 %; Black = 22.6 % Other = 6.4 %		Offspring age 8 yrs (6 waves from pregnancy to age 8)	Describe the diversity of adverse childhood experiences among teen mothers and determine maternal risk profiles that contribute to internalizing and externalizing problems in offspring
Sujan et al. (2022) (F)	Population registries Sweden	1,216,208 singleton, first-born offspring born to women under age 30 between 1973–2012 Teenage mothers (<20) = 114,006 (9.1 %)	20–24 yr old mothers = 525,330 (42.0 %) 25–29 yr old mothers = 610,864 (48.9 %)	Offspring age varied by outcome	Examine associations between young maternal age at first birth and risk for offspring deaths, accidents & suicides compared to mothers aged 20–24 and 25–29 yrs. Reexamine associations by controlling for covariates and comparing to cousins
van de Weijer (2022) (F)	Population registries Netherlands	2,098,815 offspring born between 1991 and 2001 who were suspected of criminal activity: 80,732 pairs of offspring differentially exposed to maternal age at birth # in full sample not defined; 40,366 in cousin comparison	# in full sample not defined 40,366 in cousin comparison	Offspring age 12–18 yrs	Examine relationship between teen mothering and offspring suspected of crime between age 12–18 yrs
van Vugt et al. (2016) (NF)	Pittsburgh Youth Study (first grade boys recruited in 1987–1988 from	462 mother-son dyads selected from a larger study (247 sons scored high for conduct problems and 256 without conduct problems randomly selected from the larger sample) Description of full sample only Mean maternal age at birth = 20.73 yrs (SD = 4.12 yrs)		Offspring age 19; assessed twice a year for 4 yrs from age 7 and annually till age 19 urs	Examine the relationship between young maternal age and persistent delinquency in male offspring at age 19 yrs

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Table 1 (*continued*)

Author/Year/(F – funded, NF – not funded, no funding indicated)	Data Source	Total Sample		Offspring Age & Timing of Assessments	Aims of Study
		Description of offspring or their teen mothers	Description of offspring or their adult mothers		
	public schools) USA	White = 41 % Black = 56 % Other = 4 %			
Vaske et al. (2015) (F)		Collaborative Perinatal Project (1959–1966) & criminal records 1999–2000 Providence RI, USA	3,766 mother–child dyads Examine the interrelationships between young maternal age, low birth weight, and criminal arrests among adult offspring		Offspring mean age 37 yrs; prenatal- 7 yrs; criminal records from 33 to 40 yrs
Offspring of mothers ≤ age 17 = 8.9 % (n = 340) (no further description)	Offspring of ≥ 18 = 91.1 % (n = 3426) (no further description)				
Wildsmith et al., 2012 (F)	NLSY79 & NLSYCY* USA	1,011 first-born offspring of teen mothers 472 (42.9 %) maternal age ≤ 17 yrs 539 (53.3 %) maternal age = 18 or 19 White = 60.1 % (n = 326) Black = 29.6 % (n = 459) Hispanic = 10.3 % (n = 226) married at birth = 54.0 %		Offspring < 21 yrs	Examine relationships between early maternal factors, offspring factors at age 14, and family environment that increase the risk for single childbearing among adolescent offspring
Yoon et al. (2019) (F)	Young Women and Child Development Study Northwestern WA USA	Two cohorts of 488 teen mother–child dyads (firstborns) teen mothers ≤ 17 yrs White = 58.2 % Black = 25.8 % Mixed/other = 16.1 %		Offspring age 11; data from waves at age 3, 6, & 11 yrs	Examine pathways between teen mothers' adverse childhood experiences, aspects of parenting, and child externalizing behavior at age 11yrs
Yoon (2022) (F)	Young Women and Child Development Study Northwestern WA USA	Two cohorts of 240 offspring of teen mothers Mean age of teen mothers = 16.5yrs White = 37.9 % Black = 32.4 % mixed or other = 29.7 %		Offspring age 17; data from waves at age 5.5, 6, 9.6, 10.5, 11.5, 15.1, 16 & 17 yrs	Examine the impact of the timing and duration of childhood adversity on offspring externalizing behavior at age 17 yrs
Yu et al. (2022) *(NF)*	New Mothers Study Memphis, TN, USA	414 Black teen mothers and their first-born children mean age teen mothers = 17.94 yrs (SD = 3.04 yrs)		Offspring age 18; assessed at age 2, 6, 9, 12 & 18 yrs	Examine associations between teen mothers' psychological factors and offspring executive function at age 6 and 18 yrs
Zer et al. (2019)	perinatal & hospital databases Sokora University Medical Center Israel	213,177 singleton births from 1991 to 2014 2347 births to mothers ≤ 17 18,645 births to mothers 18—20 yrs	192,185 (90.2 %) births to adult mothers (21–35 yrs)	Offspring 18 yrs	Determine if young maternal age is associated with increased risk for pediatric morbidity in offspring

* NLSY79 followed youth born between 1957 and 1964. They were 14–22 years of age in 1979, interviewed yearly till 1994, and then biennially. The NLSY79 Child and Young Adult cohort (NSLY79Child/YA) includes offspring born to female NSLY79 respondents. Offspring completed a range of assessments until age 15; a subsample continues to be followed.

** AddHealth (National Longitudinal Study of Adolescent to Adult Health) followed 90,000 adolescents who were enrolled in grades 7–12 beginning in the 1994/95 school year. This nationally representative sample has followed participants to mean age 29 years over 4 waves.

were the most frequently studied.

Twenty-five research teams of 32 studies used US longitudinal datasets; 18 of these studies were based on samples restricted to teen mother–child dyads. Nine teams used US national databases and 11 teams used population registries from mostly Northern European countries to compare the offspring of teen and adult mothers on outcomes of interest. These large datasets permitted researchers to adjust for selection factors that contribute to the risk of teen mothering and poor outcomes by comparing teen mothers' offspring to their discordant siblings (that is, offspring born later, during the mothers' adult years) or to their cousins (offspring of teen mothers' full- or twin-sisters who gave birth as an adult). The latter approach is sometimes referred to as a children-of-siblings design (Coyne, Långström, Rickert, et al., 2013). Both approaches allow researchers to examine selection factors that contribute to the risk of teen mothering by controlling for unmeasured family, environmental, and genetic factors that offspring share with their siblings and cousins (Coyne, Långström, Rickert, et al., 2013), thus promoting causal explanations. The causal effect of teen mothering can also be estimated by using miscarriage data. Because most miscarriages are considered random, comparing offspring of teen mothers to offspring of mothers who gave birth at an older age after having a teen miscarriage also controls for many unmeasured variables (Hoffman, 2015).

We review study findings below by age group and domain; when outcomes span more than one age group, we report study findings in the oldest age group. Teen mothering, teen childbearing, or young maternal age are used as equivalent terms. Although all studies were conducted in high-income countries, we often refer to their national origin because teen birth rates and health and social policies often differ between countries.

4. Child outcomes

Sixteen research teams studied outcomes in children 6 years of age or older. Fourteen of these addressed child outcomes in the domains of mental health and education; most were based on samples restricted to teen mother–child dyads. Only two teams estimated the effect of maternal age on child outcomes with national samples (Brady, Hennessy, & Polek, 2016). Duncan and colleagues (2018) were the sole team to compare sibling and cousin offspring and offspring whose mothers gave birth or had a miscarriage as a teen.

Mental Health: Offspring mental health was the subject of 16

Table 2
Studies by Age Groups and Outcomes.

Study Author (Year)	Age of offspring at final assessment (Year)			Outcomes					
	1 (6–12)	2 (13–19)	3 (≥20)	1	2	3	4	5	6
Addo et al. (2016)		x				x			
Aizer et al. (2022)		x	x			x			x
Barclay and Myrskyla (2016a)		(males)	x		x	x			
Barclay and Myrskyla (2016b)		(males)			x				
Barclay and Myrskylä (2018)			x		x				
Barnes and Morris (2012)		x		x			x		
Basu and Gorry (2021)		x			x				
Bert (2011)		x		x					
Brady et al. (2016)	x			x					
Carslake et al. (2017)		(males)			x				
Carslake et al. (2019)			x		x				
Chang et al. (2014)	x	x		x					
Chudal et al. (2015)	x	x		x					
Cornelius et al. (2010)	x					x			
Cornelius et al. (2011)	x			x					
Cornelius et al. (2012)		x		x					
Coyne, Långström, and Lichtenstein et al. (2013)		x	x			x	x	x	
Coyne, Långström, Rickert, et al. (2013)			x				x		
De Genna et al. (2011)		x							x
De Genna et al. (2013)		x		x				x	
De Genna and Cornelius (2015)		x						x	x
De Genna et al. (2015)		x							x
Duncan et al. (2018)	x			x		x			
Farris et al. (2011)		x		x					
Fishman and Min (2018)			x			x			
Gorry (2022)			x			x	x		
Groth et al. (2017)		x			x				
Hendrick and Maslowsky (2019)		x							x
Jutte et al. (2010)		x			x	x			x
Khatun et al. (2017)			x			x			
*Kim et al. (2020)	x			x					
Lee et al. (2017)		x		x					
Lee, Gilchrist, et al. (2017)*		x							
Liang et al. (2021)	x	x		x					
Lipman et al. (2011)			x	x	x	x			
Menard et al. (2015)		x		x					
*Menon et al. (2020)	x			x					
Mok et al. (2017)			x	x	x		x		
Myrskyla and Fenelon (2012)			x		x				
Oberlander and Black (2011)	x			x		x			
Pasalich et al. (2016)	x			x					
Russotti, Rogosch, et al. (2021)	x	x		x					
Russotti, Warminham et al. (2021)	x			x					
Stargel and Easterbrooks (2020)	x			x					
Sujan et al. (2022)			x	x	x				
van de Weijer (2022)		x					x		
van Vugt et al. (2016)		(males)					x		
Vaske et al. (2015)			x				x		
Wildsmith et al. (2012)		x		x					x
Yoon et al. (2019)	x			x					
Yoon (2022)		x		x					
Yu et al. (2022)	x	x		x					
Zer et al. (2019)		x			x				
Totals	16	31	14	27	13	12	8	2	7

Outcome: 1 = mental health; 2 = physical health; 3 = education; 4 = delinquency/crime; 5 = substance use; 6 = sexual activity.
* Lee, Gilchrist, et al. (2017) did not examine specific outcomes but identified sub-groups of teens based on risk profile.

studies; five of these studies extended into adolescence. The most frequently studied mental health issues included externalizing (e.g., aggression, conduct problems) or internalizing symptoms (e.g., anxiety, depression). Three research teams drew on U.S. longitudinal samples of teen mother–child dyads to examine the relationship between maternal or child adverse childhood experiences (ACEs) and child internalizing or externalizing problems (Pasalich, Cyr, Zheng, McMahon, & Spieker, 2016; Stargel & Easterbrooks, 2020; Yoon et al., 2019). They described a positive relationship between teen mothering and externalizing problems of children at age 9 (Pasalich et al., 2016) and age 11 (Yoon et al., 2019). Teen mothers with a history of physical and sexual abuse were more likely than non-abused teen mothers to have insecurely attached infants, which predicted greater externalizing behaviors in offspring from pre-school to grade 3 (Pasalich et al., 2016). Yoon et al. (2019) described the following trajectory with longitudinal data; teen mothers' ACEs scores were associated with their levels of stress and conflicts with their mothers (child's maternal grandmother) at offspring age 3, use of physical punishment at child age 6, and child externalizing behavior at age 11. In a subsequent study, Yoon (2022) examined the effect of the timing and duration of offspring ACEs on their behavior at age 17; compared to other time periods, child maltreatment at age 11.5 was the best predictor of child externalizing behavior. Taking another approach,

Stargel and Easterbrooks (2020) identified children at risk of internalizing and externalizing problems at age 8 based on teen mothers' ACEs profiles. Of the four profiles identified, children in the "high, multiple risk" group were at the highest risk for problems. These studies show the value of examining maternal or child ACEs as a risk factor for children's mental health problems.

Researchers typically estimate the *average* effect of teen mothering on child outcomes, potentially obscuring how the effect may vary across sub-groups (Hoffman, 2015). Like Stargel and Easterbrooks (2020) above, researchers studied heterogeneity by examining how the effect of teen mothering on outcomes varied by subgroups. Menon, Katz, and Easterbrooks (2020) sorted offspring into three groups based on their attachment scores; the "secure" group of children had higher executive functioning scores than the other groups. In a study with Black teen mothers < age 18 years at delivery, Oberlander and Black (2011) examined associations between children's emotional and psychological adjustment by age 2 across two family caregiving patterns (maternal care versus shared care with grandmother). After controlling for maternal and child age, gender and preschool attendance, outcomes at offspring age 7 years were better for maternal versus shared care. These results highlight the value of uncovering sample heterogeneity.

The following researchers compared offspring of teen and unrelated adult mothers and reported more favorable outcomes for adult mothers' children. Mental health problems were greater among Irish teen mothers' 9-year-old children than children of adult mothers, but were not predicted by young maternal age but by family disadvantage and conflict, single parenting, and maternal depression (Brady et al., 2016). In a U.S. sample of maltreated and non-maltreated children of mostly low-income families, offspring of teen versus adult mothers were more likely to experience chronic maternal maltreatment which contributed to externalizing and internalizing symptoms of their children between age 10 and 12 years (Russotti, Warmingham, Handley, Rogosch, & Cicchetti, 2021). In a follow-up study, internalizing symptoms extended to age 18–20 years for the chronically maltreated children of teen mothers (Russotti, Rogosch, et al., 2021). After including many demographic and maternal variables (e.g., child age, gender, birth order, prenatal and postnatal factors) as potential mediators or confounders, Duncan, Lee, Rosales-Rueda, and Kalil (2018) reported that externalizing behaviors were reduced among 10–13 year old offspring for each year a mother delayed a first birth. Comparing the offspring of teen mothers to their later-born siblings and cousins born to adult mothers did not substantially affect these results. Mediation analyses further suggested that children benefitted from mothers' gains in education or income that was associated with delayed parenting. The risk of Attention-Deficit/Hyperactivity Disorder (ADHD) was highest in children of young mothers and fathers and also elevated in children of parents over age 35 (Kim, Choi, Lim, Ha, & Kwon, 2020). Symptoms of ADHD in this Korean sample were limited to parental report.

Education: Three research teams examined outcomes in this domain based on the school performance or IQ scores of offspring. Duncan et al. (2018) reported that math and reading scores improved for each year that a mother delayed a first birth, including when teen mothers' offspring were compared to their later-born siblings and cousins born to adult mothers. In a primarily Black sample of teen mother–child dyads, children's IQ scores at age 6 years were lower than the average score in the general population (Cornelius et al., 2010). IQ scores improved from age 6–10 years (Cornelius et al., 2010). Higher scores correlated with children's higher grade level and maternal education, cognitive ability, and White race, but not with maternal socioeconomic status (SES). Maternal depression and illicit drug use were associated with declining scores. Oberlander and Black (2011) reported that sharing care with the grandmother versus maternal care reduced academic achievement at offspring age 7 years. They noted that maternal care appeared to benefit children's mental health and academic achievement without reducing teen mothers' education or employment.

5. Adolescent outcomes

Thirty-one research teams addressed adolescent outcomes. One research team did not measure a specific outcome but identified groups of 17-year-old offspring based on their current functioning; the majority (52%) were on track, 37% were at-risk, and 11% were troubled (Lee et al., 2017). Teen mothers' economic hardship and number of pregnancies, and offspring disconnection to school, predicted assignment into the at-risk or troubled groups.

Mental Health: Outcome measures in the 13 studies in this domain included behavioral issues (e.g., aggression, hyperactivity, inattention), emotional issues (e.g., depression, anxiety), mental health disorders, or executive functioning. Outcome data were based on child-report; parent or teacher report; population registry data, including International Classification of Diseases codes; or study testing.

Researchers identified risk or protective factors for offspring mental health using samples of teen mother–child dyads. Behavioral problems were reduced in 14-year-old offspring of teen mothers who attended church regularly compared to non-regular church goers (Bert, 2011). After adjusting for covariates, maternal smoking during pregnancy, male sex, Black race, and maternal depression, hostility, and low SES increased the risk of behavioral issues in teen mothers' offspring (Cornelius et al., 2011; Cornelius, Goldschmidt, De Genna, & Larkby, 2012). Farris, Nicholson, Borkowski, and Whitman (2011) reported that adolescent offspring of mostly Black teen mothers were more likely to have disruptive behaviors compared to the general population. Disruptive behaviors were observed among girls and boys, but elevations at age 5 years did not necessarily persist beyond age 10. After controlling for maternal IQ, the relationship between Black teen mothers' psychological resources at 2 years and offspring executive functioning at ages 6 and 18 years were marginally significant (Yu et al., 2022).

Several research teams compared outcomes for offspring of teen and older mothers. Based on a matched sample of children from a Taiwanese school district and after controlling for maternal and paternal factors, Lee et al. (2017) reported that teen mothers' offspring were at greater risk of behavioral problems than offspring of older mothers, and problems persisted from grades 1 to 6. Male offspring were at greater risk than female offspring regardless of maternal age at birth.

National datasets were used in the following studies. Menard et al. (2015) reported a small association between young maternal age and persistent antisocial behavior of 19-year-old U.S. offspring. This effect was eliminated after adjusting for mothers' antisocial behavior, suggesting that young maternal age is not an independent risk factor for child antisocial behavior. ADHD was the outcome of interest for two European research teams. Young maternal and paternal age remained a risk factor for ADHD in Finnish offspring, after adjusting for several confounders including parental psychiatric history (Chudal et al., 2015). Chang et al. (2014) reported that teen mothering increased the risk of ADHD in their offspring by 78% compared to adult mothers' offspring. In analyses that compared discordant siblings, the relationship between teen mothering and offspring ADHD was attenuated but remained significant. When Chang et al. (2014) used a children-of-siblings approach, the relationship between teen mothering and offspring ADHD was largely explained by genetic confounding. Lastly, Liang et al. (2021) reported that the parents of children with mental health disorders were more likely to have mental health disorders themselves, and the likelihood of transmitting disorders to their children varied by parents' gender and age. Compared to teen parents, offspring of older parents were at greater risk of ADHD and autism spectrum disorder. Offspring of teen mothers, teen fathers, and fathers ≥ 50 years of age were at higher risk of major depressive disorder. Lastly, there was a greater likelihood of bipolar disorder among offspring of teen mothers and fathers ≥ 50 years (Liang et al., 2021).

Physical Health: Six research teams of seven studies targeted various health outcomes (e.g., obesity, hospitalizations, death). Data were collected by phone (Barclay & Myrskyla, 2016b; Basu & Gorry,

2021), at a research site, or were archived in hospital databases or population registries. Adolescent offspring of Black teen mothers were more likely to be overweight or obese at age 18 years if their mothers were overweight or had high weight gain during pregnancy (Groth, Holland, Smith, Meng, & Kitzman, 2017). At offspring age 18, health conditions (cardiovascular, hematologic, respiratory, and endocrine) among offspring did not differ by maternal age in an Israeli sample, even though pregnancy complications were higher among the teen mothers (Zer, Wainstock, Walfisch, & Sheiner, 2019). These results likely reflect the low incidence of these health conditions among youth in general. After controlling for maternal socioeconomic and marital status and birth outcomes of offspring, teen mothers' first-born and later-born offspring were at higher risk of death and hospitalization from early childhood till age 17 years than offspring of adult mothers (Jutte et al., 2010), suggesting that family-level confounders contributed to poor outcomes. Barclay and Myrskyla (2016b) studied 19-year-old Swedish offspring; in unadjusted models, offspring of mothers who gave birth between 20–39 years of age fared better on self-rated health, health behavior (drinking alcohol, smoking, exercising), and health indicators (e.g., obesity) than offspring of teen mothers and mothers over age 40. Analyses that adjusted for covariates did not show significant relationships between maternal age at either extreme or health outcome, which likely reflected the lack of statistical power. Another team of Swedish researchers found that 18-year-old male offspring of older mothers had less favorable body mass index (BMI) and blood pressure (BP) than offspring of teen mothers using birth cohorts from 1951 to 1987 (Carslake, Davey Smith, Tynelius, Van Den Berg, & Rasmussen, 2017). In analyses that compared discordant siblings and adjusted for many covariates, the relationship of maternal age to BP was reduced. Basu and Gorry (2021) also described worse health outcomes (e.g., obesity, physical disorders, self-reported health) for teen mothers' offspring compared to those of older mothers in a U.S. national sample, but the effect of young maternal age was eliminated when offspring of teen mothers were compared to offspring of mothers whose first pregnancy as a teen ended in miscarriage. As described earlier, comparing offspring of teen mothers with offspring of mothers who miscarry a teen pregnancy controls for unmeasured factors (Hoffman, 2015).

Education: Five research teams used either a self-report measure of high school completion (Addo, Sassler, & Williams, 2016) or administrative data of high school completion or grade point average (Aizer, Devereux, & Salvanes, 2022; Carslake et al., 2017; Coyne, Långström, Lichtenstein, & D'Onofrio, 2013; Jutte et al., 2010). Across all five studies, researchers found a greater likelihood of educational deficits for offspring of teen mothers versus those of older mothers in cross-sectional analyses, even after controlling for confounders. Educational deficits was also observed among offspring of mothers 20–24 years (Addo et al., 2016) and teen mothers' later-born offspring (Jutte et al., 2010). The magnitude of the risks of poor academic performance for Swedish teen mothers' offspring increased from 1960 to 1989 as teen mothers became increasingly disadvantaged (Coyne, Långström, Lichtenstein, et al., 2013).

The relationship between young maternal age and adverse educational outcomes was reduced or eliminated when covariates were added and offspring were compared to their younger siblings (Coyne, Långström, Lichtenstein, et al., 2013; Jutte et al., 2010) and cousins (Aizer et al., 2022). The effects of maternal age on outcomes were also reduced or eliminated when researchers used child birth year as a covariate when multiple birth cohorts were included in analysis (Carslake et al., 2017; Coyne, Långström, Lichtenstein, et al., 2013), suggesting that the offspring of older mothers benefitted from the secular trend of educational expansion by virtue of being born into later birth cohorts.

Delinquency/Crime: Outcome measures for the four studies in this domain were based on child self-report of antisocial activities (Barnes & Morris, 2012); a combination of self- and parent-report of delinquent behavior and criminal records (van Vugt, Loeber, & Pardini, 2016); criminal convictions from Swedish registries (Coyne, Långström, Rickert, Lichtenstein, & D'Onofrio, 2013); or being the suspect of a crime from registries in the Netherlands (van de Weijer, 2022).

In a U.S. sample, van Vugt et al. (2016) found a small but significant relationship between young maternal age and persistent delinquent behavior in teen mothers' 19-year-old male offspring. Only 20 % of this relationship was explained by higher levels of maternal stress, poor maternal-child communication, and having more children. Barnes and Morris (2012) reported that the relationship between young maternal age and male offspring delinquent behavior was not mediated by maternal or neighborhood characteristics or the child's level of self-control, but solely by the child's level of exposure to drug-using peers. They explained that teen mothers' children are likely to know peers who engage in delinquent behavior as residents of low-income neighborhoods. Using population data from the Netherlands, the adverse relationship between young maternal age and offspring criminal activity was reduced by 64 % with increasing controls and disappeared when teen mothers' offspring were compared to their cousins who were born to adult mothers (van de Weijer, 2022). However, the relationship between teen mothering and offspring crime remained significant when offspring of differentially exposed full- and twin-sisters were compared (Coyne, Långström, Rickert, et al., 2013). The disparate results of these studies likely reflect the genetics of various comparison groups.

Sexual Behavior: Early or risky sex and teen birth were the outcomes of interest in 7 studies. With a dataset restricted to teen mother–child dyads, De Genna and colleagues identified many risk factors for early or risky sex of offspring by age 16 years, including early puberty, offspring trauma, chronic maternal marijuana use, heavy maternal alcohol use, and prenatal alcohol exposure (De Genna, Goldschmidt, & Cornelius, 2015; De Genna & Cornelius, 2015; De Genna, Larkby, & Cornelius, 2011). Boys were more likely to report riskier sex than girls; girls were more likely to report pregnancy than boys (De Genna et al., 2015).

Turning to teen births, 32% of teen mothers' offspring gave birth as a teen in the 1970s or 1980s when teen birth rates were high (Wildsmith, Manlove, Jekielek, Moore, & Mincieli, 2012). In this U.S. national sample, higher educational aspirations, abstaining from alcohol or other substances, and co-residing with a step-parent or grandparent at age 14 years protected against a teen birth. Reduced risks were also associated with higher levels of maternal education and household income (Hendrick & Maslowsky, 2019). Research teams from Canada (Jutte et al., 2010) and Norway (Aizer et al., 2022) found that when teen mothers' offspring were compared to their later-born siblings, the adverse effect of young maternal age was substantially reduced but only in the Norwegian study. None of these studies controlled for birth year over a period of declining teen birth rates and increasing access to legal abortion.

Substance Use: De Genna, Larkby, and Cornelius (2013) examined substance abuse among offspring with a longitudinal sample of mostly Black teen mother–child dyads. The researchers identified offspring behavioral problems at age 6 years and depressive symptoms at age 14 years as risk factors for illicit cannabis use at age 14 years.

6. Adult outcomes

Offspring age varied within and across the 14 studies in this domain. Seven research teams focused on offspring less than age 30, two included offspring between age 30 and 60, and one team included offspring over age 60. Age varied widely in the four remaining studies. Carslake, Tynelius, van den Berg, and Smith (2019), for example, examined mortality with a Swedish sample where age ranged from 18 to 80.75 years, with a mean age of 43.1 years.

Mental Health and Substance Use: With one exception, researchers estimated a causal relationship between teen mothering and poor mental health of primarily young adult offspring. After adjusting for confounders, Danish offspring of teen mothers *and* mothers aged 20–24 years were at higher risk for attempted suicide, substance abuse, and

psychiatric illness than offspring born to mothers 25 years of age and older (Mok, Antonsen, Pedersen, & Webb, 2017). In unadjusted analyses, offspring of teen mothers were at greater risk for suicide attempts, substance-related problems, and other mental health issues than offspring of adult mothers; these results, however, were attenuated when offspring were compared with their later-born siblings (Coyne, Långström, Lichtenstein, et al., 2013; Sujan et al., 2022) and cousins (Sujan et al., 2022). The association was eliminated entirely in another study (Lipman, Georgiades, & Boyle, 2011). Based on the discordant sibling analysis for birth cohorts from 1960 to 1989, Coyne and colleagues also reported that the magnitude of the negative association between teen mothering and substance-related problems in offspring born between 1960 and 1989 was reduced over the 30-year time frame.

Physical Health: Six research teams of 7 studies examined outcomes that included death (from disease, accidents, or suicides), medical conditions, general health, and others. Offspring age varied from a low of 22–34 years (Lipman et al., 2011) to a mean age of 65 years (Myrskyla & Fenelon, 2012). In four studies, research teams examined offspring death by 5-year categories of maternal age (e.g., ≤19, 20–24, 25–29…≥ 40); deaths were elevated among offspring of teen mothers and mothers of advanced age (Barclay & Myrskyla, 2016a; Barclay & Myrskylä, 2018; Carslake et al., 2019; Mok et al., 2017; Myrskyla & Fenelon, 2012; Sujan et al., 2022). Teen mothering was attenuated as a risk factor when researchers adjusted for confounders in one study (Mok et al., 2017) but not in another (Barclay & Myrskylä, 2018). However, adjusting for offspring birth year reduced the lifespan of offspring of teen versus older parents across common causes of death (Barclay & Myrskylä, 2018; Carslake et al., 2019; Sujan et al., 2022). Compared to the offspring of teen mothers, offspring of older women, on average, are born to more affluent parents and also benefit from improvements in public health that have occurred over the last century. Interestingly, two research teams reported inconsistent results in sibling comparison analyses using largely similar Swedish data (Barclay & Myrskylä, 2018; Carslake et al., 2019). Lipman et al. (2011) found no differences in self-reported general health for young adult offspring born to adult mothers and to the discordant offspring of teen mothers.

Education: In one study, researchers examined IQ scores and found that the independent effect of young maternal age on IQ was small and was reduced by 30% after adjusting for maternal factors and child birthweight (Khatun et al., 2017). The five research teams that examined educational attainment of offspring up to about age 30 years reported that teen mothers' offspring completed between 0.66 and 1.83 fewer years of education than offspring of older mothers in unadjusted models (Aizer et al., 2022; Barclay & Myrskyla, 2016a; Fishman & Min, 2018; Gorry, 2022; Lipman et al., 2011). Adverse effects of young maternal age on offspring education remained but was reduced when researchers compared offspring to their cousins (Aizer et al., 2022; Gorry, 2022), except for the offspring of the youngest teen mothers (maternal age at birth 15–17 years) and more advantaged teen mothers (Aizer et al., 2022). Researchers who compared earlier- and later-born siblings in fully adjusted models also reported a diminished effect of young maternal age (Barclay & Myrskyla, 2016a; Fishman & Min, 2018; Lipman et al., 2011) and in one study, the effect was eliminated for the offspring of 18–19-year-old teen mothers, not younger mothers (Fishman & Min, 2018). The effect of young maternal age was also eliminated when offspring of teens who gave birth as a teen were compared to offspring of adult mothers who had miscarried as a teen (Gorry, 2022). These studies suggest that poor educational outcomes are mainly driven by family factors rather than young maternal age, except for offspring born to the youngest mothers.

Crime: Five research teams examined offspring criminality based on self-report (Gorry, 2022) or criminal records (Coyne, Fontaine, Långström, Lichtenstein, & D'Onofrio, 2013; Coyne, Långström, Rickert, et al., 2013; Mok et al., 2017; Vaske et al., 2015). Although maternal age was not associated with convictions in U.S. adult offspring, the combination of being born low birth weight to a mother ≤ age 17 years increased the likelihood of convictions for teen mothers' offspring (Vaske et al., 2015). Mok et al. (2017) reported an elevated risk for adult criminality for Danish offspring of teen and young adult mothers and fathers (age 20–24 years). Teen mothering also predicted criminality in Swedish and U.S. offspring in unadjusted models, but the effect was eliminated when comparisons included discordant siblings or miscarriages (Coyne, Långström, Lichtenstein, et al., 2013; Gorry, 2022). However, a causal relationship between teen mothering and offspring criminality was attenuated but remained significant when cousins were compared. The relationship was strongest for cousins born to discordant identical twin sisters (Coyne, Långström, Rickert, et al., 2013). These researchers concluded that the social factors that predispose teens to become mothers largely explain the relationship between young maternal age and offspring crime.

7. Discussion

Scientific interest in teen mothering remains high despite declining teen birth rates. We included 53 studies, far more studies on offspring outcomes than in an earlier review (Coyne & D'Onofrio, 2012). Our review also documents a growing number of population-based studies using novel comparison groups; this methodological trend bodes well for improving our understanding of offspring outcomes. As expected, outcome measures and covariates varied tremendously based on the available datasets. Little consistency existed even in how teen mothers were defined by age (less than age 17, 18, 19, or 21 years). Age differences are not trivial. As younger teen mothers tend to be more disadvantaged than their slightly older peers, their children tend to fare worse (Aizer et al., 2022; Fishman & Min, 2018).

Researchers who used longitudinal samples restricted to teen mother–child dyads took advantage of repeated measures to describe temporal patterns that preceded outcomes (Cornelius et al., 2010; De Genna et al., 2015; De Genna & Cornelius, 2015; De Genna et al., 2013; Farris et al., 2011; Lee, Corte, & Wang, 2017; Menard et al., 2015; Oberlander & Black, 2011; Pasalich et al., 2016; van Vugt et al., 2016). Stargel and Easterbrooks (2020), Yoon et al. (2019) and Yoon (2022) identified how relationships between maternal or child ACEs and child behavioral problems varied for sub-groups. These results are consistent with studies that show variations in ACEs among teen mothers (Hillis et al., 2004; SmithBattle 2018b); extensive evidence of a graded relationship between ACEs and a host of poor outcomes over the life-span (Shonkoff et al., 2012); growing evidence of the intergenerational effects of ACEs (Nwanaji-Enwerem et al., 2021); and high prevalence of ACEs among children who are low-income or of color (Crouch et al., 2019; Giano, Wheeler, & Hubach, 2020).

Researchers who estimated the causal effect of teen mothering typically relied on longitudinal data with U.S. national samples or population registries from northern Europe. These large samples had sufficient power to examine causal relationships and permitted the use of discordant sibling and cousin comparisons to adjust for measured and unmeasured factors. Compared to researchers using U.S. national samples, researchers using population registries were better able to specify covariates based on known maternal-child risk factors for the outcome of interest given the linking of administrative datasets related to crime, education, or health. Regardless of the data source, researchers typically conducted a series of analyses and reported how results were affected as covariates and comparison groups were added. When cross-sectional analyses were performed with few controls, teen mothers' offspring fared poorly across outcomes and age groups. Adjusting for measured background factors reduced the causal effect of teen mothering on many outcomes (Chudal et al., 2015; Barclay & Myrskyla, 2016a, 2016b; Barclay & Myrskylä, 2018; Carslake et al., 2019; Chudal et al., 2015; Coyne, Långström, Lichtenstein, et al., 2013; Coyne, Långström, Rickert, et al., 2013; Fishman & Min, 2018; Jutte et al., 2010; Mok et al., 2017), although two research teams found no effect on anti-social behavior of teenage offspring (Barnes & Morris, 2012; Menard et al., 2015). Other

researchers observed few differences in behavioral or educational outcomes for offspring of teen and young adult mothers, a finding which may reflect growing similarities in the social circumstances of teen mothers and mothers less than age 25, including increases in single mothering and economic disadvantage (Cornelius et al., 2012; Fishman & Min, 2018).

When researchers reanalyzed data with sibling or cousin comparisons to control for unmeasured genetic, family, and neighborhood factors, the causal effect of teen mothering was further reduced. A small effect was observed on education for adolescent and adult offspring (Aizer et al., 2022; Jutte et al., 2010), adolescent health (Carslake et al., 2017; Jutte et al., 2010), mental health (Barclay & Myrskyla, 2016b; Carslake et al., 2017; Chang et al., 2014; Duncan et al., 2018), adult substance use (Coyne, Långström, Rickert, et al., 2013), and adult mortality (Sujan et al., 2022). Effects on mental health (Chang et al., 2014; Lipman et al., 2011), delinquency/crime (Coyne, Långström, Rickert, et al., 2013; van de Weijer, 2022), and educational attainment (Coyne, Långström, Rickert, et al., 2013), were eliminated when teen mothers' offspring were compared to their later-born siblings or cousins, and in studies where researchers used miscarriage data or birth year as a moderator to control for period effects (Barclay & Myrskyla, 2016b; Barclay & Myrskylä, 2018; Carslake et al., 2017, 2019; Gorry, 2022). Secular trends were shown to effect results; offspring of older parents had higher levels of educational attainment and longer lifespans than offspring of teen parents likely due to the educational expansion and improved health and mortality that has occurred over decades. Coyne, Långström, and Lichtenstein et al. (2013) also reported that the magnitude of the relationship between teen mothering and offspring education and crime (but not substance use) worsened over a 30-year period. Unfortunately, researchers did not examine the effect of secular trends on outcomes in the U.S. studies that combined multiple birth cohorts.

Inconsistent findings (small versus no effect) in the above studies may reflect random fluctuation or the choice of outcome measures, datasets, comparison groups, sample sizes, or period effects. Despite these inconsistencies, all the analyses based on sibling/cousin comparison confirm that the causal effect of teen mothering on offspring outcomes is minimized as unmeasured factors are controlled.

Two recent meta-analyses (Cresswell et al., 2022; Lee et al., 2020). Lee et al. examined the child outcome of externalizing behaviors. They found a small ($d = .21$) but significant effect of maternal age at birth on externalizing behaviors across 18 studies. Cresswell and colleagues did multiple meta-analyses. Although they included 34 studies (35 study groups) in their review, no meta-analysis had greater than 7 studies. While this might reflect the current state of the science, so few studies in a meta-analysis does not provide confident findings. Since we began this scoping review, Cederbaum, Jeong, Yuan, and Lee (2020) published a systematic review on offspring sexual and substance use behavior and reported an increased risk of risky sexual behavior for offspring born to teen mothers and inconclusive results related to child substance use. They also stated that the diversity in outcome measures precluded meta-analysis . These researchers also made clear that the relationship between young maternal age and adverse outcomes is confounded by many factors so causal relationships cannot be assumed. Thus, while quantitative findings from meta-analyses are an important way of understanding the current evidence, scoping reviews, such as ours, provide more description of the studies and respond to our third aim of appraising the strengths and limitations of available evidence.

The results of this review echo a chorus of scholars who have long argued that the poor outcomes attributed to teen mothering disregard the many factors that are organized by systemic inequities that predispose teens to become mothers (Chilman, 1980; Geronimus, 1992; Luker, 1996). Because these upstream conditions are baked into the social worlds that most teen mothers and their children inherit, delaying teen childbearing in the absence of mitigating these conditions is unlikely to significantly improve maternal-child outcomes.

We applaud the progress over the last few decades in addressing selection factors into teen mothering. But we lament how the relentless search for risk factors and poor outcomes unintentionally reinforces an overly deterministic view of a risky future that not only stigmatizes teen mothers but disregards their resilience and lived realities (SmithBattle, 2020; SmithBattle & Phengnum, 2023; Varadi, Raby, & Tardif-Williams, 2020; Vinson, 2018). Chilman (1980) early critique of research remains relevant today; the scientific paradigm that enshrines objectivity and self-contained individuals locates maternal risks in the teens themselves separate from the life-world that shapes life prospects. Although efforts to disentangle the causes and consequences of teen mothering with ever greater precision have advanced our scientific understanding, the "25-year research love affair" (Hoffman, 2015, p. 646) devoted to teasing out their effects misses the intelligibility and meaning of teen mothering as pragmatic expressions of the life-world. A recent umbrella review that synthesized decades of qualitative research on the topic captures how mothering, from teen mothers' perspectives, offers a pathway into adulthood that transforms and imperils (SmithBattle, Punsuwun, & Phengnum, 2021). Precisely because normative pathways to adulthood are largely foreclosed well before pregnancy, teen mothers know firsthand that there is little to lose and something to gain from mothering. However, gains from developing new priorities, reducing risky behavior, and reinvesting in school are often imperiled by the social inequities that precede and follow pregnancy as manifested in housing instability, inadequate childcare, low-wage work, and toxic environments. This qualitative evidence complements the strongest quantitative studies reported here, suggesting that teen mothering *does not* begin a downward spiral, with the possible exception of teen mothers from affluent backgrounds who are the least likely to get pregnant but the most likely to have their education disrupted by mothering (Aizer et al., 2022; Diaz & Fiel, 2016). Despite this converging evidence, little progress has been made in reframing professional, public health, or policy discourse on the high-risk nature of teen mothering. We call for reconceptualizing the risky discourse on teen mothering so that maternal-child risks are located in social and racial inequities rather than in mothers' presumed deviance, deficits, and individual risk-taking. Translating these findings for policymakers and broad public consumption should be a high priority.

Future Research: Researchers who compared offspring to their siblings or cousins or to offspring whose mothers miscarried or aborted a teen pregnancy present a roadmap for teasing out the effects of teen mothering on maternal-child outcomes. The challenges in conducting these studies and their limitations are well described (Hoffman, 2015). Examining heterogeneity in general and in exposure to ACEs should also be considered to better understand how the effects of teen mothering on outcomes differ for various sub-groups of offspring. Collecting biomarkers of chronic stress prospectively with ACEs measures would also advance our understanding of how the social determinants of teen pregnancy, including racial and economic inequities, become embodied for various sub-groups (Geronimus, 2023). Mixed findings regarding the impact of paternal age as a covariate also suggest further study (Aizer et al., 2022; Carslake et al., 2017; Chudal et al., 2015; Coyne, Långström, Rickert, et al., 2013; Mok et al., 2017).

Researchers who controlled for birth year when datasets included multiple birth cohorts underscored the importance of placing findings in socio-historical context. Researchers are also advised to adjust for the growing disadvantage of teen mothers and for policy changes that potentially impact teen birth rates and maternal-child outcomes. Cross-national studies of the effects of teen mothering on outcomes may prove fruitful if differences between countries are sufficiently described to recommend policy directions. Mining qualitative studies for variables that align with teen mothers' perspectives are also recommended (Ellis-Sloan, 2019).

Strengths and Limitations: Although our search process was designed to be systematic and exhaustive, we may have missed studies. Findings are unlikely to generalize to contemporary offspring because

samples were drawn from datasets established years or decades ago, and income inequality has increased globally. Variations between countries (e.g., in racial/ethnic composition, teen birth rates, and reproductive health, education, and social policies) also limit generalizability. Findings based on sister and cousin comparisons may not generalize to teen mothers without siblings or with only one child.

8. Conclusion

Our understanding of teen mothering has improved over the last decade as more researchers controlled for selection factors that contribute to the risk of teen mothering *and* poor outcomes. Researchers using discordant sibling and cousin comparisons with national samples find that poor outcomes are largely due to teen mothers' preexisting disadvantage; the majority of teen mothers are born into a precarious world that limits their health and life chances, and those of their children. We recommend that researchers continue to examine heterogeneity; control for selection factors and birth year; place findings in sociohistorical context; consider variables that align with the perspectives of teen mothers; and examine the impact of policy changes on maternal-child outcomes. This review also bolsters the argument that we can expect little improvement in the lives of teen mothers and their children in the absence of upstream policies that mitigate the systemic inequities that contribute to teen births in the first place. Given rising levels of disadvantage among teen mothers across the globe (SmithBattle & Flick, 2023), and the Supreme Court's reversal of abortion rights in the U.S, mitigating social, racial and reproductive health inequities are more important than ever.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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