Pediatric RESEARCH

www.nature.com/pr

SYSTEMATIC REVIEW

Social determinants of health and child maltreatment: a systematic review

Amy A. Hunter[1,2,3] and Glenn Flores[3,4]

BACKGROUND: Child maltreatment causes substantial numbers of injuries and deaths, but not enough is known about social determinants of health (SDH) as risk factors. The aim of this study was to conduct a systematic review of the association of SDH with child maltreatment.

METHODS: Five data sources (PubMed, Web of Science Core Collection, SCOPUS, JSTORE, and the Social Intervention Research and Evaluation Network Evidence Library) were searched for studies examining the following SDH: poverty, parental educational attainment, housing instability, food insecurity, uninsurance, access to healthcare, and transportation. Studies were selected and coded using the PICOS statement.

RESULTS: The search identified 3441 studies; 33 were included in the final database. All SDH categories were significantly associated with child maltreatment, except that there were no studies on transportation or healthcare. The greatest number of studies were found for poverty ($n = 29$), followed by housing instability (13), parental educational attainment (8), food insecurity (1), and uninsurance (1).

CONCLUSIONS: SDH, including poverty, parental educational attainment, housing instability, food insecurity, and uninsurance, are associated with child maltreatment. These findings suggest an urgent priority should be routinely screening families for SDH, with referrals to appropriate services, a process that could have the potential to prevent both child maltreatment and subsequent recidivism.

Pediatric Research (2021) 89:269–274; https://doi.org/10.1038/s41390-020-01175-x

IMPACT:

- SDH, including poverty, parental educational attainment, housing instability, food insecurity, and uninsurance, are associated with child maltreatment.
- No prior published systematic review, to our knowledge, has examined the spectrum of SDH with respect to their associations with child maltreatment.
- These findings suggest an urgent priority should be routinely screening families for SDH, with referrals to appropriate services, a process that could have the potential to prevent both child maltreatment and subsequent recidivism

BACKGROUND

Child maltreatment is a pervasive public health problem in the United States (US).[1] Comprised of acts of commission and omission by a parent or other caregiver (e.g., physical abuse, sexual abuse, and various forms of neglect),[2] child maltreatment is a substantial cause of pediatric injury and death. In 2018, nearly 700,000 childhood victims of nonfatal maltreatment were identified, and an estimated 1770 children died.[1] The combined human and institutional cost attributed to maltreatment morbidity and mortality in the US is estimated to be $124 billion annually.[3]

The World Health Organization defines social determinants of health (SDH) as "the conditions in which people are born, grown, work, live, and age, and the wider set of forces and systems shaping the conditions of life."[4] These conditions are shaped by the distribution of resources, and connect facets of the physical, social, and built environment associated with health outcomes.[5] Among the most commonly recognized SDH (economic stability, education, neighborhood and built environment, health and healthcare, and social and community context),[6] poverty is a major and often overarching factor. Poverty also has been identified as a known risk factor for child maltreatment.[7] Thus, identifying how poverty and other SDH are associated with child maltreatment is a necessary step to develop effective interventions for maltreatment prevention and treatment, and mitigating the risk of associated physical and psychological injury.

Not enough is known about the association of SDH with child maltreatment. Four published systematic reviews have included analyses that examined the relationship between a single or two SDH and maltreatment. Two included socioeconomic status,[8,9] one included socioeconomic status and parental educational

[1]Injury Prevention Center, Connecticut Children's Medical Center and Hartford Hospital, Hartford, CT, USA; [2]Department of Public Health Sciences, University of Connecticut, Farmington, CT, USA; [3]Department of Pediatrics, University of Connecticut School of Medicine, Farmington, CT, USA and [4]Health Services Research Institute, Connecticut Children's Medical Center, Hartford, CT, USA
Correspondence: Glenn Flores (gflores@connecticutchildrens.org)

Received: 30 June 2020 Revised: 9 September 2020 Accepted: 10 September 2020
Published online: 25 September 2020

attainment,[10] and the fourth included immigration status.[11] No published systematic reviews (to our knowledge), however, have examined the spectrum of SDH with respect to their associations with child maltreatment. Therefore, the aim of this study was to conduct a systematic review of the associations of SDH (including poverty, housing insecurity, food insecurity, uninsurance, healthcare access, and transportation) with child maltreatment.

METHODS

Inclusion criteria

Studies were selected using the PICOS approach for inclusion and exclusion.[12,13] The a priori inclusion criteria for studies were as follows: (1) English-language studies, (2) children 0–18 years old living in the US, (3) peer-reviewed, (4) observational and experimental designs, (5) outcome measures reported for at least one form of maltreatment, and 6) exposure measures for at least one SDH. The exclusion criteria were: (1) specific SDH could not be identified, and (2) conference presentations (e.g., abstracts, posters, or oral presentations).

The outcome of interest was child maltreatment, defined by the Child Abuse Prevention and Treatment Reauthorization Act of 2010 as "at a minimum, any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse or exploitation, or an act or failure to act which presents an imminent risk of serious harm."[2] Included studies were assessed for the associations of selected SDH—including poverty, food insecurity, housing instability, parental educational attainment, child uninsurance, transportation barriers, and access barriers to healthcare—with child maltreatment. These SDH were chosen because they are domains hypothesized to be most likely associated with child maltreatment and were addressed in a recently published SDH screening instrument used for testing interventions effective in reducing SDH and improving child and caregiver health.[14] Immigration status was not included because of the recent publication of a systematic review examining the association of this SDH with child maltreatment.[11]

Data sources

Five data sources were searched through March 2020: (1) PubMed, (2) Web of Science Core Collection, (3) SCOPUS, (4) JSTORE, and (5) the Social Intervention Research and Evaluation Network Evidence Library. All searches contained the following terms: ("Child Abuse"[Mesh] OR "child abuse"[tw] OR "child maltreatment"[tw] OR "child mistreatment"[tw] OR "child neglect"[tw]) AND ("Social Determinants of Health"[Mesh] OR "social determinants of health"[tw] OR "social class"). Searches for terms related to specific SDH varied. A sample search strategy (SCOPUS) can be found in Supplementary Table S1 (online).

An effort-to-yield measure of search precision, number needed to read (NNR) was calculated by taking the inverse of the precision of the searches. Precision was calculated by dividing the number of included studies by the number of screened studies, after removal of duplicates. NNR quantifies the number of articles that would be needed to be read before finding one that meets the established inclusion criteria. Dependent on the subject and inclusion criteria, this number provides insights into the time and resources needed for replication, or to conduct a similar study.

Selection of studies

All studies were stored on a Microsoft Excel document detailing the reasons for inclusion or exclusion.

Data abstraction

A codebook was developed using Microsoft Excel. Variables included study characteristics (year of publication, study design and population size, duration, data sources, and level[s] of analysis), sociodemographic characteristics of the study population (child age, racial composition, and sex), SDH under investigation, child maltreatment type (sexual, physical, psychological, neglect, multiple forms, and other), and measures of study quality.

Study quality

A modified version of the Downs and Black checklist was used to assess study quality (Supplementary Table S2).[15] Each item was scored as no (0) or yes (1). The sum of all items ranged from 1 to 8, with higher scores representing a lower risk of bias.

Data synthesis

The criteria for SDH and definitions of child maltreatment varied by study. Therefore, we were unable to combine endpoints in a meta-analysis. Data synthesis at the level of the individual, family, and community were used to analyze included studies.

Study registration

The study protocol was registered with PROSPERO (CRD42020166969).

RESULTS

Study characteristics

Our initial search yielded 3441 studies. After screening by titles and abstracts, 118 met the initial inclusion criteria. Following a full review of 118 studies, 33 were included in the final analysis. The process for selecting included studies is presented in Fig. 1. Search precision was 0.0096 and the NNR was 104. The characteristics of included studies are presented in Table 1. Included studies were published from 1978 to 2020.[16–48] Nine studies used national data,[16,23,27,30,36,38,42,43,47] and the remaining studies used data from individual states, including 14 from the Midwest,[17–20,25,26,28,29,31,33,39–41,45] four from the South,[21,22,32,37] four from the Northeast,[34,35,46,48] one from the West (California),[24] and one from the Pacific (Alaska).[44] Of these studies, 5 conducted chart reviews, 7 used cohort study designs, 7 used a cross-sectional design, and 14 conducted ecological analyses. Included studies assessed the relationship between SDH and child maltreatment at the levels of the individual, zip code, county, and census tracts.

Study outcomes

Poverty. Twenty-nine studies explored the association of poverty with child maltreatment.[16–28,31–45,47] Poverty was found to be consistently and strongly associated with maltreatment, with all but three studies identifying a significant association between either familial or community-level poverty and child maltreatment.[16,18,21] Across studies, poverty was defined by county,[45] neighborhood,[41] familial/household income,[17–20,23,28,41–43] socioeconomic status,[44] poverty rate,[21,27,35,40] unemployment,[16,17,21,31,32,34,36,40] percentage

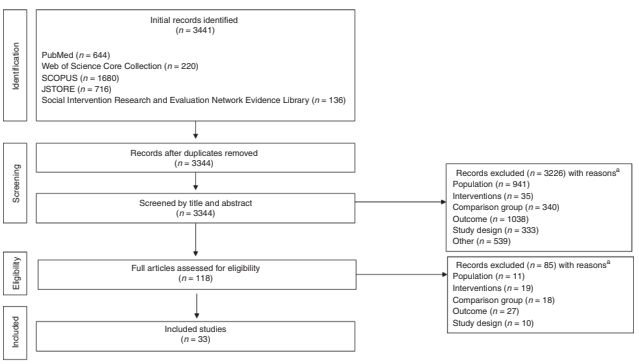

Fig. 1 Flow diagram of study selection. [a]Studies may have been excluded for multiple reasons.

Table 1. Characteristics of included studies ($n = 33$).

First author, ref.	Year	US region	Study design	Child age	Social determinant(s) of health	Child maltreatment	Quality score
Alperstein[46]	1988	Northeast	Chart review	<18 years old	Housing insecurity	Nonspecific	6/8
Anderson[45]	2014	Midwest	Cohort	<5 years old	Poverty	Physical abuse, neglect	7/8
Austin[44]	2020	Pacific	Chart review	<3 years old	Poverty	Nonspecific	7/8
Berger[42]	2007	National	Cohort	<10 years old	Poverty, housing insecurity	Substandard parenting	7/8
Berger[43]	2017	National	Cohort	<10 years old	Poverty	Physical abuse, neglect	8/8
Coulton[40]	2018	Midwest	Ecological	<18 years old	Poverty, housing insecurity	Nonspecific	8/8
Coulton[41]	1999	Midwest	Ecological	<19 years old	Poverty	Nonspecific	6/8
Drake[39]	1996	Midwest	Cross-sectional	<18 years old	Poverty	Physical abuse, sexual abuse, neglect	7/8
Eckenrode[38]	2014	National	Ecological	<18 years old	Poverty	Nonspecific	7/8
Ernst[37]	2001	South	Ecological	<18 years old	Poverty	Physical abuse, sexual abuse, neglect	7/8
Farrell[36]	2017	National	Cross-sectional	<5 years old; high vs. low poverty	Poverty	Nonspecific	8/8
Fong[35]	2019	Northeast	Ecological	<5 years old and 0–18 years old	Poverty	Nonspecific	7/8
Frioux[34]	2014	Northeast	Ecological	<18 years old	Poverty, housing insecurity	Physical abuse, sexual abuse, serious neglect	6/8
Garbarino[33]	1978	Midwest	Ecological	Unspecified	Poverty, housing insecurity	Nonspecific	7/8
Greeley[32]	2016	South	Chart review	<18 years old	Poverty, education, housing insecurity	Sexual abuse	7/8
Gross-Manos[31]	2019	Midwest	Cross-sectional	<18 years old	Poverty	Nonspecific	7/8
Helton[30]	2019	National	Cohort	<10 years old	Food security	Physical abuse, psychological abuse	8/8
Hirsch[29]	2015	Midwest	Cohort	Unspecified	Housing security	Physical abuse, neglect	8/8
Jonson-Reid[28]	2013	Midwest	Cross-sectional	<12 years old	Poverty, housing insecurity	Physical abuse, sexual abuse, neglect	7/8
Kim[27]	2018	National	Ecological	Unspecified	Poverty, housing insecurity	Physical abuse sexual abuse, neglect	7/8
Koch[25]	1995	Midwest	Ecological	<1 years old	Poverty, education,	Nonspecific	8/8
Korbin[26]	1998	Midwest	Ecological	Unspecified	Poverty, housing insecurity,	Nonspecific	8/8
Kupfer[48]	1995	Northeast	Chart review	<12 years old	Uninsurance	Sexual abuse	3/8
Maguire-Jack[24]	2017	West	Cross-sectional	<12 years old	Poverty, education	Physical abuse, neglect	8/8
Marcal[23]	2018	National	Cohort	<10 years old	Poverty, housing security	Physical abuse (excluded severe cases), neglect	7/8
Martin[22]	1982	South	Chart review	Unspecified	Poverty, housing insecurity	Physical abuse, sexual abuse, neglect, abandonment	6/8
Moore[47]	1989	National	Cross-sectional	<18 years old	Poverty	Sexual abuse	7/8
Morris[21]	2019	South	Ecological	<18 years old	Poverty, housing security	Physical abuse, sexual abuse, neglect	7/8
Slack[18]	2004	Midwest	Ecological	<3 years old	Poverty, education, housing insecurity	Neglect	7/8
Slack[19]	2003	Midwest	Cross-sectional	Unspecified	Poverty	Nonspecific	7/8
Slack[20]	2017	Midwest	Cohort	Unspecified	Poverty, education, housing insecurity	Nonspecific	7/8
Weissman[17]	2003	Midwest	Ecological	<18 years old	Poverty, education	Nonspecific	8/8
Wood[16]	2012	National	Ecological	<6 years old	Poverty, housing insecurity	Physical abuse	6/8

of families living below the federal poverty level,[24,28,31–33,36–39] children living in poverty,[17,47] receipt of public assistance,[19,25,31,40] composite impoverishment scores,[26] and self-reported acute financial challenges.[22]

In some studies, the relationship between poverty and maltreatment differed by abuse type. For example, one study found that neighborhood poverty was associated with all three forms of child maltreatment, but to different degrees.[38] Another study indicated that financial problems were strongly associated with neglect and abandonment, but the association was less pronounced for sexual abuse.[21]

Associations between poverty and maltreatment varied by race/ethnicity. A study comparing predominantly white and black neighborhoods found that the association between poverty and child maltreatment was strongest in whites.[25] Research linking multiple sources of data showed that black children living in poverty were twice as likely to be reported for needs-based neglect than their white counterparts.[26] A recent study showed that when income was held constant, white race was strongly associated with both sexual abuse and neglect, and black race was associated with physical abuse.[27]

Housing instability. Thirteen studies examined the relationship between housing instability and child maltreatment.[16,18,20,21,23,26,28,29,32–34,40,46] Most studies revealed that housing instability is associated with child maltreatment. Among these studies, the definition of housing stability varied, and included percent vacancy,[21,26,32,33,40] rates of foreclosure and delinquency,[16,18,34] hazardous living conditions,[29] and instability/mobility (>1 move per year).[20,23,28] Only one study examined homelessness, performing an analysis of hospital and pediatric ambulatory records of children <18 years old.[46] After matching families on income, homeless children were found to have higher rates of maltreatment-related emergency-department (ED) visits and child maltreatment than their nonhomeless counterparts. One study found that displacement due to foreclosure, eviction, or mortgage delinquency was associated with maltreatment investigations.[34] Two studies documented that housing instability/mobility (>1 move per year) was associated with child protective service (CPS) reports and maltreatment risk.[20,23]

Two studies found no association between housing insecurity and child maltreatment.[18,28] In the first, housing instability consisted of an aggregate measure of material hardship, including difficulty paying rent, eviction, or having experienced any utility shutoff in the previous year.[18] In the second, housing instability was measured by residential mobility.[28]

Several studies reported differences in the association between housing stability and child maltreatment type. Two identified an association between the percent of vacant housing in communities and sexual abuse.[21,32] Another study found that hazardous housing conditions were associated with neglect, but not physical abuse; a history of housing instability increased the strength of this association.[29] One study found that mortgage delinquency was associated with traumatic brain injury and other forms of physical abuse.[20]

Food insecurity. Just one study examined the relationship between food insecurity and child maltreatment.[30] An analysis of a national sample from the Fragile Families and Childhood Wellbeing Study revealed that, compared with food-secure households, food-insecure households experienced increased rates of total parental aggression (7% vs. 20%, respectively). Controlling for maternal characteristics did not attenuate this association.

Parental educational attainment. Eight studies considered the relationship between parental educational attainment and child maltreatment.[17,18,20,24,25,32,41,42] The results of most studies indicate that low parental educational attainment is associated with child maltreatment. Parental educational attainment was defined as high-school completion in six studies,[17,18,20,32,41,42] maternal education level in one,[25] and completion of postsecondary education in the last.[24] Two studies found no association.[18,24] Notably, one of these studied failed to report victim and perpetrator demographic characteristics (age, sex, or race/ethnicity),[18] and the other relied on self-reported data.[24]

Uninsurance. One study was identified that examined the association of the child lacking health insurance with child maltreatment.[48] This study reported that a higher proportion of preadolescent children seen in the ED with suspected sexual child abuse were uninsured, compared with a control group of children seen in the ED with upper-limb fractures, at 52% vs. 1%, respectively. No statistical analyses, however, were conducted, nor is it clear whether there was matching of cases and controls by age, sex, or other relevant characteristics.

Other SDH. The search did not reveal any studies that examined the associations of transportation or access to healthcare with child maltreatment.

DISCUSSION

Multiple studies document that SDH, including poverty, housing instability, food insecurity, low parental educational attainment, and child uninsurance, are significantly associated with child maltreatment. A recent systematic review also concluded that although the immigrant parental status is associated with a lower likelihood of overall child maltreatment, it may be associated with a higher risk of child neglect and neglectful supervision.[11] Taken together, these findings suggest that an urgent priority, therefore, should be to routinely screen families for SDH in inpatient and outpatient settings and in CPS, and to address identified SDH with referrals to appropriate services. This screening and referral process could have the potential to not only prevent child maltreatment by reducing or eliminating the SDH before they result in maltreatment, but might also decrease the risk of maltreatment recidivism in families in which maltreatment already has occurred. The American Academy of Pediatrics, American Academy of Family Physicians, and the National Academy of Sciences, Engineering, and Medicine all have endorsed SDH screening and service referral.[49–51] Several studies document that patients and caregivers are comfortable with completing SDH screening.[52–56] Addressing SDH by referral to such services as case managers, social workers, housing vouchers, medical–legal partnerships, and parent mentors, already has been shown to reduce hospitalizations, improve housing quality and stability, enhance economic security, improve healthcare outcomes, insure more uninsured children, increase the quality of care, empower parents, and save money for society,[57] thereby holding great promise as interventions that may prove effective in ultimately reducing or preventing child maltreatment.

Poverty was the SDH for which the greatest number of studies documented an association with child maltreatment. Although few studies have investigated the temporal relationship between poverty and child maltreatment,[8] there is evidence that families living in poverty are more likely to be reported to CPS for neglect.[58] Poverty sequelae, such as inability to feed, clothe, or house a child, overlap with the definition of child neglect, so it is important to distinguish intentional neglect from family challenges related to living in poverty. Differential or alternative response is one CPS approach that addresses maltreatment reports by attending to unmet family needs.[59] An analysis of the effectiveness of this form of intervention has shown that families living in poverty benefit most from this approach.[60] To date, this response has been implemented at the individual and family

levels. Extending differential or alternative response to the community level may be an effective strategy for families living in impoverished neighborhoods, where racial biases in child maltreatment reports and investigations have been identified.

The study results underscore several unanswered questions regarding the association between SDH and child maltreatment. First, it is unclear whether transportation barriers or impaired access to healthcare are associated with child maltreatment, given that no studies were identified on these SDH. Second, because the definitions for each SDH varied considerably within and across studies (especially for poverty), it is unclear whether more consistent SDH definitions would yield different findings. Third, because males as caregivers and heads of household were underrepresented and often excluded from some study populations,[20,23,25,33] an unanswered question is whether there are associations of paternal educational attainment and other male-caregiver SDHs with child maltreatment. Although single mothers have been identified as an at-risk population for maltreatment perpetration, it is equally important to examine the role that men play in maltreatment. In a previous analysis, the first author identified men as the predominant perpetrator in 58% of cases of fatal maltreatment in the US.[61] Results of our study emphasize the need for research inclusive of male caregivers, to identify and mitigate risk factors before they escalate to maltreatment fatalities. Fourth, most studies focusing on sexual abuse were primarily limited to female populations,[32] despite evidence that male children also are victims of sexual abuse. There is an urgent need to investigate how SDH perpetuate or protect against sexual abuse in male children, so that prevention efforts can be tailored by sex. Finally, because most studies combined maltreatment into one aggregate category, an unanswered question is what are the associations of SDH with specific maltreatment categories. It has been posited that each maltreatment type has a unique etiology, and lumping these types into one category likely attenuates the ability to identify meaningful associations. Although few studies in this systematic review disaggregated by maltreatment categories, those that did found significant differences in maltreatment risk according to the SDH examined.

Based on the study findings, a research agenda is proposed to address key issues regarding the association of SDH with child maltreatment. Research is needed to address the aforementioned identified research gaps, including studies on transportation barriers, impaired access to healthcare, consistently defined SDH, SDH for male caregivers, and the associations of SDH with specific maltreatment categories and male victims of sexual abuse. Studies are needed to determine whether there is a direct association between the number of SDH and the risk of maltreatment, and whether the presence of multiple SDH can synergistically increase maltreatment risk. Research is urgently needed to determine whether SDH screening and referral to appropriate services result in SDH reduction and elimination as well as decreases in or the prevention of child maltreatment and maltreatment recidivism.

LIMITATIONS AND STRENGTHS

Certain study limitations should be noted. First, as with all systematic reviews, the quality of this analysis is limited by the scientific rigor of included studies. Second, studies were selected based on the search criteria. It is possible that relevant literature was missed because of the heterogeneity of terms used to describe the various SDH and child maltreatment. Third, many included studies were cross-sectional or ecological, preventing the ability to draw conclusions about the temporal relationship between SDH and child maltreatment. Fourth, many data sources for the included studies used administrative data derived from CPS. In most instances, these records only included reports of maltreatment that were screened in and accepted for either an investigation or alternative response. As a result, these data sources likely exclude many cases of maltreatment, given evidence demonstrating equivalent risk of incidence and recurrence between maltreatment reports and substantiations.[28,38]

CONCLUSIONS

SDH, including poverty, parental educational attainment, housing instability, food insecurity, and uninsurance, are associated with child maltreatment. These findings suggest that an urgent priority should be routinely screening families for SDH, with referrals to appropriate services, a process that could have the potential to prevent both child maltreatment and subsequent recidivism. Unanswered questions include whether SDH are associated with specific maltreatment categories and male victims of sexual abuse, and whether transportation barriers, impaired access to healthcare, consistently defined SDH, and SDH for male caregivers are associated with child maltreatment. A proposed research agenda includes addressing these unanswered questions; determining whether there is a direct association between the number of SDH and the risk of maltreatment, and whether the presence of multiple SDH can synergistically increase maltreatment risk; and investigations on whether SDH screening and referral to appropriate services result in SDH reduction and elimination, as well as decreases in or the prevention of child maltreatment and maltreatment recidivism.

ACKNOWLEDGEMENTS

We thank Marissa Gauthier for her assistance with the initial citation search.

AUTHOR CONTRIBUTIONS

A.A.H. and G.F. made substantial contributions to the study conception and design, acquisition of data, analysis, interpretation of data, drafting the article, and revising the article critically for important intellectual content.

ADDITIONAL INFORMATION

The online version of this article (https://doi.org/10.1038/s41390-020-01175-x) contains supplementary material, which is available to authorized users.

Competing interests: The authors declare no competing interests.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

REFERENCES

1. US Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. Child maltreatment 2018. https://www.acf.hhs.gov/cb/resource/child-maltreatment-2018 (2020).
2. US Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth, and Families, Children's Bureau. The Child Abuse Prevention And Treatment Act (CAPTA) 2010, Washington, DC. https://www.acf.hhs.gov/sites/default/files/cb/capta.pdf (2011).
3. Fang, X., Brown, D. S., Florence, C. S. & Mercy, J. A. The economic burden of child maltreatment in the United States and implications for prevention. *Child Abuse Negl.* **36**, 156–165 (2012).
4. World Health Organization. About social determinants of health. https://www.who.int/social_determinants/sdh_definition/en/ (2020).
5. US Department of Health and Human Services, Centers for Disease Control and Prevention. *Establishing a Holistic Framework to Reduce Inequities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States*. (US Department of Health and Human Services, Centers for Disease Control and Prevention, Atlanta, 2010).
6. Healthy People 2020. Social determinants of health. https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health (2020).
7. Fortson, B. L., Klevens, J., Merrick, M. T., Gilbert, L. K. & Alexander, S. P. *Preventing Child Abuse and Neglect: A Technical Package for Policy, Norm, and Programmatic Activities* (National Center for Injury Control and Prevention, Centers for Disease Control and Prevention, 2016).

8. Conrad-Hiebner, A. & Byram, E. The temporal impact of economic insecurity on child maltreatment: a systematic review. *Trauma Violence Abuse* **21**, 157–178 (2020).
9. Stith, S. M. et al. Risk factors in child maltreatment: a meta analytic review of the literature. *Aggress. Violent Behav.* **14**, 13–29 (2009).
10. Connell-Carrick, K. A critical review of the empirical literature: identifying correlates of child neglect. *Child Adolesc. Soc. Work J.* **20**, 389–425 (2003).
11. Millett, L. S. The healthy immigrant paradox and child maltreatment: a systematic review. *J. Immigr. Minor Health* **18**, 1199–1215 (2016).
12. Higgins, J. P. & Green, S. *Cochrane Handbook for Systematic Reviews of Interventions*, Vol. 4 (Wiley, Hoboken, 2011).
13. Littlel, J. H., Corcoran, J. & Pillai, V. K. *Systematic Reviews and Meta-Analysis* (Oxford University Press, New York, 2008).
14. Gottlieb, L. M. et al. Effects of in-person assistance vs personalized written resources about social services on household social risks and child and caregiver health: a randomized clinical trial. *JAMA Netw. Open* **3**, e200701 (2020).
15. Downs, S. H. & Black, N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J. Epidemiol. Commun. Health* **52**, 377–384 (1998).
16. Wood, J. N. et al. Local macroeconomic trends and hospital admissions for child abuse, 2000-2009. *Pediatrics* **130**, e358–364 (2012).
17. Weissman, A. M., Jogerst, G. J. & Dawson, J. D. Community characteristics associated with child abuse in Iowa. *Child Abuse Negl.* **27**, 1145–1159 (2003).
18. Slack, K. S., Holl, J. L., McDaniel, M., Yoo, J. & Bolger, K. Understanding the risks of child neglect: an exploration of poverty and parenting characteristics. *Child Maltreatment* **9**, 395–408 (2004).
19. Slack, K. et al. Child protective intervention in the context of welfare reform: the effects of work and welfare on maltreatment reports. *J. Policy Anal. Manag.* **22**, 517–536 (2003).
20. Slack, K. S., Font, S., Maguire-Jack, K. & Berger, L. M. Predicting child protective services (CPS) involvement among low-income U.S. families with young children receiving nutritional assistance. *Int. J. Environ. Res. Public Health* **14**, 1197 (2017).
21. Morris, M. C. et al. Connecting child maltreatment risk with crime and neighborhood disadvantage across time and place: a bayesian spatiotemporal analysis. *Child Maltreatment* **24**, 181–192 (2019).
22. Martin, M. J. & Walters, J. Familial correlates of selected types of child abuse and neglect. *J. Marriage Fam.* **44**, 267–276 (1982).
23. Marcal, K. E. The impact of housing instability on child maltreatment: a causal investigation. *J. Fam. Soc. Work* **21**, 331–347 (2018).
24. Maguire-Jack, K. & Font, S. A. Community and individual risk factors for physical child abuse and child neglect: variations by poverty status. *Child Maltreatment* **22**, 215–226 (2017).
25. Koch, J. et al. Risk of child abuse or neglect in a cohort of low-income children. *Child Abuse Negl.* **19**, 291–295 (1995).
26. Korbin, J. E., Coulton, C. J., Chard, S., Platt-Houston, C. & Su, M. Impoverishment and child maltreatment in African American and European American neighborhoods. *Dev. Psychopathol.* **10**, 215–233 (1998).
27. Kim, H. & Drake, B. Child maltreatment risk as a function of poverty and race/ethnicity in the USA. *Int. J. Epidemiol.* **47**, 780–787 (2018).
28. Jonson-Reid, M., Drake, B. & Zhou, P. Neglect subtypes, race, and poverty: individual, family, and service characteristics. *Child Maltreatment* **18**, 30–41 (2013).
29. Hirsch, B. K., Yang, M. Y., Font, S. & Slack, K. S. Physically hazardous housing and risk for child protective services involvement. *Child Welf.* **94**, 87–104 (2015).
30. Helton, J. J., Jackson, D. B., Boutwell, B. B. & Vaughn, M. G. Household food insecurity and parent-to-child aggression. *Child Maltreatment* **24**, 213–221 (2019).
31. Gross-Manos, D. et al. Why does child maltreatment occur? Caregiver perspectives and analyses of neighborhood structural factors across twenty years. *Child Youth Serv. Rev.* **99**, 138–145 (2019).
32. Greeley, S. C. et al. Community characteristics associated with seeking medical evaluation for suspected child sexual abuse in greater Houston. *J. Prim. Prev.* **37**, 215–230 (2016).
33. Garbarino, J. & Crouter, A. Defining the community context for parent-child relations: the correlates of child maltreatment. *Child Dev.* **49**, 604–616 (1978).
34. Frioux, S. et al. Longitudinal association of county-level economic indicators and child maltreatment incidents. *Matern. Child Health J.* **18**, 2202–2208 (2014).
35. Fong, K. Neighborhood inequality in the prevalence of reported and substantiated child maltreatment. *Child Abuse Negl.* **90**, 13–21 (2019).
36. Farrell, C. A. et al. Community poverty and child abuse fatalities in the United States. *Pediatrics* **139**, e20161616 (2017).
37. Ernst, J. S. Community-level factors and child maltreatment in a suburban county. *Soc. Work Res.* **25**, 133–142 (2001).
38. Eckenrode, J., Smith, E. G., McCarthy, M. E. & Dineen, M. Income inequality and child maltreatment in the United States. *Pediatrics* **133**, 454–461 (2014).
39. Drake, B. & Pandey, S. Understanding the relationship between neighborhood poverty and specific types of child maltreatment. *Child Abuse Negl.* **20**, 1003–1018 (1996).
40. Coulton, C. J., Richter, F. G., Korbin, J., Crampton, D. & Spilsbury, J. C. Understanding trends in neighborhood child maltreatment rates: a three-wave panel study 1990-2010. *Child Abuse Negl.* **84**, 170–181 (2018).
41. Coulton, C. J., Korbin, J. E. & Su, M. Neighborhoods and child maltreatment: a multi-level study. *Child Abuse Negl.* **23**, 1019–1040 (1999).
42. Berger, L. Socioeconomic factors and substandard parenting. *Soc. Serv. Rev.* **81**, 485–522 (2007).
43. Berger, L. M., Font, S. A., Slack, K. S. & Waldfogel, J. Income and child maltreatment in unmarried families: evidence from the earned income tax credit. *Rev. Econ. House.* **15**, 1345–1372 (2017).
44. Austin, A. E. et al. Heterogeneity in risk and protection among Alaska Native/American Indian and Non-Native children. *Prev. Sci.* **21**, 86–97 (2020).
45. Anderson, B. L., Pomerantz, W. J. & Gittelman, M. A. Intentional injuries in young Ohio children: is there urban/rural variation? *J. Trauma Acute Care Surg.* **77**, S36–40 (2014).
46. Alperstein, G., Rappaport, C. & Flanigan, J. M. Health problems of homeless children in New York City. *Am. J. Public Health* **78**, 1232–1233 (1988).
47. Moore, K. A., Nord, C. W. & Peterson, J. L. Nonvoluntary sexual activity among adolescents. *Fam. Plann. Perspect.* **21**, 110–114 (1989).
48. Kupfer, G. M. & Giardino, A. P. Reimbursement and insurance coverage in cases of suspected sexual abuse in the emergency department. *Child Abuse Negl.* **19**, 291–295 (1995).
49. Council on Community Pediatrics. Poverty and child health in the United States. *Pediatrics*. **137**, 1–14 (2016).
50. American Academy of Physicians. The EveryONE project: screening tools and resources to advance health equity. https://www.aafp.org/patient-care/social-determinants-of-health/everyone-project/eop-tools.html (2020).
51. National Academies of Sciences, Engineering, and Medicine. *Integrating Social Care into the Delivery of Health Care: Moving Upstream to Improve the Nation's Health* (National Academies Press, Washington, 2019).
52. De Marchis, E. H., Alderwick, H. & Gottlieb, L. M. Do patients want help addressing social risks? *J. Am. Board Fam. Med.* **33**, 170–175 (2020).
53. De Marchis, E. H. et al. Part I: a quantitative study of social risk screening acceptability in patients and caregivers. *Am. J. Prev. Med.* **57**, S25–S37 (2019).
54. Wylie, S. A. et al. Assessing and referring adolescents' health-related social problems: qualitative evaluation of a novel web-based approach. *J. Telemed. Telecare* **18**, 392–398 (2012).
55. Hassan, A. et al. Youths' health-related social problems: concerns often overlooked during the medical visit. *J. Adolesc. Health* **53**, 265–271 (2013).
56. Byhoff, E. et al. Part II. A qualitative study of social risk screening acceptability in patients and caregivers. *Am. J. Prev. Med.* **57**, S38–S46 (2019).
57. Hogan, A. H. & Flores, G. Social determinants of health and the hospitalized child. *Hosp. Pediatr.* **10**, 101–103 (2020).
58. Yang, M. Y. The effect of material hardship on child protective service involvement. *Child Abuse Negl.* **41**, 113–125 (2015).
59. Child Welfare Information Gateway. *Differential Response to Reports of Child Abuse and Neglect* (US Department of Health and Human Services, Children's Bureau, Washington, 2014).
60. Siegel, G. L. *Lessons from the Beginning of Differential Response: Why it Works and When it Doesn't* (Institute of Applied Research, St. Louis, 2012); retrieved from http://www.iarstl.org/papers/DRLessons.pdf (2012).
61. Hunter, A. A., DiVietro, S., Scwab-Reese, L. & Riffon, M. An epidemiologic examination of perpetrators of fatal child maltreatment using the National Violent Death Reporting System (NVDRS). *J. Interpers. Violence* 886260519851787 (2019).