



Socioeconomic adversity and child health following the COVID-19 pandemic: A convergent integrated mixed-methods review of household and neighbourhood inequalities

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ABSTRACT

Children experience inequalities in health at household and neighbourhood level, even in wealthy countries. Measures to contain the COVID-19 pandemic such as school closures, followed by the cost-of-living crisis, did not affect all children equally. This review aimed to understand the impact of socioeconomic adversity on child health and development following the COVID-19 pandemic.

Systematic literature searches used the SPIDER tool to identify studies, and a convergent integrated approach to combine and synthesise quantitative and qualitative data. A mixed methods appraisal tool was used to appraise for risk of bias.

Three integrated findings were identified from 125 studies: 1. Socioeconomic adversity and unequal exposure to risk; 2. Community support and professional input as protective influences. 3. Structural and system-level requirements to address socioeconomic adversity.

COVID-19 restriction measures were associated with worsening family finances and health of disadvantaged children who experienced cramped living conditions and insecure food and housing. COVID-19 amplified existing health inequalities. These inequalities could potentially be reduced through public health interventions such as improved availability of community services, greater consideration of sociodemographic factors in healthcare settings, and by professionals using their collective voice to influence policy development, for example through improved data sharing to help public-sector services make the best use of available data to support vulnerable families.

1. Introduction

Even in the world's wealthiest countries, some children lack basic necessities for health and wellbeing within their home and neighbourhood (Gromada et al., 2020). The home environment in a 'good' childhood provides a safe space, with healthy food to eat and ambient temperatures for comfortable living conditions (Timar et al., 2022). But if this is not available, unhealthy living conditions can irretrievably affect child mental and physical wellbeing, cognitive development and their prospects for a happy and healthy future (Timar et al., 2022). Neighbourhood risks are also unequally distributed, for example, children with no access to a park are 32% more likely to be overweight/obese and 20% more likely to be diagnosed with ADHD (Reuben et al., 2020). Both the home and neighbourhood can influence school

readiness, educational attainment, longer-term economic participation, and health outcomes into adulthood (Marmot et al., 2020).

Since 2000, UNICEF's *Innocenti Report Card* series has focused on assessing the rights and wellbeing of children across some of the world's wealthiest countries. As part of this work, UNICEF developed a conceptual framework for understanding the determinants of child wellbeing (Gromada et al., 2020). This framework recognises that child health is shaped by multiple factors, including children's daily activities and relationships (such as those with family and peers), the broader social networks surrounding them, the resources available within their immediate environments, and wider national policies and socio-economic, environmental, and political contexts.

This review specifically examines the role of *resources* within this framework. Resources are defined here as both the quality of

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neighbourhood environments in which children live and the economic circumstances of their households (Gromada et al., 2020). These factors are widely recognised as key drivers of inequalities in child health and wellbeing within countries, contributing to significant variation in childhood outcomes even among high-income nations.

Although children were at a low risk of death and severe illness from COVID-19, an indirect burden from the protective responses to the pandemic fell on them, especially those from the most deprived backgrounds (SAGE, 2020). Natural disasters are known to widen inequalities in society and pandemics are no exception to this, and many researchers believe that COVID-19 has acted as a 'syndemic', exposing and amplifying existing inequalities in society (Sydenstricker, 2006; Bambra et al., 2020). One of the protective responses were lockdowns, including school closures, which during the peak saw 1.6 billion children out of school worldwide, with most occurring from March 2020 (BBC News, 2020; UNESCO, 2021). This is despite evidence showing that school closures alone would prevent just 2-4% of deaths, considerably less than other social distancing measures (Viner et al., 2020). This meant that many low-income parents struggled to provide enough food for their children, exacerbated as access to free school meals was not guaranteed (Bryant, 2021; Hoskins and Wainwright). Households with children were hardest hit, with 20.8% reporting food insecurity in the first two weeks of lockdown, compared to 13.7% of households without children (Goudie and McIntyre, 2021).

Online schooling additionally created unique challenges, in both access to internet, and a limited number of functional devices for multi-child families to use (Hoskins and Wainwright; Holmes and Burgess, 2020; Holmes and Burgess, 2022). In the United Kingdom (UK), approximately 9% of households with children lacked access to a laptop, desktop or tablet, and 2% had no access to internet just before the pandemic began (OFCOM, 2020; Coleman, 2021). Living conditions at a time where families were 'staying at home' during lockdowns were also a concern with many families outgrowing their accommodation but not able to afford more space locally (Ucci et al., 2022a). Potentially exacerbating this, as we recovered internationally from the COVID-19 pandemic, families have experienced a cost-of-living crisis with the cost of everyday essentials such as food and energy rising much faster than average household incomes (Francis-Devine and HoC, 2025). Families with low incomes are most at risk, as they have less disposable income to absorb the higher cost (Finch, 2022). In fact, there has been much criticism that official measures of UK inflation do not reflect the true cost of living for the most deprived households (Elliot, 2022). In 2021/22, 19% of children in the UK (aged <16 years) lived in relative low-income families (Department for Work and Pensions). A household is said to be in relative low income if they have less than 60% of the income of the median household, and this is a well-understood measure of living standards in the UK (Department for Work and Pensions, 2020).

The cumulative effects of existing inequalities and the indirect effects of COVID-19 restriction measures and cost-of-living crisis have likely worsened existing inequalities, potentially leading to worse life course outcomes unless mitigating actions and policies are introduced (Bambra et al., 2020; Save the Children, 2022). Previous literature reviews which examined the impacts of the COVID-19 pandemic on child health have largely focused on specific domains, such as mental health or obesity, with many also not adequately considering differences in children experiencing reduced availability of household and neighbourhood resources. Furthermore, they have not explored the intersection between these factors and the cost-of-living crisis (Tall and Biel, 2023; Meade, 2021; Ng and Ng, 2022; Stavridou et al., 2021).

This literature review aimed to address these gaps by examining household and neighbourhood inequalities in child health and development since the onset of COVID-19. It adopted a longer-term perspective beyond the immediate pandemic period and took a holistic approach to child health that integrated both physical and mental outcomes. It aimed to improve understanding of how socio-economic inequalities in children's health and development have evolved in the

post-pandemic period. It aimed to synthesise evidence on the impact of social inequalities on child health and development outcomes since the COVID-19 pandemic. Specifically, it used the UNICEF framework to identify:

- Which neighbourhood and household resources have become less available for children since the start of the COVID-19 pandemic,
- How parents and children experiencing reduced availability to household or neighbourhood resources perceive its impact on child health and development, and
- The possible facilitators for child health and development in families experiencing reduced availability to household or neighbourhood resources since the COVID-19 pandemic.

2. Methods

A mixed methods systematic review was conducted in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocol (PRISMA) guidelines (Page et al., 2021). The protocol was registered a-priori on PROSPERO (CRD42023451007).

2.1. Search strategy and inclusion criteria

The search strategy aimed to locate both academic and grey literature using (MEDLINE Ultimate, Web of Science, Embase and PsycINFO) and Google searches to locate government and charity reports. The database searches were developed in consultation with an academic librarian, with specific expertise in health sciences. This guided database selection, and search term development and optimisation. Literature reviews were not included, but those which appeared relevant had reference lists examined to identify any studies which may be relevant to this systematic review. Additional papers were found through backwards searching of reference lists and citations, and searches of the internet to find government articles and charity reports.

The phenomenon of interest, the COVID-19 pandemic and cost-of-living period, were defined as the post-2020 period. The definition for neighbourhood resources was adapted from Alderton et al., 2019 and complimented with household resources search terms following reading of relevant literature (Bambra et al., 2020; Goudie and McIntyre, 2021; Ucci et al., 2022b). The search strategy for early child development (de Oliveira et al., 2020) and child health were also modified from existing studies (Hoffmann et al., 2022). Searches were completed in October 2024 and were limited to studies published since January 2020. The full search strategy is provided in supplement 1. The SPIDER tool was used to define the inclusion criteria (Cooke et al., 2012), as summarised in Table 1.

2.2. Study selection, data extraction and transformation

Results were downloaded into Endnote 20, and duplicates removed. Title and abstract screening were conducted (by CW) sequentially as distinct stages to support a structured and transparent study selection process. Initial title screening was used to remove clearly irrelevant records based on predefined criteria, thereby reducing the volume of records progressing to the abstract screening stage, for example those not in high-income countries, or which looked at adult health. Abstract screening then involved a more detailed assessment of eligibility against the inclusion criteria, followed by full texts. Reasons for exclusion were recorded for studies that did not meet the criteria at the abstract and full-text screening stages. While duplicate independent screening is usually recommended to reduce bias, a pre-defined eligibility criteria and structured protocol was agreed ahead of study selection to ensure consistency. In addition, a random sample of 20% of abstracts and full texts were independently reviewed by two other reviewers (SH & NS). Screening was only continued following discussion, that ensured the inclusion criteria was being clearly and consistently applied.

Table 1
The systematic search strategy using the SPIDER tool.

	Inclusion Criteria	Exclusion Criteria
S – Sample	- Children from G7, EU, Australia and New Zealand - Children aged 0 to 17 years. This was including datasets with people over the age of 17, providing they include specific results for some or all of the age ranges between 0 and 17 years, or where the mean or median age of the study is between 0 and 17 years. - Informants (e.g., parents/ carers, teachers, or practitioners) reporting on children.	0–17-year age range cannot be extracted.
PI – Phenomenon of interest	- COVID-19 pandemic period and the subsequent cost of living crisis - Household-level resources: - Material deprivation: the ability to afford basic resources such as sufficient food, heating and educational resources such as internet. - Neighbourhood-level resources: - Neighbourhood housing quality, garden/outdoor space access, density, typology, or affordability. - Neighbourhood public open space quality, quantity, or access (e.g., distance from residence to nearest public open space; proportion of land area that is public open space within a geographic area). - Quality and/or accessibility (i.e., distance from residence) to local social, health, municipal, or childhood education and care services.	
D – Design	- Quantitative, qualitative and mixed method designs from January 2020 - Government and charity reports. - Published in English or can be auto translated.	Commentaries, letters, book chapters, abstracts, protocols or conference papers.
E – Evaluation	- Early childhood (under 5 years) development outcomes, reflecting the period characterised by rapid brain development, neural plasticity and the establishment of key skills. This is a critical time in which exposures and experiences can have a disproportionate impact on later life health outcomes. Development outcomes to include: - Developmental risk and delay - Socio-emotional skills (externalizing and internalizing behaviours) - Cognitive (school readiness).	

Table 1 (continued)

	Inclusion Criteria	Exclusion Criteria
	- Gross and fine movement skills. - Verbal communication skills. - Overall child health (0-18 years) outcomes to include: - Diseases, birth outcomes, allergies, injury, mortality, mental health and well-being and HRQOL	
R – Research Type	Qualitative, quantitative, and mixed methods	

A standardised data extraction sheet was developed a-priori and piloted using the Joanna Briggs Institute (JBI) Mixed Methods Data Extraction Form with data stored in Microsoft Excel. It was designed to allow recording of data which answered each of the three sub questions of this review including country of study, age range, sex, ethnicity, measures of material/neighbourhood deprivation and any measures of health and development. It followed a Convergent Integrated Approach (Lizarondo et al., 2019) which allowed a simultaneous synthesis of diverse data types, supporting a more holistic understanding of the research questions, as qualitative and quantitative findings are integrated rather than treated in isolation.

All data were extracted by CW and were independently checked (LF & KW). Quantitative data comprised descriptions of the results in words in addition to the numerical outcomes. All results regardless of statistical significance were listed. Qualitative data extracted comprised the themes and subthemes, as defined by the original authors, as well as participant quotes and authors' descriptions of the results. All data were extracted verbatim from the primary studies. If the relevant data was only available in tables or a figure, but not referred to in the text, this was extracted, and CW provided her own narrative interpretation, in line with the recently released JBI guidance (Lizarondo et al., 2025). The primary reviewer (CW) is experienced in statistical analyses, and the independent validators (LF & KW) with mixed methods, ensuring that there were experienced researchers on the team to minimise any possible misinterpretations of numerical or statistical results in line with guidance (Lizarondo et al., 2025). Disagreements on interpretation were resolved through discussion.

This review took a social-constructivist epistemological stance, focusing on the relationship between social conditions and health opportunities (Matteucci, 2015). Data integration involved assembling the quantitative and qualitative extracted data, and detailed examination to identify likenesses and create categories based on similarity in meaning (CW). In line with JBI guidance, the data were coded into categories, representing 'qualitization', which applies when the extracted data grouped together is a mix of qualitative and quantitative data, or just quantitative data alone (Lizarondo et al., 2025). Categories were then aggregated to produce the overarching integrated findings from both the quantitative and qualitative studies. These categories were developed in close discussion with SH, an experienced mixed methods researcher.

2.3. Risk of bias assessment

The Mixed Methods Appraisal Tool (MMAT) version 2018 was used to assess risk of bias (Hong et al., 2018). All included studies were assessed by the first reviewer (CW), and a second reviewer (LF) then checked this decision. Any discrepancies were resolved through discussion. A percentage score was calculated to indicate the proportion of MMAT criteria met for each study in line with guidance, where 0% indicated that no quality criteria were met and 100% indicated that all criteria were satisfied. This is in line with guidance on how to report MMAT (Reporting the results of MMAT, 2018). For mixed methods studies, the overall quality score is the lowest score of the study

components.

3. Results

In total 125 studies met the inclusion criteria. See PRISMA diagram (Fig. 1) for details. A substantial proportion of records were excluded at the title screening stage. This reflects the deliberately broad search strategy employed to maximise sensitivity and ensure comprehensive identification of potentially relevant studies across diverse contexts. Consequently, a high volume of citations were retrieved, many of which were not directly relevant to the review question. As reasons for exclusion were not systematically recorded at this stage, detailed categorisation of exclusions is not available.

3.1. Study characteristics

Included studies came from 18 countries. Household measures included material deprivation such as the ability to afford basic resources such as sufficient food, medical insurance, digital devices and internet access. Proxies were also used as indicative of material deprivation such as parent education, parental employment, the financial impact of the pandemic (including job loss), and being in the receipt of government support. Fewer studies reported on neighbourhood resources (32%, $n = 40$), but those that did reported on housing quality and insecurity, indoor and outdoor space, housing type and the built environment. See Table 2 for full study characteristics.

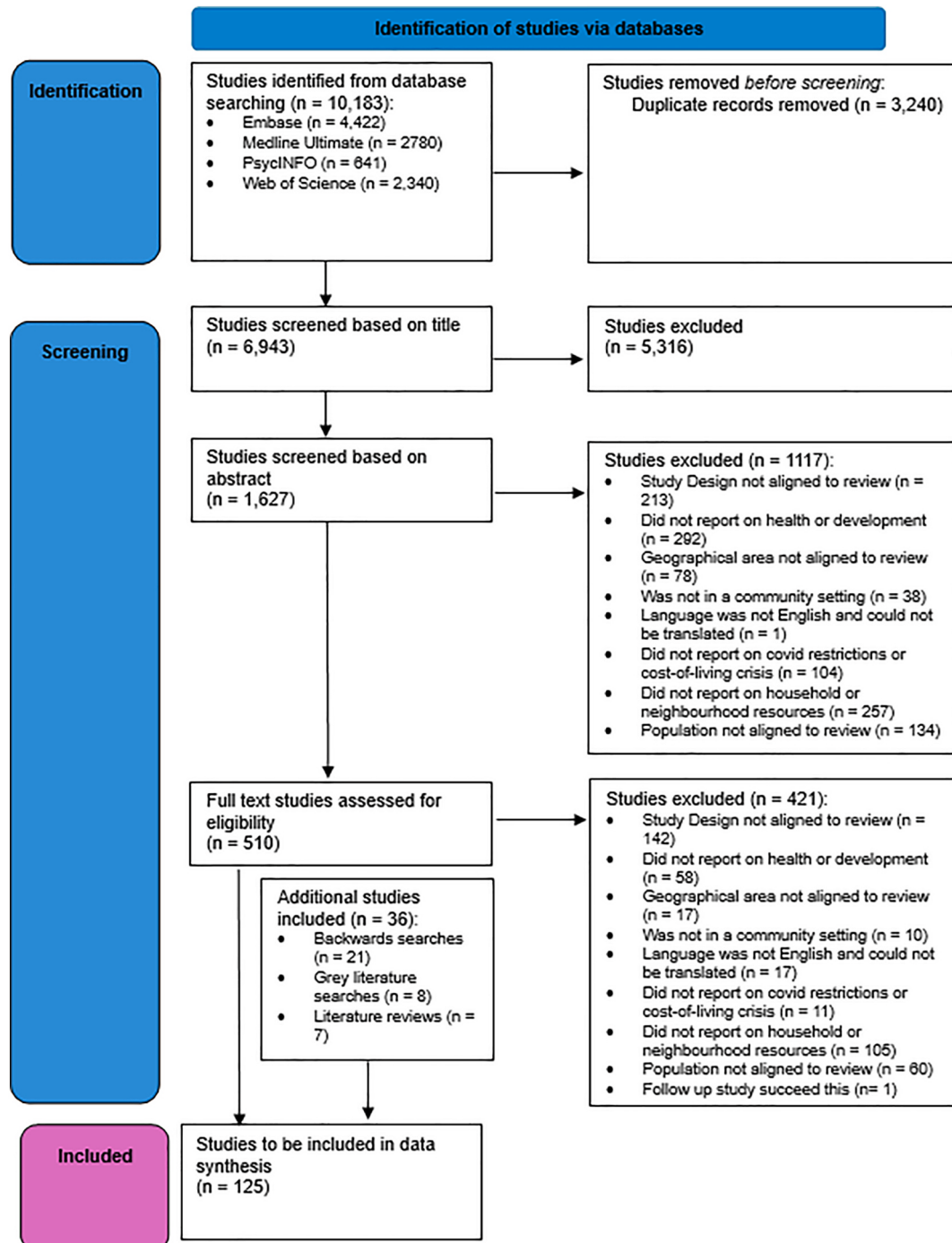


Fig. 1. Flowchart of the review process.

Table 2
Study characteristics.

		Number of studies
Country	US	58
	UK	22
	Germany	9
	Canada	8
	Italy	6
	France	4
	Netherlands	4
	Australia	4
	Spain	3
	More than one country	2
	Other Countries	5
Phenomenon of interest	COVID-19 pandemic period	116
	Cost-of-living crisis	6
	COVID-19 pandemic period & Cost-of-living	3
Resource	Household	85
	Household & Neighbourhood	26
	Neighbourhood	14
Design	Quantitative	109
	Qualitative	7
	Grey literature - report	7
	Mixed Methods	2
Health/Development outcome	Mental health/wellbeing	79
	Obesity/weight increase	12
	Child development	9
	Dental Health	5
	More than one health or development outcome	5
	Other health	5
	HRQOL	4
	Birth Outcomes	3
	Child functioning	2
	Mortality	1

3.2. Risk of bias

Results from the quality assessment are shown in supplement 2. This was conducted for 118 of the studies, excluding the 7 pieces of grey literature which were Government/charity reports and either did not have clear research questions or did not clearly set out their methods for collecting and analysing data (Save the Children, 2022; Northern Health Science Alliance, 2023; Department for Education, 2023; Institute of Health Visiting, 2023; NSPCC, 2024; Rainer et al., 2024; The Children's Society, 2024). The methodological quality of the included studies varied but were generally mid-to-high quality. Based on the MMAT appraisal, 25% of studies met 80–100% of the MMAT criteria, 41% met 40–60% of the MMAT criteria, and 4% met only 0–20% of the MMAT criteria. Common limitations included samples not being representative of the general population, and a lack of validated measures being used for household and neighbourhood resources, and health outcomes.

4. Results of synthesis

The categories and integrated findings are summarised in supplement 3. Three main integrated findings are summarised in Table 3. Integrated finding 1 addressed objectives 1 and 2, whilst integrated findings 2 and 3 addressed objective 3.

4.1. Socioeconomic adversity and unequal exposure to risk

In total, 125 studies reported on how socioeconomic adversity influenced child health and development. Across studies, a consistent pattern emerged whereby children experiencing pre-existing household and neighbourhood inequalities were disproportionately affected by the COVID-19 pandemic and subsequent cost-of-living crisis. These findings

Table 3
Integrated findings and categories identified from synthesis of results.

Integrated findings	Category
Socioeconomic adversity and unequal exposure to risk: <i>The circumstances in which children live and how they disproportionately shape child health and development.</i>	Income insecurity as a pathway of socioeconomic adversity Food insecurity and pathways to poorer child health Housing insecurity as a pathway to poorer child health The home, space and digital connection Indirect pathways linking disadvantage to child health Pre-existing disadvantage and unequal vulnerability Health occasionally better for those experiencing disadvantage Ambiguous and inconsistent associations
Community support and professional input as protective influences: <i>Facilitators of family health and wellbeing, in places including the local neighbourhood, and health and educational settings,</i>	Coordinated professional responses to socioeconomic adversity Protective systems within schools and communities Tailoring support to address socioeconomic and cultural barriers
Structural and system-level requirements to address socioeconomic adversity: <i>Wider influences on child health, outside the direct control of children and their families, which have potential to either mitigate or exacerbate the consequences of socioeconomic adversity.</i>	Policy as a mechanism for reducing child health inequalities Health care systems as determinants of equitable access Research priorities for understanding and reducing inequalities

suggest that broader social and economic conditions, including digital exclusion, housing and food security, shaped children's exposure to health risks and opportunities for wellbeing. Importantly, these are circumstances that are directly experienced by families but are often beyond their immediate control.

4.1.1. Income insecurity as a pathway of socioeconomic adversity

Across both qualitative and quantitative studies, financial insecurity emerged as a common challenge for families following the COVID-19 pandemic (Save the Children, 2022; Adegboye et al., 2021; Blackwell et al., 2022; Silk et al., 2021; Penner et al., 2021; Bosch et al., 2022; Bryson et al., 2021; Price et al., 2022; Neece et al., 2020; Leigh et al., 2023; Khoury et al., 2022; Dondi et al., 2021a; Dondi et al., 2021b; Leitão et al., 2022; Yarger et al., 2023; Cabrera et al., 2022). Many families experienced employment uncertainty, job losses and decreases in household income during the COVID-19 pandemic period (Blackwell et al., 2022; Silk et al., 2021; Penner et al., 2021; Bryson et al., 2021; Price et al., 2022; Leitão et al., 2022; Yarger et al., 2023; Cabrera et al., 2022; Gassman-Pines et al., 2020; Luijten et al., 2021; Barboza et al., 2021; Burgette et al., 2021; Dayton et al., 2022; Xiao et al., 2022; Ward and Lee, 2022; Vasa et al., 2021; Panjwani et al., 2021; Oliva et al., 2021; Moulin et al., 2023; McKune et al., 2021; Folch et al., 2022; Eales et al., 2021; Glynn et al., 2021; Palmer et al., 2023), with economic concerns and job losses persisting once the lockdown measures had finished through the subsequent cost-of-living crisis (Save the Children, 2022; The Children's Society, 2024; Park et al., 2024). Qualitative evidence highlighted the difficulty of living in financial strain, with one parent describing the worries about meeting household costs: *The only thing that worries me is the payments that have to be made: rent, the cars, food ...* (Neece et al., 2020). Together, these findings suggest that economic insecurity became a significant source of stress for many families and may have shaped children's health indirectly through its impact on the wider household environment.

4.1.2. Food insecurity as a pathway to poorer child health

Food insecurity was similarly reported across numerous studies during the COVID-19 pandemic period and the subsequent cost-of-living crisis (Northern Health Science Alliance, 2023; The Children's Society, 2024; Blackwell et al., 2022; Silk et al., 2021; Dondi et al., 2021a; Dondi et al., 2021b; Ward and Lee, 2022; Panjwani et al., 2021; Park et al., 2024; St. Pierre et al., 2022; Ling et al., 2022; Copeland et al., 2024; Natale et al., 2023; Steimle et al., 2021; Meyer et al., 2023; Lax et al., 2022; Patrick et al., 2020; Goudie, 2023). Although food security worsened for many families, some studies reported an improvement in a minority (Dondi et al., 2021a; Adams et al., 2021), potentially reflecting the protective influence of temporary federal financial support and increased access to food assistance programmes during the pandemic (Park et al., 2024; Patrick et al., 2020; Adams et al., 2021; Kapos et al., 2024). This heterogeneity suggests that broader policy and welfare responses may have modified families' experiences of economic hardship.

Evidence from quantitative and qualitative grey literature converged in demonstrating an association between food insecurity and poorer child health outcomes. Quantitative studies linked food insecurity with increased psychological distress (Capielo Rosario et al., 2024), anxiety (Ward and Lee, 2022), depression (Glynn et al., 2021), stress and worry (Yang et al., 2022), fear (Ling et al., 2022), sadness (Xiao et al., 2022) and behavioural health (Panjwani et al., 2021; Glynn et al., 2021; Steimle et al., 2021; Lax et al., 2022; Patrick et al., 2020). Qualitative findings complemented these associations by illustrating how limited access to food affected the day-to-day wellbeing of children, as highlighted by one young person: "I haven't been getting much to eat lately and I can see how this affects my mood..." (NSPCC, 2024). Many studies showed an association between food insecurity and worse child mental health since COVID-19 (Xiao et al., 2022; Ward and Lee, 2022; Panjwani et al., 2021; Glynn et al., 2021; Lax et al., 2022; Patrick et al., 2020; Goudie, 2023; Capielo Rosario et al., 2024; Yang et al., 2022). Together these findings indicate that uncertainty about food availability is associated with poorer child mental health.

Beyond mental health, food insecurity was also associated with lower child development (Copeland et al., 2024) and higher levels of unmet dental needs (Karande et al., 2023). These findings suggest that the implications of food insecurity extend beyond emotional wellbeing and may affect multiple dimensions of child health and development. Evidence supporting these associations was derived from a combination of peer-reviewed studies and some grey literature sources. While the studies scored 40-80% on MMAT, many relied on surveys of a cross-sectional designs, limiting conclusions about causality. Nevertheless, a consistent pattern across study designs and evidence types, suggesting that food insecurity was an important correlate of child health during the pandemic and recovery period.

4.1.3. Housing insecurity as a pathway to poorer child health

Across studies, safe and affordable housing was a persistent challenge for many families, with housing insecurity consistently associated with worse child mental health outcomes (Leigh et al., 2023; Copeland et al., 2024; Lax et al., 2022; Abramovich et al., 2021). Quantitative evidence and grey literature indicated that unmet housing needs in children were associated with worse mental health in terms of emotional and behavioural needs (Lax et al., 2022), increased anxiety, irritability, inattention, mood, hyperactivity and obsessions/compulsions (Leigh et al., 2023) and suicidal thoughts (NSPCC, 2024). These findings were complemented by qualitative accounts, which highlighted how poor housing conditions, instability and unresolved maintenance issues can shape daily life. For example, one described how their asthma had been impacted by ongoing exposure to mould in the home: "We have lots of problems at home that haven't been fixed by the landlord. So now there's mould growing in my bedroom, which isn't great for my asthma..." (NSPCC, 2024).

Observations from health professionals, visiting families in their

homes, provided additional insight into these living conditions, offering a more direct understanding of the environments in which children live. Evidence from the annual State of Health Visiting report in the UK highlighted the impact of structural factors on social housing, and its associated impact on parental mental health, and child mental and physical health: "Families have been severely impacted by austerity, Universal Credit [a state welfare benefit], COVID and the on-going lack of good quality social housing. These social issues have had such a harmful impact upon parental mental health, child and infant physical and mental health, attachment, development and overall life chances and outcomes" (Institute of Health Visiting, 2023). In another study, a Health Visitor witnessed homes with broken heating, where they found a baby sleeping in a bed under an adult duvet to keep warm, putting the child at risk of sudden infant death (Northern Health Science Alliance, 2023).

These findings provide important contextual evidence that complements quantitative associations by illustrating the material realities underpinning housing insecurity. They indicate that housing is an important correlate of both mental and physical health outcomes in children, while qualitative and observational evidence provides critical insight into the mechanisms and lived experience through which these associations may operate. Evidence supporting these associations was largely derived from studies scoring 60-100% on MMAT, instilling confidence in these findings.

4.1.4. The home, space and digital connection

Across studies, the home environment and access to digital resources emerged as important determinants of children's experiences during the pandemic period. While technology provided vital means of maintaining access to school, healthcare and even physical activity, not all families were able to benefit equally from these opportunities (Burgette et al., 2021; Panjwani et al., 2021; Jenssen et al., 2021; Daskalska et al., 2024; Fisher et al., 2022).

Quantitative and qualitative evidence highlighted disparities in access to digital devices and reliable internet connections, which created barriers to online learning and service access for some children (Meyer et al., 2023; Hurel et al., 2023; Rimpela et al., 2021). These findings suggest that digital exclusion may have compounded existing socio-economic disadvantage through educational disruption, reduced access to support services and greater social isolation. However, evidence was not entirely consistent, and several studies suggested that adverse impacts associated with lower levels of digital access may not have persisted after the initial COVID-19 restrictions (Department for Education, 2023; Penner et al., 2021; Metherell et al., 2021; Lacey et al., 2023). For example, from a UK context, adolescents without access to a computer for online schooling experienced poorer mental health when the social restriction measures were in force around December 2020, likely due to social and educational disruptions, but these differences appeared to diminish as restrictions were relaxed and opportunities for more in-person contact resumed (Metherell et al., 2021). These findings indicate that the impact of digital exclusion on children may be context-dependent and influenced by broader social conditions which are not fully understood.

Physical aspects of the home environment were also consistently associated with child health and wellbeing. During periods of restriction, families spent substantially more time together within the home, often working, studying and socialising in limited living space, often with restricted access to outside space (Silk et al., 2021; Barboza et al., 2021; Palmer et al., 2023; Hurel et al., 2023; Bourion-Bédès et al., 2022). Limited space in homes, was shown across several studies to be associated with poorer mental health (Silk et al., 2021; Bosch et al., 2022; Hurel et al., 2023; Felfe et al., 2023; Ravens-Sieberer et al., 2022, 2023; Mitra et al., 2021; Zhang et al., 2024; De Coninck et al., 2022; Estevez et al., 2023) and lower health-related quality of life (HRQoL) (Felfe et al., 2023; Ravens-Sieberer et al., 2023). Adolescents with less study space were more likely to report being stressed (De Coninck et al., 2022), or have a worsening of hyperactivity and

emotional symptoms (Bosch et al., 2022). A lack of space within the home also impacted the physical health of children including child obesity (Barboza et al., 2021), development outcomes (Institute of Health Visiting, 2023), and the risk of sudden infant death syndrome (Rosenthal et al., 2023). Children living in apartments experienced lower HRQoL (Bourion-Bédès et al., 2022), increased hyperactivity/inattention (Christner et al., 2021) and worse perceived physical well-being (Mastorci et al., 2021) compared to those living in houses. These findings indicate that space within the home environment can influence multiple dimensions of child health, through both environmental and psychosocial mechanisms, such as access to a study space, a lack of privacy and co-working in small spaces with family members.

Access to outdoor space appeared to be a protective factor for children. Across studies, children who had access to an outdoor space had better emotional wellbeing (Folch et al., 2022; Estevez et al., 2023; Mastorci et al., 2021; Berasategi et al., 2021; Hazlehurst et al., 2022), showed fewer psychological and conduct issues, and fewer hyperactivity and inattention problems compared to their peers without access to these spaces (Estevez et al., 2023; Christner et al., 2021; Seivwright et al., 2023). Quantitative and qualitative evidence highlighted the importance of outdoor space for exploration, play and exercise. For younger children in particular, outdoor space supported opportunities to develop their fine and gross motor skills (Rosenthal et al., 2023), and the maintenance of a healthy weight (Mayne et al., 2023; Koebnick et al., 2023). Together, this evidence suggests that access to space, both inside and outside of the home, may have buffered some of the adverse consequences of pandemic-related restrictions by promoting mental wellbeing and early-years development.

Evidence supporting these findings was derived from studies scoring between 40 and 100% on MMAT, indicating mid-to high quality and instilling confidence in the finding. They were a mix of qualitative, observational and cross-sectional design, and as such limits causal inference. Nevertheless, a consistent pattern emerged across study types, indicating that both digital and physical aspects of the home environment were important correlates of child health and wellbeing during the pandemic period.

4.1.5. Indirect pathways linking disadvantage to child health

Evidence from both quantitative and qualitative studies suggested that the relationship between socioeconomic advantage and child health may operate indirectly through family and household processes. Two studies showed that financial strain following COVID-19 restrictions was associated with poorer parental mental health, which in turn was associated with worse child mental health and wellbeing (Adegboye et al., 2021; Low and Mounts, 2022). These findings point to a possible psychosocial pathway whereby economic hardship may impact child health through its impact on family functioning and parental wellbeing. Similar patterns were observed in studies which examined changes to family roles and relationships. Among Latin American adolescents, parental income and job loss was associated with increased childcare responsibilities for younger siblings, which in turn was associated with poorer mental health due to reduced opportunities for social interaction with their peers (Roche et al., 2022). Likewise, low-income families were more likely to experience job and income loss, which was associated with increased parent child-conflict and subsequently lower child positive affect and higher levels of child negative affect (Wang et al., 2021). Evidence supporting these findings all scored 60% on MMAT, showing that these studies were of a reasonable quality. Taken together, these findings suggest that socioeconomic disadvantage may not only influence child health directly through material deprivation, but also through interconnected psychosocial pathways including parental stress, family conflict, caregiving responsibilities and social isolation.

4.1.6. Pre-existing disadvantage and unequal vulnerability

Evidence indicated that the negative health impacts of the pandemic were not experienced equally. Rather, families with preexisting disparities in household or neighbourhood resources were impacted disproportionately, with children facing multiple forms of disadvantage experiencing the greatest health burden (Moulin et al., 2023; Jenssen et al., 2021; Brooks et al., 2021). For example, families with lower socio-economic status prior to the pandemic, who also experienced a declining income during the pandemic were more likely to report emotional symptoms in their children (Moulin et al., 2023). Similarly, within countries, geographical inequalities persisted, with children in North of England more likely to experience food insecurity compared to those living in the more affluent South, highlighting how broader structural inequalities shaped family experiences (Northern Health Science Alliance, 2023).

Several studies demonstrated the intersection of socioeconomic disadvantage with other forms of marginalisation. Children and young people from the LGBTQ2S communities (Abramovich et al., 2021), those with a disability (Neece et al., 2020; Castro-Kemp and Mahmud, 2021; Guzman et al., 2023; Scherrer et al., 2022), or neurodiversity (Moulin et al., 2023; Sherlock et al., 2024), refugee populations (Meyer et al., 2023; Rosenthal et al., 2023) and racial and ethnic minority groups experienced additional challenges which may have exacerbated existing inequalities (Barboza et al., 2021; Capielo Rosario et al., 2024; Scherrer et al., 2022). Qualitative evidence provided insight into these experiences, for example, some LGBTQ2S young people experiencing housing insecurity were required to remain living with unsupportive family members during periods of restriction, a circumstance associated with poorer mental health outcomes (Abramovich et al., 2021).

Evidence also highlighted that disadvantage may accumulate across multiple domains for individuals. Children with additional healthcare needs living in low socioeconomic households experienced increased disease complexity during COVID-19, despite not reporting higher rates of mental health problems (Goudie, 2023). Similarly, racial and ethnic disparities were evident across the United States where Non-Hispanic Black and Hispanic children experienced substantially higher estimated excess disability adjusted life years (DALYs) compared to non-Hispanic White children (Scherrer et al., 2022). Refugee children appeared particularly vulnerable as existing social isolation was exacerbated by limited access to technology, restricting meaningful social contact with peers, and potentially contributing to worse mental health outcomes (Northern Health Science Alliance, 2023).

Throughout these studies, a consistent pattern emerged, suggesting that other forms of marginalisation and social vulnerability often magnified the consequences of socioeconomic disadvantage. This finding was supported by both qualitative and quantitative studies, scoring between 40 and 100% on MMAT indicating the findings were underpinned by mid-to high quality evidence. These findings highlight the importance of considering the accumulation of disadvantage when seeking to understand child health inequalities.

4.1.7. Health occasionally better for those experiencing disadvantage

Despite the overall pattern across studies indicating that socioeconomic disadvantage was associated with worse child health outcomes, findings were not universally negative. Evidence from several studies indicated that some children experiencing socioeconomic disadvantage demonstrated stable, or, in some cases, improved outcomes during the pandemic (Cabrera et al., 2022; Rimpela et al., 2021; Cost et al., 2022; Jensen and Reimer, 2021). These findings could highlight the heterogeneity of children's experiences, suggesting that socioeconomic adversity did not affect all families in the same way.

Some associations appeared to run counter to the broader pattern of disadvantage across some studies. For example, one study reported that family economic concerns related to COVID-19 were associated with improvement in children's obsessions/compulsions, anxiety and attention difficulties (Cost et al., 2022). Similarly, Hispanic children living in

families experiencing economic disadvantage, demonstrated higher levels of social competence (Cabrera et al., 2022). In Finland, adolescents who shared digital equipment with members of their family reported fewer daily health complaints (Rimpela et al., 2021). Likewise, students who had mothers without a college education had declining levels of loneliness during the first spring lockdown, while those with college-educated mothers had an increasing levels of loneliness (Jensen and Reimer, 2021).

These findings suggest that socioeconomic risk does not inevitably result in poorer child outcomes and with some families experiencing potential protective factors that buffered the effects of adversity. Possible explanations are unclear, but may include strengthened family relationships, the development of adaptive coping strategies, or greater resilience among groups already accustomed to managing socioeconomic challenges. Studies underpinning this evidence scored between 40 and 80% on MMAT demonstrating reasonable confidence. However, these findings were reported in a relatively small number of studies and should be interpreted cautiously, particularly as one study had underrepresentation of low-income families (Cost et al., 2022), and other studies did not use recognised scales for health and wellbeing (Rimpela et al., 2021) (Jensen and Reimer, 2021). It is also possible that this finding may reflect heterogeneity in study methods, study populations and outcome measures rather than a direct contradiction of the wider evidence base.

4.1.8. Ambiguous and inconsistent associations

Despite socioeconomic disadvantage frequently being linked to worse child health outcomes, the evidence was not entirely consistent. Across several studies, declines in health were not exclusive to deprived children, and in some cases, those experiencing increased social advantage had worse health outcomes (Price et al., 2022; Luijten et al., 2021; Daskalska et al., 2024; Raviv et al., 2021; Scrimin et al., 2022; Anders et al., 2022). For example, during COVID-19-related school closures, higher household income was associated with an increased likelihood of parents reporting mental health concerns in their child (Raviv et al., 2021), while depressive and anger symptoms were associated with having highly educated parents (Luijten et al., 2021). Similar inconsistencies were evident for some physical health outcomes. Children from more affluent areas were more likely to report coordination and language problems, as well as being more likely to be overweight than those from deprived areas (Weyers and Rigo, 2023). These findings suggest that more affluent children experienced unique stressors during the pandemic, which might include greater academic pressure, increased disruption to extracurricular activities and reduced access to enrichment opportunities that typically support physical development and emotional regulation. Additionally, well-educated parents may also demonstrate differences in health literacy and reporting behaviours which could have contributed to these findings.

More broadly, studies reporting on other resources including parental employment, government assistance, parental education, deprivation, financial impacts such as job and income loss, and digital inequalities did not indicate any consistent impact on child health (Elliot, 2022; Department for Education, 2023; Rainer et al., 2024; The Children's Society, 2024; Blackwell et al., 2022; Silk et al., 2021; Penner et al., 2021; Bosch et al., 2022; Bryson et al., 2021; Price et al., 2022; Neece et al., 2020; Leigh et al., 2023; Khoury et al., 2022; Dondi et al., 2021a; Dondi et al., 2021b; Leitão et al., 2022; Yarger et al., 2023; Cabrera et al., 2022; Gassman-Pines et al., 2020; Luijten et al., 2021; Burgette et al., 2021; Dayton et al., 2022; Xiao et al., 2022; Ward and Lee, 2022; Vasa et al., 2021; Panjwani et al., 2021; Oliva et al., 2021; Moulin et al., 2023; McKune et al., 2021; Folch et al., 2022; Eales et al., 2021; Palmer et al., 2023; Park et al., 2024) (Copeland et al., 2024; Natale et al., 2023; Steimle et al., 2021; Kapos et al., 2024; Yang et al., 2022; Karande et al., 2023; Hurel et al., 2023; Rimpela et al., 2021; Metherell et al., 2021; Lacey et al., 2023) (Ravens-Sieberer et al., 2022, 2023; Mitra et al., 2021; Zhang et al., 2024; De Coninck et al., 2022;

Estevez et al., 2023; Christner et al., 2021; Low and Mounts, 2022; Roche et al., 2022; Wang et al., 2021; Castro-Kemp and Mahmud, 2021; Guzman et al., 2023; Cost et al., 2022; Jensen and Reimer, 2021) (Scrimin et al., 2022; Anders et al., 2022; Weyers and Rigo, 2023; Rai et al., 2024; Rodriguez-Pose et al., 2024; Bailey et al., 2021; Waite et al., 2021; Oppermann et al., 2024; Pampati et al., 2023; Been et al., 2020; Bhat, 2021; Bolbocean et al., 2023; Charalampopoulou et al., 2022; Figas et al., 2023; Hawrilenko et al., 2021; Lyu and Wehby, 2022, 2023; Green et al., 2023; Westrupp et al., 2023; Woodward et al., 2023; Yusuf et al., 2022; Zambrana and Hart, 2022; Stevens et al., 2023; McGuine et al., 2021; Hussey et al., 2024; Thorpe et al., 2023; Geweniger et al., 2022; Paizan et al., 2022; Hendry et al., 2022; Soneson et al., 2023; Bhandari and Gupta, 2024). These studies varied substantially in quality, scoring between 0 and 100% on the MMAT, indicating considerable heterogeneity in methodological rigour.

Whilst these inconsistencies reduce confidence in some specific associations, they also highlight the importance of avoiding simplistic assumptions regarding socioeconomic disadvantage. Importantly, these findings were identified across different countries and population subgroups. Consequently, they may represent heterogeneity in study populations, outcome measures, definitions of socioeconomic resources and methodological approaches, rather than genuinely conflicting evidence.

Given the variation in study quality and design, these findings should be interpreted as evidence of the complex and context-dependent nature of children's experiences during the pandemic. Although findings from this review demonstrate the clear negative impacts on child health from cramped living conditions, food and housing insecurity, these mixed findings suggest that different forms of disadvantage and advantage shaped children's experiences in non-uniform ways – patterns that cannot be fully explained by a simple linear model of deprivation.

4.2. Community support and professional input as protective influences

Sixty-eight studies reported on 'Community support and professional input', these are facilitators of family health and wellbeing in local communities. Across studies, community support and professional input in both the local neighbourhood, health and educational settings emerged as important factors that could mitigate the consequences of socioeconomic disadvantage and promote child health. Evidence from qualitative, quantitative and grey literature sources consistently suggested that the availability, accessibility and responsiveness of local services influenced how effectively families were able to navigate experiences of household and neighbourhood inequality.

4.2.1. Coordinated professional responses to socioeconomic adversity

Evidence consistently emphasised the importance of collaborative working between professionals and families to ensure that services remained responsive to local need (Institute of Health Visiting, 2023; Rainer et al., 2024; Leigh et al., 2023; Panjwani et al., 2021; Eales et al., 2021; Copeland et al., 2024; Meyer et al., 2023; Patrick et al., 2020; Rimpela et al., 2021; Ravens-Sieberer et al., 2023; De Coninck et al., 2022; Raviv et al., 2021; Pampati et al., 2023; Figas et al., 2023; Dopke et al., 2023). Across studies, collaboration was viewed not only as a mechanism for improving service delivery, but also for addressing household and neighbourhood inequalities. Several studies highlighted the potential role of professionals working within health and care, including their role in advocacy for policy change on behalf of the families which they represent. For example, collective advocacy for policy changes can improve child health through addressing socioeconomic hardship and systemic racism (Capielo Rosario et al., 2024), potentially through improved school meals or changes to agriculture policies which distort market forces and promote obesity (Jenssen et al., 2021). These findings were from mid-to high-quality studies scoring between 40 and 100% on MMAT. This evidence suggest that professionals hold an influence, which extends beyond their individual-level interactions with families, and can contribute to

addressing the wider social determinants that shape child health.

4.2.2. Protective systems within schools and communities

Schools emerged across studies as a particularly important community asset, that has potential to buffer some of the adverse effects of household and neighbourhood inequalities. Beyond their educational role, schools have potential to provide access to wellbeing support, nutritious food and exercise for children (Capielo Rosario et al., 2024) (Rigó and Weyers, 2024) (Rainer et al., 2024; The Children's Society, 2024; Wang et al., 2021). Evidence suggested that maintaining access to these resources during the COVID-19 restriction periods may have helped mitigate some of the health and development consequences associated with household and neighbourhood inequities.

One study highlighted the importance of ensuring that vulnerable children can continue to access a continuous dedicated space and support within schools during pandemics (Paizan et al., 2022). Where in-person attendance is not possible, several findings suggested that there is a need for teaching professionals to provide equitable access to digital resources and maintain regular communications with children and parents (Silk et al., 2021; Rimpela et al., 2021; Metherell et al., 2021; Ravens-Sieberer et al., 2023; Rai et al., 2024; Paizan et al., 2022). This could potentially reduce the risk of digital exclusion, educational disengagement and learning gaps for deprived children. These findings complement earlier evidence presented in the review, which identified digital exclusion as potentially being associated with worse mental health outcomes.

Schools and community assets were also identified as settings where preventative public health interventions could be delivered making them more accessible to disadvantaged children. Examples included the provision of healthy food from schools for consumption during out-of-school hours (Capielo Rosario et al., 2024), affordable opportunities for sports to promote child development (Rigó and Weyers, 2024), and the provision of socio-emotional support through initiatives such as Mental Health Support Teams (Rainer et al., 2024; The Children's Society, 2024; Wang et al., 2021). These findings were underpinned by studies scoring between 40 and 100% on MMAT, indicating mid-to high quality studies. Collectively, these findings suggest that community-based interventions have potential to reduce inequalities by improving access to preventative public health resources that promote health and wellbeing.

4.2.3. Tailoring support to address socioeconomic and cultural barriers

Evidence from several studies suggested that continued access to in-person support from healthcare professionals has potential to reduce some of the adverse effects associated with pandemic restrictions and can increase child resilience for any future pandemics (Silk et al., 2021; Price et al., 2022; Ward and Lee, 2022; Estevez et al., 2023; Oppermann et al., 2024; Yusuf et al., 2022). Notably, studies consistently highlighted that support has potential to be the most effective when it is accessible, inclusive and responsive to the needs of those from minoritised populations such as deprived families, refugees, LGBTQ2S young people, and children with neurodiversity or disabilities (Bryson et al., 2021; Neece et al., 2020; Meyer et al., 2023; Abramovich et al., 2021; Bhat, 2021; Yusuf et al., 2022).

Accessibility modifications were suggested in evidence, they included consideration of financial constraints to accessing services, translation services, and designing service hours around family's needs (Leigh et al., 2023; Figas et al., 2023). These findings suggest that service accessibility may be an important mechanism through which existing inequalities have potential to be addressed. Several studies also highlighted the importance of professionals recognising and addressing the socioeconomic aspects of what might make a child ill, as opposed to solely focusing on presenting health concerns (Gassman-Pines et al., 2020; Dayton et al., 2022; Ward and Lee, 2022; Capielo Rosario et al., 2024; Metherell et al., 2021; Thorpe et al., 2023). Findings suggested that screening for issues such as food insecurity or financial insecurity

may enable more contextually relevant and holistic care. For example, in the context of food insecurity, clinicians could be trained and encouraged to incorporate nutrition assessments and support into their therapeutic work, potentially benefitting the child but also their wider family members (Capielo Rosario et al., 2024). Finally, studies highlighted the potential value of interventions aimed at parents to help foster resilience in their child, reduce family stress and support positive parent-child relationships (Ward and Lee, 2022; Adams et al., 2021; Oppermann et al., 2024; Figas et al., 2023; Westrupp et al., 2023; Yusuf et al., 2022). These studies scored between 40 and 100% on MMAT indicating that findings were underpinned by mid-to high-quality studies. Given evidence highlighted elsewhere in this review, which links poor parent mental health to worse child mental health, these interventions may represent an important mechanism for reducing the indirect effects of household and neighbourhood inequity on children.

4.3. Structural and system-level requirements to address socioeconomic adversity

Seventy-four studies reported on wider systemic issues such as government policy and funding. Across studies, these wider influences were outside the direct control of children and their families but appeared to play an important role in either mitigating or exacerbating the consequences of socioeconomic adversity on child health.

4.3.1. Policy as a mechanism for reducing child health inequalities

Across studies, there was consistent evidence that policy interventions may have an important role to play in reducing health inequalities by addressing inequity in household and neighbourhood resources (Rainer et al., 2024; The Children's Society, 2024; Bryson et al., 2021; Ward and Lee, 2022; Vasa et al., 2021; Panjwani et al., 2021; Park et al., 2024; Adams et al., 2021; Karande et al., 2023; Rosenthal et al., 2023; Daskalska et al., 2024; De Coninck et al., 2022; Estevez et al., 2023; Christner et al., 2021; Weyers and Rigo, 2023; Oppermann et al., 2024; Pampati et al., 2023; Lyu and Wehby, 2022; Paizan et al., 2022; Wang et al., 2022). Some studies highlighted the importance of addressing the social and economic conditions in which children live, including improvements to neighbourhood environments through investment in high-quality social housing, safer public spaces and support for local businesses (Westrupp et al., 2023; Thorpe et al., 2023).

The importance of strengthening mental health provision through coordinated workforce planning and the expansion of school-based mental health support was highlighted in grey literature (Rainer et al., 2024). This complements the finding presented elsewhere in the review, which identified worse child mental health as one of the outcomes most consistently associated with fewer household and neighbourhood resources. In addition, studies emphasised the importance of considering the potential impact of new policies on existing inequalities during both policy development and implementation, particularly for children and young people from diverse backgrounds (Dondi et al., 2021a; Luijten et al., 2021; Anders et al., 2022).

A recurring finding across both quantitative and qualitative studies was the potential importance of government assistance to mitigate the consequences of household and neighbourhood inequities in children. A highlight from this evidence was the importance of maintaining access to nutritious food through school meal programmes. In particular, the continuation of these programmes throughout school holidays, and a highlighted need for school meal eligibility criteria to be revised to include all deprived families, e.g. by expanding the scheme to every family on Universal Credit [welfare benefit in the UK] (Northern Health Science Alliance, 2023; Panjwani et al., 2021; Park et al., 2024; Goudie, 2023; Yang et al., 2022). Other studies suggested that policies supporting employment, childcare and work-life balance may indirectly benefit child health. Specific suggestions included an improved national childcare offer or through improved workplace benefits such as paid

time-off and requirements for employers to pay the living wage(Leitão et al., 2022; Ward and Lee, 2022; Ravens-Sieberer et al., 2023; De Coninck et al., 2022; Christner et al., 2021; Wang et al., 2021; Hendry et al., 2022; Spinelli et al., 2020).

Grey literature emphasised importance of government support for data sharing and service coordination, noting that this is required to support vulnerable families. Improving links between organisations was viewed as a potential mechanism for increasing access to support among vulnerable families(Rainer et al., 2024; The Children's Society, 2024). This included a suggested resolution of data sharing issues to enable the auto-enrolment of families to services which they are eligible for (Rainer et al., 2024; The Children's Society, 2024). For example, resolving barriers to data-sharing between government departments could facilitate automatic enrolment into schemes such as Healthy Start, improving access to nutritional support for eligible families (Northern Health Science Alliance, 2023). They further advocated for children's well-being to become a national policy priority, including the development of population-level measures of child wellbeing to guide decision-making and service delivery(Rainer et al., 2024; The Children's Society, 2024).

Quantitative studies from the pandemic period suggested that policy protections put in place, such as income support and eviction moratoria, may have helped mitigate some of the immediate effects of socioeconomic hardship for vulnerable families(Blackwell et al., 2022; Park et al., 2024; Lax et al., 2022; Adams et al., 2021; Kapos et al., 2024; Fisher et al., 2022; Bhandari and Gupta, 2024). However, both qualitative and quantitative studies also highlighted the continued unmet need of some vulnerable families and argued that additional targeted financial support may be required, particularly in the context of rising living costs and inflation(Adegboye et al., 2021; Cabrera et al., 2022; Dayton et al., 2022; Panjwani et al., 2021; Moulin et al., 2023; McKune et al., 2021; Adams et al., 2021; Capielo Rosario et al., 2024; Ravens-Sieberer et al., 2023; Seivwright et al., 2023; Wang et al., 2021, 2022; Raviv et al., 2021; Geweniger et al., 2022; Bhandari and Gupta, 2024).

Taken together, these findings suggest that policy responses may play a vital role in determining the extent to which socioeconomic disadvantage translates into worse child health outcomes. Additionally, these findings suggest that policy interventions may influence child outcomes through both material pathways, such as access to food and housing, but also indirectly through the aspects which only impact their caregivers, such as working conditions and work-life balance. Studies quality ranged considerably from 0 to 100%, but were supported across multiple high-quality papers, increasing the confidence in these findings.

4.4. Health care systems as determinants of equitable access

Evidence from several quantitative studies suggested that access to healthcare resources reflect wider socioeconomic inequalities and have adverse effects on child health. In countries without universal healthcare, medical insurance can be an indicator of deprivation, reflecting differences in families' ability to access services and treatment(Jenssen et al., 2021; Koebnick et al., 2023; Brooks et al., 2021; Dopke et al., 2023; Min et al., 2024). Across studies, children with public insurance or no insurance were more likely to experience obesity and increases in body mass index (Jenssen et al., 2021; Koebnick et al., 2023; Brooks et al., 2021; Dopke et al., 2023; Min et al., 2024). Similar patterns were observed for oral health outcomes, with those on public insurance having higher associated levels of unmet dental need (Karande et al., 2023) and those that were not publicly insured associated with having worse oral health, including having bleeding gingivae (Lyu and Wehby, 2022, 2023). These findings scored between 60 and 80% on MMAT, showing they were underpinned by mind-to high-quality studies. These findings suggeststhat insurance status, and its associated healthcare access may represent another pathway through which broader socioeconomic inequalities become associated with child health outcomes.

4.4.1. Research priorities for understanding and reducing inequalities

Many qualitative and quantitative studies pointed to the importance of continued research into the ongoing and long-term effects of COVID-19 pandemic on children. In particular, they highlighted the need to monitor whether the inequalities observed during the COVID-19 pandemic period persist, widen or diminish over time, several studies also recommended improved data sharing to assist with continued monitoring of vulnerable populations (Neece et al., 2020; Cabrera et al., 2022; Xiao et al., 2022; McKune et al., 2021; Folch et al., 2022; Eales et al., 2021; Natale et al., 2023; Adams et al., 2021; Capielo Rosario et al., 2024; Hurel et al., 2023; Metherell et al., 2021; Weyers and Rigo, 2023; Been et al., 2020; Figas et al., 2023; Green et al., 2023; Geweniger et al., 2022). Taken together, these findings suggest that future research could play a vital role in guiding preventative public health approaches to ensure that children experiencing household and neighbourhood inequalities receive support before reaching crisis point (The Children's Society, 2024; Price et al., 2022; Leigh et al., 2023; Khoury et al., 2022; Cabrera et al., 2022; Vasa et al., 2021; Panjwani et al., 2021; Folch et al., 2022; Eales et al., 2021; Abramovich et al., 2021; Bourion-Bédès et al., 2022; Ravens-Sieberer et al., 2022; Ravens-Sieberer et al., 2023; Seivwright et al., 2023; Anders et al., 2022; Geweniger et al., 2022; Francisco et al., 2020). These studies were mid-to high-quality instilling confidence in this finding, having scored between 40 and 100% on MMAT. These findings highlight that understanding these longer-term pathways may be particularly important for developing effective interventions to reduce health inequalities across the life course.

Findings from this review suggest that household and neighbourhood adversity was associated with child health through interconnected pathways, and moderated by protective systems, structural responses and levels of pre-existing disadvantage. These relationships are summarised in Fig. 2.

5. Discussion

This review synthesised evidence from quantitative, qualitative and grey literature sources to examine how household and neighbourhood resources were associated with child health and development following the COVID-19 pandemic. Overall, the findings suggest that several neighbourhood and household resources have become worse or less available for children since the COVID-19 pandemic, including family finances, and access to food and affordable housing. Across studies, financial, food and housing insecurity, along with limited living space and digital exclusion were associated with poorer child health outcomes. Importantly, these impacts were not experienced equally. Families with preexisting disparities or from minority populations were impacted disproportionately following COVID-19 with health being made even worse. One possible explanation is the cumulative nature of social determinants, whereby exposure to multiple forms of disadvantage increase the likelihood of worse health outcomes through the life course (Jones et al., 2022). These findings support the idea that that COVID-19 may have acted as a 'syndemic', amplifying existing inequalities in social determinants of health and exacerbating the burden of disease, additively increasing its negative effects (Bambra et al., 2020).

Food insecurity was shown to effect child mental health, and wider literature suggest that this is through both psychosocial and nutritional mechanisms. Limited access to healthy food can affect physical health, whilst uncertainty around the availability of food can increase parental stress, depression and anxiety, which may affect parenting practices (Gallegos et al., 2021; Abraham et al., 2023). As shown in evidence from this review, poor parental mental health can contribute indirectly to worse child mental health and wellbeing. Housing insecurity was found to influence child mental health, weight, development, HRQoL and sudden infant deaths within this review. There is suggested causal evidence that measures of housing insecurity including structural quality of buildings, heating and frequent property moves can impact child mental

Conceptual Framework: Pathways linking household and neighbourhood disadvantage and child health

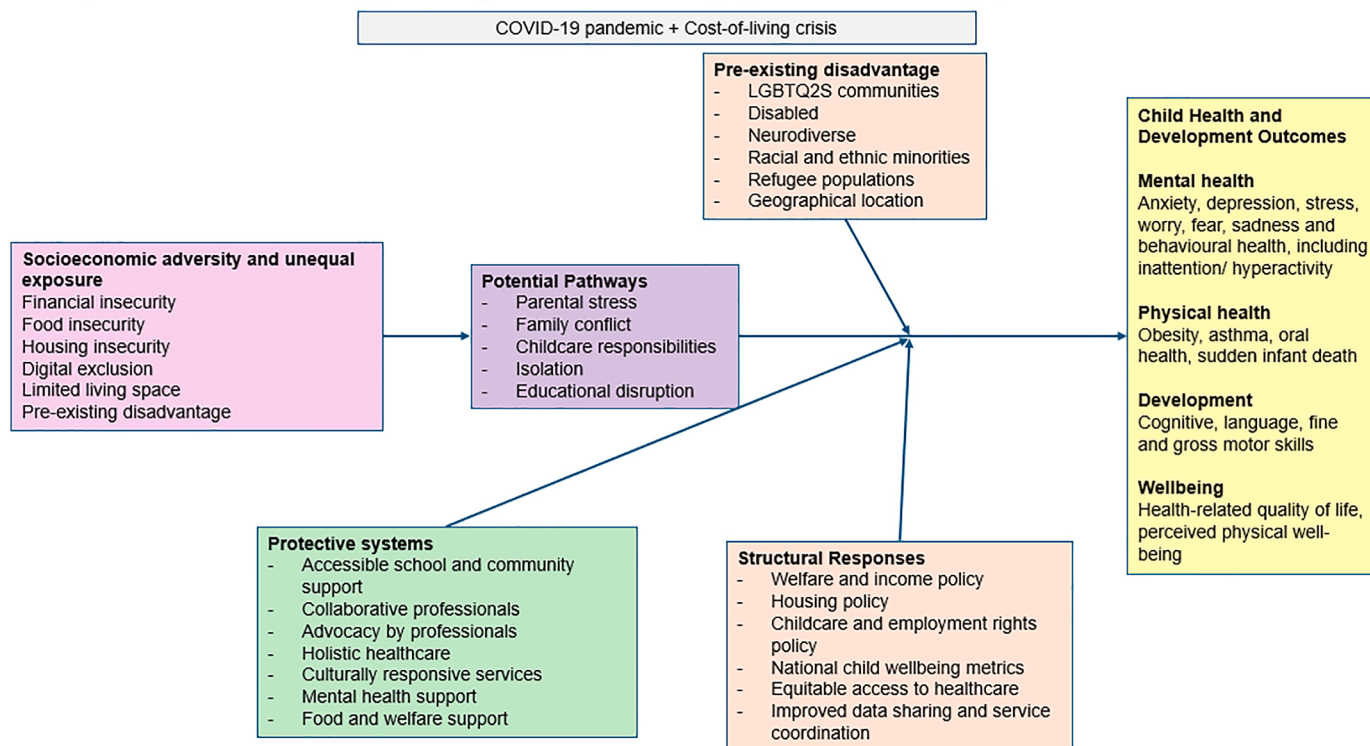


Fig. 2. Conceptual framework linking household and neighbourhood adversity and child health following the COVID-19 pandemic.

and physical health outcomes (Li et al., 2026). This mental health impact can be mediated by parenting stress (Marçal, 2022). Limited indoor space and overcrowding may reduce the opportunities for study, play, privacy and physical activity, which may contribute to worse mental health, development and behavioural difficulties (De Coninck et al., 2022) (Silk et al., 2021; Barboza et al., 2021; Palmer et al., 2023; Hurel et al., 2023; Bourion-Bédès et al., 2022). In contrast, access to outdoor space may act as a protective factor, promoting improved child development, mental health and the maintenance of a healthy weight. Access to gardens, parks and green spaces is widely known to provide opportunities for physical activity, play, social interaction and stress reduction, which support both physical and emotional wellbeing (Bikomeye et al., 2021; Vanaken and Danckaerts, 2018; Sugar).

The review identified the protective influences of schools, the local community and healthcare professionals against household and neighbourhood adversity. Services which were both accessible and culturally relevant appeared to reduce barriers to support for deprived and marginalised populations. These findings suggest that health and care professionals should routinely screen children for socioeconomic aspects of what might make them ill, regardless of whether it seems relevant to the presenting complaint. This can be through asking general queries at routine appointments, and identifying the presence of risk/protective factors, then referring them where required to professionals in community agencies or other disciplines to provide assistance (Garg and Dworkin, 2011). For the implementation of this, guidelines and screening tools may provide a pivotal role, to assist healthcare professionals with a more holistic assessment of health and care when working with families (Chung et al., 2016). Schools and community settings also emerged as potential sources of mental health provision, exercise and food support. It is likely that this would require commitment and support from senior educational leaders and staff, which could be facilitated by them observing the positive impact of any changes on their pupils (Herlitz et al., 2020). Such approaches align with a preventative model of care that seeks to address the wider determinants of

health before children reach crisis point. Further to this, current policy initiatives in England are seeking to improve access to healthcare, through neighbourhood-based health centres (Department of Health and Social Care PMSO, 2025). This may provide opportunities to strengthen protective systems for children, providing accessibility, inclusivity and cultural responsiveness remain central to both the planning and implementation of these centres.

The review also identified evidence which indicated that some children from more socially advantaged backgrounds experienced some adverse health outcomes. These were far fewer, than those reporting on the adverse health outcomes of deprived children. It is possible advantaged children experienced unique stressors during the pandemic, or that educated parents may feel more empowered to advocate on behalf of their child including having the required skillsets to familiarise themselves with service delivery, legislation and budgetary issues associated with their child's condition (Ewles et al., 2014; Ashcraft et al., 2019). Additionally, higher income families are better able to pay for health services and support which meet their child's needs (Ewles et al., 2014), leading to children getting earlier diagnoses. This reinforces the importance of avoiding simplistic assumptions regarding children's experiences of the pandemic and disadvantage, which appeared to be highly context dependent.

Whilst the health of deprived children mostly got worse since COVID-19, this review highlighted evidence showing that it did occasionally improve, showing that in some situations household and neighbourhood inequalities may be serving as a protective factor (Cost et al., 2022). This could be explained by targeted government assistance introduced following the pandemic to overcome family poverty associated with poor child health. It appears this assistance did at least in part do as intend, and alleviated the financial stress of job loss, whilst also allowing economically inactive parents to spend more time with their child (Cost et al., 2022), which would have been advantageous as children spent long periods of time at home.

From the evidence in this review, it is apparent that addressing child health inequalities requires action beyond the direct control of

caregivers. There is a requirement that Governments continue to create and implement policies that address socioeconomic adversity. Tools such as the Health Equity Assessment Tool (HEAT) may assist policy-makers in considering the potential distributional impacts of policy decisions and reducing the risk of unintentionally widening inequalities (Office for Health Improvement and Disparities, 2020; Dondi et al., 2021a; Luijten et al., 2021; Anders et al., 2022)⁽¹⁷⁸⁾. Professionals will also have a vital role to play, ensuring these policies remain contextually relevant, and if not, collectively advocating on behalf of families in need. This could be through amplifying the voices of those experiencing health inequalities, voicing policy concerns to governments or, creating quality improvement projects to improve care and raising awareness of inequalities (Olatunbosun and Wilby, 2022).

5.1. Implications of the results for practice, policy and future research

Some themes identified within this review have direct implications for policy, practice and future research. From a practice perspective, there is a clear need to strengthen the accessibility and availability of any community-based, preventative approaches which may help reduce inequalities. This includes ensuring that services for parents, especially those from minoritised groups are inclusive and accessible, through flexible healthcare appointment times and the availability of translation services. In addition, professionals should adopt a more holistic approach to health and social care assessments, routinely considering family socioeconomic circumstances alongside presenting issues, to ensure that support is appropriately tailored.

At the policy level, the findings highlight the importance of addressing the broader social determinants to reduce child health inequalities. Specifically, professionals can make valuable contributions to policy development by using their collective voice to advocate on behalf of the needs of families. Any future policy approaches will need to explicitly consider and mitigate potential unintended consequences that might further embed inequalities. Improved sharing and integration of public services data could enhance the ability of services to support vulnerable families, including through the auto-enrolment of families into schemes that they are eligible for (e.g. Healthy Start Scheme). Furthermore, improved financial support for childcare may facilitate parents to have a better work-life balance, whilst also supporting improved child development. Finally, this review highlights important priorities for future research. In particular, a need to understand the longer-term impacts of the COVID-19 pandemic and the cost-of-living crisis on child health, especially those experiencing socioeconomic disadvantage.

5.2. Strengths and limitations

The strength of this systematic review is that it synthesised 125 pieces of international research examining the impact of household and neighbourhood social inequities on child health and development since COVID-19. The inclusion of both quantitative and qualitative data, and the broad search strategy enabled the review of a wide breadth of literature and a deeper understanding of the impact of social inequities on child health and development. A limitation of this review is that due to resource constraints, most of the study screening was completed by a single reviewer (CW), which has the potential to introduce selection bias and reduce reproducibility. To mitigate this, a random sample of 20% of abstracts and full text articles were independently reviewed by two additional reviewers (SH and NS). Further, the inclusion criteria defined the phenomenon of interest period as post-2020 period, rather than looking at specific mitigation measures, which reflects the broader impact of the pandemic context but cannot attribute differences in child health to individual restrictions. It should also be noted that some of the included studies looked at correlative associations, and this does not necessarily indicate causality between social inequities, child health and development. Finally, although this study focussed on the household

and neighbourhood environments, child health is undoubtedly also influenced by factors wider than this, such as policies, activities and relationships with parents and peers, and this was recognised in the protective mechanisms identified in this review.

6. Conclusion

Child health inequalities in some of the world's wealthiest countries appear to have been exacerbated since the COVID-19 pandemic. Poorer health and development outcomes were consistently associated with cramped living conditions, food and housing insecurity, particularly among children already experiencing disadvantage. These findings support the concept that COVID-19 acted as a syndemic and amplified pre-existing societal inequalities. Addressing these disparities will require well-considered national policies for families, and a coordinated professional response being delivered within local communities. Moreover, a substantive transformation of services and support systems is required to ensure they are both accessible and contextually relevant. Through these structural changes, services may more effectively fulfil their critical role in promoting long-term child health and wellbeing and reducing health inequalities.

Ethics statement

Ethical approval was not required for this study because it is a literature review based exclusively on previously published research and publicly available sources. No human participants, animals, or identifiable personal data were directly involved in the study, and no new data were collected. Consequently, approval from an institutional ethics committee or review board was not necessary. The review was conducted in accordance with accepted standards for scholarly research, including accurate representation, citation, and synthesis of existing literature.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

The authors used Microsoft Copilot to support the refinement of wording of this manuscript during the resubmission process. All AI-assisted content was reviewed, edited, and verified by the authors, who take full responsibility for the accuracy and integrity of the final submitted work. The interpretation of findings and all editorial decisions remain solely those of the authors.

CRediT authorship contribution statement

Christine Wilson: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Sarah Hanson:** Methodology, Supervision, Validation, Writing – review & editing. **Lauren Flannery:** Validation. **Katie Warncken:** Validation. **Nicholas Steel:** Conceptualization, Methodology, Supervision, Validation, Writing – review & editing.

Competing interests

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssm.2026.119680>.

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Data availability

Data will be made available on request.

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