Child poverty and health inequalities in the UK: a guide for paediatricians

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ABSTRACT
One in three children in the UK lives in relative poverty. There are clear and consistent links between child poverty and paediatric morbidity and mortality. In this review, we discuss drivers for family poverty in the UK, and how this leads to poor child health outcomes. We present a framework for healthcare professionals and institutions to consider interventions and strategies relating to socioeconomic health inequalities. We will focus on approaches to mitigate the effects of child poverty on children using our services at a local level and outline the importance of healthcare workers advocating for structural and high-level policy change to address the deep-rooted societal problems that cause child poverty.

INTRODUCTION
Child health outcomes in the UK are suboptimal when compared with other rich countries. One of the drivers for this is child poverty. In this review paper, we discuss key elements of child poverty in the UK and consider two mechanistic processes: why are children living in poverty, and how does this affect child health? Strategies for change are then considered, grounded in these mechanistic concepts, detailing why short-term, small-scale interventions to mitigate against the effects of poverty must happen alongside wider approaches to deep-rooted societal problems. Although we acknowledge the importance of ethnic, gender and geographical drivers of inequality, we do not address these in this guide.

Aims, scope and outline
(1) Equip paediatricians and other professionals with the knowledge and tools to understand how poverty drives inequalities and affects health outcomes in the UK and (2) what child health professionals can do about it.

In Section 1, we define poverty and describe the current state of child poverty in the UK.

In Section 2, we present evidence that living in poverty puts children at risk of acute and chronic health problems throughout their lives.

In Section 3, we describe the complex mechanisms by which child poverty can lead to health inequalities.

In Section 4, using these mechanistic concepts, a framework is presented demonstrating both how clinicians and healthcare institutions can address inequalities, and suggesting key considerations for successful interventions.

KEY MESSAGES
⇒ Child poverty is common in the UK and has catastrophic short-term and long-term effects on children’s health and well-being.
⇒ As paediatricians we have a duty to understand the structural, complex mechanisms behind health inequalities and how they impact the families we care for.
⇒ The roles of the paediatrician is to look deep within ourselves and our services to see where we have fallen short, and using the frameworks set out alongside families, effect changes which reduce inequalities.
⇒ All children deserve to live their best life; the frameworks outlined in this guide should help us achieve that goal.

In Section 5, we offer some tips on communication about child poverty and health inequalities.

Section 1: What do we mean by ‘child poverty’?
When a person does not have resources to live to an acceptable standard, they are in poverty. Typically, poverty describes financial hardship, but other dimensions include reduced freedom to express opinions and have choices, and impaired ability to access services and resources. Child poverty is usually described in relative terms (children in households with income below 60% of the UK median household income—the ‘poverty line’). At this income, households may struggle to afford the absolute basics in life. The level of income at which families can afford participate fully in society is called the Minimum Income Standard (MIS). This is calculated based on views of the public.1 The median UK household income in 2020 was around £30 000 per annum, so families with income below £18 000 would be below the poverty line. The MIS was calculated as £26 592 (for a two-parent family, with two children in primary school).2 Children living in households with an income of £18 000–£27 000 may not be below the poverty line, but their parents would struggle to have sufficient finances to offer them an acceptable standard of living.

Around one in three children lives in relative poverty in the UK. Child poverty rates have risen over the past 10 years and are likely to continue to do so in the aftermath of COVID-19. After the last recession, UNICEF identified that in rich
countries, children were the age group most at risk of falling into poverty.2

Single parent families are at particular risk of poverty, due to the high costs associated with childcare leading to reduced opportunities for savings, and no scope for investment (eg, in a mortgage or opportunities for children); families may then enter a vicious cycle of debt. Although detailed consideration is beyond the scope of this review, mothers are particularly vulnerable to many elements in this model.3–5

The ‘low financial resilience model’ is depicted in figure 1.

Section 2: Correlation between poverty and child health inequalities in the UK

Health inequalities do not only exist between the most advantaged and most deprived children in the UK. For many inequalities the rise is exponential. For example, figure 2 shows relative rates of increase by decile of deprivation of Clinical Commissioning Groups (CCGs) for the low birth weight in the UK: eradicating poverty does not in itself remove inequality.

This section will focus on how the most deprived children suffer the highest levels of morbidity and mortality throughout their lives.

Mortality in childhood

Between 2013 and 2017 there was an unprecedented rise in infant mortality, which was only observed in the most deprived quintile, and associated with an increase in child poverty.6 Infants in the most deprived decile are, consistently, around twice as likely to die as those in the least deprived decile (figure 3).

The National Child Mortality Database team reviews paediatric deaths in the UK. In 2021, they reported key findings about the association between socioeconomic deprivation and paediatric death7:

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**Figure 1** The ‘Low Financial Resilience Model’ of family poverty (Lee, Hawcutt, Sinha, 2021): Structural financial drivers of family poverty: the problems of insufficient income and high outgoings mean families cannot save—they are not financially resilient and cannot invest as much as they would like in opportunities for their children.

**Figure 2** Exponential increase in rates of low birthweight infants by deciles of deprivation (Clinical Commissioning Group (CCG) level, based on Index of Multiple Deprivation (IMD); data from Public Health England Fingertips Tool, 2021).

**Figure 3** Infant mortality rates are associated with child poverty in England. Red line=most deprived decile; green line=decile 5 (middle); blue line=least deprived decile. Created using Office for National Statistics data—Child and infant mortality in England and Wales Statistical bulletins: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/childhoodinfantandperinatalmortalityinenglandandwales/previousReleases.

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On average, there was a relative 10% increase in risk of death between each decile of increasing deprivation.

Seven hundred fewer children per year might die if the children living in the most deprived areas had the same mortality risk as those in the least deprived.

One in 12 of all child deaths reviewed had one or more factors related to deprivation.

**Acute illness**

Children from disadvantaged backgrounds are significantly more likely to require hospital admission and require longer duration of stay. Of children attending emergency departments (EDs), those from the most deprived quintile are 60% more likely to be frequent attenders (more than four attendances in a year) than the most affluent.

**Chronic illness**

A meta-analysis identified that children from a disadvantaged socioeconomic background were 72% (OR 1.72, 95% CI 1.48 to 2.01) more likely than other children to be diagnosed with a chronic illness. The physical condition with the highest increased risk was asthma (OR 2.20, 95% CI 1.87 to 2.85), and the non-physical conditions were intellectual disability (OR 2.41, 95% CI 2.03 to 2.86) and ‘psychological disorders’ (OR 1.88, 95% CI 1.68 to 2.10).

**Healthiness**

Data from the National Child Measurement Programme show that the rates of obesity and severe obesity in Year 6 are increasing in the most deprived quintile, and the gap between the richest and poorest children is widening (figure 4).

**Health and well-being in adulthood**

Improvements in life expectancy had stalled before the pandemic, and getting worse for certain groups, particularly women in the poorest decile. There are clear associations between levels of child poverty and life expectancy (figure 5).

Chronic ill-health in adulthood is an important driver for reduced life expectancy. There is increasing recognition that diseases considered ‘adult illnesses’ in fact have their origin in childhood. For example, long-term cohort studies show that chronic obstructive pulmonary disease (COPD) has origins in early childhood, with 60% of adults with the disease entering adulthood with obstructive lung function. Children from the poorest quintile are five times more likely to develop COPD as adults.

**Section 3: Mechanisms by which poverty can affect child health outcomes to consider when attempting to develop interventions to address inequality**

There are various models that describe the complex factors involved in determining a person’s health. In the commonly used Dahlgren-Whitehead Rainbow (figure 6), the health of a person is determined by their constitutional factors, lifestyle factors, community networks, and the wider socioeconomic, cultural and environmental conditions in which they live.

In this section, we describe the complexity of the mechanisms by which poverty leads to child health inequality. Health services can influence each of these factors—some directly by the way we work, and some indirectly through advocacy. We highlight four key mechanistic considerations:

1. Parents in poverty are less able to offer their children a healthy lifestyle.
2. The odds stack up against children.
3. The inverse care law.
4. Poverty gets under your skin.

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**Figure 4** Prevalence of obesity in Year 6 children in the most deprived (solid line) versus least deprived (dashed line) decile of deprivation according to school postcode (data taken from https://digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2020-21-school-year, last accessed 19 April 2022).

**Figure 5** Lower tier local authority—life expectancy versus child poverty in that location. (A): women, England r=0.82 (p<0.001); (B): men, England r=0.77 (p<0.001). Data—Public Health England Fingertips (https://fingertips.phe.org.uk/, accessed 12 December 2021); Pearson rank correlation analysis.

**Figure 6** The Dahlgren-Whitehead model of health determinants.
Parents in poverty are less able to offer their children a healthy lifestyle

We developed the ‘clock/capacity/cost’ model to understand how families are limited in their choices with regards to healthy lifestyle for their children. In short, the inability to offer a healthy lifestyle can be traced to ‘three C’s’: clock (time restraints), capacity (resource constraints) and cost (financial restraints), and consideration of the ‘requirements versus the reality’ at each step shows the intricate and deep-rooted effects of poverty. In figure 7 we illustrate how this model can demonstrate the challenges parents with financial difficulties face when providing a healthy meal for their children.

When developing interventions to address inequalities, coproducing a matrix like this with families can help identify the deep-rooted structural problems that need to be addressed. The key points for paediatricians demonstrated in such models are as follows:

► Development of interventions to address health inequality must be coproduced with families and communities. Clinicians, managers and people who make funding decisions are often removed from the realities of living in poverty.
► Interventions to address a symptom (eg, obesity) cannot focus solely on educating parents as this does not address structural barriers.
► When considering the affordability of healthy lifestyle choices, this model demonstrates that, for example, it is too simplistic to think about the price of food alone.

The odds stack up against children: adverse exposures associated with poverty accumulate, with disproportionately bad effects

There are four concepts to consider around the cumulative effect of adverse exposures:
1. Adverse exposures associated with poverty tend not to occur in isolation.
2. Adverse exposures may work synergistically against children.
3. Children at risk may be less likely to have access to protective factors.
4. Temporal factors (presence and time of insult) are likely to make the problem worse.

The importance of considering adverse exposures of poverty in this framework can be illustrated with the example of air quality in table 1.

Regarding these mechanisms, effective intervention to improve respiratory health by improving air quality should address a variety of factors:
► Better health for pregnant women.
► Better housing for children in deprived areas.
► Interventions to reduce secondhand smoke exposure.
► Better access to healthy nutrition and green space.
► Better access to mental health resources.
► Clean air strategies for schools.

The inverse care law: socioeconomic status tends to be associated with quality of care

Children have benefited greatly from policies, upstream interventions and large-scale interventions to improve health such as legislation and interventions to reduce secondhand smoke exposure and immunisation programmes. However, interventions to improve child health do not always reduce inequalities relating to socioeconomic deprivation. Multiple public health interventions, while improving overall health, can in fact widen inequalities relating to socioeconomic deprivation.17–19

One cause to consider is that healthcare in more deprived communities may be less effective. The inverse care law was first described in 1971.20 Over 50 years later, this is still one of the major barriers to improving health inequalities:
► Children in deprived areas may have less access to the medical care they need. Analyses from the Health Foundation21 and the Nuffield Trust report that general practitioners (GPs) in the most deprived areas have around 370 more patients on
average than those in the least deprived. There are financial barriers to accessing secondary care: in a survey in Liverpool, we identified that it costs families approximately £35 to attend a respiratory clinic appointment and 8% of families reported missing appointments because of financial difficulties.22

Children from deprived backgrounds may receive less good care. GP practices in more deprived areas on average earn fewer quality and outcomes framework points, have worse Care Quality Commission ratings and lower patient satisfaction scores than those in more affluent communities.21 A recent report also found that children with chronic renal failure were significantly less likely to receive a pre-emptive kidney transplant if they came from a deprived background, a finding not explained by their clinical status or time of presentation to specialist services.23

Public spending cuts affect poorer areas disproportionately hard. Austerity measures tend to hit northern towns and cities with high rates of premature mortality.24 High levels of public spending cuts are associated with adverse effects in children, including rates of food poverty25 26 and perinatal outcomes such as low birth weight.27 28

Poverty gets under your skin: the pathobiological effects of socioeconomic deprivation

Living in poverty has chronic pathobiological effects,29 including inflammatory,30 31 metabolic,32 and endocrine33 34 dysfunction and maladaptation. The pathobiology of child poverty is driven by various factors, summarised in figure 8. An example of how epigenetic factors35 can affect child health is depicted in figure 9, using asthma as an example. This may explain our finding that

### Table 1 The synergistic effects of poverty on child health: the example of air pollution

<table>
<thead>
<tr>
<th>Adverse exposures associated with poverty tend not to occur in isolation.</th>
<th>Air pollution exposure is highest in the most deprived areas,37 and children are disproportionately exposed to the highest levels of pollution.38 Children in more deprived families are more likely to be exposed to secondhand smoke.39 Children in deprived areas are more likely to live in housing with poor ventilation40 and other features of substandard housing. Families in poverty may ventilate their house less because of problems such as fuel poverty or living in areas with crime that make it less easy to open windows.</th>
</tr>
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<tbody>
<tr>
<td>Adverse exposures may work synergistically against children.</td>
<td>Exposure of pregnant women to air pollution in the second trimester increases the risk of their offspring having asthma,41 but this risk is greatest in mothers suffering from psychological stress.42 Expectant mothers suffering from stress are more likely to smoke antenatally, which increases the risk of their offspring developing asthma.43 Smoking and poor quality housing put their baby at higher risk of severe bronchiolitis44 (which in turn increases the risk of asthma)45</td>
</tr>
<tr>
<td>Children at risk of these adverse exposures may be less likely to have access to protective factors.</td>
<td>Good nutrition could have a protective effect against inflammation caused by air pollution, but the more deprived families may find this prohibitively expensive. Exercise in childhood is associated with better lung function, but living in polluted areas, with lack of green space, makes this more difficult to achieve. The foundations for developing a robust respiratory system happen in babies—those babies living in cold housing during their first winter will be expending calories on maintaining body temperature and avoiding hypoglycaemia, rather than organ development.</td>
</tr>
<tr>
<td>Temporal factors are likely to make the problem worse.</td>
<td>Persistence: Pollution-related airway damage in the poorest children happens both outdoors and indoors meaning they do not get a break from exposure. They may be exposed to high levels of traffic pollution on their school commute. At school, viral spread and poor building quality compounds the problem further. Time of insult: Children from deprived areas enter primary school with suboptimal lung function due to antenatal and Early Years disruption of airway development and are at increased risk of the effects of air pollution.</td>
</tr>
</tbody>
</table>

![Figure 8 The pathobiology of poverty in childhood (Lee et al).](http://adc.bmj.com/)
across our severe asthma network, children in the worst deprivation had higher levels of airway inflammation and worse lung function.36

Section 4: A framework for healthcare institutions to use to address inequalities in child health

We propose the framework outlined in figure 10 as a guide for how healthcare institutions can address problems related to child poverty.

If paediatricians, and the institutions in which they work, want to develop strategies to address inequalities, they should be incorporated into Quality Improvement processes. Examples of social initiatives in the UK, which address causes and consequences of child poverty, can be found at the Wellbeing and Health Action Movement (WHAM): https://www.whamproject.co.uk/the-social (accessed 3 March 2022) and on the Health Foundation website (https://www.health.org.uk/, accessed 3 March 2022).

In Section 3, we highlighted the complexities of how health inequalities are driven by poverty. Based on these key concepts, we suggest the following considerations when developing interventions locally to address poverty and health inequalities in children:

► When planning an intervention, time should be spent understanding, in detail, the mechanisms behind the inequalities of interest. The four steps to consider (described in Section 3) are the following: (1) a clock/capacity/cost exercise to identify the limitations of choice for families, (2) coexisting drivers for inequality that may have synergistic effects, (3) where the inverse care law may manifest in clinical pathways and (4) how the pathobiology of poverty might impact on clinical outcomes.

► Interventions should be codeveloped in partnership with children, families and the communities in which they live. Strategies placing the onus on families (such as solely focusing on education about health choices) are unlikely to lead to sustained reduction in inequality.

► System-wide changes across pathways and services are more likely to reduce inequalities. Small changes may offer some relief for families and may be necessary and well-received, but will not reduce inequalities.

► Healthcare delivery systems need to develop strategies that mitigate against the effects of poverty. Policy changes are needed to end child poverty, and paediatricians should see it as part of our role to champion and advocate for these.

Section 5: How to talk to parents, professionals and local influencers about child poverty and health inequalities

Talking to parents

Many health professionals find it difficult to raise questions about finances. The stigma associated with poverty may also impact parents’ ability to discuss the challenges they face. To make this subject more approachable:

► Change the thinking around socioeconomic impacts of health from ‘wider determinants’ of health to ‘core determinants’—then it does not just become easier to ask about them, it becomes imperative.

**Figure 9** Epigenetic processes involved in the pathology of asthma—from epithelial dysfunction, inflammatory processes, airway hyper-responsiveness and chronic airway remodelling.

**Figure 10** A framework for healthcare institutions to address child health inequalities.
The key benefits of addressing child poverty cut across the board. Work towards destigmatising poverty: do not shy away from questions, and explain openly and empathetically why you are asking questions about housing, traffic, etc.

Timing of discussions is vital; parents may feel alienated if they are confronted about smoking when they are stressed about an acutely unwell child.

Do not guess who might be struggling based on appearances or postcodes—‘screening’ for poverty can be counterintuitive. Ask everyone the same suite of questions and tell every parent that you ask these routinely. As mentioned in section 1, families who do not fall below the poverty line may still be struggling to get by. They may in fact be ineligible for certain resources, such as Free School Meals, that might otherwise have made their financial situation easier.

It is important to let families know they are not alone in experiencing problems.

Talking to professionals and local policymakers

Sustained and meaningful change happens by policy changes, redistribution of healthcare funds and making new laws that protect children. Inequalities cannot improve without repairing the inherent problems in society and health services. Although doctors are not taught how to influence thinking in strategic areas, the key principles are simple.

Healthcare leaders, activists and policymakers are keen to hear from clinicians about inequality. Our expertise must include evidence as well as our experience.

Talking is the best way to open doors and develop a network; colleagues will often be linked in with different initiatives and leadership roles and may be able to get a foot in the door with the right person.

Stand firm. Compromise is fine (and healthy), but reaching for ‘low-hanging fruit’ can often divert from where the problems really lie.

The key benefits of addressing child poverty cut across the board—there are financial, resource, moral, ethical and environmental benefits if children do not live in poverty. It is useful to identify which of these is relevant to the people with whom we speak.

Paediatricians must ensure that people know that poverty increases the risk of childhood mortality, and that there is an urgency to improve the situation.

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Review


