Addressing Education and Health Inequity: Perspectives from the North of England

A report prepared for the Child of the North All-Party Parliamentary Group

Schools, nurseries, and educational settings
Please note that this report often uses "schools" as shorthand for "schools, nurseries and other educational settings". One central message of this report is the need for a "whole system" approach that includes all relevant stakeholders, and this includes all parts of the education system.

About the APPG
The Child of the North All-Party Parliamentary Group brings together policy makers and experts in child outcomes from across the country to find solutions to the disparities suffered by children in the North of England.

About the APPG evidence session
The APPG held its evidence session for this report on 17th May 2023 on Child of the North and Educational Inequalities.

In March 2021, the Northern Health Science Alliance (NHSA) and N8 Research Partnership's report Child of the North: Building a Fairer Future after COVID-19 was launched in Parliament revealing how children in the region suffered under the pandemic; with disproportionate impacts on their education, mental wellbeing and physical health. Now, moving on from the pandemic with the cost of living crisis, children in the North of England are likely to be among the worst affected, which risks undermining the future of levelling up and productivity growth in the country.

The APPG session sought to explore differences in funding models for education across the UK, the impact this has on children's outcomes, and to look at solutions to tackle educational and health inequality in the North of England and beyond.

Thank you to the expert witnesses who gave evidence to the APPG: Professor Mark Mon-Williams, University of Leeds; Professor David Taylor-Robinson, University of Liverpool; Dr Megan Wood, University of Leeds; Maryam, Alumna, Dixons Trinity Academy, Bradford; and James Lauder, Assistant Vice Principal, Dixons Trinity Academy, Bradford.

About Child of the North
Child of the North is a partnership between Health Equity North and the N8 Research Partnership.

About Health Equity North
Health Equity North is a virtual institute focused on place-based solutions to public health problems and health inequalities across the North of England. It brings together world-leading academic expertise from the NHSA's members of leading universities, hospitals, and academic health science networks, with the aim of fighting health inequalities through research excellence and collaboration. The institute will focus on three key themes: Child of the North; Health for Wealth; and Health Resilience. For more information visit: www.healthequitynorth.co.uk | @_HENorth

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Foreword

Anne Longfield CBE
Chair of the Commission on Young Lives

Dr Camilla Kingdon
President of the Royal College of Paediatrics and Child Health

The evidence detailing inequalities across the UK is overwhelming. These inequalities affect everyone as inequity drives poor population health and this, in turn, places unbearable pressure on our National Health Service (a service that was never designed to cope with such an unhealthy population). The time to simply describe these problems is over. The 2010 Marmot report laid bare the scale of inequalities across the UK and the need to tackle the social determinants of poor health. The 10-year review of the Marmot report showed inequalities widening and life expectancy stalling. The social and economic costs of these inequalities will cripple the UK unless urgent action is taken.

The question is: how do we address social determinants of health and reverse these inequalities? This Child of The North report attempts to provide some answers to this question through the lens of childhood and education (and complements the health focused recommendations previously made by the Royal College of Paediatrics and Child Health).

First, the report provides a welcome focus on children and young people. We welcome this emphasis because all the evidence suggests that early action produces effective outcomes. A failure to address childhood inequality creates a conveyor belt of disadvantage. The downstream costs of inaction during childhood are far too high for individuals, families, and society. These arguments are not novel, and a compelling case was made in the Chief Medical Officer's (CMO's) 2012 annual report ("Our Children Deserve Better"). The CMO's report made the economic case for early investment – public sector costs in England estimated at:

- c. £1.24 billion for children born preterm until age 18 years (with total societal costs c. £2.48 billion).
- £640 million-£2.24 billion for the costs of severe traumatic brain injuries.
- c. £588-686 million per annum for the long-term costs of obesity.
- c. £1.58 billion per annum for Special Educational Needs-related issues for children aged 5-15 years (£2.35 billion in the long-term).

It hardly needs stated that these costs were estimated over 10 years ago and before the dreadful developmental disruption associated with the Covid-19 pandemic (the Northern Health Science Alliance and N8 Research Partnership's "Child of the North: Building a fairer future after COVID-19" report shows the devastating impact of the pandemic on children and its disproportionate effect on the North of England).

Second, the report emphasises that the responsibility for improving outcomes for children and young people lies with everyone and across all our public service organisations. Health inequalities cannot be addressed through health services or local action alone. The link between health and educational attainment is unequivocal. Most importantly, the report shines a spotlight on the incredible work undertaken by our schools, nurseries, and other community settings in supporting the needs of children. In many disadvantaged communities, these have become the anchor institutions that connect our fragmented public services (social capital providing this

function in more affluent areas). Schools and nurseries have been peripheral to discussions about how we can improve childhood health for far too long. This report provides strong arguments for the need to put education services at the heart of endeavours to improve population health (with integrated care boards offering an excellent opportunity to undertake such action).

Third, the report suggests practical steps that could and should be taken at a local level and makes clear the actions that central Government should take to improve outcomes for children and young people growing up in the UK. With the engine of Government behind them, these proposals could begin to transform opportunities for children and young people immediately and improve the health of our entire nation. However, it needs to be a priority.

Importantly, these recommendations are based on evidence that has been generated through our regional universities – Bradford, Durham, Lancashire, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Teesside and York – working with their communities. In fact, one of the key messages shining through this report is the need to better connect all our public services – including universities. Universities were founded to act as engines of creativity and innovation across arts and humanities, social sciences, medicine, and the sciences. We urgently need to hardwire these engines into our public services so that decisions and policies can be based on the best possible evidence from across multiple disciplines.

The pandemic showed how science can provide answers to our most pressing problems and we now need to use this powerful tool to tackle the problem of childhood inequality.

It seems most fitting that the problems impacting the North of England are being addressed by the universities that serve these areas. We are delighted to see Professors Charlie Jeffery and Matthew Grenby (Vice-Chancellor of University of York and Pro Vice-Chancellor of Research and Innovation, Newcastle University, respectively) lead the Child of The North initiative jointly with Health Equity North's Professors David Taylor-Robinson and Kate Pickett (of Liverpool and York University, respectively). This initiative aims to connect the Northern England universities and research intensive NHS hospital trusts so that they can push and pull learning in order that their local service providers can access the very best evidence for decision making and continually evaluate their policies.

Finally, we are pleased to see the report make practical suggestions as to how connected routine datasets can be used to support whole system responses to families facing multiple disadvantages. The report highlights incredible work being undertaken from Blackpool across to Scarborough, and from Durham down to Sheffield and Liverpool. We note with pleasure, however, the volume of evidence that has been generated from Bradford. This stands as a testament to the work of Professor John Wright who has worked tirelessly over the last two decades to create a "City of Research". The Born in Bradford project is a superb research asset that has and can yield rich insights into the factors that we can change to improve children's life chances, and it is great to see similar assets being created in Liverpool, Hull, and Doncaster.

The time to reverse the tide of growing inequality is upon us. This report provides a springboard and route map for action. We thank the APPG for raising the standard and rallying everyone – regardless of political or organisational affiliation – to put an end to childhood inequity.

2. Executive Summary

60 second summary

Educational funding for the North of England has lagged the rest of the UK over the past decade. Meanwhile, North-South inequalities have accelerated through the cost-of-living crisis and the Covid-19 pandemic.

It is therefore unsurprising that educational attainment in the North of England is poorer than the rest of the country. Children in North of England schools are more likely to be absent, often because of physical and mental health problems, than children in South of England schools.

This is bad for the UK economy and creates a timebomb for the NHS, social care, and criminal justice system. The inequity is bad for everyone throughout the UK, not just those living in poverty.

This report highlights creative approaches from the North of England that can address these problems. Powerful case studies illustrate how health services can be delivered with and through schools and nurseries. Innovative approaches to the SEND (Special Educational Needs and Disability) crisis are offered, and the importance and effectiveness of pre-school interventions are underlined.

The underpinning partnerships and proven successes in connecting data for effective public service coordination are emphasised. Thus, the report illustrates programmes that can transform education and lives – not only in the North but throughout the UK.

Key findings

Ongoing inequalities in funding have meant schools in the North of England have received less funding on average than their southern counterparts over the past decade. This reflects the lower funding received by schools in disadvantaged areas – despite the increased burden placed on these schools because of the wider societal issues that impact the families they serve.

Children in the most affluent schools in the country had bigger real-terms increases in funding from the National Funding Formula between 2017 and 2022 (8–9%) than those in the most deprived ones (5%).

NFF funding per pupil showed 4 percentage points less increase in real terms in the most-deprived primary schools (0.7%) compared to the least-deprived ones (4.8%) between 2017–18 and 2022–23, creating a lag in the reduction of the inequality gap.

Schools in London received an average of

£6,610

per pupil compared to **£6,225, £5,956**, and **£5,938** in the North East, North West, and Yorkshire & The Humber, respectively. **On average, pupils in London received 9.7% more funding than those in the North. Students in London achieve a third of a grade higher, on average, than students in the North.**

There are record numbers of school absences across the North of England. In the 2022/23 autumn term, school absence rates were greater in the **North East (7.9%) and Yorkshire & The Humber (7.7%),** compared to **Outer London (7.0%) and Inner London (7.2%)**.

Children are more likely to be persistently absent (missing more than 10% of school) in the **North East (25.6%) and Yorkshire & The Humber (24.5%)** compared to **Outer London (23.1%) and Inner London (23.8%).**

The structural inequalities faced by children in the North of England are multifaceted and urgent action is required to address the concomitant educational funding inequality.

The long-term consequences of poor educational attainment include poor physical and mental health, young people Not in Education, Employment or Training (NEET), involvement in the criminal justice system and the need for long-term social care. These costs and the economic stagnation caused by educational disadvantage are more than the UK can bear (with the costs impacting public service delivery for the whole country).

The early years are a critical intervention point for supporting healthy development and addressing entrenched inequity. Children who fail to reach a good level of development on the Early Years Foundation Stage Profile (EYFSP) are nine times more likely to perform below expected levels in reading, and seven times in maths at Key Stage 1. Further, they are three times more likely to become a persistent absentee (<90% attendance), and three times more likely to become NEET at 16-17 years of age.

Children born into the poorest fifth of families in the UK are almost 13 times more likely to experience poor health and educational outcomes by the age of 17 years. Children from the lowest income households are five times more likely to experience poor academic achievement. Mitigating inequality in early childhood (rather than a single focus on absolute poverty) would reduce the number of children experiencing multiple adversities by more than

80%⬇

The fundamental problem is that public services are fragmented. Families struggle to access a complex web of services, children's education and health outcomes suffer, and, in the worst safeguarding cases, vulnerable children fall into the gaps left between professionals. But Opportunity Areas (OA) funded through the Department for Education have shown the huge potential for coordinating public services – such as health – with and through schools.

Opportunity Areas (OAs) have made a transformational difference in the areas in which they have been put in place. Blackpool OA supported approximately 200 secondary school pupils who were at risk of being excluded. Bradford OA allowed 110 schools to engage with educational research activity and 39 Bradford schools improved by at least one Ofsted grade between 2016 and 2019. In the North East Coast OA,

64% children were at expected levels in maths in 2016 (Key Stage 1 and Key Stage 2) which rose to 68% and 71% for KS1 and KS2, respectively, and **6,000 primary school pupils were screened for speech and language disorders through the OAs**.

Public services in the North of England have been forced to create innovative approaches to deal with the poor outcomes faced by their children and young people. For instance, Bradford has created a first-of-its-kind connected database that contains the primary- and secondary-care health records of citizens across the Bradford district linked with education records, social care, policing data, etc.

The database is an incredibly powerful tool that allows scientists, working with policy makers, to undertake holistic data science that can shine a light onto critical social issues that span disparate services. Bradford has proved the principle and provided a methodology that can be scaled up in a test-and-learn manner across the North of England to inform a national approach.

OAs were able to use the insights made available through Connected Bradford to support children's educational needs in a holistic manner. For example, the data showed that over 2,500 children in Bradford identified with an ophthalmic defect, affecting their eyesight, were not taken to an optometrist for appropriate treatment (i.e., prescription glasses) despite receiving a letter home. These insights enabled an intervention that connected health and education and supported children's reading through the provision of prescription glasses.

The connected data also show how health and education data can be combined to help identify and support children with SEND at the earliest timepoint possible. Children who do not reach a "good level of development" on the statutory assessment conducted in the first year of schooling (the EYFSP) are over five times more likely to require Special Educational Needs support two to seven years later, compared to children who do reach a "good level of development". The Electronic Developmental Support Tool, developed by researchers in the North of England, is being trialled from September 2023 in schools across Bradford to identify and support neurodivergent children. The potential for this tool to be used by schools across the UK is great.

The connected data are also showing the lack of information provided to educational settings about the large numbers of children with known health problems within schools and nurseries. The research demonstrates that these children are at increased risk of poor educational attainment without support, but the children's needs are often unmet because information is not shared.

For example, the data show that children born prematurely in the summer months are at a "double disadvantage". The likelihood of a child reaching a "good level of development" on the EYFSP at the end of reception is reduced by 9% for each successive week earlier that they are born. Fewer than 20% of children whose prematurity means they start school a year early go on to demonstrate a "good level of development" on the EYFSP.

In many cases, children have a known health problem that places them at risk of having SEND. For example, approximately a third of children with neurodevelopmental conditions (specifically developmental delay, intellectual disability, autism, and congenital anomalies) have a genetic cause.

This research highlights the urgent need for educational professionals, schools, and nurseries to be made aware of children with congenital anomalies so that they can be monitored, to ensure support is put in place at the earliest possible time.

Summary of recommendations

1 Allocate additional funding over 2025-30 to secondary and post-16 providers to address the lag before the new (fairer) National Funding Formula (NFF) takes effect. Implement the National Audit Office's recommendation to "evaluate the impact" of the NFF.

2 Address historical structural inequalities by immediately developing options to adjust the NFF to include the "health burden" borne by schools from 2025.

3 Use schools and nurseries as "hubs" for delivering health services, especially within disadvantaged communities; providing support so they can help families meet the health needs of their children and young people (e.g., through funding family support workers).

4 Create formal partnerships at local authority area level that enable schools, health services, police, local authorities, voluntary services, regional universities, faith leaders, and businesses to propel data driven, "whole system", place-based approaches to improving social mobility, health, and education through schools and nurseries.

5 Create connected datasets to support coordinated public service delivery. Use existing NHS England "Secure Data Environment" investment to enable trusted partners (e.g., N8+ research-intensive universities and Northern Health Science Alliance, Northern England NHS hospital trusts) to test-and-learn optimal methodologies for data connection before national adoption.

6 Harness world-leading UK university research so local authorities and integrated care boards can base decisions on the best evidence (based on proven methodology from Northern England). Develop the "Chris Whitty model" where universities become the Research and Development departments of public services such as local authorities.

7 Address the SEND crisis by working with schools to adopt the SUCCESS programme (Supporting Understanding of Children's Communication, Emotional and Social Skills) to reduce the barriers families face in accessing autism services, diagnoses, and support.

8 Use UK research expertise to implement the Electronic Developmental Support Tool from September 2024 so schools across the UK can identify and meet the learning and support needs of all children and young people while reducing reliance on specialist services.

9 Act early to address problems before children enter school and avoid the long-term costs (e.g., NEET) associated with a lack of school readiness. Target investment to improve access to high-quality training for early years educators and health visitors to improve staff retention and uptake.

3. Children in North England schools have had a bad deal: Understanding education inequalities and their consequences

This chapter highlights:

- Ongoing inequalities in funding have meant schools in the North of England have received less funding on average than their southern counterparts over the past decade. This reflects the lower funding historically received by schools in disadvantaged areas.

- Poorer attainment is visible at every phase of the education journey for children growing up in the North of England, increasing NHS pressures, and stifling economic growth. Mitigation requires immediate remedial action, as historical inequalities – amplified through the Covid-19 pandemic – are incredibly difficult to address after young people leave education settings.

- Schools are serving disproportionate numbers of children growing up in disadvantaged circumstances in the North of England. These children can thrive in school with the right support, but the National Funding Formula (NFF), which the Government uses to allocate money for state-funded schools in England, needs to go further in recognising the wider challenges faced by schools and nurseries in disadvantaged areas relating to the physical and mental health of children, young people, and their families.

The evidence is clear: schools in the North of England support disproportionate numbers of children in poverty, children with poor levels of development on entering school, vulnerable children, children who have suffered from neglect and abuse, and children in local authority care [1]. Children in the North of England are also at greater risk of being born into unhealthy environments [2].

Children growing up in poverty are more likely to experience multiple vulnerabilities, significantly limiting their readiness and ability to learn but also impacting school absenteeism, and the likelihood of becoming NEET (Not in Education, Employment, or Training) later in adolescence [3]. There is also evidence to suggest that disadvantage can decrease young people's aspirations [4].

The repercussions of physical and mental health problems are increasingly being borne by schools and nurseries. The Covid-19 pandemic exacerbated these problems (creating a public service time bomb for the UK) but insufficient funding was allocated to mitigate the long-term consequences for those children and young people hit hardest by the pandemic and its aftermath.

An historic contextual divide shows continued poorer educational attainment in the North

A wealth of reports (such as those produced by the Northern Health Science Alliance and Health Equity North) consistently show that inequalities are persisting or deepening post-pandemic, increasing the risk to children's health, wellbeing, and attainment. These statistics include a 17% higher mortality rate due to Covid-19 in the North, an average of 41 additional days in lockdown, falling wages (against rises in other parts of the country), higher unemployment rates, and decreased parental and child mental health [5, 6].

The Covid-19 pandemic also directly compounded the educational divide due to more frequent and longer lockdowns imposed in the North. Children and young people in the North East and Yorkshire & The Humber experienced four times the number of months of lost learning in primary maths, compared to the South West and London [1]. Post-pandemic behaviour of pupils is also a concern, with 60% of schools in the North East facing behaviour related challenges compared to the pre-pandemic period [7].

Meanwhile, 80% of schools reported students are now facing increased challenges around anxiety, resilience, and social and emotional preparedness. In addition, the problems of "school hesitancy" that started in the pandemic are still playing out, with record numbers of school absences plaguing schools across the North of England. For the 2022/23 autumn term, stark regional disparities, particularly between the North and London, were found in school absence rates (including those due to illness) and the proportion of children reported as persistently absent (missing more than 10% of school) [8] – see Table 1.

"I feel we've been overlooked in the North East" – Secondary school pupil, Durham

The longstanding North-South divide in educational attainment means that children in the North of England are leaving school with poorer results than their peers in the South, with negative impact on their future work prospects and earnings, contributing towards economic deprivation. The current cohorts of children leaving school with low attainment constitute a major risk for public services in future years. The long-term consequences of poor education on physical health and mental health are well documented, and this "educationally disadvantaged" population will place great pressure on the NHS, social care, and criminal justice system in future years.

Despite these challenges, during the pandemic, schools showed that – with the right permissions and resources – they can act as incredibly effective providers of, and channels to, support for the

most vulnerable children and young people. This insight drives not only this chapter, but the whole of this report.

Child poverty in the North
Even prior to the pandemic and cost-of-living crisis, a recent study found that the North East experienced the highest child poverty rate in UK [9] (see also Figure 1). Two in five children (38%) were living below the poverty line in 2020/21, continuously limiting these children's opportunities and life chances [10].

This gives a clear indication that households are falling below the UK average household income and not able to meet the financial costs of a basic standard living, decreasing children's health, wellbeing, and education attainment.

The Child Poverty Action Group showed that low-income families were hit the hardest during the pandemic with school closure cost [10]. The findings show 40% of low-income families missed at least one essential resource to support children's learning. One third of the families who were most concerned about finances had to buy a laptop, tablet, or other equipment.
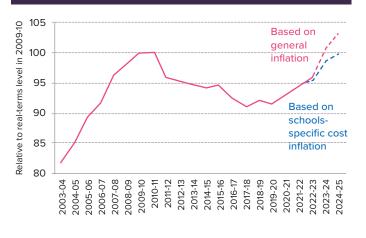
Schools in the North of England disproportionately affected by funding cuts
In addition to existing child poverty rates, a recent Institute for Fiscal Studies (IFS) report [12] shows overall trends in school funding indexed to 2010, and the stark inequalities faced by the North. Funding gradually rose to that point, before cuts of almost 10% in the years

leading up to the pandemic. School funding levels have been lower than in 2009/10 for the last 13 years when accounting for inflation.

Critically, the IFS makes clear that:

- Areas outside of London with higher levels of deprivation and worse educational attainment experienced the largest cuts per pupil.

- A cut of nearly 12% in the most deprived secondary schools was applied in London, but was 15% for equivalent schools outside of the capital between 2010 and 2018 .

While the 2019/2020 spending review announced a welcome increase in funding for schools, the current National Funding Formula (NFF) means spending will not return to 2010 levels until 2025, equating to 15 years of stagnation in school funding (see Figure 2).

Most critically, for over a decade, the NFF failed to reflect the impact of disadvantage on learning. By 2025, welcome changes to the NFF aim to make funding fairer between schools, but this will not be sufficient to:

- Meet the disproportionate need for additional support in the short to medium term, for children currently in school and post-16 education in the North, resulting from historic disparities in funding and the impact of Covid-19.

Table 1: Absence rates by region for the 2022-23 autumn term

Region	Overall absence rate	% of children recorded as "persistently absent" (<90% attendance)
England	7.5%	24.2%
North East	7.9%	25.6%
North West	7.3%	23.4%
Yorkshire and The Humber	7.7%	24.5%
Inner London	7.2%	23.8%
Outer London	7.0%	23.1%

Source: Department for Education [1]

Figure 1: Share of children living in absolute child poverty (before housing costs) in the UK and each North East local authority, 2014/15 and 2020/21

Source: Department for Work and Pensions [11]

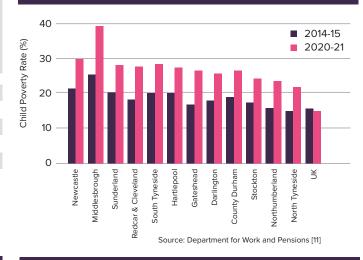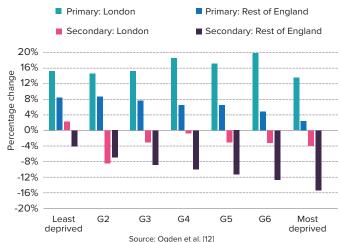**Figure 2:** Changing funding for schools between 2003-04 and 2024-25

Source: Ogden et al. [12]

Figure 3: Real-terms changes in school spending per pupil by eligibility for free school meals, 2010-11 to 2019-20

Source: Ogden et al. [12]

- Overcome the significantly greater barriers to learning (e.g., those created by health problems and poverty) faced by children attending schools in the most disadvantaged communities (disproportionately, but not exclusively in the North).

Therefore, funding support must be given to education settings to support the generation who lost and are losing opportunities in real-time while the funding "levels up".

Ongoing equity audit is needed to understand the impacts of the NFF

The NFF provided bigger real-terms increases between 2017 and 2022 for more affluent schools (8–9%) than the most deprived ones (5%) [12]. NFF funding per pupil increased by 4 percentage points less in real terms in the most-deprived primary schools (0.7%) compared to the least-deprived ones (4.8%) between 2017–18 and 2022–23, creating a lag in the reduction of the inequality gap (see Figure 3).

The historic underfunding of schools in the North of England meant they were less well positioned to absorb the impact of the Covid-19 pandemic. Indeed, average funding per pupil, on average, favoured schools in London. Schools in London received an average of £6,610 per pupil compared to £6,225, £5,956, and £5,938 in the North East, North West, and Yorkshire & The Humber, respectively [13]. Moreover, the evidence shows clearly that the pandemic hit more disadvantaged areas harder, and this meant that the North of England was subject to a greater pandemic impact than the South.

The Department for Education committed an additional £3.3 billion to schools to cover the additional costs incurred by the pandemic. However, the National Audit Office reported that stakeholders were concerned that "funding provided by the Department [for Education] was insufficient to cover the additional costs arising from the pandemic" [14]. Moreover, the NAO suggested that the pandemic funding was delivered in the context of: "a shift in the balance of funding from more deprived to less deprived local areas".

The modified NFF is to be praised for its allocation of additional funding according to factors such as income deprivation, eligibility for free school meals, low prior attainment, and English as an additional language (EAL). Nevertheless, it still does not sufficiently recognise the full impact of childhood disadvantage and the disproportionately greater inequalities in physical and mental health affecting schools serving the most disadvantaged communities (more of which are located in the North of England).

The weight of evidence suggests that further rebalancing is essential, to help schools meet the additional needs of children from the most disadvantaged communities. These include the

"The children of today will be the scientists of tomorrow... even if they live in Doncaster" — *Secondary school pupil, Doncaster*

number of children in poverty, arriving at school without a substantial breakfast, without safe or suitable spaces to complete homework, without good digital access, and more generally the poorer health experienced by children, young people, and their families. These are all factors known to limit children's readiness to learn, and likelihood of achieving their potential.

A failure to put plans in place to mitigate the historic educational inequality burden placed on disadvantaged communities (amplified through the pandemic) will create downstream costs (within the NHS, social care, criminal justice system etc.) that the UK simply cannot afford. Inequalities impact everyone, not just the most disadvantaged. Thus, the economy will be starved of the healthy and educated workforce it desperately needs if these inequalities are not addressed head on, and the economy will suffer – affecting everyone in every part of the country. The social costs of not supporting children will affect not only the historically deprived regions of the North but the whole national economy. There is an urgent need to create plans to fund and empower schools to act at pace in addressing the lost opportunities faced by the current generation of young people.

Key recommendations:

✓ Address stakeholder concerns that: "the funding provided by the Department [for Education] was insufficient to cover the additional costs arising from the pandemic" [14].

✓ Allocate additional funding to secondary and post-16 providers to support young people from the most disadvantaged areas over 2025-30 (tapered if necessary). This will fund – and could be ringfenced for – the additional behavioural, health (mental and physical), and learning support programmes that schools in the North need to implement. This will help to counter historic underfunding and address the increased levels of deprivation faced by children in the most disadvantaged areas.

✓ Implement the NAO's recommendation that the DfE: "Evaluate the impact of the National Funding Formula and minimum funding levels over time and use that information to inform whether further action is needed to meet its objectives". Funding should be commensurate to the level of need to reduce longstanding inequalities in attainment outcomes. The evidence showing the intersections and interactions between health and education is already compelling (see Chapter 6). Options need to be developed immediately to adjust the NFF criteria from 2025, with a view to including the "health burden" borne by schools (with funding settlements considered holistically across the Departments for Education, and Health and Social Care). This would benefit all schools supporting disadvantaged communities, which would, in turn, address the North-South inequality divide.

"Supporting those who need extra help is the most human of actions" - *Secondary school pupil, South Yorkshire*

4. The lived experience of a young person from the North of England

I am proud of who I am and where I have come from, as the North is a truly special place that is filled with young people who are bursting with passion to enforce change. As a young person, it is incredibly frustrating to hear the widely held assumptions about the North, driven by the negative media portrayal and the lack of attention that we receive.

I understand that my actions make a difference, and I am honoured to be a board member on Bradford's Education Alliance for Life Chances. This has enabled me to work alongside professionals to witness the action that is occurring across the North. I have been able to voice my opinions, and I am incredibly fortunate to have this platform to speak out for countless other students and young people like me.

Completing my A-Levels during the height of the pandemic felt like a real challenge as the news and media were dominated by stories of the increasing demands and struggles students were experiencing. It felt like the pandemic not only highlighted but further deepened the disparities between the North and the South.

The pandemic was particularly challenging for my mental health. My A-Levels were two years of constant turmoil and uncertainty, particularly involving university offers and applications, and whether exams were going ahead or not.

"[it feels like there is] an unfair divide [between the North and South] and it should be the same" – Student, Huddersfield

"You feel embarrassed because you can't remember things because you have had a lot of other things going on" – Primary school pupil, Newcastle

I witnessed many of my friends struggle through similar issues, as we strained to maintain the pressure of performing well, combined with relentless negative media narratives about schools from the North. As students, we felt extremely neglected and hopeless in a crucial time of need. Navigating the pandemic was extremely challenging for everyone, but as students, the impact felt even more profound.

We have missed the opportunity to build essential skills

The inability to socialise with others and have a true sixth-form experience meant that we missed out on a vital stepping-stone and lost part of our educational journey. The pandemic had no precedent, and it felt as though there was not enough understanding about how to support us in managing the range of emotions that we were experiencing. The pandemic was unlike anything today's adults had ever experienced, yet, as young people, we were expected to deal with the consequences alone. It was isolating, difficult, and demanding. Throughout all the lockdowns, we had to maintain our studies, but we were unequipped to deal with the impact that the lack of socialising had on our mental health.

We are experiencing anxiety, depression, and mental ill health that desperately needs addressing

I now tutor young people and the impact of the pandemic has been even more apparent as I work with students every day. I remember feeling shocked at seeing students who were outgoing, confident, and bubbly before the pandemic, yet lost their spark once they had returned from lockdown.

Once the restrictions were lifted, students were expected to resume their studies as normal, as though nothing had changed. The reality was that everything had changed. More and more students are experiencing anxiety, depression, and mental ill health, and suddenly, familiar environments, like school, have become foreign.

Every day, students struggle with their mental health and, unfortunately, this is far too common among students within our schools. We need more support and there needs to be more action to support all children and young people, because the impact of the pandemic will span generations.

Young people need support to reverse unhealthy habits developed during the pandemic

The pandemic saw a decline in physical activity among young people, but I have seen research that shows this particularly affected young people from the North. Students in lockdown were no longer required to participate in compulsory physical education lessons, and the restrictions meant that many children and young people were unable to leave their homes. This meant that more and more young people became increasingly inactive.

I believe that there is a strong correlation between socioeconomic status and obesity. Young people from across the North are struggling to remain active, and the pressures on household income throughout the pandemic meant that young people were unable to eat healthily. Not only did this impact their physical health, but the lack of physical activity further deepened the impact on their mental health.

It is apparent that young people are affected by various issues that are beyond their control, yet we feel as if we are being left to manage the ramifications alone.

Structural inequalities related to ethnicity, household income and gender need to be recognised
While I acknowledge that there has been lots of work done in recent years, mental health remains largely regarded as a taboo (particularly within South Asian communities, such as mine). Speaking from first-hand experience, mental health is often not taken seriously, with many people not recognising its importance, and seeking support for mental health is deemed as a sign of someone being vulnerable and weak.

These are just some of the stereotypes associated with mental ill health, which many young people, like myself, faced during the pandemic. We are still struggling with these problems today, in the aftermath of the pandemic. Some families feel too ashamed to seek support for their mental health, and often, there simply has not been sufficient provision available. Work needs to be done to address these key issues that young people face every day.

"[Lockdown] was quite hard because we only had two laptops between the four of us" – Primary school pupil, Lancashire

"[Lockdown] was hard, not having such a routine" - Secondary school pupil, Leeds

The digital divide exacerbates the inequalities faced by many children from schools in the North of England
Another key inequality which deepened the impact of the pandemic in the North of England was the lack of technology. Many students struggled with the daily work set online, meaning students were even further behind, due to their inability to simply access the learning.

Students are still struggling daily with the learning that they lost. This will undoubtedly affect their academic attainment, and the prolonged impact of this is colossal, potentially even affecting their employment in the future.

In an era of evolving technology, young people are continuing to struggle, as they are unable to access key things, such as online homework, remotely. There needs to be fair chances for all, and this involves having adequate access to technology.

A plea for change
Young people are trapped in this seemingly infinite cycle, which they cannot seem to escape. The impact of the pandemic is something that we can all witness right now, but its reverberations will be felt for generations to come.

I am just one of countless young people who have been neglected for far too long, and it is time for some change. I would like to call upon the Government to act now, to prevent more young people from losing out. I would like to see changes implemented over the next few years, creating equal opportunities for all young people.

5. The lived experience of a school leader from the North of England

James Lauder, Assistant Vice Principal, Dixons Trinity Academy, Bradford

It was hugely instructive to be able to participate in the Child of the North All Party Parliamentary Group meeting on 17th May 2023 and share my experiences as a school leader within the North of England. I work for Dixons Academies Trust, a highly regarded multi-academy trust that was created to challenge educational and social disadvantage in the North. We have established high-performing non-faith academies across Leeds, Bradford, Liverpool, and Manchester that maximise attainment, value diversity, and build cultural capital. We estimate between 15-20% of all English secondary schools have visited our schools to learn from our sector-leading best practice, founded on building schools that are driven by well-articulated missions and values.

As a trust, we collaborate closely with other academy trusts across the North (made easier, for example, through Bradford's Education Alliance for Life Chances – see Chapter 7), and with colleagues in maintained schools, local authorities, the NHS, and other partners across the North. The perspective presented here reflects my experience and the experience of our colleagues and partners.

The costs of the pandemic are continuing to impact education

The consensus across schools in the North of England is that the pandemic has caused secular social trends that we do not yet fully understand, and which have had far-reaching ramifications in education. Our lived experience includes the following:

- An exacerbation of regional attainment gaps. Students in London achieve a third of a grade higher, on average, than our students in the North [15]. These differences cannot be ascribed to worse teachers or school leadership as these patterns transcend Ofsted school ratings and impact schools that are praised for their teaching and leadership.

- A significant increase in poor mental health among young people, creating educational challenges within schools.

- Sharply increasing levels of need in our students, in terms of maturity, attachment, and the spectrum of diagnosable Special Educational Need and Disability (SEND). The level of need we are now seeing is often far beyond mainstream specialism.

- A precipitous decline in attendance (raising major safeguarding concerns and worry about the long-term education outcomes

for these children and young people). We understand that lying alongside, if not behind, all these trends is an increase in poverty affecting our children, young people, and their families.

How our schools are responding

In my academy trust, we have responded to these worrying developments by:

- Investing approximately £1.5 million to tackle poverty across 16 schools. This investment is vital, but it is directed at urgent "sticking plaster solutions" to issues such as hunger, uniform, or safeguarding, so it is not optimally coordinated or strategically deployed. It means that, on average, our schools have two fewer teachers than they would otherwise have had if we had not needed to redivert these funds.

- We have taken on and opened more schools so that more young people in the North have access to a high-quality education.

- We have begun to build strategic partnerships with other public sector agencies; for example, by hosting NHS family support workers within our schools and by contributing to Bradford's place-based collaborative Education Alliance for Life Chances (see Chapter 7).

- We have looked to give our young people and their families a voice by working with Citizens UK to establish Bradford and Liverpool Citizens, and to support Leeds and Manchester Citizens.

"...people deserve an equal chance" – Student, Huddersfield

Schools will only be as strong as the support they can access for their children

We are proud of the innovative big moves that our trust, and many others in education, have made in the wake of the pandemic. However, we need to be clear that schools will only be as strong as the support they can access for their children. In my own school, I have been able to see objective evidence that documents the mental ill health epidemic impacting our young people. I am fortunate to be able to have access to such data thanks to our involvement in Born in Bradford's Age of Wonder research programme, which has pulled learning from Manchester's #BeeWell project (see inset) to enable schools to better understand the social and emotional problems faced by their students.

The pandemic has created increased need for mental health support, but the destruction of support services has caused the crisis. In laudable efforts made within localities, these support services are being knitted back together at a place-based level by innovative collaboration across silos (see Chapters 7 and 8). These developments hold the promise of a more effective, frontline driven system of integrated public services for children and families. However, these initiatives cost money, and the public purse will, in the long run, get what it pays for. Current levels of funding are not enough to guarantee good outcomes for the children and young people within our schools.

The good news is that in Bradford, we have already seen that the new way of working described within this report saves public resources by ensuring families can access early NHS intervention through school – saving funds for education activities and improving outcomes.

The challenges faced by North England schools
Schools have been asked to face the challenges bequeathed to society by the Covid-19 pandemic. These challenges extend far beyond the tremendous damage done to learning caused by lockdowns. Schools are also paying increased energy prices (which in some cases amounts to a 400% increase in a school's energy costs), and unfunded pay rises.

We are seeing the very real consequences that confirm the National Audit Office's suggestion that insufficient funds were allocated to fund Covid recovery in education, despite Sir Kevan Collins' recommendations (including an additional 100 hours of teaching

"I feel like children in the North are misunderstood so to have an opportunity to change that is amazing" – *Secondary school pupil, Liverpool*

per pupil). By not sufficiently funding an intentional Covid recovery plan, schools will spend years paying for the unintentional plan we now have instead – costs both in the millions of pounds and costs in the underachievement of children plagued by poorer mental health and low attendance.

Schools in the North are a firm part of the efforts (described within this report) to build integrated public services that tackle entrenched social problems at the place-based and individual family levels.

This approach is rooted in using unambiguous evidence to meet overwhelming need. Policymakers should pay close attention to this work so that decision makers can use evidence to show where spending a little can save a lot. Targeted funding can help children to have great, healthy lives that contribute to the economy and decrease the pressures within health, social care, and the criminal justice system.

The #BeeWell project

#BeeWell is an innovative programme that blends academic research and youth-led change to "pivot the system" to make young people's wellbeing everyone's business. Data on the domains and drivers of young people's wellbeing are collected on an annual basis, with actionable insights fed back to schools, communities, and our coalition of more than 100 project partners via interactive data dashboards and themed analyses. This provides an evidence base to inform decision making and provision across the system.

To date, 60,000 young people from more than 180 secondary schools across Greater Manchester have taken part in #BeeWell. Several important insights have been generated from the

resultant data, including the role of place in young people's wellbeing, the factors driving poor wellbeing outcomes among LGBTQ+ young people, and the connections between physical activity and wellbeing. Critically, responses to the #BeeWell data have totalled nearly £1m to date, including a social prescribing pilot led by our partners at Curious Minds, new LGBTQ+ youth-led commissioning via the Greater Manchester Integrated Care Partnership, and physical activity campaigns and interventions led by Greater Manchester Moving and the Youth Sport Trust.

In autumn 2023, the #BeeWell programme will expand to Hampshire, Isle of Wight, Portsmouth, and Southampton, as part of the vision to create a public policy agenda by 2030 that gives equal weight to both attainment and wellbeing, and uses reliable data to inspire improved outcomes for both.

Born in Bradford: Age of Wonder

Age of Wonder is a continuation of the Born in Bradford longitudinal birth cohort study that began back in 2007. In response to the cohort entering adolescence, we have adapted #BeeWell's pioneering work to embed actionable research in secondary schools across the city.

Through co-production with our young people and schools, we have identified the most pressing issues Bradford's teenagers face today and developed the Age of Wonder Young People's Survey. From mental and physical health, to the environment, social media, and discrimination, not only are we giving our teenagers a voice, but also the necessary tools to be heard.

Each year, interactive datasets are provided to senior leadership, facilitating agile, data-driven operational decision-making in response to what's happening on the ground. Moreover, data science workshops give students the opportunity to explore the data for themselves, promoting data literacy, demystifying research, and stimulating advocacy for the core issues that emerge from their curiosity.

Over the course of the next six years, we will be expanding our cohort to 30,000 young people, joining them on their journey through adolescence and into adulthood. Along the way, we will be linking schools to public health initiatives tailored to their needs, responding to the concerns of young people, and evaluating the effectiveness of school-based interventions.

6. The intersections and interactions between health and education

This chapter highlights:

- Health barriers to education that are invisible to schools and nurseries (due to lack of data sharing) result in children not receiving the support they need.

- Examples that illustrate how health and education can effectively work together to benefit children, families, and public services.

- The potential for delivering health services within the school gates.

"I didn't know you had to brush for two minutes so I used to do it for a minute but now I do it for two minutes" – BRIGHT study participant

The evidence is clear: the divide between health and education service delivery means that health information is not communicated to schools or nurseries. Therefore, many children experience health barriers to education that could and should be supported, but whose needs are not being met due to siloed working. The long-term consequences are devastating, with evidence showing that early unmet educational needs increase the risk of children being absent from school and ultimately becoming NEET (Not in Education, Employment or Training) [16, 17]. Moreover, the evidence shows that improving the educational attainment of children and young people decreases the risk of long-term physical and mental health problems.

"If you're not healthy it limits the amount you can learn" – Secondary school pupil, South Yorkshire

There is accumulating evidence that health and education can work together effectively to ensure that children's health needs are met in a timely fashion. The Special Educational Needs and Disability (SEND) crisis and the waiting list problems associated with autism (and other neurodevelopmental conditions) is just one example of the need for health to work in partnership with educational settings to effectively tackle problems that affect both services. Integrated care boards provide an outstanding opportunity for such integration. Evidence shows the potential to better support children's health needs within education settings, with the following examples illustrating successful approaches to connecting health and education to improve outcomes for children and young people.

Using knowledge that congenital anomalies affect educational attainment to tailor teaching provision
Advances in medical diagnosis and care has meant infant mortality rates due to congenital anomaly (birth defects) in England and Wales have reduced by over 70% in the last 40 years [18, 19, 20]. It is now estimated that most of those born with congenital anomaly will survive at least 20 years [21]. Nevertheless, many children continue to be diagnosed with congenital anomalies, with the burden falling disproportionately on children in the North of England [19]. This information is not shared routinely with schools, despite evidence that many of these children are at high risk of poor educational attainment. Research into congenital heart disease (CHD) and orofacial clefts (OFCs) has shown that these conditions are associated with worse academic performance [22, 23]. OFCs

have been particularly well researched within the UK, illustrating persistently poor educational outcomes throughout primary school [24, 25].

Research comparing the educational outcomes of 555 children with congenital anomalies to 11,188 controls from the Born in Bradford cohort found that children with any major congenital anomaly were three times more likely to not achieve the expected level at Key Stage 1 (aged 6-7 years) when compared to their peers without a congenital anomaly [26]. It was also found, for the first time, that children with congenital anomalies of the urinary tract, gastrointestinal system, and limbs are more likely to underperform academically even when those with chromosomal anomalies were excluded.

For children with CHD, academic outcomes were shown to worsen as they progress through primary school, likely because of insufficient support in place for these children (see Figure 4).

This research highlights the urgent need for educational professionals, schools, and nurseries to be made aware of children with congenital anomalies so that they can be monitored, to ensure support is put in place at the earliest possible time.

Known genetic differences can be used to identify SEND early
In many cases, children have a known health problem that places them at risk of having SEND. For example, approximately a third of children with neurodevelopmental conditions (specifically developmental delay, intellectual disability, autism, and congenital anomalies) have a genetic cause.

Figure 4: Educational outcomes and SEND provision for children with congenital heart disease by school level

EYFSP = Early Years Foundation Stage Profile; KS1= Key Stage 1; KS2 = Key Stage 2; SEND = Special Educational Needs and Disability

One specific genetic cause of neurodevelopmental conditions is known as "copy number variants" (CNVs). CNVs are minor chromosomal re-arrangements such as deletions or duplications on one or a small number of genes. Many CNVs have now been linked to a high risk of developmental delay, intellectual disability, motor coordination difficulties, and a range of physical and mental health problems [27]. The risk of neuropsychiatric problems in children with CNVs is also greater in deprived areas [28].

It is well documented that early identification of neurodevelopmental conditions enables support to be implemented early, which has major benefits for the children and their families. The diagnosis of a genetic disorder is increasingly being made early in a child's life. This affords opportunities for the provision of early education support to this high-risk group of children. Nevertheless, these children frequently do not receive the care they need, even after their symptoms have clearly manifested. Families frequently describe the long uphill struggle they undertake for their child's needs to be met.

A recent study reports that 23.1% of parents of children with a genetic condition associated with neurodevelopmental conditions feel that their child's school does not provide their child with the right educational support [29]. Parents commented that there is a lack of awareness of the challenges associated with their child's genetic condition, which could make it difficult for parents to secure SEND support for them. Some parents reported their children were affected by social isolation and bullying, low self-esteem and anxiety, and showed distress upon going to school. Lack of understanding of their child's condition can cause a discrepancy between the child's ability and the school's expectation of them. Support was likely to be given in reaction to problems rather than proactively planned. When effective support was provided, children were reported to display improved academic and social outcomes.

There is a great opportunity to improve outcomes for many children by sharing information about known medical conditions (e.g., CNVs) with schools. There is a need to improve awareness about genetic conditions and the educational impact of CNVs among health practitioners and education staff (including teachers, headteachers, teaching assistants and Special Educational Needs co-ordinators (SENCOs)). A known genetic problem should trigger a proactive support plan to be put in place by health and educational professionals working together. The creation of such plans could reduce the risk of social isolation, the exacerbation of mental health problems, and sub-optimal educational achievement. The long-term benefits to the child, family, NHS, and economy would be immense.

"You can teach children more effectively when they come into school ready and able to learn, and schools are able to do that when they better understand home-school circumstances" – *Teacher*

Many children struggle to read because they struggle to see, and schools can play a major role in ensuring there are "glasses in classes"
There are many children who struggle to learn to read at an acceptable rate and these children are over-represented in the North of England [30]. The natural response to a high number of children with reading problems within a school or academy trust is to improve school leadership around reading or to provide pedagogical approaches such as phonics programmes. Evidence suggests, however, that a fundamental health problem might, in part, explain the unsatisfactory levels of reading shown by many children, especially within disadvantaged areas. Early analyses using connected data showed that over 2,500 children in Bradford identified with an ophthalmic deficit (i.e., they needed a pair of eyeglasses) were not taken to the hospital eye service or the local optometrist despite a letter informing the relevant carer that there

was a problem with the child's eyesight [31].

Moreover, the evidence shows that children with uncorrected eyesight are at increased risk of delayed reading skills [32]. These insights were obtained because the ophthalmic status of the children could be obtained from the health records (i.e., the children's medical records) while the child's reading abilities were available through the connected education data (i.e., information from the Department for Education). This simple example demonstrates the power of connected datasets in flagging important intersections between education and health, and showing where we need to address health barriers that impact on education.

The data insights led to practical action through the "glasses in classes" programme of research that shared information across health and education and made certain that every child who needed glasses received two pairs (one for home and one for the classroom).

This scheme has since been trialled in several areas in the North of England (and beyond), including Derby, Doncaster, Durham, and the North Yorkshire coast. This empowers schools with the information needed to ensure they can support children to receive the eyeglasses they need to see clearly (and thereby learn effectively). The schools are then able to work with the families to make certain the child is seen by the appropriate health professionals. This programme has shown the great benefits that are gained when information is shared across health and education, and shows the potential of using schools as hubs for health service delivery in disadvantaged areas.

Dental decay impacts education and needs to be addressed in partnership with nurseries and schools
Approximately a quarter of five-year-olds in England have tooth decay [33]. This figure rises close to 50% in parts of Northern England.

There are also marked inequalities in the prevalence of tooth decay associated with deprivation, ethnicity, and SEND [33, 34]. Decay directly impacts children's quality of life which, left untreated, causes toothache and disrupted routines including school attendance [35].

In England, treatment of decay is the most common reason why young children are admitted to hospital, costing the NHS over £50 million a year [36]. Around 12,250 children are on waiting lists for this dental care under general anaesthetic, with some waiting up to 80 weeks for their treatment [37]. While on this treatment pathway, children miss an average of three days from school [38].

However, tooth decay is preventable [39]. There is strong evidence for the effectiveness of brushing twice a day with fluoride toothpaste, limiting sugary foods and drinks, and attending the dentist regularly. When these behaviours are established in early life, they provide lifelong protection [40, 41]. There is a clear need to implement interventions that are effective. Scotland's national "Childsmile" programme has shown robust reductions in the number of children with decay with the programme paying for itself within three years. After eight years, the savings are two and a half times the initial cost. In Bradford, a number of these interventions have been tested within our local communities and are being implemented across West Yorkshire and beyond. These interventions include:

- Supporting schools and nurseries to establish supervised toothbrushing programmes (BRUSH study) [42].

- Training health visiting teams to have effective oral health conversations with parents of young children (0-2 years old) as part of both the universal Healthy Child programme and the Maternal Early Childhood Sustained Home-visiting programme for vulnerable families (HABIT study) [43].

- Empowering parents of autistic children to establish good oral health behaviours at home (toothPASTE study) [44].

- Demonstrating the acceptability and feasibility of oral health lessons delivered by teachers in secondary schools (BRIGHT trial) [45].

Preterm birth can affect school readiness and early academic attainment
Preterm birth is classified as children born before 37 weeks gestation, which accounts for approximately 7-8% of live births in the UK. Children born preterm are known to be at greater risk of experiencing developmental problems, showing below-average academic attainment, and/or having special educational needs. In some cases, the impact of preterm birth is particularly disruptive (see Figure 5) and results in preterm children being among the youngest

"Schools can put a sort of therapist on the school grounds who anyone can go talk to ... just to have someone to listen to them" – Secondary school pupil, Liverpool

children in their year group, which also affects early academic attainment. Despite this, schools are never made aware of which of their pupils were born preterm or whether this has affected their year of entry.

Such factors can have substantial impacts on children's school readiness. Research shows that the likelihood of a child reaching a "good level of development" on the Early Years Foundation Stage Profile (EYFSP) at the end of reception is reduced by 9% for each successive week earlier that they are born [46]. Additionally, children who start school a year earlier because of being born prematurely show a "double disadvantage".

Fewer than 20% show a good level of development – much lower than other prematurely born children whose early birth did not affect the year they started school.

Meanwhile, research shows that the attainment gap between children born preterm and their typically developing peers can narrow across the course of primary school, suggesting that early intervention might enable them to "catch up" [47]. However, without greater information sharing, such action is not currently possible.

This evidence suggests action is needed to reduce the risk of preterm children being educationally disadvantaged. By sharing this "health" information, schools will be better able to support these children within the classroom.

"Schools are the biggest influence on children and they should encourage a healthier lifestyle" – Student, West Yorkshire

Additionally, rather than starting school in the September following their fourth birthday, as is normal in England, it has been proposed that children born preterm should have the option to use their original due date to recalibrate when they start school, especially if their premature birth has affected their year of school entry. The City of Bradford Metropolitan District Council worked with researchers from the Universities of Leeds and Bradford to ensure local policies acknowledged the "double disadvantage" effect when parents apply for delayed school entry.

Creating healthy schools
The pandemic highlighted many problems with school building infrastructure and the difficulty in ensuring classrooms are adequately ventilated. The circumstantial evidence linking good ventilation and airborne illness transmission in schools is substantial. For example, US schools that used improved outdoor air ventilation together with other mitigation strategies had lower rates of Covid-19 transmission compared to the rest of the community [48]. Schools in Bradford participated in a study that provided direct evidence of significant reductions in Covid-19 illness absences when schools were fitted with air cleaning technologies (see the "Class-ACT" case study in Chapter 9).

Figure 5: How premature birth can lead to a child starting school a year earlier than expected during pregnancy

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
							Delivery date		Estimated due date		

Unfortunately, many school buildings are unable to provide well-ventilated spaces to their students. Evidence from the pandemic showed natural ventilation varied between schools (with many schools struggling to provide adequate ventilation) and natural ventilation was lower in winter when illness rates were higher [49].

This provides support for the frequent reports of schools acting as "super-spreader" sites for illness. These unhealthy school environments mean that children and young people are more likely to be absent from school (with all the educational and safeguarding issues this entails) and teachers are more likely to be off ill.

Moreover, the perception of schools as hubs of illness transmission has the potential to contribute towards the growing trend of "school hesitancy".

The consequences of poor classroom ventilation are profound. The research shows that good ventilation is likely to lead to improved academic performance [50], reduced school absence [51], and increased teacher retention [52]. Once more, the historical inequality in school funding places an increased burden on schools in Northern England. There is an urgent need to address the longstanding chronic neglect of school building infrastructure [52] in general, and

particularly in our most disadvantaged areas (where ill health is worse and the consequences of contracting illnesses – such as Covid-19 – are greater).

Key recommendations:

✓ Health and education service providers should implement strategies so that all children with additional health needs are assessed and provided with a multidisciplinary support plan that ensures better care and support for these children throughout their educational journey.

✓ Health and education professionals should be given training on the impact of various health conditions on wider educational outcomes.

✓ Integrated care boards need to work with multiple academy trusts, NHS Trusts, and maintained schools within their areas to ensure genuinely integrated service delivery across health and education.

✓ Schools should be used as "hubs" for delivering health services, especially within disadvantaged communities.

7. Education-led partnerships can improve life chances for children and young people

This chapter highlights:

- Services are currently fragmented. As families struggle to access a complex web of services, children's education and health outcomes suffer, and, in the worst safeguarding cases, vulnerable children fall into the gaps left between professionals.

- Formal partnerships within local authority areas can provide the permissions, resources, and vision needed to connect services around families via schools. Schools, health services, police, the local authority, voluntary services, universities, faith leaders, and businesses can come together to drive change.

- Patterns of risk vary from place to place, community to community. At "place" level (electoral ward or similar) schools and early years settings can "Act Locally" as an effective hub for communities, local businesses, and services to build an integrated, evidence-led response to local needs.

The evidence is clear: current systems for delivering public services are fragmented and can be challenging to navigate – especially for families already experiencing disadvantage. Indeed, children growing up in poverty are much more likely to require multiple forms of support, spanning education, physical and mental health, care, and policing [3].

The long-term consequences of disconnected services can be seen in the poor social mobility and chronic ill health of children growing up in disadvantaged communities – and the costs to individuals, families, and health and care systems are more than the UK can afford.

Below are examples of various programmes that have helped connect schools with wider, specialist services at both a local authority and ward level.

Opportunity Areas – Improving social mobility through education partnerships

The Department for Education's (DfE) Opportunity Areas (OAs) place-based programme supported social mobility in areas facing entrenched deprivation between 2016 and 2022. The long-term objective was to transform the life chances of children and young people in 12 areas across the country with low social mobility (Northern England having six of the 12 areas including Bradford, Blackpool, Derby, Doncaster, North Yorkshire Coast, and Oldham). The programme aimed to learn more about what works in improving education outcomes in coastal, rural, and urban areas. It tackled regional inequalities by convening resources, using evidence-based approaches, and testing new approaches to unlock barriers that hold young people back in geographic areas where educational challenges are greatest.

Many programme insights were gathered and shared through DfE

"Insight Guides" over the six years of delivery. These showed the importance of:

- Place-based working in a holistic, bespoke approach that is tailored to each community's specific needs.

- Targeted funding for designated areas and building on local knowledge to enable deployment of the expertise needed to enact change.

- Evidence-based strategic thinking and championing local leaders.

- Building relationships and the work of independently chaired partnership boards that have engaged with local stakeholders.

- Independent chairs and external "disruptors" to encourage change.

OAs in Northern England were transformative. They provided much-needed investment into education that enabled bespoke place-based support. For example, the Blackpool OA supported approximately 200 secondary school pupils in the area who were at risk of being excluded, while the North Yorkshire Coast OA filled over 100 teaching posts across 28 schools, including attracting 24 teachers from outside the area. In addition, over the course of the programme, the quality of education improved, with 39 schools improving at least one Ofsted grade in the Bradford OA. There were two core success factors that drove improved outcomes and lasting place-based change. These were effective leadership and discretionary funding made available from central government.

Effective leadership of the OA's formal partnership boards is fundamental in bridging divides between local authorities, health partners, and schools, to change practice and culture, and tackle underperformance. This leadership also oversaw how Government funding was being utilised locally and ensured accountability.

Equally important was a discretionary budget, able to bring additional capacity when schools and other providers needed to release staff – for example, in peer-led school improvement programmes, and to invest in additional packages of support for professionals, children, and families.

The challenge faced by Northern areas is the limited ability of local and regional partners to draw from their core funding when services are already overstretched, and resources must be committed to respond to new and emerging need (i.e., Ofsted inspections). Even through the Covid-19 pandemic, OAs had the agility to respond to changing need and contributed to educational recovery aided by both strong leadership as well as discretionary funding.

Since the OA programme ceased, many areas have continued to deliver evidence-based interventions, support networks, and formal partnership arrangements to continue tackling the issues that still see poorer child health and educational outcomes in areas of deprivation. These efforts are at risk, however, without support from central Government.

The Priority Education Investment Area (PEIA) continues to provide welcome targeted support within disadvantaged areas, but the focus has reverted to work "inside the school gates". The PEIAs focus on topics such as writing and maths is important but PEIAs would be most effective when supported to address those issues "outside the school gates" that impact children's ability to learn. The proven benefits of the OA programme suggests strongly that PEIAs should be better resourced to tackle place based educational problems in a more holistic manner.

The Morecambe Bay Curriculum project

A focus on place means the ability to not only consider inequalities in the context of economic deprivation and educational disadvantage, but also coordinate a powerful response to the climate crisis as it centrally affects the lives and prospects of children and young people within their communities.

The University of Lancaster and Lancaster and Morecambe College launched the Morecambe Bay Curriculum project in 2020. The Morecambe Bay Curriculum is supported and delivered by teachers, early years practitioners, researchers, health professionals and community leaders who recognise that a collective approach is key to tackling the climate crisis and creating opportunities for young people.

The curriculum ensures that the different stages of the education system (from early years to postgraduate students), provide the skills, knowledge and behaviours required by business to respond to the climate emergency.

The community lies at the heart of the Morecambe Bay Curriculum and they curate the content and bring it to life at a grassroots level. Children and young people across Morecambe Bay are focusing on themes of land, water, air, economy, and community. The Morecambe Bay Curriculum's community partners are ensuring that children are encouraged and empowered to become the change-makers and innovators our planet needs.

"I think really the most important thing that the Opportunity Area did was to say 'we need to bridge that divide between health and education'".
– Education practitioner

Bradford's Education Alliance for Life Chances – Local leaders coming together to drive change
Schools have long recognised the impact of health, care, and other non-educational factors on children's behaviour and readiness to learn, and the potential to use their unique access to children and families to link them to essential services. OAs provided the necessary connections, permissions, and resources to allow schools to take a leadership role, without imposing unrealistic burdens or distractions from their core business.

In Bradford, the Education Alliance for Life Chances (EALC - pronounced "elk") was formed as a legacy recommendation from Bradford's OA, to sustain progress on social mobility [53]. EALC is led by the leaders of the strongest multi-academy trusts, local authority, health trusts, policing, universities, and faith groups.

To be effective, EALC-type partnerships require the right mix of resources, permissions, and authority to drive and oversee change. This will vary according to the priorities being addressed but is always essential.

In Bradford, EALC has partnered with the Centre for Applied Education Research (CAER) to bring research to schools and early years settings, effectively placing it as the district's Research and Development department. This includes connecting children's data and enabling information sharing to:

- Improve safeguarding and efficiencies.

- Demonstrate trends (e.g., eating disorders affecting secondary school students) and tackle poor school attendance.

- Identify children at risk of autism through the Early Years Foundation Stage Profile.

EALC is a promising partnership model and Bradford has worked hard to secure these arrangements following the OA programme. Similarly, like OAs, EALC-style arrangements require both effective leadership and a discretionary budget to drive the change on the scale that is needed. Locally, resources are tight, and while Bradford could expect partners to be open to suggestions to match fund investment, it needs a longer-term solution that enables the partnership model to drive change at both a local authority area-level and implement place-level delivery, e.g., "Act Locally".

Wherever they are established, EALC-type partnerships are well placed to drive action on challenges requiring bold, innovative collaboration.

In Bradford, the Priority Education Investment Area work is a cross-cutting theme within the CAER. This demonstrates the potential for local areas to bring together the many relevant stakeholders to improve outcomes for children and young people by working with and through schools. There is, however, a need for central Government to coordinate and resource such local initiatives.

"Act Locally" – Schools leading data-driven, place-based partnerships for children
Patterns of risk vary from place to place, community to community. Three "Act Locally" partnerships in Bradford act as an effective hub for communities, local businesses, and services to build an integrated, evidence-led response to local needs by working with and through schools and nurseries. These responses are driven by insights from data science following a model first developed on the Holme Wood estate through funding from the Alan Turing Institute. Each partnership is specific to an area that has high levels of multiple deprivation: Holme Wood, Manningham and Girlington, and Keighley.

Built around, and led by, local schools, each partnership has brought local policy makers – from health, education, care, and policing – together with residents, front-line professionals, and members of the university research community to tackle challenges. Each partnership agreed three area priorities, key actors in each area, and identified sources of data, including lived experience. This enabled the "Act Locally" groups to provide a mandate for change from the community, and to speak as one to local commissioners and decision makers to seek resources, permissions, and support. For example, the "Act Locally" group in Keighley prioritised food insecurity as the data showed the area scored highly on related markers of deprivation and 8.2% of adults experienced hunger in

"I learned that data science is related to a lot of careers. I was already planning on coming to this university and it has made me even more determined now." – Secondary school pupil, Keighley

2021 [54]. It also aligned with findings from work with young people earlier in the year, when "Bradford Citizens Alliance" – a coalition of organisations in the district that serve young people (led by Dixons Academies Trust, see Chapter 5) – identified the "cost of living" as a priority area for pupils and students in Bradford.

Keighley Schools Together (KST) – a self-organised network of local schools – took the lead on this priority. First, they worked with charitable food organisation "Rethink Food" to re-route surplus supermarket food through schools, giving families a more accessible alternative to food banks. KST then worked with the Leeds Institute for Data Analytics (LIDA) to deliver data workshops in local schools, enabling pupils to analyse (and in some cases, provide their own) data and information on access to affordable and healthy food options in the community. These workshops also encouraged and allowed pupils to gain experience in data science and research as a potential career.

KST will reconvene their "Act Locally" partnership in the autumn term of 2023. With a clearer evidence base and a mandate for action, the partnership will share learning from its first phase and use data science tools such as the "Priority Places for Food Index" to plan ways that schools and their partner organisations can better support local pupils and families experiencing food insecurity and poor diet.

Key recommendations:

✓ Create formal partnerships (that agree resources, permissions, and authority) at local authority area level, that enable schools, health services, police, local authorities, voluntary services, regional universities, faith leaders, and businesses to drive "whole system" approaches to improving social mobility, health, and education through schools and nurseries.

✓ Establish "Act Locally" convening groups at place level (i.e., ward or similar) that allow schools to work with their communities, children's service professionals, and businesses to influence and drive a more effective, efficient, and responsive offer from local services.

✓ Allocate at least £1m per year to allow meaningful action at scale through formal partnerships between local authorities and the Government. Robust monitoring and challenge should be overseen by the Government to ensure value for money and learning.

8. Universities can be "Research and Development" departments for local authorities

This chapter highlights:

- Universities can ensure delivery of evidence-based policy by becoming "Research and Development" (R&D) departments for localities, allowing public service providers to ensure decisions on the use of public funding rely on the best evidence, and programmes are robustly evaluated.

- Successful examples demonstrating initiatives connecting universities and public sector organisations from Bradford, Leeds, and wider West Yorkshire.

- Work underway to extend city R&D departments across the North of England, led by the Child of The North consortium, and its potential for national adoption.

The evidence is clear: as the development of the Covid-19 vaccine showed, academic research can be a powerful tool for improving people's lives, beyond university walls. Local partners and communities can design, build, and oversee more effective public services by harnessing the capacity of universities.

Universities should be the engines of creativity and innovation for public services

At present, universities – and the world-class research, and researchers they produce – are disconnected from the societies they live in and alongside. There is an urgent need to build relationships and systems that can hardwire universities into education, health, housing, social care, policing, and other public service systems. Universities will then be able to more effectively inform the development of these public services, as well as responding to what these services need.

The Child of The North consortium, led by the N8+ (a partnership of the eight most research-intensive and associated universities in the North of England) has developed two initiatives that demonstrate how to connect universities to public service organisations, and the benefits this can produce.

These are:

- The Born in Bradford Centre for Applied Education Research (CAER) [55].

- The Child Health Outcomes Research At Leeds (CHORAL) programme [56].

CAER offers a testbed for creating city R&D departments
CAER connects researchers to schools, health professionals and families, designing and testing new ways to understand, identify and meet the needs of children. Basing its research and interventions in educational settings, CAER takes advantage of schools' unique access and knowledge of their children and families. It informs organisations, practitioners and policymakers looking to obtain a holistic view of the factors that influence outcomes for children and young people.

Within CAER are eight "R&D" groups, focussing on themes shown by the evidence to exert the greatest influence on children and young people's education and wellbeing in Bradford:

- Social, emotional, and mental health.

- Autism and neurodiversity.

- Digital makers.

- Vulnerabilities and future policing.

- Motor skills, physical activity, and food insecurity.

- Birth to 5 years.

- Child health in schools.

- Learning, language, and cognition.

"The fact that recruitment to BaBi has been so high in Wakefield district shows how positive the culture has been and how well received the study has been by the local families" – Judith Holliday, BaBi Wakefield Principal Investigator

Evidence demonstrates that vulnerable and disadvantaged children and their families tend to face multiple challenges, which span the eight CAER themes. If left unsupported, a child's ability to reach their academic, social, and personal potential can be significantly limited. These children and their families require coordinated, multi-agency support from fully integrated services – including education, health, and social care – which are more efficient but harder to plan, deliver and oversee.

By partnering with the local authority, NHS trusts, police, and multi-academy trusts, CAER aims to empower schools and early years settings to connect with other local services, and design and deliver evidence-based and integrated approaches that support children and families, in and beyond the classroom.

For example, CAER established webinars throughout the pandemic to connect school leaders with health experts (including paediatricians, public health, psychiatrists, virologists, etc.). These webinars were so successful, with over 1,000 attendees, there is now a monthly programme that connects school leaders (from the district's 208 schools) to academic experts – with a mandate to explore improved ways of working (e.g., improving speech and language pathways, better management of asthma within schools).

R&D groups bridge and connect to operational and research communities to:

* Connect research priorities to the most important and complex delivery challenges facing children, families, and services in the district.

* Align research timelines to planning and commissioning cycles, so they can influence the way services are delivered.

* Help the system test, evaluate, learn, and share effective practice.

As another example, CAER has responded to the local authority's concerns of high school absence rates across the district by conducting research that can be used to inform policy changes.

Preliminary findings using pre-pandemic figures show large discrepancies across each of the wards within the district, with the ward with the highest rates of unauthorised school absences being 22.4 times higher than the ward with the lowest rate. These findings suggest a specific place-based approach (i.e., at ward-level) to policy change and intervention may be most effective.

Applying the CAER methodology to improve children's lives in Leeds
The success of CAER supported the creation of the CHORAL programme through a partnership developed across Leeds Teaching Hospitals NHS Trust, Leeds Hospitals Charity, and the University of Leeds. CHORAL's vision is to improve children's lives through the delivery of a sustainable programme of transformative research focused on child health. CHORAL is harnessing and coordinating the world-leading but fragmented children's research across the Leeds City region and creating the optimal research infrastructure and environment to drive better health and social outcomes for children and young people across Yorkshire. Health inequalities have been identified including:

* The adverse impact of major congenital abnormalities on education outcomes (see Chapter 6).

* Disproportionately worse cancer outcomes for children from South Asian backgrounds living in the UK.

CHORAL is connecting clinicians, clinical scientists, academics, and wider healthcare professionals to enable a whole system approach to child health. "Multidisciplinary research groups" (MRGs) will

"Born and Bred in" (BaBi)

"Born and Bred in" (BaBi) is currently being run across six sites in England including Doncaster, Wakefield, and Leeds. These sites link routinely collected data from multiple services and providers for participating mothers and their babies (recruitment takes place through maternity services).

Linked health, social, and educational data can then be used to provide a picture of children's lives over time, and help local policymakers understand how local factors influence life outcomes. In the future, participant data will be brought together across sites to answer questions of national relevance.

In August 2023, BaBi reached the milestone of recruiting over 22,000 participants. The network will continue to increase research capacity across regions, and will help inform policies and practices, ultimately improving care, health, and life outcomes for children and their families.

The BaBi datasets provide an outstanding asset and an ideal opportunity for the research community to bring their academic firepower to bear on societal issues playing out within their locality (thereby supporting public service providers including integrated care boards).

BaBi has greatly increased research capacity in the North of England, by expanding Reproductive Health & Childbirth teams and introducing Research Midwives to several Yorkshire and Humber Trusts. This model is ripe for national adoption and would allow every area to pull on the type of insights available to Bradford through Born in Bradford and coming online in Liverpool through C-GULL (see Chapters 5 and 9, respectively).

deliver against three themes:

* Children's cancer translational research.

* Comprehensive childhood outcomes research – delivering a step-change in understanding how to support children through innovative data linkages.

* Determinants of long-term mental, physical, and social health in children and young people – a partnership to tackle the wider determinants of child health.

Working with young people across these MRGs will enable co-production of research that meets the needs of patients and their families whilst ensuring the sustainability of world-leading research and researchers.

This initiative will enable timely and appropriate response to new intelligence by adopting the CAER methodology to place public service partners, such as schools, at the heart of the partnership.

Harnessing the potential for city R&D departments across the North of England
Child of The North, as a platform for collaboration, high-quality research, and policy engagement, offers an outstanding opportunity to create similar ecosystems across the North of England focused on the priorities and research strengths within the locality – an initiative championed by Professor Charlie Jeffery, Vice-Chancellor of the University of York, in his role as chair of the N8, and led by Professor Matthew Grenby, Pro Vice-Chancellor of Research and Innovation, Newcastle University.

Child of The North is developing the detail of the R&D work across its partners and considering how this becomes a tangible "translation pipeline" between the research community and education settings. Professor Jeffery is exploring how integrated care boards across the North of England can make best advantage of the R&D work and create a model through which the UK's public services can benefit directly from our world-leading university system.

Key recommendations:

✓ The methodology used by the Centre for Applied Education Research (CAER) and Child Health Outcomes Research At Leeds (CHORAL) should be rolled out across the North of England to bring public organisations together to improve outcomes for children and young people.

✓ Regional universities and public service organisations should work together to create a positive and inclusive network of R&D departments across the North of England. These departments should be represented on public boards to ensure decisions are based on the best possible evidence.

✓ Universities should be hardwired into programmes such as the "Opportunity Area" scheme (see Chapter 7) from inception so that investments can be properly evaluated and learning what does and doesn't work can be disseminated more effectively at a national level.

"[there is a] greater sense of community up North"
– Student, Mirfield

Creating citizen scientists in schools

SAMHE stands for Schools' Air quality Monitoring for Health and Education and is a great example of the potential for universities and schools to work together.

SAMHE brings together scientists, students, and teachers to collect invaluable information whilst educating and inspiring young people in schools. SAMHE is establishing a network of air quality monitors in schools across the UK, to generate an unparalleled dataset which will help researchers better understand schools indoor air quality.

Schools are provided with a free high spec air quality monitor that measures carbon dioxide (CO_2), volatile organic compounds (VOCs) particulate matter (PM), temperature and relative humidity. Teachers and students access their data through a specially designed interactive codesigned web app, seeing how air quality changes over the course of hours, days or weeks and months.

The web app also offers a range of related activities and experiments, creating opportunities for pupils to be scientists and do hands-on experiments with their monitor. The data from each monitor is recorded in a national database. SAMHE is being supported by the Department for Education to recruit 1,000-2,000 schools covering a full range of school types, sizes, locations and building styles. This will generate enough data for the scientists to analyse to understand schools' air quality across the UK. The overall aim is to understand and improve long-term air quality for all schools (see the "Class-ACT" case study in Chapter 9).

9. Connected datasets can improve public service delivery

This chapter highlights:

- The power of using connected data across our public services to provide integrated care and inform policy.

- The potential of using data science and artificial intelligence (AI) to trial interventions digitally before rolling out to the "real world".

- A public health intervention that used connected health and environmental data to test investments in improving the air quality of classrooms and demonstrated the impact on education outcomes.

The evidence is clear: The inability of public service organisations to share information acts as a major barrier to planning and delivering integrated care [57, 58, 59, 60].

Public services are organised and delivered within specialist organisations (e.g., education, health, social care, and policing). Policies are developed within political structures that map to these organisations both centrally (e.g., Department for Education, Department for Health and Social Care, Ministry of Justice, etc.) and at a local level (e.g., multiple academy trusts, hospital trusts, local authorities, and regional policing authorities).

The fundamental problem with this structure is that the lives of families and individuals do not fall neatly within these organisational silos. This underpins the drive to move towards "integrated care" systems where organisations are better connected. Unfortunately, the planning of integrated care is prevented through a lack of knowledge about how services intersect and interact within the lives of families. The delivery of integrated care is hindered because practitioners cannot share and integrate information across organisations.

The consequences of failing to use information effectively in public service delivery are catastrophic. It is rare to read a serious case review (Children's Act 2004) that does not highlight failures in information sharing across organisations. In December 2021, the tragic case of Star Hobson [61] showed that our systems do not take advantage of scientific advances in data science nor in the opportunities offered by connecting data across services.
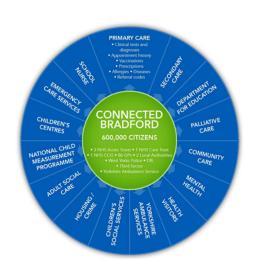
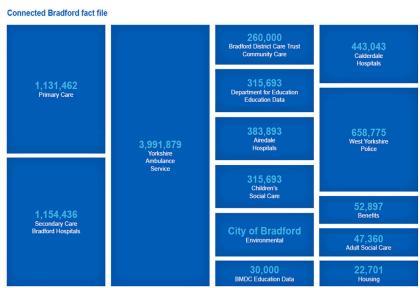**Two evidence-informed approaches that improve understanding of how public services intersect and interact**

1. Bradford has created a first-of-its-kind connected database (see Figure 6) that contains the primary- and secondary-care health records of citizens across the Bradford district that are linked with education records, social care, policing data, etc. The database is an incredibly powerful research tool that allows scientists, working with policy makers, to undertake holistic data science that can shine a light onto critical social issues that span disparate services. Bradford has proved the principle and provided a methodology that can be scaled up in a test-and-learn manner across the North of England to inform a national approach.

2. Bradford has used its research networks (such as EALC and CAER - Chapters 7 and 8, respectively) to work with Bristol to identify legal pathways that allow organisations to "reidentify" an individual in their care so they can efficiently and effectively connect with other public services to coordinate a whole system response to an individual's or family's care needs. The implementation of this approach will allow practitioners to better understand the needs of citizens through access to records that would otherwise be hidden from them – such as an individual's GP having sight of education or social care records to better understand the causes of a child's ill health.

Creating a connected database that can enable integrated decision making

Bradford showcased the potential of connected data with the Born in Bradford project [62], one of the world's largest longitudinal birth cohort studies linking data for over 30,000 residents. Frequent

Figure 6: The Connected Bradford linked database

engagement with families ensured continued routine data linkage (e.g., in health, social care, and education records) in an ethical manner that was overseen by the communities who were described in the datasets.

The success of Born in Bradford in using connected data led to the creation of the "Connected Bradford" database [57] that sits within the NHS (the Bradford Teaching Hospital NHS Foundation Trust). The NHS provides a secure environment containing linked administrative datasets for thousands of citizens across the Bradford District (see Figure 6).

Connected Bradford is an incredibly powerful tool that provides extracts of data that cannot be linked back to individuals. This allows decision makers to understand how different public services interact and enables a genuinely integrated approach to care. The database has enabled transformational research such as Class-ACT (see below) and opens the potential for greater insight through advanced data science approaches and AI (see below).

Similar approaches to generate data linkage of health and education records have since been adopted by other projects across the North of England including BaBi (Born and Bred in) Leeds, Doncaster, and Wakefield (www.babinetwork.co.uk) and the initiation of the C-GULL (Children Growing Up in Liverpool) cohort study (www.cgullstudy.com) — see Chapter 8 and the case study below. These initiatives will allow similar insights to be obtained at a place-based, population level. It is recommended that similar practices of linking public service data become routine across the North as a trailblazer before being rolled out nationwide.

"I feel like we're going to have to hit rock-bottom before anyone will take this seriously"
— Student, Hartlepool

Classroom Air Cleaning Technologies (Class-ACT) — how integrated datasets can be used to address fundamental research questions
The Covid-19 pandemic highlighted the importance of good ventilation in the prevention of airborne diseases [63, 64, 65]. Many classrooms are poorly ventilated, which increases the risk of a child or member of staff contracting an airborne illness [66]. One possible solution to poorly ventilated classrooms is the provision of "air cleaning technologies" that remove particles from the circulating air. These include the Covid-19 virus and other pathogens, as well as particles that can cause asthma or hay fever.

The linked health and education data available in Connected Bradford allowed the Class-ACT project [67] to conduct a randomised trial to understand the impact that air cleaning technologies had on children's attendance in school. By combining health records with school absences, the study found that schools that had these relatively low-cost air cleaning technologies fitted showed significantly lower absence rates. Without these connected datasets it would only be possible to obtain a piecemeal picture of the potential for disease transmission to be reduced through fitting air-cleaning technologies within schools.

Using data science, digital twins, and AI to bring science to the art of policymaking
Connected data do not only offer immediate benefits to practitioners, as shown by projects such as Class-ACT, but they also create opportunities for the use of advanced technologies to better understand problems and coordinate responses holistically. For example, the UK's research councils and Government are investing heavily in "digital twins": ecosystems of computer models that

connect with real-time data and aim to mirror their real systems [68]. With Connected Bradford data there is the possibility to build a digital twin that captures the multitude of different services that an individual or family interacts with. The simulation can then be used to experiment with potential policies before their implementation, discovering possible adverse and unexpected outcomes, and thus reducing risk. It is also possible to incorporate AI methods that interact with the simulation and provide the opportunity to develop bespoke and unexpected solutions to problems. These opportunities, coupled with the new possibilities offered by "digital footprints" data, could revolutionise our approach to reducing many social problems that span disparate services.

Using the experience of Bradford to develop wider connected datasets
Connected Cities (extending the "Connected Bradford" model to other cities) would allow such coordination to become a routine feature of public service delivery – with all the associated long-term benefits to families, and the economy.

The Connected Bradford team have secured £8.3m from NHS England to create a "Secure Data Environment" (SDE) for Yorkshire hosted by the Bradford Teaching Hospital NHS Foundation Trust. This new platform will harness the collective learnings of Connected Bradford and host Bradford Insights. Beyond Bradford, the SDE has the potential to enable other areas in the North of England to develop similar systems (e.g., Connected Leeds, Connected Sheffield) and allow scientists across the N8+ Research Partnership to conduct their own policy-focused research. Outside of the North of England, the Insight Bristol team are being supported to use the NHS England SDE architecture so they can also benefit from linking police and local authority data with health records.
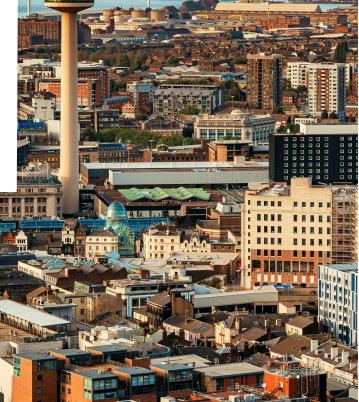
Key recommendations:

✓ Bradford has developed a proven methodology to create connected datasets in ways that can support coordinated public service delivery. This should be enhanced and disseminated to other partners, such as those across the N8+ research-intensive universities in the North of England.

✓ Innovations in AI and Digital Twin technologies should be leveraged with these connected datasets to develop new approaches to data-led decision making.

✓ Bradford should be supported to trial the use of the NHS England "Secure Data Environments" (data storage solutions that can house confidential data in safe and ethical ways) as a way of allowing practitioners across health, education, social care, and policing to share information securely and efficiently to address safeguarding problems and enable genuine holistic public service delivery. These efforts should be overseen by partners across the N8+ so that the work can be scaled at pace across the North of England in a test-and-learn manner.

Children Growing Up in Liverpool (C-GULL)

The University of Liverpool's Children Growing Up in Liverpool (C-GULL) study, launched in 2023 and based at the Liverpool Women's Hospital, is a large-scale longitudinal birth cohort study that will follow the lives of 10,000 Liverpool children and their families from early pregnancy. C-GULL was developed in response to an increase in challenges, such as health inequalities, infant mortality, poverty, and problems with healthcare and support services access in the Liverpool region. The study will help researchers better understand how health and social issues drive challenges such as these and provide insights into how outcomes can be improved for children.

In its initial phase, C-GULL will collect extensive data, including biological, biometric, socio-demographic, and psychosocial information, during pregnancy and a child's first two years. Data collection methods will assess areas such as home and neighbourhood environment, child development, and physical and mental health.

Additionally, the study will link health and educational records and collect real-time data using health technologies (e.g., devices to track physical activity and sleep) and mobile applications, to better understand how various factors influence each other. Together, all of this information will provide a comprehensive picture for clinicians and researchers of how various factors influence health and wellbeing. The study will ultimately inform strategies and policies that improve life outcomes, to create a more equitable future for children in Liverpool.

10. Evidence-based approaches to address the SEND crisis

This chapter highlights:

- Children with additional needs can thrive in mainstream classrooms provided their needs are met early.

- Providing support early within the school context reduces the burden on specialist services as only children with the most severe and complex needs will require referral, thus reducing extensive waiting times.

- A collection of digital tools can be used to help identify children who need support and provide advice on how to best do so.

The evidence is clear: children and young people with neurodevelopmental conditions (e.g., autism, developmental coordination disorder) and SEND can thrive in mainstream education if their learning and support needs are met at an early age [69]. Yet, there is still a SEND crisis. Schools and parents rely on health systems to identify need and trigger support but waiting times for assessments are often several years and getting longer. This can lead to worse outcomes for these children and young people, with delays in the provision of support having devastating impacts on academic achievement, mental health, and later life chances. Below are examples of various digital tools and interventions that can be used to identify those children who require additional support.

Helping schools identify support needs, while reducing reliance on specialist services
Research conducted at the Universities of Leeds, Bradford and Lancaster has demonstrated that the statutory Early Years Foundation Stage Profile, conducted in England at 4-5 years of age, can identify children who are more likely to require Special Educational Needs and Disability support in the future [70]. This research shows that children who do not reach a "good level of development" are over five times more likely to require SEND support two to seven years later, compared to children who do reach a "good level of development". This builds on prior research highlighting the importance of input from schools in the identification process, as well as the effectiveness of teachers in identifying neurodevelopmental issues and SEND [71, 72, 73].

Although the EYFSP is a useful tool, it provides information at only one time point – the start of a child's school journey. Researchers have therefore developed a new tool: the "Electronic Developmental Support Tool" (EDST). This tool, which has been developed alongside educational psychologists and Special Education Needs Co-ordinators (SENCOs), can be conducted multiple times across primary school. The tool involves teachers rating a child's acquisition of key developmental skills against expected levels for their age. It is based on the EYFSP assessments where teachers answer a short series of questions relating to a child's: "cognition and learning"; "communication and interaction"; "socioemotional and mental health"; and "sensory and physical" skills. During this process, teachers invite parents into school to help complete the EDST.

"I didn't even know about CAMHS until last year, and that's kind of sad... 'cause I could've used some support here and there" — Young person with autism

This increases the likelihood of gaining a more holistic picture of a child's strengths and difficulties and reduces the risk of children falling through the net.

Providing this broader picture for each child addresses the structural inequalities that are often reported in the diagnosis and referrals of SEND and neurodevelopmental conditions. For example, recent research has demonstrated that boys are more likely to receive an autism diagnosis compared to girls, with girls who do receive a diagnosis receiving it later than boys on average [74]. Girls with autism from Asian backgrounds are at further risk of delayed and missed diagnosis compared to their male peers and girls from White British backgrounds [75].

As of August 2023, the EDST is being trialled in 14 schools across Bradford. It produces a simple report summarising each child's learning and support needs that can then be shared with other education and health professionals as part of a more connected system. Furthermore, as part of this offer, researchers are currently working with educational psychologists, teachers, and SENCOs to identify adjustments and evidence-based interventions that can be delivered immediately within the classroom to help support children based on their unique, highlighted needs.

"I spent so much time masking... I was always just very drained and tired" — Young person with autism

This will form a "Digital Advice Bank" which will automatically and more efficiently present advice on adjustments and interventions to be made in the classroom. This is due to be rolled out in January 2024 and will be coordinated with the work conducted by the Healthier Together team. Healthier Together addresses inequality by providing consistent, accurate and trustworthy healthcare advice to parents, carers, young people and professionals and is supported by the Royal College of Paediatrics and Child Health.

From September 2024, the EDST could be offered to schools across the UK if central government coordinated this initiative. Putting effective support in place sooner means children are less likely to fall behind their peers and require expensive specialist support while they wait for a clinical assessment (if they still need to be referred to specialist services).

Universal screening and intervention can address motor skill difficulties in schools
Motor skills are a crucial aspect of childhood development as they are the mechanism through which children explore and learn about the world. Approximately 5% of children have clinically significant motor skill difficulties [76]. However, most of these children never receive the support they need despite the devastating impact on their education and health, and the downstream costs borne by the health and care system [72, 77]. In the short term, this results in long (or closed) waiting lists due to the demand placed on services, and parental dissatisfaction (with the associated mental ill health of parents and children). In the long term, epidemiological studies show untreated deficits greatly elevate the risk of long-term physical (e.g., obesity) and mental (e.g., depression) health problems [78, 79, 80, 81].

Work conducted by the Centre for Applied Education Research (CAER) shows that schools are an optimal setting to assess and support motor skills, enabling the creation of new care pathways for children with motor skill difficulties. FUNMOVES (FUNdamental MOVEment Skills) was co-produced with schools, healthcare professionals and providers to empower schools to identify and support motor deficits and ensure health services (paediatrics, physio- and occupational therapy) only see children who require specialist support.

FUNMOVES incorporates:

- A universal assessment tool that allows teachers to test a whole class in an hour, using resources readily available in schools.

- Manualised school intervention resources to support children identified by the assessment tool. The intervention incorporates activities readily implemented within schools based on evidence of efficacy within the health system. The activities require minimal equipment and can be incorporated into physical education lessons, playtime, and classroom movement breaks.

- A family resource focused on changing everyday routines (e.g., hop rather than walk to the bathroom) without the need for regimented programmes, large time commitments, or expensive equipment. These resources pull on international evidence regarding effectiveness.

FUNMOVES works in close collaboration with the Children's Development Service (CDS) in Bradford, who are (in part) responsible for the assessment and support of childhood motor skill difficulties. The CDS have adopted FUNMOVES in their clinics to help prioritise their waiting list since traditional clinical tools (e.g., the Movement Assessment Battery for Children) take significantly longer to administer yet yield similar conclusions. This has had a positive impact on the speed of assessment and thus contributes to the waiting list problem plaguing the service.

FUNMOVES thus provides a powerful tool to address some of the underlying problems that sit beneath the current SEND and neurodevelopmental condition referral crisis (e.g., the autism assessment waiting lists), complementing the EDST while also being effective in its own right.

Finding efficiencies in the assessment system to improve identification and support for children with autism
SUCCESS (Supporting Understanding of Children's Communication, Emotional and Social Skills) was a project trialled in Bradford through the Department of Education's Opportunity Area programme. It had two phases:

1. Teacher identification of children likely to require an autism assessment, using the EYFSP assessment, as a trigger for schools to use autism screening tools.

2. The deployment of multi-disciplinary teams into schools to carry out assessments for autism on site for children identified as being at risk of undiagnosed autism (and other conditions).

SUCCESS was shown to effectively:

- Identify autistic children who are likely to remain undetected for longer, and therefore be vulnerable to poorer outcomes (e.g., girls and children from minority ethnic groups).

- Help families overcome hesitancy about visiting Child and Adolescent Mental Health Services (CAMHS); for example, due to

"... unless you've got a physical diagnosis, schools won't support [you]... if you're on the waiting list or trying to get that diagnosis, you're going years without support"–
Young person with autism

cultural issues around mental health, because of schools' trusted relationships with families. This reduces the likelihood of missed appointments and the resultant costs.

- Enable clinicians to draw on both teachers' observations and their own observations of children learning and interacting in a familiar school environment, making for a richer assessment.

- Facilitate multi-disciplinary teams in working with teachers and families to put support mechanisms in place straight away.

SUCCESS has since been rolled out across four other areas in England over 2022-2023. This included work in Cambridgeshire focusing on girls in Years 5 and 6 where the EYFSP has been used to identify autistic girls who had not been identified because they were "masking" their difficulties in the classroom. SUCCESS is ready for implementation by other localities, with appropriate advice and support to help them adapt the approach to their local contexts.

Furthermore, researchers are now working with schools and health partners to refine the model to allow "dual assessment" of autism and ADHD. This work is being piloted in autumn 2023 in disadvantaged areas, where data shows the greatest disparities in time to assessment.

Realising a vision enabling children with neurodevelopmental conditions and SEND to thrive at school
Our longer-term vision is for a connected system: both the EDST and FUNMOVES will help schools and health partners identify children who need assessment earlier, while 'in-school assessment' (the SUCCESS approach) will speed up the clinical process. This will require more work on data sharing and information governance. While the EDST, FUNMOVES and SUCCESS are standalone tools, our broader vision is for these to be used in conjunction to ensure no child has their needs unmet.

Key recommendations:

✓ National implementation of the Electronic Developmental Support Tool (EDST) from September 2024 to help schools identify and meet the learning and support needs of all children and young people while reducing reliance on specialist services.

✓ Empower schools to deliver the FUNMOVES (FUNdamental MOVEment Skills) assessment to measure children's motor skills so that they can support children where necessary.

✓ Work with localities and schools to adopt the SUCCESS (Supporting Understanding of Children's Communication, Emotional and Social Skills) programme to reduce the barriers children and their families face in accessing services, diagnoses, and support.

11. Evidence-based approaches to supporting pre-school children

This chapter highlights:

- Pre-school children's language and communication skills, social and emotional development, and physical development have been significantly impacted by the Covid-19 pandemic.

- Evidence suggesting the importance of ensuring children are "school ready" and the implications when this is not the case.

- The introduction of the 50 Things initiative to improve development in the early years and ensure children are school ready that is being rolled out across several local authority areas.

The evidence is clear: Pre-school children's language and communication skills, social and emotional development, and physical development have been significantly impacted by the Covid-19 pandemic [82].

These disadvantages are disproportionately affecting children who already have a greater level of need and exacerbating inequalities [83]. For example, with reduced access to specialist services during the Covid-19 pandemic, children with existing difficulties (such as speech and language problems) are at an even higher risk of negative repercussions on their social, behavioural, and academic development [84].

The first 1001 days of a child's life have a lifelong impact on their physical and mental health as well as educational attainment and life chances. Intervening as early as possible has been shown to be the most cost-effective way to improve children's life chances and reduce inequalities in outcomes [85].

There are stark inequalities in children's early experiences and outcomes, with socially disadvantaged children more likely to be overweight and miss key developmental milestones. For example, children living in the most deprived areas are more likely to be overweight/obese (20.3%) than those living in the least deprived areas (7.8%) [86]. Children of Pakistani heritage are less likely to achieve good developmental outcomes (60.0%) than White British children (67.0%) [87]. In inner city areas of Bradford, 1 in 4 children were late talkers even before the pandemic, compared to a national average of 1 in 10 [88].

These inequalities are entrenched, with more than a decade of similar inequalities apparent in these outcomes and no evidence of any reductions over time.

Considering the implications of children not being "school ready"
Large North-South discrepancies in performance on the Early Years Foundation Stage Profile (EYFSP) are known to exist (as reported in the previous Child of the North report [1]). A larger proportion of children from London, the South East, and East of England are considered "school ready" (as indicated by the EYFSP) compared to children from Yorkshire & The Humber, the North West, and North East. This is particularly problematic when considering recent research indicating the importance of school readiness on later academic and non-academic outcomes. Recent studies have suggested that children who fail to reach a good level of development are:

- Nine times more likely to perform below expected levels in reading at Key Stage 1 [73].

- Seven times more likely to perform below expected levels in mathematics at Key Stage 1 [73].

- One and a half times more likely to perform below expected levels across all subjects at Key Stage 2 [89].

- Three times more likely to become a persistent absentee (<90% attendance) [90].

- Three times more likely to become NEET at 16-18 years of age [91].

- Two times more likely to have dental decay at 5-6 years of age [92].

Children growing up in poverty are at greater risk of multiple adversities in adolescence
Evidence shows a strong association between early childhood poverty and experiencing multiple vulnerabilities in adolescence [3]. The number of children living in poverty in the UK increased by 350,000 between 2021 and 2022, to 4.2 million [93]. Almost a third of children in the UK now live in poverty [94]. Failing in education is the most likely and most costly outcome for these children.

> *"[50 Things] is a fantastic app... I use it regularly as a tool to help inspire and shape activities that I can do with my children"* — *Parent*

Previous research has consistently shown the link between early childhood poverty and adverse outcomes [1]. However, studies traditionally focus on individual outcomes rather than examining them as groups or clusters. More recent research has explored the association between household income in early childhood and adverse health and social outcomes known to limit life at age 17 years [3]. The focus was on adverse outcomes proven to limit life chances: psychological distress, self-assessed ill health, smoking, obesity, and poor education achievement. It was found that:

- Children born into the poorest fifth of families in the UK are almost 13 times more likely to experience poor health and educational outcomes by the age of 17.

- Children from the lowest income households are five times more likely to experience poor academic achievement.

- Children from the lowest income households are four times more likely to be regular smokers by the age of 17.

While this research does not show that reducing absolute poverty is a flawed goal, it does suggest that:

- Reducing absolute poverty would not eliminate adverse outcomes associated with early disadvantage. Shifting children from the lowest income group to the next lowest would achieve only a maximum 5% reduction in multiple adolescent adversity.

- Reducing inequality through better connected public service

support would be more effective and efficient: removing health and education inequality in early childhood would reduce the number of children experiencing multiple adversity by more than 80%.

An overstretched workforce means pre-school children are not receiving the support and care they need

Exacerbating these issues further is that the early years and health visitor workforce is underpaid, understaffed, and undervalued. For example, 45% of childcare workers were reported to be claiming state benefits and tax credits [95]. Research suggests a relationship between quality of early childhood education and care and the qualification levels of the early years' workforce, even more so in more deprived areas [96]. In addition, health visitor services are severely understaffed, with staff-to-child ratios often as high as four times the recommended level, meaning a quarter of two-year-olds are missing out on vital health and wellbeing assessments [97]. A recent survey reporting 78% of health visitors feel increasingly stressed means this is unlikely to be rectified without change [77]. Therefore, pre-school children are not receiving the support and care they need.

Evidence shows intervening early to be the most effective way to reduce inequality among children, and the most efficient way to deploy public funds [98]. By providing free or cheap resources to families to help children develop, some of these adverse outcomes might be avoided, even for the most disadvantaged families.

The Better Start Bradford programme [99] has demonstrated that effective systems change in partnership working is possible. The programme has had success in making early prevention and intervention a top priority across health, local authority, nurseries, and voluntary and charitable sector organisations. The programme uses evidence from Born in Bradford to provide evidence of what is feasible for delivery on the ground, what is acceptable to families, and what is effective in improving children's outcomes to enhance school readiness [100].

50 Things to Do Before You're Five initiative helps every child reach key milestones

A number of developmental outcomes have been linked with attendance of good quality early childhood education and care (ECEC) settings [101]. The evaluation of the original Sure Start children's centres in the UK demonstrated positive effects on early years outcomes, and reduction in hospital admissions of children [102]. However, children in deprived areas are far less likely to have access to good quality ECEC so they are already disadvantaged.

"It can be used in a bespoke way to support specific areas of need and help [children] to achieve their potential" – 50 Things (Kirklees)

"[50 Things] has helped my child to be more explorative and curious" – Parent

Thus, improving ECEC access and quality in deprived areas has great potential to have a big impact on children's early life chances.

There is also growing evidence of the impact of "add-on" interventions such as parenting programmes, with evidence of effectiveness on child outcomes and other such evaluations underway [103]. The sustained increase at school entry (4-5 years), of language delay, poor physical health, and emotional trauma strongly suggests that a sustained offer to families of accessible activities for all children is needed. One such programme is the 50 Things to Do Before You're Five initiative (https://50thingstodo.org).

Play is a fundamental aspect of childhood and should underpin everything within the early years. 50 Things to Do Before You're Five seeks to help every child reach pivotal health, learning, and wellbeing milestones by providing caregivers with 50 low- or no-cost ideas for play. So far, 50 Things has been rolled out across several local authorities across the North, including Leeds, Bradford, Sheffield, Oldham, Wakefield, Calderdale, and Kirklees.

A recent impact report suggested 50 Things to Do Before You're Five has had a positive impact on children's development, with 72% of parents feeling more able to help their child learn in different ways, and 63% better able to communicate with their child/children when playing [98].

The impact of 50 Things makes sense because evidence suggests that active play, facilitated and supported by parents and carers who have an informed position and understand the immense value of small actions, helps:

- Improve health by establishing active lifestyles, leading to better mental wellbeing, lower obesity, and improved coronary and respiratory fitness.

- Establish healthy habits that can last a lifetime.

- Improve language and communication.

- Develop fine and gross motor skills.

- Enhance parental confidence.

- Impact school readiness, including better self-regulation, metacognition (thinking about one's own thinking and learning), and resilience.

Key recommendations:

✓ National leadership is needed to scale up the "Better Start Bradford" model to make early prevention and intervention a top priority across health, local authority, nurseries, and voluntary and charitable sector organisations.

✓ Increasing investment is required to improve access to high-quality training for early years educators and health visitors to improve staff retention and uptake.

✓ A concerted effort is required to pull together national and international examples of best practice that can inform approaches to supporting pre-school children in disadvantaged areas. The report published by the Royal Commission into Early Childhood, Education and Care in August 2023 should be used to drive a debate about how the UK is supporting its future generations.

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