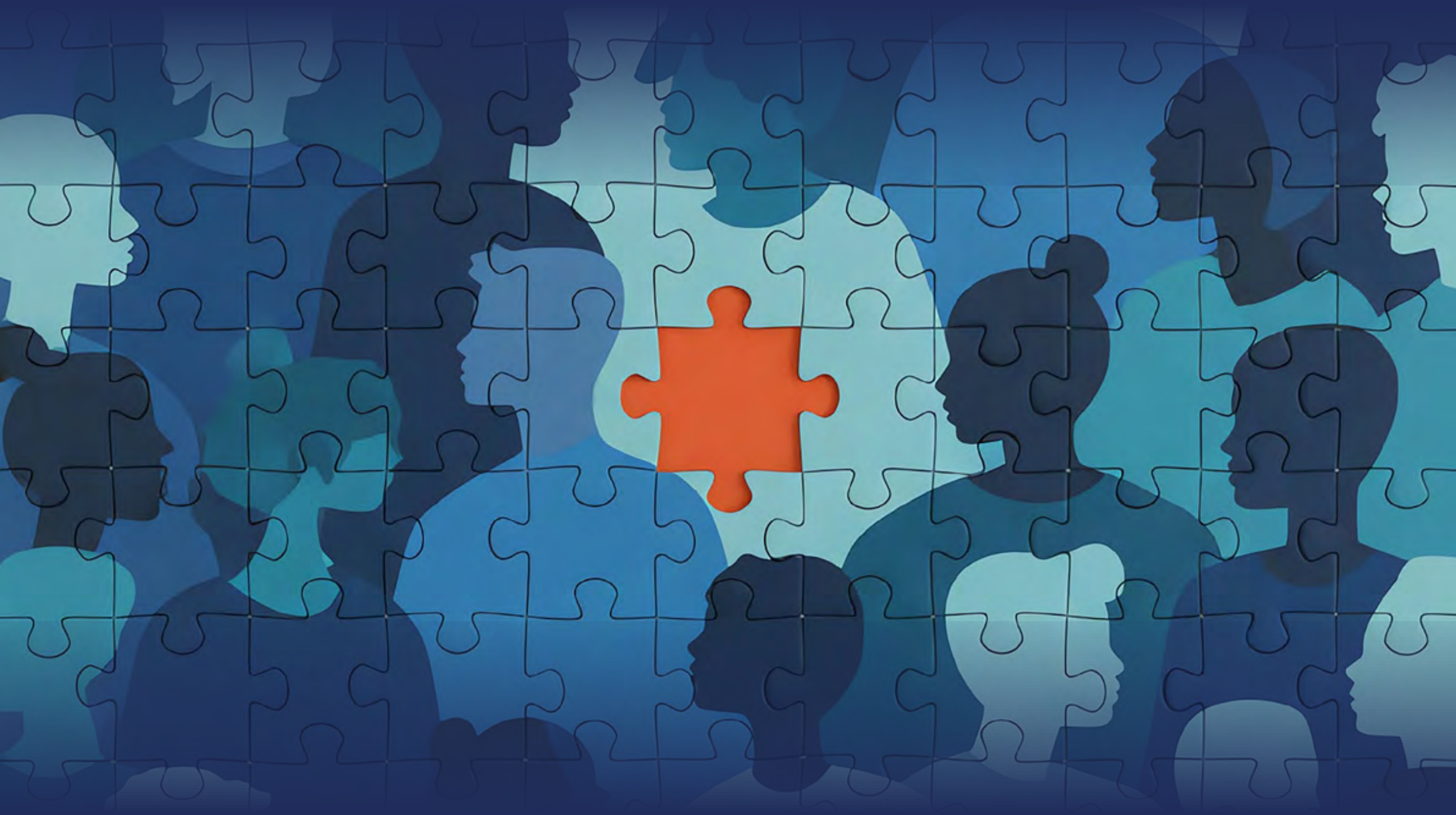
A country that works for all
children and young people



Connecting data: Intelligent and informed delivery to support every child to succeed

Child of the North
N8 CIR Computationally Intensive Research
N8 Research Partnership
Health Equity North
Centre for Young Lives
NIHR | Applied Research Collaboration Yorkshire and Humber

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We are publishing this report at a moment when the case for change could not be clearer. For too long, public services have been conditioned to concern themselves with the risks of linking and sharing data; while seemingly ignoring the risks of *not* doing so.

The recent Phase 1 Southport Inquiry has laid bare, in the starkest possible terms, what can happen when warning signs are seen in fragments, when information is not shared well enough, and when no single part of the system is able to see risk clearly and act with confidence. The Inquiry examined decisions across education, health, social care, policing, youth justice and more, and found poor information management and sharing, a lack of clear lead responsibility, and a significant gap in the ability of public services to assess and manage serious risk across agencies. It called for stronger multi-agency coordination and a shared risk-assessment approach.

As disturbing as this phenomenon is, it is sadly not new. The 2023/24 annual report of the Child Safeguarding Practice Review Panel shows that in 81% of serious incidents where a child died or suffered serious harm, there was a lack of coordination between services driven by poor information sharing, delayed responses and fragmentation. The Panel's previous annual report stated that *"weaknesses in information sharing continue to be a key perennial challenge."* The national review of child protection, produced in response to the murders of Arthur Labinjo-Hughes and Star Hobson, observed that *"time and again we see that different agencies hold pieces of the same puzzle but no one holds all of the pieces or is seeking to put them together."*

These cases illustrate what is actually at stake. This report's subject matter may be technical, but its implications are not. It is a practical contribution to the challenge of how to build public services that can identify young people's vulnerabilities earlier, understand their needs in the round, and act together before harm escalates. Effective data sharing, enabled by connected data infrastructure, is literally a matter of life and death.

This report grew directly out of the Manchester showcase (see page 25) convened by Child of the North, the N8 Computationally Intensive Research group and the Northern Health Science Alliance. That event brought together policymakers, researchers, NHS leaders, local authorities and delivery partners to focus on one urgent question: how connected data can help public services improve the lives of children and young people. The discussions that day shaped and sharpened this report. But the roots of the report run much deeper. They lie in five years of shared work, much of it accelerated by the pandemic, as we and many of our partners were forced to confront a simple truth: children's lives are connected across health, education, social care, community safety and family circumstances, but our systems still too often see them separately. That disconnect makes it harder to identify vulnerability, harder to act early, and harder still to prevent children from falling through the gaps.

For Haroon, this reaches back to his work with Baroness Anne Longfield in the Children's Commissioner's Office, where they led a unique programme of work to understand how many children are vulnerable, what kinds of needs

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they have, and whether those needs are being identified or supported. The lack of connected data meant that it was often not possible to identify the presence of multiple overlapping vulnerabilities even in the aggregate, let alone for an individual child. But even the limited, fragmented data that was available showed that over 2 million children in England were living in a family facing complex needs, including over 100,000 in families affected by the 'toxic trio' of domestic abuse, parental drug and alcohol dependency, and severe parental mental ill-health. This analysis – manually connecting together different data sources – uncovered vast swathes of unmet need: 760,000 vulnerable children seen by children's services but not in receipt of any formal support, while another 830,000 were not even on the radar.

During the pandemic, the Children's Commissioner's Office produced a local area data dashboard to help government and councils identify, monitor, and respond to rising levels of childhood vulnerability throughout the crisis. That work showed both the power and the limits of the data then available: it made many vulnerable children more visible, but it also exposed how fragmented our systems were and how partial our view remained.

For Camilla, Mike and Steve, the same period reinforced an argument long made by paediatricians: that better support for children requires better data sharing across services, including the development of a single unique identifier to help services work together more effectively around children and families. The Royal College of Paediatrics and Child Health has been central to this case, advocating for the NHS number to be used as that identifier and for the wider digitisation and linkage of children's data across health, education and social care. More recently, the BACD Strategic Research Group and the Council for Disabled Children have strengthened that case further, recommending that child-level identifiers and linked data should explicitly be usable not only for operational safeguarding and welfare purposes, but also for research and service improvement, within existing legal and data protection frameworks.

In parallel, the wider Child of the North, N8 Computationally Intensive Research and Born in Bradford partnership has been exploring how routine linked data can be used not simply to describe need, but to identify vulnerability earlier and support better intervention. That includes work with the Data Improvement Across Government group, prompted by government interest in whether an electronic vulnerability index could help public services build a more coherent, preventive understanding of risk. The same motivation runs through all the work reflected here: a determination to move from disconnected information and reactive services towards a system that can see the whole child more clearly and respond more intelligently.

The report therefore brings together several strands that have too often sat apart: the RCPCH's long-standing focus on holistic early intervention that meets families where they are; Haroon's work on prevention, data infrastructure and evidence that leads to practical action; Camilla's leadership on children's health and on the need for better information-sharing across services; the work of BACD and others on a single unique identifier; RCPCH's long standing advocacy for using the NHS number as that identifier, alongside its wider work to digitise children's health records; the lessons from Connected Bradford; and the challenge from government itself to think harder about how data can help identify children at risk earlier. What follows is our attempt to bring those strands into one place.

At its heart, this is a report about children, not computers. It argues that connected data must be seen as core public-service infrastructure: essential if we are serious about prevention, earlier intervention, public trust and *better outcomes*. This last point is key. By "better outcomes", we do not simply mean keeping the most vulnerable children safe at the sharp end of child protection; we also mean a healthier, happier, more skilled, more resourceful, and ultimately more successful future population. Increasing the wellbeing, capability and capacity of the country's most precious asset – its young people – is the real prize on the table, and with enough patience and commitment, it will unlock many billions in fiscal, economic and social benefits every year in perpetuity. Connected data for connected services does not just safeguard the lives of extremely vulnerable children; it also safeguards the sustainability of the state, the cohesion of our communities, and our path to enduring national prosperity.

The question is no longer whether data can be linked safely and lawfully and used to drive improvements in service provision. Not only *can* this be done; it *has* been done. The question is whether the state can demonstrate the vision and commitment to build the systems, leadership and public legitimacy needed to use that capability well on a national scale.

This national model should be understood not as a collection of isolated local projects, but as a federated national grid of Connected ICBs. In such a system, local and regional partnerships would retain ownership of their data, relationships and priorities, while operating within a wider national framework that allows places to borrow strength from one another, share methods and learning, and contribute to a common public asset. The goal is not a single central database, but an interconnected ecosystem in which trusted local systems generate insight, improve services, and support research and innovation at national scale. This is how government can combine the responsiveness and trust that come from place-based leadership with the consistency, interoperability and cumulative learning that only a national approach can provide.

Integrated Care Boards are the right organising level for this agenda in England because the needs of children and families form a complex system. Poverty, mental health, neurodivergence, school absence, safeguarding, housing and wider family pressures interact dynamically across services and over time. Such systems cannot be understood, or effectively controlled, by managing each part in isolation. They work better when communication across the system is strong, when feedback is visible, and when local partners can self-organise around shared information and common goals. Connected data provides exactly that feedback infrastructure. Its purpose is not to centralise every decision, but to help the system act more like a system. ICBs are the appropriate level because they sit at the critical middle layer: large enough to coordinate across NHS providers, local authorities and other partners, but close enough to place to remain grounded in operational reality and local context. ICBs complement well the organisational arrangements with the UK's devolved nations allowing a genuinely connected UK approach that maintains local context and bypasses issues of interoperability.

This model is therefore deliberately distributed. Local authorities, schools, family hubs, primary care, neighbourhood teams and frontline NHS partners remain the anchor institutions on the ground, because they are closest to children, families and communities and are best placed to translate data into action. But they need a broader frame within which shared infrastructure, governance and intelligence can be organised across multiple places. Many ICBs contain several local authorities and a range of statutory and voluntary partners. The ICB is the level at which these local systems can be connected without flattening their differences, while also linking upwards to Whitehall departments whose policies and funding streams must be better aligned around children's lives.

We believe that England should adopt a national devolved "Connected ICB" model: an NHS-hosted, securely governed data infrastructure that links primary and secondary care records with education, social care, and other relevant public-service datasets to improve prevention, target support earlier, and design services around people's real lives rather than institutional silos. The problem facing public services is not a lack of effort or funding, but a structural inability to see need across organisational boundaries. Families experience health, learning, safeguarding, poverty, housing, and community risks together; our services still tend to see them separately. Connected data must be viewed as core infrastructure for effective public service delivery.

There is also a wider prize here for the UK. Connected data infrastructure is not only a tool for improving public services; it is **an asset for science, innovation, and economic growth**. A network of trusted local systems, linked through shared national infrastructure, would make it easier to generate better evidence, embed research into live public service settings, evaluate new technologies more quickly and attract inward investment into regions with strong civic data capability. In that sense, a Connected ICB model would help government do two things at once: improve outcomes for children and families, and build a stronger national platform for research, innovation and productivity. **The same infrastructure that helps services act earlier and more intelligently can also help the UK become a world leader in data-enabled public good.**

> The goal is not a single central database, but an **interconnected ecosystem**.

> We believe that England should adopt a national devolved **"Connected ICB"** model.

2. Recommendations

The UK needs to adopt a national model for connected data if we are to improve outcomes for children and families, reduce inequity, and make public services more effective. The Manchester event showed that the challenge is not a lack of data, but a lack of infrastructure, mandate, governance, and delivery models that allow data to be used safely and meaningfully across organisational boundaries. Connected Bradford has shown that this can be done. The task for HMG is now to move from isolated examples of good practice to a coherent national approach.

The recommendations below are reinforced by the Centre for Young Lives' Growing Up Well trailblazer (https://t.ly/rorHZ) in Humber and North Yorkshire, which demonstrated how Child of the North principles can be operationalised through ICB leadership, neighbourhood-level delivery, stronger links between health and education, and investment in connected data infrastructure.

These recommendations were refined through a three-round Delphi consultation involving the academic and practitioner experts from the Manchester showcase. The final round showed strong consensus that the recommendations should now be finalised, subject only to minor wording refinements. The expert group strongly supported the need for a national model, a clear mandate, long-term and protected investment, proportionate governance, lawful frontline information sharing, education partnership and a test-and-learn approach. The main area of remaining debate concerned how best to provide independent research access: most respondents favoured embedding a proportionate national research-access route within the existing recommendations, while a minority preferred a standalone recommendation. The final recommendations therefore retain the ten-part structure but strengthen the text on research access, governance and accountability.

1. Give local systems a clear national mandate, legal basis and practical duty to link relevant data across health, education, social care and wider public services where this serves a clear public benefit.

National government should move beyond encouragement and make clear that local systems can and must work together to share and link data responsibly. This mandate should be supported by statutory guidance, standardised data-sharing agreements, model information-governance templates, clear accountability arrangements and practical implementation support. This mandate should also be reflected in relevant national accountability and inspection frameworks, so that local systems are assessed on whether they are building lawful, high-quality and useful data linkages in the public interest.

2. Establish a national Connected ICB programme, using NHS secure data infrastructure as the anchor for linked public-service data, and delivered through locally governed ICB partnerships.

Connected ICBs should provide a lawful, secure and practical mechanism for linking data across health, education, social care and wider public services. They should operate within a national framework but be governed locally with partner organisations, so that data linkage supports local prevention, safeguarding, service planning, evaluation and frontline decision-making. The national programme should also include a proportionate research-access route, including accredited researcher pathways, clear approval timelines, safeguards for multi-ICB studies, appropriate data-retention rules, publication expectations and alignment with existing national data infrastructure.

3. Invest ringfenced, long-term funding in the core capacity and capability required to build, maintain and run Connected ICBs safely, effectively and sustainably.

This should include long-term funding for secure infrastructure, data engineering, information governance, data standards, analytics, evaluation, public engagement, operational implementation and partnership working. Investment should support both technical infrastructure and the skilled multidisciplinary teams needed to translate linked data into improved services and outcomes. Funding should be linked to clear implementation milestones and evaluation requirements, so that investment supports sustained capability rather than short-term pilots.

4. Put proportionate, enabling and risk-based governance, ethics, public trust, transparency and data standards at the centre of the Connected ICB model.

Governance arrangements should make clear who can access linked data, for what purposes, under what

> Create lawful, practical and **trusted pathways** for frontline information sharing, not only retrospective analysis.

> Make education a full and **clearly defined partner** in the national connected data model, with role-based and purpose-limited access to relevant information.

safeguards, and with what accountability. The model should include public and professional engagement, transparent rules on onward sharing and third-party access, strong information governance, clear ethical oversight, high-quality data standards and mechanisms for addressing poor data quality, bias and misuse. Governance should be strong enough to protect the public and maintain trust, but practical enough to enable responsible frontline use, service improvement, evaluation and accredited research.

5. Create lawful, practical and trusted pathways for frontline information sharing, not only retrospective analysis.

The national model should distinguish clearly between different but connected uses of linked data: frontline operational information sharing, safeguarding and direct support; service planning and commissioning; population health analytics; independent research; and evaluation. Each use should have clear legal bases, access controls, safeguards, transparency requirements and accountabilities, so that practitioners can access and share relevant information when it is necessary, proportionate and in the interests of children, families and communities. These distinctions should not become silos: well-governed flows between them allow evidence to improve practice, and practice to improve the evidence.

6. Begin with a national test-and-learn phase in selected localities, focused on children, young people and families experiencing multiple disadvantage, while drawing on existing adult health and social care data-linkage infrastructure and learning.

The test-and-learn phase should identify practical barriers, develop replicable governance, technical and public-engagement models, evaluate benefits and risks, and produce implementation tools that can be adopted nationally. Early sites should be selected to reflect different local contexts and should include areas where data-linkage work is already underway. The test-and-learn phase should also test proportionate research access, including how universities and accredited researchers can work with Connected ICBs from the outset.

7. Make children, young people and families the priority population for national rollout of the Connected ICB model.

Connected data should be used to improve prevention, early support, safeguarding, SEND provision, attendance, educational outcomes, health and wellbeing. Prioritising children and families should not exclude adult services; rather, existing adult health and care data-linkage platforms, structures and learning should be used where they can accelerate infrastructure, governance and learning for children's services.

8. Make education a full and clearly defined partner in the national connected data model, with role-based and purpose-limited access to relevant information.

The model should specify how schools, early years settings, colleges, local authorities, academy trusts and other education partners contribute to and benefit from connected data. Access should be proportionate, role-based and linked to clear purposes such as safeguarding, inclusion, early support, attendance and wellbeing. The model should distinguish these purposes from data categories and policy areas such as SEND, exclusions, attainment and absence, and should align with existing Department for Education data governance, including arrangements for the National Pupil Database. The model should include strong safeguards for children, families and professionals, and should clarify how state-funded, independent and other education settings are treated.

9. Build a national community of practice to support connected public-service data, shared learning and implementation across local systems.

This community should bring together ICBs, local authorities, education partners, analysts, data engineers, information-governance specialists, researchers, evaluators, practitioners and public representatives. Its purpose should be to share tools, standards, use cases, technical solutions, governance models, research-access processes, evidence and implementation learning, so that local systems do not have to solve the same problems in isolation.

10. Align accountability, commissioning and evaluation around the implementation of shared outcomes for children, young people, families and communities, prevention and whole-system delivery.

National and local accountability frameworks should encourage partnership working rather than reinforce organisational silos. Evaluation should assess whether connected data improves prevention, early intervention, service coordination, equity, efficiency and outcomes. Inspection and accountability arrangements should support lawful, high-quality data sharing, learning and improvement, while avoiding rigid frameworks that discourage innovation, maximise linkage for its own sake, or undermine locally appropriate collaboration.

Conclusions

These recommendations amount to a practical national recipe for adopting a successful data linkage model (Connected Bradford) across England that can align with similar approaches within the devolved nations. The implementation of these recommendations does not require a new central bureaucracy or a single national database. The implementation of the recommendations would deliver something more intelligent: nationally backed, locally delivered connected data systems, anchored in NHS infrastructure, shaped by public trust, strengthened by research, and used to improve how services work around children and families. The evidence in this report suggests that the question is no longer whether this can be done – it can be done and is being done – but whether government is prepared to provide the clarity, investment and leadership needed to harness the full benefit of this at scale.

> Build a national community of practice to **support** connected public-service data, shared learning and implementation across local systems.

3. Principles

Our data show that we must act now. The data also tell us where to act. Research can help show how to act. But none of this will matter unless partners are able to work together with clarity, trust, and purpose.

The recommendations in our previous Child of the North reports are grounded in seven shared principles. In the context of connected data, these principles matter even more: the effective use of connected data must form part of a wider public service reform agenda that improves the lives of children, young people, and families.

This means combining leadership, local knowledge, multi-agency working, evidence, and investment with a determined focus on sharing and using information more effectively across public services.

This is how connected datasets can become a practical tool for better decisions, earlier help, more effective delivery, and economic efficiencies.

1. Putting our children first

Connected data must begin with a clear moral purpose: improving the lives of children and young people. The point of linking information across services is not simply to create better datasets, but to make it easier for professionals to identify needs early, respond in a joined-up way, and support children and families before problems escalate. A system designed in this way will ensure that we use data to remove friction for families, not create new hurdles. Connected data should therefore be understood as a means of putting children first in practice: enabling earlier intervention, more coherent support, and a stronger public service response across the life course.

2. Addressing inequity

Connected data should be used to reduce inequity, not merely to describe disadvantage. The most disadvantaged children and communities are often those interacting with multiple services while still falling through the gaps between our siloed organisations. An improved use of connected data could help public services see cumulative disadvantage more clearly, target support more intelligently, and act earlier where need is greatest. This is especially important if we wish to take advantage of the scientific approach encapsulated by proportionate universalism: maintaining universal services, while directing greater intensity of support towards children, families, and communities facing the most severe challenges. Connected data can help ensure that scarce resources are focused where they can make the greatest difference.

3. Adopting place-based approaches

Data are most powerful when interpreted in context. Children's lives are shaped by the places in which they grow up, and the same pattern of need may look very different across different towns, cities, and neighbourhoods. Connected data should therefore support place-based action and help local partners understand how need is clustering within communities. Thus, services can be designed around local realities. This means recognising localities, empowering communities, and ensuring that local professionals, children, and families help shape how data are interpreted and used. National infrastructure matters, but it must support local intelligence, local leadership, and local accountability rather than averaging across local differences.

4. Working together effectively across our public services

Children's needs do not arrive in neat organisational silos, and neither should our response. The effective use of connected data depends on making multi-agency working a reality rather than an aspiration. This requires clear governance, shared priorities, practical support for frontline professionals, and the removal of avoidable barriers to collaboration, including non-legal barriers to information sharing, misaligned thresholds, fragmented budgets, and disconnected operating processes. It also requires a culture where agencies are expected to act together on shared intelligence. Connected datasets are valuable because they can help professionals respond together; but this only happens when there is a shared responsibility and collective action across services.

5. Putting education at the heart of public service delivery

Education settings are among the few universal institutions that reach almost every child and their family. Thus, they have a central role to play in the creation of more connected

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Warner Bros.

public service delivery. In a connected data system, schools, nurseries, and colleges should not be expected to carry responsibility for every social challenge. Instead, they should be recognised as vital partners in identifying emerging need, shaping early support, and helping families access joined-up services. Education is often where problems first become visible and where trusted relationships already exist. A more effective connected data approach should strengthen that role, making it easier for education settings to work with health, social care, and other services as part of an integrated support system around the child.

6. Using and sharing information across public service providers effectively

Connected data are most useful when they support better decisions, clearer accountability, and more tailored services. Information should be shared lawfully, proportionately, and safely, with a clear public benefit and a strong commitment to trust. The aim should be to ensure that practitioners have the information they need, at the point they need it, so support is coordinated and families are not required to repeat their story to multiple agencies. This also means moving beyond siloed data collection towards a system that reflects how families live and how services intersect. In that sense, using data more effectively is not separate from better public service delivery; it is one of the key enablers. Government should clarify in legislation and guidance that child-level identifiers and linked data can support research and service improvement, subject to existing legal and data protection frameworks.

7. Harnessing the power of research

Connected data should underpin a stronger cycle of learning across local and central government, services, and communities. The UK has exceptional research capacity, and that capacity should be used not only to analyse problems but to test solutions, evaluate delivery, and support continuous improvement. This speaks directly to the Child of the North call to put research and development at the heart of strategy and delivery. We should be prepared to learn together across agencies and sectors, combining administrative data, local insight, practitioner expertise, and lived experience to understand what works, for whom, and in what context. Connected datasets make this possible at a new level of sophistication, but only if accompanied by openness, shared learning, and a commitment to act on the evidence.

Making the principles real

These seven principles provide the foundations for a connected data approach that is practical, ethical, and focused on impact. These principles act as a reminder that data alone do not improve outcomes. Improvement comes when information is combined with trust, professional judgement, community engagement, and the will to act. This is the opportunity now facing government: the possibility of connecting services more intelligently around children and families.

The practical value of these principles has already been demonstrated in Humber and North Yorkshire. As the Centre for Young Lives' Growing Up Well report shows, the seven Child of the North principles can be translated into system leadership, commissioning, and delivery when an ICB and its partners create the space to align evidence, data, local priorities, and cross-sector action.

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Connected data are most useful when they **support** better decisions, **clearer** accountability, and more **tailored** services.

4. The need for action

The case for action is now overwhelming. Child of the North has shown that too many children in the UK are growing up in circumstances that damage their health, development, learning and life chances. The systems intended to support these children and young people are too fragmented to respond effectively. The result is not only avoidable suffering for children and families, but rising pressure on public services, lower productivity, and a growing economic cost to the country. This report amplifies the message communicated throughout the Child of the North campaign: connected data must be seen as essential infrastructure for a more preventive, joined up and effective country.

The Child of the North reports have shown that childhood inequality is a major public policy challenge facing the country. The series began from the proposition that government must put children first, because childhood determines long-term health, educational success, workforce participation and social cohesion. The same pattern has reappeared across 12 different issues affecting children: children's needs are deeply interconnected, but public systems remain organised in silos. Poverty affects attendance, school readiness, nutrition, mental health and oral health. Neurodivergence, SEND, absence and vulnerability to crime are often linked. Poor health creates barriers to learning; educational exclusion increases later risk; and place matters profoundly, with disadvantage clustering geographically and compounding over time. Together, these reports describe one connected crisis, experienced in different ways across childhood.

The poverty report made clear that hardship is not a marginal issue affecting a small minority. It is a structural force shaping children's life chances from the start. It highlighted that 4.3 million children in the UK were living in poverty in 2019/20 after housing costs, up by 400,000 over the previous decade, and that around one-third of the increase in infant mortality between 2014 and 2017 could be attributed to rising child poverty. It also showed how school systems are routinely left trying to mitigate the effects of poverty without the tools or resources to do so alone. This is a clear illustration of the fact that poverty is not just an outcome to be measured; it is a driver of overlapping need across health, education, care and safeguarding. A system that cannot connect those pressures will continue to intervene too late and too narrowly.

The reports on mental health, school hubs, SEND, oral health, preschool years and school attendance reinforced the same conclusion: children rarely present with one neat, isolated problem. Needs overlap, accumulate and often worsen when support is delayed. The school hubs report argued that services traditionally delivered outside the school gate must be brought into and around education settings if children are to receive timely support. The preschool report demonstrated that early developmental disadvantage can have long-term consequences. Children who start school unprepared are much more likely to struggle academically, miss school regularly, and later face difficulties entering education, employment or training. The attendance report warned that children who stop attending regularly can quickly go "off the radar", while the oral health report demonstrated both the scale of unmet need and the direct effect of health problems on children's quality of life, attendance and attainment. These are not disconnected findings. Together, they show that the earlier government can identify emerging need and coordinate support, the greater the opportunity to change a child's trajectory.

The SEND and autism work made the argument even sharper. These reports showed that families often face a long struggle to secure assessment, support and understanding, while information relevant to a child's needs sits in separate systems that do not routinely speak to one another. At the same time, the series repeatedly emphasised that education,

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health and care cannot sensibly be disentangled in the lives of children with additional needs. The campaign page summarising the 2024/25 series makes clear that one of the consistent themes across the programme has been the need for public services to work together more effectively and for information to be shared and used properly across providers. In other words, the logic of connected data was present across the whole Child of the North programme, even where it was not the main subject of an individual report.

It also argued that health and education must be **integrated** so that no child's needs fall between the cracks.

Earlier action is usually both more humane and more cost-effective.

The reports on physical activity, nutrition, digital futures, vulnerability and crime, and arts and creativity added a further crucial insight: effective policy must address the wider conditions in which children live, learn and grow. Childhood obesity, digital exclusion, low physical activity, vulnerability to exploitation, and lack of access to creative opportunity are not fringe concerns. They shape development, belonging, aspiration and resilience. The series showed that these issues are patterned by deprivation and place, and that children's outcomes depend on the interaction between family resources, local services, community infrastructure and institutional capacity. This is why place-based, whole-system approaches run through the Child of the North programme so strongly. This is why data systems limited to a single service or department are not sufficient.

The 2025 education equity synthesis stated plainly that the twelve Child of the North reports had shown what works: reducing poverty improves health and attainment; investing in early years pays dividends throughout life; and tackling health inequalities requires support to arrive early, before difficulties become crises. It also argued that health and education must be integrated so that no child's needs fall between the cracks. That is precisely the bridge to this final report. If the programme has shown what needs to happen, then this report addresses a central question of delivery: how government can build the infrastructure that allows services to see problems sooner, act together earlier, and evaluate impact more intelligently.

Connected data matter because the current model of public service delivery is still organised around institutions rather than lives. Families experience poverty, ill health, neurodevelopmental need, school absence, housing stress, safeguarding concerns and community risk together. Yet our services still tend to record, assess and respond to these issues separately. Leaders struggle to understand how need is clustering across populations and places. Practitioners struggle to coordinate support. Families are left repeating their story. Children who are in intermittent contact with services risk disappearing between thresholds and responsibilities. This is not just about inefficiencies. It is one of the key reasons why prevention remains so difficult to achieve in practice.

The Child of the North reports have made it clear that earlier action is usually both more humane and more cost-effective. The same lesson recurs whether the issue is school readiness, autism, oral health, absence, mental health or vulnerability to exploitation: when support is delayed until needs intensify, the human and financial costs rise. This makes the connected data agenda more than an argument about modernisation. It is a practical requirement for any government serious about prevention, public service reform and value for money. Without better ways to connect information across health, education, social care and related services, government will continue to spend large sums treating symptoms late rather than addressing causes early.

There is also a positive case for action. The Child of the North programme has gone beyond documenting the crisis; it has highlighted workable solutions. Across these reports, one model appears repeatedly: services working in and through trusted local institutions, especially schools and nurseries; researchers and practitioners collaborating to test what works; and local areas using evidence to redesign support around children's real lives. The city of Bradford has been especially important in this regard. The wider Child of the North work has repeatedly drawn on Bradford's experience to show that early intervention, community engagement, and joined-up delivery can be made real. This connected data report takes that one step further by showing how the "Connected Bradford" model provides the infrastructure needed to support that wider reform agenda.

This is why action is needed now. The Child of the North reports have already shown government the scale of the challenge, the consequences of inaction, and the principles of effective reform. The final missing piece is the ability to connect insight to delivery across systems. Connected data cannot per se eradicate poverty, end the SEND crisis, improve school readiness or solve the mental health crisis. But without connected data, government will continue to tackle each of these issues with only a partial view. The evidence assembled across the Child of the North programme points to a clear conclusion: if we want a country that works for all children and young people, we need public services that can see the whole child, act as one system, and learn continuously from the data they already hold. Connected data are now essential to making this ambition a lived reality.

5. Information matters

The Renaissance, the Industrial Revolution, and the Digital Age show that information ‘tipping points’ transform civilisation. The invention of writing, the creation of the Gutenberg press, and the third industrial revolution have all driven economic prosperity and enhanced human health and education through improved information sharing.

On August 16, 1858, President James Buchanan applauded:

> ‘...an enterprise accomplished by science, skill and indomitable energy... more useful to mankind, than was ever won by conqueror on the field of battle.’

Buchanan was responding to Queen Victoria’s telegraphic message, celebrating the rapid sharing of information made possible by the new transatlantic cable. The cable made possible the exchange of messages in hours rather than days. It immediately revolutionised the UK’s economy, with traders able to forecast, buy and sell more efficiently. From where we now stand, we can see how the transatlantic flow of information drove the exchange of ideas that built our modern global society.

The ability to gather, interpret, and transfer information is now more important than ever. Humans have survived and thrived because of their ability to store, process, and transmit information; finding food and shelter whilst avoiding danger, and passing this information on to others. **Civilisations** grew because they created educational systems able to transmit information across space and time. **Science** provided formal structures for separating signal from noise allowing, for example, medicine to advance on the basis of reliable information and demonstrate cause and effect. **Information** theory allowed data to be stored in incredible quantities and processed at phenomenal speeds through the creation of computer systems.

We are living in an **‘age of data’**. It has already transformed our business and our media. It has the potential to transform, and level up, the health, education, and life chances of citizens throughout the UK. But it has not yet done so, and the cost is more than we can bear as individuals and as a country.

The same geographical inequalities identified by the ‘Child of the North’ reports can be seen through the prism of *information inequality*. Our affluent areas are adept at harnessing information to build business opportunities and drive local economies. Their schools – usually supported ably by families – equip young people with the skills that employers and the country require and transmit the information that children need to make healthy life choices. Communities are more likely to engage with crime prevention strategies and to report antisocial behaviours to the police. Parents take responsibility for sharing information across education and health systems. This means that schools, for example, are better able to identify and meet the education needs of a child with SEND before problems become entrenched. There is a clear correlation – and, we would argue, causal link – between the information advantage of areas such as the South East of England in access to computers and broadband, and the proportion of children who benefit because their families possess the skills to take advantage of that digital infrastructure.

In contrast, a disadvantaged community can be described entirely in terms of informational failures. Communities find it difficult to collate information and share their needs with public services. Families struggle to know how to access support and make the changes they need. Statutory organisations lack the contextual information needed to design efficient services, capable of adapting and working for the people they serve. Information sharing across public services is limited or non-existent. Whether this is due to shortcomings in technology, resources, or leadership, it inevitably leads to safeguarding failures and predictable tragedy. In disadvantaged communities, children do not acquire the information they need to live healthy lives, aspire or compete in the employment market. In turn, the skills pipeline is damaged and the potential for local business to drive transformation is limited. The BACD work shows that data linkage remains slow, expensive and error-prone without a common identifier, and those errors are often greatest for the most vulnerable children, including children of asylum seekers, adopted children, children from ethnic minorities, and children who move address frequently.

Information inefficiencies lie at the heart of the inequalities blighting our nation. But there is hope, because information science offers solutions as well as a framework for understanding problems. We now have the foundational knowledge and capability to apply information theory to these deep, societal challenges. Achieving this goal would not only transform millions of individual lives; the required revolution in our information systems would place the UK at the vanguard of international data science – with all the commensurate economic benefits.

In the US, Silicon Valley stands as testament to the financial benefits of connecting universities to business and applying information theory to the marketplace. The UK has the potential to be a world leader in the application of data science to *wellbeing* (including health, education, care, and

entertainment), with an inevitable and significant boost to our GDP through the development of the underpinning AI, analytics, and visualisation methodologies (such as immersive technologies). We have the potential to make the UK both the best place to grow up, and the best place to start and grow digital businesses.

Bradford has built and tested the first **'Connected District'**. Connected Bradford is a new, independent unit for the region – a virtual team, housed in the Wolfson Centre for Applied Health Research, bringing together the Connected Bradford team, N8+ scientists and researchers with our communities and those designing, commissioning, and delivering front line services, to:

- Connect and draw insights from routine data held by education, health, care and policing services, to better understand risks and vulnerability, as they vary from place to place, community to community;
- Build tools that can deliver data insights to front line professionals, help them share information, coordinate support, and guide their interactions with families;
- Use visualisation methodologies to help families, communities, professionals and policymakers understand and interact with data – enhancing the accuracy of data insights, improving transparency and trust, and allowing the redesign of systems;
- Link schools with health systems through its Department for Education funded *Born in Bradford Centre for Applied Education Research* (CAER). BiB CAER provides an operational arm for Connected Bradford, allowing the application of data insights at pace in educational settings, and enabling place-based community engagement using schools as anchor institutions within localities.

Connected Bradford science projects are already making a difference to the lives of the most disadvantaged communities, by allowing Connected Bradford to direct and improve design, delivery, and evaluation of services, with a current focus on SEND and 'early help'. The projects are only progressing because Connected Bradford fought for and secured the necessary combination of **permissions, mandate and resources**, from national and local government, families and communities, and our anchor institutions. These include:

- the support of senior leaders from Multiple Academy Trusts, NHS Hospital Trusts, NHS Care Trusts and Local Authorities across West Yorkshire;
- the Department of Levelling Up, Housing and Communities' 'Data Accelerator';
- the NIHR Applied Research Collaboration, MRC PRP, and NHSA networks;
- the Department for Education funded programme of work on the use of routine education data to identify and support children with undiagnosed autism;
- the input and support of the Data Improvement Across Government group.

This report outlines the operating model, resource requirements, and the impact that would be generated through the creation of a new Connected ICB initiative.

HMG must be at the heart of this endeavour, helping to unblock, encourage, and incentivise the required bold leadership. In return, Connected ICBs would transform policymakers' understanding of demand 'on the ground', facilitate its ability to predict need, and provide data tools for designing and evaluating the impact of policies (and public spending).

> We have the **potential** to make the UK both the best place to grow up and to start and grow digital businesses.

> Connected Bradford science projects are already **making a difference** to the lives of the most disadvantaged communities.

Happy

6. The Manchester showcase

Child of the North, together with the N8 Computationally Intensive Research group and the Northern Health Science Alliance, hosted a one-day workshop at the Whitworth Art Gallery in Manchester, focused on Special Educational Needs and Disabilities (SEND) and the value of connected data.

The Manchester showcase marked an important moment in the development of this report. It brought together many of the themes that have run through the Child of the North programme: the need to put children first, the urgency of tackling inequity early, the importance of linking health and education, and the role of research in helping government move from describing problems to solving them. Crucially, it also demonstrated that connected data is no longer a peripheral technical issue. It is now central to any serious attempt to improve public service delivery for children and young people.

The event did not emerge in isolation. It grew out of a wider effort across Child of the North, the N8 universities and the N8 Computationally Intensive Research group to connect child research, data science and policy more effectively across the North of England. There was a shared recognition that no single university, public service or discipline holds all the assets needed to meet the scale of the challenge. Connected data research in the North is already world-class, but the opportunity now is to scale this work, align it more effectively with policy priorities, and ensure that evidence generated in the North helps shape national decisions. The workshop on 23 February 2026 was therefore designed not simply as a workshop, but as a point of alignment: a place where researchers, policymakers, data scientists and delivery leaders could begin to build a common agenda for action.

The event brought together government policymakers, researchers, NHS leaders, local authority representatives and data specialists to focus on one pressing challenge: how to better use data to improve outcomes for children and young people, particularly in relation to SEND. The timing was significant. The workshop took place at the request of No. 10, the Department for Education and the Department of Health and Social Care and coincided with the launch of the government's Schools White Paper, Every child achieving and thriving [1]. This gave the day both urgency and purpose. It was not an abstract discussion about data architecture. It was a live conversation about how evidence, linkage and analysis could support reform of a system under severe strain.

From the outset, the event was framed around a proposition that has sat at the heart of Child of the North: children's lives do not fit neatly into administrative categories, and the support they need cannot be built around institutional silos. Professor Charlie Jeffery and Anne Longfield stressed in the wider workshop framing that children in the North are more likely to grow up in poverty, with consequences not only for individual life chances but for social cohesion, economic growth and demand on public services. They argued that no individual system can solve these problems alone and that universities have a critical role to play as hubs for collaboration, trust and impact. That framing shaped the tone of the showcase: one grounded in urgency, but also in a strong sense that a different model is both possible and necessary. The importance of the showcase was not simply

Children's lives **do not** fit neatly into administrative categories.

A different model is both **possible** and **necessary**.

that it gathered expertise in one room, but that it exposed the next stage of the challenge: moving from proof of concept and local excellence to a nationally backed model for delivery.

Prevention requires joined-up systems

The keynote opening, led by Baroness Anne Longfield and Haroon Chowdry, set out the central challenge with clarity. As the SEND White Paper ushered in a renewed focus on improving outcomes for children and young people, they argued that government and public services now had to move beyond siloed policy and crisis response and embrace prevention as a practical organising principle. The implication was clear: prevention cannot be delivered by services that only see fragments of a child's life. If the state is to intervene earlier, it must be able to understand risk earlier, and that requires better use of the data already held across education, health, care and related systems.

> Prevention cannot be delivered by services that only see **fragments** of a child's life.

This was entirely consistent with the wider Child of the North argument. The keynote stressed that vulnerable children are too often only seen clearly once their difficulties have intensified. Linked, accurate and responsibly shared information is therefore not a technical luxury but an essential enabler of better public services. Without it, policymakers cannot understand need in the round, commissioners cannot design effectively for real patterns of vulnerability, and frontline professionals cannot coordinate support around families. The speakers were careful not to present connected data as an end in itself. Rather, they positioned it as the means through which a more humane, more intelligent and more preventive public service model could be built.

The keynote also established an important tone of realism. It acknowledged the recognised challenges around data use, including governance, consent, public trust and fragmentation across systems. But the message of the event was that these barriers should no longer be treated as reasons for inaction. Examples from the North of England already show that data linkage can be done and can make a material difference. The real risk now lies in failing to connect information and continuing to allow children to fall between services that do not speak effectively to one another.

Connected data reveal risk across the life course

Professor Marianne van den Bree provided an incredibly powerful contribution to the day by showing how connected data can illuminate the developmental trajectories of multiple long-term psychiatric and chronic physical health conditions

across the life course. Her presentation made a point that resonates strongly with this report: the roots of poor health outcomes which tend to manifest in (older) adulthood are often visible much earlier in life. Yet, these patterns can rarely be laid bare in full within a single dataset. By bringing together repeated measures combining evidence across health, education and social domains, it becomes possible to identify early-life patterns of vulnerability and understand how risks accumulate across the life course. The contribution of such insights to tailored early intervention approaches can avoid those risks from hardening into poorer adult outcomes.

Her presentation of the LIfespaN multimorbidity research Collaborative (LINC) programme findings showed why this matters for children with vulnerabilities. Risks are shaped by childhood adversity, neurodivergence (including when caused by genetic conditions), poverty, ethnic heritage and wider inequalities, and their effects often emerge early and continue to impact individuals across long stretches of their life course.

Findings from the LINC programme indicate that adverse childhood experiences such as abuse or neglect increase the risk of psychiatric diagnoses (anxiety disorder and depression), as well as diagnoses of cardiometabolic conditions such as Type 2 Diabetes, hypertension and, chronic kidney disease, obesity, or dyslipidaemia (obtained through linked electronic health records), and the co-occurrence of these conditions many years later, in older age [2]. Furthermore, early evidence of this increased risk is already present in young adulthood where individuals who have had such adverse experiences are more likely to be depressed and have higher body mass index.

In addition, one project examined whether neurodivergent individuals may be at increased risk of multiple long-term conditions in midlife. Preliminary analyses suggested that those diagnosed with autism, ADHD, intellectual disability, and/or learning difficulties had nearly four-fold increased odds of being also diagnosed with anxiety disorder and/or depression as well as one or more of the cardiometabolic conditions listed above at 35-55 years old. These findings suggest that standard healthcare pathways may be overlooking the complex health needs of neurodivergent populations.

LINC findings (using linked electronic health records and education records) also indicate that a particularly vulnerable group of children in society, those with genetic mutations that greatly increase the likelihood of neurodevelopmental and psychiatric conditions [3] are often not diagnosed by a medical genetics clinic, particularly if they grow up in mixed heritage, disadvantaged neighbourhoods [4]. Children with these mutations were furthermore found to rarely have obtained a diagnosis of a neurodevelopmental condition or special educational needs support.

Findings in older-age individuals indicated that those who had one of these mutations had increased likelihood of diagnoses of all LINC study psychiatric and cardiometabolic conditions as well as their co-occurrence (as recorded in their electronic health records) [5]. Combined, these findings suggest that improved pathways for genetic diagnosis for at-risk children, combined with offering timely and tailored psychiatric care and educational support where needed, may contribute towards the prevention of complex chronic psychiatric and physical health presentations later in life.

> Standard healthcare pathways may be **overlooking** the **complex health needs** of neurodivergent populations.

LINC researchers conducted longitudinal studies in a non-clinical population to further understand differences in early life (childhood, adolescence and early adulthood) in risk of later diagnoses of co-occurring psychiatric and physical health conditions. They found evidence of early life differences in a range of factors including in depressive symptoms, higher Body Mass Index (BMI) and elevated levels of blood risk markers (e.g., insulin, inflammation)[6,7].

LINC research in people of South Asian ancestry in the UK found that they are at risk of early onset of co-occurring psychiatric and physical health conditions (using linked electronic health records), not infrequently before they reach the age of 40 years, when routine NHS health checks usually begin. Age and gender-specific patterns were found with younger people more likely to first develop mental health conditions, men cardiometabolic conditions and women both conditions, pointing towards opportunities for tailored interventions [8].

Children with sporadic contact with services may **disappear entirely**.

Connected data is not simply useful because it provides more information, but because it **reveals relationships** and **trajectories**.

The significance of the LINC findings for policy is profound. If government wants to prevent escalation rather than merely manage crisis, it needs to establish the infrastructure that allows risks to be seen early and across systems and addressed by the implementation of appropriate and tailored support systems for at-risk children and their families. In this sense, the keynote evidence helped make the intellectual case for the report as a whole: connected data is not simply useful because it provides more information, but because it reveals relationships and trajectories that siloed services cannot otherwise see.

Policymakers need actionable evidence

A notable strength of the Manchester showcase was that it was not only a research event. It was also an unusually direct conversation with policymakers about the kind of evidence government can use. Participants from the Department for Education and across government were explicit that the current system contains major gaps. Harriet Fearn, Chair of the Data Improvement Across Government group, pointed to the need for better coding, more consistent definitions, and local connected datasets that could reveal the nuance often lost in national systems. Her warning that children with sporadic contact with services may disappear entirely from the evidence base was particularly striking, because it captured one of the most serious weaknesses of the present system: those most at risk are often the least visible.

The discussion also underlined that research must be usable by policymakers. Evidence needs to show not only the scale of need, but what is stopping a child from flourishing, what works, and what difference action will make. David Amos, Head of SEND and AP Analysis at the Department for Education, provided an important challenge. Research, he argued, must tell policymakers something usable. It must help government understand what is stopping a child flourishing, what works, and what difference action will make. With substantial public investment already committed to SEND, there was a clear demand for evidence that was not merely descriptive but actionable. This emphasis on a clear “so what” is highly consistent with the Child of the North approach: evidence must be rigorous, but it must also speak to delivery, reform and public value.

Dr Dougal Hargreaves reinforced this case from a clinical perspective, highlighting the increasing pressures seen in children’s mental health and the limitations of fragmented service pathways. His contribution underlined an important theme of the day: the argument for connected data is not administrative or academic. It arises from the day-to-day reality of public services trying to support children whose needs cut across organisational boundaries.

From insight to usable reform

The panel discussion brought these themes together in a particularly practical way. A central question was how data and research can be translated into forms that genuinely influence national and regional policy. There was broad agreement that policymakers need evidence that is concise, actionable and closely tied to live decisions. Participants stressed that connected data must not be presented as an abstract technical capability but as a tool for better safeguarding, better planning and earlier intervention. This emphasis on communication mattered. The challenge is not only to produce good evidence, but to present it in ways that can support action at pace.

The discussion also surfaced a recurring tension in this field: the country has both strong analytical capability and weak systemic coherence. Contributors noted the absence of a fully coherent national strategy for data sharing, despite clear examples of innovation at the local level. They pointed to the need for stronger public engagement, clearer rules and practical routes for sharing information safely. At the same time, there was a realistic recognition that local areas often hold richer and more nuanced data than national systems, including primary care data, service context and detailed operational information that can explain variation more effectively. This matters greatly for the argument of this report. A national model is needed, but it must be capable of drawing strength from local data assets and local knowledge rather than flattening them.

Another significant theme in the panel was the role of local infrastructure and partnerships. Participants suggested that local authorities, particularly those with Health Determinants Research Collaborations, could play a stronger role in connecting research and delivery if supported by university infrastructure, mixed-methods capability and better coding practices. Funding mechanisms such as data accelerators were identified as practical enablers. There was also support for more regular briefings, seminar series, cross-sector training and embedded researcher schemes to help keep government connected to learning on the ground. These points matter because they shift the conversation from isolated projects to system design. The panel was, in effect, sketching the components of a model that could allow government to learn continuously from connected local data.

Perhaps the most important conclusion from the discussion was that integrated working is already possible in parts of the system, but it remains too dependent on local determination rather than national expectation. Participants pointed to existing pathways where paediatricians, schools and GPs already share information in order to support children more effectively. The lesson was not that the system must begin from scratch, but that it needs clearer guidance, stronger support and a more explicit shared purpose. That is precisely the argument carried through this report: the issue is no longer whether public services should use connected data more effectively, but how quickly government is prepared to create the conditions in which they can do so.

Why Child of the North and the CIR matter for national delivery

The Manchester showcase was important because it showed alignment where alignment is often missing. Researchers, public service leaders, and policymakers were not arguing about whether children's needs are interconnected. They were grappling with how to build the practical infrastructure, permissions and relationships needed to respond to that reality. The event also reinforced a wider theme emerging from the N8 workshop read-out: that collaboration across disciplines, institutions and regions is essential if the North is to shape national policy rather than simply respond to it. The discussion repeatedly returned to shared language, common standards, stronger coordination, better communication with policymakers, and a more deliberate effort to translate research into public action.

The Manchester showcase was more than a successful event. It was a demonstration of the policy and research ecosystem championed by Child of the North: where universities, health systems, schools, local authorities and government departments work together to generate insight, test solutions and improve outcomes for children. The Manchester event showed that the North of England should be part of the national conversation as it already has the intellectual capability, delivery experience and public-service commitment needed to support this agenda. The challenge now is to match that capability with national backing and a clear route to implementation.

> Integrated working is already possible in parts of the system, but it remains **too dependent** on **local determination** rather than national expectation.

> The North of England should be part of the **national conversation**.

7. Learning from Connected Bradford

Bradford has developed an approach that could allow delivery of the Connected ICB vision.

A connected database has been created within the NHS that links the health records of citizens across the Bradford District with other associated data including education records, social care, environment, housing and policing data.

Connected Bradford is not simply an interesting local initiative. It is a strong demonstration that linked administrative data can be used lawfully, securely, and purposefully to improve understanding, support earlier intervention, and enable a more genuinely integrated public service response to support those in need.

Building Integrated Data Through Trust

Bradford has shown the power of connecting routine administrative records through the Born in Bradford (BiB) project. BiB is one of the world's largest longitudinal birth cohort studies and has linked routine data for over 60,000 Bradfordians. Frequent engagement with the families and children has ensured the Bradford community are at the heart of these efforts and allowed continued routine data linkage (including health, and education records) in a transparent, co-produced, and ethical manner.

Bradford has repeatedly shown what becomes possible when research, local leadership, public trust and public service delivery are brought together around children and families. In the context of this report, its importance is even greater.

From Born in Bradford to Connected Bradford

BiB has demonstrated not only the scientific value of linking health, and education, but also the importance of doing so in ways that are transparent, co-produced and ethically grounded. This long-term relationship with local communities matters enormously. Bradford did not build connected data capacity by treating citizens as passive data subjects. It built it by developing trust, showing public value, and embedding local people in the wider story of research and improvement. That is one of the most important lessons for national policy: connected data is not just a technical challenge. It is a social and civic one as well.

From that foundation, Bradford moved from cohort-based linkage to something broader and more system-facing: the creation of the Connected Bradford database. This brought together records across primary care, community care, secondary care, education, social care and a wider set of local administrative systems, including housing, benefits, crime and the National Child Measurement Programme. The significance of this is hard to overstate. It means that patterns of need can be seen not through the narrow lens of one service, but across the institutions that shape children's lives. It allows leaders and researchers to understand not only what is happening within individual services, but how those services interact, overlap and sometimes fail to connect.

Creating a connected database that can allow integrated decision making

Bradford matters because it addresses the two central problems that run through this report. The first is analytical: public services struggle to see how need, risk and demand are distributed across a population when data remain locked in separate systems. The second is practical: even when professionals know that a child or family is facing multiple challenges, they often lack the mechanisms to share information and act together in a timely and coordinated way. Bradford has shown that progress is possible. Bradford has developed a connected database capable of exploring opportunities for integrated decision-making, and it has identified pathways through which information could, in tightly governed circumstances, be used to support earlier intervention across the whole-system.

Importantly, Bradford has located this work within NHS infrastructure. Connected Bradford sits within Bradford Teaching Hospitals NHS Foundation Trust and provides a secure environment for linked administrative datasets. That institutional choice is one of the clearest practical lessons for national rollout. The report's wider argument is that the NHS is the most credible anchor institution for scaling connected data, and Bradford shows why: it combines strong public legitimacy, established governance structures, and the technical capacity needed to hold and manage sensitive data securely. Rather than inventing an entirely new institutional model, government can build from what Bradford has already shown is feasible.

Better insight: seeing children’s lives more clearly

The first great strength of Connected Bradford is that it enables a more accurate picture of need. Linked datasets allow decision-makers to see how different vulnerabilities and service contacts cluster across the life course and across neighbourhoods. In a conventional siloed system, each organisation sees only part of the story. Health may see developmental or clinical concerns. Schools may see absence, behaviour or learning difficulty. Social care may see risk within the family. Local authorities may see housing stress or neighbourhood disadvantage. Connected Bradford is a de-identified dataset, but it makes it possible to see those issues in relation to one another. That does not replace professional judgement, but it gives leaders and practitioners a far richer basis on which to plan and commission.

This is especially important for children, because childhood disadvantage rarely presents with one issue at a time. SEND, poor mental health, school absence, safeguarding concerns, poverty and wider family pressures often overlap. The ability to see these intersections is what makes connected data so valuable. It allows local systems to move beyond counting isolated service demands and towards understanding patterns of multiple vulnerability. That, in turn, creates the conditions for earlier and more intelligent action. Bradford therefore offers more than a data asset. It offers a new way of understanding public service demand and a more realistic picture of how children’s needs unfold in real life.

Better intervention: moving from insight to action

The second key lesson from Bradford is that connected data should not be confined to retrospective analysis. The report is clear that one of the major failures of the current system is the inability of professionals to share information effectively when children and families need coordinated support. Serious case reviews repeatedly expose these failures, and the draft rightly highlights the tragic case of Star Hobson as a stark reminder of what can happen when risks are seen in fragments rather than as part of a whole. Bradford’s importance is that it points towards a more practical model: one in which linked data and carefully designed information-sharing pathways could help professionals connect around a child or family before difficulties intensify further.

This is where the Bradford model moves beyond the language of “data linkage” and into the realm of service reform. The issue is not simply whether records can be connected in principle. It is whether connected data can help change how the system behaves. That is a crucial point for government. National rollout does not need to begin with a perfectly comprehensive operational system everywhere at once. It can begin by backing places to establish secure linked datasets, test practical use cases, and show how better information can support better frontline coordination.

Why Bradford matters nationally

What makes Bradford so compelling is not merely that it has built something impressive, but that it has done so in a way that is highly relevant to national policy. It has shown that cross-sector linkage can be achieved. It has shown that governance and public trust can be built. It has shown that NHS-hosted infrastructure can support broader public-service insight. And it has shown that linked data can be used not just for academic analysis, but to support a more integrated approach to children’s lives. In a policy environment often dominated by abstract debate about data risk, Bradford provides a practical counterweight: a working example of public-value data use grounded in place, partnership and delivery.

That national relevance is reinforced by the practical outcomes that Bradford has already supported. As set out elsewhere in the report, connected datasets in Bradford have helped identify autistic children who have not yet had their needs identified, supported the design of faster and more effective responses, enabled work linking vision and reading outcomes, and provided a basis for studying the educational and health effects of interventions such as classroom air-cleaning technologies. These examples matter because they show the breadth of what connected infrastructure can support: not one policy problem, but a whole ecosystem of prevention, service redesign and evaluation. Bradford is therefore not simply a SEND story, or a safeguarding story, or a research story. It is a model for how a local system can become more capable of learning and acting across multiple issues at once to support our communities.

The lessons for government

There are several clear lessons for national government:

1. Connected data works best when rooted in place, shaped by local relationships, and designed around clear public purposes.

2. Trust must be built through transparency, engagement, and visible public benefit.

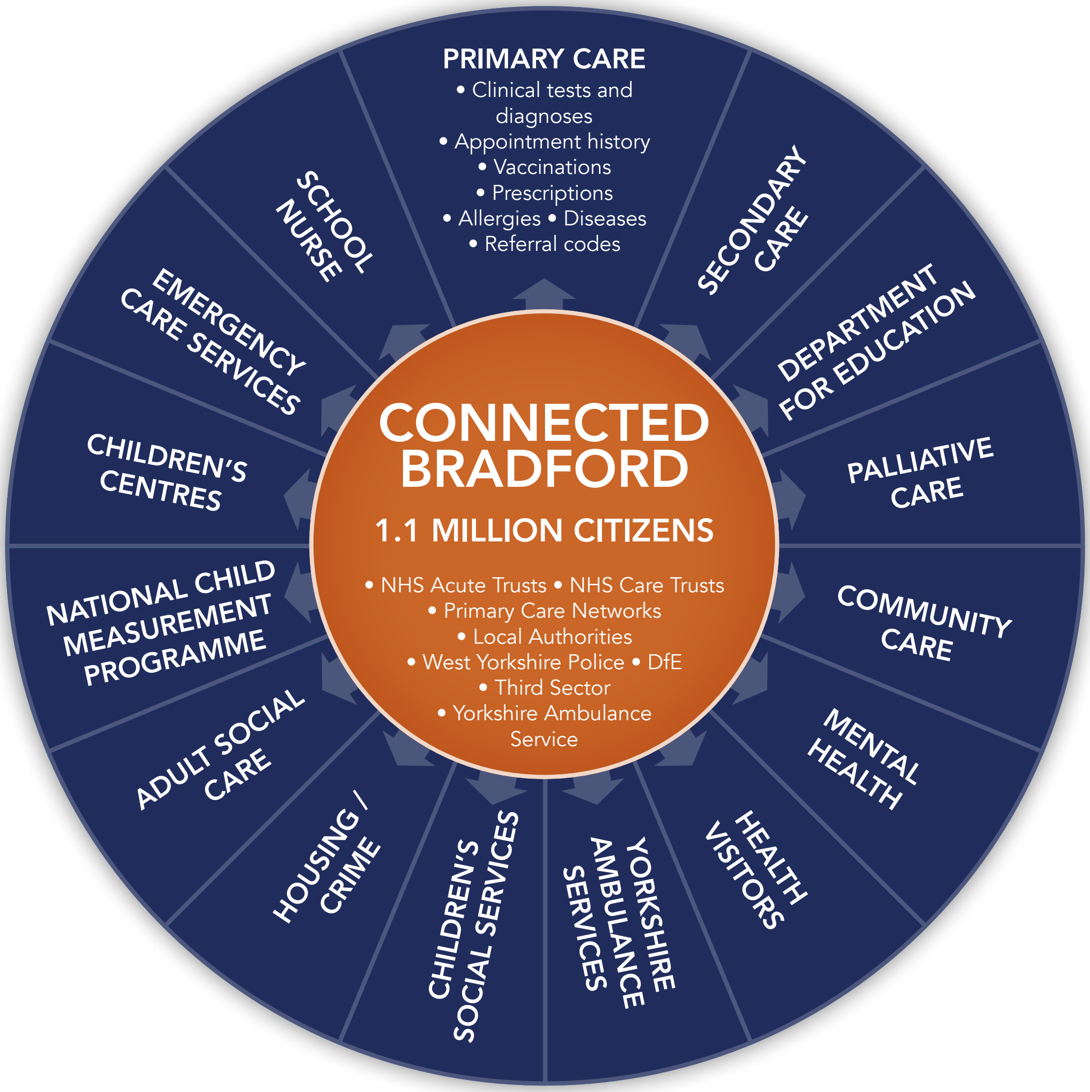
3. The NHS can provide a credible anchor for linked infrastructure, but it must connect meaningfully with education, social care, and other local systems.

4. The value of connected data lies not only in better analysis, but in enabling earlier intervention, more coordinated support, and stronger evaluation of what works.

Bradford demonstrates that national reform does not need to start from scratch; government already has a practical model from which to learn. This is why Bradford should not be seen as an exception, but as an exemplar. The question for government is no longer whether such a model is possible. Bradford has answered that. The question is whether national government is prepared to take the next step: to back other areas to adopt, adapt and scale the lessons Bradford has already generated. That is why Connected Bradford sits at the heart of this report. It is the clearest example we have of what a connected public service infrastructure could look like in practice – and why the UK should move from isolated innovation to national adoption.

Connected Bradford fact file

1,131,462	Primary Care
1,154,436	Secondary Care Bradford Hospitals
3,991,879	Yorkshire Ambulance Service
260,000	Bradford District Care Trust Community Care
315,693	Department for Education Education Data
383,893	Airedale Hospitals
315,693	Children's Social Care
City of Bradford	Environmental
30,000	BMDC Education Data
443,043	Calderdale Hospitals
658,775	West Yorkshire Police
52,897	Benefits
47,360	Adult Social Care
22,701	Housing



CONNECTED BRADFORD

1.1 MILLION CITIZENS

- NHS Acute Trusts
- NHS Care Trusts
- Primary Care Networks
- Local Authorities
- West Yorkshire Police
- DfE
- Third Sector
- Yorkshire Ambulance Service

PRIMARY CARE

- Clinical tests and diagnoses
- Appointment history
- Vaccinations
- Prescriptions
- Allergies
- Diseases
- Referral codes

SECONDARY CARE

DEPARTMENT FOR EDUCATION

PALLIATIVE CARE

COMMUNITY CARE

MENTAL HEALTH

HEALTH VISITORS

YORKSHIRE AMBULANCE SERVICES

CHILDREN'S SOCIAL SERVICES

HOUSING / CRIME

ADULT SOCIAL CARE

NATIONAL CHILD MEASUREMENT PROGRAMME

CHILDREN'S CENTRES

EMERGENCY CARE SERVICES

SCHOOL NURSE

8. Challenges and opportunities

The case for a national connected data infrastructure in the UK is unarguable. The British Association for Childhood Disability (BACD) has shown that better data linkage can improve record matching, reduce administrative burden and costs, strengthen policy, improve service planning, support earlier identification of children at risk, and reduce the need for families to repeatedly provide difficult or distressing information across services.

The difficult question is not whether data linkage should happen, but how it can be delivered in a way that is lawful, trusted, and useful in practice. The challenge is not simply technical but institutional, cultural, and civic. Barriers involving inconsistent legal frameworks, governance complexity, professional confidence, public trust, workforce capability and implementation capacity are real, but they are not arguments for delay. On the contrary, they underline the need for a clear and deliberate national strategy.

One of the most persistent barriers is uncertainty about the legal and ethical basis for the linkage and use of data across services. In practice, this uncertainty often halts action, even where the public benefit is strong. Health, education, social care, and other public bodies may be eager to collaborate, but hesitant without clarity around permissions, accountabilities, and risk. Yet caution is not a neutral or risk-free position. When data are not connected, needs go unidentified, risks are missed and opportunities for earlier support are lost – harms that are real but diffuse, and so too easily discounted against the more visible risks of acting. The evidence presented in this report shows that this tension can be resolved. Bradford has already demonstrated that lawful, secure and transparent arrangements are achievable, and the wider Connected Humber and North Yorkshire (Connected HNY) proposal builds directly on that experience. The task for government is therefore to replace ambiguity with confidence by providing clearer national support while allowing local systems to implement robust, proportionate and publicly legitimate arrangements.

Clarity of purpose is essential. Connected data cannot be justified in the abstract and programmes often fail when objectives are too broad or poorly defined. In contrast, tightly scoped use cases allow local systems to demonstrate value, build confidence and create a practical basis for wider rollout. This is why this report's emphasis on focused local pilots and clearly bounded applications is so important. Connected data becomes much easier to support when its purposes are concrete, intelligible and visibly beneficial.

Governance of connected data use stands out as an area of opportunity where clear progress can be made. Connected systems require clear accountability for how data are used, who is responsible, and how decisions are scrutinised. Fragmented leadership is often the reason that integrated working stalls, forcing organisations to negotiate each decision from first principles and slowing progress. This report calls for a clearer oversight model, which includes citizen and professional representation, a clear point of challenge, and visible structures that ensure organisations do what they say they will do. Done well, governance is not simply about control, it is an enabling condition for innovation, facilitating confident collaboration at pace.

Public trust and confidence in public services are fragile and should not be taken for granted – they are slow to build and quickly eroded. Handled poorly, the use of connected data risks deepening suspicion, straining the relationships between communities and the services meant to support them. Handled well, they offer another path – towards greater transparency, and with it, renewed confidence. Community consent and confidence are achieved through local leaders working with parents, families and professionals to create an environment of trust. Public engagement must include those populations for whom data quality is currently weakest, otherwise systems risk reproducing inequity. This is not an optional extra. It is part of the core delivery model. The opportunity here is significant: if local systems engage communities well, connected data can strengthen democratic legitimacy by showing that public services are using information more intelligently and more transparently to improve children's lives – enhancing rather than undermining public trust and confidence in public services.

Public **trust and confidence** in public services are fragile and should not be taken for granted.

> The opportunity here is to show that connected data can be both **ambitious** and **disciplined**.

Implementation must also proceed at a realistic scale. A common mistake in public service reform is to attempt comprehensive transformation across an entire system too quickly. This report argues instead for starting with the lowest viable unit of implementation: defined neighbourhoods, localities or cohorts where governance, relationships and delivery models can be tested before scaling. The Connected HNY proposal reflects this logic by proposing an initial roll-out across three localities before expanding using a test-and-learn approach. The opportunity here is to show that connected data can be both ambitious and disciplined: locally grounded at first but designed with scale in mind from the outset.

The workforce dimension must also not be underestimated. Connected data will only improve outcomes if professionals across health, education, care and related sectors are willing and able to use them. This will require training, support, time and a degree of cultural change, alongside recognition that the practical burden of integration and maintenance often falls on frontline professionals already under considerable strain. However, this challenge also opens up a major opportunity. By starting small and building on success, connected data approaches can reduce analytical duplication, sparing agencies from running parallel analyses on separate datasets, and instead let professionals share insights, common approaches and a common language. Coordinated working becomes easier rather than harder, easing the burden on a workforce already under strain rather than adding to it.

Institutional barriers remain significant. Although ICB structures create some opportunities for integration, their formal remit remains too narrow to deliver the wider Connected ICB vision at pace. Local leaders may support collaboration in principle, but hesitate to commit resources or permissions when accountability systems remain siloed and services are under pressure. Inspection, guidance and performance frameworks do not yet consistently reward the kind of whole-system working that this report advocates. This leaves local systems carrying shared responsibility without shared authorisation. Many of these barriers to local innovation can only be removed by better alignment of national policy with prevention, research engagement and safe and ethically robust information sharing.

Education illustrates this challenge especially clearly. Schools are among the most important institutions in children's lives and are often best placed to identify emerging need early. Yet they do not always find it easy to contribute to strategic discussions across health, care and wider public services. This weakens the system as a whole. More effective connected data arrangements would allow schools and trusts to contribute with authority, without imposing unrealistic responsibilities on them. Properly integrated education data within connected data systems could become one of the strongest mechanisms for earlier identification, local engagement and coordinated support around children and families.

Another opportunity lies in the creation of a strong community of practice. Too often, local systems are left to solve similar technical, legal and governance problems in isolation. A broader network, with Connected ICBs playing a leadership role and with support from partners such as the Alan Turing Institute and the N8 universities, would help develop common approaches, share learning and connect policymakers with practitioners and researchers. Many of the barriers identified in this report are common across systems. A wider and stronger community of practice would help turn isolated experimentation into cumulative progress.

There is also a wider strategic opportunity for government itself. Connected data would not only improve local service coordination but would also provide national policymakers with a far stronger evidence base for understanding demand, identifying effective practice and evaluating the impact of investment. This is one of the most important opportunities in the report: a more intelligent relationship between national policy and local patterns of vulnerability and practice would increase confidence in policy making and the effectiveness of local delivery. It would also sharpen the fiscal case for prevention. Because connected data makes emerging need visible earlier, it allows services to act before problems escalate into acute and costly crises, and the resources required to support a young person upstream are typically far smaller than those consumed by late, reactive intervention. For government, this reframes connected data not as an administrative cost but as an investment that reduces demand on the most expensive parts of the system while improving children's lives.

Taken together, the challenges and opportunities set out in this chapter point to a simple conclusion: connected data systems will not succeed through technical fixes alone. The barriers and the opportunities are often two sides of the same conditions – the very factors that currently hold progress back are those that, addressed well, will unlock it. Success depends on legal clarity, public trust, strong governance, local partnership, workforce development and national support. If these conditions can be established, the opportunities are substantial. Public services would be better able to see patterns of need, intervene earlier, reduce duplication, coordinate support and learn more effectively from what works. The challenges, then, are substantial. But so is the prize. With clear leadership, strong governance and public trust, connected data can become a practical foundation for a public service system that intervenes earlier, supports families more effectively, and gives every child a better chance to thrive.

Barnsley on practical AI and data foundations

At the same time as the Manchester showcase, Child of the North colleagues were represented at a Royal Academy of Engineering Practical AI event in Barnsley, held in partnership with the Cabinet Office Test, Learn and Grow programme and Barnsley Metropolitan Borough Council. That discussion provides a useful companion perspective to this report because it focused not on data linkage in the abstract, but on what local systems need in practice if they are to use data and AI responsibly in children's services.

Several themes strongly reinforced the arguments made in this report. First, participants repeatedly stressed that local systems must start with the problem, not the technology: before building AI tools or complex infrastructure, organisations need to define precisely what problem they are trying to solve, what improvement would count as success, and what minimum data are required. Second, the discussion underscored that data foundations matter more than shiny tools. Barnsley's immediate challenge is to bring fragmented information from multiple systems into a usable form, with "good enough" data for clearly defined use cases seen as more important than waiting for a perfect data lake.

Third, the Barnsley event reinforced the principle that human oversight must remain central. In high-stakes contexts such as children's services, AI should augment professional judgement by surfacing information, reducing administrative burden and helping identify risk earlier; it should not replace human decision-making. Fourth, the event highlighted that public trust is built through trustworthy action: communities respond more positively when shown concrete examples of data being used to improve services they care about, rather than being asked to engage only with abstract questions about AI and data sharing.

Perhaps most importantly, the Barnsley discussion warned that the children and families with the greatest needs are often also "data minorities" – those whose records are incomplete, inconsistent or missing, and who are therefore least well served by systems built on administrative data alone. This is a crucial reminder that connected data and AI must be designed with inequity in mind from the outset. The lesson from Barnsley is therefore fully consistent with the wider argument of this report: better data use begins with clear purpose, strong foundations, public trust and a determined focus on improving outcomes for the children who are easiest to overlook.

Read the full story here:
https://t.ly/3ew1B

9. Preparing for delivery

Why Integrated Care Boards are the right organising level

A central argument of this report is that Integrated Care Boards (ICBs) are the optimal organising level for a national connected data model.

The needs of children and families form a complex system. They do not present neatly through one service at a time, which means that the holistic needs of families cannot be understood by breaking the system into separate component parts and managing each need in isolation. Poverty, school absence, neurodivergence, mental health, physical health, safeguarding concerns, family stress, housing insecurity and wider community risks interact dynamically over time. The interrelationships between these factors must therefore be considered alongside the conditions of each part.

In complex systems, isolated command-and-control mechanisms tend to fail because they ignore feedback loops, local context and interdependence. In contrast, complex systems work when there is effective communication across the component parts, when feedback is visible, and when local actors are able to respond intelligently to shared information. In other words, effective 'control' in a complex system is achieved through self-organisation around common signals, shared goals, and trusted relationships.

This is why connected data matter. Its purpose is not to centralise all decisions. Connected datasets create the feedback infrastructure that allows a distributed service system to function more coherently. Connected data enables services to work in a more coordinated and informed way by showing a child and family's broader patterns of need. It supports earlier identification of emerging risks and allows practitioners to respond using the most accurate and up-to-date information.

The ICB is the right level for coordinating approaches to connecting data because it sits at the critical middle layer of the public service architecture. ICBs are large enough to convene multiple NHS organisations, local authorities and system partners around a shared population, but close enough to local delivery to support Local Authorities and NHS partners connecting to place, community, and operational reality. ICBs are therefore the appropriate meso-level for coordination in a distributed model.

In contrast, Whitehall is too distant and too abstract and individual organisations are too narrow. Neighbourhoods and localities are essential for delivery, but too small to provide the full strategic, analytical and governance architecture required. The ICB is the level at which these different scales can be brought into an effective alignment.

This is particularly important because connected data requires coordination in two directions at once. First, it requires vertical coordination involving national government departments. Children's lives do not follow departmental boundaries, and neither can a national data strategy. Health, education, social care, policing, and housing all shape outcomes. National government must therefore provide the mandate, legal clarity, standards and incentives that sit above local systems.

Connected data also requires horizontal coordination within regions. Many ICBs, such as West Yorkshire, contain several local authorities, multiple NHS providers and a range of other statutory and voluntary partners. The ICB is the level at which those local systems can be connected without flattening their differences. ICBs can provide the shared infrastructure, governance and strategic oversight that allows local authorities and frontline NHS partners to act on insights in ways that reflect local context.

This does not mean that ICBs should replace local leadership. On the contrary, the model proposed in this report is deliberately distributed. Local authorities, schools, NHS trusts, primary care, family hubs, neighbourhood teams and voluntary organisations remain the anchor institutions on the ground because they are closest to children, families, and communities. These are the parts of the system that can ensure connected data insights are translated into action and interpreted in light of local realities. But those local institutions need to be connected to one another, and to a broader strategic frame, if the system is to learn and improve holistically.

Importantly, this argument is consistent with the current direction of NHS reform. The 10 Year Health Plan says that power should move out from Whitehall to places, providers and patients, and explicitly states that ICBs will be the

> Connected data enables services to work in a more **coordinated** and **informed** way by showing a child and family's broader patterns of need.

strategic commissioners of local healthcare services. Our arguments are consistent with the move towards ICBs as strategic commissioners. Strategic commissioning requires high-quality intelligence, linked data, public insight and the ability to understand need across a population. It does not require ICBs to own or operate every element of data infrastructure. Our Connected ICB model therefore positions ICBs as the bodies that coordinate and commission around linked intelligence, while secure data processing and linkage are undertaken by the appropriate NHS-hosted or nationally supported infrastructure.

For this report, the implication is clear. The Connected ICB model aligns with both complexity science and current NHS reform. It does not ask ICBs to become centralised command structures. It asks them to do something more intelligent and more realistic: provide the strategic commissioning, shared infrastructure, cross-boundary governance and population-level insight that allows a distributed set of local institutions to coordinate more effectively around children and families. In a complex system, that is what effective organisation looks like. The role of the ICB is not to override local self-organisation, but to make it possible, visible, and accountable at scale.

How should government begin to connect data?

The answer emerging from this report is clear. Delivery should not start with an attempt to transform everything at once. It should begin with a disciplined, place-based approach that is ambitious in intent but controlled in execution: building the core infrastructure for connected data, testing it through a small number of priority use cases, and expanding only as confidence, capability and public trust grow. That is how a national model can be built in a way that is both credible and sustainable.

This report argues that Connected ICBs require a system-level solution to the challenge of linking complex datasets. But it is equally clear that this large-scale infrastructure should be developed in parallel with smaller, tightly managed projects that can prove the principle in practice. This balance is important. Systems need a long-term architecture, but they also need early demonstrations of value. A delivery model that combines both will allow government and local partners to make progress without overburdening existing services or asking communities to trust an approach that has not yet shown its worth. In other words, delivery should be built on visible wins as well as sound design.

> Projects should be delivered in a **highly controlled way**, centred on specific localities and a small number of agreed priorities.

This means the first phase of implementation should be intentionally focused. Projects should be delivered in a highly controlled way, centred on specific localities and a small number of agreed priorities. The purpose of the first phase is not merely technical testing. It is to establish the conditions for success: clear governance, workable data flows, strong community engagement, and practical evidence that connected data can improve how services operate around children and families. Starting in this way makes it possible to learn without destabilising frontline delivery. It also keeps the work anchored in the realities of place, which is essential if connected data is to support genuine public service reform rather than producing better dashboards.

Within this model, Connected ICBs have a distinct coordinating role. The report envisages them taking responsibility for linking projects together, sharing learning across localities, monitoring progress and spending, and organising the national oversight arrangements that will be needed to sustain confidence and momentum. This is an important design principle. Delivery will only succeed if someone is clearly responsible for holding the whole picture together. Without this coordinating function, there is a risk that local pilots become fragmented, lessons are not transferred, and the wider national opportunity is lost. Connected ICBs therefore need to be more than delivery vehicles for isolated projects; they should be the mechanism through which local experimentation is turned into system-wide learning.

At the same time, the report is right to resist a one-size-fits-all model. Localities will vary in the issues they need to prioritise, the assets they can draw on, and the best ways to engage communities and services in planning and delivery. Each locality should therefore develop and own its own plan, while operating within a shared overall framework. This combination of local ownership and common structure is one of the strengths of the proposed approach. It allows delivery to reflect local realities without losing national coherence. Government must recognise that the success of a national rollout depends on its ability to reflect local variation, including the differing needs, levels of trust, service configurations, and organisational readiness across places.

The staged process set out in the draft provides a strong foundation for this. The first step is to identify and define the local areas in which work should begin. This involves using service data and other intelligence to understand where issues are clustering, auditing the scale and cost of demand across services, mapping local resources, and identifying the individuals and organisations with the authority to influence delivery. This is a critical starting point because successful implementation depends on an accurate understanding of both need and leverage. It is not enough to know where pressures are greatest; systems also need to know what assets already exist, who can make decisions, and where change is most likely to take hold.

The second step is to describe those areas properly by combining data with lived experience. The report's reference

Growing Up Well: translating Child of the North principles into practice in Humber and North Yorkshire

The Centre for Young Lives' **Growing Up Well** trailblazer in Humber and North Yorkshire provides an important bridge between the wider Child of the North programme and the connected data agenda set out in this report. As the Growing Up Well report makes clear, the work in Humber and North Yorkshire was explicitly grounded in the seven Child of the North principles and translated them into practice through ICB leadership, place-based working, stronger links between health and education, and a commitment to prevention, equity and evidence.

A critical enabler of that work was the **Humber and North Yorkshire Futures Group**, which created the space for longer-term strategic collaboration beyond day-to-day operational pressures. Through that partnership, evidence, data and evaluation were brought directly into system leadership and decision-making. This included the development of connected data infrastructure, neighbourhood-level insight and test-and-learn approaches designed to understand what works, for whom and in what contexts.

Growing Up Well is especially significant for this report because it helped generate the strategic conditions for **Connected HNY**. A core learning point in the report is the creation of the **CHNY System Intelligence Hub** designed to connect academic expertise in data science, research and evaluation with local system priorities (working with the Yorkshire and Humber ARC) and to oversee the development of a **Connected HNY** database. In this sense, Connected HNY did not emerge in isolation. It grew out of a wider attempt to apply Child of the North principles in practice and to use data, partnership and place-based reform to improve outcomes for children and young people.

The significance of this is national as well as local. Growing Up Well shows that the Child of the North principles can be operationalised through ICB infrastructure when leadership, evidence, co-production and cross-sector accountability are aligned. This connected data report builds on that learning by setting out the infrastructure needed to support similar reform at scale: secure linked data, stronger evaluation, better neighbourhood intelligence, and more joined-up action around children and families.

to the Act Locally methodology is especially important here. Connected data is at its strongest when it is not used in isolation, but alongside the knowledge of the people who live and work in a place. Bringing together residents, practitioners, researchers and policymakers to identify priorities and describe their impact creates a fuller and more trustworthy basis for action. This is also the point at which delivery moves from analysis to shared understanding. It becomes possible to see not just what the data say, but what those patterns mean in everyday life – and therefore what kinds of intervention are likely to be both effective and acceptable.

The third stage is to use that insight to develop and refine workable models for change. This requires analysis and consultation to create a more accurate picture of how problems are playing out and to identify leverage points where systems and processes could be adjusted to make support more effective and more efficient. This is also the stage at which the potential for investment should be assessed, not only investment in digital infrastructure, but in local organisations, local leadership, and the wider civic capacity needed to sustain reform. The report is right to treat this as part of delivery preparation rather than an afterthought. Connected data can only improve outcomes if services are able to respond to what the data show.

From there, local systems should move to proposals for change. These proposals should describe how services, people and resources will be realigned, what goals will be pursued, and how success will be measured. The latter matters greatly. A connected data model will only retain support if it can show what difference it is making. Evaluation should therefore be built in from the start, with clear criteria for outcomes, experience, equity and value for money. This is not simply about accountability. It is how a test-and-learn model becomes a scalable reform model: by generating evidence that can support wider adoption across places and over time.

The final stage is delivery itself, supported by clearer governance, oversight and challenge. By this point, local systems should have the mandate, relationships and technical arrangements needed to move from preparation into implementation. The report is right to stress that launch is not the end of the process. Delivery must be accompanied by ongoing monitoring, challenge and refinement. That is especially important in a field where trust is hard won and where small implementation failures can have wider consequences for public confidence. The right approach is therefore one of careful expansion: launching, learning, adjusting and only then scaling further.

What emerges from this section is a model of delivery that is both pragmatic and ambitious. Pragmatic, because it starts small, focuses on defined localities, and recognises

the operational pressures under which services are already working. Ambitious, because it does not treat those local projects as ends in themselves, but as the first building blocks of a connected national system. This is exactly the right balance. The government does not need to wait for perfect conditions before acting. Nor should it assume that a reform of this scale can be imposed overnight. Preparing for delivery means building the infrastructure, relationships and public legitimacy that make scale possible.

It is important to reemphasise that the Connected ICB model does not require each ICB to become a separate safe haven or routinely receive identifiable data. The ICB should act as the strategic commissioner, connector and coordinator for the local system: agreeing priorities, convening partners, aligning governance, ensuring public engagement, and making sure that linked intelligence is used to inform prevention, service design, commissioning and evaluation. The technical processing of identifiable data, pseudonymisation, linkage and controlled access can be undertaken through appropriate secure NHS infrastructure, which may include an NHS provider-hosted linked data environment, a regional Secure Data Environment, a DSCRO or national data service, depending on the lawful basis, local architecture and agreed governance arrangements. The purpose of the model is therefore not to create multiple new ICB safe havens, but to ensure that each ICB has access to the linked intelligence and partnership arrangements required to act as an effective strategic commissioner for children, families, and communities.

Taken together, the delivery approach set out here provides a practical route from innovation to implementation. It shows how connected data can move from an idea with strong local exemplars into a repeatable model for national adoption: start with place, define priorities clearly, build trust, test the model, evaluate honestly, and scale what works.

Answering the practical questions on data linkage

Preparing for delivery also means answering the practical questions that government, delivery leaders and the public will rightly ask. Can this be done lawfully and ethically? What exactly will the data be used for? How will citizens know what is happening? And what kind of governance will make the model trustworthy in practice? These questions should not be seen as obstacles to progress, but as tests of whether the system is serious about doing this well. In each case, the evidence from Bradford and the wider Connected HNY proposal suggests that workable answers already exist.

First, the legal and ethical route is challenging but navigable. Connected Bradford has already established an approach to lawful, secure and transparent data linkage that can guide future systems and Connected HNY would build directly on that experience with support from N8 university experts and external scrutiny. The important point for government is that this agenda does not begin from scratch. There is already a practical pathway for establishing linked datasets responsibly, and one of the key tasks now is to make that pathway easier for other places to follow.

Second, the purposes of the data must remain clear and tightly defined. The proposal in this report is not to create a vague or open-ended data resource. It is to use connected data for two specific public purposes: to build a research and evaluation resource that helps systems understand how need and demand intersect across services, and to support tightly governed forms of information sharing where coordinated professional action can improve outcomes for children and families. This clarity of purpose is essential to both public trust and effective delivery.

Third, citizens must be able to see how their data are being used and why. Community engagement is therefore not an optional extra, but one of the foundations of the model. The report draws on existing practice in Bradford to show how communities can be involved meaningfully in discussions about linked data, local priorities and public benefit. In the Connected ICB model, local projects should be co-produced with communities, informed by lived experience, and supported by accessible ways of explaining what data are being used for and what difference they are making. Trust will only be sustained if people can see both the safeguards and the value. Public trust must also be understood as more than passive acceptance. A successful connected data model requires an active social licence: a continuing public understanding that data are being used for clear public benefit. This will require transparent and accessible communication about how data are used, understandable and flexible opt-out mechanisms, routine involvement of the public in shaping new projects, and a willingness to show not only successes but also failures and what has been learned.

Fourth, strong governance and oversight are indispensable. Information governance is one of the main challenges in linking and using data across systems, but Bradford has shown that this too can be addressed through rigorous processes: clear agreements, robust privacy protections, independent advice, and visible oversight arrangements. A successful national model will need the same qualities. Local systems must be able to show that responsibilities are clear, risks are managed properly, and scrutiny is built into the design rather than added later. This is not simply a matter of compliance; it is what makes confident collaboration possible.

Finally, the model must begin at a scale that is ambitious enough to matter and disciplined enough to succeed. The creation of a connected database is the essential minimum foundation, but its value must then be demonstrated through carefully chosen local applications that show how better information can improve planning, coordination and early intervention in practice. This is why the report proposes beginning in a small number of localities and building from there. It allows the system to prove the principle, learn quickly and scale on the basis of evidence rather than aspiration.

These practical questions clarify what responsible implementation requires: lawful foundations, clear public purposes, visible community engagement, credible governance and a disciplined route to scale. Connected data becomes a realistic and workable part of public service reform if these elements are in place.

10. Supporting infrastructure

We propose that government should develop a common national layer of support for Connected ICBs: a shared library of metadata, algorithms, standards and approval pathways that makes local innovation easier rather than harder.

Too much effort is currently wasted because local systems repeatedly solve the same problems around data discovery, cataloguing, governance, access and analytical tooling. A more efficient model would provide a single front door through which approved users can find data, understand how datasets are structured, navigate consistent metadata and dictionaries, apply through streamlined approval routes, and work with reusable methods and tools inside secure environments. This would not replace local leadership or local accountability. It would give local systems the common infrastructure they need to move faster, learn from one another and build connected services on firmer foundations. The national layer of support should make full use of the existing publicly funded infrastructure of the type outlined in this section.

NIHR Applied Research Collaborations (ARCs)

NIHR Applied Research Collaborations (ARCs) are an integral part of national research infrastructure in England. ARCs aim to improve outcomes, reduce inequalities, enhance service quality and efficiency, and increase long term sustainability across health and social care. Designed to accelerate applied health and care research that meets the needs of local populations and supports local health systems, ARCs work together to spread and scale effective interventions to a national footprint. Each ARC functions as a partnership between NHS providers, universities, local authorities, charities, industry partners and other organisations to translate research evidence into everyday practice. Taking their focus from Government missions and national policy, they focus on national challenges such as ageing populations, mental health, and increasing workforce and system pressures.

Aligning ARC Purpose with Regional System Reform

Jake Abbas, Chief Analyst at Humber and North Yorkshire Integrated Care Board (HNY ICB), described ARCs as a critical mechanism for bridging national policy with emerging local and regional system architecture. As Integrated Care Boards (ICBs), NHS England regional structures, and neighbourhood providers adapted to new arrangements, ARCs provided continuity and coherence – helping ensure that evidence based interventions developed nationally were implemented effectively at place and neighbourhood levels.

This aligns closely with the national intention of ARCs: to increase the rate at which research findings are implemented into practice and to generate evidence that informs decision making across health and care systems. ARCs play a vital role towards the end of the translational research pathway; their fundamental value lay in **speeding up translation** of effective interventions into policy and service change – turning tested research into operational improvement, faster.

The Connected Humber & North Yorkshire Approach

Within Humber and North Yorkshire, the ARC formed part of a wider sub regional collaboration. The **Connected Humber and North Yorkshire (CHNY) Hub** aims to sit at the centre of this model, built around a curated system wide linked data resource. This resource would support population health management, neighbourhood level planning, service improvement and academic research – facilitated through a Secure Data Environment (SDE). The arrangement, blending ICB-funded core capacity with additional external ARC-linked expertise, could create a resilient and flexible analytic ecosystem.

Challenges: Data Access, System Change and Architectural Uncertainty

Currently there are significant challenges that constrain the full potential of ARC ICB integration:

- **Evolving governance and system architecture**, resulting from changes to the role of ICBs and in some areas the footprints they cover, changes to national/regional DHSC (including NHS England) structures, and implementation of new local provider models for delivering neighbourhood health.

- **Data access and linkage fragility**, including the closure of Commissioning Support Units, uncertainties around the Federated Data Platform, and dependencies on secure data environments.

- **Rapid organisational change**, which risks disrupting essential data flows, evidence generation and longer term research programmes.

ARC Networks as Mechanisms for Coherence and Translation

Despite uncertainty, ARC networks offer a structured mechanism for effective collaboration and delivery as they:

- Connect local delivery with national policy priorities.

- Link ICB strategic commissioning needs with academic research capacity.

- Strengthen data infrastructure and enable access to linked datasets.

- Act as delivery partners capable of supporting evidence driven system redesign.

This echoes the national ARC mandate to support evidence mobilisation, improve implementation of proven interventions, and ensure that research is scalable and relevant to health system needs.

> There is a need for **government support** to stabilise data access, clarify organisational roles and enable continuity of research and innovation **during system transformation**.

Looking Forward: Support, Stability and Test and Learn Opportunities

There is a need for government support to stabilise data access, clarify organisational roles and enable continuity of research and innovation during system transformation. The Humber and North Yorkshire region is well positioned to operate as a test and learn environment, leveraging its strong ARC ICB partnerships and robust data infrastructure to pilot new models of integrated research, policy and delivery.

NIHR Health Determinants Research Collaborations

The NIHR Health Determinants Research Collaborations (HDRCs) are an important part of the wider infrastructure needed to make connected data useful for public service reform. They are designed to strengthen research capacity within local authorities, enabling councils to better understand and act on the social, economic and environmental factors that shape health, wellbeing and inequality.

This matters because many of the determinants of children's outcomes sit outside the NHS. Housing, poverty, transport, education, employment, food insecurity, green space, family stress and community safety all shape children's lives. However, the evidence needed to understand these wider determinants is often fragmented across local government, health, education, policing and the voluntary sector. HDRCs help address this gap by embedding research capacity inside local authorities and supporting councils to work with academic partners, communities and public services to generate and use evidence more effectively.

For the connected data agenda, HDRCs offer three important contributions. First, they strengthen the local authority role in a model that might otherwise be seen as too health-led. Connected ICBs will only succeed if local government is a full partner, because councils hold many of the levers that shape prevention, early intervention and the wider conditions in which children grow up. Second, HDRCs help build the culture and capability needed to turn data into action. Their purpose is not simply to produce research, but to make evidence part of everyday decision-making in local government. Third, they create a route for meaningful public and community involvement, ensuring that data-led approaches are shaped by the people and places they are intended to serve.

Several HDRCs across the North of England illustrate this potential. Bradford HDRC is building on the district's wider City of Research infrastructure, developing linked data capacity, stronger governance and community-led approaches such as public involvement panels, citizen juries and community insight methods. This aligns closely with the Connected Bradford model and shows how local authority research capacity can support a broader place-based data ecosystem.

Gateshead HDRC is focused on stark health inequalities, including large differences in life expectancy between neighbourhoods. Its work on housing, food access, green space, education and healthcare shows why connected data must extend beyond clinical records if public services are to understand the real drivers of childhood and family disadvantage.

Wakefield HDRC is similarly focused on the everyday determinants of health, including housing, transport, jobs and education. By building research skills among staff and residents, and by integrating lived experience into research design, it demonstrates how local systems can combine data, community insight and policy action.

Newcastle HDRC is developing cross-council research and data infrastructure to embed evidence-informed decision-making across local government. Its emphasis on co-produced research, university collaboration and public involvement reinforces one of the central arguments of this report: connected data systems must be built around trust, local legitimacy and practical use.

Taken together, the HDRCs show that the UK already has significant civic research capacity on which a national Connected ICB programme could build. They also underline an important lesson for government. Connected data infrastructure should not be designed as a purely technical or NHS-facing exercise. It must connect with the wider determinants of children's lives, and it must be rooted in the local authority systems that shape housing, education, community safety, family support and place-based prevention.

The next step is to align this capacity more deliberately with the Connected ICB model. HDRCs could help identify priority datasets, clarify evidence gaps, support public engagement, strengthen local analytical capability and ensure that linked data are used to inform real decisions about services and investment. In doing so, they could become a key bridge between local government, universities, communities and NHS-hosted data infrastructure.

The opportunity is therefore clear. HDRCs are not a separate initiative sitting alongside the connected data agenda. They are one of the mechanisms through which connected data can become useful, trusted and grounded in place. A national Connected ICB programme should explicitly recognise and draw on HDRCs as part of the civic infrastructure needed to turn linked data into better outcomes for children, families and communities.

ESRC Vulnerability & Policing Futures Research Centre

The ESRC Vulnerability & Policing Futures Research Centre is a £10m investment jointly hosted by the Universities of York and Leeds. Its goal is to transform how police and partner organisations collaborate to reduce harm to vulnerable people in society. Its research examines how vulnerabilities – including those linked to mental illness, domestic abuse, modern slavery, and online exploitation – emerge, intersect, and compound. Drawing on 38 local, national, and international partners – spanning police forces, local authorities, charities, and people with lived experience, the Centre develops integrated, evidence-based approaches to improve how public services identify and respond to vulnerability.

> Connected data infrastructure should not be designed as a **purely technical** or NHS-facing exercise.

A core strand of the Centre's work is its Connected Data Analytics programme, led by Professors Dan Birks and Mark Mon-Williams (University of Leeds). The programme applies data science methods to data routinely collected by public services – police, health, education, and social care – to generate actionable insights into public service problems, current responses, and future service needs. Recognising that people's lives do not fit neatly into the categories of health, education, policing, or social care, the programme takes a cross-sector view of how services can be better coordinated around the needs of disadvantaged communities.

The programme pursues two complementary goals. First, it uses linked administrative data to build a holistic understanding of the conditions under which harms emerge and how services respond. Anchored in Bradford through collaboration with the NHS's Connected Bradford research database, this place-based approach builds on the internationally recognised Born in Bradford study and the District's City of Research infrastructure. Second, the programme seeks to develop the next generation of socially responsible public service data scientists. Over five years it is supporting over 20 exploratory projects led by early career data scientists, delivered in partnership with the Leeds Institute for Data Analytics and its award-winning Data Scientist Development Programme which seeks to deliver data science for public good.

Projects are co-designed with practitioners from the Bradford region and undertaken by data scientists supported by interdisciplinary teams of supervisors combining domain knowledge, methodological expertise, and applied practice experience. Work to date has spanned a broad range of topics, from highlighting distinct pathways between absence type, attainment, and future disengagement from employment and training, to estimating how the nature and scale of police demand varies across communities in ways that often run contrary to public expectations, to showing that looked-after children's risk of going missing increases fourfold in the weeks following a previous missing episode.

These projects help to **answer questions** that matter to local partners and government.

This work is **already demonstrating** how linked public service data can drive regional and national change.

These projects help to answer questions that matter to local partners and government, providing evidence-based insights to inform better resource allocation, earlier intervention, and more joined-up services. Outputs are shared openly, from research-ready datasets and open code to analytical and visualisation tools and practice-focused summaries, maximising reuse across research and practitioner communities. Taken together, this work is already demonstrating how linked public service data can drive regional and national change – contributing to both the Opportunity and Safer Streets government missions and, ultimately, improving outcomes for the vulnerable people these services exist to protect.

CADRE: building a federated child and adolescent data resource

The Child and Adolescent Data Resource (CADRE) provides an extensible network of locally governed databases that securely link pseudonymised information from health, education and social care services. This data can be used by approved researchers to support children and young people's health research, innovation and service improvement. Its purpose is straightforward: to help professionals, researchers and service planners see the full picture of children's lives, rather than isolated fragments held separately by different institutions.

CADRE was created in response to the continuing rise in children and young people's mental ill health, with fewer than a third of children with mental health needs accessing and receiving care. A central problem is that records are held separately by hospitals, schools, GPs, social services and mental health teams. This makes it harder to identify early warning signs, understand risk factors, recruit into research, develop better prevention, and create more effective treatments. CADRE directly addresses this problem by safely combining information from different services to create a more complete picture of children's health and wellbeing.

CADRE is designed to overcome data fragmentation by securely linking data across sectors, creating a richer and ethically governed resource that no single organisation could build alone. This can support earlier identification of need, better-targeted services in the community, more effective interventions, and better use of resources.

CADRE is currently being developed across several sites, including Cambridgeshire, Greater Manchester, Merseyside and the West Midlands. Greater Manchester is showing how a major city-region can begin to build the partnerships, governance and data infrastructure needed to understand children and young people's health and wellbeing across organisational boundaries. CADRE-GM is focused on creating a linked, pseudonymised and standardised data resource that provides longitudinal, multi-agency data for research and service improvement. Although these are the first sites, the network has been designed to grow.

CADRE uses pseudonymisation before data enter the database. The system uses the CRATE tool (Clinical Records Anonymisation and Text Extraction) to support this process safely and consistently. Identifiers are stored separately from clinical and service data, and researchers do not have access to identifiable records. Where re-identification might be needed for a specific approved study, contact is made directly where families have given permission for this, or through the child's clinician if that's their preference. Contact to provide a family with information about research projects that children are eligible to participate in can only be made with appropriate consent. The resource uses the Five Safes framework: safe data, safe projects, safe people, safe settings and safe outputs. Research projects must be approved for public benefit, researchers must be trained and authorised, the data are hosted in a Secure Data Environment, and outputs are screened so that they do not disclose personal information. This is precisely the kind of privacy-preserving infrastructure needed if connected data is to command public trust while still generating public value.

CADRE's data access model is important. Approved researchers can use CADRE data for ethically approved clinical trials, population studies, health service improvement work and the development of digital innovations using artificial intelligence and machine learning. Access is restricted to the data needed for a specific project, and applications are reviewed by a local Data Access Committee that includes research, methods, ethics and patient and public representatives. Researchers can apply to access data within one region, or to access anonymous data across several regions using privacy-preserving federated analytics.

This federated capability is particularly relevant to the national Connected ICB model proposed in this report. CADRE points towards a future in which local and regional systems retain governance and control, while common standards and federated analytics allow learning across places. This avoids the false choice between isolated local datasets and a single centralised national database. Instead, it creates the possibility of a distributed national learning system: locally governed, securely linked, standardised where necessary, and capable of generating insight across regions without moving or exposing sensitive data unnecessarily.

Born and Bred In (BaBi) Network

The Born and Bred In (BaBi) Network (www.babinetwork.co.uk) represents a significant shift in how population health research is conducted in England [1]. Originating from the pioneering work of the Born in Bradford programme, BaBi was created with a central ambition: to embed a consented research model directly into routine health services, enabling large scale, longitudinal research without adding burden to families or clinicians. By integrating verbal consent into everyday antenatal appointments, midwives and healthcare staff can seamlessly recruit participants into local electronic birth cohorts. This embedded consent model is the backbone of BaBi's rapid expansion and consistent data collection, allowing health researchers to link routinely collected maternal and child health records to understand long term patterns in wellbeing, service use and environmental influences.

Since its inception, the BaBi Network has grown at remarkable pace. Across England, more than 85,000 participants have now joined, across sites representing 11% of all births nationally – a scale that places BaBi among the most ambitious birth cohort infrastructures in the country. This growth has been enabled by the network's distributed design: BaBi consists of multiple local cohorts embedded within NHS Trusts, each tailored to its own population while contributing to a central meta cohort. The BaBi Network Coordinating Centre, based within the Born in Bradford team, oversees quality assurance, governance and methodological consistency across sites, ensuring that while local ownership is preserved, national research questions can still be explored.

Enrolling in BaBi involves more than consent for routine data linkage. Families are also asked for permission to be contacted for future studies, opening the door to further research that can build on local priorities or national needs. This "consent to contact" mechanism creates an enduring relationship between participants and researchers, enabling BaBi to follow families over time and invite them into targeted research that may benefit their communities. This is especially significant given that most people are unaware that data sharing across health services is not routine. In reality, maternal and child health data are often siloed across systems. BaBi addresses this gap by securely linking health, education and social care data, creating a richer and more coherent picture of family wellbeing and service interactions than would otherwise be possible.

The BaBi Network's approach has already demonstrated its value. For example, linked data from a BaBi site has been used to study the relationship between air pollution exposure and childhood asthma, revealing strong associations between traffic congestion and respiratory outcomes. Such findings have been used to engage policymakers and influence decisions affecting local environments, demonstrating the dual local–national impact that BaBi was designed to achieve. Ongoing cross Network analysis is exploring the uptake and impact of the national maternal vaccination programme to protect babies from respiratory syncytial virus (RSV). The level of detail available in the linked data adds significant and valuable nuance to the overall picture available through national data sources, allowing researchers to explore multi-dimensional equity perspectives so we not only know how much uptake and impact there is, but importantly the characteristics of those who benefit, allowing targeted approaches and changes to promote more inclusive practices to drive down inequalities from the very start of life. Meanwhile, the network's growth has built capacity across the NHS: more than 1,500 clinical staff have now been trained to take research consent, enabling many Trusts to offer maternity research opportunities for the first time.

A defining feature of the BaBi model is its role as a local health intelligence system. Each BaBi site generates tailored insights about its population, helping local teams identify patterns, inequalities or unmet needs. However, the BaBi approach emphasises that data alone is insufficient: meaningful impact requires translating research findings into service changes or interventions, followed by robust evaluation. This creates a continuous cycle of improvement – collecting data, interpreting it, implementing change and assessing its effectiveness. This model strengthens local decision making while contributing to national datasets capable of addressing rarer or more complex questions.

BaBi stands as a **new blueprint** for population level research in the NHS.

By embedding research within routine care, the BaBi Network has created a **sustainable, scalable** platform.

Today, BaBi stands as a new blueprint for population level research in the NHS – one that prioritises accessibility, consent, community involvement and local relevance while contributing to national knowledge. By embedding research within routine care, the BaBi Network has created a sustainable, scalable platform for understanding how families' health and wellbeing evolve over time. Its success highlights not only the power of routinely collected data, but also the importance of using that data to drive tangible improvements in health services and outcomes for families across England.

National Cultural Data Observatory

The National Cultural Data Observatory (NCDO) is an important component of the wider infrastructure needed to make connected data work for children, families, communities and places. Its focus is the UK's arts, culture and heritage sectors, but its relevance to this report is much broader. Culture is not separate from the lives of children and young people. Existing research demonstrates how it shapes their wellbeing, belonging, confidence, aspiration, civic pride, local identity and access to opportunity. It is also increasingly central to place-based growth and regeneration, healthy lives, educational achievement – including skills that are highly valued even in an AI-dominated workplace – and community cohesion. Cultural opportunity and cultural participation should be understood as part of the wider ecosystem of support around children, families and communities when building a country that works for all children and young people.

Data about arts, culture and heritage are currently fragmented, incomplete, inconsistent and insufficiently granular. Valuable information is held by government departments, arm's-length bodies, local authorities, cultural organisations, funders, researchers and community partners, but is rarely connected in ways that allow policymakers, sector leaders, or communities to see the whole picture. This creates a familiar problem. The cultural sector often struggles to demonstrate its social and economic contribution, while policymakers lack the robust, comparable and place-sensitive evidence needed to plan investment, evaluate impact, and understand how culture contributes to wider outcomes. The problem is not a lack of data, but a lack of infrastructure, standards, governance, and capacity to connect existing information and turn it into practical insight and actionable sector intelligence.

The NCDO (https://t.ly/KOvff) was developed to address this gap. Led by the Centre for Cultural Value, The Audience Agency, MyCake and Culture Commons, with affiliate university and sector partners, the NCDO project has produced a blueprint (https://t.ly/0SM9V) for a national cultural data infrastructure. The project engaged nearly 500 stakeholders and reviewed a wide range of datasets to explore how cultural, social, and economic data could be brought together in a trusted, usable and policy-relevant form. Its central proposition is that the UK needs an independent, federated, mixed-methods and people-centred data observatory for arts, culture and heritage based around a manifesto (https://t.ly/WJQp4) to which 100s of organisations have already signed up. This would not create a single centralised database that flattens local context. Instead, it would provide a shared research framework through which data from different sources and places can be connected, compared, interpreted and reused safely, ethically and sustainably.

The NCDO offers a complementary infrastructure for understanding the cultural and civic dimensions of children's lives. It can help local systems understand where cultural opportunity is strong, where access is limited, where investment is needed, and how cultural participation intersects with education, health, wellbeing, inclusion, local identity and economic opportunity. The work centred on Bradford UK City of Culture 2025 is especially important in this context (https://t.ly/6byFn). The NCDO demonstrator (Accessible through signing up here https://t.ly/C3OfC) illustrates how national, regional and local datasets can be connected through a single local portal using the NCDO blueprint. Bradford provides a powerful real-world testbed because it combines cultural ambition, deep civic identity, acute inequalities, major policy interest and a wider local ecosystem already in place.

Secure Data Environments

NHS England's **Secure Data Environment (SDE)** programme already provides a major part of the infrastructure needed to deliver the recommendations in this report. The SDE network is an England-wide investment designed to become the default route for approved researchers to access NHS data safely. These environments allow approved users to analyse **de-identified, minimised data within secure platforms**. This means that government does not need to start from scratch. A substantial national investment has already been made in the secure infrastructure, governance standards, and interoperability needed to support connected data at scale.

> Connected Bradford already sits **within** this wider Yorkshire and Humber infrastructure.

Secure Data Environments are useful for the delivery model proposed in this report. In practice, a Connected ICB should not be understood as an ICB directly holding all identifiable data or operating all linkage functions itself. Rather, the ICB footprint provides the strategic geography within which partners agree the purposes, governance, public engagement and commissioning questions that linked data should support. The secure data infrastructure may be hosted by an NHS provider, as in the Connected Bradford model, or delivered through a regional SDE, DSCRO or national data service arrangement. This allows the model to align with national digital architecture while retaining the local legitimacy, public-service focus and place-based intelligence needed for prevention and early intervention. The **Yorkshire and Humber Secure Data Environment (Y&H SDE)** shows how this national investment can be used to support a Connected ICB model. The Y&H SDE was established to improve patient care and safety, transform services, reduce inequalities and enhance life chances across the 5.7 million people in the region.

Connected Bradford already sits within this wider Yorkshire and Humber infrastructure. Yorkshire and Humber SDE has adopted a robust approach to **citizen engagement** with **two-way patient and public involvement and engagement lying at the heart of its approach**. The SDE has patient and public engagement as a **core function** with the public being kept informed of activities and benefits, and public views regularly assessed and incorporated into project approval methodology. This governance infrastructure is designed to secure public legitimacy over time. For example, the Y&H SDE has run a **Citizens' Jury**, bringing together 25 members of the public from across Yorkshire and the Humber to develop recommendations for decision-makers.

A Yorkshire and Humber SDE survey of around **850 people** found that **72%** were happy to share their health record for research purposes via the SDE; **66%** were comfortable with an approved NHS organisation accessing identifiable records and then removing identifiers; and **56%** were comfortable with sharing via the SDE for non-research purposes. This shows that when the public are given a secure model, a clear public purpose and visible safeguards, most people are comfortable with this approach. Connected Bradford is expanding to become Connected West Yorkshire, which will continue to be hosted on **physical servers** within Bradford Teaching Hospitals NHS Foundation Trust, rather than relying on a cloud-based service. This offers an added level of reassurance on **data sovereignty**: the hosting organisation retains direct control over the hardware and physical environment in which the data sit. It can also offer resilience advantages. If a cyber incident or major outage affects external providers, a locally controlled on-premises environment can be isolated, prioritised and recovered by

> Much of the infrastructure needed for a Connected ICB approach **already exists**.

the host NHS organisation more directly than a dispersed third-party cloud dependency. The NHS SDE programme (and the Yorkshire and Humber SDE in particular) means that much of the infrastructure needed for a Connected ICB approach already exists. Government can therefore accelerate adoption of this report's recommendations by leveraging existing NHS investment rather than building a new system from the ground up.

Synthetic data and the double lock: widening access while protecting privacy

Secure Data Environments provide the foundation for safe access to sensitive linked data. But infrastructure should not only protect data from misuse; it should also enable more people to generate public value from data safely. One of the major risks in the current system is that the most valuable datasets are also the hardest to access. The richness, representativeness, longitudinal depth and linkability that make connected data so powerful also increase the risk of reidentification. Consequently, access to high-value administrative data often requires complex legal agreements, specialist infrastructure and relationships that can take years to build. This protects privacy, but it also limits the ability of researchers, analysts, innovators and public service leaders to generate the insights needed to improve services, reduce inequalities and support economic growth.

Synthetic data offers one route through this tension. Synthetic data are artificial datasets generated from real-world information using computational techniques. If developed and validated properly, they can retain the statistical properties and relationships of the original data without exposing the records of citizens. This creates the possibility of allowing a much wider research and innovation community to explore patterns, test hypotheses, design analytical code and develop new tools in a way that protects citizens' privacy by design. The goal is not to replace real data, but to create a safe layer through which researchers can learn from the structure of real-world systems without needing direct access to identifiable or highly sensitive records.

The approach being developed in Bradford in partnership with Stanford University is especially important because it builds on the wider Connected Bradford and Born in Bradford datasets. These assets are precisely the kind of data infrastructure that can answer major questions for public health, public service reform and economic policy: which early interventions deliver long-term value; how health, education and social care needs interact; where services should be targeted; and which innovations are most likely to improve outcomes for children and families.

The "double lock" model we are developing allows this value to be unlocked without giving researchers open access to sensitive real-world data. The first lock is the creation of high-fidelity synthetic datasets that are made available for exploration, code development, and hypothesis testing. Researchers can use these synthetic datasets to understand data structures, define cohorts, develop methods and refine analyses. The second lock is that final analyses can then be run against the real-world data inside the secure environment, with the original data remaining inaccessible and unmoved. Researchers will not receive the underlying records. Instead, they will receive approved outputs generated through controlled processes, with access rules, monitoring, disclosure checks and governance applied throughout the workflow.

This model has several advantages. It lowers the entry threshold for legitimate research, allowing more of the UK's scientific and analytical community to work on questions of public value. It reduces duplication by allowing methods and code to be developed on synthetic data before being applied securely to real data. It supports innovation by enabling universities, public services and responsible industry partners to test new analytical approaches without exposing citizens' records. It also strengthens reproducibility, because synthetic datasets and common data models can make it easier for researchers to understand, compare and apply methods across different places and datasets.

The double lock approach is also proportionate. Access can be tailored according to risk. Lower-risk synthetic data can be made available with fewer barriers, while more sensitive synthetic data, derivative outputs and final real-world analyses can be subject to tighter controls. Different approaches to synthetic data generation (including rules-based methods, fuzzy data and advanced machine learning techniques) can be tested for different data types and use cases. Each synthetic dataset should be accompanied by quality reporting that assesses fidelity to the original data, privacy risk, potential bias and appropriate access conditions. This is essential, because synthetic data are only useful if they are both safe and analytically meaningful. Poorly designed synthetic data could mislead researchers; poorly governed synthetic data could create privacy risks. The infrastructure therefore needs to treat synthetic data as part of a governed ecosystem, not as a shortcut around governance.

This matters for children and families because many of the most important policy questions require precisely the kind of linked, longitudinal data that is hardest to access. Understanding the relationship between early years development, SEND, school absence, mental health, housing, air quality, safeguarding and later outcomes requires data that cut across organisational boundaries and follow patterns over time. Synthetic data could allow researchers and policymakers to explore these relationships more safely and at greater pace, while ensuring that identifiable information about children, families and communities remains protected.

The economic opportunity is also significant. A national Connected ICB model supported by synthetic data capability would create a stronger platform for research, innovation and inward investment. It would allow the UK to develop and test data science, artificial intelligence, visualisation and evaluation methods in live public-service contexts, while maintaining high standards of privacy, governance and public trust. This is not only about improving access for academics. It is about building the conditions for a responsible data-enabled economy in which innovation is directed towards public benefit: better prevention, better services, better evidence and better outcomes.

The Bradford approach also shows why public involvement must sit at the heart of this work. Synthetic data and secure analytics are technical tools, but their legitimacy depends on public trust. Citizens should be able to understand why data are being used, how synthetic data are created, what safeguards exist, who can access what, and what benefits are being delivered. The work in Bradford includes co-production, public engagement, practical oversight frameworks and direct engagement with young people. This is a scalable model. Data infrastructure for children and families must be shaped not only by technical possibility, but by the expectations, rights and priorities of the communities whose data make the work possible.

The wider lesson for government is clear. Secure Data Environments are necessary, but they should be developed alongside synthetic data capability and double lock access models that allow insight to be generated safely. This would help government move beyond a binary choice between open access and closed data. The better model is a graduated system: synthetic data for safe exploration, secure environments for controlled analysis, real-world data that remain protected, and approved outputs that can inform policy, service design and innovation. Bradford is already helping to show how this can be done. A national Connected ICB programme should build on that work, using synthetic data not as a substitute for privacy, but as part of the infrastructure that makes privacy-preserving research, responsible innovation and economic growth possible.

Growing Up Well

The Centre for Young Lives has already developed practical infrastructure that government could use to accelerate adoption of the recommendations in this report. Through its **Growing Up Well** programme, the Centre has created and successfully trialled a methodology for working with Integrated Care Boards to drive place-based reform, strengthen cross-sector leadership, and build the data and evaluation capacity needed to improve outcomes for children and young people. This is not a theoretical offer. It has been tested over the past eighteen months with the **Humber and North Yorkshire ICB**, where the Centre worked with local authorities, schools, universities, voluntary organisations and NHS partners to develop a model that is now explicitly framed as scalable and adaptable to other areas.

A clear methodology lies at the heart of the programme. The Centre positions itself not as a service provider, but as a **system partner and catalyst**, bringing together evidence, data, lived experience and policy insight to help local leaders rethink how support is designed and delivered. In Humber and North Yorkshire, this meant translating the **Child of the North principles** into a practical framework for ICB leadership and neighbourhood delivery. The methodology includes defining common goals and shared outcomes across organisations, working openly with "learning loops" so that evidence can shape implementation in real time, using available data to identify leading indicators of risk and success, engaging established local delivery partners, and strengthening data and digital capability so that services can access, link and use information more effectively. This can be conceptualised as a test-and-learn playbook built around discovery, robust data, iteration, local adaptation, evaluation, accountability and scale.

A particularly important aspect of the Growing Up Well infrastructure is its explicit focus on **connected data**. The Humber and North Yorkshire trailblazer created the conditions for the development of **Connected HNY**, a linked data environment designed to enable secure data-sharing across health and care, initially focused on children and young people. The programme brought evidence, data and evaluation directly into system leadership through the **Humber and North Yorkshire Futures Group**, and the emerging **Connected HNY platform** could provide a secure environment for linking health and education data, mapping need at neighbourhood level, targeting resources more effectively and supporting continuous improvement in services. The methodology is therefore not simply about partnership-building; it includes a practical route for ICBs to create connected datasets and begin using them to improve decision-making, identify unmet need earlier, and redesign services around children's real lives.

The Growing Up Well programme helps ICBs act as **anchor institutions**, connecting health, education, social care, local government, voluntary organisations and research partners around shared outcomes for children. The Humber and North Yorkshire work showed how linked data and local intelligence can support better public service delivery across sectors, including earlier identification of need, more targeted investment, stronger school-based support, and more effective coordination around families. The Growing Up Well programme constitutes ready-made national infrastructure that government could use immediately to speed the adoption of a Connected ICB model and to turn the recommendations in this report into practical action.

> This report shows that **information matters.**

Consensus infrastructure for evidence-based policymaking: Symphonia

Connected data infrastructure is necessary because children's lives are complex, interdependent, and poorly represented by information held in separate systems. But public services also need better infrastructure for interpreting evidence, integrating professional judgement, preserving disagreement, and turning complex information into decisions that can command legitimacy.

This report shows that information matters. The same information-theoretic problem appears at every level of the system. Frontline practitioners see only fragments of a child's life. Local leaders see only fragments of population need. National policymakers see only fragments of what is happening across places. Researchers see only fragments of evidence spread across disciplines, datasets, reports and professional experience. The task is therefore to compress, structure and transmit the right information, in the right form, to the people who need to act, without losing the uncertainty, disagreement and context that make that information meaningful.

This report used a Large Language Model (LLM) platform – Symphonia – to help us reach consensus on our academic community's recommendations to government on how to connect data. Symphonia is an open-source LLM platform designed to support iterative expert consensus. It treats evidence synthesis as a structured information problem: experts contribute partial knowledge, evidence, judgements, counterarguments and levels of confidence. The platform helps organise those inputs into a synthesis that maps areas of agreement, disagreement and uncertainty. Human experts then review, correct, and refine the output through Delphi-style cycles. The aim is to allow expert judgement by reducing the coordination burden that currently limits how many voices can be included in policy synthesis.

Evidence synthesis can be understood as a compression problem. A large and diverse set of expert inputs must be turned into a shorter artefact that is usable for decision-making. Poor synthesis reduces complexity too aggressively: it strips out dissent, overstates certainty, privileges the loudest voices, or hides the assumptions behind a recommendation. Symphonia is designed to preserve the important structure of the information while making it intelligible and actionable thereby reducing volume without erasing signal.

Traditional approaches to expert synthesis are powerful but constrained. Expert advisory groups, scientific advisory councils, roundtables and Delphi methods can help policymakers draw on professional and academic judgement. But they are often expensive, slow and limited by the number of people who can practically be involved. As the number of contributors grows, the task of reading, comparing, reconciling and reporting diverse views becomes increasingly difficult. This creates a bottleneck. In practice, policymakers may receive a polished synthesis, but the process by which evidence, dissent, uncertainty and minority views were compressed into that synthesis may be opaque.

Symphonia addresses this bottleneck by using LLMs as a drafting and synthesis engine within a human-governed process. Expert inputs can be submitted as structured evidence fragments: claims, proposed actions, implementation barriers, examples, caveats, uncertainties and arguments for or against a position. The model then creates an initial synthesis that separates consensus statements, contested issues, evidence gaps and candidate policy actions. Crucially, the platform is instructed not to adjudicate between contributors or manufacture agreement where none exists. Instead, its function is to make the structure of the discussion visible so that experts can refine it.

This matters because consensus is not the same as unanimity. In complex public-service reform, there will often be legitimate disagreement about priorities, risks, timing, governance and implementation. A good consensus process should not flatten those disagreements. It should identify where there is broad agreement, where uncertainty remains, which objections are substantive, and which trade-offs require political or operational judgement. In that sense, Symphonia is best understood not as a tool for producing artificial agreement, but as infrastructure for making disagreement usable.

This also has a practical advantage. Policy recommendations are often weakened by one of two failures. Either they are produced too narrowly, without enough challenge from people who understand implementation; or they are consulted on so broadly that the resulting feedback becomes difficult to synthesise rigorously. LLM-assisted Delphi methods offer a route between those failures. They allow many contributors to take part asynchronously, while still producing a structured synthesis that can be reviewed and challenged. This could make policy consensus processes faster, more transparent and more scalable, without abandoning human judgement.

The Symphonia platform has relevance beyond this report. A national Connected ICB programme would generate difficult choices: which datasets should be prioritised, which use cases should come first, what governance standards are sufficient, how public trust should be built, how local autonomy should be balanced against national consistency, and how evidence from different places should inform national decisions. These are not purely technical questions. They require judgement across research, ethics, law, delivery, lived experience, commissioning, education, health and social care. Tools such as Symphonia can help convene and synthesise that distributed expertise more systematically.

For example, Connected ICBs could use LLM-supported consensus methods to agree local priority use cases, identify implementation barriers, review public engagement findings, compare learning between sites, or refine national standards. A national community of practice could use the same approach to gather structured input from analysts, practitioners, families, school leaders, clinicians, information governance experts and policymakers. This would create a living deliberative infrastructure around connected data: not a one-off consultation, but an iterative process through which evidence, experience and disagreement are continuously captured and translated into action.

The safeguards are as important as the opportunity. Symphonia should not be treated as an autonomous policymaker, nor should its outputs be accepted without review. The platform is most useful when it firmly retains the ‘human-in-the-loop’. Experts must be able to inspect, challenge and amend the synthesis. Prompts should be designed to prioritise faithfulness over rhetorical polish. The system should distinguish evidence from opinion, consensus from contested judgement, and strong conclusions from uncertain ones. Human reviewers should remain responsible for final decisions, especially where recommendations have ethical, legal, financial or political implications.

There are also risks of omission, over-smoothing and false certainty. LLMs are good at producing coherent prose, but coherence can be dangerous if it makes unresolved disagreement look settled. A consensus platform must therefore be designed to preserve minority views where they are policy-relevant, highlight uncertainty explicitly, and avoid implying that a recommendation is stronger than the underlying contributor evidence justifies. For the purposes of this report, the Delphi process should therefore treat disagreement as data, not as noise. A recommendation that fails to reach consensus may still be valuable if the process clearly identifies why stakeholders disagree and what evidence would be needed to resolve the issue.

Symphonia type approaches have the potential to strengthen the democratic and scientific quality of policy development. They can make consultation more inclusive by reducing the practical burden of participation. It can improve transparency by recording how recommendations evolve across rounds. It can make consensus more meaningful by requiring participants to consider arguments rather than simply register preferences. It can also support evaluation, because the process generates structured data on agreement, disagreement, confidence, perceived omission and changes in judgement over time.

11. Innovative approaches trialled in the real world

The Electronic Developmental Support Passport: using routine education data to identify need earlier

The Electronic Developmental Support Passport (EDSP) is an important example of how insights from routine data can be translated into practical tools for frontline services. The EDSP shows how administrative education data can be repurposed to help practitioners identify developmental differences earlier, document needs more consistently and provide support without necessitating that families pursue time-intensive diagnostic pathways.

The starting point for the EDSP is the recognition that the current SEND system operates as a diagnosis-led system. Children and families often face long waits for clinical assessment, while schools may feel uncertain about what support can or should be provided prior to a diagnosis. This results in delayed support, inequity, and avoidable pressure on specialist services. Many children who experience difficulties with learning, behaviour, communication, attention, motor development or self regulation may not meet diagnostic thresholds for specific conditions, may not have their needs identified or referred, or may not wish to pursue a diagnosis that could feel stigmatising. The EDSP responds to this challenge by supporting a shift from diagnosis-led provision to needs-led support.

The tool builds directly on evidence generated through linked routine administrative data. Population-based studies using connected education and health data have shown that the Early Years Foundation Stage Profile, a statutory teacher-completed assessment at school entry, captures meaningful variation in children's developmental trajectories. EYFSP scores have been associated with later neurodevelopmental diagnoses, including autism and ADHD, as well as later educational outcomes such as persistent absence and risk of becoming not in education, employment or training. This shows that teacher observations at school entry hold valuable insight into children's later needs, and may do so in ways that are less affected by the inequalities that shape access to clinical referral pathways.

Predictive information is useful only if it can be translated into action. The EDSP therefore turns the logic of routine developmental observation into a digital, classroom-based system that can be used by teachers, teaching assistants and SENDCOs. It uses adaptive, observation-based assessment to identify functional developmental needs and generate tailored support strategies for children. It is not a diagnostic instrument. Its purpose is to help practitioners understand where a child may be experiencing barriers to learning or participation, and to provide practical support in response.

The EDSP is structured around four broad domains that are familiar to education practitioners: cognition and learning; social, emotional and mental health; sensory and physical development; and communication and interaction. Within these sit twelve skill areas including reading, writing, maths, cognitive processing, regulation of emotions and actions, attention and flexibility, impulse control, building relationships, everyday movement, sensory sensitivity, self-care, and communication.

A key strength of the EDSP is that it is designed to minimise burden while still capturing meaningful information. For most pupils who are developing in line with expected milestones, practitioners can move through the twelve skill areas quickly, recording that the child is meeting or exceeding expectations. When a concern is identified, the tool branches into more detailed questions about the relevant fundamental learning skills and task competencies. This means assessment depth is proportionate to need: brief where no concerns are present, and more detailed where a child's profile requires closer understanding.

The EDSP also links identification directly to support. Where unmet fundamental learning skills are identified, the tool automatically generates evidence-informed recommendations. These recommendations are designed to sit within Quality First Teaching and to support reasonable adjustments or low-level interventions that can be implemented in the classroom without additional specialist

> The EDSP responds to this challenge by **supporting a shift** from diagnosis-led provision to needs-led support.

> Predictive information is useful only if it can be **translated into action**.

training. For example, a pattern of needs relating to attention, regulation and responsibility can trigger a recommendation for psychoeducational resources to support differences in attention.

The EDSP is explicitly designed to move from observation to action. It helps schools provide structured support while children are waiting for specialist assessment, and it can improve the quality of onward referrals where specialist input is needed. The EDSP can help paediatricians, GPs, CAMHS and other professionals understand the child's profile in context by creating a clearer record of functional needs. Recommendations are integrated within the NHS Healthier Together platform, giving a single, place based access point to evidence based guidance. The platform tailors this guidance for clinicians, education professionals, and families, creating a practical bridge between education and health.

The EDSP also supports stronger partnership with families. The tool can generate letters to parents and carers, including where school staff believe a child is developing as expected, while inviting families to raise concerns that may not be visible in school. This is particularly important for children whose difficulties are masked in educational settings or whose needs present differently at home. Where concerns exist, the EDSP can be worked through collaboratively with families, adding contextual information and strengthening the shared understanding of a child's needs, strengths and support priorities.

From a connected data perspective, the EDSP is significant because it creates structured, standardised, longitudinal information about children's developmental needs. In contrast to the EYFSP's design of one-off assessment at school entry, the EDSP is designed for repeated use across the primary school years. This creates a developmental record that can move with the child across educational transitions, including the transition from primary to secondary school, where information is often lost or fragmented. It therefore shows how routine education data can become not only an administrative record, but a practical support passport for the child.

#BeeWell

Since 2021, the #BeeWell programme has heard the voices of nearly 200,000 young people across Greater Manchester, Hampshire, Isle of Wight, Portsmouth and Southampton, including over 32,000 pupils identified as having Special Educational Needs (SEN) across both mainstream and non-mainstream settings. This substantial representation, combined with annual data collection and linkage to administrative datasets (e.g., attendance and exclusions, free school meal eligibility, ethnicity), makes #BeeWell one of the most comprehensive sources of insight into the lived experiences of young people with SEN in England. The programme addresses a critical gap in existing systems by including young people in non-mainstream schools, whose voices are often underrepresented. The programme's latest reports highlight both strengths in participation and engagement, alongside persistent inequalities in wellbeing, discrimination, and school belonging.

The findings (https://t.ly/aGI4e) show that, despite the additional challenges they face, young people with SEN participate in many cultural and recreational activities at rates similar to their peers. Approximately one in three regularly attend youth clubs, and they report comparable levels of involvement in arts and cultural activities such as cinema or theatre visits, reading for pleasure, arts and crafts, and other creative hobbies. These patterns suggest that, when accessible opportunities exist with local communities and youth provision, SEN pupils are able to engage as socially and creatively as those without SEN. This positive aspect of their experience highlights the importance of maintaining and expanding inclusive community provision.

However, #BeeWell's data also highlights significant wellbeing disparities. Young people with SEN consistently report lower levels of mental wellbeing and self-esteem, alongside higher levels of emotional difficulties. These adverse outcomes are particularly pronounced among pupils with an Education, Health and Care Plan (EHCP). The consistency of these patterns across regions suggests that SEN pupils face systemic barriers that affect their emotional and psychological wellbeing, requiring coordinated responses across education, health and local systems.

In addition to these internal wellbeing challenges, pupils with SEN experience disproportionately high rates of discrimination and bullying. #BeeWell reports that disability-related discrimination is nearly three times higher among those receiving SEN Support and four times higher among pupils with EHCPs compared to peers without SEN. They are also more likely to be bullied physically, relationally and online, and again, the risks are even greater for those with an EHCP. These findings paint a troubling picture of how SEN pupils navigate school environments in which they are far more vulnerable to unfair treatment and negative social experiences than their counterparts.

The consequences of these challenges manifest in the social lives of young people with SEN, many of whom report deeper feelings of isolation. Over 11% say they "often or always" feel lonely, compared to 8.4% of those without SEN. This disparity highlights the compounding effect of bullying, discrimination and lower wellbeing on the social connections that are essential for healthy adolescent development. For many SEN pupils, the school experience is shaped, not only by their support needs, but by the social attitudes and behaviours they encounter daily.

Beyond social relationships, #BeeWell also found that SEN pupils in mainstream schools face additional challenges, including lower perceived physical health, reduced satisfaction with their academic attainment, and a weaker sense of school belonging. In contrast, evidence from special schools (https://t.ly/89SZL) highlights the importance of supportive environments. Pupils in these settings report stronger staff relationships, more positive experiences of attainment, and slightly higher levels of wellbeing than their peers with SEN in mainstream schools. This suggests that barriers extend beyond social inclusion and also reflect differences in school structures and environments, reinforcing the need for holistic approaches that address emotional, social, academic and health dimensions of inclusion.

Recognising the diverse needs of SEN pupils, #BeeWell has built accessibility directly into its data collection approach. Alongside the full survey, the programme offers a short version and a symbol-based version for pupils in non-mainstream schools, co-designed with young people and staff to ensure accessibility. These adaptations ensure that the perspectives of young people with a broad range of SEN profiles are meaningfully captured. Schools receive data dashboards combining survey and administrative data, which present overall results and enable responses to be broken down by key characteristics, including SEN status. This helps staff better understand the experiences of their SEN cohorts and tailor their responses accordingly. This investment in inclusive survey design and feedback mechanisms demonstrates the programme's commitment not only to listen to young people but also to ensure their voices are embedded within decision-making systems.

Overall, the #BeeWell findings reveal a compelling case for change. While SEN pupils show strong engagement in cultural and creative activities, they continue to face marked inequalities in wellbeing, exposure to discrimination and bullying, and feelings of belonging at school. The evidence highlights the need for multi-level action, including expanding inclusive community opportunities, tackling discriminatory behaviour, strengthening school belonging, and embedding SEN-aware approaches throughout educational settings. Ultimately, by amplifying the voices of young people with SEN, #BeeWell provides a robust foundation for schools, local authorities and partners to continue to develop more equitable, supportive environments where every young person can thrive.

C-GULL Study (Children Growing Up in Liverpool)

The C-GULL Study (Children Growing Up in Liverpool) is an ambitious longitudinal research project recruiting 10,000 families from across the Liverpool City Region, making it one of the largest family studies in the UK and the first of its kind in Liverpool.

The study aims to explore and improve the health and well-being of children as they grow, with a particular focus on understanding the unique challenges faced by families in the area. These include issues such as childhood poverty, limited access to healthy food, higher rates of obesity, and the increased prevalence of chronic health conditions like asthma and allergies. By examining these factors in depth, researchers aim to build strategies that reduce health inequalities and support families in creating healthier futures for their children.

To achieve this, C-GULL is designed as a prospective, observational cohort study involving infants and their parents in a triad structure. Participation is open to individuals aged 16 and over who are pregnant and have booked maternity care through Liverpool Women's NHS Foundation Trust. Over the course of the project, researchers will follow families from pregnancy through early childhood, collecting rich data that can shed light on developmental, environmental, and health-related influences.

C-GULL plans to gather information at multiple time points, including at two antenatal visits (12–16 weeks and 32–36 weeks), at birth, and when the child reaches 3, 12, and 24 months of age. This extensive timeline allows the research team to build a detailed understanding of children's early experiences and how these relate to later health outcomes.

Data collection within the study is wide-ranging. It includes biological and biometric measures, socio demographic and psychosocial information, assessments of child development, and insights into family life, neighbourhood context, and home environments. Through record linkage, the study also incorporates health and education data to create a more comprehensive picture of each child's experiences. Additionally, human samples collected during pregnancy and around the time of delivery will be stored for future research, allowing scientists to explore emerging questions over time and within broader scientific contexts such as the impact of the gut microbiome on mental health.

Born in Bradford – how a research project is helping a city breathe easier

Since 2007, the Born in Bradford (BiB) research programme has been working to find out what keeps families healthy and happy, and to find ways to reduce health inequalities. Over 60,000 Bradford residents are actively involved in BiB cohort studies which collect detailed health and lifestyle data and link this to routine health, social care, environmental and education data. We also host the Connected Bradford routine administrative dataset for around 600,000 citizens living in Bradford and Airedale.

Like many urban areas, Bradford has high levels of pollution, particularly in deprived parts of the City. Poor air quality is a major cause of early death and illness in the UK and globally.

> Our work demonstrates the **powerful role** that linked data can play in helping to develop and evidence effective policy.

With clear links to lung and heart disease among children and adults, pollution contributes to up to 43,000 UK deaths each year. Without action to tackle poor air quality, NHS spending on pollution-related conditions will rise from £1.6 billion to £5.3 billion each year.

Using linked environmental and health data BiB has been working to understand how pollution impacts on health, and crucially, what can be done to reduce it. We have shown how pollution can impact low birth weight of babies [1]; and in children, higher blood pressure [2] and poorer cognitive development [3].

Using data collected at city wide scale we have shown how peaks in air pollution are linked to higher demand for health services. Over a three-year period we estimated that up to one in three GP appointments and one in two emergency department visits were for breathing issues on high pollution days [4]. We have also shown how pollution can affect the onset of common mental disorders; by tracking movement of residents in the city we have shown that people who relocate to an area with more air pollution have an 11% greater risk of developing a new mental health problem, compared with the other movers [5].

In 2018, Bradford had illegally high levels of vehicle exhaust pollution [6]. This particularly affects those living in the inner city on the lowest incomes, with young children and in ethnically diverse communities. Our research informed the development and introduction of the Bradford Clean Air Zone (CAZ) which was launched in September 2022 [6]. The CAZ is the largest in the UK outside London, with 20% of the Bradford population living inside the zone boundary.

We are tracking the impact of the CAZ on air quality and health. After one year of operation, we found that there were 700 fewer GP visits for breathing and heart problems each month after only 1 year of the Clean Air Zone. This is estimated to save the NHS around £30,000 each month [7].

Our work demonstrates the powerful role that linked data can play in helping to develop and evidence effective policy. As a result of our work, communities in Bradford are breathing cleaner air and living healthier lives.

Oral Health and School absence

Children's oral health continues to represent a significant public health and educational concern. One in four children in the UK have dental decay by the age of five, with this figure rising to one in three children living in deprived areas. Tooth decay is the leading cause of hospital admissions among young children, particularly those aged 5 to 9. For children with SEND they are 1.5-2 times more likely to need their dental care under general anaesthetic.

This persistent issue indicates widespread, preventable disease that affects children's health, wellbeing, and life chances.

> “The most common reason for children being admitted to hospital is for tooth decay. It is completely and utterly shocking, it is truly Dickensian.”
>
> – Minister Kinnock

The issue of oral health is strongly correlated with both social inequality and unmet need. In the financial year ending 2025, **33,976 hospital tooth extractions** in children and young people (0–19 years old) were attributed specifically to tooth decay – an **11% increase** on the previous year, with costs to the NHS of over £51 million per annum.

The impact is not limited to health. Poor oral health contributes to pain, disrupted sleep, difficulty eating, and reduced confidence; factors that directly affect **school readiness** and children's ability to participate in early learning. School absence for dental reasons is not recorded on school attendance software. Therefore, to quantify this issue, academics at the University of Leeds worked with 25 local schools across West Yorkshire. Annual absence for dental reasons was estimated as:

- 963 school days lost in 15 primary schools
- 724.5 school days lost in 5 secondary schools
- 357 days lost in 5 special provision schools

Reasons for absence included toothache and disrupted sleep, infection, emergency, dental care, post-operative recovery from dental surgery, and attendance for a dental appointment.

This highlights the high education costs of a preventable disease. There is an urgent need to pilot changes in school attendance software to capture school absence for dental reasons. These data would provide greater granularity and help schools and NHS commissioners to develop local solutions to enable these children to quickly access urgent dental care and return to school and engage with all the opportunities provided by school.

Overall, the evidence presents a clear and urgent message. Children's oral health in England is not improving at the pace required to prevent avoidable suffering, educational disruption, and escalating healthcare costs. Strengthened prevention, improved access to NHS dental care, and sustained early years interventions are necessary to address what professionals repeatedly describe as a "public health emergency."

Standardising Identification of Specific learning difficulties

Specific learning difficulties (SpLD), including dyslexia and dyscalculia, affect a substantial proportion of children in England, yet fewer than 2% of pupils are formally identified. This study (https://t.ly/ORQS6) examined how individual attainment, demographic background, and school-level factors shape who gets identified, drawing on National Pupil Database records for around 540,000 Year 6 pupils across 14,800 schools.

The evidence is clear: school matters as much as the child

After accounting for attainment in reading and mathematics, the likelihood of a child being identified with SpLD varied substantially between schools. Two pupils with identical academic profiles attending two different schools faced nearly a three-fold difference in their odds of being identified. Findings suggest that identification is not a neutral, needs-led process, but seems to be shaped by where a child happens to sit in a classroom.

Structural inequities run through the system

Girls were consistently less likely to be identified than boys with the same low attainment, and the gap was starkest in mathematics, where boys had roughly twice the odds of identification. Pupils with English as an Additional Language (EAL) were markedly under-identified: with the same low reading scores as their non-EAL peers, EAL pupils had around a quarter of the odds of being flagged. Children who had recently changed schools were also substantially less likely to be identified, a novel finding that points to how mobility disrupts the teacher observation and record-keeping that typically triggers referral for services.

School context compounds these effects. Pupils in higher-achieving schools were more likely to be identified, suggesting that "unexpected underachievement" is judged against local peer norms rather than an absolute benchmark. Meanwhile, pupils in schools with higher average deprivation were less likely to be identified, consistent with wider evidence that formal assessment pathways, often requiring costly private evaluation, seem to be more accessible in affluent communities.

What needs to change

Three priorities emerge. First, England needs national guidelines that define SpLD and standardise identification procedures; the SEND Code of Practice currently provides neither. Second, teachers need better training to recognise quieter, internalising presentations of learning difficulty that disproportionately affect girls, alongside culturally and linguistically responsive assessment for EAL pupils. Third, targeted investment in assessment capacity within disadvantaged schools is essential if access to support is to reflect need and not postcode or parental resources.

Modelling which children are likely to receive an Education, Health and Care Plan (EHCP)

Dr Judith Lunn works in partnership with local authorities in the North West of England analysing routinely collected data, conducting qualitative systems mapping and employing community-based approaches to identify early risk in vulnerable children and young people, with the aim of translating cross-sector evidence into actionable insight for commissioners and policymakers.

One research strand uses administrative data to model which children are likely to receive an Education, Health and Care Plan (EHCP), identifying early risk signals before formal assessment. A related project examines health inequalities in sleep outcomes, with findings that show children who are both eligible for free school meals and with additional needs experience significantly poorer sleep outcomes when measured between year 6 and year 9 in mainstream settings.

The most substantial current project is a Health Needs Assessment (HNA) for Westmorland and Furness Council addressing health needs of children and young people most at risk of economic inactivity. This involves working with local authority partners, youth organisations, and young people themselves.

The work combines quantitative population profiling with qualitative engagement, and is exploring data linkage across education, social care, and health records to enable a shift from crisis response to earlier, place-based intervention.

A distinctive feature is the co-design of a digital engagement tool with young people at a Barrow youth project, building a replicable model for community-based health needs assessment. Across these projects, a consistent finding is that early risk indicators that include attendance, attainment at KS2, SEND status, and geography cluster together, and that joined-up data infrastructure is a prerequisite for the kind of whole-system insight needed to reduce inequality and improve outcomes.

ADLib (Accessing Disability Library)

ADLib is an open access, research-led, online resource designed to ensure that all children and young people – including those with learning disabilities – are represented in research. The platform was created in response to the persistent problem that learning disabled voices are almost always excluded from research, particularly when individuals communicate in non-traditional ways. ADLib addresses this gap by developing research-informed tools that can amplify the 'voices' of learning-disabled children and young people.

Traditional data collection tools rely on written or spoken language and are often inaccessible to people who use alternative or nonverbal communication methods. This leads to the systematic under-representation of their experiences from their own point of view. ADLib recognises that innovative approaches are required to change this. Its central purpose is to support researchers to design studies that meaningfully include learning disabled participants, helping to ensure that *"all children are represented, including those with disabilities."* This commitment underpins the project's broader aim: to reshape research practices so that learning disabled individuals can express their own views using methods that align with their communication needs and preferences.

To achieve this, ADLib provides a co-produced, online, open access library of inclusive and research-informed data collection tools. The library hosts pre-made resources, editable templates, multilingual tools, and detailed guidance on developing accessible research instruments. These materials were developed in collaboration with learning disabled and non-disabled researchers at Mencap, a speech and language therapist, research software engineers, and staff and students at Applefields School. The platform continues to expand through a built-in crowdsourcing function, allowing researchers worldwide to contribute additional tools.

As part of its development, the ADLib team coproduced four tools specifically designed to support conversations about next steps with learning disabled adolescents and emerging adults, helping them express their goals, preferences, and perspectives in developmentally appropriate ways. These tools align with the project's emphasis on amplifying learning disabled voices and equipping participants to shape decisions that affect them – reflecting the broader principle that children and young people have the right to express their own views.

> The platform **continues to expand** through a built-in crowdsourcing function.

Ultimately, ADLib positions itself as a transformative initiative aimed at creating more ethical, inclusive, and equitable research. By offering innovative, accessible tools and promoting the full participation of learning disabled individuals, the platform seeks to build a future where their voices meaningfully influence the evidence base that shapes policy, education, and services.

Integrated Data to Understand Post 16 Risk in Leeds

In Bradford, linked administrative data are bringing to light young people's outcomes after secondary school, especially for those with special educational needs and disabilities (SEND). By connecting education, health and social care records, Robin Evans went beyond simple NEET (not in education, employment or training) labels to identify six distinct post-16 pathways. Crucially, persistent disengagement signals a high risk of long-term exclusion and need for intensive support. The analysis highlighted an early warning sign – high secondary school absence strongly predicts later disengagement – and showed that context matters. For vulnerable young people, the odds of a high-risk trajectory range from about 8% to 29% across schools, while more advantaged peers show minimal variation. This underscores that supportive school environments improve outcomes where needs are greatest. Insights from this work are guiding the sharing of effective practices and informing more equitable, evidence-based education policy.

In parallel, a project called EmCASH (Emergency Care After Self-Harm) led by Dan Romeu is using innovative methods to improve support for young people in crisis, with over 50,000 such hospital cases across England each year. EmCASH brings together international research evidence, analysis of linked NHS records (covering hospitals, mental health, ambulance and NHS 111), and interviews with young people, families and clinicians. Crucially, young people themselves co-produce the research, ensuring findings reflect real needs. This participatory approach has identified key principles for effective care after self-harm: ensuring patients feel safe and respected in A&E, involving families, and tailoring support to cultural needs. By grounding recommendations in both data and lived experience, EmCASH is informing more evidence-based services and guiding policy on where to target resources for youth mental health emergencies.

Another strand led by Dan Birks uses data science to better understand community vulnerability and demand for police services. The Vulnerability & Policing Futures programme links police, health, education and social care data to pinpoint how vulnerabilities develop, where early interventions can help, and to forecast fine-grained patterns of crime and demand using advanced techniques like AI and simulation. This work shows that many calls on police time stem from non-crime incidents and unmet social needs, highlighting opportunities for multi-agency intervention. Through initiatives like the Yorkshire Policing Academic Centre of

Excellence, insights are shared with practitioners to improve resource allocation and design evidence-led strategies to reduce harm. These Northern England projects demonstrate how connecting diverse data can spur innovation and lead to practical improvements in education, health and public safety.

Using the Age-Two Developmental Check to Predict School Readiness

Supporting delivery of the government's 75% Good Level of Development milestone by 2028

The government has committed to 75% of five-year-olds in England achieving a Good Level of Development (GLD) by 2028, up from 67.7% today. Every local authority is now developing a Best Start plan to achieve this.

A key question for commissioners and system leaders is: **how do we identify the children who need support early enough to make a difference?**

Researchers at Born in Bradford, Bradford HDRC and the University of York have used the Connected Bradford dataset to explore whether a child's outcome on the routine two-year developmental check (ASQ-3) predicts their school readiness at age 5.

Using Connected Bradford allowed the team to explore this question longitudinally, tracking children's outcomes over time (meaning that we looked at children's ASQ-3 outcomes and then the same child's EYFS outcome 2-3 years later). **This is the first time that longitudinal data has been used to answer this question.**

What This Research Tells Us

Analysing longitudinal data from over 47,000 children, the study found that:

- **Children who achieved a Good Level of Development on the ASQ-3 at age two had more than three times the odds of being school-ready at age five.**
- Boys and children living in the most deprived areas were significantly less likely to reach expected development at both ages – with children in the most deprived quintile of IMD having 60% lower likelihood of achieving a GLD at age five compared to the least deprived.
- Children from South Asian backgrounds were least likely to meet expected development at age two; children from White Other ethnicities were least likely to do so at age five – highlighting that no single approach will reach all vulnerable groups.
- 1 in 5 children have already fallen behind by age two, reinforcing the importance of intervention during the first 1,001 days.

The Policy Implication

The ASQ-3 is already a universal tool delivered through the Healthy Child Programme. This evidence suggests it has the potential to function not just as a population-level monitoring measure, but as an early identification tool – enabling a flag of children at age two who are at risk of not being school-ready, and to connect them to targeted support before they start school.

This has direct relevance for Best Start in Life local plans. Local authorities designing early identification pathways now have a stronger evidence base for investing in:

- maximising uptake of the two-year review and ASQ-3 assessment (currently missed by around 1 in 4 families nationally)
- effective sharing of relevant developmental information from Health Visitors to family hubs, Early Childhood Education and Care settings and schools and vice versa
- commissioning evidence-based interventions for children identified as at risk at age two

This study is currently a preprint and has not yet been certified by peer review: https://t.ly/R0c99

How Smart Devices Shape Neurodivergent Children's Experiences

Professor Abigail Durrant's work explores how smart devices and data driven interactions shape the daily experiences of neurodivergent children. As Director of EPSRC-funded Northern Health Futures (NorthHFutures) Hub (EP/X031012/1) and Centre for Digital Citizens (EP/T022582/1), working in partnership with Coram Life Education, Abigail's research highlights how technology can become an important emotional and sensory refuge whilst also posing risks to health and increased vulnerability to online harms. Citing GP and Papaya founder Susie Davies who was interviewed, *"For children who are neurodivergent... technology and smartphones is a safe space to inhabit, particularly if you find the real world quite challenging and stressful."* This safe space allows children to regulate their environment, manage sensory demands, and interact on their own terms. However, the gamification features and algorithmic behaviours are also found to encourage fixations, leading young people into echo chambers where they may *"just consume media without thinking critically about it"* – in the words of a 13-year-old female research participant.

Working with doctoral candidate Sonu Fakiha, Abigail and team further examine how tangible media – physical, responsive digital objects including consumer wearables and smart networked devices – support multi-sensory communication and engagement. These technologies offer structured, predictable interactions that neurodivergent children often find more accessible than socially complex real world settings, with demonstrative potential for applications in learning and therapeutic contexts. More research is needed with this population to better understand the risks alongside the opportunity space. For example, smart products mention recording use patterns in their data policies to personalise, to increase engagement and profitability through algorithmic behaviours. Furthermore, the datafication of homes and school settings via this Internet of Things renders neurodivergent children vulnerable to surveillance, privacy violations, and the undermining of parental or teacher controls. Children have also talked about mental health impacts.

Key to this research is a close partnership with Voluntary Community and Social Enterprise (VCSE) organisations, working alongside children, their parents and teachers, and cross-sector experts, to understand practical need in the places that people live and work. By grounding service design in actual data practices, following a community-centred approach to innovation, the aim is to drive more inclusive and meaningful support to wellbeing: https://www.northfutures.org/.

NortHFutures – led by Newcastle University in partnership with universities in the North East and North Cumbria (NENC), plus health and social care providers, industry and VCSE – also works with the NENC Secure Data Environment programme to understand stakeholder perspectives on how mental health data can be utilised for research.

Addressing social determinants of health in children with complex needs through family-centred social prescribing

The majority of Dr Anna Basu's patient caseload (children with neurological conditions) require SEND support. In addition, she identified high levels of unmet non-medical need in hospitalised children with neurodisability and set up a family centred social prescribing link worker service to address these needs for the children and their families.

SPACE Pilot (Social Prescribing and Community rEsources) is an innovative prototype service devised to respond to health inequalities impacting the lives of children with complex healthcare needs and their families. More than half of such families have financial difficulties; nearly half express unmet non-medical service needs, and a third express difficulty accessing non-medical services (https://t.ly/A1UGl).

The service, which is delivered through a VCSE organisation, Ways to Wellness, was launched at the Great North Children's Hospital, using specialist social prescribing key workers, or link workers, to support patients to engage with supportive community resources (https://t.ly/xClKX).

Within the service, link workers co-develop personalised goals with families and successfully support them in finding ways to achieve these over six months, beyond hospital discharge. Families and staff value the service; and a multiple methods evaluation including social return on investment (SROI) analysis was favourable (https://rdcu.be/eZLiD). This was only possible because of the detail of the data collected on a bespoke secure management information system ("MIS").

This service aligns with the Ten Year plan by supporting the transition from hospital to the community through strong links with community settings. Patients have been supported with earlier discharge from hospital. By addressing unmet social needs early, the service also aligns with the sickness to prevention agenda. Further description of the current service is available at https://t.ly/IfYhA.

Public engagement and inclusion of the child's voice through consultation with youth forums have been central to the development and evaluation of the service – see this poster presentation to "RCPCH & Us": https://t.ly/AwX3C.

What are we learning about data from this work? If we want to equitably support children and families facing heightened inequalities due to chronic complex needs at scale, systems need to get better at documenting and (with appropriate safeguards and access rules in place) sharing/flagging up data about social determinants of health.

Data insights into sensorimotor problems

Many children experience difficulties with their ability to transform perceptual information (e.g., vision) into skilled movement despite there being no obvious problem with their neuromuscular system. These difficulties are accurately described as 'sensorimotor' in nature and studies have shown that approximately 5% of children are affected by a neurodevelopmental disorder of their sensorimotor skills. These difficulties impact the child's ability to interact skilfully with the world. This can be seen through challenges in completing everyday activities such as writing, dressing, and catching a ball. The DSM-V and ICD-10, the two most widely used diagnostic classification systems, capture these difficulties in the clinical diagnoses of 'Developmental Coordination Disorder' (DCD) and 'Specific Developmental Disorder of Motor Function' (SDDMF), respectively.

DCD/SDDMF is known to have a detrimental impact on long-term health, education, and mental health outcomes. In the UK, diagnosis is typically required before children can access support, yet research has repeatedly highlighted parental dissatisfaction with assessment and support pathways. Despite these publicly expressed concerns, there has been a lack of research quantitatively exploring the diagnostic landscape. We therefore aimed to evaluate the recording of DCD/SDDMF diagnoses in a diverse district (Bradford, UK) using routinely collected digital healthcare records in order to provide insights to the Independent Prevalence Review.

Clinical codes related to sensorimotor skill assessments and diagnoses were searched within the Connected Bradford dataset, specifically within the Health and Education Research Database subset, which contains linked health (primary and secondary care) and education records for 375,420 individuals born between circa 1988 and 2021. If the estimated 5% prevalence rate is applied to this population, there should have been around 18,771 diagnoses in Bradford. However, across all of the available records only 142 formal SDDMF diagnoses and 53 formal DCD diagnoses were identified in childhood. Even when all related diagnoses and clinical findings were included, the cumulative total was just 1,546, representing only 0.41% of the sample, which is 12 times lower than expected.

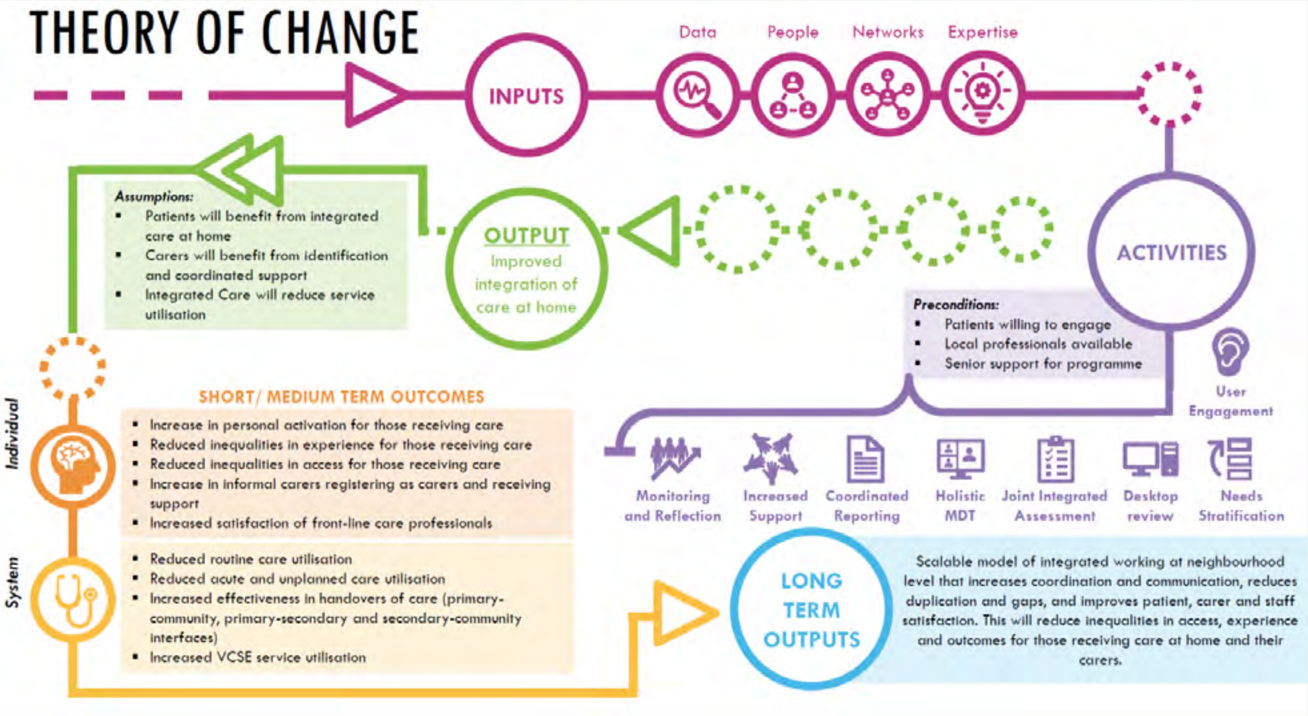
Over the same period, the dataset contained 9,459 autism and 6,740 ADHD diagnoses respectively, despite autism being considerably less prevalent and ADHD having a similar prevalence to DCD/SDDMF. Moreover, there were low levels of recorded assessments and no evidence in electronic records of the recommended standardised assessment tool being deployed. Clinicians reported using paper-based assessments not captured digitally, raising questions about whether assessments are translating into formal diagnoses.

DCD/SDDMF therefore appears to be substantially under-recorded and/or underdiagnosed in routine healthcare records in Bradford. This likely reflects wider national and international challenges, given the well-documented issues with fragmented clinical pathways, inconsistent terminology, and overstretched services. Further research is needed to investigate barriers and facilitators to assessment, diagnosis, and support for children with DCD/SDDMF if we are to build a country that works for children with sensorimotor difficulties.

Home Care in Hull

Home Care provision is a critical element of our community care provision. It enables people to remain independent at home for as long as possible and to return home from hospital more quickly with care and support. It can help prevent or delay escalation in need that results in hospital admissions or permanent admissions to residential care.

Hull Health and Care Partnership focused development of Integrated Neighbourhood Teams around home care services. An initial model of an Integrated Neighbourhood Team was developed using a “test and learn” approach in a small, highly deprived location of Hull. The Team involved a single PCN, Adult Social Care, the homecare provider, community services and VCSE organisations. Data were shared by Adult Social Care on patients in receipt of home care services with the PCN. This enabled identification of patients within the PCN who might benefit from the integrated neighbourhood teams approach. Consent for data sharing was covered within the Yorkshire and Humber Shared Record Agreement as well as consents sought at the initiation of adult social care services, enabling rapid transfer of information. The programme has developed improved relationships between individuals receiving care at home and their GP Practice, complementing the ongoing support available through the adult social care team. This is creating an avenue for continuity of care through the care coordinator which expedites access to appropriate care and support for patients. Patients are actively followed-up by the team where appropriate, often in a coordinated way so adult social care and primary care follow-up together. Individuals may be discharged from the MDT caseload but continue to receive ongoing care from all agencies ensuring the sustained intervention impact beyond the period of MDT working.



Assumptions:
- Patients will benefit from integrated care at home
- Carers will benefit from identification and coordinated support
- Integrated Care will reduce service utilisation

Preconditions:
- Patients willing to engage
- Local professionals available
- Senior support for programme

SHORT/ MEDIUM TERM OUTCOMES

- Increase in personal activation for those receiving care
- Reduced inequalities in experience for those receiving care
- Reduced inequalities in access for those receiving care
- Increase in informal carers registering as carers and receiving support
- Increased satisfaction of front-line care professionals

- Reduced routine care utilisation
- Reduced acute and unplanned care utilisation
- Increased effectiveness in handovers of care (primary-community, primary-secondary and secondary-community interfaces)
- Increased VCSE service utilisation

Scalable model of integrated working at neighbourhood level that increases coordination and communication, reduces duplication and gaps, and improves patient, carer and staff satisfaction. This will reduce inequalities in access, experience and outcomes for those receiving care at home and their carers.

Beverley Road Corridor Project – Our People Our Place

The Hull Place partnership introduced the ‘Our People, Our Place’ initiative to identify priorities beyond traditional health and care issues by focusing on the wider determinants of health. The initiative was a collaboration where a range of agencies **shared data** and coordinated comprehensive, cross-disciplinary services for individuals and families within the Beverley Road Corridor area of Hull.

The partnership created a Business Intelligence mapping dashboard that consolidated 51 indicators across 8 partners by area postcodes. The dashboard enabled an efficient review of needs and activities and identified patterns of demand across agencies.

The Partnership identified 10 postcodes with high needs and frequent service use. One postcode stood out, with 1,127 instances of service use costing an estimated £543,000*. This included 100 calls to 111, 34 ambulance calls to 999, 37 mental health contacts, 187 uses of urgent care, 107 hospital bed days, 43 social care contacts, 68 police calls for crime and anti-social behaviour, 11 fire service calls, 119 police calls for service, 76 housing benefit claims, and 2 troubled families. Across all 10 high-need postcodes, the estimated total service cost was £2.82 million.

Working with Hull University, the Partnership established methods to intervene and assist residents of this area, preventing negative outcomes. The methods included:

- Improving interaction with health and social services by making them more accessible.
- Using **data-driven** targeting of vulnerable areas to deliver preventative, multi-agency mobile services.

The project had a soft launch, with a new project team based in the heart of the Beverley Road community on the former Endeavour school site. Leveraging the MEAM (Making Every Adult Matter) and MAVA (Multi-Agency Vulnerable Adults) frameworks, the Partnership concentrated on homes with multiple occupants.

This approach facilitated a new partnership dialogue centred on cross-sector demand for preventative support and enabled community and voluntary sector participation. It is anticipated that ‘Our People, Our Place’ will provide a model for other areas of the city as it develops, with learning from the project used to create increasingly person-centred innovative practice – where connected data can enhance the approach.

* Looked at a very limited range of the measures included in the dashboard (12 of 53).

Meeting community need in a sustainable fashion in Bradford

In Bradford, fundamental concerns around access to services and premature mortality – especially in some of our most deprived neighbourhoods – were identified through conversations with citizens via the ICB’s Listening in programme and Bradford’s research networks.

Connected Bradford was used to calibrate these concerns and elicit the detail. The scrutiny of geospatial data revealed a clear overlay of high deprivation with the highest prevalence of premature strokes and heart attacks.

This information was made available to community representatives and VCS colleagues with an offer of support. This resulted in a truly co-produced, regularly deployed, community-based clinic involving anchor institutions such as mosques and community centres as well as other key stakeholders – Primary Care Networks (PCN), Community Partnerships, Bradford Institute for Health Research, community wardens and local councillors.

Citizens learn about the community-based clinic through word of mouth, posters and digital media.

Citizens receive core elements of the NHS Health Check such as blood pressure measurement and, if deemed appropriate by the PCN attendees, blood tests for cardiovascular disease, type 2 diabetes and kidney disorders (full blood count, urea and electrolytes, HbA1c, Lipid profile). Crucially, this data is immediately uploaded to the individual’s own GP record, thus allowing appropriate follow-up with their own general practitioners should this be required.

The sharing of local data was key in winning support for this work, and data analytics remains an essential tenet of service delivery and sustainability.

This method of service delivery is allowing local citizens to access important prevention and early intervention activity without having to engage in a parallel care system.

Feedback from attendees has verified that primary care services are much easier to access with regard to a known condition or where tasks have been already performed.

All who attend a CHC have a code attached to their SystmOne record that allows us to view their subsequent health outcomes but in a pseudonymised form. We can verify new diagnoses and treatments and, with time, evaluate the impact of this work as well as how it might be improved.

The programme has been built on data analysis, community engagement and trusted relationships which have allowed us to broaden the offer to preventative health, social prescribing and further offers of support from allied organisations.

Our ongoing mixed-methods evaluation of the work is also inclusive and draws from the world of quality improvement. All individuals who participate in each CHC provide the information for tests of change, rapid feedback and evolving iterations of the community clinic.

Proactive Social Prescribing in York

York Centre for Voluntary Services, City of York Council Public Health and the York Health and Care Partnership have worked together to deliver a three-year proactive social prescribing project focussed on improving outcomes for individuals with respiratory conditions who are likely to be affected by the cost-of-living crisis.

Target population

People at very high risk of non-elective admission; People with respiratory conditions (risk of harm from winter / cold homes); People living in areas of deprivation.

Cohort

18+, IMD 1-3, COPD, very high risk of admission.

18+, IMD 1-3, Asthma, very high risk of admission.

18+, IMD 1-3, Bronchiectasis, very high risk of admission.

The Challenge

A requirement was identified in York Place within Humber and North Yorkshire Integrated Care Board (H&NY ICB) to create a proactive social prescribing model for targeting cohorts of patients who could benefit from targeted interventions. With the current cost of living crisis and upcoming winter pressures, it was agreed that the social prescriber would deliver intensive interventions targeted at a specific, complex cohort of patients, particularly focusing on areas of deprivation across York.

Our Response

The York Place team engaged with the local Commissioning Support Unit to develop a targeted algorithm that would run on our population health intelligence platform (RAIDR). A unique URL (SmartLink) was created to identify patients living with respiratory conditions in Index of Multiple Deprivation (IMD) deciles 1-3 who were at high or very high risk of hospital admission in the next 12 months, as predicted by the combined predictive model (CPM) that was built into RAIDR's Primary Care dashboard. Defined patient lists were made available periodically for the social prescribing leader to easily access and assess.

This approach has since evolved and is now embedded within routine population health management processes across Primary Care Networks (PCNs). Patients with COPD are identified proactively using a population health management approach, where SystmOne data is analysed through an algorithm to risk stratify patients based on clinical indicators, healthcare utilisation and social factors.

Defined patient lists are generated and refreshed on a rolling basis, allowing the proactive social prescriber to prioritise outreach and maintain a dynamic caseload focused on those at greatest risk. Using a person-centred approach, the social prescriber undertakes holistic assessments and works with individuals to co-produce tailored support plans, linking them to a range of services including respiratory reviews, community support, welfare advice, and lifestyle interventions.

The Outcome

The model has demonstrated strong impact and continues to build momentum:

- 181 York residents have been supported since the project began in 2023
- 124 respiratory review requests have been completed, many leading to medication optimisation and increased confidence in inhaler use
- Improved patient outcomes including reduced social isolation, better self-management, and increased engagement with services

The use of linked population health data has improved targeting and efficiency, reducing manual resource requirements within the ICB and enabling a more coordinated, multidisciplinary approach. The service has strengthened integration between primary care, VCSE partners, and wider system services, while also informing future commissioning of personalised care and early intervention models. Positive patient feedback continues to highlight the value of proactive outreach and personalised support in improving wellbeing and helping people stay well at home.

The effectiveness of this data-driven, proactive approach has led to the model being further expanded to support additional cohorts, including Trans and Non-Binary individuals.

> Patients with COPD are **identified proactively** using a population health management approach.

The BACD calls for **meaningful public engagement** alongside legislative change.

Currently, large-scale data sharing and linkage **takes many years** to achieve.

British Academy of Childhood Disability Strategic Research Group

The British Academy of Childhood Disability Strategic Research Group, working with the **Council for Disabled Children** and supported by The Castang Foundation, has made important contributions to the national debate on connected data for improved public services supporting children. They have produced a report that focuses on the opportunities and challenges involved in linking datasets across health, education, social care and other public services, with particular attention to the potential role of a **Single Unique Identifier (SUI)** for children. The BACD report addresses one of the most practical barriers to progress: the difficulty of linking data about large numbers of children safely, accurately and at pace for research and service improvement. Currently, large-scale data sharing and linkage takes many years to achieve, reducing the ability of public services and researchers to use population-level data in a timely way to improve outcomes for children and families.

The BACD report urges government to introduce a Single Unique Identifier through the Children's Wellbeing and Schools Bill, with the legislation making it clear that the identifier should be used not only for operational safeguarding and welfare purposes, but also for **research that improves the lives of children and families**. These representations have been made directly to Minister McAllister and officials at the DfE, highlighting the positive opportunities this brings to develop rich evidence to inform policy and practice in the best interests of babies, children and families, and seeking assurances that usage for research purposes will be possible.

BACD and its partners are explicit that data connection should happen within existing legal and data protection frameworks. The argument is that the current lack of clarity creates avoidable hesitation among data controllers and slows progress on work that could support better services, earlier intervention, and stronger evidence for policymaking. The BACD report therefore provides an important legislative and policy complement to the wider argument in this CotN report – connected datasets should be understood as core public-service infrastructure.

BACD argue that an SUI could improve the accuracy and efficiency of record matching, reduce administrative burdens and delays, lower some privacy risks by reducing the need to share multiple identifiers, and enable better longitudinal tracking of children's experiences across services. In turn, this would strengthen research, improve policy and service planning, and support earlier identification of children and groups at risk. Moreover, linkage could reduce the need for children and families to re-share difficult or traumatising information repeatedly across systems. However, the BACD report is realistic about the challenges. It highlights governance complexities, public trust and privacy concerns, uneven data quality, and inconsistencies in legal and policy frameworks across health, education and social care.

The BACD report focuses on **equity**. It notes that current linkage methods can be especially inaccurate for children whose baseline data quality is poorer, including children of asylum seekers, adopted children, children from ethnic minority communities, children who move address frequently, and others whose lives are already marked by instability or vulnerability. This means that the absence of effective linkage does not affect all children equally; it can deepen the invisibility of those who most need support. The BACD calls for **meaningful public engagement** alongside legislative change including populations for whom good quality data are currently lacking, so that trust is built and privacy concerns are addressed. The BACD report reinforces a central conclusion of this Child of the North report – better data-sharing must be lawful, trusted and publicly legitimate but it is essential if services are to understand vulnerability properly and improve children's lives through earlier, more joined-up action.

12. Executive editor summary

This report represents the culmination of a substantial collective effort. We are enormously grateful to everyone listed as an author or contributor, and to the many unacknowledged colleagues who have worked behind the scenes to shape the thinking, test the arguments, challenge the assumptions, and strengthen the recommendations.

The work described here has depended on the generosity, expertise, and persistence of colleagues across government, academia, public services, the voluntary sector, data science, health, education, policing, local government, and communities. What has united this diverse group is a shared commitment to building a country that works for all children and young people.

This report is presented as a single publication, but it is better understood as the product of a five-year programme of work. Its origins lie in a set of questions posed by Robert Arnott, now within National Infrastructure and Service Transformation Authority, about whether administrative data could be used to identify need earlier and support more preventive public services. Those questions brought together a group of colleagues to explore the possibility of creating an "electronic vulnerability index" that might help public services identify children and young people at risk of poor outcomes before difficulties became entrenched.

This early work proved both powerful and humbling. It showed that the ambition was right, but that the task was more complex than any single index or tool could capture. The original group helped clarify the key challenges: public services first needed to connect data safely, lawfully and usefully; that different forms of need require different forms of evidence and interpretation; and that the goal should not be a generic vulnerability score, but the development of carefully designed, context-specific tools to identify and respond to particular needs. These 'vulnerabilities' include educational need, risk of becoming not in education, employment or training, emerging health and developmental needs, safeguarding concerns, and pathways that may lead children and young people towards involvement in the criminal justice system.

We therefore want to record our explicit thanks to those who contributed to that formative thinking: Ava Green (née Boxer), Roisin Corcoran, Rob Savage, Ed Manley, Jacqui Jensen, Kirby Swales, John MacLeod, Becky Francis, Roger Taylor, Leon Feinstein, Lee Turner, Mark Birkin, Gary Davies, and Mat Mathai. Their guidance helped set the intellectual foundations for much of the work described in this report.

The work naturally widened as the complexity of the challenge became clearer. It became apparent that questions of cross-Whitehall collaboration, data governance, public trust, legal clarity, technical infrastructure and operational delivery needed to be considered. These discussions were supported through the Data Improvement Across Government (DIAG) group, originally chaired by Robert Arnott and subsequently by Harriet Fearn. We are grateful to everyone who contributed to the approaches adopted in Bradford through the knowledge imparted through that forum. These conversations were invaluable in helping the team understand the practical barriers facing government and local systems, and in shaping a more realistic model for how connected data can support prevention and early intervention.

What has united this diverse group is a **shared commitment** to building a country that works for all children and young people.

It became apparent that questions of cross-Whitehall collaboration, data governance, public trust, legal clarity, technical infrastructure and operational delivery **needed to be considered**.

The team in Bradford were extremely grateful for the insights of DIAG and so many other groups and individuals who freely shared their advice. The insights helped drive the development of Connected Bradford, under the leadership of Professor John Wright, and informed the creation of the Electronic Developmental Support Passport described in this report. In turn, this led to a partnership between Bradford and the Humber and North Yorkshire ICB (HNYICB) through the 'Futures' group chaired by Professor Charlie Jeffery. The 'Futures' group then led a 'Connected Humber and North Yorkshire' programme (described within this report) and we are grateful for all of the colleagues within the Futures Group and the HNYICB for helping us further refine the 'Connected ICB' model. This work demonstrates the importance of combining national ambition with place-based leadership, trusted local partnerships, community engagement, and rigorous science.

We would like to record a particular debt to the interns, doctoral researchers, early career scholars, and analysts who played such an important role throughout this programme. Their enthusiasm, creativity, and expertise enriched every stage of the work. They asked the difficult questions, challenged the assumptions of those more senior than themselves, wrangled the often messy and complex data, and built the tools – often to great effect. Science depends on this continual renewal of ideas and perspectives. The methods, partnerships, and evidence presented in this report will have lasting value only if they are adopted, refined, and ultimately improved upon by those who come next. We look to this next generation of great minds knowing that they will take this work in new directions and achieve more than we could ever manage. There is a fitting parallel in all of this. A report concerned with creating opportunities for young people has, in so many respects, been shaped by young people already taking matters into their own hands – contributing, innovating, and helping to build the future.

Science can take a long time. It requires patience, challenge, iteration, and humility. It often reveals that the first question is only the beginning, and that meaningful progress depends on building the methods, partnerships, and evidence needed to answer increasingly granular questions over time. But the scientific method works. It allows humans to accumulate knowledge, test assumptions, learn from failure, refine ideas, and build evidence that can support healthy lives.

This report is a testament to that process. It shows what can happen when people across disciplines and institutions commit to a shared public purpose, and what can happen when government, researchers, practitioners and communities work together to turn data into insight, and insight into action. The prize is not better data for its own sake. The prize is earlier help, fairer opportunity, safer childhoods, stronger communities and a more effective country. This is the ambition behind this report, and it is the responsibility we now collectively carry forward.

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This report is a collaborative programme of work between Child of the North, N8 Computationally Intensive Research, and the Centre for Young Lives, with the support of the Royal College of Paediatrics and Child Health and the NIHR Applied Research Collaboration Yorkshire and Humber, and contributions from researchers, policymakers and practitioners across the North of England and beyond.

About the Child of the North initiative

Child of the North is a partnership between the N8 Research Partnership and Health Equity North, which aims to build a fairer future for children across the North of England by building a platform for collaboration, high quality research, and policy engagement. The centrality of data has led to a partnership with the Computationally Intensive Research theme within the N8 (see below).

Who is the Child of the North?

The “Child of the North” is an archetype (like the “unknown soldier”), representing all the millions of children throughout the UK whose lives are blighted by inequalities. We use the Child of the North as a means of illustrating the inequities that affect children and young people. These inequalities are well captured by the differences in opportunities available to the child growing up in the North of England versus the South. But inequalities are present throughout the UK at both a national and regional level. These inequalities are bad for almost everyone and the future of the UK depends on their urgent eradication. The Child of the North represents every child who deserves a better start to life, regardless of where they live.

About the N8 Research Partnership

The N8 Research Partnership is a collaboration of the eight most research-intensive Universities in the North of England: Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield, and York. Working with partner universities, industry, and society (N8+), the N8 aims to maximise the impact of this research base by promoting collaboration, establishing innovative research capabilities and programmes of national and international prominence, and driving economic growth.

www.n8research.org.uk

About N8 Computationally Intensive Research

N8 Computationally Intensive Research (N8 CIR) focuses on the creation of a Centre of Excellence in CIR methods, skills, and facilities to underpin the strategic research objectives of the N8 universities, and to accelerate progress in areas of research that are of strategic importance to the N8 partners, including some that have not made heavy use of technology in the past.

www.n8cir.org.uk

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 Northern Health Science Alliance’s members of leading universities and hospitals, to fight health inequalities through research excellence and collaboration.

www.healthequitynorth.co.uk

About the Centre for Young Lives

The Centre for Young Lives is a dynamic and highly experienced innovation organisation dedicated to improving the lives of children, young people, and families in the UK – particularly the most vulnerable. Founded by former Children’s Commissioner, Anne Longfield CBE, who has been at the forefront of children’s issues for decades, the Centre’s agile team is highly skilled, experienced, and regarded. It is already widely known and well respected across government departments, Parliament, local and regional government, academia, the voluntary sector, and national and local media. The Centre wants to see children and young people’s futures placed at the heart of policy making, a high priority for Government and at the core of the drive for a future for our country which can be much stronger and more prosperous.

www.centreforyounglives.org.uk

About the N8+

Collaboration lies at the heart of “Child of the North”. The N8 has proved a useful organising structure but the Child of The North vision is to: (i) use the North-South England divide to show the impact of inequity on all children in the UK; (ii) bring together stakeholders from across the UK to build a better country for CYP. One aspiration is to link researchers from across the UK to support evidence-based approaches to policymaking. In particular, there is a desire to unite Higher Education institutes across the North of England so we can address problems in partnership.

Quotations

The illustrative quotations throughout the report were taken from extensive qualitative and consultation work with children, families, and professionals.

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> The methods, partnerships, and evidence presented in this report will have **lasting value** only if they are adopted, refined, and ultimately **improved upon** by those who come next.

> We look to this **next generation** of great minds knowing that they will take this work in new directions and **achieve more** than we could ever manage.

> Science can take a long time. It requires **patience, challenge, iteration, and humility**. It often reveals that the **first question is only the beginning**, and that meaningful progress depends on building the methods, partnerships, and evidence needed to answer increasingly granular questions over time. But **the scientific method works**. It allows humans to accumulate knowledge, test assumptions, learn from failure, refine ideas, and build evidence that can **support healthy lives**.