

Data Visualisation in Children's Social Care

Compiled by Renuka Jeyarajah-Dent
Deputy CEO, Coram

April 2019

Commissioned by: Nuffield Foundation

Acknowledgements

We are grateful to the agencies, partners and informants who made this study possible. This study was funded by the Nuffield Foundation.

The Nuffield Foundation is an independent charitable trust with a mission to advance social well-being. It funds research that informs social policy, primarily in Education, Welfare, and Justice. It also funds student programmes that provide opportunities for young people to develop skills in quantitative and scientific methods. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics and the Ada Lovelace Institute. The Foundation has funded this project, but the views expressed are those of the authors and not necessarily the Foundation. Visit www.nuffieldfoundation.org



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Published by Coram

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Coram 41 Brunswick Square, London, WC1N 1AZ

Registered charity no: 312278

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1. Introduction

Renuka Jeyarajah-Dent, Deputy CEO, Coram and project manager for this project;

With Dr Jeff Mesie, Head of Impact and Evaluation, Coram.

There is a vast amount of child-level administrative data available to the children's social care sector. However, there continues to be a significant gap in the capacity of local authorities to make effective use of their own data, other local authority (LA) data and national-level data to both inform their operational decision-making and evaluate their performance. Most local authorities report that they do not have the analytical capacity to use this data to generate insights to improve their current and future performance.

This project sought to identify how the power of data could be harnessed to understand the experiences of children when they come into contact with social services and to evaluate the effectiveness of the interventions made.

At a seminar hosted by Coram in October 2016, a presentation given by Sir David Spiegelhalter OBE FRS demonstrated to the LAs present the potential of data visualisation and issued a challenge to children's social care to look at its performance in more exacting ways. Sir James Munby (then President of the Family Courts) was also present and acknowledged that performance management within the courts itself was poor and that data could be used better to inform learning.

Coram proceeded on the basis that using a data-driven approach in its consultancy work with local authorities had been useful in helping children's services managers to understand the experiences of children and identify ways to improve services. We believed that giving these managers a better handle on their data offered the prospect of a more nuanced analysis and greater potential for improvement. We were also aware that university-based researchers were publishing findings about children's care journeys that local authorities could not easily replicate locally due to the way that their data was held or because they required additional data (for example surveys and case file analyses) to be linked with administrative child-level data as an integral part of the research.

The purpose of this project was to convene a discourse between local authorities, researchers and data scientists to understand:

The questions that LAs would like data to help them to answer;

If exposure to research raises questions of interest that LAs see a value in pursuing

How available data (held nationally or locally) could be visualised to help answer these questions

The ambition was to select service areas on which to focus and to produce a set of prototype visualisations that would be of use to our partner LAs. We also sought to share these, and other visualisations, with a wider set of LAs to determine if such an approach was potentially useful across the local children's services sector.

In order to progress, we engaged key partners:

- As the intended key beneficiaries of the project were children within children's social care, LAs were included as partners. Kent and North Yorkshire county Councils were the primary LA partners.
- Several academics had already published important research which was influential to LA practice. Professor Ruth Gilbert (Professor of Clinical Epidemiology, University College London and UCL GOS Institute of Child Health); Professor Judith Masson, (Professor of Socio-Legal Studies, University of Bristol); and Professor Judith Harwin (Professor of Socio-Legal Studies, Lancaster University).
- Other partnership work looking at data was already in train and Dr Lisa Holmes (Rees Centre, University of Oxford) was engaged as the principal research partner to coordinate this
- As an expert data science agency, the Alan Turing Institute was engaged to inspire the partnership and link to current thinking on data visualisation in other fields. Dr James Geddes of the Alan Turing Institute (Principal Research Data Scientist) joined the project.

Coram's internal expertise is complemented by the organisation's reputation for facilitating both professional and public discourse. Dr Jeff Mesie (Head of Impact & Evaluation); Kevin Yong (Managing Director of Coram-i) and Renuka Jeyarajah-Dent (Deputy CEO) acted for Coram in advisory and project management roles.

Process

We began by bringing local authorities, data scientists and university-based researchers together (26 January 2018) and sharing our knowledge and understanding of both the problems in the system and the potential opportunities to utilise modern data science in children's social care. Presentations from Profs Ruth Gilbert (&Dr Louise McGrath-Lone), Judith Masson, Judith Harwin (with Dr Bachar Alrouh) and Dr Lisa Holmes and as well as the Alan Turing Institute covered a number of key issues including:

- The existence of different cohorts with different types of engagement with the care system over time, and the large number of children in those cohorts (1 in 30 children experiencing care by the age of 18).
- The fact that around 20% of children involved in proceedings do not enter care before, during or immediately following those proceedings
- The wide regional variations of rates of entry to care
- Current local area use of data for strategic and operational purposes and the application of modern data science approaches to visualising LA data at a national level.

While this led to interesting discussions, the next step was not immediately obvious. *It was difficult to define exactly what problems data visualisation might solve and the questions data visualisation might answer.*

Dr. James Geddes reminded the local authorities that data visualisation was used:

- (1) As an aid to decision-making
- (2) As an aid to exploratory modelling;
- (3) To convey particular information that is otherwise hard to grasp.

(these were not necessarily mutually exclusive).

To shape the next stages of the project we looked at local authorities in more depth to better understand whether and how data visualisation might support local area planning and decision making at a strategic level.

It was clear that LAs were undertaking good work to consolidate data and that there was some good quality analysis but there was little attempt to build formal models (either driver/decision trees, simulations, or statistical models) or to use the data to make predictions about the future.

We decided to focus on questions that were of interest to the LAs and had also been considered by a researcher. We wanted to see if we could help to communicate the research through the visualisation of data.

North Yorkshire LA made early attempts to design a “railway diagram” to map a child’s pathway through the system with some statistics around numbers shown “at the stations”. This was discussed with other authorities and the consensus was that it could be a potentially fruitful way to help them to understand where children were in the pathway; where the bottlenecks were and how many times children were repeating cycles of the system. One example of interest was <https://www.shipmap.org/>.

A key insight for the partnership was that people engage with and better understand data portrayed as maps. Dynamic maps that showed movement seemed to present a lot of information in an accessible form and were an effective way to explain both the totality and the constituent elements of journeys. A short development phase was undertaken with Kent County Council to explore how the journey of children through part of their system could be mapped.

Kent County Council is the largest county in the country with over 1.5 million people living within its boundaries. On 31st March 2018 it had 1,645 children in its care, 2,395 on ‘Child in Need’ Plans and 9,930 children and young people defined as ‘children in need’ (using the CiN census definition). Its Director of Integrated Services (Children’s Social Work Lead), Sarah Hammond and her team were most curious about children entering the front door of children’s social care: what decisions were being made on their behalf; which pathways did they go down and where did they end up?

The Kent team reported that there was much data collected on children once they enter the care proceedings frameworks and protocols but they *did not have enough insight into potential drift* happening earlier on in the process. This was the stage in the process at which professionals were meant to intervene swiftly to enable children to remain safely at home. Kent had invested in its data analysts and was keen to work with the project to benefit from the partnership’s expertise. Sarah Hammond deployed Matthew Wagner (Senior Management Information Officer - Data Analysis) and Penny Ademuyiwa (Assistant Director – Front Door) to the project. A map was drawn of all possible pathways that a child could travel through once referred to children’s social care and data for 20% of all children in the period 2014 to 2018 was anonymised under GDPR compliant

standards and submitted to the Alan Turing Institute. **The resulting data visualisation, described in section 8, is a product of the project.**

In parallel, work was undertaken by our university-based partners to explain the potential of longitudinal data, the opportunities and dangers of linking together data from different sources and the use of data to highlight hitherto unexpected levels of variation. **Professor Judith Masson** then undertook some applied data linkage with North Yorkshire County Council, **described in section 5. This is another of the products from this project.** This aspect of the project was facilitated by Dr Lisa Holmes and was conceptualised to build on work that had been carried out with North Yorkshire County Council to explore the nature and availability of children's social care and family justice data, as part of the Family Justice Observatory scoping phase¹. Judith's Masson's section shows how linking of data, even within one authority, such as proceedings and care data, can offer a different and richer understanding of children and young people's trajectories than could otherwise be obtained by looking at each data set individually. Her section identifies a major deficit in the children's social care data currently collected from all local authorities in England and Wales. Prof. Masson sets out a simple mechanism that local authorities can use to gain a clearer picture of the patterns of decisions they and their local courts make about care proceedings and illustrates how additional data about care proceedings can make a difference in understanding the impact of child protection intervention on care demand.

Prof. Ruth Gilbert cautioned against too much reliance on snapshot data. She explained the value of population-based approaches where identifying individuals is not necessary to obtain insight. She showed (**see section 4**) that analyses of the whole longitudinal record can reveal a very different picture to how rates of features such as entry to care are currently understood and provide insights about subgroups of children that might not be obvious to services. Prof. Gilbert also highlighted the opportunities and dangers of linking datasets. Linkage error is not random but disproportionately affects certain groups which can lead to an underestimate of adversity within these groups unless this is managed appropriately.

Prof. Judith Harwin demonstrated how visualisations can illustrate variations between regions and identify areas for further investigation. In **section 6**, she highlights the limitations of working with children's data where the key features are often held in narrative form only and are painstaking to extract. She argues that greater use of categorical data to describe family situations, interventions and outcomes would make nuanced analysis and visualisation more feasible and provide benefits to provider agencies.

Dr Jeff Mesie explores the concept of '**Never Events**' in **section 7**, an additional element to this project. This approach has been used in the NHS and data pertaining to such events is analysed and used to escalate issues in order to improve safety, effectiveness and patient experience. We considered whether such a methodology was applicable in children's social care.

¹The Nuffield Family Justice Observatory aims to support the best possible decisions for children by improving the use of data and research evidence in the family justice system in England and Wales. Further information is available here: <https://www.nuffieldfjo.org.uk>

2. Local authorities' current use of data and reporting

Dr Lisa Holmes, Director of the Rees Centre & Senior Researcher, University of Oxford.

Research has highlighted that the data submitted to government departments (for example, the Department for Education) as part of national statutory returns, such as the SSDA 903 and CiN Census constitute a small proportion of the data held and utilised within LA children's services departments (Ward, Holmes and Soper, 2008; Holmes and McDermid, 2012). Local authorities provide data to government departments on an annual basis, the analyses of which - in the form of national statistical releases - is published up to eighteen months after the commencement of the data collection period (i.e. analysis of data for year commencing 1 April 2017 is published in September and December 2018), consequently providing a retrospective analysis for a sector that is evolving, both in terms of organisational structures and also in terms of the populations that they serve.

The way in which data is presented in the Department for Education's National Statistical Release provides a series of year on year snap shots and a trend analysis. The break down by LA facilitates an exploration of trends over years, for example in terms of the number of children looked after. However, these analyses do not provide an indication of the longitudinal pathways of children. A recent longitudinal analysis of the pathways of children in need by the Department for Education, provides a preliminary analysis of social care pathways and educational outcomes (Department for Education, 2018).

The process of preparation of data for submission to the Department for Education has been reported to be onerous and time consuming for some local authorities, with the process of preparing data taking up to three months (local authorities submit data by the end of June each year). Current research has identified that where local authorities have to spend time preparing the data for submission that data tends not to be used for local strategic and planning purposes (La Valle et al., forthcoming).

In a recent Research in Practice Change Project (Bowyer et al., 2018) work was undertaken with eighteen local authorities to explore their data usage at a local and regional level to inform strategic and operational planning and decision making. The focus of the project was on support for children and young people at the 'edge of care', but included an exploration of child level and finance data to better understand the throughput and trajectory of cases, from early intervention and through statutory children's social care services (including child protection, children in need, looked after children and care leavers). The project identified a range of practices and initiatives whereby local area data sets are linked and matched, either between agencies or across different parts of the children's social care system. Sebba and colleagues (2017) provide examples of how local area decisions have been better informed through the use of local level data in the Department for Education Children's Social Care Innovation Programme (Round One) projects, including the use of embedded data analysts; increased practitioner use of data and the development of data warehouses (ibid).

The Children's services Analysis Tool (ChAT) provides another recent example of secondary use and meaningful visualisation of data. The ChAT uses child-level data from Annex A (Ofsted's Single Inspection Framework) and the last five years of published statistics for Children in Need, Children Looked After, and Adoptions, to provide an aggregated analysis for the LA as well as comparisons with its Statistical Neighbours and England. ChAT was developed as a part of the collaborative 'Data to Intelligence' project between Waltham Forest Council, Hackney Council, and Ofsted and has been made available to all local authorities as a free resource.

A majority of the information that the ChAT displays is captured using the LAIT² which also displays data annually in national, regional and statistical neighbour contexts over the past seven years (where data is available). ChAT provides the information in a dashboard format. As with LAIT, ChAT is reliant upon yearly returns data and so does not provide up-to-date analysis of a LA. There is a facility to import data sets on a more regular basis, however this would be reliant on local authorities routinely and more frequently extracting the necessary data from their management information systems to then import into the tool.

The value of child level data lies primarily in the ability to provide detailed information on each aspect of supporting a child. These elements can then be aggregated in a number of different ways to carry out analysis on a range of variables. The value and use of child level data across all levels of children's services needs to be acknowledged, however the effort to extract, collate and submit the data needs to be considered to ensure that procurement of the data does not outweigh the benefits of its analysis (McDermid, 2008).

References:

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²LAIT (Local Authority Interactive Tool) is an on-line tool developed by the Department for Education that features comparable information at national, regional and statistical neighbours' level, so that local authorities can assess their performance against national and regional trends. It includes information such as: Child Protection, Looked after Children (LAC), Children in Need (CiN), early years and youth offending. LAIT is driven by data received from mandatory returns such as the SSDA 903 data and CiN Census data. The limitations are that it only features data for a full year and this data takes time to get onto the system.

LAIT is available at:

<https://www.gov.uk/government/publications/local-authority-interactive-tool-lait#history>

3. The questions that local authorities would like data to help them to answer

Alastair Lee, Data and Information Manager, East Sussex Children's Services and also Chair of the National Children's Social Care Performance and Data Management Group;

Matt Wagner, Performance & Analytics Manager, Kent County Council.

Main data questions facing local authorities

1. Cost

There are two main elements of 'high' cost within children's services: the costs of placements for children that are looked after or have special educational needs (SEN) and the costs of the social care and special educational needs referral, assessment and intervention processes.

In 2017/18, local authorities in England spent £4.5bn on Looked After Children and care leavers – almost half of the total children and young people budget. Work carried out by Rosemary Perry and Mark Evans for the South East Sector Led Improvement programme on complex LAC has revealed the extent of the costs and revealed that the children with the highest level of need are not always in the highest cost placements. Their review examined 817 cases of looked after children aged 10 or older in twelve LAs. It revealed an average placement cost of £3,000 per week, with a total annual cost of over £127 million.

The next step is to look at how LAs can work together to benefit children and manage these costs. A particular challenge is that 8,530 looked after children were in "secure units, children's homes and semi-independent living accommodation" in 2018 (DfE: Children Looked After in England - including adoption- year ending March 2018).

Similar issues exist for children with SEN. On 18 Jan 2018 (the SEN2 census date) 126,960 were in special schools and as a result will be assessed as being in the greatest need and so receive the highest level of funding from the LAs. Of these children, 11,785 were in independent special schools.

LAs need to know the cost of the key processes in SEND. This includes activities such as: dealing with a referral; a request for an Education, Health and Care (EHC) plan; carrying out an assessment, whether early help, child protection or EHC plan; a section 47 enquiry; adopter recruitment and support; or child placement.

Children's services departments need such cost information to enable them to make more detailed judgements about service development. One example would be whether reducing the early help service would result in more activity going into the social care teams and whether that would result in any savings being cancelled out. Another example is the cost consequences of raising the threshold for EHC plan requests and dealing with more tribunals or lowering the threshold and dealing with more EHC plans.

Questions about cost are also relevant to judgements about specific interventions aimed at improving outcomes for children and families.

2. Effectiveness of interventions

Local authorities need to know which interventions succeed in improving outcomes for children and their families. They need access to impartial and robust evidence for the impact of these interventions. This is particularly important when commissioning preventative services that aim to reduce demand for higher-level interventions. Preventative services are guaranteed to cost money now and it is vital to have evidence on whether they will save more than the cost over the longer term.

It is also important to understand how the availability of effective interventions varies geographically (often referred to as the 'postcode lottery'). There may be a wider range in the large conurbations and a narrower range in more rural areas. If interventions are shown to be effective we need to understand how these can be developed and made accessible to all LAs.

Given that every child and family is unique, no single intervention will represent the whole story. It is important to look at both successful and unsuccessful outcomes and understand the elements that contributed to this. We can take placement breakdown as an example. What do we know about these cases (characteristics of children, birth parents, placement, etc.)? What support was available and taken up? Children returning to care often have complex or multiple needs that are difficult to meet and therefore expensive – could an LA have invested more to intervene earlier to avoid cost later on?

3. Forecasting future demand

What pressures will children's services departments (early help, child protection, special educational needs) face in five years and beyond? What models of effective intervention would enable us to manage this given the costs involved?

The number of children with a child protection plan at any time during the year has increased from 62,210 in 2015 to 68,770 in 2018, an increase of 10.5%. The number of looked after children on 31 March increased from 69,470 in 2015 to 75,420 in 2018, an increase of 9%. These increases go beyond the 2.3% increase in child population seen over the same period. What are the drivers behind these increases? Will these trends continue and, if so, what will be the impact on the whole system? For example, if the number of looked after children continues to increase, will LAs also need to increase the number of adopters recruited?

There were 240,000 children with a statement or EHC plan in 2015 and this increased to 320,000 in 2018, largely due to the extension of plans to include young people up to age 25, but all age groups increased (under 5 by 11% and 5-10 by 16% in the same period). These children will progress through the system as they age, how will this affect the amount of provision needed and what is going to happen next? Will numbers continue to increase? Will this be in all categories of SEN? How should this be managed?

4. Are we collecting the right things? - too much process, not enough outcomes

Does the data we collect really tell us anything about the experience of the child/family? There are two aspects to what we need to know to better understand and develop the system:

- a) "experience of the system" i.e. the user perspective and
- b) the "outcomes for people who have experience of the care system".

Use of strength and difficulties questionnaire (SDQ) is inconsistent. What more could be learned from care experienced people (those that have been through the system)? Could a better use of experiential data within LAs be encouraged as a way of developing this work?

The debate around need-threshold-service-outcome is still active in the field. There are few randomised control studies that populate the 'what works' agenda and much still to be done to understand the 'value added' by various placements/interventions.

5. Workforce (skills/training) and outcomes for young people

Practice within social work and early intervention is a key element of service delivery. Which models of practice, training and workforce development are most effective at improving outcomes for children and young people? Could the impact of social worker training, experience and continuing professional development (CPD) on the outcomes for young people be better evidenced? In what situations, and with whom, are different models of practice most effective?

6. National variation

Why is there so much variation nationally in some of the data? And which are the most useful factors to consider when comparing 'similar' LAs? Examples include the Income Deprivation Affecting Children Index (IDACI) and the Index of Multiple Deprivation (IMD).

7. How can we make better use of LA data to improve outcomes for young people?

The Statistical First Releases are a snapshot of the data and only represent a small proportion of all the data a LA holds. How else can the mass of data that a LA holds be utilised? Examples such as the work in Kent and N. Yorkshire through the Coram-Nuffield project and the What Works Centre's project in Bracknell Forest are effective innovations. Once developed, how can other LAs make use of these tools and knowledge? How and where will they be held, managed and kept up to date?

We have good examples such as the ChAT and Children's Social Care Benchmarking tool developed by Waltham Forest, Hackney and Ofsted that are available to all LAs through the Knowledge Hub. How can these tools be developed to help LAs identify how their systems are working, how they compare to others, and whether there are advantages in working differently? What are the factors that affect success?

LGInform is a tool that is under-utilised by children's services departments but one that has huge potential to deliver off-the-peg reporting of key data. More capacity will enable the tool to be exploited to its full potential.

There is detailed data held by each LA and with the right expertise, more can be done to understand its impact. It may be possible to do longitudinal studies over individual children's life courses and understand what affects the outcomes for vulnerable children. Can data be accessed more quickly to help investigate the next big burning issue for Directors of Children's Services? This must be achieved by developing the expertise of professionals who know and understand the data and must include children's services front line workers and managers.

What would Amazon and Google do with this data? This is a question that must be asked. New capacities must be forged so that data can be understood and utilised in a way that benefits children. There is enormous potential to revolutionise children's social care but there still a long way to go.

4. Using longitudinal data to evaluate children's social care

Ruth Gilbert, Professor of Clinical Epidemiology, UCL Great Ormond Street Institute of Child Health.

Background

The UK is world-renowned for its longitudinal birth cohort studies. Research from these studies has advanced knowledge about the needs of children and families and impacted policies and practices¹. Longitudinal studies are now widely recognised as essential for understanding who we are, what problems we face through our life course, and what combinations of factors, whether our genes, development, disease, family, behaviours or environments, make us likely to thrive or struggle². The topic of vulnerable children has benefitted hugely from longitudinal studies^{3, 4}. For example, long-term follow up of the UK 1958 birth cohort shows lifelong associations between child neglect and impaired cognitive abilities and mental health through childhood, adolescence, and into middle age, with measurable deficits at age 50 years⁵. Longitudinal studies are the best way we have of learning from what happened to past groups of children. The most useful type of longitudinal data is collected prospectively as this can be used to predict what is likely to happen to similar groups of children in future. This type of prognostic information should underpin decisions about if and when to intervene. Longitudinal data can also be used to look back at children's past experiences, for example, to show how many young offenders have ever been in care. This type of look back gives useful information about the burden of adverse experiences but does not tell policy makers which children in care are most at risk of offending and who might benefit most from interventions.

Longitudinal studies are changing². The emerging wealth of electronic administrative data that is routinely collected by services means longitudinal studies can be conducted at scale, quickly and at relatively low cost compared with traditional, researcher-crafted studies... At the same time, public participation in researcher-developed, consented cohort studies is declining and maintenance of follow up over many years is becoming more challenging². However, there are some disadvantages to longitudinal studies based on administrative data. The data collected is primarily for running the service and it reflects only those who use the service and how the service views and codes them. Key information may be missing or inaccurate. On the other hand, a major advantage is the comprehensive data collection from all those using services. This is critical for vulnerable children who are often lost to follow up from traditional, consented studies.

In England, there are three key sources of longitudinal administrative data relevant to vulnerable children; children's social care data, education data, and healthcare data⁶⁻⁸. All cover the whole population in England and link multiple events over time for the same individual to give a longitudinal record over the child life course of up to 10-20 years. Linkages between service sectors have been developed at national and local levels in England, but are more advanced in Wales, Northern Ireland and Scotland, and long-established in the Nordic countries. Linkage of longitudinal records for the whole of England has been achieved for education and social care data⁹, and there are examples of linkage for health and education for specific groups^{10, 11}. Future linkage of data for all three sectors for all children in England would provide a powerful longitudinal data resource to understand how children move in and out of the care system, education and health care, and how services vary across the country in the ways they work together. Among many questions that could

be addressed is 'how to effectively integrate services?' who receives the services they need, who falls through the net, and what happens to them in the longer-term?

In the next section I give examples of how longitudinal data from whole populations can be used in a de-identified or anonymised form by researchers or other analysts from national or local government. Even without linkage between sectors (health, education and social care), whole country data analyses using each of these longitudinal data resources separately can be highly informative. The timelines in Figure 2 show an imagined example of one child life course that could be captured through events measured in health, education and social care data. Findings could improve understanding of children's experiences of services across the life course, inform service and policy development, and provide information for families, practitioners and policy makers. Identifying individuals is not necessary for these purposes. Records about individuals have all identifiers removed and any outputs need to adhere to governance requirements to preserve confidentiality¹². This purpose for using de-identified data about populations for service evaluation or research is distinct legally and practically from the use of longitudinal data for 'direct care' of named individuals for case management. Data for direct care is not dealt with in this report.

Longitudinal data can transform our understanding of services by revealing patterns in populations that practitioners providing the service may be unaware of. Examples of the different types of questions that can be addressed are given in sections 1-3 below.

1. What is the overall burden of adverse outcomes in the population?

The experience of being in care is an important event in a child's life history and of their family, reflecting crisis, stress, separation and loss at a critical point of development. Yet few service providers know what proportion of children have ever been in care. A longitudinal study using administrative data from the Department of Education of a one-third representative sample of all children born in England and entering care from 1992 onwards calculated the risk of entering out of home care for the first time by their eighteenth birthday (Figure 1)¹³. Overall, 3.3% of all children born in England in 1992-94 had entered care by 18 years. For those born in more recent years, the proportion rose steeply so that by the time children born in 2010 reach 18 years, far more than 3.3% will have ever been in out-of-home care. As the duration of care is also increasing, net costs of care for more children for longer periods, will continue to rise substantially in the coming years. The annual cross sectional, or snap-shot statistical reports published by the Department for Education, reflect children in care just in one year (e.g.: 0.6% of the child population in 2016), not the risk for a child over their life time.

A second example, relates to children in need of LA services for disability or to achieve or maintain health or development or avert impairment (section 17 of the Children Act 1989). Annual statistical first releases by the Department for Education provide a cross-sectional snapshot of this population on 31 March each year. In 2015, 2.7% of children were assessed by local authorities as being a 'child in need' between 0 to 5 years of age. However, a study by Bilson and Martin using information from 78 local authorities, reported that of all children born in 2009/10 and followed over subsequent years until their fifth birthday: 23% were referred to children's social care, 17% were assessed and 14% were found to be a 'child in need' before their fifth birthday – far more than the 2.7% captured in the one-year snapshot figures¹⁴. The proportion of all children who would have been a 'child in need' at least once by their 18th birthday has not yet been estimated. It is likely to exceed 30% of all children as at 31 March 2017, 75% of all children in need were 5 years or older¹⁵.

Similarly striking cumulative risks can be calculated for other sectors. For example, since 2010, the proportion of children recorded as having any form of special educational need in a year has declined from 20% to 14% each year. Taking the longitudinal view across all school years, 44% of children entering year 1 in 2005/6 ever had one or more records indicating special educational needs.

These longitudinal analyses show the burden of adverse outcomes in terms of the child's experience across the life course. They can change our view of who these services are for. Children's social care services interact with a very substantial proportion of the child population, not a small marginalised group. One child in 30, or one in every classroom, is placed in out of home care. Around one in every 2-3 children is considered to have special educational needs, and it is likely (but yet to be calculated) that 1 in 3 children will receive services as a 'child in need'. Such high levels of need across the child population argue for a public health, preventive approach that tackles the causes of need and improves universal systems and services to improve support for parenting and children across their life course¹⁶.

2. Who is most or least likely to have an adverse outcome?

Quantifying the burden of a problem or adverse outcome (e.g. the proportion of children ever placed in out of home care) is useful, but longitudinal data can tell us much more about who is most (or least) at risk, and when. Figure 1 shows that children born in more recent years have an increased risk of being placed in care, especially in the first year or two of life. Where a child lives is another risk factor. Bywaters et al reported that deprivation, and particularly being deprived but living in a less deprived area, was associated with an increased risk of being placed in care¹⁷. McGrath-Lone used longitudinal data for England to show that black ethnicity strongly increased the risk of ever being placed in care, with one in 10 children of black ethnicity in England ever having been placed in care, largely explained by their higher levels of deprivation¹⁸. She also showed that the increase in care placements over time has been primarily driven by an increase in the proportion of White children entering care, rather than increased ethnic diversity among children in England^{13, 17}.

All the previous examples used the whole child population as the denominator population with events, such as placement in care, used as the outcome. Longitudinal analyses restricted to children in care need to consider other adverse outcomes. For example, using longitudinal data for England for children discharged from out of home care between 2007-2012, McGrath-Lone showed that the risk of returning to care decreased over time, but was increased for adolescents and those with voluntary section 20 placements¹⁹. She went one step further and developed a predictive model to calculate the risk of early return to care given various combinations of child and service characteristics. Longitudinal, population-based data are a critical resource for developing predictive models for decision support. Such models have the power to change practice by influencing administrative data systems, without necessarily involving practitioner judgements. Predictive models therefore need robust and continuing validation, as they depend on context, wane in utility over time, and if based on administrative data from out-dated practices, could be misleading.

3. Using longitudinal data to identify subgroups

Practitioners are likely to be most aware of the characteristics of children who present to services. For example, who referred them, what was the precipitating event, and whether concerns were about neglect, abuse, or family dysfunction. Statistical modelling or advanced computer analyses (e.g. machine learning) of the whole longitudinal record can provide insights about subgroups of children that might not be obvious to services. For example, McGrath-Lone used sequence analysis to group children in England who had ever entered out of home care before age 18 years, according to the number, order and duration of periods of care. The statistical model defined 6 groups, the largest of which comprised 58% of all children who ever entered out of home care before 18 years old. This group was characterised by their short duration in care. Half of these children had been in care for less than 4 months over their childhood, with half of the 58% having only 2 separate periods in care¹⁸. Such descriptions of subgroups provide an overview of who receives services. The next step is to include clinical and social information in the analyses to find out whether different subgroups have different risk factors and outcomes, which might indicate the need to be managed differently. Outcomes, such as educational achievement (from linkage with education data), and risk factors, such as chronic physical or mental health conditions or parental health problems (through linkage with health data) can be highly informative for family interventions²⁰.

Various types of outcome data have been collected on looked-after children by local authorities since 1999. Since 2009, items have included child-level information on health-related outcomes such as immunizations, health checks and Strengths & Difficulties Questionnaire (SDQ) scores⁶. However, these data are collected only for children in continuous care for 12 months or more, excluding the vast majority of children ever placed in care. Record linkage between service sectors is an efficient way of capturing risk factors and outcomes for all children ever placed in care.

4. Record linkage

What is linkage error?

To make the most of administrative data on children in contact with social care services requires linkage to administrative records from other service sectors. Record linkage is the process of bringing together information relating to the same individual from different sources. Linkage involves comparing all possible pairs of records and applying a set of linkage criteria or rules to determine whether or not records belong to the same individual. Different linkage methods can be used. Deterministic or rules-based methods are common, but probabilistic linkage methods are more accurate²¹. In practice, a combination of these two approaches is often used, but many government data providers use only deterministic methods. The aim of the linkage method is to determine the true match status of each record pair. A 'Match' indicates record pairs belonging to the same individual, and a 'Non-match', record pairs belonging to different individuals. Linkage error occurs when record pairs from different individuals link, causing a 'false match'. An example is different people having the same NHS number. A more frequent type of error is 'missed matches', where multiple records from the same individual fail to link. For example, the same person has multiple NHS numbers. Missed matches and false matches become more common as the completeness and accuracy of identifying characteristics diminish. Inbuilt systems for checking identifiers, such as routine cross-checking of hospital patient details against a national look-up demographic spine, reduces linkage error. Use of multiple characteristics in the linkage process, such as sex, school, LA and dates of contacts with services, can also improve linkage accuracy.

Linkage error occurs even when linking events for the same individual within the same database. For example, children who are placed in care are assigned a child ID by the LA. This is the main identifier held by the Department for Education in the national 'child looked after' (CLA) database, together with date of birth, gender and ethnicity⁶. If the same child is looked after by different local authorities, they receive a different child ID and cannot therefore be linked. However, when and if the child enters the state school system, the unique pupil number is added, which allows linkage to education data for that child even if they move to another LA. An exception is adopted children, who receive new identifiers and whose longitudinal history, pre and post adoption, cannot be followed to examine associations between their care and educational and other outcomes. However, a larger group for whom it is not possible to explore education outcomes is the growing proportion of children who enter and leave the care system before school entry. In the longitudinal cohort of children born between 1992 and 1994, one in five (21.9%) left the out-of-home care system for the final time before age 5 years. These care histories of children exiting care before school age are not linkable to a child's education records. This makes it difficult to evaluate education outcomes following the rise in early care placements for very young, preschool children in recent years. The Department for Education should address this linkage problem as a matter of urgency.

Why is linkage error important?

Linkage error is not random but disproportionately affects certain groups who are likely to have poorer quality identifiers to enable linkage²¹. Examples include names that are difficult to spell or names that vary, children in temporary or insecure accommodation or living with different family members, children living in communal establishments or traveller communities, children changing placements, those with multiple siblings, and children whose carers have reasons to withhold or not know key information such as postcode or the child's date of birth.

Linkage error can lead to biased results in analyses of longitudinal administrative data, which particularly impact the marginalised groups just described. False matches can increase the variability of estimates, and dilute true associations. Missed matches cause a serious problem of selection bias, which occurs when particular groups are systematically less likely to link and hence more likely to be excluded from analysis. For example, adverse educational outcomes of marginalised groups may be underestimated if these children fail to link and their needs are therefore not counted in analyses.

How to address linkage error

Methods to address linkage error hinge on transparency about how data were processed and the linkage was done²². Biases in analyses can be mitigated if analysts are given information from the linkers that allow sensitivity analyses, comparisons of linked and unlinked records, and information on the uncertainty of the linkage²³. Most valuable is evidence that compares linked data with 'gold standard' datasets where the true match status is known. Systems for encrypted linkage reduce linkage accuracy. Encrypted linkage is often commissioned from commercial suppliers, and involves encrypting identifiers at source before linkage to avoid identification and the restrictions of new GDPR regulation of personal data²⁴. These processes also prevent understanding and feedback into the system information on the underlying data quality mechanisms, thereby preventing an improvement cycle for data quality.

Key messages

1. Longitudinal administrative data resources are an essential resource for the evaluation children's social care, which is underused by government and researchers.
2. Delays in processing permissions to use administrative data for research continue to frustrate advancements in the use of these complex data for public benefit.
3. Research and transparency are needed to improve methods for data processing and linkage by national and local government data providers. Processing, linkage and analyses of administrative data, within and outside government, need to be reported, shared, replicated and built upon to advance efficient use of data for children's social care.
4. Training and methodology support for analytic capacity within local authorities and government is needed. New collaborations between government data providers and the research community could support, retain and develop analysts within the service and bring innovation.

Acknowledgements

I am grateful to Louise McGrath-Lone, Matthew Jay and Katie Harron for their research contributions to this article

Figure 1: Cumulative incidence of first placement in out-of-home care in England according to year of birth^{13, 25}.

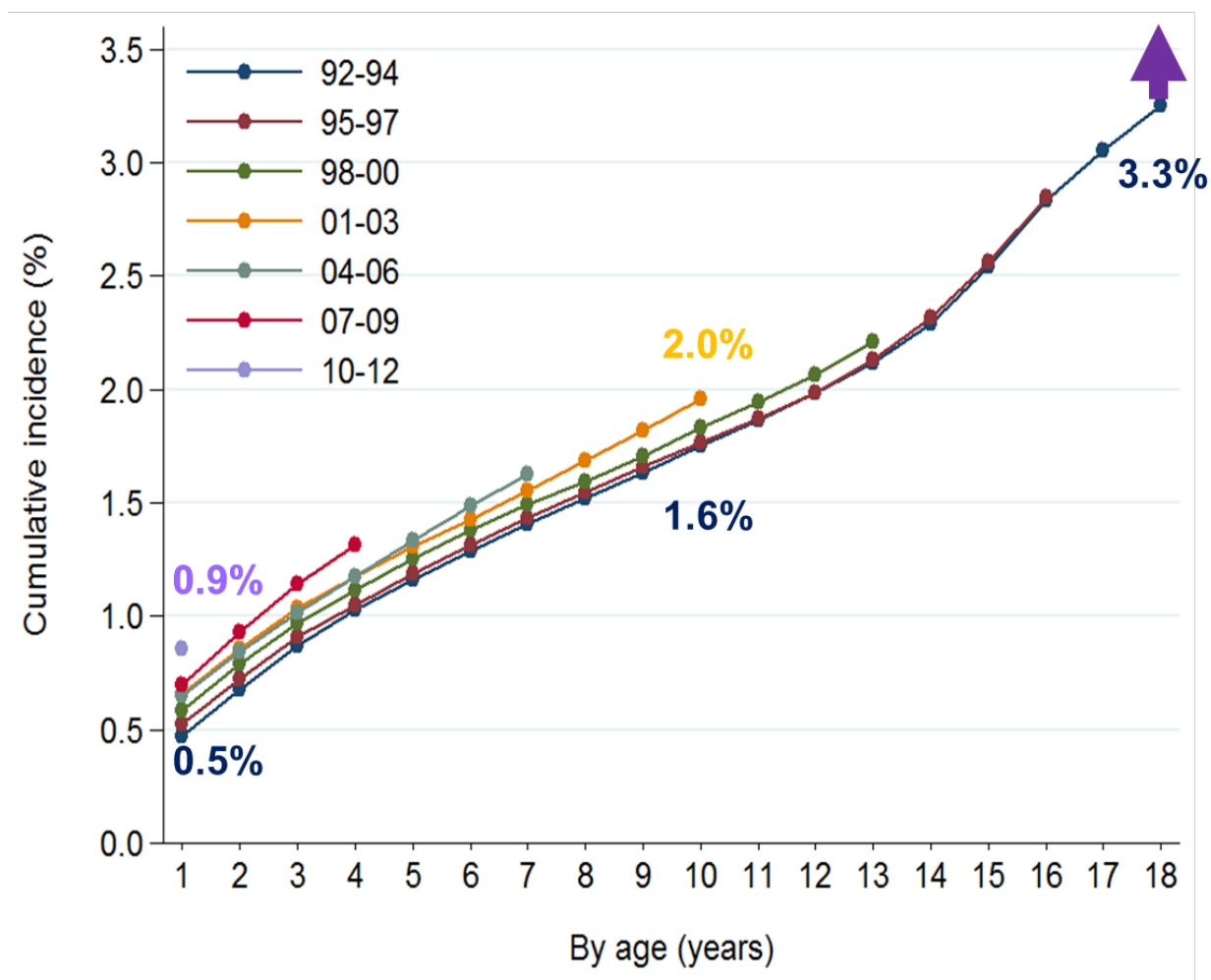
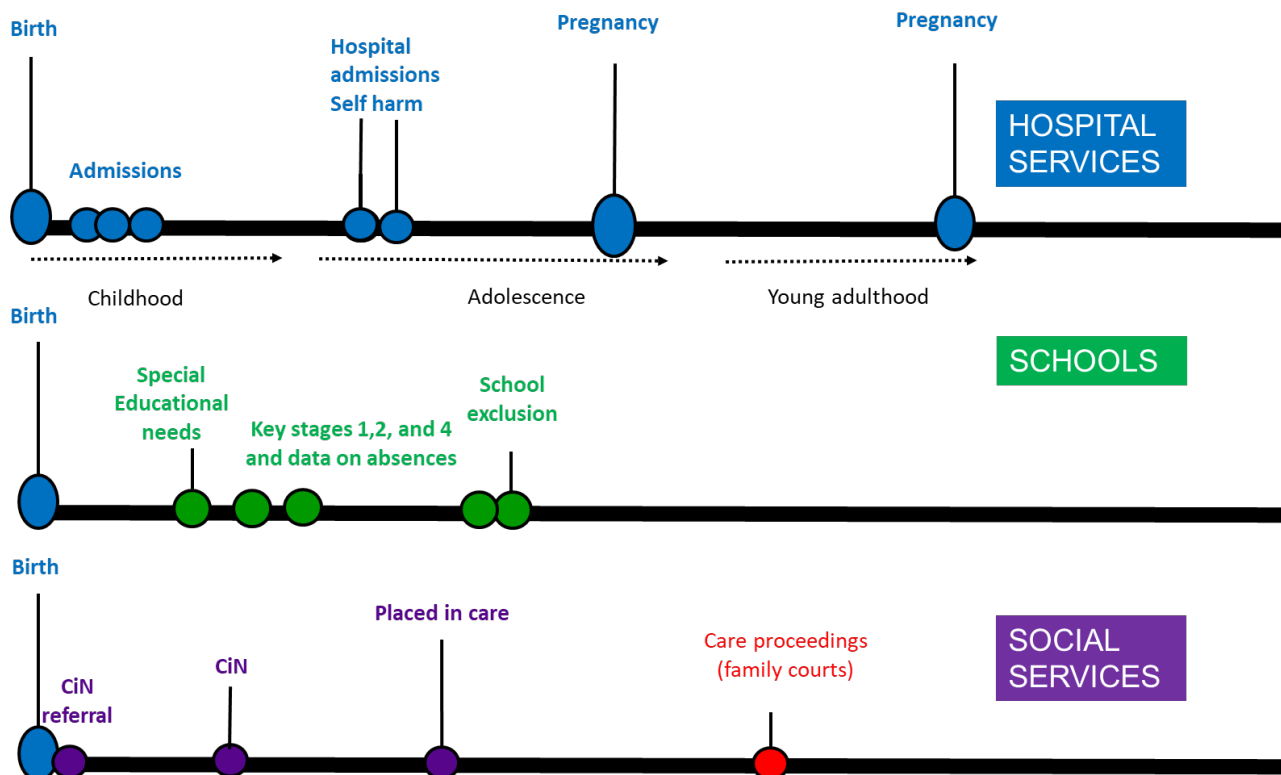


Figure 2: Diagram illustrating the type of events captured for one child in longitudinal datasets.



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5. From Court Proceedings to Care:

Applying Outcomes of Care Proceedings for Children Study Method to Analyse North Yorkshire County Council's CYPS data

Professor Judith Masson, Professor of Socio-Legal Studies, University of Bristol;

Dr Ludivine Garside, Senior Research Associate, University of Bristol;

Sean Jenney, Data & Intelligence Specialist, North Yorkshire County Council.

Summary

- The *Outcomes of Care Proceedings for Children Study* established that 20% of children subject to proceedings in the (random) Study sample were not in care before, during or after proceedings, raising questions about the use of proceedings.
- The use of care proceedings is not recorded in the Looked after Children and Children in need databases so links between proceedings and services cannot be seen.
- The *Outcomes Study* researchers devised a simplified method to enable local authorities to analyse their social care data with legal department data to show the impact of care proceedings on care.
- This was successfully piloted in one LA. Findings were displayed in simple visualizations.

Introduction

Data visualisation aims to communicate data clearly and efficiently; the pictures presented must display what managers in children's social care and other data users need to see in order to make decisions about services provision and the allocation of resources. Consequently, data visualisation needs to start with collecting the right data and clearly focused analysis. This paper identifies a major deficit in the children's social care data currently collected from all local authorities in England and Wales, illustrates the difference additional data about care proceedings can make to understanding the impact of child protection intervention on care demand and it sets out a simple mechanism local authorities can use to get a clearer picture of the patterns of decisions they and their local courts make about care proceedings.

Care proceedings

Local authorities have a statutory responsibility to bring care proceedings where compulsory measures are needed to protect children suffering, or at risk of, significant harm (Children Act 1989). In practice, only local authorities bring these proceedings. There were over 14,200 applications, involving 23,000 children, in England alone in 2017-18 (Cafcass 2018). Although only a minority of children become looked after through court proceedings, children subject to care orders stay longer, consequently 80% of the care population on 31st March 2018 were subject to an order made in care proceedings (DfE 2018). Local authorities also provide services for other children subject to care proceedings, supervising parental care, supporting special guardians and arranging adoptions.

Children's social care data and care proceedings

Local authorities in England make annual returns to the Department for Education relating to the services provided for any child looked after or in need. This information is collated into two child level databases, the CiN and the CLA. Returns are compiled from recording systems for service provision, which use the same unique identifier for each child each year, making it possible to examine children's care and service journeys over time. Annual snapshots of the data at national, regional and LA level covering are published including, for example, the numbers of children with child protection plans, looked after and adopted. The data are made available to local authorities via the Local Authority Interactive Tool (LAIT) (DfE 2017), which enable local authorities to produce their own reports including contextual material about their area and population and make comparisons with statistical neighbours. Data collected for these returns are primary sources for local authorities' own analyses. The London Boroughs of Hackney and Waltham Forrest working with Ofsted have produced the Children's Services Analytical Tool (ChAT), another interactive tool which provides reports (and visualisations) required for Ofsted single inspections ChAT produces the information required by Ofsted for Inspections, (Annex A data) from the LA's data returns to the Department for Education. (Waltham Forrest et al, 2017; Ofsted 2017).

Separately, LA legal departments keep records of all care proceedings cases, usually by reference to their court application number so that the lawyers responsible can monitor progress with other lawyers and the court. Legal department records do not usually include the children's social care identifier; most children are not in care at the start of care proceedings but, whether they have a child protection plan or not, all are in need of protection – that is the purpose of the court application. It is extremely rare for any child unknown to the LA to be the subject of immediate care proceedings (Masson et al 2008). Other data on care proceedings are collected by Cafcass in its case management system, which published monthly statistics on the number of care applications and annual statistics on the rate of application per 10,000 children in each LA. The annual rates are also included in the data that can be analysed using LAIT, developed by the Department for Education.

Despite the impact of care proceedings on local authorities and the care system, the use of *care proceedings* is not recorded in either of the two Department for Education administrative databases. It is possible to infer that there have been care proceedings if a child's legal status is 'care order' but, as will be shown, a substantial number of children subject to care applications are not in care before, during or after proceedings, and others are looked after under s.20 during these proceedings (Masson 2018a).

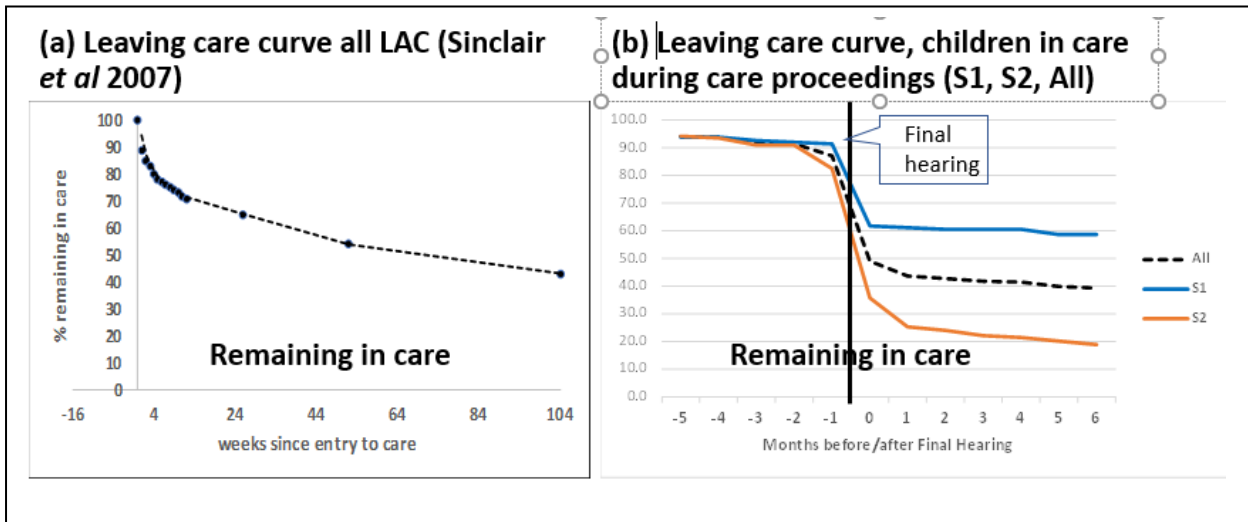
The Outcomes of care proceedings for children Study (2015-18)

The *Outcomes for children study* (Masson et al 2018) was designed as a natural experiment to compare court processes and decisions, before and after the reforms to care proceedings, introduced by the Children and Families Act 2014, and the outcomes for the children involved, one and five years after the proceedings ended (Dickens et al 2019). It used data extracted by the researchers from documents prepared for court for a random sample of care proceedings, brought by six local authorities in England and Wales, and linked these with administrative data about the same children held in the two databases (and their equivalents in Wales). Data for the pre-reform sample (S1), which came from proceedings brought in 2009-10, were originally collected by the research team for a study of the pre-proceedings process (Masson et al 2013). The post reform sample (S2), applications made in 2014-15, was collected for the *Outcomes for Children study*. The combined sample included 616 children, 290 children in S1 and 326 in S2. Match rates of 90% for S1 and 98% for S2 were achieved with the CLA and CiN data combined.

Data Linkage

Linking children’s administrative data with their court proceedings data enabled the researchers in the *Outcomes for Children Study* to analyse the data to see what involvement the children had with children’s services before and after their care proceedings. Variables were derived from the combined data set to identify children who were (or were not) in care during and after the proceedings so that their distinct care/ service journeys could be identified and a ‘leaving care curve’ (Sinclair et al 2007) could be visualised for children subject to proceedings, see Figure 1.

Figure 1: Leaving Care curves for all children (Sinclair et al 2007) and for children subject to care proceedings (Masson et al 2018)



Analysis of the linked data also identified that 17.1% of the matched children in S1 and 24% in S2 were *not* looked after before or during the care proceedings, of these, a small number, under 5% of the total entered care at the final hearing when a care order was made. It also identified how long children who left care at the final hearing spent in care. From this it was possible to calculate the effect of the reduction of care proceedings duration on care demand (see Masson et al 2018 for details).

A simplified method

Whilst these findings may raise questions about the use of care proceedings, particularly for children who remain at home throughout or enter care only at the final hearing, individual local authorities need first to identify their own patterns of care use relating to proceedings and the issues these raise for them. To support this, the researchers prepared a simplified approach which enables local authorities to analyse their social care data to establish the interactions between care proceedings and care use in their areas, and over time.

Only three proceedings-related variables are required for the analysis: 1) the date of application; 2) the date of the final order; and 3) the order made. LA legal departments will have these for every set of care proceedings; they need to be added to the social care data for each child involved in the proceedings. Using only these, any analysis of CLA or CiN data can identify which children had been subject to proceedings, and when; children’s status at the start and end of proceedings; the duration of care during proceedings; and how these patterns change over time.

The way in which the data were held, could be extracted and matched to children’s social care data was unknown and likely to vary between local authorities, so that initially each LA needs to develop their own processes to identify and link the data.

Testing the simplified method

Anything can be simply explained but this does not always mean it is simple to put into practice. Coram’s Nuffield funded project, *Visualising Data in Care Proceedings* provided the opportunity to test the method from identification, through matching to analysis, and also to establish managers’ views about the utility of the analysis. Time and resources limited the testing to a single LA; managers at North Yorkshire County Council agreed to co-operate, an analyst from the children’s social care team, Sean Jenney, was given the task of acquiring the data from the legal department, matching this to children’s social care data, undertaking the analysis and visualising it.

Marshalling legal department data

The legal department’s spreadsheet showed 268 unique individuals involved in care proceedings between 2016 and 2018. Without a single system of unique IDs, cases were identified using children’s surname, initials and the date of order. A confirmed match with children’s social care data was achieved for 90% of the children. Copying data from a legal department spreadsheet was possible but some had to be entered by hand. Order data was not complete for a few children and this had to be extracted from legal files. Overall, this process produced a sample for analysis of approximately 250 children.

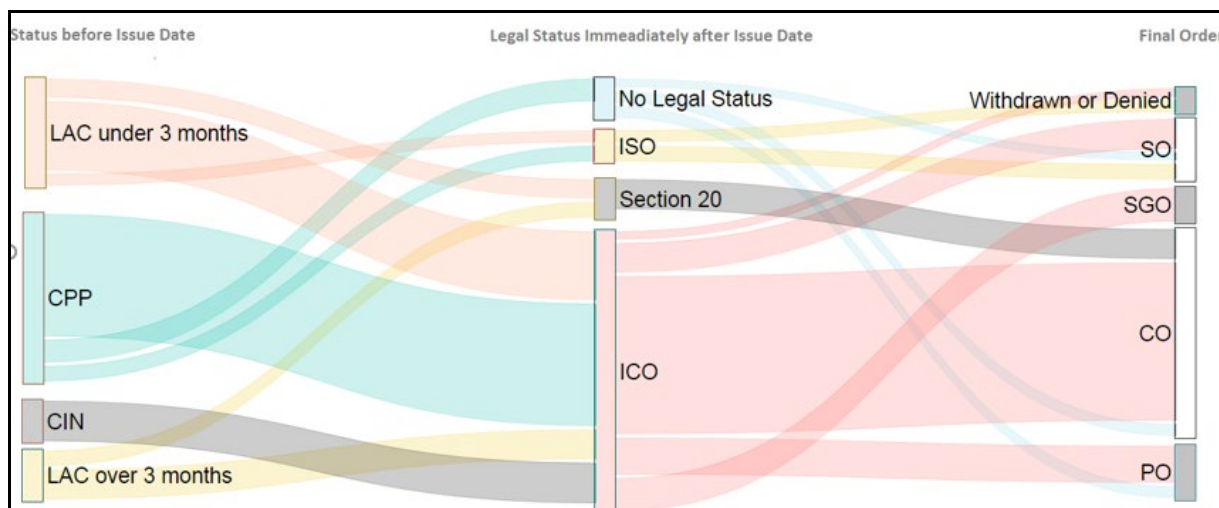
The data matching process (unsurprisingly) identified discrepancies between legal and social care data which impact on matching and the sample achieved. Such errors can also lead to inconsistencies in the LA’s evidence, result in critical comments from the judiciary and give parents the impression that LA staff do not know them well enough.

Analysis using these data

The leaving care curve for children subject to care proceedings was similar to that in the *Outcomes for Children Study* but a smaller percentage of children left care around the final hearing, reflecting the use of care orders with home placement rather than supervision orders. Comparing children subject to proceedings and those without (which was not possible in the *Outcomes for Children Study*), 70% of children subject to care proceedings remained in care 50 weeks after entering, compared with only 50% of those without proceedings.

Sankey diagrams were used to plot the different care and service journeys of children subject to proceedings. For clarity here, some uncommon journeys, for example involving family assistance orders and emergency protection orders have been excluded and journeys with SGOs and SGOs and supervision orders have been combined.

Figure 2: Children’s care journeys before and in care proceedings (2017 data)



Sankey diagrams allow the flow of cases to be plotted between two time points. Figure 2 is a Sankey diagram showing children's journeys through care proceedings from left before proceedings through to final order on the right. It shows, for example that most children who had been subject to s.20 for less than three months were made subject to an Interim Care Order but a small number remained looked after under s.20 or were subject to interim supervision orders. Further, while most children subject to ICOs ended proceedings with care, placement or special guardianship orders, a few left proceedings with no order or a supervision order. A closer look might raise questions about the use of proceedings in these cases.

Future development

New recording methods and systems in the Legal Department will allow instant and automatic matching to take place, with any discrepancies highlighted for correction. Elsewhere, the introduction of a common IT and data management system for both children's social care and legal departments will make it easier to track cases and analyse social care for children subject to proceedings in the way outlined above.

Conclusions

The method of analysis developed in the *Outcomes for Children Study* was simplified and could be successfully applied within the test LA despite the data being held in different systems. The resulting analysis, particularly when visualised, was well-received by managers who noted that it highlighted clearly children's different pathways into and during proceedings, and the numbers of children who took these. They suggested that more detailed data held by children's social care could be included to examine previous interactions with children's social care (visits, contacts, other services involved) for children on the edge of care proceedings and used to predict the likely journeys a child would take through the service, particularly in proceedings. Combining this with measuring how successful or disruptive this journey is to a child could assist future decision-making with regard to planning legal proceedings.

Ethics and Funding

Ethical oversight for the study was undertaken by the Research ethics committee of the Faculty of Social Sciences and Law at Bristol University. Data access was approved by the President of the Family Division for the court data, the Department for Education Data Access Management Panel and each of the participating local authorities. The initial funding came from the ESRC Grant ES/M008541/1 but the data visualisation aspects were funded under a grant to Coram from the Nuffield Foundation.

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6. Outcome of supervision orders: how can data be used to understand children's pathways?

Professor Judith Harwin, Professor in Socio-Legal Studies and Co-Director of the Centre for Child & Family Justice Research, Lancaster University;

Dr Bachar Alrouh, Senior Research Associate, Centre for Child & Family Justice Research, Lancaster University.

Introduction

Data visualisation is increasingly recognised as a powerful tool to communicate complex information clearly and simply in a format that as a visual display, is far more memorable than words. However its potential contribution to LA children's services is still a very new topic of inquiry.

This article draws on a recently completed study '[A national study of supervision orders and special guardianship and their contribution to children's lives and family justice](#)'³ to illustrate some general themes around data collection and usage, including visualisation. It asks whether there are any messages from the study that could be of benefit to local authorities and whether they might make any changes in the way in which they collect, record or classify their data in order to better understand children's pathways and improve their outcomes. The premise on which this article is written is that data visualisation is only as good as the data on which the visual display is based and the challenge is to strengthen gaps in what is collected and to strengthen data quality.

The article⁴ focuses on the use of Children and Family Court Advisory and Support Service (Cafcass) (England) national administrative court data and LA casefile data and it draws out the advantages and drawbacks of each data source.

Aims of the study and data sources

This study provides the first national analysis of supervision orders and their outcomes. When a supervision order is made by the courts following care proceedings, its purpose is to support family reunification. The LA 'advises, assists and befriends' the child and family but it has no parental responsibility⁵. By contrast a care order authorises the child's removal from parental care. It lasts until the child is 18 and the LA holds parental responsibility.

The purpose of the national profiling based on the Cafcass (England) administrative database⁶ was to ascertain the use of supervision orders over time and by region and to examine their risk of breakdown, evidenced by return to court for further care proceedings because of significant harm. The national profiling was accompanied by a case file study carried out in four local authorities comprising 210 children from 127 families⁷. Two authorities were based in the South and two were

³Harwin, J., Alrouh, B., Golding, L., McQuarrie, T., Broadhurst, K. & Cusworth, L. (2019). *The contribution of supervision orders and special guardianship to children's lives and family justice*. https://www.cfj-lancaster.org.uk/app/nuffield/files-module/local/documents/HARWIN_SO_SGO_FinalReport_V2.1_19Mar2019.pdf

⁴ This article is based on a presentation made by the authors at a conference Data visualisation in children's social care convened by Coram on 10.12.2018.

⁵ The order normally lasts for one year, but can be renewed annually, up to three years.

⁶ For further information about Cafcass go to <https://www.cafcass.gov.uk/about-cafcass/>

⁷ As the first ever national study of supervision orders, the article focuses in particular on supervision order outcomes and examines the use of standalone supervision orders to support family reunification.

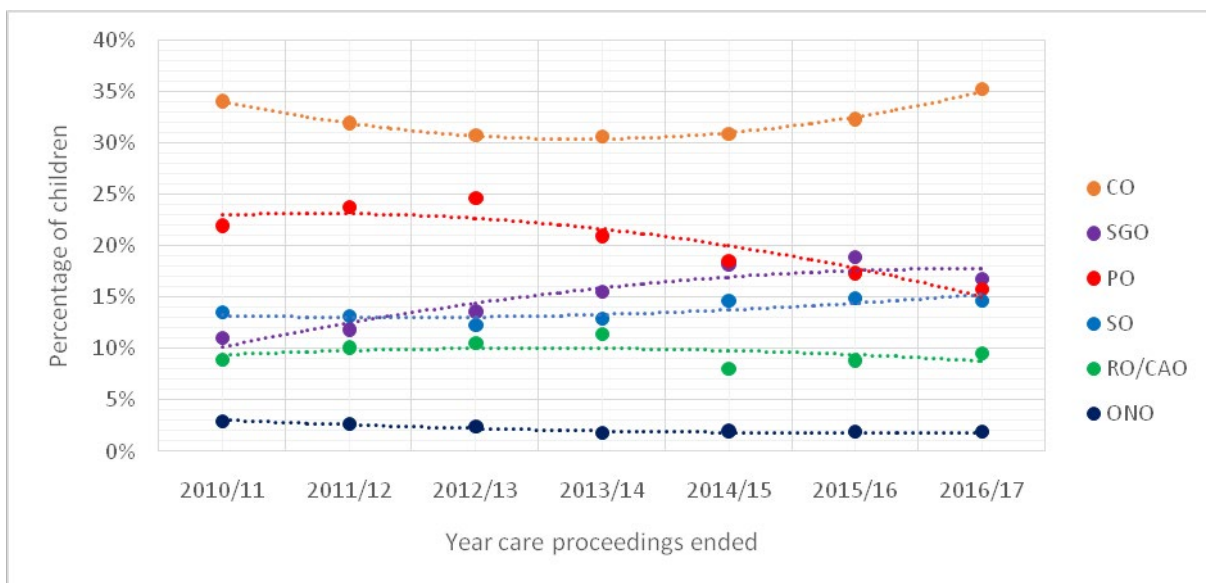
in the North. Cases were collected on children made subject to supervision orders between April 2013 and March 2015. The children were followed up for a maximum of four years after the supervision order was made to track a range of outcomes that included neglect and abuse, permanent placement change and returned to court. Both elements of the study made use of administrative data that is routinely collected by children’s services and Cafcass and was repurposed for the study’s research objectives.

Strengths and weaknesses of the Cafcass (England) national dataset for local authorities

The strength of the Cafcass dataset lies in its large number of records on court related data. As care proceedings always involve a Cafcass officer to represent the interests of children separately, it was possible to collect information on the entire population of children subject to care proceedings. For the purposes of this study the analysis of legal outcomes was carried out on 140,059 children in 81,758 cases that concluded between 2010/11 and 2016/17.

Understanding national trends in the use of different legal orders made at the end of care proceedings is important for local authorities because it enables them to compare their own legal order usage with the national picture. The graph below (Figure 1) provides a useful illustration of the relationships between the different legal orders and their use over time, using trend lines. It shows that there has been very little change in the use of supervision orders over time with the biggest changes taking place in the use of special guardianship orders (SGOs) and placement orders. Under an SGO, the child is placed with friends or the extended family until the age of 18 whereas a placement order authorises the LA to place a child for adoption when parents do not consent. As can be seen, the proportion of children placed on SGOs rose steadily over the period but placement orders went down.

Figure 1: Percentage of children subject to each of the six legal orders, per year (2010/11 – 2016/17)



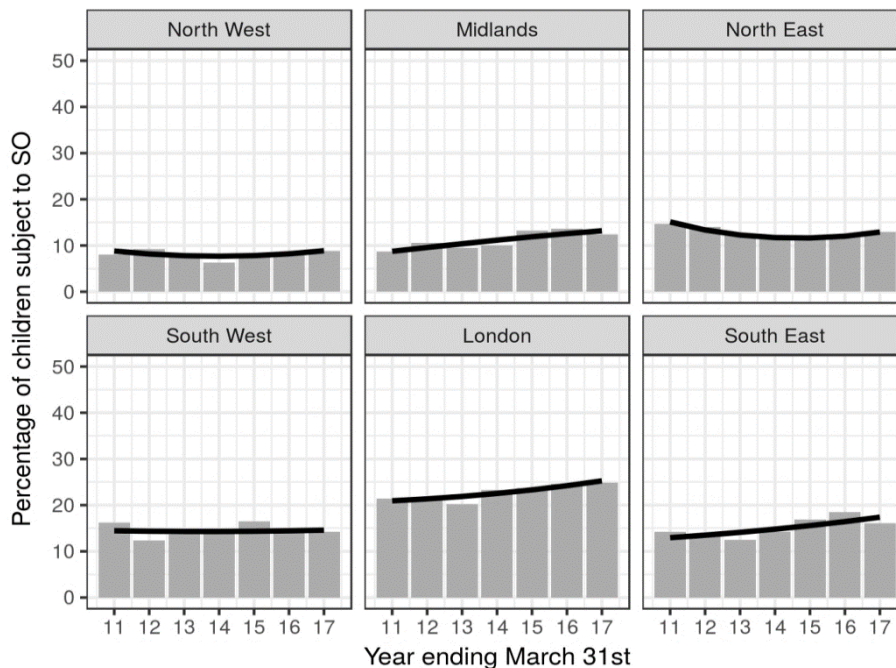
Variation at regional level in the use of different legal order types

Understanding whether there are regional differences in the use of different legal order types has especial value for local authorities because it enables them to compare their own decision-making

with other regions. Work by Bywaters and colleagues⁸ has studied variation in relation to child protection and children who are accommodated by the LA⁹ but variation by legal order has only recently started to be examined¹⁰.

The next two graphs (Figure 2 and 3) show clearly that where a child lives affects the likelihood of a supervision order being made. Figure 2 describes the variation across the Designated Family Justice (DFJ) regions in their use of supervision orders. London consistently had the highest proportion of supervision orders while the North West had the lowest proportion. These variations were greater than would be expected by chance. This is an important finding because supervision orders have very different legal consequences for children compared to other order types. A child who lives in London is more than twice as likely to be reunified with birth parents under a standalone supervision order supporting family reunification as a child in the North West.

Figure 2: Percentage of children subject to a supervision order, by circuit, per year (2010/11 – 2016/17)



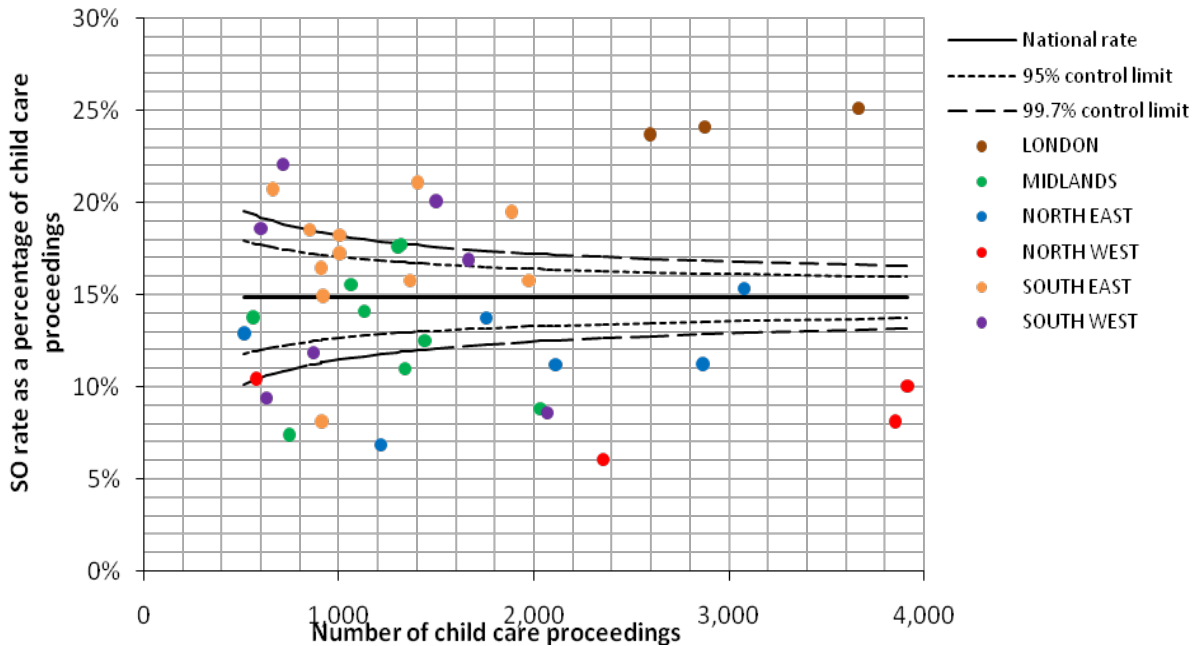
⁸Bywaters P., Brady G., Bunting L., Daniel B., Featherstone B., Jones C., Morris K., Scourfield J., Sparks T. and Webb C. (2018) Inequalities in English child protection practice under austerity: A universal challenge?, Child and Family Social Work, 23 (1), pp. 53-61.

⁹ Accommodated children are looked after by the local authority without the need to go to court. It requires parental consent to the arrangements and parents have the right to remove the child from the local authority’s care.

¹⁰https://www.cfj-lancaster.org.uk/app/nuffield/files-module/local/documents/HARWIN_SO_SGO_FinalReport_V2.1_19Mar2019.pdf
https://public.tableau.com/profile/moj_analysis#!/vizhome/ChildreninFamilyJusticePublicLawApplicationstoOrdersTool_0/FrontPage

To gain an even more nuanced analysis of LA and court decision-making it is also possible to drill down and analyse smaller areas. Here the helpful contribution of funnel plots¹¹ emerges. It showed that within Designated Family Judge (DFJ) areas, there is also variation in the use of supervision orders which is greater than would be expected by chance. All London authorities make a high proportionate use of supervision orders whereas a more diverse picture emerged in the South West. Some DFJ areas in the South West were outliers because their use of supervision orders was much greater than that of the majority whereas others fell well below the average. A representation of the data in this format enables courts and local authorities to compare their own position and to generate questions as to what might explain the differences.

Figure 3: Percentage of children subject to a supervision order, by DFJ area (2014/15 – 2016/17)



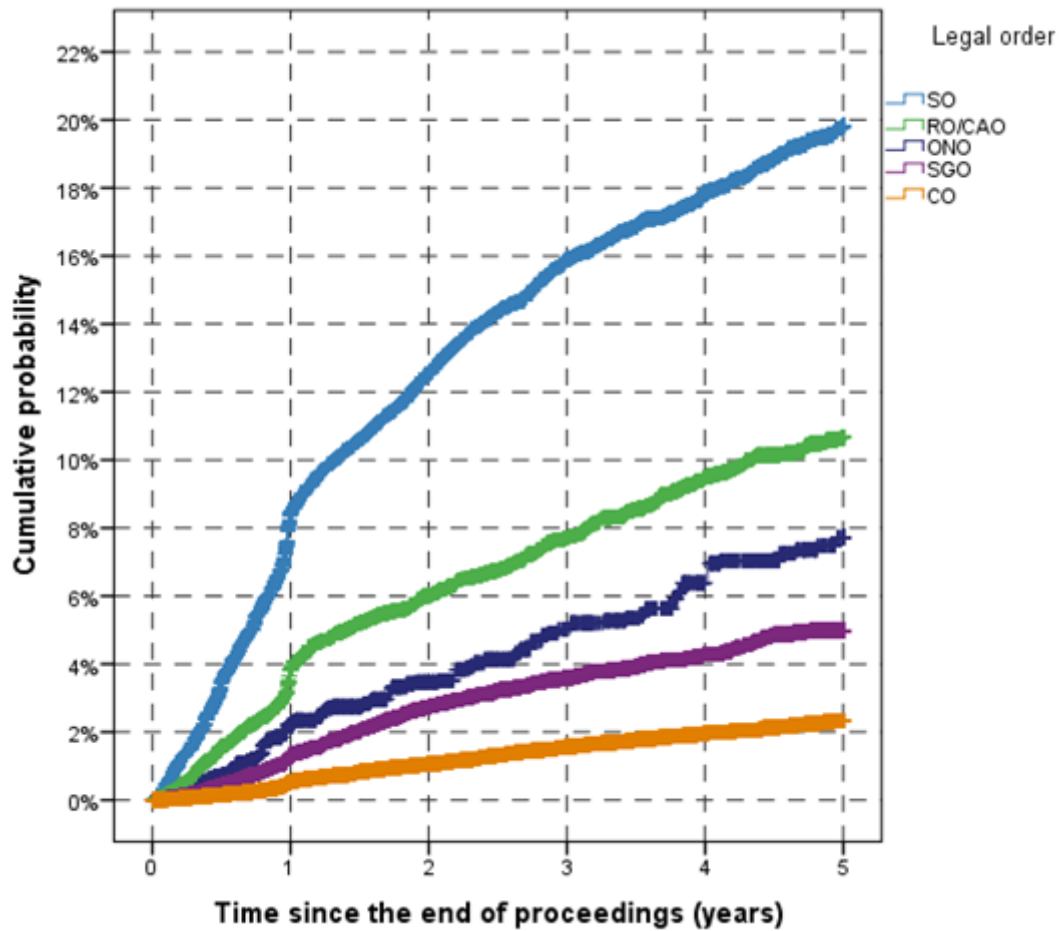
Recurrence of significant harm and return to court for further care proceedings

The importance of evidence based decision-making has increasingly become a priority in children’s services. Nowhere is this more important than in understanding the child outcomes of particular legal orders at national level. However, this data is not routinely available. Nor is it available in a format that can compare outcomes very simply. Using survival analysis¹², it was possible to demonstrate in a simple graph (Figure 4) that standalone supervision orders supporting family reunification had the highest rates of further care proceedings within 5 years compared to other legal order types examined in the study. It was also possible to see the pace of return to court per child on an annual basis by order type. For local authorities this is particularly valuable because it allows proactive planning by identifying maximum periods of risk and vulnerability.

¹¹Spiegelhalter, D (2005) Funnel plots for comparing institutional performance 24(8) Stat Med 1185.

¹²Kartsonaki, C. (2016). Survival analysis. Diagnostic Histopathology, 22(7), 263-270.

Figure 4: Return to court for new care proceedings, by legal order type



The limitations of national datasets

National datasets such as the Cafcass database are an excellent example of what is often described as ‘long and thin data’¹³. As already demonstrated, it was possible to collect population level data over time. However this was only possible for a limited number of variables, thereby limiting what can be analysed and visualised. For example, the Cafcass dataset does not allow us to understand the influence of ethnicity on child outcomes and ethnicity trends over time because that data was not routinely collected by Cafcass until recently. Neither was the precise placement of the child routinely collected by Cafcass. As a result, this lack of specificity limits ability to differentiate child outcomes on the basis of specific living arrangements.

A second limitation of this data is that it cannot explain results but only describe them. Nevertheless the importance of this should not be underestimated because the national, regional and area visualisations all provide benchmarks. They can help courts and local authorities to see how far their own rates are similar or different to the national trends and similarly their child outcomes in relation to the single measure of return to court for further care proceedings. They cannot however account for those findings.

The national Cafcass datasets have some other limitations with regard to tracking child outcomes after the supervision order, or indeed any court order, has been made. They cannot provide information on what happened after the end of proceedings if the case did not return to court. If however the case did return to court for further care proceedings, the court datasets are unable to

¹³ <https://www.ucl.ac.uk/iehc/research/primary-care-and-population-health/research/thin-database/database/pros-cons>

provide information on what happened to the child between the two sets of care proceedings, what other problems arose, or identify the triggers to return to court. Neither can the data shed light on children's pathways that led to return to court. This information is crucial for local authorities because it has the potential to help put the child on an alternative pathway and break the pattern. But first the pattern needs to be identified. This is the value of using LA administrative data to track outcomes to complement court order data.

In conclusion, long and thin data sets can only produce visualisations of data that is available. They are a good source of descriptive information on a limited range of variables. But they can start a conversation and this is crucial.

Using local authority case file data to track children's pathways and outcomes over time

To address the limitations of the national datasets in relation to explaining children's pathways and outcomes, LA children's service records can provide a rich source of data. For example, case notes provide valuable information on children's histories and psychosocial difficulties and those of their parents and indicate case progress.

However collecting this type of data can be challenging and indeed may not be feasible. First, it is not possible to collect data on every single case in every LA. Second, the data is often collected in narrative form and is unstructured, Third, the way of in which the data is collected and its quality are not necessarily consistent across local authorities. In research this is normally addressed by using sampling methods which leads to collecting a large number of variables on a limited number of cases- in contrast to long and thin national datasets.

In terms of data visualisation, the challenge for the study was to illustrate the frequencies of a large number of child and parent problems and to capture change over time from the start of the proceedings to the end of the four year follow up. Three time points needed to be charted for a total of 18 child variables and 14 adult variables. Statistical significance needed to be tested for each variable at each time point to calculate progress, no change, or deterioration. Bar charts (Figure 5 and Figure 6) were chosen as a helpful way of bringing together this information. Any practitioner, team or service manager would be able to see immediately that neglect and emotional abuse recur most frequently while parental non-engagement was the most common problem at the start of proceedings but was superseded by housing and financial difficulties at the end of the follow up. With this information local authorities can start to identify priority areas for intervention.

6. Outcome of supervision orders: how can data be used to understand children’s pathways?

Figure 5: The children’s experience of abuse and neglect and wellbeing profiles at the start and end of proceedings, and end of the four-year follow-up

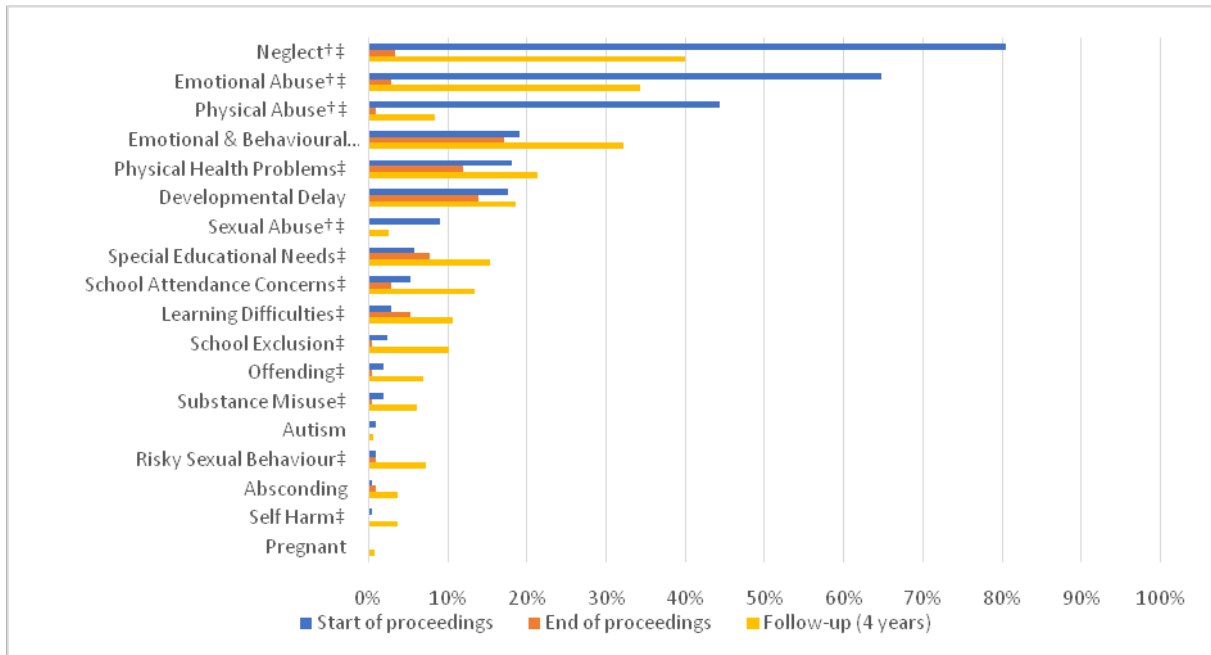
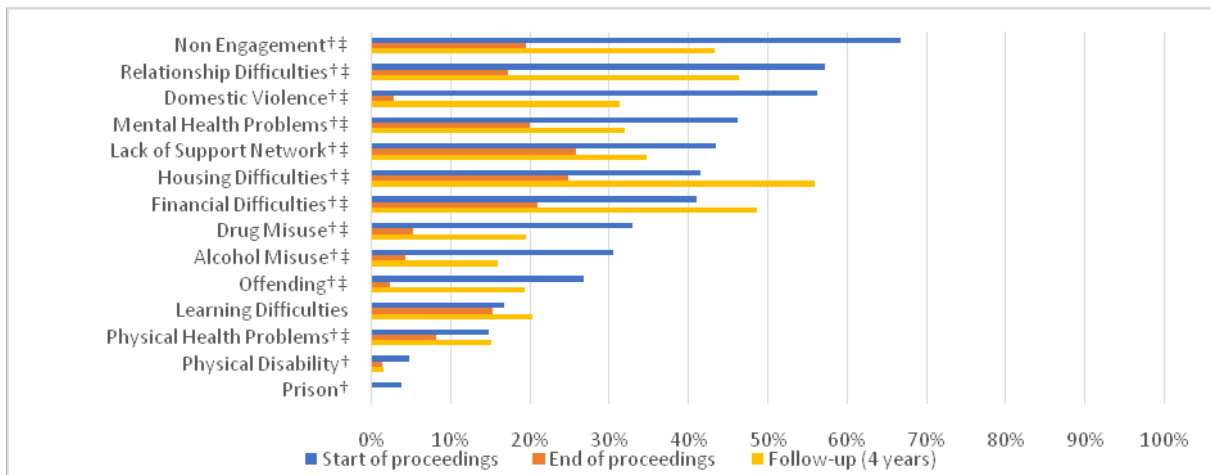


Figure 6: The children’s exposure to parental problems at the start and end of proceedings, and end of the four-year follow-up

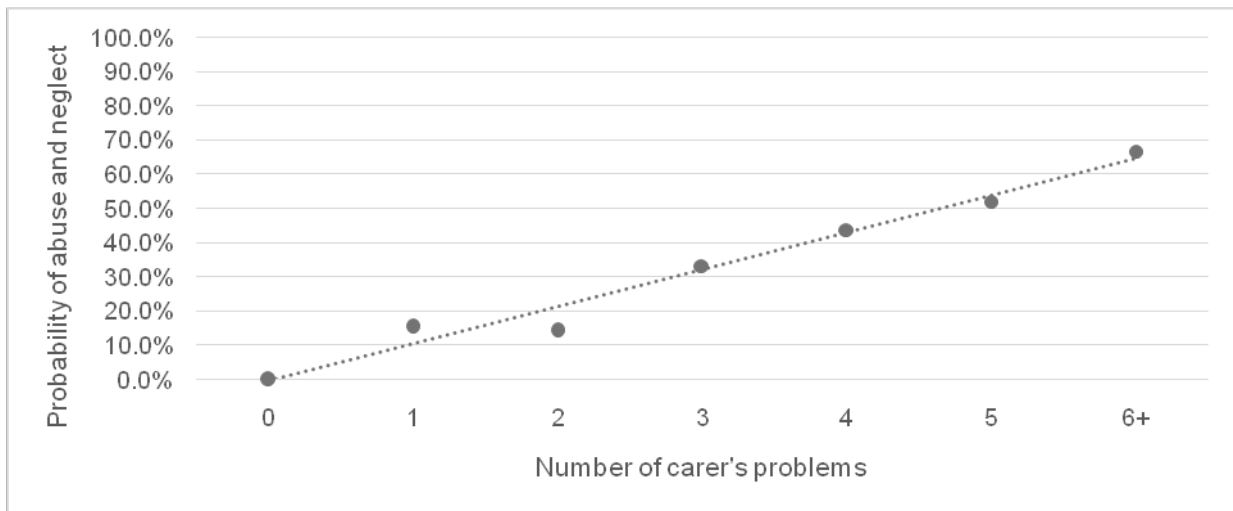


† denotes that the change from the start to the end of proceedings was statistically significant (p<0.05)

‡ denotes that the change from the end of proceedings to the end of year four of the follow-up was statistically significant (p<0.05)

A more nuanced picture with greater explanatory potential can be gained by examining the inter-relationships between abuse and neglect and parental difficulties. Figure 7 communicates in a simple way the relationship between abuse, neglect and carer problems. Taken together, these three figures help practitioners to identify risk factors for poor outcomes and to prompt further consideration of how they might be minimised.

Figure 7: The relationship between the likelihood of child abuse and neglect and the number of carer problems during the supervision order



Issues around services data: the need for structured data

The need for structured data in children’s services also emerged from the study, again limiting the possibilities of comprehensive data analysis and visualisation. A particular problem was establishing whether the services set out in the court care plan were offered, received and whether the parent and, when relevant, the child attended, partially, fully or disengaged. This data was not routinely available in either the children in need or child protection reviews. Yet this is crucial information in order to understand the contribution of supervision orders to children’s lives and is also important for accountability reasons, should the case return to court.

However the bigger issue is whether it is possible to collect service data in a systematic way, how to record it, and how to classify it. For a brief period the DfE Children in Need census returns required local authorities to specify service receipt by type and duration but for unexplained reasons, it no longer forms part of the data return¹⁴. It has left a gap in the ability of children’s services to generate information on services consistently in a way that would be helpful to the sector. The challenge to children’s services is to consider how to fill this gap. One possibility would be to develop a pilot template which could test the feasibility of collecting service data in a systematic way. This would also provide an opportunity for a systematic approach to analysis and reporting with the potential to assist both practice and policy development. The need for better systems of recording children’s service data has also been highlighted by Holmes¹⁵.

In conclusion, structured, high quality and standardised data is an essential pre-requisite to achieving effective data visualisation.

Conclusions

This article has discussed the use of data visualisation based on national and LA datasets. It has illustrated how data visualisation can communicate important and sometimes complex messages in a simple and clear way. These visualisations lay down benchmarks which can help prompt children’s services planners and practitioners to review their own services and practices. They can also start conversations with local family justice boards and other local authorities to identify issues for further investigation.

¹⁴ Characteristics of children in need in England: 2015 to 2016 /SFR52-2016_Methodology.pdf)

¹⁵Holmes, L., McDermid, S. & Sempik, J. (2011).Exploration of the costs and impact of the Common Assessment Framework. London: Department for Education.

By critiquing the two primary sources of administrative data it is clear that neither is sufficient on its own. Both have strengths and gaps. The article has suggested that there may be more systematic and structured ways of collecting the data. This in turn raises the question of what data should be collected in the light of scarce resources. A data forum could be a helpful way of addressing these issues by bringing together data analysts in children's services, policy and practitioner groupings. The newly established Family Justice Observatory, with its aim of improving the use of data and research evidence, could play a helpful part in this forum.

7. Never Events

Dr Jeff Mesie, Head of Impact & Evaluation, Coram

The Nuffield project on data visualisation also briefly considers the concept of never events. This paper covers:

- why we were interested in never events
- what they are and how common they are
- what they are not
- the key features of different types
- what might be helpful about a never events approach for children's social care
- what may be practical for children's social care

Origins

At a seminar held by Coram in October 2016 a presentation given by Sir David Spiegelhalter, OBE FRS, demonstrated to the local authorities present the potential of data visualisation and discussed the impact of 'never events' on the health profession.

Coram's bid on data visualisation that was submitted to Nuffield included a brief section on never events. In common with many agencies based in social care, Coram had limited knowledge about never events. However, we were of the view that their applicability in the sector could be considered with a genuinely open mind

The nature of never events

The first task was to understand never events as they work in the UK and the rest of the world. A desk-based review of literature relating to the implementation of 'never events' was undertaken.

Beginnings and use internationally

From the mid-1990s, health insurers in the USA were concerned about the costs of patient safety and medical error. In 1996 studies in Utah and Colorado estimated an annual cost of \$37.6 billion for adverse events and \$17 billion for medical error. The term 'never events' was coined in the USA (2001) by the CEO of the US National Quality Forum to refer to medical errors which should not occur. The forum does not use the term 'never events', instead it uses the term 'serious reportable events'. However, it is a term that has endured despite the existence of alternative terms in various jurisdictions such as 'sentinel events' or 'reportable events'.

In the UK the Darzi report 'High Quality Care for All' (2008) created the National Patient Safety Agency that would draw up a list of never events. As of January 2018 the NHS had 15 never events (plus one temporarily suspended).

Each jurisdiction compiles its own list of never events or similar safety incidents that should not occur when the required preventative measures are in place. Countries vary in terms of the number of never events listed. For example, the NHS originally had eight never events listed which later grew to 25 and then 16. Whereas, Japan's reporting system varies in terms of what is monitored locally and nationally. Canada has a total of 15 never events listed. In the US over 25 states have different mandatory reporting systems. There are two separate core lists, one is produced by the National Quality Forum (NQF) and lists 29 adverse events and the other is produced by the Joint Commission (TJC) which lists 15 sentinel events. The NQF has an extended list because it is intended to include events that are of relevance to not only patients and health care professionals but also to policy makers and other providers.

The WHO draft guidelines for adverse event reporting note that the act of reporting “does not improve patient safety, it is the response to reports that leads to change” (WHO 2005, p.12).

UK application

In the UK never events are defined as “serious, largely preventable patient safety incidents that should not occur if healthcare providers have implemented existing national guidance or safety recommendations.”

Their purpose is to highlight potential weaknesses in how an organisation manages fundamental safety processes. A single never event acts as a red flag that an organisation's systems for implementing existing safety advice/alerts may not be sufficiently robust. Never events are not concerned with apportioning blame in organisations when these incidents occur but rather to learn from what happened. The process is transparent – with the base number by type published quarterly for each trust.

The key idea is that never events are not ‘preventable’ in an abstract way but in a clearly defined way. Operating procedures are in place that should prevent their occurrence. Processes to prevent each never event are listed and include the WHO surgical safety checklist, Safer Practice Notices, Patient Safety Alerts, National safety standards for invasive procedures, health building notes and other standards.

The trigger is about breaches of standards, not about harm having ensued. A never event can occur without anyone having been harmed on that occasion. Coram was advised that in the early days of never events some NHS staff did not understand why great attention was being paid to an event where nobody had come to harm.

Never events are also not about becoming more risk averse. They should not impact on clinical decisions. It concerns the need to ensure that the decisions are implemented in a way that is consistent with patient safety. For example, deciding to count swabs at the end of an operation has no bearing on the decision whether to operate or not.

A common misconception about never events is that they primarily concern surgery. In the UK, the bulk of never events are much more general with a considerable emphasis on environment, buildings and equipment. Below are some examples:

- Surgical (3) eg “wrong site surgery”
- Medication (5) eg “administration of medication by the wrong route”
- Mental Health (1) “Failure to install functional collapsible shower or curtain rails”
- General (6) including

- “Falls from poorly restricted windows”
- “Chest or neck entrapment in bed rails”
- “Scalding of patients”.

By contrast, the number of reported incidents is heavily weighted towards surgery. Surgery accounts for around 80% and medication for 12% of reported never events.

There are around 450 never events a year in England. This must be considered in the context of 54m patients treated a year, 20m Finished Consultant Episodes (“admitted patient care under one consultant within one healthcare provider”) across 200 NHS trusts in England and approximately 240 independent providers. It is not just about hospitals; locations of incidents have included a Superdrug pharmacy. Given patient volumes they appear to be rare.

As well as never events, NHS trusts may also experience ‘serious incidents’ that do not meet the definition of a never event.

There is no definitive list of events/incidents that constitute a serious incident and the advice given is that lists should not be created locally. Serious incidents are events in health care where the potential for learning is so great, or the consequences to patients, families and carers, staff or organisations are so significant, that they warrant the use of additional resources to mount a comprehensive response. Serious incidents can extend beyond incidents which affect patients directly and include incidents which may indirectly impact patient safety or an organisation’s ability to deliver ongoing healthcare.

Investigation

Investigation is via Root Cause Analysis (RCA). Root Cause Analysis is a systematic review of an incident identifying immediate (root causes) and underlying (contributing) factors associated when an incident occurs. As a result of a RCA, recommendations and lessons learned are established (see NHS Serious Incident Framework: Supporting learning to prevent recurrence).

The process for staff is facilitated by the application of a Just Culture Guide to evaluate the actions of staff involved in patient safety incidents. This includes questions such as:

- 3a. Are there agreed protocols/accepted practice in place that apply to the action/omission in question?
- 3b. Were the protocols/accepted practice workable and in routine use?
- 3c. Did the individual knowingly depart from these protocols?
- 4a. Are there indications that other individuals from the same peer group, with comparable experience and qualifications, would behave in the same way in similar circumstances?
- 4b. Was the individual missed out when relevant training was provided to their peer group?
- 4c. Did more senior members of the team fail to provide supervision that should normally be provided?

The aim is to depart from an individual blame culture and uncover the systemic issues that contribute to such incidents

Do 'never events' work?

The effectiveness of a never events framework in improving patient safety and reducing or eliminating the incidence of avoidable harm must be considered. The results are somewhat mixed and it seems to depend on the never event in question.

There is some US evidence for reduction in some areas, for example, hospital-acquired conditions (HACs) fell by 17% from 2010 to 2014 (AHRQ 2018). This translated as an estimated 1.3 million fewer harms that were experienced by patients, and the prevention of approximately 50,000 deaths as a result of the decline in HACs. Later data for 2014 to 2016 shows an 11 percent decrease.

A study in California (Peterson, J et al, 2015) found that pressure ulcers in children, a never event, were reduced by 60% through improved awareness and prevention strategies.

In the UK it appears that perhaps retained foreign object (the biggest category) is declining. In 2017/18 there were 102 reported events of this type in England compared to 124 in 2012/13 (NB year on year figures are not strictly comparable as guidance and definitions are updated). However, a study by the UK's Association of Anaesthetists in 2015 suggested that never events in surgery may be random rather than related to hospital performance.

<https://www.aagbi.org/news/%E2%80%98never-events%E2%80%99-surgery-occur-random-and-are-not-related-hospital-performance>).

In 2018 the CQC was asked by the Secretary of State to produce a report to examine the underlying issues in NHS trusts that contribute to the occurrence of Never Events and the learning that can be applied to wider safety issues. The report (CQC 2018) found that staff trusts received too many safety-related messages from too many different sources and that staff were struggling to cope with large volumes of safety guidance, had little time and space to implement guidance effectively, and the systems and processes around them were not always supportive.

One of its key recommendations was for NHS Improvement to work with professional regulators, royal colleges, frontline staff and patient groups to develop a framework for identifying where clinical processes and other elements, such as equipment and governance processes, can and should be standardised.

Standardisation of processes was seen as a way to make it easier for staff to speak up with confidence if processes are not being followed. The report also recognised that standardisation could be seen as something that reduces the ability of clinicians to act flexibly where necessary.

Other Types of 'Never Events'

In the US (or parts of it) there is a greater focus on patient protection and care management events. Some of these never events are less focused on following protocols and appear more like a serious incident report, as is customary in social care. Examples include:

- Discharge or release of a patient/resident of any age, who is unable to make decisions, to other than an authorized person
- Patient death or serious disability associated with patient elopement (disappearance)
- Patient suicide, attempted suicide, or self-harm resulting in serious disability, while being cared for in a health care facility

- Patient death or serious injury resulting from failure to follow up or communicate laboratory, pathology, or radiology test results
- Any instance of care ordered by or provided by someone impersonating a physician, nurse, pharmacist, or other licensed health care provider
- Abduction of a patient/resident of any age
- Sexual abuse/assault on a patient within or on the grounds of a health care setting
- Death or significant injury of a patient or staff member resulting from a physical assault (i.e., battery) that occurs within or on the grounds of a health care setting

(From National Quality Forum, *List of Serious Reportable Events*).

These sorts of incidents seem more transferable to social care – particularly children in care, but perhaps less so for other service users.

Contrasting NHS never events and social care reporting

The NHS process as described above is focused on preventable incidents, where an incident is based upon failure to follow accepted practice at a system or individual level. At its core is the development of, and adherence to, standardised operating protocols.

Social care matters are more concerned with harm that has occurred. Ofsted notifications are almost solely focused on unexpected child deaths or the serious injury of children. Between April 2016 and 31 March 2017, Ofsted received 433 serious incident notifications 49% related to child deaths.

As long ago as 2005 the SCIE report *Managing risk and minimising mistakes in services to children and families* called for a social care focus on safety. It argued that a focus on 'no harm' incidents or near misses can prevent more serious incidents in the future. This appears not to have been taken up in the sector.

Serious case reviews may not be the best context for learning. The sector can benefit from a focus on improvement and client safety that looks at process at times other than in the wake of a terrible incident.

In children's social care there are many 'musts' and 'shalls' in various guidance. Here are some random examples:

- Needs assessment of care leaver no more than 3 months after 16th birthday
- Missing children must always be offered an independent return interview
- Child subject to a care order, must have a care plan (section 31A);
- Where a child becomes looked after as a result of being remanded to youth detention accommodation (YDA), the LA must visit the child
- If an organisation removes an individual from work with children because the person poses a risk of harm to children, the organisation must make a referral to the Disclosure and Barring Service;
- Child seen in accordance with their plan
- Staffing in residential homes must not fall below a given staff: child ratio.
- Use of unregulated accommodation
- Restraint that deliberately inflicts pain should never be used on children in children's homes.

The question is if these scenarios have the potential to be considered as never events and if there are likely to be benefits from collecting them.

While children's social care has a range of 'must do/must never do' statements in various guidance they do not seem to lend themselves to form the basis of the types of 'never events' that have been applied in the NHS. This is primarily because of an absence of defined systems and processes that if replicated would make them almost impossible to occur. We do not have many standardised protocols that apply nationally in every LA and trust. There are standards for building safety, there is Working Together and guides for practitioners on topics such as Child sexual exploitation. These do not appear to provide the sort of operating procedures comparable to the NHS protocols.

The tentative conclusion from this review is that the NHS approach is unlikely to work in children's social care. To adopt such a system would require a set of protocols that are not currently present. Some of the procedures for children's social care, as documented in tri.x for many LAs, may be an initial basis for developing such protocols if this was the preferred route. While these types of standards are not currently in existence, there may be a consensus about particular protocols that should always apply and the potential harm that can be caused when they are not in place. They may be better thought of as 'key practices' where breaches should be monitored so that agencies can demonstrate that systems are robust. Incidents could be reviewed and remedial action taken even in the absence of harm having occurred. Learning that often takes place in the absence of harm and allows exploration of systemic issues (as in the *Just Culture* framework) offers a positive environment for reducing future incidents.

Summary

There is particular merit in an approach to investigating events that is not precipitated by harm having occurred, but is instead triggered by the occurrence of an avoidable event as the focus of learning. Social care may benefit from moving away from a 'harm having occurred' approach as is used for serious incidents and serious case reviews.

The approach used to investigate never events outlined in *Just Culture* Guide appears to be worthy of merit as a means of identifying systemic issues.

The protocols and regulations of the type used to prevent (and define) never events in health do not appear to be present in social care and equivalent processes would be difficult and slow to develop across the system.

Nevertheless, it should be possible to identify a set of 'key practices' and provide a focus for such development.

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8. A Dynamic Mapping of Process

Kevin Yong, Managing Director, Coram-i;



Matt Wagner, Performance & Analytics Manager, at Kent County Council;

with information from Dr James Geddes, Principal Research Data Scientist, The Alan Turing Institute.

Properties of Maps

A map is not a photo or a scale drawing. A map is a symbolic representation of selected characteristics of a place. Ordnance survey maps, for example, have many features that are not seen in the landscape in quite that form.

Current or former place of worship;

-  with tower
-  with spire, minaret or dome

Nor are they to scale: people are familiar with representations like the London underground map, which represents a set of stations and routes laid out in a way to assist navigation between them, rather than any attempt at geographical accuracy in terms of distance.

Dynamic Representation

Maps are usually presented in a static form, representing a set of characteristics from a specific point in time. This is because the medium typically used (paper) did not allow the characteristics to change over time. As technology has advanced the ability to create dynamic representations has grown: for example, the weather forecast once involved a simple map with icons fixed to it to indicate the expected weather in various locations but has evolved into a moving image showing the expected change in the weather over time.

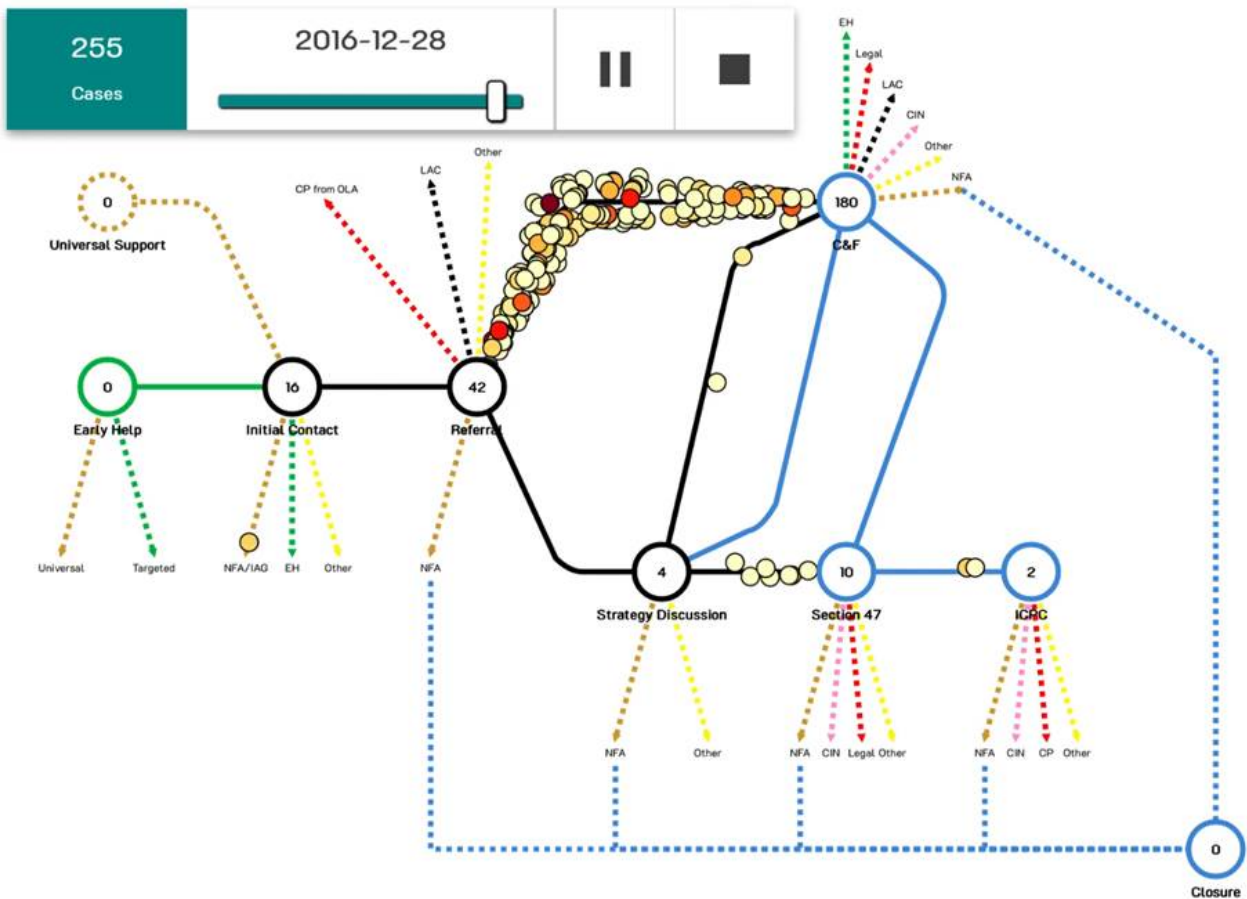
Dynamic representations have the additional benefit of taking advantage of our brain's innate ability to spot patterns and our work has explored how we can capitalise on this alongside our familiarity with maps as a concept.

For this piece of work we took our inspiration from a number of dynamic visualisations including the national grid, air traffic control and shipmap.org. The demonstration we have developed has drawn on the moving images of shipmap.org and air traffic control and overlaid these on to a map similar to a tube map. The map itself represents the different stages that a child's case may move through when they become known to children's social care services. Our demonstration seeks to show how children experience the system in terms of how quickly they move between stages, how many times they come through the system, and where they 'go'.

What we did

Matt Wagner at Kent County Council drew a process map to show the key steps (stations) in the LA’s contact and referral process and provided nearly four years’ worth of child-level data to the Alan Turing Institute so that they could create this demonstration. The Alan Turing Institute then commissioned via their network a research software engineer (RSE) with experience in D3 development from Newcastle University to work with them to create the visualisation.

In the visualisation each child is represented as a dot on the process map, whose position is interpolated between two stations based on the elapsed time, with a small ‘traverse’ offset added for those children who took longer in order to avoid too much overlap of the dots. As the data sharing agreement was between Kent and the Turing, rather than Newcastle, a synthetic dataset, having the same statistical properties as the original but randomly generated was created by the Turing and used by the engineer during development. This was all done within a four-month timeframe at the end of the project.



Reception

We first presented our demonstration at an event in December 2018 and since then it has been shown to a number of relevant parties including Ofsted and the What Works Centre for Children’s Social Care. All those who have seen it have been struck by the power and simplicity of the visualisation. It is able to show the ebb and flow of cases over time, even showing the impact of an

Ofsted inspection; the different experience that children known to social care have, for example in the time taken to complete a Child and Family (C&F) Assessment; and prompted senior managers to look in more detail at how they are deploying resources and whether there is consistent practice among social workers, such as the threshold for referring to a C&F Assessment.

This prototype has been well-received by practitioners, senior managers and analysts, who have not seen anything similar in children's social care. All have agreed that they would like to see it developed into a tool that the sector can use, with the potential benefits of:

- Seeing the impact of changes (practice, process, policy) or events (e.g. inspection) on the system
- Understanding how the process followed to deliver the same service differs among LAs, giving more context to performance data (e.g. conversion rates from referrals to assessments will differ depending on how referrals are handled and counted)
- Being able to compare different groups to see how their experience varies

What the local authority has done as a result

The visualisation highlighted some interesting results for the LA:

1. It's very clear that the vast majority of social work prior to CIN, CP or LAC is in conducting section 17 (rather than section 47) assessments.
2. Although the LA's proportion of cases re-referred within 12 months is in line with the national average (at around 23%), it appears that the majority of referrals have had a previous referral in the last 3 years. A little more investigation shows that 60% of referrals had a previous referral within the last 36 months, meaning that a significant proportion are re-referred between 12 and 36 months later. This is likely to be true for other authorities as well. Knowing this could have an impact on how authorities approach long-term sustainability and the value of wider support for families in reducing demand into social care.
 - As a result the LA is conducting a more in-depth analysis into re-referrals to identify key factors which affect the likelihood of a family being re-referred.
3. A significant proportion of the assessments where there are multiple previous referrals receive no further action (NFA) after the assessment. One might expect a lower proportion to be NFA'd compared to 'new' cases because the authority already has more information about the family, which should allow a more informed decision to be made at the front door.
 - Since the visualisation was produced, the front door team within the LA has conducted a more in-depth audit into decision-making on referrals where the assessment is subsequently NFA'd. This identified some cases where an Early Help assessment may have been sufficient to assess the family's needs. As a result, front door workers are being encouraged to consider on a case-by-case basis whether an Early Help assessment would be appropriate to address the areas of need identified at the Front Door. This has resulted in an increase in the number of cases being sent for Early Help assessments. Over the same period, the Early Help and Social Care front doors have been integrated to create a single front door service in which

management oversight has been increased to ensure that decision-making is appropriate and consistent.

4. In the LA, the vast majority of strategy discussions in the front door result in a section 47 investigation. The majority of these section 47 investigations are then closed with no further action. This raised a question as to whether this same decision could have been made at an earlier point in some of these cases (for example, during the strategy discussion).
 - Since the visualisation was produced, the LA has been exploring this question with further data analysis and an audit by the quality assurance service. The resulting report has not yet been published.

The benefit of this data visualisation has been in raising useful questions for the LA to investigate with further analysis. It may have been possible to identify some of these questions through exploratory analysis, but this is time-consuming and local authorities rarely have enough capacity for it. This visualisation succeeds in fast-tracking some of that explorative analysis to enable a LA to conduct more targeted detailed analysis quicker.

9. Summary and Conclusions

Renuka Jeyarajah-Dent, Deputy CEO, Coram (project manager for this project)

Coram's consultancy Coram-i works in partnership with LAs to achieve swifter and better 'permanence' (Children Act 1989 Guidance Volume 2, June 2015) for children who cannot live at home and to promote resilience for children in care. Coram has been working with children in care since 1741 at the time of the first admission to the Foundling Hospital.

This project was based on observations that data was not being actively utilised to influence the progression of children's plans. Behind every number there is a child and the intention was to interrogate whether better visualisation of the data could actually influence practice on behalf of children both in aggregate and individually. The hypothesis was that the Alan Turing Institute would bring a fresh perspective to the knowledge held by academics and practitioners but also one that was grounded in expert data science and technology. The aim was to inspire and challenge the sector by sharing what had been achieved elsewhere. Managing this process with a diverse group of stakeholders (data scientists, LA data analysts, academics, SW practitioners and managers) was challenging and it took a relatively long time to finalise the work plans. However the project was successful one – especially in relation to the modest size of the grant (under £90,000).

The project has facilitated discussions across the sectors about the quality and availability of national datasets. This is evidenced in the contents of this report and attendance at two events that drew a diverse range of participants from both national and local agencies.

Key messages include:

- Improved data linkage systems are needed that enable linking to be carried out responsibly and ethically.
- Swifter processes to obtain appropriate permissions for the use of administrative data are needed for research for public benefit. Research methods and findings should then be shared in a transparent manner in order to progress efficient use of data in children's social care.
- Longitudinal studies over individual children's life course enable us to better understand both the nature of the issues and the difference that the sector can make.
- The children's sector needs to invest in its capacity and grow its own data science expertise in order to forge a cohort of analysts who are both familiar with the sector and have a sound grasp of the innovative statistical methods that are being developed and applied to handle large and complex datasets in the information age.
- Even simple data linkage can generate new and important results.
- Data visualisation techniques can support inter-professional discussions and understanding and identify issues for further investigation
- Visualisations that involve a temporal modelling of flow through key processes offer a new perspective on how children and families experience services and stimulate service re-evaluation.
- The never events approach does not transfer readily across to children's social care, but there are useful elements that could be profitably applied. The main advantages result from a focus on process in the absence of harm having occurred. It is worth identifying key processes to define and monitor to improve service quality.

The project produced:

- A data visualisation (prototype) which has demonstrated the potential to support both operational practice and strategic decision making.
- Collaborations between local authorities and academics to produce data visualisations, and to interrogate data in a different way.

The collaboration between Professor Judith Masson and North Yorkshire council offered the opportunity for the LA to receive the research findings and to explore whether these findings could be utilised effectively to better understand practice via new data linkage and visualisations carried out with the LA. Discussions at meetings resulted in academic presentations at project events, the articles contained within this report and submission to CFSW.

It is clear, however, that a data visualisation is only as good as the data it employs. Much effort is still expended in 'simply' cleaning up the data collected in children's social care. Given this we need to consider how it can be used and to what end. Nevertheless, the prototype produced with Kent's data has enabled the LA to ask itself questions in order to better understand the journeys of children and its response to the children it seeks to serve.

The prototype has been received enthusiastically by a range of stakeholders including LA leaders, social work managers, LA data analysts and Ofsted. Its potential is also recognised by the Alan Turing Institute.

With further development the prototype could be applied by a larger number of local authorities as:

- A tool to assess the impact of current referral thresholds and to support further discussion and review. (The flow through the various pathways will be dependent on decision making at key junctions on the map).
- An intervention tool – to assess whether timely access to data on the journeys of children through the system can affect decision making on their behalf.
- A mechanism to measure the success of various interventions to resolve issues that would obviate the need for later support.
- A workload indicator/resource planning tool for the various pathways.
- A way of interrogating the journeys of specific cohorts of children e.g. by gender; race; age; sibling group; legal category.
- A means of evaluating the impact that a significant event has on the flow of children (e.g. Ofsted inspection, change in practice/process, restructuring).
- A way of identifying the range of different processes that are used by LAs to deliver similar functions.
- A tool to compare the scale with which different pathways are used in different LAs and the time it takes to complete key processes.



Coram (The Thomas Coram Foundation for Children)
Coram Community Campus
41 Brunswick Square
WC1N 1AZ

www.coram.org.uk

Registered Charity No. 312278