Department for Education

Decision-Making in Children's Social Care – Quantitative Data Analysis

Research report

June 2017

Alex Tupper, Ross Broad, Natalia Emanuel, Andy Hollingsworth, Susannah Hume, Chris Larkin, Janna Ter Meer & Michael Sanders

The Behavioural Insights Team

Contents

Executive Summary

Every day, social work practitioners make decisions about the wellbeing of thousands of vulnerable children and families. These decisions are often complex, concerning emotive issues in conditions of uncertainty. They are often made under both time and resource pressure.

Previous research has revealed how professional decision-making in social work, and many other disciplines, can be influenced by a range of psychological factors, as well as contextual factors such as the availability of information and resources.[1] The Behavioural Insights Team (BIT) itself has previously conducted qualitative research exploring judgment and decision-making in children's social care,[2] identifying several behavioural factors that may impact social workers' ability to make decisions.

Drawing on the recommendations of BIT's previous report, BIT was commissioned by the Department for Education (DfE) to conduct a complementary quantitative research project, using raw data on social work cases to reveal decision-making patterns. This report presents the findings of this research.

Project approach

The project set out to explore available data relating to social worker decision-making. It was a big data project to try to understand better the current decision-making process, detect any trends or early patterns in decision-making, and provide insights for the social work profession about current practice.

The project involved analysis of data on 123,131 episodes of care for approximately 49,000 children who were referred to children's social care at three English local authorities (LAs) between 1 July 2010 and 30 June 2014. Each LA provided different amounts and types of data from their children's social care data system, depending on the structure and content of the local data system used.

Once data was extracted it was cleaned and organised, enabling us to assemble specific journeys for each child for each occasion they came into contact with LA children's social care.

We standardised the terminology[3] and approaches across the data sets. This allowed us to we were able to define the general pathway for each child and enabled some indicative comparisons across the LAs.

---

[1] Ward H, Brown R & Hyde-Dryden G (2014) 'Assessing Parental Capacity to Change when Children are on the Edge of Care: an overview of current research evidence', Research Report, Centre for Child and Family Research, Loughborough University, June.

[2] Kirkman E & Melrose K (2014) 'Clinical Judgement and Decision-Making in Children's Social Work: An analysis of the "front door" system', A report by the Behavioural Insights Team, London: Department for Education.

[3] A full explanation of what each term refers to can be found in the 'Methodology' section.

Below is a visualisation of this pathway:
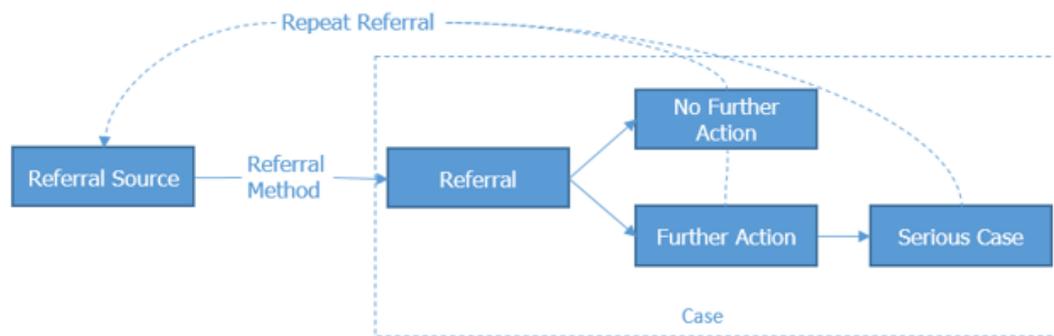
This report examines corellations between ten variables of interest available in the data, and the probability of a case progressing along this common pathway. For example, it considers whether the day of the week a referral is received changes the probability that it is proceeded to further action, becomes a serious case or is ultimately subject to a repeat referral.

Variables are analysed together, and so results are reported controlling for all other observed factors in the data. In effect, results can be interpreted as giving **the impact of a particular factor 'all other things being equal'**. For example, referrals made at the weekend might happen to be for younger or older children than those in the week. This difference in age could explain differences in the proportion of cases being progressed to further action. The way we have done our analysis enables us to 'disentangle' the impact of a child's age from the impact of being referred at the weekend.

The findings presented in this report demonstrate correlations observed in the available data sample. They should not be interpreted as implying causation[4]. Other factors not captured in the data may explain the relationships presented. We can only control for factors that we observe in the data provided. To follow the example above, the staff who work at the weekend might behave in a systematically different way from those who work in the week. Without knowing the characteristics of staff making each decision we would be not be able to 'disentangle' this from the effect of a referral coming in on a weekend day. Comparisons are also only made within the dataset considered and cannot be assumed to be reflective of broader national trends.

---

[4] Corellation implies only that two factors are statistically related in the data, the presence of one increases the likelihood of presence of the other. This could be because one causes the other. However, it could also be because a third, unobserved factor – something beyond the ten we have considered in this report – is underlying both.

Key findings

This project was large and in many ways one of the most striking findings is the level of variability in predictive relationships across LAs. One clear message from the analysis is that, while there are patterns within local authorities, these patterns often vary between the three Authorities in the analysis.

The impact of team caseload, of children's age or disability status and of the referral source all vary across local authorities – not just in degree but in direction. For example, in two local authorities an increase in average team caseload was associated with a decrease in the proportion of cases proceeding to further action. In a third, the reverse was the case, with a correlation between high team caseload and a higher proportion of case progressing to further action. This highlights the crucial importance of considering local context when using the findings in this report to inform new practices.

Nevertheless, this project also identified a range of factors that are correlated with, and may be influencing, decision-making in children's social services. Several correlations, in particular, are consistently observed across all three local authorities and point to interesting behavioural factors that may be influencing the outcomes of social worker decision-making. One thought-provoking result was the relatively lower likelihood of cases progressing to further action when the referral was received at a weekend across all three LAs. Similarly, referrals received by email (or another written form) were also consistently less likely to progress to further action than those received by more immediate or personal means (phone calls or personal visits for example).

Both of these cases highlight the opportunity and challenge inherent in this type of approach. Without the type of analysis used in this report, and the volume of data used, it is unlikely these corellations would have been detected. However, both findings also demonstrate the importance of distinguishing causality and correlation. For example, the lower referral rate for written referrals could have at least two possible explanations. The effect could be on social worker decision-making at the point of referral, with written referrals carrying less weight or capturing less attention from busy frontline staff. Equally, they could be artefacts of the decisions made by referrers themselves – with referrers picking up the phone when they have serious concerns, and saving email referrals for cases they are less immediately concerned about. Without further research, we are unable to identify which of these is driving the relationship we observe.

Another striking finding is for children from non-white ethnic groups. The results of our analysis show that, compared to referrals about a white child, those relating to a black, Asian, or mixed race child are significantly more likely to proceed to further action in all three local authorities. Such cases are also more likely to become a serious case, even controlling for all other material factors for which we had data. Again, however, we need to proceed with caution. This finding could potentially imply that social workers are being influenced by unconscious bias[5]. Equally, the fact that there is also a higher likelihood that a black, Asian, or mixed race child will become a serious case could suggest that the

---

[5] An unconscious bias is a bias that affects us 'under the radar' of conscious thought, without awareness or control. Research suggests that we are all subject, to a greater or lesser degree, to unconscious biases of some kind.

higher referral rate is being driven by something we can't observe, such as higher levels of need in these amongst these communities in these LAs.

Below we set out a summary of the ten key areas which, following all of our analysis, emerged as areas in which variables were observed to influence decision-making by social work practitioners.

Some of these findings are intuitive, while others hint at less obvious influences that might be at play in decision-making.

A: Day of the week

There are observable links between the day of the week a referral was received and subsequent decisions made by social workers. However, the patterns observed are not consistent across local authorities.

At local authority 1 (LA1), as the week progresses, referrals are increasingly less likely to proceed to further action within children's social care (i.e. for the referral to be accepted by children's social care and subject to further assessment).

At all three local authorities, referrals received over the weekend are less likely to proceed to further action. The thick black bars in the first graph below show how at LA1, referrals received on a Saturday are 7 percentage points less likely (compared with a referral received on a Monday) to progress to further action, Similarly, referrals received on a Sunday are 3 percentage points less likely to progress to further action. (Note that the thick black bars indicate the relative likelihood of progressing to further action, controlling for other factors. The thin dotted lines indicate the raw proportion progressing to further action before other factors have been controlled for).

Proportion of cases proceeding to further action by the day of the week the referral was received (LA1)
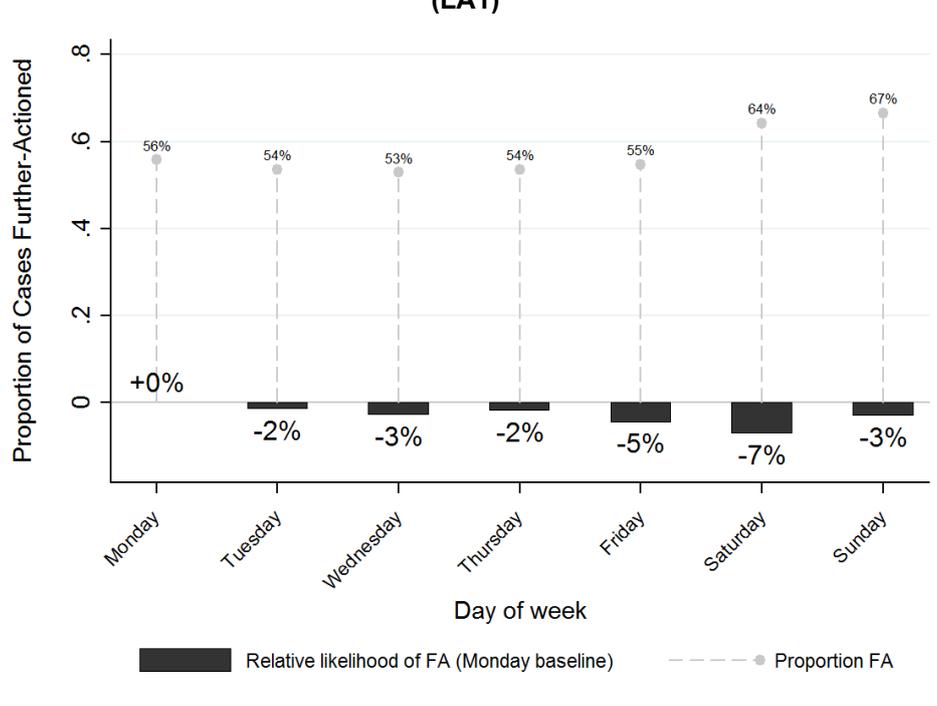
Proportion of referral proceeding to further action by the day of the week the referral was received (LA2)
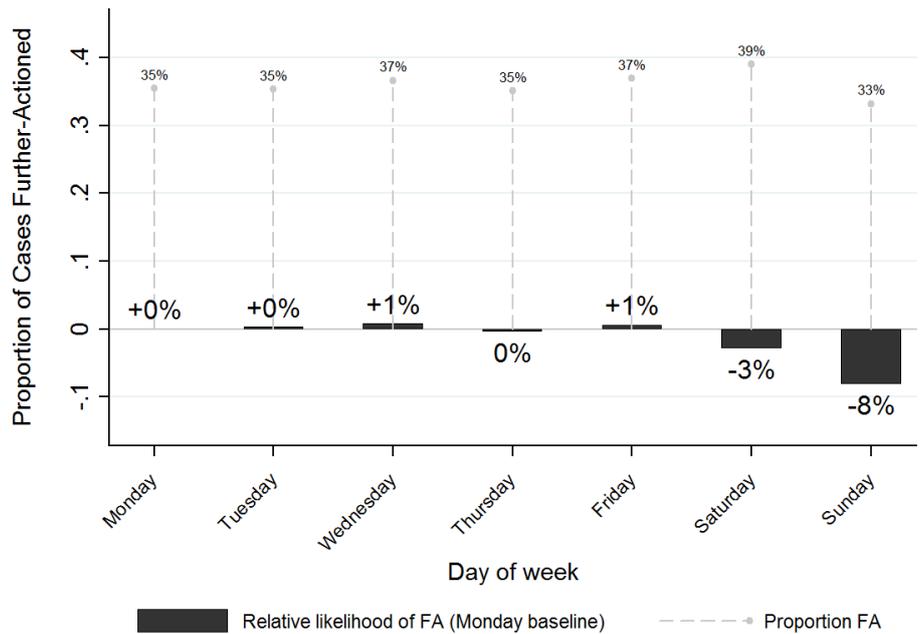

Key discussion points

- Does the structure of social work shift patterns affect decision-making patterns?
- If a single person is reviewing decisions at the weekend, are wider system factors (like system pressure or resource availability) impacting their decisions about when to progress cases to further action?

B: Social worker caseload

Social worker caseload has different relationships with decision-making at the local level. At LA1 and LA3, the higher the case load at the time of receiving the referral, the lower the proportion of referrals progressed for further action. The reverse is true of local authority 2 (LA2).

The graph below plots the estimated likelihood of a case progressing to further action against the caseload of the team holding it in LA1. The line of best fit shows how increasing team caseload (at the time the referral was received) means that it is progressively less likely that the referral will be accepted and progress to further action.

Likelihood of progressing from referral to further action given team caseload (LA1)

Mean = 26   Coefficient = -.0038
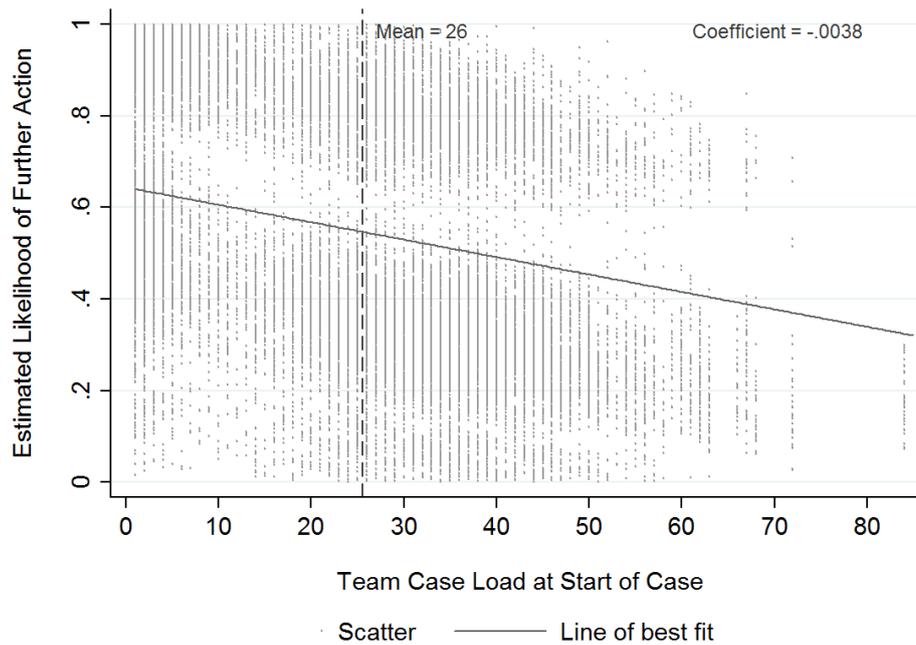
Key discussion points

- As caseload increases, do resource constraints limit the number of cases that can progress to further action?
- Does time pressure mean social workers have less time to obtain information about a child so decline to progress them?

C: Referral source

Referrals received from an internal source (i.e. other social workers) are most likely to proceed to further action, while referrals originating from family members are least likely to proceed at LA1 and LA2 (though at LA3 referrals from family members are highly likely to progress to further action). Referrals from school sources are also highly likely to proceed to further action and become a serious case at LA1.

Key discussion points

- Could differences in presentation of material by referral source be driving this observation, not the source necessarily?
- Could referrals from family sources be less likely to progress as information is presented in a non-professional way that is harder to interpret?

D: Referral method

Referrals arising from other visits to the family or internal sources[6] are most likely to progress to further action and to develop into a serious case. Email/written methods of referral are least likely to progress to further action, and least likely to subsequently become a serious case.

Key discussion points

- Does the effort associated with an individual making a referral using different referral methods act as a good proxy for the severity of the case? For example, is the relative difficulty of having a face-to-face conversation versus writing an email treated as a signal of the referrer's underlying view about how serious the case is?

- Are more personal referral methods (i.e. visits and calls) more engaging, so more likely to be progressed to further action?

E: Ethnicity and language

Children from non-white ethnic groups are more likely to have a referral progress to further action and more likely to become a serious case, when controlling for other factors found in the data. However, when introducing data on children with a recorded language other than English (data only available in LA2) this picture becomes more nuanced.

At LA2, compared to children from a white ethnic background, referrals about children from a black or mixed ethnic background are 17 percentage points more likely to progress to further action, while referrals about children from an Asian background are 22 percentage points more likely to progress

---

[6] This could include a number of situations. For example, they could be visits by a non-social work staff member (e.g. a family support worker).

Likelihood of progressing from referral to further action given child ethnicity (LA2)
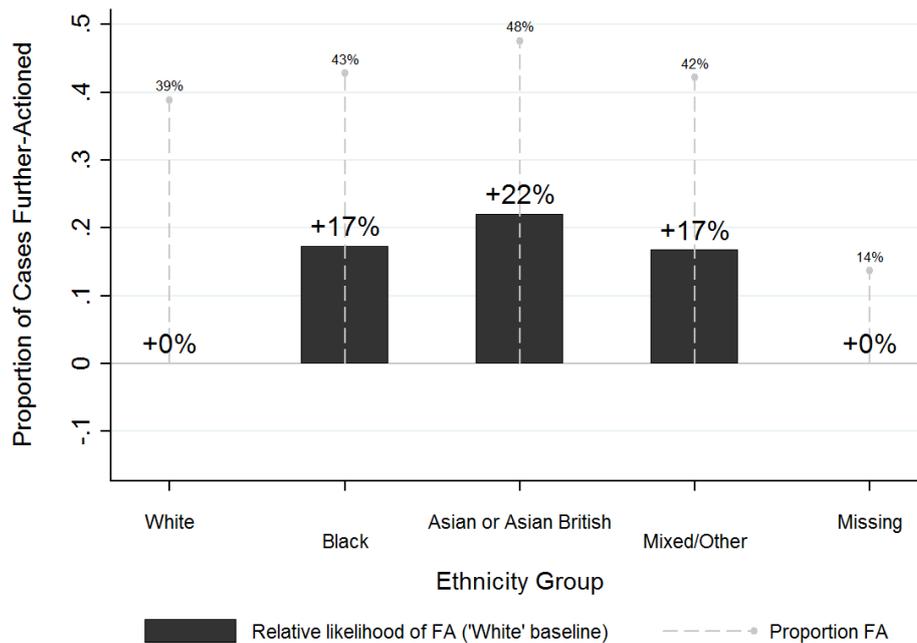
However at LA2, children with a recorded language other than English are more likely to be referred for further action, no more likely to become a serious case and less likely to become a repeat referral.

Key discussion points

- Could social workers be influenced by unconscious bias? Or does the higher proportion of cases involving children from non-white ethnic backgrounds becoming serious cases justify the higher proportion initially progressing to further action?
- For children recorded as speaking a language other than English, is further action being used to gain additional time to translate information and determine need?

F: Other presenting child characteristics

Gender of the child has no discernible influence on decision-making in any of the three LAs, while age and disability status have different relationships with the likelihood of further action and becoming a serious case.

At LA2 (the only LA where this data could be extracted), children whose parents are recorded as having a history of domestic violence, alcoholism, or drug usage are 8 percentage points less likely to progress from referral to further action, despite being more likely to become a serious case.

Likelihood of proceeding from referral to further action given parent social care history (LA2)
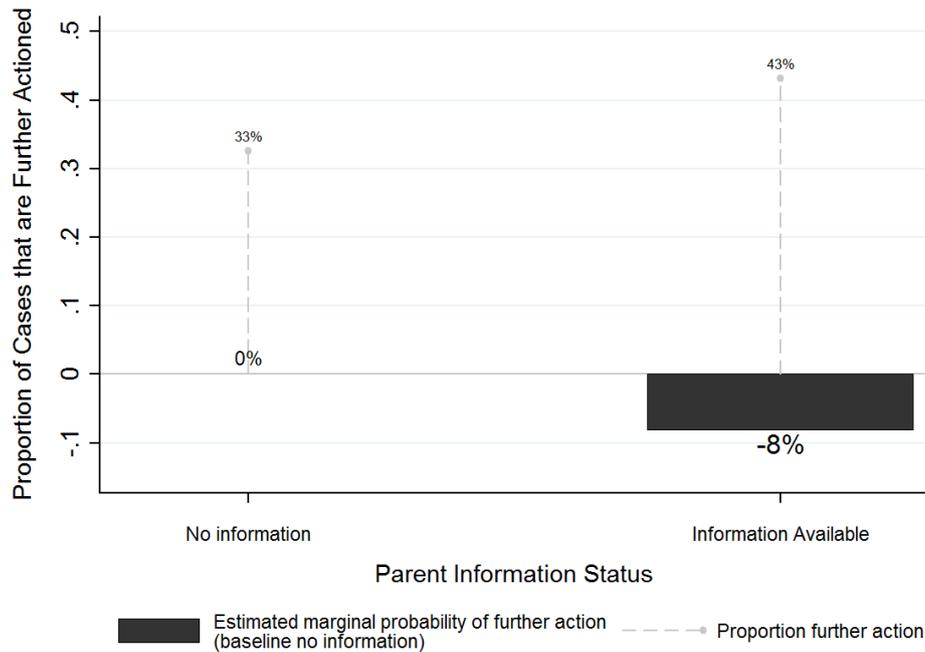
Key discussion points

- Could a family history of social care involvement have an impact on the perceived thresholds for intervention? This could lead to a 'normalisation effect' where children's current need for support is evaluated relative to past events in that family rather than in absolute terms.

- Are other agencies already supporting the family so there is seen to be less need for immediate children's social care input?

G: Deprivation

Deprivation domains have very mixed effects at the local level across the likelihood of cases both progressing to further action and eventually becoming serious cases. One consistent finding is that geographic areas that are more deprived on the health domain are more likely to have a referral about a child proceed to become a serious case. Children from geographic areas with greater income deprivation are less likely to have a referral result in further action than those from areas with less income deprivation.However, this picture is more mixed when considering the likelihood that referrals proceed to become a serious case.

Key discussion points

- Do social workers have time to consider deprivation when immediate evidence is likely to be limited?

- Does the mixed nature of the findings here point to a methodological limitation of our study? Does aggregated data appropriately identify children who could be deprived but live in a high income area?

H: Social worker experience

Social worker experience information was only available for agency social workers at LA1. Additional experience within LA1 by agency social workers[7] reduces the likelihood that a referral will proceed to further action and that it would subsequently become a serious case, but increases the likelihood that repeat referral will occur.

Key discussion points

- Does the link between experience and reduced further action and serious case outcomes indicate that social workers become more confident (or less risk averse) with experience?
- Could case allocation (to social workers) also be influencing the pattern observed? For instance, are referrals that appear more complex given to more experienced social workers for decision-making?

I: Social worker employment type (permanent or agency)

There are no differences in decision-making patterns between agency and permanent staff members in LA1, despite what might be perceived as different incentive and motivation structures.

Key discussion points

- Would this finding depend on the experience levels of local agency and permanent staff?
- Is the aggregate experience of a social work team more important than the balance between agency and permanent staff?

J: Time and system changes

There is significant fluctuation in the likelihood of a referral being progressed to further action across the four year time period reviewed, indicating that there may be other system and contextual factors at the local level which have an influence on decision-making. Each LA also appears to see different fluctuations in the likelihood of referrals progressing to further action over the four year period, with no clear patterns of fluctuation observed across LAs.

Key discussion points

- What factors could explain the significant fluctuation observed? For instance, do resource constraints, Ofsted inspections, or high-profile local cases trigger changes in local practice and decision-making?

---

[7] Data on social worker experience levels was only available for agency social workers and also only reflected the number of days they had spent working at LA1 specifically during the four year period covered.

Free text analysis

Data provided by LA1 also contained social worker's assessments of the case written in free text. Analysis of this text conducted for the project also revealed a number of correlations. Again, some of these are intuitive and some less so. For instance:

- Use of the words 'genital mutilation' and 'forced marriage' are highly correlated with a referral progressing to further action;

- A range of terms linked to neglect, drug and alcohol misuse, violence or physical abuse and mental health issues are correlated with further action;

- Use of the words 'accidental', 'at ease', and 'network' by a social worker means that a referral is less likely to proceed to further action; and

- References by a social worker to 'SDM' (a structured decision-making model) or an 'opinion' are correlated with a referral not proceeding to further action.

Next steps

The findings in this report have been gleaned from three local authorities and it is not possible to conclude whether findings would hold more broadly. Indeed, there are some substantive differences between the three local authorities in our sample, suggesting that local contextual factors play an important role.

Above all else, it is important to include further investigation into causation in any next stage of work. For example, the results from our analysis suggest that the aggregate case load within a team when a referral is received influences the likelihood of it progressing to further action. On the one hand, this could mean that social workers are influenced by decision fatigue at periods of high workload. A different interpretation might be that something else has happened in the system (a high-profile near miss for example) which has increased referrers' sensitivity and resulted in them lowering their own thresholds for referring a case. As such, a lower proportion of referrals would meet the thresholds needed for further action. Aside from these two examples, it is likely there are many more possible explanations for any given correlation identified. Without further work which is methodologically able to disentangle correlation and causation we will not be able to choose between these different potential explanations. Knowing what the correlations mean, what the 'causal direction' is and which factors are driving the others is critical to developing the right tools to help social workers in future.

At the local level, we encourage local authorities to explore reproducing elements of the analysis using data from their own children's social care department. Findings could then inform implementation of strategies to guard against the influence of the behavioural factors identified. As local authorities invest in new data systems, we encourage them to consider the potential for analytical projects of this nature, capturing new data in a format more suited to analysis.

This is particularly true for 'soft' data – information that can be encoded that captures the surrounding context of decision-making. While the case files used in this research were data-rich, much information we would like to have included in the analysis was not recorded or not recorded in a consistent format. Further, the structure of data systems

used by most children's social services departments' limited potential analysis (large portions of key information are captured as free-text, for example). Ultimately, this meant that the identification of a range of factors that were highly predictive of key outcomes was not possible at this point.

At the central and professional level, we encourage the Department for Education and the broader social work profession to explore ways to apply these insights and to disseminate these applications nationally. Specially, there are two areas for consideration.

First, the findings suggest that it is possible to derive data-based information on how social workers make decisions. This means that it should be possible to develop stronger, evidence-based feedback mechanisms to social work practitioners to support their decision-making.

Secondly, the analysis shows that there is also potential for the introduction of standardised decision-making aids (informed by the data and experienced professionals) that can better structure and enable professional judgment, helping to guard against some of the behavioural factors that may cloud decision-making.

This second area for consideration draws on the concept of professional 'boot-strapping', which aims to improve decision-making consistency by preventing contextual 'noise' from distracting professionals from the factors they know are most important.[8]

Taking this approach in the children's social care context would involve working with experienced practitioners from across England to determine the range of key elements that are looked at when assessing need for a particular child or family. A series of workshops or structured decision-making simulations could then be run to extract professional knowledge from experienced social workers about the key factors they are looking for when making decisions, particularly at the front door of children's social care.

By codifying the approaches and knowledge extracted from this engagement, and developing standardised decision-making guidance, new or less experienced practitioners could be assisted to make more structured, evidence-based judgments using the same approach as experienced professionals, with extra safeguards introduced to guard against potential biasing behavioural factors.

In the future, we look forward to a world of improved data availability and predictive analytics, more robust and structured decision-making guidance that supports professional judgment, and ultimately improved outcomes for vulnerable children and families.

---

[8] Gigerenzer G (2008) *Gut feelings: Short cuts to better decision making,* London: Penguin Group.

Summary of key relationships

The table indicates summary observations on the relationship of key variables with the relative likelihood of a referral progressing to further action.

Key variable	LA1	LA2	LA3
A: Day of the week			
Day of the week most likely to have an referral progress to further action	Mon	Wed, Fri	Thurs
Are referrals received on the weekend relatively more or less likely to proceed to further action?	Less	Less	Less
B. Social worker caseload			
Does higher caseload mean a referral is more or less likely to progress to further action?	Less	More	Less
C. Referral source			
Which referral source is most likely to progress to further action?	Internal	School	Family
Which referral source is least likely to progress to further action?	Family	Family, Emergency	Emergency
D. Referral method			
Which referral method is most likely to progress to further action?	Visit / Internal	Meeting	Data not available
Which referral method is least likely to progress to further action?	Email / written	Email / written	Data not available
E. Ethnicity and language			
Does a child having a non-white ethnic background mean a referral is more or less likely to progress to further action?	More	More	More
Does a child speaking a language other than English mean a referral is more or less likely to progress to further action?	Data not available	More	Data not available
F. Other presenting child characteristics			
Does disability status mean a referral is more or less likely to progress to further action?	Less	More	More
Does the increasing age of a child mean a referral is more or less likely to progress to further action?	Less	Less	More
Does a parental history which is known to social care mean a referral is more or less likely to progress to further action?	Data not available	Less	Data not available

Key variable	LA1	LA2	LA3
G. Deprivation			
Very few consistent effects observed at the LA level across the five deprivation domains (crime, education, employment, health, and income).			
H. Social worker experience			
Does experience impact on the likelihood of a referral progressing to further action?	No	Data not available	Data not available
I. Social worker employment type (permanent or agency)			
Does employment type impact on the likelihood of a referral progressing to further action?	No	Data not available	Data not available
J. Time and system changes			
Dramatic movements in the likelihood of a referral progressing to further action, but different patterns observed across each LA.			

1. Introduction

This introductory section provides the background to the project, situating the project within the context of the children's social care system.

The aims and objectives of this project are introduced, with linkages to the previous project conducted by BIT in this area explained.

Every day, social workers make critical decisions about the wellbeing of thousands of children and families in our society.

These decisions often have to be made in tight timeframes in conditions of uncertainty, on the basis of potentially limited information.[9] Decisions may also be constrained by available resources or other system pressures. Situations presented are often 'chaotic' and may 'not fit neatly into a carefully constructed paradigm.'[10]

In this decision-making context, social workers require both analytical and emotional intelligence, as well as techniques to cope effectively with stress in a fast paced and highly-scrutinised environment. It is recognised that 'social workers need high intelligence to achieve the level of critical reasoning needed to make sound judgments and decisions on the complex family problems they confront.'[11]

The need to provide greater evidence and improved feedback to social workers on their professional practice is well recognised. Commencing with the landmark Munro Review, a range of current reform initiatives across children's social care are underway, aimed at generating new and stronger evidence about what works in improving outcomes for vulnerable children and families.

This report is not intended to provide a comprehensive review of the literature about decision-making in the social work context. Instead, it represents a practical research exercise aiming to add to the growing body of data-led research in the field. As explained further below, the project sought to test a fresh approach to analysing social worker decision-making, trying to observe any behavioural or contextual factors that might be influencing outcomes through quantitative analysis of children's social care data.

---

[9] Munro, E. (1999) 'Common errors of reasoning in child protection work.' Child Abuse & Neglect, 23, 8, 745-758.
[10] Ward H, Brown R & Hyde-Dryden G (2014) 'Assessing Parental Capacity to Change when Children are on the Edge of Care: an overview of current research evidence', Research Report, Centre for Child and Family Research, Loughborough University, June.
[11] Munro, E (2011) *The Munro Review of Child Protection*, Final Report: A Child-Centred System, Department for Education: London.

Project overview

Building on recommendations from BIT's 2013 report on social worker decision-making, in October 2014 the Department for Education commissioned BIT to consider further how behavioural insights could potentially improve and better support professional decision-making by social workers in the field.

Taking a quantitative research approach (complementing the qualitative research approach used for the initial report), the project set out to explore available data capturing social worker decision-making. Working with local authorities through analysis of existing administrative data collected by children's social services departments, the scope of the project included examination of:

- The demographic/situational profiles of children referred to the local authority children's social care;

- The specific decisions that have been made by social workers, including through analysing available 'soft' or incidental data (such as decision-making times); and

- The outcomes intrinsic to local authority children's social care associated with these decisions.

The aim was to identify commonalities and patterns in decision-making, generating new evidence for the profession about decision-making practices.

One specific objective was to try to identify information that can be influential in decision-making at certain points in a child's journey through social care.

BIT is not an expert in social work practice. Other researchers, government departments, and practitioners have explored the context of social worker decision-making from other angles and perspectives, in greater depth. However, with expertise drawn from the behavioural sciences – including psychology, behavioural economics, and social anthropology – BIT brings a deep understanding of human decision-making, including how context can significantly shape our decisions, which is equally relevant in children's social care.

Indeed, evidence from a range of fields has shown how professional decision-making can be influenced by behavioural factors.[12] In the social work context, it has been noted that professional judgments are 'influenced not only by the availability of information and resources, but also by a wide range of philosophical, psychological and organisational factors that have a powerful impact on decision making.'[13]

---

[12] Danziger S, Levav J, & Avnaim-Pesso L (2011) 'Extraneous factors in judicial decisions', *Proceedings of the National Academy of Sciences* (PNAS), vol. 108 (17), pp. 6889-6892.

[13] Ward H, Brown R & Hyde-Dryden G (2014) 'Assessing Parental Capacity to Change when Children are on the Edge of Care: an overview of current research evidence', Research Report, Centre for Child and Family Research, Loughborough University, June.

There are approaches that can mitigate the influence of behavioural factors on decision-making. For example, in the health profession, the introduction of a decision-making tool to assist emergency physicians in diagnosing heart attacks was able to significantly improve the likelihood of an accurate diagnosis.[14] This tool was created by working with complex data sets to identify key risk indicators for heart attacks. This information was then distilled into a simple series of three Yes/No questions to help professionals determine whether the patient should be admitted in a complicated, busy, and noisy context (a crowded and bustling emergency department). Such techniques marry the insights that complex data can provide with the needs and expertise of the professional to drive better decisions.

Professional expertise and experience does provide some immunity to the kinds of biases in decision-making we might expect from a lay-person. However, professionals, including social work practitioners, are still human beings and human rationality is bounded.

The value of big data sets

This project is an example of a big data project, using a large volume of data from local authority children's social care (as well as other relevant data from the Office of National Statistics (ONS) Indices of Deprivation) to explore potential insights into the patterns in social workers decision-making about progressing and escalating cases.

While no precise definition exists, in general a big data project seeks to explore large volumes of data with high levels of complexity through advanced analytical methods in order to derive meaningful new information and insights.[15] Big data has been identified by Government as one of the 'eight great technologies' which will propel the United Kingdom to future growth.[16] Among its many applications and benefits is the potential for big data to provide insights which enable people working within a system to make better decisions.[17] By providing a deeper understanding of service users, and a greater ability to detect variation in decision-making, big data (and other similar approaches) has the potential to enable significant improvements in system operations.

The public sector is starting to explore the value that can be unlocked through analysis of existing data, as demonstrated in the example below:

---

[14] Gigerenzer, G. (2008). Gut feelings: Short cuts to better decision making. London: Penguin Group.
[15] HM Government Horizon Scanning Programme (2014) *Emerging Technologies: Big Data,* A Horizon Scanning Research Paper by the Emerging Technologies Big Data Community of Interest, December.
[16] See HM Government (2013) Eight Great Technologies - Technologies in which the UK is set to be a global leader, October.
[17] McKinsey Global Institute (2011) *Big data: The next frontier for innovation, competition, and productivity*, McKinsey and Company, May; IBM (2015) 'What is Big Data?'.

Example big data project – reducing infection rates in premature babies[18]

Commencing in Canada, "Project Artemis" involves the use of analytics to reduce infection rates for premature infants in hospital neonatal units. Hospital neonatal units are configured to collect and analyse real-time data on the vital metrics of babies, including pulse rates, respiration rates and blood oxygen levels, aiming to detect clinically significant conditions and their onset behaviours.

For premature infants, academic research had revealed that those with more stable heartbeats were more susceptible to nosocomial infections. Big data analytics allow doctors to detect these infections in premature babies up to 24 hours before visible symptoms appear, through alerts triggered by observed patterns in an infant's heartbeat that are linked to infection.

An important methodological difference for big data projects should be noted. Historically, data projects worked by determining variables to investigate in a dataset, and then performing bespoke analysis on those particular pieces of data.

Big data projects involve a much wider approach, working across as many elements within the dataset as possible to observe patterns or predictive factors. Statistical techniques are applied across the whole of a database to try to find correlations, without having a pre-existing assumptions in mind about what will be found.[19] In essence, this is a 'theory-blind' approach which seeks out interesting findings wherever they are in the data set. This is powerful: a big data approach means that we can discover things we were not looking for, whereas historically it was necessary to have a theory and form a hypothesis first.

The next section provides further detail about the specific methodological approach taken for the project, as well as the process undertaken to obtain data from participating local authorities.

---

[18] See Reddy SG (2014) 'Big Data Saves Small Babies by Detecting Nosocomial Infections Earlier Than Clinicians', 19 November; Beyman, M (2013) 'Big data's powerful effect on tiny babies', 13 September.
[19] Information Commissioner's Office (ICO) (2014) *Big data and data protection*, July.

2. Project approach

This section sets out the project approach, including detail on how local authorities were engaged for participation, the scope of data requested, and the subsequent approach taken to conduct quantitative analysis.

To our understanding, this was the first time that a project of this type, using the scale of data set used, had been attempted in the children's social care context in England, focusing on decision-making by social work practitioners within local authorities.

Given this, it is unsurprising that several challenges were encountered in the project approach. Despite these challenges, of the seven local authorities initially approached to take part in this project, we were able to collect data from three. This section sets out the approach used to conduct the project, including the challenges faced in employing the chosen methodology.

Full detail is presented on these challenges in order to assist future researchers who may wish to take a similar approach. Significant learning has been realised through the course of progressing this project; we hope that it will not be lost and can guide future projects of this type.

Engaging with local authorities

This project would not have been successful without the voluntary participation of local authorities as the bodies responsible for the delivery of social care services to children in their communities. Authorities needed to be able and willing to share a large sample of data from their children's social care data system to enable the planned analysis to take place. Given the relatively unique nature of this analysis, this was not something that any of the local authorities involved had done before.

Following initial discussions with the Department for Education, invitations to participate in the project were sent to five local authorities based on three general criteria:

- Ensuring an appropriate mix of geographical location (i.e. rural and urban; North and South) from across England;

- Ensuring an appropriate mix of size of children's social care departments (i.e. larger and smaller local authorities); and

- Ensuring strong data quality (i.e. targeting local authorities that were perceived to have stronger current data systems).

In the invitation, local authorities were advised that their involvement in the project would be anonymous, with no identifiable local authority-specific findings to be made available.

All seven local authorities initially approached responded with a positive response, indicating a willingness to participate in the project.

The BIT project team travelled to each local authority to meet senior members of the children's social services department (including the Director or Deputy Director of Children's Services) as well as a sample of social work practitioners and relevant performance and data analysts. The visits introduced the project, discussed areas of interest that could be explored through analysis, and engaged with technical staff on the logistics of data extraction.

Immediately after the initial meeting, one local authority advised that they would be unable to participate due to technical challenges in extracting a large sample of data from their social care data system. This Authority was in the process of transitioning to a new data system, having had their current system in place for over a decade. Another local authority withdrew from the project shortly after the exploratory discussions, following announcement of an Ofsted inspection.

For one local authority, strong on-the-ground support resulted in data being extracted and provided to BIT in March 2015. This would not have been possible without the strong support of key personnel at the relevant Authority for which we are grateful.

Legal barriers to project participation were identified by some local authorities given the data sharing required. Explained in further detail below, these legal challenges ultimately led to a further two local authorities withdrawing from participation.

Given these developments, in April 2015, two further local authorities were invited to participate in the project to maintain an appropriate sample size. One of these local authorities provided data to BIT in May 2015. In September 2015, data was received from the third of the three local authorities analysed in this report.

This report thus presents findings from analysis of the children's social care data from three local authorities. The final data sample consists of a medium-sized peri-urban local authority, a medium-sized London borough, and a small London borough. Each local authority provided a differing volume of data, given the size of their historical caseload, the structure of their data system and data quality challenges.

The three local authorities that formed the final data sample were toward the higher end of performance, as assessed by their most recent Ofsted inspection of children's services. Two of the three local authorities were rated as 'Good' by Ofsted following their most recent inspection, with the other local authority rated as 'Adequate' (under the former inspection framework).

In summary, several key lessons were learnt during the process of engaging with local authorities for the project:

- Extracting large volumes of data from children's social care data systems is complex and technically difficult. Old or inflexible data systems/hardware can present difficulties. Given the unique nature of this analysis, this type of approach is also a new area for local authorities and so they may not currently have the necessary staff capability or capacity;

- Local authorities face a very wide range of ongoing workload pressures. In this context, seeking voluntary participation for a new type of project is always challenging, with local authorities facing understandable trade-offs in terms of resource allocation. This ultimately meant that project timelines had to be extended; and

- The support of the Director of Children's Services was important in indicating engagement with the project. However, we would also not have been successful without the ongoing support of key data analysts in each local authority who worked with us to support us in data extraction and validation.

Legal challenges to data sharing

In the course of engaging with local authorities, legal challenges were identified to the sharing of the volume of data sought for the project.

Participation in the project involved each local authority individually satisfying themselves that sharing data for the project was permissible within the scope of the Data Protection Act. In general, the framework set out in the Data Protection Act places the obligation on the Data Owner (in this case, the local authority) to satisfy themselves that sharing of the data is fair and lawful. It is a matter of individual judgment for each particular instance of data sharing, focusing on the purpose and necessity of the sharing and the rights of the data subject.

Our original intent had been to extract anonymised data, with unique reference numbers used to link children (instead of names and dates of birth). However, this became more challenging when personal data was found to be contained in key fields that capture the decision-making of social workers. The nature of data systems used by local authorities meant that free text fields were used by social workers to record their decision-making, describing the background to the case, key factors present, and the rationale for their decision. Given this flexible system, social workers can – and do – enter personal data, such as the name of the child or their family members into the free text fields.

The Department for Education provided assistance to try to overcome these legal challenges, developing a Data Sharing Agreement which local authorities could enter into with the Department, with BIT then acting as the Data Processor on behalf of the Department. BIT also developed a tool which could search for first names and likely date of birth formulations (e.g. 12 October 2005 or 12/10/2005) in free text fields, before redacting that information (replacing it with 'NAME' or 'DATE'). This ensured that information was anonymised to a level that some local authorities felt confident that it was extremely unlikely that individuals could be identified.

Given the nature of the project, BIT also made clear that no incidental personal data would be analysed at the individual case level, with analysis of free text fields to be conducted using automated software to observe correlations.

Nevertheless, even following strong engagement between the Department for Education, BIT and relevant local authorities, two local authorities ultimately withdrew from the project over privacy concerns.

Ultimately, we recognise that local authorities (as Data Owners) needed to make their own judgement about whether they felt the data sharing request was justified.While the amount of data requested was proportionate to a project of this nature, we know that local authorities found the volume difficult to justify given the lack of precedent and the framework set out in the Data Protection Act. As noted, this methodology is relatively new in the public sector, and has likely never been attempted in children's social care. Hopefully, as use of large data sets spreads, analyses of this type will become more commonplace and local authorities and other public bodies will feel more comfortable that appropriate precedents are in place and that sharing is justified. We strongly belive that the value of such analyses more than justify the sharing requests.

Data extract request

Given our project methodology, a wide data extract request was made of participating local authorities. Not all local authorities were able to extract all of the data we sought; the scope of the data request comprised three tranches (full detail on all data requested is set out in Appendix B).

The first tranche related to the presenting characteristics of each individual child with a recorded referral to children's social care at the local authority for the period 1 July 2010 to 30 June 2014 (four years). The four year period was selected to obtain a sufficiently large sample of completed child journeys through children's social care, and to identify instances of repeat referral.

The second tranche of data related to the interactions (also described by various local authorities as episodes, cases, or contacts) that each individual had with children's social care during the time period for analysis. This data included the free text fields which had the potential to contain personal data.

The third tranche of data was information on the social work practitioners who were recorded as decision-makers in the data system for the relevant time period. The purpose of this request was to explore how the characteristics of the individual practitioners might interact with their observed decision-making.

This third tranche of data proved the hardest to obtain, for a mix of reasons. For all participating local authorities, this data was located in a separate human resources database, making it harder to extract. For some local authorities, it was also seen as too sensitive to provide data on the characteristics of social workers. However, one local authority was able to provide some data on the experience and employment type of social workers, for which interesting findings were observed.

While we were not able to explore this third element in detail, we believe that there is great potential for this analysis. We encourage other researchers and practitioners to explore this area, investigating how the personal characteristics of a social worker may be influencing their decision-making.

Methodology

As noted, this project was conducted as a big data project, seeking as much raw administrative data as possible from the data systems used by children's social services departments in participating local authorities.

Once data was extracted from each local authority and securely transferred to BIT, members of the BIT project team worked with representatives from the relevant local authority to clean and organise the data, assembling specific journeys for each child for each occasion they came into contact with local authority children's social care.

Datasets across all local authorities were standardised to an extent, creating common general pathways for each child. Below is a visualisation of this pathway:
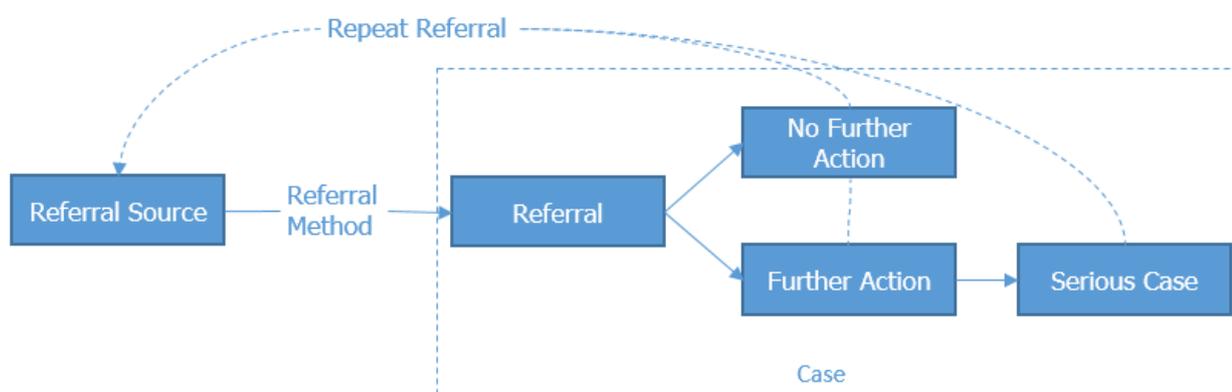
This required generation of consistent definitions and terms across the data sets and general approaches used by participating local authorities. Each of these terms is used throughout the remainder of the report in the presentation of findings.

- A **Referral** is the initial request for services for a child made to local authority children's social care. Referral represents the first point at which a child's wellbeing is considered by a social worker, with a determination made as to whether any further action is required. Further action will involve accepting the referral and undertaking an assessment of the level and nature of risk being faced by the child.

- The **Referral source** is the originating party (the referrer) who contacted local authority children's social care with a concern about the child. Referral source is grouped into several major categories, including police, education, health care professional, and family member.

- The **Referral method** is the specific mechanism by which a child was brought to the attention of the children's social services department (e.g. email, phone, visit, meeting).

- **Case** refers to a unique interaction with the children's social services department for a given child. A case can last a long time (if a child proceeds to become a Child in Need for instance), or can be very short (if a referral about a child is subject to no further action).

- **No further action** is defined for the purposes of this report as the conclusion of a referral with no further action by children's social care. This does not mean that no further action has been taken by any agency, and this could include a step-down to non-statutory services or the provision of information or advice.

- **Further action** is defined for the purposes of this report as the conclusion of a referral with any action other than no further action by children's social care or the provision of information or advice. Further action generally includes accepting the referral and proceeding to an assessment, review or more in-depth consideration of need (note that this definition does not encompass referral to a broader step-down family service).

- **Serious case** is defined for the purposes of ths report as a child who progresses to require more intensive support or intervention. This includes, for example, children on a S17 or S47[20] plan and children subject to a police protection order or emergency protection order.

- **Repeat referral** is defined for the purposes of this report as a child having a second or subsequent referral to local authority children's social care within the four year time period captured by the dataset, having either had an initial referral that was subject to no further action, or having previously had a referral for which further action was taken and where the case was subsequently closed.

Three key outcome variables were then created in each local authority dataset for the purposes of analysis. The outcome variables were (as defined above):

1. The likelihood of a referal proceeding to further action
2. The likelihood of a referal proceeding to become a serious case
3. The likelihood of the child who was the subject of a referal being subject to repeat referral.

Correlational analysis through multiple regression was then performed to determine which variables are most strongly associated with each of the above outcomes, controlling for the other factors observed in our data. Initial findings were shared with participating local authorities for feedback and validation, before being incorporated into the project report.

Free text analysis methodology

The project also involved the conduct of free text analysis to explore the documented content of social worker decision-making.

This analysis was conducted using Stata (a data analysis and statistical software package), employing an iterative search algorithm that detects different words, groups of words, or other patterns in the data.

---

[20] Section 17 and Section 47 of the Children Act 1989.

The words that were searched for were divided into four categories:

1. Technical words – technical words or phrases that are specific to the social work context, such as 'section 47' or 'CIN'.

2. Protective words – words that describe 'protective' factors, such as those which either indicate that parents are healthy, or that there is some element of the home environment which is likely to protect the child from harm. This list includes words such as 'loving' and 'nurturing', as well as 'community'.

3. Harm words – words that indicate an element observed in an assessment that is likely to represent potential harm to the child. These include terms like 'alcohol', 'drug-dependency', and 'domestic violence'.

4. Behavioural words – words that may be associated with higher or lower rates of action being taken by social workers, but which do not reflect elements of the case itself. For example, whether a 'doctor', 'nurse' or 'police' was mentioned in decision-making. It also includes terms such as 'opinion' and 'intuition'.

Lists of words were developed from several sources, but most prominently from; the Munro Review of Child Protection: Final Report, analysis of published Serious Case Reviews, previous free-text analysis of Serious Case Reviews, and discussions with social workers that took place as part of the project.

The algorithm detects these words as well as negative qualifiers (for example "not" and "isn't") around them to produce a net score for each word and for each aggregate category (the net score is the total number of times a word occurs, minus the total number of times it is referred to in the negative). For instance, the content: "Dad seems to have a problem with alcohol, and has ten alcoholic drinks per day. Mum does not drink alcohol" would have an alcohol score of 1, because alcohol is mentioned twice positively and once negatively. A list of all words explored is set out in Appendix C – Words forming part of free text analysis.

Similar processes were conducted to explore the effect of text length (i.e. the total number of words present in the response).

Regression analysis was used to predict the probability of the outcomes of interest, and how this is correlated with the use of particular phrases or types of phrase in the data. Results from the free text analysis are presented in the next section.

Methodological caveats

Given the nature of this project, there are several caveats that should be noted when interpreting the findings presented.

Findings demonstrate correlations that were observed in the available data sample. They should not be interpreted as necessarily implying causation. There may be other factors not captured in the data provided that explain the findings presented. We view these results as the beginning of conversations on how to interpret the results, not the end.

The findings represent results available from analysis of data from three local authorities – while efforts were made to select a representative sample of local authorities from across England, a degree of care should be exercised when extrapolating any

observations to a national landscape. We note that local authorities being willing to participate, and having the facilities and resources to enable data extraction is likely to be non-random, and potential selection bias should be borne in mind when considering general applications of these findings.

There are also differences in children's social care practice across the participating local authorities. For instance, one local authority in the sample operates a multi-agency safeguarding hub (MASH) at the front door of children's social care, with a range of professionals involved in deciding whether a referral requires further action.

Changes in the children's social care system also occurred across the time period for which data was extracted. For instance, the two-stage initial and core assessment approach was replaced with a continuous assessment approach part way through the data sample period (though at different precise time points for each local authority). Other events, such as Ofsted inspections, also influenced practice at some local authorities across the time period explored.

For several key areas explored, findings are based on data from a subset of participating local authorities, depending on which were able to share the relevant data. When findings relate to only one or two participating local authorities, this is clearly noted.

Overview of data sample

The table below presents a summary of the data sample that was ultimately analysed across the participating local authorities. As demonstrated, two of the participating local authorities (hereafter "LA1" and "LA2") were approximately the same size, with the third local authority ("LA3") being smaller in size.

Table 1: Overview of local authority data sample and key variables

Cases	Complete Sample	LA1	LA2	LA3
Total cases	123,131	50,723	56,776	15,632
Unique children	48,948	19,511	17,531	11,906
Mean number of times child seen in dataset	2.8	2.9	3.7	1.3
Percent subject to further action	52.8%	57.8%	41.3%	61.4%
Average age	7.9 years old	7.1 years old	8.1 years old	9.0 years old
Female	46.7%	47.6%	46.6%	45.4%
Child race				
White	43.2%	65.4%	33.2%	21.4%
Black	14.0%	7.7%	23.6%	21.6%
Asian	8.4%	13.4%	5.8%	3.9%

Cases	Complete Sample	LA1	LA2	LA3
Mixed/Other	12.8%	3.9%	17.5%	20.5%
Missing	18.9%	9.6%	19.8%	32.7%
Disabled	2.5%	3.3%	1.2%	3.0%
Team caseload	26.5	25.5	27.4	Not available
Referral Source				
Internal	14.6%	21.6%	9.6%	10.0%
Family	7.3%	7.2%	6.7%	10.0%
School	14.9%	13.5%	14.4%	21.6%
Medical	11.9%	8.7%	12.8%	19.4%
Legal	6.7%	8.1%	4.4%	10.3%
Non-Police Emergency	2.8%	1.8%	4.0%	2.0%
Police	28.1%	15.5%	36.5%	38.2%
Other	15.9%	23.7%	11.6%	6.0%
Referral Method				
Phone	28.8%	47.4%	12.2%	No data
Meeting	5.4%	10.2%	1.2%	No data
Email/Written	26.2%	20.1%	31.6%	No data
Visit/Internal	3.3%	4.4%	2.3%	No data
Legal	18.5%	0.5%	34.71%	No data
Missing	18.8%	17.8%	17.9%	No data

The next section moves to present key findings from the data analysis conducted, highlighting variables found to have a significant influence on the outcomes defined.

3. Key findings

This section presents the key findings that emerged from the project. It is organised by way of key areas of interest identified through analysis conducted. Headline messages for each area of interest are presented at the start of each sub-section. For a guide on how to interpret the figures presented, see Appendix A.

Regression analysis[21] was conducted with our outcome measures (further action, serious cases, and re-referral), assessed against all of the variables found in the data. Through all statistical analyses conducted, ten key variables emerged as having a significant marginal relationship with decision-making by social work practitioners, all else equal, with variation in outcomes observed across the data sample.

The ten key variables were:

A. Day of the week

B. Social worker caseload

C. Referral method

D. Referral source

E. Ethnicity and language

F. Other presenting child characteristics

G. Deprivation

H. Social worker experience

I. Social worker employment type (permanent or agency)

J. Time and system changes

---

[21] *"Regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modelling and analysing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables (or 'predictors'). More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed"* - Wikipedia contributors, "Regression analysis" *Wikipedia, The Free Encyclopedia,* (accessed March 30, 2016).

One clear message from the analysis is that, while there are patterns within local authorities, these patterns vary between the three local authorities in the analysis. This highlights the importance of considering local context when using the findings in this report to inform new practices. Findings in each local authority for each of these areas provide insight into factors, both behavioural and contextual, that may be influencing social worker decision-making. Findings from free text analysis also presented at the conclusion of this section.

Note that all variables contained in datasets provided to BIT were explored, but only observations relevant to the most interesting findings that emerged are presented in this section.

Findings presented for each of the ten key variables also reflect results after controlling for the influence of other variables. For instance, the observed correlation between day of the week and likelihood of proceeding to further action represents the additional influence, on top of other factors identified, that is attributable to the referral received on that day.

A note on reading this report

The majority of the graphs in this report are bar charts with two components, a dotted grey line and a thick black bar. The raw statistics for each variable (without controlling for the influence of other variables) are presented through the dotted grey lines. These are presented for information and completeness. However, looking at these lines alone can often be misleading. Even big differences can often be explained by other factors, which we have controlled for in our analysis.

As such, you should focus your attention on the thick black bars around the x axis at the bottom of each graph. These show the relative likelihood of an outcome compared to a defined baseline – showing how many percentage points more (or less) likely the defined outcome is than the baseline once we have controlled for the influence of other variables.

Some graphs are scatter charts for which we provide lines of best fit. These take the form of a continuous black line. The lines of best fit provide a representation of the estimated general trend whilst controlling for all other variables. For example, in Section F (Graph F.8), we describe the relationship between a child's age and the likehlidhood of one of their cases becoming serious. The line of best fit in this instance describes the general relationship between age and the estimated likelihood of becoming a serious case, whilst controlling for all other variables (gender and ethnicity for example).

As noted, this report is intended to start discussion and debate among the social work profession. While the results presented represent correlations only and do not necessarily show causation, they raise interesting questions about causation that may be testable. As such, we include a closing discussion for each of the key areas covered in this section entitled hypotheses/further discussion points. The assumed question behind each of these closing discussions is: "what else could the findings suggest?"

A final contextual factor worth pointing out is the significant differences observed across local authorities in the proportion of children who proceed to become a serious case. In particular, rates of a child becoming a serious case in LA2 are significantly lower than both LA1 and LA3. This observation links with differences observed between local authorities in the proportion of children who are 'looked after' out of home, or the subjects of child protection plans, with deprivation generally identified as the major explanatory factor.[22]

A: Day of the week

Headlines

- There are strong linkages between the day of the week that a referral was received and subsequent decisions – however, these linkages are stronger within LA1 and LA3, with most patterns not consistent across all three local authorities.

- One consistent finding is that referrals received over the weekend are least likely to proceed to further action, despite higher numbers of these referrals that subsequently progress to become a serious case in LA1.

Previous behavioural research has shown the effects of 'decision fatigue' - that is, how tiredness that comes from making decisions repeatedly can affect patterns of decisions made over time. For example, judges have been shown to be more likely to make decisions that challenge the status quo after lunch breaks and in the morning than at other times.[23]

We investigated the relationship between the day of the week that a referral was received and the subsequent decision on whether that referral should proceed to further action, as well as whether the referral eventually became a serious case.

We found strong patterns within local authorities but contradiction in the patterns across local authorities. This may be attributable to differences in how each local authority manages its workload across the week.

For LA1, referrals received on a Monday were observed to be most likely to proceed to further action. The relative likelihood of further action is lower on all other days, with referrals received on Friday and Saturday the least likely to proceed to further action. (Note that the thick black bars indicate the relative likelihood of progressing to further action, controlling for other factors. The thin dotted lines indicate the raw proportion progressing to further action before other factors have been controlled for).

---

[22] Bywaters, P (2015) 'Inequalities in Child Welfare: Towards a New Policy, Research and Action Agenda', British *Journal of Social Work*, 45 (1): 6-23.

[23] Danziger S, Levav J, & Avnaim-Pesso L (2011) 'Extraneous factors in judicial decisions', *Proceedings of the National Academy of Sciences*, *108*(17), 6889-6892.

**Figure A.1 – Proportion of referrals proceeding to further action by the day of the week the referral was received (LA1)**
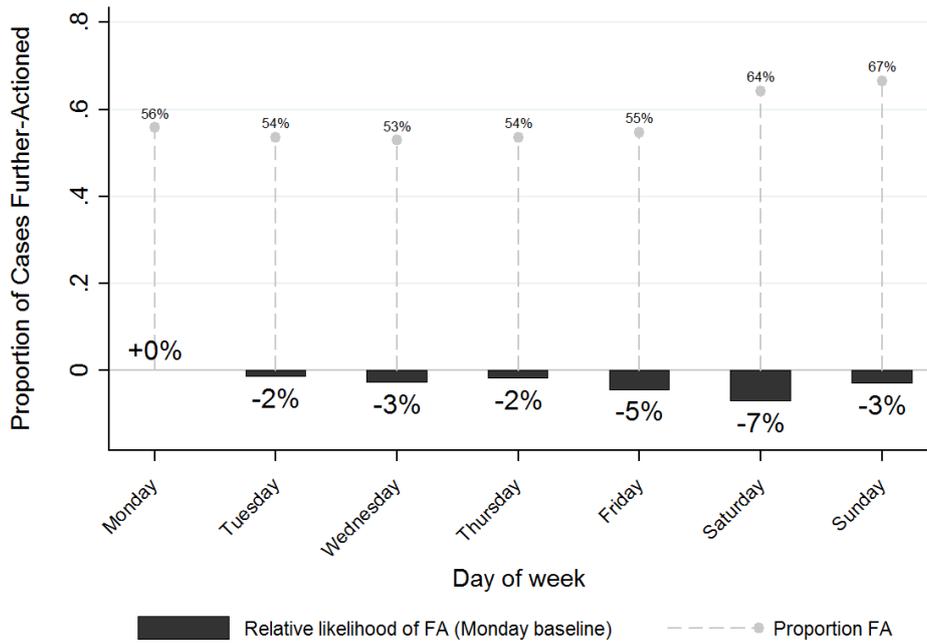
Conversely, referrals received on a Saturday or Sunday at LA1 were more likely to develop into a serious case, when controlling for other factors. Referrals received on a Friday were least likely to become a serious case. This indicates a mismatch in LA1 with referrals received over the weekend less likely to proceed to further action but more likely to subsequently become a serious case.

Figure A.2 – Proportion of referrals becoming a serious case by the day of the week the referral was received (LA1)
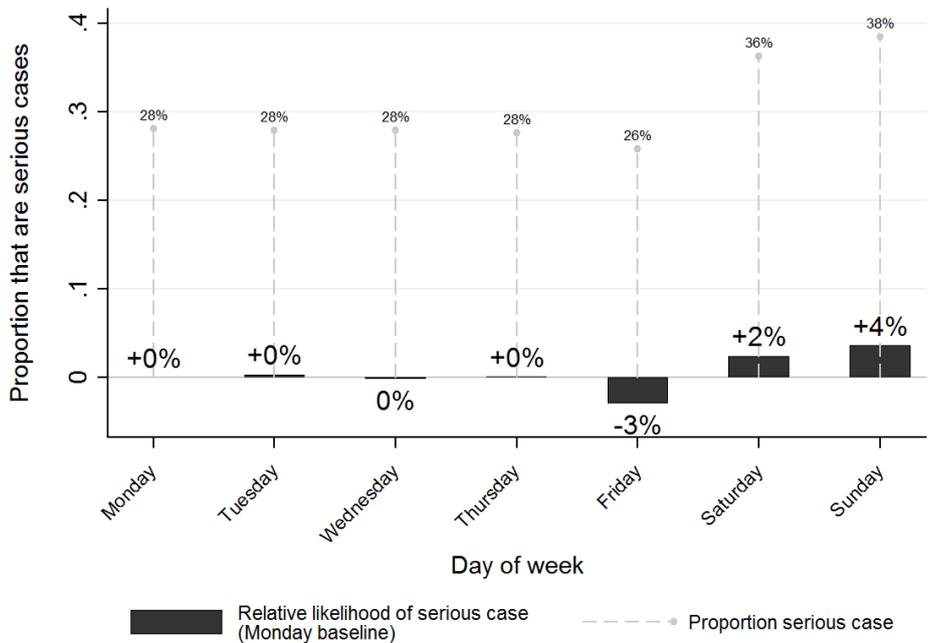
In LA2, there was little variation observed in the likelihood of a referral proceeding to further action across weekdays, although there is a slightly higher likelihood of further action on Wednesdays and Fridays. Compared to all weekdays (including Monday), referrals received on a Saturday or Sunday are less likely to result in further action.

Figure A.3 – Proportion of cases proceeding to further action by the day of the week the referral was received (LA2)
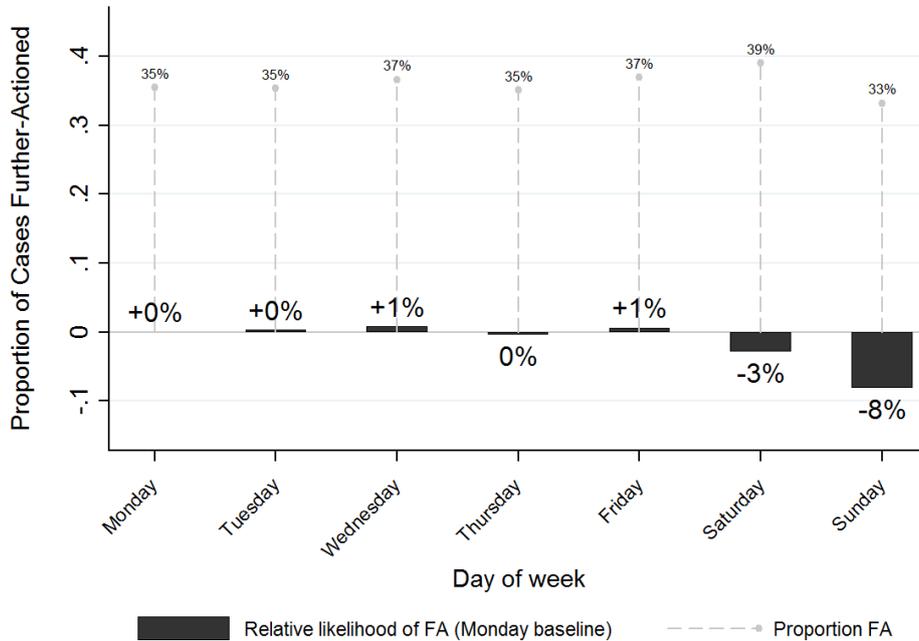
In LA2, the likelihood of a referral progressing to become a serious case was relatively static across each day of the week, with referrals received on Thursday and Sunday 2 percentage points less likely to proceed to further action when other factors were controlled for.

Figure A.4 – Proportion of referrals becoming a serious case by the day of the week the referral was received (LA2)

34
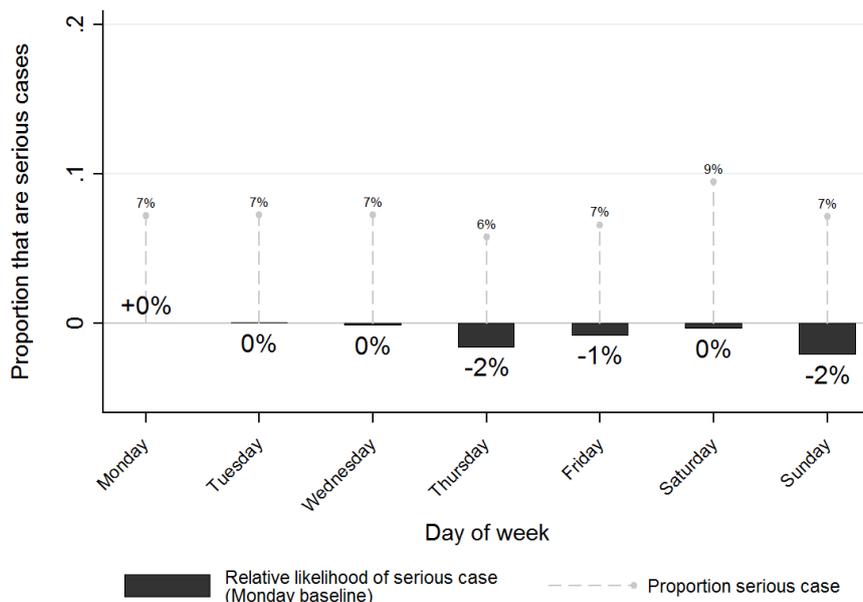
In LA3, referrals received later in the week were more likely to proceed to further action, with Thursday the day on which there was the greater likelihood of further action. Again, referrals received on the weekend were less likely to proceed to further action.

Figure A.5 – Proportion of referrals proceeding to further action by the day of the week the referral was received (LA3)
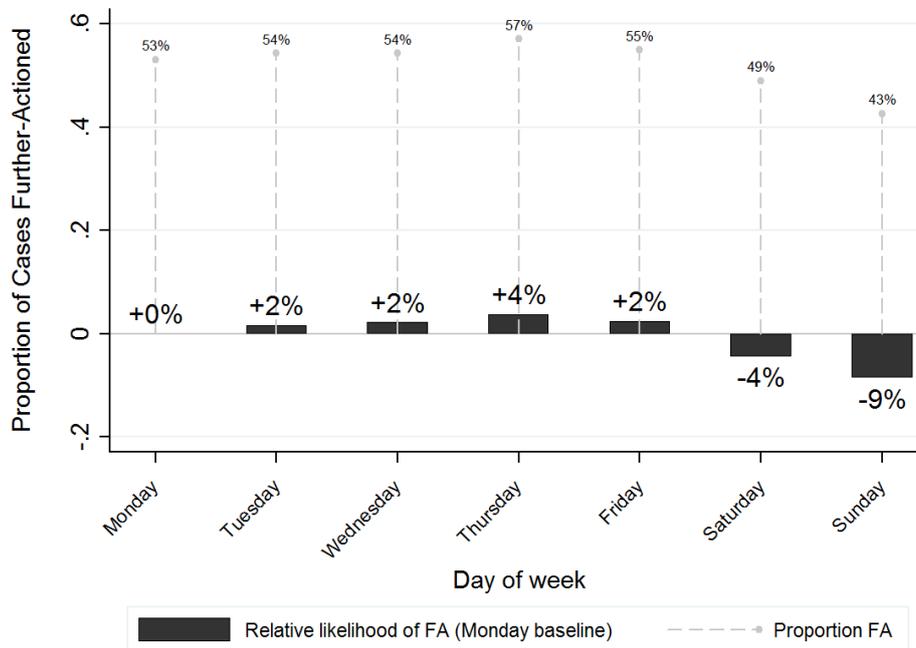
Unlike other local authorities, for LA3 referrals received on a Saturday or Sunday were the least likely to ultimately become a serious case. Referrals received on a Friday were also less likely to proceed to become a serious case, but in absolute terms and after controlling for other factors in our data.

Figure A.6 – Proportion of referrals becoming a serious case by the day of the week the referral was received (LA3)
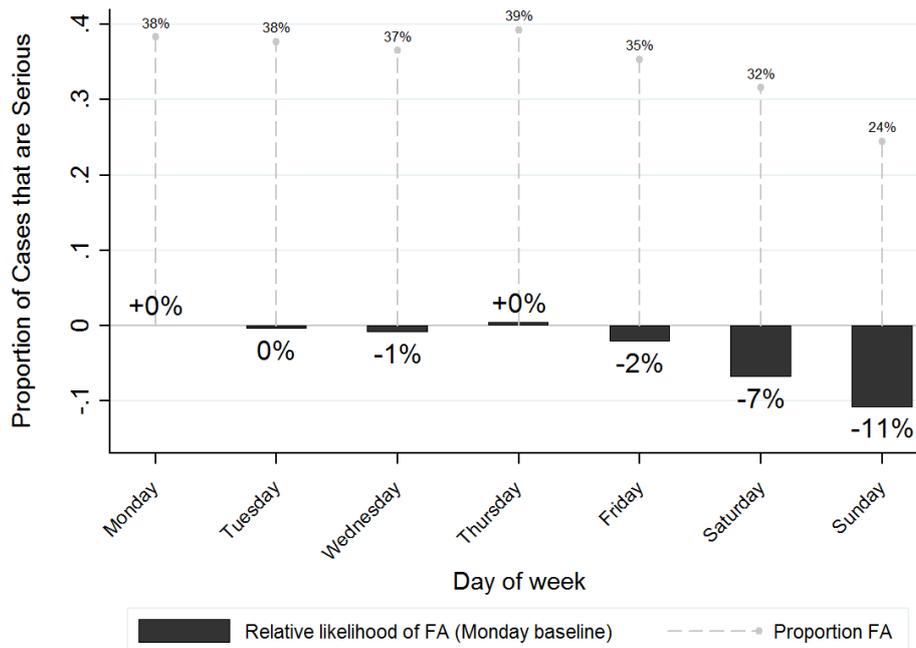
Hypotheses/further discussion points

- Does the structure of social work shift patterns (such as having a new duty team start on a Monday; or having reduced staff available on the weekend) affect decision-making patterns?

- If a single person (Manager or Supervisor) is ultimately reviewing the recommendations of social workers about whether to progress a referral to further action, are they being influenced by system factors (such as resources available or wider system pressures) in determining how many children should proceed to further action?

- In other contexts, frequent, sequential professional decision-making has been shown to lead to mental fatigue, causing different, sometimes lower quality decision-making patterns.[24] Could this 'decision fatigue' play a role in how decision are made earlier in the week when staff are refreshed after the weekend? Irrespective of the direction (more or less further action decisions than on other days), it could be that this is a result of staff having more energy and making more considered decisions on Mondays than on other days.

B: Social worker caseload

Headlines

- The social worker caseload has different relationships with decision-making outcomes at the local level. At LA1 and LA3, the higher the case load at the time of the referral, the lower the proportion of referrals progressed to further action, but the reverse is true of LA2.

Being busy can impact how we make decisions. As such, we report the relationship between caseload and the proportion of referrals that proceed to further action.

Note that caseload could only be measured at the team level given data availability. The scatterplots below link team caseload at the time a new referral is received to the likelihood of that referral proceeding to further action.

There is a divergence in findings across the three local authorities. For LA2, higher team caseloads at the time of the referral being received are observed to result in fewer referrals progressing to further action.

However, for LA1 and LA3, a link can be observed between increased team (at LA1) and service (at LA3) caseloads and a decreased likelihood that a referral will proceed to further action. The size of these relationships varies, however. In LA1, an increase of the team caseload of 10 (against a mean of 26) cases would be associated with a

---

[24] Danziger S, Levav J, & Avnaim-Pesso L (2011) 'Extraneous factors in judicial decisions', *Proceedings of the National Academy of Sciences* (PNAS), 108 (17): 6889-6892.

3.8 percentage point decrease in the likelihood of a given case proceeding to further action. In LA3, shown in B3, an increase in the service caseload of 1,000 cases (against a mean of 2542) is associated with a 2.9% point decrease in the likelihood of a given case proceeding to further action.

Figure B.1: Likelihood of progressing from referral to further action given team caseload (LA1)
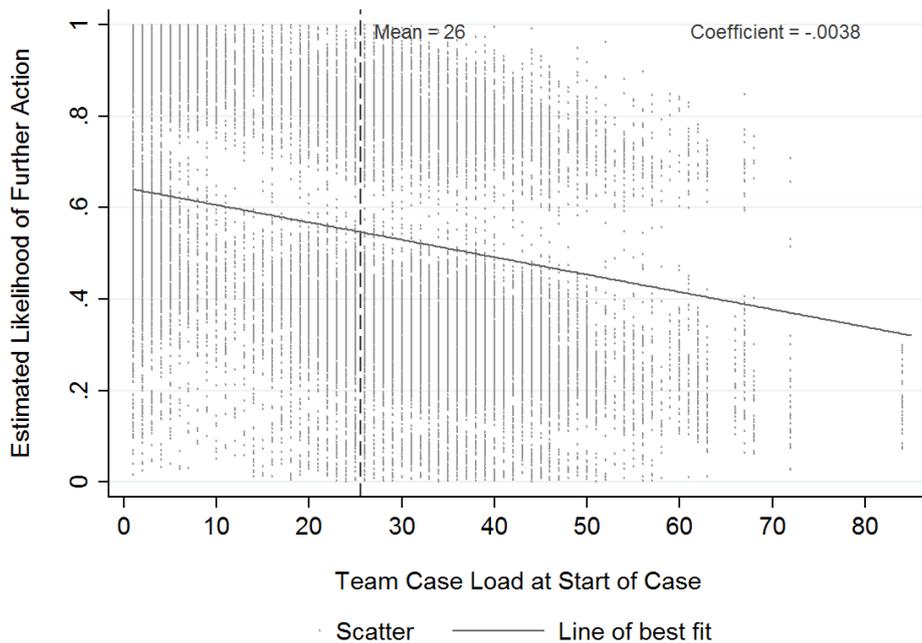
At LA2, the direction of the relationship is reversed. However, a relative increase in caseload is also having less impact on the probably of proceeding to further action. In LA2, an increase in team caseload of 10 cases (against a mean of 27) is associated with a 0.8% point increase in the probability that the case will proceed to further action.

Figure B.2: Likelihood of progressing from referral to further action given team caseload (LA2)
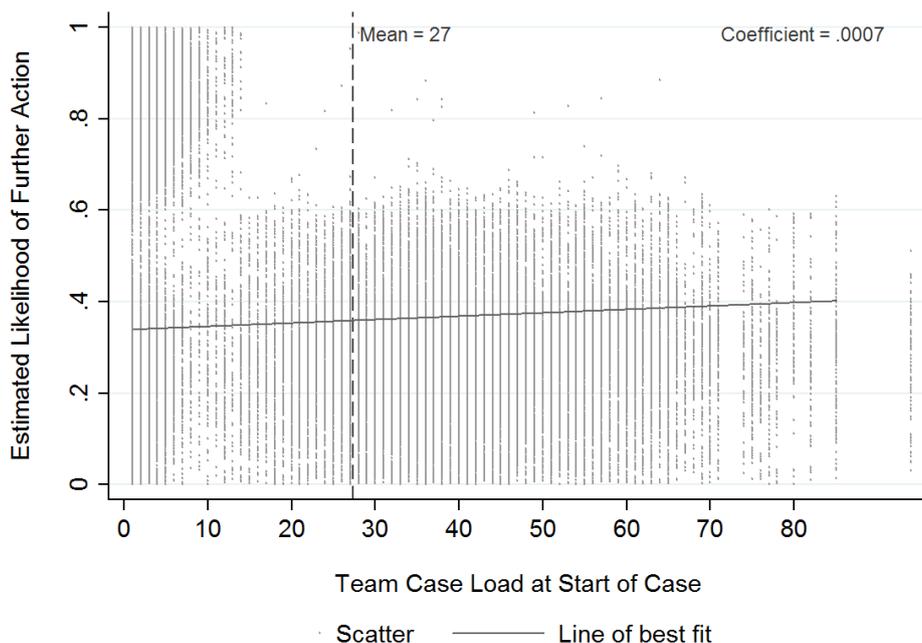
Caseload data from LA3 was not available at the team level. Instead, the service-wide caseload (i.e. number of open cases at the time the referral was received) have been plotted against the likelihood that the new referral would proceed to further action.

Figure B.3: Likelihood of progressing from referral to further action given overall service caseload (LA3)
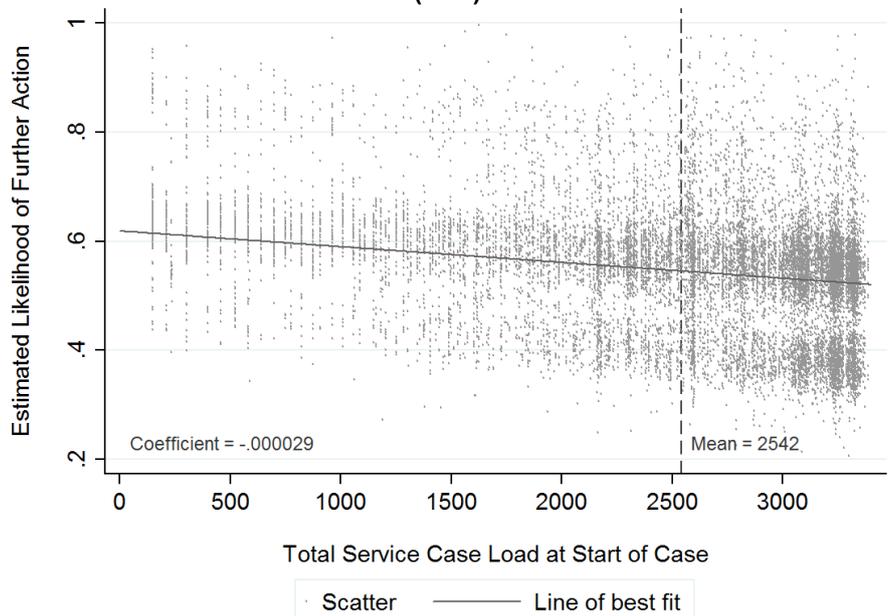
On likelihood of becoming a serious case, a more consistent pattern can be identified. Although weak in some cases, larger caseloads unanimously correlate with reduced instances of referrals becoming serious. This may be in line with expectations as the most complex referrals (the ones most likely to become serious) may be given to staff in teams with smaller caseloads as they require more investigation. The strength of this relationship is weak, however: in LA1, an increase in caseload of 10 cases is associated with a 2.1% point decrease in the rate of becoming a serious case, while in LA2 the same increase in caseload is only associated with a 0.1% point change.

Figure B.4: Likelihood of becoming a serious case given team caseload (LA1)
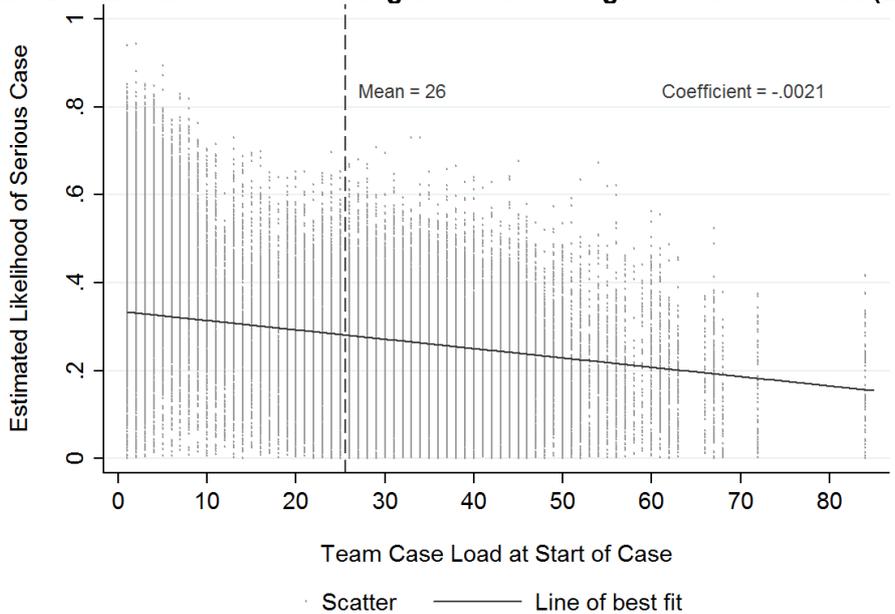
Figure B.5: Likelihood of becoming a serious case given team caseload (LA2)
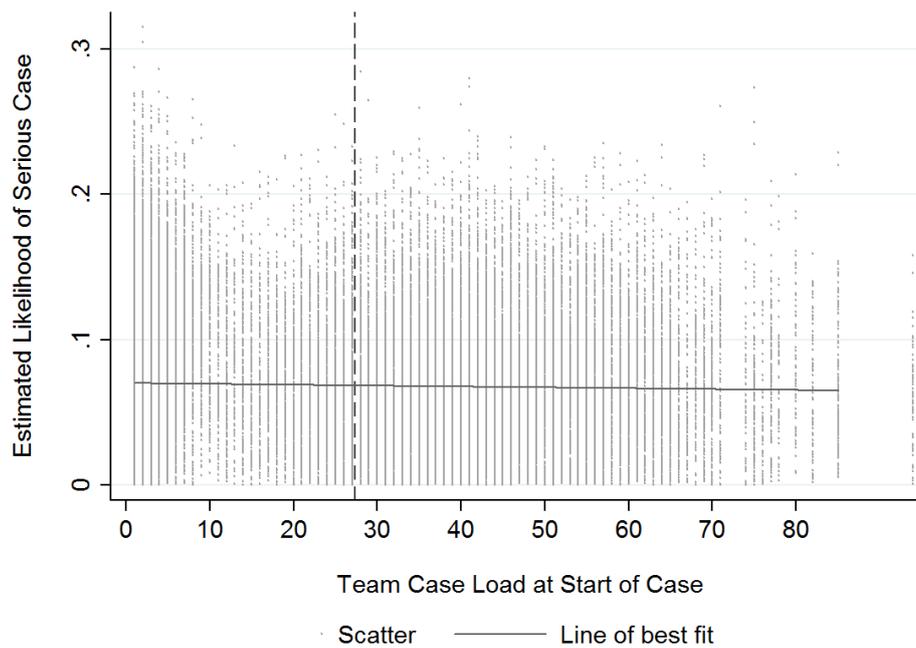
Figure B.6: Likelihood of becoming a serious case given overall service caseload (LA3)
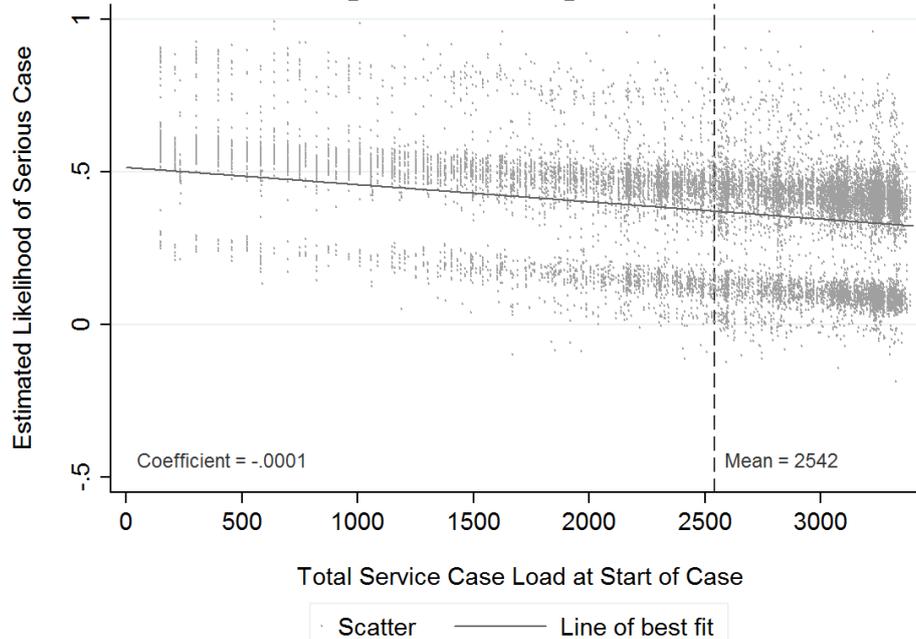
On the likelihood of a referral being subject to no further action (without becoming a serious case), and then returning to children's social care as a repeat referral, differing results were found across local authorities.

For LA1, there was a strong correlation between team caseload and the likelihood that a referral would be subject to a later repeat referral, with an increase in caseload of 10 cases being associated with a 3.7 percentage point increase in the probability of re-referral.

Figure B.7: Likelihood of a referral being subject to a later repeat referral given team caseload (LA1)
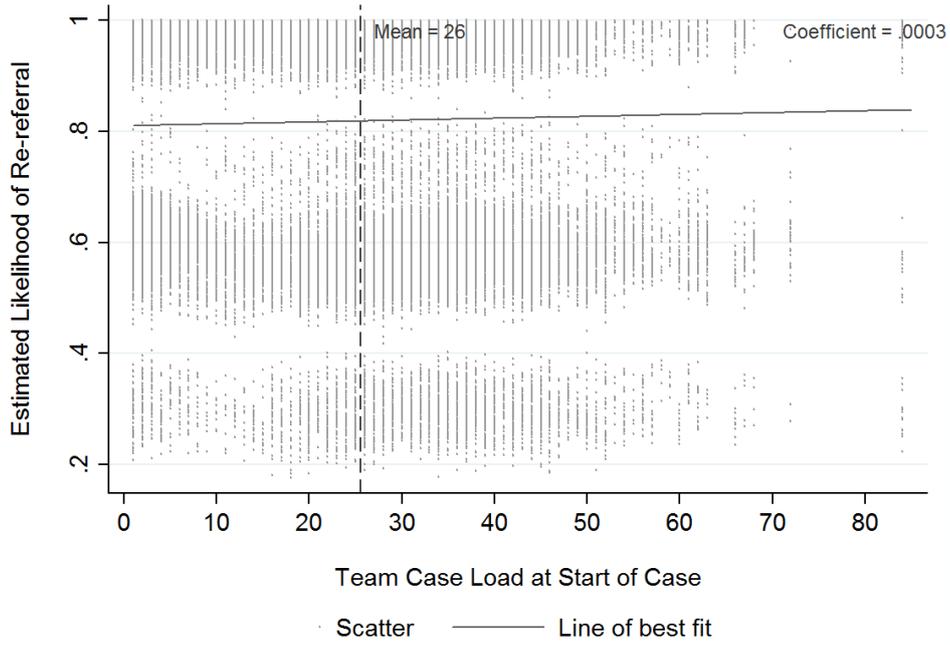
However, for LA2 and LA3, higher caseloads were observed to lead to a lower likelihood of repeat referral.

Figure B.8: Likelihood of a referral being subject to a later repeat referral given team caseload (LA2)
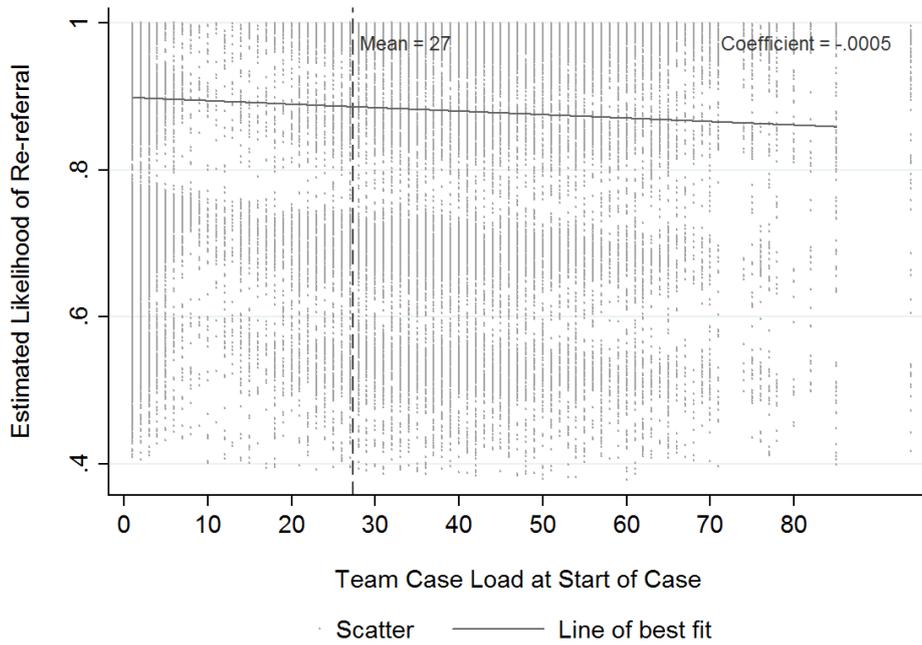
Figure B.9: Likelihood of a referral being subject to a later repeat referral given overall service caseload (LA3)
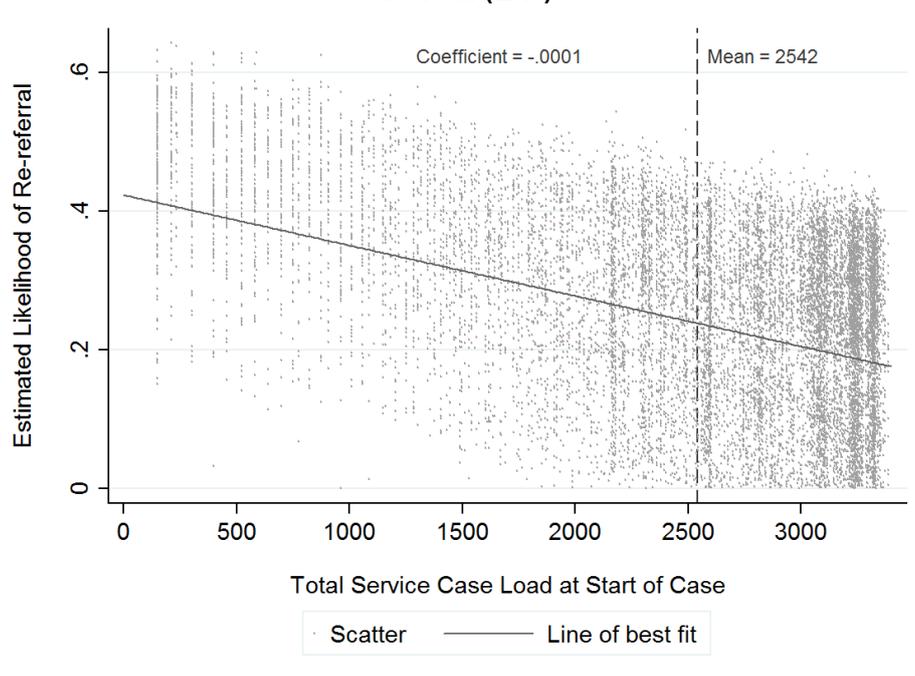
There appear to be different patterns across the likelihood of a referral progressing to further action and the likelihood of repeat referral across the local authorities. For LA1, higher caseload is linked with reduced further action and increased likelihood of repeat referral. However, this pattern is reversed across LA2 and LA3, with higher levels of initial further action and lower likelihood of repeat referral. This suggests that local factors may be contributing to the patterns being observed.

Hypotheses/further discussion points

- Do resource constraints limit the total number of cases that can be progressed from referral to further action, meaning that the proportion of cases subject to further action changes as the caseload increases?

- What other factors might come into play? For example, could time pressure mean that the social worker has less time to seek out more information or consider in more detail the vulnerability of a given child when they already have a higher caseload? Could the sheer volume of cases create a sense that the issues that children are referred with are normal, thereby creating a higher threshold for further action? Could decision fatigue play a role?

- Decision fatigue may also be an issue with higher caseloads. However, would this factor lead to a higher likelihood of further action as the social worker has less time to make a determination, thus progressing a referral to further action to avoid future risk? Or are they more likely to not take further action as they feel like they (and likely their colleagues) already have plenty of work to do?

- Could the amount of process and/or paperwork to record a particular decision at the point of referral be influencing outcomes? For instance, if it takes more process and paperwork to record a decision not to take further action, does this mean that in times of high caseload, social workers are more likely to progress a referral to further action given the reduced effort required?

C: Referral source

Headlines

- Referrals received from an internal source (e.g. other social care colleagues) are most likely to proceed to further action, while referrals originating from family members are generally least likely to proceed (with one notable exception).

- Referrals from school sources were also highly likely to proceed to further action and become a serious case at LA1.

The source of the referral about a potentially vulnerable child was also observed to have an influence on decision-making outcomes.

Studies of social-work decision-making have shown how some types of evidence are given greater weight than others.[25] The source of the evidence has also been found to skew the response it receives – for instance, more attention may be paid to concerns made by other professionals than to those made by neighbours and relatives.[26]

More broadly, behavioural science tells us that the messenger can make a big difference when determining how to act on information. Of course this is often a perfectly reasonable influence; some messengers are more reliable than others, after all, but we can also be influenced by less robust factors, such as how much we like someone or whether they are a peer, for example.

For analytical purposes, several major categories of referral source (or messenger) were defined, namely:

- Internal (i.e. from another source within the local authority, generally another social care colleague)

- School

- Family member

- Medical

- Legal

- Police

- Emergency services

- Other

---

[25] Ward H, Brown R & Hyde-Dryden G (2014) 'Assessing Parental Capacity to Change when Children are on the Edge of Care: an overview of current research evidence', Research Report, Centre for Child and Family Research, Loughborough University, June.
[26] Munro E (1999) 'Common errors of reasoning in child protection work,' *Child Abuse & Neglect*, 23(8): 745-758; Kirkman E & Melrose K (2014) 'Clinical Judgement and Decision-Making in Children's Social Work: An analysis of the "front door" system', A report by the Behavioural Insights Team, London: Department for Education.

When investigating messenger effects in the data, we unsurprisingly found that the source of the referral does seem to matter. What was interesting was that the patterns were different for each local authority.

Robust data on referral source was available from LA1 and LA2. This field only became regularly used at LA3 later in the time period analysed for this report, resulting in lower levels of use. Findings from LA3 should thus be treated with caution. In LA1, referrals from internal sources led to a much higher probability of further action and were 15 percentage points more likely to become a serious case. Referrals from family sources were least likely to progress to further action, and were also least likely to become a serious case. However, referrals from family sources were the most likely to be subject to a repeat referral. However, in our sample, none of the repeat referrals that had previously not progressed to further action ever became a serious case.

Figure C.1: Likelihood of progressing from referral to further action given referral source (LA1)
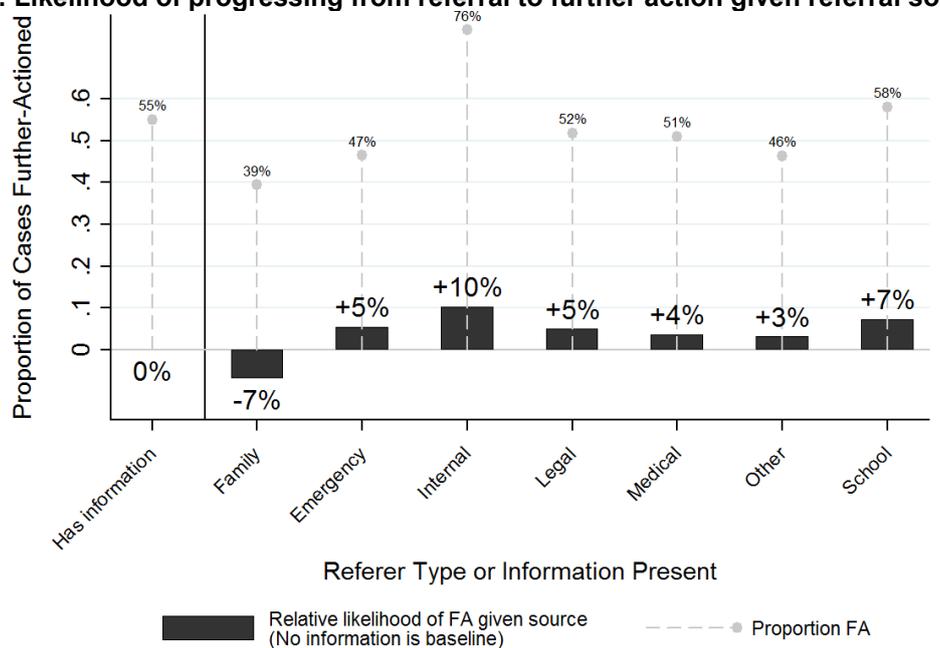
Figure C.2: Likelihood of becoming a serious case given referral source (LA1)
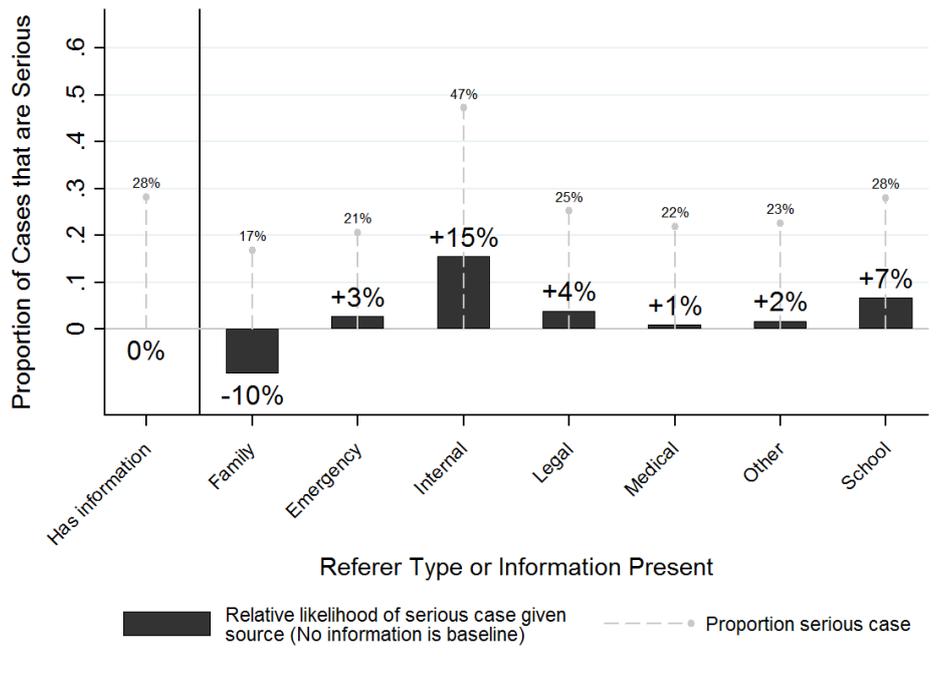
Figure C.3: Likelihood of a referral being subject to a later repeat referral given referral source (LA1)
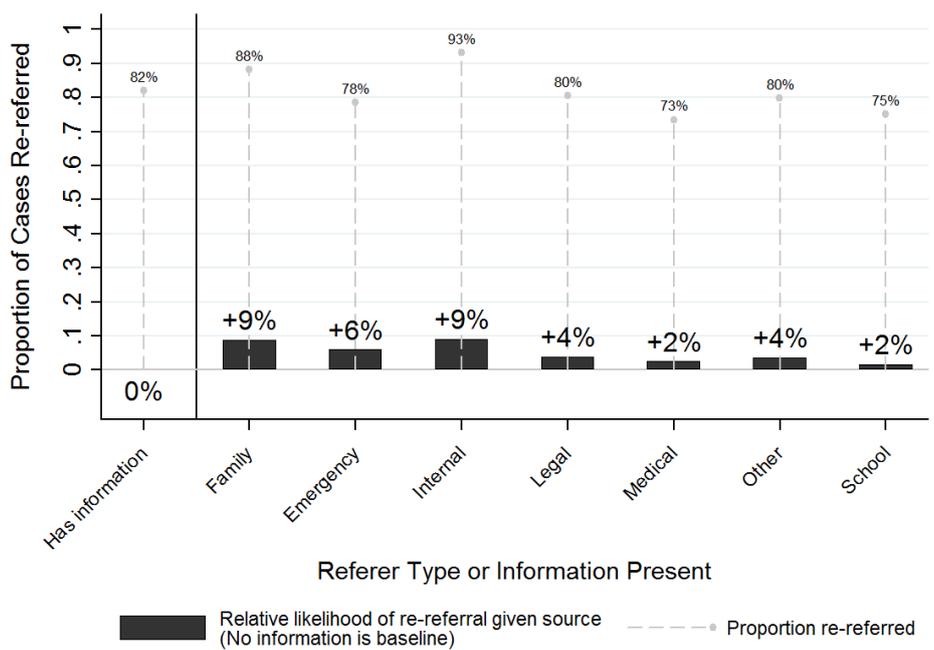
In LA2, internal sources were again more likely to result in a referral proceeding to further action, but school sources were even more likely to progress to further action. Further, referrals from internal and school sources were the least likely to be subject to later repeat referral.

Interestingly, however, it is legal sources of a referral that result in more than twice the average rate of serious cases, with internal and school sources only slightly more likely to become a serious case.

Figure C.4: Likelihood of progressing from referral to further action given referral source (LA2)
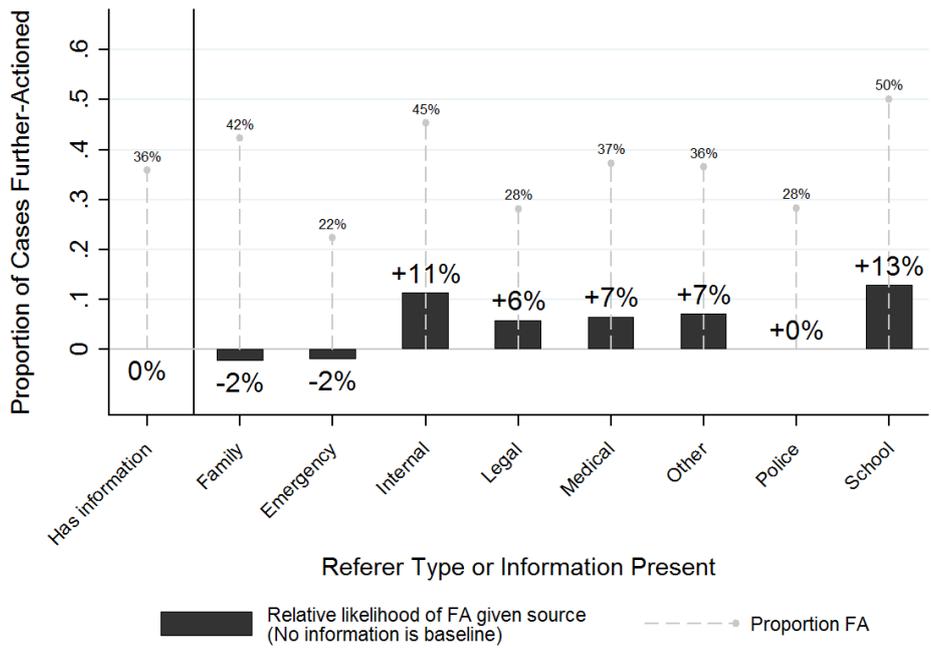
Figure C.5: Likelihood of becoming a serious case given referral source (LA2)
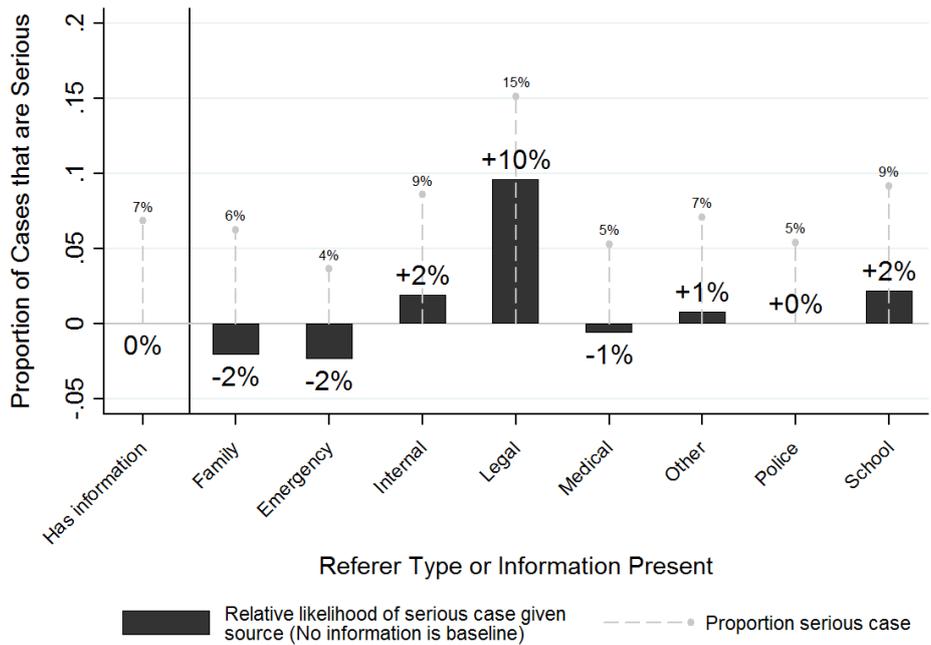
Figure C.6: Likelihood of a referral being subject to a later repeat referral given referral source (LA2)

Relative likelihood of re-referral after initial NFA ('Other' is baseline) ⬛ — — —●— Proportion re-referred
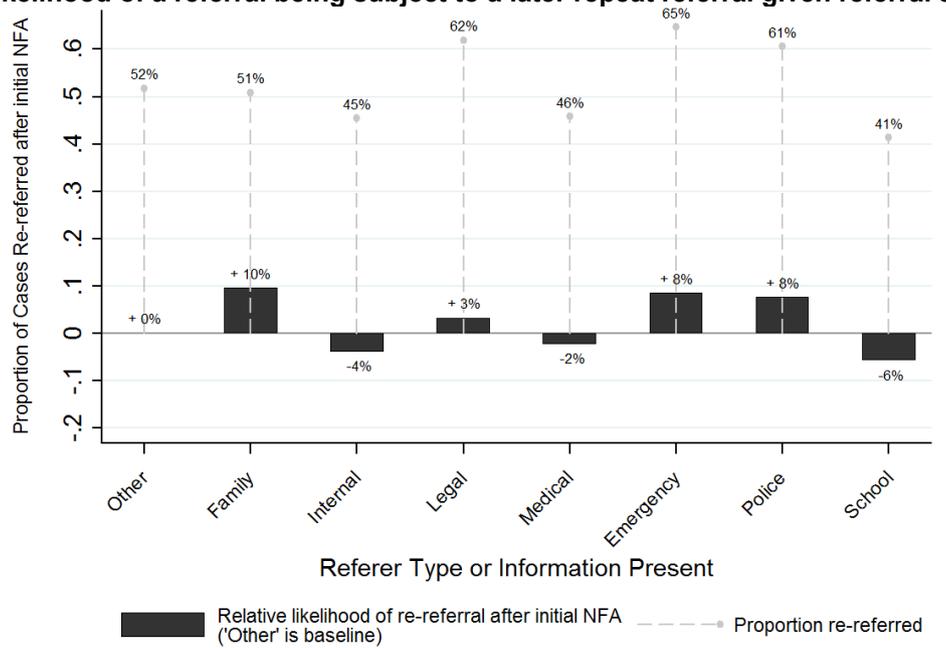
For LA3, only limited data was captured on the source of the referral. In general, when the source of the referral was captured in the data system, it was much more likely to proceed to further action, when other factors are controlled for.

For those referrals which did record information on the referral source, interestingly referrals from family sources were the most likely to proceed to further action. This finding is directly contradictory to the other local authorities. However, referrals from internal sources remained highly likely to proceed to further action, even after other factors associated with the case are controlled for.

Figure C.7: Likelihood of progressing from referral to further action given referral source (LA3)

Relative likelihood of FA given source ⬛ — — —●— Proportion FA
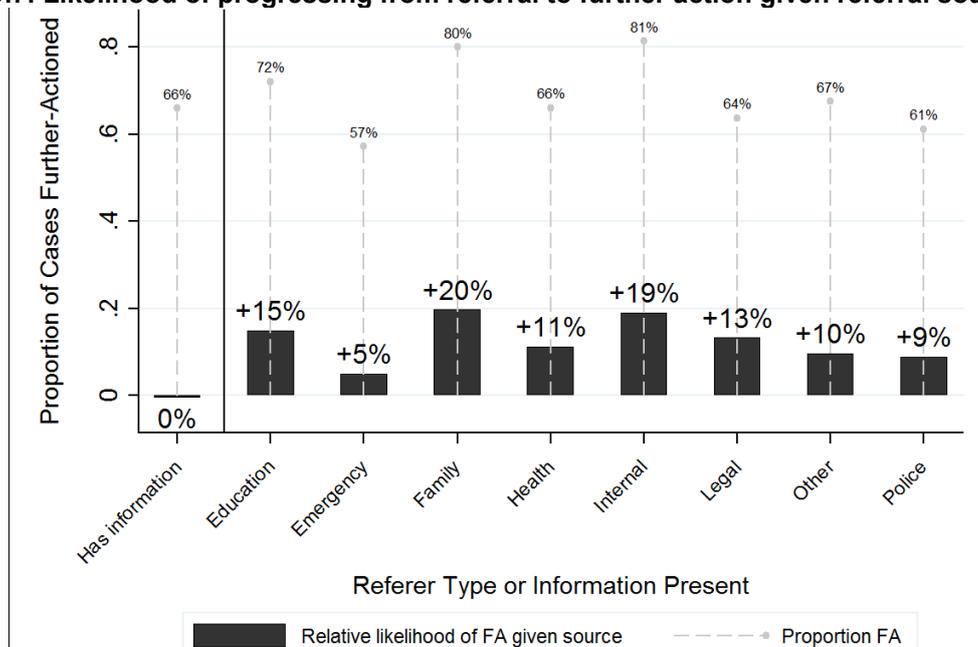
Hypotheses/further discussion points

- Is information about the referral provided to social workers in different forms across these main sources? If so, could the difference in presentation of the information be driving the outcome, and not the source necessarily? For instance, referrals received from the police anecdotally can be in a form that is more difficult to digest – does this mean that social workers are less likely to progress a referral to further action given the additional 'noise' associated with the referral form?

- Are referrals from family sources overweighted or underweighted? While they are least likely to proceed to further action and become a serious case, they are most likely to be subject to a repeat referral. However, those repeat referrals are also less likely to become a serious case.

- Are referrals from internal and other professional sources more likely to proceed to further action because they are unconsciously more influential to the social worker or because information is presented in a neater form?

- Similarly, are referrals from family sources less likely to proceed to further action because the source is perceived as less knowledgeable or reliable or because information may be presented in a harder form to translate?

D: Referral method

Headlines

- Referrals arising from other social care colleague visits or from internal sources are both most likely to progress to further action and to develop into a serious case.

- Email and written methods of referral are least likely to progress to further action, and least likely to subsequently become a serious case.

We know from previous BIT research that people act differently on the basis of different message media. As expected, different methods of referral play out in different ways.

Similarly to referral source, referral method was found to have an influence on outcomes. Several categories of referral method were defined for analytical purposes, namely:

- Phone
- Meeting
- Email or written communication
- Visit by social worker or internal source[27]
- Other

---

[27] This could include a number of situations. For example, they could be visits by a non-social work staff member (e.g. a family support worker). They could also be a visit by another social care colleague that relates to a different family or child based at the same address.

Data on referral method was available at LA1 and LA2. Interestingly, a different referral method had the strongest relationship with the likelihood of further action in each of these authorities.

For LA1, referrals arising through visits or internal sources (generally through engagement with a child by another social worker in the local authority) were most strongly associated with proceeding to further action (along with 'other' sources). Email and written methods of referral resulted in the fewest incidents of further action.

Figure D.1: Likelihood of progressing from referral to further action given referral method (LA1)
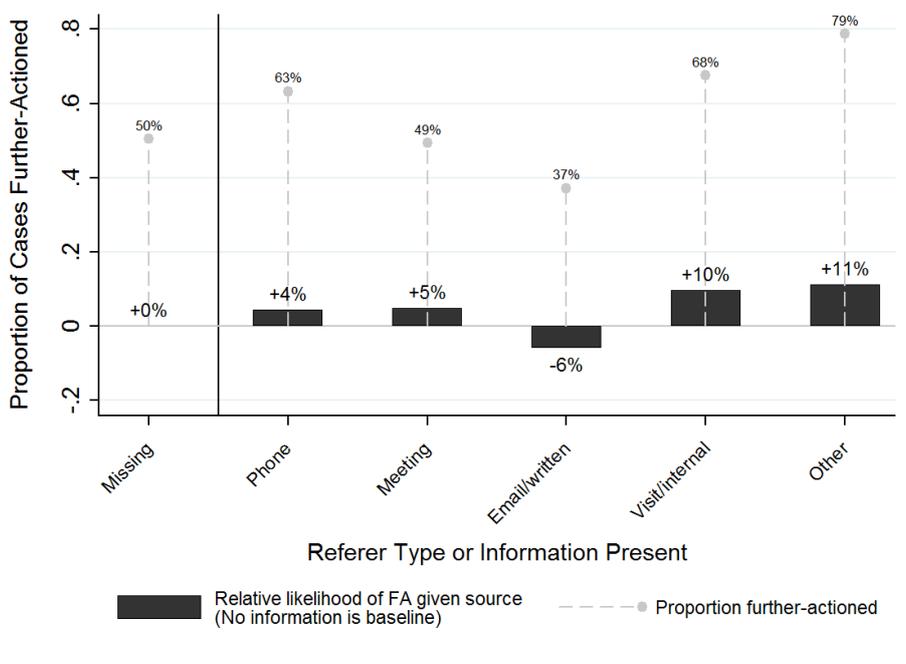
For LA2, data availability was more limited, with a high proportion of missing data fields. Of note is that referrals from an email or written method were still the least likely to proceed to further action.

Figure D.2: Likelihood of progressing from referral to further action given referral method (LA2)
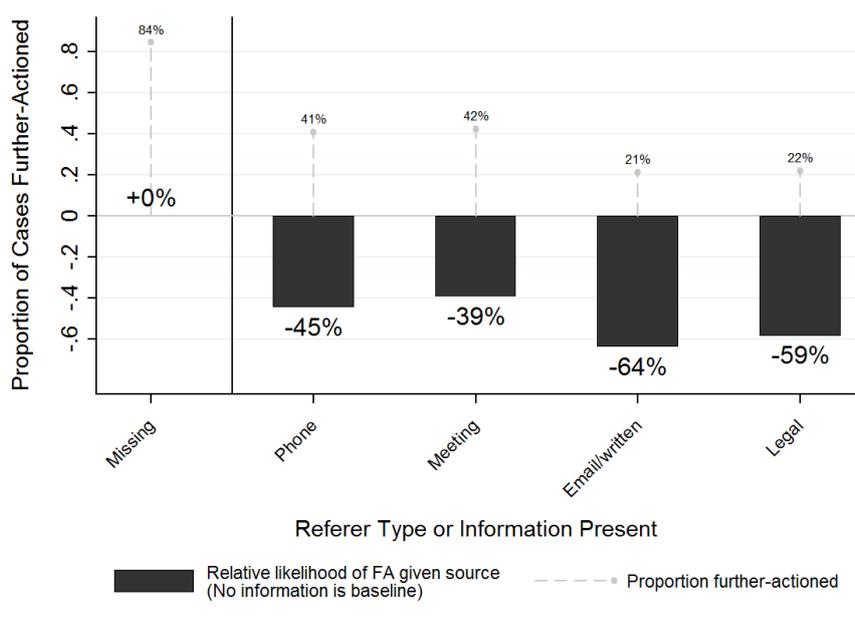
On the likelihood of becoming a serious case, at LA1 referrals that arose from an internal or visit method were most likely to become a serious case. The email/written referral method was least likely to result in a referral becoming a serious case.

Figure D.3: Likelihood of becoming a serious case given referral method (LA1)
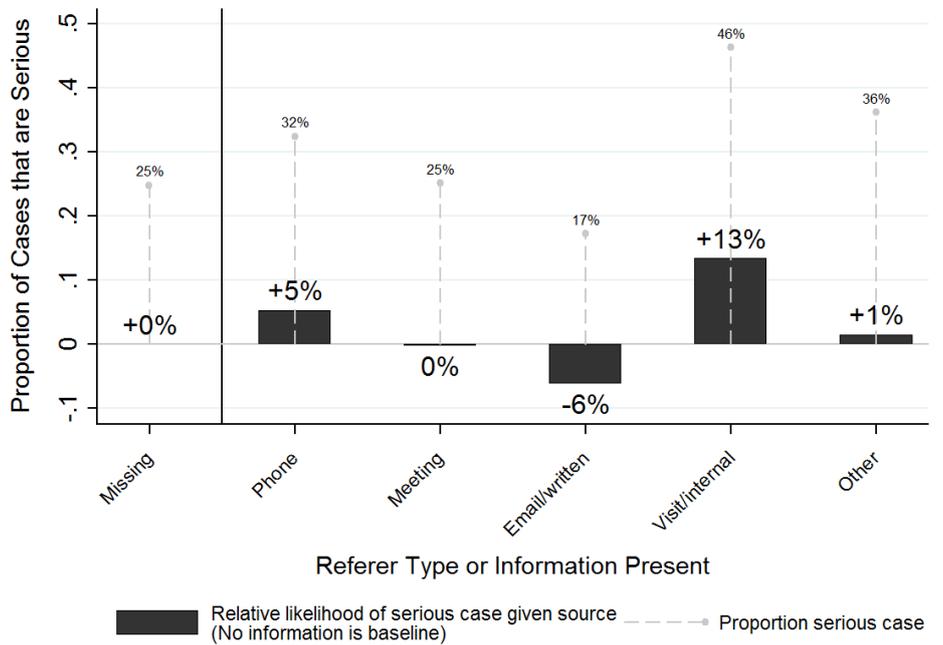
At LA2, the email/written referral method was again least likely to result in a referral becoming a serious case, all else being equal. Interestingly, legal methods of referral were also less likely to become a serious case.

Figure D.4: Likelihood of becoming a serious case given referral method (LA2)
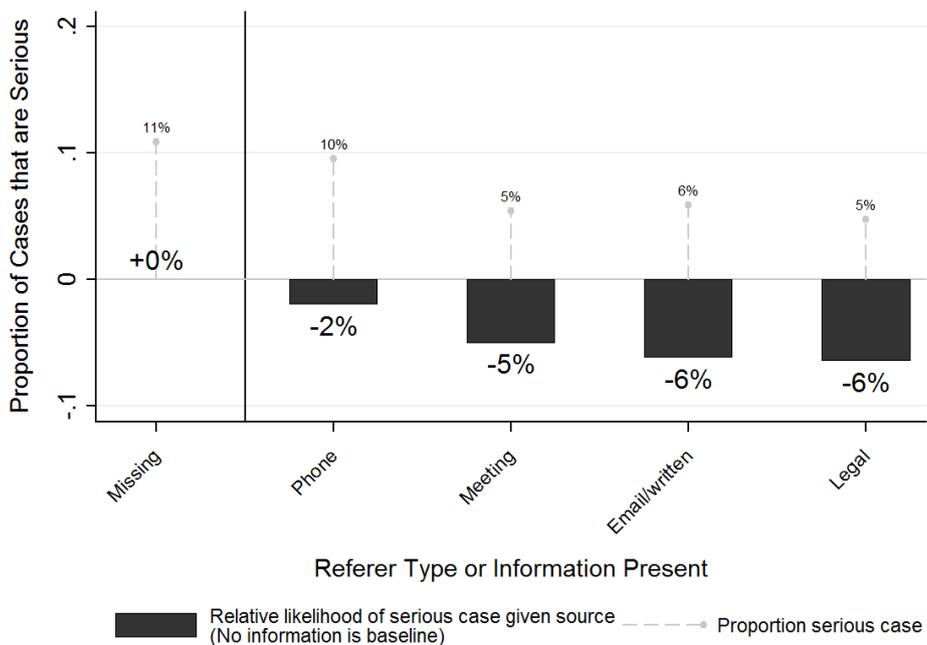
Hypotheses/further discussion points

- Is the decision by the referral source about which method to use to make the referral linked to their judgements of the seriousness of the case? Is the referral method chosen by the referral source also interpreted by the social worker? For instance, is it perceived that email or written methods are used for cases that the referral source thinks are less serious?

- Referrals stemming from social care staff visits and other internal sources are most likely to proceed to further action and most likely to become a serious case. Is this a sign of good judgment on the part of the social workers as the small number of cases they refer for further action often prove to be serious? Conversely, could this be a sign of under-referrals following visits, perhaps because it seems the assessment has already been completed and a watch and wait approach is deemed acceptable? Further, could this mean that children's service cases are being held for longer in less resource intensive or lower-level family services, and only escalated when they become quite serious?

- Are face-to-face or personally-engaging (i.e. calls) referral methods more visible and emotional to the social worker, so more likely to be remembered and potentially progress to further action?

- Email and written referral methods are consistently the least likely to proceed to further action. Is this because the content of the email or written communication is harder for social workers to encode, or because there is less ability for social workers at the front door to proactively obtain all relevant information from the person making the referral? Further, are email or written referrals less powerful because of the lack of personal engagement with the social worker making the decision?

- Alternatively, given that our model cannot be fully exhaustive, it is possible that email referrals were, even controlling for all other factors in our data, systematically less urgent than other cases because of factors that we can't observe?

E: Ethnicity and language

Headlines

- Children from non-white ethnic groups are more likely to be referred for further action and are more likely to become a serious case.

- Children for whom English is a second language and children who do not speak English are more likely to be referred for further action, no more likely to become a serious case and less likely to become the subject of a repeat referral.

We were interested in whether ethnicity or language was predictive of key decision outcomes. A substantial body of research shows that decision-makers, even professionals, can allow factors that may not be relevant, such as race, to unduly influence decisions.

All participating local authorities were able to provide data on the ethnicity of the child. The results are striking – compared to referrals about a white child, those relating to a black, Asian, or mixed race child are significantly more likely to proceed to further action. For LA2, language is also recorded, which means that this relationship between ethnicity and further action is additional to the correlation attributed to non-English speaking, which may otherwise have been correlated with at least some of our ethnicity variables, as well as further action. The grey bars show that, controlling for other material factors, children of non-white recorded ethnicity are more likely to proceed to further action. This finding is consistent across all three local authorities.

Figure E.1: Likelihood of progressing from referral to further action given child ethnicity (LA1)
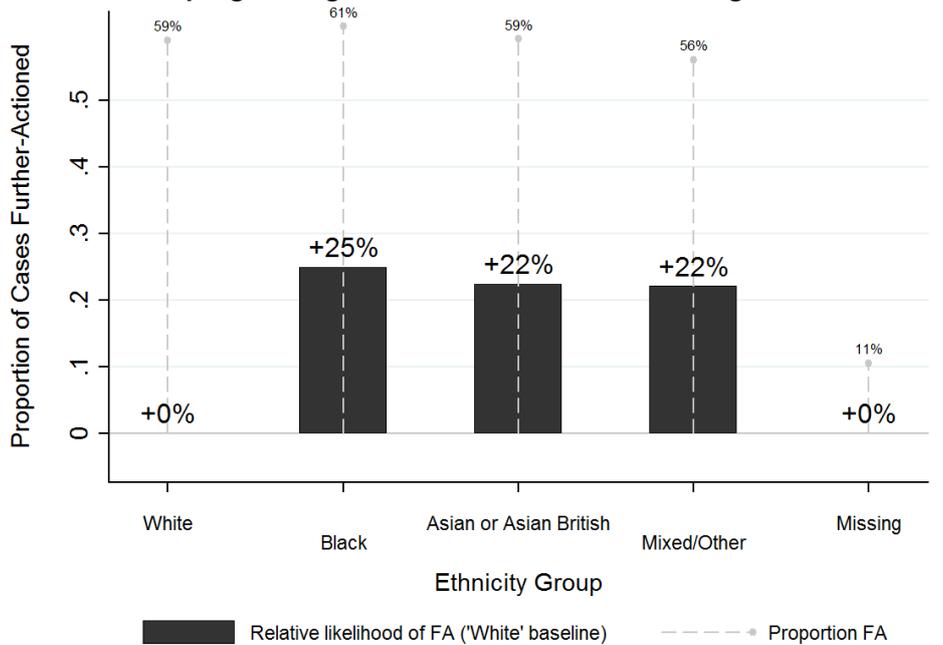
Figure E.2: Likelihood of progressing from referral to further action given child ethnicity (LA2)
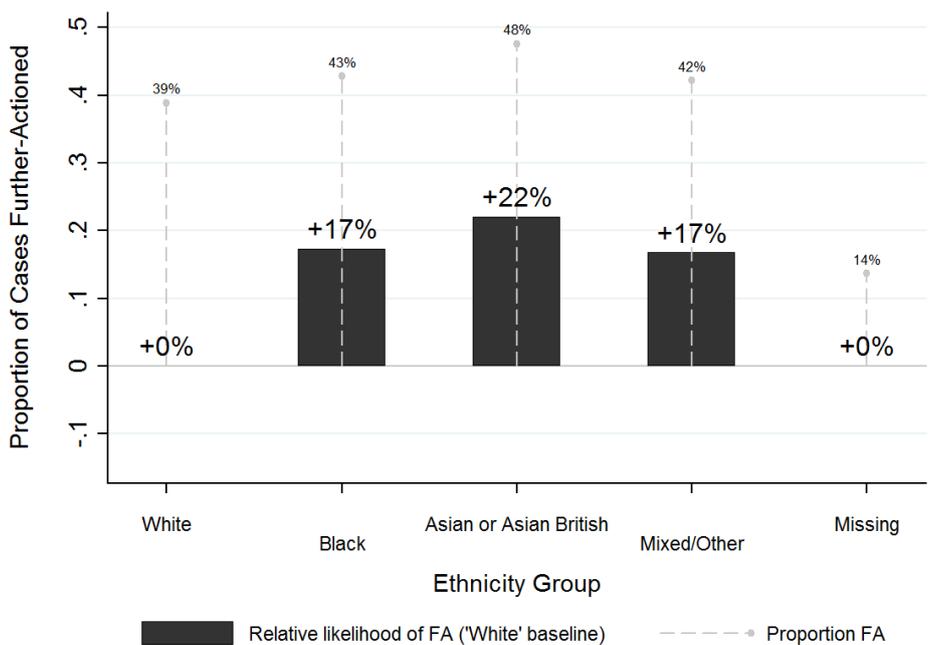
Figure E.3: Likelihood of progressing from referral to further action given child ethnicity (LA3)
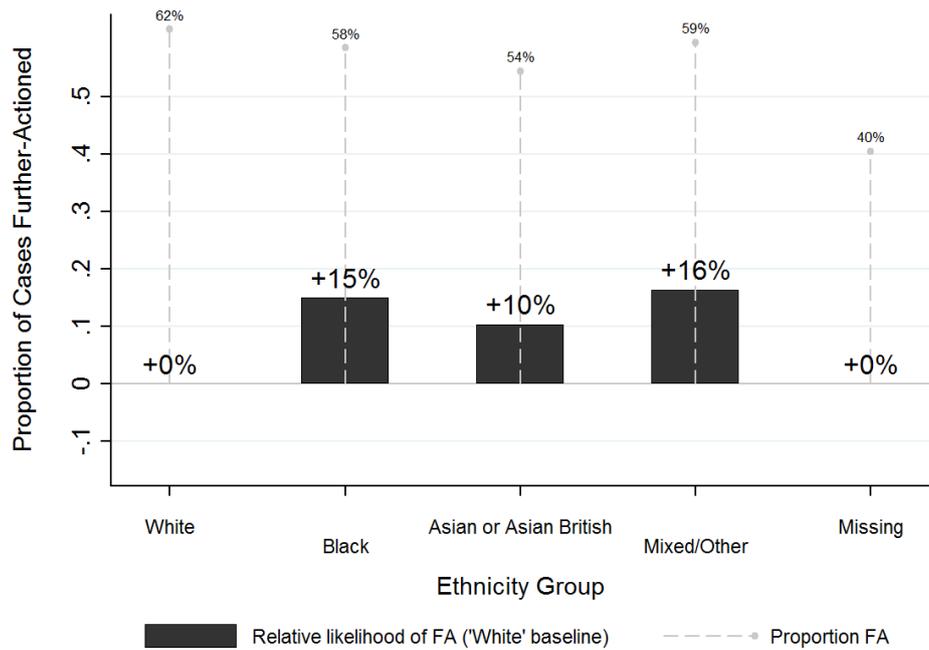
Referrals about children from black, Asian, or mixed ethnicity are also more likely to proceed to become a serious case. This perhaps supports the previous observation that non-white children are more likely to proceed from referral to further action.

Figure E.4: Likelihood of becoming a serious case given child ethnicity (LA1)
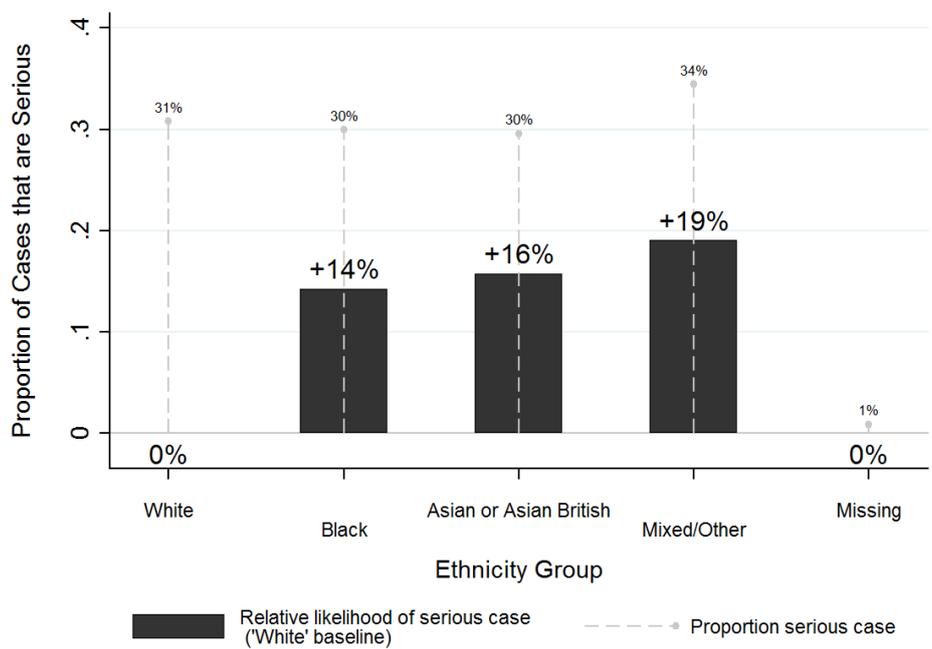
Figure E.5: Likelihood of becoming a serious case given child ethnicity (LA2)
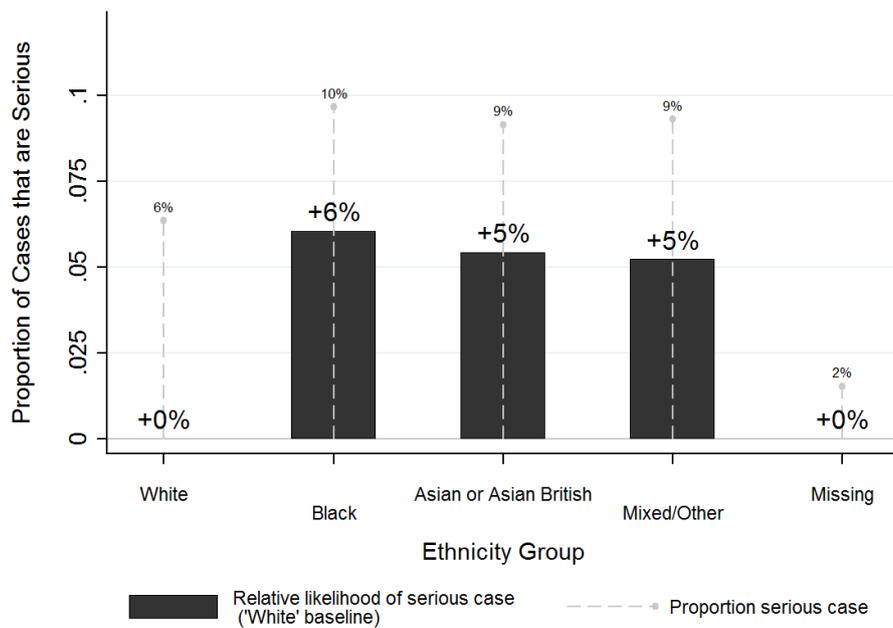
Figure E.6: Likelihood of becoming a serious case given child ethnicity (LA3)
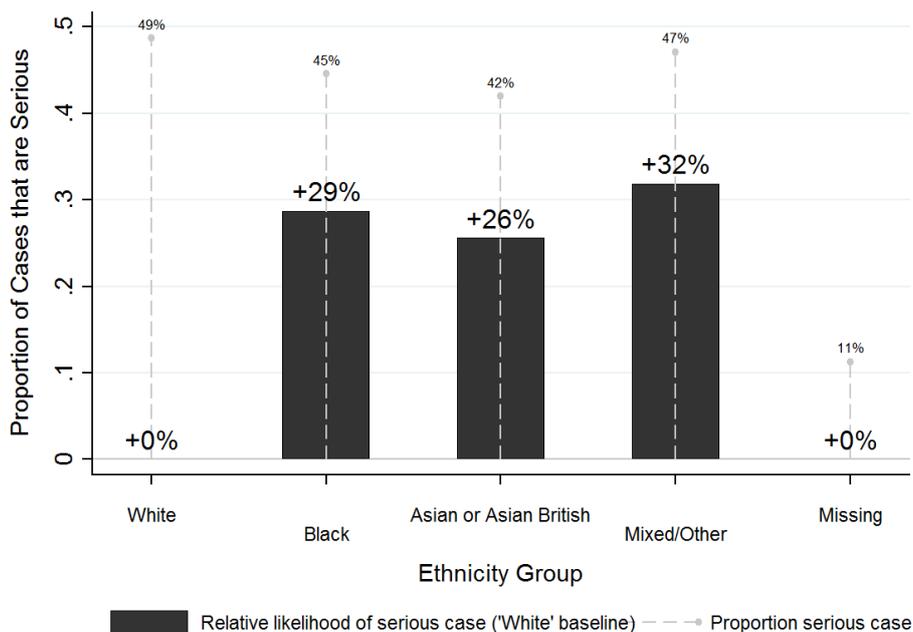
Notably, missing race is a good indicator that the case will not be progressed to further action, or become serious. This may be indicative of the fact that where race is missing, it was quickly apparent that the case needed little attention and so data entry was scant.

Analysis also looked at how ethnicity interacted with the likelihood of being subject to a later repeat referral. Here, results were more mixed across local authorities. For LA1 and LA3, there was again a large difference in results across ethnicities, with non-white ethnicities more likely to be subject to a repeat referral. For LA2, a different pattern was observed, with children of Asian heritage were least likely to be subject to a repeat referral.

Figure E.7: Likelihood of a referral being subject to a later repeat referral given child ethnicity (LA1)
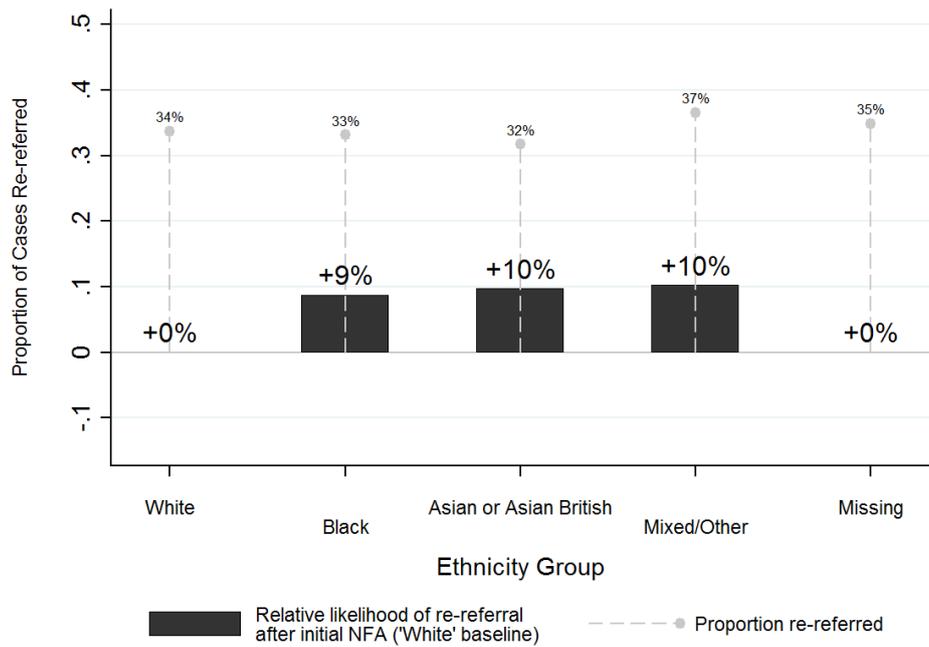
Figure E.8: Likelihood of a referral being subject to a later repeat referral given child ethnicity (LA2)
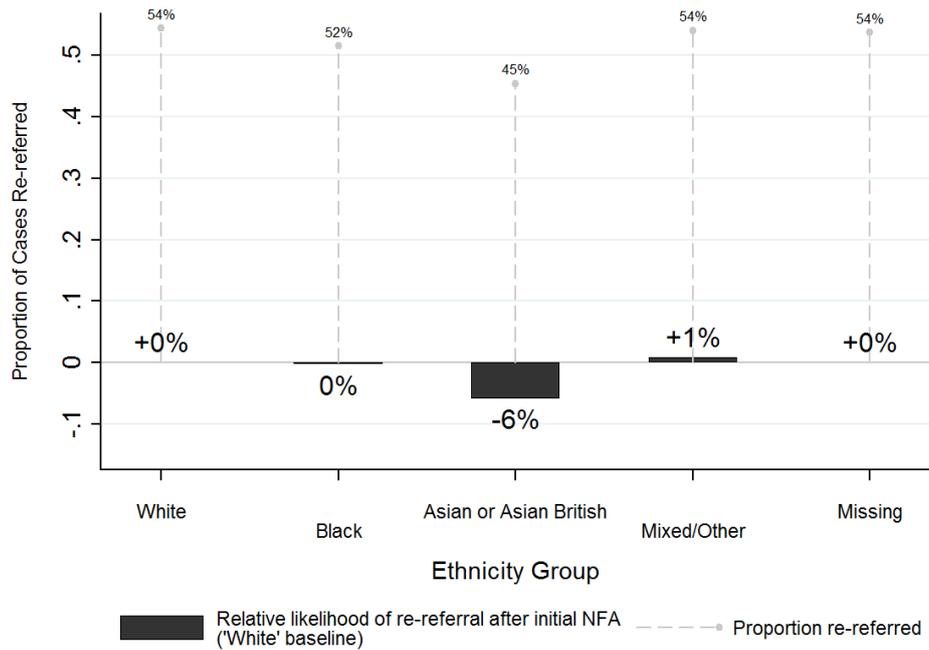
Figure E.9: Likelihood of a referral being subject to a later repeat referral given child ethnicity (LA3)
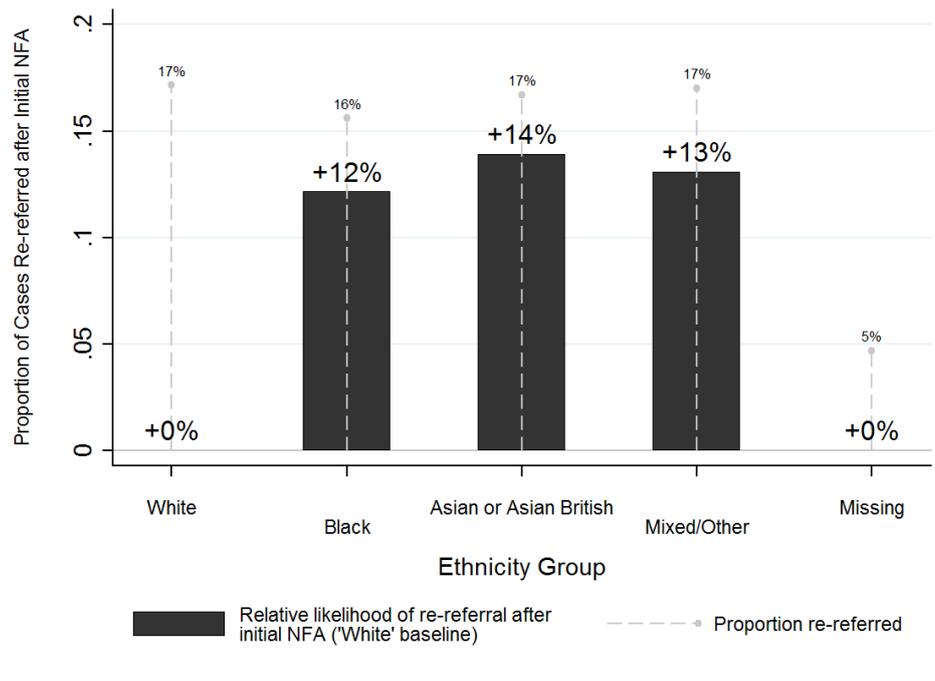
LA2 was also able to provide data on the language spoken by the child and family. Compared to referrals for children who spoke English, referrals about children who were recorded as speaking a language other than English were 11 percentage points more likely to receive further action.

However, children recorded as speaking a language other than English were no more or less likely to proceed to become a serious case when compared with children recorded as speaking English.

Interestingly, children who are not recorded as speaking English are observed to be 10 percentage points less likely to be the subject of a repeat referral than children who speak English.

Figure E.10: Likelihood of a referral progressing to further action given language spoken (LA2)
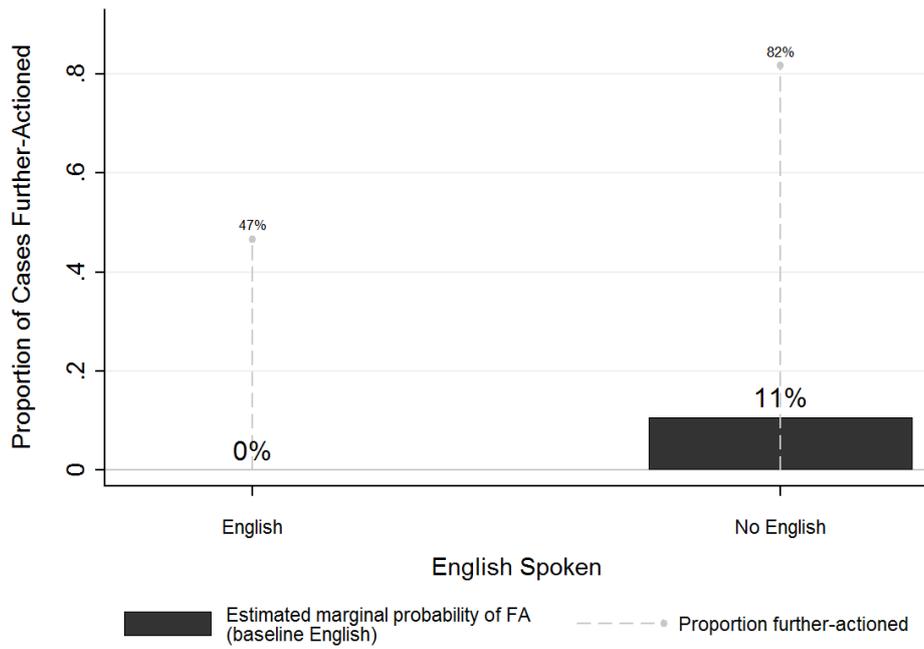
Figure E.11: Likelihood of a referral progressing to become a serious case given language spoken (LA2)
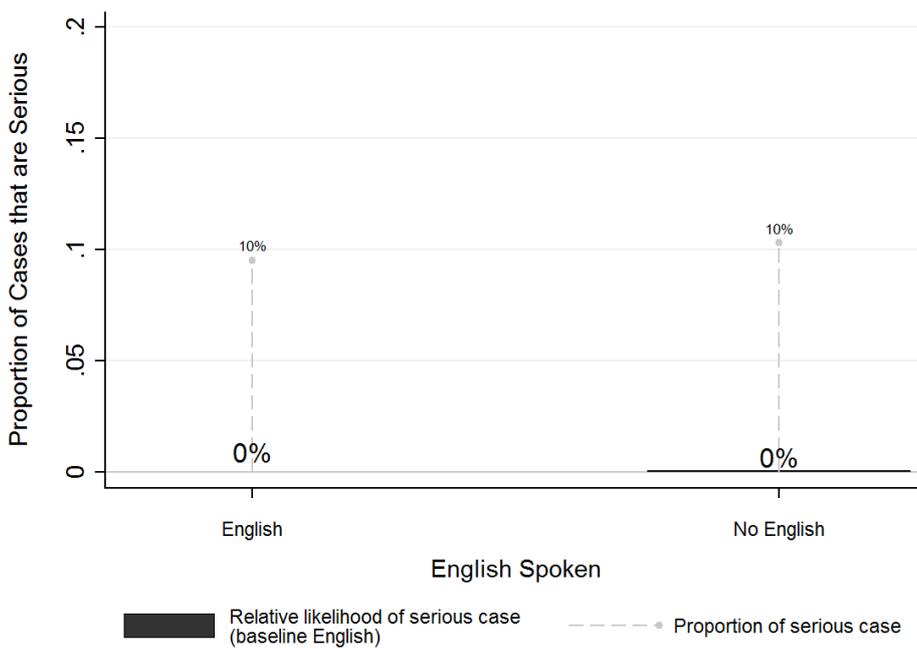
Figure E.12: Likelihood of a referral being subject to a later repeat referral given language spoken (LA2)
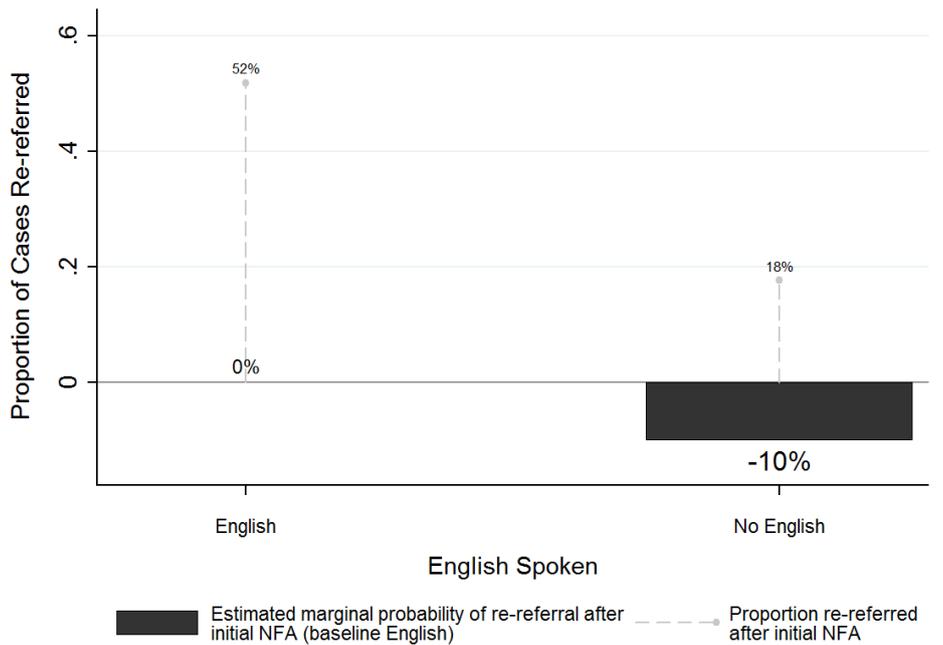
Hypotheses/further discussion points

- Does the striking finding that referrals about a black, Asian, or mixed race child are significantly more likely to proceed to further action mean that social workers are being influenced by unconscious bias? Or does the higher likelihood that a child of black, Asian, or mixed race ethnicity will become a serious case in part justify this finding, or suggest some omitted factors in our analysis?

- Could this analysis suggest that, for children (and highly likely families) who do not speak English as a first language, social worker practitioners are using further action decisions to gain additional time (and perhaps information to process) to determine vulnerability?

- If the likelihood of becoming a serious case is no higher for children who do not speak English as a first language, and the likelihood of recurrence is lower, should the fact that there may be bias or increased caution in decision-making in these cases be flagged to social workers?

F: Other presenting child characteristics

Headlines

- Gender has no discernible influence on decision-making, while the age of the child and disability status had different relationships with the likelihood of further action and becoming a serious case across local authorities.

- Children whose parents are recorded as having a history of domestic violence, alcoholism or drug usage were found to be less likely to progress from referral to further action.

Analysis also explored several other presenting characteristics of a child that were captured in available data, including gender, age, and disability status.

Gender had no differential influence on any of the key outcomes across the three local authorities. Results are not presented given this finding, with no significant difference in likelihood of proceeding to further action, becoming a serious case, or being subject to repeat referral.

Findings for the influence of disability status were more surprising. At LA1, disability status had a minimal influence on the relative likelihood that a referral would proceed to further action. Indeed, the grey bars show that, controlling for other material factors, referrals about disabled children were marginally more likely to proceed to further action.

However, at LA2 and LA3, children with a disability were more likely to proceed from referral to further action. This finding was significant at LA3, where disabled children were 23 percentage points more likely to proceed to further action.[28]

---

[28] Note that although children with disabilities are legally Children in Need, this analysis only considers cases referred for child protection, safeguarding or related concerns and does not consider referrals to specialist disability teams. See Appendix B for further information.

Figure F.1: Likelihood of progressing from referral to further action given recorded child disability (LA1)
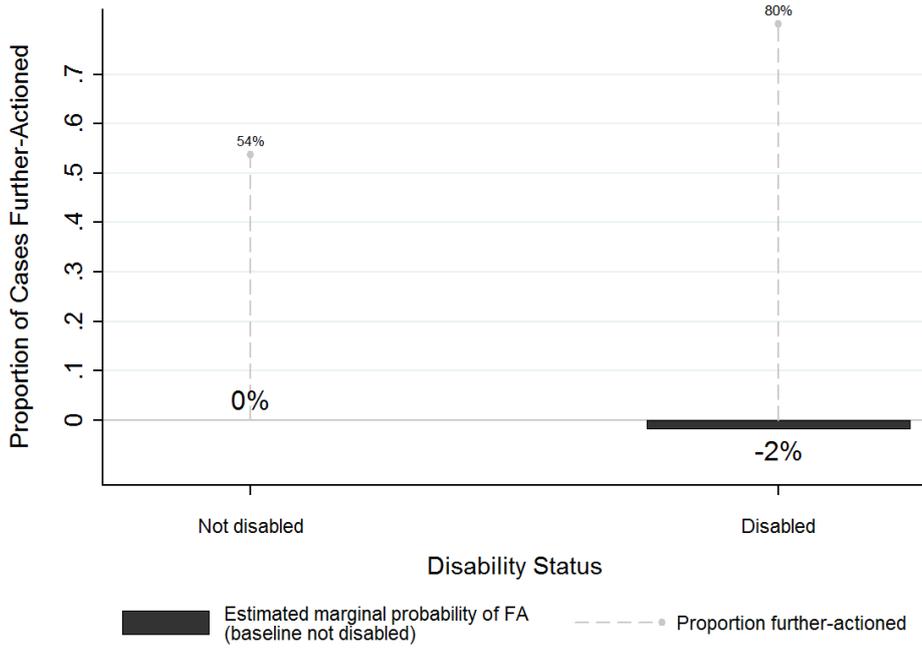
Figure F.2: Likelihood of progressing from referral to further action given recorded child disability (LA2)
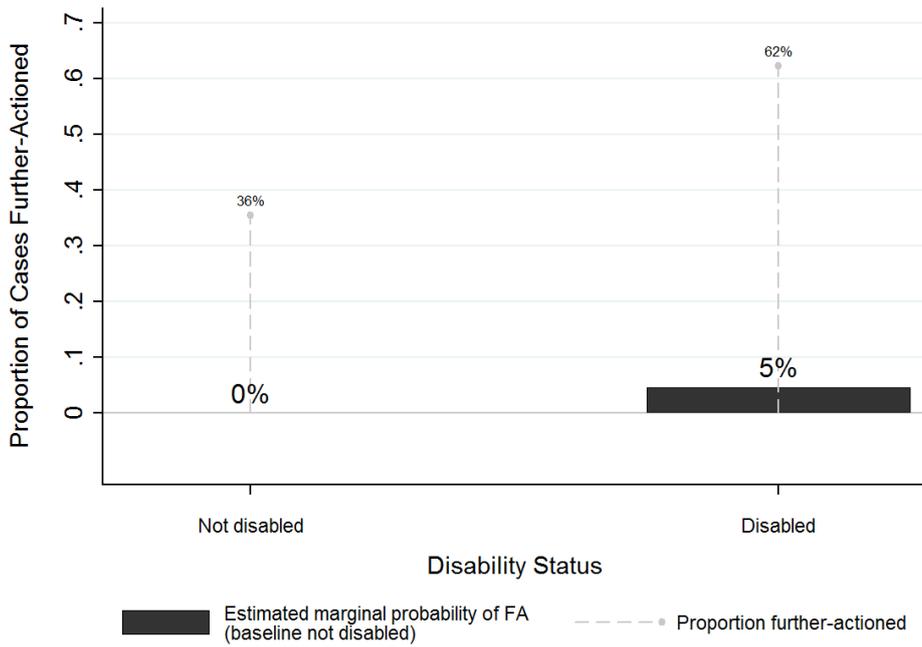
Figure F.3: Likelihood of progressing from referral to further action given recorded child disability (LA3)
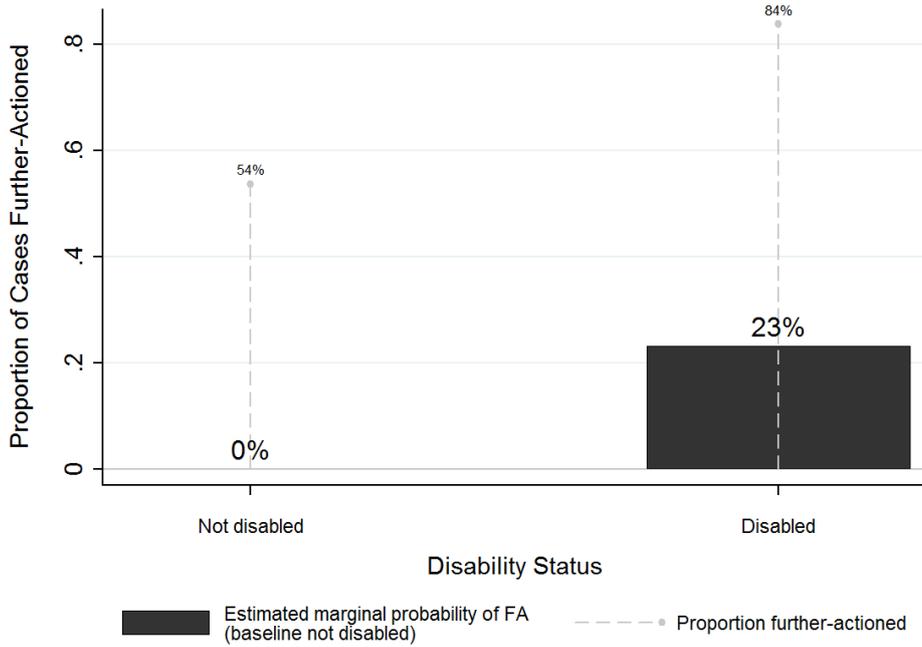
On becoming a serious case, again disability status was observed to relate differently to the likelihood of a referral becoming a serious case across local authorities.

For LA1 and LA3, referrals about disabled children were more likely to subsequently become serious cases than children with no recorded disabilities. Again, this result was more striking for LA3, but went in the opposite direction in LA2, where disabled children were less likely to proceed to become a serious case.

Figure F.4: Likelihood of progressing from referral to become a serious case given recorded child disability (LA1)
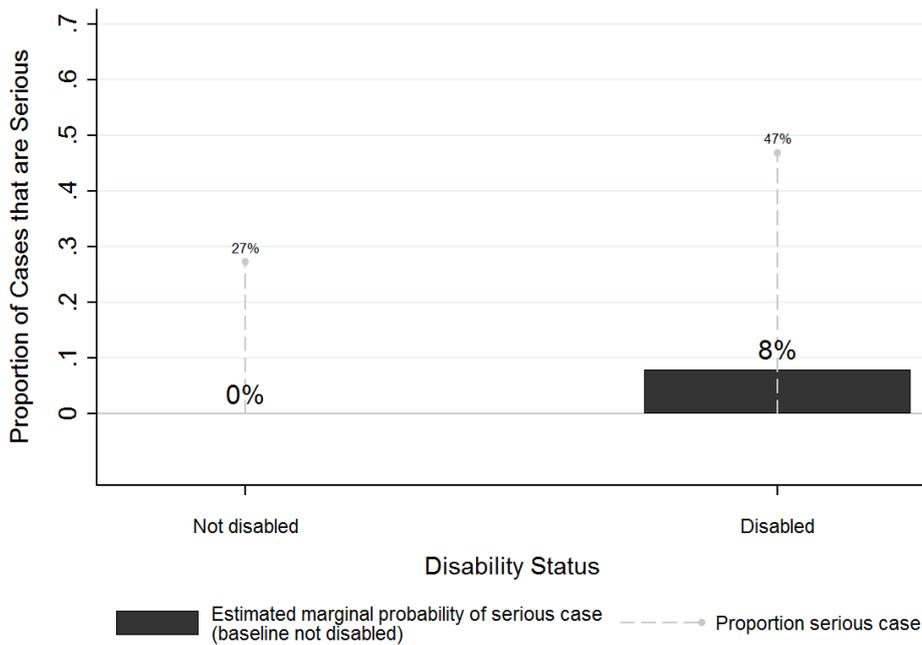
Figure F.5: Likelihood of progressing from referral to become a serious case given recorded child disability (LA2)
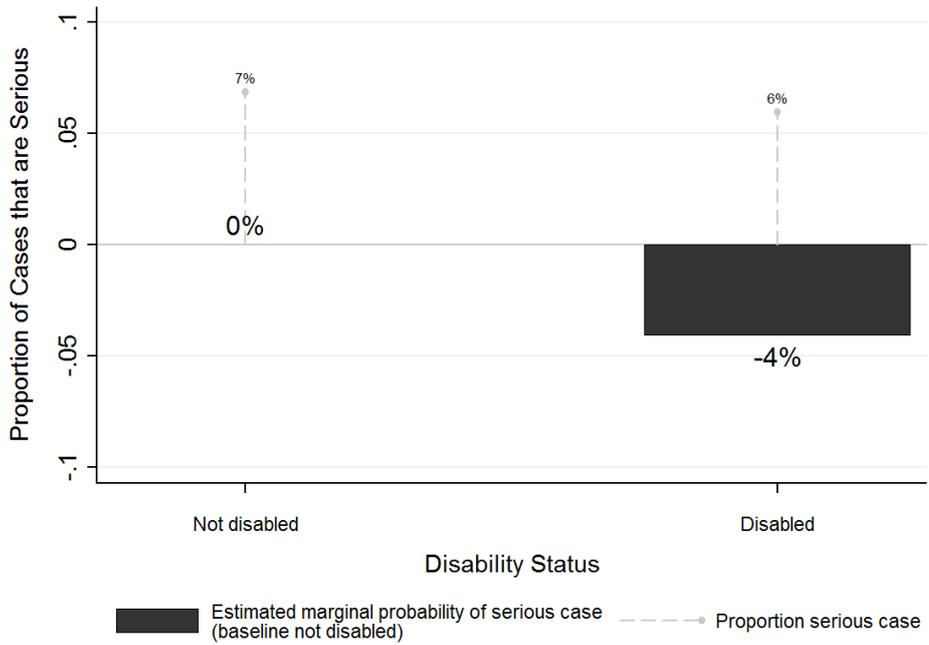
Figure F.6: Likelihood of progressing from referral to become a serious case given recorded child disability (LA3)
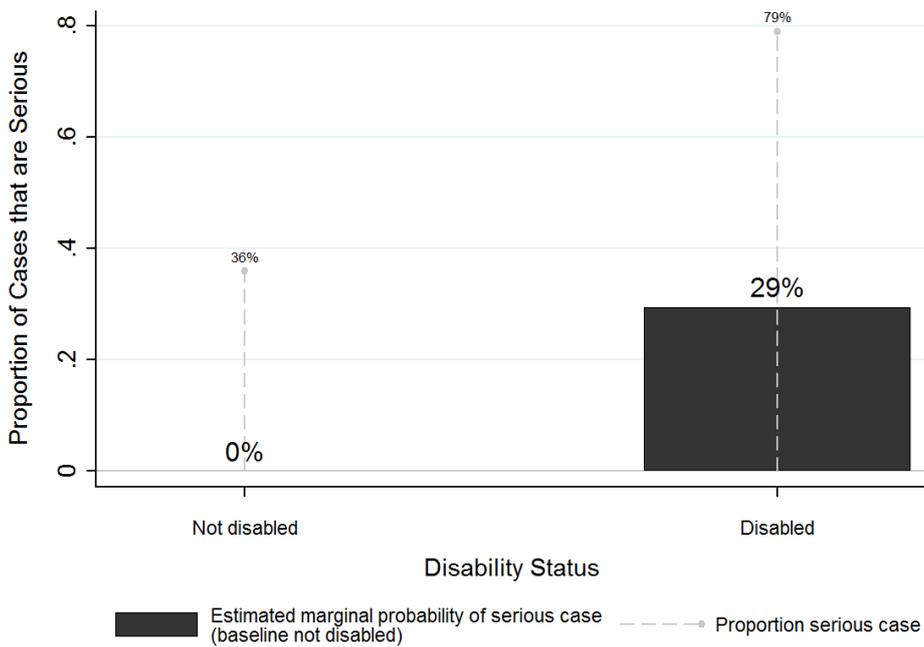
Moving to age, there were again differences observed across local authorities. For LA1 and LA2, the older the child at referral, the less likely they were to proceed to further action. However, this position was reversed at LA3 with younger children at referral less likely to proceed to further action. Across LA1 and LA2, an additional five years of life is associated with a roughly 4.8 percentage point decrease in the probability of progressing to further action. In LA3, the same increase in age is associated with a 1.8 percentage point increase in the probability of proceeding to further action.[29]

Figure F.7: Likelihood of progressing from referral to further action given child age at referral (LA1)
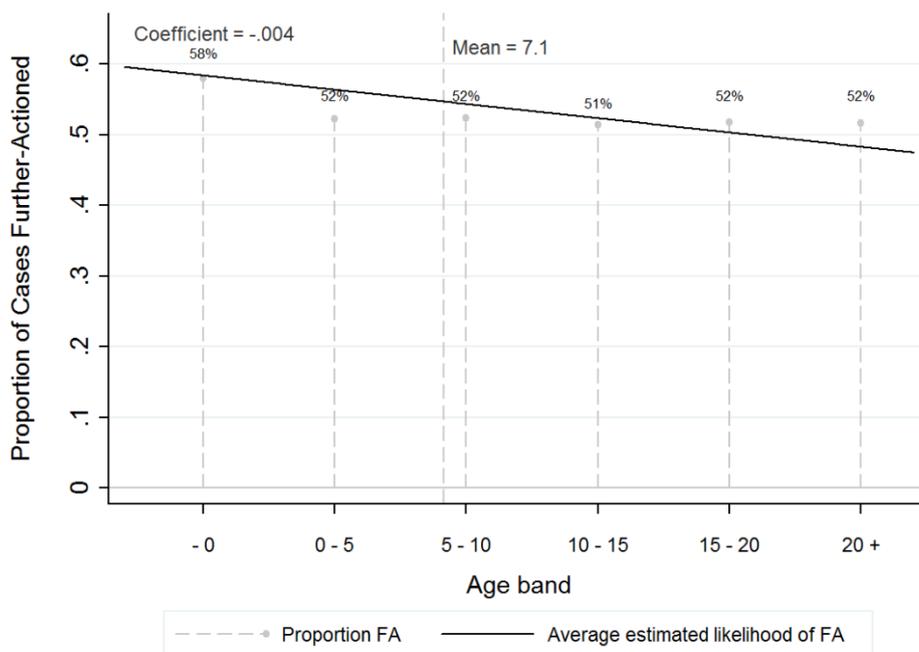
[29] Methodological caveat: In this section (and throughout the report) we have treated the potential relationship between age and other variables as linear. In other words, we have treated age as a continuous variable rather than discreet ranges (0-5, 5-10 etc). However, one might wonder if age actually relates to outcomes in this way, or is perceived by social workers to do so. For example, we could plausibly see high but consistent likelihoods of progression to further action amongst children of primarys school age or younger – but a significant drop once they enter secondary school.

For this section, we have separately estimated the relationships between age and 'serious' and 'further action' outcomes with the inclusion of controls that allow our estimated relationships to change appreciably between ages. What this should allow us to do in practice is to detect if such 'cut-off' effects in fact occur. Controlling for outliers, our analysis suggests that the true relationships between age and the 'further action' and 'serious' outcomes are approximately linear, despite an intuition that this might not be the case. As a result, the results reported in this subsection (and the controls used throughout this report) relate to our estimates of linear relationships between age and outcomes.

Figure F.8: Likelihood of progressing from referral to further action given child age at referral (LA2)
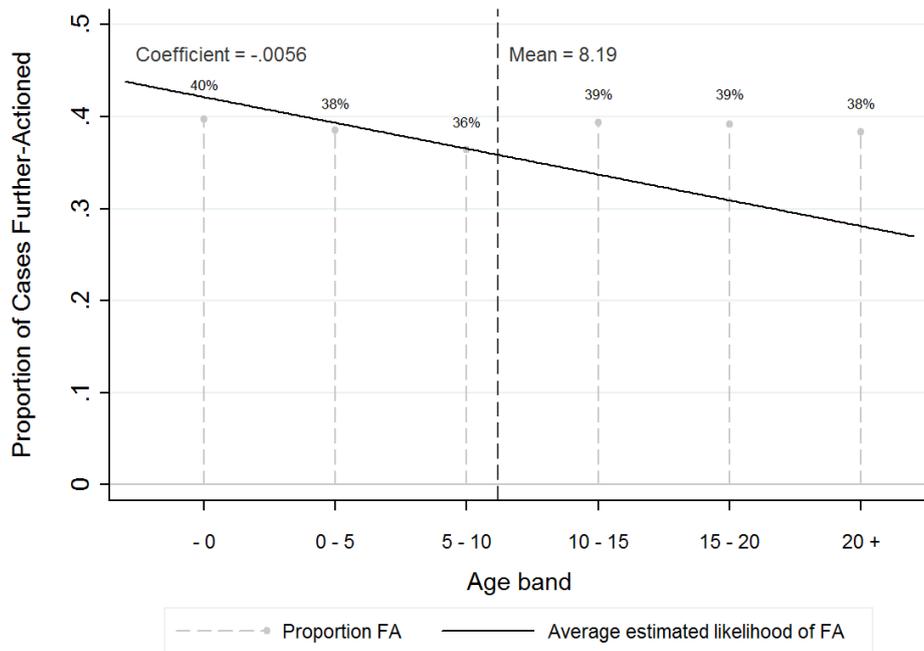
Figure F.9: Likelihood of progressing from referral to further action given child age at referral (LA3)
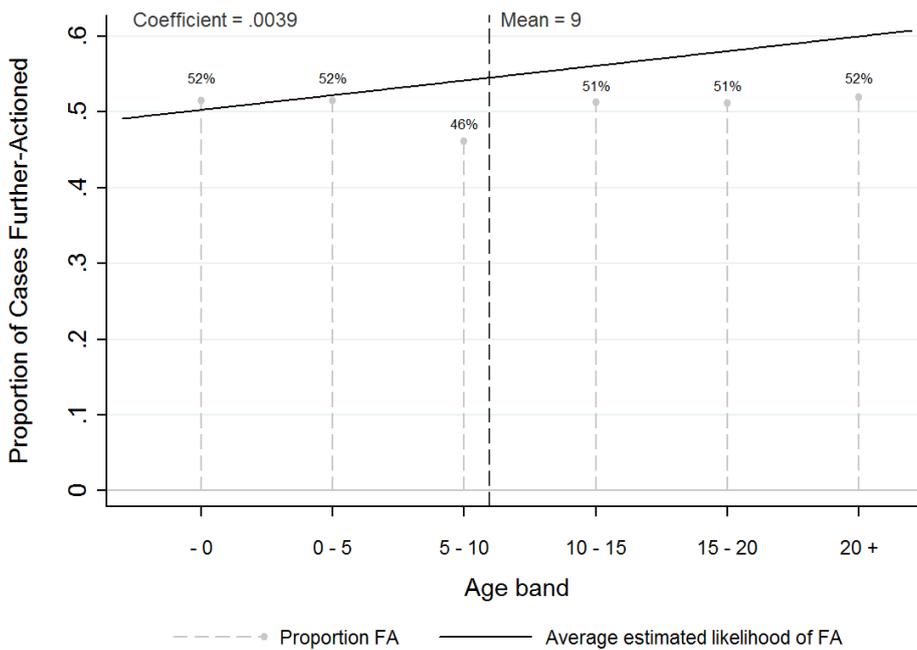
The lines of best fit show that, controlling for other material factors, how the likelihood of becoming a serious case is estimated to change with age. This means that the line of best fit can be higher than the blue bars given the influence of other material factors. On the likelihood of becoming a serious case, at LA1 and LA2 referrals about older children are less likely to develop into a serious case. Again, this position is reversed at LA3, with referrals about younger children less likely to develop into a serious case.

Figure F.10: Likelihood of becoming a serious case given child age at referral (LA1)

Coefficient = -.007   Mean = 7.1
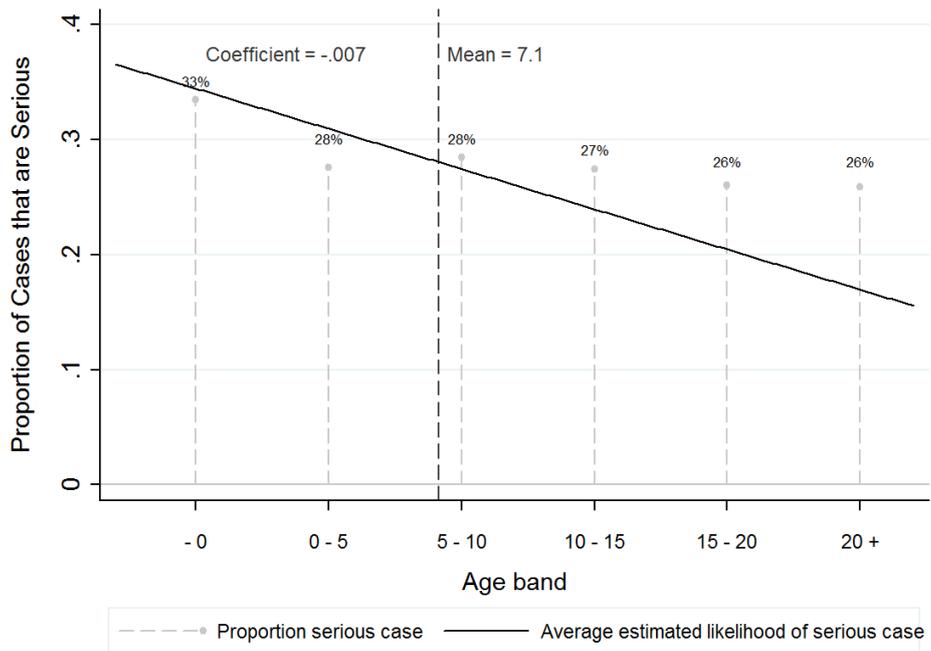
Figure F.11: Likelihood of becoming a serious case given child age at referral (LA2)

Coefficient = -.0021***   Mean = 8.17
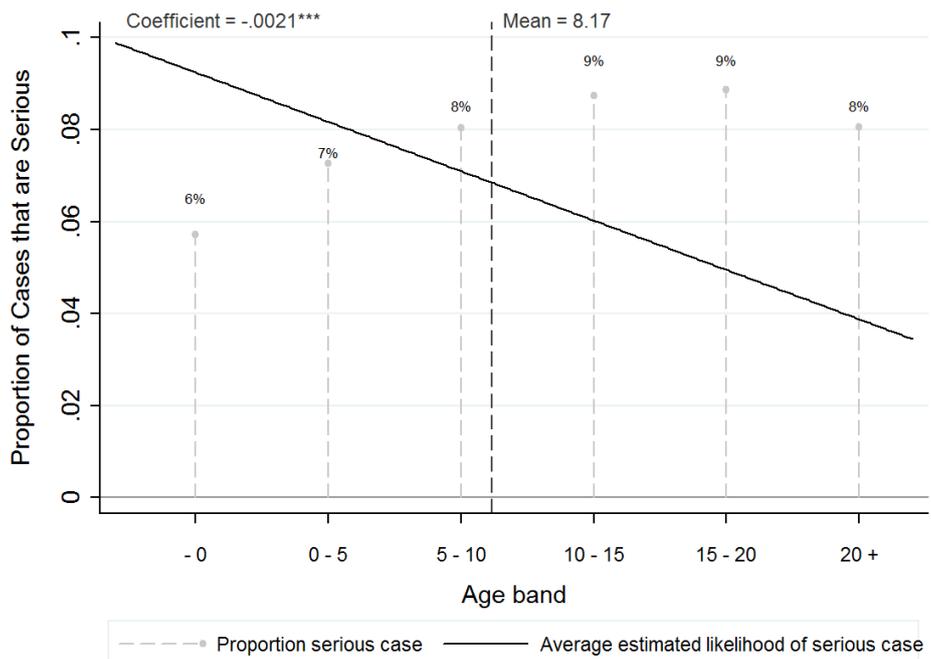
Figure F.12: Likelihood of becoming a serious case given child age at referral (LA3)
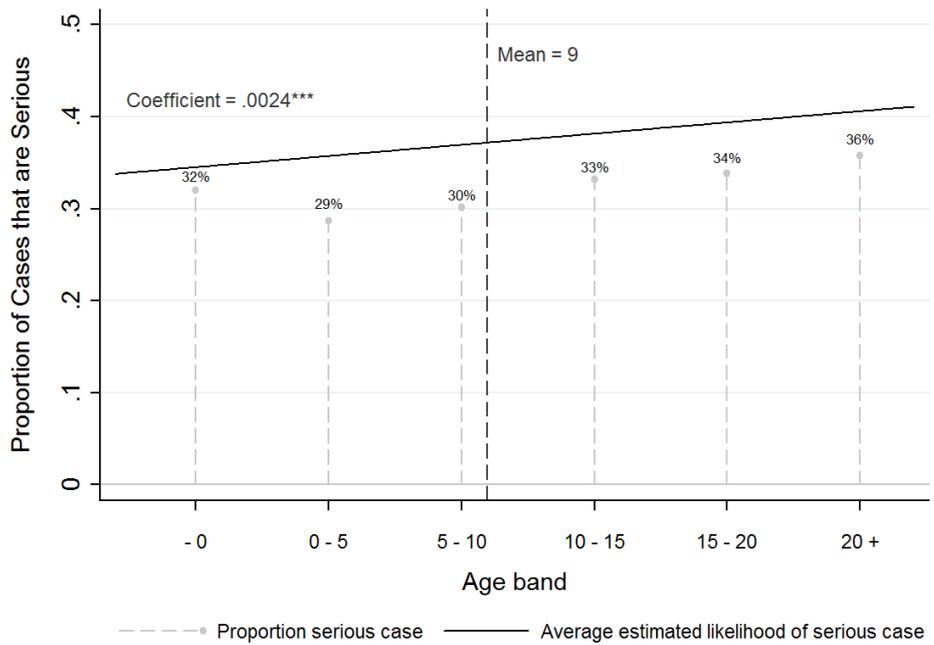
LA2 was also able to provide data on the social care history of the parents of the child. Those children whose parents are recorded as having an issue such as a history of domestic violence, alcoholism, or drug usage were found to be less likely to progress from referral to further action, but more likely that repeat referrals about the child would occur and the child would ultimately become a serious case. While some of the cases where no information about parental needs or background was recorded undoubtedly had relevant factors present, this is still an interesting finding.

Figure F.13: Likelihood of proceeding from referral to further action given parent social care history (LA2)
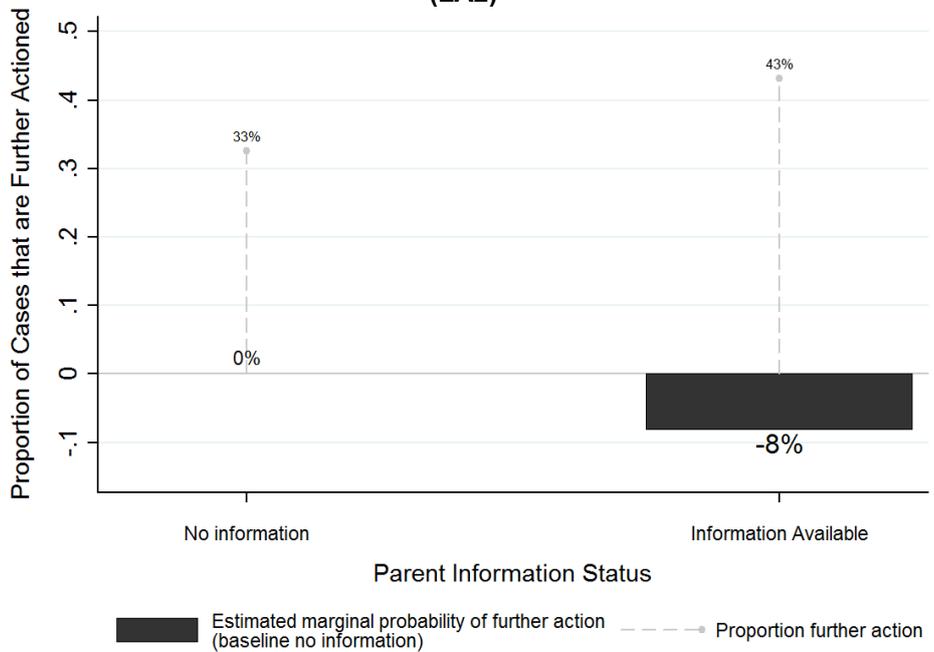
Figure F.14: Likelihood of proceeding to become a serious case given parent social care history (LA2)
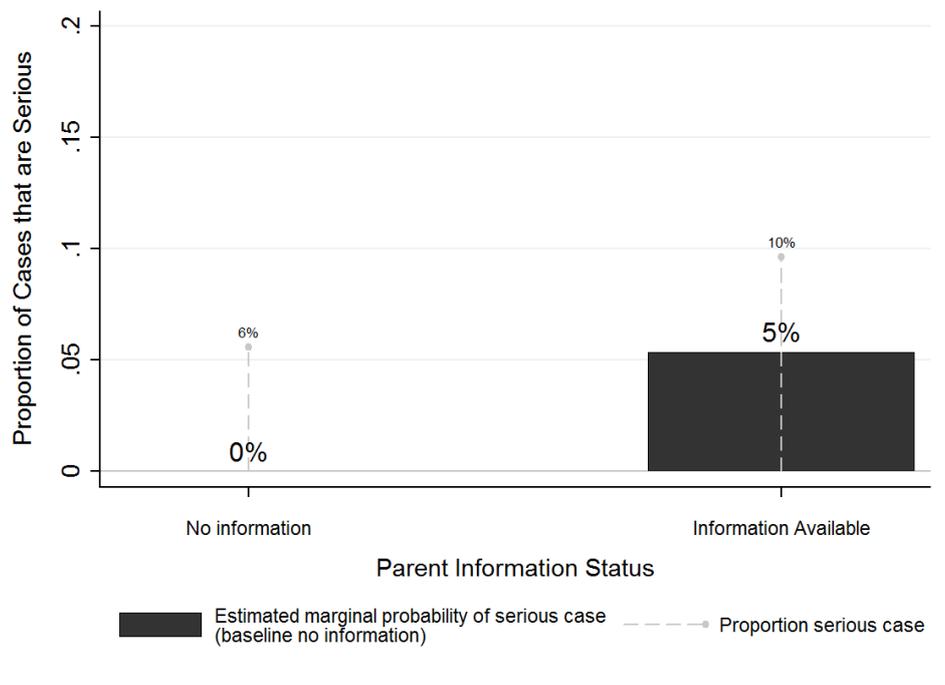
In terms of which parental factors were most positively correlated with progressing from referral to further action, alcohol abuse, experience of abuse as a child, and a history of allegations of abuse were the three main factors, while having a physical disability had the strongest negative correlation.

We note that in these graphs, unlike others in this report, our baseline category is taken as the average for cases where parents have some unspecified social care history which *is* recorded, rather than those cases where no parental social care history is reported. This decision was taken on the grounds that no information being recorded may indicate no parental social care history, or simply that this is not recorded, as is suggested by the negative association seen in F.13. As such, we specify a relative likelihood for our baseline category in these graphs, which is compared to the 'no information' case.

Figure F.15: Likelihood of proceeding from referral to further action by parent social care history type (LA2)
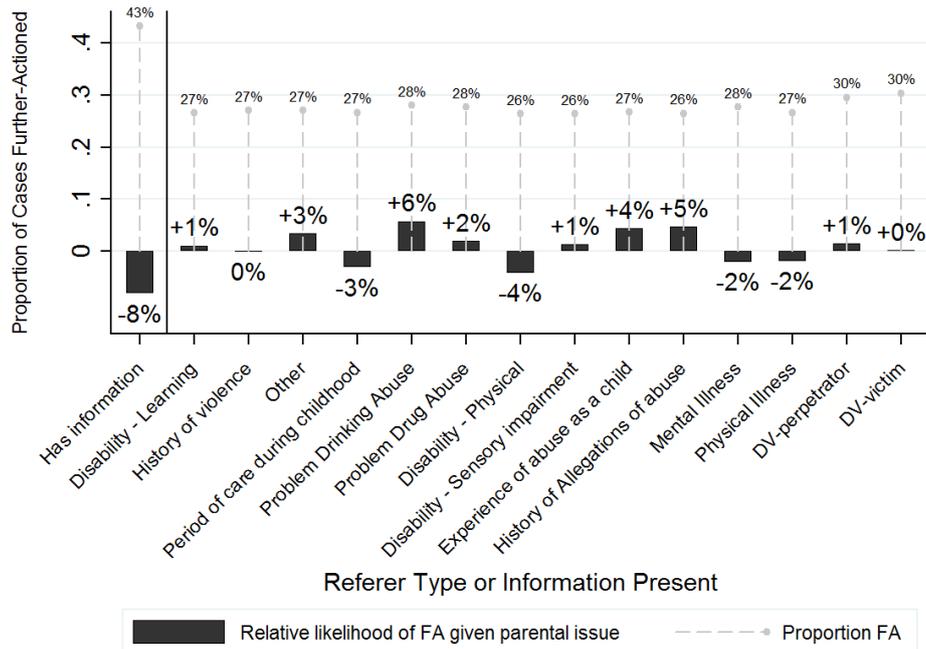
On which parental factors were most highly correlated with becoming a serious case, experience of abuse as a child was the key factor. Interestingly, a referral about a child whose parent had a period of care themselves during childhood was much less likely to proceed to become a serious case, although this could be explained by cross-correlation with other variables controlled for in our analysis.

Figure F.16: Likelihood of proceeding to become a serious case by parent social care history type (LA2)
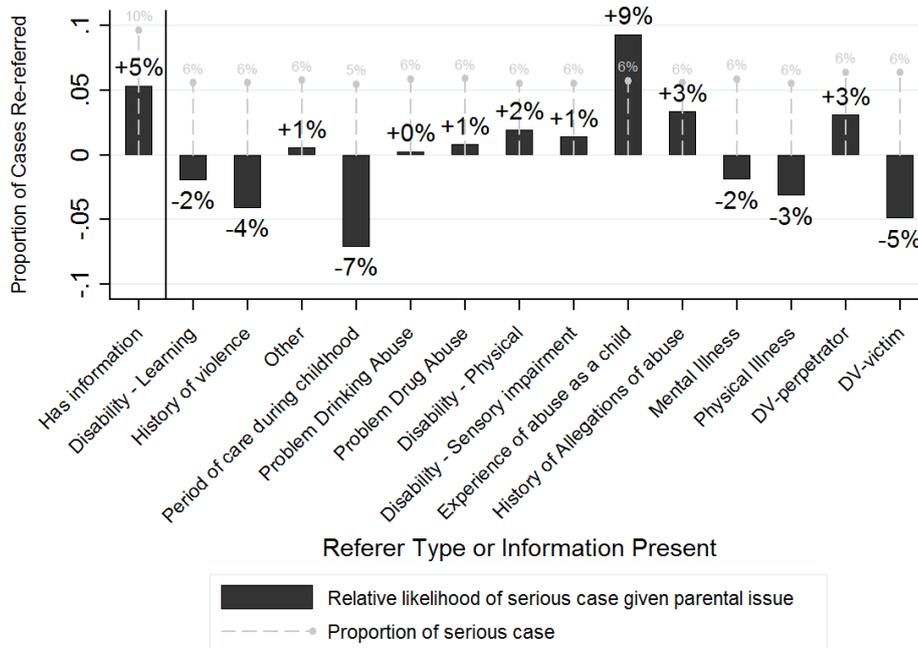
Hypotheses/further discussion points

- Could a family history of social care involvement have an impact on the perceived thresholds for intervention? This could lead to a 'normalisation effect' where children's current need for support is evaluated relative to past events in that family rather than in absolute terms. Could it be assumed that there are specialised protective factors in their environment around the child that allow them to cope with adverse situations?

- Alternatively, could this observation be because other agencies, or early help services, are already involved, and there is a sense that a level of support is already being provided to assist the entire family?

- Could the lack of obvious escalation or trigger for action (as parental or family issues have been ongoing) mean that social workers are less likely to take further action, with potentially higher-level of need or dysfunction becoming normalised over time?

- What tools could be devised to reverse the trend of no further action decisions being made when the parents have an issue that has come to the attention of local authority children's social care?

G: Deprivation

Headlines

- Deprivation domains have mixed effects at the local level. One consistent finding is that areas that are more deprived on the health domain are more likely to have a referral about a child proceed to become a serious case.

- Interestingly, children from areas with greater income deprivation are less likely to have a referral result in further action.

Each local authority provided detail on the postcode in which a child lived. BIT was able to aggregate this full postcode level data to determine the lower layer super output area (LSOA) within which the child lives.

The LSOA represents a geographic area, and is a unit of analysis at which a range of statistics from the Office of National Statistics (ONS) are available, based on data from the 2010 census.

Of most interest for this project were statistics relevant to the characteristics of the neighbourhood in which the child and family were present, with a focus on deprivation. The ONS publishes data on the "Indices of Deprivation", which are available at this level.[30] Data was available across the domains of deprivation in crime, education,

---

[30] For background information, see English Indices of Deprivation, available at: https://www.gov.uk/government/collections/english-indices-of-deprivation.

employment, health, and income by LSOA, and this was able to be matched with decision-making outcomes.

Within each domain, the higher the deprivation score, the more deprived the LSOA in that domain. Although, because the scores were designed to provide a relative ranking of areas with respect to their deprivation and not an absolute measure, it is not possible in general to say how much more deprived one area is than another.[31]

Tables in this section focus on the bottom quartile (LSOAs with the higher scores and thus most deprivation) and the top quartile (LSOAs with lower scores and thus lower levels of deprivation), within each local authority. We note that due to the differing makeups of the local authorities in terms of their overall deprivation, the bottom quartile within a local authority will differ in terms of its level of deprivation to the bottom quartile on the others, making comparison in this way relative rather than absolute. Tables show the likelihood of key decision-making outcomes relative to those within the inter-quartile range of the distribution (i.e. the middle 50% of deprivation scores within each local authority).

In the tables below, results have been colour-coded to aid comprehension. Positive numbers (shown in blue) mean that a referral from a child within an LSOA from that quartile is relatively more likely to proceed to further action or become a serious case (depending on the outcome being explored). Only higher effective sizes (greater than 1 percentage point) are coloured and shaded.

Negative numbers (shown in grey) indicate that a referral about a child within an LSAO from that quartile is relatively less likely to proceed to further action (or become a serious case). Again, only higher effect sizes (greater than 1 percentage point) are coloured and shaded.

Crime was the first of the five domains explored. Crime levels in the neighbourhood where the child lives are observed to be more strongly related to the likelihood of a referral progressing to further action within the bottom quartile, though with different results across local authorities.

In LA1 and LA3, referrals concerning children from neighbourhoods in the bottom quartile of deprivation in the crime domain were 1.7 percentage points and 1.2 percentage points more likely to proceed to further action. In LA2, the relationship was reversed, with children from the bottom quartile almost 2 percentage points less likely to proceed to further action. The observed influence for children in neighbourhoods in the top quartile was less powerful.

---

[31] For further information, see The English Indices of Deprivation 2010, Department for Communities and Local Government, available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6320/1870718.pdf" \t "_blank".

Table G.1: Relative likelihood of a referral progressing to further action given crime levels in their neighbourhood (all local authorities)

Crime (further action)	Bottom quartile	Top quartile
LA1	1.70%	0.05%
LA2	-1.95%	-0.69%
LA3	1.20%	-0.58%

Interestingly, higher neighbourhood crime levels are less likely to lead to a referral about a child proceeding to become a serious case at LA1 and LA2, with a very strong correlation for LA1. At LA3, the relationship is different, with higher neighbourhood crime levels more likely to mean that a referral becomes a serious case.

Table G.2: Relative likelihood of a referral becoming a serious case given crime levels in their neighbourhood (all local authorities)

Crime (serious case)	Bottom quartile	Top quartile
LA1	-3.83%	0.72%
LA2	-1.06%	-2.09%
LA3	1.53%	-0.90%

On education, there were very mixed linkages observed between the average education levels of the neighbourhood that a child lived in and the likelihood of proceeding to further action or becoming a serious case. There are differences across local authorities in terms of the direction of relationships, but limited differences in direction between the bottom and top quartiles.

Table G.3: Relative likelihood of a referral progressing to further action given education levels in their neighbourhood (all local authorities)

Education (further action)	Bottom quartile	Top quartile
LA1	-0.78%	-1.98%
LA2	1.24%	1.77%
LA3	-1.37%	0.15%

Table G.4: Relative likelihood of a referral becoming a serious case given education levels in their neighbourhood (all local authorities)

Education (serious case)	Bottom quartile	Top quartile
LA1	-2.15%	-2.86%
LA2	1.32%	2.84%
LA3	-1.41%	0.57%

On employment, different results were again observed across local authorities. In LA1, lower employment levels in the neighbourhood of the child increased the likelihood that they would progress from referral to further action, and also decreased the likelihood that they would become a serious case – a counter-intuitive result.

In LA2, lower employment levels in the local neighbourhood did make it less likely that a referral would both proceed to further action and become a serious case, though the relationship was weaker.

In LA3, there was perhaps the strongest relationship, with higher employment levels in the local neighbourhood making it less likely that a referral would proceed to further action.

Table G.5: Relative likelihood of a referral progressing to further action given employment levels in their neighbourhood (all local authorities)

Employment (further action)	Bottom quartile	Top quartile
LA1	2.13%	1.19%
LA2	-1.04%	0.48%
LA3	1.24%	-1.96%

Table G.6: Relative likelihood of a referral becoming a serious case given employment levels in their neighbourhood (all local authorities)

Employment (serious case)	Bottom quartile	Top quartile
LA1	-0.22%	1.09%
LA2	-2.70%	-1.88%
LA3	1.54%	-0.03%

Health was another domain in which there were some mixed but generally weak results across local authorities. Perhaps most interestingly, in LA1, lower health levels were less likely to lead to further action, but most likely to become a serious case. In LA2, higher neighbourhood health levels were perhaps more intuitively found to decrease the likelihood that a referral would proceed to further action and become a serious case.

Table G.7: Relative likelihood of a referral progressing to further action given health levels in their neighbourhood (all local authorities)

Health (further action)	Bottom quartile	Top quartile
LA1	-2.21%	-0.23%
LA2	0.70%	-3.85%
LA3	-0.98%	-0.48%

Table G.8: Relative likelihood of a referral becoming a serious case given health levels in their neighbourhood (all local authorities)

Health (serious case)	Bottom quartile	Top quartile
LA1	3.04%	-0.20%
LA2	1.19%	-2.95%
LA3	0.46%	-0.25%

Income levels in the neighbourhood of the child also had a mixed relationship with key outcomes. In LA1, lower neighbourhood income levels were correlated with lower levels of further action and lower likelihood of becoming a serious case – a counter-intuitive result.

In LA2, results were again perhaps counter-intuitive, with lower income levels less likely to result in a referral proceeding to further action, though were more likely to subsequently become a serious case.

Table G.9: Relative likelihood of a referral progressing to further action given income levels in their neighbourhood (all local authorities)

Income (further action)	Bottom quartile	Top quartile
LA1	-1.36%	0.60%
LA2	-1.85%	0.35%
LA3	0.30%	-0.98%

Table G.10: Relative likelihood of a referral becoming a serious case given income levels in their neighbourhood (all local authorities)

Income (further action)	Bottom quartile	Top quartile
LA1	-1.43%	-1.81%
LA2	1.04%	0.75%
LA3	-0.99%	-0.45%

Hypotheses/further discussion points

- Do social workers have time to take deprivation into account at the point of referral, when immediate evidence of local deprivation is likely to be relatively limited?

- Do the mixed results displayed above indicate that deprivation is a relative concept across local areas, with LSOA level data unable to provide meaningful coverage? For instance, is this data appropriately identifying families or children who could be relatively deprived but live in a high income neighbourhood?

- Would household level deprivation information provide a more interesting picture, or would relative comparisons to neighbours still be required?

H: Social worker experience

Headlines

- Additional experience within LA1 by agency social workers reduces the likelihood that a referral will proceed to further action, but increases the likelihood that repeat referral will occur.

Limited data from LA1 indicated that the amount of experience that a social worker has within the local authority could be influencing decision-making outcomes.

Note that this data was not available on the total experience of the social worker (career to date). This finding represents analysis of the total number of days that a specific social worker was employed within LA1 at the end four-year time period explored.

In addition, social worker experience data in LA1 was only available for agency staff, not permanent staff. Analysis of this data revealed that, for agency staff, additional tenure within the local authority slightly decreased the likelihood of a referral progressing to further action.

Figure H.1: Likelihood of a referral progressing to further action given experience levels of agency social worker (LA1)
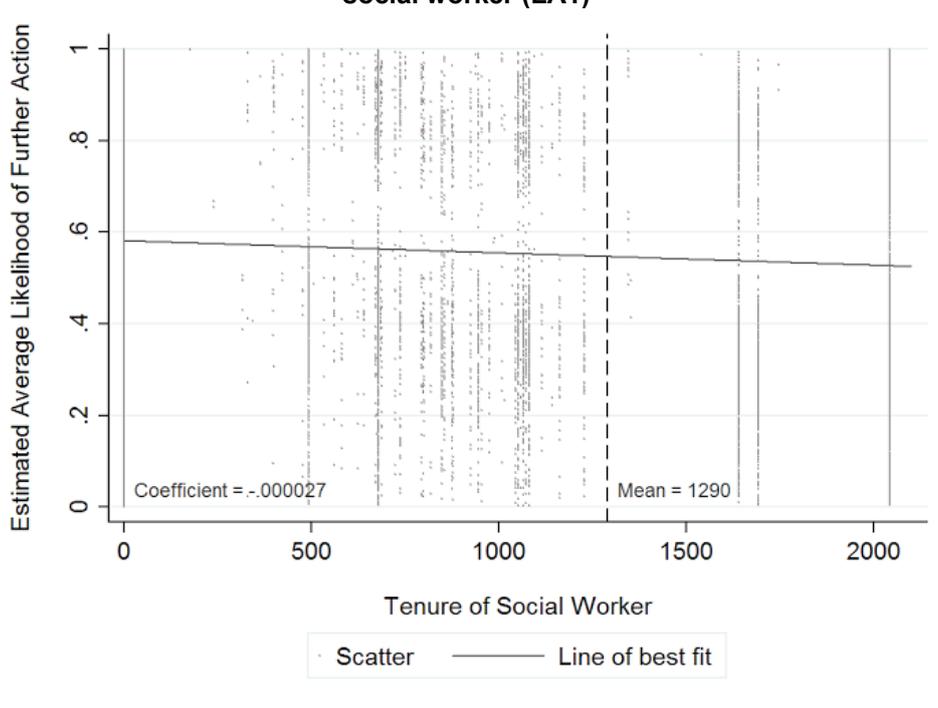
The tenure of the agency social worker within LA1 was observed to have no relationship with the likelihood of a referral proceeding to become a serious case.

Figure H.2: Likelihood of a referral becoming a serious case given experience levels of agency social worker (LA1)
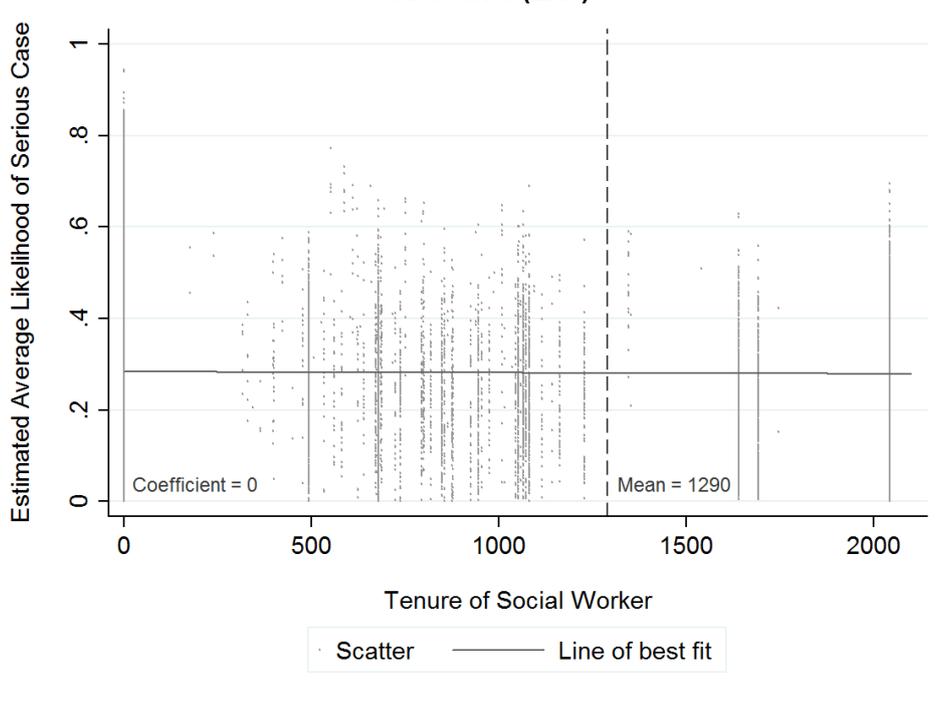
Finally, the experience level of the agency social worker seems to increase the likelihood that a referral will subsequently be subject to a repeat referral, albeit slightly, with an extra year of social work experience being associated with a 0.9 percentage point increase in the probability of a repeat referral.

Figure H.3: Likelihood of a referral being subject to a repeat referral given experience levels of agency social worker (LA1)
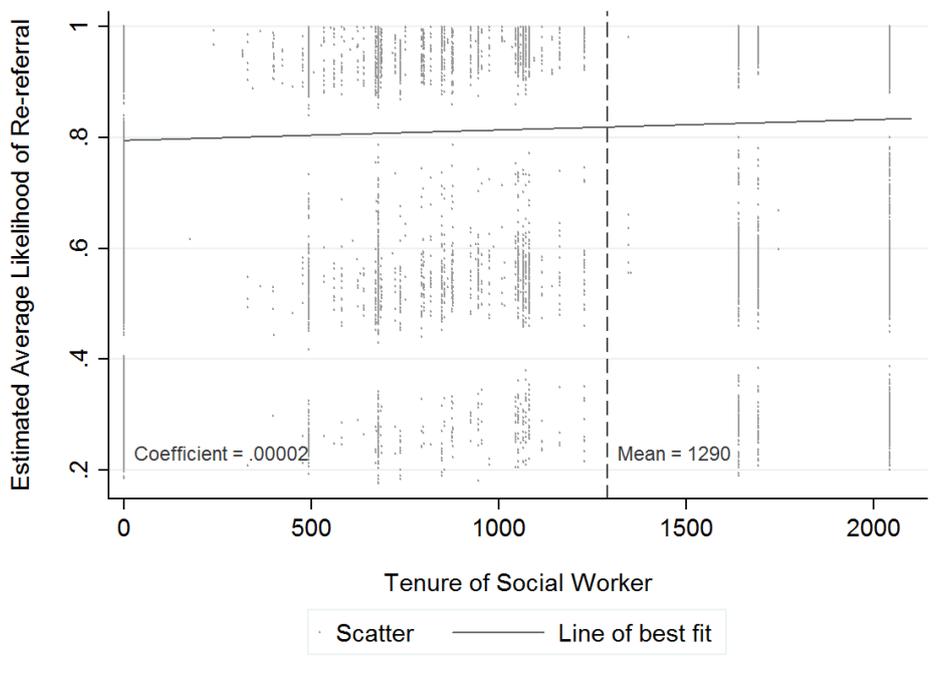
Hypotheses/further discussion points

- Anecdotally, LA1 observed that agency staff can be more experienced than permanent staff members, who can be comparatively new to the local authority. Does this mean that the results above can be extrapolated in a meaningful way, given the likelihood that these social workers will have deeper experience outside the specific local authority?

- Does the link between experience and reduced further action indicate that social workers become more confident (or less risk averse) with experience?

- How does the link between experience and reduced further action interact with the increased likelihood of repeat referral? Does this indicate that social workers may be more prone to making quicker judgments and stereotyping particular cases as they gain experience, without digging deeper for more information?

- Could the distribution of cases to social workers by a Manager or Supervisor also influence decision-making patterns? For instance, are referrals that appear more complex given to more experienced social workers for decision-making?

- Could levels of collaboration in decision-making make interpreting these results more challenging? For instance, are less experienced staff likely to talk to more experienced staff when making decisions, hence making the impact of experience on decision-making less noticeable?

I: Permanent versus agency staff

Headlines

- No differences in decision-making patterns were observed between agency and permanent staff members, despite what might be perceived as different incentive and motivation structures.

Where the experience, culture and incentive structure of non-permanent staff may differ from that of the permanent employees, we might expect to see differences in decision making.

For LA1, data was also available on whether the social worker was a permanent member of staff, or an agency member of staff. Anecdotally, within LA1 agency members of staff were typically older and more experienced, with the profile of permanent staff including a higher number of younger, newer social workers.

Interestingly, analysis revealed no systematic differences in decision-making outcomes across agency and permanent staff, when other case level characteristics were controlled for. Permanent staff were no more likely to progress a referral to further action, and the likelihood of a referral becoming a serious case or being subject to repeat referral was also the same across both staff types.

Figure I.1: Likelihood of a referral progressing to further action given social worker employment type (LA1)
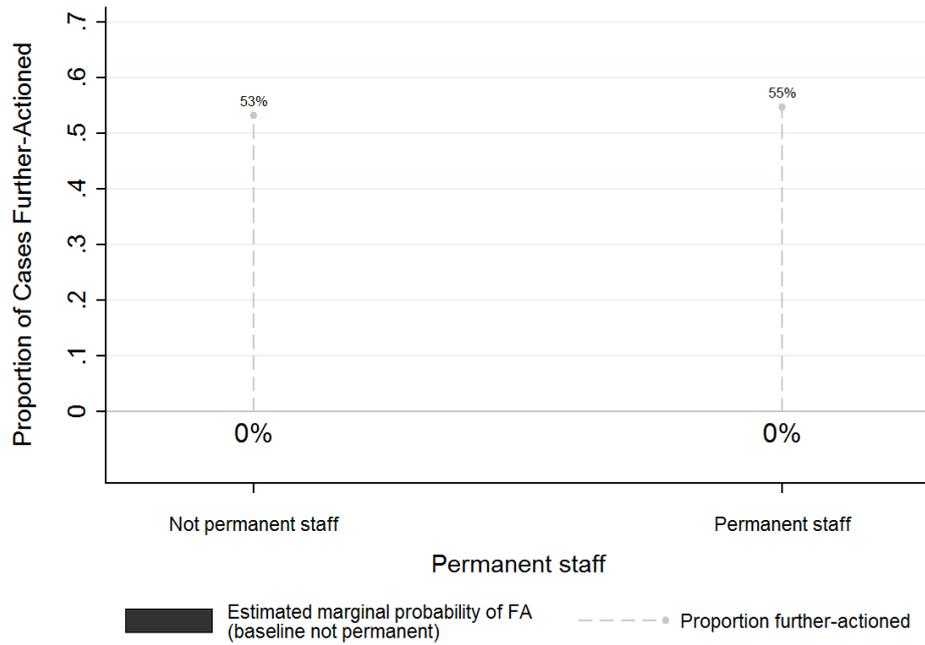
Figure I.2: Likelihood of a referral becoming a serious case given social worker employment type (LA1)
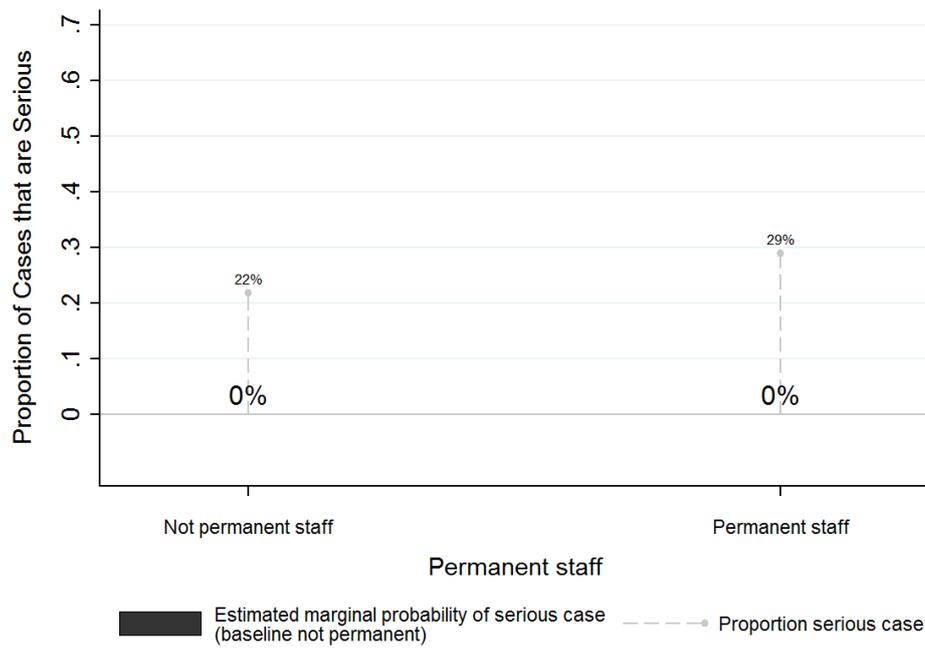
Figure I.3: Likelihood of a referral being subject to a repeat referral given social worker employment type (LA1)
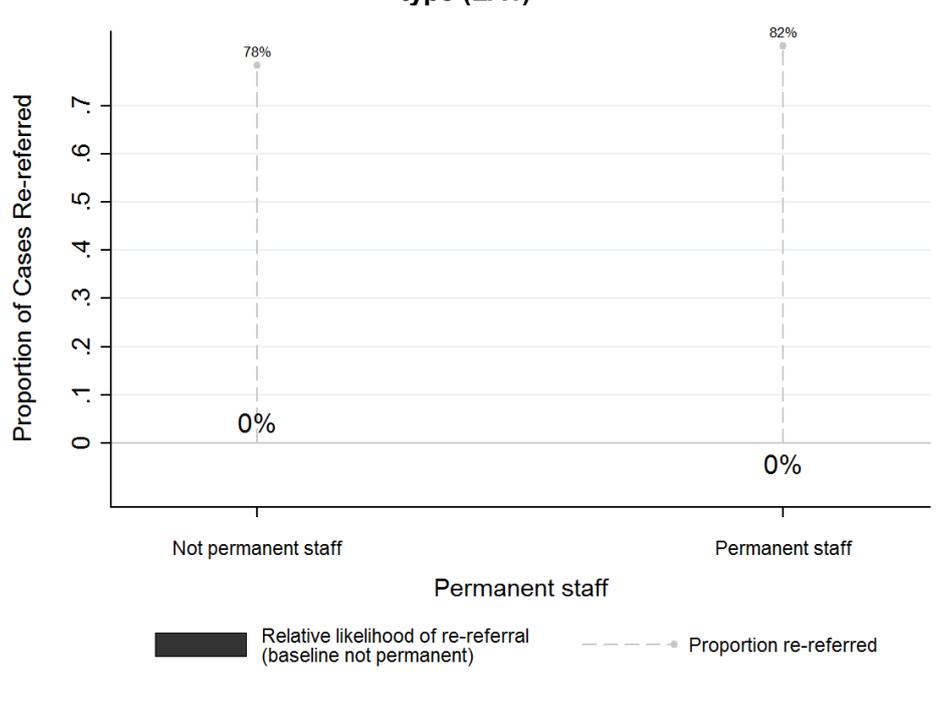
Hypotheses/further discussion points

- Would the above observation hold across all local authorities, or would it depend on the experience levels of the agency-employed social workers available in the local area?

- If permanent social workers were anecdotally younger and less experienced within LA1, how could the above result be explained in the context of the findings about the importance of experience? Is it actually the aggregate experience levels of a cohort of social workers within a local authority that is most important?

- The social worker experience data available for this project is relatively sparse. As such, is more detailed analysis required to allow the production of a comprehensive understanding of the relationship with employment type, tenure, and decision-making?

J: Time and other system changes

Headlines

- Dramatic movements in the likelihood of a referral progressing to further action can be observed across the four year time period reviewed, indicating there are likely to be other system and contextual factors at the local level which can have a powerful influence on decision-making.

On top of each variable explored above, interesting patterns were also observed in key outcomes across the four year period for which data was extracted.

For instance, there was variation in the number of referrals proceeding to further action over the four year time period. The tables below present the percentage of referrals proceeding to further action for each local authority across the four-year period forming part of the data sample.

Figure J.1: Variation in proportion of referrals proceeding to further action (LA1)

* Averaged over fortnightly periods in which the cases began
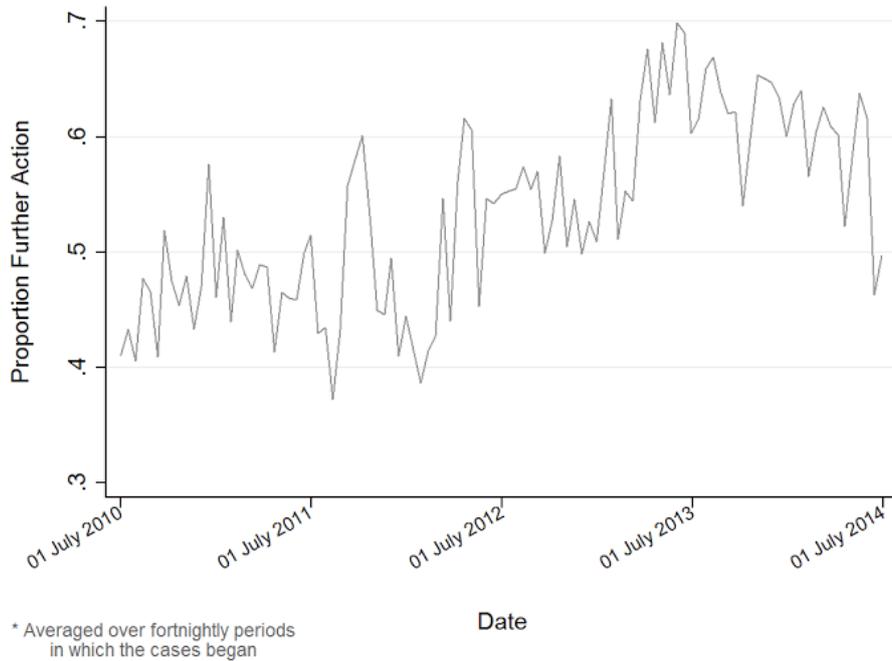
Figure J.2: Variation in proportion of referrals proceeding to further action (LA2)

* Averaged over fortnightly periods in which the cases began
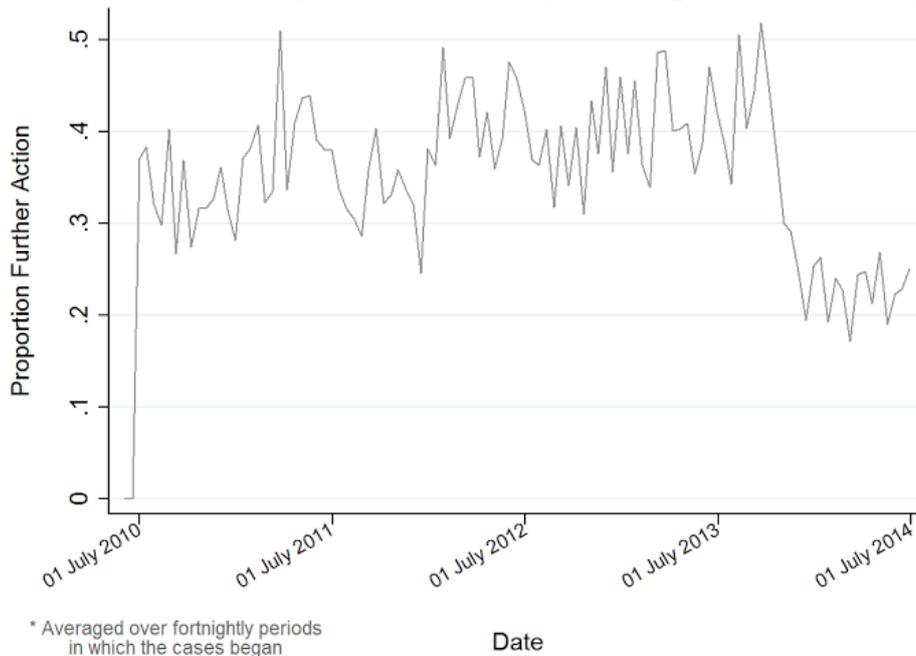
Figure J.3: Variation in proportion of referrals proceeding to further action (LA3)

* Averaged over fortnightly periods
in which the cases began
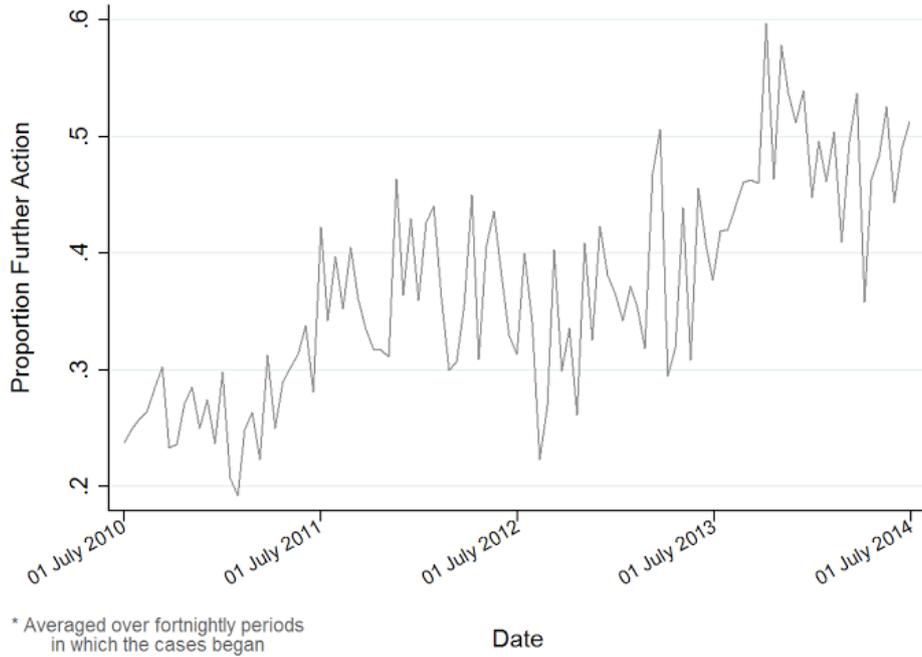
Some significant drop-offs and increases in the proportion of referrals being progressed to further action can be observed, indicating that there a likely to be a range of external system pressures that can significantly influence decision-making patterns.

Analysis also explored the likelihood that a referral would progress to become a serious case over the four year period for which data was extracted. Again, the figures below present the percentage of referrals proceeding to become a serious case for each local authority across the four year period:

Figure J.4: Variation in proportion of referrals proceeding to become a serious case (LA1)

* Averaged over fortnightly periods
in which the cases began
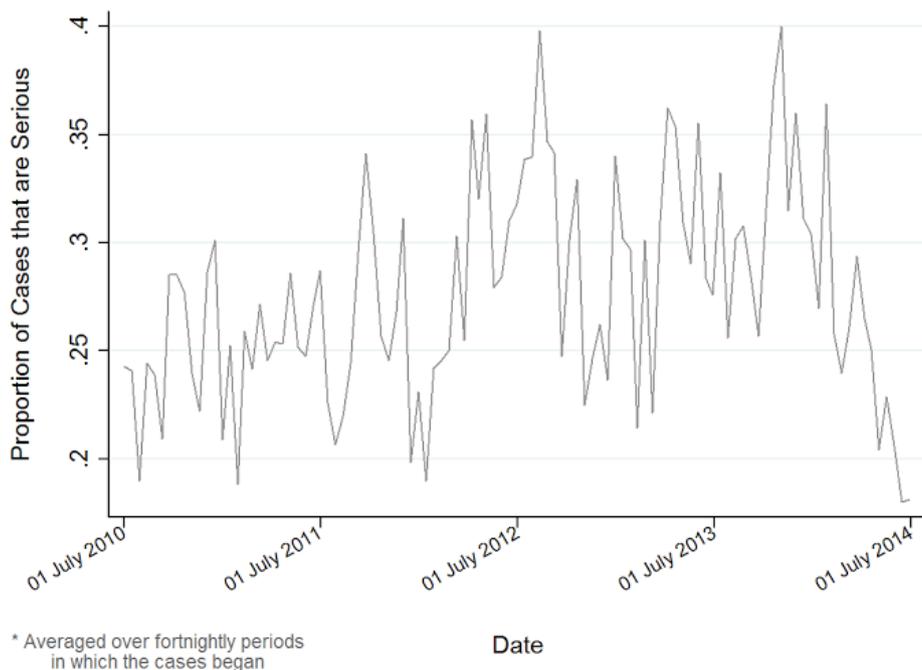
Figure J.5: Variation in proportion of referrals proceeding to become a serious case (LA2)

* Averaged over fortnightly periods in which the cases began
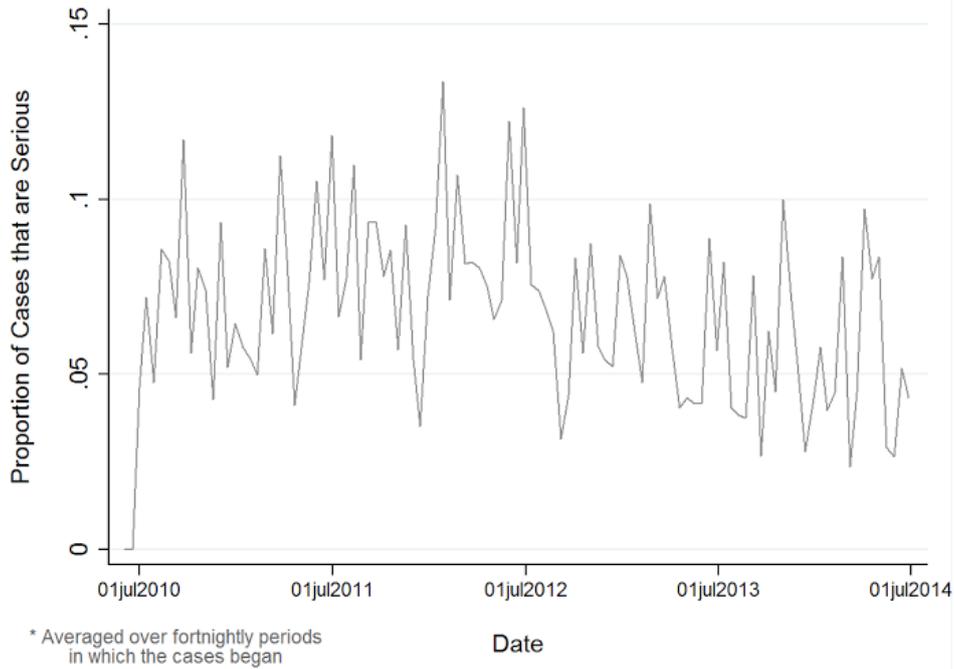
Figure J.6: Variation in proportion of referrals proceeding to become a serious case (LA3)

* Averaged over fortnightly periods in which the cases began
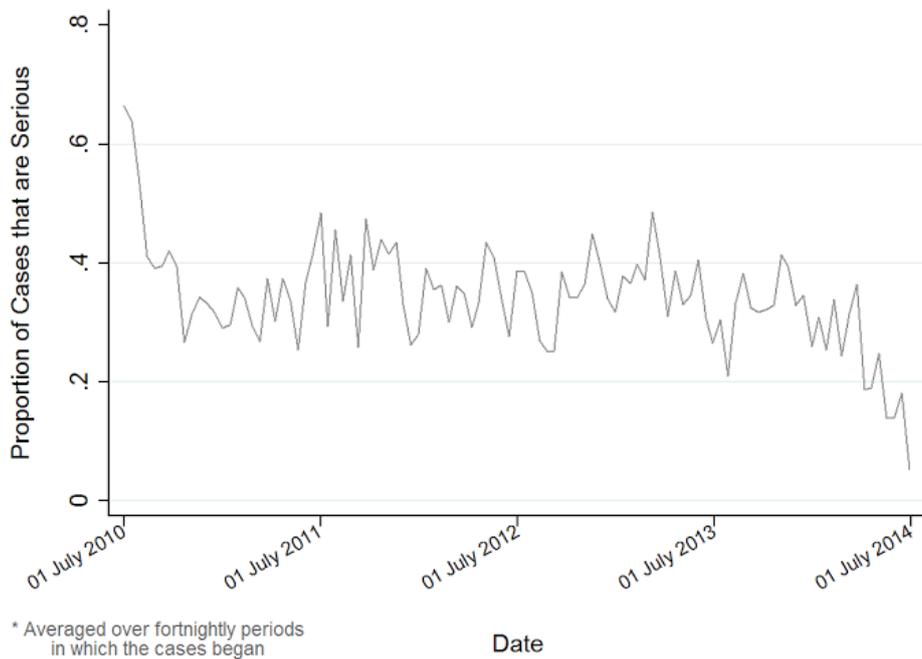
Note that there is some noise presented at the start of and at the end of the graphs, given a higher number of open cases at the 1 July 2010 start date for data extraction were likely to be serious cases, and a higher number of open cases at the 30 June 2014 cut-off date were unlikely to have developed into serious cases yet.

Discounting this noise, analysis indicates that, in general, the percentage of referrals that have proceeded to become a serious case has remained relatively stable over time, with perhaps a gradual rising trend evident in LA1.

Hypotheses/further discussion points

- What other factors are likely to explain some of the significant movements observed, particularly the likelihood of a referral progressing to further action? For instance, do Ofsted inspections or high-profile local child protection cases trigger changes in local practice and social worker decision-making? Further, could the local authority budget cycle be influencing decision-making patterns?

- Given the larger fluctuations in the likelihood of a referral progressing to further action, are system constraints limiting a higher degree of fluctuation in the likelihood of a referral becoming a serious case?

Free text analysis

As noted previously, the detailed assessment and decision-making for a particular case was largely contained in free text fields within local authority data systems.

Typically, a free text box would exist within the relevant social care data system, into which social work practitioners would detail the background to the case, their observations, and their reasons for deciding on a particular course of action. After documenting their reasoning, the practitioner would then select an outcome (e.g. no further action or proceed to assessment) and send the record onto a Manager for review/approval.

Free text information about social worker decision-making was able to be extracted from one participating local authority (LA1). Statistical analysis then explored the correlation between key categories of words (e.g. risk and protective) and defined outcomes, as well as individual words and defined outcomes.[32] The influence of the length of the free text entry made by the social worker to explain their decision-making was also explored.

On categories of words, each additional protective word was found to make it 3.1 percent more likely that a child would progress from referral to further action. However, when controlling for the length of the free text entry made (i.e. the amount of words that a social worker has written to document their decision-making), the influence of protective words dropped to zero.

Each additional harm word was found to make it 2.2 percent more likely that a child will progress from referral to further action. After controlling for the length of the free text entry, harm words were still found to be predictive of further action, with each additional harm word used making it 1.0 percent more likely that the child would proceed from referral to further action.

---

[32] A full list of words explored as part of free text analysis is provided in Appendix C.

In general, the more that a social worker writes in the free text field, the more likely it is that a referral will proceed to further action. Every additional 100 words was found to make it 10% more likely that a child will proceed from referral to further action.

Moving to specific words, the table below presents a list of words that were found to be correlated with progressing to further action in a statistically significant way:

Words correlated with progressing to further action[33]
Betting* (60.2 percentage points more likely to proceed to further action)
Genital mutilation** (51.1 percentage points)
Poverty* (37.3 percentage points)
Mania* (33.3 percentage points)
Out of work* (32.5 percentage points)
Evict* (32.2 percentage points)
Depressive* (31.3 percentage points)
Harassing** (31.2 percentage points)
Locked up*** (30.6 percentage points)
Alcohol abuse*** (25.5 percentage points)
Jail* (19.5 percentage points)
Truant* (18.1 percentage points)
Custodial*** (16.6 percentage points)
Trauma* (16.3 percentage points)
Chaotic*** (15.8 percentage points)
Groomed** (15.8 percentage points)
Credit** (15.6 percentage points)
Lump** (13.7 percentage points)
Depressed*** (13.4 percentage points)
Smack*** (13.4 percentage points)
Gang** (13.2 percentage points)

[33] All words presented in the table are statistically significant with an estimated influence of greater than 3 percentage points. Standard definitions of statistical significance are used - *** = (p<0.001), meaning that the probability of the result not being due to random chance is greater than 99.9%; ** = p<0.01; and * = p<0.05.

Words correlated with progressing to further action[33]
Shouted* (13.2 percentage points)
Threat** (13.1 percentage points)
No food** (12.1 percentage points)
Relapse* (13.1 percentage points)
Bullying* (13.1 percentage points)
Distress*** (12.1 percentage points)
Hungry** (11.8 percentage points)
EDT*** (10.8 percentage points)
Violent*** (10.5 percentage points)
Forced marriage** (10.3 percentage points)
Emotional wellbeing** (10.1 percentage points)
Violence*** (9.8 percentage points)
Court order** (9.7 percentage points)
Substance*** (9.6 percentage points)
Illness* (9.3 percentage points)
Bruises*** (8.9 percentage points)
Punched* (8.9 percentage points)
Hits*** (8.4 percentage points)
Dirty*** (8.0 percentage points)
Neglect*** (7.9 percentage points)
Sexual*** (7.9 percentage points)
Marks*** (7.7 percentage points)
Burns* (7.7 percentage points)
Drunk*** (7.4 percentage points)
Gun* (7.1 percentage points)
Custody*** (6.3 percentage points)
Knife*** (6.3 percentage points)
Unborn*** (6.0 percentage points)
Hitting** (6.1 percentage points)

Words correlated with progressing to further action[33]
Depression* (6.0 percentage points)
Money*** (5.8 percentage points)
Cocaine** (5.8 percentage points)
Drinking* (5.7 percentage points)
Love* (5.6 percentage points)
Poor*** (5.5 percentage points)
Prison*** (5.4 percentage points)
Arguing* (5.4 percentage points)
Unsupervised* (5.0 percentage points)
Overdose*** (4.5 percentage points)
Risk*** (4.4 percentage points)
Hospital*** (4.4 percentage points)
Hit*** (3.8 percentage points)
Cut* (3.8 percentage points)

Some of the findings from the free text analysis were unsurprising. For instance, the groups of terms below were found to be highly correlated with a referral proceeding to further action:

- 'Genital mutilation' and 'forced marriage';

- Terms linked to neglect, such as 'no food', 'hungry', and 'neglect';

- Terms linked to drug and alcohol misuse, such as 'alcohol abuse', 'substance', 'drunk', 'cocaine', 'drinking', and 'overdose';

- Various terms linked to violence or physical abuse, such as 'lump', 'hits', 'bruises', 'punched', 'marks', 'bruises', 'gun', 'knife', 'hitting', and 'hit'; and

- Terms linked to mental health issues, such as 'mania', 'depressive', and 'depressed'.

Other terms that are highly correlated with further action are perhaps worthy of deeper reflection, despite seeming intuitive on first glance. These include:

- 'Betting' and 'poverty', two terms very highly correlated with further action, although both occur relatively infrequently, such that "poor" is overall a better indicator; and

- Terms such as 'locked up', 'jail', 'custodial', 'prison', and 'custody', which occur much more frequently.

Several other interesting words were found to be correlated with further action:

- The term 'EDT' (meaning Emergency Duty Team), which may not be surprising as these teams operate out of hours and therefore might be expected to receive the most urgent cases (i.e. those that cannot wait);

- 'Truant', likely referring to non-attendance at school (although we note from further analysis that this term is *most* predictive when schools are not the referrers); and

- Somewhat counter-intuitively, the protective terms 'emotional wellbeing' and 'love'. In the case of love, the word appears to be used by social workers as a foil, or when recording the statements of others, such as "X does love her children, but…"

Free text analysis also looked for words that might be correlated with a child not progressing from referral to further action. Interestingly, there were far fewer words found to have a statistically significant correlation with not proceeding to further action, and some findings were counter-intuitive.

Words that were found to be correlated with not progressing to further action in a statistically significant way are presented in the table below:

Words correlated with not progressing to further action
SDM*** (Structured Decision Making) (154.4 percentage points more likely to not proceed to further action)
Unemployment* (107.1 percentage points)
Non-compliance* (76.8 percentage points)
At ease** (72.2 percentage points)
Isolation*** (34.7 percentage points)
Harass*** (34.6 percentage points)
Evicted* (34.2 percentage points)
Smacking*** (32.3 percentage points)
Bipolar** (26.4 percentage points)
Network* (13.0 percentage points)
Accidental** (12.6 percentage points)
Grooming* (11.5 percentage points)
Opinion*** (11.4 percentage points)

Words correlated with not progressing to further action
Threaten/threats* (10.9 percentage points)
Attacked* (10.6 percentage points)
Mess*** (5.0 percentage points)
Transfer*** (5.0 percentage points)

A first observation is that the term 'SDM' (referring to a Structured Decision Making model that can be used to assess the strengths and needs of a particular child) is very strongly correlated with a referral not proceeding to further action. The SDM has been described as a 'highly structured (i.e. tick box) approach with few accompanying descriptors'.[34] This finding indicates that the SDM is more regularly cited by social work practitioners for decisions not to progress a referral to further action, but less regularly cited for decisions to take further action.

The word 'opinion' is more highly correlated with not progressing a referral to further action. From interviews with Social Workers, we suspect this is related to the need felt by social workers to support the decision to take further action with evidence, which might be seen as being at odds with opinion.

Some findings are intuitive, with 'at ease', 'network', and 'accidental' all highly correlated with a decision not to progress a referral to further action.

Other findings are somewhat counter-intuitive, with 'unemployment', 'isolation', 'smacking' and 'mess' all correlated with taking no further action. Interestingly, 'bipolar' is correlated with taking no further action, while other words related to mental health issues (such as 'mania' and 'depressive') are highly correlated with progression of a referral to further action (we note that, reflecting incidence, depressive, depressed and depression appear approximately 10 times as often as bipolar). We also note that in our data, bipolar and depression/depressive/depressed never appear in the same casenote. The term 'non-compliance' is also correlated with no further action.

Several contradictions were also noted in the free text analysis, with variations of the same term showing correlations with both further action and no further action. For instance, 'evict' is correlated with a referral progressing to further action, while 'evicted' is correlated with not progressing to further action. Similarly, 'smack' (further action) and 'smacking' (no further action), 'harassing' (further action) and 'harass' (no further action), and 'groomed' (further action) and 'grooming' (no further action) are correlated with outcomes in the opposite direction. In the case of grooming, this appears to be that the word 'groomed' is used in the context of an accusation or suggestion from a third party (X suggests that Y is being groomed by Z", while "grooming" is more commonly used when either (a) the child themselves has been accused of grooming other children: usually in shorter case notes, suggesting that the social worker does not view the allegation as substantive, or (b) in the context of training or materials to help adults or children

---

[34] Barlow J, Fisher JD, & Jones, D (2012) *Systematic review of models of analysing significant harm*, Research Report DFE-RR199, report produced for the Department for Education, March.

"understand the grooming process", suggesting a lower level need for intervention. Groomed and grooming never occur in the same case note.

Similarly, while 'out of work' is correlated with further action, 'unemployment' is correlated with no further action.

Finally, free text analysis looked for words that might be correlated with a child progressing from an initial referral to become a serious case. Perhaps highlighting the diversity of serious needs that may present, there were significantly fewer words found to have a statistically significant correlation with becoming a serious case. Again, some findings were counter-intuitive.

Words that were found to be correlated in a statistically significant way with a referral ultimately becoming a serious case are presented in the table below:

Words correlated with a referral becoming a serious case
SDM** (90.3 percentage points more likely to become a serious case)
Trusted* (39.1 percentage points)
Argued** (14.1 percentage points)
Screaming* (11.7 percentage points)
Alcohol abuse* (9.5 percentage points)
Lump* (7.8 percentage points)
Section section*** (7.5 percentage points)
Court order* (6.6 percentage points)
Neglect*** (5.1 percentage points)
Conference*** (4.4 percentage points)
Risks* (3.6 percentage points)
Bruises* (3.4 percentage points)
Heroin* (3.3 percentage points)

Most notable is how use of "SDM" (referring to a Structured Decision Making model) is strongly correlated with a referral ultimately becoming a serious case (remembering that it was also highly correlated with a referral not progressing to further action). Other findings, such as "argued", "screaming", "alcohol abuse", and "neglect" are intuitive, though "trusted" is found to be strongly correlated with becoming a serious case, which is surprising.

Based on this analysis of words correlated with a referral progressing to become a serious case, it appears that there are few strongly predictive terms on which feedback could be provided to social workers. This was a limited sample however (of LA1 only), and there is scope for revisiting as data systems improve and further free text samples become available.

4. Conclusions and extension

This final section draws some overarching conclusions from the analysis conducted, reflecting back on the objectives of the project.

It also suggests several next steps that individual local authorities, the Department for Education, and the social work profession may wish to consider to take forward any further work in this area.

As noted, the decision-making burden faced by social work practitioners in children's social services is one of the most onerous in the public sector.

Every day, hard working professionals make hundreds of decisions about the wellbeing of some of society's most vulnerable children and families, often in situations of considerable time pressure on the basis of complex and often incomplete information.

Using a large sample quantitative approach, this project has identified a number of insights that point to factors that are correlated with, and may be influencing, decision-making in the children's social services. While the ambitions for the project were in part constrained by practical and legal challenges, several correlations observed still point to a range of interesting behavioural factors that may be influencing the outcomes of social worker decision-making.

These behavioural factors are likely to reflect a combination of both contextual factors and cognitive factors. Contextual factors include how the referral source, referral method, and presenting characteristics of the child could be influencing decision-making. Cognitive factors include how the day of the week, team caseload, and experience level of the social worker may be influencing decision-making.

As noted in the methodological caveats, this report presents correlational findings only given the approach employed. Further investigation is required to explore causation in this context, to determine what may be driving some of the correlational findings observed. The data findings do not answer questions – instead they hopefully pose a wide range of interesting and potentially fruitful future research questions.

Local investigation

We hope that this report has generated a range of interesting findings which will prompt local authorities and social work practitioners to reflect on current practice. There are several elements of the analysis presented which individual local authorities could look to reproduce at a local level, testing the extent to which the behavioural factors identified may be operating within their children's social care, and even potentially their adult social care, departments.

There are a range of strategies that could also be considered at a local level to protect against the potentially biasing influence of some of the behavioural factors identified. Strong practice supervision is a key avenue to guard against the influence of potential biases and extraneous influences on decision-making. On social worker caseload and day of the week for instance, supervisor efforts could focus on keeping a closer eye on

the flow of referrals to children's social work, or perhaps monitoring decision-making patterns by social workers on a more real-time basis. A decision-making dashboard could be developed at the local level to provide more useful information to supervisors about current decision-making practices and patterns, informing stronger practice supervision where appropriate. Over time, local authorities could even look to build data analysis into everyday operations, learning from what is happening on a day-to-day basis to feed into ongoing improvement, without the need to commission separate projects to explore available data.

However, care will be required to avoid inadvertently biasing decision-making in the opposite direction, with social workers too conscious of the potential influence of other factors (for instance, feedback could excessively reduce the number of referrals proceeding to further action on a Monday after identifying this as a current point of potential bias at the local level).

Further, at certain points in the children's social care system, it may be appropriate to consider methods to standardise the way in which initial referral information is presented to assessing social workers, so that referral source and method does not potentially bias decision-making. If possible, data systems could present information about the referral in a uniform way, revealing broader contextual information about the source and method of the referral only after a social worker has formed an initial view. This could help to avoid, for instance, current anecdotal feedback that referrals from police sources are treated somewhat differently by social workers given the form in which they are delivered to the children's social care department.

Training provided to both new and current social workers could also consider openly referring to potential behavioural factors that may influence decision-making. Pointing out the circumstances in which social workers may be subject to potentially unconscious influences on their professional practice is one way to help combat those influences.

Enabling future projects with large data sets

This project also represented one of the first times that this approach had been taken in this area. The potential for projects of this nature will continue to increase as technology advances and the size of datasets expands.[35]

As local authorities invest in new data systems for the operation of their social care departments, we encourage them to consider the future potential for analytical projects of this nature, which offer the ability to reach new levels of understanding about child pathways and outcomes. Data quality remains an ongoing challenge, and we also encourage greater capture of 'soft' data about the surrounding context of decision-making.

---

[35] McKinsey Global Institute (2011) *Big data: The next frontier for innovation, competition, and productivity*, McKinsey and Company, May.

The analytical potential of some of the 'soft' contextual data about professional decision-making is high. For instance, some factors such as the influence of the time of day on decision-making, were not able to be explored in full detail. It is recommended that local authorities consider opportunities to capture data about a wider range of contextual factors associated with decision-making, such as the precise time at which a decision was recorded, and the precise time at which a case was allocated to a social worker. A further area that we were unable to explore using available data was the influence of a looming time deadline (e.g. the statutory limit for making a decision on a referral) on the likelihood of proceeding to further action.

Another area which would be worthwhile exploring in more detail in subsequent analysis is the influence of the personal characteristics of the social worker. While perhaps more challenging to the profession, we encourage local authorities and practitioners to be bold and explore what influence the personal characteristics of individual social workers may be having on decision-making. Data on the age, experience level, gender, current postcode, educational qualifications, employment type, caseload, and ethnicity of social care practitioners may all provide interesting insights into how decision-making may be influenced. In turn, this could provide insight into how professional practice can be shaped and improved.

Predictive decision-making tools

One potential outcome from this project was the discovery of a range of factors that, in combination, were highly predictive of the need for a child to proceed beyond referral to further action. A range of factors could also have been identified that, in combination, were highly predictive that a child would ultimately become a serious case.

This discovery could have added further weight to arguments that an evidence-based decision-making tool could be introduced to assist social workers in exercising their professional judgment.

On the basis of the data sample we were able to analyse for this project, and taking into account the structure of data systems used by most children's social care departments (with important information contained in free text fields), it appears that this may not be possible.

While a number of factors were identified that appeared predictive of outcomes, there were a large number of such factors. This indicates that most cases are likely to have their own unique circumstances and combination of risk and protective factors, which can 'interact in complex and fluid ways'.[36]

However, we believe there is still scope for considering further the provision of stronger, evidence-based guidance to social work practitioners on rigorous, predictive data that can support their decision-making. In some contexts, data-driven models have been

---

[36] Ward H, Brown R & Hyde-Dryden G (2014) 'Assessing Parental Capacity to Change when Children are on the Edge of Care: an overview of current research evidence', Research Report, Centre for Child and Family Research, Loughborough University, June.

found to be more accurate in predicting some forms of behaviour, including the likelihood of future abuse and neglect, than clinical judgment alone.[37] Providing feedback on the likely outcomes of different types of presenting cases could assist social workers to exercise their professional judgment, providing new evidence and prompting deeper consideration, particularly for factors that might not immediately seem intuitive.

As data quality and data availability improves, the ability to identify predictive factors and produce estimates of probability about the potential future pathways of vulnerable children will increase. This should be able to provide a richer layer of evidence that social work practitioners can take into account, in addition to their existing professional experience and intuition.

A future world can be envisaged in which data systems are able to generate risk flags for each presenting child, based on previous information about the probability of the case proceeding to require specialist intervention. Even at the front door of children's social services, more advanced use of data could provide improved feedback to social work practitioners about the likelihood of various scenarios.

Improved professional decision-making guidance

There is also scope for consideration of standardised decision-making aids that could better structure and enable professional judgment, helping to guard against some of the potential behavioural factors identified in this report that may be influencing decision-making.

Evidence from other contexts has shown how so-called 'professional boot-strapping' can help to improve the consistency of decision-making, preventing extraneous contextual 'noise' from distracting professionals from the factors they know are important.[38]

Taking this approach in the children's social care context would involve working with experienced practitioners from across England to determine the range of key elements that are looked at when assessing need for a particular child or family. A series of workshops or structured decision-making simulations could then be run to extract professional knowledge from experienced social workers about the key factors they are looking for when making decisions, particularly at the front door of children's social care.

By codifying the approaches and knowledge extracted from this engagement, and developing standardised decision-making guidance, new or less experienced practitioners could be assisted to make more structured, evidence-based judgments using the same approach as experienced professionals, with extra safeguards introduced to guard against potential biasing behavioural factors.

---

[37] See Shlonsky A & Wagner D (2005) 'The next step: Integrating actuarial risk assessment and clinical judgment into an evidence-based practice framework in CPS case management', *Children and Youth Services Review*, 27: 409-427.
[38] Gigerenzer G (2008) *Gut feelings: Short cuts to better decision making,* London: Penguin Group.

However, we recognise that while predictive data and decision-making guidance can improve understanding and professional decision-making, ultimately it cannot replace it. Ongoing research and analysis into decision-making patterns and potential influencing factors is required to best support social work practitioners in what is a challenging professional decision-making environment.

In the future, we look forward to a world of improved data availability and predictive analytics, more robust and structured decision-making guidance to support practitioners to best exercise their professional judgment, and ultimately improved outcomes for vulnerable children and families.

Appendix A – Interpreting the figures presented

Findings are presented through two main types of graphs. Bar graphs are used, with an example presented below.

Figure 0.1 - Example Bar Chart
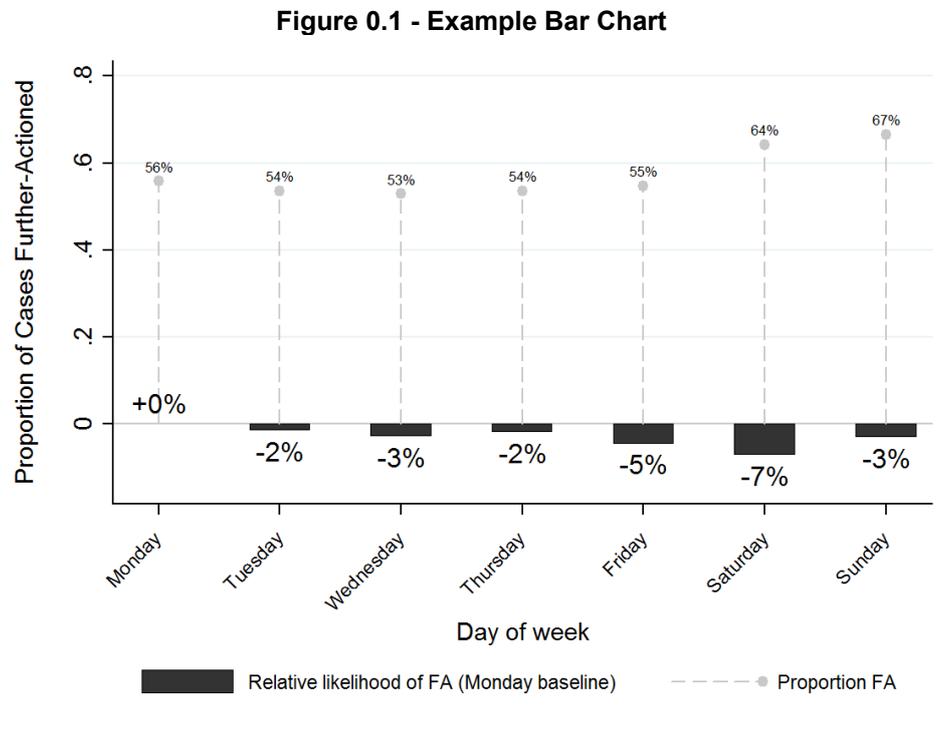
The x-axis will present the independent variable, in this example, the day of the week. The y-axis will present the dependent variable, which will be one of the key outcomes previously defined. Here, the proportion of referrals proceeding to further action is shown on the y-axis.

The light grey dotted lines show the raw proportion of each classification within the independent variable (here, each day out of all the days of the week) that were observed to be correlated with the dependent variable (progressing from referral to further action). It is important to note that the light grey dotted lines present raw aggregated statistics only, without controlling for the influence of other variables.

The black bars labelled with percentages coming off the x-axis are most important. These indicate the relative likelihood of the category of independent variable leading to the dependent variable, controlling for all other factors. In the example above, we see that referrals received on a Thursday are 2 percentage points less likely to progress to further actions, when compared to referrals received on a Monday (the relevant baseline for this comparison will always be listed in the key, below the chart).

The second main type of graph used is the scatterplot, as shown below:

Figure 0.2 - Example Scatterplot
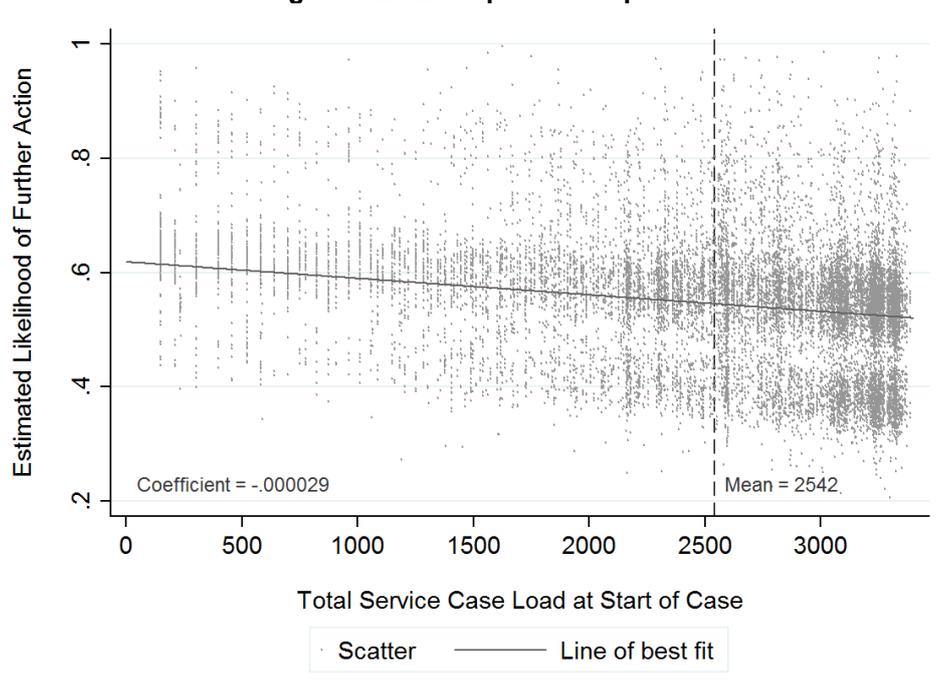
Again the independent variable (here, total service case load) is presented on the x-axis, with the dependent variable (here, the likelihood that a referral progresses to further action) on the y-axis. The scatterplot presents all relevant data points within the dataset, before creating a line of best fit (controlling for the influence of other variables).

The graph includes a label for the mean of the x-axis variable (here, 2542) and the coefficient of an estimated line of best fit (-0.000029). The coefficient should be interpreted as the marginal change in the probability of the outcome occurring (in this case, further action following referral) associated with a 1-unit increase in the x-axis variable (in this case, case load). Here, this means that for every 0.3 extra cases taken on by the children's social care department, there is a 1 percent increase in the likelihood of a referral proceeding to further action.

The lines of best fit provide a representation of the general trend whilst controlling for all other material factors; they are drawn by extrapolating from the average estimated likelihood, at the average age, by the estimated marginal difference in outcome likelihood between cases with a unit difference in the characteristic being examined (for example, one year when looking at age).

Appendix B – Full scope of data requested

1. Presenting characteristics of the child

The first tranche related to the presenting characteristics of each individual child with a recorded referral to children's social care at the relevant local authority for the period 1 July 2010 to 30 June 2014 (four year period). This included all referrals in relation to child protection, childen in need, care proceedings and looked after children. It did not include referrals to specialist teams for children with disabilities. The four year time period was selected to obtain a significant sample of completed child journey's through the social care system, and also to identify potential instances of repeat referral.

The anonymised data from individual child records that was requested was:

- Unique identifier for the individual child
- Unique identifier for the family unit or household, if present
- Lowest Super Output Area (LSOA) or Postcode (if LSOA not available)
- Age of young person at point of referral
- Month/Year of birth
- Gender
- Ethnicity
- Disability
- Religious status
- Social care history
- Parental occupation
- Primary needs codes (as required for CIN survey)

Of the above, data on religious status and parental occupation was not captured by any of the participating local authorities.

2. Interactions with local authority children's social care

The second tranche of data requested related to the interactions (also described by various local authorities as episodes or contacts) that each individual had with children's social care during the time period being explored (1 July 2010 – 30 June 2014). This again included all interactions in relation to child protection, childen in need, care proceedings and looked after children. Again, it did not include referrals to specialist teams for children with disabilities.

The data request sought full information within each of the below potential data fields:

- Unique personal reference key associated with interaction/episode
- Date of interaction/episode

- Initiator (source) of the interaction/episode

- Initiating method (e.g. phone, email) of the interaction/episode

- Description/summary of the interaction/episode*

- Social worker analysis of the interaction/episode*

- Social worker recommendation about the interaction/episode*

- Management notations on interaction/episode*

- Final decision associated with interaction/episode

- Time and date information associated with all recorded actions on the interaction/episode

- Unique identifier for the individual child

- Unique identifier for the social worker associated with recorded action

Items marked with asterisk represent potential free text fields (depending on the specific make-up of the local authority's data system) that could contain personal data.

3. Information on the social work practitioners making decisions

The third tranche of data sought was information on the social work practitioners recorded as decision-makers within the data system for the relevant time period. The purpose of this request was to explore how the characteristics of the individual practitioner might interact with their decision-making.

The data extract request asked for specific data fields relevant to the background of the identified social worker, namely:

- Age

- Level of experience

- Highest education qualification

- Ethnicity

- Employment type (agency or permanent; full time or part time)

- Employment start date (within the local authority)

- Team unique identifier (i.e. which team a social worker belongs to)

- Absenteeism data on the social worker

- LSOA or postcode of team location (or other unique identifier of location).

This data was to be anonymised, and linked through a unique identifier for the social worker within the system.

Appendix C – Words forming part of free text analysis

Harm words
suffering suffer harm failure risk risks concerns concern concerned unborn "court_order" abuse abused neglect neglected injury injuries injured sexual sexually accidental "nonaccidental" domestic threats threat threaten threatened violence violent emotional verbal abuser allegation allegations abandoned delusions "mental_health" psychosis schizophrenia bipolar mania manic depression depressive depressed exploitation exploited exploits FGM "genital_mutil" "honour_killing" "forced_marriage" duress accost accosted accosts attack attacking attacked attacks hit hits hitting punch punches punched punching bruises cuts marks burns alcohol liquor drugs substance clean remission relapse heroin crack "crack_cocaine" cocaine amphetamine methamphetamine pills acute illness health stress stressful absence absent truant truancy poverty poor hunger hungry malnourished isolation isolated racism bullying discrimination loneliness lonely distrust conflict bankrupt gambling loan betting bookies debt debtor debts bailiffs bailiff prison jail custodial "young_offenders" DV YOI HMP "domestic_violence" "physical_abuse" smacked smacking smack shouting shouted shout argument arguing argue argued "sexual_abuse" "sexual_trafficking" trafficked grooming groomed "sexually_inappropriate" "emotional_abuse" tearful bedwetting unsupervised lice immobile deterioration deteriorated deteriorate deteriorating "nonengagement" "noncompliance" untidy chaotic mess messy unclean dirty smelly "toxic_trio" "school_attendance" "attendance_issues" "poor_attendance" "housing_benefit" evicted "insecure_housing" transient "financial_difficulties" credit money unemployment "out_of_work" "looking_for_work" "special_needs" "learning_disability" "panic_attack" cut distress welts trauma harmful maltreatment "alcohol_abuse" "drug_abuse" marijuana overdose "drug_user" methadone drink "previous_contact" "services_in_place" custody evict eviction "bed_and_breakfast" ctc wtc cben cb "maternity_pay" "crisis_loan" crisis "legal_advice" rent arrears fleeing "natal" perinatal "peri_natal" "post_natal_depression" starving starved incarcerated "locked_up" "no_food" wetting unkempt scream screaming screamed agitated harass harassed harassing harrassed harrass harrassing chastisement odour odor chastised chastise gang weapon gun knife cane abrasion lumps lump drinking drunk defensive dishonest untruthful lie lying aggressive wary cautious suspicious "bad_vibe" previous prior accident mishap confusion

Protective words
strength supportive readiness spirituality "cultural_roots" community stability stable "emotional_support" "tangible_support" "decision_making_assistance" "problem_solving_assistance" support "self_esteem" "social_companionship" companionship recreational sport sports networks network trust trusting trustful trusted loving love healthy positive nurturing nurture "emotional_wellbeing" happy "at_ease" strong neighbour neighbours family friends friend guardian clean tidy neat alert uncluttered attending nutrition nutritious compliant comply established secure commit committed security nice resilient robust "hard_working" try trying encouraging tough passion passionate care caring sustainable viable income money wages earning salary links social capital "social_capital" bonds connections friendship relationship hobby hobbies pursuits active energetic affection affectionate warm devoted comfortable comfort sincere heartfelt welcoming hospitable honest

Harm words
truthful candid frank open sincere reference vouch "good_word" religion religious "good_english" "good_student" bond bonds rapport close "well_behaved" behave obey conform attend attending "on_time"
Technical words
icpc isu "section_steen" "Section_fseven" cpp cin rcpc strategy transfer conference referral contact nfa hosdar edt "section_seven" "section_tseven" tm sdm uasc iro pephna camhs hv "single_issue" "multiple_issue" escr
Behavioural words
"gut_feel" sense opinion feeling intuition "my_experience" colleague "social_worker" holiday weekend police teacher school doctor nurse hospital internal email phone "phone_call" meeting telephone

List of figures