



Ministry of Housing,
Communities &
Local Government

Title: **Business Rates Retention Steering Group**

Paper: Children and Young People's Services (CYPS) relative needs formula

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Venue: Local Government Association, 18 Smith Square, London

1. As part of the review of local authorities' relative needs and resources, MHCLG and DfE commissioned a research project to develop a new multi-level model for Children and Young People's Services (CYPS). This paper provides an update on modelling progress, based on the research project undertaken by LG Futures and academic partners. The content of this paper was covered in the most recent **Needs & Resources Technical Working Group** meeting on 25 June 2019. Papers can be found on the LGA website¹.
2. The methodology and development of the multi-level model was generally well received by members. There was some discussion around the variables included in the model, particularly the implications of including or excluding ethnicity as a driver of need. The group acknowledged the analytical significance of ethnicity as a variable, but some members expressed concern that including it in the model may perpetuate unmet need in the system.
3. Members also asked whether more technical detail could be shared when available, as well as indicative allocations, and were interested in how best to deliver transparency on outcomes.

Background

4. In order to deliver an up-to-date assessment of the relative needs between authorities providing Children and Young People's Services, there is broad agreement that the best available option is to develop a new service-specific formula which offers appropriate levels of analytical robustness. The multi-level model approach identified by MHCLG and DfE helps to account for the low incidence and high variation within

¹ <https://www.local.gov.uk/topics/finance-and-business-rates/business-rates-retention/technical-working-group-needs-and>

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children's services and will reflect the more detailed approach taken for adult social care, another high risk, complex, high-profile and demand-led area.

5. The Government ran a competitive bidding process to complete this work and following initial scoping work in autumn and winter 2017/18, successful contractors LG Futures, in collaboration with academics from University of Plymouth and the University of Huddersfield, identified the preferred option to proceed with a model based on individual level child data, using data from the National Pupil Database owned by DfE. This is a highly robust approach as it looks both at the characteristics of individual children as drivers of need as well as the characteristics of the areas in which they live. LG Futures presented primary work, including the process involved and how an individual-level approach would work to the Technical Working Group in March 2018.²
6. This approach uses individual child-level social care activity data, along with wider child-level data and socio-economic data about the area, to predict the likelihood that a child will have interaction with social care services. This means that the model is highly detailed, built up from individual children's information and allows the formula to go further than the traditional dependence on geographically-aggregated data.
7. Using data at this level also removes the impact of local authority (or court service) decision-making from the relative allocations. For example, if Authority A has the same number of children with characteristics that suggest they would be within the care system as Authority B, both authorities will receive the same relative needs share for this element of the model, regardless of whether these children enter the care system. This means that if a particular authority has invested heavily in targeted early intervention and reduced need in a particular area, they will still receive the same needs share for the children that they have in this area. Therefore, **the model will not penalise those authorities that are more efficient or place more emphasis on preventative services.**
8. Once complete, a tailored Area Cost Adjustment will be applied to the CYPS model to account for local variations in the cost of delivering services. The Area Cost Adjustment is covered in more detail in a separate paper.

Section 1: Structure of the model

2

https://www.local.gov.uk/sites/default/files/documents/Children%27s%20services%20research_update%20-%20March%202018.pdf

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9. **The first step in building the model is to combine data on the detailed characteristics of children with data on the use of children's services.** This involved linking data at an individual child level from:
 - a. the National Pupil Database (NPD) and Individual Learner Record (ILR), which details the socio-demographic characteristics of all children registered at state-maintained schools and Further Education colleges, with
 - b. the Children in Need (CIN) and Children Looked After (CLA) datasets, providing details on all contacts with children's services, (including any children not listed in the NPD/ILR)
10. This was supplemented with data collected directly from local authorities on the Lower Super Output Area (LSOA) level of origin for all children on their CLA and CIN registers.
11. **The second stage in creating the model is to determine how best to measure activity within children and young people's services..**
12. The model uses a database of c.3.3m individual level child records from local authorities across the country. Combining individual records with data that shows whether these children have accessed different services means that we can look at the combinations of characteristics which result in a child accessing social care. These are used to predict whether all children in the NPD are likely to have contact with social care services. These predictions are then aggregated to local authority level to produce a funding allocation model for each service area. The individual models are then weighted using current expenditure levels and a local authority level CYPS needs share is produced.
13. In the multi-level model, the expected service needs of individual children are predicted across a series of CYPS service area categories using a series of 'activity metrics' as contained within the CLA and CIN datasets. Those needs are then aggregated to LA level. These define each LA's relative *service* needs with respect to each category, but it is then necessary to combine those need estimates to reflect the relative *resource* requirements.
14. The contractors linked two core readily available data sets - service activity, and expenditure associated with service activity – which have been then used to divide the overall model into seven 'expenditure/activity' service areas. These are included in Table 1 below.
15. Each of these service area categories was tested to see how they aligned with appropriate activity metrics – that proxy measures for children's services activity more

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broadly – which needed to be available in the child-level dataset. Contractors, in discussion with officials at DfE, identified four appropriate activity metrics. These are:

- a. CIN – whether the child is registered CIN on 31st March;
- b. REF – whether the child is referred with further action in the year;
- c. CARE – whether the child has ever been in residential or foster care during the year; and
- d. CEASED – whether the child left care during the year for any reason.

16. Using these four activity metrics, contractors have produced model options aligning the service area categories with the activity metrics. Our view is that a three metric model provides a good balance between accuracy and simplicity. The REF metric (whether the child is referred with further action in the year) has a lower correlation with the service expenditure category which it acts as a proxy for than the CIN metric.

Table 1: Service areas per activity metric

Metric	Service area
CIN	1. Child, young people and family support services & 2. Safeguarding triage: assessment, case management, and commissioning & 7. Youth Justice
CARE	3. Residential Care for Children Looked After & 4. Fostering for Children Looked After
CEASED	5. Supporting legal permanence in alternative families; 6. Care leaver services

Section 2: Characteristics driving service use

17. The individual characteristics of over 3 million children in the modelling dataset are acting as the ‘cost drivers’ in the multilevel model. Characteristics could only be used where they were present both in the modelling dataset and in the dataset of all NPD children which would be used in the final model. The variables which were considered to be robust and showed a significant contribution to the model are included in Table 2.

18. Some characteristics were considered to be too erratic in terms of local level application to be robust. Variables were also excluded from consideration where there were significant amounts of missing data. This was particularly the case for those looking at duration across a school year, due to the numbers of pupils moving schools mid-year.

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19. In addition to the individual characteristics in the dataset, data about the LSOA from which the child originates is also appended to each child. This is referred to as pseudo-individual data (attached to an individual but referring to the characteristics of the small area around the child). LSOA-level variables which were considered to be robust and showed a significant contribution to the model are included in Table 2.
20. Several **variables at LA-level** were also considered for inclusion alongside the child-level dataset. However, none of these variables met the accepted analytical criteria for improvement to the model statistics. This means inclusion of level 2 variables is likely to result in distortion of the model rather than improvement. This is not unexpected; the evidential base of over 3 million separate data points at child level has such a high level of predictive power that inclusion of a relatively small number of local authority data points is unable to add significantly to this.

Table 2: Variables driving service use

			Included?
Level 1	Individual-level	Sex (Male/Female)	✓
		Age (6-7 years; 8-9 years; 10-11 years; 12-13 years; 14-15 years; 16-17 years)	✓
		Ethnicity (Minor ethnic groups used, n=17 incl. unknown)	✓
		Free school meals (FSM) eligibility (yes/no)	✓
	Pseudo-individual-level (LSOA-level)	Indices of Deprivation Affecting Children (IDACI) score	✓
		Proportion of children in LSOA with limited activities	✓
		Proportion of parents in LSOA with level-1 educational qualifications or below	✓
		Proportion of overcrowded households in LSOA	✓
		Population density of LSOA	✓
		Journey times to town centres	✓
Level 2	Local Authority-level	Rates of under-18 pregnancies	x
		Rates of self-harm/suicide	x
		Rates of admissions for alcohol-related conditions	x
		Rates of juvenile convictions or cautions	x
		Net international and UK migration	x
		Rural population	x
Other	Interaction variables	Interaction between FSM eligibility and child being aged 16 or 17	✓
		Interaction between FSM eligibility and socio-economic deprivation level in child's LSOA (as measured by the IDACI score)	✓

21. During the iterative modelling process, two interaction variables were found to improve the model. These were included in the model as incorporating the effect of interactions

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between two different variables explained service usage further than including just the variables themselves. An interaction between Free School Meal (FSM) eligibility and a child being aged 16 or 17 is included as FSM eligibility data is missing for children who attend Further Education Colleges and whose details are recorded in the Individualised Learner Record (ILR).

22. Secondly, the interaction between FSM eligibility and socio-economic deprivation level in a child's LSOA (as measured by the IDACI score), aims to differentiate between children in income-deprived households living in more affluent areas and those children in more affluent households that live in deprived neighbourhoods. This can be illustrated by Table 3 below.

Table 3: Illustrated impact of the interaction of Free School Meal eligibility and socio-economic deprivation

	FSM	
	Yes	No
Low deprivation	9.4%	1.4%
High deprivation	14.4%	5.8%

23. This shows that being deprived in an area of high deprivation presents the greatest odds of having a social care intervention, but being in receipt of FSM increases your odds further in a low deprivation area compared to a high deprivation area.

Section 3: Characteristics driving need

24. The model is built to describe likelihood of service usage. The advantage of a multi-level model is that it accounts for variation and patterns of need within as well as between local authorities in order to attempt to eliminate any undue impact of individual councils' decisions on usage levels. It is worth noting, however, that there will be some level of need that is inherently random and unpredictable, therefore we cannot expect a model with any level of complexity or number of variables to predict 100% of need.
25. It is still important to consider whether the characteristics which drive service use also describe the need to use services. Of the variables identified above, there is good evidence that most of these are key drivers for need to use services. However, there is mixed evidence with regard to ethnicity.
26. The model currently uses White British children as a reference category, and suggests that some Black ethnic categories are more likely to be users of children's services, with Asian Indian, Asian Bangladeshi, Asian Pakistani and Chinese children less likely.

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There is evidence to suggest that this may represent lower need to use services for a number of reasons:

- a. More extended family structures mean need for care is absorbed within the family.
- b. There is evidence to suggest that there are lower levels of drug and alcohol abuse among these communities, although it is possible that access to these services reflects a similar pattern of lack of use of services.

27. However, it is also plausible that the differences in ethnicity represent groups who are experiencing unmet need, or that entrenched patterns of behaviour on the part of children's services may result in increased or decreased likelihood of service use by some groups.
28. Given the mixed evidence in this area, there is a decision to be made as to whether we include ethnicity as a driver within the model. Although inclusion or exclusion makes relatively little difference to the model overall, it could have a significant impact for particular authorities.
29. The primary difference of excluding ethnicity from the model would be to reduce allocations in areas with high proportions of children of those ethnicities assessed as having high usage (e.g. children of some Black ethnic categories). This may be problematic as children within this category will already be in the system and therefore will not cease to place a cost burden on the local authority. Similarly, for those authorities who are considered to have unmet need in particular ethnic groups, it is far from certain that an increase in non-ringfenced funding will result in those authorities investing in seeking out families who do not currently have contact with the system.
30. While we accept that ethnicity provides a significant challenge in assessing need, ignoring this factor in allocating funding may not be an effective way to improve the performance of the system in the short term. In recent engagement, members of the Association of Directors of Children's Services' (ADCS) Resources and Sustainability Policy Committee found it logical to include ethnicity in the new formula given that it does drive current usage.
31. **Balancing the known impact of ethnicity on usage of services against the possible impact of ethnicity on the supply of services, we are minded to include ethnicity in the model, subject to further analysis, including the implications for equalities.**

Question: Do you have views on inclusion of ethnicity within the model?

Section 4: Updating the model

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32. As the model does not use population data and instead uses a database from a fixed point in time, we cannot use population projections in order to forecast relative needs in the way we have proposed for most other relative needs formulas within the review.
33. It may be the case that the most appropriate option is to fix the formula until an appropriate point to update the model is reached (e.g. when carrying out a full refresh of relative needs shares). It is possible to update the variables within the model without respecifying the model itself, as has been done with the current formula.

Section 5: Next stages

34. Once we have had an opportunity to reflect on the final technical research report, we plan that the formula will be subject to an academic peer review.
35. Across the review we need to ensure an appropriate balance between simplicity, transparency and precision. Whilst we are of the view that this model represents the most robust approach available for children's services, we are conscious that the model is inherently complex and based on data which is highly sensitive.
36. We have said that our objective analysis should, where appropriate, provide an opportunity for experts in local government to sense check the results and we will therefore continue to prioritise our engagement with the sector. This may involve sharing drivers of need for social care interventions for each identified characteristic, along with the extent to which they increase the odds of needing those interventions, however there are some limitations given the sensitivity of the individual child-level data.
37. Although this will not allow authorities to replicate needs shares, it will provide an indication of what is driving need for individual authorities. We also plan to publish the full technical report and consider the most appropriate point at which to formally consult on the outputs of the formula. **We would welcome your views on how best to achieve these aims.**