Technical Annex on the Home to School Transport Relative Needs Formula (RNF)

Introduction

The home to school transport (HTST) formula estimates each local authority's share of need to spend on pre-16 HTST. Shares are calculated using pupil level data: we estimate each pupil's eligibility for HTST and use the distances these pupils travel to school to estimate relative need to spend for each local authority. Shares for pupils who may qualify for transport because of their special educational needs and disability (SEND) are calculated separately and weighted when combined with mainstream transport shares; this is to account for the additional costs associated with providing SEND transport.

Methodology

Shares for mainstream and SEND HTST are calculated separately and then combined into a single share for each local authority.

Mainstream shares

We use pupil-level data from the January 2024 school census to identify pupils aged between 5 and 15 at the start of the academic year who do not have an Education, Health and Care plan (EHCP) and attend state-funded education provision.

We use eastings and northings coordinates to calculate the straight-line distance between each pupil's home address and their nearest suitable state-funded school (based on age and sex, excluding selective schools). We adjust straight-line distances to approximate actual road distances using an adjustment factor derived for each local authority. More information on this adjustment factor can be found below.

We use the HTST statutory walking distances to identify pupils who are potentially eligible for transport: for pupils under 8 years old the adjusted distance between their home and school is more than 2 miles and for pupils aged 8 and above the adjusted distance is more than 3 miles. This allows us to estimate the eligible population, though we cannot identify all eligible pupils, as we're unable to evaluate details of pupils' travel e.g. unsafe routes.

Any adjusted distances greater than 50 miles are set to 50. This is to remove potentially erroneous data and journeys that are less likely to occur every day, for example pupils who attend boarding provision. No distances included for mainstream shares exceeded the 50-mile threshold.

We calculate each local authority's mainstream HTST share by dividing the sum of the adjusted distances of pupils living in the local authority by the national total of the adjusted distances.

$$Mainstream\ LA\ share = \frac{\Sigma(\text{Adjusted distances travelled by pupils living in the LA})}{\Sigma(\text{Adjusted distances travelled by all pupils})}$$

SEND shares

We use pupil-level data from the January 2024 school census to identify pupils aged between 5 and 15 at the start of the academic year who have an Education, Health and Care plan (EHCP) and attend state-funded education provision. In addition to this, we use pupil-level data from the SEN2 data collection (a dataset of all EHCPs) to identify pupils aged between 5 and 15 who attend an independent mainstream or independent special school where this is the school named in their EHCP.

We use eastings and northings coordinates to calculate the straight-line distance between each pupil's home address and the provider they attend. We adjust straight-line distances to approximate actual road distances using the same adjustment factor derived for each local authority as in the mainstream HTST calculation. Any adjusted distances greater than 50 miles are set to 50. The distance cap affects 0.4% of distances. We calculate the average of these adjusted distances for each local authority.

We use the 2024 Schools, Pupils and their Characteristics publication to calculate each local authority's share of the pupil population aged 5 to 15 at the start of the academic year in all school types. These shares act as a proxy for SEND need in each local authority. It is an established part of the funding system for schools and high needs provision that funding allocations are not based directly on data relating to the number of EHCPs. Using the total pupil population provides us with a measure for proxying the varying levels of need based on SEND for each LA, and to better account for the SEND provision that is available to each LA we adjust this weighting using the distances that pupils with EHCPs travel to their place of education. For each local authority, we multiply the average adjusted distance by their share of the pupil population, to create a distance weighted pupil share, and divide this by the national sum of distance weighted shares to derive the SEND HTST share.

$$LA\ population\ share = \frac{\Sigma(\text{Pupils aged 5 to 15 living in the LA})}{\Sigma(\text{All pupils aged 5 to 15})}$$

$$SEND\ LA\ share = \frac{\text{Average adjusted distance travelled by pupils living in the LA} \times \text{LA population share}}{\Sigma(\text{Average adjusted distance travelled by pupils living in LAs} \times \text{LA population shares})}$$

Combining shares

Each local authority's SEND HTST share is multiplied by 6.6 and added to their mainstream share. We then calculate their share of the national total of the combined shares. The weighting of 6.6 was derived from dividing the estimated average per pupil spend on SEND HTST by the estimated average per pupil spend on mainstream HTST as published by the County Councils Network in their 2023 report.

$$LA\ combined\ share = \frac{\text{Mainstream LA share} + (6.6 \times \text{SEND LA share})}{\Sigma[\text{Mainstream LA share} + (6.6 \times \text{SEND LA share})]}$$

The combined shares are multiplied by MHCLG's Upper Tier Foundation Formula Area Cost Adjustment factor[1], excluding remoteness, and rebased again on the national total.

Adjusting straight-line distances to approximate road distances

Distances calculated using eastings and northings coordinates are straight-line distances and are the shortest distance between two points. We adjust the straight-line distances to approximate road distances using a local authority level average straight-line to road distance adjustment factor.

We have compared the actual road distance between a sample of postcodes (sourced from Ordnance Survey data) to the equivalent straight-line distance. For each pair of distances, we calculated the ratio of actual distance divided by straight-line distance, and from these calculated the average for each local authority.

$$LA\ straight\text{-}line\ distance\ adjustment = \frac{\Sigma(\text{Actual road distance} \div \text{straight-line distance})}{\text{Number of postcodes sampled from the LA}}$$

If a pupil's home and education provider are in different local authorities, the adjustment factor of their home local authority is used to adjust the whole distance.

Changes from the Fair Funding Review 2.0 consultation

The shares presented during the consultation phase had adjusted distances capped at 20 miles. This has been increased to 50 miles for the final formula.

Data and technical definitions

Pupil level data is from the National Pupil Database, a termly census of pupils in state-funded schools in England.

- Data on pupils with EHCPs in independent schools is from the SEN2 data collection, an annual data collection of all EHCPs maintained by local authorities.
- Data on the total pupil population is from the annual Schools, Pupils and their Characteristics publication.
- Average spend per pupil using mainstream and SEND HTST from the County Councils Network 2023 report on home to school transport.
- Eastings and northings coordinates are from the ONS National Statistics Postcode Lookup file.
- Ordnance Survey data to calculate road distances (AddressBase Plus, MasterMap Highways)

[1] https://www.gov.uk/government/publications/area-cost-adjustment-values-table