ICB Allocations and ICB place-based tool

NHS England

Introduction

This webinar will discuss:

- A brief overview on how allocations to ICBs are calculated
- A more detailed dive into how we derive our models, data, methods etc, taking the development of the general and acute formula as an example
- The place-based tool, our user-friendly interface for exploring outputs from our models at lower area level (place), targeted primarily at ICBs

Calculating ICB allocations: an overview

Dr Heather Ross, Allocations Senior Analytical Lead, Analysis and Insight for Finance

NHS England

From target shares to allocations

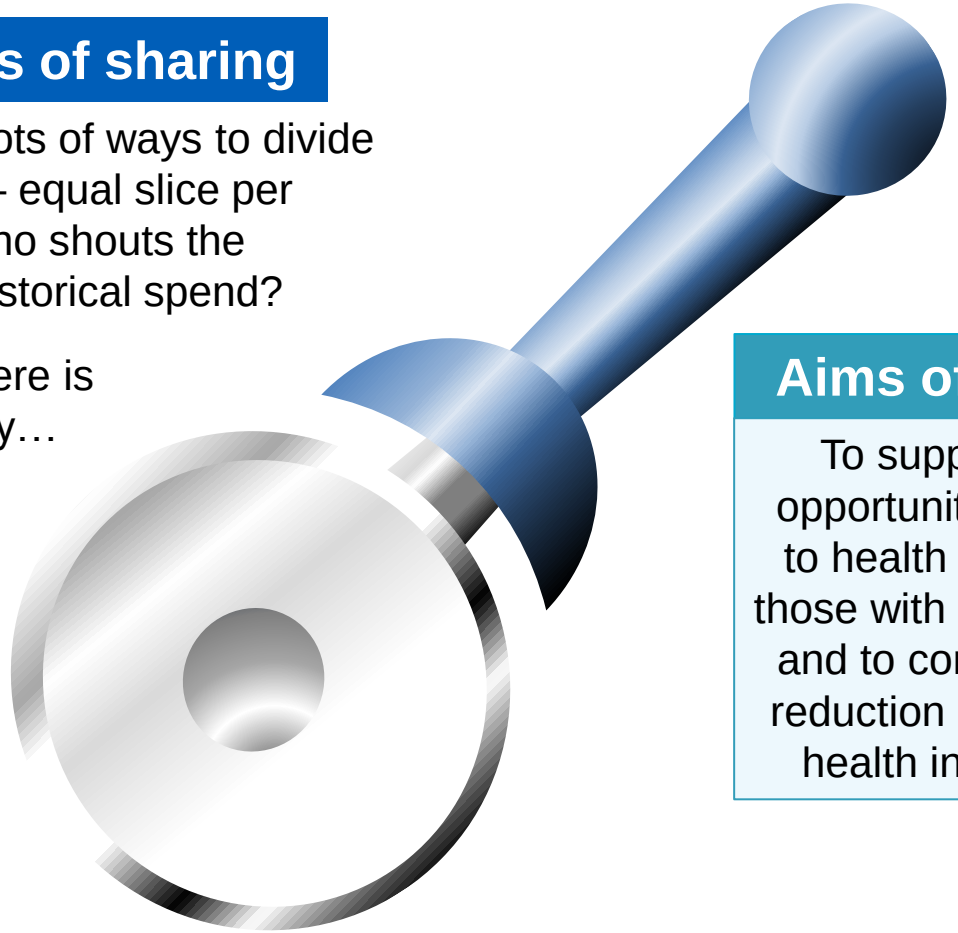
Target % shares	Target £ allocations	ICB £ baselines	Convergence	Final £ allocations
The allocations model calculates **weighted populations (% target share) for each relevant funding stream**. Each component part of the model contributes a need index or weighted population, combined in accordance with the relative spending these areas represent. Targets are affected by population changes, source data updates, new technology, formula improvements and NHS policy changes.	The NHS has a fixed resource. National budgets are set across various funding streams, depending on historic spend, need and current priorities. These include ICB 'core' allocations (hospitals and secondary care), Primary Medical Care (combining funds for GP practices and other Primary Care) and some Direct Commissioning. **Target shares (%) are applied to total budgets to calculate individual ICB target allocations (£).**	Baselines (current ICB budgets) are **based on published allocations**, including any relevant adjustments and additional funding. Starting with current budgets ensures a level of stability between years. Changes to budgets may include adjustments for boundary changes.	After base growth is applied to all ICBs, to offset common pressures such as population growth, convergence (previously 'pace of change') **applies differential growth, to move ICBs below target towards their 'fair share' target allocation over time**. It determines how quickly ICBs are moved from their baselines towards target, constrained by available resources and without creating instability which could damage local health economies.	A final ICB £ allocation, also expressed as £ per head (for comparison) **includes any other additional allocations**. The overall allocation provides ICBs with the autonomy to determine their own spending based on local need.

Fair shares: Population based formula

Methods of sharing

There are lots of ways to divide resources – equal slice per person? Who shouts the loudest? Historical spend?

Perhaps there is a better way…



Aims of formula

To support equal opportunity of access to health services by those with equal needs, and to contribute to a reduction in avoidable health inequalities.

Develop an impartial objective formula

To support decisions around allocations, **a statistical formula, or 'model'** (a complex set of formulas) has been developed, which calculates a target fair share of the national budgets for local areas.

'Weighted Capitation' Formula

This type of model has proved adaptable over many years and has been used effectively since the 1970s to distribute NHS resources between health care organisations. These models take information on a local population and advise what share of funding they should get.

Using this method, more resources are directed to areas estimated to have higher health needs, or where health inequalities can be reduced by investing in healthcare. For example, larger populations, more older people, worse health and higher levels of deprivation.

Formula development overseen by an independent committee – the Advisory Committee on Resource Allocation (ACRA)

Target shares: Based on statistical evidence

Individual data

The allocations formula is built up from analysis of **anonymised NHS data** regarding demographics of individuals and their use of NHS health services.

This person-based approach to calculating target shares helps ensure accuracy and takes account of local variation in health needs.

Testing predicted spending

These predictions are then re-tested on further patient data where costs are already known, allowing the model to be refined, then retested.

The measure of need derived from the person-based research is effectively the expected relative cost of specified healthcare services by age and sex in a GP practice.

Informed by actual patient spending

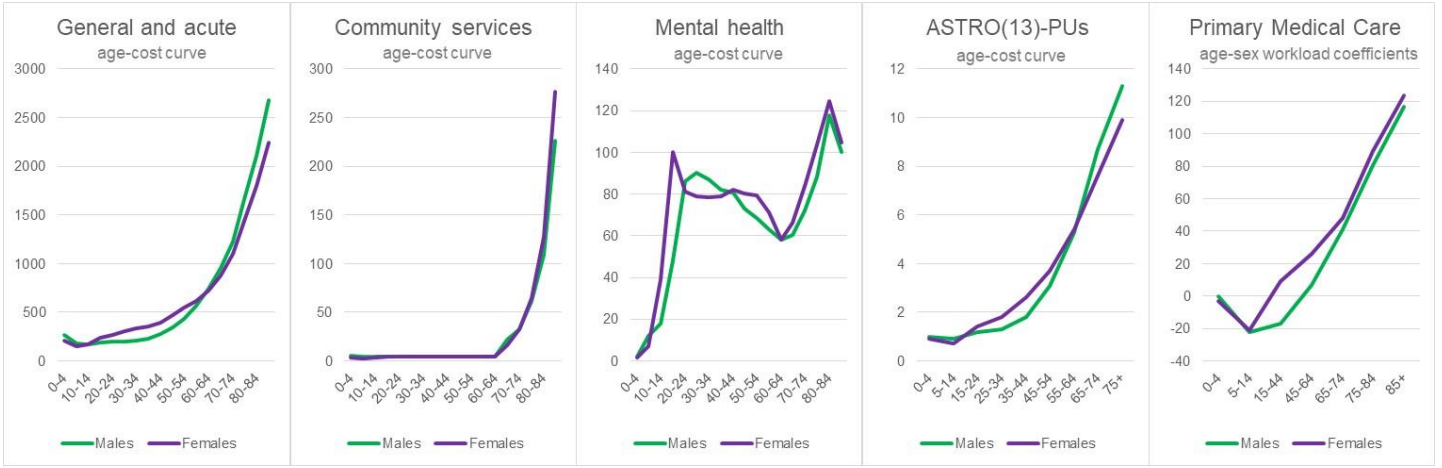
Data from records of GP practice patients are linked to treatment records, to calculate overall cost of care.

Costs of health services for millions of real patients over a number of years are reviewed.

Statistical analysis identifies factors that can be used to predict future share of spending, for a given sex-age group in any GP practice in England (all data used are non-identifiable).

Age cost curves to show predictions

Different streams of spending on health services can vary significantly depending on age and sex. The graphs below show age-cost curves for the main parts of the allocations model. Full details can be found in the Allocations Technical Guide



Allocation model (target shares)

	ICB Core Services	Primary Medical Care
2023/24	**£101.7 billion**	**£10.6 billion**
Need adjustments *% of overall spend shown, though needs may vary for services across the country*	69.6% General and acute 11.8% Mental Health 9.3% Prescribing 5.6% Community 3.7% Maternity **Utilisation models 89.8%** Health inequalities and Unmet need 10.2%	100% Formula No other adjustments **Utilisation models 85%** Health inequalities and Unmet need 15%
Cost adjustments *Estimate of effects on healthcare spend of unavoidable cost differences between health care providers, based on location*	**Staff and buildings** Market forces factor (MFF) **Transport in rural areas** Emergency ambulance cost adjustment (EACA) **Inefficiently small hospitals** Unavoidable remoteness **Historic private contracts in trusts** Unavoidable costs of Private Finance Initiative (PFI)	**Staff and buildings** Market forces factor (MFF) **Supply factors** In calculating the target allocation, only the health needs of the population are taken into account. 'Supply factors' such as the number of hospital facilities available, shouldn't influence that estimation of the level of need. However they might affect how much healthcare people receive, so we measure those factors and then neutralise them in an area's allocation calculation. This helps to balance the funding between urban and rural areas.

What is in a model: General & Acute

Daniel Sutcliffe, Senior Analytical Manager, Analysis and Insight for Finance

G&A model

- Model Approach:
  - Linear cost model
  - Person level model
  - The goal is to estimate average cost per head in the population
- Dependent variable:
  - Inclusion: costs associated with Admitted patient care, Outpatients and Accident and Emergency Care
  - Exclusion: maternity services and specialized services
  - HRG prices where available, estimated costs where not e.g. PLICS
- Quality assurance of dependent variable
  - Age cost curves by clinical area
  - Outlier detection
  - Clinical engagement
  - Geographical mapping, local engagement

Explanatory variables

Need variables

Medical Diagnostic History,

Age & Gender,

Ethnicity

Household Type

Deprivation Measures

Supply variables

CCG of GP Practice,

Distance To The Nearest Hospital

Hospital Supply Variables (Capacity)

We use only those that prove predictive of use

Supply variables

- Supply variables are included to take account of factors affecting costs that were not related to need
- The final specification includes both need and supply side variables.
- The effect of allowing supply side variables to determine the cost prediction, however, increases the potential circularity of the prediction models by allocating more money to areas which have invested in more supply of healthcare.
- Supply variables are therefore “sterilised” so that they do not impact the weights used for setting allocations.
    - We set their values to the national average, before predicting spend

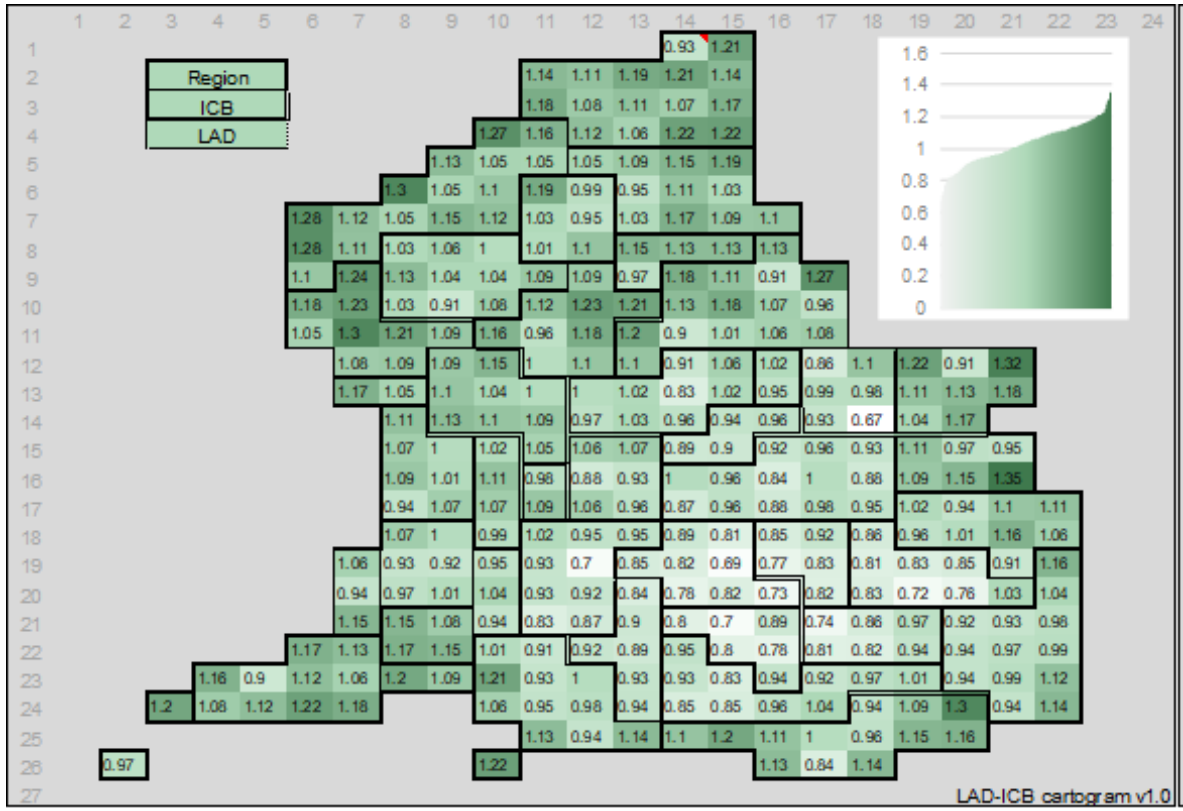
Variable selection and model fit

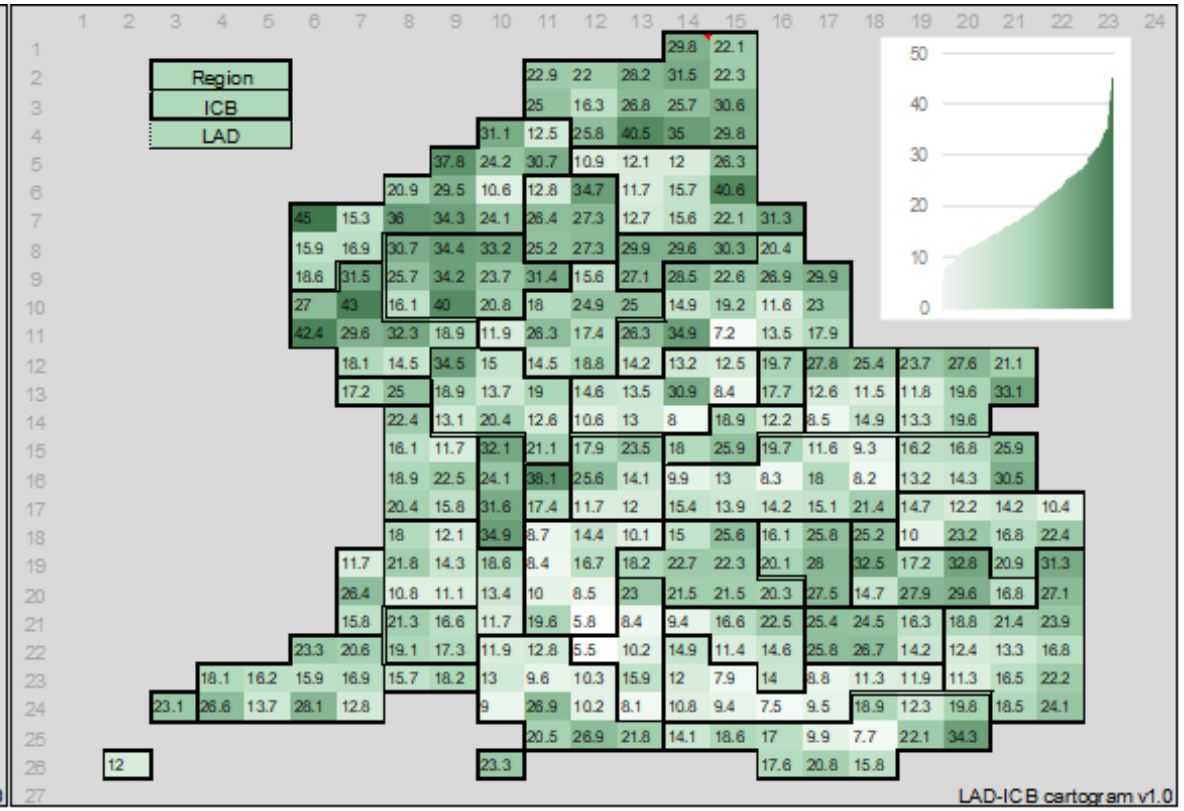
- ITERATIVE VARIABLE SELECTION
  - Statistical control and examining incremental validity
  - Clinical and technical engagement
  - Data Partition: estimation and validation
- MODEL FIT: No single measure of model fit. Examples:
  - Adjusted $\boldsymbol{R2}$ (R-squared)
  - Mean absolute error (MAE)
  - Proportion Not Within 10%
  - Akaike Information Criterion (AIC)
- QUALITY ASSURANCE: Some examples:
  - Peer reviewed the coding in the software package;
  - Examined the results for plausibility, and investigated outliers;
  - Some variables are unexpectedly negative (suggesting lower need). They are believed to represent systematically unmet need and are reset to zero, so they match the reference group (White – British).
  - Clinical engagement and local engagement
  - Examined variables for plausibility in direction of influence; and
  - Presented all of the modelling and outputs for review by TAG and ACRA.

G&A model: Results

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)					
		A1	**A2**	**A3**	**A4**	**A5**	
Deprivation quintile (D1 = least deprived, D5 = most deprived)	**D1**	**0.60**	**0.80**	**0.90**	**0.99**	**1.10**	**0.96**
	D2	**0.61**	**0.86**	**0.97**	**1.05**	**1.15**	**1.00**
	D3	**0.69**	**0.92**	**1.04**	**1.12**	**1.22**	**1.00**
	D4	**0.76**	**0.98**	**1.10**	**1.18**	**1.26**	**1.00**
	D5	**0.86**	**1.07**	**1.18**	**1.24**	**1.42**	**1.06**
		0.74	**0.95**	**1.03**	**1.08**	**1.16**	

G&A need index at LAD targets the most challenged communities





Place-based tool

Elbereth Puts, Senior Analytical Manager, Analysis and Insight for Finance

NHS England

Place-based tool

Context:

- Allocation to place is the responsibility of commissioning bodies
- Developed as a response to move from up to over a 100 CCGs, to 42 ICBs
- To support ICBs in understanding need in their smaller local areas, below the level of ICB

In scope:

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Target % shares | Target £ allocations | ICB £ baselines | Convergence | Final £ allocations

Place-based tool

- Uses information also available from the annexes to the Technical guide
- Constitutes a user-friendly way for creating user-defined places using GP practice as building blocks
- Calculates weighted populations and need indices for places relative to the ICB, for different service segments, down to the GP practice level

- Insights might support allocation to place or discussions on place-based allocations
- Need indices are figures around 1.00, where 1.00 is the same need as the ICB, a figure lower than 1.00 indicates lower need than the ICB, and a figure higher than 1.00 indicates a higher need

- Key features:
  - Download results e.g. for own analysis
  - Save and return to session option

Demo

https://aif-allocation-tool-202324-202425.streamlit.app/

Other supporting documents and tools

- Waterfall tool
- Technical guide
- Annexes
- Infographics slide pack
- All available from: www.england.nhs.uk/allocations

Contact

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