



Technical Guide to Allocation Formulae and Convergence

For 2022/23 to 2024/25 revenue allocations

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Promoting equality and addressing health inequalities are at the heart of NHS England's values. Throughout the development of the policies and processes cited in this document, we have:

Given due regards to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it;

Given regard to the need to reduce inequalities between patients in access to, and outcomes from, healthcare services and in securing that services are provided in an integrated way where this might reduce health inequalities.

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1 Executive summary

1.1 Overview

The allocation of funding to Clinical Commissioning Groups (CCGs) and in future, subject to the passage of the Health and Care Bill¹, Integrated Care Boards (ICBs) to support them in commissioning services for their local population is one of the key duties of NHS England.² The long-standing approach we take in setting allocations puts the principle of ensuring equal opportunity of access for equal need at the heart of our approach to allocating budgets.

The approach is also informed by NHS England's duty to have regard to the need to reduce inequalities between patients with respect to their ability to access services and with respect to the outcomes they achieve.³

These two aims are reflected in the target formula, which produces a target allocation or 'fair share' for each area, based on a complex assessment of factors such as demography, morbidity, deprivation, and the unavoidable cost of providing services in different areas.

The formula is based on independent academic research and is overseen by an independent external group, the Advisory Committee on Resource Allocation (ACRA), which provides advice to the Secretary of State for Health and Social Care and the Chief Executive of NHS England.

Allocations will therefore differ depending on the exact combinations of these factors in each area, as well as how quickly an area can be moved towards its target allocation each year, determined by our convergence (previously 'pace-of-change') rules.

This process aims to be transparent, and to ensure that changes in allocations do not result in the destabilising of local health economies.

This document describes how ICB allocations are calculated. The allocations process has been in existence in broadly this form since 1976 and has been continually improved and updated as clinical services have changed, the NHS has been re-structured, and more and better data and analytical techniques become available.

We welcome comments and feedback on our approach. In particular, the Advisory Committee on Resource Allocation are currently developing their research and development programme for the next round of allocations. Suggestions for work that might be included there and comments about the wider process, such as the convergence policy can be sent to the NHS England allocations team at england.revenue-allocations@nhs.net.

¹ <https://bills.parliament.uk/bills/3022>

² Section 223G NHS Act 2006, as amended by the Health and Social Care Act 2012.

³ Section 13G Health and Social Care Act 2012.

1.2 Main changes to the allocation formula

The main changes to the formula compared with those used for 2019/20 – 2021/22 allocations are set out below. These changes are described in more detail within this technical guide and the supporting documents.

- 1) We have used the GP registered list size as at October 2021 rather than the annual average for the most recent 12 months. This change is for this round of allocations only and reflects the differential impact of recent changes in registered populations caused by the COVID-19 pandemic.
- 2) The component for general and acute services has been refreshed by running new statistical models on updated data.
- 3) The component for specialised services has been refreshed by running new statistical models using new data sources. As it is proposed that this model will be used to distribute resources from 2023/24, the details of this model are not covered by this technical guide.
- 4) The metric used to calculate the unmet need and health inequalities adjustment has been changed from the standardised mortality ratio for those aged under 75 years (SMR<75) to a measure of avoidable mortality.
- 5) The model for calculating the adjustment for unavoidable small provision in remote areas has been updated.
- 6) An additional unavoidable cost adjustment has been included to reflect the financing costs of some Private Finance Initiative (PFI) funded hospitals.
- 7) Local Authority Districts (LADs) have been used as the basis for applying average cost weights to GP practices that have opened since each model was developed and for the application of the market forces factor (MFF). Previously CCGs were the basis for each of these, but this approach accounts for some geographical variation within ICBs, which cover large heterogeneous areas.
- 8) Additional adjustments have been applied to models to account for rapidly growing practices.
- 9) Other than data updates the following areas of the model have not had any methodological changes:
 - The mental health model
 - The community services model
 - The prescribing model
 - The maternity model
 - The emergency ambulance cost adjustment (EACA)
 - The primary medical care model

2 Introduction

2.1 How allocations were set

2.1.1 Financial framework

The COVID-19 pandemic necessitated simplified finance and contracting arrangements that supported systems to dedicate maximum focus on responding to immediate operational challenges. For 2022/23 the financial and contracting frameworks will evolve, building on the COVID arrangements but reinstating population-based funding allocations.

The key factors are:

- The framework will operate at system level. Systems will continue to be the key unit for the purposes of allocations and financial planning.
- System funding allocations will be set on a population basis, with convergence over time towards a fair share of the national budget.
- The calculation of fair shares will be updated to reflect new data and the recommendations of the Advisory Committee on Resource Allocation.
- Previous sustainability funding paid to provider and commissioner organisations will now form part of system budget allocations and be subject to convergence over time.
- Additional resources made available to support systems to manage the direct and indirect costs of the COVID-19 pandemic will be reduced, reflecting the overall NHS settlement.
- Nationally calculated block contract values established under the COVID framework will be replaced by locally agreed funding flows, reflecting the Aligned Payment and Incentive framework set out in the National Tariff.

2.1.2 Overall allocation quantum

The total NHS budget for the years 2022/23 to 2023/24 was set in the Spending Review in October 2021 (SR21). The SR21 settlement confirms the Long Term Plan (LTP) funding settlement, provides additional resources for elective recovery and to reflect the impact of COVID, and extends the settlement period to 2024/25.

The total resources for the NHS in the 2021/22 financial year were significantly increased above the original LTP settlement, in order to manage the costs of dealing with the COVID pandemic.

Table1: SR21 settlement, £m

SR 21 Settlement, £m	2021/22	2022/23	2023/24	2024/25
Original LTP mandate	133,289	139,990	148,467	151,630*
21/22 COVID funding	14,543			
SR 21 settlement		8,998	6,122	8,231
Other adjustments (including £2.85bn for pensions)	3,375	3,380	3,383	3,387
Total mandate (nominal)	151,207	152,368	157,972	163,248

The 2024/25 value shown here is based on flat real terms growth against the 2023/24 figure.

2.1.3 Commissioning stream allocations

Allocations for each commissioning stream have been set taking into account expected price inflation, activity growth, LTP required levels of efficiency and the impact of the SR21 settlement in respect of COVID costs and elective recovery funding.

Core ICB funding grows by 3.6% against a 2021/22 baseline constructed for allocation purposes. This is based on the following assumptions:

- The 21/22 core programme baseline used for allocation purposes is an annualised H2 (second half of 21/22) 21/22 allocation with appropriate adjustments. This specially constructed baseline is required because the 2021/22 financial year was based on two separate half-year periods. Compared to the previous CCG allocation this also includes resources allocated for indirect impacts of COVID and the transfer into ICB allocations of funding previously provided to support financial sustainability (Financial Recovery Fund).
- Growth funding is provided for inflation (updated for latest GDP deflator forecasts and the impact of the Health and Social Care Levy), efficiency, and activity (in line with LTP assumptions). This includes funding to deliver the Mental Health Investment Standard and increase investment in community services.
- An additional reduction is applied to remove part of the excess indirect impacts of COVID, consistent with the SR21 settlement.
- Further resources are added to transfer additional recurrent maternity costs associated with implementation of the Ockendon review from the System Development Fund (SDF), and to provide additional resources allocated in line with the health inequalities adjustment.

ICBs also receive allocations for

- Primary care (GP services), the contractual commitments of the GP contract are the main driver of the funding requirement. The core allocation quantum

remains in line with the LTP allocations after updates to reflect contractual and service changes.

- System Development Funding (SDF). Resources available to deliver a number of priorities in the Long Term Plan, including additional services above core provision in mental health, primary care, cancer and diagnostics are included in this budget line which grows to reflect commitments to increase spending in these areas. This funding is allocated based on an assessment of the requirements for each programme rather than using the formula approach described in this document.
- COVID-19 direct allocation. Additional funding to support local systems in managing the costs of COVID. This allocation is reduced from the equivalent in 2021/22 in line with planning assumptions on COVID.
- Elective recovery. Additional funding from the SR21 settlement.
- Running costs. Increased to reflect the impact of the Health and Social Care Levy on staff costs but otherwise held flat in cash terms.

2.1.4 Advisory Committee on Resource Allocation (ACRA)

ACRA is an independent, expert, technical committee that makes recommendations to NHS England on the target formula for NHS allocations and to the Department of Health on the target formula for public health allocations. ACRA's remit does not include convergence policy, which is set by NHS England for NHS allocations. ACRA's membership includes academics, GPs, NHS managers and public health experts.⁴

The latest recommendations by ACRA for the formula for NHS allocations are in Annex 1 and were accepted in full by NHS England. The formulae recommended by ACRA are based on research, and references to the research and other relevant publications are provided in Annexes 3 and 4.

ACRA was established in 1997 as a successor to the different committees that over time have provided advice on NHS allocations formulae, starting with the Resource Allocation Working Party of 1976.

2.1.5 Steps in setting allocations

Once the national budgets are known, there are four steps in the calculation of actual allocations:

- determine target allocations based on relative need and relative unavoidable costs;
- establish baselines (usually the previous year's allocations plus any adjustments, for 2020/21 the baseline is set as described in section 2.1.3);
- calculate opening distances from target (baseline minus target); and

⁴ ACRA terms of reference; [NHS England » Advisory Committee on Resource Allocation \(ACRA\) terms of reference](#)

- determine each ICB's allocation growth based on their opening distance from target and convergence model.

The approach for calculating ICB running cost allowances is necessarily different.

2.2 Scope of the Technical Guide

2.2.1 Funding streams covered

This guide provides an overview of the calculation of the allocations for 2022/23. Allocations for 2023/24 and 2024/25 will have the same technical basis but will be published later.

The guide covers:

- the calculation of the formulae for core ICB and primary medical care target allocations;
- convergence policy;
- ICB running cost allowances.

2.2.2 Allocations spreadsheets

The Technical Guide includes this document and a set of workbooks which show the calculation of target and actual allocations for core ICB responsibilities and primary medical care. This document also provides a brief guide to the workbooks. The workbooks include detailed notes on data sources and the calculations.

Due to the large size of many of the workbooks, many values have been hard coded for publication rather than driven by Excel formulae. Where this is the case, the notes in the files explain the relationship between the columns in the workbooks. The calculations have also been set out over several separate files rather than two or three files, again for reasons of size. A list of the accompanying workbooks is at Annex 4.

2.2.3 Weighted capitation formulae

The formulae for target allocations estimate the relative need and relative unavoidable costs between ICBs for healthcare services. Target allocations are based on the weighted capitation formulae recommended by ACRA. There are separate formulae for ICBs' core responsibilities and primary medical care. For each of these, weighted populations are calculated for each ICB, and each ICB's target allocation is the ICB's share of the total weighted population for England multiplied by the national budget for the relevant funding stream.

Weighted populations are calculated for each ICB for the baseline year of 2021/22 and each of the years 2022/23 to 2024/25, based on the projected registered population for each area for each year.

An overview of the weighted capitation formulae is set out below. The subsequent sections provide more detail on the formulae and policy for convergence.

For further information, references to the research and modelling are provided in Annexes 3 and 4.

2.3 Overview of methodology for the weighted capitation formula

2.3.1 Methodology

An overview of the approach for calculating weighted populations is set out below. The detailed differences in the calculations for ICB core responsibilities and primary medical care are set out in the subsequent sections and the accompanying workbooks.

2.3.2 Weighted populations

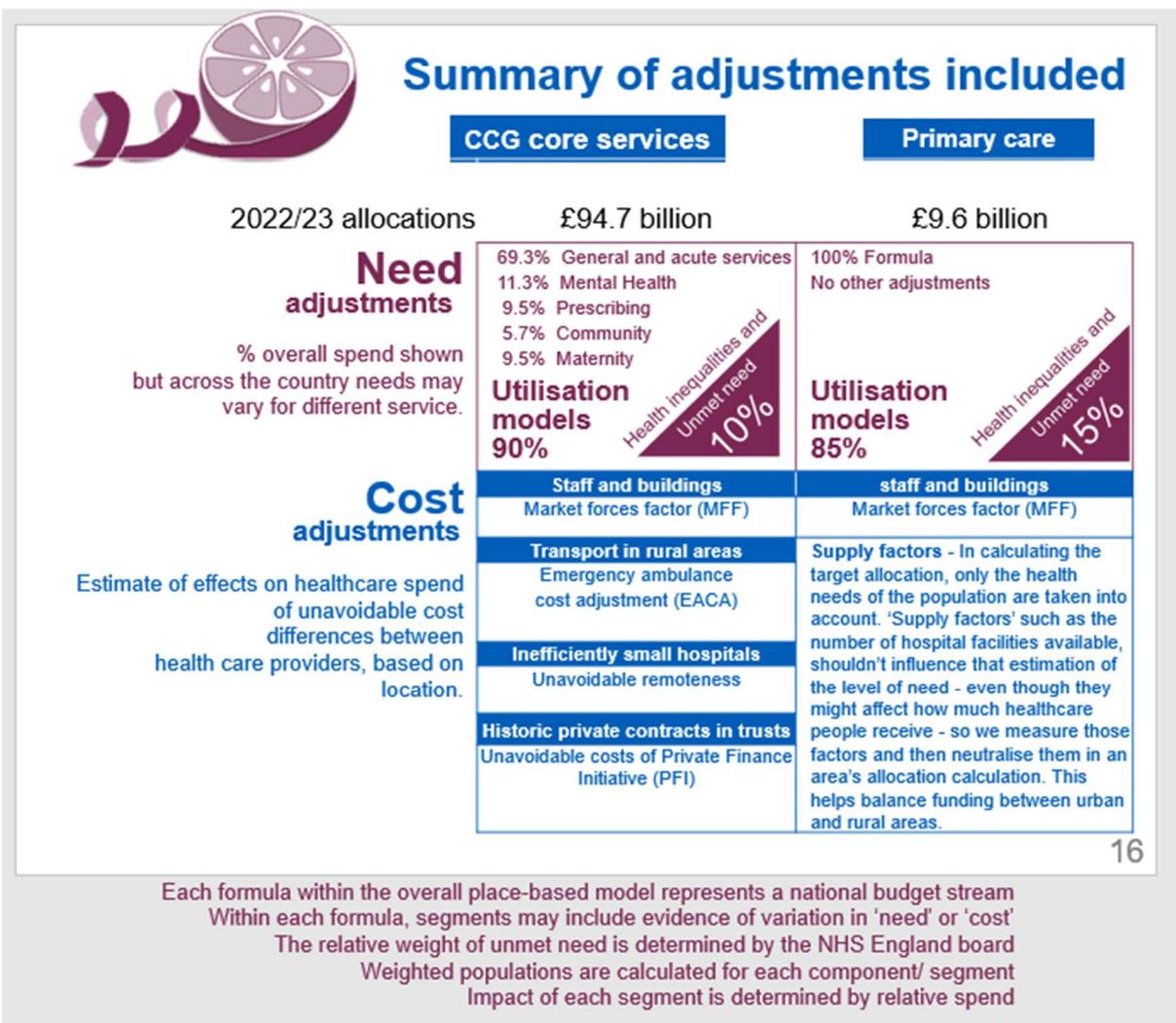
The weighted population for each ICB is based on:

- the size of each ICB's registered population;
- a weight, or adjustment, per head for need for health care services related to age and sex (all else being equal, areas with older populations typically have a higher need per head) and for need over and above that due to age (all else being equal, areas with poorer health have a higher need per head);
- a weight, or adjustment, per head for unmet need and health inequalities;
- a weight, or adjustment, per head for unavoidably higher costs of delivering health care due to location alone, known as the Market Forces Factor (this reflects that unit staff, land and building input costs are higher in some parts of the country, particularly London, than in others); and
- an adjustment in the core ICB formula for the higher costs of providing emergency ambulance services in sparsely populated areas, an adjustment for the higher costs of unavoidably small hospitals with 24-hour accident and emergency services in remote areas and an adjustment for the unavoidable costs of the Private Finance Initiative (PFI).

As the need for different types of health services varies across the country, there are separate formulae for each of ICB core responsibilities, specialised services and primary medical care. Within each of these, there may be separate components and adjustments – for example the distribution of need for ICB core responsibilities is different between general and acute, mental health, community and maternity services.

The different components and adjustments for unavoidable costs are summarised in Figure 2.1 and more details on each are provided in the relevant sections of this document.

Figure 2.1: Summary of ICB formula and adjustments



2.3.3 Fair shares formula

The weighted capitation formula estimates the need per head of each ICB's population relative to other ICBs and is also known as the fair shares formula. It does not seek to calculate an absolute level of need for each area, but to assess relative need (and relative unavoidable costs) between areas.

2.3.4 Population base

The initial populations used in the formula for each ICB are the registered lists of all their GP practice members in October 2021. These are then projected forward for each year 2022/23 to 2024/25, based on Office for National Statistics' age-sex specific residential population projections for local authority districts (LADs).⁵

2.3.5 Variation in need

People do not have identical needs for health care services. A key difference is that need varies according to age and sex. In particular the very young and elderly, whose populations are not evenly distributed across the country, have a higher need for health services than the rest of the population. The weighted capitation formula therefore takes account of the relative need per head of different age-sex groups and the different age-sex profiles of local populations.

Even when differences due to age and sex are accounted for, populations with the same age-sex profiles display different levels of need. An additional adjustment to reflect the relative need for health services over and above that due to age and sex is therefore necessary.

2.3.6 Utilisation approach

Statistical modelling has been used to examine the relationship between the utilisation of health services on the one hand, and the characteristics of individual patients and the areas where they live on the other hand. These models have been used to decide which factors to include in the formula to predict future need per head and the relative weight on each of the factors.

Typically, the models estimate need related to age and sex and additional need over and above that due to age and sex as a single set of weights rather than separate weights for age and additional need. This is because additional need varies by age group.

2.3.7 Supply side variables

The statistical models also include 'supply' variables to take account of the greater availability of health care services generally leading to higher use. As utilisation driven by available capacity is not a reflection of need, while the supply variables are included in the models, they are sterilised and set to the national average when calculating weighted populations. This means areas are not penalised in the formula for lower utilisation due to relatively lower capacity.

2.3.8 Market Forces Factor (MFF)

The costs of providing health care unavoidably vary across the country due to different unit input costs, in particular staff costs and the costs of land and buildings.

⁵ [ONS 2018 Subnational population projections for LADs](#)

The weighted capitation formula includes an adjustment for these unavoidable costs, derived from the adjustment used in setting prices and known as the Market Forces Factor (MFF). These costs are due to location alone, not need.

2.3.9 Emergency ambulance cost adjustment

The emergency ambulance cost adjustment (EACA) adjusts for unavoidable differences in the costs of providing these services across the country, particularly in sparsely populated areas due to for example the longer distances to incidents and conveying patients to hospitals. The EACA is only included in the formula for ICB core allocations.

2.3.10 Costs of unavoidable smallness

In the formula for ICB core allocations there is an adjustment for the higher costs of running unavoidably small hospitals with 24-hour A&E departments in remote areas. These hospitals are typically unable to achieve the same economies of scale as other hospitals.

The adjustment is based on modelling the costs at site level for all hospitals to give a 'cost-curve', showing the estimated relationship between the size of hospitals and costs. Criteria were developed to identify the hospitals that were unavoidably small due to remoteness. These were based on the size of the population served being relatively small, and travel times to other hospitals being relatively long. The 'cost-curve' gave the estimated higher costs for the remote hospital sites.

2.3.11 Excess finance costs of the Private Finance Initiative (PFI)

This adjustment is new for the 2022/23 allocations round and has been introduced to reflect the impact of excess finance costs relating to historic PFI contracts. Several trusts with PFI obligations have previously been in receipt of direct payments based on historical analysis undertaken by DHSC in 2011. The new approach will replace these direct payments with a consistent methodology and is focussed on the additional finance costs some trusts pay in PFI contracts compared to public sector financing.

The EACA, the adjustment for the costs of unavoidable smallness due to remoteness and the PFI adjustment capture higher costs over and above those covered by the MFF.

2.3.12 Rurality

There are a range of adjustments made in the core ICB allocations formula that account for the fact that the costs of providing health care may vary between rural and urban areas. Target allocations include three adjustments that specifically support remote or sparsely populated areas:

- the emergency ambulance costs adjustment to reflect longer travel times in sparsely populated areas;
- an adjustment to remove from the formula supply induced demand in urban areas where people live close to a hospital; and
- the adjustment for unavoidable small hospitals, to support continued provision by hospitals with 24/7 A&E services that are remote from the wider hospital network and have unavoidably higher costs

Some of the differences between rural and urban areas, such as the tendency for rural populations to be older, are naturally taken into account in the formula.

2.3.13 Unmet need and health inequalities adjustment

NHS England has a strong commitment and legal duty to have regard to the need to reduce health inequalities. We look to meet some of this legal duty through the approach to allocations. We also recognise that our utilisation-based approach to measuring healthcare needs will not necessarily fully capture needs that are not being met. An adjustment is made in the allocations formula to account for health inequalities and unmet needs.

In order to take account of health inequalities and unmet need in the allocations formula, and following a review of the health inequalities adjustment, ACRA have recommended that a measure of avoidable mortality is the best available indicator on which to base the adjustment. The adjustment is calculated for the population of each small area and then aggregated to ICB level. Applying the measure at the small area level takes into account unmet need/health inequalities within as well as between ICBs.

As part of the Long Term Plan, ACRA were commissioned to undertake a review of the health inequalities and unmet need adjustment used in resource allocations. The review considered alternative measures to SMR<75 (the measure that was used in previous allocations rounds) and concluded that a measure of avoidable mortality was a sound alternative and was considered a better fit to the definition of health inequalities as the causes of death included in the measure have been identified as those that could have been avoided through public health measures and timely and effective health care intervention.

ACRA are still unable to make an evidence-based recommendation on how much funding should be redistributed through the unmet need adjustment. The share will remain at 10% for the core ICB formula and 15% for primary medical care. The differential reflects our assessment of the relative importance of these streams in addressing unmet need and health inequalities.

3 Population base

3.1 Calculating ICB estimated registrations

3.1.1 GP registered lists

The starting point for the weighted capitation formula is each ICB's population. The populations used are the registered lists of all member GP practices of the ICB as published by NHS Digital.

In the last round of allocations the baseline population was calculated as a 12 month average of GP registrations. This was to better reflect seasonal patterns in some areas, such as areas with high numbers of students or seasonal workers.

For the 2022/23-2024/25 allocations only, ACRA has recommended using a single month snapshot of GP registrations to set the baseline population.

The COVID-19 pandemic has had an impact on the size and relative distribution of the GP registered population. For the period April to June 2020 there was an unprecedented fall in GP registrations. Although the number of registered patients has now begun to rise, the levels of growth have been lower than previous trends. To minimise the impact on allocations of these changing patterns of GP registration, which may not reflect future patterns, the committee is recommending that a single month is used as the baseline population rather than a 12 month average.

The 12 month average population will be used for future allocation rounds, once registered populations have stabilised. The baseline GP registered population for 2022/23 allocations is for October 2021.

GP registered lists are used irrespective of the patients' place of residence or where they use NHS services. This follows the guidance '*Who pays? Determining responsibility for payments for providers*' (NHS England 2020)⁶.

3.1.2 Projected registered lists

The GP registrations in October 2021, aggregated to ICB level, are projected forward to give estimated GP and ICB registered lists for each year from 2022/23 to 2024/25.

In the previous allocation round this was done using the ONS projections for resident populations in CCGs by quinary age-sex group. If population growth in an area is disproportionately in a younger or older population – which will affect relative levels of need – this is reflected in the changes in need-weighted populations over time. The percentage growth in CCGs' age-sex registrations were assumed to be the same as the projected percentage growth in their age-sex resident population.

As many ICBs are now large, the local authority district (LAD) projected populations will be applied to GP practice populations as this will allow for more local variation in population projections to be captured.

The ONS projected populations are the 2018 based Sub-National Population Projections⁷ (SNPPs) published at LAD age-sex level. These projections start with the 2011 Census populations, which are rolled forward to 2018 by adding the number

⁶ [NHS England, *Who pays? Determining responsibility for payments to providers*, August 2020](#)

⁷ [ONS 2018 based Subnational Population Projections \(SNPP\) for LADs](#)

of births and net migration and subtracting the number of deaths. Trends for the fertility rates, death rates and net migration are used by the ONS to project forward from 2018.

The sizes of ICBs' registered lists differ from the sizes of the ONS resident populations. This is for several reasons, the largest of which is cross-boundary flows: people who are registered with one ICB but reside in a different ICB. Other reasons include people who are entitled to register with a GP practice but are excluded from ONS populations because they have not yet been resident in the UK for 12 months, unregistered patients who are included in ONS populations, and patients for whom there is a delay in removal from registered lists, for example following a move abroad.

3.1.3 Projected weighted populations

Weighted populations are calculated for 2021/22 based on the registered population in October 2021 and for each year 2022/23 to 2024/25 using the projected ICB registered populations for each year.

Each ICB's share of England weighted population will change over the period from 2021/22 to 2024/25 to reflect the differences in age-sex population projections across the country over that time.

3.1.4 Unregistered populations

Using registered lists does not take account of people who are not registered with a GP practice. ACRA has previously considered whether an adjustment should be made to the formula for unregistered populations, but the absence of reliable data on the size of the unregistered population by area and their healthcare needs, means for the present they could not recommend an adjustment.

A - Registrations by GP practice and CCG – 2021/22 (Excel file)

This gives the number of registrations in October 2021 by GP practice and ICB, broken down by age-sex group.

B – Calculation of ICB estimated registrations 2022/23 (Excel file)

This shows the projected registered populations from 2022/23 by ICB and their population growth rates.

4 Integrated Care Board core allocations

4.1 Introduction

There are three steps in calculating weighted populations for target allocations for ICB core responsibilities. The first is to weight, or adjust, registered populations for relative need, the second is to weight for unmet need/health inequalities, and the third is to weight for unavoidable differences in costs.

This section covers the first and second, the weights per head for need and the health inequalities and unmet need adjustment. There are separate weights per head for need for general and acute, mental health, community and maternity services, as well as prescribing, as the distribution of each need component is different across the country.

Section 3 has described the population base, section 5 describes the adjustments for unavoidable costs, and section 6 describes how the need-weighted populations for general and acute, community mental health, maternity, and prescribing are combined into a single need-weighted population. Section 6 also describes how the need-weighted populations are combined with the unmet need adjustment and the adjustments for unavoidable costs to give a single unified weighted population for each ICB for its core allocations.

The basic approach in calculating need-weighted populations for ICBs is to multiply the population for each age-sex group for each GP practice by the relative need per head estimated from research. The products for each age-sex group are summed to give the relative need-weighted population for each GP practice. The weighted populations for GP practices are summed to give the relative need-weighted populations for each ICB.

4.2 General and acute

4.2.1 The development of the model

Since the 2014/15 allocations ACRA has recommended that relative need per head for general and acute services is estimated using a person-based approach, first developed by the Nuffield Trust⁸. The person-based approach uses anonymised data at the individual level to provide accurate estimates of need for small and atypical populations.

For the 2016/17 allocations, NHS England refreshed the Nuffield research using more recent data and re-estimated the models to produce updated weights for different drivers of need⁹. The same approach and methodology as the Nuffield Trust were followed.

For the 2019/20 allocations round the model was unchanged and the need weights derived for 2016/17 allocations were applied to updated population estimates.

⁸ See [Bardsley M and Dixon J \(2011\) Person-based Resource Allocation: New approaches to estimating commissioning budgets for GP practices. Research summary. Nuffield Trust.](#)

⁹ <https://www.england.nhs.uk/wp-content/uploads/2016/04/3-rep-elland-all-sections.pdf>

The model has been refreshed for the 2022/23 allocations round as part of ACRA's development programme. The same approach and methodology were followed as previously. A new formula has been developed using more recent data and some additions and changes to the model specification. A paper detailing the development of the new model is available on the allocations website.¹⁰

4.2.2 Services covered

The general and acute model covers inpatient spells in hospital and community settings, outpatient attendances, accident and emergency attendances and critical care. Mental health, community (non-inpatient) and maternity services were excluded as they are covered by separate component models. Specialised services were also excluded as they are currently subject to different commissioning arrangements.

4.2.3 Need estimated from past healthcare use

Relative need was estimated from past patterns of utilisation of health services. Costs per head in 2018/19 were calculated for each individual registered with a GP practice in April 2018, by applying a cost to each inpatient spell, outpatient attendance, A&E attendance and critical care day. The costs used were National Tariff prices where available, and otherwise reference costs. In a small minority of cases, the specialty average was used in the absence of tariff prices and reference costs.

Statistical modelling was used to select the 'best fit' drivers of relative costs at the person level and the relative weights for each driver. The quantified relationships found were taken to be predictors of relative future, cost-weighted need for health care services, with the exception of the supply variables.

The modelling tested a wide range of potential variables to select those that were the best in statistical terms, and also plausible indicators of need, to be included in the final model. Morbidity (previous diagnoses) and age were the most important variables in the model.

4.2.4 Explanatory variables

An extensive set of explanatory variables were gathered for testing in the model. The starting point for this list were the variables tested in previous iterations of the general and acute model. The need variables tested in the model are summarised in table 3.

¹⁰ <https://www.england.nhs.uk/allocations/>

Table 3: Need variables

Explanatory variable	Description	Change since last update
Morbidity flags, comorbidity flags and number of diagnoses	<p>Historical diagnosis data were collated for all inpatient episodes and spells in 2016/17 and 2017/18 from the SUS+ dataset for the April 2018 cohort of GP registered patients. SUS+ is the Secondary Uses Service dataset that contains patient level data for hospital activity.</p> <p>These diagnoses data are used to create morbidity flags, indicating a past diagnosis of a condition in one of the World Health Organisation defined sub-chapter of the International Classification of Diseases (ICD).</p> <p>The use of two years of historical diagnosis data is consistent with both the Nuffield PBRA 2011 model and the 2016/17 update. This reflects the diminishing explanatory power of historical data on future hospital costs with time.</p> <p>Additional comorbidity flags are also included that take account of how having two diagnoses can increase or decrease the relative need compared to the sum of having each diagnosis alone. These are based on the higher level ICD chapters.</p>	Data taken from 2016/17 and 2017/18 SUS+ rather than 2011/12 and 2012/13.
Age, sex and area of residence	Age, sex and Lower Super Output Area of residence were taken from the GP registrations data Master Patient Index (MPI).	Data based on April 2018 rather than April 2013.

Explanatory variable	Description	Change since last update
Ethnicity	Matched each individual's ethnic group using a range of patient level health datasets. This has identified the ethnic group for 61% of individuals. For the remaining population an area-based proportion is used. Ethnicity is now included at ethnic group (16 groups).	Previously ethnicity was included as an attributed area-based variable from the Census - the proportion of the population resident in the LSOA in each of four broad ethnic categories.
Privately funded care flag	A flag was created for anyone with any privately funded care episodes recorded in SUS+ in 2016/17 or 2017/18.	Data taken from 2016/17 and 2017/18 SUS+ rather than 2011/12 and 2012/13.
New registrations	A flag for whether someone was newly registered with their current GP, based on the previous 12 months. Modelling has consistently found that being newly registered with a GP was associated with higher need and therefore higher cost.	Based on registration in 2017/18 rather than 2012/13.
Variables from the ONS Census of Population	A range of variables relating to population characteristics from the 2011 census. Only available for small geographical areas (lower layer super output areas - LSOAs) rather than for individuals, so individuals are 'attributed' with the value for the LSOA in which they reside.	No change
Index of Multiple deprivation	The underlying indicators from the Index of Multiple Deprivation. Only available for small geographical areas (lower layer super output areas - LSOAs) rather than for individuals, so individuals are 'attributed' with the value for the LSOA in which they reside.	Updated for IMD2019 Use underlying indicators rather than composite scores
Log population variance	Log of the variance between registered and resident populations for each LSOA. To account for possible list inflation	Updated to 2018 populations
Variables from the Department of Work and Pensions	Eligibility for Disability Living Allowance (DLA) or Personal Independence Payment (PIP)	New variable

Explanatory variable	Description	Change since last update
Quality Outcomes Framework prevalence data	Prevalence data from the Quality Outcomes Framework (QOF) were also tested as need variables. Individual flags are not available and so individuals are 'attributed' with the value for the practice they are registered with.	Updated from 2012/13 to 2018/19.
GP survey	A range of indicators from the GP survey. Individual flags are not available and so individuals are 'attributed' with the value for the practice they are registered with.	Updated to 2018

New need variables tested in this round

Household composition	<p>Linking the MPI to the anonymised Unique Property Reference Number (UPRN) allows us to identify all individuals resident in a property and derive a household type variable that indicates the composition of the household as</p> <ul style="list-style-type: none"> • care home; • other communal establishment; • two adults and one or more children; • multi-adult and one or more children; • two adults of the same gender; • two adults of different gender; • one adult and one or more children; or • single person.
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Explanatory variable	Description	Change since last update
Morbidity counts	<p>As well as the morbidity flags and a variable constructed for the number of different diagnosis recorded for an individual, an additional morbidity count variable was constructed for testing in the model. A morbidity count variable was constructed which indicated where an individual had had a particular diagnosis recorded three or more times during 2016/17 and 2017/18. This was based on the hypothesis that having a diagnosis recorded more frequently indicates a higher level of need. The count of diagnoses recording was capped at three or more to avoid including access effects in the model.</p>	

4.2.5 Supply variables

The utilisation of health care may also be affected by the relative availability of health care services. Variables were tested in the modelling to adjust for this, known as supply variables. The supply variables tested in the model are summarised in table 4. While these variables were included in the models as they affected utilisation, they were not included in the formula to calculate weighted populations; instead their value for each area was set to the national average. This means if an area has lower use of health care services because of lower capacity or longer distance, this is corrected for in the formula.

Table 4: Supply variables

Explanatory variable	Description	Change since last update
Travel duration to hospital sites	Gravity weighted travel duration for an LSOA to all hospital sites	Updated list of hospital sites and travel duration calculations
CCG dummy	A flag for each individual indicating which CCG is responsible for commissioning their health care – based on the GP practice at which they are registered	Configuration of CCGs in 2018/19 rather than in 2013/14.
Quality Outcomes Framework scores and exception rates	Weighted scores and exception rates from the Quality Outcomes Framework (QOF) were also tested as supply variables. Individual flags are not available and so individuals are 'attributed' with the value for the practice they are registered with.	Updated from 2012/13 to 2018/19.
Hospital supply variables	A range of gravity weighted variables for each LSOA, including median waiting times, diagnostics and numbers of beds/operating theatres.	Updated from 2012/13 to 2018/19.
GP workforce survey	A range of variables relating to GP workforce. Individual flags are not available and so individuals are 'attributed' with the value for the practice they are registered with.	Updated to 2018

4.2.6 Implementing the model

The refresh modelled cost weighted need in 2018/19 for those registered with a GP practice in April 2018 using values of the explanatory variables in 2016/17 and 2017/18.

In previous allocations rounds, where a GP practice has opened or been newly formed since the modelling was undertaken, the average need per head by age-sex group for the relevant CCG was used. As ICBs are now such large areas, the

average need per head by age-sex group has been calculated for local authority districts (LADs). This allows for more variation in need within ICBs to be accounted for.

The data used for the modelling excluded treatments received in hospitals in Wales by those registered with an England GP practice. NHS Wales Information Services has previously provided counts of activity data for those registered with a GP practice in each of NHS Shropshire CCG, NHS Herefordshire CCG, NHS West Cheshire CCG and NHS Gloucestershire CCG. The need index is adjusted for ICBs that include these CCGs to account for patients treated in Wales.

C1 – General and Acute need per head 2022/23 (Excel file)

This shows the need per head for each age-sex group for each GP practice. It also shows where the LAD average need per head by age-sex group was used for new practices.

The file also shows each GP practice and ICB's registrations weighted for need for general and acute services.

4.3 Community Services

4.3.1 Background

In the 2019/20 allocations round a model for community services was used for the first time. Previously it was assumed that need for community services was in line with need for general and acute services.

The community services model has not been updated for 2022/23 allocations. Although the community services dataset is now more mature, the data are not yet consistent across all providers for a long enough period of time to build an alternative model for community services.

As there was no national dataset available at the time, the community services model was based on analysis of local datasets from a diverse group of CCGs. This allowed us to develop a community services component, which is significantly different from the general and acute component.

For the purposes of ICB allocations, community services are ICB funded health services that take place outside of a hospital setting and are not part of the primary medical care portfolio. Community mental health services are excluded here as they are included in the mental health formula. Community services funded by local authorities, such as health visiting and school nursing, are also out of scope.

Community services cover a wide range of service types and different ICBs will offer different sets of services depending on the make-up of their populations and on historical factors affecting service provision in their area. The most common forms of service are district nursing or long-term condition management, intermediate care, podiatry and children's services. Other services include physiotherapy and speech and language therapy.

The development of the model was based on analysis of contact with district nursing, because:

- it represents a large part of the spend on community health services (18%);
- it is applied universally across England; and
- it has an age profile which rises steeply with age for recipients in their 70s and 80s which is significantly different to the profile for general and acute services.

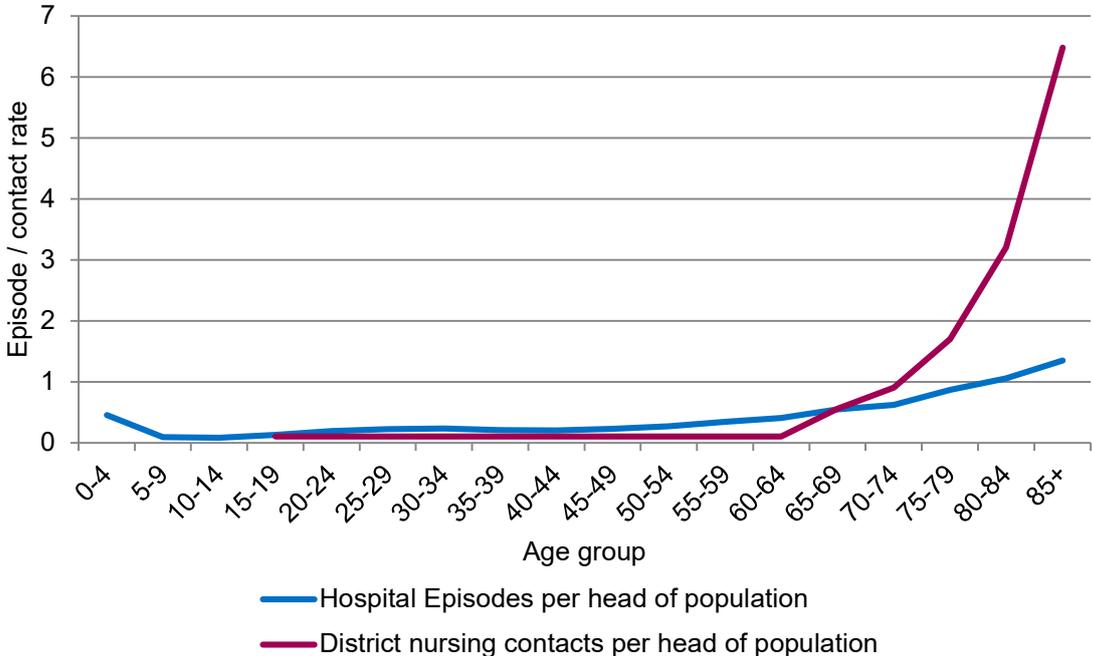
4.3.2 Approach

The development of the model for the community services component was based on analysis of district nursing data for five CCGs in Kent for 2016/17 and three CCGs in the West Midlands each with part-year activity in at least one of three years (2015/16 to 2017/18). The model was validated using data from Leeds. Further details can be found within the Community Services research paper¹¹.

Programme budgeting shows that the two sets of CCGs are a reasonable sample of middle-ranking CCGs for district nursing spend, so would produce a reliable starting point for the equitable distribution of relevant funding.

Utilisation of district nursing rises as recipients get into their 70s and 80s and suggests a quite different age-cost curve to the one for general and acute services as shown in Figure 4.1, justifying the requirement for a separate component for community services to reflect this.

Figure 4.1: Comparison of age-cost curves for General Acute and Community Services



Our analysis showed that half of all community service activity (weighted by expenditure) varies by age in a similar way to district nursing. The community

¹¹ [Community services formula for 2019/20 to 23/24 revenue allocations](#)

services component of the core CCG formula was therefore used to distribute 50% of the community services budget with the remaining 50% continuing to be distributed in-line with the general and acute component of the formula.

4.3.3 Model

Analysis was undertaken to attempt to estimate a workload model for district nursing, details of which can be found in the Community Services research paper. Due to restrictions in the data available it was concluded that estimating a workload model would add little value and greater uncertainty over and above an activity model, thus we developed an activity model using contact rate, based on a combination of the Kent and West Midlands data.

Analysis showed that age was the most important factor in determining need for community health services, but within each age band there was also a notable deprivation slope that means that, controlling for age, patients in more deprived areas receive more district nursing contacts than those in less deprived areas. Our approach is therefore based on a regression model taking account of age, sex and deprivation.

4.3.4 Implementing the model

Contact rates by age and sex are calculated for GP practices and ICBs based on applying the contact rates from the model to the registered populations by age, sex and deprivation decile. These contact rates are then applied to the registered populations for those cohorts to produce a weighted population.

C2 – Community Services 2022/23 (Excel file)

This shows contact rate by age and sex for GP practices and ICBs.

The file shows also each GP practice's and ICB's registrations weighted for need.

4.4 Mental health

4.4.1 Approach

The mental health model has not been updated for 2022/23 allocations. The adult mental health component was refreshed for the 2019/20 allocations round.

The refreshed model used person-level data on the use of mental health services, learning disability services, Improving Access to Psychological Therapies (IAPT) services, and general and acute hospital services, as well as demographic characteristics and area level socio-economic characteristics. Specialised mental health services, which are commissioned by NHS England, were excluded from the model whenever data would allow.

The refreshed model was based on more up-to-date data than the previous model and also included IAPT services and updated categories for unit cost breakdowns.

Further detail on the development of the model can be found in the Mental Health model research paper¹².

4.4.2 Data

The model is based on national datasets for 2015/16 that capture person-level service usage in a consistent and comparable way. The two main datasets used were the Mental Health Services Data Set (MHSDS¹³) and the IAPT dataset. Information on inpatient and outpatient care was complemented with Secondary Uses Survey (SUS) data when not reported in the MHSDS. Individual cost-weighted activity estimates were calculated by aggregating the cost for inpatient bed days (split by the cost per general bed day and cost per intensive bed day) and unit costs for community care contacts (split by the pay band of the care professional overseeing the care) and IAPT contacts.

These data were merged with other person and area level information relative to 2013-14 and 2014-15 derived from other routinely collected data available within NHS England for all individuals registered with a GP practice in England at 1st of April 2015.

4.4.3 Explanatory Need and Supply Variables

The model included a set of explanatory variables that were found to be associated with the future use of mental health care, including both need and supply variables.

Key indicators of need that were included are:

- **Individual level indicators** of age, gender and ethnicity, and of physical health diagnostic flags (from inpatient diagnoses, relating to issues such as substance misuse and conditions such as diabetes¹⁴);
- **Household level indicators** on household composition to inform key drivers discussed in the literature such as living alone¹⁵;
- **Small area level indicators** where individual and household level data are not available, in particular the proportion of people in receipt of benefits, indicating levels of worklessness; and
- **General Practice (GP) indicators** on the proportion of students on the GP list and the Quality and Outcomes Framework measures covering the prevalence of severe mental illness.

¹² Mental health allocations formula for 2019/20 to 2023/24 revenue allocations

¹³ Formerly the Mental Health and Learning Disabilities Services Data Set and the Mental Health Minimum Dataset

¹⁴ As identified in work published by Public Health England on links between physical health and severe mental illness <https://www.gov.uk/government/publications/severe-mental-illness-smi-physical-health-inequalities>

¹⁵ The mental health costs for individuals living alone were found to be higher than individuals who did not, further details are outlined in the Technical report for the Mental Health Allocation Formula.

A set of supply variables are also been included to account for differences in supply side issues. The variables included are:

- A set of variables indicating the CCG of the GP practice where the individual is registered, to account for differing levels of access and commissioning approaches to mental health services;
- A variable indicating the degree of service use for each GP practice at each mental health trust, to control for the supply of mental health services by taking account of the effect that differing provider approaches to provision, classification, coding and reporting of treatment, may have on individual cost; and
- Average driving distance between the LSOA centroid (of patient residence) and the closest provider (mental health trust headquarters), as living closer to a provider is associated with higher access to and utilisation of services. Sterilising this variable in the formula is important so that rural areas are not under-allocated resources.

4.4.4 Need Estimates

Individual need estimates were derived by taking predictions from the model but sterilising the effect of supply variables and variables which were counterintuitive. Variables were sterilised by fixing values to reflect England averages, to predict need. Individual need estimates were aggregated to the patient age and gender levels and used to weight GP registered populations.

4.4.5 Children's and Young People's (CYP) Mental Health Adjustment

The refresh of the adult model concentrated on those aged 20 and over, so an alternative method was used to estimate mental health need per head for the four quinary age bands under 20. The adult model is person-based but person-based CYP data has not yet been available for long enough in the MHSDS to extend the model to this age group. The adjustment for CYP therefore followed a similar approach to that taken in previous allocations rounds.

The method used all mental health activity captured as inpatient bed days and outpatient appointments within the Mental Health Services Data Set (MHSDS) for 2017/18.

Cost-weighted activity estimates were calculated by quinary age groups and across these age groups by gender. The unit costs used for bed days and appointments were taken as estimated for the adult model. 9% of all the cost-weighted activity within the MHSDS was for CYP and the remaining 91% captured services delivered to adults, however, it should be noted that this activity excludes adult IAPT contacts.

The CYP cost-weighted activity estimates were then expressed as a percentage of cost-weighted activity for the 20-24 age groups, split by gender.

The percentage of cost-weighted activity by gender and for the four children and young person's age groups were then applied to the need per head from the refreshed adult mental health model by gender for those aged 20-24. These ratios were validated against data extracts from Hospital Episode Statistics (HES).

D – Mental Health need per head 2022/23 (Excel file)

This shows the need per head for each age-sex group for each GP practice and ICB calculated using the refreshed mental health model and estimates for those aged under 20 as described above.

The file also shows the weighted populations for mental health and mental health relative need index for each GP practice and ICB.

4.5 Maternity

4.5.1 Approach

The maternity model was last refreshed for 2016/17 allocations by NHS England. The model used person-based data to estimate cost per birth by GP practice in 2013/14. For the 2019/20 and 2022/23 allocations rounds, the model is unchanged and the need weights derived for 2016/17 allocations were applied to updated birth estimates.

4.5.2 Model

The same data set was used as for the refresh of the 2016/17 general and acute model. This included diagnoses in previous years and a wide range of data including for example from the ONS Census of Population.

A number of new variables were created for the refresh of the maternity component, including the proportion of births that were low birth weight births and the number of births by the mother in the period 2010/11 to 2013/14.

A smaller set of variables were tested for inclusion in the model than for general and acute, based on the plausibility of relevance for maternity services. For example, the proportion of those aged over 65 in the small area claiming state benefits was not tested.

Age and some morbidity markers (previous diagnoses) were found to be important determinants of predicted costs per birth. Supply variables were included in the model but set to the national average in the calculation of weighted populations.

4.5.3 Implementing the model

For the 2022/23 allocations round, ONS statistics on 'live births by age of mother and father, 2014 to 2019'¹⁶ were used to weight female registered patients aged 15 to 44 by quinary age bands within LSOAs, to distribute live births in England by GP practices. The costs per birth were applied to the average annual number of live births between 2015 and 2019.

For practices that had opened since the end of 2013/14 (and for which there is not a cost per birth available from the model), the average cost per birth for the LAD in which the GP practice is located was used.

E – Maternity need 2012/23 (Excel file)

This shows the number of new registrations for births, the estimated cost per birth, and the variables in the maternity model and their coefficients

The file also shows each GP practice and ICB's registrations weighted for maternity need.

¹⁶ [ONS Births by parents' characteristics](#)

4.6 Prescribing

4.6.1 Approach

The prescribing component covers the costs of medicines prescribed in primary care and actually dispensed. It does not cover the costs of dispensing the prescriptions as these are not funded by CCGs.

The model has two stages; the first weights for need related to age and sex, and the second stage weights for additional need over and above that related to age and sex. The unit for analysis in the models is GP practices.

The model was last refreshed by NHS England for 2016/17 allocations and is based on the cost of prescriptions by GP practice in 2013/14. For the 2022/23 allocations round the model is unchanged and the need weights derived for 2016/17 allocations were applied to updated population estimates.

4.6.2 Weights for age and sex

The adjustment for age and sex applies the weights that were developed by NHS Digital known as ASTRO(13)-PUs.¹⁷ This is an index of the national average costs of prescriptions by age-sex group.

4.6.3 Weights for additional need

The model for additional need includes both need and supply variables as for the other components. The set of variables in the model were determined by statistical goodness of fit and plausibility as indicators of need. The need variables in the final model include for example the Index of Multiple Deprivation and the proportion of those aged 70 years and over claiming disability living allowance (DLA).

4.6.4 Implementing the model

ASTRO(13)-PUs and additional need estimates were applied to each GP practice and the GP practice weighted populations summed to give the ICB weighted populations. Supply variables were included in the model but set to the national average in the calculation of weighted populations.

Where a GP practice has been newly opened or formed, the average additional need values for the relevant LAD for these GP practices has been applied.

F – Prescribing need 2022/23 (Excel file)

This shows the calculation of registrations weighted for age, sex and additional need for each GP practice and ICB. It shows also where the additional need variables were not available from the model for new practices, and the average LAD value was used.

The file also lists the coefficients and variables in the model.

¹⁷<https://webarchive.nationalarchives.gov.uk/20180307182940/http://content.digital.nhs.uk/prescribing/measures>

4.7 Adjustment for rapidly growing practices

4.7.1 Approach

Where GP practices are growing rapidly in size, the cost weights calculated for some of the component models may no longer be representative of those practices.

Analysis of registration trends has been undertaken that has identified two practices, both from the Babylon GP at Hand (GPAH) group, that have grown significantly in recent years and have a different age profile to the original practice or practices in their local area and should therefore be subject to adjustments.

4.7.2 Implementation

There are two Babylon GP at Hand (GPAH) digital first practices, one in North West London and one in Birmingham. As these practices were not in existence when the majority of the models were developed and because they have a registered population that is geographically dispersed it is necessary to calculate cost weights for these practices that take account of the different need profiles of the areas from which they draw patients.

As ICSs are now so large, the registered population of the GPAH practices has been mapped to LADs. The cost weights for each GPAH practice have been calculated by applying the LAD average cost weight to the population resident in that LAD, where the LAD has more than 2% of the GPAH registered population. This is three LADs for the Birmingham GPAH practice and 18 LADs for the London practice. As the London practice was in existence when the general and acute model was developed the average cost weights from the model will be used for this practice.

4.8 Unmet need and health inequalities adjustment: Avoidable mortality

4.8.1 Approach

Given the use of utilisation-based formulae in our allocations approach, ACRA recognises the importance of attempting to account for health needs which are not visible in the utilisation statistics. We also have a duty to use an approach which tries to help reduce avoidable health inequalities. As such, a significant proportion of target allocations is devoted to a combined unmet need/health inequalities adjustment.

In order to take account of health inequalities and unmet need in the allocations formula, ACRA have previously recommended that the standardised mortality ratio for those aged under 75 (SMR<75) was the best available indicator on which to base the adjustment.

As part of the Long Term Plan, ACRA was commissioned to undertake a review of the health inequalities and unmet need adjustment used in resource allocations. The review considered alternative measures to SMR<75 and concluded that a measure of avoidable mortality was a sound alternative and a better fit to the definition of health inequalities, as the causes of death included in the measure have been identified as those that could have been avoided through public health measures and/or timely and effective health care intervention.

Different definitions of avoidable mortality were considered, varying the age cut-off from including all avoidable mortality under 75, to including avoidable mortality among all ages, to using a bespoke definition that uses the 75 years age cut-off but includes all age mortality for specific causes of death. The bespoke definition was considered the most appropriate as it captures some avoidable mortality for age groups over 75, while avoiding some of the concerns with applying avoidable mortality to all age groups. More detail can be found in ACRA's review on the NHS allocations website¹⁸.

As in previous allocation rounds, ACRA have not been able to make an evidence based recommendation on how much funding should be redistributed through the unmet need adjustment. For 2022/23 the share for Primary Medical Care and ICB core allocations will remain at 15% and 10% respectively.

4.8.2 Avoidable mortality

The unmet need/health inequalities adjustment is based on the indirectly standardised bespoke measure of avoidable mortality applied at small area level to take account of inequality in health outcomes within as well as between ICBs.

The standard indicator of avoidable mortality is measured by counting the number of registered deaths (aged <75 years) from a list of diseases classed as preventable and treatable agreed between OECD nations using ICD-10 definitions. Preventable deaths are defined as deaths from causes that could be avoided through public health measures (e.g. Influenza). Treatable deaths are defined as deaths from causes that could be avoided through timely and effective healthcare interventions

¹⁸ <https://www.england.nhs.uk/allocations/>

(e.g. Appendicitis). For the purposes of the review, ONS produced a bespoke measure of avoidable mortality that include certain causes of death for over 75s. Indirect standardisation is applied at small area level (middle layer super output area (MSOA¹⁹)) and then aggregated to ICBs.

4.8.3 Weights per head

The adjustment has been updated to use the latest available data for avoidable mortality (2015-19).

The methodology for weighting applied to each MSOA is unchanged from that introduced for weighting the SMR<75 values for 2019/20 allocations.

In 2019/20, on the recommendation of ACRA, we revised our approach to the weighting we apply to each MSOA. Previously each MSOA was assigned to one of sixteen groups based on its SMR<75 value.

Each of the sixteen groups was given a weight per head, with all the MSOAs in group 16 having a weight ten times higher than the MSOAs in group 1. The weight for the intermediate groups increased exponentially, so that group one had a weight of 1.00, group two a weight of 1.17, through to group fifteen with a weight of 8.58 and group sixteen with a weight of 10.00.

Now instead we apply a continuous exponential distribution based on avoidable mortality values. This is calibrated to the previous approach by setting the weights for the two MSOAs at the mid-points within groups 2 and 15 to the weights they would have been assigned previously, i.e. 1.17 and 8.58 respectively. We apply the continuous exponential across all other MSOAs using their values for avoidable mortality.

This ensures that weighting is a function of avoidable mortality values rather than simply the rank of the MSOA. This better reflects the wide variation in avoidable mortality values seen in the group with the highest mortality ratios allowing weights for some MSOAs to rise above the previous upper limit of 10.

4.8.4 Implementation

Each MSOA's population is given a weight based on this methodology and the MSOA weighted populations are then summed to ICB level using the number of the ICB's registrants resident in each MSOA.

G – Avoidable mortality weighted populations (Excel file)

This shows the weights per head for each of the 6,791 MSOAs in England, and the calculation of avoidable mortality based weighted populations for ICBs.

¹⁹ MSOAs are small geographical areas designed by ONS for statistical reporting and analysis and MSOAs have similar population sizes.

5 Unavoidable costs

5.1 Introduction

There are adjustments for four types of unavoidable costs: the market forces factor (MFF); the emergency ambulance cost adjustment (EACA); remoteness; and the Private Finance Initiative (PFI).

The adjustments are included in the weighted capitation formula to take account of the higher costs of commissioning services as a result of these unavoidable factors.

5.2 Market Forces Factor (MFF)

5.2.1 Approach

The MFF adjusts for the unavoidable differences in unit input costs between areas due to their geographical location alone. For example, it typically costs more to run a hospital in a city centre than in other areas due to higher staff, buildings and land costs. This adjustment is for higher, unavoidable input costs alone.

The provider MFF was updated in 2019/20, incorporating more up-to-date data and a revised methodology to improve the accuracy of the estimates of unavoidable cost difference between providers. The previous MFF values were produced in 2010.

Following the update, the provider MFF consists of 6 components, which are; non-medical and dental staff; medical and dental staff; land; buildings; business rates; and other.

Full details of the changes to the provider MFF and the methodology for creating the MFF are set out in *A guide to the market forces factor*, published as part of the S118 consultation for the National Tariff.²⁰

To smooth the impact of change to the new MFF, the transition to the updated MFF values is taking place over a five-year period in equal steps. This phased approach has been replicated in ICB target allocations.

In the 2019/20 allocations round a CCG MFF was calculated. For this round of allocations, MFF is applied at LAD level to allow for variations in unavoidable costs within ICBs to be accounted for.

5.2.2 MFF index for LADs

The MFF for each provider is the starting point for the calculation of MFFs for LADs. The MFF for each LAD is calculated from the MFFs of providers where patients received inpatient, outpatient and A&E treatment for each GP practice located in the LAD.

The LAD's MFF is the weighted average of providers' MFFs, where the weights are the spend in the LAD with each provider. The weights are often known as the purchaser-provider matrix, which has been updated for 2022/23 allocations.

The updated purchaser-provider matrix uses activity for the 12 months up to February 2020 (to avoid any impact of the COVID-19 pandemic on patterns of

²⁰ See <https://improvement.nhs.uk/resources/201920-payment-reform-proposals/>

activity) as recorded in the Secondary Uses Service Payment by Results (SUS PbR data).

The LAD MFFs are expressed as an index, with the England average set to the value of 1.0.

For each GP practice, the LAD MFF index for the LAD in which the practice is located is applied to the GP weighted populations for general and acute, community, mental health and maternity services. These are then combined to create a combined weighted population adjusted for MFF.

The prescribing component is not adjusted by the MFF as the costs of prescribed medicines are the same throughout the country.

H – Market Forces Factor (Excel file)

This shows the percentage of each LAD's costed inpatient, outpatient and A&E activity with each provider, along with the 2022/23 LAD MFFs, plus the scaling to rebase LADs' MFFs to an index so that the England average equals 1.0

5.3 Emergency ambulance cost adjustment

5.3.1 Approach

The Emergency Ambulance Cost Adjustment (EACA) adjusts for unavoidable variations in the costs of providing emergency ambulance services in different geographical areas, and in particular sparsely populated areas. The EACA was refreshed by NHS England for the 2016/17 allocations round. The same model was used in 2019/20 and the model is unchanged for 2022/23 allocations.

5.3.2 Model

Data on times to incidents, times at incidents, times to convey to hospitals, and turnaround times at hospitals from four ambulance trusts (North East, South West, London and East Midlands) were used to develop separate models for times to 'see & treat' and 'see & convey'. See & convey is where the patient is taken to a hospital in the emergency vehicle, and see & treat is where the patient is treated at the scene (such as in the patient's home) and is not transported to hospital.

Data was provided at MSOA (middle super output area) level to maintain patient confidentiality. Data from other sources on the characteristics of MSOAs were collected by NHS England, including population density, distance to A&E departments, and age profiles.

Distance to A&E departments and population density were found to be important in the models.

The two models for see & treat and see & convey were combined to give average predicted times in minutes using the proportions of see & treat and see & convey cases in the dataset.

5.3.3 Implementation

The modelled times in minutes for MSOAs were summed to ICB level. The modelled times for ICBs were converted into an index, with the England average set to the value of 1.0.

The index from the previous step was applied to the proportion of national Hospital and Community Health Services (HCHS) expenditure on ambulance services, to give the final overall EACA index. The same EACA index value is applied to the combined weighted populations for general and acute, mental health, community and maternity services.

I – Emergency Ambulance Cost Adjustment (Excel file)

This shows the EACA index as calculated from the coefficients from the models.

5.4 Unavoidable costs of remoteness

5.4.1 Approach

The purpose of this adjustment is to provide funding to ICBs to meet the unavoidably higher costs of remote hospital sites, where the costs are higher because the level of activity is too low for the hospital to operate at an efficient scale.

There are two steps in calculating the adjustment. The first is to define remote hospital sites, and the second is to estimate by how much their costs are unavoidably higher. This adjustment was introduced in 2016/17 allocations, the same model was used in 2019/20. An updated econometric analysis of the unavoidable costs of being a small provider has been produced for the 2022/23 allocations round.

5.4.2 Identifying remote hospitals

The remoteness adjustment applies to hospitals providing Tier 1 A&E services. The criteria used to define remote hospitals are as follows:

- i) There is a population of under 200,000 within a one-hour travel time of the site. A population served of 200,000 is the scale at which a hospital is taken as being able to achieve close to national efficiency levels. This is to avoid an adjustment being applied to larger remote hospitals for which costs should not be unavoidably high.
- ii) The next nearest provider (with tier 1 A&E services) is one hour or more away by normal road travel times (including ferry times where relevant), for at least 10% of the population served. One hour is taken to be the maximum travel time to hospitals for clinical safety reasons for emergency care. The proportion of the population served who are more than 60 minutes away from the next nearest hospital provides an indication of whether the hospital is serving a population of under 200,000 for reasons of remoteness or for other reasons. An adjustment to target allocations is only made when this percentage is 10% or higher. This avoids giving very small (immaterial) adjustments to a large number of providers.

Travel times were used rather than road distances or straight-line distances. Travel time to the next nearest hospital is an indicator of whether or not consolidation of services onto fewer sites is feasible.

The criteria identified eight hospital sites as unavoidably small due to remoteness. The list of hospitals subject to the remoteness adjustment has been left unchanged for 2022/23 allocations.

5.4.3 Higher costs due to smallness

To calculate the adjustment introduced in 2016/17, a cost curve was estimated for all hospitals, which gave the estimated cost of sites by activity levels. The estimated relative costs were adjusted to remove the impact of differences in case mix and in costs that are already compensated through the market forces factor (that is unavoidable differences in unit input costs across the country).

Estimated costs for predicted activity for a hospital serving a population of 250,000 people, around the national average, were used as the reference point for deriving the size of estimated higher costs of remote sites. The cost curve gave the estimated

higher costs above the reference point for each of the hospitals with predicted activity levels that correspond to the size of their population catchment area.

The adjustment reflected the expected higher costs based on the cost-curve, rather than the actual costs of the hospital, which may be affected by a number of factors unrelated to its scale. Predicted activity for a given population catchment area was used for the remote hospitals instead of actual activity, as the latter may be affected by other factors such as patient choice.

The updated method for calculating the adjustment takes a different approach and has exploited the Patient Level Information and Costing (PLICS) data which was not available when the original adjustment was calculated. The PLICS data supports a better understanding of costs as it provides costing of activity at an individual level, allowing for variation in costing between patients. The previous model used reference costs which provide average cost for each type of activity at each provider. An econometric model was used to identify the drivers of costs and made use of variables not previously available.

The key finding from the new econometric modelling was that the most important factor in determining economies scale is not the size of the site, but the size of the department. As smaller hospitals tend to have fewer departments that are larger relative to their size, the econometric model indicates that the costs of being a small hospital have previously been overestimated. However, there may be factors other than size that impact on the costs of providing services in small hospitals in remote locations and further work is warranted to explore this. To ensure that no ICB is disadvantaged while further work is considered the adjustment applied for each hospital will be the higher value from either the pre-existing adjustment or the new adjustment.

5.4.4 Implementation

The total adjustment was £37 million covering seven ICBs for the eight hospital sites. The adjustment for the baseline year of 2021/22 was calculated by adjusting the 2018/19 figure by uplifting by an amount equivalent to the tariff inflation over that time period. These are shown in Table 5.1 Adjustment for unavoidable smallness: adjustment by site How the adjustments for higher costs due to unavoidable smallness were included in weighted populations for CCGs is described in section 6.

Table 5.1 Adjustment for unavoidable smallness: adjustment by site

Hospital	Adjustment 2022/23 £000s	ICB
Furness (University Hospitals of Morecambe Bay)	£6,771	NHS Morecambe Bay CCG
West Cumberland (North Cumbria)	£6,027	North East and North Cumbria ICB
St Mary's (Isle of Wight)	£5,726	Hampshire and the Isle of Wight ICB
North Devon (Northern Devon)	£4,296	Devon ICB
Cumberland	£3,879	North East and North Cumbria ICB
Hereford (Wye Valley)	£3,681	Herefordshire and Worcestershire ICB
Pilgrim (United Lincolnshire)	£3,254	Lincolnshire ICB
Scarborough (York Teaching)	£3,572	Humber and North Yorkshire ICB

5.5 Excess finance costs of the Private Finance Initiative (PFI)

5.5.1 Approach

The purpose of this adjustment is to reflect the impact of excess finance costs that some trusts face due to the financing arrangements for some buildings constructed under historic PFI arrangements. This adjustment is new for the 2022/23 allocations round. Several trusts with PFI obligations have previously been in receipt of direct payments based on historical analysis undertaken by DHSC in 2011. The new approach will replace these direct payments with a consistent methodology based on the excess finance costs some trusts pay in PFI contracts compared to other sources of public sector financing.

5.5.2 Calculation of costs

2020/21 trust account consolidation (TAC) data has been used to estimate the excess financing costs (defined as derived interest rate and contingent rent above 6.3%).

5.5.3 Implementation

The adjustment is implemented in the same way as the adjustment for unavoidable smallness as is described in section 6.

6 Total weighted populations for core ICB allocations

6.1 Combining the formula components

6.1.1 Unified weighted populations for October 2021 registrations

As described earlier, there are separate weighted populations for need for general and acute services, mental health services, community services, maternity services and prescribing, and additionally there are adjustments for unmet need/health inequalities and unavoidable costs.

These are combined into unified weighted populations for each ICB for core allocations in the following steps.

1. Apply the MFF index to GP practice weighted populations for general and acute, mental health, community and maternity services and aggregate to ICBs.
2. The hospital and community services (HCHS) need-weighted population is calculated by combining the weighted populations for need for general and acute, mental health, community and maternity services. This is done by weighting each component according to its modelled share of HCHS spending in 2024/25. As the Financial Recovery Fund (FRF) is now included in baselines and in allocations, and as the FRF is predominantly for providers of general and acute services, the relative weight of the general and acute component of the formula has risen for this round of allocations. This does not imply that the funding for other components such as mental health has fallen in absolute terms.
3. Apply the EACA index.
4. Combine the weighted populations for HCHS from steps 2 and 3 with the weighted populations for prescribing, weighting each element according to its modelled share of total spending in 2024/25. There is no adjustment for the MFF and EACA for prescribing.
5. Combine the outcome from step 4 with the unmet need/health inequalities adjustment. The latter is given a weight of 10% and the outcome from step 4 a weight of 90%.
6. Apply the adjustments for unavoidable costs due to remoteness and PFI.

6.1.2 Unified weighted populations for 2022/23

Unified weighted populations for 2022/23 are calculated by applying the component model outputs to projected populations which are calculated as described in Section 3.

J – Overall weighted populations for ICBs and GP practices 2022/23 (Excel file)

This shows the overall weighted population for each ICB for core allocations for 2022/23 based on projected populations for 2022/23, and the weighted populations for general and acute, community, mental health, maternity, prescribing and the health inequalities and unmet need adjustment.

The file also shows the overall weighted population for each GP practice for 2022/23.

7 Primary medical care allocations

7.1 Introduction

The formula for primary medical care (GP services) allocations was updated in 2016/17. This update moved away from using the Carr-Hill contractual formula that is at the heart of the General Medical Services (GMS) contract, to a formula based on new estimates of workload per patient by age-sex group, which were used as the relative weights per head for allocations.

ACRA endorsed the new formula, ACRA's recommendations on the workload formula are for allocations purposes only. ACRA's remit does not extend to recommendations on how GP practices are remunerated through the GMS contract.

The formula for 2022/23 allocations is unchanged.

7.2 Methodology

7.2.1 Data

The requirement was to measure general practice workload and consider how the attributes of practices and their patients influenced that workload. The dataset used was the Clinical Practice Research Datalink (CPRD), which is an ongoing primary care database of anonymised medical records for a large number of general practitioners. It is broadly representative of the UK general population in terms of age, sex and ethnicity. For this work there were usable records from around 210 practices covering about two million patients.

Workload was measured by the number of minutes electronic files for patients were open, weighted by staff group.

7.2.2 Modelling approach

A linear fixed effects model was fitted to the CPRD data to estimate the effect of patient and practice characteristics on GP workload. The model is at the person level, and of the form:

$$\text{Total file opening times (weighted by staff group)} = \text{Constant} + \text{Age-sex group} + \text{New registration} + \text{IMD decile} + \text{Practice ID}$$

Age and sex are well known to affect workload; typically more elderly patients have more minutes of GP practice time than younger age groups.

Index of Multiple Deprivation (IMD) is a proxy for higher need in more deprived areas. IMD 2010 data were used as these data were in the CPRD dataset at the time of data extraction. IMD values were imputed for the individual patients who did not have associated IMD deciles in the dataset provided.

Being newly registered with the practice was found to be associated with higher workload.

The intercept (constant) represents the estimated average number of additional weighted contact minutes per year that a patient on the registration list at the start of the year with baseline characteristics has with their GP surgery. In the model that is a male patient, aged 0-5, in IMD decile 1.

The practice ID was treated as a supply variable, and not included in the weighted populations. This removes the impact on workload of differences between individual GP practices in their working practices.

ACRA considered whether rurality should be included as a factor in determining workload but advised that it should be excluded from the model. This was because of uncertainty over whether it was reflective of additional workload or systematic differences in behaviour in rural practices not arising from workload.

More information on the model can be found in the paper *Primary medical care – new workload formula for allocations to CCG areas*.²¹

7.3 Implementation

The model's coefficients and constant term were applied to GP practice registered lists in October 2021 and to projected practice populations for 202/23. The GP practice MFF from the Carr-Hill formula was also applied. This gave GP practice weighted populations which were then aggregated to ICBs.

An adjustment accounting for 15% of the overall primary medical care weighted population is applied to adjust for unmet need and health inequalities (see Section 4.7). An adjustment was also applied to account for estimated dispensing doctors' fees in 2020/21, uprated to 2021/22 values.

ICB weighted populations for 2022/23 were derived using the projected GP registered population profiles as described in section 3.

7.4 Other primary care

In 2022/23 some ICBs will take on delegated responsibility for other (non-medical) primary care services, which comprise dental services (primary, secondary and community), general ophthalmic services and community pharmaceutical services. This is subject to the passage of the Health and Care Bill and agreement with NHS England. The allocations for these functions will not be included in the core ICB allocations, as they are currently developed based on an existing methodology.

For 2022/23, regional budgets for these functions are set in line with the NHS Long Term Plan, and adjusted for activity growth changes, inflation and the impact of COVID-19 payment arrangements. Adjustments have also been made to reflect boundary changes based on values provided by NHSEI regional teams.

Allocations will be made to any ICBs taking on newly delegated functions, as agreed with NHS England.

²¹ See <https://www.england.nhs.uk/wp-content/uploads/2016/04/5-primary-care-allctins-16-17.pdf>

K1 – Primary Care (medical) (Excel file)

This shows the coefficients from the new primary medical services model and data at GP practice level.

The file also shows the calculation of weighted populations for primary medical services and how these are combined with the avoidable mortality weighted populations to give overall weighted populations.

8 Specialised services

A new needs-based allocation model for specialised services has been developed. This will be implemented at a later point. Technical guidance on this model will be produced following wider engagement on the model.

9 Convergence

9.1 Principles of convergence

Actual allocations have been derived from target allocations through a convergence policy. This sets a base growth, reflecting typical pressures, including estimated growth in weighted population. A convergence factor is then applied, such that ICBs that are furthest above target receive less funding growth than in the base growth, and those that are furthest below receive more funding growth.

This approach moderates the move from the baseline towards target allocations to:

- ensure the maximum growth for the furthest below target is set at a level that balances achieving an acceptable distance from target with setting growth at a level that can be effectively deployed;
- ensure the minimum growth for the furthest over target is set at a level that allows stability of services and creates confidence for medium term planning;
- avoid year-on-year volatility in allocations for those ICBs close to their target allocation; and
- produce a distribution of allocations that does not exceed the available budget.

9.2 Setting the baseline

9.2.1 Approach

In previous allocations rounds the baseline has been the previous year's allocation, plus adjustments for policy changes, boundary changes, etc. This remains the approach for primary medical care, but the financial framework introduced to respond to the COVID-19 pandemic has led to this changing for 2022/23 ICB core allocations.

Core services baseline envelopes have therefore been set by reference to the system envelopes allocated for the second half of 2021/22 (H2), doubled to represent a full year allocation. The baseline is therefore broader than the previous CCG allocations and includes:

- CCG programme allocations;
- system top-up (including sustainability funding/Financial Recovery Fund previously allocated to individual organisations); and
- growth funding.

COVID-19 funding, CCG running cost and delegated primary care allocations are excluded for this purpose as they are being distributed as separate allocations. Non-recurrent funding included within H2 envelopes (funding for the H1 backpay related to the 3% pay award, and support for providers' other income losses) are also excluded from the baseline envelope. Further adjustments are then made to the baseline envelope as below:

- Specialised commissioning adjustments to remove funding from system top-up in baseline envelopes and incorporate into specific contracts.
- Adjustments to reflect funding for low volume activity being transferred to the commissioner systems (which had previously been funded through system top-up distributed to the provider's system).

- Incorporation of funding for CCG community non-demographic growth into baseline envelopes that had previously been funded through separate SDF allocations.
- Further SDF adjustments associated with mental health, removing funding from baseline envelopes and to be incorporated into specific SDF allocations.

9.2.2 Boundary Changes

Baseline envelopes have been adjusted to reflect boundary changes. Where a CCG is splitting between systems the baseline allocation has been proportionally split between systems using weighted populations of the ICB. Block contract baselines have also been split to reflect the weighted population.

Boundary changes also requires splitting of capacity funding allocated under the COVID framework funding even when it is an associate (i.e. non-lead CCG) that is impacted by the boundary change. The split has also been estimated using weighted populations of the impacted area as a proportion of the entire system. This capacity funding is part of the baseline envelope whereas specific COVID funding will be a separately notified allocation.

As well as boundary changes, we considered if additional adjustments were needed for population changes connected with the rapidly growing practices, noted above.

For core services no adjustment was needed. 2021/22 system envelopes are already based on a break-even basis and so the additional resource demand created by rapidly growing systems is also taken in to account.

For primary medical care, the baselines are set using the published allocations and so do not take account of the rapid growth in these practices. We have therefore made two adjustments:

- Adjustments had already been made for growth up to December 2019. These adjustments have been rolled forward and grown in line with overall growth in primary medical care allocations.
- Adjustments for additional growth between December 2019 and October 2021 have been estimated using the age-gender weightings for the local authority of residence of the individual moving in to or out of the practices. This allows us to create a weighted population for the transferring group and this is used to estimate the proportion of the allocation that should be transferred.
- A minimum transfer is applied, set at £65k. Only if the total adjustment exceeds this is it applied. This avoids small value transfers and mitigates the risk of double counting population change through both these adjustments and the use of ONS population trends.

9.3 Setting the convergence

9.3.1 Base growth

Having set the 2021/22 baseline, setting the allocation for future years begins by setting the base growth. For core allocations, the average base growth represents the level of funding needed for known cost pressures, including inflation and population/activity growth. This is estimated to be 4.0% for core services in 2022/23. For primary medical care the average base growth is set at the average growth

(6.5% in 2022/23) which reflects the GP contract, population growth and a transfer of funding into primary medical care allocations from core allocations.

While the average population growth in 2022/23 is approximately 0.5% this is not true for all ICBs. The base growth for a particular ICB is therefore adjusted to reflect the local change in the weighted population, at uniform MFF.

9.3.2 Convergence

For each ICB a convergence is then set based on the distance from target (DfT) after base growth. The ICBs that are furthest above target will see the largest negative convergence, while those that are below target see positive convergence. Broadly this moves systems towards target, while moderating that growth to ensure systems are financially stable and, for systems that are close to target, we avoid destabilising systems by making changes due to small data fluctuations.

One purpose of the convergence factor is to produce a distribution of funding which does not exceed the available budget. This is a new objective compared to previous CCG allocation rounds and reflects the fact that the 2021/22 baselines (+ base growth) are supported by non-recurrent funding from the Government and need to be reduced to the level funded by the revised 2022/23 settlement.

The 2022/23 convergence for ICB core and primary care services are in table 6.

Table 6: 2022/23 convergence

DfT after base growth	Convergence
ICB core services	
Less than -1%	+0.25%
Between -1% and +2%	Varies uniformly between +0.25% and -0.5%
Between +2% and +4%	-0.5%
Between +4% and +5.62%	Varies uniformly between -0.5% and -0.94%
Greater than +5.62%	-0.94%
Primary care	
Less than -4.3%	+0.89%
Between -4.3% and +1.59%	Varies uniformly between +0.89% and -0.4%
Greater than +1.59%	-0.4%

9.3.3 Adjusted convergence

Due to the structure of the COVID financial framework, the 2021/22 baselines include a mix of some provider-based and some population-based costs. A baseline exercise to move towards a population-base is planned before issuing 2023/24 allocations.

During 2022/23 additional expectations are in place to ensure financial stability. In particular, where an ICB is commissioning activity from providers in another ICB they should not expect efficiency greater than the efficiency in the tariff assumptions.

Similarly, direct commissioning contracts will not assume efficiency of more than 1.1%.

This means that a system that is a nett exporter of activity, ie, one where the provider cost base is smaller than the allocation, will have less opportunity to achieve savings to meet the convergence challenge. Similarly, systems that are nett importers of activity will have a greater opportunity to achieve savings.

To correct for this the convergence for the ICB core allocation is adjusted by the ratio of the provider cost base and the allocation.

After applying the adjusted convergence, the average growth in the recurrent core allocation is 3.3%. Once additional health inequalities funding and the transfer in of additional maternity funding are included the growth in the total core allocation is 3.6%.

For primary medical care allocations, the average allocation growth remains at 6.5% after convergence.

N – Primary medical care convergence (Excel file)

This file sets out the calculation of the convergence for ICBs for primary medical care

O – ICB core convergence (Excel file)

This file sets out the calculation of the convergence for CB core services

10 Running cost allowances

10.1 Overall envelope

The overall envelope for 2022/23 is £1,081m.

10.2 Calculation of running cost allowances

10.1.1 Approach

Shares of the running cost allowance for ICBs in 2022/23 are based on the relative share of running costs in their constituent CCGs, adjusted for boundary changes on a per capita basis.

S – Running cost allowances (Excel file)

This shows the calculation of running cost allowances for 2022/23.

Annex 1: ACRA commissioning letter and letter of recommendations

Julian Kelly
Chief Financial Officer
NHS England
Skipton House
80 London Road
London
SE1 6LH

To: Peter Smith,
Chair of Advisory Committee on Resource Allocation (ACRA)
Emeritus Professor of Health Policy, Imperial College London

Dear Professor Smith,

Commissioning Letter for Advisory Committee on Resource Allocation

I would like to express my gratitude for the contribution of ACRA to the update of the CCG allocation formula. The important progress the Committee made in the refresh of the mental health and learning disabilities model, the development of the community services model, changes to the baseline and projected populations and updating the methodology used in the combined health inequalities and unmet need adjustment have improved the quality of the analysis that underpins the production of target allocations.

ACRA's advice and the refreshed formulae were critical contributors to NHS England issuing firm allocations for 2019-20 to 2021-22 and indicative allocations for 2022-23 and 2023-24.

The work programme for the next two years will build on that recent progress with a focus on updating the general and acute and specialised services models, development of a patient-level prescribing model and a review of the rurality adjustments. In addition, a key area for development for the next round of allocations will be the health inequalities and unmet need adjustment. In recognition of ACRA's contribution in this area and as stated in paragraph 2.25 of the Long Term Plan, NHS England and Improvement commission ACRA to conduct and publish a review of the inequalities adjustment in the funding formula. Simon, my Board colleagues and I look forward to receiving ACRA's recommendations for firm allocations from 2022-23.

I would like to take this opportunity to thank you, the members of ACRA and the Technical Advisory Committee for your valuable work in making independent expert recommendations in the important area of health allocations.

Yours sincerely,

09/11/2021

Amanda Pritchard
Chief Executive, NHS England

Dear Amanda,

ACRA's recommendations on 2022/23 ICS target allocations

The Advisory Committee on Resource Allocation (ACRA) is an independent, expert committee with a remit to provide recommendations and advice on the formulae that inform target budgetary allocations for local commissioners of health services. Our remit covers providing recommendations to NHS England on NHS allocations and to the Secretary of State for Health on public health allocations.

I am writing to you to set out the recommendations from ACRA on Integrated Care System (ICS) target allocations for 2022/23 onwards. These recommendations are the culmination of the Committee's work programme over the past three years. During that time, the Committee has also separately provided advice to the Department of Health and Social Care on public health allocations.

Below, in section A, I set out the areas on which the Committee has agreed to make formal recommendations. For completeness, the components of allocations where new recommendations have not been made are then listed in section B. I then provide a brief summary of our suggested priorities for investigation into methodological improvements for the next round of allocations in section C, concluding with broader recommendations that the committee would like to make in support of high quality approaches to allocations in future.

Our recommendations continue to be based on the principles that the formulae support equal opportunity of access for equal need and contribute to the reduction in avoidable health inequalities. ACRA continues to assess and test the evidence base for the formulae, making our recommendations on the best evidence available, and also noting when judgements have necessarily been made where the available data are limited.

I should like to thank members of ACRA, members of ACRA's Technical Advisory Group (TAG), members of the Health Inequalities Task and Finish Group (HITFG) and the NHS England Analysis and Insight for Finance Team for all their contributions to delivering the work programme.

Section A: ACRA's recommendations for methodological changes to 2022/23 ICS target allocations

The committee would like to make the following recommendations on five key components of ICS target allocations methodology, compared to the methodology last used for the 2018/19 CCG allocations round.

Recommendation 1: A refreshed model for general and acute hospital services is adopted

The current general and acute services model was first introduced in 2016/17 having been developed in 2015. In refreshing the formula we have adopted a similar methodology ("Person Based Resource Allocation", PBRA) and re-estimated the models using more recent data. The data used in the model are from before the start of the COVID-19 pandemic. An extensive set of explanatory variables have been tested in the model. The committee has also considered changes to the model specification and has selected the model that provides the best fit to the data while also being parsimonious and stable when applied to different samples of data.

Our recommended model contains a set of need variables based on demographic information about the local population (age, gender, and ethnicity), household formation, indicators of deprivation and relevant morbidity information based on hospital diagnoses. It also contains a set of supply-side variables to control for varying levels of access around the country, varying approaches to the provision of care and varying practices amongst providers in recording activity.

Recommendation 2: A new model for specialised services is adopted

The current specialised services model was developed for the first time for 2016/17 allocations. These allocations were indicative and were not used to distribute specialised services resources. The model covered less than 50% of specialised services spend with remaining spend targeted in line with historic spending patterns. The committee was asked to advise and make recommendations on an updated model that would support increased delegation of resources to ICSs from 2023/24.

Our recommended model utilises an alternative dataset (the Patient Level Contract Monitoring dataset rather than the Secondary Uses Service data) that has enabled model coverage to be extended to over 90% of specialised services spend (excluding highly specialised services and specialised mental health services). The model includes a set of need variables based on demographic information about the local population (age, gender, and ethnicity), household formation, benefit entitlement, and relevant morbidity information based on coding by hospitals. It also contains a set of supply-side variables and a set of provider variables that have been developed to account for variations in provider efficiency and service delivery practices.

The committee would welcome the opportunity to contribute to further development of this model should there be significant feedback between now and implementation in 2023/24.

Recommendation 3: An update is made to the measure used in the combined adjustment for health inequalities and unmet need

The health inequalities and unmet need adjustment is currently based on a measure of premature mortality – the standardised mortality ratio for those aged under 75 (SMR<75). These data are available at a small area level and thus allow the adjustment to reflect inequalities within as well as between CCGs. To form the adjustment, a weighting is applied to the standardised mortality ratio of each small area before the results are aggregated to CCG level. The methodology is readily adapted to accommodate the new arrangements based on ICSs.

As part of ACRA's review into the health inequalities adjustment, commissioned in the NHS Long term plan, the committee has considered alternative measures that could be used to calculate the adjustment. We have concluded that the metric used to calculate the adjustment should be changed to a measure of avoidable mortality; this was the only other measure to pass all of the review's criteria and is considered a better fit to the definition of health inequalities than SMR<75 as the causes of death included have been identified as those that could have been avoided through public health measures and/or timely and effective health care intervention. In contrast, the SMR<75 includes deaths from all causes and excludes all deaths, no matter what the cause, for those aged over 75 years. The committee is not recommending any other change to the way the adjustment is calculated.

The impact of this adjustment depends on the weighting of the inequalities component within overall target allocations. ACRA has previously been asked to advise on that weighting, but there has been a lack of evidence on which ACRA can make a recommendation. As part of the health inequalities review the committee have attempted to gather evidence from CCGs that would provide an evidence base for this decision. As CCGs do not map their expenditure in a way that could robustly identify spend on health inequalities the committee is not in a position to make a recommendation on the weights and this remains a matter for the NHS England Board.

A National Institute for Health Research (NIHR) funded project is currently underway to consider alternative methods of adjusting for unmet need within allocations; unmet need is currently included as part of the health inequalities adjustment. This project has been delayed but is expected to report during 2023. Until the completion of this project the committee is not recommending any changes to how adjustments are made for unmet need.

Recommendation 4: Baseline populations are estimated using GP registrations for a single month

For the previous round of allocations ACRA recommended a change to use a 12-month average of GP registrations as the baseline population. This was to account for seasonality in the size of registered populations for some CCGs. The COVID-19 pandemic has had an impact on the size and relative distribution of the GP registered population. For the period April to June 2020 there was an unprecedented fall in GP registrations. Although the number of registered patients has now begun to rise, the levels of growth have been lower than previous trends. To minimise the impact on allocations of these changing patterns of GP registration, the committee is recommending that a single month is used as the baseline population rather than a 12 month average. This is recommended for this round of allocations only, with the

expectation that the 12 month average population will be used for future allocation rounds once registered populations have stabilised.

Recommendation 5: The costs of providing services in unavoidably small hospitals are updated

Updated modelling has been undertaken to consider the additional costs for small hospitals that are unable to operate at an efficient scale and are remote from other providers of Type 1 A&E services. This adjustment will continue to be applied to the hospitals that have been identified as being unavoidably small due to remoteness.

Section B: Issues that are not part of this set of recommendations

We recommend that the remaining components of CCG target allocations that are not covered in section A above are modelled as in previous rounds, where appropriate using updated data. These components are the mental health formula, the community services formula, the prescribing formula, the maternity formula and the primary medical care formula.

Section C: Our priorities for methodological improvements for the next round of allocations

We are confident the recommendations resulting from our work programme over the past three years will improve the efficiency and equity of the target allocation formulae. The committee has identified several areas it believes should be considered in future allocation rounds. The committee recognises that the development of models in this work programme will be impacted both by the COVID-19 pandemic and system reform. The priorities for development will need to be informed by the extent to which both data and patterns of utilisation have been impacted by COVID-19 and will need to be responsive to the changes brought about by system working. The areas considered to be priorities for development are:

1. **Mental Health:** Since the development of the mental health model for 2019/20 allocations the quality and quantity of data relating to mental health has improved as mental health providers have been challenged to improve their recording and submission to mandatory data collections, in particular the Mental Health Services dataset (MHSDS). Our work on the review of health inequalities has also highlighted that, given the significant variations in levels of access to mental health services, varying levels of unmet need and challenges in finding data that are suitable for a health inequalities adjustment for these services, there could be merit in exploring alternatives to a utilisation based approach for mental health.
2. **Community Services:** Time, resource and data limitations have meant that the travel time adjustment for community services was not recommended for implementation in 2022/23. Further work on this adjustment is warranted, alongside consideration of whether the quality and consistency of data for community services has improved to the extent that this model could be further developed.

3. **Health inequalities and unmet need:** A National Institute for Health Research (NIHR) commissioned project on unmet need is considering alternative methods for accounting for unmet need in allocations and is due to conclude in 2023. The committee will need to consider the outputs of the research and make recommendations regarding implementation. The ACRA report for the review of the health inequalities adjustment also sets out a range of recommendations for further work. Any further work on health inequalities will also have to take account of the outputs of the NIHR unmet need project and the subsequent separation of unmet need and health inequalities adjustment that may be necessary.
4. **Ethnicity:** Additional cross-cutting work is warranted on how ethnicity is accounted for in our utilisation models. Additional evidence should be sought to determine the extent to which the health outcomes of specific ethnic groups vary from White British groups. This work would need to be supported by improved individual data relating to ethnicity through the ability to link data on individual characteristics to utilisation data.

Section D: Two concluding recommendations

I should like to conclude by making two broader recommendations that the committee is unanimous in believing would make a significant impact on the service's ability to support fair and efficient resource allocation in future.

The first is that **a high priority is given to maintaining and enhancing the accuracy of GP registered lists.** These are fundamental to allocations, being the key driver of the distribution of resources to different parts of the country, and any loss of trust in the quality of lists presents a threat to the credibility of the allocations process as a whole.

The second recommendation is that **access to high quality patient level data should continue to be developed and progressed.** From the ACRA perspective there are four key issues.

First, irrespective of how pricing and contracting arrangements develop over time, there should be a duty on providers to record accurate information on what services are being provided to whom, in order to support a host of policy, managerial and research needs, including resource allocation. It is essential that high quality patient level data are available from all providers, including mental health providers, and both NHS and non-NHS providers of community services. Improved quality and consistency of patient level data for community and mental health services will be crucial for enhancing the needs-based models for these services.

Second, providers and commissioners should recognise the importance of accurate coding of diagnoses. The development of the general and acute model has demonstrated the impact that, for instance, the depth of coding can have on allocations and the distribution of resources. Any drop in the quality of recording of diagnostic information will affect the ability to accurately model need and so have an

adverse impact on the robustness of the target allocations. The recording of diagnoses is also important for mental health providers. In previous work we identified significant inconsistency between providers in their recording of mental health diagnoses and clusters (with some capturing up to 90% of patients and some less than 10%), meaning that we could not use those data to enhance the mental health needs model.

Third, recent improvements in the recording of patient characteristics such as ethnicity, necessitated by the COVID-19 pandemic, should also be fed through to the patient level datasets to improve the way that such characteristics are accounted for in our models.

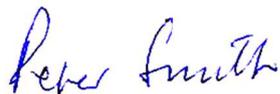
Alongside a focus on high quality data recording, we ask that efforts are redoubled to assure the public of the protection of their data, and to maximise completeness of datasets, whilst ensuring continued access to high quality, patient level linked datasets for NHS analysts and researchers. The future effectiveness of our allocation formulae will be critically dependent on having in place an information governance framework that minimises barriers to the sharing of suitably anonymised data in secure settings. To support this the public needs to be assured that allowing access to their data is safe and will contribute to a better, fairer NHS.

In this regard, we would particularly emphasise the importance of successfully delivering NHS Digital's plans for the new GP Data for Planning and Research (GPDPR) dataset that can be connected to secondary data. To allow analysts to measure resources and impacts for patients through primary care into secondary and tertiary settings would represent a major step forward, especially if it can draw in information from non-health datasets - such as on social care and on income, wealth, employment and interactions with the welfare system.

We hope that our recommendations are helpful to the decisions that the NHS England Board needs to make on ICS allocations. I should be happy to discuss further with you if you would find this helpful.

I am copying this letter to the Secretary of State for Health and Social Care, for information.

Yours sincerely,



Peter Smith

Emeritus Professor of Health Policy, Imperial College London
Emeritus Professor of Health Economics, University of York

Chair of the Advisory Committee on Resource Allocation

cc Secretary of State, DHSC
CFO, NHS England & NHS Improvement

Annex 2: Age-cost curves

Age-cost curves show the relative cost per head of providing NHS services to different age and sex groups, and are derived from the research to develop the formulae used to allocate resources to NHS organisations.

The age-cost curves are not used in the funding formula directly, but age and gender are taken into account in the formula in the modelling of the need for health care services at the person level or small area level.

The age-cost curves are included here as they are sometimes helpful for other analyses.

The age-cost curves are given below. Note that:

- they are for different years for different components, reflecting the data used for the underpinning modelling.
- they show total costs for each age-sex group or age-sex weights (the latter where additional need weights cannot be broken down by age-sex group).
- some are actual costs from the data used for the modelling and some are predicted costs from the modelling, dependent on the availability of cost data.

General and Acute

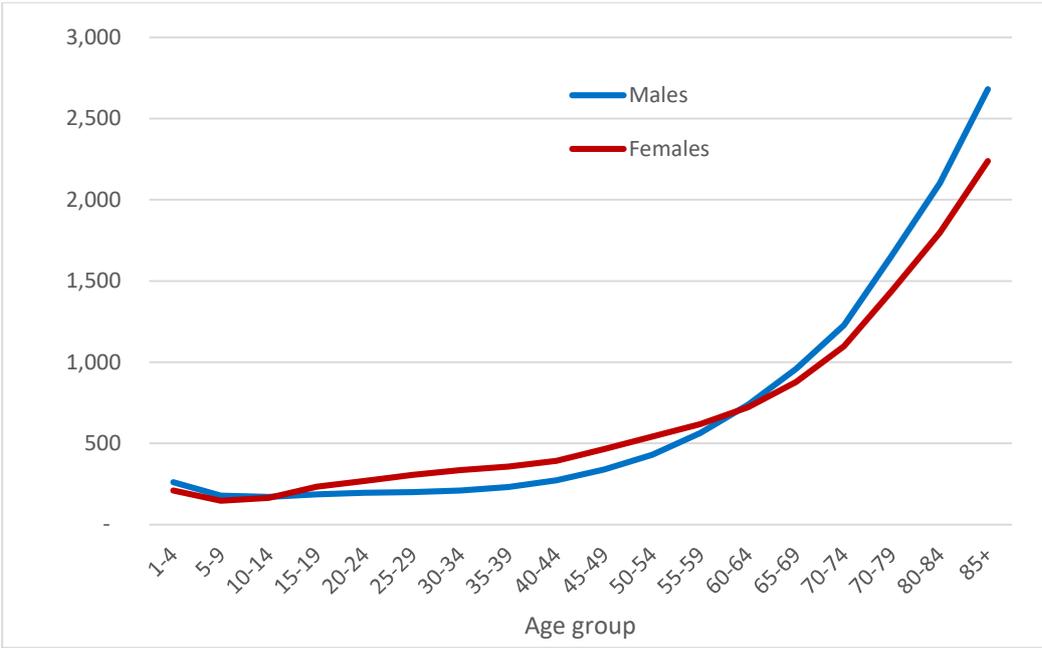
Table A1 shows the modelled cost per head for 2018/19 from the refresh of the general and acute formula as outlined in section 4.2. They include inpatient, outpatient and A&E attendances.

They exclude mental health, maternity and specialised services.

Table A1: General and acute age-cost curve

Age group	Males	Females
1-4	262	209
5-9	179	149
10-14	172	165
15-19	187	233
20-24	195	269
25-29	201	306
30-34	209	335
35-39	231	358
40-44	272	392
45-49	340	466
50-54	430	543
55-59	563	619
60-64	738	723
65-69	958	877
70-74	1228	1098
75-79	1658	1440
80-84	2103	1799
85+	2682	2239

Figure A1: General and acute age-cost curve



Community services

Table A2 shows the modelled cost per head derived from the community services formula as outlined in section 4.3. This is the full community services model, based on district nursing contacts, which is applied to 50% of community services spend in the ICB allocations formula.

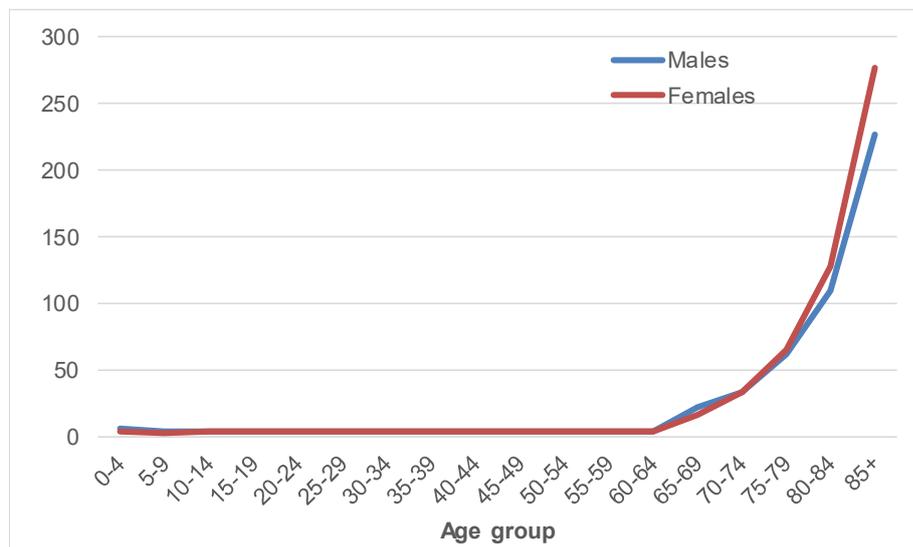
The data for the modelling did not include those aged under 15, so the general and acute (G&A) model age-cost curve was used as a proxy. The ratios of the G&A age-cost curve for the age groups 0-4, 5-9 and 10-14 (as a proportion of the G&A age-cost curve for those aged 15-19) were calculated and applied to the community services age-cost curve for those aged 15-19.

Table A2: Community services age-cost curve

Age group	Males	Females
0-4	5.7	3.6
5-9	4.0	2.7
10-14	4.1	3.0
15-19	4.1	4.1
20-24	4.1	4.1
25-29	4.1	4.1
30-34	4.1	4.1
35-39	4.1	4.1
40-44	4.1	4.1
45-49	4.1	4.1
50-54	4.1	4.1
55-59	4.1	4.1
60-64	4.1	4.1
65-69	21.7	16.3
70-74	32.9	32.6

Age group	Males	Females
75-79	61.5	64.5
80-84	109.0	127.0
85+	226.4	276.2

Figure A2: Community services age-cost curve



Mental health

Table A3 shows the modelled cost per head for 2015/16 derived from the 2018 refresh of the mental health formula as outlined in section 4.4.

The individual cost of mental health services in 2015/16 was estimated as a function of individual and area level need and supply predictor variables in 2013/14 and 2014/15. Activity data were from the Mental Health and Learning Disabilities Dataset (MHLDD) and the Improving Access to Psychological Therapies (IAPT) dataset for 2015/16, and were costed using Reference Costs for 2015/16.

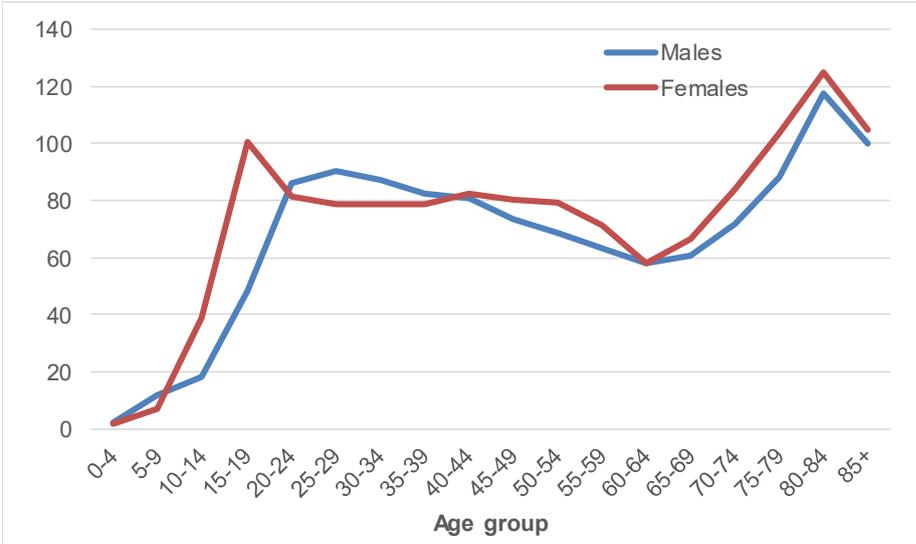
The data for the modelling did not cover those aged under 20 so inpatient and outpatient activity data from the 2017/18 Mental Health Services Data Set (which contains data for children and young people) were used. Weights for each age-sex group 0-4, 5-9, 10-14 and 15-19 were calculated from the estimated service cost of each age-sex group expressed as a proportion of costs for those aged 20-24. These weights were then applied to the need per head for those aged 20-24 from the adult model to estimate need per head for the under 20 age-sex groups.

The age-cost curve excludes the MFF and specialised mental health services.

Table A3: Mental health age-cost curve

Age group	Males	Females
0-4	2.0	1.6
5-9	11.9	7.0
10-14	17.9	38.9
15-19	48.2	100.1
20-24	86.0	81.1
25-29	90.4	78.8
30-34	87.0	78.4
35-39	82.1	78.8
40-44	80.7	82.2
45-49	73.2	80.4
50-54	68.7	79.3
55-59	63.0	71.3
60-64	58.0	57.9
65-69	60.5	66.3
70-74	71.9	83.9
75-79	88.4	103.7
80-84	117.6	124.7
85+	100.1	104.7

Figure A3: Mental health age-cost curve



Prescribing

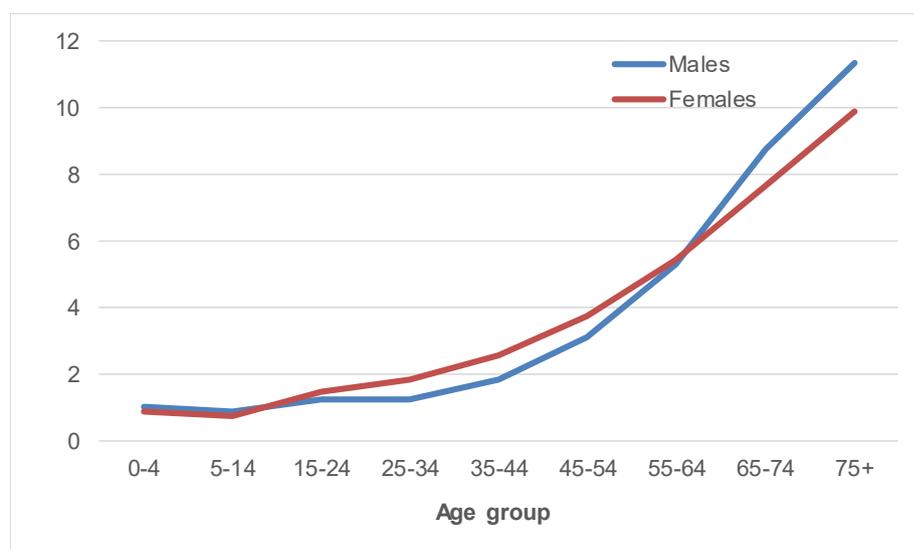
Table A4 shows the prescribing age-cost curve, better known as Age, Sex and Temporary Resident Originated Prescribing Units (ASTRO-PU) developed by NHS Digital. The latest available are for 2013. These are based on actual costs rather than modelled costs.

This weighting is designed to weight individual GP practice populations for age and sex to allow for better comparison of prescribing patterns. The number of temporary residents attending practices is no longer captured or included in funding allocations. The weightings are standardised (based on a male child under 4 years being 1.0) and are used in the prescribing resource allocation model to calculate the expected cost of drugs prescribed for each GP practice

Table A4: ASTRO(13)-PUs

Age group	Males	Females
0-4	1.0	0.9
5-14	0.9	0.7
15-24	1.2	1.4
25-34	1.3	1.8
35-44	1.8	2.6
45-54	3.1	3.7
55-64	5.3	5.4
65-74	8.7	7.6
75+	11.3	9.9

Figure A4: ASTRO(13)-PUs



Primary Medical Care

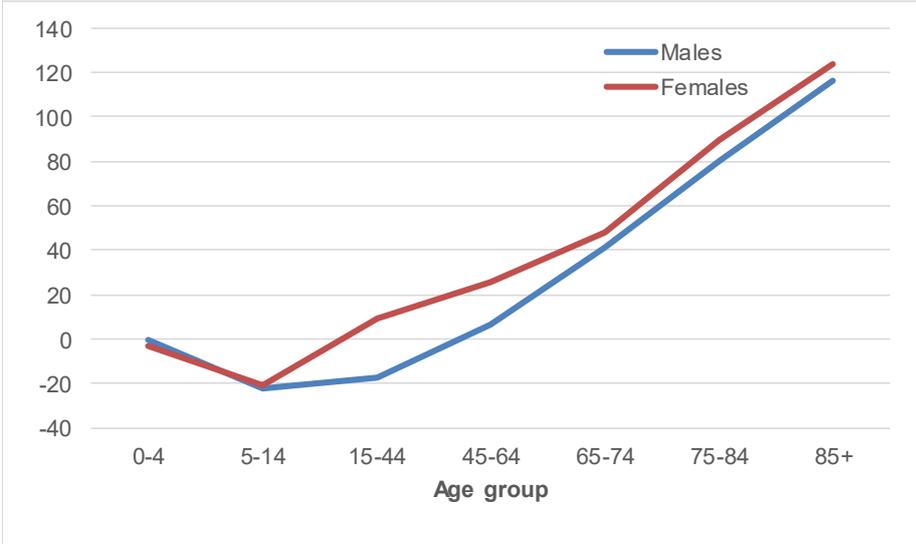
Table A5 shows the Primary Medical Care (PMC) age-cost curve derived from the 2015 refresh of the PMC allocation formula. The model estimated the effects of patient and practice characteristics on GP practice workload (see section 7). The modelling produced age-sex coefficients that represent the estimated average number of additional weighted contact minutes that a patient in each age-sex group has with their GP surgery compared to the baseline, that is a male patient aged 0-4.

The primary medical care age-cost curve is for modelled weights per head by age-sex group, not modelled or actual costs. The age-cost curve excludes need over and above that related to age and sex, and also differences in costs, such as the MFF, which cannot be broken down by age-sex group.

Table A5: Primary Medical Care age-gender workload coefficients

Age group	Males	Females
0-4	0.0	-3.2
5-14	-22.4	-20.9
15-44	-17.2	9.1
45-64	6.7	25.7
65-74	41.1	48.1
75-84	80.5	89.4
85+	116.7	123.5

Figure A5: Primary Medical Care age-gender workload coefficients



Annex 3: References

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Annex 4: List of documents published alongside the technical guide

A set of ACRA papers and research reports will be published shortly.

This guide will be updated once these are published.

ACRA papers

Research reports

ACRA's review of the health inequalities and unmet need adjustment

Update to the model for general and acute services for 2022/23

Spreadsheet files

A Registrations by GP practice and ICB – October 2021

B Calculation of GP and ICB projected registrations 2022/23

C1 General and Acute need per head 2022/23

C2 Community Services need per head 2022/23

D Mental Health need per head 2022/23

E Maternity need 2022/23

F Prescribing need 2022/23

G Avoidable mortality weighted populations

H Market Forces Factor

I Emergency Ambulance Cost Adjustment

J Overall weighted populations ICBs and GP practices 2022/23

K1 Primary care (medical)

K2 Other primary care

N Primary medical care convergence

O ICB core convergence

S Running cost allowances

Equality Analysis

Equality Analysis for 2022/23 revenue allocations to Integrated Care Boards is available in Annex 5 of this document.

Annex 5: Equality and Health Inequalities Analysis

This document presents our analysis into how equality and health inequalities are accounted for in the 2022/23 revenue allocations to Integrated Care Boards.

1. 2022/23 revenue allocations overview

The proposal covers resource allocation to Integrated Care Boards (ICBs). The formulae underlying these allocations aim to support equal opportunity of access for equal need and contribute to the reduction of health inequalities amenable to healthcare.

The resource allocations cover:

- Core ICB services
- Primary medical care

1. Steps in setting allocations

The following steps have been followed to allocate resources, once the national budgets are known:

- Determine target allocations based on relative need and relative unavoidable costs
- Establish baselines (based on previous year's funding)
- Calculate base uplift of baselines, using estimated pressures.
- Determine distances from target, based on long term financial trajectory
- Determine convergence (how far ICB areas are moved closer to their long-term target allocations each year through efficiencies. Convergence balances, within the available resources, providing stability in funding for all organisations and moving them towards their long-term target.)

2. Target shares

The national weighted capitation formulae are used to calculate an ICB's target share of the available resources. Target shares are in proportion to each ICB's population weighted by the need for health care services (such as that due to the age profile of the population). There are also weights to account for differences in unavoidable costs due to location in providing healthcare services between geographical areas across England.

The target shares of the long-term financial trajectory give each ICB's target allocation in monetary terms.

There are separate weighted capitation formulae for ICBs' core responsibilities, and primary medical care. The weighted capitation formulae are recommended by the Advisory Committee on Resource Allocation (ACRA). ACRA is an independent, expert, technical committee and its membership includes GPs, academics, public

health experts and NHS managers. ACRA's recommendations are evidence based from research and statistical modelling.

3. Equality

Equality is at the heart of the weighted capitation formulae. The formulae recommended by ACRA aim to allow local organisations to commission similar levels of health services for populations with similar levels of need (horizontal equity), and appropriately higher levels of health services for populations with higher levels of need (vertical equity).

The principle of a weighted capitation formula was established in 1976 following the Report of the Revenue Working Party (RAWP). RAWP interpreted its terms of reference as being: "to reduce progressively, and as far as feasible, the disparities between the different parts of the country in terms of the opportunity for access to health care of people at equal risk."

4. Weighted capitation formulae

The weighted populations for ICBs are based on:

- the population base – a count of the population each ICB is responsible for;
- a weight, or adjustment, for higher need for health care services due to age (areas with more elderly populations receive higher allocations per head, all else being equal);
- a weight, or adjustment, for additional need for health services over and above that due to age (areas with poorer health receive higher allocations, all else being equal);
- an adjustment for unmet need and health inequalities;
- a weight, or adjustment, for unavoidable differences in the costs of providing health services due to location alone – the Market Forces Factor (areas where the cost of living, land etc. are higher receive higher allocations, all else being equal);
- in the formula for core ICB allocations, an adjustment for the higher costs of providing emergency ambulance services in sparsely populated areas, and an adjustment for the higher costs faced by unavoidably small hospitals in remote areas providing 24-hour accident and emergency services. This round of resource allocations also adds an adjustment for excess PFI (private finance initiative) financing costs.

The values of the weights per head differ between the formulae for ICB core allocations and primary medical care due to differences in relative need across the country for the respective health services.

The weighted capitation formula for ICB core allocations also has separate components for general and acute, community, mental health, maternity and

prescribing. This is because need varies differently across the country for each of these services, and the available datasets, and so analytical approaches, vary in each case.

The research developing general and acute, maternity and mental health models used data at the individual level (anonymised) to provide accurate estimates of the different needs of different individuals and population groups. The exception to this was the prescribing formula, as data were only available at GP practice level. This is an improvement on previous approaches which typically estimated need for small areas. However, due to limitations to data availability, at present the community services component of the formula does use small areas data.

5. Adjusting for different characteristics

Observing need per head directly has not proved possible to date. Instead statistical modelling has examined the relationship between the utilisation of health services on the one hand, and the characteristics of individuals (including data on diagnoses) and the area where they live on the other hand. These models have been used to decide which factors to include in the formula to predict future need per head. Factors were selected based on their statistical significance in predicting future need for healthcare resources and the plausibility of the relationship.

Need related to age and sex

People do not have identical needs for health care services. A key difference is that need varies according to age and sex, and in particular the very young and elderly, whose populations are not evenly distributed across the country, have a higher need for health services than the rest of the population. The weighted capitation formulae therefore take into account the relative need per head of different age-sex groups and the different age-sex profiles of local populations.

Additional need (over and above that related to age and sex)

Even when differences related to age and sex are accounted for, populations with the same age profiles display different levels of need. An additional adjustment to reflect the relative need for health services over and above that related to age and sex is therefore necessary. This adjustment is based on morbidity indicators and population characteristics, such as the underlying indicators from the Index of Multiple Deprivation, associated with morbidity.

Need related to age, sex and additional need over and above that due to age and sex are estimated as a single set of weights rather than two separate sets of weights in the general and acute, mental health, maternity and primary medical care models. This is because additional need varies by age-sex group and differentially across the country by age-sex group. The prescribing formula estimated need related to age-sex separately to additional need due to data availability.

Additional need for general and acute, mental health and specialised services was estimated using morbidity data based on the diagnoses for hospital inpatient admissions for each patient.

The Index of Multiple Deprivation (IMD) was used in the primary medical care formula due to the absence of other information in the data set available for the modelling. The prescribing formula also uses the IMD, and proxies for morbidity mainly from the Population Census.

Supply side variables

The models also include 'supply' variables to take account of the greater availability of health care services generally leading to higher use. While the supply variables are included in the models, they are set to the national average when calculating weighted populations. This means areas are not penalised in the formula for lower utilisation due to relatively lower capacity.

Unmet need and health inequalities adjustment

The models typically assess need as it is currently met by NHS services and therefore may not capture unmet need or inappropriately met need. Typically, the most deprived communities do not access health care in the most appropriate way, resulting in poorer health outcomes. NHS England also has a duty to have regard to the need to reduce inequalities between patients in access to, and outcomes from, healthcare services.

There is an adjustment for unmet/inappropriately met need and health inequalities in the weighted capitation formula, which was recently reviewed by ACRA. In the previous allocation round, the adjustment was based on the standardised mortality ratio for those under 75 years of age (SMR<75). The advantage of this measure is that it is relatively stable at the CCG level across successive periods, and it is relatively straightforward to understand and interpret. SMR<75 also comes with some disadvantages, however. It relies on premature mortality being a reliable proxy for morbidity as well as mortality inequalities. This is not always the case, e.g. for mental health and musculoskeletal conditions where disease results in disability rather than death. Furthermore, SMR<75 related only indirectly to health inequalities experienced by persons over 75 years of age.

The review considered six other candidate measures and assessed these measures against five criteria, each of which check whether the measure is fit for use in the adjustment. These criteria are whether the measure is:

- published regularly
- available for small geographic areas
- based on robust sources
- technically appropriate
- correlated with deprivation.

The review concluded that the adjustment should use a bespoke definition of avoidable mortality. Avoidable mortality is a better fit to the definition of health

inequalities as deaths have been identified where they could have been prevented, or treated, by more timely and effective healthcare intervention. The bespoke definition extends the scope of the definition used by the Organisation for Economic Co-operation and Development (OECD) by including deaths due to some causes to all age groups, where these causes are considered avoidable for all ages. The impact of a move from SMR<75 to the bespoke definition of avoidable mortality is small, but favours redistribution to younger and most deprived areas.

The adjustment is calculated for the population of each small area (Middle layer Super Output Area (MSOA)) and then aggregated to ICB level. Applying the measure at the small area level takes into account unmet need/health inequalities within as well as between ICBs. To turn this into a revenue adjustment an exponential weighting is applied, meaning that a higher weight per head is given to the small areas with the worst avoidable mortality rate.

ACRA's recommendations are principally based on research and modelling. However, due to the lack of robust quantitative evidence on unmet need which is comprehensive and consistent between services and across the country, ACRA's recommended measure to be used for the unmet need and health inequalities adjustment was largely pragmatic and based on judgement. Ongoing research commissioned by the National Institute of Health Research (NIHR) is currently investigating how an equitable resource allocation may account for unmet need.

ACRA was unable to recommend the share of the overall weighted capitation formula that should be based on the unmet need and health inequalities adjustment. The NHS England Board meeting of 17 December 2015 decided that the share should be 15% for primary medical allocations and 10% for CCG (now: ICB) core allocations. We have decided to continue using these weightings in the proposed allocations.

The share is highest for primary medical care as it is expected that unmet need and health inequalities can be more effectively addressed through primary medical care than through secondary care.

Unavoidable costs

The weighted capitation formula includes adjustments for unavoidable costs due to location, so that areas with higher costs are not disadvantaged in their allocations. The adjustments for higher unavoidable costs include the market forces factor (MFF), the emergency ambulance cost adjustment (EACA), and an adjustment for remote hospitals. This round of resource allocations also adds an adjustment for excess PFI (private finance initiative) financing costs.

The MFF adjusts for unavoidably higher unit staff and premises costs, which are higher in particular in London. The EACA adjusts for the longer journey times of ambulances in sparsely populated areas, and the final adjustment is for the higher costs of hospitals because of unavoidable smallness due to remoteness.

6. Convergence policy

Convergence policy sets actual allocations by determining how far ICBs are moved closer to their long-term target allocation each year. Convergence policy balances,

within the available resources, providing stability in funding for all organisations with moving those furthest away from target towards their target.

7. Local Commissioning and Provider Decisions

NHS England provide Integrated Care Boards with allocations for their ICB based on the principles outlined above. However, ultimately the commissioning decisions of individual ICBs and the operational decisions of individual providers are a key determinant of the impact on protected groups.

2. How do the 2022/23 revenue allocations formulae reflect health care needs of protected characteristic groups

This section provides an assessment of the way in which the 2022/23 revenue allocations formulae reflect health care needs of protected characteristics groups.

1. Age

The weighted capitation formulae specifically takes into account the different needs for health care services by age group, which are especially higher for older age groups and significantly greater for the oldest age groups. For example, the general and acute formula gives a weight per head 4 times higher for those aged 65 to 69 year compared with those aged 20 to 24 years, and 10 times higher for those aged 85 years and over compared with those aged 20 to 24 years.

The needs of the most elderly are also reflected in the community services model. Need for these services increases much more rapidly with age than for other services.

The increased need of young children is also reflected in the model, although this is less significant than for older people.

The updates to the general and acute and specialised services models has improved the way that age is accounted for in the models. Previously the effect of age was modelled for 5-year age groups. An alternative 'splines' approach has been implemented that allows the relationship between age and cost to vary within these 5-year age groups.

Furthermore, the use of a bespoke definition of avoidable mortality in the health inequalities and unmet need adjustment sees a small redistribution to younger populations compared to the previously used SMR<75. It also takes explicit account of deaths of people over 75 years that are considered avoidable which is an

improvement on the previous approach which did not include the deaths of people over 75.

2. Disability

The aim of the formula is to equalise allocations relative to health needs across ICBs, and therefore directly reflect need due to disability. For example, the general and acute and mental health models are largely based on past patterns of morbidity at the individual level as measured by diagnostic data for hospital admissions. The prescribing formula also includes morbidity measures, such as the proportion of the local population with activity limiting health conditions. The data available for the primary medical care formula did not include data on disability, but the Index of Multiple Deprivation (IMD) was used as proxy for poorer health.

There is also a separate unmet need/health inequalities adjustment. This is because the models typically assess need as it is currently met by NHS services and therefore may not capture unmet need or inappropriately met need. Typically, the most deprived communities do not access health care in the most optimal way, resulting in poorer health outcomes.

In the previous and current round the unmet need/health inequalities adjustment has been adjusted to ensure it is sensitive to the most severe challenges, using measures of mortality and more resources are thus targeted at those communities with the worst scores on these measures.

A criticism of this approach is that it may be less sensitive to inequalities associated with mental health conditions and learning disabilities. Despite an active research programme, we have not yet identified a suitable alternative measure. This work will continue.

3. Gender Reassignment and/or people who identify as Transgender

These groups' treatment needs, as for all population groups, will be included in the diagnostic information used in the general and acute and mental health services formulae. Beyond this, there is a lack of data on the groups' needs suitable for consideration for use in an allocations formula and so there is no specific adjustment in the formulae. As for other groups, local commissioners and providers are subject to the public sector equality duty.

Where trans and non-binary people present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality duty and public sector equality duty.

4. Marriage & Civil Partnership

Marital and civil partnership status was tested in developing the formulae and found to be statistically significant in general and acute and not statistically significant in the mental health formula.

In the mental health formula and the update of the general and acute formula we use a new variable that allows us to characterise the household that an individual lives in. The available data did not permit marriage and civil partnership to be tested as an additional variable in the primary medical care workload formula.

5. Pregnancy and Maternity

There is a separate maternity formula within the formula for ICB core allocations to take account of the specific health care needs related to pregnancy and maternity.

6. Race and ethnicity^[1]

The mental health, prescribing, maternity, and general and acute formulae include ethnicity variables. The modelling for the mental health formula and general and acute formulae use individual ethnicity data where available from administrative datasets. The modelling tested 16 ethnicity variables, which is an improvement on the previous formula which only used 4 ethnicity variables.

For some groups the modelling suggested lower than typical need. This was not supported by any other evidence, and so we have interpreted this as unmet need, removing this lower than typical need from the model. This uses a standard statistical approach, the sterilisation of counter intuitive variables.

The research for the prescribing and maternity formulae did not have data on ethnicity for each individual. Instead the proportion of people by ethnic group in each individual's area of residence was used from the Population Census (place of residence was defined by Lower Level Super Output Area – LSOA). A number of variables for ethnicity were tested and the proportion of non-white people in the prescribing formula and the proportion of black African ethnic groups for maternity were found to be statistically significant with a positive coefficient, indicating higher need.

7. Religion and belief

Religion or belief have previously been tested for inclusion in the general and acute formula and found not to be statistically significant (over and above the other variables in the model, such as diagnoses). It was tested for a previous version of the mental health model, with the same result. This has not been re-tested for this iteration due to lack of data availability.

8. Sex

The weighted capitation formula directly takes account of the different needs of males and females in each age-group. For example, the need for general and acute services for women in their 30s is higher than that for men, while the need for general and acute services for men aged 85 and over is higher than for women.

The mental health component has separate formulae for men and women of working age as their needs were found to be different.

9. Sexual orientation

These groups' treatment needs, as for all population groups, will be included in the diagnostic information used in the general and acute and mental health services formulae. Beyond this, there is a lack of data on needs that are specific to orientation and so there is no specific adjustment in the formulae. As for other groups, local commissioners and providers are subject to the public sector equality duty and the health inequality duty

The sexual orientation monitoring information standard has the potential to improve recording of sexual orientation and we will adjust our approach as the data quality and coverage allows it.

3. How do the 2022/23 revenue allocations formulae reflect health care needs of people who experience health inequalities

This section provides an assessment of the way in which the 2022/23 revenue allocations formulae reflect health care needs of people who experience health inequalities.

1. Looked after children and young people

There is no specific adjustment in the formulae for looked after children and young people.

Where looked after children and young people present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality and public sector equality duty.

2. Carers of patients

There is no specific adjustment in the formulae for carers. Data on voluntary care was tested for inclusion in the general and acute formula but was not found to be statistically significant.

Where carers present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality and public sector equality duty.

3. Homeless people

There is no specific adjustment in the formulae for homeless people and rough sleepers.

Where homeless people and rough sleepers present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality duty and public sector equality duty.

The basis of our allocations is the registered population of the ICB; we have been unable to identify suitable data to make an adjustment for unregistered people. There is evidence that, despite NHS guidelines, homeless people may face greater challenges registering with a GP (eg <https://www.healthwatch.co.uk/news/2018-03-23/improving-access-gp-services-people-who-are-homeless>) and, for this and other reasons, studies have shown that they are less likely to be registered with a GP (eg, Elwell-Sutton, Fok, Albanese, et al, 2017, Journal of Public Health, 39, 26–33, <https://academic.oup.com/jpubhealth/article/39/1/26/3065715>) and so their need may not be adequately reflected in the utilisation based element of the formula.

This is part of our rationale for including a component for unmet need and health inequalities in our formula. As part of the recent review of this adjustment, ACRA considered available data on population groups that experience poorer health outcomes and are underrepresented in GP registrations, and therefore may not be reflected well in the resource allocation formulae, in particular homeless and traveller populations. The review found that available data suffer from quality issues, but nevertheless concluded that a separate adjustment for these groups would not make a material difference to the weighted populations used in resource allocations.

Work will continue in this area through monitoring available data and ongoing research commissioned by the National Institute of Health Research (NIHR) on how an equitable resource allocation may account for unmet need specifically, which will be relevant for this particular group.

4. People involved in the criminal justice system

There is no specific adjustment in the formulae for people involved in the criminal justice system.

Funding for health care in prisons is currently directly commissioned by NHS England and is therefore not covered by the ICB allocations formulae.

Where people involved in the criminal justice system (but outside of prison) present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality and public sector equality duty.

5. People with additions and/or substance misuse issues

A number of diagnostics that are linked to alcohol and drug misuse were considered for inclusion in the model, although most proved not to be statistically significant indicators of future need for healthcare. However, in the mental health model we found a significant relationship with the diagnostic “poisoning by adverse effect of

and under dosing of drugs, medicaments and biological substances (ICD-10 codes T36-T50)”

6. People or families on a low income

Measures of deprivation are routinely tested in the development of allocations formulae. The percentage of people in receipt of benefits and/or DLA/PI have been found to be indicative of higher need for general and acute, specialised and mental health services. Other deprivation measures are also statistically significant in the general and acute and mental health models.

There is also a separate unmet need/health inequalities adjustment based on the avoidable mortality rate for small areas (MSOAs). This measure is strongly correlated with deprivation (using the Index of Multiple Deprivation (IMD)). The IMD, in turn, consists of several domains including income and employment deprivation. This adjustment is included because the models typically assess need as it is currently met by NHS services and therefore may not capture unmet need or inappropriately met need. Typically the most deprived communities do not access health care in the most optimal way, resulting in poorer health outcome.

7. People with poor literacy or health literacy

There is no specific adjustment in the formulae for people with poor literacy or health literacy.

Where people with poor literacy or health literacy present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality and public sector equality duty.

8. People living in deprived areas

Measures of deprivation are routinely tested in the development of allocations formulae.

Areas with greater socio-economic disadvantage typically have poorer health after accounting for age and higher health care needs. This is reflected in the formulae through the inclusion of morbidity data or indicators. Morbidity data were not available for the primary medical care formula, and the Index of Multiple Deprivation was included instead.

There is also a separate unmet need/health inequalities adjustment based on the avoidable mortality rate for small areas (MSOAs). This measure is strongly correlated with deprivation (using the Index of Multiple Deprivation). This adjustment is included because the models typically assess need as it is currently met by NHS services and therefore may not capture unmet need or inappropriately met need. Typically the most deprived communities do not access health care in the most optimal way, resulting in poorer health outcome

9. People living in remote, rural and island locations

A set of supply variables are included to take account that greater availability of health care services generally leads to higher use. While the supply variables are included in the models, they are set to the national average when calculating weighted populations. This means areas are not penalised in the formula for lower utilisation due to relatively lower capacity, which may be the case in rural/remote locations.

There is a separate adjustment in the ICB core allocation to account for the additional costs of providing hospital services in remote areas. The Emergency Ambulance Cost Adjustment (EACA) also reflects the additional costs of providing ambulance services in remote areas. ACRA considered whether rurality should be included as a factor in the Primary Care model in determining workload but advised that it should be excluded from the model. This was because of the uncertainty over whether it was reflective of additional workload or systematic behaviour in rural practice not arising from workload.

10. Refugees, asylum seekers or those experiencing modern slavery

There is no specific adjustment in the formulae for asylum seekers and/or refugees, or for those who have experienced human trafficking or modern slavery.

Where asylum seekers, refugees, or those who have experienced human trafficking or modern slavery present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality duty and public sector equality duty

11. Other groups experiencing health inequalities

➤ *Ex-service personnel / veterans*

There is no specific adjustment in the formulae for ex-service personnel or veterans.

Where ex-service personnel or veterans present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality duty and public sector equality duty.

➤ *Those who have experienced Female Genital Mutilation (FGM)*

There is no specific adjustment in the formulae for those who have experienced FGM.

Where those who have experienced FGM present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other

groups, local commissioners and providers are subject to the health inequality duty, public sector equality duty and Safeguarding Children Guidelines.

➤ ***Gypsies, Roma and travellers***

There is no specific adjustment in the formulae for Gypsies, Roma and travellers.

Where Gypsies, Roma and travellers present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the health inequality duty and public sector equality duty.

The basis of our allocations is the registered population of the ICB; we have been unable to identify suitable data to make an adjustment for unregistered people. Studies of rates of GP registration show wide variation (from 50-91% - Aspinall, 2005, A Review of the Literature on the Health Beliefs, Health Status, and Use of Services in the Gypsy Traveller Population, and of Appropriate Health Care Interventions, Health ASERT Programme Wales Report Series, see https://kar.kent.ac.uk/9170/1/Aspinall_GypsyTraveller_ASERT.pdf) and it is likely that overall Gypsies, Roma and travellers are less likely to be registered with a GP, and so their need may not be adequately reflected in the utilisation based element of the formula.

This is part of our rationale for including a component for unmet need and health inequalities in our formula. As part of the recent review of this adjustment, ACRA considered available data on population groups that experience poorer health outcomes and are underrepresented in GP registrations, and therefore may not be reflected well in the resource allocation formulae, in particular homeless and traveller populations. The review found that available data suffer from quality issues, but nevertheless concluded that a separate adjustment for these groups would not make a material difference to the weighted populations used in resource allocations.

Work will continue in this area through monitoring available data and ongoing research commissioned by the National Institute of Health Research (NIHR) on how an equitable resource allocation may account for unmet need specifically, which will be relevant for this particular group.

➤ ***Those living with mental health issues***

A specific component of the formula is designed to estimate need for mental health services and so support equal opportunity of access for those services. In addition, we have increased the importance of this component, relative to other aspects of care, aligning it with the latest comprehensive information on mental health spending.

We expect mental health services to be an area of continuing research interest in future allocation cycles, particularly as data quality improves.

➤ **Sex workers**

There is no specific adjustment in the formulae for sex workers.

Where sex workers present with higher levels of need this will be reflected in the diagnostic flags and may attract a higher weight. As for other groups, local commissioners and providers are subject to the public sector equality duty.

4. Sources used in the analysis

1. Published evidence

Data sets and sources used in the models, explored for inclusion but rejected, or used for cross checking and validation include:

- SUS-PbR (inpatient, outpatient, A&E)
- Hospital Episodes Statistics
- Patient Level Contact Monitoring dataset
- Mental Health Minimum Dataset
- IAPT dataset
- Master Patient Index

Census 2011 local area characteristic measures including:

- Ethnicity
- Household type
- Household tenure
- Residents of communal establishments
- Marital status
- Car or van availability
- Religion
- Long-term health problem or disability
- Working status
- Routine occupation
- Schoolchildren and students living away from home.

DWP

- Working age benefit claimants
- Eligibility for DLA/PIP

Office for National Statistics

- General Health (very good, good, fair, bad, very bad) by age group
- Long-term health problem or disability
- Approximate social grade

QOF

- Atrial fibrillation
- Cancer

- Cardiovascular disease
- CKD
- Coronary heart disease
- Dementia
- Depression
- Diabetes
- Epilepsy
- Heart failure
- Hypertension
- Hypothyroidism
- Learning disabilities
- Mental health
- Peripheral artery disease
- Palliative care
- Stroke and TIA

Indices of multiple deprivation 2019

- IMD underlying indicators

Population data

- Resident from ONS
- GP Registered populations from PDS
- new registration data from NHS Digital

GP Patient Survey

Health inequalities and unmet need adjustment candidate measures:

- SMR<75
- Avoidable mortality
- Healthy Life Expectancy (HLE)
- Disability Free Life Expectancy (DFLE)
- Electronic Frailty Index
- ONS Health Index

Mental health data not already covered in the above:

- Adult Psychiatric Morbidity survey
- Mental Health of Children and Young People in England survey
- Small area mental health index (SAMHI)
- Rate of people subject to the mental health act per 100,000 people

Data on hard to measure population groups affected by health inequalities from Ministry for Housing, Communities and Local Government (MHCLG):

- Traveller Caravans per local authority, January 2020
- Percentage of households assessed as homeless per local authority, July 2020
- Number of people accessing emergency accommodation per local authority, January 2021

Key gaps in this evidence are mental health need at the small area level, and data on hard to measure groups affected by health inequalities at the small area level.

2. Consultation and involvement findings

Consultations were held with ACRA, CCGs and NHS E&I.

a. Regular formal consultations with ACRA (2019-2021):

The Advisory Committee on Resource Allocation (ACRA) makes recommendations on the preferred, relative, geographical distribution of resources for health services.

ACRA is an independent, expert committee comprising of GPs, public health experts, NHS managers and academics. ACRA meetings occur quarterly, during which ACRA members steer research leading up to the recommendations for resource allocations.

The supporting ACRA sub-group, the Technical Advisory Group (TAG) also meets on a needs-basis, to discuss more technical aspects of the allocations formulae.

In addition, there have been six meetings of the Health Inequalities Task and Finish Group, a sub-group of ACRA, for the health inequalities and unmet need adjustment review.

Supporting minutes and papers for these meetings will also be published.

b. Engagement with CCGs (2020/2021)

The review of the health inequalities and unmet need adjustment included engagement with CCGs who gain most from the adjustment to understand their needs of a health inequalities adjustment and supporting information around this, to facilitate and empower them to commissioning decisions that address and reduce health inequalities in their areas.

The informal consultations with CCGs engaged a very small number of CCGs only and therefore findings may be biased to these CCGs.

c. NHS E&I written internal consultation (October/November 2021)

The review of the health inequalities and unmet need adjustment received an internal review by key NHS E&I stakeholders, to allow ACRA to consider these comments and update their recommendation if necessary.

5. Outstanding key issues.

1. Improving availability and quality of data on individual characteristics

There are currently gaps and quality issues around certain data on individual characteristics, such as on ethnicity and mental health. These could be addressed through, for example, accessing newly available datasets or through data linking. The allocation formulae may be greatly improved in terms of accurately capturing individual characteristics if more and greater quality data are available. This will require liaison with data owners and processors to improve and access these data.

2. How can the health inequalities and unmet need adjustment be improved further?

In particular:

- How can mental health inequalities be better captured in the health inequalities and unmet need adjustment?
- How may an equitable resource allocation account for unmet need specifically?

Regarding health inequalities and mental health, the following would improve this further:

A review of newly available data; understand how ICBs address inequalities in mental health and how this affects cost and; assess the feasibility of developing a composite indicator for use as a possible mental health inequalities adjustment.

This will be part of a future ACRA work programme.

Regarding unmet need, this is already the topic of ongoing research commissioned by the National Institute of Health Research (NIHR).

As the NIHR project on unmet need may yield a separate adjustment for unmet need, future work should consider how the current health inequalities and unmet need adjustment should change.

This will be part of a future ACRA work programme.

3. How has COVID-19 impacted need for healthcare (and health inequalities) and how does this need to be reflected in the allocation formulae?

Longer-term data on the impact of COVID-19 on healthcare need and health outcomes by population characteristics.

This will be part of a future ACRA work programme.

6. Summary of this analysis

The proposal covers resource allocation to ICBs. The formulae underlying these allocations aim to support equal opportunity of access for equal need and contribute to the reduction of health inequalities amenable to healthcare.

The models typically assess need as it is currently met by NHS services and therefore may not capture unmet need or inappropriately met need. Typically, the

most deprived communities do not access health care in the most appropriate way, resulting in poorer health outcomes. NHS England also has a duty to have regard to the need to reduce inequalities between patients in access to, and outcomes from, healthcare services.

There is an adjustment for unmet/inappropriately met need and health inequalities in the weighted capitation formula. This is based on the avoidable mortality rate for small areas (MSOAs). The adjustment is calculated for the population of each small area and then aggregated to ICB level. Applying the measure at the small area level takes into account unmet need/health inequalities within as well as between ICBs.

This adjustment will support and encourage services, including integrated services, that could reduce health inequalities.

[\[1\]](#) Addressing racial inequalities is about identifying any ethnic group that experiences inequalities. Race and ethnicity includes people from any ethnic group incl. BME communities, non-English speakers, Gypsies, Roma and Travelers, migrants etc.. who experience inequalities so includes addressing the needs of BME communities but is not limited to addressing their needs, it is equally important to recognise the needs of White groups that experience inequalities. The Equality Act 2010 also prohibits discrimination on the basis of nationality and ethnic or national origins, issues related to national origin and nationality.