TITLE OF REPORT/PAPER:

Review of the health inequalities adjustment to the CCG funding formulae

Table of Contents

Review of the health inequalities adjustment to the CCG funding formulae

Glossary

Adult psychiatric morbidity survey (APMS): Survey providing data on the prevalence of diagnosed and un-diagnosed mental illnesses among adults in England. Adult Psychiatric Morbidity Survey: Survey of Mental Health and Wellbeing, England, 2014. - NHS Digital

Advisory Committee for Resource Allocation (ACRA): Advisory Committee tasked with the health inequalities adjustment review. Its terms of reference can be found here: https://www.england.nhs.uk/publication/advisory-committee-on-resource-allocation-acra-terms-of-reference/

Avoidable mortality: A measure of mortality under the age of 75 from a list of causes (agreed by the OECD) that are avoidable either through effective primary prevention interventions (i.e., preventable deaths) or timely healthcare interventions and treatments (i.e., treatable deaths).

Clinical Commissioning Groups (CCGs): NHS organisations responsible for commissioning hospital and community services across England.

Common mental health disorders (CMHD): The prevalence of mental health diagnoses related to any form of depression or anxiety.

Disability-free life expectancy (DFLE): A variable that estimates the proportion of a person's life that is lived without physical restrictions and/or long-term illnesses.

Electronic Frailty Index (eFI): A composite indicator measuring physical morbidity, which is used by clinicians and GPs.

European standard population (ESP): A reference dataset of the European population from 2013, which is used by the ONS to directly standardise variables to enable age-controlled comparisons of mortality between areas.

Gap in mental health need (GMHN): Variables calculated to represent unmet mental health need by subtracting standardised scores of the mental health need index from the standardised scores of mental health issue prevalence.

General and acute services: A funding stream within the allocations model for CCGs, representing hospital and community services. Sometimes referred to as secondary care.

Health Index: An experimental statistic in development by the ONS, providing a broad measure of health and wellbeing that is comparable over time and between geographic areas.

Health Inequalities Task and Finish Group (HITFG): A sub-group of ACRA whose work focuses on how to reduce health inequalities through changes to the allocations formula, which is detailed in this report.

Healthy life expectancy (HLE): A variable that estimates the proportion of a person's life that is lived in subjectively 'very good' or 'good' health.

Improving access to psychological therapies (IAPT) dataset: Dataset providing information about the utilisation of treatments for CMHDs in England.

Indices of multiple deprivation (IMD): Statistics measuring and ranking relative deprivation between LSOAs in England.

Integrated Care Boards (ICBs): Partnerships between the organisations that meet health and care needs across an area, to coordinate services and to plan in a way that improves population health and reduces inequalities between different groups.

Mental health of children and young people in England survey (MHCYP): Survey providing data on the prevalence of diagnosed and undiagnosed prevalence of mental illnesses among children and young people in England.

Mental health need index: Used in the allocations model, representing the utilisation of mental health services by dividing the weighted mental health population of an area (e.g. CCG, GP practice) by the registered population.

Middle / Lower layer super output areas (MSOA/LSOA): Geographic areas calculated by the ONS that can be used for data collection (e.g., comparing mortality between areas). There are currently 7,201 MSOAs and 34,753 LSOAs across England and Wales.

Primary care: A funding stream within the allocations model to CCGs, representing first-point of contact services such as GP, health visitor, optician and dentist services.

Primary Care Trusts (PCTs): Administrative bodies responsible for commissioning primary, community, and secondary healthcare providers in England. Replaced by CCGs in 2013.

Quality Outcomes Framework (QOF): A measurement of disease prevalence and care quality achievement rates across CCGs.

Small area mental health index (SAMHI): A composite measure of population mental health need across LSOAs in England.

Specialised services: A funding stream within the allocations model for CCGs, representing treatments for complex and/or rare diseases by specialist staff. Sometimes referred to as tertiary care.

Standardisation: A statistical technique that puts different variables on the same scale (e.g., using z-scores), enabling comparisons between areas with different population demographics (e.g., controlling for different proportions of age groups between areas).

Standardised mortality ratio of all causes of death under 75 years of age (SMR<75): A measure of mortality from all causes of death registered under the age of 75.

Standardised years of life lost (SYLL): A measure of mortality that accounts for the relatively greater impact of premature mortality at younger ages, providing a comparable measure of premature mortality between different areas.

Technical Advisory Group (TAG): Supports ACRA with technical expertise regarding allocations and funding recommendations.

Executive Summary

NHS England & Improvement commissioned the Advisory Committee for Resource Allocations (ACRA) to conduct and publish a review of the health inequalities adjustment to the CCG funding formulae. This is the executive summary to the full report on the review by ACRA's subgroup, the Health Inequalities Task and Finish Group (HITFG).

Health inequalities are avoidable differences in health across the population and between different groups within society, that are amenable to healthcare and preventative activities (and therefore can be avoided with the appropriate provision of healthcare and prevention that is in the scope of the bodies we are funding).

Disparities in healthcare access, experience and outcomes are avoidable and do not occur randomly or by chance but are determined by circumstances largely beyond an individual's control. Focused action on tackling health inequalities in the scope of the bodies we are funding seeks to bridge these differences in order to ensure equitable access, excellent experience and optimal outcomes with the aim of putting in place prerequisites to reduce health inequalities that are amenable to healthcare.

The review considered alternatives to the current adjustment which uses the Standardised Mortality Ratio for those aged under 75 year old (SMR<75.) Avoidable mortality was deemed a sound alternative and is considered a better fit to the definition of health inequalities as the causes of death involved have been identified as those that could have been avoided through public health measures and timely and effective health care intervention. Evaluation of both avoidable mortality and SMR<75 showed that both perform moderately well in accounting for physical morbidity, and both perform poorly in accounting for mental health need.

Different definitions of avoidable mortality were considered, varying the age cut-off from including all avoidable mortality under 75, to including all ages, to using a bespoke definition that uses the 75-age cut-off but includes all age mortality for specific causes of death. The bespoke definition is considered more desirable 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. Evaluation of the impact of these definitions on allocations shows that the bespoke definition would see smaller changes than other tested definitions of avoidable mortality and would increase the target allocation for the most deprived CCGs compared to SMR<75.

Using available data, the review also looked at the impact of using a specific adjustment for populations that experience poorer health outcomes and are underrepresented in GP registrations, on ICB allocations. This impact was found to be very small and therefore no specific adjustment is recommended

The review also sought feedback from CCGs to understand how they implement the health inequalities adjustment. Based on engagements with a small group of CCGs, a key finding is that CCGs are not generally familiar with the health inequalities adjustment, and more explanation of the adjustment would be welcomed.

Review of the health inequalities adjustment to the CCG funding formulae

Based on these findings, ACRA makes the following recommendations for the 2022/2023 allocations:

1.   Retain the health inequalities adjustment. There is clear evidence that some groups secure poorer health outcomes than other groups, and it is the NHS's duty to reduce these differences in outcomes.
2.   Change the health inequalities adjustment from using SMR<75 to indirectly standardised avoidable mortality using a bespoke definition that includes mortality among all age groups for selected causes, and otherwise includes mortality among those aged under 75.
3.   Furthermore, applying indirect standardisation is recommended, as this yields statistically robust results and ensures consistency with the previous measure. This standardisation relates to the England population, which is the most appropriate population considering the overall occupation covers England.
4.   It is not recommended to make a separate adjustment for specific population groups who experience poorer health outcomes due to the different dimensions of health inequalities, although continuing review of available data is required as data may improve and the situation may change.

The review also identified eight areas for further work:

1.   Further review into how mental health is captured in the health inequalities adjustment by continuing review and assessment of relevant data, understanding how mental health inequalities impact on costs, and consider using a composite indicator.
2.   Further work should also consider how disability is captured by the health inequalities and unmet need adjustment.
3.   Continued analysis of the ONS Health Index which could be a relevant alternative measure for future use as a health inequalities adjustment measure, if it becomes available at a smaller area level. Other measures such as those reflecting health inequalities among children and young people could also be considered.
4.   Consider if and how the health inequalities adjustment should change in light of the introduction of a separate adjustment for unmet need that may arise from the separate NIHR funded project on unmet need.
5.   Influence improvements in data collections and improvement in access to (newly available) data so it may be used for further research to understand and address health inequalities in the context of making an adjustment to allocations.
6.   Conduct further review of the advantages and disadvantages of using direct and indirect standardisation methods.
7.   Expand on the CCG mappings which assess where and how additional costs for providing care to disadvantaged occur in service delivery. Further work using these mapping may provide an indication of the overall quantum required, as well as whether the 5%, 10% and 15% health inequalities adjustment for specialised services, CCG Core services and primary care is

appropriate. This information could serve to increase transparency to ICBs on the health inequalities adjustment, and support accountability.

8.   As an overarching recommendation cutting across the areas for further work, any additional research should consider the need for including ICB views. ICBs should be informed on the adjustment – with particular attention to highlighting how this is built up from the lower area level – to facilitate constructive consultations.

9.   Monitoring on COVID-19 and the impact on health inequalities should also continue into the future work programme.

10.   Consider the adjustment in terms of the different model components. Firstly, consider whether the health inequalities adjustment for primary care and community services – together representing out-of-hospital services – on the one hand and other core services on the other could be two different measures, considering the components have a different focus (primary care and out-of-hospital services having a greater preventative role). Secondly, it should consider the impact of the relative size of the quanta of money allocated to each component, and therefore the size of their health inequalities adjustments, in terms of their ability to address health inequalities.

1. Background to the review

This section provides the policy background to this review of the health inequalities and unmet need adjustment. It also presents an overview of how the adjustment has historically been implemented, as well as the key questions for the review which this paper reports on.

1.1 Policy background

NHS England and NHS Improvement committed in the NHS Long Term Plan (paragraph 2.25) to commission the Advisory Committee for Resource Allocations (ACRA)[1] to conduct and publish a review of the health inequalities adjustment to the CCG funding formulae. ACRA set up a subgroup, the Health Inequalities Task and Finish Group (HITFG), to take forward the work, draft the health inequalities adjustment review and make recommendations.

HITFG is an independent, expert committee comprising of public health experts, NHS managers and academics with expertise in health inequalities, supported by analysts from NHS England and NHS Improvement. The list of members is available at Appendix A. This report sets out the work undertaken by the HITFG for the review, the findings from the review, and finally presents proposed recommendations for the health inequalities adjustment to the CCG resource allocation.

The Long Term Plan commitment and the review follow several policy developments aimed at addressing health inequalities. The Health and Social Care Act 2012 introduced the first legal duties for health inequalities.[2] The act requires health bodies including the Department of Health and Social Care, Public Health England and NHS England and NHS Improvement to have due regard to reducing avoidable inequalities in healthcare provision. NHS England and NHS Improvement's mandate 2018 to 2019 states that its first objective is to reduce health inequalities (through better commissioning). It meets some of its legal obligations in respect of reducing avoidable inequalities in healthcare provision through its approach to CCG resource allocations. At the time of writing, the draft Health and Care Bill 2021 also makes several references to the duties of integrated care boards in reducing inequalities between patients in accessing care and in terms of outcomes achieved for them by the provision of health services.[3]

It should be noted that for the purpose of this review, the relevant scope of the above mandates covers action through bodies funded from the CCG allocations, rather than all modes of healthcare (which would also include private or non-NHS) or indeed other public services which may be known to have beneficial effects on

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[1] ACRA terms of reference are available from: https://www.england.nhs.uk/publication/advisory-committee-on-resource-allocation-acra-terms-of-reference/

[2] The Health and Social Care Act 2012 is available from (provision 4 relates to health inequalities): https://www.legislation.gov.uk/ukpga/2012/7/contents/enacted

[3] The draft Health and Care Bill 2021 is available from: https://bills.parliament.uk/bills/3022

health outcomes. Furthermore, this review is focused on a health inequalities adjustment. When the review and indeed this report refer to health inequalities, it is within this specific scope and objective, i.e. to implement a national measure and supporting methodology that can take account of local differences and that facilitates such an adjustment. As a result, academic literature and work done by the NHS where this does not directly support this specific objective, is not covered in this report. It is acknowledged, however, that there is a wealth of resource on the wider topic of health inequalities.[4]

1.2 Historical implementation

The health inequalities and unmet need adjustment in its current form was first introduced by NHS England as part of the allocations for 2013/14.

The policy aim of the adjustment is two-fold, reflecting the adjustment covers health inequalities and unmet need:

1. To meet its duty to have regard to reducing inequalities in access to health care (that is: to NHS-funded services as opposed to other public or indeed private services) and;
2. To meet its duty to reduce inequalities in outcomes from health care.[5]

The adjustment is intended to redistribute resources in order to make a contribution to the reduction in health inequalities. This includes health inequalities caused by unmet need. If all health inequalities were being addressed then measures of health outcomes or status would be (more or less) uniform; in the case of SMR<75, used for the allocation of resources for 2019/20 to 2023/24, it would be close to one everywhere. Consequently, we apply an adjustment that adjusts the share of resources away from those areas that have relatively good outcomes (SMR<75 below one) in favour of areas that have relatively poor outcomes (SMR<75 above one).

The relative weight of the adjustment, or total funding available for the aims of equal opportunity of access and reduction in health inequalities is a policy decision rather than a technical judgment. This said, unmet need may be quantifiable. Robust evidence for a quantification of unmet need and its geographical distribution, however, is not currently available. In the interim, and as a pragmatic approach, the 2014/15 allocations and further allocations rounds since that time have grouped unmet need together with health inequalities in a single adjustment.

Prior to 2014/15, the Department of Health and Social Care used Disability Free Life Expectancy (DFLE) as its measure of health inequality and unmet need when allocating resources to Primary Care Trusts (PCTs). DFLE describes the expected years of life free from limiting longstanding illness, health problem or disability,

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[4] For example, see the Equality and Health Inequalities Hub for links to relevant information. This is available from: https://www.england.nhs.uk/about/equality/equality-hub/
[5] ACRA (2013/14)13 – Interim adjustments for unmet need and health inequalities

estimated by combining life expectancy data with self-reported information about limiting longstanding illness from the census.

DFLE had been recommended by ACRA in 2008, because it captured both morbidity and mortality aspects of health and because it was relatively stable over time.

In June 2013 ACRA reviewed its choice of mechanism for health inequalities adjustment. The committee concluded that the standardised mortality ratio for people under 75 years of age (SMR<75) would be a better option.

The reasons for ACRA's recommendation were as follows:

- SMR<75 data are available at small area level in contrast to DFLE at the time, so the measure captures variation within areas as well as between areas, such as pockets of deprivation in otherwise affluent areas;
- the data are frequently updated;
- like other measures of population health, the data are highly correlated with deprivation;
- deaths are properly recorded; and,
- in 2012 ACRA had recommended using SMR<75 in the public health formula for local authorities, and it was implemented in 2013/14.

For the 2019/20 round of allocations ACRA concluded that SMR<75 continued to be the best available data to use in NHS England's adjustment for health inequalities and unmet need for resource allocations. Its advantages outweighed its disadvantages. Alongside the advantages listed above ACRA also included:

Additional advantages:

- It is relatively stable at CCG level across successive periods; and
- It is relatively straightforward to understand.

Disadvantages:

- It can be considered to have technical drawbacks because it relies on indirect standardisation (this is explored in more detail below);
- It relies on premature mortality being a reliable proxy for morbidity as well as mortality inequalities, whereas in many cases (e.g. mental health, musculoskeletal conditions, disease results in disability rather than death); and
- It relates only indirectly to the health inequalities experienced by persons over 75 years of age.

1.3 This review

For this review of the health inequalities and unmet need adjustment, the HITFG again considered alternatives to the SMR<75.

Other key questions being considered as part of the review are:

(1) the relative geographical distribution of funding for health inequalities in England, including how targeted the money should be towards the CCGs that have the highest levels of health inequalities as measured by the health inequalities adjustment (currently: SMR<75);

(2) whether any separate consideration may be needed for particular populations, such as travellers;

(3) the overall quantum that is required to be directed into health inequalities/unmet need from the total budget (which is currently a top slice of 10% (£9.1bn by 2023/34) and results in about £1bn being redistributed towards CCGs whose targets increase with the health inequalities/unmet need adjustment);

(4) How CCGs are using place-based allocations to address health inequalities, and how much of their allocation they are spending on health inequalities; and

(5) the relationship between health inequalities and unmet need and potential for separating out the adjustment.

It should be noted that question (5) on the relationship between health inequalities and unmet need, and the potential for separating out the adjustment, is addressed as part of a separate research project that is aiming to produce adjustments specific to unmet need. This research project extends beyond the scope of this particular review, with results expected in 2022. Therefore, this review continues to assess a measure for an adjustment for health inequalities as well as unmet need. That said, the onus of the analysis and this report is largely on health inequalities, as not to cause overlap with other work on unmet need.

This report will present the work done regarding these questions, and the findings of the review, according to the following structure:

- Overall approach to the review
- Defining health inequalities for allocations
- Selecting a measure for the adjustment
- Adjustment for populations that experience poorer health outcomes and are underrepresented in GP registrations
- Practical considerations for application of a health inequalities adjustment
- Future outlook
- Conclusions and recommendations

Please note that all data used in the analyses for this review predate COVID-19. It is likely that COVID-19 has an impact on health inequalities and may indeed exacerbate health inequalities. Therefore, continued analysis and monitoring is required, which is discussed under the Future outlook section.

2. Overall approach to the review

This section presents the high-level approach to the review across the different areas of work.

Throughout the review, regular meetings of HITFG ensured a clear steer of the analysis and focus on key questions. HITFG consists of members with specialist expertise. As members of the HITFG, they abide by the "Seven Principles of Public Life" (also known as the Nolan Principles). The Nolan Principles can be consulted from Appendix B.

HITFG is a subgroup of ACRA, and the health inequalities and unmet need adjustment is part of the allocation formulae, so the review also uses ACRA's criteria for assessing formulae which ensure their quality and relevance. These criteria are available in ACRA's terms of reference.[6]

Progress with the review was regularly reported to ACRA. ACRA's Technical Advisory group (TAG) also provided advice and recommendations to HITFG on technical aspects of the review.

Most of the day-to-day analysis and reporting was conducted by the secretariat of ACRA, in line with the steers of HITFG and ACRA members.

3. Defining health inequalities for allocations

This part of the review aimed to clarify what is meant by "health inequalities" in the context of an adjustment to CCG allocations.

3.1 Approach

A definition for health inequality in the context of CCG allocations was developed using a framework combining several definitions from relevant organisations and documents[7]. These include:

- The Health and Social Care Act 2012
- The Government's Mandate to NHS England
- NHS England's Long Term Plan
- ACRA terms of reference
- ACRA commissioning letter

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[6] ACRA terms of reference are available from: https://www.england.nhs.uk/publication/advisory-committee-on-resource-allocation-acra-terms-of-reference/
[7] HITFG(2020)08: Definition of Health Inequalities for CCG Allocations

The agreed upon definition of health inequality was then shared with the HITFG for further comments and revision. The secretariat also consulted the Director of Health Inequalities at NHS England and NHS Improvement.

The definition of health inequality was also used to identify dimensions of health inequalities and disadvantaged groups that experience poorer health outcomes. A list of these dimensions and population groups experiencing poorer health outcomes was collated from several documents and agreed with Public Health England.

3.2 Findings

Using the sources outlined in section 3.1, key aspects of the health inequalities definitions were compiled and are listed in Table 1.

Table 1: Key aspects for the health inequalities definition

Definitions	Where used	Aspects[8]	Meaning	Related Interventions
Reducing **avoidable inequalities** in healthcare provision	NHS England mandate & ACRA terms of reference	**Avoidable**	Where health inequalities can be mainly avoided through effective public health, primary prevention interventions, secondary prevention interventions and treatment	Public health interventions. Primary and secondary prevention interventions. Healthcare/ treatments.
Health inequalities are **unfair and avoidable differences in health across the population, and between different groups within society**.	NHS England Health Inequalities Long Term Plan Definition	**Unfair**	There is no technical definition as this is an issue of social (in)justice.	
Reduction of health inequalities that are amenable to healthcare	ACRA commissioning letter	**Amenable or treatable**	Where health inequalities can be mainly avoided through timely and effective healthcare interventions. These include secondary prevention and treatment. Therefore, health inequalities that can be directly addressed through healthcare provision.	Healthcare/ treatments. Secondary prevention.

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[8] The definitions for avoidable and amenable are based on the technical definitions relating to mortality: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/methodologies/avoidablemortalityinenglandandwalesqmi
"*Preventable mortality*: causes of death that can be mainly avoided through effective public health and primary prevention interventions (that is, before the onset of diseases or injuries, to reduce incidence)
Treatable mortality: (previously known as amenable mortality): causes of death that can be mainly avoided through timely and effective healthcare interventions, including secondary prevention and treatment (that is, after the onset of disease, to reduce case fatality)
Avoidable mortality: avoidable deaths are all those defined as preventable or treatable"

Building on these key aspects, the agreed definition of health inequalities for the purpose of this review and the CCG allocations is:

Health inequalities are avoidable differences in health across the population and between different groups within society, that are amenable to healthcare and preventative activities (and therefore can be avoided with the appropriate provision of healthcare and prevention that is in the scope of the bodies we are funding).

The following supporting explanatory paragraph further defines what prevention means in the context of addressing health inequalities, aligning with the vision statement of the NHS England and Improvement Health Inequalities Improvement Program:

Disparities in healthcare access, experience and outcomes are avoidable and do not occur randomly or by chance but are determined by circumstances largely beyond an individual's control. Focused action on tackling health inequalities in the scope of the bodies we are funding seeks to bridge these differences in order to ensure equitable access, excellent experience and optimal outcomes with the aim of putting in place prerequisites to reduce health inequalities that are amenable to healthcare.

Finally, a list of dimensions of health inequalities and disadvantaged groups that experience poorer health outcomes was developed. This list can be found in Appendix C.

4. Selecting a measure for the adjustment

This part of the review explored a range of measures that could be used for the health inequalities adjustment, and sought to answer what the relative geographical distribution of funding for health inequalities in England should be (key question 1), as well as whether any separate consideration may be needed for particular populations, such as travellers (key question 2).

This section relates to the main recommendation for implementation of the health inequalities and unmet need adjustment as part of the 2022/23 resource allocation round. Therefore, the key messages of this section are summarised in Box 1 below, before presenting findings in more detail.

Box 1: Key messages summary for the implementation of a measure for the health inequalities and unmet need adjustment

The **recommended change** is to use a bespoke definition of indirect standardised avoidable mortality, instead of using the indirectly standardised mortality ratio for people aged under 75 (SMR<75).

The **rationale for this change** is as follows:

- **Avoidable mortality** is a better fit to the definition of health inequalities as it only includes causes of death that could have been avoided through public health measures and timely and effective health care intervention, whereas SMR<75 includes deaths from all causes.
- The **bespoke definition**, which includes deaths for people under 75 but includes deaths for people of all ages for some causes of death, strikes a balance between concerns around the 75-age cut-off not being considerate of health inequalities for older age groups and not being reflective of increased life expectancy on the one hand, and issues of measuring the avoidable aspect in deaths for older age groups as this may be difficult to distinguish from other comorbidities.
- **Indirectly standardised** figures are more stable over time compared to directly standardised, although only marginally so.

The **impact of this change** compared to keeping the SMR<75 sees a redistribution of up to £4 per head to the most deprived and young CCGs, taking up to £3 per head from CCGs with older, and less deprived areas. To put this into context, the current adjustment based on SMR<75 on the total CCG target allocation per head is between +£72 and -£48.

4.1 Possible alternative measures to SMR<75

A framework[9] was developed to compare alternative measures to the current SMR<75, assessing their suitability for use in the health inequalities adjustment. The framework was informed by the original recommendations of ACRA for the use of SMR<75 in the health inequality adjustment. The framework criteria are presented in Table 2, with examples of how SMR<75 currently meets the criteria.

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[9] HITFG(2021)15: alternative measures to SMR<75

Table 2: Framework used to compare alternative measures to SMR<75 for use in the health inequalities adjustment

Criterion	SMR<75 example
Published regularly	Published every year
Available for small geographic areas	Available at lower or middle layer super output areas (LSOA/MSOA)
Based on robust sources	Uses all registered deaths in England
Technically appropriate	Used widely, easy to understand, appropriate for comparing mortality between geographic areas
Correlates with deprivation	Strong correlation with indices of multiple deprivation (IMD) score

The HITFG considered several alternative measures for the health inequalities adjustment which were assessed against these criteria:

- Avoidable mortality, which passed all criteria.
- Standardised years of life lost, for which the primary disadvantage is that it is only available at England level, and therefore it is not possible to use this measure to look at variation in health inequality between and within areas.
- Health Index, which is not available at the MSOA level but rather at local authority level, although future versions may be available at MSOA level.
- HLE and DFLE, which are also not available at the MSOA level but rather at local authority level. Data are also based on subjective survey data, and are subject to sampling issues.
- Electronic Frailty Index, which is available at a small geographic level (GP practice) but is not based on data sources that are robust for the purpose of a health inequalities adjustment: it only measures frailty in older adults.

Table 3 summarises the outcomes of the assessment for each of these measures against the different criteria.

Table 3: Alternative measures to the SMR<75 and assessment against criteria

	Regularly updated?	Available at small area level?	Based on robust data sources?	Technically appropriate?	Correlates with deprivation?
Avoidable mortality	Yes	Yes	Yes	Yes	Yes
Standardised years of life lost	Yes	No	Yes	Yes	Unknown
Health Index	Yes	No	Yes	Yes	Yes
HLE and DFLE	Yes	No	Yes	Yes	Yes
Electronic Frailty Index	Yes	Yes	No	No	Unknown

Avoidable mortality was the only measure to pass all criteria and is considered a better fit to the definition of health inequalities (compared to SMR<75 which includes deaths from all causes in individuals under age 75) as the causes of death involved have been identified as those that could have been avoided through public health measures and timely and effective health care intervention and, for some relevant causes, include all ages. Therefore, the HITFG recommended that it be taken forward for further analysis, with the note that the Health Index should be revisited as a potential candidate in the future.

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 (e.g. Appendicitis). If there was no strong evidence that the cause of death was predominantly preventable or treatable then it is allocated 50:50 to both (e.g. Diabetes mellitus). This ensures no double counting between preventable and treatable mortality. A full list of conditions included in calculating avoidable mortality is provided in Appendix D.

The ONS publish directly standardised avoidable mortality rates at CCG level[10] but provide mortality data at MSOA (middle layer super output area) level over a five-year period. Whilst not published, the ONS were also available to provide indirectly standardised rates of avoidable mortality for comparison in this analysis. Treatable and preventable mortality rates are also available by MSOA but many MSOA rates are not available or unreliable due to small numbers of deaths. The HITFG also have concerns around how some cause of death diseases are classified as treatable and/or preventable and therefore preferred the combined avoidable mortality measure.

Additional analysis on avoidable mortality focused on the following aspects:

- Standardisation method
- Ability to account for physical morbidity and mental health
- Different definitions of avoidable mortality
- Methodology for calculating the adjustment

The following sub sections describe these analyses and their findings.

4.2 Method of standardisation

Avoidable mortality, as published by the ONS, is directly standardised to the European Standard Population (ESP)[11]. This means that for each area the number

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[10]https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/avoidablemortalityinenglandandwales/previousReleases
[11]https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/causesofdeath/bulletins/avoidablemortalityinenglandandwales/previousReleases

of deaths in each age/gender group are adjusted to give an estimate of the number of deaths that would have been seen if that area had had a population in proportion to the ESP.

There are several potential disadvantages to this standardisation method.

First, the data are standardised to an external population. The ESP has a very slightly higher proportion of older people than the England population which gives more weight to deaths in older age groups, although in practice this impact is negligible. Furthermore, it is an external population not relevant to the allocation.

Second, directly standardised data may not be stable over time. In particular, when used for small areas like MSOAs the actual number of deaths in any one age/gender group can be small and so vary significantly from year to year. These variations directly drive variations in the directly standardised mortality, meaning it can become unstable.

Indirect standardisation is based on taking the number of deaths observed in England for each age/gender group and applying this to the actual population of the area in question to find the expected number of deaths. The actual number of deaths is divided by this to create a mortality ratio.

This mitigates the disadvantages of direct standardisation. It relates to the population in question, and by using the national number of deaths in constructing the denominator it is significantly more stable. [12]

4.2.1 Impact of alternative standardisation methods for avoidable mortality on allocations

Finally, the impact of a potential move from SMR<75 to the different avoidable mortality measures on the 2021/22 core CCG target allocation per head was assessed, to understand the change a potential move will bring about. Before reviewing these results, it is useful to consider the current target allocation, and the impact of the health inequalities and unmet need adjustment.

The full 2021/22 CCG target allocation per head (£), including the health inequalities and unmet need adjustment, is provided in Figure 1 below.[13] For Figures 1 to 6, CCG's (135 in 2019/20) were assigned to deprivation quintiles using the English indices of deprivation 2019[14] and age quintiles were assigned using the percentage of registered patients aged 65+ in November 2020.[15]

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[12] HITFG(2021)19 Direct & indirect avoidable mortality update
[13] The A5/D5 cell in this Figure – and other deprivation/age matrices presented in this report – is blank. This cell is because there are no CCGs where the population is both in the most deprived quintile and in the oldest age quintile.
[14] https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019
[15] https://digital.nhs.uk/data-and-information/publications/statistical/patients-registered-at-a-gp-practice

Figure 1 shows that the overall target model allocates more funding per head to CCGs that have both older and more deprived populations.

Figure 1: 2021/22 CCG target allocation per head (£)

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)				
		A1	A2	A3	A4	A5
Deprivation quintile (D1 = least deprived, D5 = most deprived)	D1	1,224	1,262	1,316	1,338	1,411
	D2	1,250	1,304	1,420	1,466	1,469
	D3	1,327	1,329	1,450	1,448	1,501
	D4	1,297	1,412	1,506	1,617	1,562
	D5	1,401	1,509	1,597	1,709	

Figure 2 looks only at the impact of the health inequalities and unmet need adjustment (based on SMR<75) on the overall target model. The adjustment increases funding to CCGs with the most deprived population (as does the overall target model), but unlike the overall target model, redistributes more funding to younger populations, while funding for CCG older populations is decreased. This highlights the redistributive effect of the adjustment, which redistributes funding from older and less deprived areas to younger and more deprived areas. The adjustment means an increase of up to £72 per head and a decrease of up to £48.

Figure 2: Impact of the health inequalities and unmet need adjustment on the 2021/22 CCG target allocation per head (£)

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)				
		A1	A2	A3	A4	A5
Deprivation quintile (D1 = least deprived, D5 = most deprived)	D1	-3	-16	-29	-27	-39
	D2	-2	-3	-10	-22	-38
	D3	5	-1	1	-9	-31
	D4	24	35	17	-1	-50
	D5	72	51	42	47	

Directly standardised avoidable mortality compared to SMR<75

The impact on 2021/22 CCG target allocations per head of using directly standardised avoidable mortality 2013-2017 in the health inequalities adjustment instead of SMR<75 2013-2017 is shown in Figure 3. The direct standardised rates were directly standardised to the European Standard Population (ESP). The ESP was checked against the distribution of the England population and this was not found to be materially different.

The deprivation / age quintiles show that CCGs with younger populations would gain with the gain higher in more deprived areas at the expense of older, more deprived areas (for reference the average core CCG target allocation per head is £1,413). The

move of funding from older to younger populations in Figure 3 is likely driven by the difference between avoidable mortality and SMR<75. SMR<75 includes all mortality, whereas avoidable mortality only includes mortality that could have been avoided through public health measures and timely and effective health care intervention. The results presented below suggest that deaths amongst younger populations are more often classified as avoidable than deaths in older populations, and therefore CCGs with younger populations see an increase in their target allocation per head.

Figure 3: Impact on 2021/22 core CCG target allocation per head (£) of using directly standardised avoidable mortality in the health inequalities adjustment instead of SMR<75

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)				
		A1	A2	A3	A4	A5
Deprivation quintile (D1 = least deprived, D5 = most deprived)	D1	2	1	-1	-2	-1
	D2	3	-1	-4	-2	-3
	D3	4	-3	-4	-2	-1
	D4	5	9	-1	-4	-3
	D5	14	-3	-8	-9	

Indirectly standardised avoidable mortality compared to directly standardised avoidable mortality

The impact on 2021/22 CCG target allocations per head of using indirectly standardised avoidable mortality 2013-2017 in the health inequalities adjustment instead of directly standardised avoidable mortality 2013-2017 is shown in Figure 4. The deprivation / age quintiles show that CCGs with younger, more deprived populations would lose whilst CCGs with older, more deprived populations would gain. This is likely to be driven by the difference in standardisation method, and in particular the impact this has on CCGs with older populations, as mortality occurs more amongst older populations.

Analysis has shown that this change is driven by MSOAs which have large disparities across the two dimensions used to standardise the rates. That is: mortality rates and the population distribution by age. This is specifically driven by MSOAs that have both a large young population that has low mortality, and a small old population that has proportionally high mortality. In practice, these are MSOAs with large student populations and a small (likely deprived) old population.

Direct standardisation attributes a high avoidable mortality rate to these MSOAs because even though the older population is small, the mortality amongst the population is relatively high and it is applied to the standard population which a has much higher proportion of older people than these MSOAs, therefore the directly standardised rates reflect this. As a result, more funding is allocated to these MSOAs for their small old populations with high mortality, although their overall population is relatively young. Therefore, direct standardisation appears to favour relatively young CCGs, while this is driven by mortality amongst their small old population.

Indirect standardisation attributes a lower avoidable mortality rate to these younger MSOAs because it takes into account the relatively small size of the old population compared to the overall England population, and therefore gives it a smaller weighting. In addition, the young population in these MSOAs do not have high mortality. The low overall avoidable mortality rate means that less funding will be allocated to these relatively young CCGs, which leads to more funding being allocated to relatively older CCGs.

Figure 4: Impact on 2021/22 core CCG target allocation per head (£) of using indirectly standardised avoidable mortality in the health inequalities adjustment instead of directly standardised avoidable mortality

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)				
		A1	A2	A3	A4	A5
Deprivation quintile (D1 = least deprived, D5 = most deprived)	D1	-2	-1	0	1	1
	D2	-2	2	2	2	1
	D3	-4	1	2	2	2
	D4	-6	-5	2	4	1
	D5	-10	3	8	11	

Indirectly standardised avoidable mortality compared to SMR<75

The impact of using indirectly standardised avoidable mortality instead of indirectly standardised SMR<75 in the health inequalities adjustment is shown in Figure 5 (this is effectively Figure 3 plus Figure 4). This covers the 2021/22 CCG target allocations per head using 2013-2017 data for both avoidable mortality and SMR<75. The IMD / age quintiles show that generally the most deprived CCGs would benefit regardless of age. CCGs with younger populations would gain slightly more in target allocation per head as these tend to have a higher proportion of deaths that are classified as avoidable. The impact is a combination of the drivers causing change as described for Figure 3 and 4.

Figure 5: Impact on 2021/22 core CCG target allocation per head of using indirectly standardised avoidable mortality in the health inequalities adjustment instead of SMR<75

		Age quintile (A1 = youngest quintile, A5 = oldest quintile)				
		A1	A2	A3	A4	A5
Deprivation quintile (D1 = least deprived, D5 = most deprived)	D1	0	0	-1	-1	-1
	D2	0	0	-2	0	-2
	D3	0	-3	-2	0	0
	D4	-1	4	1	0	-2
	D5	4	-1	1	2	

Indirectly standardised avoidable mortality was the preferred measure to SMR<75 for use in the health inequalities adjustment for the following reasons:

- 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, whereas SMR<75 includes deaths from all causes.

- Indirectly standardised data were shown to be more stable over time compared to directly standardised, although only marginally so.

- Indirectly standardised data uses England as the standard population and ensures consistency with the SMR<75.

4.3 Accounting for physical and mental health in the adjustment

The ability of avoidable mortality to account for physical and mental health inequalities was compared with that of SMR<75 using a series of correlations[16]. This analysis helps determine whether this alternative measure has added benefits if used in the health inequalities adjustment, such as accounting for a wider range of health inequalities related to physical morbidity and mental health, when compared to SMR<75.

4.3.1 Physical morbidity

Physical morbidity was measured using healthy life expectancy (HLE) and disability free life expectancy (DFLE). These variables are published by the ONS and are well-known for measuring physical morbidity[17] (e.g. HLE is used by the World Health Organisation's Global Health Observatory as an indicator to monitor Global Health), combining age and sex specific mortality rates with self-reported measures of health from the Annual Population Survey[18]. As such, HLE provides an estimate of the remaining number years that an individual can expect to live in "very good" or "good" general health, and DFLE the number of remaining years spent free from a limiting long-standing illness or disability. By using a subjective measure of health quality, both HLE and DFLE provide measures reflecting inequality related to physical morbidity. Correlational strengths were used to evaluate the ability of avoidable mortality and SMR<75 in accounting for physical morbidity. The correlational

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[16] HITFG(2021)20 An updated comparison of avoidable mortality and SMR75 in accounting for physical morbidity and mental health issues

[17] e.g. HLE is used by the World Health Organisation's Global Health Observatory (https://www.who.int/data/gho) as an indicator to monitor Global Health, for example as part of its annual World Health Statistics (https://www.who.int/data/stories/world-health-statistics-2021-a-visual-summary)

[18]
https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/healthstatelifeexpectanciesuk/2017to2019

strengths of these relationships, organised by sex and age group, are presented in Appendix E. Key findings include:

- Both directly and indirectly standardised avoidable mortality and SMR<75 consistently shared similar strength correlations with HLE and DFLE.
- Correlations with HLE and DFLE were stronger for younger age groups.
- Correlations with HLE and DFLE were stronger among males than females.

Furthermore, relationships were also examined with the self-report components of HLE (i.e. the proportion of people self-reporting as being in good health) and DFLE (i.e. the proportion of people self-reporting as living without a disability). Key findings include:

- Similar strength correlations for avoidable mortality and SMR<75 with the proportion of people in self-reported good health or disability-free. Correlations with directly standardised avoidable mortality were consistently the strongest (except among 20-24 year olds), but were still similar to correlations with indirectly standardised avoidable mortality and SMR<75.
- Correlations with self-reported good health or disability free were stronger among older age groups.
- Correlations with self-reported good health or disability free were stronger among males than females, particularly for good health in younger age groups.

Overall, both avoidable mortality and SMR<75 show a similar ability in the extent to which they can account for physical morbidity. This is similar regardless of whether HLE and DFLE are used to represent physical morbidity, or the proportion of people estimated to be in good health or disability-free, demonstrating moderate to weak relationships with all variables. However, whilst relationships are stronger among younger age groups for HLE and DFLE, they are stronger among older age groups for the proportion of people estimated to be in good health or disability-free. Whilst the proportion of people estimated to be in good health or disability-free can be considered as more direct measures of physical morbidity, they are based on subjective responses that limit their application when compared to HLE and DFLE.

4.3.2 Mental health

Mental health was explored separately for three reasons.

Firstly, mortality-based measures, such as avoidable mortality and SMR<75, are conceptually related to physical morbidity, and do not reflect the population's mental health morbidity. Therefore, this review also explored how these measures are able to account for mental health morbidity, by looking at different measures of mental health.

Secondly, previous analysis of the latest Mental Health formula identified some limitations for addressing health inequalities[19] as well as potential for improvement, such as inclusion of additional services in the formula and use of additional data. These limitations informed the decision to investigate the ability of avoidable mortality to account for mental health issues.

Thirdly, it is generally accepted that the level of identified mental health need more so than other health care services depends strongly on the available supply of services in the local area. This creates difficulties in disentangling unmet need and health inequalities. As a result, the review here will consider unmet need, although this is exploratory in nature. Further work is required and should draw on insights generated by the unmet need project described in section 7.1.

The ability of avoidable mortality and SMR<75 to account for mental health morbidity was assessed by evaluating the correlation of avoidable mortality (directly and indirectly standardised) and SMR<75 with the prevalence of different mental health disorders across CCGs.

The initial analysis showed different mental health conditions correlate to different degrees with mortality measures, prompting further analysis using different data. This was done iteratively, in recognition of the limitations of different datasets, in particular focusing on capturing different aspects of mental health need, i.e. known need as captured by service utilisation, but also unknown need (which may exist as either met need outside of NHS provision, or unmet need), with particular emphasis on unmet need. The analysis conducted and presented in this section looks at:

- prevalence estimates based on utilisation data (known mental health need)
- additional prevalence data to also represent unknown and unmet mental health need
- modelled prevalence data
- experimental measures.

Using prevalence data to represent known mental health need.

The data on prevalence of different mental health disorders used in this analysis reflect the different categories of mental health expenditure as identified in the Mental Health Investment Standard (MHIS)[20], whereby CCGs are required to increase funding for a range of mental health services at a proportional rate to their annual allocation increase. Further details on the datasets used to measure mental health disorder prevalence are available in Appendix F (Table F1). The data are utilisation based, meaning that they measure mental health conditions of those who accessed health services.

Overall, results show (Table F2) that both avoidable mortality and SMR<75 correlate well with emotional, conduct and kinetic disorder prevalence among children, and to

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a lesser degree with common mental health disorder (CMHD) prevalence. Both show a weak correlation with dementia prevalence and the rate of mental health act sectioning[21] (i.e. people being detained in hospital for mental health assessments or treatments).

Key findings on the comparison between avoidable mortality and SMR<75 include:

- Stronger correlations between directly standardised avoidable mortality and common mental health disorders (CMHD) prevalence, relative to indirectly standardised avoidable mortality and SMR<75.
- Similarly moderate correlations with emotional, conduct, and kinetic disorder prevalence among children between measures of avoidable mortality and SMR<75.
- Similarly weak correlations with dementia prevalence and rate of mental health act sectioning between measures of avoidable mortality and SMR<75.

Using prevalence data to capture unmet mental health need

As part of assessing the ability of both avoidable mortality and SMR<75 to account for mental health need, variables were sought that could capture unmet mental health need.

The mental health need index was identified as a way of expressing known mental health need between CCGs, as the mental health allocation model is based on utilisation of mental health services.[22] It is calculated using the age and sex composition of CCG populations, which is used to estimate the utilisation of mental health services in a CCG. By identifying a measure of met mental health need, the mental health index can then be used to help estimate unmet mental health need.

Assuming that the prevalence of different mental health disorders represented known mental health need, unmet mental health need could be expressed by subtracting the relative ranking of mental health disorder prevalence from the relative ranking of the mental health need index across CCGs. This was achieved by standardising both variables using z-scores to calculate the gap in mental health need (GMHN) for each mental health disorder. As the mental health need index and mental health disorder prevalence are measured using different units, z-scores enable comparisons between the two variables using a common unit of measurement, which is necessary to calculate GMHN.

The ability of directly and indirectly standardised avoidable mortality to account for unmet mental health need was compared with SMR<75 by analysing the correlational strengths with GMHN variables, which are presented in Appendix F (Table F3). Overall, these results show that both avoidable mortality and SMR<75 do not perform well in accounting for unmet mental health need.

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[21] https://www.nhs.uk/mental-health/social-care-and-your-rights/mental-health-and-the-law/mental-health-act-easy-read
[22] More information on the mental health allocation model is available from: It

Key findings on the comparison between avoidable mortality and SMR<75 include:

- Similar and weak correlations between directly and indirectly standardised avoidable mortality with each measure of GMHN.
- Similar and weak correlations between SMR<75 and avoidable mortality with each measure of GMHN.
- Stronger correlations between directly standardised avoidable mortality and GMHN based on dementia prevalence, relative to indirectly standardised avoidable mortality and SMR<75.

Using modelled data to represent mental health need

As the prevalence measures and GMHN variables were based on utilisation data that may not fully represent all aspects of mental health need, we have also considered modelled prevalence estimates. By estimating the proportion of the population that may have a mental health disorder, modelled data may help compliment the assessment of mental health need in the utilisation-based model. Public Health England published estimated prevalence of depression among adults at local authority level for 2015, based on data modelling from the 2014 Health Survey for England by Imperial College[23]. The analysis was therefore repeated using this modelled data.

Correlations were conducted between directly and indirectly standardised avoidable mortality, along with SMR<75, with modelled estimates of the prevalence of depression from PHE. These are compared to correlations with the prevalence of CMHD in Appendix F (Table F4), along with GMHN based on both prevalence variables, to compare correlational strengths between utilisation-based and modelled estimates of prevalence. Correlations were weaker using the modelled data compared to the utilisation-based data, further suggesting that avoidable mortality and SMR<75 do not perform well at accounting for unmet mental health need.

Additional sources of modelled data were sought to provide alternative measurements of mental health need, such as the Plymouth microsimulation estimates of unmet need for depression. Microsimulation estimates for depression prevalence were based on responses to items on the adult psychiatric morbidity survey (mixed anxiety/depression disorder symptoms, MH06) and the health survey for England (rating moderate to extreme anxiety/depression and on prescribed drugs, MH35). QOF prevalence rates of depression were subtracted from modelled MH06 and MH35 for GP practices in England to create depression unmet need indicators. The microsimulation estimates were previously presented to TAG and ACRA in 2017 but were not recommended for use. This was due to the small sample sizes employed by the underlying data (e.g., the adult psychiatric morbidity survey) and the need for a data refresh, as the underlying data was sourced from 2006-11. There are limited opportunities to refresh the required data (e.g., the adult psychiatric

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[23] https://fingertips.phe.org.uk/profile/prevalence

morbidity survey is conducted every seven years), therefore it is still recommended that unmet depression indicators are not used for further analysis.

Using experimental measures to represent mental health need

An experimental composite measure of mental health has also been examined as a complementary variable to SMR<75 or avoidable mortality, the small area mental health indicator (SAMHI)[24] was proposed as fit for this purpose and was examined using the framework for alternative measures to SMR<75. The SAMHI analysis is presented in Appendix G. In principle, the combination of multiple variables relevant to mental health inequalities (e.g. depression prevalence, antidepressant usage, mental health related hospital attendances, incapacity benefit and unemployment due to mental health) and availability at LSOA level are attractive. The use of multiple data sources means the composite measure captures different dimensions of health inequalities that are not currently fully accounted for in the mental health formula. However, SAMHI for London CCGs diverges greatly from the mental health need index and seems implausibly low (this is a known but as yet unexplained issue which has been identified by other analysts working on this data set). It is therefore recommended that SAMHI is not used as the basis of an unmet need adjustment at this time. Work will continue, however, to identify a suitable composite measure for potential use as a separate mental health adjustment or to assess the ability of the health inequalities adjustment measure to capture mental health need.

Other reviewed available data sources on mental health

Alternative sources of data (i.e. the Adult Psychiatric Morbidity survey, the Mental Health of Children and Young People in England survey, and the Improving Access to Psychological Therapies dataset, where some utilisation data is already included in the current mental health formula) were also presented to the HITFG and ACRA's technical advisory group (TAG), to decide whether alternative data could be used in subsequent analysis.

Assessments of these sources are presented in Appendix H. No further analysis is recommended for these three variables at this point in time.

After extensive investigations the review did not find any measures that capture the varied and complex dimensions of mental health and mental health need (for the purpose of testing an adjustment measure), and would therefore offer a better proxy for health inequalities in mental health services. Both SMR<75 and avoidable mortality correlate well with some specific measures of prevalence of a range of mental health conditions. While a better, and more specific, adjustment measure is not available, keeping this adjustment in line with the physical health adjustment is recommended in the absence of better alternatives.

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[24] https://pldr.org/dataset/2noyv/small-area-mental-health-index-samhi

In principle, modelled prevalence estimates, like those previously produced by Imperial College and the University of Plymouth, could offer a better way forward. However, these have not been updated since ACRA last assessed their suitability and available measures are now considerably out of date.

Next steps on mental health

While both avoidable mortality and SMR<75 were able to account well for some mental health need for some specific conditions, they perform poorly for other specific conditions such as dementia. As neither account well for (all) mental health, this discussion does not impact the decision to change from SMR<75 to avoidable mortality. In addition, concerns remain about the ability of data that are available for the purpose of a health inequalities adjustment, in terms of using these data to evaluate the ability of these measures to capture the different dimensions of mental health need including unmet need.

The HITFG recommended this work should continue both through further efforts to evaluate new available data that can reflect known and unknown (including unmet) mental health need, as well as under separate research into unmet need (discussed in section 7.1). In particular, composite indicators based on different sources of (possibly modelled) prevalence data are of interest as this allows different mental health measures to be combined. This approach acknowledges the different geographical distributions of for example depression, schizophrenia and dementia, and could also capture children's mental health need. It also acknowledges the limitation of any singular data source in capturing the different aspects of mental health need.

The aim of this continued effort would be to find better ways of evaluating the ability of the health inequalities adjustment to account for mental health conditions, and/or to introduce a separate adjustment for mental health inequalities.

An alternative approach which may be more appropriate for mental health or even physical morbidity would be to consider prevalence of conditions and how this compares to our estimates of met need. The advantage of this approach would be that it could give an indication of possible patterns of unmet need, although it may be less helpful when considering other aspects of health inequalities. A challenge for implementing this alternative approach is that it is reliant on having a reliable measure of underlying need, rather than reported need. This may require sophisticated modelling and careful assessment. A possible disadvantage of this approach would be that it is complex and therefore impacts the parsimony of the overall allocations formulae. The degree of complexity would need to be assessed against the likely benefits such a complex approach would bring.

4.4 Different definitions of avoidable mortality

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. The full list of conditions included in calculating avoidable mortality is provided in Appendix D. Although the way avoidable mortality is defined (labelling certain diseases as preventable and treatable) introduces an element of judgment, these labels have been widely agreed on between experts from OECD nations and EU Member States, and therefore informed by evidence and based on a common understanding of preventable and treatable diseases.

At the request of the HITFG, three different definitions of avoidable mortality were explored which varied different included age groups, as deaths in older age groups help capture important health inequalities:

- One version using the OECD definition ("Avoidable mortality – current OECD definition"): Causes of death considered to be avoidable in persons aged under 75 (a list of causes of death and ICD-10 codes are in Annex D).
- One version expanding the OECD definition to cover causes of death considered to be avoidable in persons of all ages rather than under 75 ("Avoidable mortality – all ages")
- One version expanding the OECD definition to cover causes of death to be avoidable in persons aged under 75, except for selected causes of death for which avoidable deaths for all ages are included ("Avoidable mortality – bespoke"), previously used by the ONS in 2011 and Eurostat in 2014.[25]

The bespoke version reflects a definition used by the ONS between 2011 and 2015[26] and includes deaths for all ages for causes that are considered avoidable for those age groups.

The analysis explored the impact on core CCG target allocations per head using these different definitions compared to SMR<75. The two expanded definitions were also compared to the OECD definition. Figure 6 shows the results of the analysis. Please note that:

- Comparisons of each avoidable mortality definition to SMR<75 are shown on the left, and comparisons with the expanded definitions of avoidable mortality to the OECD definition are shown on the right.
- The matrices present the impact per age group (A1 representing the youngest age groups and A5 the oldest) and by deprivation quintile (D1 representing the least deprived and D5 representing the most deprives).
- All avoidable mortality definitions have used indirect standardisation.

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[25] https://www.oecd.org/health/health-systems/Avoidable-mortality-2019-Joint-OECD-Eurostat-List-preventable-treatable-causes-of-death.pdf
[26] http://www.ons.gov.uk/ons/about-ons/get-involved/consultations/archived-consultations/2011/definitions-of-avoidable-mortality/definition-of-avoidable-mortality.pdf

Figure 6: Summary overview of the impact on core CCG target allocation per head of using the different measures in the health inequalities adjustment

Avoidable mortality (current OECD definition) vs SMR<75				
	A1	A2	A3	A4	A5
D1	0	0	-1	-1	-1
D2	0	0	-2	0	-2
D3	0	-3	-2	0	0
D4	-1	4	1	0	-2
D5	4	-1	1	2	

Avoidable mortality (all ages) vs avoidable mortality (current OECD definition)				
	A1	A2	A3	A4	A5
D1	-1	3	3	6	1
D2	0	-1	8	6	-1
D3	-5	-13	-1	4	-2
D4	0	0	7	3	13
D5	-5	-6	2	-9	

Avoidable mortality (all ages) vs SMR<75				
	A1	A2	A3	A4	A5
D1	-2	3	2	5	1
D2	1	-1	6	6	-3
D3	-5	-16	-3	4	-2
D4	-1	4	7	3	11
D5	-2	-7	3	-7	

Avoidable mortality (bespoke) vs avoidable mortality (current OECD definition)				
	A1	A2	A3	A4	A5
D1	0	0	1	1	1
D2	0	1	0	2	0
D3	0	0	0	0	0
D4	-1	-2	-1	1	4
D5	1	0	-3	-3	

Avoidable mortality (bespoke) vs SMR<75				
	A1	A2	A3	A4	A5
D1	0	0	-1	0	0
D2	0	1	-2	2	-2
D3	0	-3	-2	0	0
D4	-1	2	0	1	1
D5	5	-1	-2	0	

The analysis shows that the impact of changing the definition of avoidable mortality to include older age groups, both definitions of "all ages" and "bespoke" move resource away from some of the most deprived CCGs to slightly less deprived and older CCGs. Whilst the "bespoke" definition would see smaller changes and would still increase the target allocation for the most deprived CCGs compared to SMR<75.

The HITFG recommended using the bespoke definition, as it addresses the concern that the 75-age cut-off does not consider health inequalities for older age groups. It was felt that these are more relevant now with increased life expectancy. As Figure 6 shows, the bespoke definition provides greater support to older age quintiles in more deprived CCGs.

That said, the HITFG acknowledged the bespoke, or indeed avoidable mortality or any single indicator, is not a perfect adjustment measure. The following three key concerns remain with regards to the bespoke definition of avoidable mortality:

Review of the health inequalities adjustment to the CCG funding formulae

1. Technical appropriateness: documentation from the ONS on a user consultation on avoidable mortality from 2016[27] highlights that of the listed preventable and treatable diseases and causes of death under avoidable mortality are in practice less preventable/treatable or harder to prevent or treat for older age groups (over 75). This is due to the inherent reduced ability of this age group to recover (frailty). In addition, death certificates for this older age groups show a higher number of conditions, indicating that comorbidity may make it difficult to distinguish whether a death was preventable.

2. Capturing health inequalities for older populations: health inequalities for older populations are a complex phenomenon where wider determinants of health, such as a lack of access to social care or loneliness have a direct impact on morbidity and mortality. This is particularly relevant for older adults with conditions such as dementia, but also extends to accidents such as deaths due to falls, which are higher among older people. Falls in themselves may not be deadly but may be if an elderly person is not found in time due to isolation and potential lack of adequate social care services support. Furthermore, mortality amongst elderly may be captured in different locations to the location where they experienced differences in their health outcomes. Older people tend to move to peripheral or rural locations where care homes are situated. Their mortality is associated with the CCG of the care home, whereas the morbidity they experienced before moving to the care home, and the associated costs, may fall to another CCG. This was one of the reasons to move from DFLE to SMR<75 and provides a rationale for using a 75-years age cut-off. It is unclear, however, to what extent this occurs. Indeed, some studies put the average age at admission to a care home at 85.[28]

3. While it is important to capture health inequalities amongst older populations, adding older populations to the measure used for the health inequalities adjustment reduces the weighting for younger deaths, which generally occur amongst the most deprived populations. Indeed, while older populations experience barriers and are affected by health inequalities mentioned in the previous point, these likely apply to deprived and affluent populations alike (although possibly not to the same extent). Furthermore, the barriers experienced by these older age groups are less likely to be experienced by the most deprived as they are less likely to reach the age of 75, and therefore they are less likely to benefit from a health inequality adjustment that increases allocations for older age groups.

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[27] Available from:
https://www.ons.gov.uk/file?uri=/aboutus/whatwedo/statistics/consultationsandsurveys/allconsultationsandsurveys/reviewofavoidablemortalitydefinition/reviseddefinitionofavoidablemortalityandnewdefinitionforchildrenandyoungpeople.doc
[28] For example: Stilwell, P. and Kerslake, A. (2004), "What makes older people choose residential care, and are there alternatives?", Housing, Care and Support and; Steventon, A, and Roberts, A. (2012) "Estimating length of stay in publicly-funded residential and nursing care homes: a retrospective analysis using linked administrative data sets", BMC Health Services Research.

4.4. Methodology for calculating the adjustment

This part of the review considered technical aspects around the relative geographical distribution of funding for health inequalities in England, including how targeted the money should be towards the CCGs that have the highest levels of health inequalities (key question 1).

The health inequalities adjustment does not use the data directly, instead the values for the adjustment measure (e.g. SMR<75, avoidable mortality) are converted into weights per head and applied to small area populations.

In the current adjustment the weight per head uses a continuous exponential distribution based on SMR<75 values. This is calibrated to match a previous binned approach by setting the weights for the two MSOAs at the mid-points within groups 2 and 15 (out of sixteen) to the weights that would have been assigned previously, i.e. 1.17 and 8.58 respectively. A continuous exponential distribution is preferred to the previous binned approach as it allows high weights for those MSOAs facing the greatest challenge. At the same time, experience working with SMR<75 in this context has given greater confidence that binning is not necessary to mitigate possible data instability.

The SMR<75 weights are applied to the resident population within each MSOA. The weighted population is normalised for each MSOA and aggregated to CCG level to calculate a raw need index. Each CCG's raw need index is then applied to their registered population and re-normalised to create an SMR<75 weighted population.

As part of the review into the standardisation methodology, the methodology for calculating the health inequalities adjustment was consistently applied to assess the impact of the avoidable mortality measure. The impact was found to be relatively small. These results were presented to TAG, which did not make a recommendation to change the methodology for calculating the health inequalities adjustment.

5. Adjustment for populations that experience poorer health outcomes and are underrepresented in GP registrations

This part of the review explored whether any separate consideration may be needed for particular populations, such as travellers (key question 2).

A list of dimensions relevant to health inequalities that have are accounted for within the allocations formulae[29] was collated. This helped identify dimensions of health inequalities and specific population groups that experience health inequalities that may not be accounted for in the formulae. As such, an investigation was made into the feasibility of using an adjustment for specific population groups affected by health inequalities in the health inequalities adjustment. The scope of the investigation was

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[29] HITFG(2021)16: Identifying unaccounted population groups in the CCG allocations

aimed towards population groups identified in the review as being underrepresented in GP registrations, in particular:

- Roma, Gypsy, and Traveller communities; and
- homeless people and people sleeping rough.

Further information on the data collected for these population groups is provided in Appendix I.

Population estimates were made for ICBs, on the assumption that a specific adjustment in the allocations formulae would be made at an ICB level in future allocations rounds, and outlier ICBs, with a statistically greater or lower number of each population group, identified.

An estimated cost per patient for the population groups was calculated to investigate the impact on overall ICB allocations. The average weighted 2019/20 general and acute need index was calculated for a sample of registered patients from GP practices specialising in homeless services. We did not identify any GP practices providing specialised services for the Roma, Gypsy and Traveller communities and were therefore unable to calculate a separate acute need index. Therefore, and on the assumption that these communities have higher health needs than the general population, we have also applied this higher need index to the Roma, Gypsy and Traveller community population estimates.

The estimated cost per patient was applied to the estimated population size of each population group for each ICB, summing the additional cost to ICBs based on a specific adjustment for each population group. For data based on households rather than individuals (e.g. households assessed as homeless, Traveller caravans), the average occupancy factor for English households from the 2011 census (i.e. 2.4)[30] was applied.

The impact upon ICB allocations using a specific adjustment for each population group was very small, with the allocation for each individual population group typically representing less than 0.1% of an ICB's overall allocation. The combined sum of each population group's specific adjustment together is not presented, as overlap between population groups may result in double counting (e.g., homeless people and people sleeping rough).

As this evidence shows that an adjustment would not make a material difference to ICB weighted populations, TAG recommended to the HITFG not to implement a specific adjustment at this time to avoid additional complexity being introduced to the allocations formula, without a material impact. Indeed, simplicity and parsimony are two key criteria for the formulae for resource allocations. However, TAG recommended the details of the analysis at should be made available to ICBs to

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[30] Available from the ONS "2011 Census: Population and household estimates for the United Kingdom, March 2011" bulletin, accessible from:
https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/populationandhouseholdestimatesfortheunitedkingdom/2011-03-21

support their own development of strategies for supporting these populations. The analysis has therefore been made available in Annex I of this report.

6. Practical considerations for application of a health inequalities adjustment

This part of the review sought to explore the proportion of the budget that is required to be directed into health inequalities and unmet need (key question 3) and to understand how CCGs are using place-based allocations to address health inequalities and how much of their allocation they are spending on health inequalities (key question 4).

6.1 Approach

To answer these questions, the approach was to engage with CCGs to provide insights into the practical implementation. The focus of this engagement was initially those CCGs that receive the greatest increase in target allocation following the health inequalities and unmet need adjustment. This was done through a workshop with 22 CCGs which explored the following questions:

- What three forms of investment do you think provide the best value in addressing your health inequalities issues locally?
- How do these investments link in to your agreed strategic/action planning priorities?
- What are the cost elements covering General & Acute and Primary Care? Are these accurately captured by the allocation model[31], or are there other costs not captured?
- Which components are thought to generate greatest financial pressure as a result of local health inequalities?

Following this workshop, further discussions with a group of representatives from five of these 22 CCGs followed to collect in-depth qualitative insights through semi-structured interviews, which allow CCG representatives to steer the conversation towards topics important to them, within the broad framework of a key set of questions by using prompts. Informed by the workshop, these discussions focused on:

- Is your CCG aware of the health inequalities adjustment?
- Does your CCG run specific programmes or interventions on health inequalities?

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[31] Referring to the model presented on page 16 of Fair Shares - a guide to NHS allocations, available from: https://www.england.nhs.uk/wp-content/uploads/2020/02/nhs-allocations-infographics-feb-2020.pdf

- Does your CCG's approach to addressing health inequalities mirror the allocation funding streams (Primary Care; General & Acute Services; Specialised Services)?
- Does the funding your CCG spends on addressing health inequalities mirror the proportion of the adjustment, i.e. 15% for Primary Care etc.
- Does your CCG have an overview of the amount it is spending on health inequalities?

Findings from these discussions are based on a small group of CCGs drawn from 22 CCGs that receive the greatest increase in target allocation following the health inequalities and unmet need adjustment. This is not a representative sample. Therefore, findings from these discussions were translated as answer options into a short questionnaire, which could support future work to validate the findings from the in-depth interviews by testing of the answers with a wider group of CCGs, or ICBs through engagement with e.g. members of the NHS Health Inequalities Improvement Forum, as well as the 22 CCG representatives that had been initially engaged.

In addition to the CCG engagement, two other supporting analyses were conducted.

An analysis of Programme Budgeting (PB) spend looked at the differences in net expenditure for CCGs by deprivation decile and by CCGs who gain or lose from the health inequalities and unmet need adjustment. The analysis tested if CCGs gaining or losing from the health inequalities adjustment or that were more deprived or affluent spent money on different services.

A mapping was prepared of factors predisposing to health inequalities and the extent to which these are covered by the CCG funding formulae. This mapping, as well as a high level graph illustrating where additional costs occur, can be found in Appendix J. Where these are not covered by the funding formulae, then a 'legitimate' call on the health inequalities adjustment can be made. To identify which factors predispose to health inequalities, NHS England & Improvement programme managers of specific services identified those factors in service delivery where health inequalities lead to additional costs, which were then matched by allocation analysts to the allocation formulae. These mappings identifying factors predisposing to health inequalities were prepared for primary care, as well as CCG core services (other than community care due to complexities of differing local arrangements for these services). Mappings were not completed for Specialised services. These mappings could be extended in the future by widening the engagement to include practitioners and public health consultants.

6.2 Findings

This section presents preliminary qualitative insights gained on the following questions:

- How do CCGs use place-based allocations to address health inequalities?
- How much are CCGs spending on health inequalities?
- What is the quantum required for addressing health inequalities?

6.2.1 How do CCGs use place-based allocations to address health inequalities?

A mapping exercise conducted in support of this review sought to identify how health inequalities might manifest in service delivery, and where these may already be captured by the utilisation formulae. This showed that generally additional quantity of appointments or treatments resulting from higher need due to health inequalities are covered in the utilisation formulae. This is also partly captured by including variables for ethnicity and morbidity in the utilisation model. What is often not captured and would therefore mean that CCGs need to call upon additional funding are the qualitative intensity of the appointments. This concerns the need for translators, longer appointments and liaison with external services.

Engagement with CCGs highlighted that consulted CCGs are not generally aware of the health inequalities adjustment or the value of the adjustment.

CCGs employ different strategies for addressing health inequalities. One CCG said that in their area health inequalities are exclusively addressed taking an embedded approach, i.e. as part of existing services. A separate fund for health inequalities would be contradictory to this approach.

Other consulted CCGs, however, provided examples of specific programmes they are funding that aim to address health inequalities by focusing on population groups who are more likely to experience health inequalities or barriers to accessing services. Examples mentioned by these CCGs are social prescribing and liaison services that provide more agency to deprived populations, including e.g. helping these groups navigate health services and support them in taking control in their own health management. These activities often work across different services e.g. linking community services and primary care, or either community services or primary care with hospital-based services/clinicians. These services may also include services beyond the scope of the CCG place-based allocation, where they intersect with known causes of health inequalities such as a person's housing situation.

As the health inequalities adjustment is a weighting in the target allocation, rather than a separately identified budget allocation, consulted CCGs indicate decisions on funding such services will be based on local decisions about what funding is available from within the overall allocation. For example, one CCG said that in their area the funding to address health inequalities in Primary Care comes from the allocation for CCG Core Services. Another CCG representative said that they fund activity to address health inequalities through additional funding from the allocation growth, but only after stabilising costs for acute services. They highlight a resulting challenge: upstream services supporting deprived groups may lead to savings in acute services, however, in order to make funding as well as other resource (e.g. workforce) available to run (often upstream) services supporting deprived groups, savings have to be made in acute services which generally represent the largest part of a CCG's expenditure. According to one of the consulted CCGs, it can be difficult to break this cycle for CCGs who have high acute costs, while CCGs with high acute costs are also likely to have more health inequalities and unmet need, and therefore need the upstream funding more so than those with lower acute costs. Another CCG

states that it can be challenging to get stakeholder buy in to reduce funding upstream in order to spend this downstream on health inequalities. It is worth noting here that this has been informed by a small number of CCGs, so reporting bias may exist. It could be possible, for example, that large older populations who need more social support drive up acute costs because the social support is not in place. This is not linked to health inequalities per se.

Analysis of Programme Budgeting spend using 2018/19 data compared CCGs who receive a larger than 2.5% increase in their target allocation as a result from the redistributive effect of the health inequalities adjustment, to CCGs whose targets reduce by more than 2.5% after implementation of the adjustment. The former (CCGs where the target allocation increased by more than 2.5% due to the health inequalities adjustment) were found to spend less on elective care and more on A&E and other health care services. Similar findings were true for CCGs with more deprived areas compared to CCGs with fewer deprived areas.

In terms of non-elective care, however, compared to the least deprived areas (D01), more deprived areas (D10) are spending more per registered patient but less per weighted patient, i.e. they are spending more per person but not as much as might be expected given the relative need of their population. The difference in spend per registered patient and spend per weighted patient may occur because the effects are diluted across other categories like A&E, Other Urgent and Emergency Care and Other Health, or may reflect unmet need.

Furthermore, analysis by Programme Budgeting Category (PBC) shows that CCGs with more deprived areas or those whose targets' increase due to the health inequalities adjustment by more than 2.5% spend more on mental health disorders, problems of the respiratory system, maternity and reproductive health and less on problems of the musculoskeletal system per registered patient.

It should be noted that significant amounts of net expenditure, both by care setting and programme budgeting category are classed as "other", which means the findings of this analysis will need to be triangulated with other more comprehensive datasets before robust conclusions can be made.

6.2.2. How much are CCGs spending on health inequalities?

Based on the responses from consulted CCGs, it is not possible to provide a breakdown of spending on health inequalities. Either health inequalities are addressed as part of mainstream service delivery, or there may be programmes dedicated to support deprived population groups, but generally this expenditure is not mapped so precisely as to be able to attribute it to "spent on addressing health inequalities". It is possible to trace expenditure for specific programmes or activities that address health inequalities, but there is no insight in particular into expenditure related to health inequalities and the extra burden of disease as part of baseline service delivery (i.e. the utilisation model).

Despite the difficulty of understanding the overall costs/expenditure involved in addressing health inequalities, the consulted CCGs generally agreed that the weightings applied in the allocation formula (i.e. 15% for Primary Care and 10% for Core Services) seemed plausible. They noted that community services can in particular play an important role in addressing health inequalities. However how this played out in local expenditure and flexibility to invest in specific additional services to address health inequalities varied considerably.

6.2.3 What is the quantum required?

The consulted CCGs felt that they could not offer an informed view on a required quantum. They highlighted that the reality is complex and the quantum is dependent on discussions and decisions at different levels, including with providers and local partners, on activities to address and reduce health inequalities. The CCGs in our group generally found that funding was mainly allocated to cover baseline service requirements, leaving limited opportunity for additional targeted investments. One CCG points out that this is particularly the case for Primary Care, where in their area they draw on funding from CCG Core Services to be able to implement activities aimed at addressing health inequalities in Primary Care. The actual costs and therefore required quantum to address health inequalities, however, will vary between CCGs and model segment. The next paragraphs discuss the different causes for this variation which are due to different levels of stakeholder acceptance, existing infrastructure, CCGs current financial situation, other funding principles and local policies.

In terms of **stakeholder acceptance**, the reallocation of resource through the adjustment in particular can be a barrier for CCGs. One CCG suggested that the alternative of a top slice, premium or investment rather than an adjustment that reallocates funding. The current adjustment approach can be difficult to accept amongst regional and local stakeholders within the scope of a CCG when this removes resources from one area, and can therefore be a barrier to introducing positive change focused on streamlining services to meet priorities around health inequalities.

Regarding organisational **infrastructure**, one representative suggested that CCGs who have previously invested in services, resource and institutional infrastructure to address health inequalities will have no new set-up costs and a lower cost to keep running these, whereas CCGs who have to set this up will have a higher cost including set-up costs. These costs may be even higher where it is difficult to achieve economies of scale or where elements such as remoteness are likely to increase costs. This is especially relevant for CCGs who have localities added to their boundaries, as different existing infrastructures may need to be reformed or extended to the new areas. Some CCGs considered that this is specifically relevant in the context of the reorganisation into ICBs.

Furthermore, one of the engaged CCGs put forward that CCGs that are not performing well financially are likely to have less discretionary space to allocate

funding to activities beyond business as usual, although additional funding upstream may be a successful way of managing expenditure downstream. The required quantum also varies locally by service, depending on the **existing financial situation**, existing infrastructures and local policies. This CCG representative suggested CCGs with high demand in e.g. acute may not have financial space to make additional targeted expenditures to address health inequalities, even when higher costs on acute in themselves may be a result of unaddressed health inequalities. On other hand, change enabled through effective knowledge management and leadership may be required.

In terms of **local policies**, engagement with CCGs showed that CCGs might spend more resource on reducing health inequalities either as part of community services (CCG core services) or under Primary Care. This may also depend on their local infrastructures as indicated earlier: If these already exist, this may justify continuing to address health inequalities within these existing infrastructures, as this is should be cost efficient. On the other hand, if such infrastructures do not yet exist, this may be a reason to set these up which would require an initial investment.

Specifically regarding primary care, one of the CCGs questioned whether the formula used for GP contractual payments is well aligned with objectives of health inequalities

Further work is needed to understand the factors and elements in service delivery for which CCGs (going forward: ICBs) need to call on the health inequalities adjustment to answer what the required quantum is for health inequalities. Further insights are also needed to understand how a health inequalities and unmet need adjustment can be translated at the local level, e.g. at practice level, to address health inequalities and unmet need experienced amongst and by the local population. Increased transparency into the allocation formulae and the resulting amount of funding may support the translation of CCG-level funding to sub-CCG action.

7 Ongoing research

This part of the review focused on ongoing research, that is:

- Topics that relate to health inequalities (and the funding required to address them) which have been addressed in the review, but where more information is needed to answer research questions.
- Topics or questions that require a significant amount of work so that they can only be answered outside of the timeline of this review.

7.1 Unmet need

This strand of work seeks to understand the relationship between health inequalities and unmet need and the potential to develop an adjustment for unmet need in particular. These are not the same and the combined allocation in a single

adjustment has been an interim solution. Research has been commissioned by the National Institute of Health Research (NIHR) into how an equitable resource allocation may account for unmet need specifically. The commissioned research looks at ways of defining and quantifying unmet need for a separate adjustment to the resource allocation. More specifically, it seeks:

1. understand alternative concepts of unmet need, its measurement, potential causes and their implications for NHS resource allocation and health inequalities;
2. examine whether the methodology of the utilisation approach used in the national resource allocation formula can be enhanced to address unmet need;
3. estimate variation in unmet need by assessing the healthcare costs of diagnosing and treating the estimated prevalent cases of undiagnosed chronic conditions in each CCG; and
4. estimate the health impact and health inequalities impact of alternative adjustments for unmet need.

This research will take place over 3 years, with results expected by 2023.

7.2 Impact of COVID-19

The review into the impact of COVID-19 mainly consisted of desk research on policy documents and emerging research as well as insights contributed by the members from the HITFG on current issues that are likely to impact on health inequalities. This impact needs to be understood so that timely changes can be made to address the impact, even if these may not be within the scope of this review.

There are currently no outputs ready to report on at this time in relation to COVID-19, while work is ongoing.

7.3. Reorganisation of CCGs into Integrated Care Boards (ICBs)

The review into a health inequalities adjustment as part of a resource allocation to ICB is ongoing. The appendices G and I of this report, however, do contain some of the ICB-level analysis done in support of the review. These may be of interest to ICBs.

Technically, the use of indirectly standardised avoidable mortality as well as the SMR<75 is robust. Data for both measures are disaggregated by MSOA, which is at a sufficient granularity to be aggregate to the new areas that represent the ICB areas.

8. Conclusions and recommendations

This section provides a summary of the findings from the review of the health inequalities and unmet need adjustment. It closes with a set of recommendations from the HITFG that follow from the review.

8.1 Conclusions

Health inequalities are avoidable differences in health across the population and between different groups within society, that are amenable to healthcare and preventative activities (and therefore can be avoided with the appropriate provision of healthcare and prevention that is in the scope of the bodies we are funding).

Disparities in healthcare access, experience and outcomes are avoidable and do not occur randomly or by chance but are determined by circumstances largely beyond an individual's control. Focused action on tackling health inequalities in the scope of the bodies we are funding seeks to bridge these differences in order to ensure equitable access, excellent experience and optimal outcomes with the aim of putting in place prerequisites to reduce health inequalities that are amenable to healthcare.

This review of the health inequalities and unmet need adjustment considered alternatives to the SMR<75. Avoidable mortality was the only 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 involved have been identified as those that could have been avoided through public health measures and timely and effective health care intervention. In comparison, the SMR<75 includes deaths from all causes.

Further analysis extending the definition of avoidable mortality to include older age groups for all ("all ages") or specific causes of death ("bespoke") shows that the impact of changing the definition of avoidable mortality to include older age groups, is that both definitions of "all ages" and "bespoke" move resource away from some of the most deprived CCGs to slightly less deprived and older CCGs. The "bespoke" definition would see smaller changes and would still increase the target allocation for the most deprived CCGs compared to SMR<75.

Both avoidable mortality and SMR<75 display a moderate ability account for physical morbidity, and a poor ability to account for some known mental health need and unknown (including unmet) mental health need. Alternative variables were explored for use in the evaluation of the candidate adjustment measures (avoidable mortality and SMR<75) as well as for use as a potential separate mental health inequalities adjustment. None of the variables and datasets explored, including SAMHI, were found to be suitable for use in the health inequalities adjustment.

Statistical analysis showed that directly standardised avoidable mortality rates are marginally more unstable over time. The existing methodology for calculating the adjustment was applied to the different scenarios (direct and indirectly standardised SMR<75 and avoidable mortality) to review the impact of the measure. The impact

was found to be small, indicating no further review of the methodology for calculating the adjustment was necessary.

The review also looked at the impact of using a specific adjustment for populations that experience poorer health outcomes and are underrepresented in GP registrations, on ICB allocations. This impact was very small, typically representing less than 0.1% of an ICB's overall allocation.

The review also considered the following questions:

How are CCG place-based allocations used to address HI? CCGs are not generally familiar with the health inequalities adjustment.

How much are CCGs spending on HI? CCGs do not map their expenditure so precisely as to be able to attribute it to "spent on health inequalities". The redistribution of resources according to the health inequalities adjustment of 15% of all resources available for Primary Care, 10% of resources available for CCG Core Services and 5% available for Specialised Services does resonate with CCGs, with the caveat that this is an ideal and that in reality for various reasons, proportional spending on health inequalities occurs differently.

What is the quantum required? The feedback received from CCGs shows that this is difficult to estimate, and the required quantum is the result of complex and various discussions and decisions. The required quantum also varies from CCG to CCG mainly due to different levels of stakeholder acceptance, existing infrastructure, CCGs current financial situation, other funding principles and local policies.

During the review, initial work was conducted on monitoring the impact of COVID-19 on health inequalities; modelling to prepare a separate adjustment for unmet need specifically; collecting feedback from CCGs and general considerations of the HITFG. This work will inform future work and changes to the health inequalities adjustment as part of an allocation to ICB.

8.2 Recommendations

The recommendations from this review for the 2022/23 allocation round are as follows:

1. The HITFG recommends retaining the health inequalities adjustment. There is clear evidence that some groups secure poorer health outcomes than other groups, and it is the NHS's duty to reduce these differences in outcomes.

2. The HITFG recommends moving the health inequalities adjustment from using SMR<75 to indirectly standardised avoidable mortality using a bespoke definition that includes mortality among all age groups for selected causes, and otherwise includes mortality among those aged under 75. The reason for this change is that avoidable mortality is conceptually a better fit than SMR<75, as it captures deaths that could have been avoided through public health measures and timely and

effective health care intervention, as well as taking into account deaths among those over 75 for specific causes of death. SMR<75 captures all deaths of persons aged under 75.

3. Furthermore, the HITFG recommends applying indirect standardisation, as this yields statistically robust results and ensures consistency with the previous measure. This standardisation should relate to the England population, which is the most appropriate population considering the overall occupation covers England.

4. It is not recommended to make a separate adjustment for specific population groups who experience poorer health outcomes due to the different dimensions of health inequalities: evidence shows the impact on the allocation would be minimal, while such a separate adjustment would affect the parsimony of the model. In addition, data on these groups are not regularly available and have several quality issues. That said, continuing review of available data is required as data may improve and the situation may change so that a separate adjustment is possible and appropriate.

The review also identified ten areas for further work. These areas were identified through the review itself, as well as by consulting directorates within NHS E&I. These are covered in the following ten recommendations for the future work programme relating to the health inequalities adjustment:

1. As a key priority, the future work programme should continue work relating to how **mental health is captured in the health inequalities adjustment**:
    a. Firstly, it should review and assess newly available data as well as improved datasets on mental health, for the purpose of assessing the ability of the health inequalities adjustment to reflect mental health need as well as potentially introducing a mental health inequalities adjustment. This continued review should seek input from relevant organisations, such as the Office for Health Improvement and Disparities. It should also seek out different types of datasets (survey and administrative data, and cross-sectional and longitudinal data), building on the strengths of different types of datasets while also acknowledging some of their limitations.
    b. Secondly, it should review how inequalities in mental health may be better captured, for the purpose of an adjustment. This work should seek to improve understanding of how ICB address inequalities in mental health, and how this affect costs, while also linking this to the NHS E&I mental health strategy and other areas of NHS E&I generating relevant insights.
    c. Thirdly, it should assess the feasibility of developing a composite indicator as the basis for a mental health inequalities adjustment. Such a composite indicator may be better able to reflect the different mental health conditions and their contributions, than a single (mortality-

based) indicator. On the other hand, the assessment should consider potential drawbacks of a composite indicator, such as difficulties in consolidating different directions of individual indicators. This work should consider the interaction with physical health, i.e. co-morbidity of mental and physical conditions.

2. The future work programme should also **consider disability**. Further work should investigate how this is captured in the health inequalities and unmet need adjustment, and how this differs for different population groups, for example for people from ethnic minorities.

3. The work programme should also **revisit the ONS Health Index**. This recently developed index could be a relevant alternative measure for future use as a health inequalities adjustment measure, if it becomes available at a smaller area level. A benefit of this measure is that it also reflects wider determinants of health, although it will require a reflection on some common concerns relating to composite indices, such as intercorrelation between different dimensions of an index, the weighting of included indicators, and how variables taking different directions are consolidated. Relatedly, further review should also consider other measures, such as those that reflect health inequalities among children and young people in addition to need among this population group already captured in the utilisation part of the allocation formulae. It is important to consider these groups, as changes in terms of addressing health inequalities can have a large impact on their entire life trajectory.

4. Consideration should be given to if and how the health inequalities adjustment should change in light of the introduction of **a separate adjustment for unmet need that may arise from the NIHR funded research project on unmet need**. This should be considered in the scope of an allocation to ICBs rather than CCGs and should build on the findings from this review.

5. The work programme should include an effort to **influence improvements in data collections and improvement in access to (newly available) data** so it may be used for further research to understand and address health inequalities in the context of an adjustment to allocations. This could cover collaboration with different relevant organisations (e.g. NHSX, NHS Digital (to be merged into NHS E&I), ONS, the Office for Health Improvement and Disparities, the national NHS E&I Health Inequalities Improvement Programme) and could include, for example, linking primary and secondary care data; access to data recorded on characteristics (including basic socio-economic characteristics) of the primary care registered population and; access to and improvement of programme budgeting data (specifically the development of spending categories that are relevant for inequalities).

6. While the review proposes to apply indirect standardisation, the **review of the advantages and disadvantages of using direct and indirect standardisation**

methods should be continued, as while both methods generally generate the same results, they have their limitations in areas where the population distribution is significantly different from the standard. Further work should seek a better understanding of how this impacts on allocations. Further lines of questioning could also include an investigation into the use of smoothing methods; increasing the age limit from 75 to 80 or 85 (which may also be appropriate for other reasons, e.g. to reflect extended life expectancy) to stabilise results at the small area level and; revisiting the use of crude rates or other measures.

7. The **CCG mappings of where and how additional costs for providing care to disadvantaged groups** occur in service delivery may provide a useful starting point to provide an indication of the overall quantum required, as well as whether the 5%, 10% and 15% health inequalities adjustment for specialised services, CCG Core services and primary care is appropriate. For example, these mappings, which should be expanded to include specialised services, could be used to quantify and cost those factors which incur extra costs. This further work could also consider including evidence on the return on investment of actions to reduce health inequalities rather than managing them once they present in a health care setting. This information could serve to increase transparency to ICBs on the health inequalities adjustment, and support accountability.

8. As an overarching recommendation cutting across the areas for further work, any additional research should consider the need for **including ICBs views**. This review already sought the views of CCGs. This should become a structural exercise. To enable ICBs to provide constructive input where their views are included, relevant NHS E&I teams (in particular, the Strategic Finance Team and the National Health Inequalities Improvement Team) should work together to raise awareness of the health inequalities adjustment with ICBs and Provider health inequalities SROs (senior responsible officers) and Executive Leads, as part of the transition to ICBs from CCGs. In particular, this should draw attention to how the adjustment is built up from the lower area level.

9. **Monitoring on COVID-19 and the impact on health inequalities** should also continue into the future work programme and be considered in the scope of an allocation to ICBs rather than CCGs. This continued monitoring should build on existing work done within the NHS, as well as on the findings from other organisations. The impact of COVID-19 on health inequalities should not be considered in isolation but should consider the impact of COVID-19 as a dimension to known disadvantages, and how this should be adjusted for.

10. The future work programme should furthermore consider the adjustment in terms of the different components of the model. Firstly, it should consider whether the **health inequalities adjustments for primary care and community services – together representing out-of-hospital services – on the one hand and other**

core services on the other hand could be two different measures. Considering the primary care and community services, and core services components have a different focus (primary care and community having a greater preventative role), this may warrant different measures for each. Secondly, it should consider the impact of the relative size of the quanta of money allocated to each component, and therefore the size of their health inequalities adjustments, in terms of their ability to address health inequalities.

Appendix A: Members of the Health Inequalities Task & Finish Group

Name	Organisation
Tarryn Lake ACMA CGMA (Chair)	Associate Director of Finance, NHS Sunderland CCG
Dr Laura Anselmi	Senior Research Fellow in Health Economics, The University of Manchester
Dr Miqdad Asaria	Assistant Professorial Research Fellow, London School of Economics and Political Science
Prof Sheena Asthana	Professor of Health Policy, Director, Plymouth Institute of Health and Care Research (PIHR)
Dr Ben Barr	Senior Clinical Lecturer in Applied Public Health Research, University of Liverpool
Dr Chris Bentley	HINST Associates
Grainne Bellenie	Lead for Equalities and Health Inequalities, NHS England & Improvement
John Brittain	Health Inequalities and Evaluation Analytics Team, NHS England & NHS Improvement
Ben Chilcott	Associate Director of Finance, NHS Devon CCG
Donald Franklin	NHS England & NHS Improvement
Paul Fryers	Public Health England
Tom Hennell	Principal Public Health Intelligence Analyst, Public Health England
Dr Karen Kinder	Research Associate, Technical University of Berlin
Dr Stephen Lorrimer	Head of Analysis and Insight for Finance, NHS England & Improvement
Dr Emmanouil Mentzakis	Associate Professor in Economics, University of Southampton
Prof Eugene Milne	Director of Public Health, Newcastle City Council
Dr Heather Ross	Analysis and Insight for Finance, NHS England & NHS Improvement
Prof Colin Sanderson	London School of Hygiene and Tropical Medicine
Chris White	Office for National Statistics

Appendix B: "Seven Principles of Public Life" (Nolan Principles)

Selflessness

Holders of public office should act solely in terms of the public interest. They should not do so in order to gain financial or other benefits for themselves, their family or their friends.

Integrity

Holders of public office should not place themselves under any financial or other obligation to outside individuals or organisations that might seek to influence them in the performance of their official duties.

Objectivity

In carrying out public business, including making public appointments, awarding contracts, or recommending individuals for rewards and benefits, holders of public office should make choices on merit.

Accountability

Holders of public office are accountable for their decisions and actions to the public and must submit themselves to whatever scrutiny is appropriate to their office.

Openness

Holders of public office should be as open as possible about all the decisions and actions that they take. They should give reasons for their decisions and restrict information only when the wider public interest clearly demands.

Honesty

Holders of public office have a duty to declare any private interests relating to their public duties and to take steps to resolve any conflicts arising in a way that protects the public interest.

Leadership

Holders of public office should promote and support these principles by leadership and example.

Appendix C: Dimensions of health inequalities and disadvantaged groups that experience poorer health outcomes

Table C1: Dimensions of health inequalities and the related disadvantaged groups that experience poorer health outcomes as identified across different documents

Dimension	Example of disadvantaged groups	Source
Age	Older Adults	Equality Act, HEAT, HITFG(2020)08, HITFG(2021)16
Sex	Males	Equality Act, HEAT, HITFG(2020)08, HITFG(2021)16
Gender	Transgender and non-binary	Equality Act, HEAT, HITFG(2021)16
Marriage and civil-partnership	Divorced	Equality Act, HEAT, HITFG(2021)16
Pregnancy and maternity	Pregnant people	Equality Act, HEAT, HITFG(2021)16
Ethnicity and race	Asian or Asian British	Equality Act, HEAT, HITFG(2020)08, HITFG(2021)16
Religion or belief	Islam	Equality Act, HEAT, HITFG(2021)16
Disability	Learning and/or physically disabled	Equality Act, HEAT, HITFG(2020)08, HITFG(2021)16
Sexual orientation	Homosexual	Equality Act, HEAT, HITFG(2020)08, HITFG(2021)16
Deprivation	Low quality housing, low educational attainment, low income	HEAT, HITFG(2020)08, Minutes from HITFG (10/12/20)
Socioeconomic status	National statistics socio-economic classification 8 (never worked and long-term unemployed)	HEAT, HITFG(2020)08, Minutes from HITFG (10/12/20)
Geography	Coastal communities, areas affected by climate change, areas with limited access to green space/poorer air quality/ reduced food availability	HEAT, HITFG(2020)08, Minutes from HITFG (10/12/20)
Homelessness	Homeless people and people sleeping rough	HEAT, HITFG(2020)08, HITFG(2021)16
Sex workers	"" ""	HEAT, HITFG(2020)08, HITFG(2021)16
Gypsy, Roma, and Traveller communities	Irish Travellers	HEAT, HITFG(2020)08, HITFG(2021)16
Vulnerable migrants	Asylum seekers and refugees	HEAT, HITFG(2020)08, HITFG(2021)16
Prisoners	People in prison or who have left prison	HEAT

The care system	Young people in or leaving care	HEAT
Mental Health	People with mental health problems, sometimes comorbid with other disabilities	HITFG(2021)16
Addiction	People affected by addiction or substance use issues	HITFG(2021)16
Living situation	Living alone or communally	HITFG(2021)16
Carers	" " " "	HITFG(2021)16
Armed forces	Veterans and ex-military personnel	HITFG(2021)16
Genital Mutilation	People with experiences of genital mutilation	HITFG(2021)16
Modern Slavery	People with experiences of human trafficking and modern slavery	HITFG(2021)16

Appendix D: Conditions included in the calculation of avoidable mortality

Table D1: Avoidable mortality definition - causes of death (classified using the International Classification of Diseases, tenth revision (ICD-10)) considered to be avoidable

Condition group and cause	ICD-10 codes	Treatable	Preventable
Infectious diseases			
Intestinal diseases	A00-A09		•
Diphtheria, Tetanus, Poliomyelitis	A35, A36, A80		•
Whooping cough	A37		•
Meningococcal infection	A39		•
Sepsis due to streptococcus pneumonia and sepsis due to haemophilus influenzae	A40.3, A41.3		•
Haemophilus influenza infections	A49.2		•
Sexually transmitted infections (except HIV/AIDS)	A50-A60, A63, A64		•
Varicella	B01		•
Measles	B05		•
Rubella	B06		•
Viral Hepatitis	B15-B19		•
HIV/AIDS	B20-B24		•
Malaria	B50-B54		•
Haemophilus and pneumococcal meningitis	G00.0, G00.1		•
Tuberculosis	A15-A19, B90, J65	• (50%)	• (50%)
Scarlet fever	A38	•	
Sepsis	A40 (excl. A40.3), A41 (excl. A41.3)	•	
Cellulitis	A46, L03	•	
Legionnaires disease	A48.1	•	
Streptococcal and enterococci infection	A49.1	•	
Other meningitis	G00.2, G00.3, G00.8, G00.9	•	
Meningitis due to other and unspecified causes	G03	•	
Neoplasms			
Lip, oral cavity and pharynx cancer	C00-C14		•
Oesophageal cancer	C15		•
Stomach cancer	C16		•

Liver cancer	C22		•
Lung cancer	C33-C34		•
Mesothelioma	C45		•
Skin (melanoma) cancer	C43		•
Bladder cancer	C67		•
Cervical cancer	C53	• (50%)	• (50%)
Colorectal cancer	C18-C21	•	
Breast cancer (female only)	C50	•	
Uterus cancer	C54, C55	•	
Testicular cancer	C62	•	
Thyroid cancer	C73	•	
Hodgkin's disease	C81	•	
Lymphoid leukaemia	C91.0, C91.1	•	
Benign neoplasm	D10-D36	•	
Endocrine and metabolic diseases			
Nutritional deficiency anaemia	D50-D53		•
Diabetes mellitus	E10-E14	• (50%)	• (50%)
Thyroid disorders	E00-E07	•	
Adrenal disorders	E24-E25 (excl. E24.4), E27	•	
Diseases of the nervous system			
Epilepsy	G40, G41	•	
Diseases of the circulatory system			
Aortic aneurysm	I71	• (50%)	• (50%)
Hypertensive diseases	I10-I13, I15	• (50%)	• (50%)
Ischaemic heart diseases	I20-I25	• (50%)	• (50%)
Cerebrovascular diseases	I60-I69	• (50%)	• (50%)
Other atherosclerosis	I70, I73.9	• (50%)	• (50%)
Rheumatic and other heart diseases	I00-I09	•	
Venous thromboembolism	I26, I80	•	
Diseases of the respiratory system			
Influenza	J09-J11		•
Pneumonia due to streptococcus pneumonia or haemophilus influenza	J13-J14		•
Chronic lower respiratory diseases	J40-J44		•
Lung diseases due to external agents	J60-J64, J66-J70, J82, J92		•
Upper respiratory infections	J00-J06, J30-J39	•	
Pneumonia, not elsewhere classified or organism unspecified	J12, J15, J16-J18	•	
Acute lower respiratory infections	J20-J22	•	

Asthma and bronchiectasis	J45-J47	•	
Adult respiratory distress syndrome	J80	•	
Pulmonary oedema	J81	•	
Abscess of lung and mediastinum pyothorax	J85, J86	•	
Other pleural disorders	J90, J93, J94	•	
Diseases of the digestive system			
Gastric and duodenal ulcer	K25-K28	•	
Appendicitis	K35-K38	•	
Abdominal hernia	K40-K46	•	
Cholelithiasis and cholecystitis	K80-K81	•	
Other diseases of gallbladder or biliary tract	K82-K83	•	
Acute pancreatitis	K85.0, K85.1, K85.3, K85.8, K85.9	•	
Other diseases of pancreas	K86.1, K86.2, K86.3, K86.8, K86.9	•	
Diseases of the genitourinary system			
Nephritis and nephrosis	N00-N07	•	
Obstructive uropathy	N13, N20-N21, N35	•	
Renal failure	N17-N19	•	
Renal colic	N23	•	
Disorders resulting from renal tubular dysfunction	N25	•	
Unspecified contracted kidney, small kidney of unknown cause	N26-N27	•	
Inflammatory diseases of genitourinary system	N34.1, N70-N73, N75.0, N75.1, N76.4, N76.6	•	
Prostatic hyperplasia	N40	•	
Pregnancy, childbirth and the perinatal period			
Tetanus neonatorum	A33		•
Obstetrical tetanus	A34		•
Pregnancy, childbirth and the puerperium	O00-O99	•	
Certain conditions originating in the perinatal period	P00-P96	•	
Congenital malformations			
Certain congenital malformations (neural tube defects)	Q00, Q01, Q05		•
Congenital malformations of the circulatory system (heart defects)	Q20-Q28	•	
Adverse effects of medical and surgical care			

Drugs, medicaments and biological substances causing adverse effects in therapeutic use	Y40-Y59	•	
Misadventures to patients during surgical and medical care	Y60-Y69, Y83-Y84	•	
Medical devices associated with adverse incidents in diagnostic and therapeutic use	Y70–Y82	•	
Injuries			
Transport Accidents	V01-V99		•
Accidental Injuries	W00-X39, X46-X59		•
Intentional self-harm	X66-X84		•
Event of undetermined intent	Y16-Y34		•
Assault	X86-Y09, U50.9		•
Alcohol-related and drug-related deaths			
Alcohol-specific disorders and poisonings	E24.4, F10, G31.2, G62.1, G72.1, I42.6, K29.2, K70, K85.2, K86.0, Q86.0, R78.0, X45, X65, Y15		•
Other alcohol-related disorders	K73, K74.0-K74.2, K74.6-K74.9		•
Drug disorders and poisonings	F11-F16, F18-F19, X40-X44, X85, Y10-Y14		•
Intentional self-poisoning by drugs	X60-X64		•

Table D2: The causes of death and ICD-10 codes that were all ages in the 2016 ONS definition of avoidable mortality and are all ages in the "bespoke" definition

Condition group and cause	ICD-10 codes	Treatable	Preventable
Infectious diseases			
HIV/AIDS	B20-B24		•
Pregnancy, childbirth and the perinatal period			
Tetanus neonatorum	A33		•
Certain conditions originating in the perinatal period	P00-P96	•	
Adverse effects of medical and surgical care			
Misadventures to patients during surgical and medical care	Y60-Y69, Y83-Y84	•	
Injuries			
Transport Accidents	V01-V99		•
Accidental Injuries	W00-X39, X46-X59		•
Intentional self-harm	X66-X84		•
Event of undetermined intent	Y16-Y34		•
Assault	X86-Y09, U50.9		•
Alcohol-related and drug-related deaths			
Alcohol-specific disorders and poisonings	X45, X65, Y15		•
Drug disorders and poisonings	X40-X44, X85, Y10-Y14		•
Intentional self-poisoning by drugs	X60-X64		•

Appendix E: Comparing avoidable mortality and SMR<75 when accounting for physical morbidity, using HLE and DFLE

Table E1: Datasets used to analyse the relationship between avoidable mortality, SMR<75, and physical morbidity

Dataset	Description	Available breakdown
Directly standardised avoidable mortality, 2013-17	Directly standardised rate of avoidable deaths under 75 years of age per 100,000 people	Metropolitan boroughs, unitary authorities and non-metropolitan counties, by sex
Indirectly standardised avoidable mortality, 2013-17	Indirectly standardised rate of avoidable deaths under 75 years of age per 100,000 people	Metropolitan boroughs, unitary authorities and non-metropolitan counties, by sex
SMR<75, 2013-17	Indirectly standardised rate of all deaths under 75 years of age per 100,000 people	Metropolitan boroughs, unitary authorities and non-metropolitan counties, by sex
HLE, 2016-18	Estimate of number of years of life left spent in good to very good health	Metropolitan boroughs, unitary authorities and non-metropolitan counties, by sex and age at estimate (20-24, 45-49, 70-74)
DFLE, 2016-18	Estimate of number of years of life left spent living without a long-term condition or physical limitation	Metropolitan boroughs, unitary authorities and non-metropolitan counties, by sex and age at estimate (20-24, 45-49, 70-74)

Table E2: The correlational strengths (R²) between avoidable mortality, SMR<75, HLE and DFLE, among females

	HLE (20-24)	HLE (45-49)	HLE (70-75)	DFLE (20-24)	DFLE (45-49)	DFLE (70-74)
SMR<75	0.59	0.50	0.24	0.62	0.61	0.31
Directly standardised avoidable mortality	0.59	0.52	0.26	0.59	0.61	0.31
Indirectly standardised avoidable mortality	0.58	0.50	0.24	0.62	0.61	0.31

Table E3: The correlational strengths (R²) between avoidable mortality, SMR<75, HLE and DFLE, among males

	HLE (20-24)	HLE (45-49)	HLE (70-75)	DFLE (20-24)	DFLE (45-49)	DFLE (70-74)
SMR<75	0.66	0.55	0.28	0.65	0.64	0.34
Directly standardised avoidable mortality	0.65	0.56	0.29	0.62	0.63	0.34
Indirectly standardised avoidable mortality	0.66	0.54	0.27	0.64	0.63	0.33

Table E4: The correlational strengths (R^2) between avoidable mortality, SMR<75, and the proportion of people in good health or living disability free, among females

	Good health (20-24)	Good health (45-49)	Good Health (70-75)	Disability free (20-24)	Disability free (45-49)	Disability free (70-74)
SMR<75	0.20	0.48	0.52	0.14	0.58	0.62
Directly standardised avoidable mortality	0.16	0.55	0.57	0.09	0.64	0.65
Indirectly standardised avoidable mortality	0.19	0.49	0.53	0.13	0.59	0.62

Table E5: The correlational strengths (R^2) between avoidable mortality, SMR<75, and the proportion of people in good health or living disability free, among males

	Good health (20-24)	Good health (45-49)	Good Health (70-75)	Disability free (20-24)	Disability free (45-49)	Disability free (70-74)
SMR<75	0.47	0.59	0.60	0.21	0.59	0.69
Directly standardised avoidable mortality	0.44	0.65	0.64	0.15	0.64	0.70
Indirectly standardised avoidable mortality	0.47	0.60	0.60	0.20	0.60	0.69

Appendix F: Comparing avoidable mortality and SMR<75 when accounting for mental health need

Table F1: Variables used to measure mental health disorder prevalence

Variable	Description	MHIS alignment
Estimated prevalence of common mental health disorders (CMHD)	% of GP registered population aged 16 and over diagnosed with any form of depression or anxiety. PHE, 2018-19	Improved access to psychological therapies and community health
Estimated prevalence of dementia	% of GP registered population diagnosed with depression across all age groups. QOF, 2019.	Mental health five year forward plan
Estimated prevalence of emotional disorders	% of GP registered population diagnosed with an emotional disorder aged 5-16. PHE, 2015.	Children and young people's mental health
Estimated prevalence of conduct disorders	% of GP registered population diagnosed with a conduct disorder aged 5-16. PHE, 2015.	Children and young people's mental health
Estimated prevalence of kinetic disorders	% of GP registered population diagnosed with a kinetic disorder aged 5-16. PHE, 2015.	Children and young people's mental health
People subject to the mental health act	Rate of people subject to the mental health act per 100,000 people. NHS Digital, 2019.	A&E and ward liaison mental health services, adult community crisis, ambulance response services, the Mental Health Act 1983, and acute inpatient services
Deprivation score on multiple index of deprivation (IMD)	Deprivation score using IMD	Not a measure of mental health, but an important criterion for use in the health inequalities adjustment (e.g. SMR<75 correlates strongly with deprivation)

Table F2: The correlational strengths (R²) between directly and indirectly standardised avoidable mortality, SMR<75, and different measures of mental health conditions prevalence

Measure of mental health conditions prevalence	SMR<75	Directly standardised avoidable mortality	Indirectly standardised avoidable mortality
CMHD prevalence (16+)	0.50	0.57	0.51
Dementia prevalence	0.01	0.04	0.02
Emotional disorder prevalence (5-16)	0.67	0.69	0.67
Conduct disorder prevalence (5-16)	0.69	0.70	0.69
Kinetic disorder prevalence (5-16)	0.69	0.71	0.69
Rate of mental health act sectioning	0.03	0.06	0.04
Deprivation level	0.79	0.82	0.80

Table F3: The correlational strengths (R²) between directly and indirectly standardised avoidable mortality, SMR<75, and measures of GMHN based on the prevalence of different mental health disorders

GMHN per measure of mental health conditions prevalence	SMR<75	Directly standardised avoidable mortality	Indirectly standardised avoidable mortality
CMHD prevalence (16+)	0.04	0.04	0.03
Dementia prevalence	0.18	0.26	0.20
Emotional disorder prevalence (5-16)	0.09	0.06	0.08
Conduct disorder prevalence (5-16)	0.09	0.06	0.08
Kinetic disorder prevalence (5-16)	0.09	0.06	0.08
Rate of mental health act sectioning	0.22	0.20	0.22
Deprivation level	0.17	0.13	0.16

Table F4: The correlational strengths (R²) between directly and indirectly standardised avoidable mortality, SMR<75, modelled prevalence of depression, CMHD prevalence, and GMHN based on modelled depression and CMHN prevalence

Mortality measure	Depression (prevalence)	CMHD (prevalence)	Depression (GMHN)	CMHD (GMHN)
SMR<75	0.32	0.50	>0.01	0.04
Directly standardised avoidable mortality	0.27	0.57	0.02	0.04
Indirectly standardised avoidable mortality	0.31	0.51	>0.01	0.03

Appendix G: An assessment of SAMHI as a measure of unmet mental health need in the health inequality adjustment

Figure G1: Cartogram of SAMHI scores across CCGs
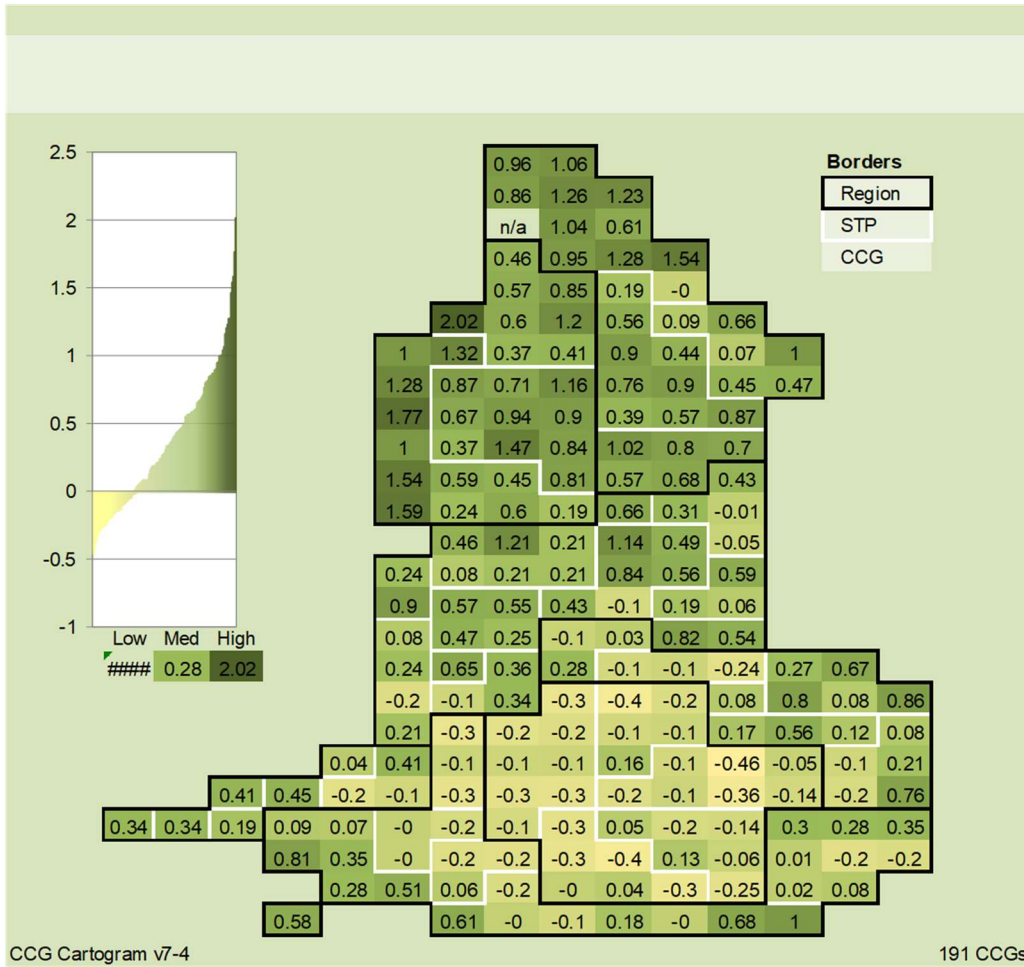
Figure G2: Cartogram of standardised difference between the mental health need index and SAMHI (low scores indicate CCGs where SAMHI is relatively greater than the mental health need index, indicating unmet mental health need)
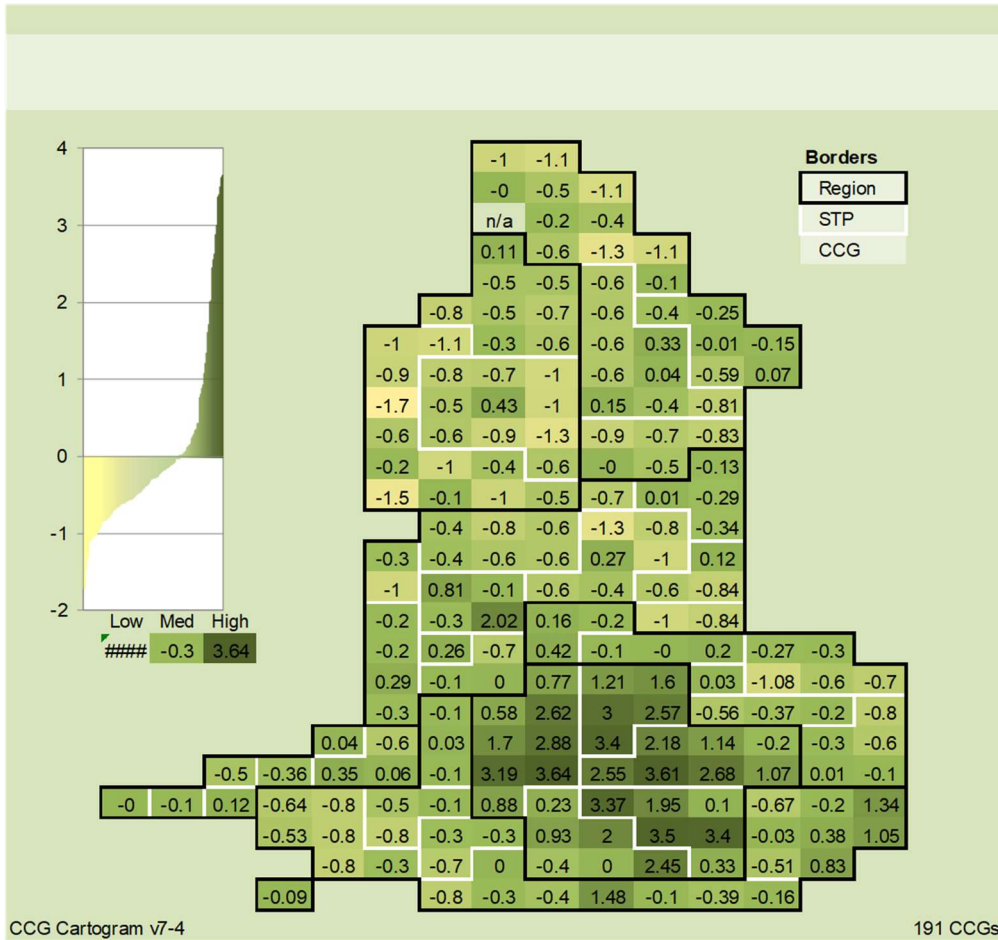
Table G1: The correlational strengths (R²) between SAMHI, the standardised difference between mental health need index and SAMHI scores, and the proportion of different age groups across CCGs

All CCGs	Under 18	18-65	65+
SAMHI	0.01	0.03	0.04
Mental Health Need Index - SAMHI	0.02	0.03	0.02

Excluding London	Under 18	18-65	65+
SAMHI	0.01	0.49	0.37
Mental Health Need Index - SAMHI	<0.01	0.04	0.03

Table G2: The correlational strengths (R²) between SAMHI, the standardised difference between mental health need index and SAMHI scores, and IMD level across CCGs

All CCGs	IMD Level (2019)
SAMHI	0.49
Mental Health Need Index - SAMHI	<0.01

Excluding London	Under 18
SAMHI	0.55
Mental Health Need Index - SAMHI	<0.01

Table G3: The correlational strengths (R²) between SAMHI, the standardised difference between mental health need index and SAMHI scores, and dementia prevalence across CCGs

All CCGs	Dementia Prevalence (QOF, 2019)
SAMHI	0.09
Mental Health Need Index - SAMHI	0.40

Excluding London	Under 18
SAMHI	0.01
Mental Health Need Index - SAMHI	0.05

Appendix H: Summary of alternative variables for measuring unmet mental health need evaluated in HITFG(2021)20

One way of further investigating the ability of the health inequality adjustment to capture unmet mental health need would be to analyse data from the Adult Psychiatric Morbidity and Mental Health of Children and Young People in England surveys . Using these datasets would confer several advantages:

- Prevalence of different mental health disorders is estimated based on questionnaire responses. Prevalence estimates therefore account for individuals meeting diagnostic criteria for disorders and not just individuals receiving treatment, better reflecting unmet mental health need.
- A range of common and severe (e.g. PTSD, personality disorders, addictions, self-harm) mental health disorders are included in the surveys. Furthermore, co-morbid mental and physical health conditions are also recorded, providing a more holistic perspective of potential relationships.
- Individual survey items can represent different aspects of mental health, which can be compared across different demographic variables (e.g. age, ethnicity, deprivation level).

However, there are also limitations in using these surveys to assess the ability of the health inequality adjustment to capture unmet mental health need:

- Due to the limited sample sizes, survey data can only be reported at national and regional level. Whilst this does not preclude using the data to investigate relationships with avoidable mortality and SMR<75, it inhibits the ability to investigate the impact upon the health inequality adjustment at CCG or ICB level.
- Surveys are not conducted routinely (e.g. the Adult Psychiatric Morbidity survey was most recently conducted in 2014). It may be more difficult to capture changes in unmet mental health need compared to more recent or regularly published data.
- Survey data are based on self-reported measures and subjective responses. Whilst these measures are valid and interviewers help ensure that surveys are completed correctly, the validity of mental health assessments may be lower than diagnoses made by clinicians.

An alternative to survey data for further investigating the ability of the health inequality adjustment to account for unmet mental health need is the Improving Access to Psychological Therapies (IAPT) dataset The IAPT presents several advantages:

- IAPT referrals include self-referrals, covering a greater range of individuals with mental health needs compared to GP referrals.
- IAPT data are published monthly and are available at CCG level. Recent changes and trends in mental health need are therefore easier to capture, as well as enabling assessments of the impact upon the health inequality adjustment at CCG and ICB level.
- Outcomes are measured in addition to prevalence (e.g. waiting time for treatment, recovery status), providing a more holistic view of mental health service inequality.

Again, there are also limitations from using the IAPT dataset:

- Whilst the IAPT includes self-referrals, the dataset is still based on individuals seeking access to psychological treatments. This reflects service utilisation, limiting the ability to measure unmet mental health need.
- IAPT focuses on treatments for common mental health disorders. Severe mental health disorders are not well reflected, limiting the ability to measure multiple forms of unmet mental health need.

Appendix I: Variation in population sizes for population groups relevant to health inequalities across ICBs

Table I1: Data used to measure population sizes of specific population groups affected by health inequalities

| Population	Variable	Description
Traveller community	Traveller Caravans per local authority, January 2020, Ministry for Housing, Communities and Local Government (MHCLG)	Local authorities provide biannual counts of Traveller caravans on sites within local authority boundaries. These include caravans on authorised sites with planning permission (e.g. private or socially rented), in addition to unauthorised sites without planning permission.
Homeless people	Percentage of households assessed as homeless per local authority, July 2020, MHCLG	Quarterly statistics on statutory homelessness, available by local authority.
People sleeping rough	Number of people sleeping rough per local authority, November 2019, MHCLG	Local authorities calculate the number of people sleeping rough in different ways. A count is conducted on one night between October 1st and November 30th of people visibly sleeping rough within the local authority boundary. Local authorities can also submit an evidence-based estimate by meeting with local agencies or include a spotlight count from a particular area alongside an overall estimate.
People sleeping rough	Number of people accessing emergency accommodation per local authority, January 2021, MHCLG	Survey of local authorities regarding the number of people accessing emergency accommodation, providing monthly snapshot data from September 2020 to January 2021.

Figures I1 and I2: Cartograms of the rate of Traveller caravans per 100,000 people per ICB in January 2020 (top), and percentage increase in ICB allocations based on corresponding population adjustment (bottom)

Figures I3 and I4: Cartograms of the rate of homeless households per 1,000 households per ICB in July 2020 (top), and percentage increase in ICB allocations based on corresponding population adjustment (bottom)

Figures I5 and I6: Cartograms of the rate of people sleeping rough per 100,000 people per ICB in November 2019 (top), and percentage increase in ICB allocations based on corresponding population adjustment (bottom)

Figures I7 and I8: Cartograms of the rate of people using emergency accommodation per 100,000 people per ICB in January 2021 (top), and percentage increase in ICB allocations based on corresponding population adjustment (bottom)
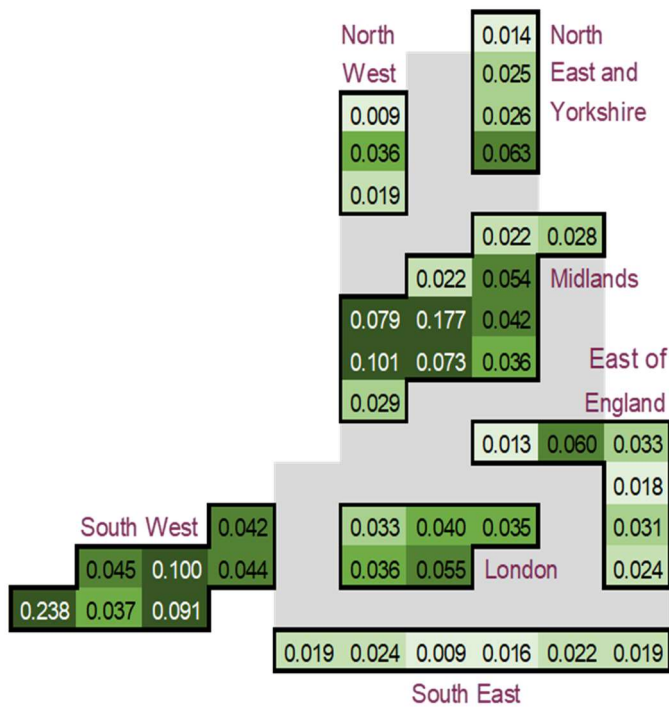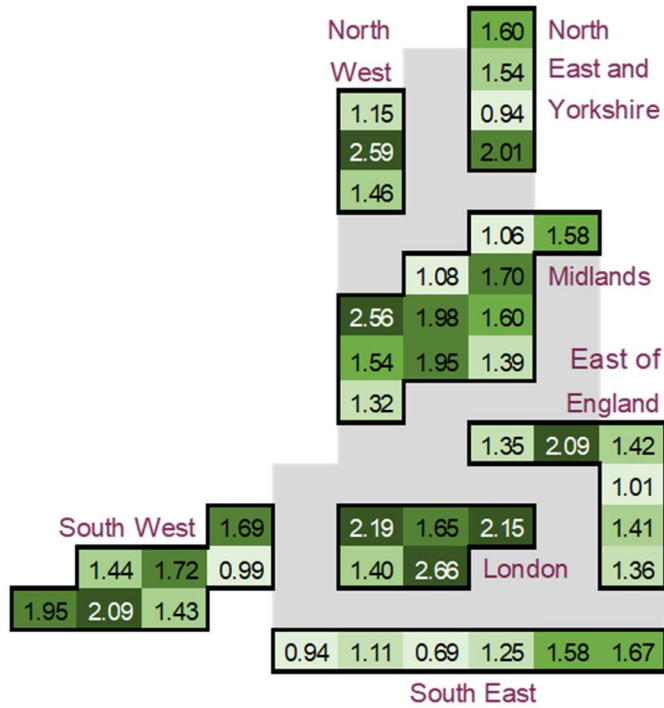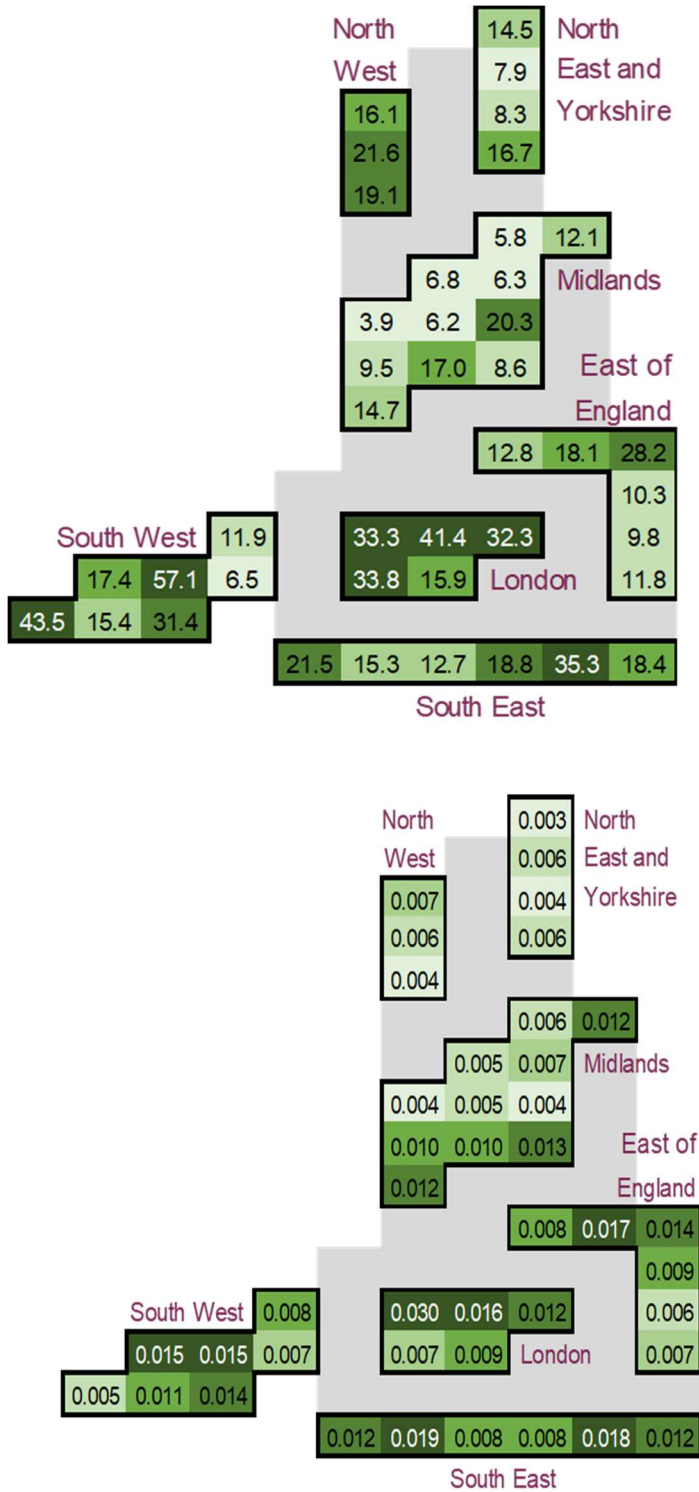
Appendix J: Factors in service delivery predisposing to health inequalities and their coverage by the CCG funding formulae

Figure J1: Health inequalities funding adjustment and potential calls on additional spend
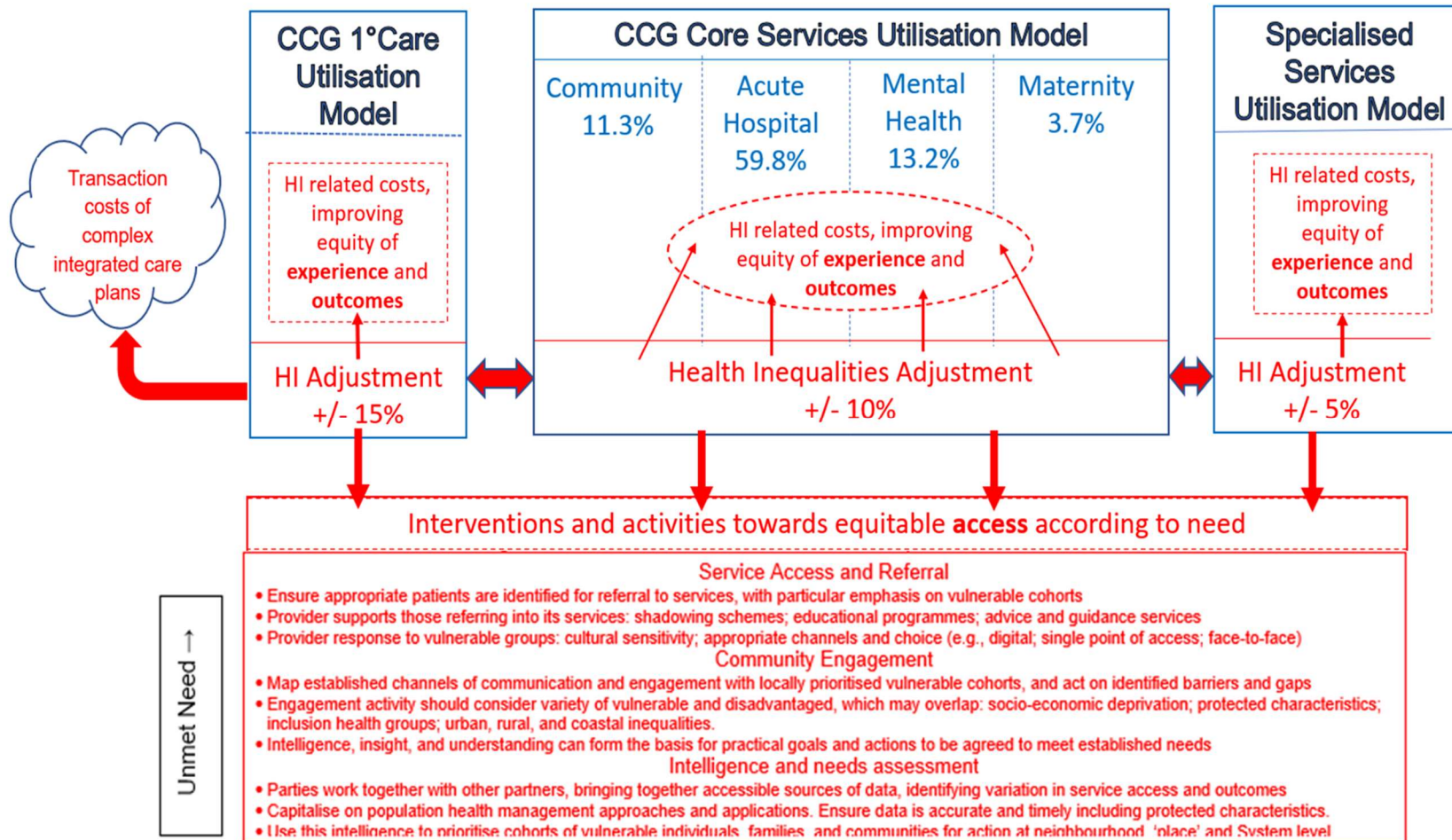
Table J1: Mapping of added costs due to deprivation in the Primary Care services formula

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	CCG formula
'Transaction costs' • Patients	Knowledge and understanding Cultural competency Health beliefs Interpretation/translation Self-management skills (e.g. DNAs)	Like transaction costs in G&A care – for primary care, some patients may need longer appointments with their GPs, for example, which will **reduce efficiency**. This could indicate higher costs for areas with more patients that potentially have interpretation / translation barriers, for example, or need extra support with understanding advice and information.	Where longer appointments are necessary this would be picked up as additional workload in the primary care formula. Additional transactional costs above the additional workload, for example interpretation services would not be included and could therefore need to be funded using the health inequalities adjustment.
Complex context	Income and debt Housing issues Employment Crime and legal Safeguarding Discrimination	Housing issues, income and debt and employment can lead to worse health, so areas with worse levels of these factors may have a larger burden on their primary services.	Investment in factors impacting on health care would require the use of the health inequalities adjustment.
Transaction costs • Services	Social care: adults; children Citizens advice Community health Mental health VCFSE	Community care and services are priced locally – should be based on actual local costs and **hence prices likely to compensate properly.**	VCFSE activity will not be covered in the existing formula and any expenditure would be discretionary use of the health inequalities adjustment
Multiple risks	Multiple behavioural risks Multiple risk conditions (anxiety/depression; BP: glucose; cholesterol; obesity)	Vaccinations like flu vaccines prioritised to certain areas of population (over 65 and those with underlying health conditions, for example). Areas with higher percentage of these groups will have higher uptake of vaccinations – could help with local outbreaks and reduce burden locally – less	Behavioural risks are not directly accounted for in the formula although the impact will be indirectly accounted for if this presents as increased workload for

	Behaviour change/relapse support Pro-active/failsafe actions for uptake: e.g. screening; health checks; vaccination	visits to GPs and hospitals, so less costs for providers. **Link to compensation?** Multiple risk conditions – some conditions may be more likely for certain people e.g. African or African Caribbean people are at higher risk of developing high blood pressure and having a stroke than other ethnic groups. Areas with more at-risk people from these multiple risk conditions may have higher health need due to these conditions and their complications – as well as increasing health need in the local area in general, they complicate treatments and procedures which creates a further financial cost.	patients. Pro-active and preventative
High condition incidence / prevalence	Burden of disease Late / crisis presentation Active search strategies for 'missing' patients Management of large long-term conditions registers Acute exacerbations / relapses	Burden of disease – on community services especially such as nursing and care homes (locally agreed prices, so should be based on actual local costs). Late/crisis presentation – higher burden on primary care (potentially more support out of hospital or more medication etc.).	Higher burdens of disease will be picked up in the primary care formula through increased workload for patients.
Multi-morbidity	Co-ordination / communication role Multiple referrals 'silo' condition management Conflicting treatment/medication Patient/carer confusion Inefficiencies/ higher costs	Aging populations tend to have more patients with multi-morbidities, which leads to higher rates of patients on multiple medications, increasing the risk of unintended drug interactions and complications. This could lead to **inefficiencies in the primary care system**, as more time is needed per patient, and more time is needed to check information such as previous or multiple referrals (could cause confusion) and ensuring the patient has proper care at home.	There are no morbidity indicators in the primary care model. However, to some extent this will be picked up through the any additional workload generated.

Table J2: Mapping of added costs due to deprivation in the CCG Core services: General and Acute formula

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	CCG formula
'Transaction costs' (structural and process costs of delivering an outcome/action. Not limited to admin costs, though may be a significant part, but also affect professional and practitioner time).	Knowledge and understanding Cultural competency Health beliefs Interpretation/translation Self-management skills (e.g. DNAs)	Tariff pricing is based off reference costs from the areas, so areas reporting higher costs for these reasons will be represented by higher reference costs. Reference costs are used in the calculation of tariff prices. If an area has a higher-than-average proportion of patients that cost more than the average due to additional complexities or additional costs of care then the tariff will not fully cover the costs.	Additional activity will be picked up in the utilisation model. Additional transactional costs above the additional workload, for example interpretation services would not be included and could therefore need to be funded using the health inequalities adjustment.

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	CCG formula
Diagnostics/investigations • Complexity • Invasiveness	Late presentation e.g.: • Late stage cancer • Diabetes already with complications Late stage diagnoses can be more common in more deprived areas or among older populations as people are less likely to know what symptoms to look out for and when to go to a medical professional (e.g. patient awareness about symptoms of breast cancer is lower among older women). Hence, areas with more patients who may lack this knowledge could have more cases of late presentations, which could cost more to treat as they are generally more advanced and complex.	<u>Diagnostic imaging</u> Some diagnostic imaging services are included in the patient's HRG national price (if admitted in hospital), some are 'empty core' HRGs so a price is paid per scan, and some have national prices. For admitted patients, diagnostic imaging is covered by national prices from APCS tariff list. Hence, the complexity of the diagnostic imaging service or the number of scans taken may not be properly compensated as it is all grouped in the HRG – this is supposed to group by resources used rather than diagnosis, but it is still a grouping so can't fully account for some of the more extreme cases.	Costs of diagnostics are picked up in the utilisation model.

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	**CCG formula**
Outpatients	Late presentation Complex co-morbidity Interpreter/cultural sensitivity	Each treatment function for outpatient attendances has a set price for four categories. Much less granular than HRG codes for elective and inpatient pricings (so **less accounting for complex co-morbidity and late presentation and additional costs for particular groups**). Hence, areas with higher proportions of patients with higher health need are potentially not reimbursed adequately for more complex outpatient procedures. **Doesn't seem to account for interpreter/cultural sensitivity adjustments.** Potentially appointments may take more time, and this increases costs that aren't being properly compensated. Even though prices are based on provider-level reference costs, they are averaged out for national prices so the more 'extremes' are lost.	Where more appointments are necessary this would be picked in the utilisation model. Additional transactional costs above the additional workload, for example interpretation services would not be included and could therefore need to be funded using the health inequalities adjustment.

Elective care	Pre-admission	HRGs **account for complex co-morbidities** which can be influenced by smoking/overweight factors, as well as pre-existing medicines. If a patient requires more resources for their treatment, they will be placed in an appropriate HRG which is then priced accordingly **(i.e. costs should be covered appropriately).**	The extent of comorbidities are accounted for in the formula.
- Population rate/age - Day case - In-patient episode - Excess LoS	- smoking/overweight - medical co-morbidity - medicines: e.g. anti-coagulant; steroids		Extra bed days and point of delivery are accounted for in the costs that are included when the allocations model is calculated and therefore additional costs due to complexities will be picked up to some extent in the modelling process.
		Long stay payments – many don't account for differing HRG complexities (set price for each day, many regardless of HRG complexity), so **hospitals may not be properly compensated for costs**. However, long stay payments only come into effect after a certain trim point, individual to the HRG, which is generally longer for more resource heavy, complex HRGs as these have longer average lengths of stay. **This does help to cover the costs appropriately.**	
		If an area has a greater than average proportion of complex patients attracting extra bed payments, then the full costs may not be covered for providers.	Additional costs above those included in the modelling process would require discretionary funding from the health inequalities adjustment.
			Patient Transport Service – Provides transport to and from healthcare appointments in non-emergencies – not explicitly

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	**CCG formula**
			accounted for in CCG formula, **so areas with more remote hospitals or more patients without their own means of transportation could be unfairly burdened.**

Non-elective care	Late presentation	Readmission – hospital doesn't get compensated for emergency readmission within 30 days of discharge from hospital, excluding admissions for cancer and obstetrics. It is intended to incentivise hospitals to reduce unplanned and avoidable emergency admissions, but this could be harder for some areas (e.g. areas with older populations who are more frail and prone to accident after a stint in hospital) than others to achieve and so those areas may be negatively impacted financially by this policy **(i.e. readmission costs potentially not covered in some areas).**	The higher proportion of non-elective care for patients from deprived areas will be picked up in the utilisation model. Additional costs incurred to try and change the pattern of utilisation from non-elective towards elective care would require funding through the health inequalities adjustment.
• Episodes • Population rate/age • Clinical complexity • LoS • Repeat/re-admission	Multimorbidity Complications Discharge complexity		
		A&E tariff prices and complexity – for patients not admitted into hospital after attending A&E, there are 12 HRGs (in 20/21 tariff) for the patient to be grouped in. Very general groupings, such as: "Emergency Medicine, Category *x* Investigation with Category *y* Treatment", so **costs not necessarily covered for more complex patients than average**. However, it must work the other way too – patients who require less than the average amount of resource may help to keep the area costs covered overall.	Ambulance services and higher costs for small hospitals with A&Es – the CCG allocation formula includes an emergency ambulance cost adjustment (EACA) which adjusts for unavoidable differences in the cost of providing these ambulance services across the country. There is also an adjustment to account for the higher costs of unavoidably small hospitals with 24-hour A&E services in remote areas. **Hence, more sparsely populated areas**
		Length of stay – impacted by clinical complexity (covered in HRG separations and by trim points) and discharge complexity. Delays at time of discharge can extend a patient's stay and cost the hospital more money, as well as potentially negatively impact the patient's recovery. **Trim points and**	

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	**CCG formula**
		excess bed days past that trim point allow for some compensation for delayed discharges.	**are getting some compensation for the higher costs of providing this non-elective care.**
Rehab and therapies • Sessions required	Effective compliance Assets and support Home environment	Physiotherapy – available through NHS, and some CCGs allow self-referral. It is classed as a community service and doesn't have a national price set in the tariff – hence subject to local pricing, and so **areas should be able to set prices that are suitable for their population's needs and are appropriate for local costs.** Post discharge currencies cover four rehabilitation pathways – cardiac, pulmonary, hip replacement, and knee replacement rehabilitation. In the tariff, there is one price per rehabilitation pathway, which surely cannot distinguish between the patients who require more support and resources and the ones who recover quickly and successfully. **Hence, some providers in areas with more patients who need extra support (e.g. older people, people with complex comorbidities, or people who don't have a suitable home environment to properly recover) may not be fully compensated.**	Complications such as effective compliance, assets and support, and home environment are all affected by a patient's housing situation, income and job security. Where these complications lead to additional costs then the health inequalities adjustment may be required to fund this.

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	**CCG formula**
Frailty / Dementia / End of life	Early onset Assets and support Premature mortality	Mainly provided through community care – essentially local level decisions based on actual cost. As this is locally determined, hard to measure how much the prices consider the different complexities such as early onset.	**The costs should already be covered by the age adjustment in formula. The community services element of the formula is heavily weighted to older populations.**

Table J3: Mapping of added costs due to deprivation for CCG Core services: Mental health formula

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	CCG formula
Complex contexts	Knowledge and understanding Cultural competency Health beliefs Interpretation/translation Self-management skills	Similarly to primary care, some patients may need longer appointments with mental health services which would reduce efficiency. Examples of this include: - Appointments where translators are required - Appointments with patients requiring extra support because of cultural beliefs or stigma about mental health	Not directly accounted for in the mental health model but ethnicity was included in the modelling and higher costs were associated with being Irish, Black African, Black Caribbean or of mixed ethnicity, compared with White British.
Multiple risks	Income and debt Housing issues Employment Crime and legal Safeguarding Discrimination	Experiencing disadvantage and discrimination can increase the risk of mental health problems. People with mental health problems can be affected by a 'spiral of adversity' where factors such as employment, income and relationships are affected by their condition. People who live in deprived areas are more likely to need mental healthcare but less likely to access support and to recover following treatment. This compounds and worsens mental health problems. As an example, the IAPT annual report shows the reliable recovery rate for patients in the most deprived quintile was 40.8% in 2019/20, compared to 54.1% for the least deprived.	Household type was included in the mental health model, people living alone were associated with high costs. People living in areas with a higher percentage of out-of-work benefit recipients were included in the model and associated with higher costs.
High condition incidence / prevalence	Burden of disease Late / crisis presentation More complex presentations in all pathways	Deprivation and social/economic inequalities are associated with poorer mental health and wellbeing, including increased prevalence of psychotic disorders and common mental health problems.	The mental health model included severe mental illness prevalence in GP practice which was associated with higher costs. Previous hospital admissions for physical health conditions were included in the model, many of which (including drug poisoning and

			symptoms and signs involving cognition, perception, emotional state and behaviour) were associated with higher costs. The proportion of benefit claimants in an area was included as a proxy for deprivation. The need for mental health services as calculated by the utilisation model strongly correlates with deprivation so the CCG formula targets more resource to areas with high mental health need measured as service use, excluding those with mental health problems who have not accessed services.

Table J4: Mapping of added costs due to deprivation for CCG Core services: Maternity formula

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	**CCG formula**
Complex Context	Complex social factors: Recent refugee / migrant / doesn't speak English, homeless, domestic violence, substance misuse	In most instances, any additional cost would be covered within the Aligned Payment and Incentive (API) approach, as part of the fixed payment which is based on the cost of delivering system plan. Where the provider/commissioner relationship is not within the scope of API (i.e. out of area or independent sector activity), this activity would attract an 'Intermediate' tariff payment for antenatal / postnatal care	Not directly accounted for in the CCG allocations, but the model includes but the utilisation model includes a deprivation indicator and some minority groups
Complex context	Debt / employment Safeguarding needs cultural competency e.g. need to take account of cultural / faith	Additional time required in appointments or for liaison with external agencies not accounted for	Not directly accounted for in CCG allocations, but the utilisation model includes a deprivation indicator and some minority groups
Multi-morbidity	Co-morbidities including obesity, diabetes type 2, mental health, heart disease	Additional complexity in managing care would attract an 'intermediate' or 'intensive' tariff if not captured within an API payment.	Morbidity flags are included in the model.
Antenatal	Smoking.	Smoking is the single biggest cause of stillbirth and often results in low birth weight baby. Additional advice and scans are likely.	Additional appointments will have been included in the utilisation model. Low birth weight is also included in the model.
Antenatal / postnatal	Deprivation: There remain statistically significant differences in the maternal mortality rates between women living in the most deprived areas and those living in the least deprived areas. Maternal mortality rates are higher amongst	Evidence recommends continuity of care targeted at women in deprived communities and those from Black, Asian and mixed ethnicity backgrounds. Enhanced continuity requires longer appointment time	Deprivation is included as a predictive factor in the maternity model, as are some ethnic groups.

	older women, those living in the most deprived areas and amongst women from particular ethnic minority groups (MBRRACE). Stillbirth rates are also higher to women resident in the most deprived areas, compared with the least deprived areas. In 2018, the stillbirth rate in the 10% most deprived areas in England was 5.7 stillbirths per 1,000 total births, compared with 2.7 stillbirths in the 10% least deprived areas (ONS)		
Community care	People from deprived communities are less able to travel to appointments and benefit more from community hubs where services are integrated. Particularly effects dispersed rural communities.	Costs of community hubs and other community clinics not accounted for	Issues of access and providing additional services to improve access would need to draw on the health inequalities adjustment.

Table J5: Mapping of added costs due to deprivation for CCG Core services: Prescribing formula

Component of care	Complicating factors	Costs covered in…?	
		Tariff / Price Production	CCG formula
Complex content	Income and debt Housing issues Employment Crime and legal Safeguarding Discrimination Rurality	• Income and debt impact on prescribing decisions and ability for patients to agree on medication. For example, treating exacerbation of asthma may require issuing 4 prescriptions (steroids, antibiotics, brown inhaler, blue inhaler). Some patients have to make a choice which one item to pay for – where they don't have free prescriptions. This can be also seen in commencing patients on long term condition medication e.g. blood pressure tablets, heart disease treatment etc The upfront saving scheme for prescriptions still requires a bulk payment up front and not a monthly payment or small payments https://www.nhs.uk/nhs-services/prescriptions-and-pharmacies/save-money-with-a-prescription-prepayment-certificate-ppc/ This also presents in children for example where although lots of work on encouraging purchase over the counter of simple treatments e.g. hay fever medication, paracetamol, wart treatment – where there is low income – requests for prescriptions are common which generates additional workload for practices. Pharmacy first diversion schemes can still result in General practice work with patients returning	Where the additional costs of prescriptions for medication available over the counter are linked to issues related to deprivation this will be picked up to some extent in the model as IMD is a variable in the model. Where this is due to other factors this may require funding from the HI adjustment.

		to request the prescription to ensure medication is free. Impact of rurality – where patients cant access cheaper over the counter alternatives there could be a demand for prescriptions on NHS if able to access them for free.	
Multiple risks	Multiple behavioural risks Multiple risk conditions (anxiety depression; BP; glucose, cholesterol and obesity) Behaviour change/relapse support Proactive/failsafe actions For uptake e.g. screening, health checks and vaccinations	• Potential for lower uptake of health prevention offers e.g. smoking cessation prescriptions, immunisations e.g. flu/COVID requiring teams in these areas to adopt different styles of provision which may not be funded in the GMS contract • Risks of alcohol, drug use can be higher adding complications to prescribing.	Behavioural risks are not directly accounted for in the formula although the impact will be indirectly accounted for if this presents as prescribing cost or is linked to deprivation.
High condition incidence/prevalence	Burden of disease Late crisis presentation Active search strategies for 'missing patients'. Management of long-term conditions Acute exacerbations and relapses	• May be higher burden of disease requiring higher prescription spend • Crisis presentation – prescriptions needed to manage the condition, complications risk e.g. antibiotics for exacerbation of COPD/asthma, or for treating leg ulceration in diabetes	If the higher burden of disease is related to age and/or deprivation this will be picked up to some extent in the model as IMD is a variable in the model. Where this is due to other factors this may require funding from the HI adjustment.
Multi-morbidity	Coordination/communication role	• In more deprived communities or certain people have risk of developing health conditions e.g. DM, hypertension, COPD at a younger age than in areas.	Where there is earlier onset of certain diseases this may not be fully accounted for in

	Multiple referrals as systems not set up to manage and tend to work in silos Risk of conflicting treatment/medication Patient/carer confusion Inefficiencies and higher costs	Where this might be expected to be developed at an older age. Conflicting treatment/medication – for example multiple conditions needing treatment, may end up having to prescribe other medication to counteract the side effects of essential medication. • Confusion of patient or carer around medication can lead to over-ordering prescriptions for example or under-ordering.	allocations as it is based on age/gender average costs. It may be picked up to some extent through the deprivation and DLA payments variables.
Access to wider primary care e.g. dentistry, optometry, pharmacy	Variation in access to General practice in more deprived areas, and the wider primary care team can lead to additional work in general practice	• For example, seeking GP prescription for antibiotics for dental infection, or optometry requesting dry eye drops which can be purchased but as explained above patient requesting free prescription.	Additional prescribing costs due to lack of access to other services would likely require use of the HI adjustment
General points		• A more general point – e.g. adopting gold standard treatment in primary care e.g. DOAC prescribing instead of warfarin can cause a huge increase in prescribing spend. This is in general looked at in isolation and not compared to balancing metrics such as e.g. reduced admissions for stroke and impact on employment and ill health. So, prescribing has downstream and upstream impacts which are affected by wider determinants of health (e.g. social care, housing, education, employment etc)	The additional cost of prescribing certain drugs for some conditions that may be more prevalent in deprived areas will likely require use of the HI adjustment as the average spend per age/sex group was calculated before such drugs were available.