

Measuring and Tracking Health Inequalities

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1 Report Information

This report on health inequalities in Kent forms part of a trio of reports focussed on the overlapping determinants of health outcome inequality.

The other reports in the series are:

- Introducing Health Inequalities in Kent
- Exploring Health Inequalities in Kent

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2 Glossary

Age-standardised Rate

A rate that has been adjusted to account for differences in age structure between populations. This allows fair comparisons between groups by removing the effect of one population being older or younger than another. The 2013 European Standard population has been used.

Deprivation

A lack of the resources and opportunities needed for a healthy and prosperous life. Deprivation encompasses multiple aspects of disadvantage, including low income, unemployment, poor housing, lower educational attainment, and reduced access to services and amenities.

Health Outcome

A measure of health status within a population. In this report, health outcomes include disease prevalence, hospital admissions and A&E attendances and reflect the health of different population groups.

Index of Multiple Deprivation (IMD)

The official measure of relative deprivation in England. It combines information on income, employment, education, health, crime, housing and the living environment to rank small geographic areas from most deprived to least deprived.

Inequality

Differences in health outcomes between population groups. In this report, an inequality exists where there is a gap between health outcome rates for different population groups.

Inequality Dimension

A characteristic used to examine differences in health outcomes between groups. The four inequality dimensions considered in this report are deprivation, ethnicity, coastal/non-coastal status and rural/urban status.

Lower Super Output Area (LSOA)

A small geographic area used for statistical analysis in England. LSOAs typically contain around 1,500 residents and are designed to be broadly consistent in population size. In this report, LSOAs are the geographic unit used to analyse area-level deprivation and other geographic characteristics.

Model-adjusted Rate

An estimated rate produced using regression modelling. It represents the expected rate for a group after accounting for other factors included in the model, such as age, sex, deprivation, ethnicity and geography. Model-adjusted rates are used to estimate the independent association between an inequality dimension and a health outcome.

Quintile

One of five equal-sized groups into which a population is divided. In this report, deprivation quintiles group the population from the most deprived 20% (Quintile 1) to the least deprived 20% (Quintile 5).

Regression Model

A statistical method used to estimate the relationship between an outcome and one or more explanatory factors. In this analysis, regression models are used to assess the association between health outcomes and factors such as deprivation, ethnicity, age, sex and geography while accounting for the influence of the other factors.

3 Executive Summary

3.1 Purpose

Health inequalities remain a central challenge for health systems nationally. This analysis identifies, quantifies and compares health outcome inequalities in Kent based on deprivation, ethnicity and geography. It also measures how deprivation-related inequality has changed over time.

3.2 Approach

The analysis examines health outcome inequalities among people registered with general practices in Kent, using ten indicators covering disease prevalence, hospital admissions and A&E attendances.

Regression modelling adjusts for key socio-economic, demographic and geographic factors to enable fair comparison between groups. Inequality is assessed across four dimensions: deprivation, ethnicity, coastal status and rurality.

Figure 1 shows the simplified data analysis process starting with raw data and progressing through to complex statistics that identify and measure inequalities.

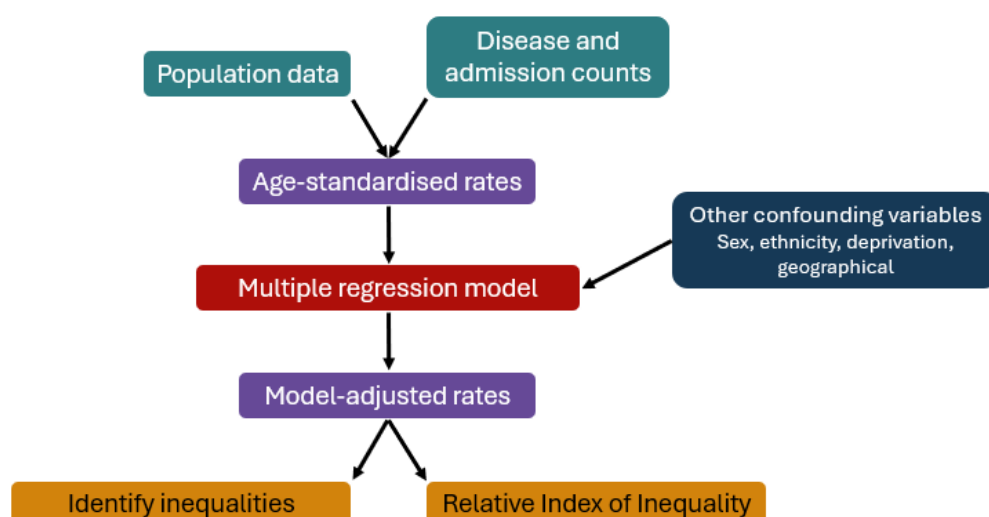


Figure 1. Data analysis process

3.3 Key Findings

Deprivation is the dominant and most consistent driver of poor health outcomes

- Across almost all indicators, deprivation shows the strongest and most consistent relationship with poorer health.
- The most deprived 20% of the Kent population repeatedly have the worst outcomes across 9 of 10 indicators (respiratory admissions in 0–19s being the exception).
- Even after controlling for age, ethnicity, rurality/urbanity and coastal status; deprivation continues to exert a strong, independent effect.
- Deprivation inequality appears to have remained broadly stable over time.

Ethnicity influences health outcomes, but in complex and condition-specific ways

- Asian groups have the highest diabetes prevalence but lower than average rates across many other indicators.
- Black groups exhibit markedly higher hypertension prevalence.
- White groups have the worst outcomes for several major indicators.
- Ethnic differences remain significant even after adjusting for confounders. However, under-diagnosis or data quality issues in certain ethnic groups may mask true inequalities.

Rural areas often look healthier, but this is partly misleading

- Apparent rural advantage often reflects population composition and rural populations tend have more limited access to services.
- Urban environment factors such as housing quality, pollution and population density likely drive additional risk not captured in deprivation indices.

Coastal inequalities are clear and partly attributable to population composition

- Coastal areas tend to have worse health outcomes independent of deprivation, ethnicity, rurality, sex and age but adjusting for these factors reduces the coastal inequality.
- Coastal inequality is partly explained by the coastal demographic profile (older, more deprived, more White).

4 Introduction

4.1 Health Inequalities

“Health inequalities are unfair and avoidable differences in health across the population, and between different groups within society” [1]. Health inequalities encompass variations in health status, life expectancy, and the prevalence of diseases among different socioeconomic groups, ethnicities, and geographic locations.

There is currently a renewed focus nationally and across all major health organisations in the UK to address health inequalities. The identification and reduction of inequalities are key themes of the Kent and Medway Integrated Care Strategy.

Inequalities are often rooted in wider determinants of health such as education, employment/income, access to greenspace, and housing. The combination of socio-economic, environmental and demographic factors affect an individual’s behaviour and access to care, which ultimately affects health outcomes.

Health outcomes such as life expectancy, disease prevalence and hospital admissions can be used as indicators of the inequalities in health that exist between different population groups. Inequalities exist on the basis of gender, ethnicity, disability, age, socioeconomic status and geography.

4.2 Analysing Health Inequalities in Kent

This analysis focuses on ethnicity, deprivation, coastal versus non-coastal geography, and urban–rural classification because these dimensions are well established drivers of health inequality across England and the UK. National evidence consistently shows that socioeconomic disadvantage, place-based factors, and protected characteristics such as ethnicity are strongly associated with differences in health outcomes. Using these dimensions therefore provides a robust and evidence-based framework for understanding and comparing health inequalities within Kent [2, 3].

Sex was not examined as a standalone inequality dimension in this first version of the analysis. Instead, sex was included alongside age as an adjustment variable within the regression models.

4.2.1 Deprivation Inequality

Deprivation is a core dimension for analysing health inequalities because it reflects the conditions in which people grow, live, work and age, and these conditions shape health across the life course. Evidence describes the following as wider or social determinants of health: income, employment, housing, education and the local environment, all of which are related to deprivation and influence physical and mental health and wellbeing [4, 5].

Deprivation affects health through several linked mechanisms. Lower income can limit access to essentials that support good health, while insecure or certain work types can increase stress and reduce control over daily life. Poor housing, fuel poverty, and weaker local environments can increase exposure to physical and mental health risks and can make healthy choices harder to sustain. Disadvantages in childhood can also carry forward into adulthood through poorer early development, lower educational attainment and reduced employment opportunities, creating cumulative effects over time. All the while, these outcomes are reversed for people in less deprived areas, creating inequality [4, 5].

These mechanisms are reflected in a clear national social gradient in health. In England, people living in the most deprived areas live shorter lives and spend substantially fewer years in good health than those in the least deprived areas, with the gap in healthy life expectancy remaining particularly large. Deprivation is therefore not simply a background characteristic; it is one of the main systems through which health inequalities are produced, concentrated and sustained, making it an essential dimension in any assessment of unequal health outcomes [2-7].

4.2.2 Ethnic Inequality

Ethnicity is an important dimension in health inequalities because differences between ethnic groups are seen not only in health outcomes, but also in the social factors and access to healthcare services that shape those outcomes. National Census analysis shows that patterns of health, disability, housing, education and employment vary considerably between ethnic groups, and that these differences overlap with factors such as age, income and place. This means ethnicity is not best understood as an isolated characteristic, but as one of the ways in which structural disadvantage, unequal exposure to risk, and unequal access to opportunity are experienced across the population [8].

The value of ethnicity as a dimension is also clear because inequalities appear across very different parts of the health system. ONS analysis has shown variation in self-reported general health between ethnic groups. UKHSA has likewise shown that some ethnic minority groups experience much higher burdens of serious infectious disease, indicating that inequality can operate through prevention, exposure, diagnosis and treatment as well as through broader living conditions [8-11].

Taken together, this makes ethnicity a justified dimension for local analysis because it provides another way of examining how differences in health outcomes and interaction with services are distributed across groups which is necessary to best understand health inequalities.

4.2.3 Coastal inequality

Coastal versus non-coastal geography is a useful dimension because coastal communities often experience a distinct combination of demographic, economic and service pressures that affect health. National evidence suggests that poorer health in coastal areas is linked not only to deprivation, but also to older age structures, weaker transport connections, labour market challenges, housing problems and difficulties attracting and retaining health and care staff. In that sense, coastal areas can act as a place-based form of disadvantage with their own mechanisms, rather than simply being another expression of deprivation alone [12].

This matters for health inequalities because the characteristics of coastal places can shape both need and access. The Chief Medical Officer's report argues that many coastal communities have more in common with one another than with neighbouring inland areas, particularly in relation to chronic disease burden, workforce shortages and the wider determinants of health. ONS Census analysis supports this by showing that coastal built-up

areas tend to have older populations, poorer self-reported health, higher levels of disability, lower employment and lower qualification levels than non-coastal areas, even after accounting for age in some comparisons [12, 13].

Coastal/non-coastal status is therefore a justified dimension because it captures a broader pattern of place-based inequality that can influence health independently of deprivation alone. Using it in local analysis helps test whether Kent's coastal communities show the same nationally recognised pattern of combined demographic, economic and service disadvantage.

4.2.4 Rural/urban inequality

Urban/rural geography is also a valid dimension, although it is best understood as capturing different types of inequality in different settings, rather than a simple hierarchy in which one is always worse. National guidance identifies geography, including whether places are urban, rural or coastal, as one of the broad factors that contributes to health inequalities because where people live affects transport, employment, education, local services and access to care [2, 3, 14, 15].

Rural areas can appear healthier on some overall measures, but this can mask distinctive risks linked to older populations, longer travel distances, transport dependence and reduced physical access to services. DEFRA's Statistical Digest of Rural England shows that rural populations are older on average and that life expectancy is generally higher, but this does not remove the practical challenges that rural communities can face in accessing care and support [14].

Urban areas, by contrast, may concentrate different forms of need. ONS analysis of built-up areas shows that health outcomes vary by settlement type, deprivation and ethnic group, and that major built-up areas can have higher age-standardised rates of poor self-reported health and disability. This suggests that urban/rural classification is useful not because it provides a single explanation, but because it helps distinguish between different patterns of risk, access and service demand across places [15].

Urban/rural status is therefore a justified dimension for investigation because it helps show how geography shapes both everyday determinants of health and the practical ability to benefit from services.

5 Aim

The aim of this analysis is to identify health inequalities in the populations of interest, measure the scale of those inequalities, and assess changes over time. Through regression modelling, the analysis seeks to distinguish the independent effects of deprivation, ethnicity, coastal status and rurality on health outcomes, separating these from the influence of other demographic and geographic factors. This provides insight into the extent to which each dimension contributes to observed inequalities and identifies which dimensions are most likely to drive differences in health outcomes across Kent.

6 Method

6.1 Population Indicators

The analysis focuses on people registered with general practices in Kent.

Ten indicators of health outcome inequality are included and selected to cover different population groups, trends and levels of preventability (Table 1). Indicators more responsive to change are classed as short-term; those less responsive are classed as long-term.

Table 1. Indicators used for the analysis of health inequality

Health Outcome	Age group	Short/Long-Term
A&E attendances	5+	Short-term
Emergency hospital admissions for any reason	5+	
Emergency hospital admissions for respiratory conditions	0-19	
Smoking prevalence	16+	
People with two or more long-term conditions	15-65	Long-term
Obesity-related hospital admissions	18+	
Diabetes prevalence	18+	
Coronary heart disease (CHD) prevalence	30+	
Hypertension prevalence	20+	
Depression prevalence	18+	

6.2 Approach

Regression modelling was used to estimate the independent association between each inequality dimension and health outcomes (see Appendix section 9.1.1) for detail on the regression model). Using multiple regression modelling, the analysis adjusts for key socio-economic, demographic and geographic factors that influence differences in disease rates and hospital use. This adjustment allows more meaningful comparisons between population groups. Figure 2 shows the data analysis process starting with raw data and progressing through to complex statistics that identify and measure inequalities.

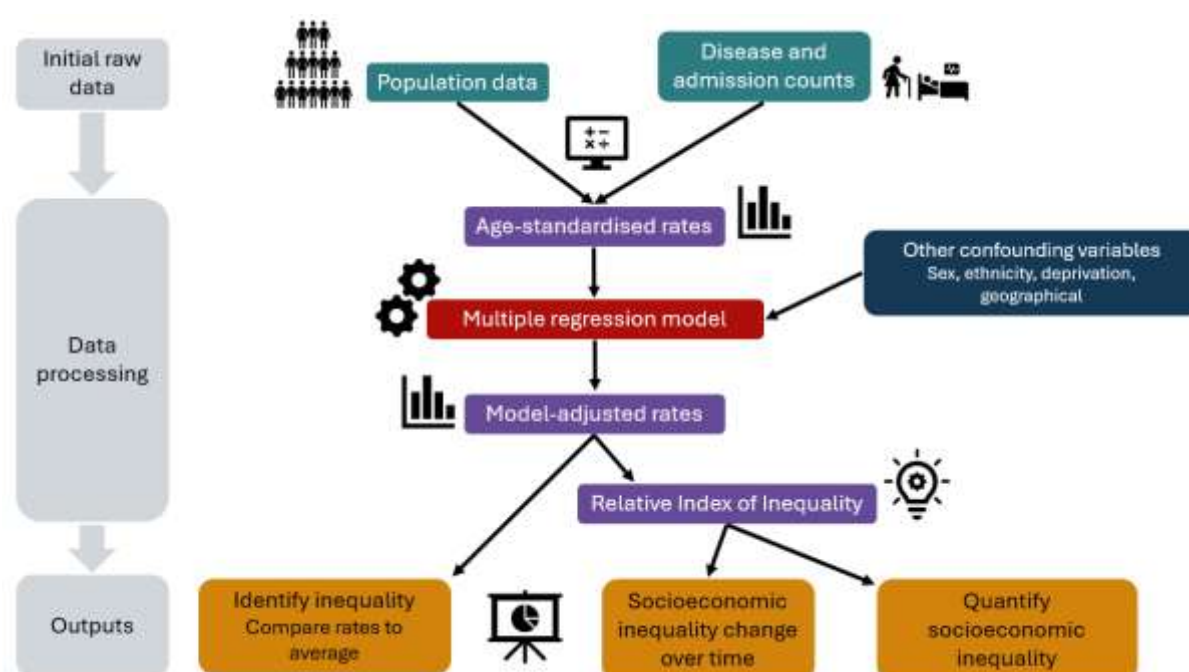


Figure 2. Data analysis process

This is an area-based analysis with data aggregated at lower super output area (LSOA). Although deprivation is measured at LSOA level, it should be noted that not all people in the LSOA will experience deprivation equally.

Due to data quality issues, hospital admission analysis for residents in Dartford, Gravesham and Sevenoaks districts has been removed.

6.3 Factors Considered

The socio-economic, demographic and geographic factors adjusted for are as follows:

- Deprivation (Index of Multiple Deprivation 2025)
- Ethnicity
- Sex
- Age
- Coastal/Non-coastal classification
- Rural/Urban classification

Four factors—deprivation, ethnicity, coastal classification and rural/urban classification—are treated as inequality dimensions. In each of these dimensions, all other factors are treated as confounding factors that influence outcomes across all dimensions.

6.4 Group Comparisons

Each inequality dimension is divided into groups (shown in Table 2). To identify unequal outcomes, each group's rate is compared with the average rate for that dimension. When calculating the average, each group is weighted equally to avoid larger groups dominating the results.

Table 2. Dimensions of inequality

Dimension	Number of groups	Groups
Deprivation	5	Most deprived 20% of the population sequentially to least deprived 20%
Ethnicity	5	Asian, Black, Mixed, Other, White
Coastal	2	Coastal residents, non-coastal residents (LSOA based)
Rural/Urban	2	Rural residents, urban residents (LSOA based)

6.5 Data Used

A single year of data is used when comparing groups to the average.

- Hospital admissions and A&E attendances: 2024/25 financial year
- Disease and smoking prevalence: November 2025 population snapshot

6.6 Measuring Deprivation Inequality Over Time

Changes in inequality over time are measured for deprivation only, using model-adjusted rates. The Relative Index of Inequality (RII) is used to assess the scale of deprivation gaps and year-on-year change.

- Hospital admissions and A&E attendances: 2024/25 (Year 2) compared with 2023/24 (Year 1)
- Disease and smoking prevalence: November 2025 (Year 2) compared with November 2024 (Year 1)

7 Results

7.1 Age-standardised Rates

As a first step in the analysis, A&E attendance rates, hospital admission rates and disease prevalence rates presented in this section are adjusted for age only to account for differences in the age structure of groups within inequality dimensions. No other confounding factors are accounted for. This shows how each inequality group compares for each indicator and shows where observed rates, after controlling for age differences within the groups, are high or where patterns exist.

Under-recording of ethnicity in both primary care and hospital settings may artificially produce differences in health outcome measures between ethnic groups. Research by the

NHS Race and Health Observatory found that some ethnic groups, most notably Mixed, Chinese and Indian, were under-represented in health data when compared with national population estimates. 'Other' ethnicity codes were found to be over-represented [16].

Similarly, under-presentation at primary care may produce artificial differences in prevalence measures.

7.1.1 Short-term Indicators

Figure 3 shows age-standardised rates in each inequality dimension for short-term indicators.

For respiratory conditions in children aged 0-19, rates are similar across all population groups. For the other short-term indicators, there is significant variation within the dimensions of inequality. Rates in the most deprived quintile of the population and rates in coastal areas tend to stand out as being higher.

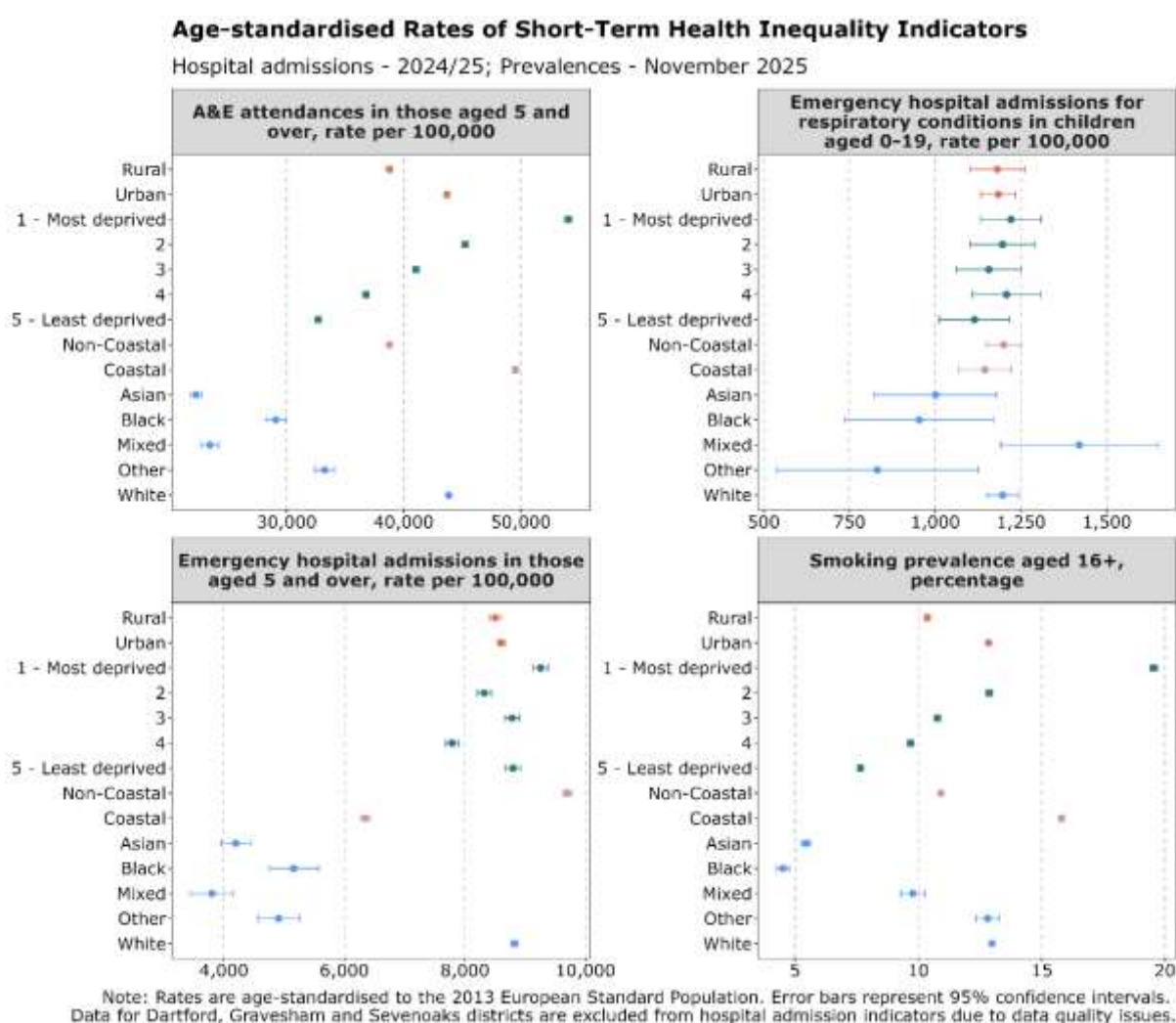


Figure 3. Age-standardised rates for groups in each inequality dimension – short-term indicators

7.1.2 Long-term Indicators

Figure 4 shows age-standardised rates in each inequality dimension for long-term indicators.

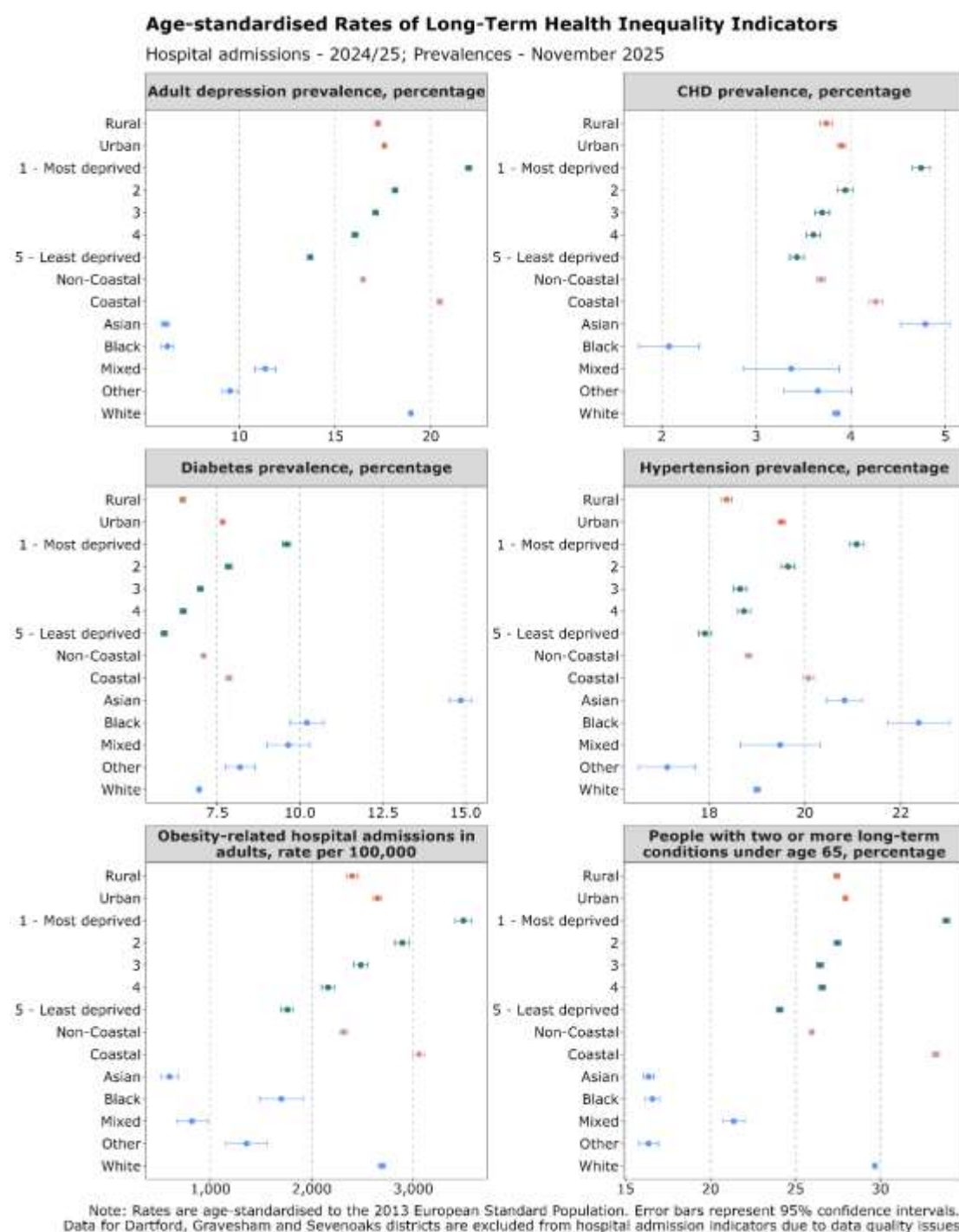


Figure 4. Age-standardised rates for groups in each inequality dimension

7.2 Model-adjusted rates

Age-standardised rates vary between groups within each inequality dimension. For example, diabetes prevalence is higher in the Asian ethnic group compared to the Black ethnic group; obesity-related hospital admissions are higher in coastal areas compared to non-coastal areas.

Model-adjusted rates give an indication as to whether the variation in age-standardised rates can be explained by the variation in confounding factors.

The model-adjusted rates show that after controlling for confounding factors, differences in rates still exist between groups within inequality dimensions.

7.2.1 Deprivation

Figure 5 (see page 22) shows that controlling for variations in sex, age, ethnicity, coastal, and rural/urban status between different deprivation quintiles has little impact on the pattern of rates across deprivation quintiles. The most deprived 20% of the population continues to have the worst health outcomes apart from emergency hospital admissions for respiratory conditions in children aged 0-19 where rates in the most deprived are similar to other deprivation quintiles.

For most indicators, after adjusting for confounding factors, the difference between the most deprived quintile and the second most deprived quintile reduces.

7.2.2 Ethnicity

Figure 6 (see page 23) shows that when the variations in sex, age, deprivation, coastal, and rural/urban status between different ethnic groups are controlled for, the pattern of rates across ethnic groups is broadly similar to age-standardised rates.

The Asian ethnic group continues to have the highest prevalence of diabetes; this is possibly explained by a combination of genetic and lifestyle factors [17]. The Black ethnic group continues to have the highest prevalence of hypertension; and the White ethnic group has the highest rates of adult depression, emergency hospital admissions, A&E attendances, obesity-related hospital admissions, smoking, and people with two or more long-term conditions under the age of 65.

It should be noted that differences in rates between ethnic groups could be the result of under-diagnosis or poorer recording of ethnicity in some ethnic groups.

7.2.3 Coastal/Non-coastal

Figure 7 (see page 24) shows that when the variations in sex, age, deprivation, ethnic diversity, and rural/urban status between coastal and non-coastal populations are controlled for, differences in prevalence and admission rates between coastal and non-coastal populations are still evident.

Coastal populations have higher rates of coronary heart disease, hypertension, obesity-related hospital admissions, long-term conditions under the age of 65 and smoking.

Non-coastal populations have higher rates of emergency hospital admissions.

Eight of ten indicators have higher unadjusted rates in coastal areas. For six of these indicators, the inequality between coastal and non-coastal populations reduces after adjusting for variations in sex, age, deprivation, ethnic diversity, and rural/urban status but does not disappear.

7.2.4 Rural/Urban

Figure 8 (see page 25) shows that age-standardised rates tend to be lower in rural areas. However, with the exception of diabetes prevalence and smoking prevalence, this difference disappears once confounding factors are accounted for. This suggests that differences in sex, age, deprivation, ethnic diversity, and coastal/non-coastal status of the populations or rural and urban areas are responsible for the lower age-standardised rates observed in rural areas.

Ethnic diversity and deprivation tend to be different in rural areas compared to urban areas; rural areas tend to have a higher White population and tend to be less deprived. Indeed, within rural areas, indicators strongly related to ethnic diversity (CHD, diabetes and hypertension prevalence) and deprivation (obesity-related admissions and smoking prevalence) all show significantly higher model-adjusted rates compared to age-standardised rates.

Health indicator rates by IMD quintile; adjusted for age, sex, IMD, coastal and rural/urban status

Hospital admissions - 2024/25; Prevalences - November 2025

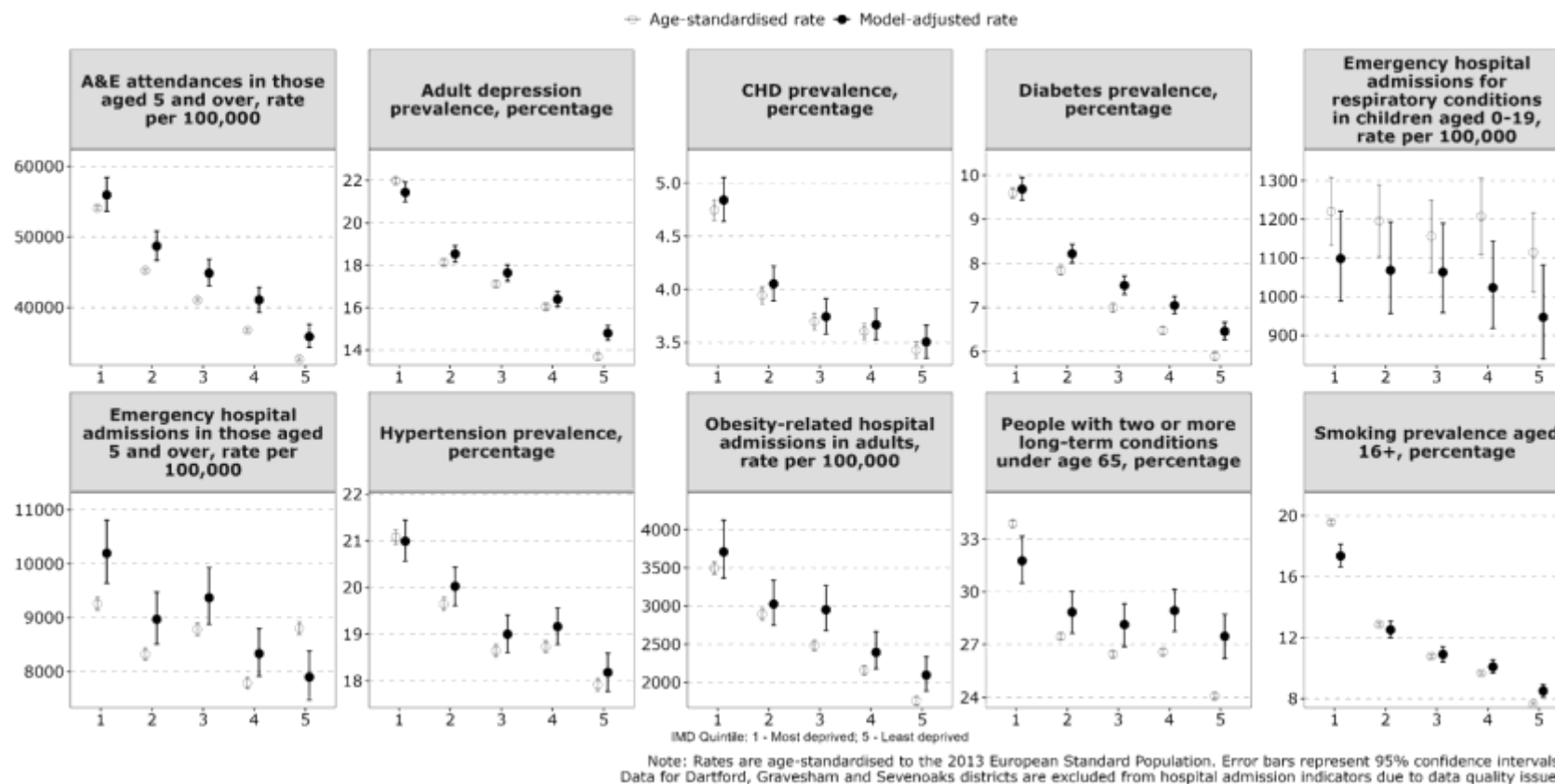


Figure 5. Age-standardised rates and model-adjusted rates by IMD quintile – all indicators

Health indicator rates by ethnicity; adjusted for age, sex, IMD, rural/urban and coastal status

Hospital admissions - 2024/25; Prevalences - November 2025

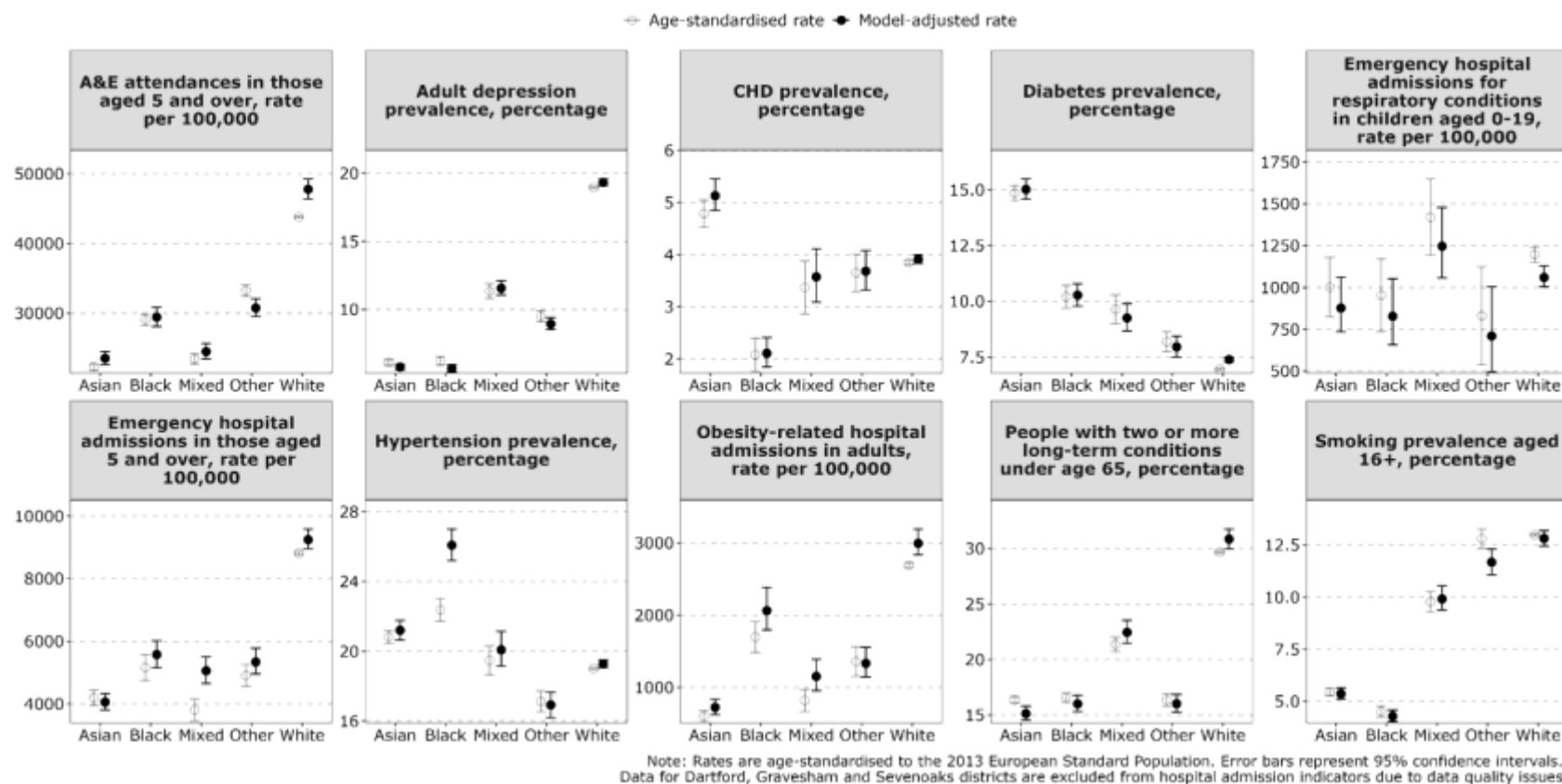


Figure 6. Age-standardised rates and model-adjusted rates by ethnic group – all indicators

Health indicator rates by coastal; adjusted for age, sex, IMD and rural/urban status

Hospital admissions - 2024/25; Prevalences - November 2025

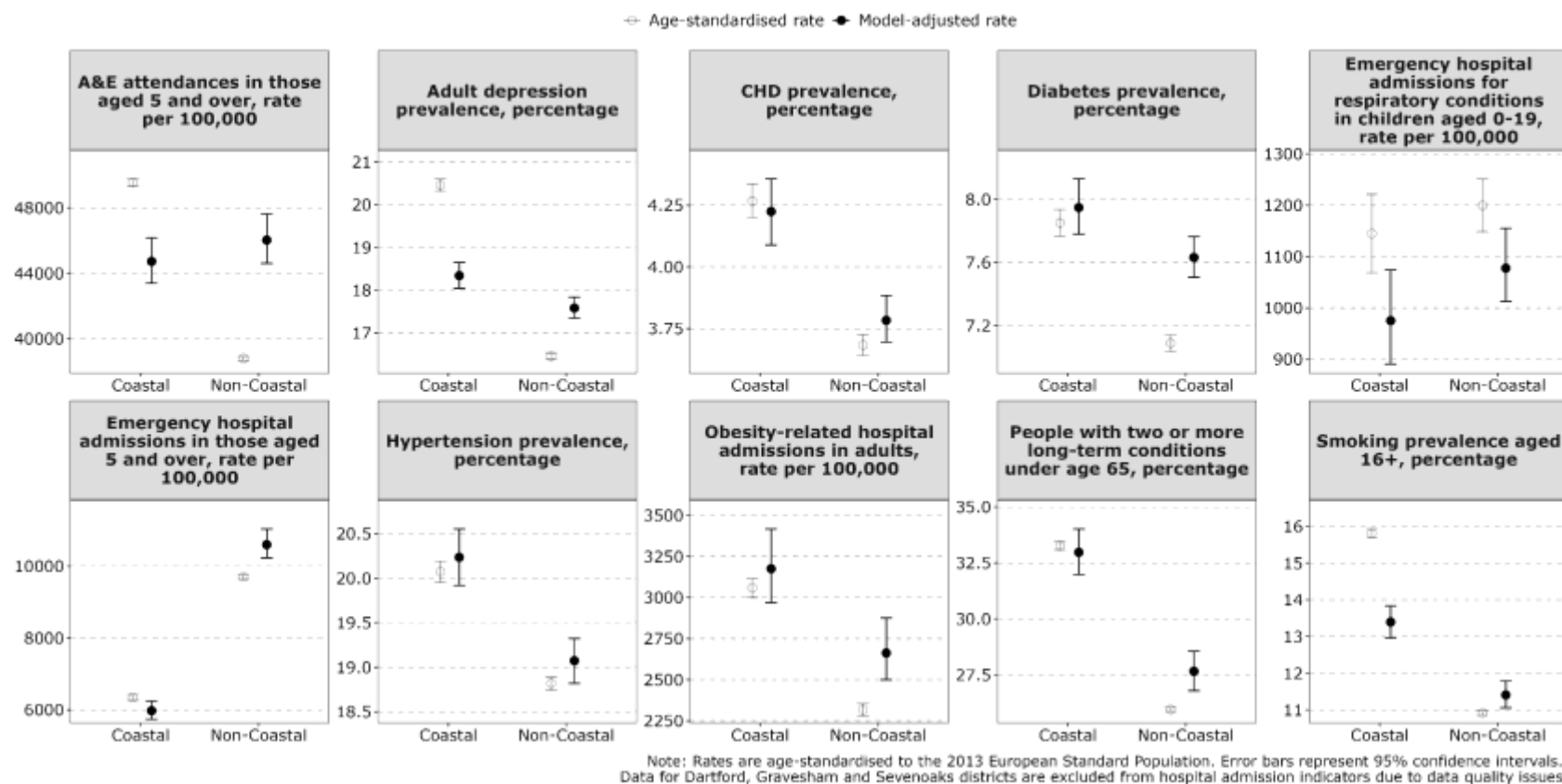
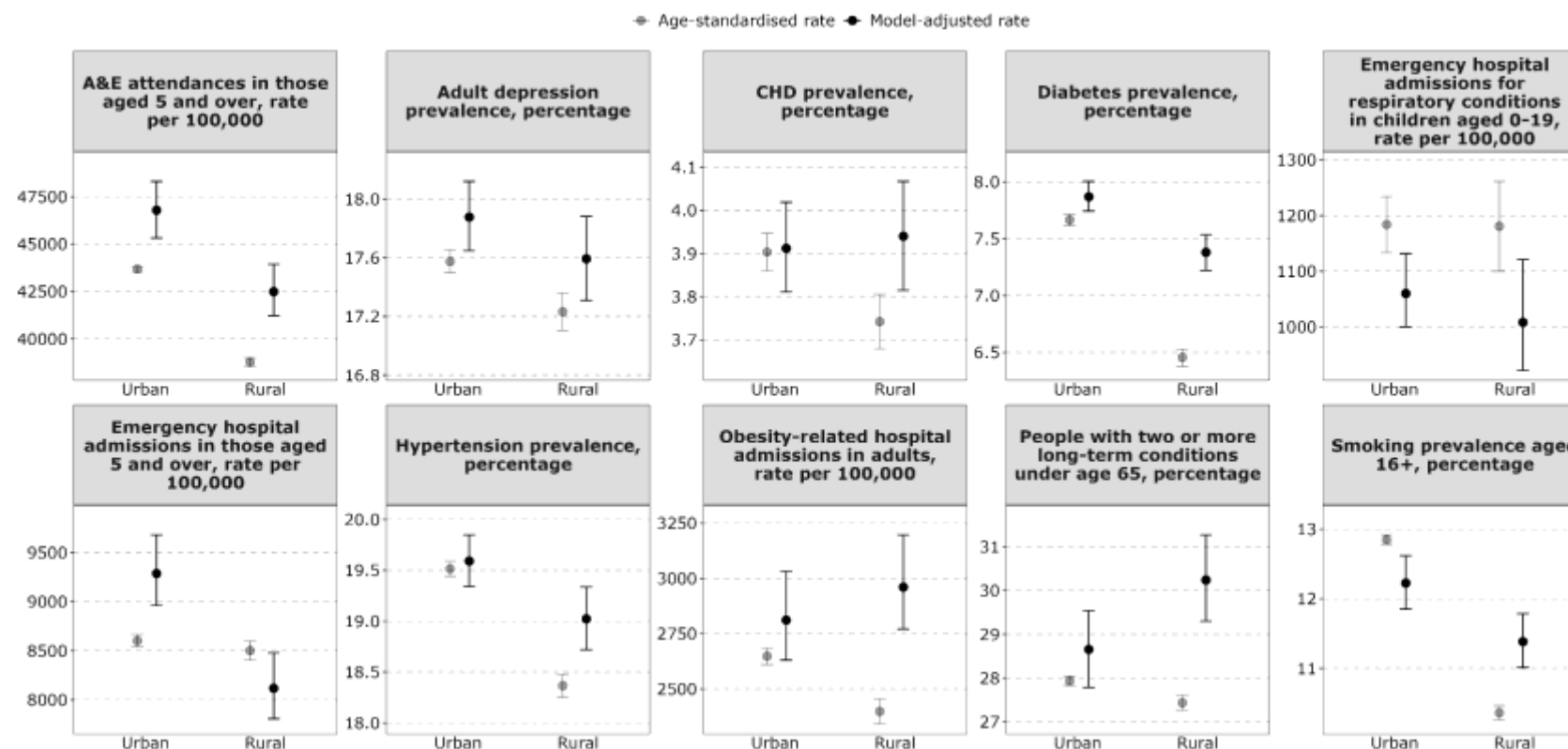


Figure 7. Age-standardised rates and model-adjusted rates by coastal/non-coastal classification – all indicators

Health indicator rates by rural/urban status; adjusted for age, sex, IMD and coastal status

Hospital admissions - 2024/25; Prevalences - November 2025



Note: Rates are age-standardised to the 2013 European Standard Population. Error bars represent 95% confidence intervals. Data for Dartford, Gravesham and Sevenoaks districts are excluded from hospital admission indicators due to data quality issues.

Figure 8. Age-standardised rates and model-adjusted rates by rural/urban classification – all indicators

7.3 Comparison to Average

Table 3 (see page 27) shows how the model-adjusted rates for each group in each inequality dimension compare to the average for the inequality dimension. To calculate the average value for an inequality dimension, the values for each group within the dimension are weighted equally (see Appendix section 9.1.2) for an explanation of the weighing method).

With the exception of emergency hospital admissions for respiratory conditions in children aged 0-19, the most deprived areas have worse health outcomes compared to the least deprived regardless of age structure, ethnic diversity, and whether the area is rural or urban and coastal or non-coastal.

Coastal areas and the White ethnic group tend to have worse health outcomes when all other confounding variables are controlled for.

In the rural/urban dimension, rates for all indicators are similar to the dimension average in both rural and urban areas. This suggests that health outcome inequality is not strongly associated with rurality. Some health outcomes appear affected to a greater extent by inequality than others. Emergency hospital admissions for respiratory conditions in children aged 0-19 shows no inequality in any dimension. Obesity-related hospital admissions, diabetes prevalence, depression prevalence and A&E attendances show inequality in two dimensions, while all other indicators show inequality in at least three indicators.

Table 3. Model-adjusted rates compared to average in each inequality dimension

Group comparison to inequality dimension average:		
Worse than average	Similar to average	Better than average

		SHORT-TERM INDICATORS				LONG-TERM INDICATORS					
		0-19 respiratory admissions	A&E attendances	Emergency hospital admissions	Smoking prevalence	Depression prevalence	Diabetes prevalence	2 or more LTCs under age 65	Obesity-related admissions	Hypertension prevalence	CHD prevalence
Deprivation	1 - most deprived										
	5 - least deprived										
Coastal	Coastal										
	Non-coastal										
Rural/Urban	Rural										
	Urban										
Ethnicity	Asian										
	Black										
	Mixed										
	Other										
	White										

7.4 Relative Index of Inequality

The Relative Index of Inequality (RII) is a ratio that compares outcomes between the most and least advantaged ends of the social scale, usually defined by socioeconomic deprivation. It is based on the Slope Index of Inequality (SII), which is an absolute measure of variation across the full deprivation scale. The SII estimates the expected values at its theoretical minimum and maximum. The SII gap is the difference between these modelled minimum and maximum values. The RII expresses this gap as a ratio and is less affected than the SII by changes in the overall level of the outcome over time.

An RII of 1 means no inequality; values above 1 indicate higher rates in more deprived groups, and below 1 indicate higher rates in more advantaged groups.

RII gives a consistent, robust value to measure change in socioeconomic inequality over time. In this analysis, RII has been calculated using model-adjusted rates.

The ten indicators in this analysis show that rates of disease and hospitalisation are approximately 1.5 times higher on average in the most deprived 20% of the population.

7.4.1 Short-term Indicators

Figure 9 shows that emergency hospital admissions for respiratory conditions in children aged 0-19 is an anomaly in that the RII shows no deprivation inequality – the most and least disadvantaged groups experience similar outcomes with regard to this indicator.

For all other short-term indicators, outcomes are worse in the most deprived group. The largest inequality is evident in smoking prevalence.

Year-on-year, there has been no statistically significant change in RII.

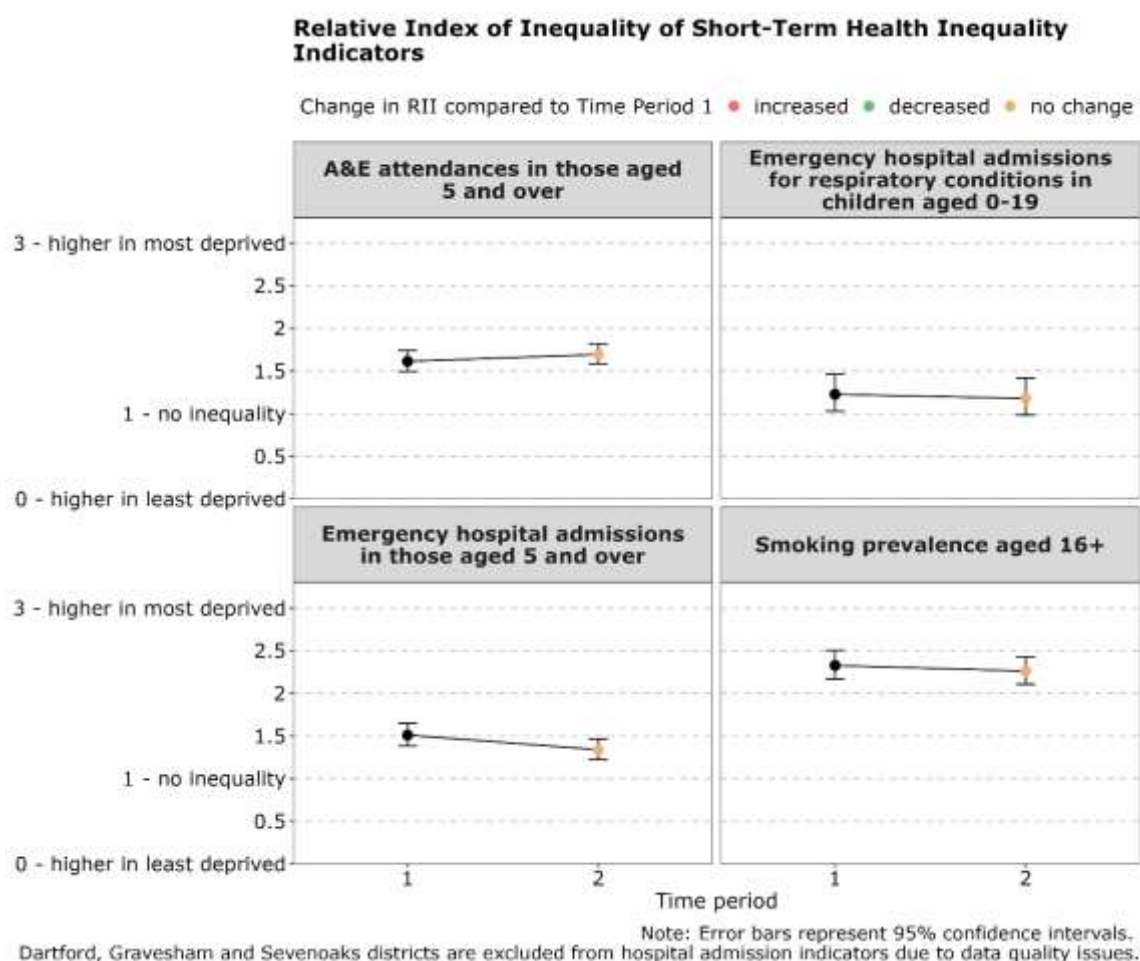


Figure 9. RII for Year 1 and Year 2 - short-term indicators

7.4.2 Long-term Indicators

Figure 10 shows that rates are higher in the most deprived populations and the inequality has remained stable year-on-year.

Hypertension prevalence is closest to deprivation equality of all long-term indicators.

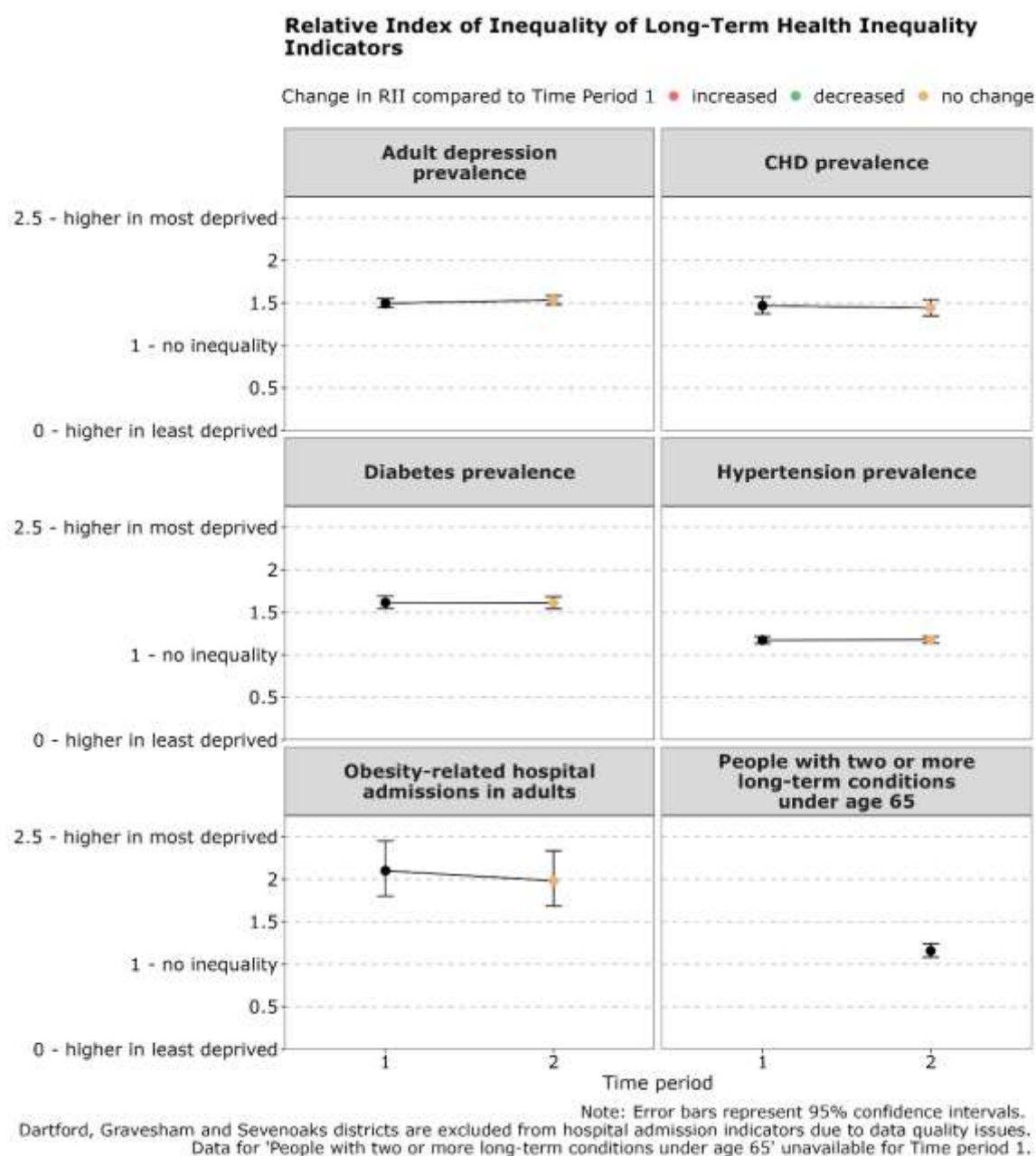


Figure 10. RII for Year 1 and Year 2 - long-term indicator

8 Summary

8.1 Deprivation

Deprivation shows the clearest relationship with health outcomes. Deprived areas have worse health outcomes regardless of age structure, ethnic diversity, and whether the area is rural or urban and coastal or non-coastal.

After controlling for age structure of the population, all health outcomes are worst in the most deprived 20% of the population, with the exception of hospital admissions for respiratory conditions in children aged 0-19. This remains true after controlling for all other variables.

Adjusted rates tend to show a deprivation gradient where rates are highest in the most deprived 20% of the population and gradually get lower as deprivation reduces. For seven out of the ten health outcomes, there is a step-change in the gradient for the most deprived 20% suggesting that poor health in the most deprived communities is disproportionately impacted by deprivation.

Relative index of inequality (RII) shows that adjusted rates of disease, A&E attendances and hospital admissions in the most deprived 20% of the population are on average 1.5 times higher than the least deprived 20%.

The deprivation inequality gap has not changed over the one-year time interval for any health outcome.

8.2 Ethnicity

Under-recording of ethnicity in both primary care and hospital settings may artificially produce differences in health outcome measures between ethnic groups. Similarly, under-presentation at primary care may produce artificial differences in prevalence measures.

In the Asian ethnic group, adjusted rates for six out of ten health outcomes are significantly lower than the Kent average, no other ethnic group has as many health outcomes better than the Kent average. Conversely, in the White ethnic group, adjusted rates for six out of ten health outcomes are significantly higher than the

Kent average, no other ethnic group has as many health outcomes worse than the Kent average.

Age-standardised rates tend to vary more across ethnic groups than across rural/urban classifications, deprivation quintiles, and coastal/non-coastal classification. Rates in Black and Asian groups tend to be lower than groups in all other inequality dimensions. However, there are notable exceptions to this where rates in the Black and/or Asian groups are the highest of any group (hypertension prevalence and diabetes prevalence).

8.3 Coastal/Non-coastal

After controlling for age structure of the population, all health outcomes are worse in coastal areas compared to non-coastal, with the exception of total emergency hospital admissions and emergency hospital admissions in those aged five and over. However, when age-standardised rates are adjusted for all other variables, rates remain worse in coastal areas for only six out of ten health outcomes. This suggests that for some health outcomes, the negative coastal effect can be explained by larger populations of higher risk people living in coastal areas.

In non-coastal areas, the adjusted rates for four out of ten health outcomes are better than the Kent average. In coastal areas, only one health outcome is better than the Kent average.

8.4 Rural/Urban

Age-standardised rates tend to be lower in rural areas. However, accounting for confounding variables reduces and for some indicators removes the gap in rates between rural and urban areas. This suggests that differences in sex, age, deprivation, ethnic diversity, and coastal/non-coastal status of the populations in rural and urban areas are responsible for the lower age-standardised rates observed in rural areas.

8.5 Change over time

Analysis of the relative index of inequality suggests little change from the baseline period (financial year 2023/24, November 2024) to the latest period (financial year 2024/25, November 2025).

8.6 Intersecting inequality

Figure 11 shows how different dimensions of inequality intersect. Although not to scale, the size of the circles represent the influence on health outcomes observed in this analysis. Deprivation is the main independent cause of inequality in health outcomes. The three other domains all have an interaction with deprivation – certain ethnic groups are more likely to live in deprived areas; coastal and urban populations are more likely to be deprived. There are also other two-way and three-way interactions: the White ethnic group is over-represented in deprived coastal areas, Black and Asian groups are over-represented in deprived urban areas. However, all four domains also have an independent effect to a greater or lesser extent, represented by the part of the circle that does not intersect with any other circle.

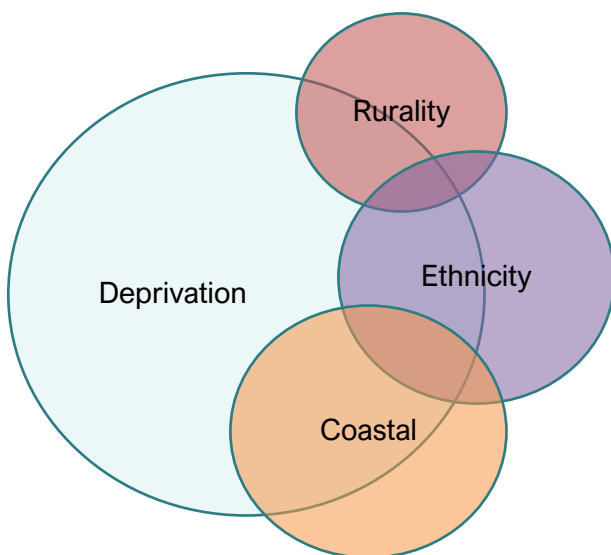


Figure 11. Intersecting dimensions of inequality

9 Appendices

9.1 Appendix A

9.1.1 Multiple regression model

Observed differences in health outcomes between population groups can be influenced by multiple factors acting at the same time. For example, coastal populations may have different age profiles, ethnic compositions and levels of deprivation compared with non-coastal populations. Simple comparisons of observed crude or age-standardised rates therefore cannot determine whether differences are associated with coastal location itself or with other characteristics of the population.

To address this, multiple regression modelling was used to estimate the independent association between each inequality dimension and health outcomes. Multiple regression is a statistical technique that examines the relationship between an outcome and several explanatory variables simultaneously. In this analysis, the outcome was the health indicator being studied, while the explanatory variables were age, sex, deprivation, ethnicity, coastal status and rural/urban classification.

The model estimates the contribution of each factor while holding all other factors constant. This means that when deprivation is being assessed, differences in age, sex, ethnicity, coastal status and rurality are accounted for. Likewise, when ethnicity is being assessed, differences in deprivation, age, sex and geography are accounted for. This approach helps isolate the independent effect of each inequality dimension on the health outcome.

Model-adjusted rates were then derived from the regression model. These rates represent the expected outcome for each group if all groups had the same distribution of the other factors included in the model. For example, a model-adjusted rate for coastal areas estimates what the rate would be if coastal and non-coastal populations had similar age structures, deprivation levels, ethnic composition and rurality. Any remaining difference between groups therefore reflects the association with the inequality dimension itself rather than differences in population composition.

By comparing age-standardised rates with model-adjusted rates, it is possible to assess how much of an observed inequality may be explained by differences in population characteristics. If the gap between groups becomes substantially smaller after adjustment, this suggests that those characteristics explain part of the

inequality. If the gap remains largely unchanged, this suggests that the inequality dimension has a stronger independent association with the health outcome.

The model-adjusted rates should not be interpreted as proof of causation. They identify statistical associations after accounting for the factors included in the model. Other factors that were not available for inclusion may also contribute to observed differences in health outcomes.

9.1.2 Equal Weighting of Groups Within an Inequality Dimension

Equal weighting was chosen to ensure that the dimension average reflected the average experience of the groups within a dimension rather than the average experience of the population as a whole. Without equal weighting, larger groups would dominate the comparison. For example, in Kent the White ethnic group comprises a much larger proportion of the population than other ethnic groups. A population-weighted average would therefore be heavily influenced by the outcomes of the White population and would provide a less balanced reference point for assessing inequalities between ethnic groups.

Using equal weighting means that each group contributes equally to the benchmark against which groups are compared. This approach makes it easier to identify which groups experience significantly better or worse outcomes relative to the overall pattern of inequality within that dimension.

The process consisted of three steps:

9.1.2.1 Estimating adjusted rates for each group

Using the fitted regression model, a model-adjusted rate was calculated separately for each group within the inequality dimension. For example, within the ethnicity dimension, adjusted rates were estimated for each ethnic group; within the coastal dimension, adjusted rates were estimated for coastal and non-coastal populations; and within the rural/urban dimension, adjusted rates were estimated for rural and urban populations.

9.1.2.2 Standardising to a common population structure

When estimating each group's adjusted rate, the inequality dimension under investigation was set to a fixed value for all observations, while age, sex, deprivation and other model variables remained unchanged. The resulting rate therefore reflects the independent association between the inequality dimension and the outcome after accounting for all other variables in the model.

9.1.2.3 Calculating an equal-weight average

Once adjusted rates had been estimated for all groups within a dimension, an overall reference value was calculated by taking the arithmetic mean of the group-specific adjusted rates. Each group contributed equally to this average, regardless of its population size.

9.1.2.4 Comparison to average (red, amber, green rating)

Groups within an inequality dimension were compared to the equal-weight average to determine whether groups were better, worse or similar to the average. 95% confidence intervals (CIs) were used to statistically determine difference from the mean. Rates with 95% CIs that overlap the 95% CIs of the average were determined to be similar to the average.

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