Office for Health Improvement & Disparities

Atlas of health variation in head and neck cancer in England

Trends and geographical variation in the incidence and mortality of head and neck cancer and associated risk factors

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Foreword

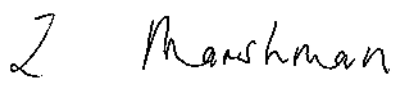
This is the first atlas of health variation for head and neck cancer in England. Head and neck cancer is an increasing public health problem, and this first atlas focuses on population-level data illustrating the impact it has on society, particularly in terms of incidence and mortality, and risk factors to consider for its prevention.

The incidence and mortality of head and neck cancer are increasing in England and there are stark social inequalities. The increase in incidence is largely being driven by an increase in oropharyngeal cancer, while laryngeal cancer shows a slight decrease.

This atlas is of particular importance for several reasons. Firstly, the term head and neck cancer is complex as the term is used for cancers of many sites including the oral cavity, oropharynx and larynx, which all have different risk factors and trends. Understanding these differences is important in identifying appropriate options for action. Despite head and neck cancer being the eighth most common group of cancers in the UK, there remains limited awareness of these cancers among the public and health professionals. While this lack of awareness persists, opportunities to prevent or identify these cancers early are often missed.

This atlas presents data from 2013 to 2019 to describe the situation prior to the COVID-19 pandemic and act as a baseline against which to measure changes. Data from 2020 is also included in the atlas and shows the early impact of the pandemic on head and neck cancer registrations. Data on routes to diagnosis and stage of diagnosis are included in the atlas to highlight the importance of early diagnosis for those with the disease. The data for incidence and mortality is presented at Integrated Care Board (ICB) boundaries to facilitate use in commissioning.

This atlas represents the joint work of stakeholders and aims to bring about improvements in the prevention and detection of head and neck cancer.



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Preface

This is the first atlas of health variation in head and neck cancer in England. It has been produced by the Office for Health Improvement and Disparities (OHID) in collaboration with the University of Sheffield.

The atlas has 32 indicators, which include indicators developed for the atlas and already available indicators. The focus of this first atlas for head and neck cancer is incidence, mortality, route to diagnosis and stage of diagnosis presented by Integrated Care Board (ICB). Variations by age, sex and deprivation are described. The atlas also includes data on risk factors for head and neck cancer and other relevant factors including dental access and human papillomavirus (HPV) vaccination.

The atlas is organised to include background information on head and neck cancer obtained from a brief review of the literature and previously published data. It then describes trends and geographical health variation in the incidence and mortality of head and neck cancer as well as associated risk factors. It uses the most recent comparable data (2013 to 2020) obtained from the National Disease Registration Service (NDRS) and OHID. The final section offers reasons for these variations and suggests options for action that key stakeholders can implement to reduce unwarranted variation. Also included are signposts to relevant evidence based resources.

The content of the atlas has been shaped by a steering group (including public health, dentistry, surgery, pathology and charity representatives) and the need for consistency with routinely published cancer statistics produced by the NDRS. In the atlas, head and neck cancer includes cancers of the oral cavity, oropharynx, larynx and other sites of the head and neck. It includes all cancers with an International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) code C00 to C14 or C30 to C32.[1] This aligns with the head and neck cancer grouping used by the NHS Get Data Out programme.[2]

The atlas provides evidence of the need to tackle variation in head and neck cancers through improving prevention of disease, recognising who is at risk and better diagnosis of people with early stage cancer.

Summary

Head and neck cancer incidence and mortality rates are increasing in England.

Prior to the pandemic, annual new cases in England had reached 10,735 in 2019. Data for 2021 suggests the trend has continued with over 11,000 new cases recorded.[3]

This increase is largely driven by an increase in oropharyngeal cancer, with 3,834 new cases in 2019, a 47% increase since 2013.

The highest incidence rates were in people aged 70 years and over, with an incidence rate over three and half times higher than for those aged under 70 years.

Males have more than double the incidence rate of head and neck cancers than females.

People living in the most deprived areas have almost double the incidence rate of head and neck cancer compared to those living in the least deprived areas.

In England 53% of head and neck cancers were diagnosed at a late stage. Diagnosis at late stage is associated with greater treatment complexity and poorer outcomes.

Across Integrated Care Board (ICB) areas the percentage of patients diagnosed at a late stage varied between 45.0% and 59.6%.

People living in the most deprived areas were more likely to be diagnosed with head and neck cancer at a late stage than those living in the least deprived areas. Reasons may include lower health literacy, poorer communication of healthcare needs and poorer access to dental services.

In 2020, 3,469 people died of head and neck cancers in England, an increase from 3,313 deaths in 2019. The mortality rate for head and neck cancer continued to increase in 2020 while for all cancers the mortality rate decreased.

There was significant geographic variation in mortality rates across England. The ICB with the highest mortality rate was double the rate of the ICB with the lowest rate and people living in the most deprived areas have more than double the mortality rate of those living in the least deprived areas.

Interpreting the data

This atlas presents data from 2013 to 2020 which is the most recent time period for which trend data is available. Whilst more recent data is available, 2021 rates would not be comparable to the 2013 to 2020 rates presented in this atlas as they have been calculated using new population estimates based on the 2021 census. Throughout the atlas we have commented on trends up to 2019 as the 2020 data is likely to have been impacted by the COVID-19 pandemic.

Where a rate has been calculated, this refers to a directly age standardised rate (DSR). DSR rates are calculated using a method which adjusts for different age-structures of the target population. This gives the overall rate that would have occurred in the target population if they all had the standard age-profile and so allows comparison between areas whilst taking account of differences in age profiles. More details on DSRs can be found in the ‘Introduction to the data and methods’ supporting document.

In some local areas, case numbers are small, so there is some statistical variation in the numbers and rates from one year to the next. Despite this volatility, patterns at sub-national geographies remain relatively consistent over time. Due to low numbers in certain indicators, years have been combined to ensure the largest cohort possible to enable meaningful analysis and comparisons. This includes the COVID-19 impacted year of 2020. Where this occurs, the years are marked using the term 'pooled'.

The information contained within this atlas is a starting point for Integrated Care Boards (ICBs) and is intended to be used in conjunction with other local data sources and knowledge. It is important users consider both counts and trends when reviewing and interpreting their own data. Users of the atlas are advised to not base judgements entirely on the most recent data point but to consider patterns over the whole time period presented.

1. Introduction

What is an atlas of variation?

Atlases of health and healthcare variation are an internationally recognised public health tool developed to identify unwarranted variation in healthcare and outcomes.[4] John Wennberg, who founded the pioneering 'Dartmouth Atlas of Health Care' defined unwarranted variation in healthcare as “variation that cannot be explained on the basis of illness, medical evidence, or patient preference”.[5]

The first 'Atlas of health variation' was produced by the NHS in 2010. The programme was formerly led by Public Health England (PHE) in conjunction with RightCare and is now led by the Office for Health Improvement and Disparities (OHID), part of the Department of Health and Social Care (DHSC), having transferred from PHE in October 2021.

This atlas is the first to look at variation for head and neck cancer in England. It demonstrates the impact head and neck cancer has on society and shows stark inequalities. The data presented can be used to understand these differences and aid the identification of appropriate options for action to reduce healthcare inequalities.

The atlas shows time trends and geographical variation in aspects of head and neck cancer. As well as all head and neck cancers, incidence is broken down by oral cavity cancer, oropharyngeal cancer and laryngeal cancer. There are further breakdowns by age and sex. Also included are indicators on stage at diagnosis, the route to diagnosis as well as head and neck cancer mortality. This atlas also features indicators on risk factors and looks at access to dental services. Data is primarily presented at Integrated Care Board (ICB) level. Data are displayed using maps, box and whisker trend charts, line graphs, bar charts, dot plots and tables.

Additional data and resources are provided to assist local stakeholders in developing and evaluating their service delivery strategies. An explanation of the data presentation is given in the companion document 'Introduction to the data and methods'.

What is variation and why does it matter?

Variations in healthcare are widespread, and their underlying causes are multifactorial, posing challenges for distinguishing whether they are acceptable (warranted) or not (unwarranted). In some cases, it is appropriate that health services vary across the country and within communities with different medical treatment paths followed meeting different levels of healthcare need between areas. However, all patients, regardless of where they live, should receive care of equal quality.

A substantial part of variation in healthcare are health inequalities, which are defined as unfair and avoidable differences in health across the population, and between different groups within society. The causes of health inequalities or disparities are complex but are generally associated with variation in a range of factors that positively or negatively influence our ability to be healthy. This includes individual health-related behaviour, such as smoking and diet; access to services; social deprivation; access to work; education levels; social networks and how much control we feel we have over our lives.

Healthcare services for head and neck cancer varies across the country and within communities, as the total burden of head and neck cancer varies widely and determining locally the cause of the variation, implementing actions to improve where necessary will lead to better outcomes for people.

How should we respond to variation?

The information contained within this atlas is a starting point for ICBs and clinical leaders, to examine their local indicators and the quality of their services, and to benchmark themselves against others and the national average. However, to understand what the variation means and whether it is unwarranted variation, further work will be necessary. It is important not to rely on comparison with the national average, but instead to consider what the appropriate figure or position is based on local need. Where there is concern identified, further analysis of the data and consultation with stakeholders will usually be required to answer the following questions:

- what are the reasons for the variation?
- is this warranted or unwarranted variation?
- is there poorer access for certain groups or is it equal across the whole population?

NHS England has programmes and tools in place that can be used to help address unwarranted variation.

These include a National Healthcare Inequalities Improvement Programme with guidance, resources and dashboard to assist those working to address health and healthcare inequalities across the health system and beyond.

Also available is the Model Health System which uses data to drive a process of continuous improvement to improve patient outcomes and population health. The Model Health System provides hospital provider level benchmarking.

The Getting it right first time (GIRFT) programme is designed to improve the treatment and care of patients through in-depth review of services, benchmarking, and presenting a data-driven evidence base to support change.

The new Head and neck cancer GIRFT workstream will focus on supporting cancer alliances in England to better provide timely, equitable and effective care with the best possible outcomes for patients.

The atlas, National Healthcare Inequalities Improvement Programme, Model Health System and the GIRFT programme demonstrate the importance of using data driven approaches to underpin the identification of unwarranted variation and identify solutions to reduce inequalities in healthcare.

Please note the former RightCare model of 'diagnose, develop, deliver' (used in previous atlases of variation) has now been incorporated into the wider population health focus of NHS England. RightCare products if still current are incorporated into the GIRFT programme.

Definition of head and neck cancer

Head and neck cancer is a collective term generally used for cancers of the oral cavity, oropharynx, larynx and other sites of the head and neck. The grouping of head and neck cancer is complex as cancers of the head and neck are biologically heterogeneous. The subsites are categorised according to the anatomical location using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) classification system from the World Health Organization.[1] In this atlas, we report on head and neck, oral cavity, oropharyngeal and laryngeal cancers. We have defined head and neck cancer as all cancers with an ICD-10 code between C00 and C14 or between C30 and C32, which aligns with the scope of the NHS Get Data Out programme.[2] This grouping does not include cancers of the thyroid, eye, bones of the head or lymph nodes. A list of each subsite included in the definition of head and neck cancer in this atlas with the relevant ICD-10 codes is provided below (Table 1.1). A more detailed description of each subsite is included in the appendices.

The rationale for aligning definitions to the Get Data Out head and neck cancer cohort and subsite groupings in this atlas is that they were defined by a multidisciplinary working group with the aim of grouping cancers that have similar incidence, treatments and outcomes.

Table 1.1: Head and neck cancer subsites and corresponding ICD-10 codes

ICD-10 code	Cancer subsite
C00	Malignant neoplasm of the lip
C01	Malignant neoplasm of base of tongue
C02	Malignant neoplasm of other and unspecified parts of tongue
C03	Malignant neoplasm of gum
C04	Malignant neoplasm of floor of mouth
C05	Malignant neoplasm of palate
C06	Malignant neoplasm of other and unspecified parts of mouth
C07	Malignant neoplasm of parotid gland
C08	Malignant neoplasm of other and unspecified major salivary glands
C09	Malignant neoplasm of tonsil
C10	Malignant neoplasm of oropharynx
C11	Malignant neoplasm of nasopharynx
C12	Malignant neoplasm of piriform sinus
C13	Malignant neoplasm of hypopharynx
C14	Malignant neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx
C30	Malignant neoplasm of nasal cavity and middle ear
C31	Malignant neoplasm of accessory sinuses
C32	Malignant neoplasm of larynx

The following definitions will be used throughout this atlas:

- head and neck cancer includes cancers listed in Table 1.1 (ICD-10 codes C00 to C14 or C30 to C32)

- oral cavity cancer includes cancers of the inner lip (C00.3 to C00.5), other and unspecified parts of the tongue (C02 - excluding lingual tonsil C02.4), gum (C03), floor of the mouth (C04), hard palate (C05.0) and other unspecified parts of the mouth (C06)

- oropharyngeal cancer includes cancers of base of the tongue (C01), lingual tonsil (C02.4), soft palate (C05.1), uvula (C05.2), overlapping lesion of palate (C05.8), palate unspecified (C05.9), tonsil (C09) and oropharynx (C10 - excluding anterior surface of epiglottis C10.1)

- laryngeal cancer includes cancers of the larynx (C32) and anterior surface of the epiglottis (C10.1)

Head and neck cancer is a public health concern

Head and neck cancer is the sixth most common cancer group globally and the eighth most common cancer group in the UK.[6] Analyses for this atlas, using data from the National Disease Registration Service (NDRS), shows that in England in 2019, prior to the pandemic, new cases of head and neck cancer had reached 10,735 with 3,313 deaths. Between 2017 and 2019 head and neck cancer accounted for 2% of all cancer deaths in the UK.[7] The associated morbidity and mortality of head and neck cancer is high.[7 8]

Incidence is increasing both nationally and internationally.[9] In the UK this is largely due to an increase in incidence of oropharyngeal cancers[10] which are associated with HPV infection and alcohol consumption.[9 11] Mortality rates are rising, driven by an increase in incidence and unchanging survival rates. [9 12] Head and neck cancer incidence and mortality rates are greatest in people aged 70 years and over and are higher in males than females. There is also a socioeconomic gradient in the incidence and mortality of head and neck cancers with higher rates found in areas of higher socioeconomic deprivation. This variation is not entirely accounted for by behavioural risk factors such as smoking and alcohol consumption.[13]

Head and neck cancers are debilitating. They are often diagnosed at an advanced stage when they have a poor prognosis that results in significant morbidity and mortality.[8] Depending on stage, subsite and treatment, people with head and neck cancer experience a significant reduction in quality of life and a multitude of long term and late effects.[8 14 15] People treated for head and neck cancer present with some of the highest post-treatment

morbidity of any cancer groups.[16] Physical changes which may result from surgical and non-surgical treatment include altered anatomy and function including tooth removal, trismus (jaw stiffness), dry mouth, increased risk of tooth decay and risk of osteoradionecrosis (death of bone tissue due to radiation therapy).[14 15] Subsequently, this may cause altered body image due to facial, intra-oral and dental disfigurement and scarring, increased anxiety and depression, social isolation and reduced interpersonal relationships, difficulty eating, speech and voice impairment, sore mouth, pain and fatigue. Treatment of more limited disease is associated with reduced morbidity and better survival.[8]

Head and neck cancers are expensive to treat, requiring multidisciplinary teams (MDT) and with costs of up to £34,000 approximately, per episode of care for very complex procedures requiring critical care. It is not only the costs of the surgical procedures and adjuvant treatments that need to be considered, post-operative rehabilitation, which is complex and costly is often also required to optimise aesthetics, function and patient's overall quality of life.[17]

The COVID-19 pandemic in 2020 resulted in significant disruption to healthcare services nationally and internationally, including head and neck cancer services.[18] Head and neck cancer referrals in the UK decreased during the pandemic, in particular during the first wave. Between March and June 2020, the number of referrals were on average 39% lower than pre-pandemic levels. Referral numbers subsequently increased and were on average 15% lower than pre-pandemic levels between January and February 2021.[18] The pandemic also resulted in reduced face-to-face outpatient appointments and theatre capacity, surgical delays and surgical de-escalation.[18] Although emerging evidence from a Scottish retrospective cohort study suggests that the pandemic did not increase the proportion of head and neck cancers diagnosed at a late stage,[19] its impact on stage of presentation and treatment protocols in England requires further exploration.

The burden of head and neck cancers and inequalities

Analyses for this atlas show that in England between 2013 and 2020 there were 79,583 new cases of head and neck cancer and 25,322 deaths. These comprised 22,490 new cases of oral cavity cancer and 8,142 deaths, 25,932 new cases of oropharyngeal cancer and 5,299 deaths and, 14,575 new cases of laryngeal cancer and 5,292 deaths.

Analyses for this atlas also show that there was variation in the incidence and mortality of head and neck cancer by age, sex and level of socioeconomic deprivation across England implying the existence of inequalities. Other studies have shown inequalities in the incidence of head and neck cancer by ethnicity.[20]

Age and sex

Head and neck cancer incidence and mortality increases with age. Analyses for this atlas show the highest incidence and mortality rates are in people aged 70 years and over. The population of the UK is ageing with the proportion aged 65 years and over expected to increase over the coming decades. Consequently, the number of new head and neck cancer cases in the UK is projected to rise by 3% from 2023 to 2025 reaching approximately 16,300 cases in 2038 to 2040.[6] The increase in incidence of head and neck cancer in older people has been attributed to biological processes associated with ageing and cumulative exposure to risk factors.[6]

In England there is a higher incidence of head and neck cancers in males compared with females.[6] There is a more than 2-fold difference in incidence in males compared with females for head and neck cancers. For oropharyngeal cancer this difference is 3-fold and for laryngeal cancers 5-fold (Table 1.2).

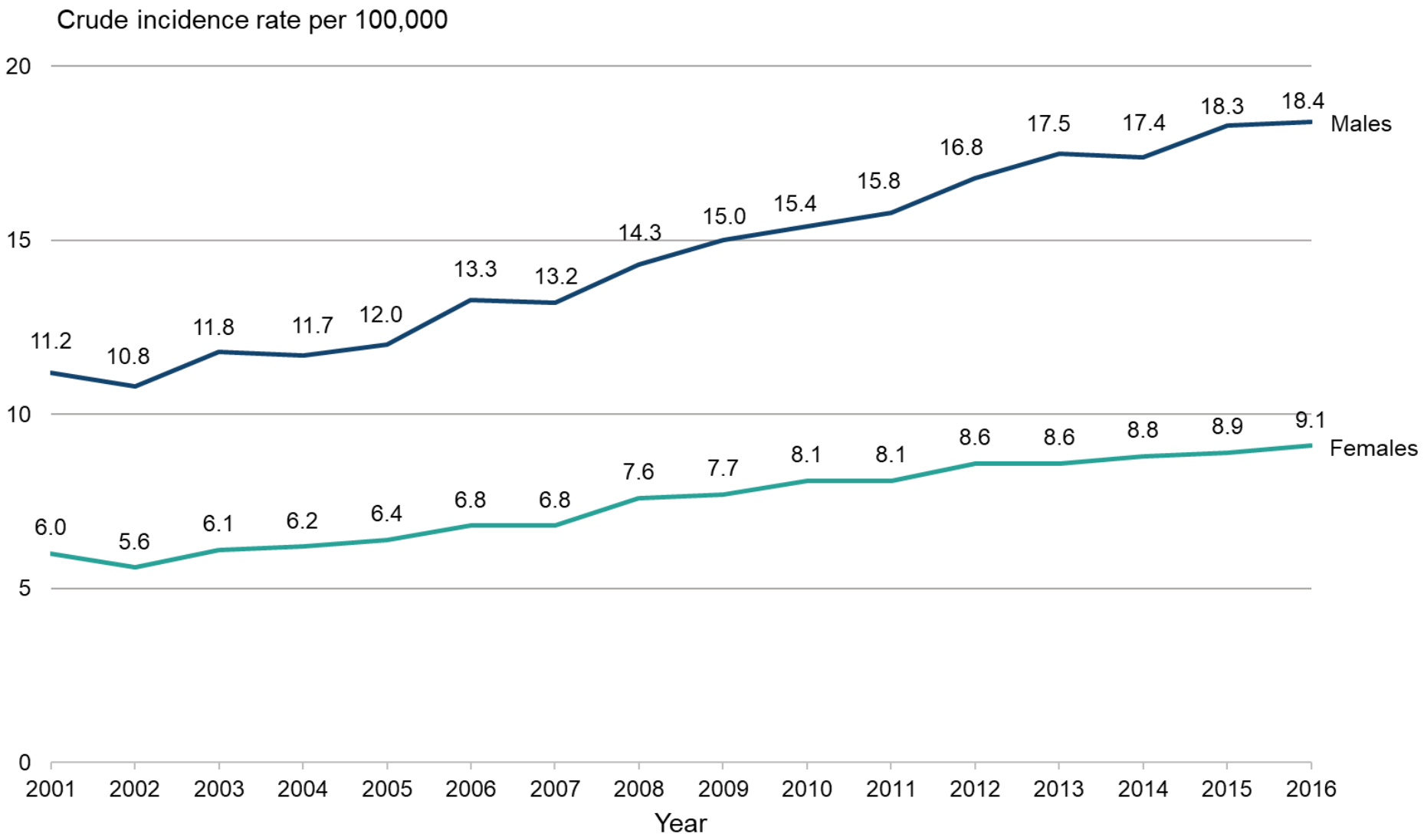
Table 1.2: Incidence rates of head and neck cancer and subsites by sex, in England (2013 to 2020)

DSR per 100,000 population

Cancer type	Males	Females
Head and neck cancer	27.9	11.3
Oral cavity cancer	6.6	4.3
Oropharyngeal cancer	9.6	3.1
Laryngeal cancer	6.2	1.2

Incidence rates of head and neck cancers are increasing in both males and females,[6] which is mostly driven by an increase in the incidence in oropharyngeal cancer. Incidence rates of oropharyngeal cancers increased annually by 7.3% in males and 6.5% in females between 1995 and 2011 and there was a 2.8% and 3.0% annual increase in males and females respectively for oral cavity (excluding lip and hard palate) cancers in the same period.[21] Between 2001 and 2016, the crude incidence of cancers of the lip, oral cavity and pharynx (ICD-10 codes C00 to C14) increased in both females and males, however, the rate of increase was greater in males (Line chart 1.1).[22]

Line chart 1.1: Incidence rate of cancer of the oral cavity, lip and pharynx (ICD-10 codes C00 to C14) by sex, in England (2001 to 2016)[22]



Ethnic groups

In England, head and neck cancer incidences vary by ethnicity and by sex within ethnic groups. The number of cases by ethnic group was estimated for 2013 to 2017 by Public Health England (PHE).[20] Amongst males, head and neck cancer incidence was highest in the white ethnic group followed by the Asian ethnic group. Incidence rates amongst males were lowest in the mixed or multiple ethnic group and the black group (Table 1.3). Amongst females incidence rates were higher in the Asian ethnic group compared with females in the white ethnic group. Incidence rates amongst females were lowest in the black ethnic group.

Table 1.3: Differences in incidence rates for head and neck cancer (ICD-10 codes C00 to C14 or C30 to C32) in ethnic groups by sex (2013 to 2017)[20]

DSR per 100,000 population

Sex and Ethnic group	Rate	95% lower confidence limit	95% upper confidence limit
Female Asian	11.8	10.9	12.8
Female black	6.2	5.3	7.1
Female mixed or multiple	suppressed	suppressed	suppressed
Female white	10.8	10.7	11.0
Male Asian	19.6	18.5	20.8
Male black	17.7	16.0	19.4
Male mixed or multiple	15.7	13.1	18.3
Male white	27.3	27.0	27.6

Note: Rates standardised to the European 2013 standard population. Rates have been suppressed in groups where there are fewer than 100 cases in total. Cases where the ethnic group is ‘not known’ are excluded from the analysis as the case cannot be allocated to a group. The rates reported are therefore likely to be an underestimate.
Asian includes Bangladeshi, Chinese, Indian, Pakistani, any other Asian background.
Black includes African, Caribbean, any other Black background.
White includes White British, White Irish, any other White background.

Socio-economic inequalities

Analyses for this atlas shows there is a relationship between area deprivation and head and neck cancer. People living in the most deprived quintile have almost double the incidence rate to those living in the least deprived quintile and more than 2.5 times the mortality rate of those in the least deprived quintile.

Deprivation was measured using the Index of Multiple Deprivation (IMD) 2019 national quintiles, with 1 representing the most socio-economically deprived quintile and 5 representing the least socio-economically deprived quintile. More details on IMD can be found in the 'Introduction to the data and methods' supporting document.

A Public Health England (PHE) report on inequalities in oral health, including oral cancer, highlighted research that showed people living in more socio-economically deprived areas were more likely to be diagnosed with oral, oropharyngeal and laryngeal cancers through emergency presentation compared with those in less socio-economically deprived areas.[23] [24] Patients from more deprived areas were found to be more likely to have delayed initial presentation.[25] [26]

The relationship between socio-economic status and head and neck cancer is not entirely explained by risk factors such as cigarette smoking and alcohol consumption.[13] The International Head and Neck Cancer Epidemiology (INHANCE) consortium found low socio-economic status (measured by educational attainment and household income) to be a strong risk factor for head and neck cancer in males and females of all ages. This relationship remained after adjustment for age, sex, country, smoking, alcohol, smoking and alcohol combined, diet and other tobacco use. Only two-thirds of the increased risk of head and neck cancer was explained by behavioural risk factors, such as smoking, alcohol, other tobacco and diet factors. This suggests lower socio-economic status increases the risk of head and neck cancer through alternative pathways or poorly understood risk factors, all of which require further exploration. Similarly, the INHANCE consortium found low occupational socio-economic status was associated with head and neck cancer, but this risk was only partly explained by smoking, alcohol and occupational exposures.[27]

The relationship between alcohol consumption and socio-economic deprivation is complex.[22] Alcohol attributable harms such as alcohol-related hospital admissions are higher in people living in more deprived areas even when few differences are noted in consumption levels; this is referred to as the alcohol harm paradox.[28]

Vulnerable groups

Vulnerable (disadvantaged) groups include people who are homeless, prisoners, travellers, looked after children and refugees.[23] There is currently insufficient evidence to

conclude if there are inequalities in oral cancer in any of these groups and further research is required.[23] The available limited evidence suggests these populations have considerably poorer oral health and face substantial difficulties accessing dental care.[23]

People with disabilities

The PHE report on inequalities in oral health reported on inequalities experienced by those with disabilities. The report concluded that the literature on disabilities and oral health in the UK was very limited, and the heterogeneity in the disabilities under study makes it difficult to summarise the findings. The studies did suggest poorer oral health outcomes and more problems accessing services among disabled people.[23]

A recent systematic review examining studies of cancer care, not limited to head and neck cancer, for people with disabilities concluded that people with disabilities often experience severe disparities in cancer care with less guideline-consistent care and higher mortality than people without disabilities.[29]

Risk factors

Tobacco and alcohol

Tobacco and alcohol consumption, both separately and in combination, are established risk factors for head and neck cancer.[9] The International Head and Neck Cancer Epidemiology (INHANCE) consortium, a global collaboration of research groups, found the odds of head and neck cancer in tobacco smokers who never drank alcohol was 2 times greater than those who didn't smoke or drink. A similar odds was observed in heavy alcohol drinkers (defined as three or more drinks per day) who never smoked tobacco.[9 30] The combined effect of both smoking and drinking increases the odds for head and neck cancer by a factor of 5 compared with those who only drink alcohol and do not smoke.[9 30]

The magnitude of risk for tobacco smoking and alcohol consumption respectively may vary by cancer sub-site. Tobacco smoking risks appear to be greatest for laryngeal cancers, whereas increased alcohol consumption may have a higher magnitude of risk for oral cavity and oropharyngeal cancers.[9 31]

Higher alcohol intensity (number of drinks per day) increases the risk of oral cavity and laryngeal cancers, while the risk related to duration of drinking appears to be more complex for these subsites.[11] For cancers of the oropharynx, both increased intensity and duration of alcohol consumption were found to increase risk.[11] Mechanisms to explain the association between alcohol intensity and head and neck cancer have been proposed. These include the oxidation of ethanol into alcohol acetaldehyde, a carcinogen, and the local effect of alcohol on cell membranes to enhance penetration of carcinogens, for

example those from tobacco smoking, into the mucosa.[11] This may explain the synergistic effect of smoking and alcohol as risk factors for head and neck cancer.[9] [31] The International Agency for Research on Cancer (IARC) concluded that alcoholic beverages and ethanol in alcoholic beverages are carcinogenic for oral cavity, pharyngeal (including oropharynx) and laryngeal cancers.[32]

There is a dose-response relationship with head and neck cancer and tobacco smoking.[9] [33] Both smoking frequency and duration increase the risk of head and neck cancer. Cigarette, cigar and pipe tobacco smoking are all associated with an increase in risk of head and neck cancer.[33] Tobacco contains 11 agents which have been confirmed as carcinogenic in humans by the IARC, in addition to many agents which are likely to be carcinogenic in humans, given evidence of their carcinogenicity in experimental animals.[34]

Other tobacco usage including smokeless tobacco

The Tobacco and Related Products Regulations (TRPR) 2016[35] states that smokeless tobacco products are tobacco products that are consumed in a way which does not involve a combustion process. These include chewing tobacco, nasal tobacco and tobacco for oral use. Specifically, these are listed as:

- Tobacco products for chewing are usually a highly fermented and liquored form of tobacco. It is consumed by placing the tobacco between the cheek and gum or teeth and is then chewed. There are many varieties but includes paan masala, gutka[36]

- Nasal tobacco (snuff), a dry to semi moist finely ground tobacco product which is mainly used in the nasal cavity. Varieties include Pakistani neswar[36]

- Tobacco intended for oral use, but not to be inhaled or chewed. These are made up of tobacco granules and flavourings designed to be sucked. This product is currently subject to a ban on sale in most European countries and the UK[37]

There is international evidence that smokeless tobacco use is associated with head and neck cancer, particularly oral cavity cancer.[38] [39] Data on the use of smokeless tobacco products within England is limited.[40] The 2004 Health Survey for England focused on the health of ethnic minority groups and questions about the use of chewing tobacco was asked of South Asian (Pakistani, Indian, Bangladeshi) respondents, subsequent national health surveys did not.[41] The use of chewing tobacco was most prevalent among the Bangladeshi group, with 9% of men and 16% of women reporting using chewing tobacco. In 2019, an online survey of 500 people from the south Asian ethnic group by ‘Action on Smoking and Health’ (ASH) found that 9% of males and 7% of females were current users of smokeless tobacco, with 24% of males and 18% of females reporting they had used smokeless tobacco. A limitation of the survey was the findings did not represent those with lower levels of English literacy.[42]

Waterpipe smoking, more commonly known as 'shisha' or 'hookah', is a method of inhaling tobacco smoke.[43] Users inhale tobacco smoke, which is often fruit flavoured, through a water filled apparatus. Usage has been traditional practice in the Middle East and southern Asia for several hundred years, however, is becoming increasingly popular in western countries and young people in particular.[43] International evidence has found that waterpipe smoking is associated with nearly a threefold increased risk of head and neck cancer (summary relative risk (SRR) 2.97, 95% CI 2.26 to 3.90).[44] Data on waterpipe usage in Great Britain from the ASH Smokefree GB survey found from 2012 to 2016 there was an increase of 11.0% to 12.9% in 'ever' waterpipe use, while 'current' waterpipe smoking remained at around 1%.[43] Pooled analysis of the 2012 and 2013 surveys found there was variation in waterpipe use between ethnic groups, with 32.6% of respondents from mixed or multiple ethnic groups reporting ever use and 4.9% reporting frequent use (at least once or twice a month) and 26.5% from Asian or Asian British ethnic groups reporting ever usage and 6.7% frequent waterpipe use.[43 45]

Human papillomavirus (HPV)

Human papillomavirus (HPV), especially HPV types 16 and 18, is a recognised risk factor for oropharyngeal cancer.[46 47]

The UK Health Security Agency (UKHSA) Green Book, chapter 18a on HPV immunisation, states the estimated attributable fraction of HPV that causes oropharyngeal cancers varies from 6% to 71%; globally 47% has been estimated from a systematic review, and a study in the UK estimated 52%. Several reasons are provided for the lack of certainty of the attributable fraction of HPV in oropharyngeal cancer including the ability to distinguish cancer of the oropharynx and tonsil from other subsites, the competing effect of smoking and chewing tobacco and quality of testing protocols.[47] The prevalence of HPV associated oropharyngeal cancer is lower in females than in males.[47]

There has been an increase in the number of HPV associated oropharyngeal cancers in the last two decades, particularly in males.[47] The rate of HPV negative oropharyngeal cancer has also increased significantly in the same time period.[47] Therefore, although a risk factor for oropharyngeal cancer, the increase cannot be attributed solely to an increase in HPV-associated disease. It has been suggested that behaviours such as sexual practices (number of sexual partners and performing oral sex), tobacco use and alcohol consumption cluster in individuals. Hence the exact nature of the contribution of HPV infection to oropharyngeal cancers is complex.[48]

England has a national HPV immunisation programme. A universal HPV immunisation programme introduced in September 2008 with all girls in school year 8 (aged 12 to 13) offered vaccination against HPV infection, as well as a catch-up programme for girls aged 13 to under 18 years.[47] A targeted vaccination programme for gay, bisexual and other men who have sex with men (GBMSM) up to and including the age of 45 years who attend sexual health services and human immunodeficiency viruses (HIV) clinics was rolled out nationally from April 2018.[47] The national HPV vaccination programme was extended to adolescent boys from September 2019.[47] From September 2023 the vaccination programme moved from 2 to 1 dose for children aged 12 to 13 and GBMSM under the age of 25.[49] This change reflects new evidence from a range of international studies that show that a single dose provides the same level of protection as 2 doses.[50] Eligible GBMSM aged 25 to 45 years will remain on a 2-dose schedule, offered through sexual health clinics.[49] The NHS is looking to improve HPV vaccination rates as part of its pledge to eliminate cervical cancer.[51]

The economic burden of head and neck cancer

The economic burden of head and neck cancer is high and increasing in England. A retrospective analysis of hospital data estimated the total direct costs of treating oropharyngeal, laryngeal and oral cavity cancers in secondary care between the financial years ending 2007 and the financial year ending 2011.[52] The cost was approximately £309 million over the 5-year period (oropharyngeal £115 million; laryngeal £96 million; oral cavity cancer £98 million). Both costs and numbers of people treated increased during the study period suggesting a trajectory for increased costs in future.[25]

The societal and economic burden of head and neck cancers go beyond the direct costs of treatment provided by the NHS.[53] Head and neck cancers incur substantial indirect costs in individuals diagnosed with head and neck cancer and those who care for them. A systematic review of the economic burden of head and neck cancer found no studies assessing the full societal burden, however, individual studies assessing the direct and indirect costs in the USA[54 55] and France[56] suggested that direct treatment costs and indirect costs contributed equally to the economic burden of disease.[53] Further economic evaluation is warranted in England to assess the indirect costs of head and neck cancer.

Healthcare variation

Organisation of services

Early diagnosis leads to better outcomes for the patient in terms of survival[57] and psychological impact,[58 59] less complex treatments[58 60] and overall improved patient care.[58 61] Diagnosis, referral, treatment and management of head and neck cancer in England involves a multidisciplinary approach.[61] Primary medical and dental practitioners refer people with suspected cancers to specialist services through the urgent suspected cancer pathway,[58] (previously known as the 'two-week wait' pathway due to the waiting time standard attached to the initial referral pathway) in accordance with National Institute for Health and Care Excellence (NICE) guidance NG12 on the recognition and referral of cancers.[62] NG12 provides guidance to primary care practitioners regarding referral timelines, suggestive signs for oral cancer, laryngeal and suspected thyroid cancers, the diagnostic and referral process, patient information and support. In 2023, the NHS Cancer Programme developed a best practice timed pathway for head and neck cancer to support the ongoing improvement effort to shorten diagnosis pathways, reduce variation and improve patient experience of care.[58] The guidance sets out how diagnosis within 28 days can be achieved for the suspected head and neck cancer pathway to meet the newly implemented 28-day Faster Diagnosis Standard.[58]

Routes to diagnosis

A population-based analysis of the routes to diagnosis for primary invasive head and neck cancer (ICD-10 codes C01 to C14 or C31 to C32) diagnosed from 2006 to 2014 was undertaken.[60] Predictors of routes to diagnosis varied. Older age, males, living in a more deprived area, two or more co-morbidities, ethnic minorities (excluding white minorities) and advanced stage of cancer were associated with higher rates of diagnosis through the emergency route. Patients presenting via emergency routes have lower survival rates.[57] Reasons for the association between older age and emergency presentation included the non-specific nature of head and neck cancer symptoms and the perception of their association with normal ageing and a fear of wasting clinician time with vague signs and symptoms.[60] Increased emergency presentation in ethnic minority groups in England has been linked to barriers to accessing healthcare, lack of trust and discrimination.[60] Reduced health literacy is a proposed common factor for older people, those from deprived areas and ethnic minority groups, consequently further exploration of the association between health literacy and emergency presentation[60] as well as other healthcare access factors, is warranted.

People aged 55 to 64 years, male, of white ethnicity, with cancer of the oropharynx, at stage 3 and 4 disease, with no co-morbidities and residing in an area of higher deprivation were more likely to be referred through the urgent two-week wait referral route.[60] Oropharyngeal cancer often presents as a neck lump thus is more likely to be recognised by patients and primary care clinicians and trigger a two-week wait referral.

People diagnosed with head and neck cancer were more likely to be referred via a dentist compared with all other non-emergency routes if they were aged 65 to 79 years, female, from ethnic minorities (excluding white minorities), had oral cancer, had stage 1 cancer and resided in a less socio-economically deprived area.[60] The cost of a dental examination and treatment and ability to access dental services may be key factors in explaining why people living in more socio-economically deprived areas are less likely to be referred by a dentist.

Data gaps

Ethnicity

The incidence of head and neck cancer sub-sites by ethnic groups are not reported in this atlas. This is because of the small numbers of cases when the cancer sub-sites are also broken down by ethnicity affecting the validity and reliability of age-standardised rates.

Smokeless tobacco

Due to the lack of robust and current data on the use of smokeless tobacco and waterpipe (shisha) in England, data on smokeless tobacco as a risk factor for head and neck cancer is not included in this atlas.

Head and neck cancers attributable to HPV positivity

Between 2013 and 2020 HPV status was not reliably captured in cancer registration data. Therefore, the proportion of head and neck cancers which are HPV positive, in particular oropharyngeal cancers, is not described in this atlas. These data are now routinely collected and can be reported on in the future.

Private dental services

No data is available on access to dental services provided on a private basis and the contribution of private dentistry to the diagnosis of head and neck cancer is unknown.

2. Incidence of head and neck cancer

The introduction provides a background to variation in head and neck cancer incidence in England. This section demonstrates variation in the incidence rates of head and neck cancer by ICB geography, age (0 to 69 years and 70 years and over), sex and lower super output area (LSOAs) deprivation quintiles in England.

A decrease in the incidence of head and neck, oropharyngeal, oral cavity and laryngeal cancers was observed in 2020. Incidence data from 2020 is an outlier due to the disruption to healthcare services during the COVID-19 pandemic. There was reduced access to primary medical and dental services during the pandemic and a reduction in cancer referrals, which may have resulted in this temporary decrease in new cases of head and neck cancers being recorded.[19] Data for 2021 suggests the upward trend in head and neck cancer incidence has continued.[3]

2.1: Variation in incidence of head and neck cancer in England

Box plot time series 2.1: Trend in variation in incidence rate of head and neck cancer across ICBs (2013 to 2020)

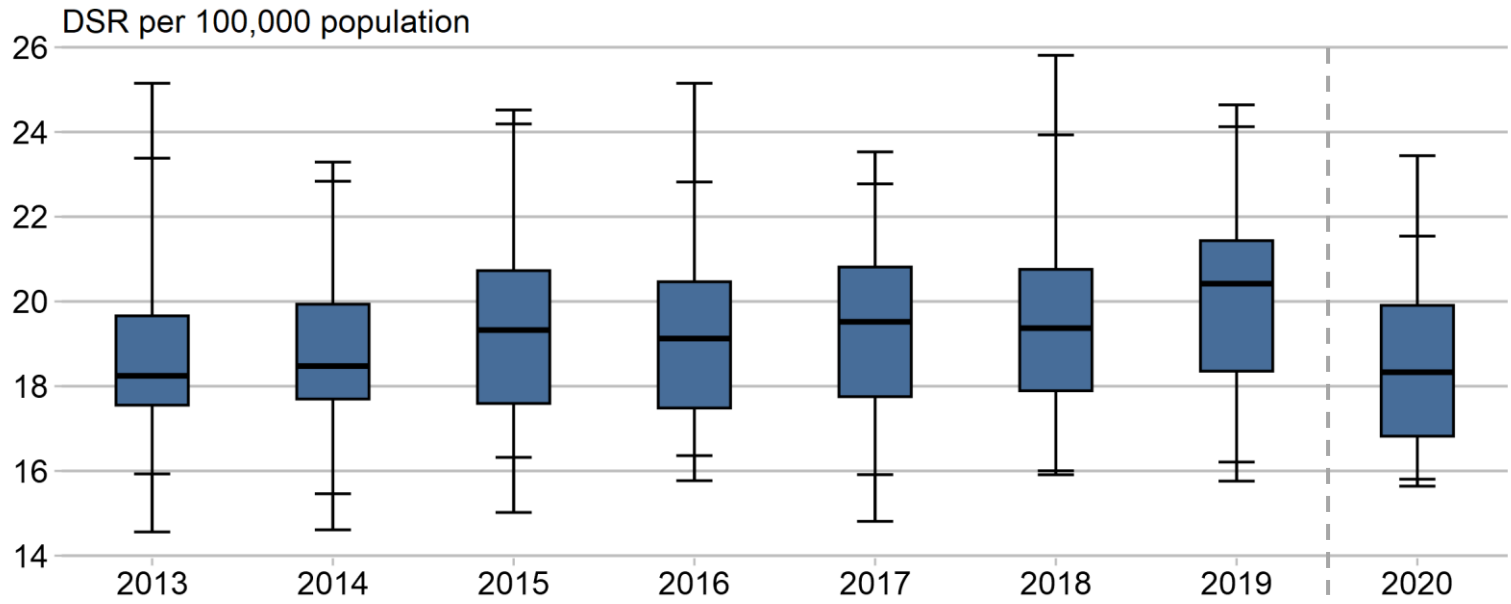


Table time series 2.1: Trend in variation in incidence rate of head and neck cancer across ICBs (2013 to 2020)

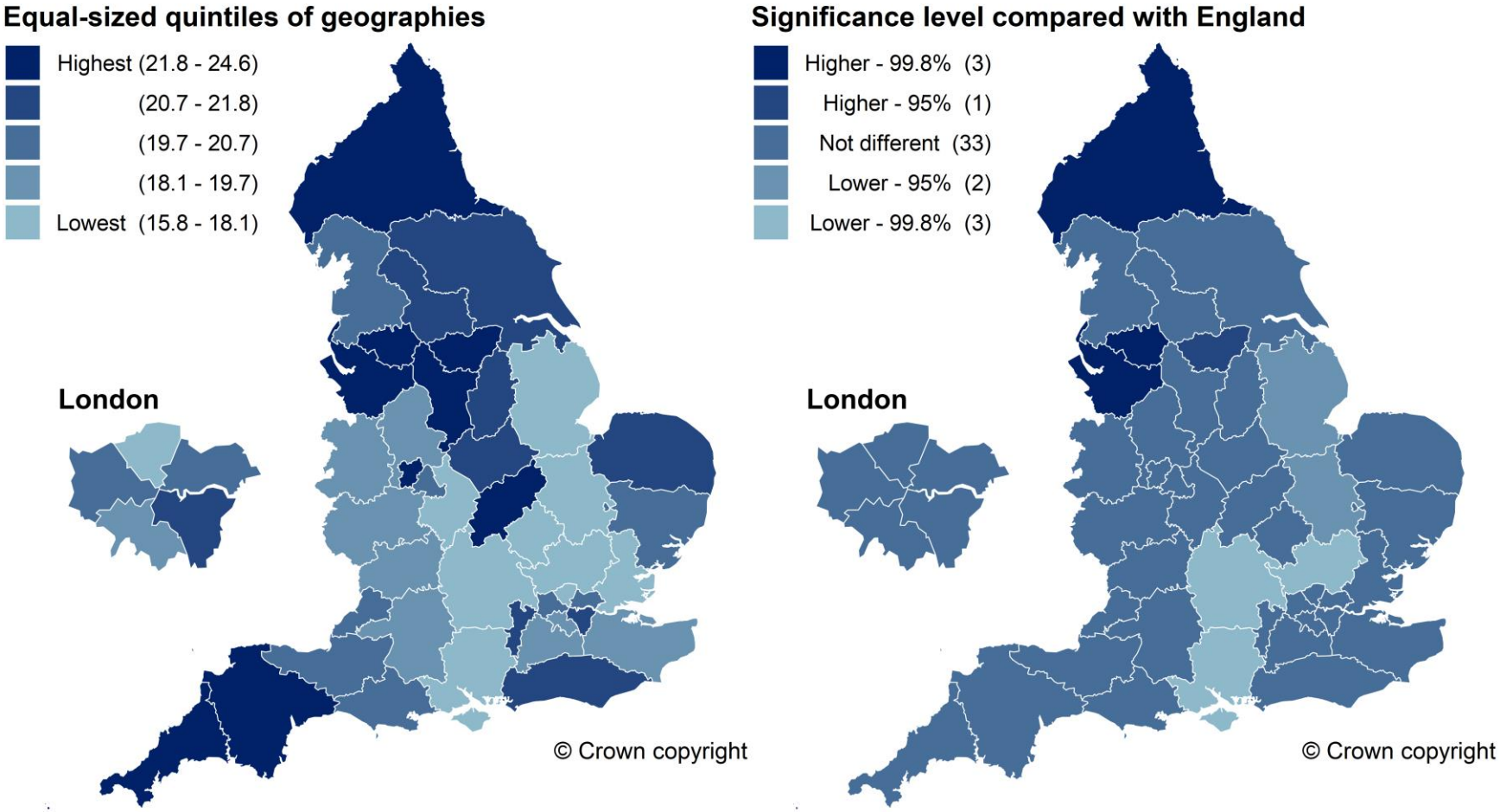
DSR per 100,000 population

Year	2013	2014	2015	2016	2017	2018	2019	Significance 2013 to 2019	2020
Maximum to minimum	10.6	8.7	9.5	9.4	8.7	9.9	8.9	No significant change	7.8
75th to 25th percentile	2.1	2.2	3.1	3.0	3.1	2.9	3.1	No significant change	3.1
95th to 5th percentile	7.5	7.4	7.9	6.5	6.9	7.9	7.9	No significant change	5.7
Median	18.2	18.5	19.3	19.1	19.5	19.4	20.4	Increasing significant	18.3

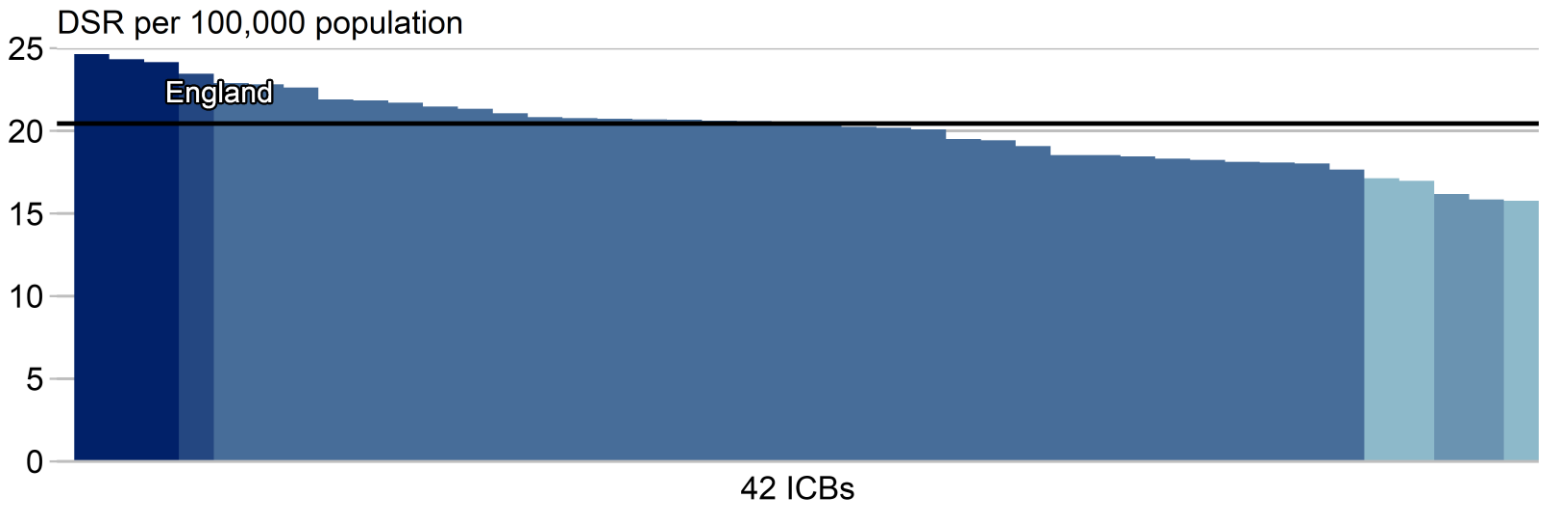
The box plot and data table show the distribution of integrated care board (ICB) values for the period 2013 to 2020. The median increased significantly from 18.2 per 100,000 population in 2013 to 20.4 per 100,000 population in 2019. In 2020 the median incidence rate decreased to 18.3 per 100,000 population.

Map 2.1: Variation in incidence rate of head and neck cancer by ICB (2019)

DSR per 100,000 population (optimum value: low)



Bar chart 2.1: Variation in incidence rate of head and neck cancer by ICB (2019)



The maps and column chart display the latest period (2019), during which ICB values ranged from 15.8 per 100,000 population to 24.6 per 100,000 population, which is a 1.6-fold difference between ICBs. The England value for 2019 was 20.4 per 100,000 population.

Of the 42 ICBs, 4 were statistically significantly higher than the England value (1 at the 95% confidence level and 3 at the 99.8% confidence level) and 5 were statistically significantly lower than the England value (2 at the 95% confidence level and 3 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.2: Variation in incidence of oral cavity cancer in England

Box plot time series 2.2: Trend in variation in incidence rate of oral cavity cancer across ICBs (2013 to 2020)

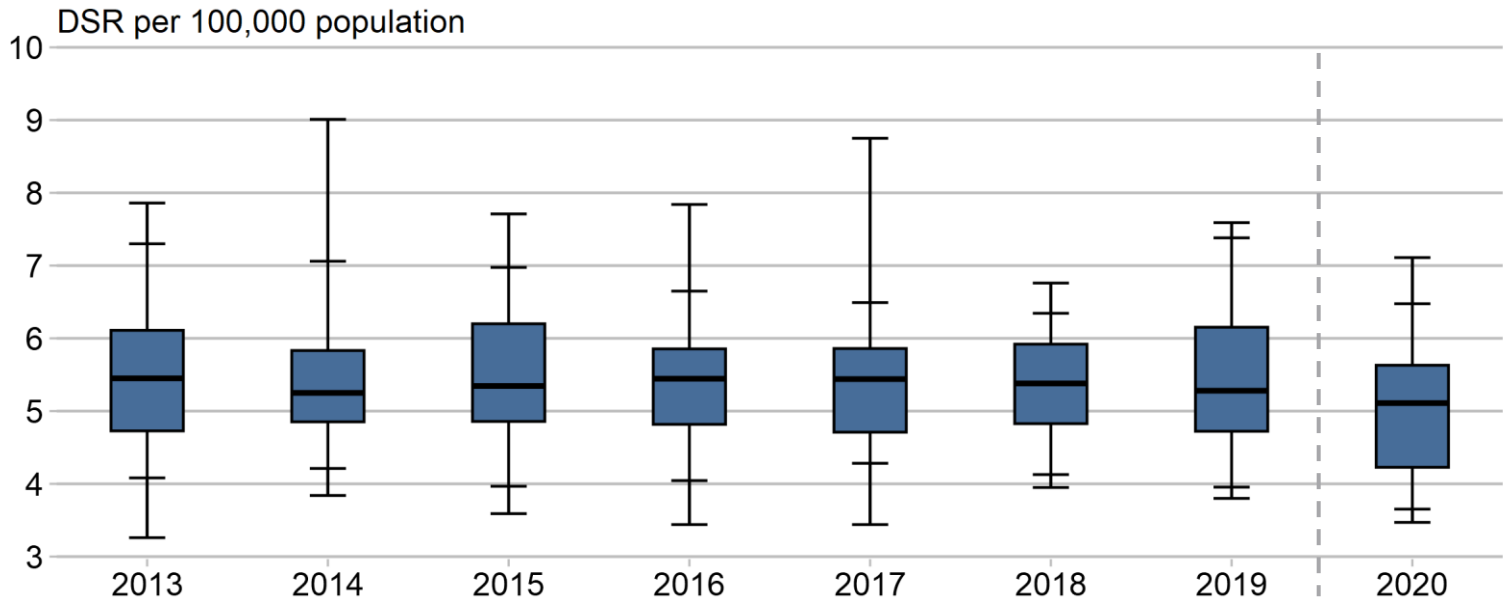


Table time series 2.2: Trend in variation in incidence rate of oral cavity cancer across ICBs (2013 to 2020)

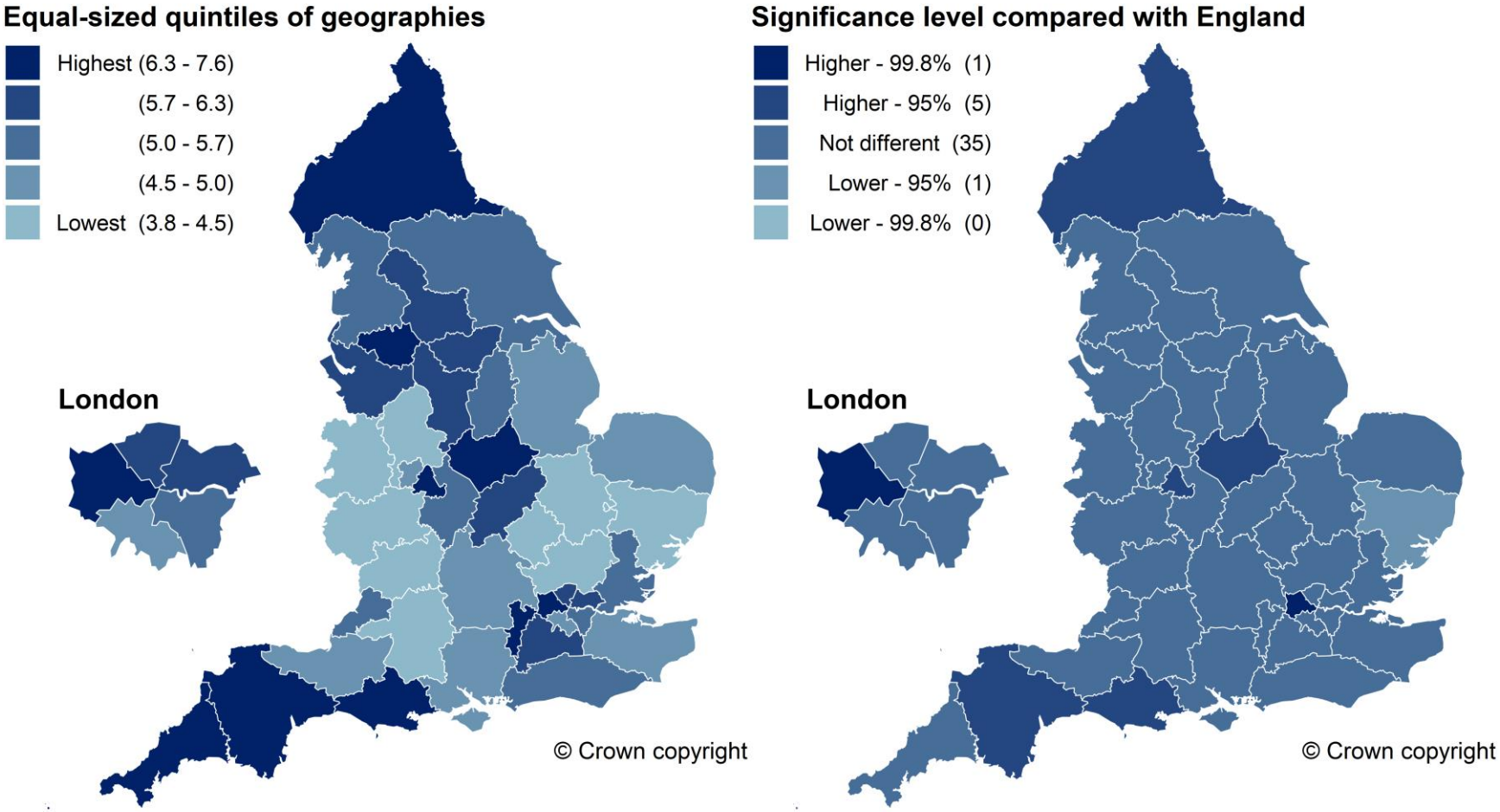
DSR per 100,000 population

Year	2013	2014	2015	2016	2017	2018	2019	Significance 2013 to 2019	2020
Maximum to minimum	4.6	5.2	4.1	4.4	5.3	2.8	3.8	No significant change	3.6
75th to 25th percentile	1.4	1.0	1.3	1.0	1.2	1.1	1.4	No significant change	1.4
95th to 5th percentile	3.2	2.8	3.0	2.6	2.2	2.2	3.4	No significant change	2.8
Median	5.5	5.3	5.3	5.4	5.4	5.4	5.3	No significant change	5.1

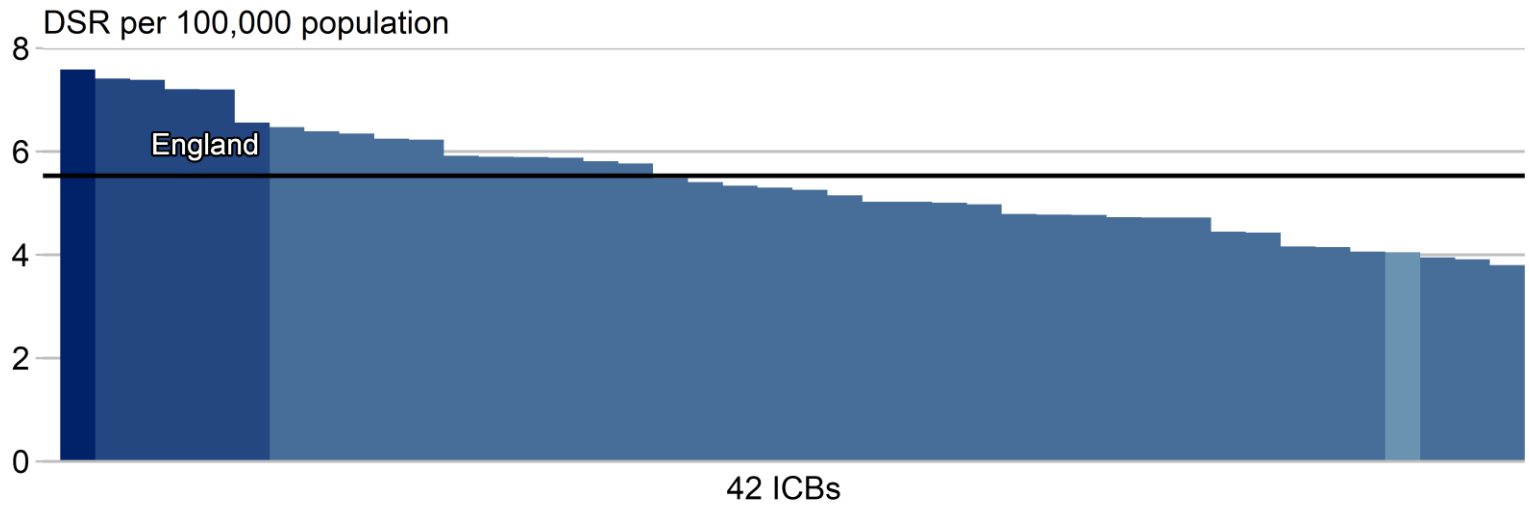
The box plot and data table show the distribution of ICB values for the period 2013 to 2020.

Map 2.2: Variation in incidence rate of oral cavity cancer by ICB (2019)

DSR per 100,000 population (optimum value: low)



Bar chart 2.2: Variation in incidence rate of oral cavity cancer by ICB (2019)



The maps and column chart display the latest period (2019), during which ICB values ranged from 3.8 per 100,000 population to 7.6 per 100,000 population, which is a 2.0-fold difference between ICBs. The England value for 2019 was 5.5 per 100,000 population.

Of the 42 ICBs, 6 were statistically significantly higher than the England value (5 at the 95% confidence level and 1 at the 99.8% confidence level) and 1 was statistically significantly lower than the England value (1 at the 95% confidence level and 0 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.3: Variation in incidence of oropharyngeal cancer in England

Box plot time series 2.3: Trend in variation in incidence rate of oropharyngeal cancer across ICBs (2013 to 2020)

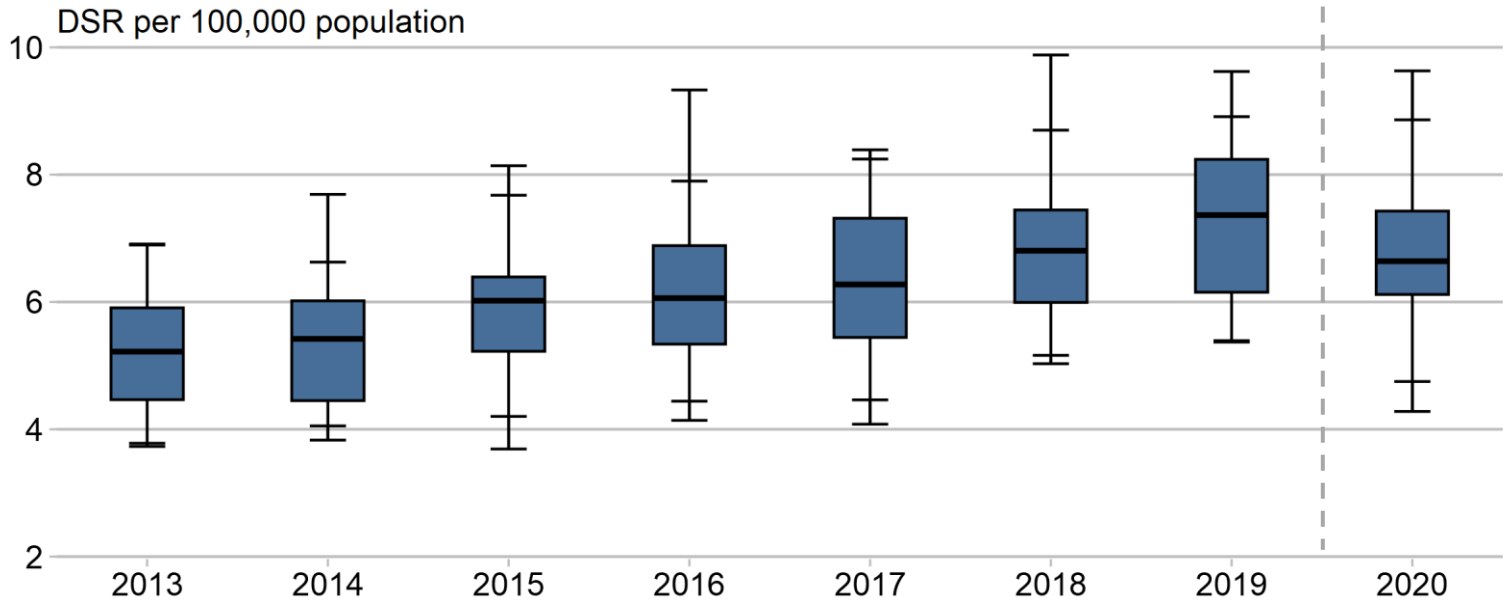


Table time series 2.3: Trend in variation in incidence rate of oropharyngeal cancer across ICBs (2013 to 2020)

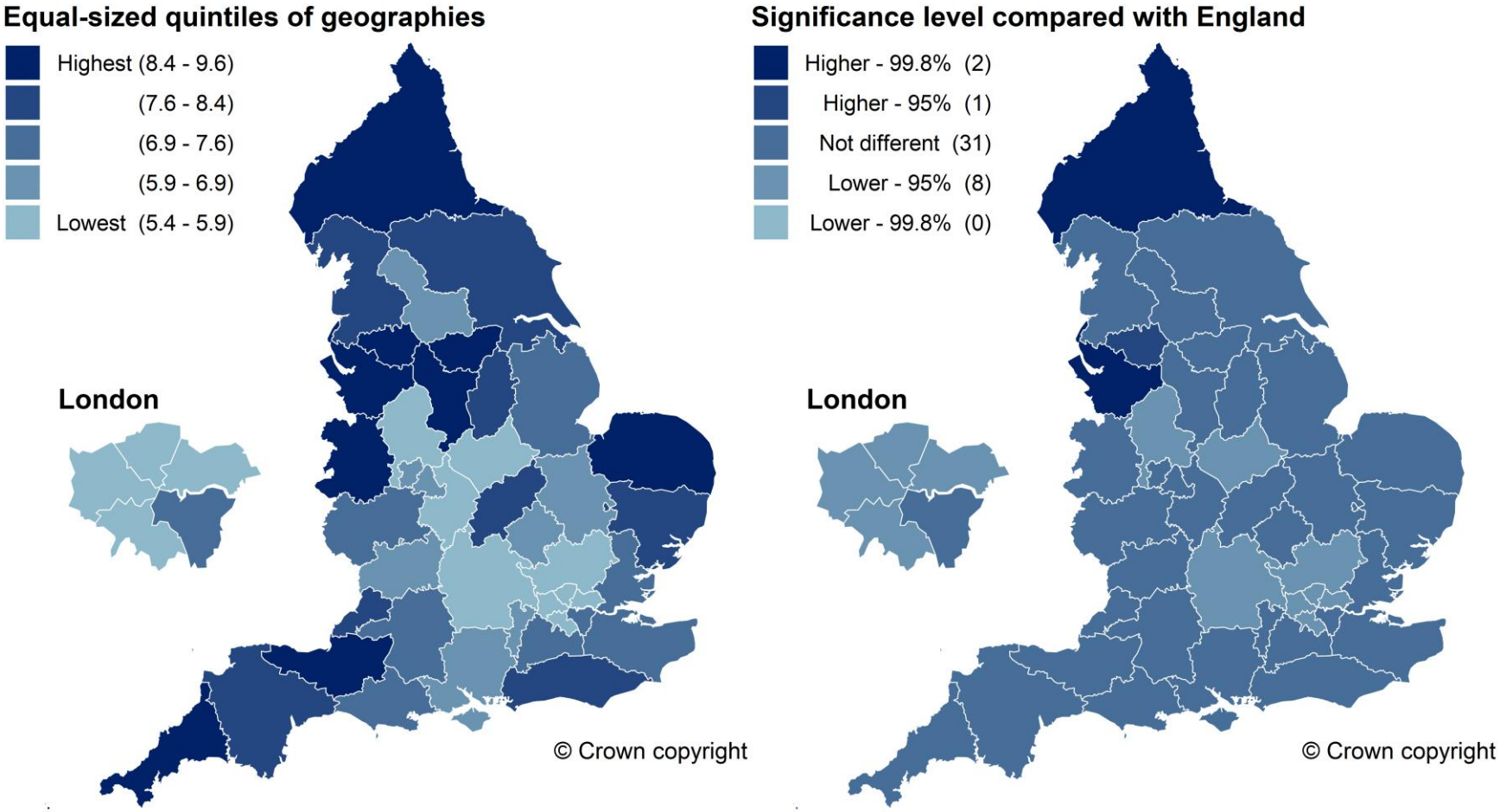
DSR per 100,000 population

Year	2013	2014	2015	2016	2017	2018	2019	Significance 2013 to 2019	2020
Maximum to minimum	3.2	3.9	4.5	5.2	4.3	4.9	4.3	No significant change	5.4
75th to 25th percentile	1.4	1.6	1.2	1.5	1.9	1.5	2.1	No significant change	1.3
95th to 5th percentile	3.1	2.6	3.5	3.5	3.8	3.5	3.5	No significant change	4.1
Median	5.2	5.4	6.0	6.1	6.3	6.8	7.4	Increasing significant	6.6

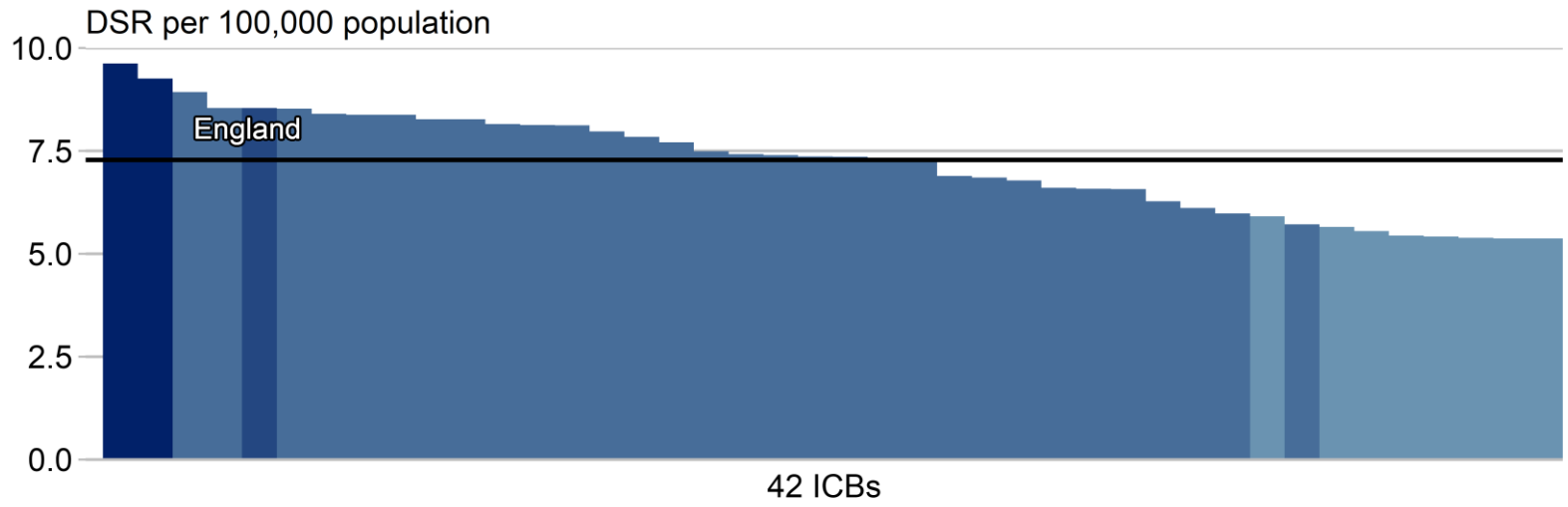
The box plot and data table show the distribution of ICB values for the period 2013 to 2020. The median increased significantly from 5.2 per 100,000 population in 2013 to 7.4 per 100,000 population in 2019.

Map 2.3: Variation in incidence rate of oropharyngeal cancer by ICB (2019)

DSR per 100,000 population (optimum value: low)



Bar chart 2.3: Variation in incidence rate of oropharyngeal cancer by ICB (2019)



The maps and column chart display the latest period (2019), during which ICB values ranged from 5.4 per 100,000 population to 9.6 per 100,000 population, which is a 1.8-fold difference between ICBs. The England value for 2019 was 7.3 per 100,000 population.

Of the 42 ICBs, 3 were statistically significantly higher than the England value (1 at the 95% confidence level and 2 at the 99.8% confidence level) and 8 were statistically significantly lower than the England value (8 at the 95% confidence level and 0 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.4: Variation in incidence of laryngeal cancer in England

Box plot time series 2.4: Trend in variation in incidence rate of laryngeal cancer across ICBs (2013 to 2020)

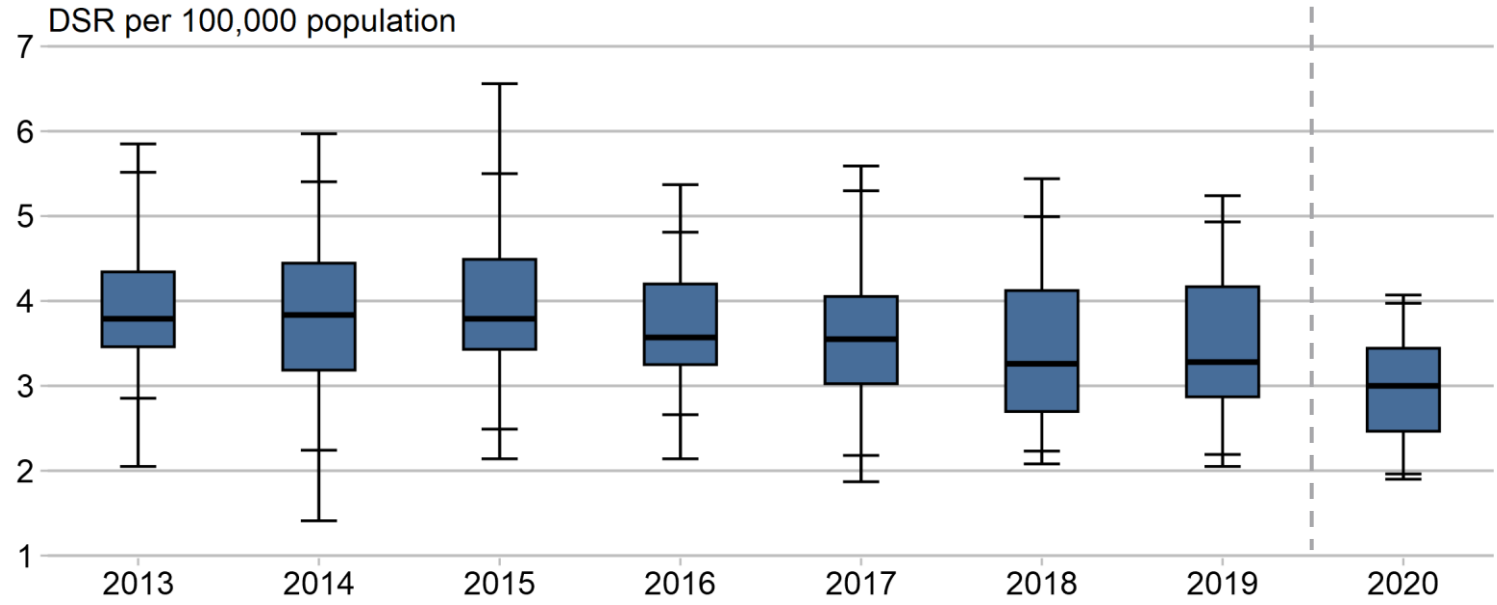


Table time series 2.4: Trend in variation in incidence rate of laryngeal cancer across ICBs in England (2013 to 2020)

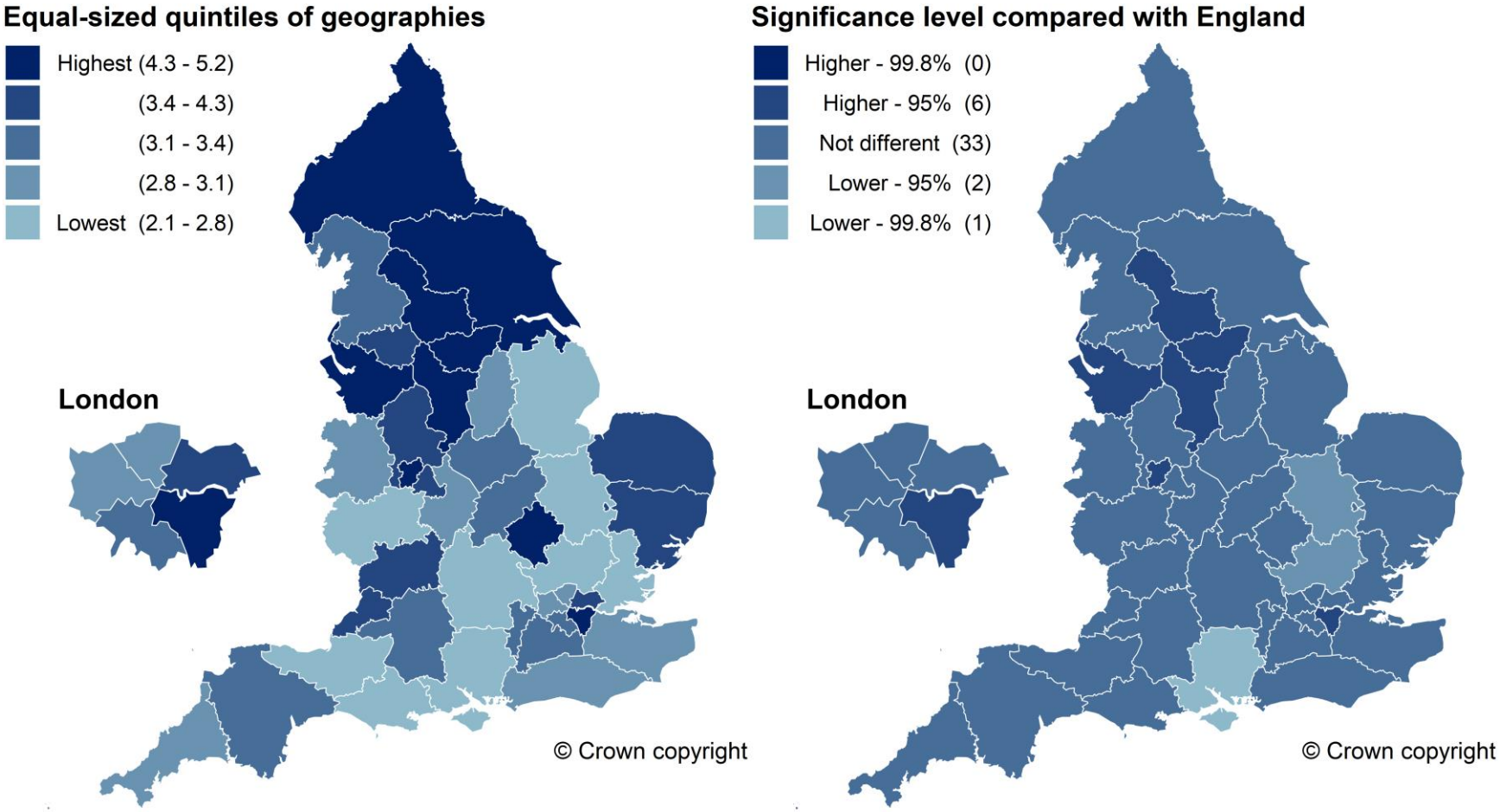
DSR per 100,000 population

Year	2013	2014	2015	2016	2017	2018	2019	Significance 2013 to 2019	2020
Maximum to minimum	3.8	4.6	4.4	3.2	3.7	3.4	3.2	No significant change	2.2
75th to 25th percentile	0.9	1.3	1.1	1.0	1.0	1.4	1.3	No significant change	1.0
95th to 5th percentile	2.7	3.2	3.0	2.2	3.1	2.8	2.7	No significant change	2.0
Median	3.8	3.8	3.8	3.6	3.6	3.3	3.3	Decreasing significant	3.0

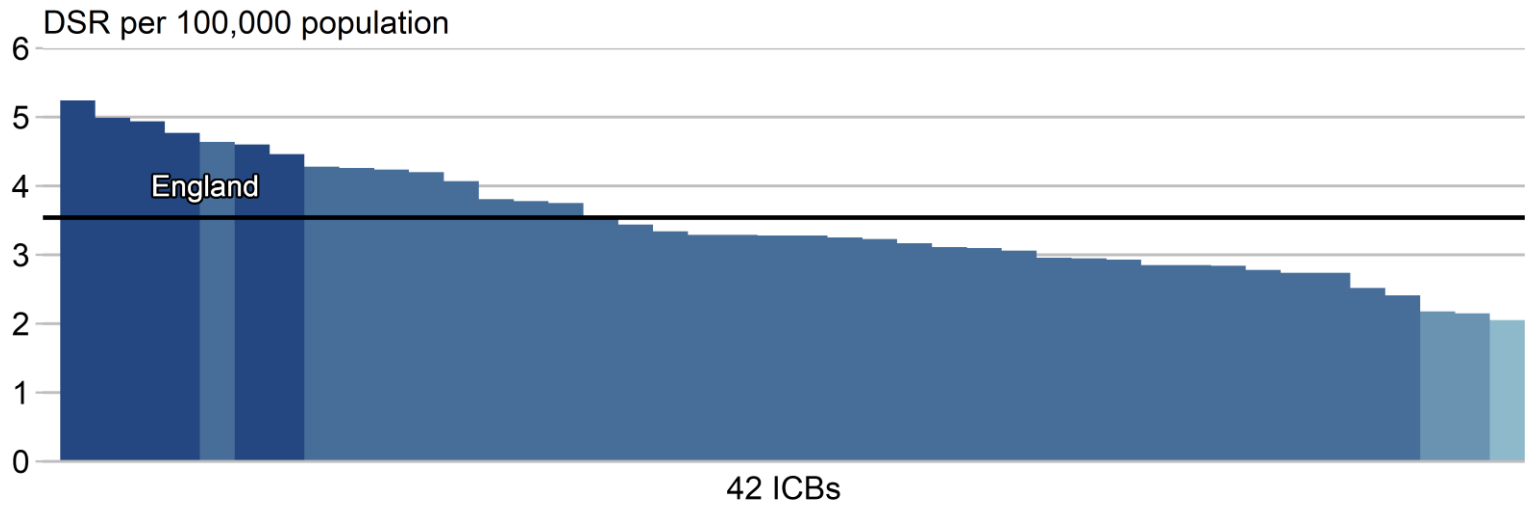
The box plot and data table show the distribution of ICB values for the period 2013 to 2020. The median decreased significantly from 3.8 per 100,000 population in 2013 to 3.3 per 100,000 population in 2019.

Map 2.4: Variation in incidence rate of laryngeal cancer by ICB (2019)

DSR per 100,000 population (optimum value: low)



Bar chart 2.4: Variation in incidence rate of laryngeal cancer by ICB (2019)



The maps and column chart display the latest period (2019), during which ICB values ranged from 2.1 per 100,000 population to 5.2 per 100,000 population, which is a 2.6-fold difference between ICBs. The England value for 2019 was 3.5 per 100,000 population.

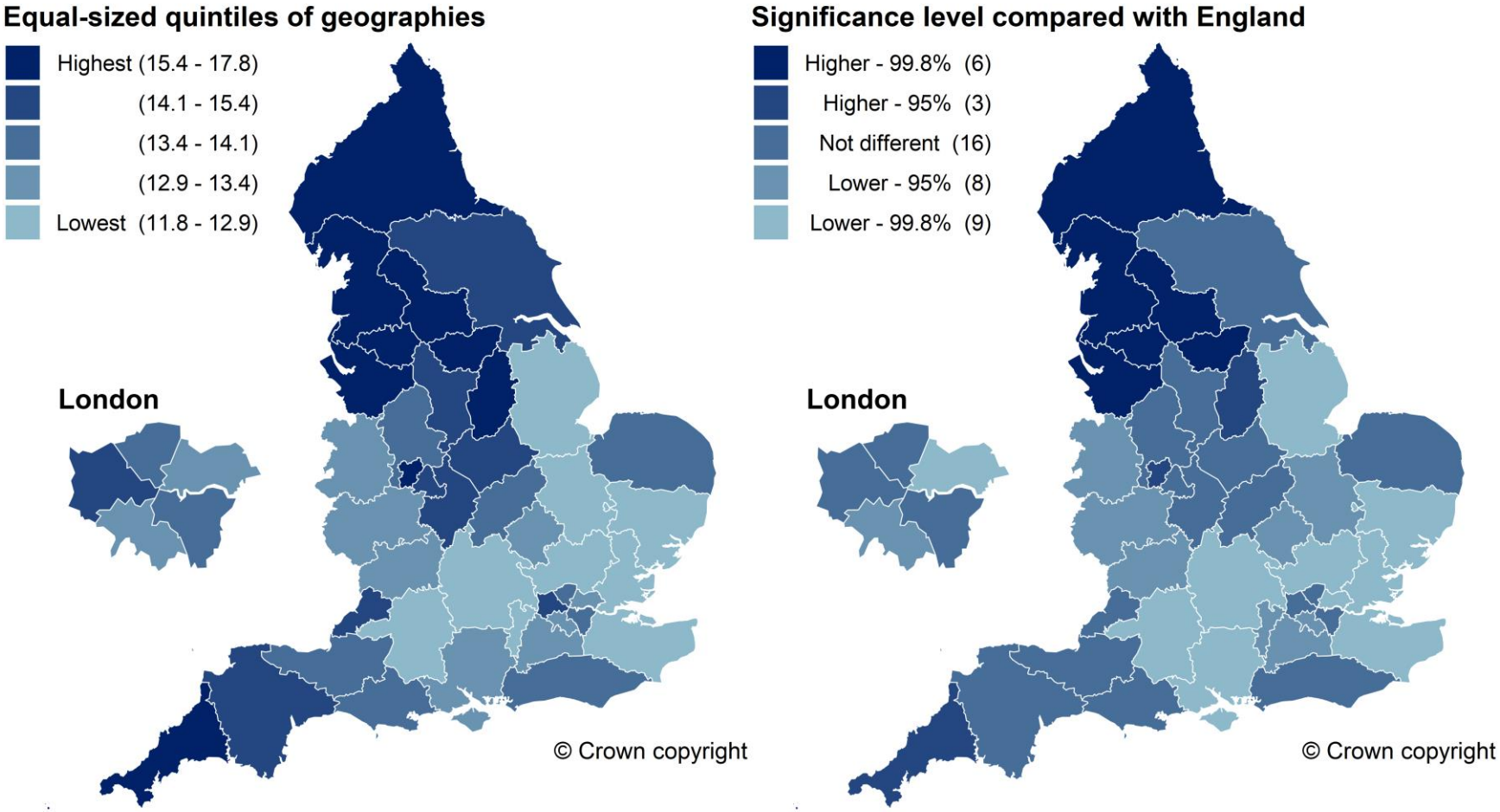
Of the 42 ICBs, 6 were statistically significantly higher than the England value (6 at the 95% confidence level and 0 at the 99.8% confidence level) and 3 were statistically significantly lower than the England value (2 at the 95% confidence level and 1 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

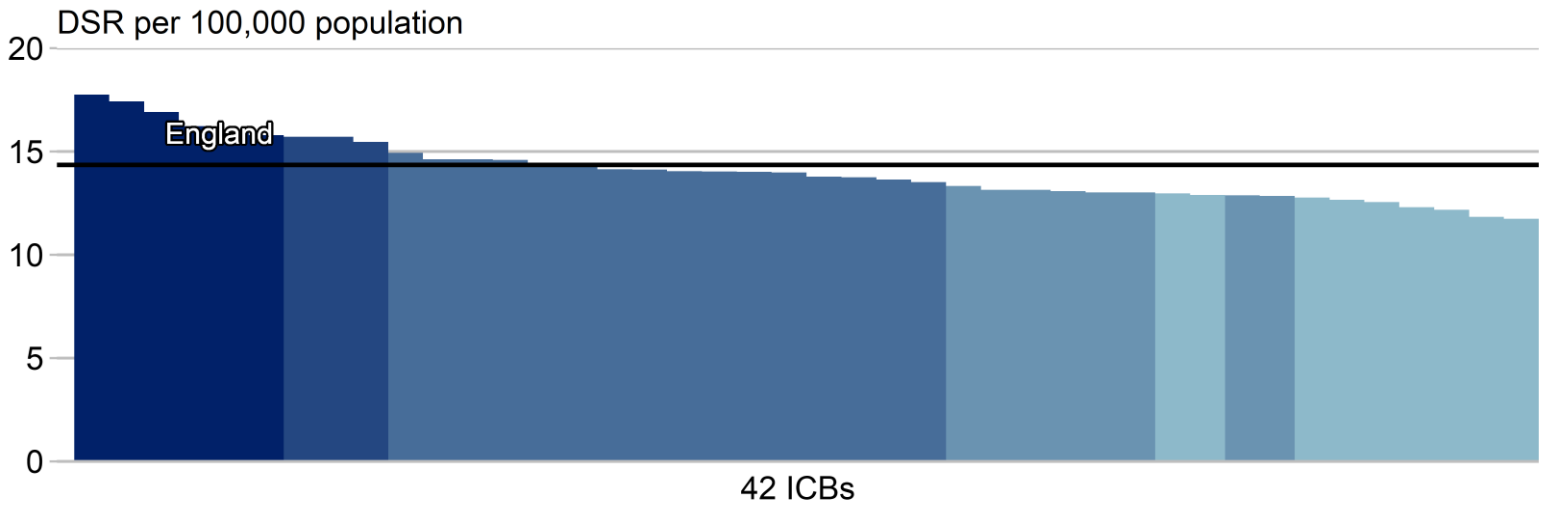
2.5: Variation in incidence of head and neck cancer in people aged 0 to 69 years

Map 2.5: Variation in incidence rate of head and neck cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.5: Variation in incidence rate of head and neck cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 11.8 per 100,000 population to 17.8 per 100,000 population, which is a 1.5-fold difference between ICBs. The England value for 2013 to 2020 pooled was 14.4 per 100,000 population.

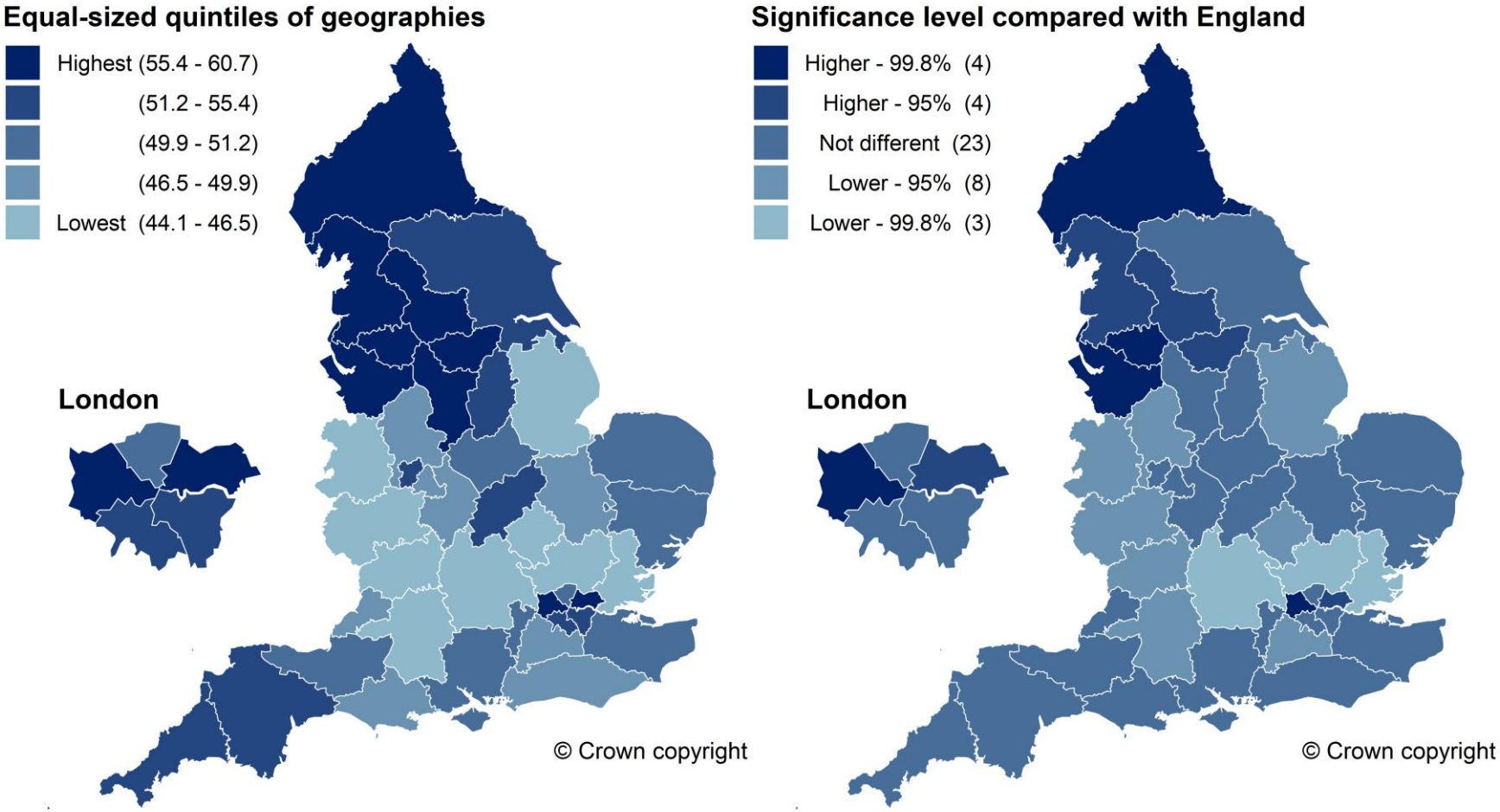
Of the 42 ICBs, 9 were statistically significantly higher than the England value (3 at the 95% confidence level and 6 at the 99.8% confidence level) and 17 were statistically significantly lower than the England value (8 at the 95% confidence level and 9 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

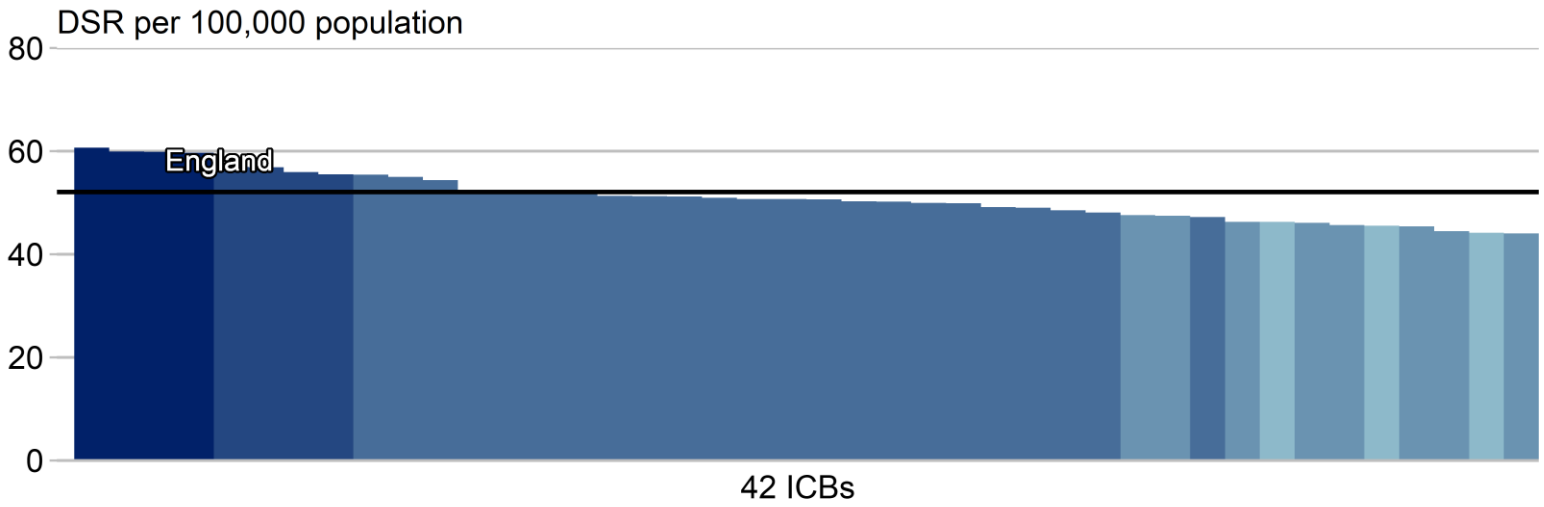
2.6: Variation in incidence of head and neck cancer in people aged 70 years and over

Map 2.6: Variation in incidence rate of head and neck cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.6: Variation in incidence rate of head and neck cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 44.1 per 100,000 population to 60.7 per 100,000 population, which is a 1.4-fold difference between ICBs. The England value for 2013 to 2020 pooled was 52.1 per 100,000 population.

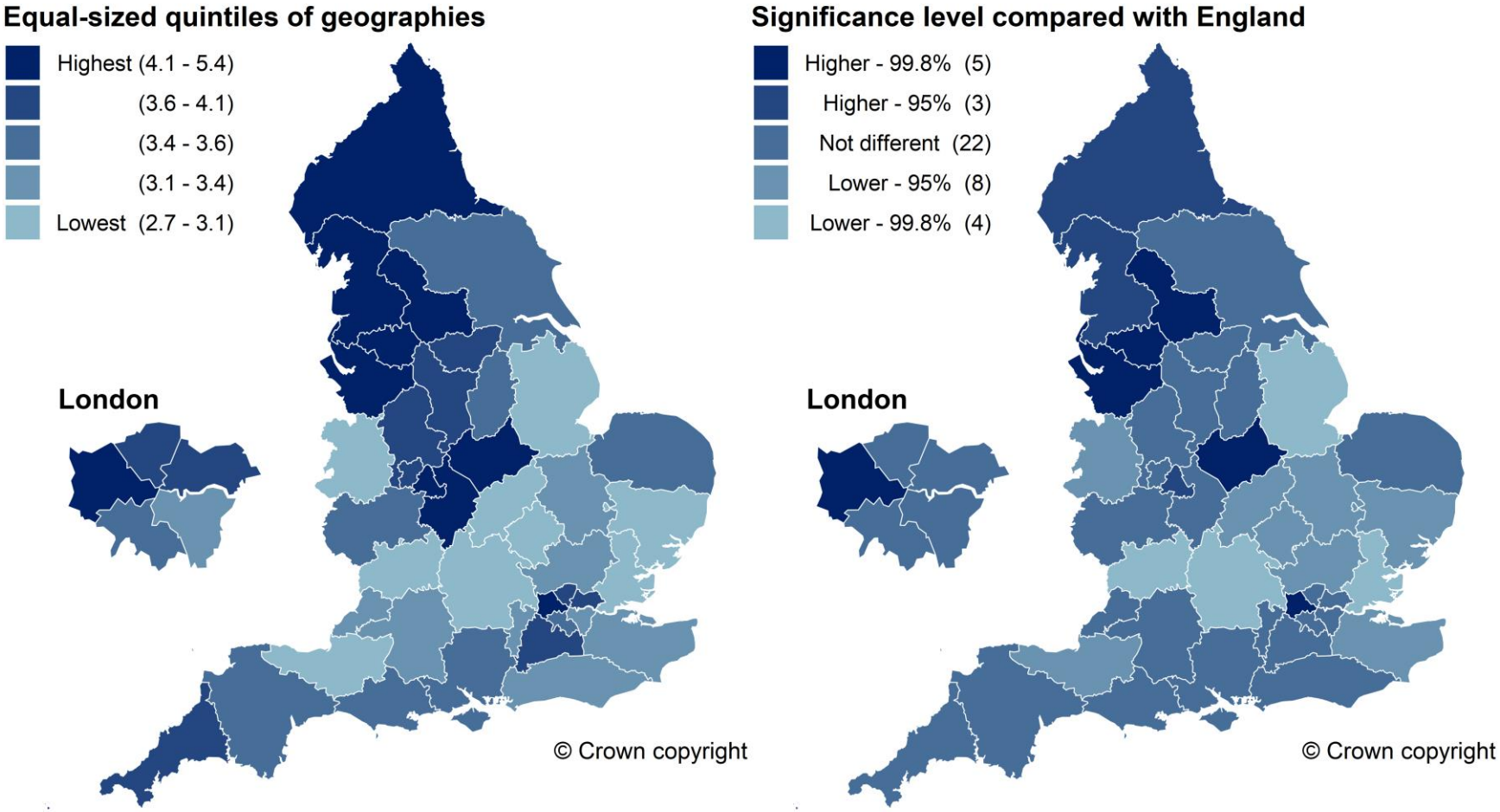
Of the 42 ICBs, 8 were statistically significantly higher than the England value (4 at the 95% confidence level and 4 at the 99.8% confidence level) and 11 were statistically significantly lower than the England value (8 at the 95% confidence level and 3 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

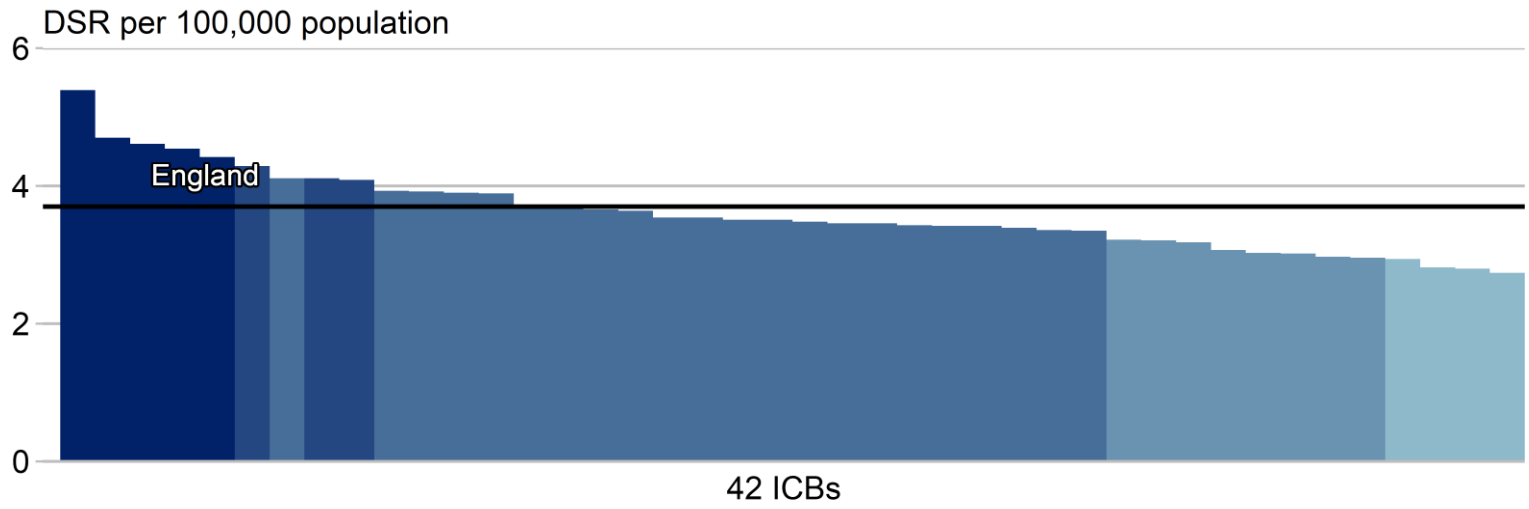
2.7: Variation in incidence of oral cavity cancer in people aged 0 to 69 years

Map 2.7: Variation in incidence rate of oral cavity cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.7: Variation in incidence rate of oral cavity cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 2.7 per 100,000 population to 5.4 per 100,000 population, which is a 2.0-fold difference between ICBs. The England value for 2013 to 2020 pooled was 3.7 per 100,000 population.

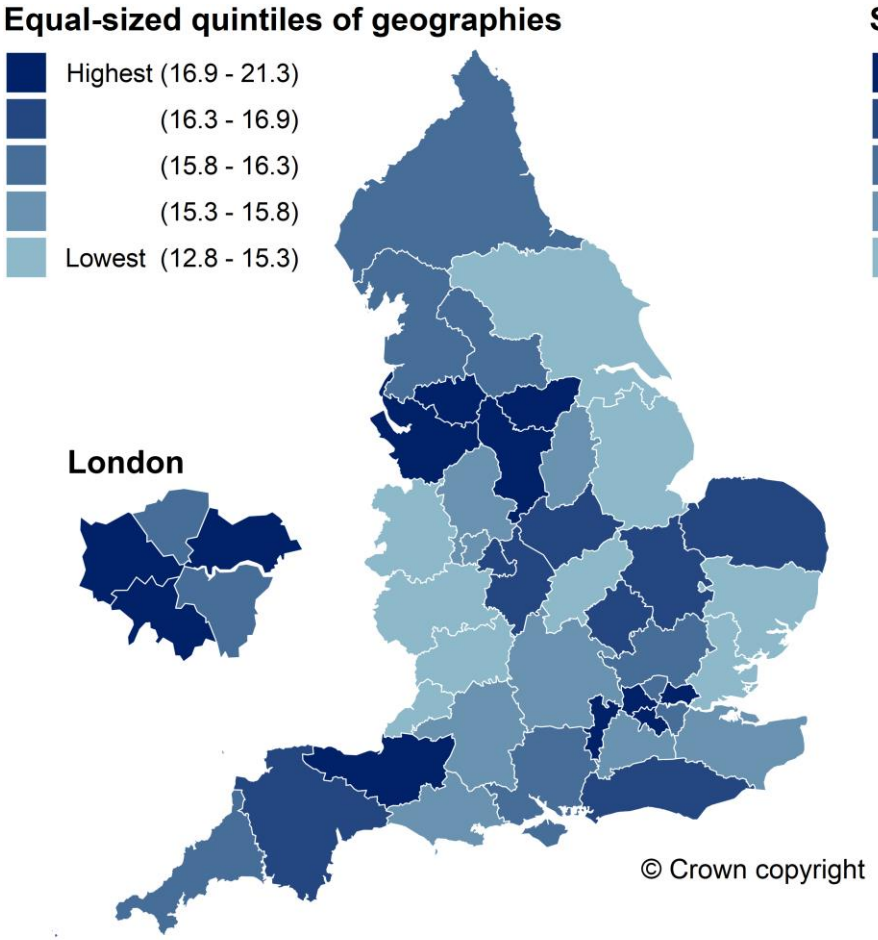
Of the 42 ICBs, 8 were statistically significantly higher than the England value (3 at the 95% confidence level and 5 at the 99.8% confidence level) and 12 were statistically significantly lower than the England value (8 at the 95% confidence level and 4 at the 99.8% confidence level).

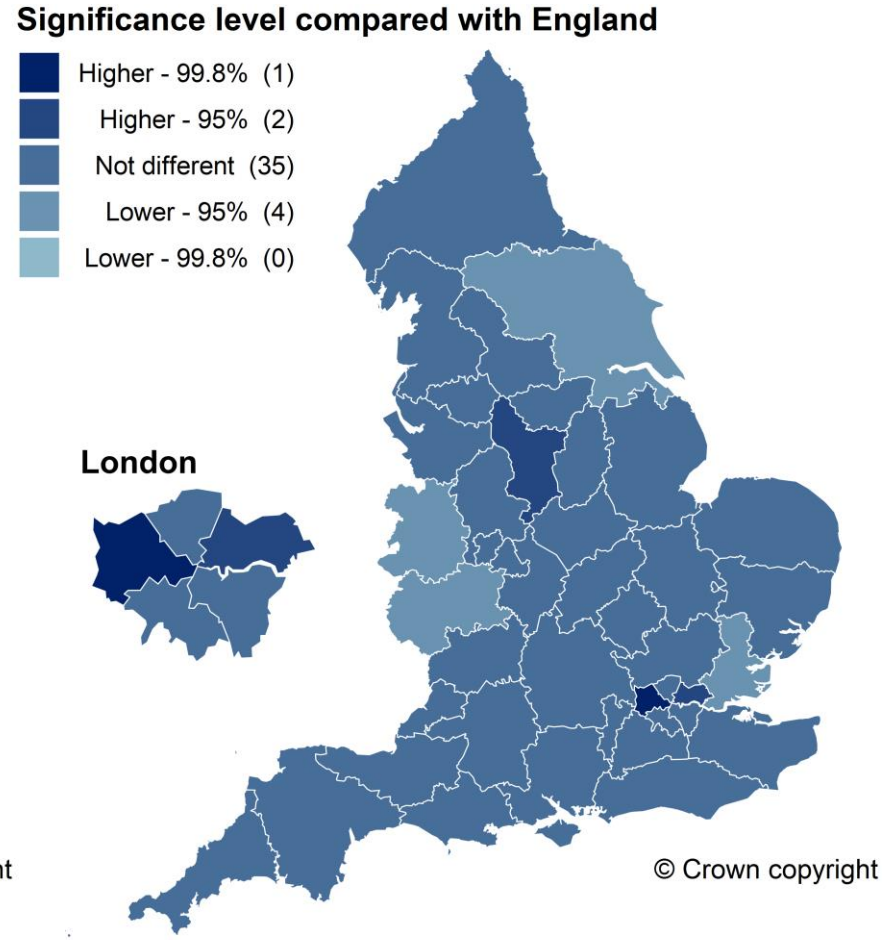
The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.8: Variation in incidence of oral cavity cancer in people aged 70 years and over

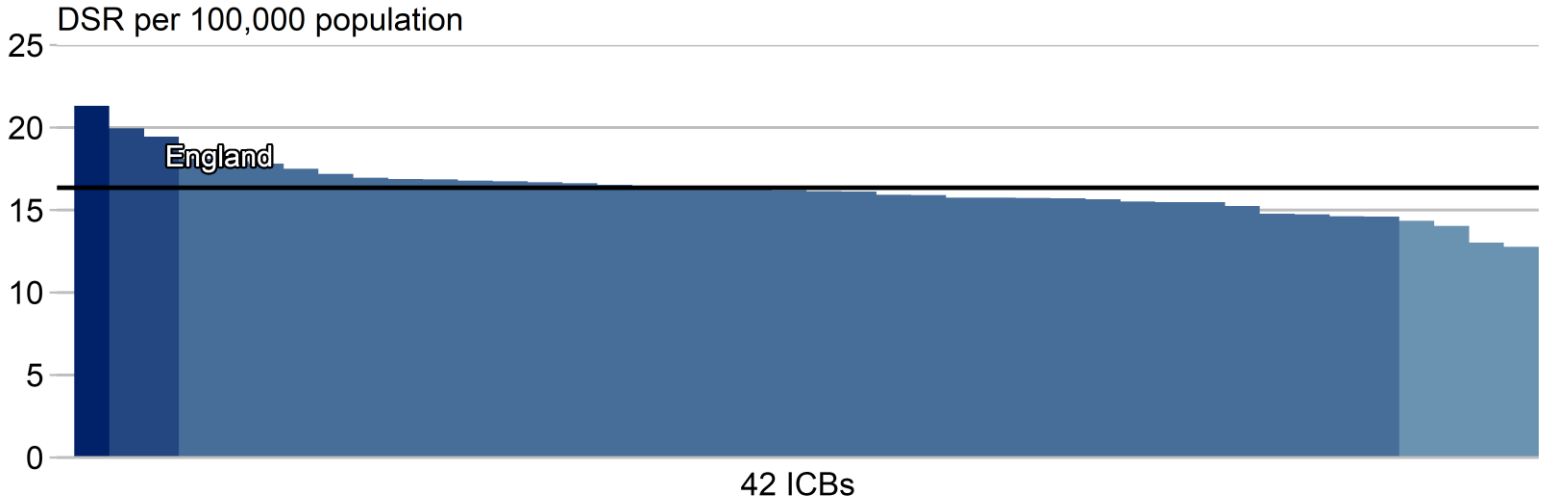
Map 2.8: Variation in incidence rate of oral cavity cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)





Bar chart 2.8: Variation in incidence rate of oral cavity cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 12.8 per 100,000 population to 21.3 per 100,000 population, which is a 1.7-fold difference between ICBs. The England value for 2013 to 2020 pooled was 16.4 per 100,000 population.

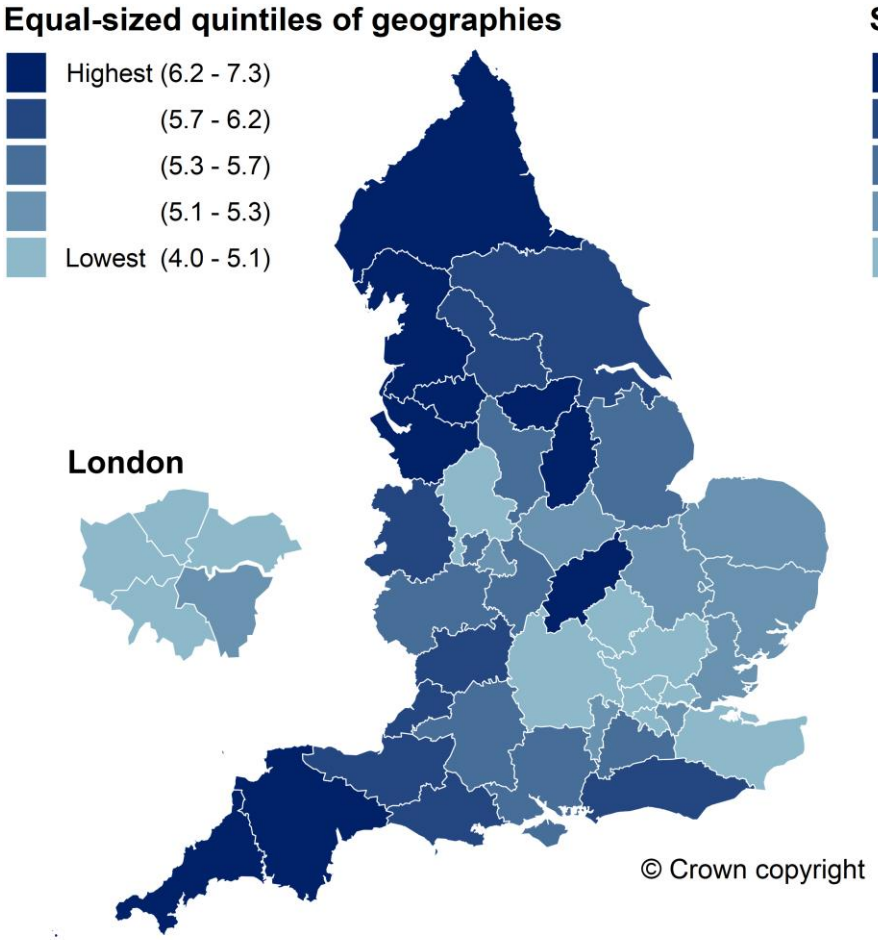
Of the 42 ICBs, 3 were statistically significantly higher than the England value (2 at the 95% confidence level and 1 at the 99.8% confidence level) and 4 were statistically significantly lower than the England value (4 at the 95% confidence level and 0 at the 99.8% confidence level).

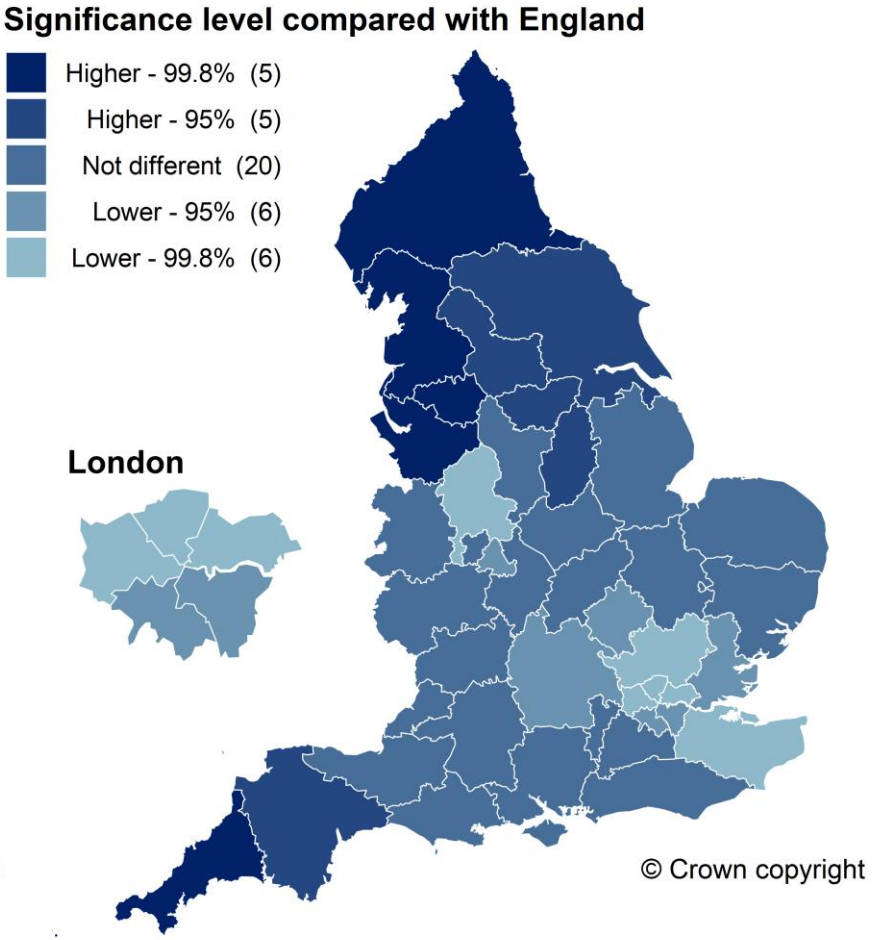
The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.9: Variation in incidence of oropharyngeal cancer in people aged 0 to 69 years

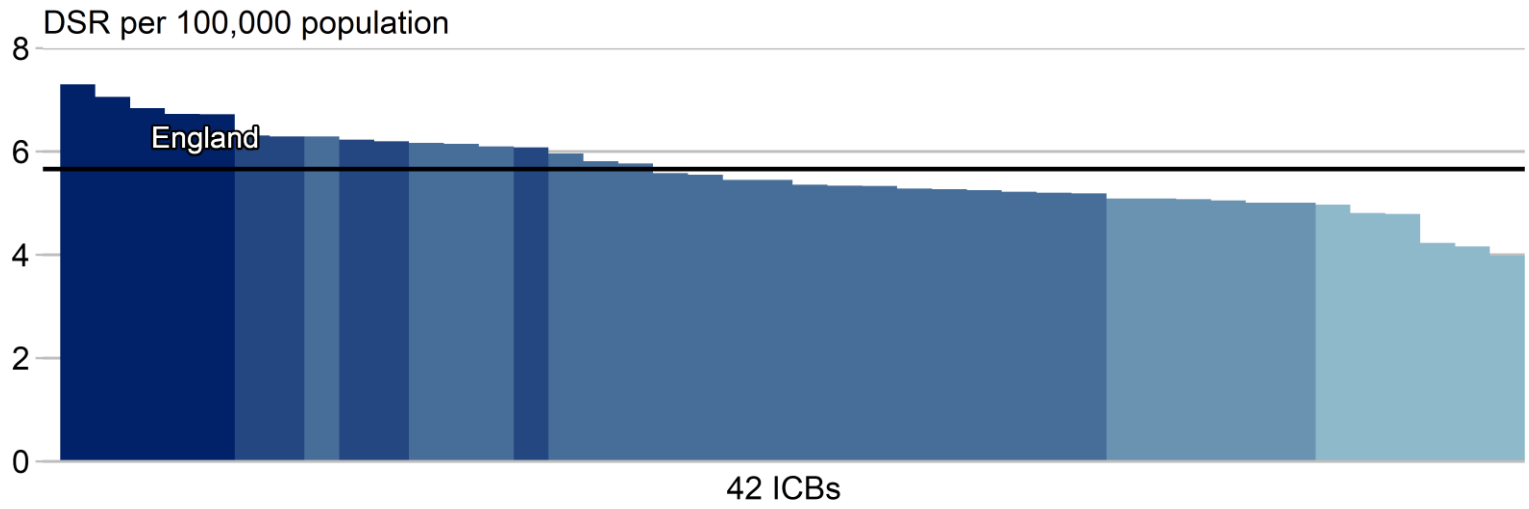
Map 2.9: Variation in incidence rate of oropharyngeal cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)





Bar chart 2.9: Variation in incidence rate of oropharyngeal cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 4.0 per 100,000 population to 7.3 per 100,000 population, which is a 1.8-fold difference between ICBs. The England value for 2013 to 2020 pooled was 5.7 per 100,000 population.

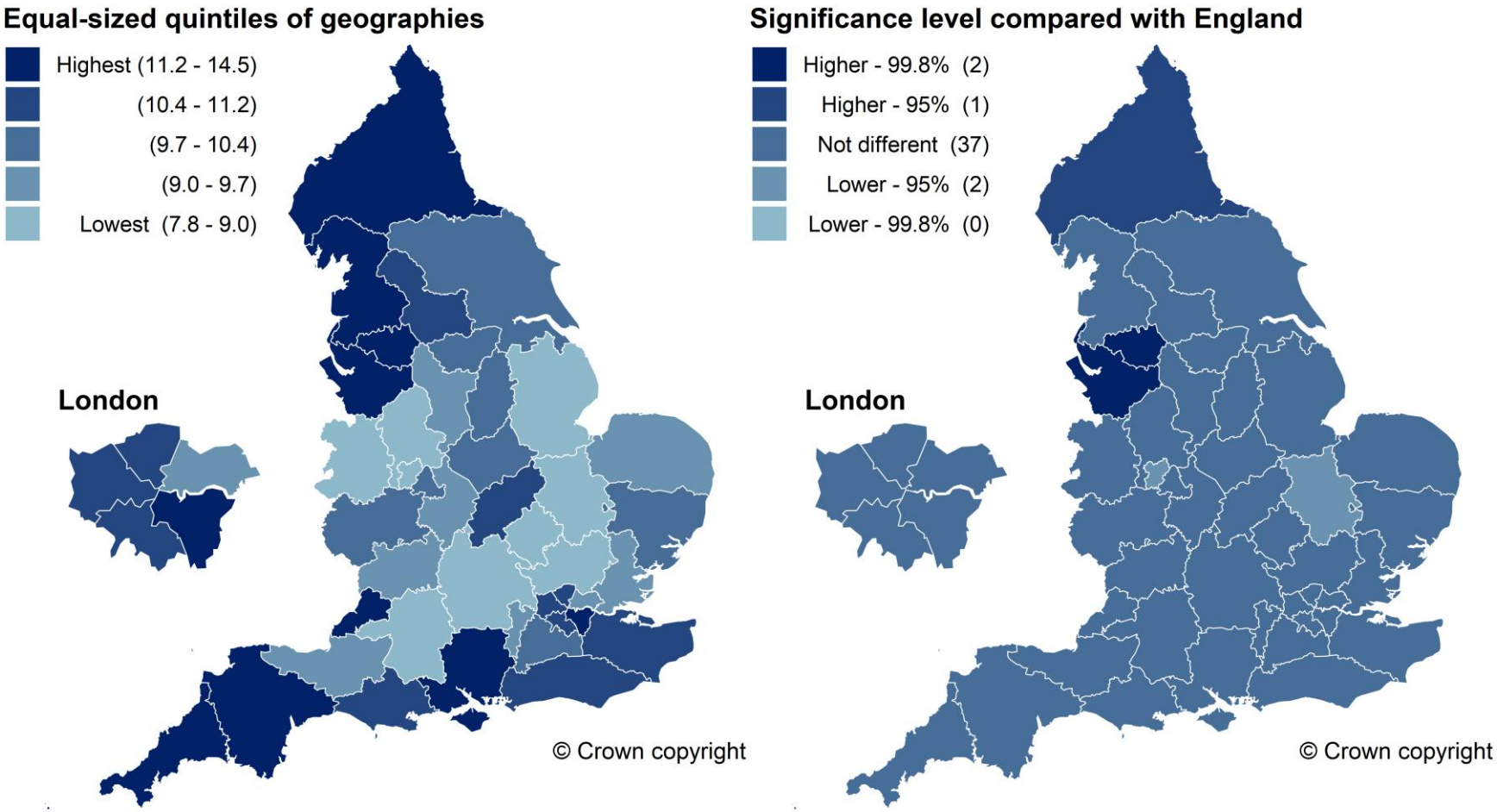
Of the 42 ICBs, 10 were statistically significantly higher than the England value (5 at the 95% confidence level and 5 at the 99.8% confidence level) and 12 were statistically significantly lower than the England value (6 at the 95% confidence level and 6 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

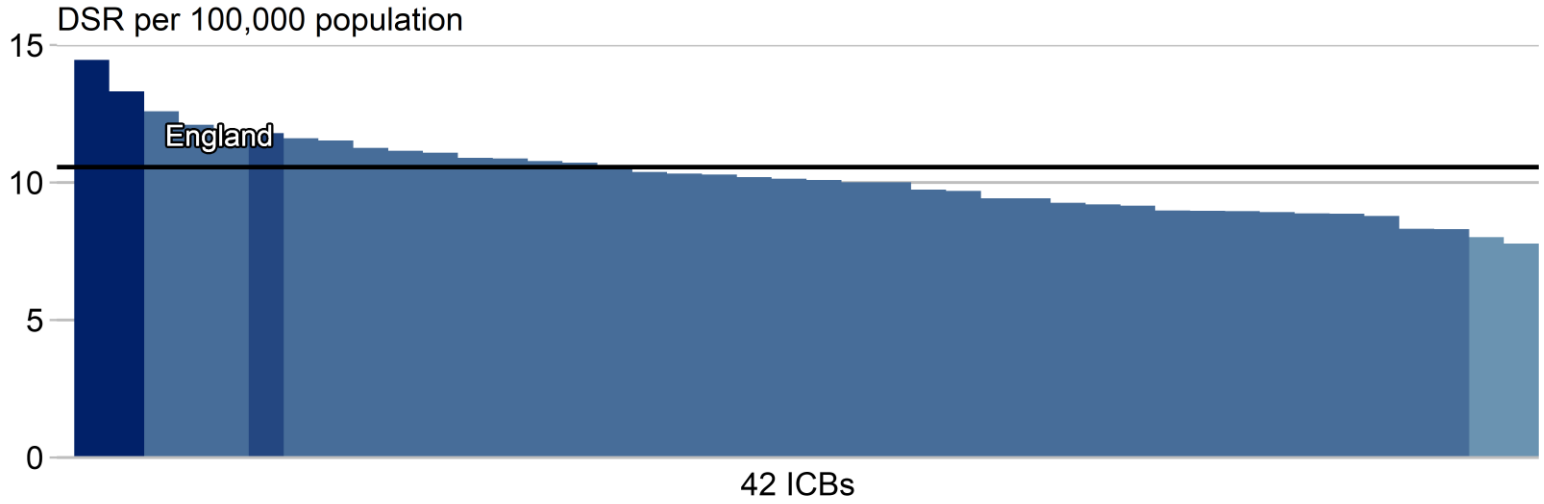
2.10: Variation in incidence of oropharyngeal cancer in people aged 70 years and over

Map 2.10: Variation in incidence rate of oropharyngeal cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.10: Variation in incidence rate of oropharyngeal cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 7.8 per 100,000 population to 14.5 per 100,000 population, which is a 1.9-fold difference between ICBs. The England value for 2013 to 2020 pooled was 10.6 per 100,000 population.

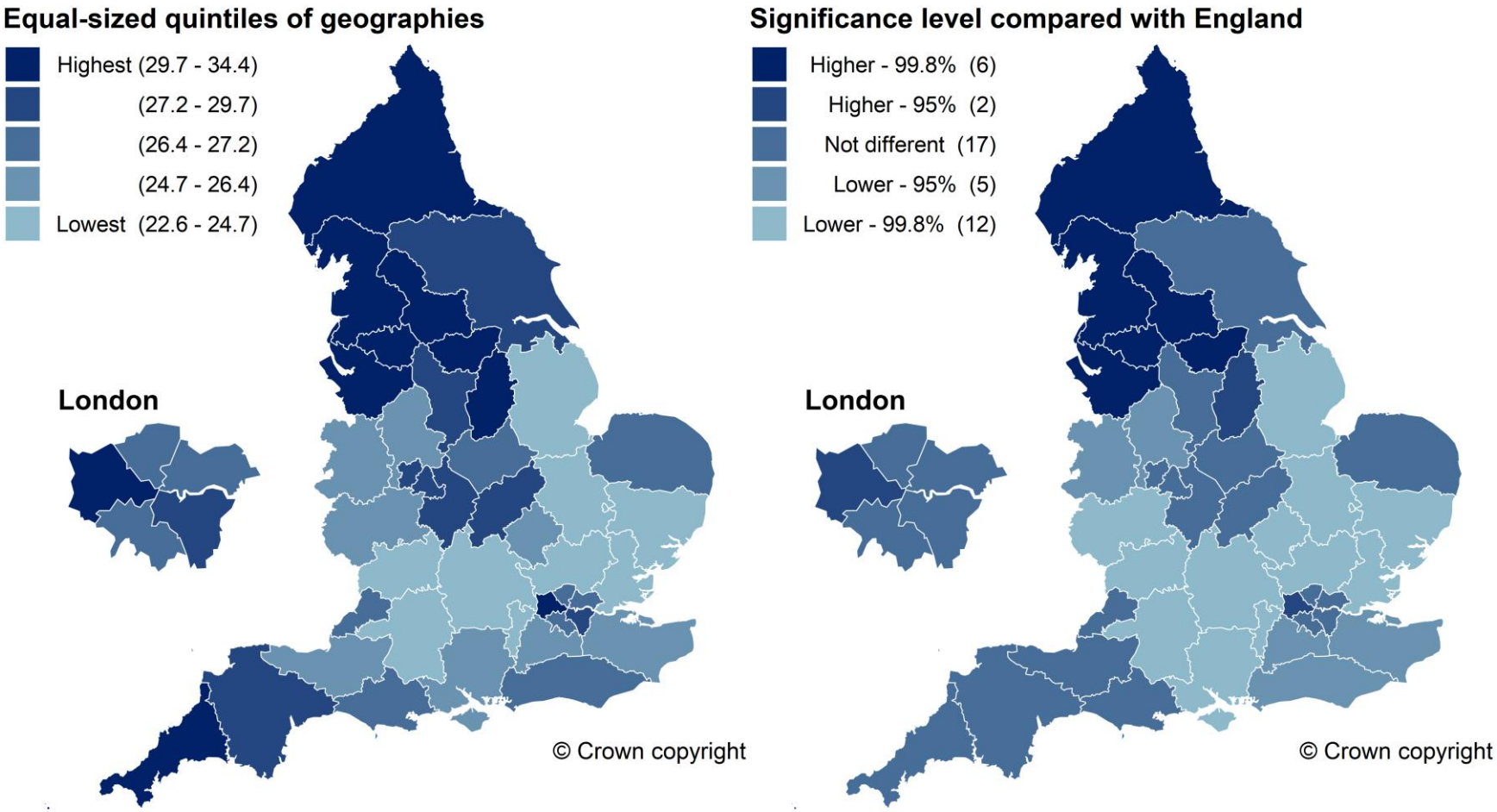
Of the 42 ICBs, 3 were statistically significantly higher than the England value (1 at the 95% confidence level and 2 at the 99.8% confidence level) and 2 were statistically significantly lower than the England value (2 at the 95% confidence level and 0 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

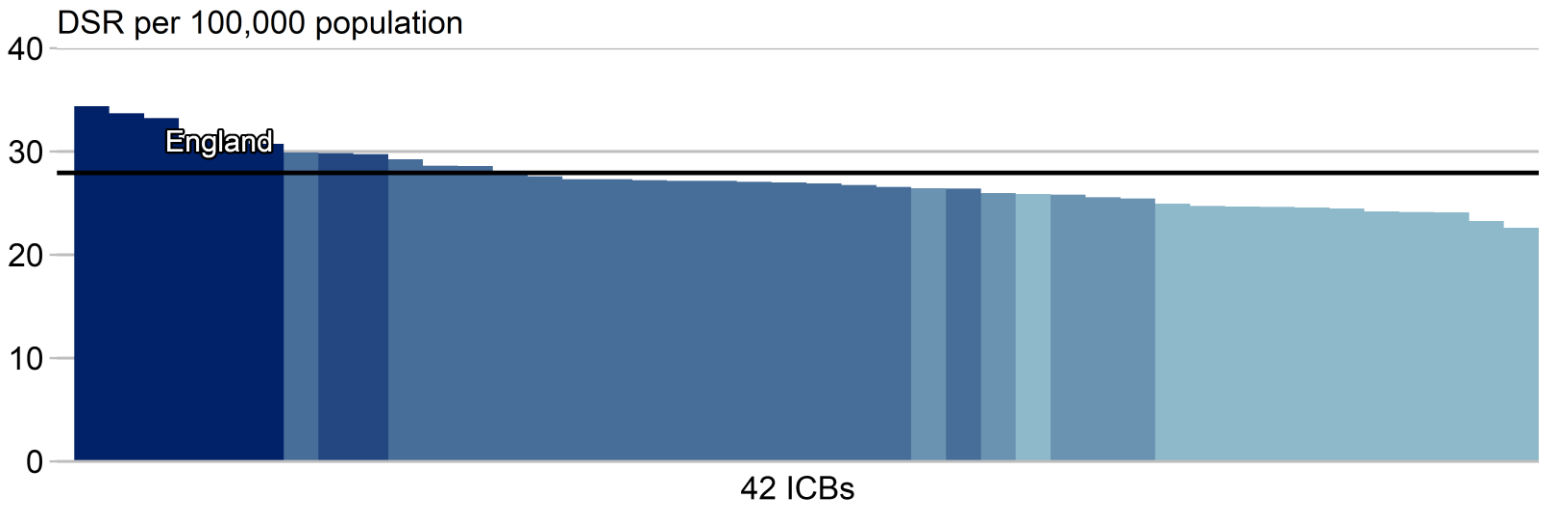
2.11: Variation in incidence of head and neck cancer in males

Map 2.11: Variation in incidence rate of head and neck cancer in males by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.11: Variation in incidence rate of head and neck cancer in males by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 22.6 per 100,000 population to 34.4 per 100,000 population, which is a 1.5-fold difference between ICBs. The England value for 2013 to 2020 pooled was 27.9 per 100,000 population.

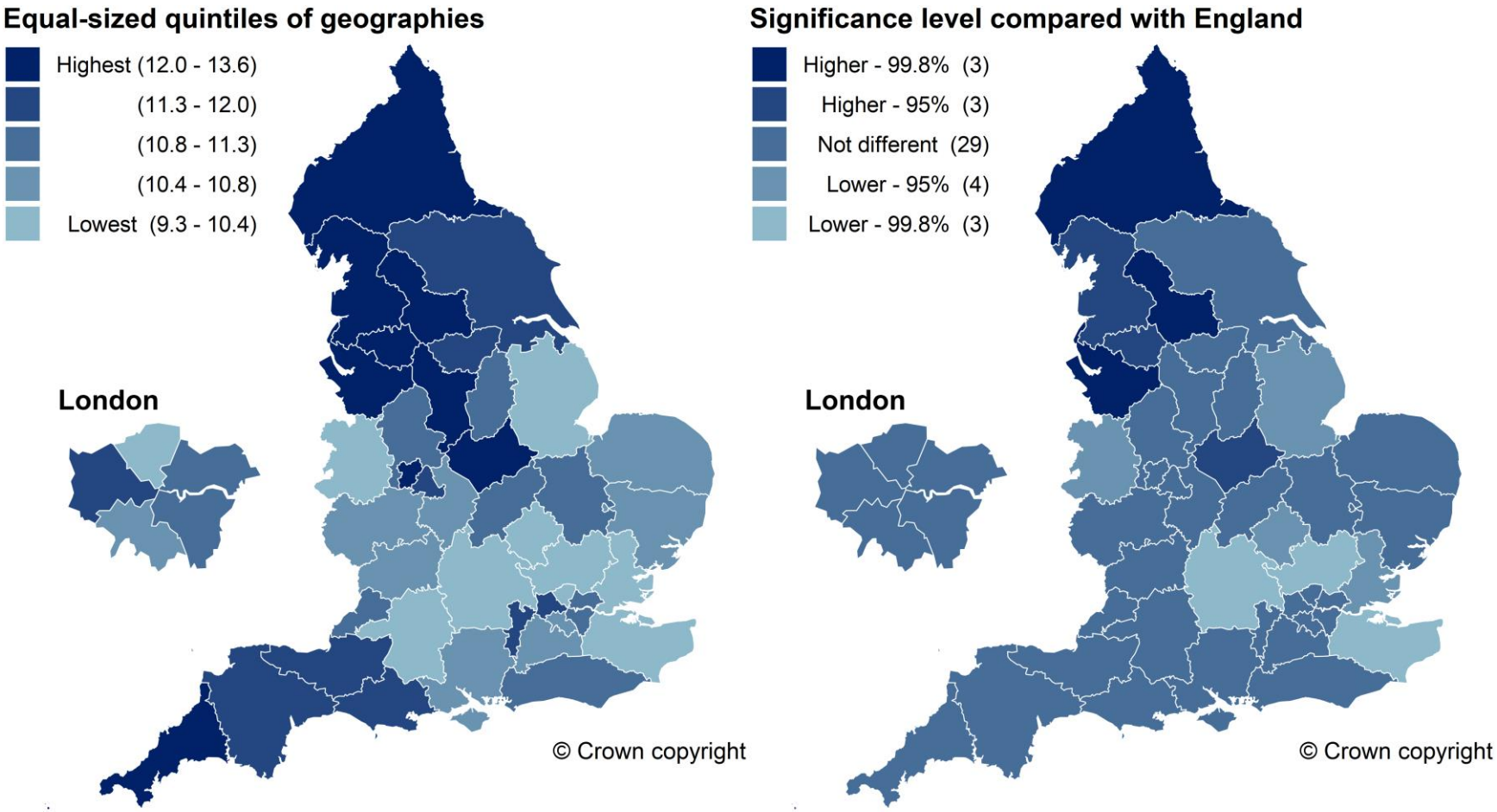
Of the 42 ICBs, 8 were statistically significantly higher than the England value (2 at the 95% confidence level and 6 at the 99.8% confidence level) and 17 were statistically significantly lower than the England value (5 at the 95% confidence level and 12 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

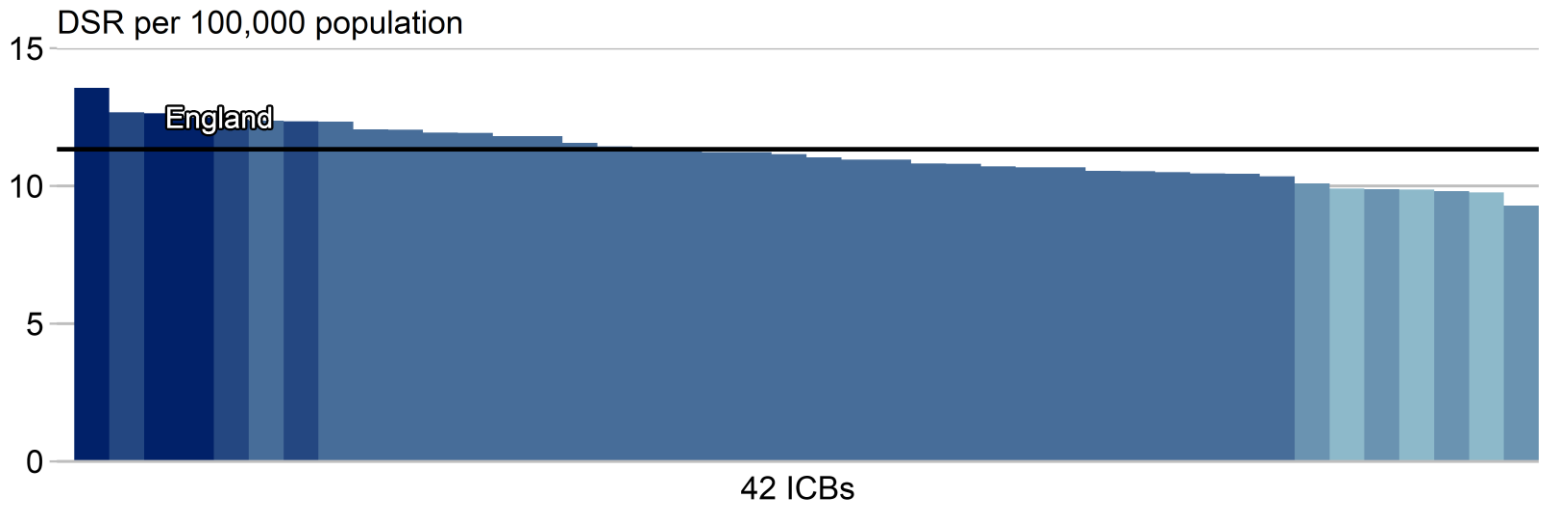
2.12: Variation in incidence of head and neck cancer in females

Map 2.12: Variation in incidence rate of head and neck cancer in females by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.12: Variation in incidence rate of head and neck cancer in females by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 9.3 per 100,000 population to 13.6 per 100,000 population, which is a 1.5-fold difference between ICBs. The England value for 2013 to 2020 pooled was 11.3 per 100,000 population.

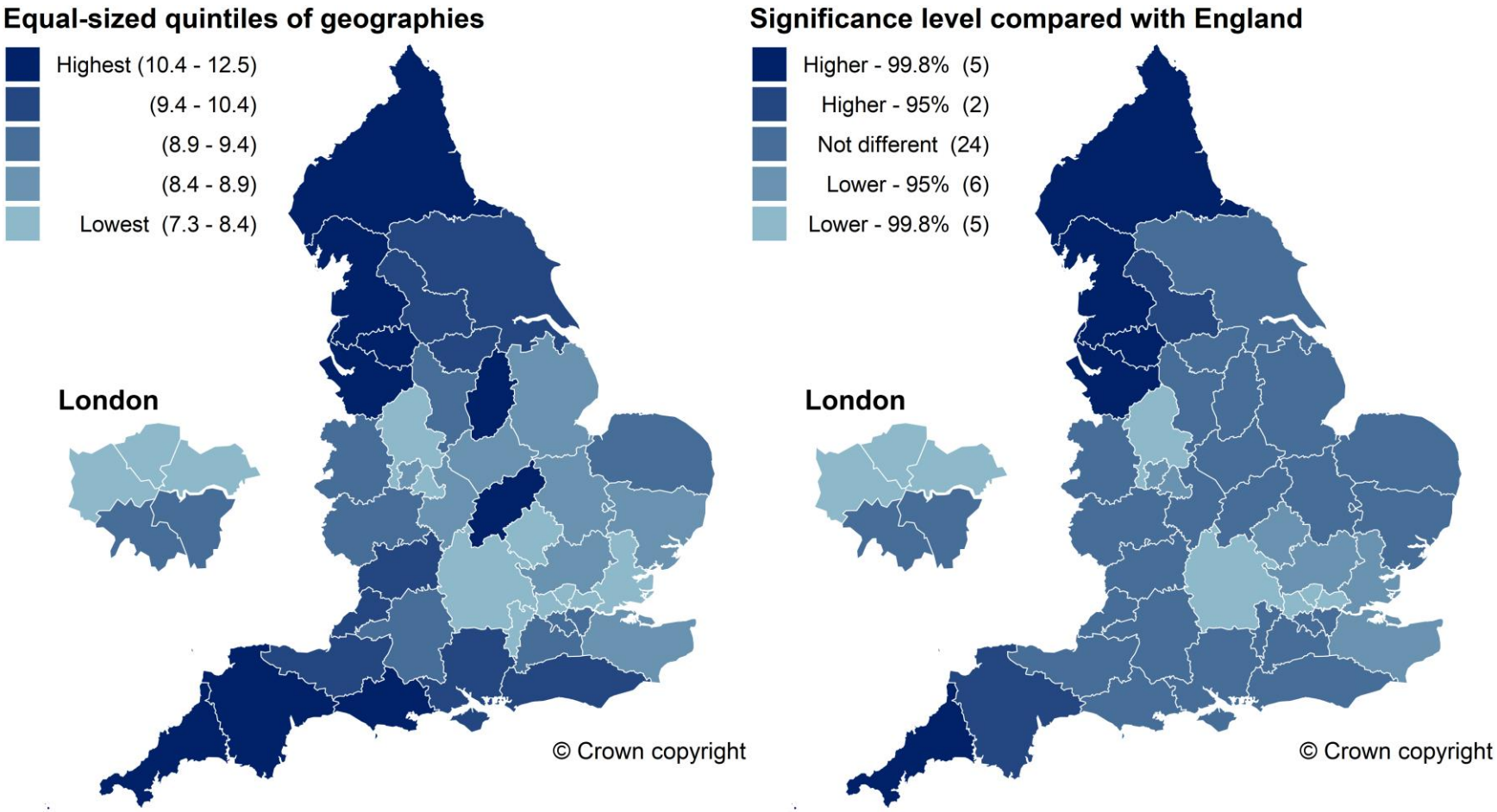
Of the 42 ICBs, 6 were statistically significantly higher than the England value (3 at the 95% confidence level and 3 at the 99.8% confidence level) and 7 were statistically significantly lower than the England value (4 at the 95% confidence level and 3 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

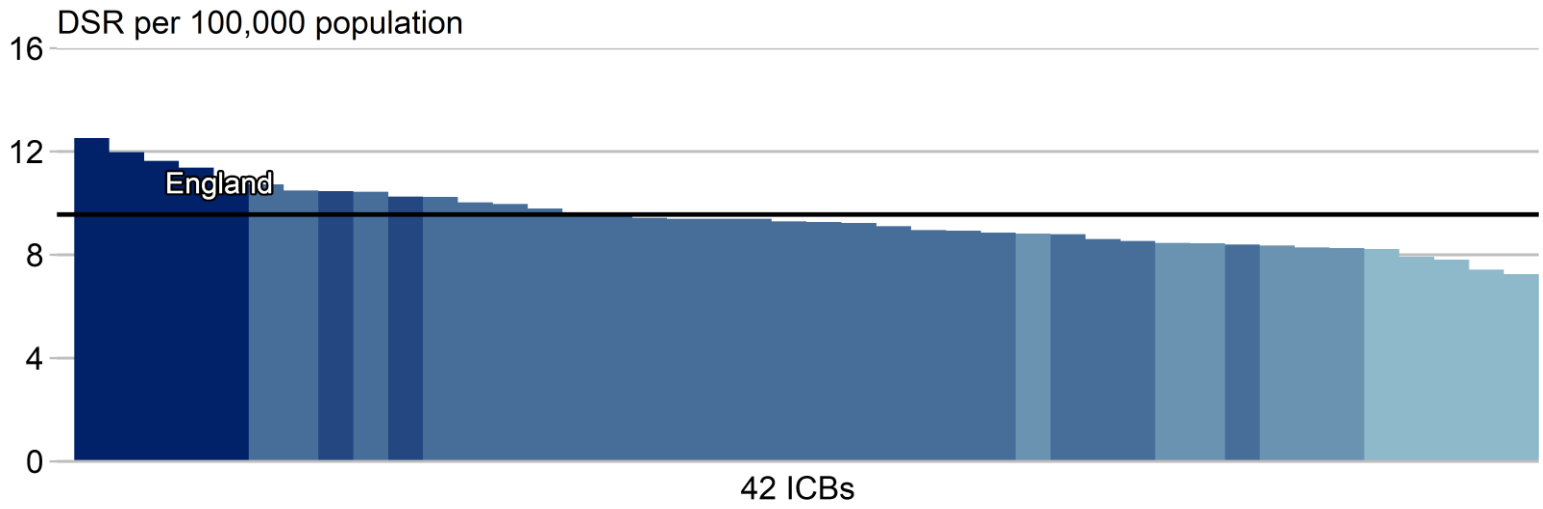
2.13: Variation in incidence of oropharyngeal cancer in males

Map 2.13: Variation in incidence rate of oropharyngeal cancer in males by ICB (2013 to 2020 pooled)

DSR 100,000 population (optimum value: low)



Bar chart 2.13: Variation in incidence rate of oropharyngeal cancer in males by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 7.3 per 100,000 population to 12.5 per 100,000 population, which is a 1.7-fold difference between ICBs. The England value for 2013 to 2020 pooled was 9.6 per 100,000 population.

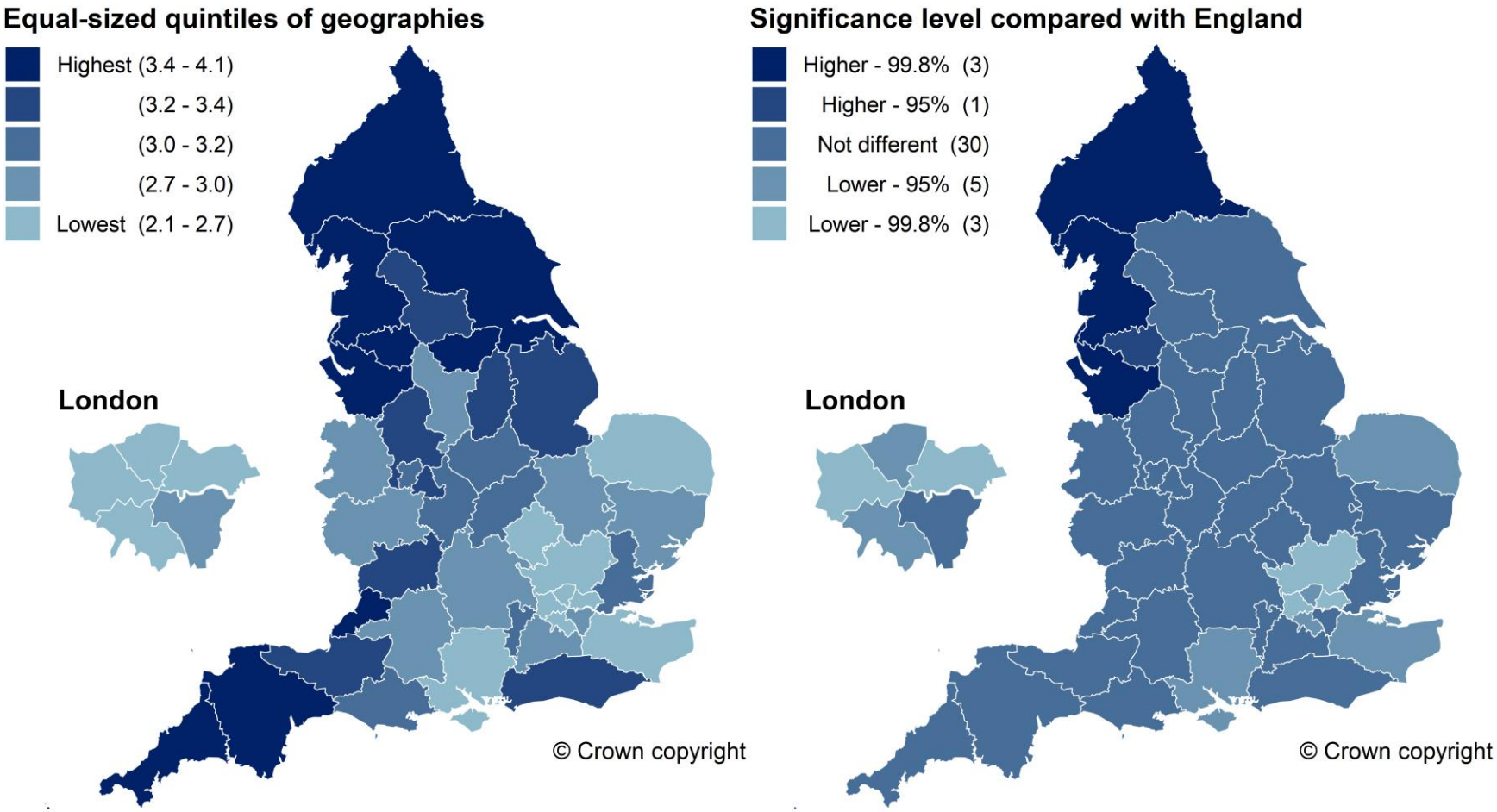
Of the 42 ICBs, 7 were statistically significantly higher than the England value (2 at the 95% confidence level and 5 at the 99.8% confidence level) and 11 were statistically significantly lower than the England value (6 at the 95% confidence level and 5 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

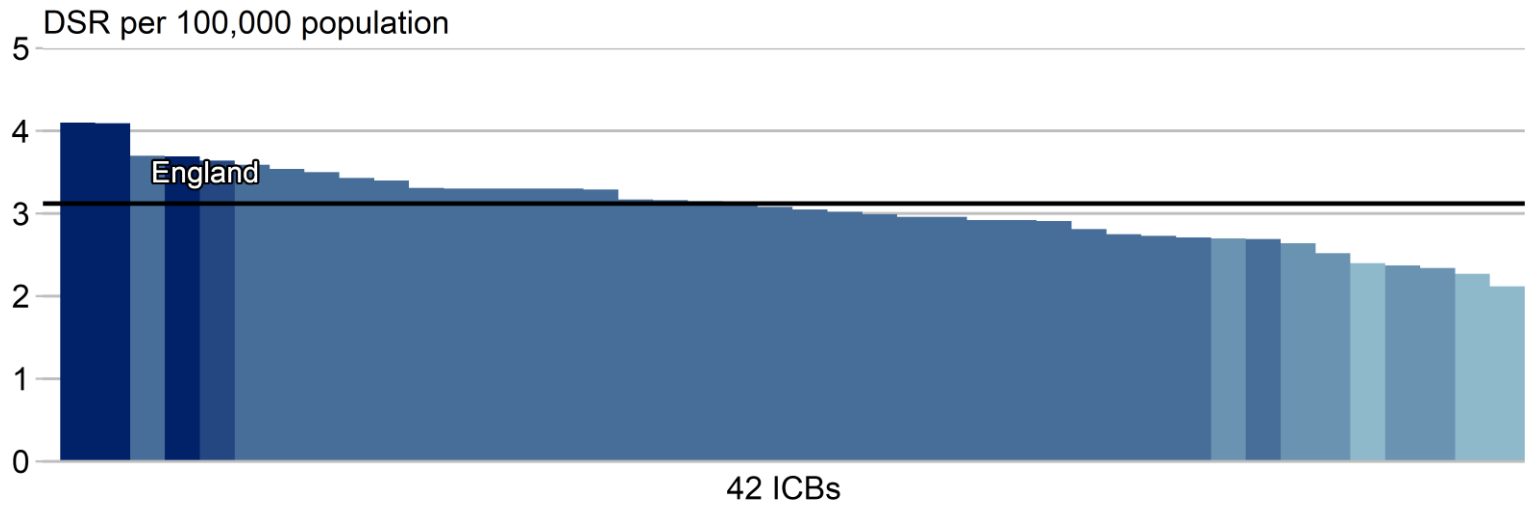
2.14: Variation in incidence of oropharyngeal cancer in females

Map 2.14: Variation in incidence rate of oropharyngeal cancer in females by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 2.14: Variation in incidence rate of oropharyngeal cancer in females by ICB (2013 to 2020 pooled)



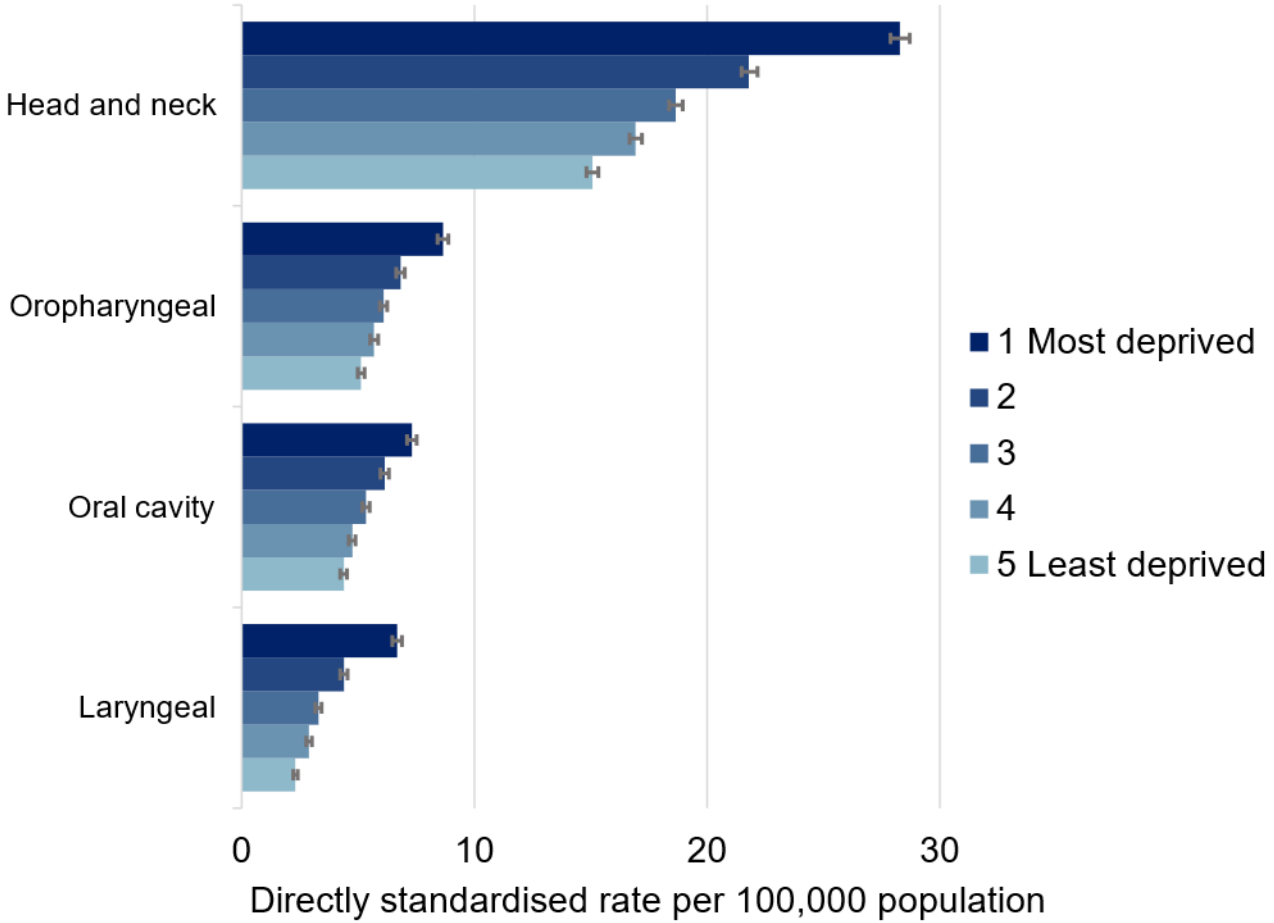
The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 2.1 per 100,000 population to 4.1 per 100,000 population, which is a 1.9-fold difference between ICBs. The England value for 2013 to 2020 pooled was 3.1 per 100,000 population.

Of the 42 ICBs, 4 were statistically significantly higher than the England value (1 at the 95% confidence level and 3 at the 99.8% confidence level) and 8 were statistically significantly lower than the England value (5 at the 95% confidence level and 3 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

2.15: Variation in incidence rate of head and neck, oral cavity, oropharyngeal and laryngeal cancer by deprivation quintile

Bar chart 2.15: Variation in incidence rate of head and neck, oral cavity, oropharyngeal and laryngeal cancer by LSOA deprivation quintile in England (2013 to 2020 pooled)



The most deprived quintile value for head and neck cancer incidence was 28.3 per 100,000 population. The least deprived quintile value was 15.1 per 100,000 population. There is a 1.9-fold difference between the most and least deprived quintiles.

The most deprived quintile value for oropharyngeal cancer incidence was 8.6 per 100,000 population. The least deprived quintile value was 5.1 per 100,000 population. There is a 1.7-fold difference between the most and least deprived quintiles.

The most deprived quintile value for oral cavity cancer incidence was 7.3 per 100,000 population. The least deprived quintile value was 4.4 per 100,000 population. There is a 1.7-fold difference between the most and least deprived quintiles.

The most deprived quintile value for laryngeal cancer incidence was 6.7 per 100,000 population. The least deprived quintile value was 2.3 per 100,000 population. There is a 2.9-fold difference between the most and least deprived quintiles.

The data showing the values for all deprivation quintiles is available in the head and neck cancer atlas data file.

Reasons for variation in the incidence of head and neck cancers

Postulating the reasons for variation in head and neck cancer incidence is complicated by the complex nature of this cancer and the heterogeneity of the cancer subsites.

Head and neck cancer incidence is generally higher in ICBs in the north of England compared with the south. Geographical variation in the incidence of head and neck, oral cavity, oropharyngeal and laryngeal cancers across the ICBs in England is likely to be attributable to variation in socio-economic deprivation, smoking, other tobacco use, alcohol consumption and regional differences in ethnicity and age profiles of local populations.

The increase in incidence of head and neck cancer in males compared with females is likely to be attributable to differences in alcohol consumption, smoking, other tobacco use and human papillomavirus (HPV) prevalence. Of note, although there are stark differences in the incidence of head and neck cancer between males and females, oral cavity cancer incidence ranged from 4.9 to 9.7 per 100,000 population in males and 3.6 to 5.6 per 100,00 population in females across ICBs, therefore differences by sex in some head and neck cancer sub-sites may be less.

There is geographical variation in the incidence rate of head and neck cancer in people aged 0 to 69 years and people aged 70 years and over. This could be due to variation in socio-economic deprivation, risk factors such as smoking, HPV prevalence, other tobacco use and the age profile of the local population.

Greater geographical variation in the incidence rate of oral cavity cancer in England is observed in people aged 0 to 69 years than people aged 70 years and over. The role of socio-economic status and variation in smoking and alcohol consumption may have a greater role in oral cavity cancer incidence in the younger age group compared with those over 70 years of age.

Additionally, greater geographical variation is observed in the incidence rate of oropharyngeal cancer in the 0 to 69 years compared with the 70 years and over age group. Risk factors, such as trends in sexual behaviour, may have a greater role in explaining the geographical variation in the younger age group.

3. Stage at diagnosis

Cancer stage

The stage of a cancer describes the size of the tumour and how far it has spread. The earlier a cancer is diagnosed, the better the outcomes, the prognosis and chance of survival.[8] The 'Union for International Cancer Control TNM staging system' is used as a basis for decision-making on treatment management and individual prognosis. Staging can also be used to inform and evaluate treatment guidelines, national cancer planning and research. The tumour, node, metastasis (TNM) system derives a stage from 1 to 4 based on three individual categories, where T describes the primary tumour site and size, N describes the regional lymph node involvement and M describes the presence or otherwise of distant metastatic spread.

Head and neck cancers of stage 1 and 2 are considered early stage disease. They are localised, easier to treat and have a better prognosis.[8] Stages 3 and 4 are considered late or advanced stage disease. Additional analysis for head and neck cancer shows that in England in 2019 42.6% (4,573) people presented at a late stage of diagnosis and in 2020 47.4% (4,749) people presented at a late stage of diagnosis. Advanced stage disease is associated with greater treatment complexity, with only palliative care available in some cases.

There are many factors that affect the timing of clinical presentation. These include public awareness of signs, symptoms, delay in seeking help, fear of wasting a clinician’s time, propensity and capacity to seek help, including affordability of dental treatment, which is in turn influenced by socio-demographic characteristics. Delays in presentation can result in presentation at a more advanced stage of disease.

Tumour related factors that influence stage of diagnosis include site of presentation and speed of tumour progression. Health system factors include access to primary care services (NHS and private) and nature of the cancer pathway, which may result in delays from first presentation to referral for specialist assessment and delays from specialist referral to diagnosis. Health professional factors include the ability of healthcare professionals to recognise the signs and symptoms of head and neck cancer and refer patients in a timely manner.[8 60 63]

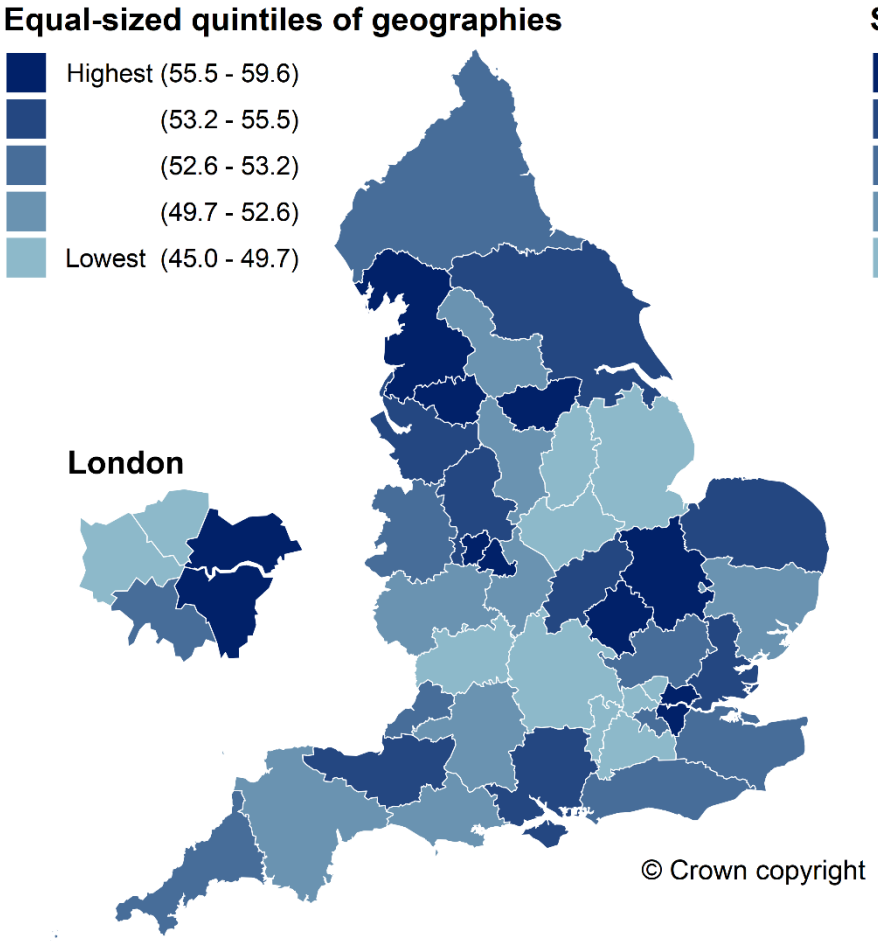
It is important to note that variation in the proportion of cancers diagnosed at a late stage by integrated care board (ICB) includes data from 2020 and therefore may reflect regional variation in the impact of the COVID-19 pandemic on health services including access to general practitioners (GPs). There was a reduction in new cases diagnosed during 2020.

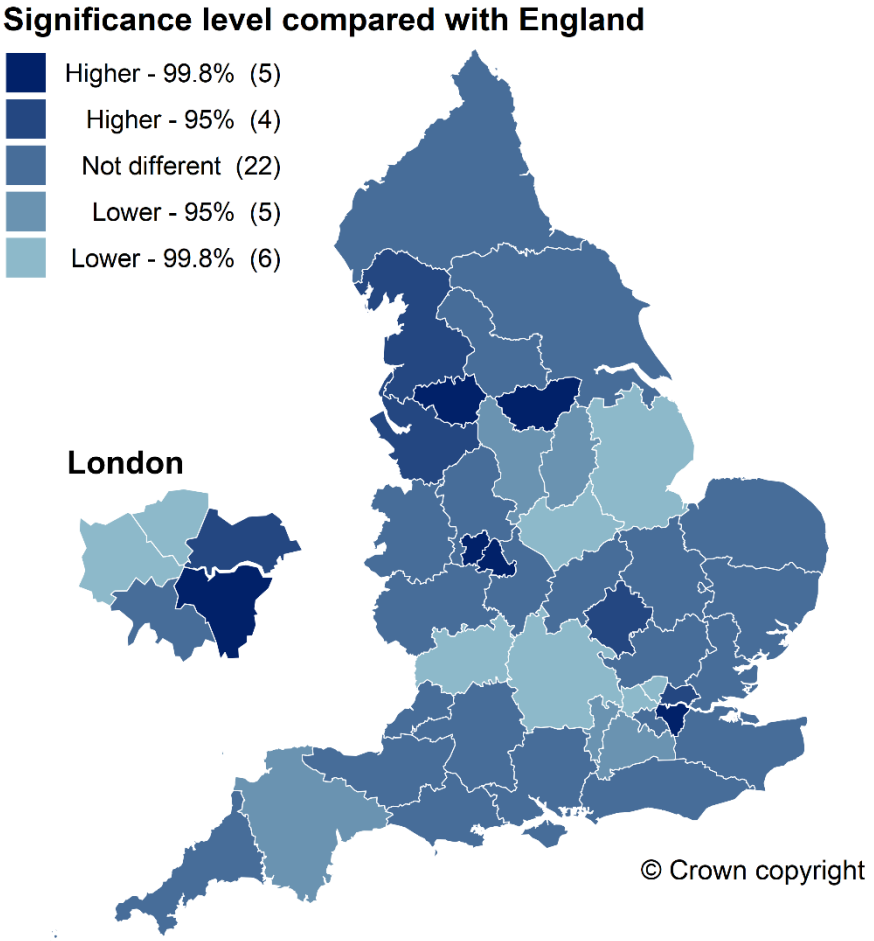
Note: The staging system for head and neck cancers changed from TNM 7 to TNM 8 between 2017 and 2018 diagnoses and this change is seen in the 2018 to 2019 data.[2] The change in definition reduced the number of ‘oropharynx including base of tongue, soft palate and tonsils’ tumours diagnosed at stage 4 and increased the number diagnosed at stage 1 and 2. The changes to the TNM staging were in recognition of the improved survival in human papillomavirus (HPV)-positive oropharyngeal cancers, compared to HPV-negative cases.[64] The pooled data for this analysis includes data using both TNM 7 and TNM 8.

3.1: Variation in percentage of head and neck cancer patients diagnosed at a late stage

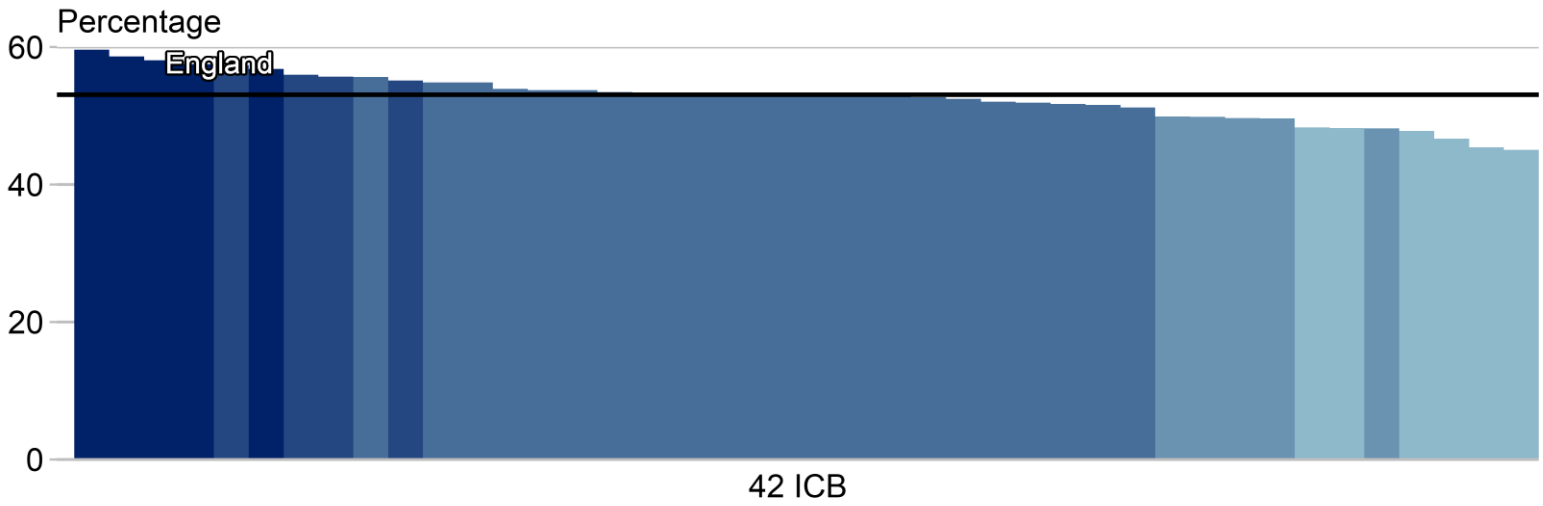
Map 3.1: Variation in percentage of head and neck cancer patients diagnosed at a late stage (stage 3 and 4) by ICB (2013 to 2020 pooled)

Optimum value: low

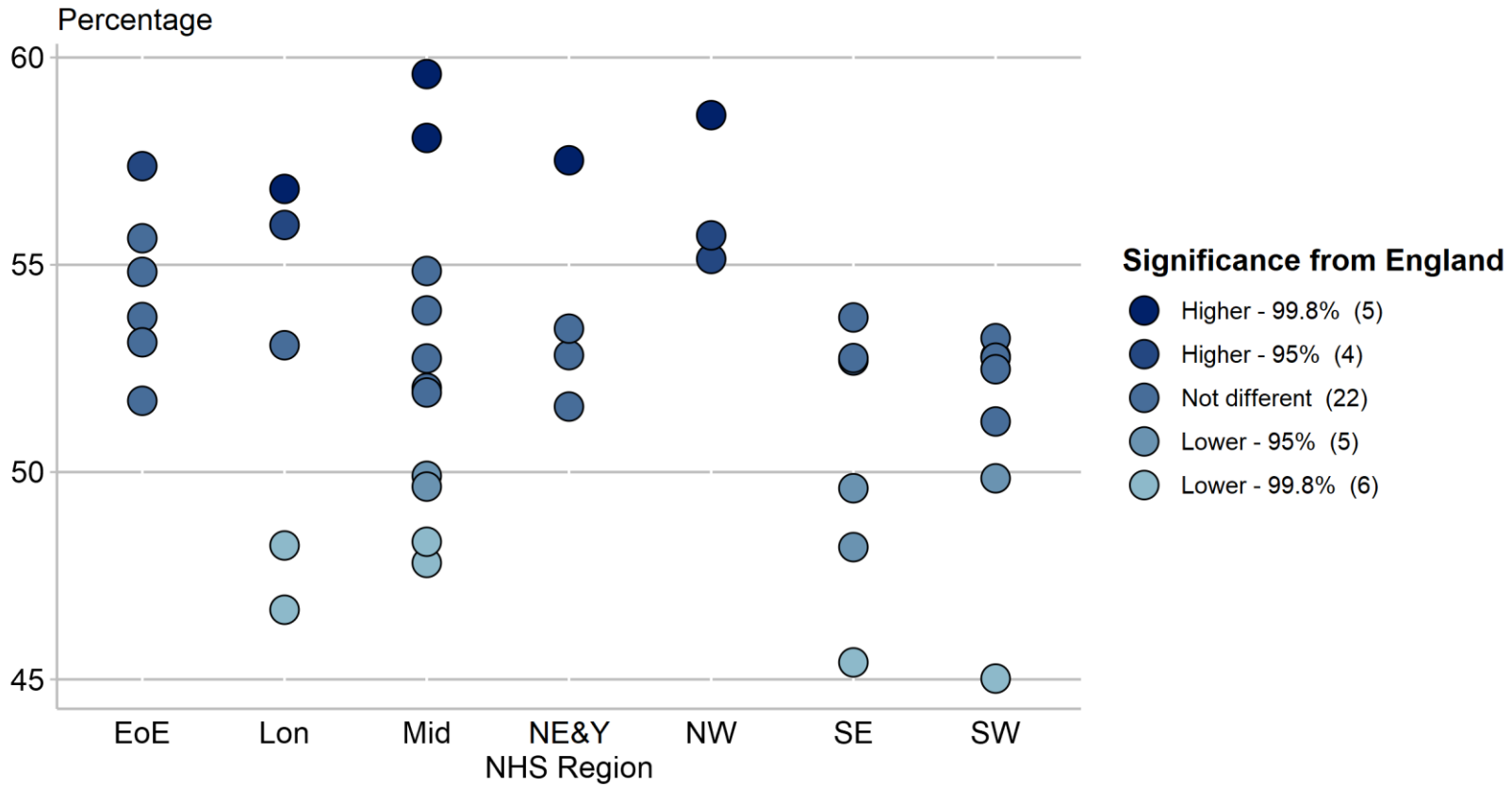




Bar chart 3.1: Variation in percentage of head and neck cancer patients diagnosed at a late stage (stage 3 and 4) by ICB (2013 to 2020 pooled)



Regional dot plot 3.1: Variation in percentage of head and neck cancer patients diagnosed at a late stage (stage 3 and 4) by ICB and NHS region (2013 to 2020 pooled)

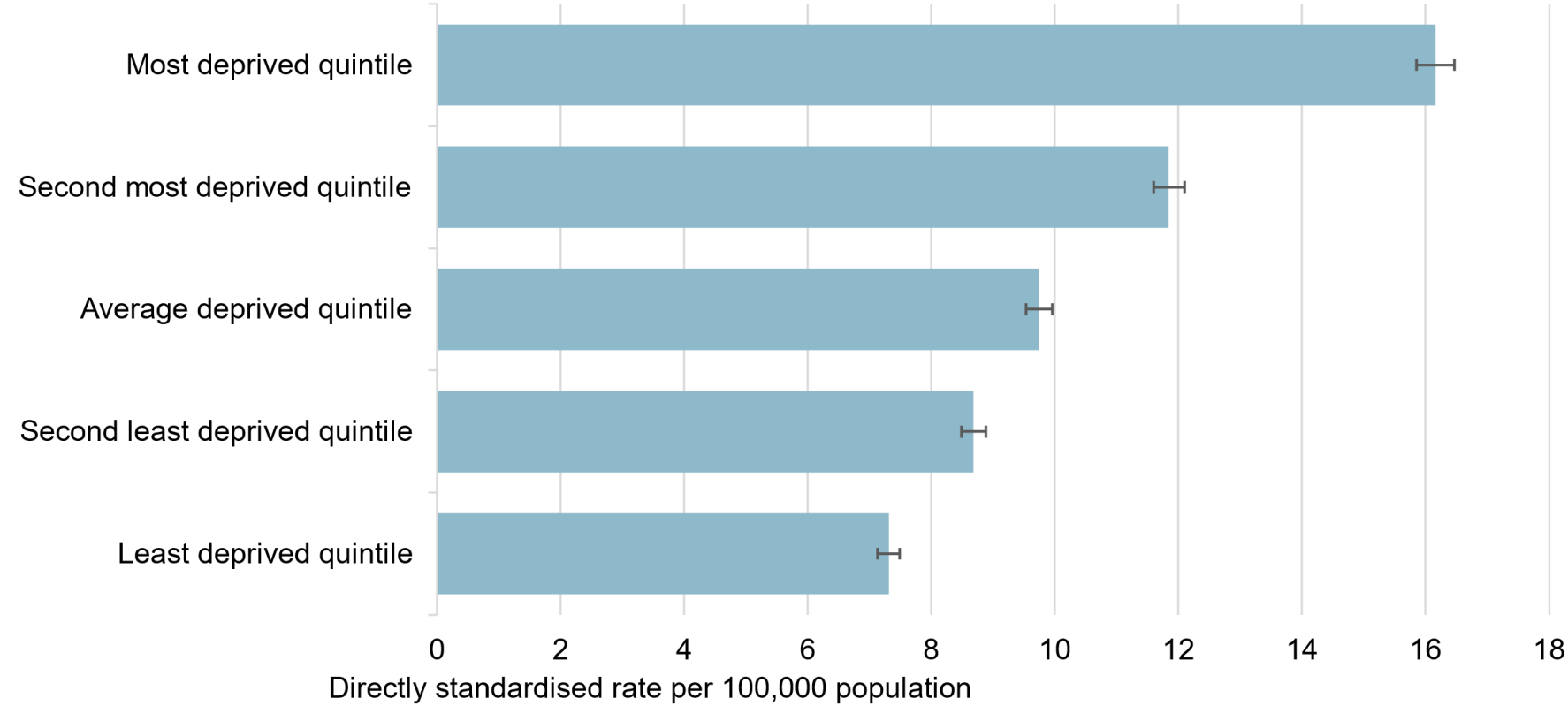


The maps, column chart and regional dot plot display data for 2013 to 2020 pooled, during which integrated care board (ICB) values ranged from 45.0% to 59.6%, which is a 1.3-fold difference between ICBs. The England value for 2013 to 2020 pooled was 53.1%.

Of the 42 ICBs, 9 were statistically significantly higher than the England value (4 at the 95% confidence level and 5 at the 99.8% confidence level) and 11 were statistically significantly lower than the England value (5 at the 95% confidence level and 6 at the 99.8% confidence level). The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

3.2: Variation in incidence of late stage diagnosis for head and neck cancer by deprivation quintile

Bar chart 3.2: Variation in incidence rate of late stage diagnosis (stage 3 and 4) for head and neck cancer patients by lower super output area (LSOA) deprivation quintile in England (2013 to 2020)



The incidence rate in the most deprived quintile was 16.2 per 100,000 population. The least deprived quintile rate was 7.3 per 100,000 population. There is a 2.2-fold difference between the most and least deprived quintiles. The data showing the values for all deprivation quintiles is available in the head and neck cancer atlas data file.

Reasons for variation in the percentage of head and neck cancer patients diagnosed at a late stage

There was geographical variation across ICBs, the percentage of patients diagnosed at a late stage (stages 3 and 4) varied between 45.0% and 59.6%. Reasons for variation in the proportion of head and neck cancers diagnosed at a late stage may include differences in:[8 60]

- population factors such as:
    - socio-economic factors
    - differences in the ethnicity and age profile
    - ability to recognise symptoms of concern and seek timely care
- health system factors such as:
    - access to primary care medical and dental services
    - referral pathways and processes

People living in the most deprived areas were more likely to be diagnosed with head and neck cancer at a late stage than those living in the least deprived areas. Possible reasons for a higher proportion of late stage diagnosis in more deprived groups have been explored in the literature and include:[8 60]

- lower health literacy resulting in reduced confidence to access, understand and evaluate healthcare needs and utilise healthcare services
- lower capacity to communicate and assert healthcare needs and decisions
- greater use of emergency services and less use of preventative services
- poorer access to dental services, for example due to cost and the administrative burden of obtaining free dental treatment
- multiple consultations

4. Routes to diagnosis

A route to diagnosis was defined in the 2012 study 'Routes to diagnosis for cancer – determining the patient journey using multiple routine data sets' as being the sequence of interactions between the patient and the healthcare system, leading to a diagnosis of cancer, based on the diagnosis setting, the pathway and the referral route into secondary care.

During 2013 to 2018, there were seven possible routes to diagnosis for head and neck cancer, which are shown in Table 4.1 along with the percentage of referrals for each route. Full definitions for the defined route are available on the National Disease Registration 'Routes to diagnosis' tool.

Table 4.1 Head and neck cancer routes to diagnosis in England (2013 to 2018 pooled)

Diagnosis route	Percentage of referrals
Urgent GP referral with a suspicion of cancer (two-week wait)	48%
General Practitioner referral	26%
Other outpatient	15%
Emergency presentation	7%
Unknown	3%
Inpatient elective	1%
Death certificate only	Less than 1%

Urgent general practitioner (GP) referrals with a suspicion of cancer (also known as two-week wait referrals) were introduced in 2000 with a target waiting time of 14 days from referral for suspected cancer symptoms to the point of first assessment with a specialist in secondary care. This was the main referral route for head and neck cancers. Following the Clinical Review of Standards and the introduction of the Faster Diagnosis Standard in October 2021, the two-week wait urgent cancer pathway was superseded and removed as a target in October 2023. Achievement of the Faster Diagnosis Standard is supported by a specific best practice timed pathway for head and neck cancer.[58]

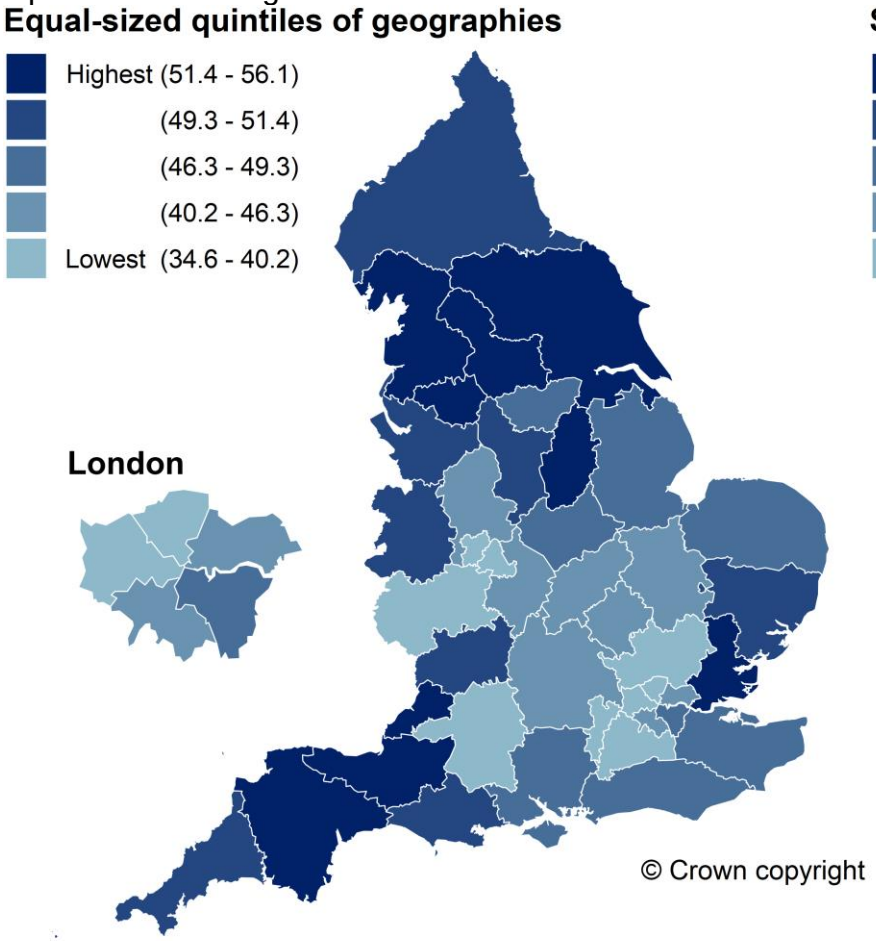
Emergency presentation comprises the different emergency pathways into secondary care including accident and emergency, emergency GP referrals to an inpatient setting (non two-week wait referrals), emergency admissions, transfer and attendance.[57 65]

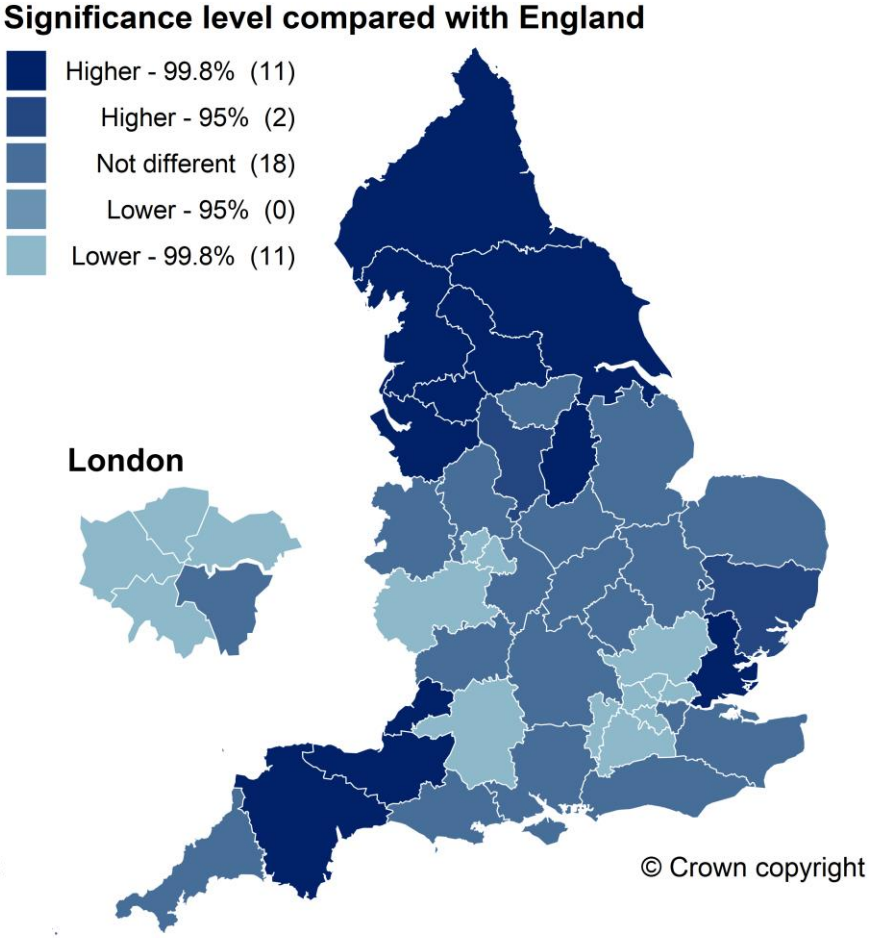
For 2013 to 2018, urgent GP referral with a suspicion of cancer (two-week wait) was the most common referral route. However, less than half (48%) of head and neck cancers were diagnosed via this route. Seven percent of head and neck cancers were diagnosed by emergency presentation. Other research has shown that those diagnosed through the emergency route were more likely to present with advanced disease.[60]

4.1: Variation in head and neck cancer diagnosed following a two-week wait referral

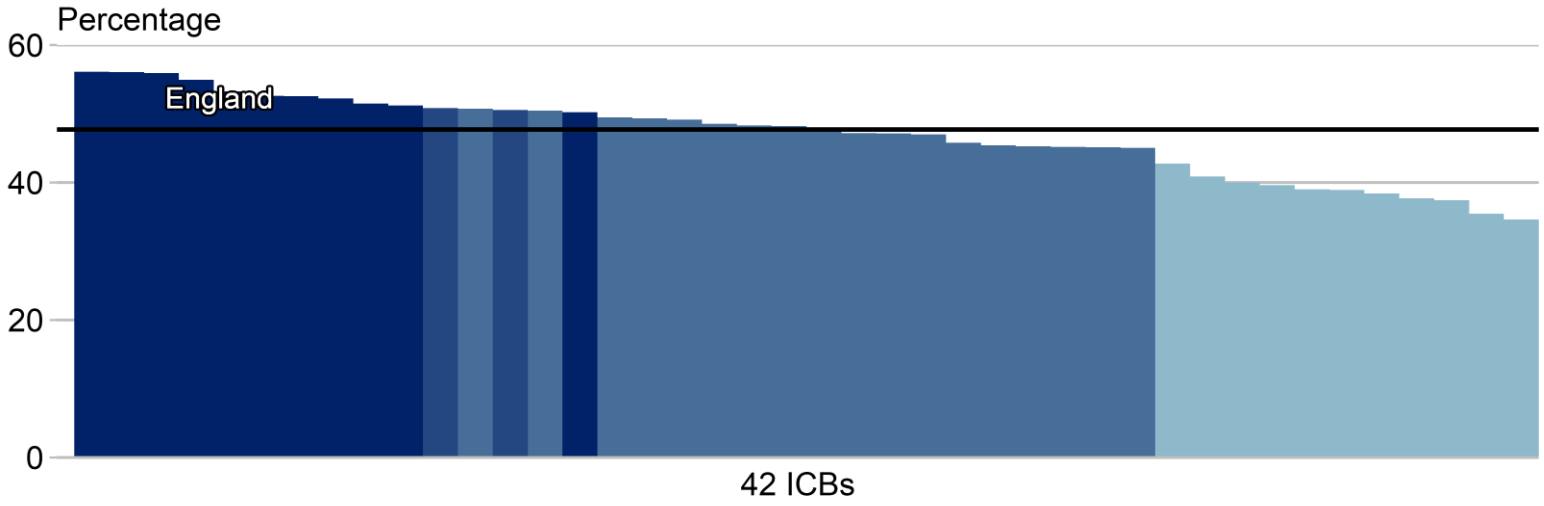
Map 4.1: Variation in percentage of head and neck cancer diagnosed following an urgent GP referral with a suspicion of cancer (two-week wait) by ICB (2013 to 2018 pooled)

Optimum value: high

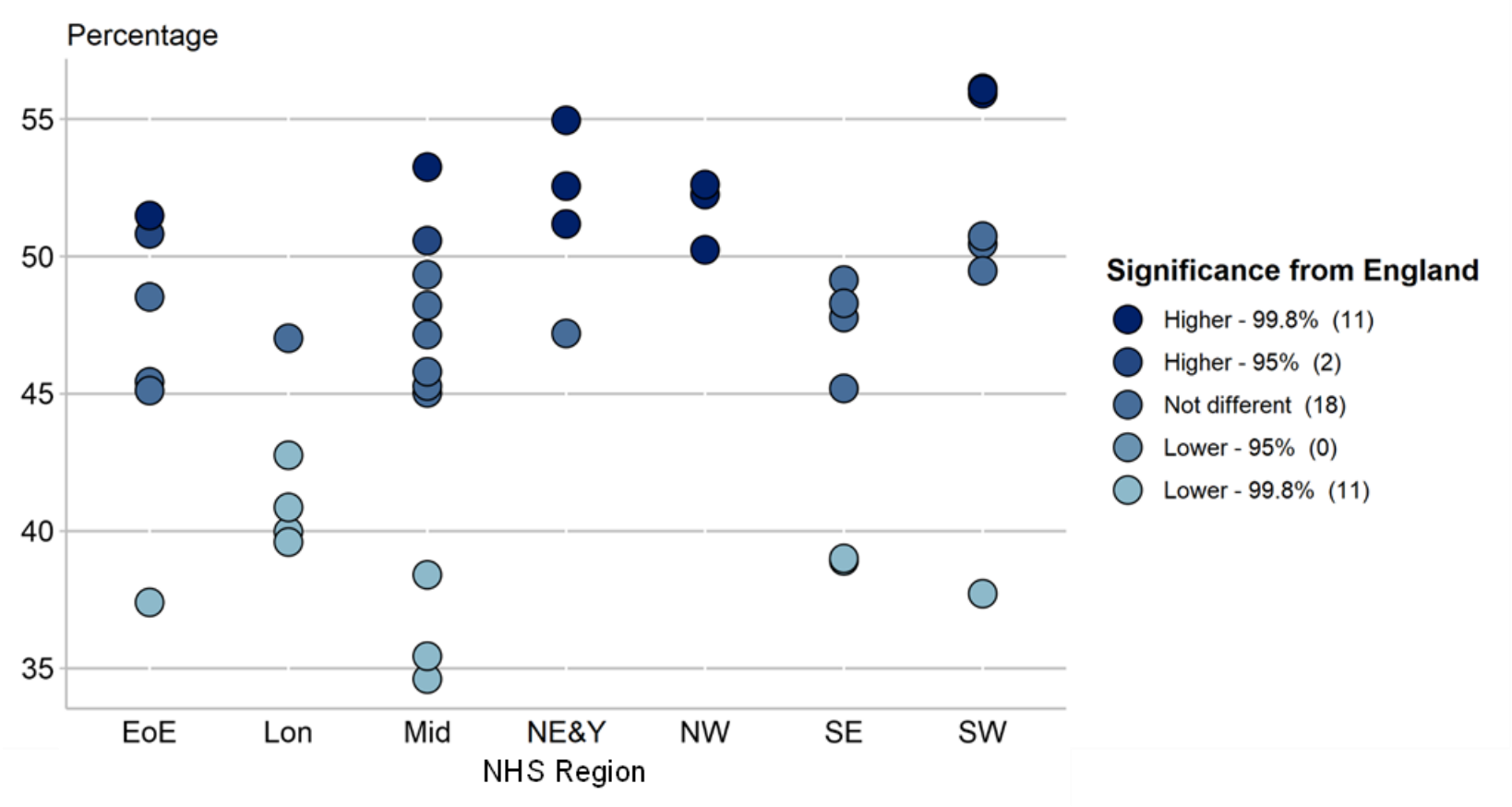




Bar chart 4.1: Variation in percentage of head and neck cancer diagnosed following an urgent GP referral with a suspicion of cancer (two-week wait) by ICB (2013 to 2018 pooled)



Regional dot plot 4.1: Variation in percentage of head and neck cancer diagnosed following an urgent GP referral with a suspicion of cancer (two-week wait) by ICB and region (2013 to 2018 pooled)



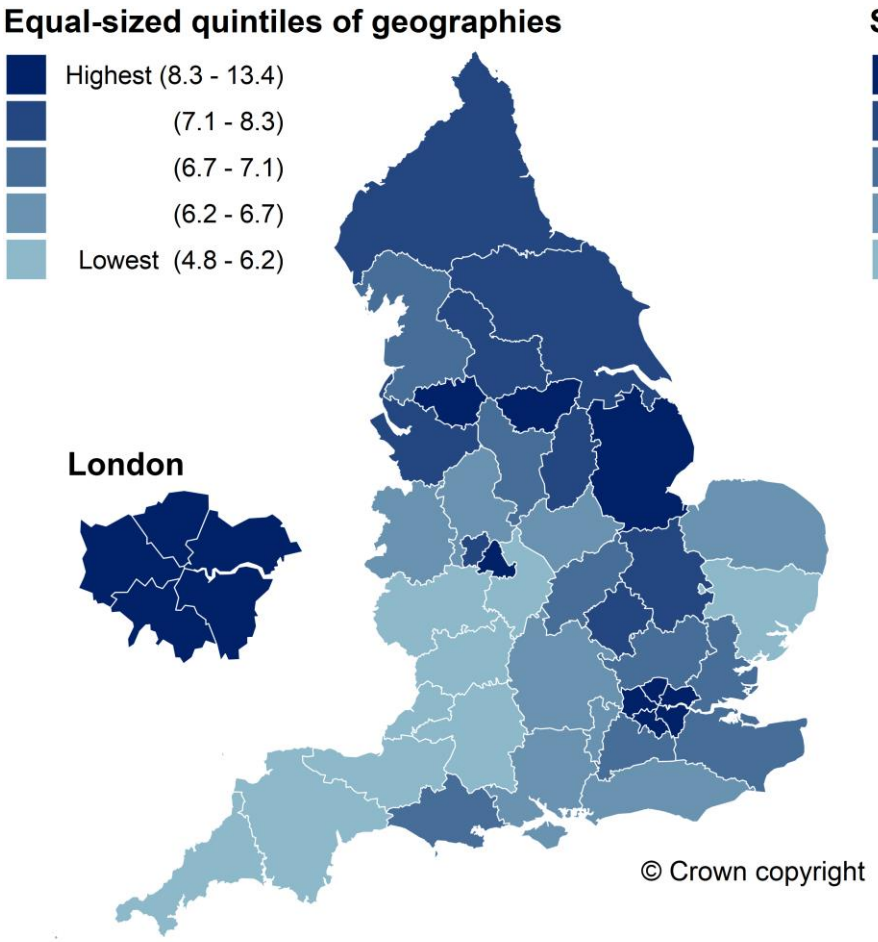
The maps, column chart and regional dot plot display data for 2013 to 2018 pooled, during which ICB values ranged from 34.6% to 56.1%, which is a 1.6-fold difference between ICBs. The England value for 2013 to 2018 pooled was 47.7%.

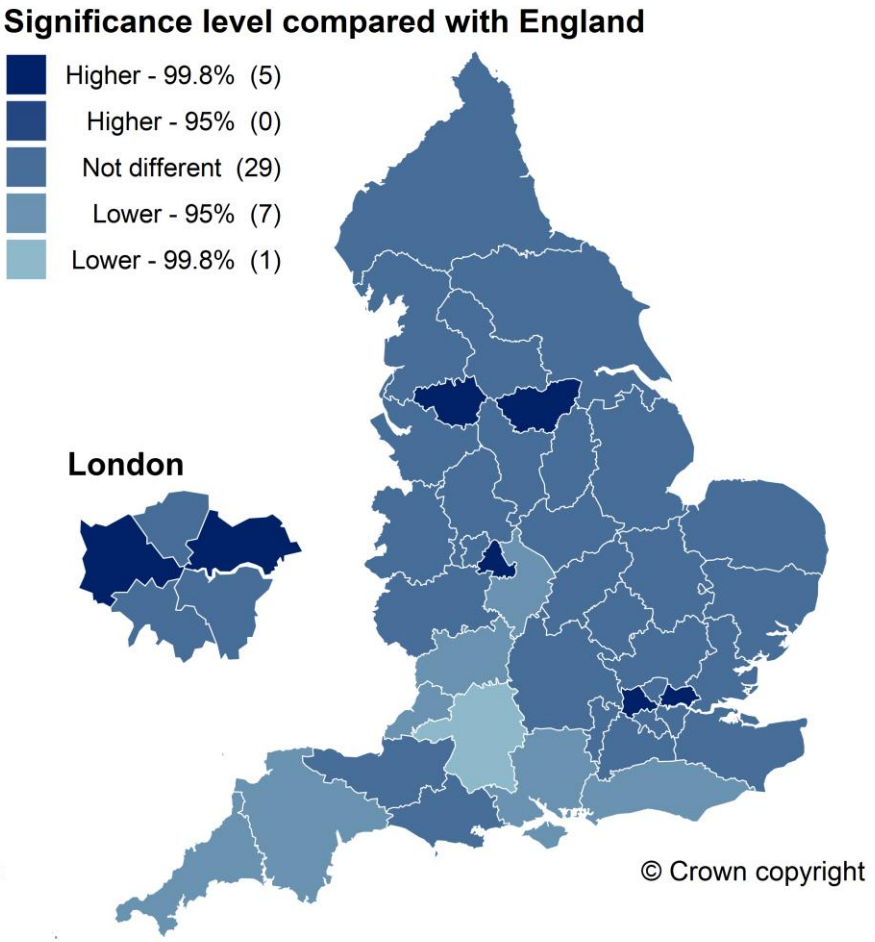
Of the 42 ICBs, 13 were statistically significantly higher than the England value (2 at the 95% confidence level and 11 at the 99.8% confidence level) and 11 were statistically significantly lower than the England value (0 at the 95% confidence level and 11 at the 99.8% confidence level).The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

4.2: Variation in head and neck cancer diagnosed following an emergency presentation

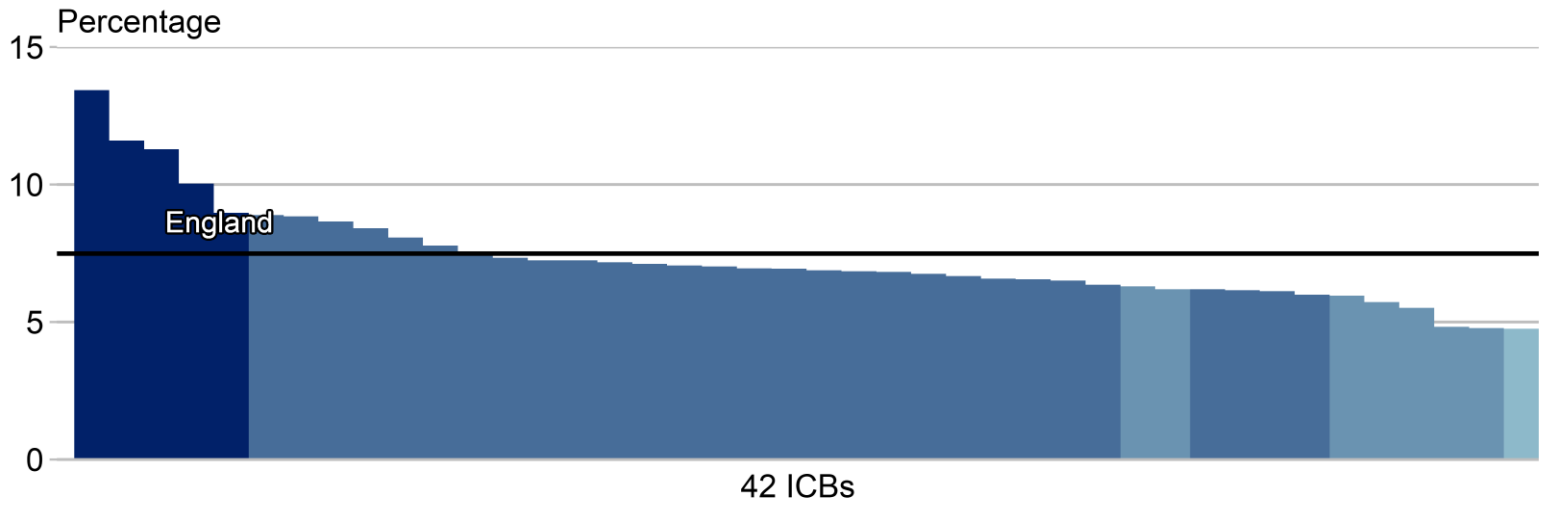
Map 4.2: Variation in percentage of head and neck cancer diagnosed following an emergency presentation by ICB (2013 to 2018 pooled)

Optimum value: low

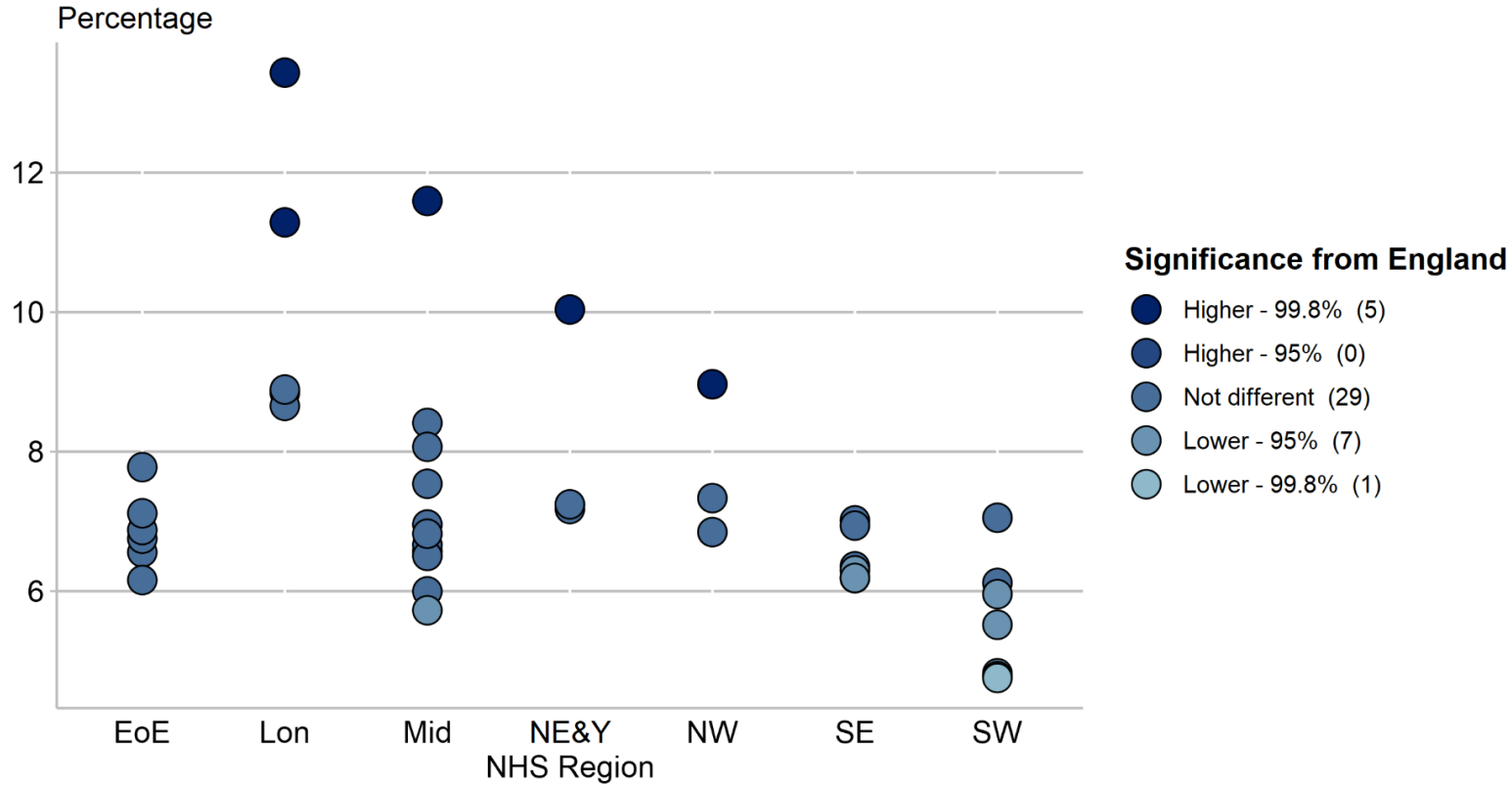




Bar chart 4.2: Variation in percentage of head and neck cancer diagnosed following an emergency presentation by ICB (2013 to 2018 pooled)



Regional dot plot 4.2: Variation in percentage of head and neck cancer diagnosed following an emergency presentation by ICB and NHS region (2013 to 2018 pooled)



The maps, column chart and regional dot plot display data for 2013 to 2018 pooled, during which ICB values ranged from 4.8% to 13.4%, which is a 2.8-fold difference between ICBs. The England value for 2013 to 2018 pooled was 7.5%.

Of the 42 ICBs, 5 were statistically significantly higher than the England value (0 at the 95% confidence level and 5 at the 99.8% confidence level) and 8 were statistically significantly lower than the England value (7 at the 95% confidence level and 1 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

Reasons for variation in the route to diagnosis for people with head and neck cancer

Between 2006 and 2014 pooled, 35% of head and neck cancers were diagnosed through the two-week wait referral route,[60] compared with 48% between 2013 and 2018 pooled.

However, there was geographical variation in the two-week wait and emergency presentation routes to diagnosis for people with head and neck cancer, including a north south divide with ICBs in the north generally having higher percentages of head and neck cancers diagnosed via the two-week wait pathway.

Reasons for variation in the route to diagnosis may include variation in:

- population factors such as:
    - socio-demographic characteristics
- health literacy:
    - delays in seeking an opinion
    - lack of understanding of signs and symptoms
    - psychological factors, for example fear
- health system factors such as:
    - access to medical and dental primary care
    - the quality of referral pathways
    - clinical skills and training of practitioners

5. Head and neck cancer mortality

Analyses for this atlas shows in England in 2020 there were just under 3,500 deaths from head and neck cancer. This has risen steadily from just over 2,800 annual deaths in 2013. The mortality rate for head and neck cancer continued to increase in 2020 while for all cancers the mortality rate decreased.[66]

There was significant geographic variation in mortality rates with the integrated care boards (ICBs) with the highest rates having double the rates of those with the lowest. There is socio-economic difference with people living in the most deprived quintile having mortality rates more than 2.5 times the rate of those in the least deprived quintile.

In England the mortality rate from head and neck cancer between 2013 and 2020 for males was 9.4 per 100,000, almost three times the mortality rate for females at 3.4 per 100,000. Across the UK for males, head and neck cancer is the 10th most common cause of cancer death, for females it is the 17th most common.[7]

Mortality from head and neck cancer in the UK had decreased from the 1970s, however, it has been gradually increasing since 2006, reflecting rising incidence and no improvement in survival rates.[9] [12] Head and neck cancer mortality is projected to rise by 12% between 2023 to 2025 and 2038 to 2040.[7] By 2038 to 2040 there could be 6,700 deaths from head and neck cancer per year in the UK.[7]

Head and Neck 5000, a prospective cohort study of people with head and neck cancer, found that current smokers had approximately 70% higher all-cause mortality compared with non-smokers and previous smokers were 40% more likely to die during follow up.[67] For alcohol there was no difference in mortality risk between active drinkers and non-drinkers.[67] Inequality in head and neck cancer mortality has been reported for several area-based and individual measures of socio-economic status including the index of multiple deprivation (IMD), educational attainment, household income, proportion of income from benefits and financial concerns. Inequalities by IMD and educational attainment were explained by age, sex, health and behavioural factors, however these factors did not fully explain inequalities by household income and proportion of income from benefits.[68]

5.1: Variation in mortality of head and neck cancer in England

Box plot time series 5.1: Trend in variation in mortality rate of head and neck cancer across ICBs in England (2013 to 2020)

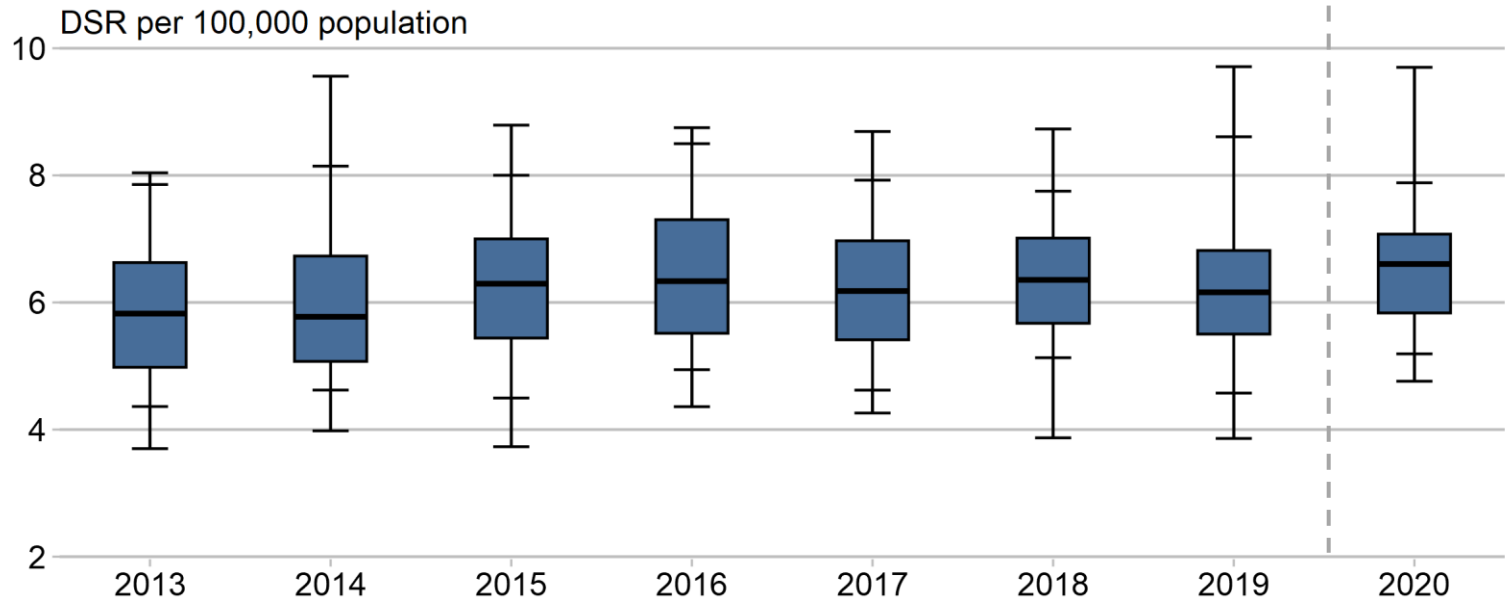


Table time series 5.1: Trend in variation in mortality rate of head and neck cancer across ICBs in England (2013 to 2020)

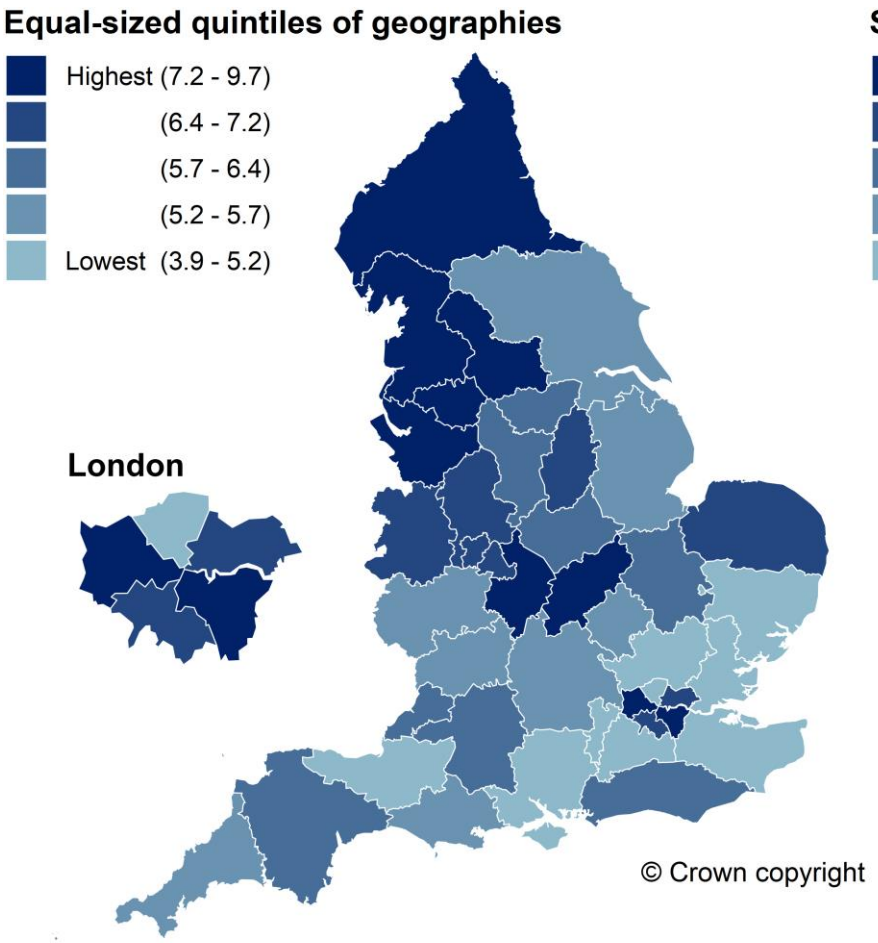
DSR per 100,000 population

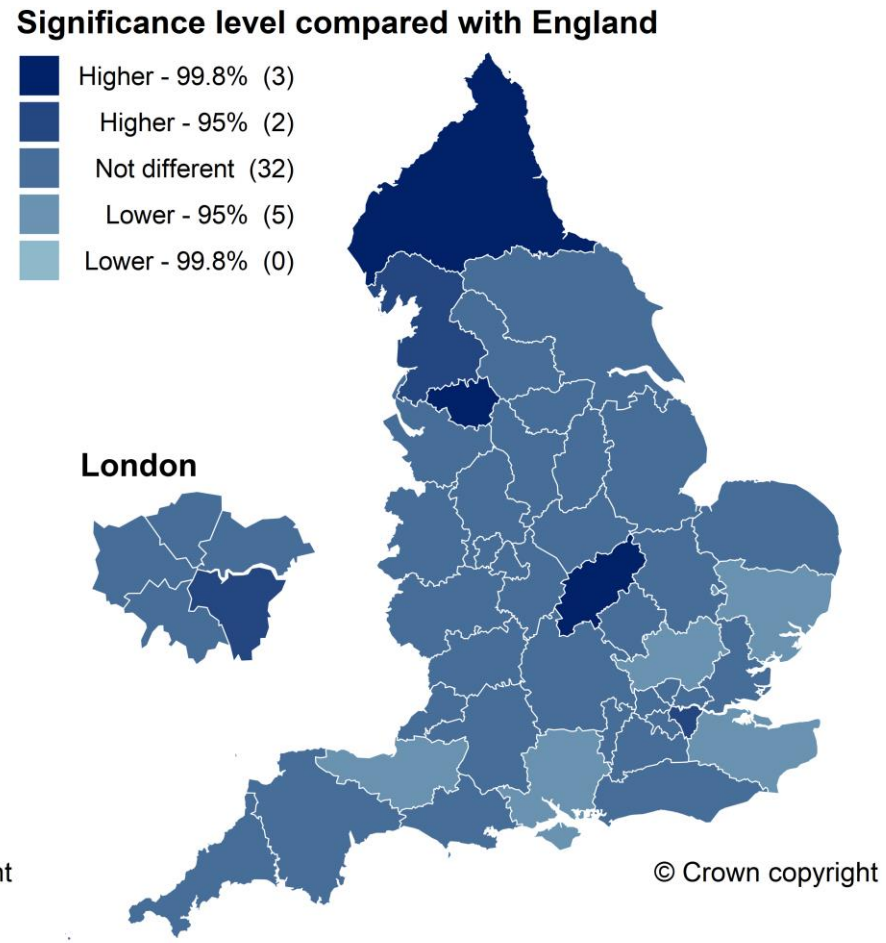
Year	2013	2014	2015	2016	2017	2018	2019	Significance 2013 to 2019	2020
Maximum to minimum	4.3	5.6	5.1	4.4	4.4	4.9	5.9	No significant change	4.9
75th to 25th percentile	1.6	1.7	1.6	1.8	1.6	1.3	1.3	No significant change	1.2
95th to 5th percentile	3.5	3.5	3.5	3.6	3.3	2.6	4.0	No significant change	2.7
Median	5.8	5.8	6.3	6.3	6.2	6.4	6.2	No significant change	6.6

The box plot and data table show the distribution of ICB mortality rates of head and neck cancer for the period 2013 to 2020. There was no significant change in the median from 2013 to 2019.

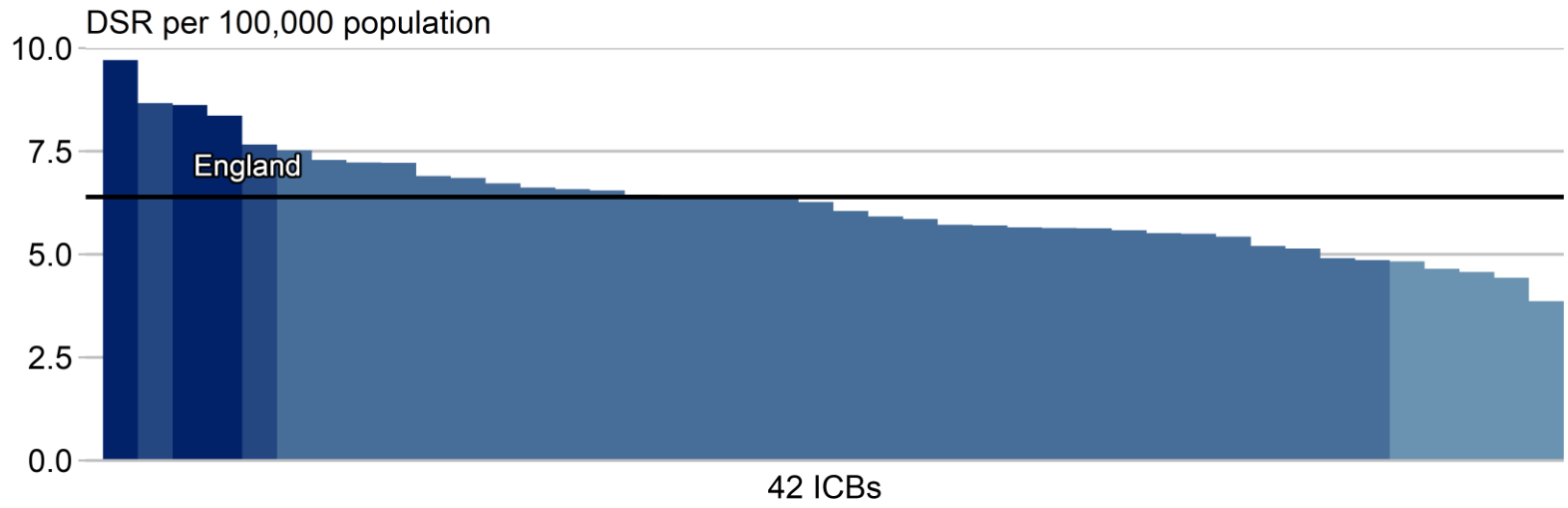
Map 5.1: Variation in mortality rate of head and neck cancer by ICB (2019)

DSR per 100,000 population (optimum value: low)





Bar chart 5.1: Variation in mortality rate of head and neck cancer by ICB (2019)



The maps and column chart display data for 2019, during which ICB values ranged from 3.9 per 100,000 population to 9.7 per 100,000 population, which is a 2.5-fold difference between ICBs. The England value for 2019 was 6.4 per 100,000 population.

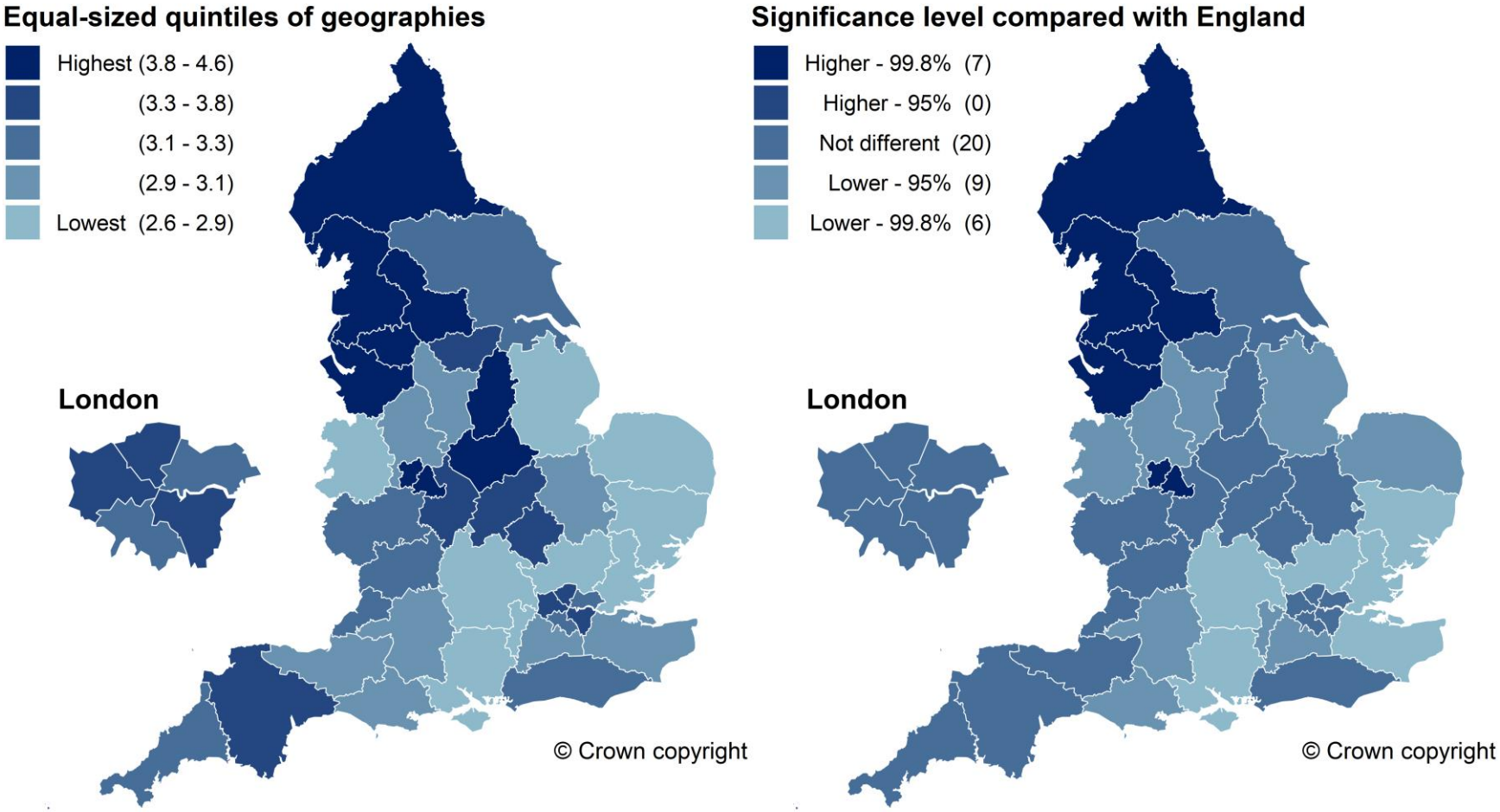
Of the 42 ICBs, 5 were statistically significantly higher than the England value (2 at the 95% confidence level and 3 at the 99.8% confidence level) and 5 were statistically significantly lower than the England value (5 at the 95% confidence level and 0 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

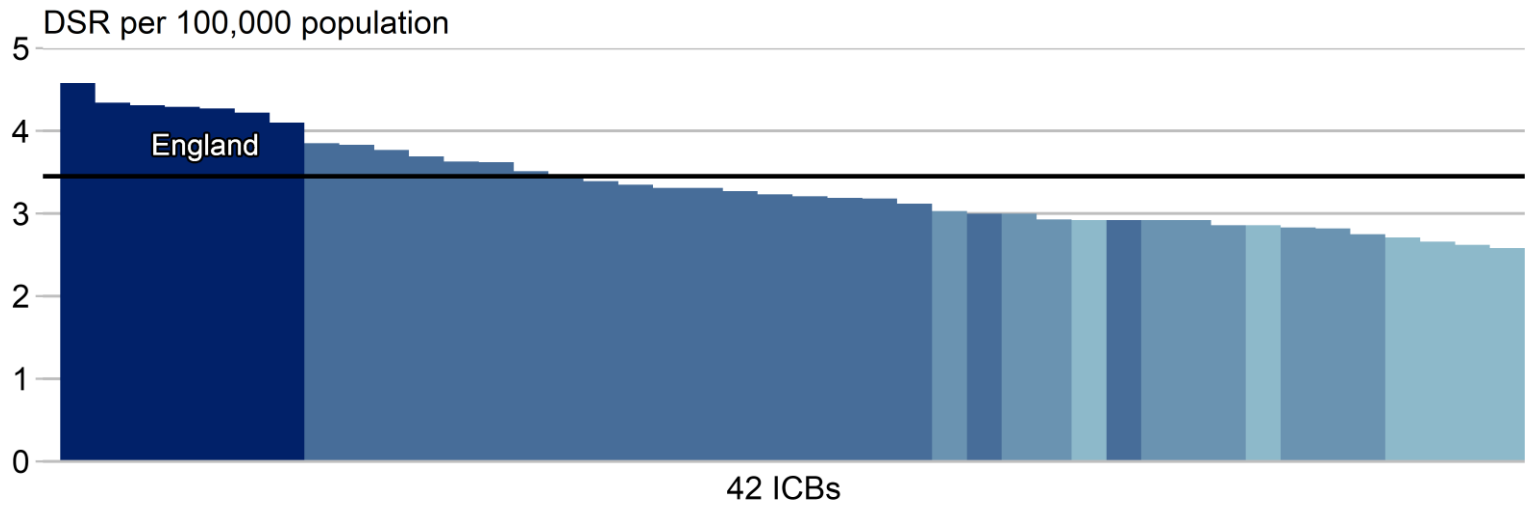
5.2: Variation in mortality of head and neck cancer in people aged 0 to 69 years

Map 5.2: Variation in mortality rate of head and neck cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 5.2: Variation in mortality rate of head and neck cancer in people aged 0 to 69 years by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 2.6 per 100,000 population to 4.6 per 100,000 population, which is a 1.8-fold difference between ICBs. The England value for 2013 to 2020 pooled was 3.5 per 100,000 population.

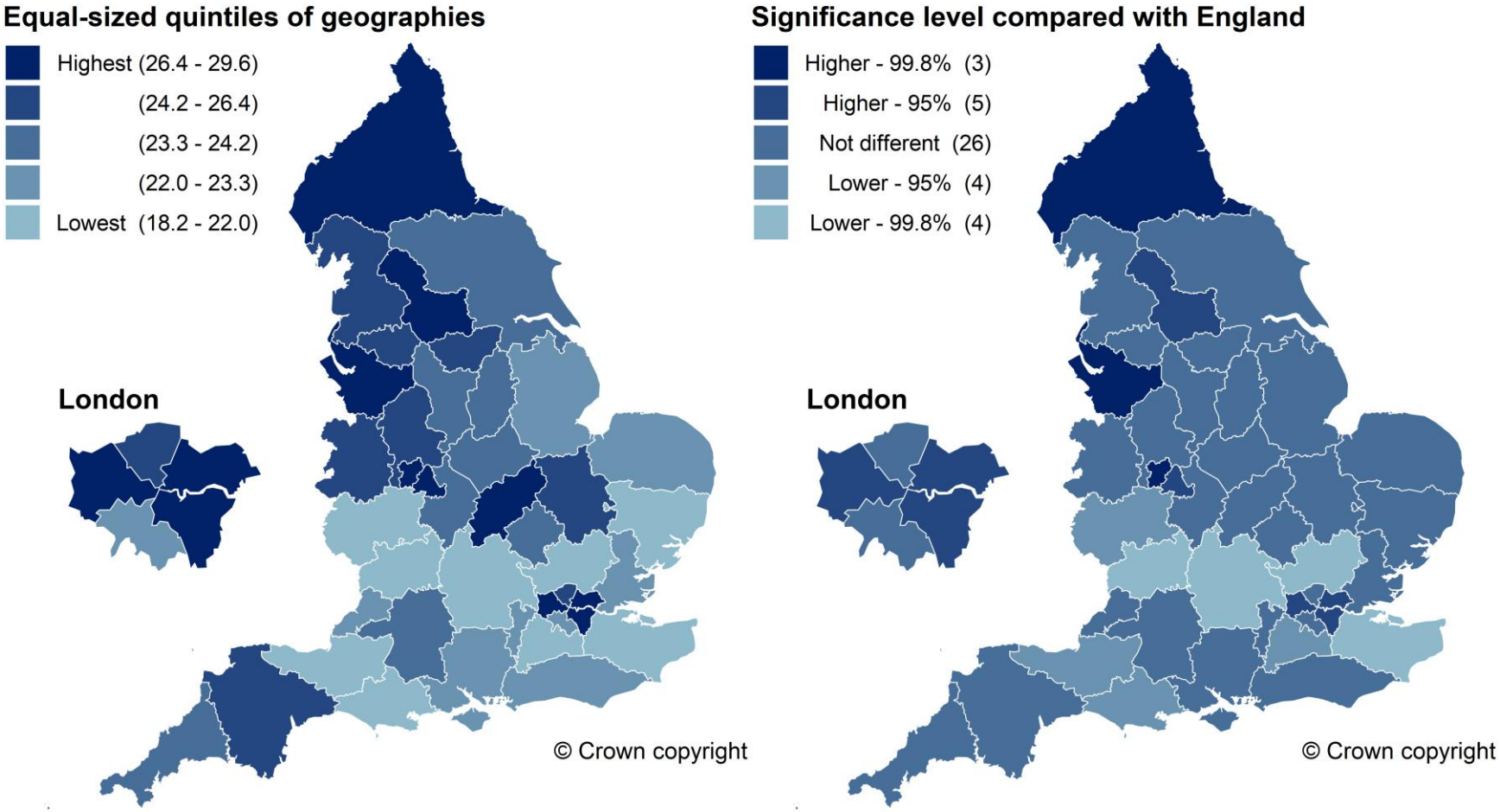
Of the 42 ICBs, 7 were statistically significantly higher than the England value (0 at the 95% confidence level and 7 at the 99.8% confidence level) and 15 were statistically significantly lower than the England value (9 at the 95% confidence level and 6 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

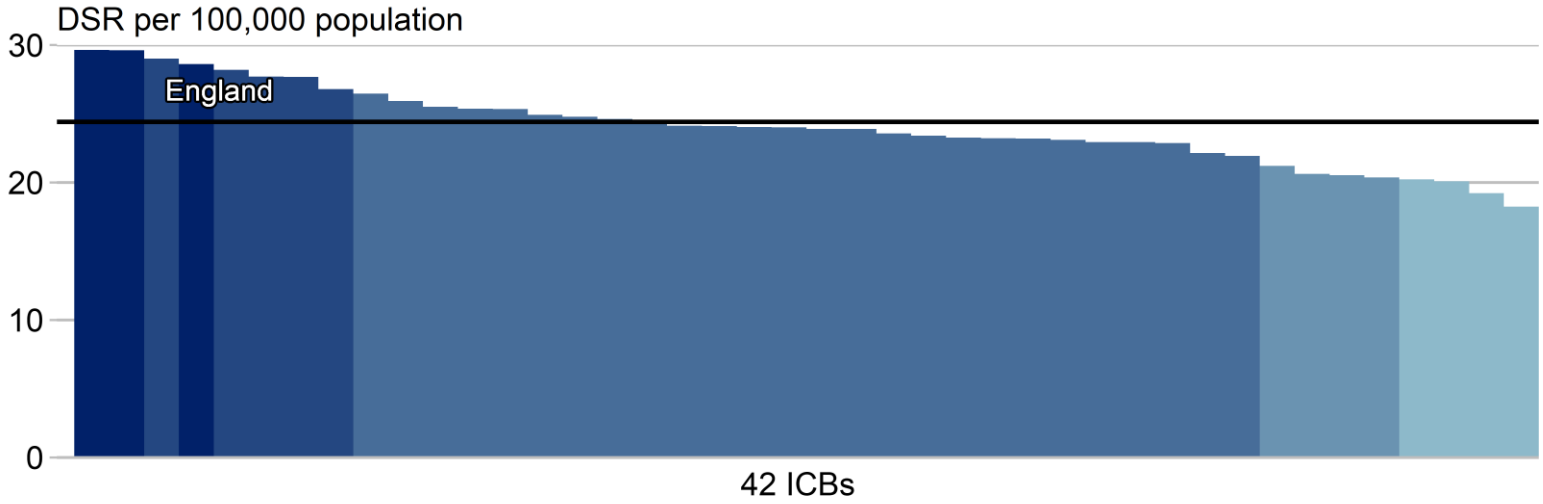
5.3: Variation in mortality of head and neck cancer in people aged 70 years and over

Map 5.3: Variation in mortality rate of head and neck cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 5.3: Variation in mortality rate of head and neck cancer in people aged 70 years and over by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 18.2 per 100,000 population to 29.6 per 100,000 population, which is a 1.6-fold difference between ICBs. The England value for 2013 to 2020 pooled was 24.4 per 100,000 population.

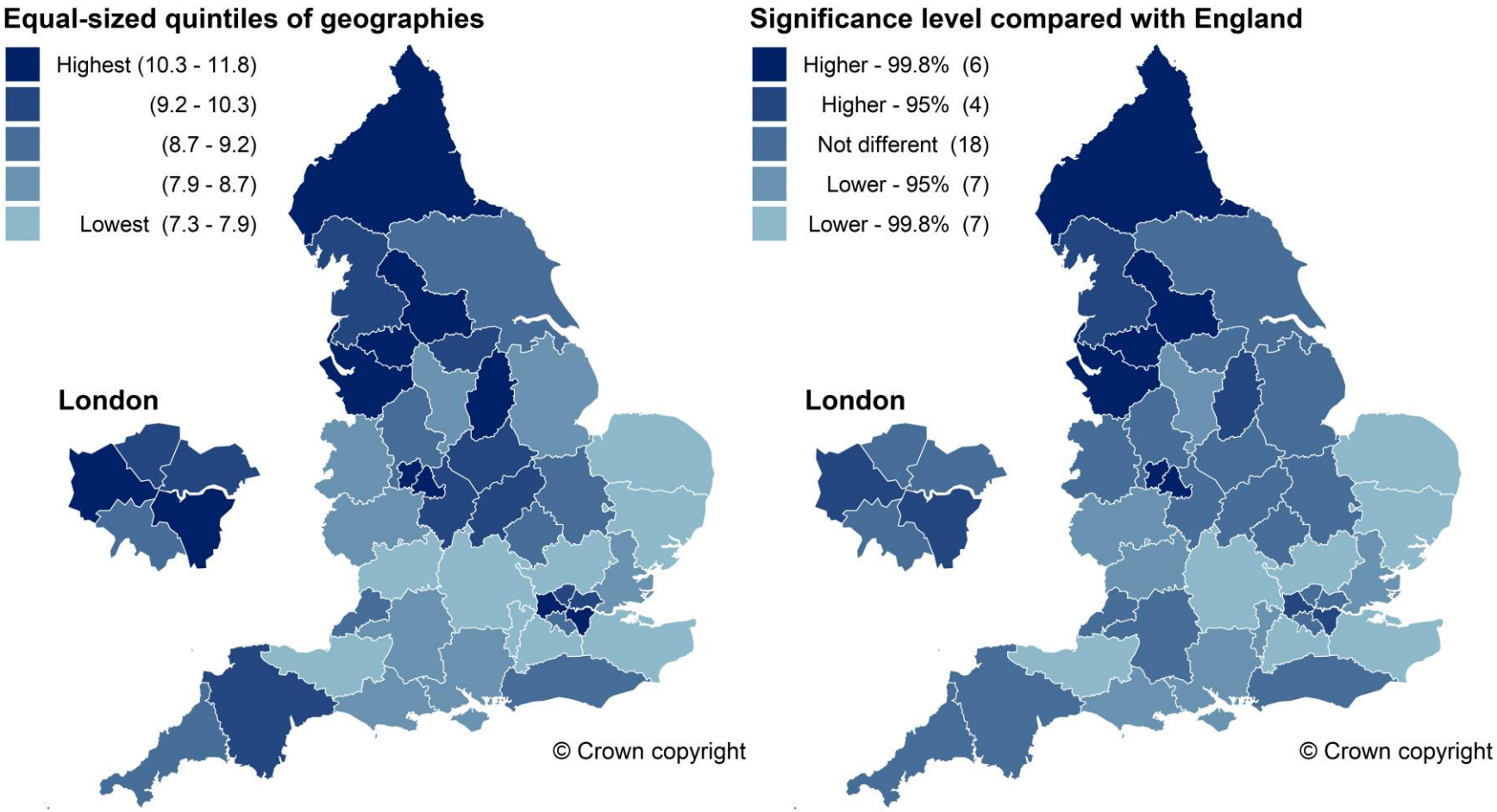
Of the 42 ICBs, 8 were statistically significantly higher than the England value (5 at the 95% confidence level and 3 at the 99.8% confidence level) and 8 were statistically significantly lower than the England value (4 at the 95% confidence level and 4 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

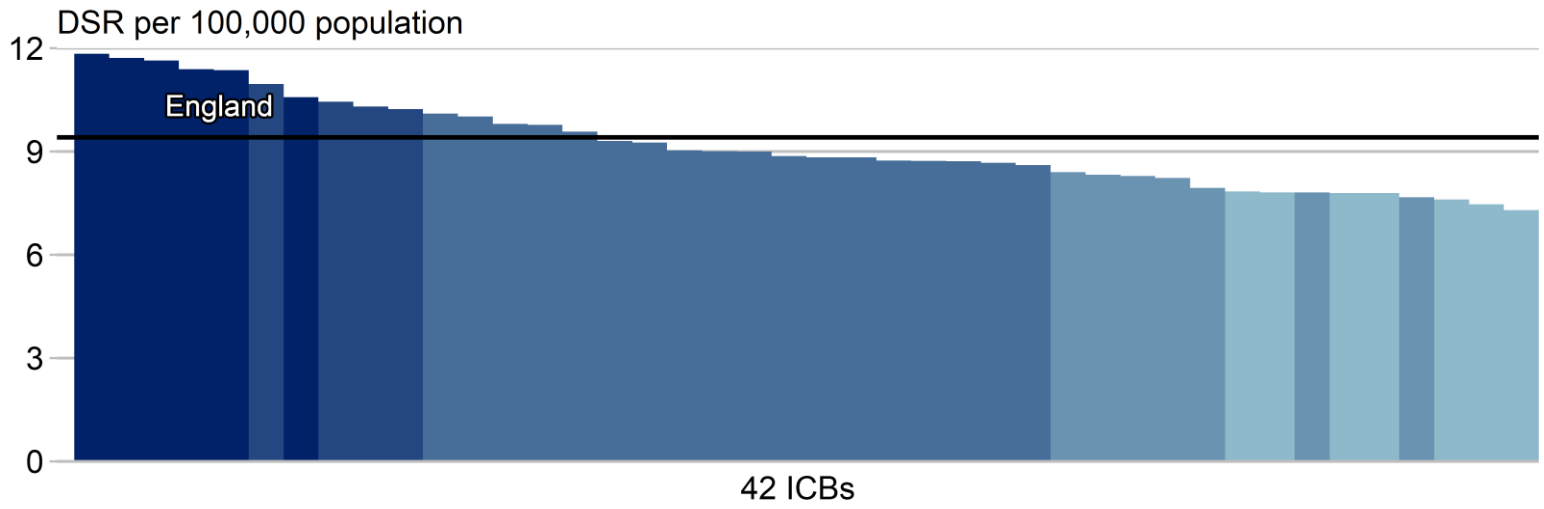
5.4: Variation in mortality of head and neck cancer in males

Map 5.4: Variation in mortality rate of head and neck cancer in males by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 5.4: Variation in mortality rate of head and neck cancer in males by ICB (2013 to 2020 pooled)



The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 7.3 per 100,000 population to 11.8 per 100,000 population, which is a 1.6-fold difference between ICBs. The England value for 2013 to 2020 pooled was 9.4 per 100,000 population.

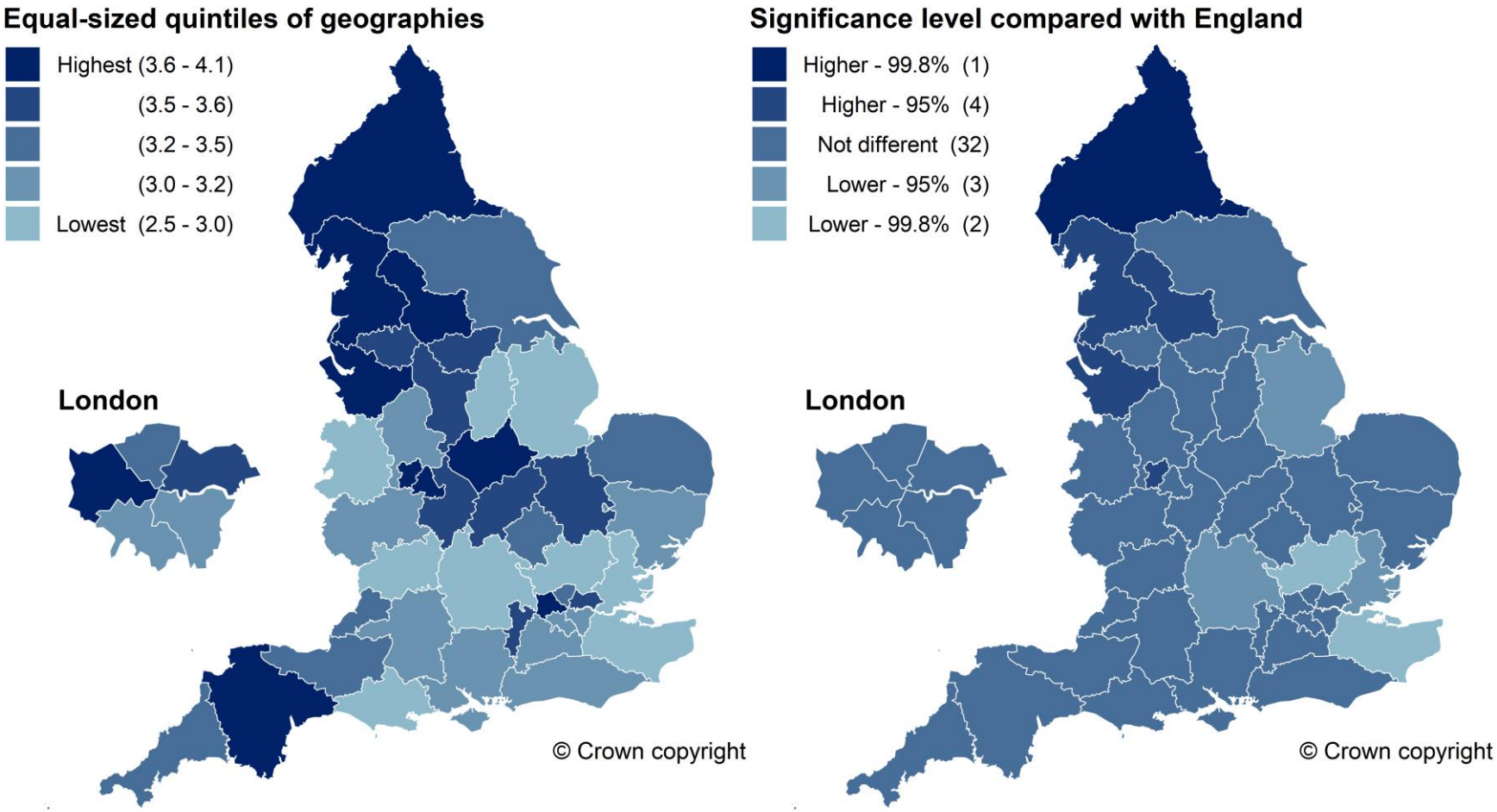
Of the 42 ICBs, 10 were statistically significantly higher than the England value (4 at the 95% confidence level and 6 at the 99.8% confidence level) and 14 were statistically significantly lower than the England value (7 at the 95% confidence level and 7 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

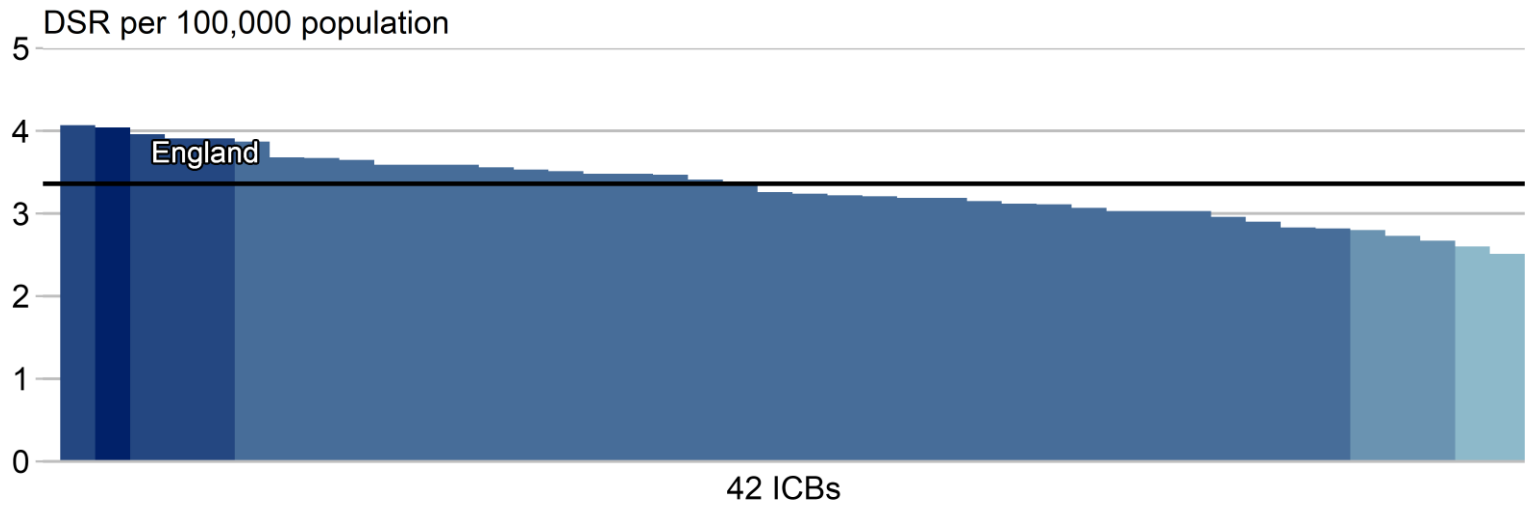
5.5: Variation in mortality of head and neck cancer in females

Map 5.5: Variation in mortality rate of head and neck cancer in females by ICB (2013 to 2020 pooled)

DSR per 100,000 population (optimum value: low)



Bar chart 5.5: Variation in mortality rate of head and neck cancer in females by ICB (2013 to 2020 pooled)



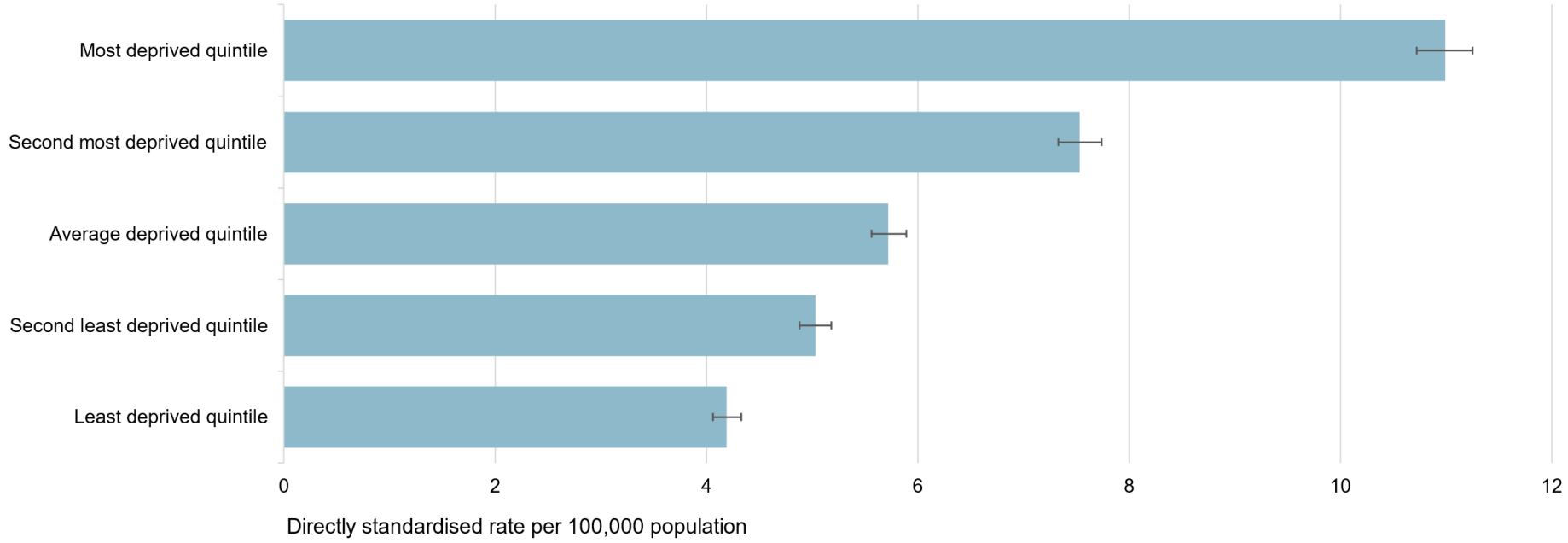
The maps and column chart display data for 2013 to 2020 pooled, during which ICB values ranged from 2.5 per 100,000 population to 4.1 per 100,000 population, which is a 1.6-fold difference between ICBs. The England value for 2013 to 2020 pooled was 3.4 per 100,000 population.

Of the 42 ICBs, 5 were statistically significantly higher than the England value (4 at the 95% confidence level and 1 at the 99.8% confidence level) and 5 were statistically significantly lower than the England value (3 at the 95% confidence level and 2 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

5.6 Variation in mortality rate of head and neck cancer by deprivation quintile

Bar chart 5.6: Variation in mortality rate of head and neck cancer by lower super output area (LSOA) deprivation quintile in England (2013 to 2020 pooled)



The bar chart displays the latest data for which the rate in the most deprived quintile was 11.0 per 100,000 population. The least deprived quintile value was 4.2 per 100,000 population. There is a 2.6-fold difference between the most and least deprived quintiles.

The data showing the values for all deprivation quintiles is available in the head and neck cancer atlas data file.

Reasons for variation in mortality rates of head and neck cancer

Analyses for this atlas shows variation in head and neck cancer mortality rates by age, sex, geography by ICB and socioeconomic deprivation between 2013 to 2020.

The mortality rate for head and neck cancer increased in 2020 compared with previous years. This increase occurred when 2020 was the first year of the COVID-19 pandemic and health services were significantly disrupted.

Possible reasons for variation in mortality rates of head and neck cancer include:

- stage of diagnosis
- population factors such as:
    - socio-demographic characteristics
    - proportion of the local population who use tobacco
    - health literacy and awareness of signs and symptoms
    - co-morbidity
- health system factors such as:
    - referral pathways and routes to diagnosis
    - access to primary care medical and dental services
    - treatment success of centres and subsequent survival
    - smoking cessation following head and neck cancer diagnosis and treatment[69]

6. Risk factors

As described in the introduction of this atlas, tobacco smoking and alcohol consumption are established risk factors for head and neck cancer. In this section, data on these risk factors are described.

Smoking is a leading cause of preventable illness and premature death.[70] The Office for Health Improvement and Disparities (OHID) estimate that there were approximately 64,000 deaths attributed to smoking in England in 2019.[71] Smoking attributable hospital admissions were an estimated 448,000 in England in the financial year ending 2020, which corresponds to over 1,200 every day.[71] Despite a continued decline in smoking prevalence, 12.7% of adults (5.3 million people) in England still smoked in 2022.[71 72]

Current cigarette smoking is socially patterned and is associated with level of education and socio-economic status.[72] The proportion of current smokers was found to be higher in those who were unemployed compared with those in paid employment.[72] Likewise, 22.8% of people classified as being in “routine and manual” occupations were current smokers compared with 8.3% of those with “managerial and professional” occupations.[72] This highlights that although the number of people smoking is decreasing nationally, inequalities in smoking prevalence remain.

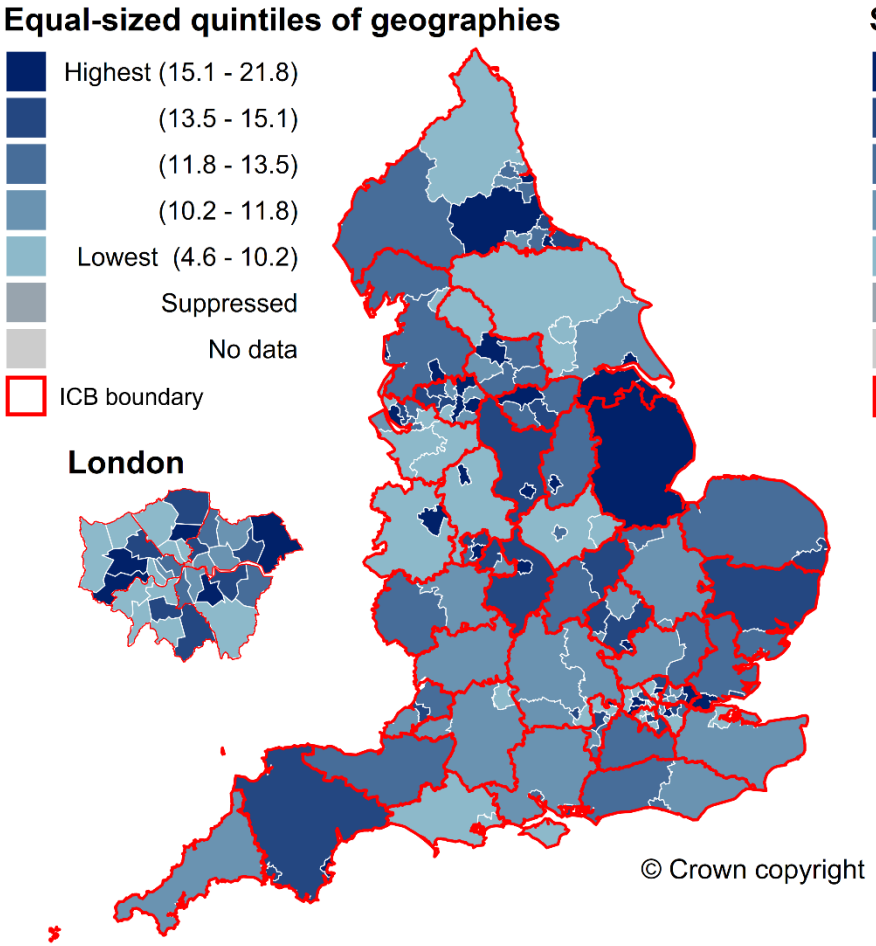
Morbidity and mortality from alcohol consumption is high in England, particularly for those in the most socio-economically deprived groups.[73 74] The proportion of adults who reported drinking more than the weekly recommended limit of 14 units has decreased since 2012.[75] However, despite this in England in the financial year ending 2022 there were 948,312 hospital admissions related to alcohol conditions (broad definition), 13% higher than in financial year ending 2017.[74] There is also regional variation in alcohol consumption, with consumption highest in adults from the North West, North East and South West.[75]

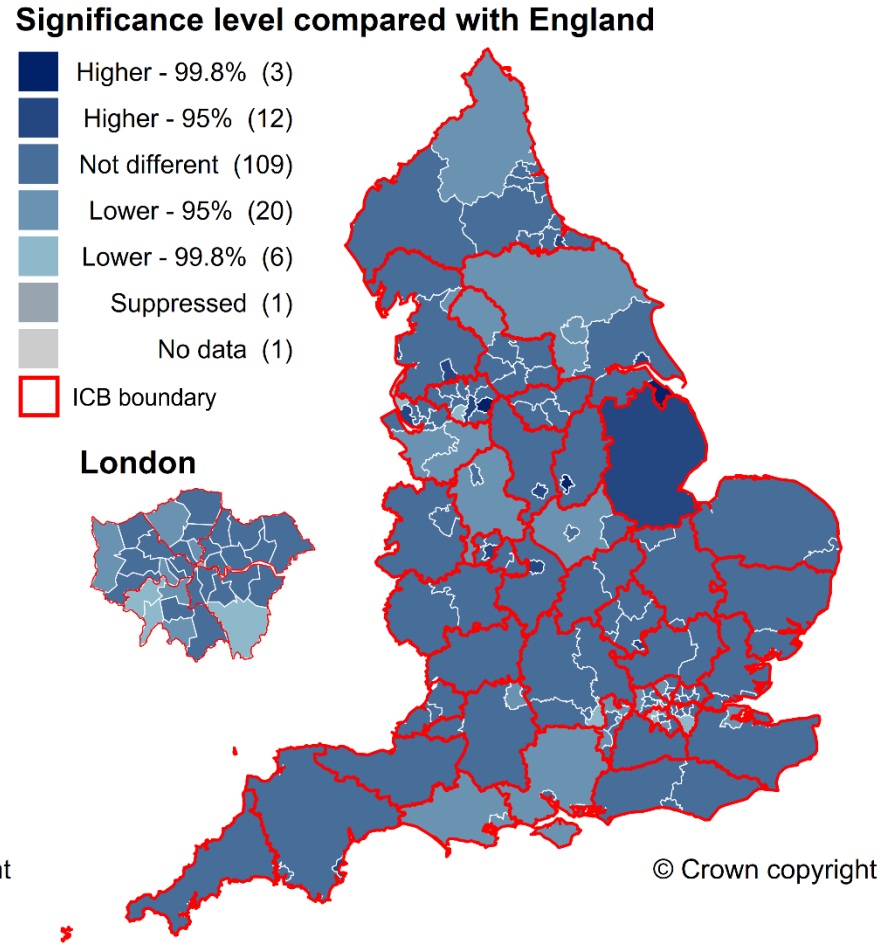
Alcohol consumption data at local authority level is collected through the Health Survey for England. The survey was disrupted and delayed due to the COVID-19 pandemic and robust, up-to-date alcohol consumption data was not available for this atlas. Hospital admission episode data for alcohol-related conditions (narrow definition) has been used as a proxy to estimate variation in harmful alcohol consumption. The narrow definition is a measure of hospital admissions where the primary diagnosis is an alcohol-related condition, so primarily due to alcohol consumption. This provides the best indication of trends in alcohol-related hospital admissions. The broad definition is where an alcohol-related condition could be the primary or secondary (contributory) diagnosis and provides an indication of the total alcohol burden placed on the NHS.[76]

6.1: Variation in percentage of people aged 18 years and over who are self-reported smokers

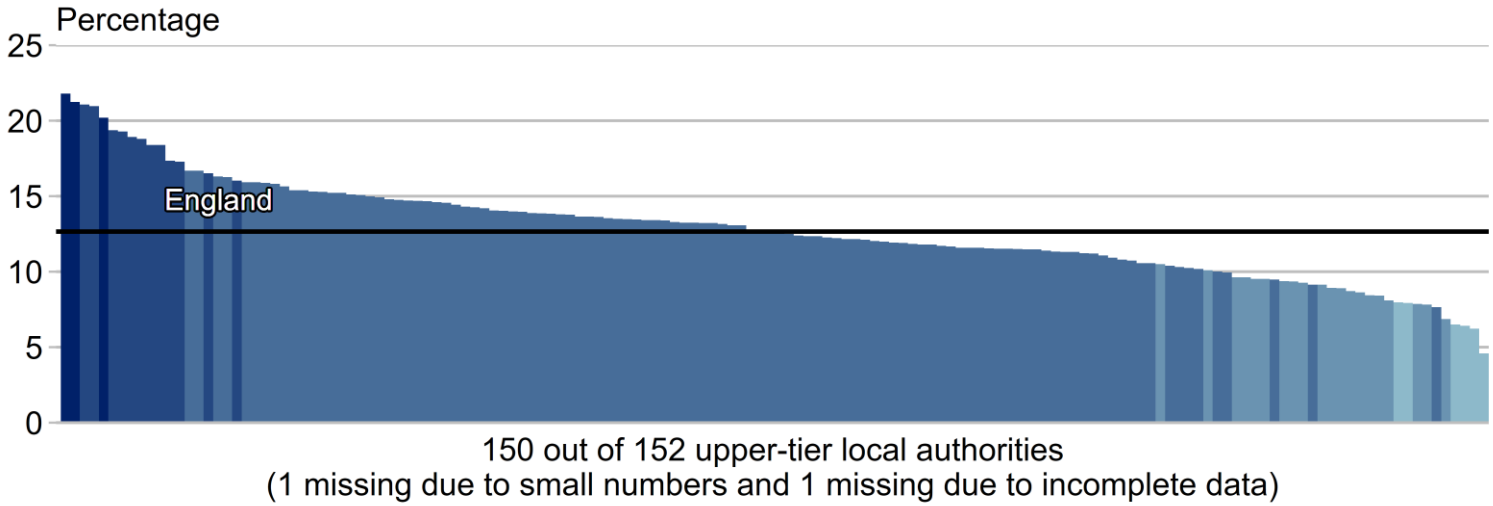
Map 6.1: Variation in the percentage of people aged 18 years and over who are self-reported smokers in the annual population survey by upper-tier local authority (UTLA) (2022)

Optimum value: low





Bar chart 6.1: Variation in the percentage of people aged 18 years and over who are self-reported smokers in the annual population survey by UTLA (2022)



The maps and column chart display the latest period (2022), during which UTLA values ranged from 4.6% to 21.8%, which is a 4.8-fold difference between UTLAs. The England value for 2022 was 12.7%.

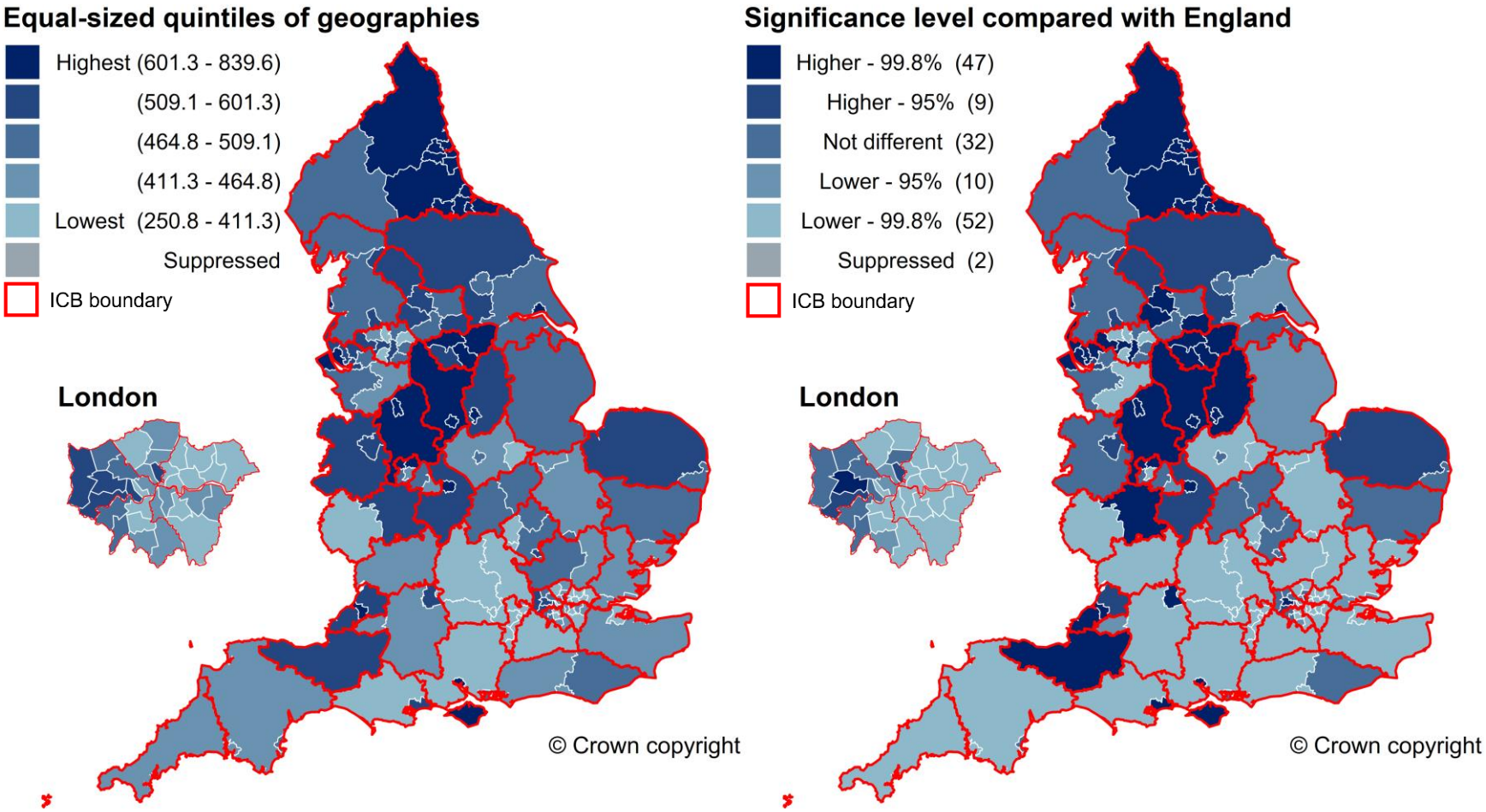
Of the 152 UTLAs (2022 UTLA configuration), 15 were statistically significantly higher than the England value (12 at the 95% confidence level and 3 at the 99.8% confidence level) and 26 were statistically significantly lower than the England value (20 at the 95% confidence level and 6 at the 99.8% confidence level), 1 was missing due to small numbers and 1 was missing due to incomplete data.

The data showing the values for all UTLAs is available in the head and neck cancer atlas data file.

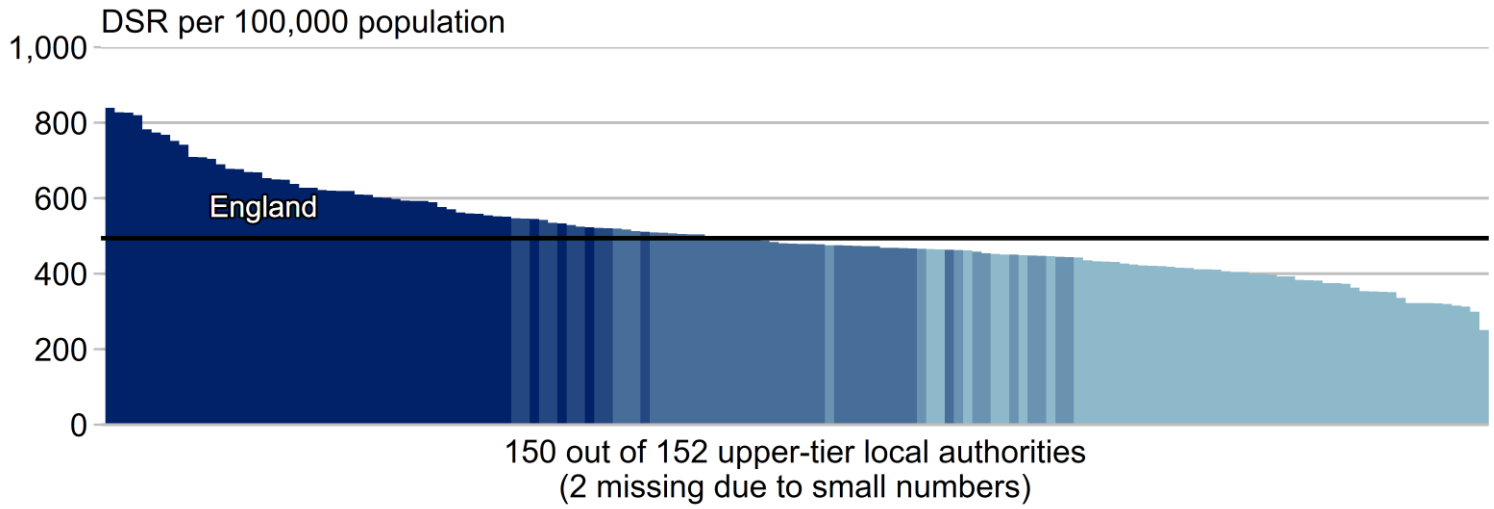
6.2: Variation in the rate of hospital admission episodes for alcohol-related conditions

Map 6.2: Variation in the rate of hospital admission episodes for alcohol-related conditions, narrow definition by UTLA (financial year ending 2022)

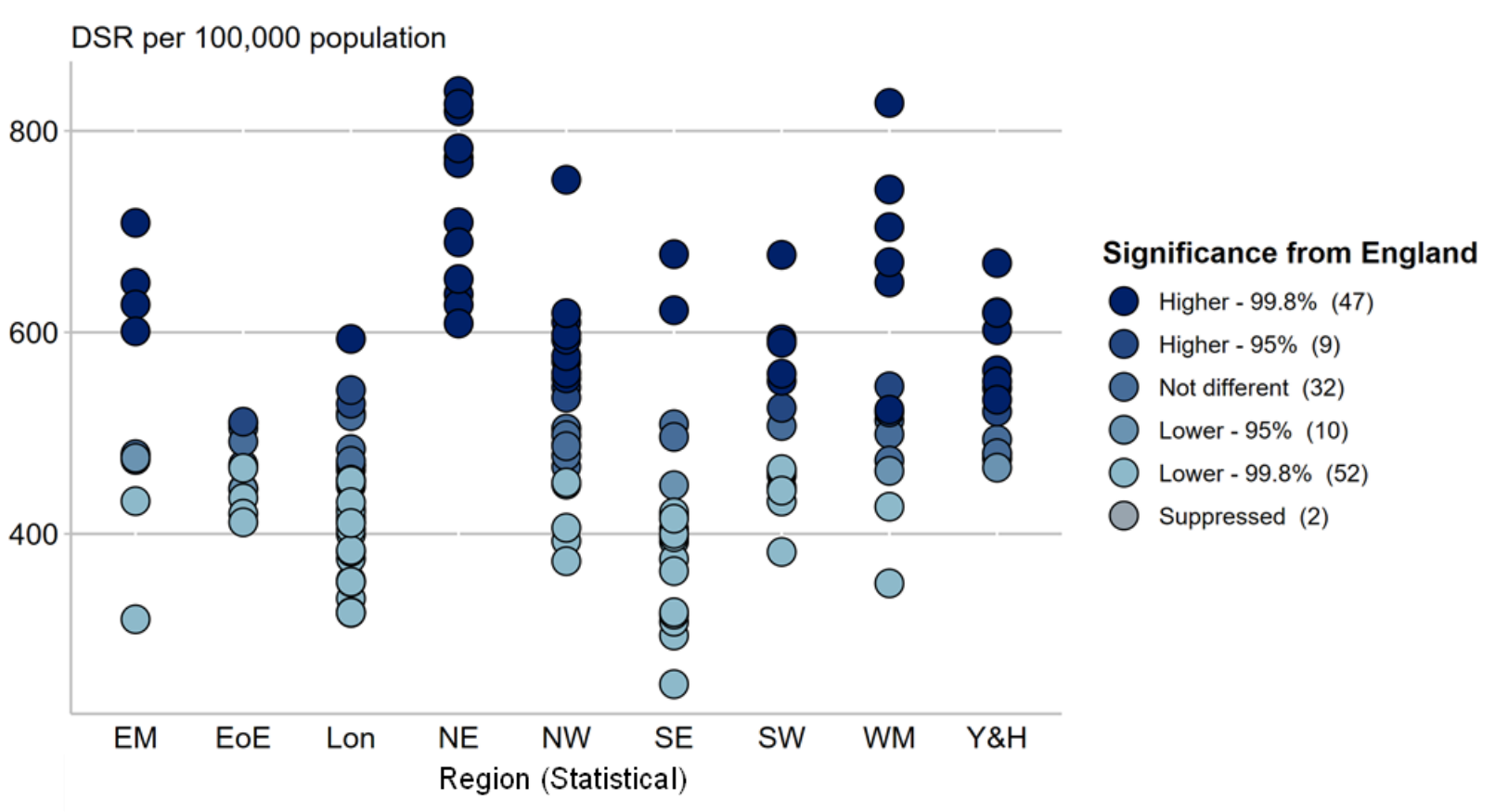
DSR per 100,000 population (optimum value: low)



Bar chart 6.2: Variation in the rate of hospital admission episodes for alcohol-related conditions, narrow definition by UTLA (financial year ending 2022)



Regional dot plot 6.2: Variation in the rate of hospital admission episodes for alcohol-related conditions, narrow definition by UTLA and region (financial year ending 2022)



The maps, column chart and regional dot plot display the latest period (for financial year ending 2022), during which UTLA values ranged from 250.8 per 100,000 population to 839.6 per 100,000 population, which is a 3.3-fold difference between UTLAs. The England value for financial year ending 2022 was 494.0 per 100,000 population.

Of the 152 UTLAs (2022 UTLA configuration), 56 were statistically significantly higher than the England value (9 at the 95% confidence level and 47 at the 99.8% confidence level) and 62 were statistically significantly lower than the England value (10 at the 95% confidence level and 52 at the 99.8% confidence level) and 2 were missing due to small numbers.

The data showing the values for all UTLAs is available in the head and neck cancer atlas data file.

Reasons for variation in smoking prevalence and alcohol-related hospital admissions

There is geographical variation in smoking prevalence in adults aged 18 years and over and in alcohol-related hospital admissions by UTLA. These variations may reflect social, cultural and demographic factors and access to alcohol or tobacco services. For alcohol, it is particularly worth noting the 'alcohol harm paradox' whereby those living in more deprived areas are at higher risk of alcohol-related harm even though gradients in consumption across socio-economic deprivation levels at an international level are small or even absent.[28]

7. Human papillomavirus vaccinations

Adolescent females in England have been offered the human papillomavirus (HPV) vaccine since 2008 (as part of the HPV immunisation programme) to reduce cervical cancer incidence by preventing infection with the highest risk types of HPV (types 16 and 18).[77] The vaccine currently used through the programme, Gardasil 9, offers extended protection against 9 HPV types: 6, 11, 16, 18, 31, 33, 45, 52, 58.[78] The HPV vaccine is most effective prior to exposure to viruses therefore the vaccination programme prioritises adolescents prior to sexual activity. However, eligible individuals (i.e. up to the age of 25) can continue to benefit after the start of sexual activity if they have not been exposed to high-risk HPV types, or if they have contracted some high-risk HPV types but not others.[47] This effect is important given that circulating levels of HPV infection are now much lower than they were when the programme started.[49]

From September 2019, males aged 12 to 13 years became eligible for HPV immunisation to offer direct protection against HPV related cancers including oropharyngeal cancer, to reduce the overall burden of HPV related cancers including cervical cancer sooner than the female-only programme and to add resilience to the UK vaccination programme.[79]

A targeted vaccination programme was introduced for gay, bisexual and other men who have sex with men (GBMSM) in April 2018, this programme aimed to extend protection against HPV as this group were unlikely to benefit from herd immunity generated by the existing girls programme and offer protection against HPV infection, HPV associated cancers and genital warts.[80] Dosage changes were subsequently announced in June 2023.[81]

- a 1 dose schedule for the routine adolescent programme and GBMSM programme for eligible individuals less than 25 years of age
- a 2 dose schedule for the GBMSM programme for eligible individuals from the age of 25 years (0, 6 to 24 months)
- a 3 dose schedule for eligible individuals who are immunosuppressed and those known to be living with HIV, including those on antiretroviral therapy (0, 1, 4 to 6 month schedule)[47]

The HPV vaccination programme in the academic year 2019 to 2020 was disrupted by the COVID-19 pandemic. Only 8 of the 150 local authorities had fully completed, and 116 partially completed, the vaccination programme in their area by March 2020 when educational establishments were temporarily closed due to lockdown. Catch-up plans were implemented but only 64.7% of 13 to 14 year old females had completed both doses of the vaccine by the end of the academic year.[79] Prior to the pandemic, HPV vaccine uptake in

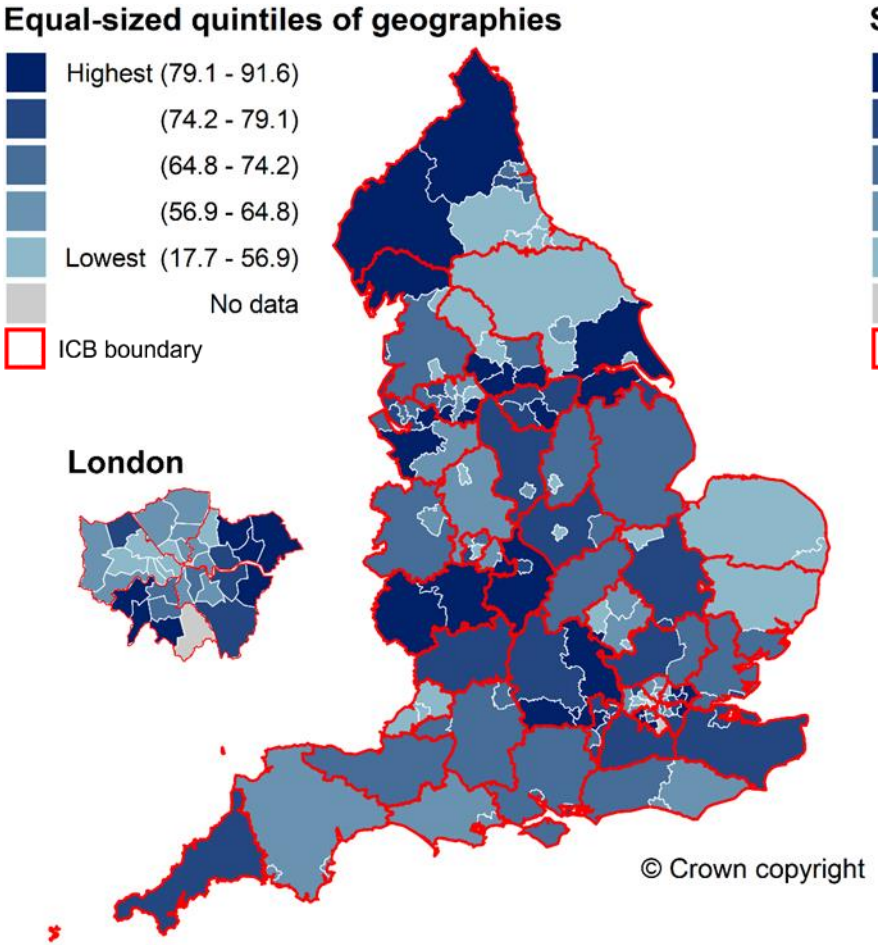
females was stable with 83.9% of females completing a 2-dose HPV schedule by school year 9 in the academic year 2018 to 2019, compared with 83.8% in the academic year 2017 to 2018, 83.1% in the academic year 2016 to 2017 and 85.1% in the academic year 2015 to 2016.[79] Extensive work has been, and continues to be, undertaken, to improve uptake through catch-up efforts for those cohorts who missed out on the offer of vaccination through the adolescent programme at the allotted time.[79 82]

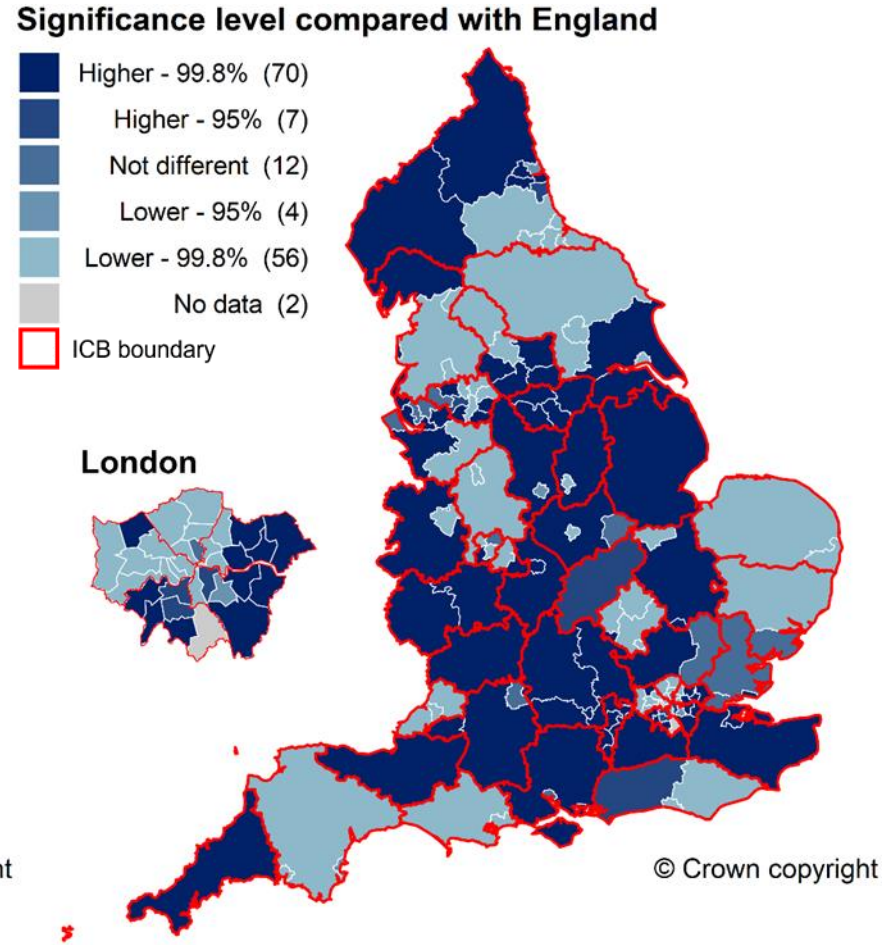
There is currently no definitive data from which to estimate the impact of the HPV vaccination programme on the incidence of head and neck cancer in future. Given the latency of disease onset it is likely that any impact will not be observed for 30 to 40 years.[83]

7.1: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old females

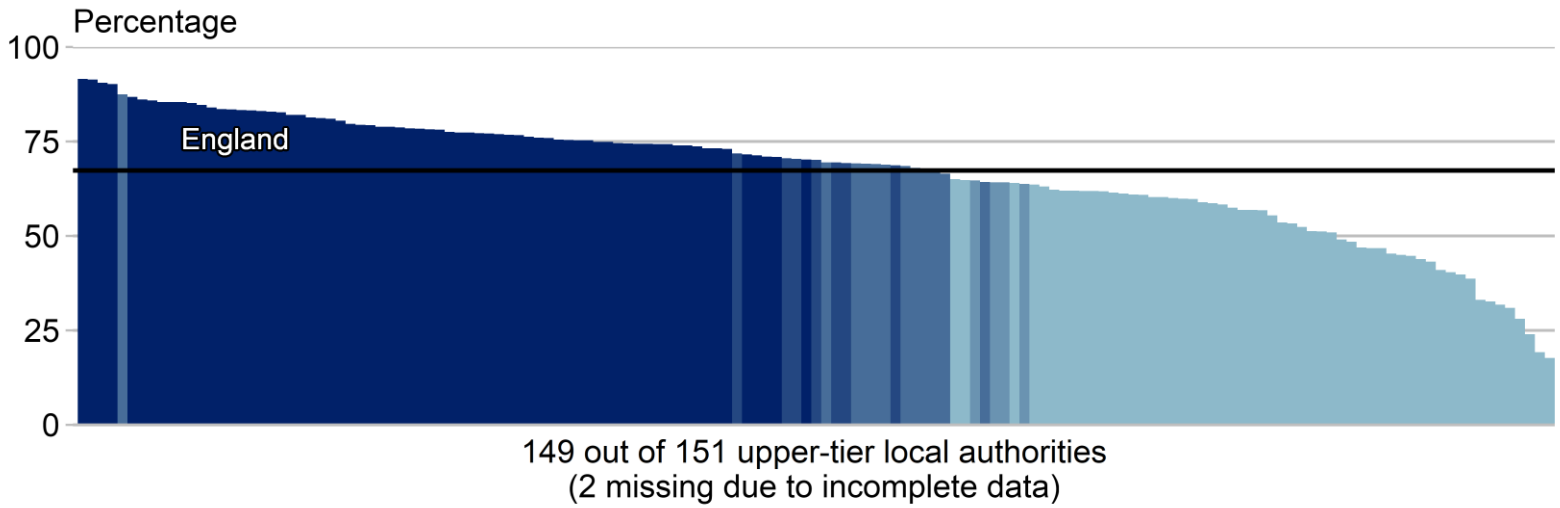
Map 7.1: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old females by UTLA (academic year 2021 to 2022)

Optimum value: high

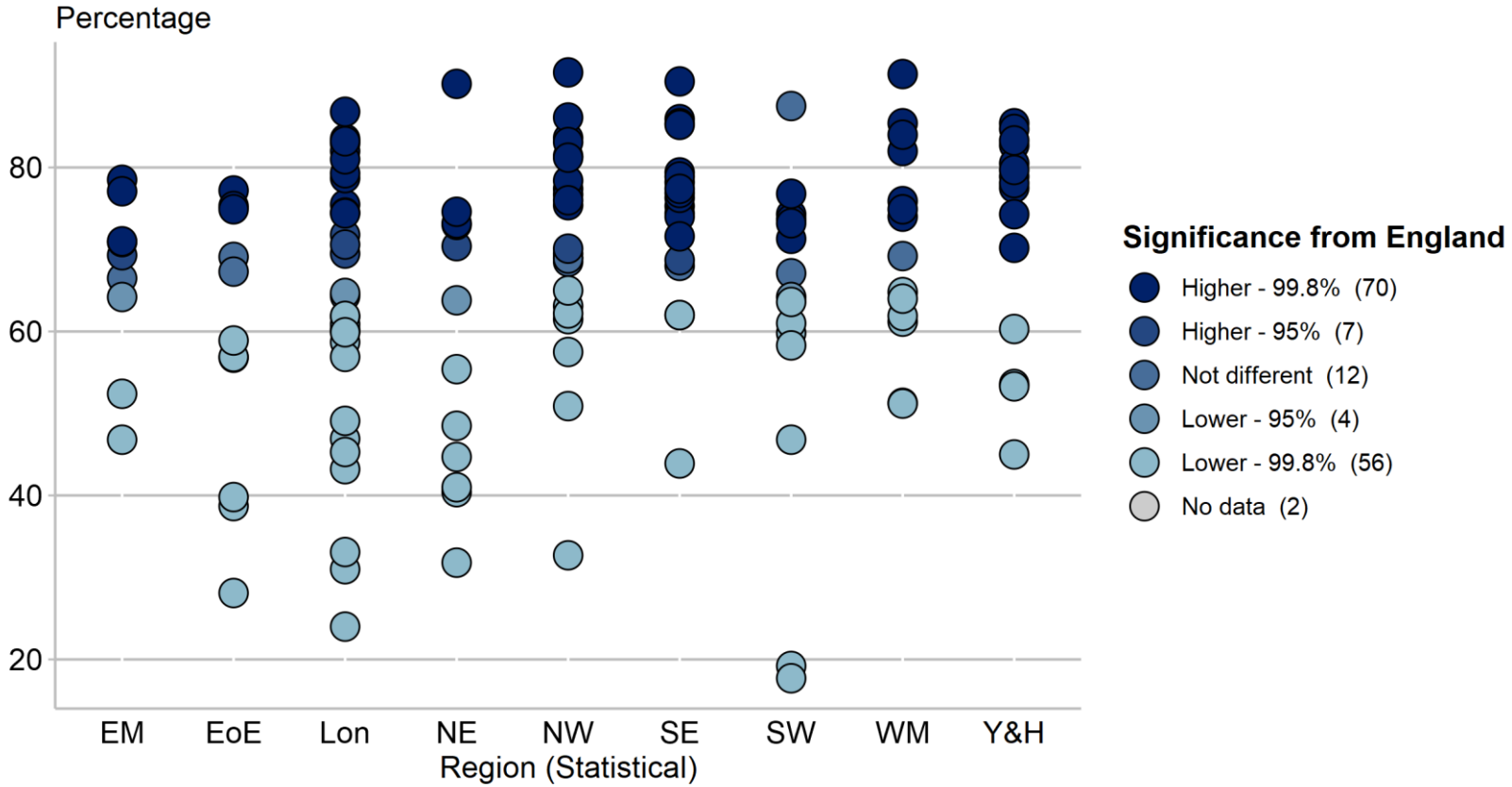




Bar chart 7.1: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old females by UTLA (academic year 2021 to 2022)



Regional dot plot 7.1: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old females by UTLA and region (academic year 2021 to 2022)

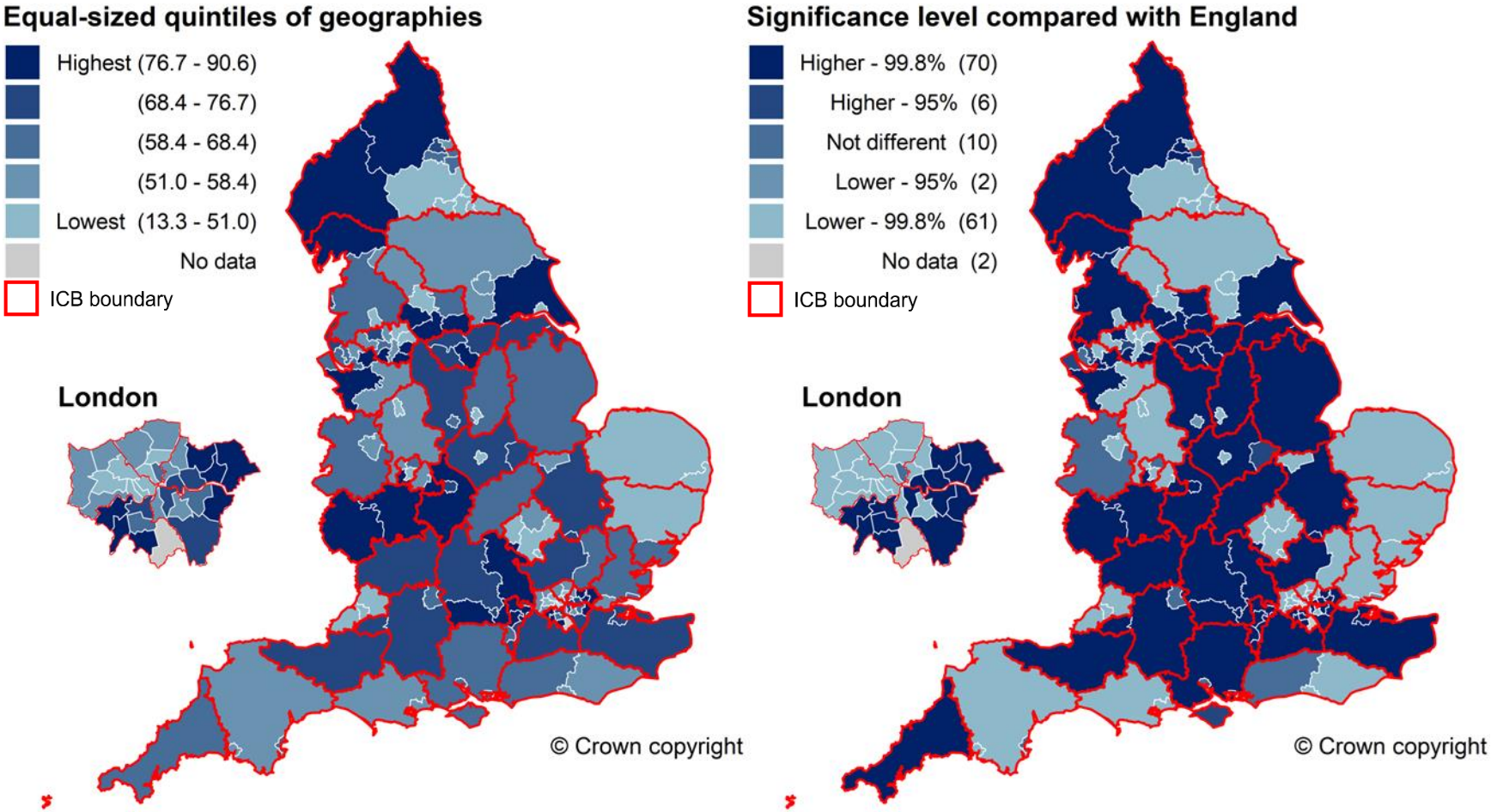


The maps, column chart and regional dot plot display data for the academic period 2021 to 2022, during which upper tier local authorities (UTLA) values ranged from 17.7% to 91.6%, which is a 5.2-fold difference between UTLAs. The England value for the academic period 2021 to 2022 was 67.3%. Of the 151 UTLAs (2020 UTLA configuration), 77 were statistically significantly higher than the England value (7 at the 95% confidence level and 70 at the 99.8% confidence level), 60 were statistically significantly lower than the England value (4 at the 95% confidence level and 56 at the 99.8% confidence level) and 2 were missing due to incomplete data. The data showing the values for all UTLAs is available in the head and neck cancer atlas data file.

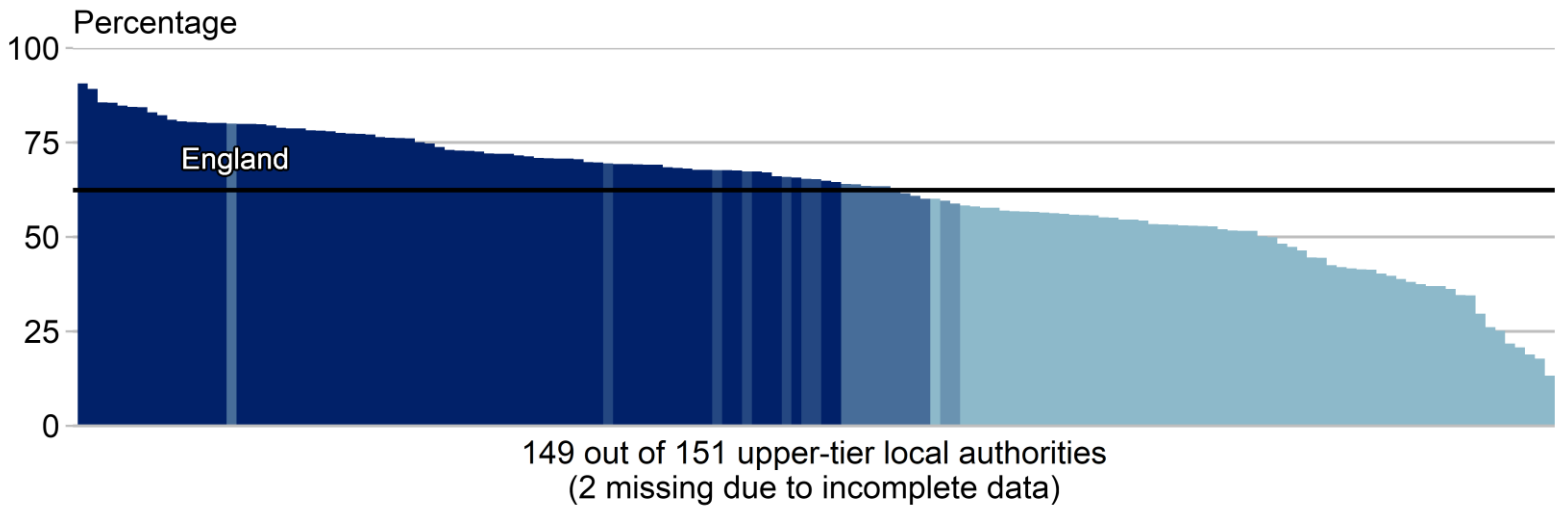
7.2: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old males

Map 7.2: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old males by UTLA (academic year 2021 to 2022)

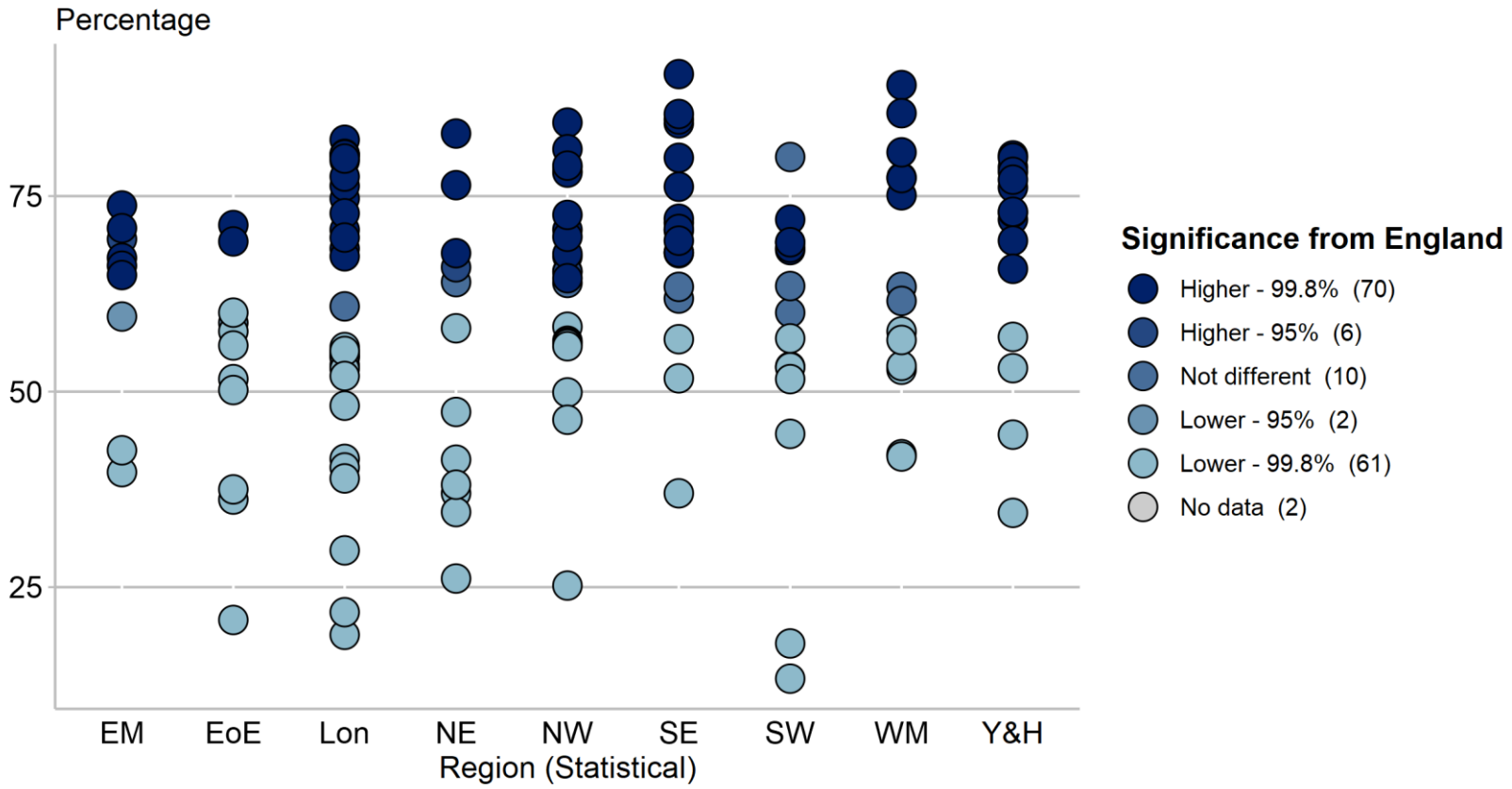
Optimum value: high



Bar chart 7.2: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old males by UTLA (academic year 2021 to 2022)



Regional dot plot 7.2: Variation in percentage of HPV vaccination coverage for two doses in 13 to 14 year old males by UTLA and region (academic year 2021 to 2022)



The maps, column chart and regional dot plot display data for the academic period 2021 to 2022, during which UTLA values ranged from 13.3% to 90.6%, which is a 6.8-fold difference between UTLAs. The England value for the academic period 2021 to 2022 was 62.4%.

Of the 151 UTLAs (2020 UTLA configuration), 76 were statistically significantly higher than the England value (6 at the 95% confidence level and 70 at the 99.8% confidence level), 63 were statistically significantly lower than the England value (2 at the 95% confidence level and 61 at the 99.8% confidence level) and 2 were missing due to incomplete data. The data showing the values for all UTLAs is available in the head and neck cancer atlas data file.

Reasons for variation in HPV vaccine coverage in females and males aged 13 to 14 years

There is substantial geographical variation in HPV vaccine coverage in both males and females by UTLA but the reasons for this are variable and reflect a complex array of factors that vary by geography and by population.

Possible reasons for variation in HPV vaccine coverage may include: [84] [85]

- population factors such as:
    - socio-demographic characteristics
    - vaccine hesitancy due to lack of information[84] and consent[85]
    - attendance rates in schools
- health system factors such as:
    - known barriers to health service access and utilisation that extend beyond HPV vaccination[86]
    - consent procedures for adolescent vaccination[87]
    - recovery of services post COVID-19 pandemic
    - variation in local programme delivery

8. Dental access

Dental professionals have a key role in the early diagnosis of head and neck cancers.[88] Compared with general medical practitioners, dentists receive more training and are more likely to see patients with head and neck cancers. Dentists are well placed to provide preventative advice and identify signs and symptoms of head and neck cancer as part of a routine dental check-up.[61] Access to primary dental care is essential to ensure people receive timely and appropriate referrals.

In June 2024 40.3% of the adult population (18 years and over) accessed NHS dental care in the preceding 24 months.[89] Access levels to NHS dental care in England continue to be lower than pre-pandemic levels; this is a particular concern in rural and coastal areas and more deprived areas.[60 90] There are inequalities in access to dental services with NHS dental service data suggesting that people from some ethnic groups (black, Asian and minority ethnic groups) may find it more difficult to access NHS dental care.[23] Difficulties in accessing NHS dental services are also experienced by older people, people with disabilities, people with additional or complex needs including those with special educational needs and disabilities (SEND) and autism, people from vulnerable groups including refugees and asylum seekers; and people who are homeless.[23 91]

Primary care dentists can provide a mix of NHS and private dentistry.[91] All adults are eligible to check-ups and treatment at NHS rates with some groups entitled to free NHS treatment. Analysis has found that deprived areas are more likely to suffer from shortages of NHS dentists, which can lead to those entitled to free care unable to access it.[92] Recent surveys report that the cost of care influences the type and timing of care, which in turn may lead to worse oral health outcomes.[93]

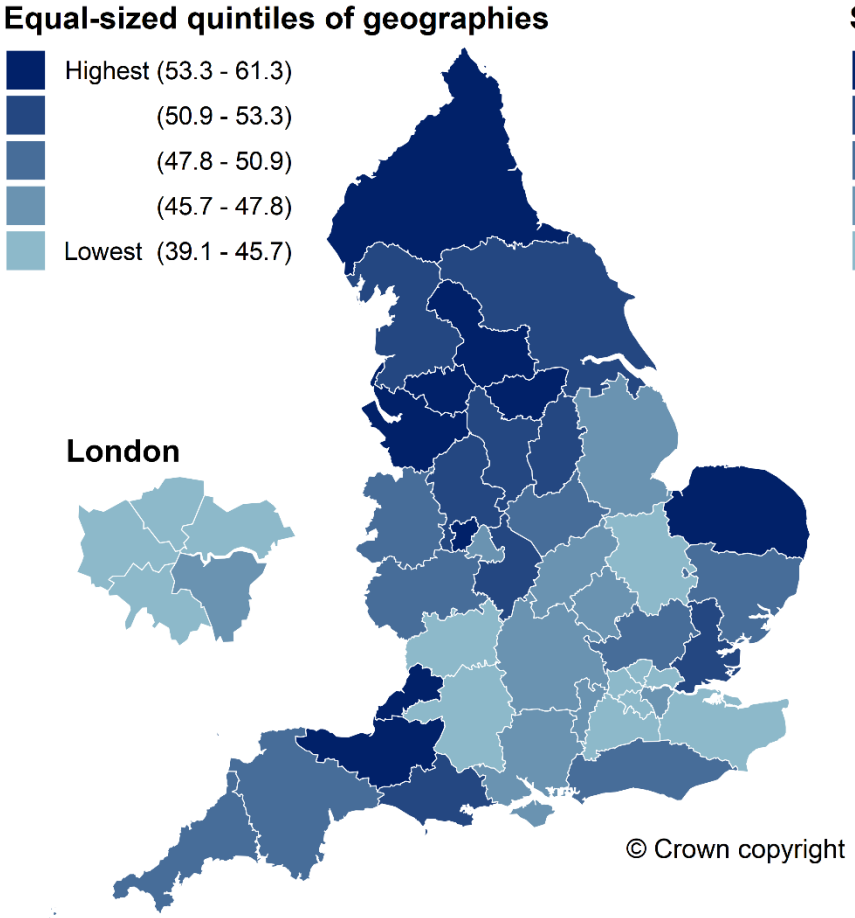
The Adult oral health survey 2021 results showed that those living in lower income households or in more deprived areas were less likely to report going to the dentist for regular check-ups, more likely to report only going to the dentist when having problems with their teeth, and more likely to report that the cost of dental care had affected the type of dental care or treatment they had received.[93]

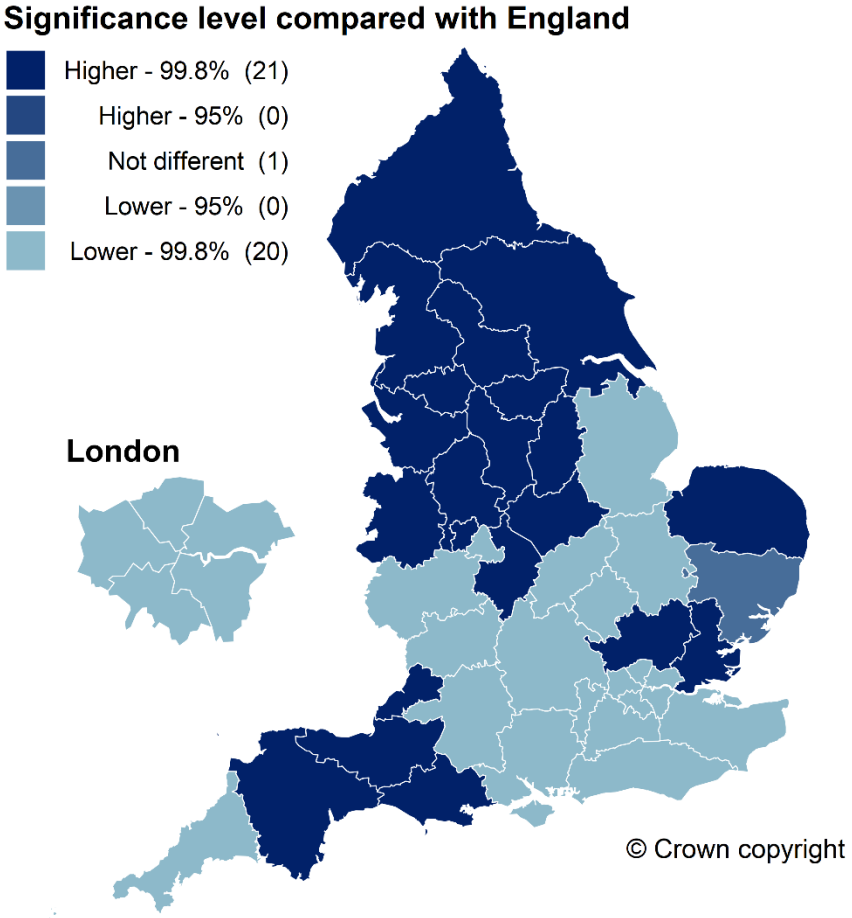
Analyses for this atlas presents data that is available on access to NHS dentistry. The indicators present measures of patients attending a dentist in the preceding 24 months, this is the maximum period between oral health reviews as recommended by National Institute for Health and Care Excellence (NICE).[94] No data is available on access to dental services provided on a private basis and the contribution of private dentistry to the diagnosis of head and neck cancer is unknown. This makes it difficult to fully gauge the true level of public demand for dental services or to measure inequalities in access that may exist.

8.1: Variation in percentage of people aged 18 to 69 years who attended an NHS dentist in the last 24 months

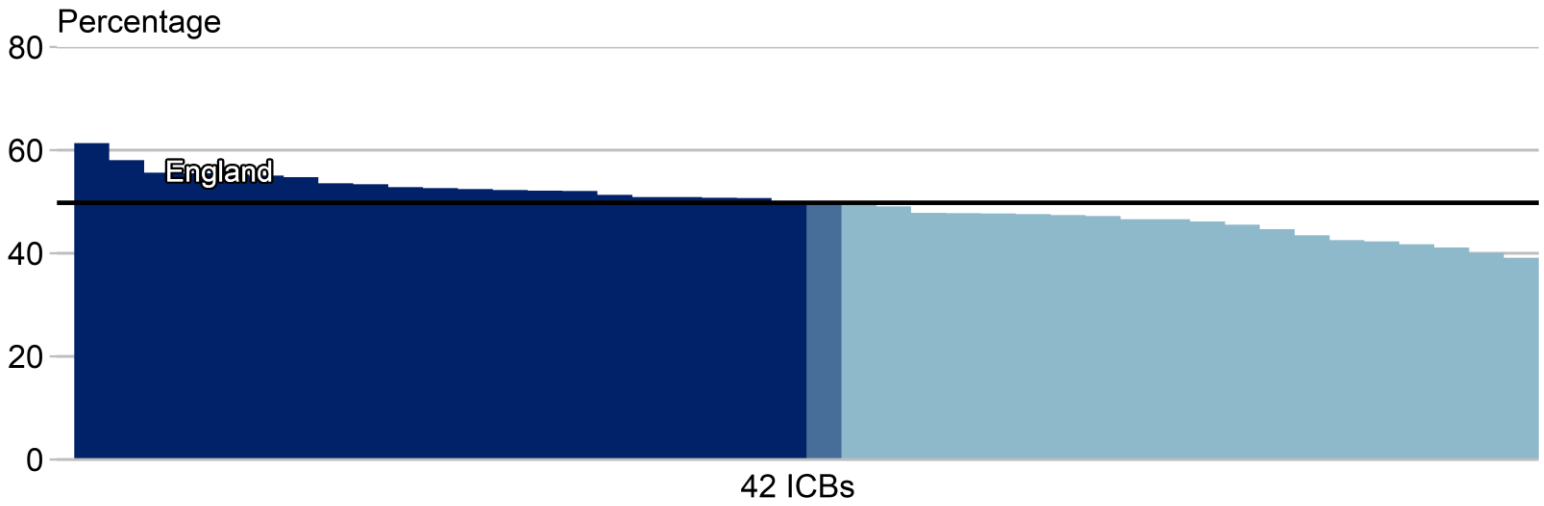
Map 8.1: Variation in percentage of people aged 18 to 69 years who attended an NHS dentist in the last 24 months by ICB (year ending December 2019)

Optimum value: high

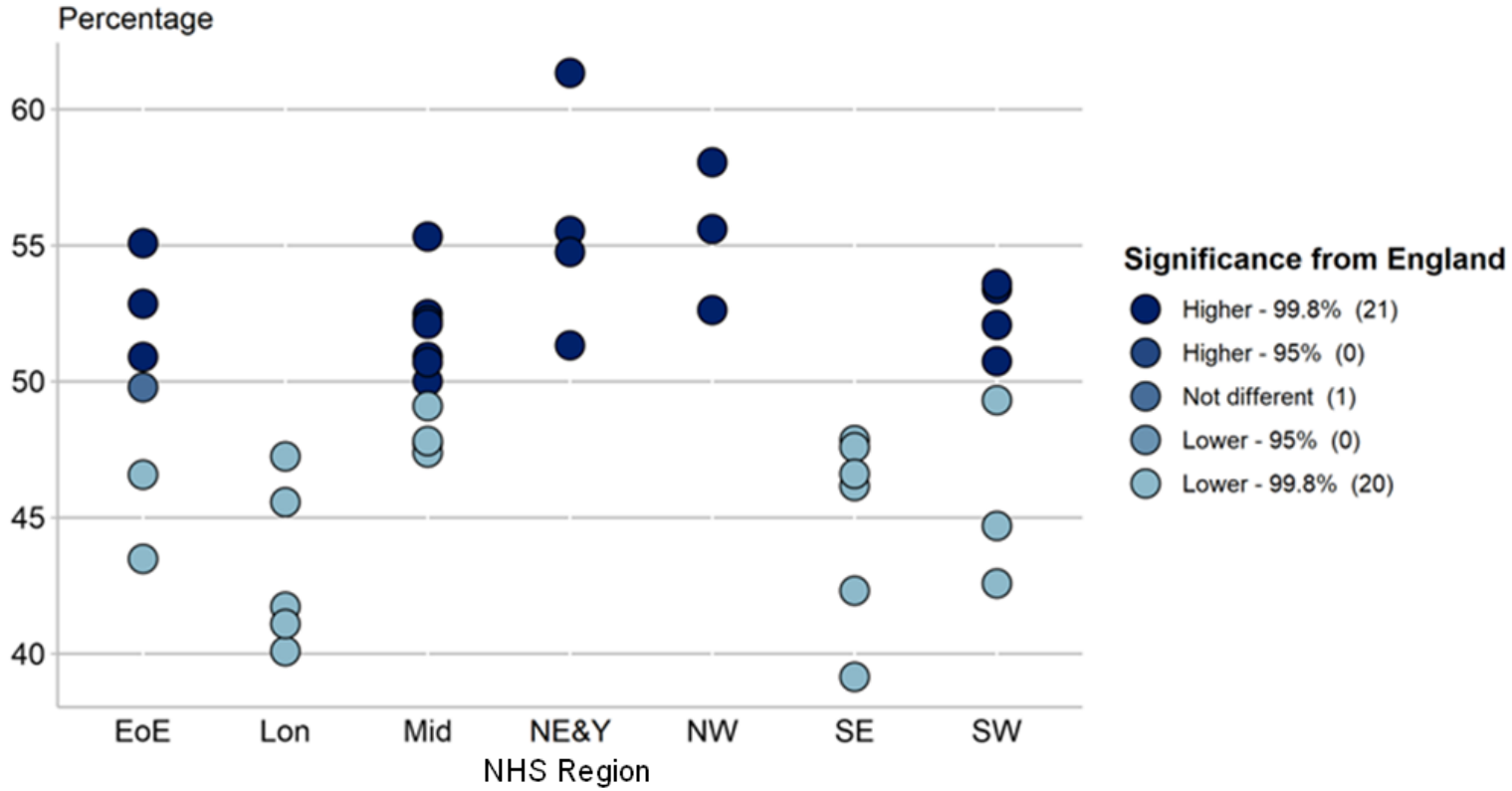




Bar chart 8.1: Variation in percentage of people aged 18 to 69 years who attended an NHS dentist in the last 24 months by ICB (year ending December 2019)



Regional dot plot 8.1: Variation in percentage of people aged 18 to 69 years who attended an NHS dentist in the last 24 months by ICB and region (year ending December 2019)



ICB values ranged from 39.1% to 61.3%, which is a 1.6-fold difference between ICBs. The England value was 49.8%.

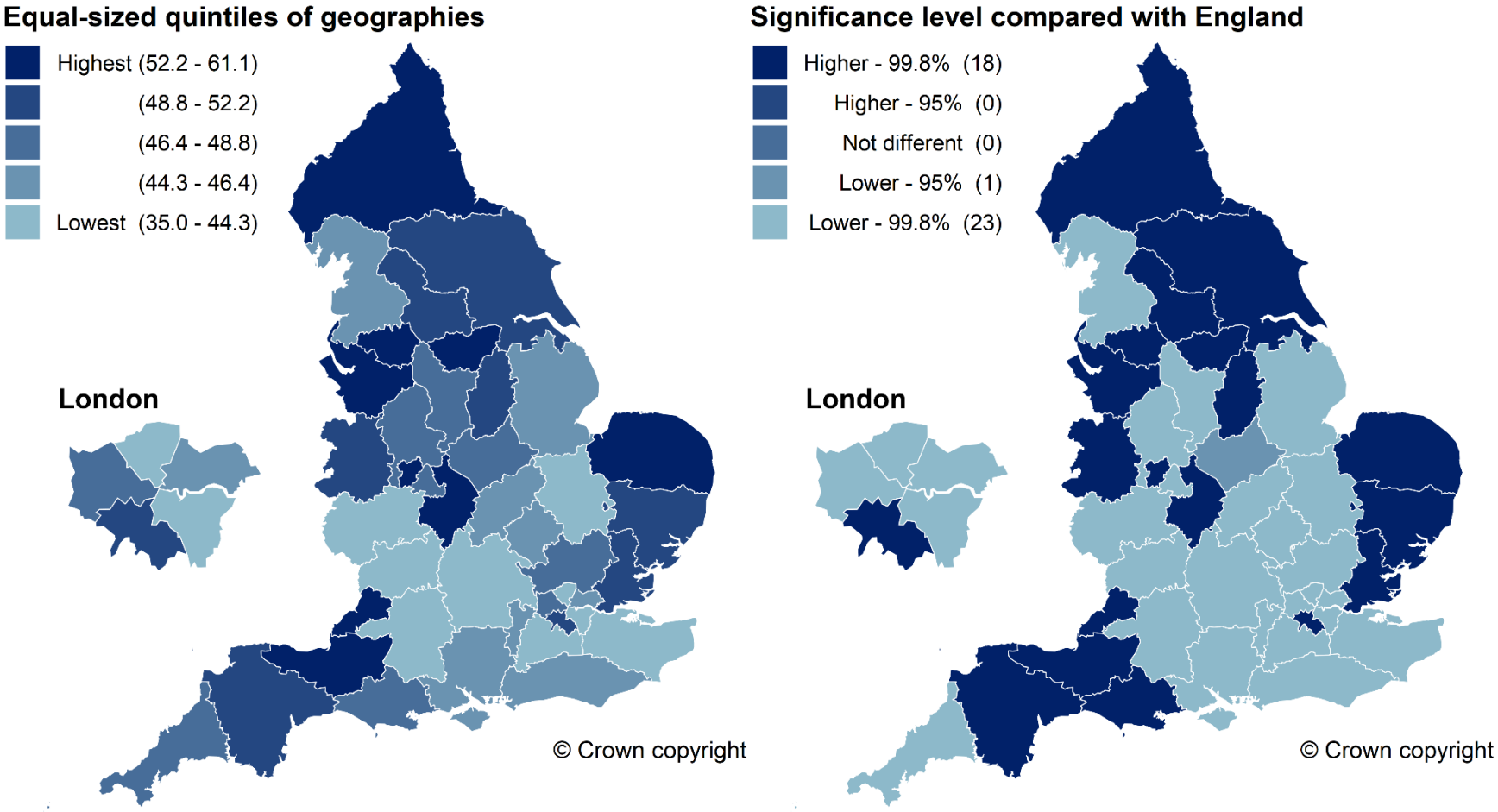
Of the 42 ICBs, 21 were statistically significantly higher than the England value (0 at the 95% confidence level and 21 at the 99.8% confidence level) and 20 were statistically significantly lower than the England value (0 at the 95% confidence level and 20 at the 99.8% confidence level).

The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

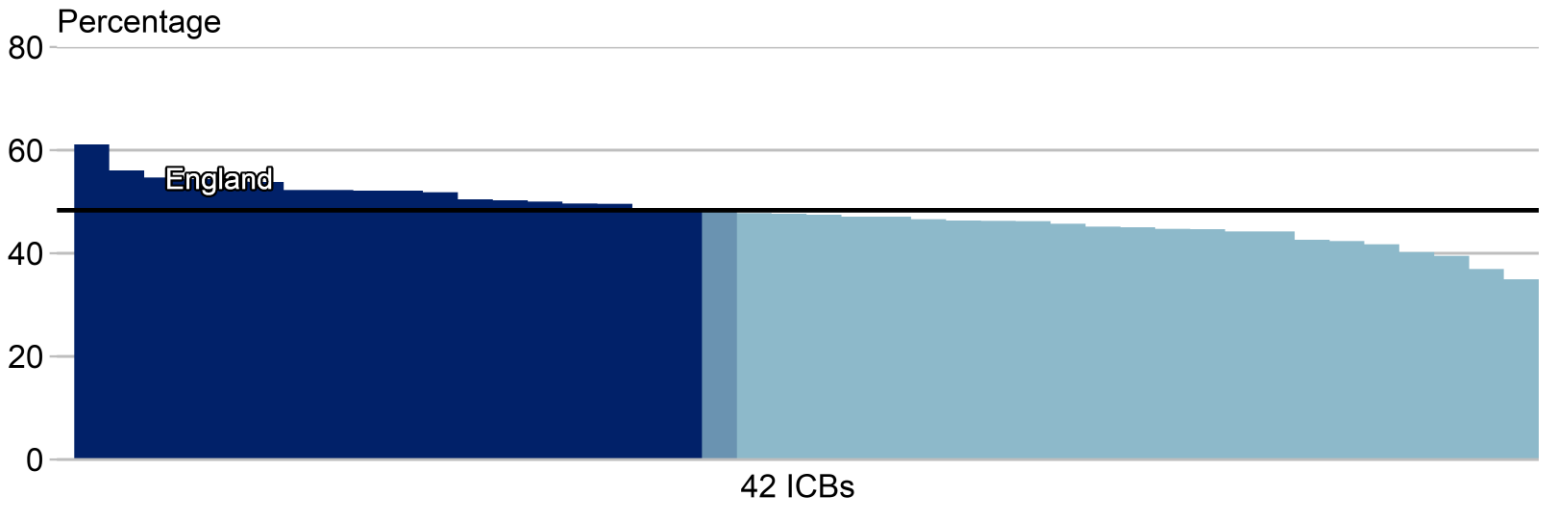
8.2: Variation in percentage of people aged 70 years and over who attended an NHS dentist in the last 24 months

Map 8.2: variation in percentage of people aged 70 years and over who attended an NHS dentist in the last 24 months by ICB (year ending December 2019)

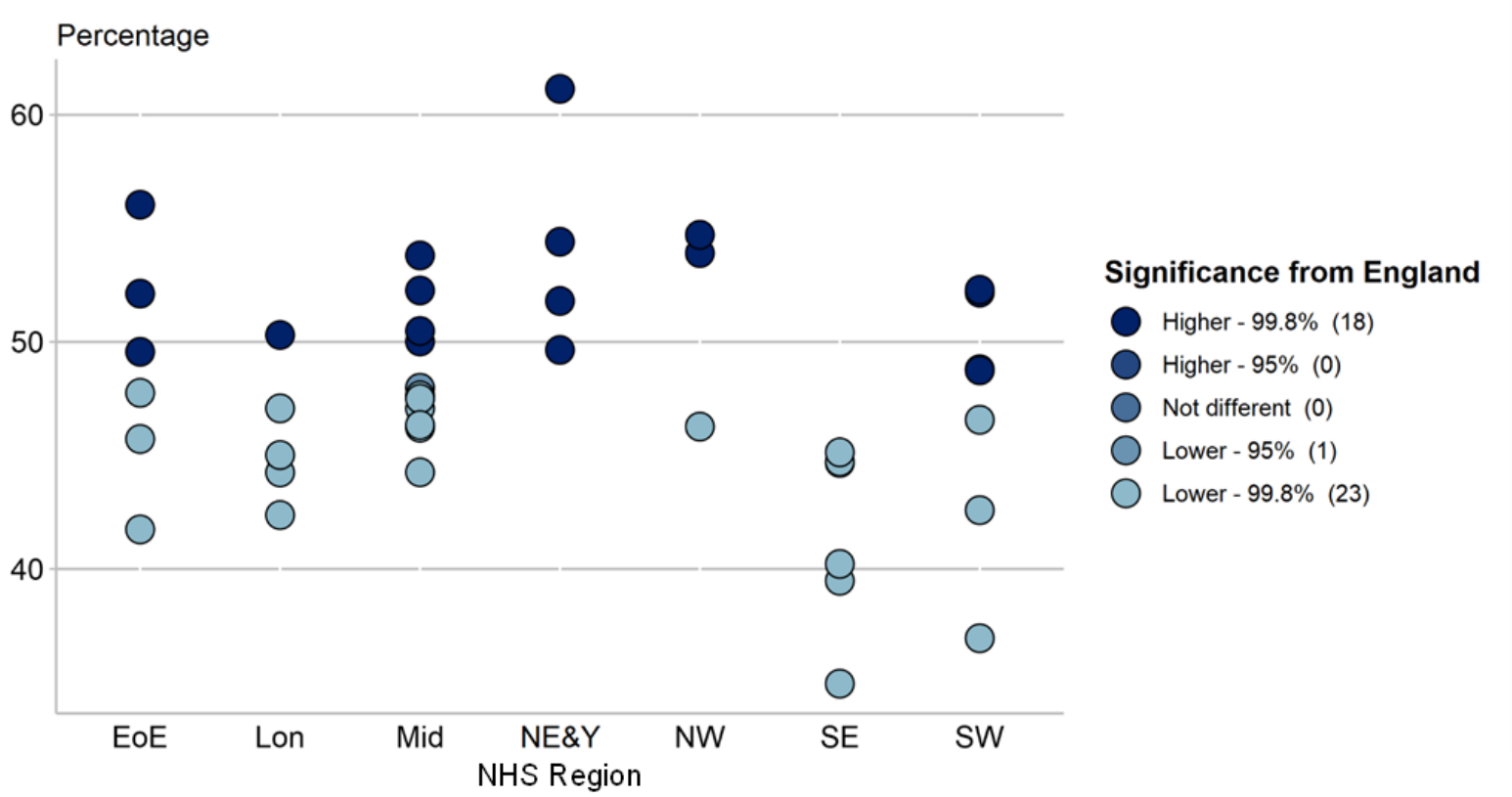
Optimum value: high



Bar chart 8.2: Variation in percentage of people aged 70 years and over who attended an NHS dentist in the last 24 months by ICB (year ending December 2019)



Regional dot plot 8.2: Variation in percentage of people aged 70 years and over who attended an NHS dentist in the last 24 months by ICB and region (year ending December 2019)



ICB values ranged from 35.0% to 61.1%, which is a 1.7-fold difference between ICBs. The England value was 48.3%.

Of the 42 ICBs, 18 were statistically significantly higher than the England value (0 at the 95% confidence level and 18 at the 99.8% confidence level) and 24 were statistically significantly lower than the England value (1 at the 95% confidence level and 23 at the 99.8% confidence level). The data showing the values for all ICBs is available in the head and neck cancer atlas data file.

Reasons for variation in dental access

There is regional variation in access to NHS dental services, Access to NHS dental services is lower in the 70 years and over age group compared with the younger age group.

No data are available on access to dentistry provided on a private basis. This affects the interpretation of variations in NHS dental access as a range of dental services are provided privately, outside of NHS contracts, and the proportion of services provided through the NHS varies considerably between areas. The amount of activity commissioned and delivered through NHS contracts does not indicate the overall availability or quality of dental services in an area.

Reasons for variation in access to NHS dental services include:

- individual and population factors such as:
    - the cost of dental services are unaffordable or perceived to be unaffordable
    - low priority of oral health among other health problems or daily difficulties especially for vulnerable population groups[23]
    - reduced health and oral health literacy affecting the ability to access or process information to improve oral health[23]
    - language and communication barriers for groups such as those from minority ethnic groups, refugees, migrants or those with hearing impairments[23]
    - lack knowledge of what services are available and how to make appointments[23]
    - dental fear and anxiety following previous dental treatment[23]
- health system factors such as:
    - lack of training for the dentistry workforce to meet the needs of more vulnerable groups[23]
    - reduced access to NHS primary dental practices:
        - the distribution of the NHS dental workforce is not aligned to the oral health needs of local populations[91]
        - increase in dentistry provided on a private basis[91]

- dental practices not taking on new NHS patients or having lengthy waiting lists to join their practice[23]

9. Options for action

To address healthcare inequalities in head and neck incidence, mortality and late stage diagnosis in England there is a need to tackle the risk factors and other influential factors described above. This section will describe options for action in terms of prevention and early detection of head and neck cancer.

In addition to the more general need to reduce social and economic inequalities, the prevention of head and neck cancer will require both 'upstream' and 'downstream' approaches to:

1. reduce use of tobacco, both smoked and smokeless [95]

2. reduce alcohol consumption

3. increase uptake of the HPV vaccine

4. improve early detection and diagnosis

It will require partnership working across different organisations including national and local government, and integrated care systems (ICSs) (which include NHS organisations, UTLAs, the voluntary sector, social care providers and other partners with a role in improving health and wellbeing)[96] adopting the principles of proportionate universalism articulated in the 2010 Marmot Review.[97]

Reduce use of tobacco

The government has committed to reducing tobacco use, particularly smoking. Smoking is the number one preventable cause of death, disability and ill health. It claims the lives of 80,000 people a year in the UK and causes one in four of all cancer deaths. The Tobacco and Vapes Bill will be the biggest public health intervention in a generation – tackling the harms of smoking and paving the way for a smoke-free UK.[95]

In 2022, the Office for Health Improvement and Disparities (OHID) launched a guide for health and care professionals to support tobacco reduction.[98] Local authorities have a role through licensing, use of trading standards teams, smoke-free spaces, commissioning of stop smoking services, communication campaigns and education initiatives. Health services and individual health or social care professionals in primary and secondary care have a role in reducing tobacco use. In future, ICSs have potential to co-ordinate system-level tobacco control that is appropriate to the needs of the local population through their role in prevention. Given the association between head and neck cancer and smokeless

tobacco described above, a focus is needed on other tobacco products and not just smoking.

Reduce alcohol consumption

Partnership working between national and local government, health services and voluntary groups is required to ensure consumption of alcohol is reduced.[99] The most recent UK alcohol strategy was published in March 2012.[100] and has not been updated. In Scotland and Wales minimum unit pricing policies have been introduced. Other possible national actions include: 1) regulation of alcohol promotion, licensing, advertising and sponsorship, 2) communication campaigns about alcohol-related harm and 3) use of a tax escalator. Local authorities have a role in restricting alcohol consumption, licensing and through education and communication campaigns. OHID has published a guide for health and care professionals to support reduction in alcohol consumption.[99]

HPV vaccination programme

National, regional and local organisations involved in HPV vaccine programmes should continue to work together to improve uptake through the universal programme for adolescents, and through the programme for gay and bisexual men who have sex with men (GBMSM). This will include work to strengthen coverage at the normal point of the universal vaccination offer, but also through catch-up opportunities for eligible individuals in primary care and in other settings.

Early detection and referral

Early detection could be facilitated by raising awareness of head and neck cancer among the public and health professionals and through developing high quality clear referral pathways.

The NHS Cancer Programme leads the delivery of the NHS Long Term Plan ambitions for cancer to increase the proportion of people diagnosed at an early stage and reduce variation and inequalities.

The variations across integrated care boards (ICBs) in the percentage of people diagnosed at a late stage and in mortality rates of head and neck cancer is unwarranted and requires particular consideration.

High quality referral pathways, appropriate to the needs of the local population, are essential. In 2023, the NHS Cancer Programme developed ‘Faster diagnostic pathways - implementing a timed head and neck cancer diagnostic pathway’ which provides guidance on a pathway from primary care to local and specialist diagnostic centres for cancer

alliances.[58] Once implemented, this pathway is intended to shorten diagnosis pathways and reduce variation. In addition, the Getting It Right First Time (GIRFT) programme has begun a national review into services for head and neck cancer patients, commissioned and funded by the NHS Cancer Programme to support local health and care systems to improve the quality of care for patients, including reducing the time to diagnosis and treatment. The effectiveness of the new pathway and actions from the national review at reducing unwarranted variation will need to be evaluated.

NHS dental access is important to ensure opportunistic screening and early detection opportunities are not missed. In future, dental contract reforms offer the opportunity to consider the role of dental teams in increasing awareness of and early detection of head and neck cancer. The Darzi report highlighted the need for the dental contract to balance activity and prevention, and to ensure that that there are enough dentists in less served areas performing NHS work.[101]

A recent tumour site review by the NHS Cancer Programme about head and neck cancer included a number of recommendations about the importance of raising awareness with the public.[102] The review suggested the need for campaigns targeted to those at high risk of head and neck cancer through working with cancer alliances to engage deprived communities. The review also recommended raising awareness and providing education to primary care professionals including general practitioners (GPs), dental professionals and community pharmacists due to their key role in early detection and referral.

Gateway-C is an education platform for primary care health professionals funded by NHS England. The platform includes a course on head and neck cancer.

Patients often present at pharmacies with the common symptoms of head and neck cancer. Community pharmacists could have a greater role in the early identification and referral of patients with suspected head and neck cancer symptoms.[103] [104]

Currently the toolkit developed by the British Dental Association (BDA) and Cancer Research UK (CRUK)[105] about early detection of cancer focuses mainly on oral cavity cancer with opportunities in future to broaden the content to include head and neck cancer more generally.

The most recent version of Delivering better oral health: an evidence-based toolkit for prevention to support dental teams, includes a revised chapter on oral cancer. Dental professionals should ensure they are familiar with the risk factors, early detection and management and prevention post-treatment for head and neck cancer. In 'Delivering better oral health' the importance of assigning an appropriate recall interval according to each patient’s risk of disease is recommended. ICBs would benefit from reviewing and promoting 'Delivering better oral health' with dental teams.

10. Resources

A number of resources are available aimed at reducing risk factors and raising awareness of head and neck cancer with health professionals and patients.

Reduce the use of tobacco

Smoking and tobacco e-learning session, the Office for Health Improvement and Disparities (OHID) and Health Education England developed this e-learning resource for health and care professionals about reducing smoking and tobacco use:

Public Health England (2018) Stop smoking options: guidance for conversations with patients [Accessed 14 June 2024]

Office for Health Improvement and Disparities (2022) 'Smoking and tobacco: applying All Our Health' [Accessed 05 Dec 2023]

Reduce alcohol consumption

Alcohol e-learning session - the OHID and Health Education England developed this content for health and care professionals to access free alcohol identification and brief advice e-learning to become confident in identifying those at risk from alcohol and delivering brief advice with a validated alcohol use screening test:

NHS England in partnership with Public Health England E-learning for healthcare: Alcohol Identification and Brief Advice [Accessed 14 June 2024]

Office for Health Improvement and Disparities 'Alcohol: applying All Our Health' [Accessed 05 Dec 2023]

Human Papillomavirus Vaccination

UK Health Security Agency (2013, updated 2020) Immunisation against infectious disease - Human papillomavirus (HPV): the green book, chapter 18a [Accessed 09 Jul 2024]

UK Health Security Agency (updated 20 Jun 2023) HPV vaccination guidance for healthcare practitioners [Accessed 14 Oct 2024]

UK Health Security Agency (2024) HPV vaccine uptake [Accessed 14 Oct 2024]

UK Health Security Agency (updated 26 Sep 2023) HPV universal vaccination leaflet [Accessed 14 Oct 2024]

Early detection and diagnosis

There are a number of courses and guidance resources aimed at raising awareness and educating health professionals about head and neck cancer:

Gateway C The early cancer diagnosis resource: Head and Neck Cancer [Accessed 14 June 2024]

Cancer Research UK and the British Dental Association Oral Cancer Toolkit - Improve your ability to improve and detect oral cancer [Accessed 14 June 2024]

Delivering Better Oral Health

This guidance includes evidence-based guidance for dental teams relating specifically to head and neck cancer and its risk factors:

Office for Health Improvement and Disparities, Department of Health and Social Care, NHS England and NHS Improvement (2014, updated 2021) Delivering better oral health: an evidence-based toolkit for prevention [Accessed 17 June 2024]

Specific topics include:

Chapter 6: Oral cancer [Accessed 17 June 2024]

Chapter 11: Smoking and tobacco use [Accessed 17 June 2024]

Chapter 12: Alcohol [Accessed 17 June 2024]

Charities supporting people with head and neck cancer

The Swallows Head and Neck Cancer Support Group Resources [Accessed 17 June 2024]

The Mouth Cancer Foundation [Accessed 17 June 2024]

Cancer Research UK Mouth and oropharyngeal cancer [Accessed 17 June 2024]

Salivary Gland Cancer UK Salivary Gland Cancer Resources [Accessed 15 August 2024]

Young Tongues [Accessed 15 August 2024]

Head and Neck Cancer Coalition [Accessed 15 August 2024]

Guidelines

Head and Neck Cancer: United Kingdom National Multidisciplinary Guidelines, Sixth Edition [Accessed 15 Oct 2024]

11. Research gaps

During the steering group meetings to develop this atlas, the following research gaps were identified:

- Effective interventions to stop tobacco use (smoking and smokeless) and reduce alcohol consumption at a population and community level as well as via primary care networks
- Appropriate approaches to improve the coverage and reduce the variation in uptake of the human papillomavirus (HPV) vaccination
- Developing understanding of the effect of reducing risk factors on head and neck cancer risk
- Assessment of the societal costs of head and neck cancer
- Ways to reduce inequalities in the incidence, stage of diagnosis and mortality in vulnerable groups
- Effective inclusive approaches to raising awareness of head and neck cancer. These approaches should be developed to be appropriate to groups in the community who are most risk of head and neck cancer and its burden
- Evidence to inform a review of the need for a screening programme for head and neck cancer including targeting screening based on risk factors, the effectiveness of screening tests and the healthcare/dental professionals to undertake screening
- Testing risk predictor tools for determining the recall interval for oral health assessments and prompting prevention interventions in dental practice
- Development and evaluation of biomarkers for early detection of head and neck cancer

These are in addition to the data gaps mentioned in the introduction.

References

[1] World Health Organization (2019) 'International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD10) Version 2019, Chapter II: Malignant neoplasms (C00-C97)' [Accessed 06 Nov 2023]

[2] National Disease Registration Service (NDRS) 'Get Data Out: Head and neck' [Accessed 12 Oct 2023]

[3] NHS England (23 May 2024) 'Cancer Registration Statistics, England, 2021 - Full release' [Accessed 08 Oct 2024]

[4] Bronner KK, Goodman DC (2022) 'The Dartmouth Atlas of Health Care – bringing health care analyses to health systems, policymakers, and the public' Research in Health Services and Regions, 2022, volume 1, article 13 [Accessed 18 Jul 2024]

[5] Wennberg J (2010) 'Tracking Medicine: A Researcher's Quest to Understand Health Care' Oxford University Press [Accessed 18 Jul 2024]

[6] Cancer Research UK 'Head and neck cancers incidence statistics' [Accessed 25 Sep 2023]

[7] Cancer Research UK 'Head and neck cancers mortality statistics' [Accessed 25 Sep 2023]

[8] Creaney G, McMahon AD, Ross AJ and others (2022) 'Head and neck cancer in the UK: what was the stage before COVID-19? UK cancer registries analysis (2011-2018)' British Dental Journal, 11 Nov 2022, volume 233, issue 9, pages 787 to 793 [Accessed 18 Jun 2024]

[9] Gormley M, Creaney G, Schache A and others (2022) 'Reviewing the epidemiology of head and neck cancer: definitions, trends and risk factors' British Dental Journal, 11 Nov 2022 volume 233, edition 9, pages 780 to 786 [Accessed 18 June 2024]

[10] Conway DI, Purkayastha M and Chestnutt IG (2018) 'The changing epidemiology of oral cancer: Definitions, trends, and risk factors' British Dental Journal, 09 Nov 2018, volume 225, edition 9, page 867 [Accessed 18 Jun 2024]

[11] Di Credico G, Polesel J, Dal Maso L and others (2020) 'Alcohol drinking and head and neck cancer risk: the joint effect of intensity and duration' British Journal of Cancer, 27 Oct 2020, volume 123, edition 9, pages 1456 to 1463 [Accessed 12 Jul 2024]

[12] Bosetti C, Carioli G, Santucci C and others (2020) 'Global trends in oral and pharyngeal cancer incidence and mortality' International Journal of Cancer, 15 Aug 2020, volume 147, edition 4, pages 1040 to 1049 [Accessed 18 Jun 2024]

[13] Conway DI, Brenner DR, McMahon AD and others (2015) 'Estimating and explaining the effect of education and income on head and neck cancer risk: INHANCE consortium pooled analysis of 31 case-control studies from 27 countries' International Journal of Cancer, 01 Mar 2015, volume 136, edition 5 pages 1125 to 1139 [Accessed 18 Jun 2024]

[14] Macmillan Cancer Support (Reviewed 2022) Late effects of head and neck cancer treatment [Accessed 18 Jun 2024]

[15] Fang CY and Heckman CJ (2016) 'Informational and support needs of patients with head and neck cancer: current status and emerging issues' Cancers Head Neck, 01 Dec 2016, volume 1, edition 1 [Accessed 18 Jun 2024]

[16] Logemann JA (1999) 'Rehabilitation of head and neck cancer patients'. In: von Gunten, CF (eds) Palliative Care and Rehabilitation of Cancer Patients, Cancer Treatment and Research, volume 100, Springer, Boston, MA [Accessed 15 Nov 2023]

[17] Hackett S, Jones O, Chatzistavrianou D and others 'Dental Update - Head and neck cancer part 3: dental management' [Accessed 15 Nov 2023]

[18] Shaw R, Schache AG, Ho MWS and others (2021) 'UK Head and neck cancer surgical capacity during the second wave of the COVID-19 pandemic: Have we learned the lessons? COVIDSurg collaborative' Clinical Otolaryngology 01 Jul 2021, volume 46, edition 4, pages 729 to 735 [Accessed 18 Jun 2024]

[19] Clements K, Cowell A, White G (2023) 'The COVID-19 pandemic has not changed stage at presentation nor treatment patterns of head and neck cancer: A retrospective cohort study' Clinical Otolaryngology, 01 Jul 2023 volume 48, edition 4, pages 587 to 594 [Accessed 18 Jun 2024]

[20] Delon C, Brown KF, Payne NWS and others (2022) 'Differences in cancer incidence by broad ethnic group in England, 2013–2017' British Journal of Cancer, 01 Jun 2022, volume 126, edition 12, pages 1765 to 1773 [Accessed 19 Jun 2024]

[21] Louie KS, Mehanna H and Sasieni P (2015) 'Trends in head and neck cancers in England from 1995 to 2011 and projections up to 2025' Oral Oncology, 2015, volume 51, edition 4, pages 341 to 348 [Accessed 18 Jun 2024]

[22] Public Health England (2020) 'Oral cancer in England: a report on incidence, survival and mortality rates of oral cancer in England, 2012 to 2016' [Accessed 26 Jun 2024]

[23] Public Health England (2021) 'Inequalities in oral health in England' [Accessed 10 Jul 2024]

[24] Abel GA, Shelton J, Johnson S and others (2015) 'Cancer-specific variation in emergency presentation by sex, age and deprivation across 27 common and rarer cancers' British Journal of Cancer, volume 112, supplement 1, pages 129 to136 [Accessed 08 Oct 2024]

[25] Taib BG, Oakley J, Dailey Y and others (2018) 'Socioeconomic deprivation and the burden of head and neck cancer—Regional variations of incidence and mortality in Merseyside and Cheshire, North West, England' Clinical Otolaryngology, 01 Jun 2018, volume 43, edition 3, pages 846 to 853 [Accessed 07 Oct 2024]

[26] Forbes LJL, Warburton F, Richards MA and others (2014) 'Risk factors for delay in symptomatic presentation: a survey of cancer patients' British Journal of Cancer, volume 111, edition 3, pages 581 to 588 [Accessed 07 Oct 2024]

[27] Conway DI, Hovanec J, Ahrens W and others (2021) 'Occupational socioeconomic risk associations for head and neck cancer in Europe and South America: Individual participant data analysis of pooled case–control studies within the INHANCE Consortium' Journal Epidemiol Community Health 01 Aug 2021, volume 75, edition 8, pages 779 to 787 [Accessed 09 Jul 2024]

[28] Katikireddi SV, Whitley E, Lewsey J and others (2017) 'Socioeconomic status as an effect modifier of alcohol consumption and harm: analysis of linked cohort data' Lancet Public Health, 01 Jun 2017, volume 2, edition 6, pages 267 to 276 [Accessed 11 Oct 2023]

[29] Tosetti I, Kuper H (2023) 'Do people with disabilities experience disparities in cancer care? A systematic review' PLoS ONE, volume 18, issue 12, page e0285146 [Accessed 14 Oct 2024]

[30] Hashibe M, Brennan P, Chuang SC and others (2009) 'Interaction between tobacco and alcohol use and the risk of head and neck cancer: Pooled analysis in the international head and neck cancer Epidemiology consortium' Cancer Epidemiology Biomarkers and Prevention, Feb 2009, volume 18, edition 2, pages 541 to 550 [Accessed 03 Jul 2024]

[31] Thomas SJ, Penfold CM, Waylen A and others (2018) 'The changing aetiology of head and neck squamous cell cancer: A tale of three cancers?' Clinical Otolaryngology, Blackwell Publishing Ltd. 2018, volume 43, pages 999 to 1003 [Accessed 01 Jul 2024]

[32] International Agency for Research on Cancer (2010) 'Alcohol Consumption and Ethyl Carbamate' IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, volume 96, World Health Organization, IARC Press, 2010 [Accessed 12 Jul 2024]

[33] Wyss A, Hashibe M, Chuang SC and others (2013) 'Cigarette, cigar, and pipe smoking and the risk of head and neck cancers: Pooled analysis in the international head and neck cancer epidemiology consortium' American Journal of Epidemiology, 2013, volume 178, pages 679 to 690 [Accessed 12 Jul 2024]

[34] International Agency for Research on Cancer (2004) 'Tobacco smoke and involuntary smoking' IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, volume 83, World Health Organization, IARC Press, 2004 [Accessed 12 Jul 2024]

[35] HM Government (2016) 'The Tobacco and Related Products Regulations 2016' [Accessed 03 Jul 2024]

[36] HM Revenue & Customs (2012 updated 07 Aug 2023) 'Classifying tobacco for import and export' [Accessed 08 Oct 2024]

[37] HM Revenue & Customs (updated 02 May 2024) 'Excise Notice 476 - Tobacco Products Duty' [Accessed 08 Oct 2024]

[38] Wyss AB, Hashibe M, Lee YCA and others (2016) 'Smokeless tobacco use and the risk of head and neck cancer: Pooled analysis of US studies in the inhance consortium' American Journal of Epidemiology. Oxford University Press, 2016, volume 184, pages 703 to 716 [Accessed 03 Jul 2024]

[39] Asthana S, Labani S, Kailash U and others (2019) 'Association of Smokeless Tobacco Use and Oral Cancer: A Systematic Global Review and Meta-Analysis' Nicotine and Tobacco Research, Oxford University Press, 2019, volume 21,pages 1162 to 1171 [Accessed 03 Jul 2024]

[40] Office for Health Improvement and Disparities, Department of Health and Social Care, NHS England and NHS Improvement (2014, updated 2021) 'Delivering better oral health: an evidence-based toolkit for prevention: Chapter 11 Smoking and tobacco use' [Accessed 13 Jul 2024]

[41] NHS Digital (yearly) Health Survey for England [Accessed 03 Oct 2023]

[42] Action on smoking and health (2020) 'Evidence into practice: Smokeless tobacco products' [Accessed 03 Jul 2024]

[43] Public Health England and the Association of Directors of Public Health (2017) Waterpipe smoking (shisha) in England The public health challenge 2017 [Accessed 19 Aug 2024]

[44] Mamtani R, Cheema S, Sheikh J and others (2017) 'Cancer risk in waterpipe smokers: a meta-analysis' International Journal of Public Health, 2017, volume 62, edition 1, pages 73 to 83 [Accessed 19 Aug 2024]

[45] Grant A, Morrison M, Dockrell M. (2014) Prevalence of waterpipe (Shisha, Narghille, Hookah) use among adults in Great Britain and factors associated with waterpipe use: data from cross-sectional Online Surveys in 2012 and 2013. Nicotine and Tobacco Research, 18 Feb 2014, volume 16, edition 7, pages 931 to 938 [Accessed 09 Oct 2024]

[46] Schache AG, Powell NG, Cuschieri KS and others (2016) 'HPV-related oropharynx cancer in the United Kingdom: An evolution in the understanding of disease etiology' Cancer Research, 15 Nov 2016, volume 76, edition 22, pages 6598 to 6606 [Accessed 01 Oct 2024

[47] UK Health Security Agency (2013, updated 2020) Immunisation against infectious disease - Human papillomavirus (HPV): the green book, chapter 18a [Accessed 03 Oct 2024]

[48] Gormley M, Dudding T, Kachuri L and others (2022) ‘Investigating the effect of sexual behaviour on oropharyngeal cancer risk: a methodological assessment of Mendelian randomization’ BMC Medicine, 01 Dec 2022, volume 20, edition 40 [Accessed 05 Jul 2024]

[49] UK Health Security Agency (20 June 2023) 'Press release: HPV vaccination programme moves to single dose from September 2023' [Accessed 11 Oct 2024]

[50] Department of health and Social Care (05 August 2022) 'Independent report: JCVI statement on a one-dose schedule for the routine HPV immunisation programme'

[51] NHS England (23 January 2024) 'Thousands more young people urged to take up HPV vaccine to meet NHS cervical cancer elimination goal' [Accessed 11 Oct 2024]

[52] Keeping ST, Tempest MJ, Stephens SJ and others (2018) 'The cost of oropharyngeal cancer in England: A retrospective hospital data analysis' Clinical Otolaryngology 01 Feb 2018, volume 43, edition 1, pages 223 to 229 [Accessed 10 July 2024]

[53] Wissinger E, Griebsch I, Lungershausen J and others (2014) ‘The Economic Burden of Head and Neck Cancer: A Systematic Literature Review’ Volume 32, PharmacoEconomics, Springer International Publishing, 2014, Pages 865 to 882 [Accessed 12 July 2024]

[54] Mariotto AB, Robin Yabroff K and others (2011) 'Projections of the cost of cancer care in the United States: 2010-2020' Journal of the National Cancer Institute, 19 Jun 2011, volume 103, edition 2, pages 117 to 128 [Accessed 12 July 2024]

[55] Bradley CJ, Yabroff KR, Dahman B and others (2008) 'Productivity costs of cancer mortality in the United States: 2000-2020' Journal of the National Cancer Institute, 17 Dec 2008, volume 100, edition 24, pages 1763 to 1770 [Accessed 12 July 2024]

[56] Serrier H, Sultan-Taieb H, Luce D and others (2014) 'Estimating the social cost of respiratory cancer cases attributable to occupational exposures in France' European Journal of Health Economics, 2014, volume, 15, edition 6, pages 661 to 673 [Accessed 12 July 2024]

[57] Elliss-Brookes L, McPhail S, Ives, A and others (2012) 'Routes to diagnosis for cancer – determining the patient journey using multiple routine data sets' British Journal of Cancer, volume 107, pages 1220 to 1226 (2012) [Accessed 16 Jul 2024]

[58] NHS England (2023) 'Faster diagnostic pathways: Implementing a timed head and neck cancer pathway - Guidance for local health and care systems' [Accessed 12 Jul 2024]

[59] Howren MB, Christensen AJ, Karnell LH and others (2012) 'Psychological Factors Associated with Head and Neck Cancer Treatment and Survivorship: Evidence and Opportunities for Behavioral Medicine' Journal Consult Clinical Psychology, April 2013, Volume 81, edition 2, pages 299 to 317 [Accessed 09 Oct 2024]

[60] Deane J, Norris R, O'Hara J and others (2022) 'Who Presents Where? A Population-Based Analysis of Socio-Demographic Inequalities in Head and Neck Cancer Patients' Referral Routes' International Journal of Environmental Research and Public Health, 01 Dec 2022, volume 19, edition 24 [Accessed 12 Jul 2024]

[61] Owens D, Paleri V and Jones A V 'Head and neck cancer explained: an overview of management pathways' British Dental Journal, 11 Nov 2022, volume 233, edition 9, pages 721 to 725 [Accessed 12 July 2024]

[62] National Institute for Health and Care Excellence (2015, updated 2023) 'Nice Guideline [NG12] Suspected cancer: recognition and referral' [Accessed 12 Jul 2024]

[63] Macpherson LMD (2018) 'Raising awareness of oral cancer from a public and health professional perspective'' British Dental Journal, volume 225, pages 809 to 814 [Accessed 23 Aug 2024]

[64] Lydiatt WM, Patel SG, O'Sullivan B and others (2017) 'Head and neck cancers - major changes in the American Joint Committee on cancer eighth edition cancer staging manual' CA: A cancer journal for clinicians. 2017, volume 67, edition 2, pages 122 to 137 [Accessed 16 Aug 2024]

[65] National Disease Registration Service (NDRS) 'Routes to diagnosis: Methodology' [Accessed 15 Jul 2024]

[66] NHS Digital 'Cancer Registration Statistics, England 2020' [Accessed 08 Oct 2024]

[67] Beynon RA, Lang S, Schimansky S and others (2018) 'Tobacco smoking and alcohol drinking at diagnosis of head and neck cancer and all-cause mortality: Results from head and neck 5000, a prospective observational cohort of people with head and neck cancer' International Journal of Cancer, 01 Sep 2018, volume 143, edition 5, pages 1114 to 1127 [Accessed 23 Aug 2008]

[68] Ingarfield K, McMahon AD, Hurley K and others (2021) ‘Inequality in survival of people with head and neck cancer: Head and Neck 5000 cohort study’ Head Neck, 01 Apr 2021, volume 43, edition 4, pages 1252 to 1270 [Accessed 12 Oct 2023]

[69] Caini S, Del Riccio M, Vettori V and others (2022) ‘Post-diagnosis smoking cessation and survival of patients with head and neck cancer: a systematic review and meta-analysis’ British Journal of Cancer, 23 Nov 2022, volume 127, edition 11, pages 1907 to 1915 [Accessed 21 Feb 2024]

[70] Public Health England (Updated December 2019) 'Health matters: stopping smoking – what works?' [Accessed 10 Oct 2024]

[71] Office for Health Improvement and Disparities Smoking Profile [Accessed 07 Oct 2024]

[72] Office for National Statistics (2023) ‘Adult smoking habits in the UK: 2022’ [Accessed 11 Oct 2023]

[73] Office for Health Improvement & Disparities (2021) 'Delivering better oral health: an evidence-based toolkit for prevention. Guidance Chapter 12: Alcohol' [Accessed 16 Jul 2024]

[74] Office for Health Improvement and Disparities 'Alcohol Profile' [Accessed 10 Oct 2024]

[75] UK Parliament: House of Commons Library (17 Jul 2024) ‘Research Briefing - Statistics on Alcohol: England’ [Accessed 10 Oct 2024]

[76] Office for Health Improvement and Disparities 'Alcohol Profile - Hospital admissions due to alcohol: Broad definition and narrow definition' [Accessed 15 Jul 2024]

[77] Falcaro M, Castañon A, Ndlela B and others (2021) ‘The effects of the national HPV vaccination programme in England, UK, on cervical cancer and grade 3 cervical intraepithelial neoplasia incidence: a register-based observational study’ The Lancet, 04 Dec 2021, volume 398, issue 10316, pages 2084 to 2092 [Accessed 15 Jul 2024]

[78] UK Health Security Agency (Jun 2019 updated 20 Jun 2023) Guidance: HPV vaccination guidance for healthcare practitioners [Accessed 14 Oct 2024]

[79] Public Health England (2020 updated 2021) 'Human papillomavirus (HPV) vaccination coverage in adolescent females and males in England: academic year 2019 to 2020' [Accessed 15 Jul 2024]

[80] UK Health Security Agency (2018, updated 2023) 'HPV vaccination programme for men who have sex with men (MSM)' [Accessed 21 Feb 2024]

[81] UK Health Security Agency (29 Jun 2023) 'HPV vaccination programme: changes from September 2023 letter' [Accessed 12 Oct 2023]

[82] UK Health Security Agency (23 Jan 2024) 'Human papillomavirus (HPV) vaccination coverage in adolescents in England: 2022 to 2023' [Accessed 14 Oct 2023]

[83] Macilwraith P, Malsem E, Dushyanthen S (2023) 'The effectiveness of HPV vaccination on the incidence of oropharyngeal cancers in men: a review' Infectious Agents and Cancer, volume 18, article 24 [Accessed 15 Jul 2024]

[84] Karafillakis E, Simas C, Jarrett C and others (2019) 'HPV vaccination in a context of public mistrust and uncertainty: a systematic literature review of determinants of HPV vaccine hesitancy in Europe' Human vaccines and immunotherapeutics, 03 Aug 2019, volume 15, issue 7 to 8, pages 1615 to 1627

[85] Lechner M, Liu J, Masterson L (2022) 'HPV-associated oropharyngeal cancer: epidemiology, molecular biology and clinical management' Vol. 19, Nature Reviews Clinical Oncology, 01 Feb 2022, volume 19 pages 306 to 327

[86] Batista Ferrer H, Trotter CL, Hickman M and others (2016) Barriers and facilitators to uptake of the school-based HPV vaccination programme in an ethnically diverse group of young women. J Public Health, volume 38, pages 569 to 577 [Accessed 14 Oct 2024]

[87] Bedford H, Firman N, Waller J and others (2021) Which young women are not being vaccinated against HPV? Cross-sectional analysis of a UK national cohort study. Vaccine 2021, volume 39, issue 40, pages 5934 to 5939 [Accessed 14 Oct 2024]

[88] Office for Health Improvement and Disparities, Department of Health and Social Care, NHS England and NHS Improvement (2014, updated 2021) 'Delivering better oral health: an evidence-based toolkit for prevention: Guidance Chapter 6 Oral cancer' [Accessed 15 Jul 2024]

[89] NHS Business Services Authority (22 August 2024) Dental statistics – England 2023/24 Dental National Overview 2023-2024 Spreadsheet [Accessed 15 Oct 2024]

[90] Evans D, Burns L, Mills I and others (2023) 'Recruitment and retention in dentistry in the UK: a scoping review to explore the challenges across the UK, with a particular interest in rural and coastal areas' British Dental Journal, 09 Jan 2023 [Accessed 15 Jul 2024]

[91] UK Parliament: House of Commons Library (29 May 2024) 'Research Briefing - NHS dentistry in England' [Accessed 10 Oct 2024]

[92] Local Government Association (2022) 'NHS "dental deserts" persist in rural and deprived communities' [Accessed 10 Oct 2024]

[93] Office for Health Improvement and Disparities (2024) 'Adult oral health survey 2021' [Accessed 10 Oct 2024]

[94]National Institute for Health and Care Excellence (2004) 'Clinical Guideline [CG19] Recommendations: Dental checks: intervals between oral health reviews' [Accessed 10 Oct 2024]

[95] Prime Ministers Office, 10 Downing Street and His Majesty King Charles III (17 July 2024) The King's Speech 2024 [Accessed 15 Oct 2024]

[96] NHS England 'What are integrated care systems?' [Accessed 11 Oct 2024]

[97] Marmot, M (2010) 'Fair society, healthy lives: the Marmot Review: strategic review of health inequalities in England post-2010' [Accessed 15 Jul 2024]

[98] Office for Health Improvement and Disparities (2022) 'Smoking and tobacco: applying All Our Health' [Accessed 05 Dec 2023]

[99] Office for Health Improvement and Disparities 'Alcohol: applying All Our Health' [Accessed 05 Dec 2023]

[100] Home Office (2012) 'Policy paper: Alcohol strategy' [Accessed 21 Feb 2024]

[101] Darzi A, (2024) 'Independent investigation of the NHS in England' [Accessed 10 Oct 2024]

[102] NHS Cancer Programme (2023). Head and Neck Tumour Site Review [Unpublished]

[103] NIHR applied Research Collaboration North East and North Cumbria 'Could community pharmacists spot and refer patients with suspected head and neck cancer?' [Accessed 10 Oct 2024]

[104] Sturrock A, Bissett SM, Carrozzo M and others (2023) 'Qualitative interview study exploring the early identification and referral of patients with suspected head and neck cancer by community pharmacists in England' British Medical Journal Open, 2023, volume 13 [Accessed 10 Oct 2024]

[105] Cancer Research UK and the British Dental Association Oral Cancer Toolkit - Improve your ability to improve and detect oral cancer [Accessed 14 June 2024]

Abbreviations

ASH	Action on Smoking and Health
BDA	British Dental Association
CRUK	Cancer Research UK
DHSC	Department of Health and Social Care
DSR	Directly standardised rate
EoE	East of England region
GBMSM	Gay, bisexual and other men who have sex with men
GIRFT	Getting It right first time
GP	General Practitioner
GPs	General Practitioners
HIV	Human immunodeficiency viruses
HPV	Human Papillomavirus
IARC	International Agency for Research on Cancer
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
ICB	Integrated care board
ICBs	Integrated care boards
ICS	Integrated care system
ICSs	Integrated care systems
INHANCE	International Head and Neck Cancer Epidemiology Consortium
IMD	Index of multiple deprivation
Lon	London region

MDT	Multidisciplinary teams
Mid	Midlands region
NDRS	National Disease Registration Service
NE&Y	North East and Yorkshire region
NHS	National Health Service
NW	North West region
NICE	National Institute for Health and Care Excellence
OHID	Office for Health Improvement and Disparities
ONS	Office for National Statistics
PHE	Public Health England
SEND	Special educational needs and disabilities
SRR	Summary relative risk
Sub-ICB	Sub-integrated care board
SE	South East region
SW	South West region
TNM	International cancer control 'tumour, node, metastasis' staging system
TRPR	Tobacco and Related Products Regulations
UKHSA	United Kingdom Health Security Agency
UTLA	Upper-tier local authority
WHO	World Health Organization

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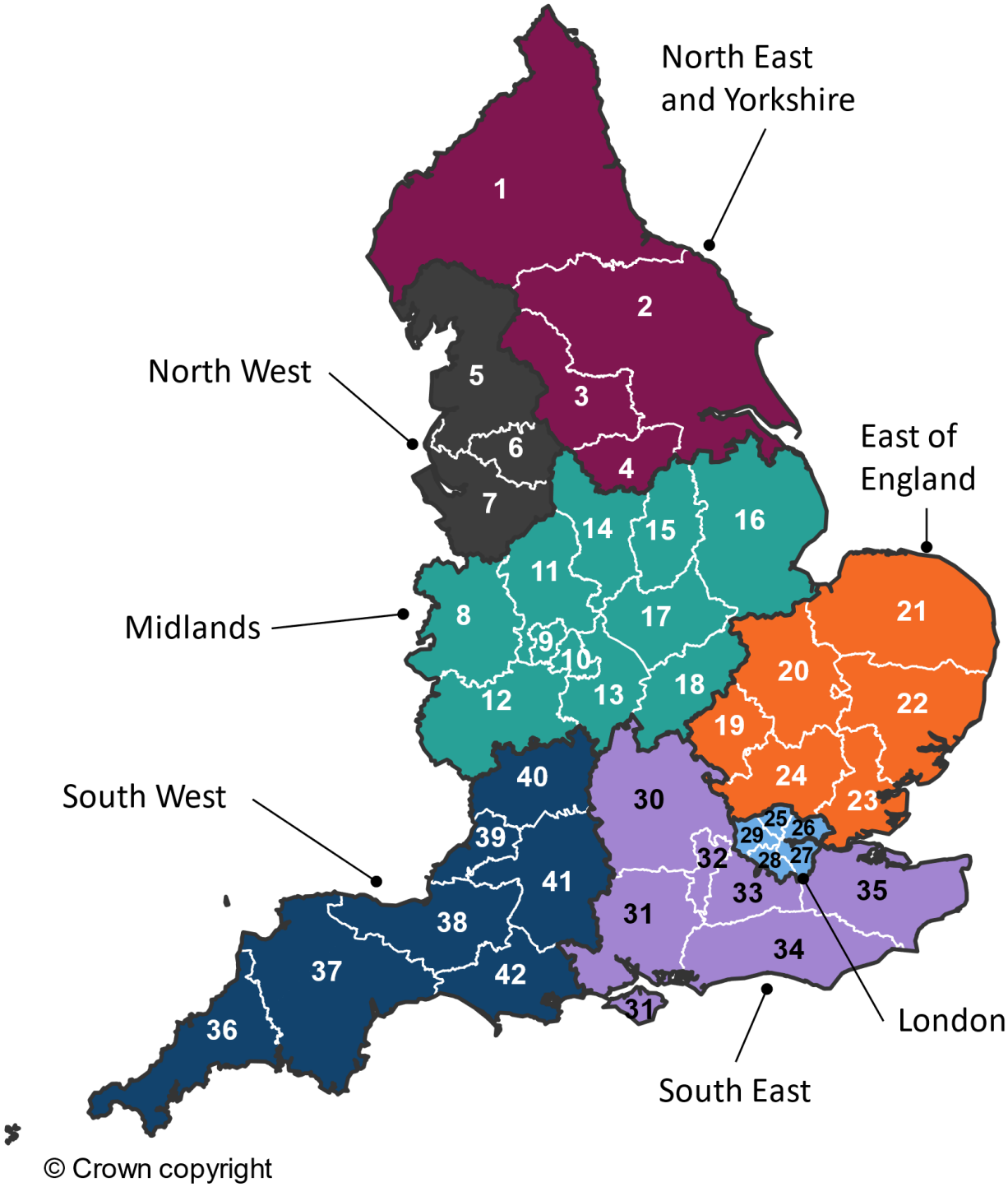
Appendix 1: Map of NHS Regions and ICBs (2022) in England



An interactive version of this map is available

List of NHS Regions and ICBs (2022) in England

North East and Yorkshire NHS Region

1. NHS North East and North Cumbria
2. NHS Humber and North Yorkshire
3. NHS West Yorkshire
4. NHS South Yorkshire

North West NHS Region

5. NHS Lancashire and South Cumbria
6. NHS Greater Manchester
7. NHS Cheshire and Merseyside

Midlands NHS Region

8. NHS Shropshire, Telford and Wrekin
9. NHS Black Country
10. NHS Birmingham and Solihull
11. NHS Staffordshire and Stoke-on-Trent
12. NHS Herefordshire and Worcestershire
13. NHS Coventry and Warwickshire
14. NHS Derby and Derbyshire
15. NHS Nottingham and Nottinghamshire
16. NHS Lincolnshire
17. NHS Leicester, Leicestershire and Rutland
18. NHS Northamptonshire

East of England NHS Region

19. NHS Bedfordshire, Luton and Milton Keynes
20. NHS Cambridgeshire and Peterborough
21. NHS Norfolk and Waveney
22. NHS Suffolk and North East Essex
23. NHS Mid and South Essex
24. NHS Hertfordshire and West Essex

London NHS Region

25. NHS North Central London
26. NHS North East London
27. NHS South East London
28. NHS South West London
29. NHS North West London

South East NHS Region

30. NHS Buckinghamshire, Oxfordshire and Berkshire West
31. NHS Hampshire and Isle of Wight
32. NHS Frimley
33. NHS Surrey Heartlands
34. NHS Sussex
35. NHS Kent and Medway

South West NHS Region

36. NHS Cornwall and the Isles of Scilly
37. NHS Devon
38. NHS Somerset
39. NHS Bristol, North Somerset and South Gloucestershire
40. NHS Gloucestershire
41. NHS Bath and North East Somerset, Swindon and Wiltshire
42. NHS Dorset

Appendix 2: ICD-10 Classifications

Classifications used in this atlas based on International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)

Table A1: Malignant neoplasm of the lip excluding skin of lip

ICD-10 Code	Code description
C00	Malignant neoplasm of the lip excluding skin of lip (C43.0, C44.0)
C00.0	External upper lip
C00.1	External lower lip
C00.2	External lip, unspecified
C00.3	Upper lip, inner aspect
C00.4	Lower lip, inner aspect
C00.5	Lip, unspecified, inner aspect
C00.6	Commissure of lip
C00.8	Overlapping lesion of lip
C00.9	Lip, unspecified

Table A2: Malignant neoplasm of base of tongue of other and unspecified parts of tongue

ICD-10 Code	Code description
C01	Malignant neoplasm of base of tongue
C02	Malignant neoplasm of other and unspecified parts of tongue
C02.0	Dorsal surface of tongue
C02.1	Border of tongue
C02.2	Ventral surface of tongue
C02.3	Anterior two-thirds of tongue, part unspecified
C02.4	Lingual tonsil
C02.8	Overlapping lesion of tongue
C02.9	Tongue, unspecified

Table A3: Malignant neoplasm of gum

ICD-10 Code	Code description
C03	Malignant neoplasm of gum
C03.0	Upper gum
C03.1	Lower gum
C03.9	Gum, unspecified

Table A4: Malignant neoplasm of floor of mouth

ICD-10 Code	Code description
C04	Malignant neoplasm of floor of mouth
C04.0	Anterior floor of mouth
C04.1	Lateral floor of mouth
C04.8	Overlapping lesion of floor of mouth
C04.9	Floor of mouth, unspecified

Table A5: Malignant neoplasm of palate

ICD-10 Code	Code description
C05	Malignant neoplasm of palate
C05.0	Hard palate
C05.1	Soft palate
C05.2	Uvula
C05.8	Overlapping lesion of palate
C05.9	Palate unspecified

Table A6: Malignant neoplasm of other and unspecified parts of mouth

ICD-10 Code	Code description
C06	Malignant neoplasm of other and unspecified parts of mouth
C06.0	Cheek mucosa
C06.1	Vestibule of mouth
C06.2	Retromolar area
C06.8	Overlapping lesion of other and unspecified parts of mouth
C06.9	Mouth unspecified

Table A7: Malignant neoplasm of parotid gland of other and unspecified major salivary glands

ICD-10 Code	Code description
C07	Malignant neoplasm of parotid gland
C08	Malignant neoplasm of other and unspecified major salivary glands
C08.0	Submandibular gland
C08.1	Sublingual gland
C08.8	Overlapping lesion of major salivary glands
C08.9	Major salivary gland, unspecified

Table A8: Malignant neoplasm of tonsil

ICD-10 Code	Code description
C09	Malignant neoplasm of tonsil
C09.0	Tonsillar fossa
C09.1	Tonsillar pillar (anterior)(posterior)
C09.8	Overlapping lesion of tonsil
C09.9	Tonsil, unspecified

Table A9: Malignant neoplasm of oropharynx

ICD-10 Code	Code description
C10	Malignant neoplasm of oropharynx
C10.0	Vallecula
C10.1	Anterior surface of epiglottis
C10.2	Lateral wall of oropharynx
C10.3	Posterior wall of oropharynx
C10.4	Branchial cleft
C10.8	Overlapping lesion of oropharynx
C10.9	Oropharynx, unspecified

Table A10: Malignant neoplasm of nasopharynx

ICD-10 Code	Code description
C11	Malignant neoplasm of nasopharynx
C11.0	Superior wall of nasopharynx
C11.1	Posterior wall of nasopharynx
C11.2	Lateral wall of nasopharynx
C11.3	Anterior wall of nasopharynx
C11.8	Overlapping lesion of nasopharynx
C11.9	Nasopharynx, unspecified

Table A11: Malignant neoplasm of piriform sinus, hypopharynx and other and ill-defined sites in the lip, oral cavity and pharynx

ICD-10 Code	Code description
C12	Malignant neoplasm of piriform sinus
C13	Malignant neoplasm of hypopharynx
C13.0	Post cricoid region
C13.1	Aryepiglottic fold, hypopharyngeal aspect
C13.2	Posterior wall of hypopharynx
C13.8	Overlapping lesion of hypopharynx
C13.9	Hypopharynx, unspecified
C14	Malignant neoplasm of other and ill-defined sites in the lip, oral cavity and pharynx
C14.0	Pharynx, unspecified
C14.2	Waldeyer ring
C14.8	Overlapping lesion of lip, oral cavity and pharynx

Table A12: Malignant neoplasm of nasal cavity and middle ear

ICD-10 Code	Code description
C30	Malignant neoplasm of nasal cavity and middle ear
C30.0	Nasal cavity
C30.1	Middle ear

Table A13: Malignant neoplasm of accessory sinuses

ICD-10 Code	Code description
C31	Malignant neoplasm of accessory sinuses
C31.0	Maxillary sinus
C31.1	Ethmoidal sinus
C31.2	Frontal sinus
C31.3	Sphenoidal sinus
C31.8	Overlapping lesion of accessory sinuses
C31.9	Accessory sinus, unspecified

Table A14: Malignant neoplasm of larynx

ICD-10 Code	Code description
C32	Malignant neoplasm of larynx
C32.0	Glottis
C32.1	Supraglottis
C32.2	Subglottis
C32.3	Laryngeal cartilage
C32.8	Overlapping lesion of larynx
C32.9	Larynx, unspecified

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