

Foreword

This is the first themed Atlas of variation in risk factors and healthcare for vision in England. It presents a range of indicators across eye health and care providing information on service activity and availability that should be meaningful to clinicians, health service managers, commissioners and provider organisations, in England. In doing so the presentation of the indicators go beyond the headline by taking account of the population at risk or in clinical need of an intervention; and cover a range of services from screening to routine and emergency care, and indicators of population eye health.

Variations in healthcare are endemic, and their underlying causes are multifactorial, posing challenges for distinguishing whether they are acceptable (warranted) or not. Eye health is no different. The atlas systematically maps out existing variations in eye health using the selected indicators. The purpose of highlighting these variations is to facilitate local scrutiny and review to inform and support any necessary actions at place and at system level. With competing priorities for healthcare resources, areas for scrutiny and review are proposed as options for action as a starter to understand the causes underlying local and regional service variations and their impact on equity, safety, effectiveness and outcomes of service provision.

Eye health services generate high volume activity across primary and secondary care. In common with the wider NHS they have also been faced with prolonged challenges for service provision from rising demand, capacity pressures (workforce, estate and infrastructure), and in addressing inequalities; all of which are likely to be contributing to the variations reported.

The indicators are drawn from the best available population level data sources that have established resourced processes and infrastructure for data collection, reporting, review and updating. Whilst there are limitations with these sources, they represent the national record. They are currently routinely used as proxies of need for service planning, commissioning and contract agreements. The atlas demonstrates their additional utility to identify and review local and regional variations and the implications of their existence, which would have hitherto remained unrecognised. Improving data quality would make better use of the health information and intelligence that could be potentially generated from these data sources.

How services are commissioned, organised and delivered, and changes in clinical practice and decision making can all contribute to service variations. In the past decade, the introduction of new interventions for previously untreatable chronic conditions has transformed service provision and clinical practice, generating multiple episodes of care. These have all contributed to the rising rates of service activity and their variations for example for outpatient attendances and intravitreal injection procedures.

Also presented in the atlas are broad population based health indicators associated with eye health. In addition to demographic factors, these serve to identify population groups at particular risk to their eye health; inform eye health needs assessments and local eye priorities; and identify opportunities for alignment with broader health priorities, prevention and health improvement interventions.

This atlas is timely. It covers the years immediately prior to the coronavirus (COVID-19) pandemic, providing a baseline and resource for monitoring the impact of the actions taken subsequently for the recovery and transformation of eye health services, their organisation and delivery; and the implementation of integrated care systems and the reconfiguration of the NHS in England.

In identifying, quantifying and reporting existing variations in eye health, this atlas has established the basis for systematically distinguishing and addressing unwarranted variations and trends over time. Should the opportunity arise it is well placed to extend its scope to cover a wider range of eye health and care services.

The Atlas of variation in risk factors and healthcare for vision in England has been eagerly anticipated. It addresses a gap in regular review and reporting of eye health data arising from routine NHS care, and will be a significant tool to monitor population eye health and its contributory factors. Its development is a testament to Public Health England, all its contributors, stakeholders and members of the steering group, and future collaborations for subsequent updates are welcomed.

A handwritten signature in black ink, appearing to read 'P Desai'.

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Preface

This first Atlas of variation in risk factors and healthcare for vision in England builds on an increasing awareness of the need for good quality data to understand aspects of the need for and provision of eye healthcare.

This is the first health intelligence product produced by Public Health England that looks across the whole vision patient pathway from those populations at risk of poor eye health, screening and healthcare services, and health outcomes. The atlas will contribute to our understanding of how services are being used, and if they are being used equitably.

The [Clinical Council for Eye Health Commissioning \(CCEHC\)](#), an independent advisory body which represents the leading organisations within the eye care sector, has developed the System and Assurance Framework for Eye Health (SAFE).¹ SAFE provides the overarching framework for strategic, population-based planning, commissioning and provision of eye health service systems delivering the whole pathway of care, and operating across service footprints to address health needs. It shows what a good eye health service system should look like and what is expected of it. The atlas has used the SAFE metrics, Portfolio of Indicators for Eye Health and Care² as the guide to developing suitable indicators.

The atlas contains 32 indicators, many developed for the atlas as well as indicators already included within products such as the public health outcomes framework (PHOF). The new indicators developed for the atlas mainly cover hospital eye services: outpatient appointments, intravitreal injections, cataract and rhegmatogenous retinal detachment surgery.

The data is presented in a format to show not only a map of geographical variation for each indicator's range of values but also, where appropriate, an accompanying map showing the statistical significance of this variation from the England value. Each indicator is also displayed using a column chart showing the geographical distribution for the most recent period of data and a box and whisker plot showing the degree of geographical variation. In each section the context is described for the indicator(s), options for action and a list of evidence-based resources to aid action. For 26 indicators, it is statistically possible to analyse trend data over time both for the England value and degree of variation.

¹Clinical Council for Eye Health Commissioning (2018) [SAFE: Systems and Assurance Framework for Eye Health](#) [Accessed 24 May 2021]

²Clinical Council for Eye Health Commissioning (2018) [SAFE: Portfolio of Indicators for Eye Health and Care](#) [Accessed 28 Jul 2021]

Importantly for every indicator there is evidence of variation across England; the rate of all vision outpatient attendances varies 2.5-fold by clinical commissioning group (CCG), the rate of admission to hospital for cataract surgery in people aged 65 years and over varies 2.2-fold and the rate of rhegmatogenous retinal detachment surgery in people aged 18 years and over varies 8.9-fold by CCG. Not only do health service indicators vary geographically but so does the prevalence of risk factors for poor vision health and vision outcomes. It is therefore essential that health service providers and commissioners use the data underpinning the presentation in this atlas, the online [Interactive Atlas](#) tool available on the RightCare website and other resources referred to within the atlas to understand more about their local picture to determine priorities for action. Following the publication of the atlas, the data will be used to create an online vision health profile. This will enable users to explore the data alongside other datasets included in the [PHE public health profiles](#).

It is important to tackle variation in vision health through better prevention of disease, recognition of those at risk, better diagnosis of those with early eye disease and improved treatment not only to improve outcomes for individual patients but also to ensure optimal allocation and use of staff, capacity and other resources within the health system.



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Introduction

Sight loss is a public health priority

It is estimated that around 2 million people in the UK are living with some form of sight loss, with this expected to rise to 2.7 million by 2030.¹ Maintaining good eye health is central to maintaining good mental, social and physical health. Vision loss is associated with a reduction in overall quality of life, mental health, independence, mobility, educational attainment and employment.²

Increasing numbers of people experiencing sight loss are due to an aging population and an increase in the prevalence of conditions associated with poorer eye health such as diabetes and obesity. People from black and minority ethnic communities are at greater risk of some of the leading causes of sight loss.^{3,4} Adults with learning disabilities are 10 times more likely to be blind or partially sighted than the general population.^{3,5}

Prior to the COVID-19 pandemic the NHS was already experiencing significant pressures and unprecedented levels of demand for elective eye care services.⁶ In the financial year beginning 2019 ophthalmology was the single largest specialty for outpatient attendances in England.⁷ This atlas shows there were 9 million outpatient attendances in the financial year beginning 2019 for all five vision treatment specialties, 9.4% of all outpatient attendances. Within supplementary figures this atlas presents analysis using provisional datasets for 2020 and 2021 to show the impact of the COVID-19 pandemic on the demand and delivery of services for eye health.

Sight loss is not an inevitable part of aging, an estimated 50% of sight loss is avoidable.⁸ Primary prevention of sight loss is closely linked to maintaining overall good health. Public health prevention programmes to reduce obesity, increase exercise and stop smoking may prevent or delay the onset of eye disease.⁹ Secondary prevention is central to maintaining vision or slowing the progression of diseases which can result in

¹ Royal National Institute of Blind People (RNIB) and Specsavers (2017) [The State of the Nation Eye Health 2017: A Year in Review](#) [Accessed 06 Jun 2021]

² Welp A, Woodbury RB, McCoy MA and others (2016) [The impact of vision loss. Making Eye Health a Population Health Imperative: Vision for Tomorrow](#) National Academies Press Washington, DC [Accessed 01 Apr 2021]

³ Royal National Institute of Blind People (April 2018) [Eye health and sight loss stats and facts](#) [Accessed 06 Jun 2021]

⁴ Scase MO, Johnson MRD (2005) [Visual impairment in ethnic minorities in the UK](#) International Congress Series, 1282:438-442 [Accessed 25 Jun 2021]

⁵ Public Health England (2020) [Guidance Eye care and people with learning disabilities: making reasonable adjustments](#) [Accessed 25 Jun 2021]

⁶ NHS England (16 January 2019) [Transforming elective care services: Ophthalmology](#) [Accessed 21 Jan 2021]

⁷ NHS Digital (08 October 2020) [Hospital Outpatient Activity 2019-20](#) [Accessed 22 Apr 2021]

⁸ London Assembly Health Committee (November 2017) [Eye health - preventing sight loss in London](#) [Accessed 01 Apr 2021]

⁹ NHS England (2018) [Eye Health Needs Assessment Wessex \(Dorset, Hampshire and Isle of Wight\)](#) [Accessed 06 Jun 2021]

sight loss and is dependent on the organisation and delivery of health services to meet need and demand. Tertiary prevention requires social services and voluntary organisations to support people who are blind or partially sighted to live independently and to adapt to living with their eye condition.

What is variation and why does it matter?

One of the key aims of the atlas of variation series is to highlight geographical variation and to try to differentiate between warranted and unwarranted variation. Warranted variation in health care services may occur because they are appropriately meeting different levels of health care need between areas. These different levels of need may reflect geographical variations in sociodemographic characteristics of the population, such as age, gender, socioeconomic status and ethnicity, risk factors and disease prevalence. These sociodemographic factors may also influence unwarranted variation if they are associated with differing levels of fair access to services. John Wennberg, who founded the pioneering Dartmouth Atlas of Health Care,¹⁰ defined unwarranted variation in healthcare as “variation that cannot be explained on the basis of illness, medical evidence, or patient preference”.¹¹

Wennberg suggests 3 categories of unwarranted variation:¹²

Effective care:

‘...interventions for which the benefits far outweigh the risks; in this case the “right” rate of treatment is 100% of patients defined by evidence-based guidelines to be in need, and unwarranted variation is generally a matter of under-use.’ However, it is important to acknowledge patient choice and the right to refuse intervention even where the evidence base for effectiveness is strong and therefore the “right” rate may never be 100%.

Preference-sensitive care:

‘...when more than one generally accepted treatment option is available, such as elective surgery; here, the right rate should depend on informed patient choice, but treatment rates can vary extensively due to differences in professional opinion.’

Supply-sensitive care:

‘...comprises clinical activities such as doctor visits, diagnostic tests, and hospital admissions, for which the frequency of use relates to the capacity the local healthcare system.’ However, as Wennberg notes, higher rates of use of supply-sensitive care do not necessarily correlate with better outcomes.

¹⁰ Wennberg JE, Cooper M and others (1996) [The Dartmouth Atlas of Health Care](#) [Accessed 07 Jun 2021]

¹¹ Wennberg J (2010) [Tracking Medicine: A Researcher's Quest to Understand Health Care](#) Oxford University Press [Accessed 07 Jun 2021]

¹² Wennberg J (2011) [Time to tackle unwarranted variations in practice](#) BMJ 2011 Mar [Accessed 01 Jun 2021]

This first Atlas of variation in risk factors and healthcare for vision in England presents data on 32 indicators across these areas: population at risk of poor eye health, screening, provision of health services, and eye health outcomes. Importantly, it shows the degree of geographical variation across these areas and their associated indicators, and where possible trend data. 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 chapter Introduction to the data and methods.

The burden of eye disease and inequalities

Glaucoma, age related macular degeneration (AMD), cataract, refractive error and diabetic eye disease are the main causes of visual impairment and sight loss/ blindness in the UK.^{1,13}

There is no national dataset that provides information on the true prevalence of the main eye conditions, instead estimates are derived from population modelling and information from the Certification of Vision Impairment (CVI) register.^{14,15} According to the latest Global Burden of Disease Study (GBD) prevalence estimates for 2019, 2.3 million people in England experience some form of blindness or vision loss.¹⁶ The GBD study estimates that the prevalence in England has risen from 2.1 million people in 2010, an increase of nearly 10%. The study estimates that 80% of this increase has occurred in the population aged 65 years and over.

Table A1: Global Burden of Disease (GBD) prevalence estimates for England, all ages, 2019¹⁶

	Number	Rate per 100,000 population
Age-related macular degeneration	107,605	190.19
Cataract	483,071	853.82
Glaucoma	67,461	119.24
Near vision loss	438,520	775.07
Other vision loss*	189,004	334.06
Refraction disorders	1,134,120	2,004.53
Total blindness and vision loss	2,307,776	4,078.95

*Includes diabetic retinopathy

¹³ Pezzullo L, Streatfeild J, Simkiss P and others (2018) [The economic impact of sight loss and blindness in the UK adult population](#). BMC Health Serv Res 18, 63 (2018) [Accessed 29 Jun 2021]

¹⁴ Public Health England [Public Health Profiles](#) Crown Copyright 2021 [Accessed 04 May 2021]

¹⁵ Deloitte Access Economics (2017) [Incidence and risk of sight loss and blindness in the UK](#) Royal National Institute of Blind People [Accessed 30 Apr 2021]

¹⁶ Global Burden of Disease Collaborative Network (2020) [Global Burden of Disease Study 2019 \(GBD 2019\) Results](#). Seattle, United States: Institute for Health Metrics and Evaluation (IHME) [Accessed 03 May 2021]

Age and sex

The older you are the greater the risk of sight loss. The RNIB estimates around 79% of people living with sight loss are over the age of 64, with the 'oldest old' at greatest risk – 1 in every 3 people aged 85 and over living with sight loss.¹

Children at higher risk of vision impairment include those who are very premature and very low birth weight babies, from an ethnic minority group, children from the most economically deprived areas and children with learning difficulties.^{17,18}

Incidence estimates suggest women are more likely to experience sight loss or blindness due to both a higher risk and more women in older age groups. The lifetime risk of permanent sight loss or blindness is estimated to be nearly 1 in 5 people. This risk is higher for women, with almost 1 in 4 women at risk of permanent sight loss or blindness compared to 1 in 8 men.¹⁵

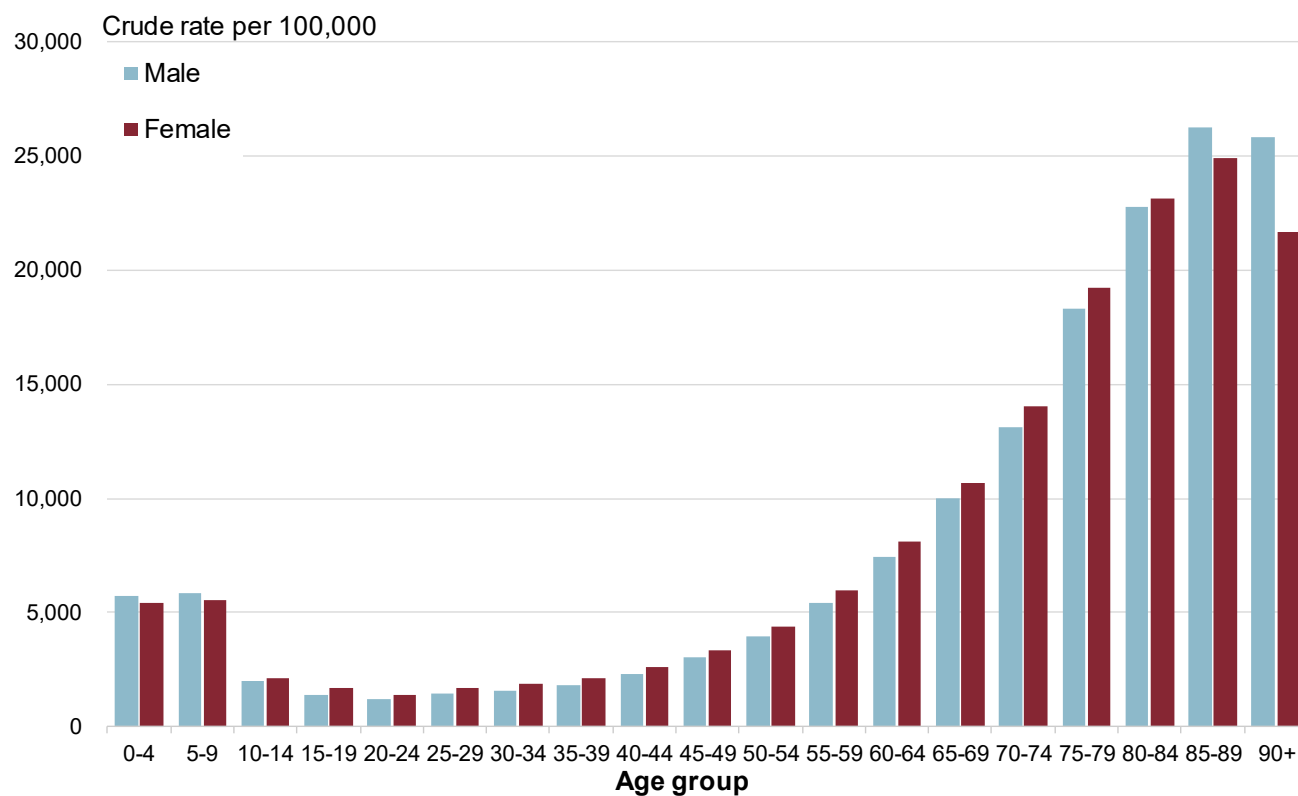
Analysis for this atlas shows that in the financial year beginning 2019 there were 9 million all vision outpatient attendances in England. 56% were for people aged 65 years and older.⁶ Many people will be required to attend outpatients multiple times throughout the year. Analysis for individuals shows that 3.4 million people attended outpatient appointments in the financial year beginning 2019, with nearly 1.8 million women and 1.6 million men attending outpatients. Figure A1 shows that women have higher age-specific rates than men in all age groups from age 10 years to 84 years.

Men and women in the 85 to 89 year old age group have the highest age-specific population rates for outpatient attendances. In the financial year beginning 2019 men aged 85 to 89 years had an attendance rate of 26,233 per 100,000 population and women 24,885 per 100,000 (see Figure A1). Overall, nearly 1 in 4 individuals in the 85 to 89 year age group had an outpatient appointment for their eye health.

¹⁷ Teoh LJ, Solebo AL, Rahi JS and others (2021) [Visual impairment, severe visual impairment, and blindness in children in Britain \(BCVIS2\): a national observational study](#) *Lancet Child Adolesc Health* 2021 Mar;5(3):190-200 [Accessed 23 Apr 2021]

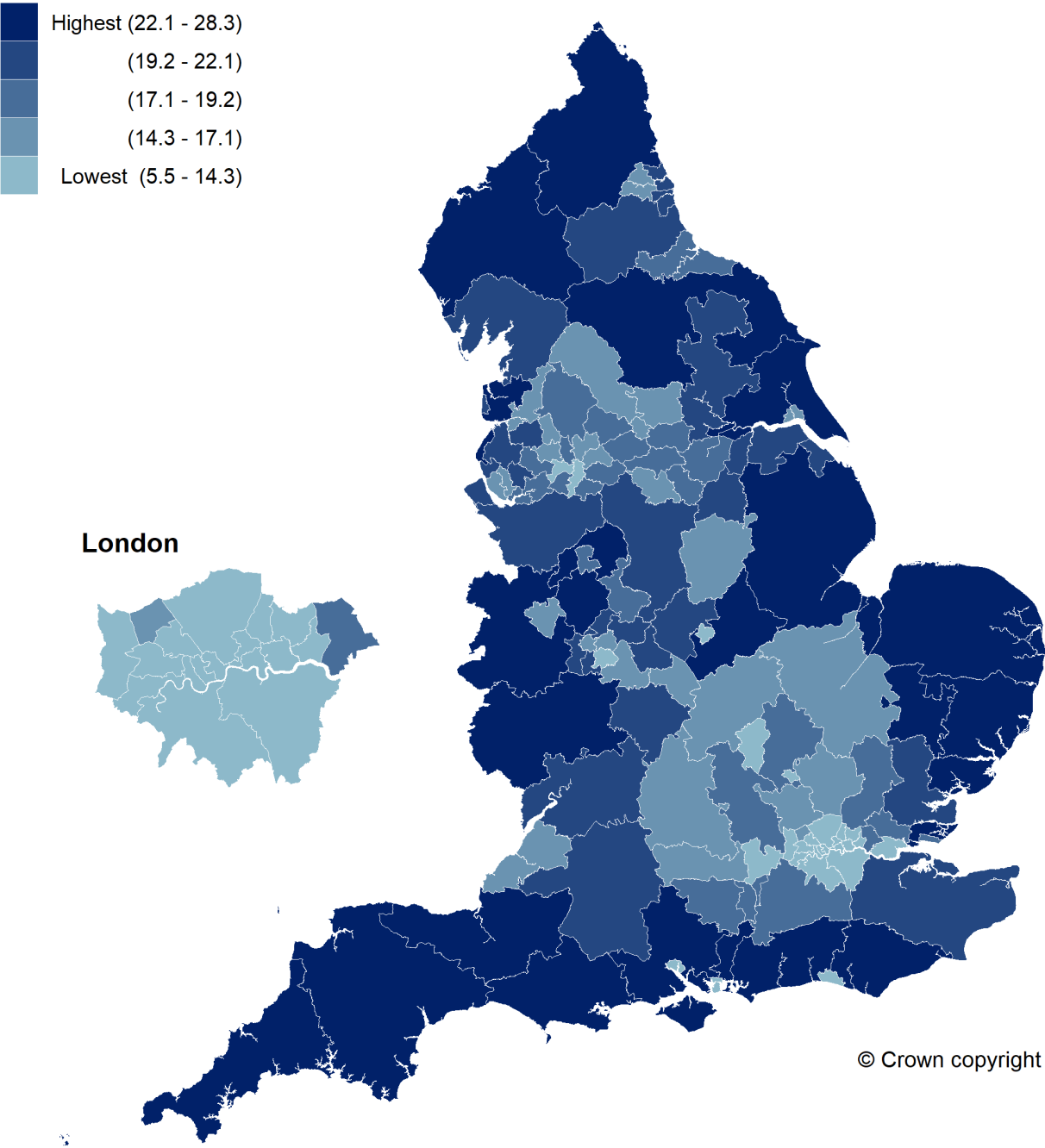
¹⁸ Woodhouse JM, Davies N, McAviney A and Ryan B (2014) [Ocular and visual status among children in special schools in Wales: the burden of unrecognised visual impairment](#) *Archives of Diseases in Childhood* 99:500-504. (cited by RNIB 2016 state of the nation) [Accessed 23 Apr 2021]

Figure A1: All vision outpatient attendances (persons based) by age and sex, for England (2019/20)



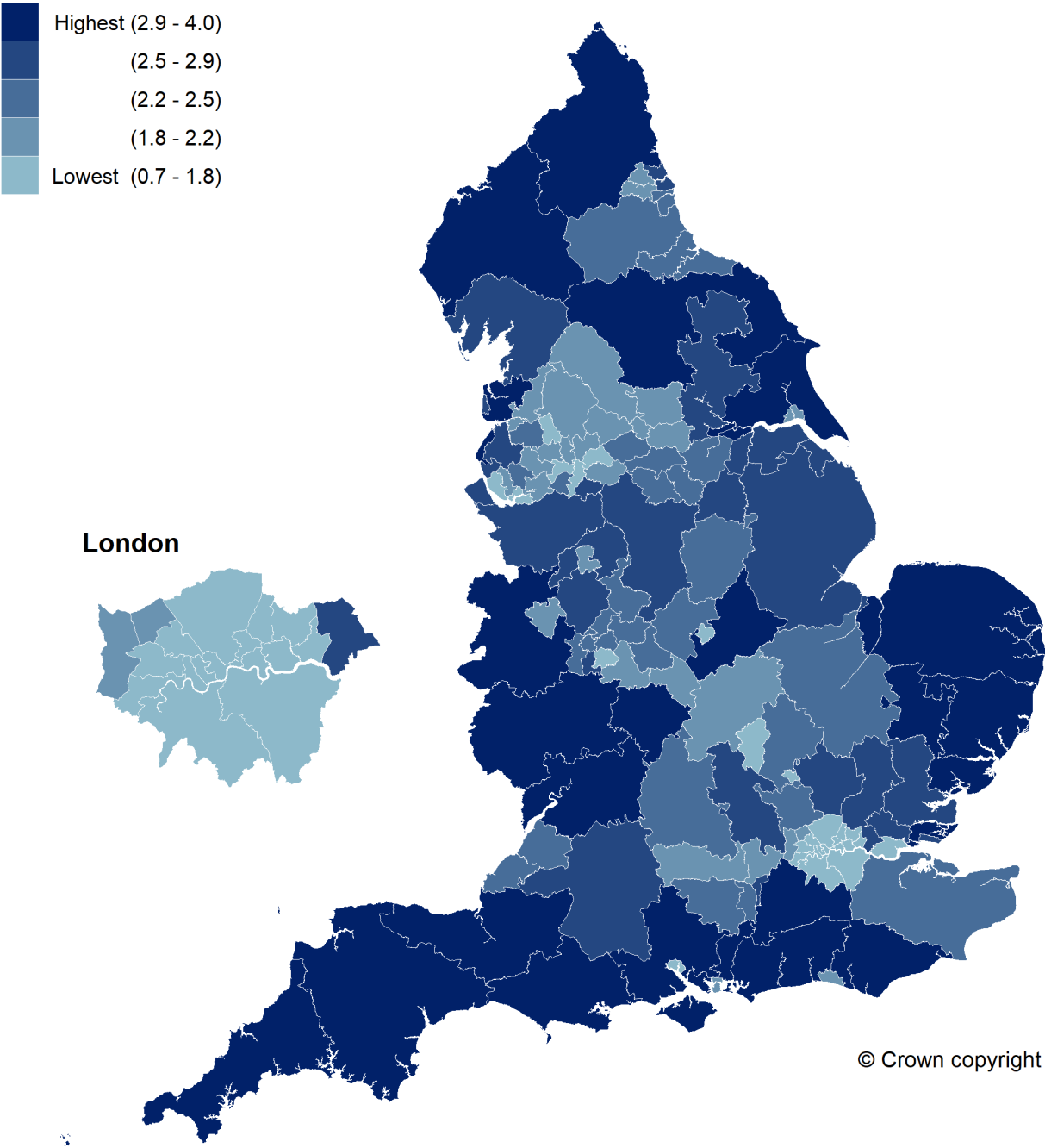
Map A1: Percentage of the GP registered population aged 65 years and over by clinical commissioning group (2020)

Equal-sized quintiles of geographies



Map A2: Percentage of the GP registered population aged 85 years and over by clinical commissioning group (2020)

Equal-sized quintiles of geographies



Ethnic minorities

People from certain ethnic minority groups are at greater risk of some of the most common causes of sight loss in the UK.

People of Black African and Caribbean ethnicity are at a 4 to 8 times greater risk of developing open angle glaucoma, the most common form of glaucoma in the UK compared with the general British population.^{19,20} There is also an increased risk of angle closure glaucoma in people from East Asian communities.

People of South Asian and Black ethnicity are at a significantly higher risk of diabetic eye disease.^{21,22} People of South Asian and Black African and Caribbean ethnicity have double the prevalence of clinically significant macular oedema and sight threatening diabetic retinopathy compared to the white population with type 2 diabetes.²²

People of Asian ethnicity have a greater risk of developing age-related cataracts with some evidence of an earlier onset of the disease.^{23,24}

Black and minority ethnic people with sight loss may also require higher support needs due to language barriers or social isolation.²⁵

Public Health England is currently improving the methodology for assigning ethnicity codes for analysis. Future updates to the hospital episode statistics indicators included within this atlas are planned to include analysis by ethnicity.

¹⁹ Wormald R, Basauri E, Wright L and others (1994) [The African Caribbean eye survey: Risk factors for glaucoma in a sample of African Caribbean people living in London](#) *Eye* 8, 3150–320 (cited by RNIB 2018 stats & facts) [Accessed 23 Apr 2021]

²⁰ Cross V, Shah P, Bativala R and Spurgeon P (2007) [ReGAE 2: glaucoma awareness and the primary eye-care service: some perceptions among African Caribbeans in Birmingham UK](#) *Eye* 21, 912-920 (cited by RNIB 2018 stats & facts) [Accessed 23 Apr 2021]

²¹ Pardhan S, Gilchrist J and Mahomed I (2004) [Impact of age and duration on sight-threatening retinopathy in South Asians and Caucasians attending a diabetic clinic](#). *Eye* 18, 233–240 2004 (cited by RNIB 2018 stats & facts) [Accessed 23 Apr 2021]

²² Sivaprasad S, Gupta B, Gulliford MC and others (2012) [Ethnic Variations in the Prevalence of Diabetic Retinopathy in People with Diabetes Attending Screening in the United Kingdom \(DRIVE UK\)](#) *PLoS One* 2012;7:e32182 [Accessed 24 May 2021] (cited by RNIB 2018 stats & facts)

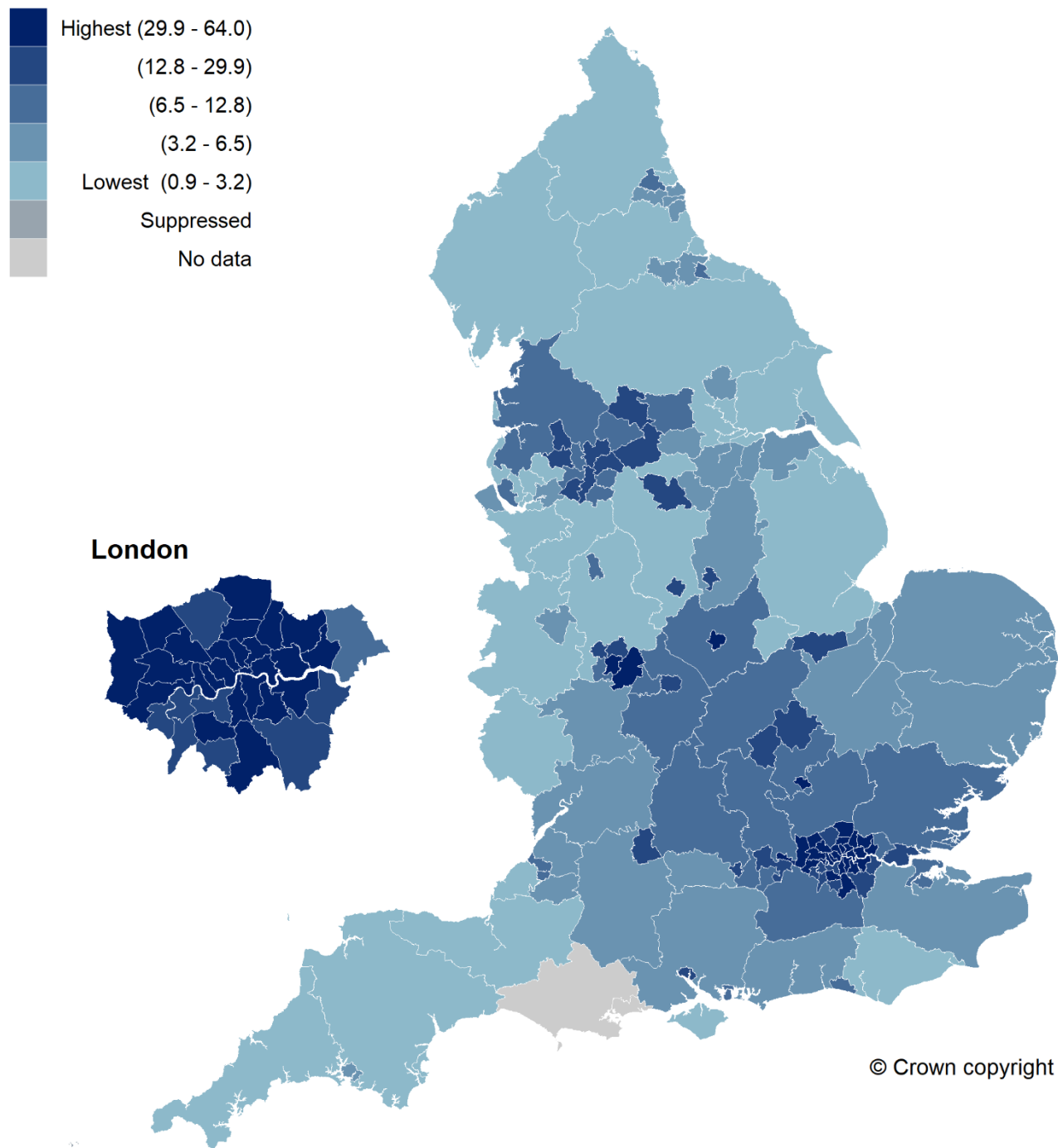
²³ Das BN, Thompson JR, Patel R, and Rosenthal AR (1993) [The prevalence of eye disease in Leicester: a comparison of adults of Asian and European descent](#) *J R Soc Med.* 1994;87(4):219-222 [Accessed 17 Jun 2021]

²⁴ Rauf A, Malik R, Bunce C and Wormald R. (2013) [The British Asian community eye study: outline of results on the prevalence of eye disease in British Asians with origins from the Indian subcontinent](#) *Indian J Ophthalmol.* 2013;61(2):53-58 [Accessed 17 Jun 2021]

²⁵ Johnson MD and Morjaria-Keval A (2007) [Ethnicity, sight loss and invisibility](#) *The British Journal of Visual Impairment* 25 (1) pp 21-31 2007, (cited by Peace S, Katz J, Holland C and Jones R. Oct 2016) [Accessed 06 May 2021]

Map A3: Percentage of population from ethnic minorities aged 16 years and over by upper tier local authority (2016)

Equal-sized quintiles of geographies



Learning disabilities

People with learning disabilities experience high levels of sight problems at all ages. Adults with learning disabilities are ten times more likely to experience sight loss than the general population.²⁶ Children with a learning disability are 28 times more likely to have a serious sight problem.²⁷ Many of the risk factors, such as smoking, diet, physical activity, hypertension and obesity associated with eye conditions such as glaucoma and diabetic eye disease are more likely to be present for people with learning disabilities than the general population.^{28,29}

Recent studies suggest half of adults with learning disabilities have not had a sight test in the recommended period and 4 in 10 children in special schools have never had a sight test.³⁰

Further information can be found in the Learning disabilities section which includes actions that can be taken to improve the sight of people with learning disabilities.

Socioeconomic deprivation

Socioeconomic deprivation is both a cause and an outcome of sight loss, at both an individual and an area level. However, it is recognised that a stronger evidence base is needed to develop universal solutions.³¹

Studies show that there is a link between low income and sight loss; 48% of people with sight loss say that they live in a household with a total income of less than £300 a week, compared to 19% of people with no sight loss.³² People with low vision are more likely to live in more deprived areas.³³ There is also a protective effect on AMD for people living in less deprived areas.³⁴

Area deprivation is associated with late presentation of glaucoma, which will result in increased risk of blindness from glaucoma.³⁵ People living in more deprived areas are

²⁶ Emerson E and Robertson J (2011) [The Estimated Prevalence of Visual Impairment among People with Learning Disabilities in the UK](#). Royal National Institute of Blind People and SeeAbility 35 (2011) [Accessed 23 Apr 2021]

²⁷ SeeAbility (2019) [Children in Focus 2019 – A Change in Sight](#) [Accessed 23 Apr 2021]

²⁸ Royal National Institute of Blind People (2014) [Sight loss: a public health priority](#) [Accessed 15 Jun 2021]

²⁹ Rickard W and Donkin A (2018) [A fair, supportive society: summary report](#). London: Institute of Health Equity [Accessed 15 Jun 2021]

³⁰ SeeAbility (2016) [Delivering an equal right to sight](#) [Accessed 23 Apr 2021]

³¹ College of Optometrists (May 2016) [See The Gap A policy report on UK eye health inequalities](#) [Accessed 18 Jan 2021]

³² Saunders A (2014) [The link between sight loss and income](#) Royal National Institute of Blind People [Accessed 06 May 2021]

³³ Yip JLY, Luben R, Hayat S and others (2014) [Area deprivation, individual socioeconomic status and low vision in the EPIC-Norfolk Eye Study](#) J Epidemiol Community Health 2014;68:204–210 [Accessed 13 Jun 2021]

³⁴ Yip JYL, Khawaja AP, Chan MPY and others (2015) [Area deprivation and age related macular degeneration in the EPIC-Norfolk Eye Study](#) Public Health Volume 129, Issue 2, 2015, 103-109 [Accessed 13 Jun 2021]

³⁵ Fraser S, Bunce C, Wormald R and Brunner E (2001) [Deprivation and late presentation of glaucoma: case-control study](#). BMJ 322, 639–643 2001 [Accessed 19 Mar 2021]

more likely to develop diabetes and diabetic retinopathy³⁶ and are also less likely to attend retinal screening, all of which will increase risk of sight loss from diabetic retinopathy.³⁷

Within more deprived areas there is a lack of public awareness of the health benefits of eye examinations combined with negative perceptions of optometry around the sale of spectacles, both of which affect people accessing services.^{38,39} There is also evidence of scarcity of optometry practices within areas of deprivation. Reasons for disparities in location and uptake are uncertain, the College of optometrists have suggested this could be linked to the optometry funding structures.³¹

The lack of good quality data for primary care eye services makes evidence of links between access to eye services and deprivation difficult to analyse. The General Ophthalmic Services (GOS) Activity Statistics publication does not include any breakdowns by eligibility reason or geography due to accuracy issues.⁴⁰ From 2020 a new provider is capturing the GOS data submitted for inputting to the Central Ophthalmic Payments System (COPS). NHS Digital have yet to announce what changes this may make to the published statistics.⁴¹

Area deprivation analysis of the hospital data for this atlas does not suggest a strong relationship with deprivation at a clinical commissioning group (CCG) level (see Figure A2) though the relationship is likely confounded by access. However, this needs to be combined with analysis of improved primary care data and at a lower geographical level to fully explore links with deprivation.

³⁶ Kilner M, Fell G, Gibbons C and others (2012) [Inequalities in eye health and healthcare requires cross-organisational collaboration](#). *Eye* 26, 671–677 [Accessed 30 Apr 2021]

³⁷ Moreton RBR, Stratton IM, Chave S and others (2017) [Factors determining uptake of diabetic retinopathy screening in Oxfordshire](#), *Diabetic Medicine* 43 [Accessed 05 May 2021]

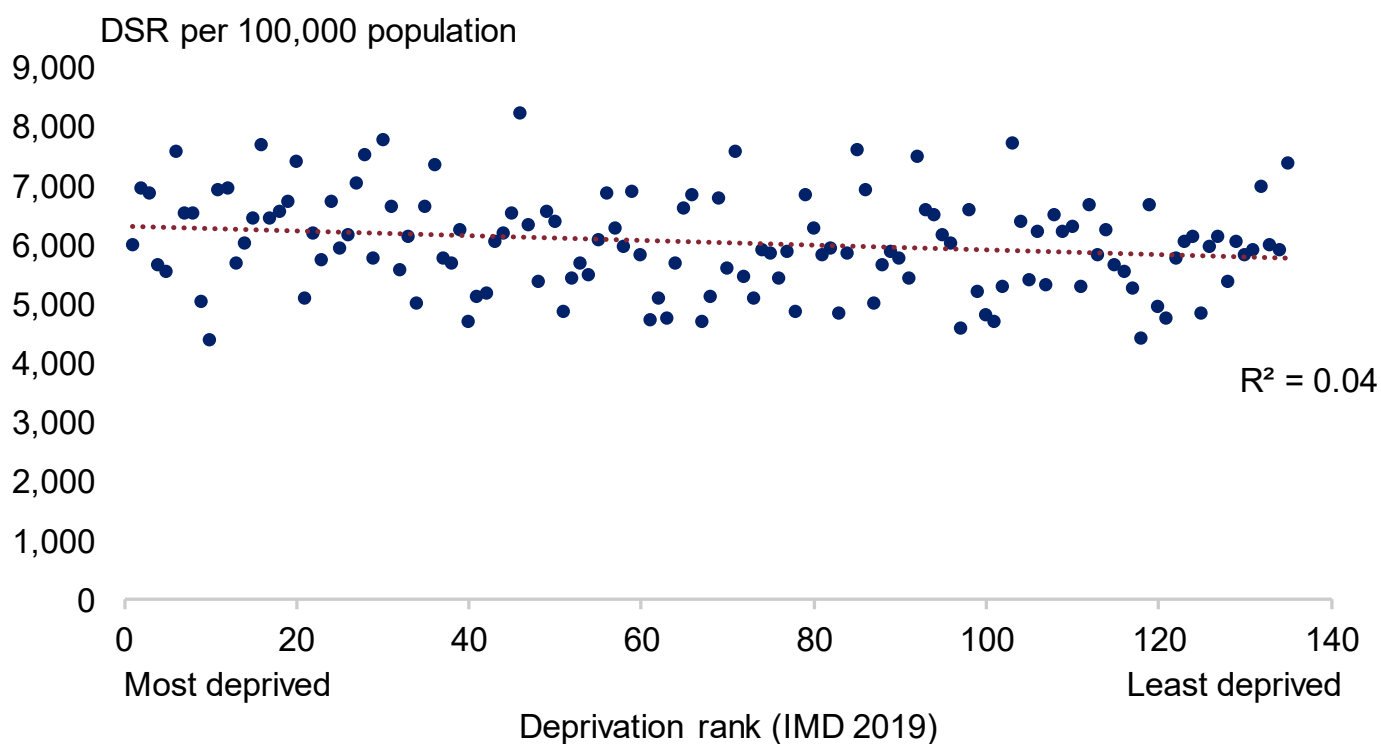
³⁸ Shickle D, Farragher TM, Davey CJ and others (2018) [Geographical inequalities in uptake of NHS funded eye examinations: Poisson modelling of small-area data for Essex, UK](#) *J Public Health (Oxf)*. 2018;40(2):e171–e179 [Accessed 13 Jun 2021]

³⁹ Shickle D, Farragher TM (2015) [Geographical inequalities in uptake of NHS funded eye examinations: small area analysis of Leeds, UK](#) *J Public Health (Oxf)* 2015;37(2):337–45 [Accessed 19 Mar 2021]

⁴⁰ NHS Digital (25 June 2020) [General Ophthalmic Services Activity Statistics England, year ending 31 March 2020](#) [Accessed 24 May 2021]

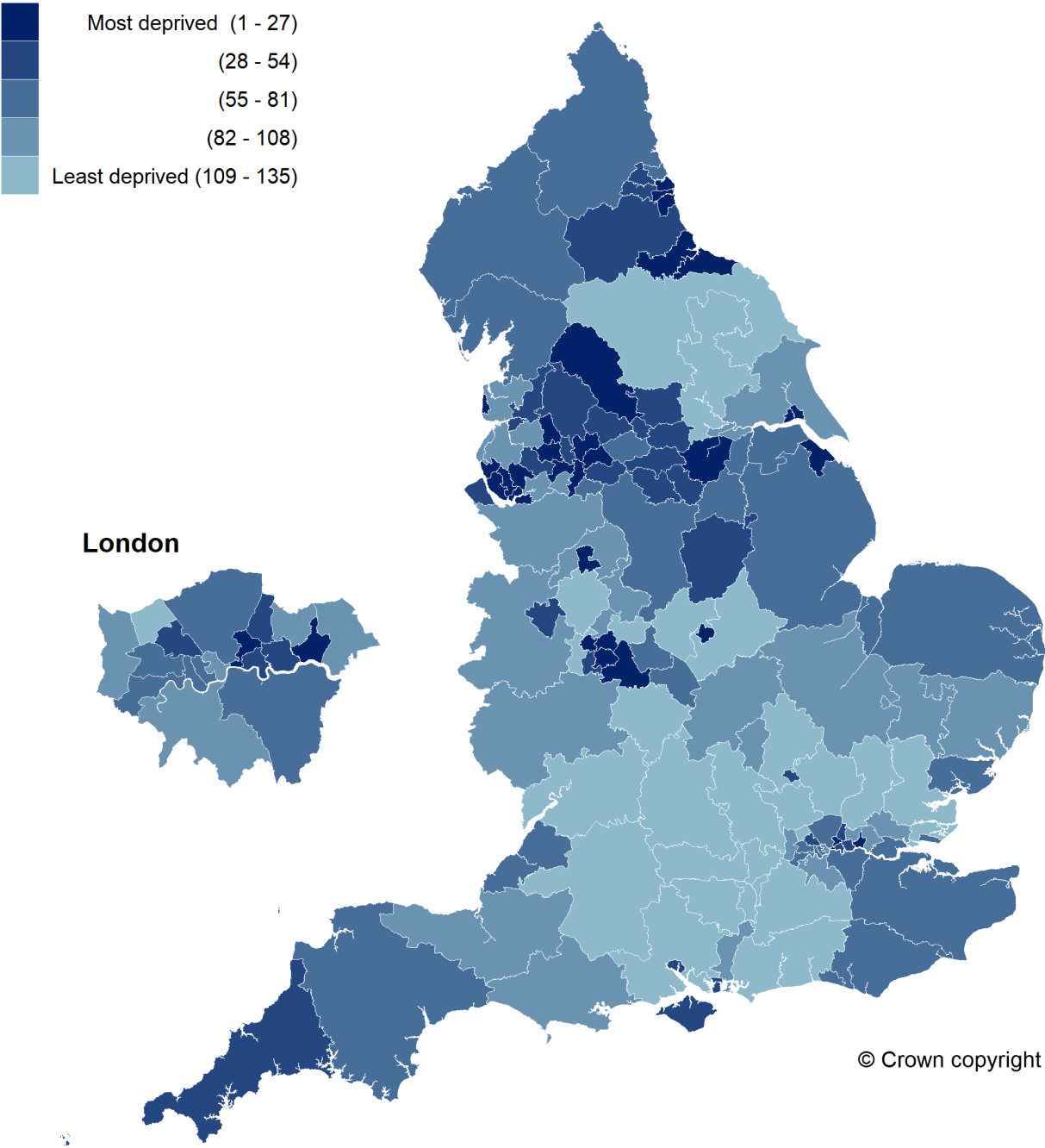
⁴¹ NHS Digital (20 Dec 2019) [Consultation on plans to cease NHS Digital General Ophthalmic Services Workforce and Activity publications](#) [Accessed 20 Jun 2021]

Figure A2: Scatterplot of all vision outpatient attendances (persons based) by index of multiple deprivation by clinical commissioning group (2019/20)



Map A4: Variation in deprivation rank (index of multiple deprivation 2019) by clinical commissioning group

Equal-sized quintiles of geographies



The economic burden of sight loss to the NHS and wider society

A study by Deloitte highlighted that the financial burden of eye health is significant for the NHS, and to wider society.⁴² In 2013, they estimated the total economic cost of sight loss to be £23.6 billion per year in England. This comprised £21.1 billion indirect costs associated with loss of productivity and reduced health and wellbeing.

The direct costs of eye health (health and social care services) in England were estimated by Deloitte to be in the region of £2.47 billion in 2013. About 50% of these costs are estimated to come from hospital inpatient, day case and outpatient expenditure, 13% for prescribing and 20% for the GOS.⁴²

As the population ages and the number of people requiring treatment for eye conditions continues to increase, the direct health service costs are projected to continue to grow. The Deloitte research projected that AMD would increase its share of sight loss and blindness prevalence from 23.2% in 2013 to 29.6% in 2050 in England, reflecting a more than doubling in the number of people affected.⁴² Across the UK AMD was estimated to account for 34% of total health system costs in 2013.¹³ This represents the rapid growth in costs associated with the anti-vascular endothelial growth factor (VEGF) therapies used within intravitreal injection procedures to treat AMD. The analysis for this atlas shows that from the financial years beginning 2013 to 2019 there was a statistically significant rise in intravitreal injection procedures. In the financial year beginning 2013, 67,000 people received therapy, by the financial year beginning 2019 this had more than doubled to 143,000 people. NICE reports that in the financial year beginning 2015 two of the medicines for the treatment of late AMD were second and fourth in the list of medicines with positive NICE technology appraisals on which the NHS spent most money.⁴³

Healthcare variation

Healthcare variation may be due to differences in preventative (for example, immunisation), primary, community, secondary and tertiary services and how they are commissioned. Maxwell's dimensions of health care quality provide a framework for measuring healthcare quality that incorporates both population level and individual patient care.⁴⁴ When the 6 dimensions are not met patient outcomes can suffer as a result.

⁴² Deloitte Access Economics (2014) [The economic impact of sight loss and blindness in the UK adult population, 2013](#) Royal National Institute of Blind People [Accessed 30 Apr 2021]

⁴³ National Institute for Health and Care Excellence (2018) [Age-related macular degeneration \(NICE Guideline \[NG82\]\)](#) [Accessed 20 Jun 2021]

⁴⁴ Maxwell R (1984) [Quality assessment in health](#) BMJ 288;1470-2 [Accessed 01 Jun 2021]

Maxwell's dimensions of health care quality⁴⁴

- access to services
- relevance to need (for the whole community)
- effectiveness (for individual patients)
- equity (fairness)
- social acceptability
- efficiency and economy

It is appropriate that eye health service provision and spend varies across the country and within communities, as the total burden of eye disease varies widely (equity in access). However, all patients, regardless of where they live, should receive eye health care of equal quality. Access to services and their importance to need is particularly relevant in relation to geographical variation. However, even where services exist, the extent to which best practice is implemented in different settings can vary widely (effectiveness).

Organisation of eye services

The primary prevention of sight loss is intrinsically linked with overall good health. Secondary and tertiary prevention require services to support people. Figure A3 provides an overview of both targeted services across the life course to detect, monitor and treat eye conditions, and universal health services that protect and promote eye health.

Commissioning of eye health services is currently complex and fragmented. CCGs are responsible for commissioning secondary eye care services. NHS England commissions GOS provided by optical practices, screening and specialised services. In addition, primary eye care services provided by optical practices to deliver first contact care, pre-referral assessment and some urgent care services, are commissioned by CCGs.

Screening programmes

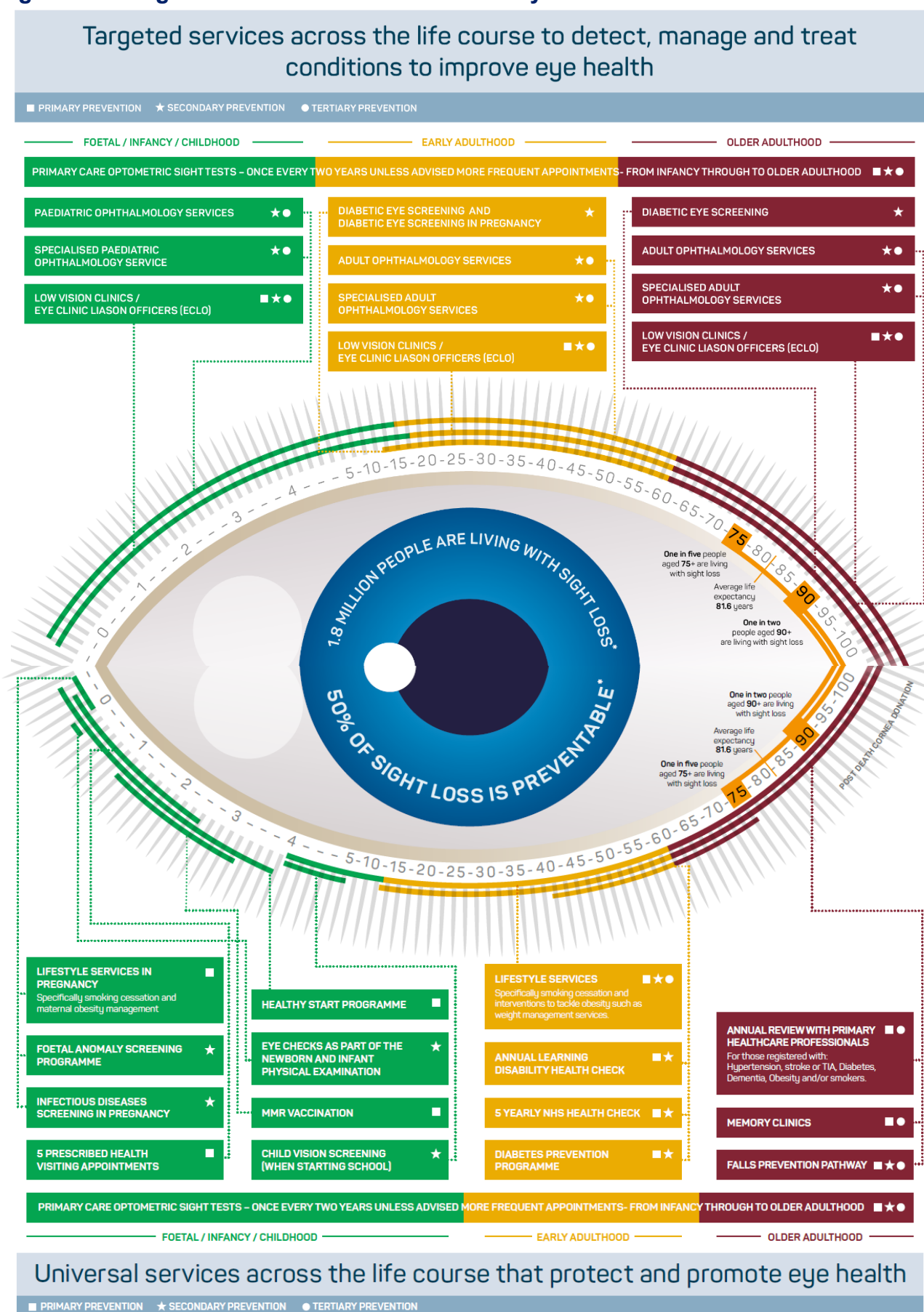
The [UK National Screening Committee](#) (UK NSC) has recommended the following population based screening programmes for eye health:⁴⁵

- the diabetic eye screening programme, a mandated service commissioned universally by NHS England
- the child vision screening programme, commissioned by local areas
- the Newborn and Infant Physical Examination Screening Programme, commissioned by NHS England, includes an eye examination to facilitate early detection of eye problems⁴⁶

⁴⁵ National Screening Committee [Current UK NSC recommendations](#) [Accessed 04 Jun 2021]

⁴⁶ Public Health England (2021) [Guidance NIPE newborn eye screening: screen positive pathway](#) [Accessed 28 Jul 2021]

Figure A3: Targeted and universal services for eye health ⁴⁷



In addition, the Royal College of Paediatrics & Child Health (RCPCH) in collaboration with the Royal College of Ophthalmologists (RCOphth), British Association of Perinatal Medicine (BAPM) and the premature baby charity BLISS provide clinical guidelines for the screening and treatment of retinopathy of prematurity (ROP) in very premature babies. For further information about ROP see the Preterm birth section.

Diabetic Eye Screening (DES)

In financial year beginning 2018 the England diabetic eye screening programme (DESP) screened 2.3 million people, this is an uptake rate of 82.6%. The DES is commissioned by NHS England and is a mandated service. It is considered a highly successful public health initiative. A review found that for the first time in 50 years diabetic retinopathy/maculopathy was not the major cause of blindness in the working age population and attributed some of this success to the DES programme.⁴⁸ For further information about DESP see the Diabetic eye screening chapter.

Child Vision Screening (CVS)

The UK NSC recommends that screening for reduced vision is offered to all children aged 4 to 5 years and should be organised and led by orthoptists.⁴⁹ In 2015 the commissioning of CVS transferred from CCGs to upper tier local authorities (UTLA). Public Health England (PHE) has developed service specifications and information materials to support the delivery of the service.⁵⁰ As the CVS is not universally commissioned there is local variation in the service provided and there is no requirement for local authorities to collect data on CVS.

In 2019 the British and Irish Ophthalmic Society (BIOS) and Clinical Council for Eye Health Commissioning (CCEHC) undertook a Freedom of Information (FOI) request to all CCGs and UTLAs in England to collect information on the commissioning of CVS.⁵¹ The FOI was answered by 98% of UTLAs. Box A1 summaries the main findings of the FOI.

⁴⁷ Public Health England (2018) [Eye Health Needs Assessment Of people in Lincolnshire, Rutland, Leicestershire, Derbyshire, Nottinghamshire, Northamptonshire, Hertfordshire and Bedfordshire](#) [Accessed 01 Sep 2020]

⁴⁸ Liew G, Michaelides M and Bunce C (2014) [A comparison of the causes of blindness certifications in England and Wales in working age adults \(16–64 years\), 1999–2000 with 2009–2010](#) BMJ Open. 2014;4:e004015 [Accessed 18 May 2021]

⁴⁹ National Screening Committee (2019) [The UK NSC recommendation on Vision defects screening in children](#) [Accessed 06 Jun 2021]

⁵⁰ Public Health England [Child Vision Screening Service Specifications and Resources](#) [Accessed 04 Jun 2021]

⁵¹ British and Irish Orthoptic Society and Clinical Council for Eye Health Commissioning (March 2020) [Vision screening provision in children aged 4-5 years in England Findings from a Freedom of Information Request 2019](#) [Accessed 04 Jun 2021]

Box A1: FOI Child Vision Screening findings

- 94% of UTLA areas provided some form of a child vision screening service
- only 47% (70 out of 148 areas) of these were fully compliant with PHE service specifications
- 9 UTLA areas had no screening service
- transfer of responsibility for commissioning CVS services remains incomplete. 30% of services continue to be commissioned by CCGs, and a further 5% of services are either not formally commissioned or there is uncertainty over who commissions the service
- there are significant gaps in the information on the availability of screening services for eligible children in different school or educational settings, and on the uptake of the screening offer

The CCEHC has recognised that the COVID-19 pandemic will have caused major interruptions to CVS services with delayed, postponed or cancelled screening for children starting reception year in September 2019 and 2020. In January 2021 the CCEHC published recommendations for alternative, failsafe arrangements for these children to have their vision tested.⁵²

Primary care services

Eye care services are available “on-demand”, largely in the high street from the private sector, providing both NHS funded and privately funded sight tests. There are no reporting requirements for private sight tests, so data is not collected centrally. This makes it difficult to fully gauge the true level of public demand for eye care or to measure inequalities that may exist.⁵³

Data is collected for the GOS that provide NHS funded sight tests and vouchers for both new and replacement spectacles. The GOS is funded to provide preventative and corrective eye care for children, people aged 60 and over, adults on low incomes and those suffering from or predisposed to eye conditions and diseases. GOS activity data is not representative of the whole population as there will be greater use of NHS funded treatment by populations from more deprived areas and by areas with a higher proportion of those aged 60 and over.⁵³

In financial year beginning 2019 the number of NHS funded sight tests carried out in England was 13,355,060 an increase of 1.0% from the previous financial year and of

⁵² Clinical Council for Eye Health Commissioning (Jan 2021) [Recommendations for the Immediate Management of the Child Vision Screening Backlog for 2019/20 and 2020/21 – in England](#) [Accessed 04 Jun 2021]

⁵³ NHS Digital (updated 11 June 2020) [General Ophthalmic Services activity statistics - Supporting information](#) [Accessed 06 Jun 2021]

38.2% since the financial year beginning 2002. Of all NHS-funded sight tests 3.5%, 462,250, were conducted at the persons home, residential homes and day care centres. In the financial year beginning 2019, 592,334 NHS vouchers for repair or replacement were used, an 3.1% increase since the previous financial year. In total 4,707,088 NHS vouchers were processed in the financial year beginning 2019.⁴⁰

Secondary care services

Core ophthalmology services are provided in most NHS Trusts with specialist services in more than 100 locations providing care on a 'Hub and spoke' model with local hospitals.

CCGs are the main commissioner of secondary care services, this includes; A&E, emergency transport, elective and non-elective treatment, inpatient and outpatient activity, critical care, drugs and devices and other healthcare. Hospital prescribing, specialised and highly specialised eye health services (including ocular genetic disorders, complex corneal disorders, uveitis and surgical treatment for complex glaucoma, for example) are commissioned by NHS England.⁵⁴

Since the financial year beginning 2009, all vision outpatient attendances have increased by 37.6% to the financial year beginning 2019. New analysis for this atlas shows in the financial year beginning 2019 there were 9 million attendances for outpatient appointments for all five vision specialities and subspecialties (ophthalmology, medical ophthalmology, paediatric ophthalmology, orthoptics and optometry) representing 3.4 million people accessing services and treatments with many patients requiring regular ongoing follow-up appointments and treatments to prevent further sight loss. In the financial year beginning 2019 alone 2.2 million people attended outpatients for the first time to begin monitoring or treatment.⁵⁵

Workforce

As a high-volume NHS activity eye health faces the same challenges as the wider NHS with recruitment and retention of staff and workforce shortages.⁵⁶ Recent reports have highlighted a shortage of consultant and specialty training posts required to meet the increasing demand for specialist ophthalmic care.^{57,58} The RCOphth estimated in 2018 that an extra 203 consultant posts were required within 2 years to meet the demand for services in England.⁵⁷ The figures for March 2021, with 1,378 posts in England represented only an increase of 118 from April 2018.⁵⁹

⁵⁴ NHS England (updated 11 March 2021) [Highly Specialised Services 2019](#) [Accessed 06 June 2021]

⁵⁵ NHS Digital [Hospital Outpatient Activity, 2019-20: Treatment specialty](#) [Accessed 06 Aug 2021]

⁵⁶ Clinical Council for Eye Health Commissioning (June 2019) [Priorities for delivering the NHS LTP for Eye Health](#) [Accessed 21 Jun 2021]

⁵⁷ Royal College of Ophthalmologists (January 2019) [Workforce Census 2018](#) [Accessed 18 May 2021]

⁵⁸ MacEwen C, Davis A and Chang L (December 2019) [Ophthalmology GIRFT Programme National Specialty Report Getting It Right First Time](#) [Accessed 13 Dec 2020]

⁵⁹ NHS Digital (March 2021) [NHS workforce statistics](#) [Accessed 15 Jul 2021]

The rate of ophthalmology and medical ophthalmology consultants in England has increased, from 1.7 consultants per 100,000 population in September 2009 to 2.5 per 100,000 population in March 2021.⁵⁹ The RCOphth estimated for hospital units an ideal consultant rate of 3 to 3.5 per 100,000 population.⁵⁷ Across England the rate varies by NHS region from 1.8 per 100,000 population in the East of England to 3.1 per 100,000 in London.⁵⁹

The RCOphth 2018 census also highlighted the need for increases in specialty doctors, staff grades and associate specialists (SAS doctors) and speciality registrars. However, SAS doctors numbers only increased by 1.7%, 40 posts, from April 2018 to March 2021,⁵⁹ below the increase of 188 posts the RCOphth recommended for England.⁵⁷ The number of ophthalmology speciality registrars have fluctuated between 670 and 830 since 2009 with no clear trend, with 296 registrars in March 2021.⁵⁹ The RCOphth commented there are insufficient specialist trainees to fill future posts and meet the expected demands of the service.⁵⁷

Increasingly multidisciplinary teams of ophthalmic nurses, orthoptists, ophthalmic technicians and hospital optometrists play crucial roles alongside medical staff. [Getting it right first time](#) (GIRFT) recommends further implementation of specialised ophthalmic multidisciplinary teams (MDTs) and implementation of the training curriculum for non-medical eye health professionals, the Ophthalmic Common Clinical Competency Framework (OCCCF).⁶⁰

Primary care optometrists and community ophthalmic services provide sight tests, preventative and corrective eye care as well as the identification of eye disease and referral of patients to hospital eye services. They can also be part of post-surgical management and ongoing care for patients after discharge. A multidisciplinary, joined up pathway approach for primary and secondary care services is recognised to be more convenient for patients and a helpful step in addressing capacity issues. Frameworks have been developed by the CCEHC to enable the training of staff and commissioning of services to move forward with these approaches.^{61, 62, 63}

The latest GOS workforce statistics report that in 2019 there were 14,280 optometrists and ophthalmic medical practitioners in England, an increase of 42% since 2009 from 10,023.⁶⁴ This represents 25.5 optometrists and ophthalmic medical practitioners per 100,000 population in 2019, an increase from 19.2 per 100,000 population in 2009. Across England the rate varies by NHS region from 22.9 per 100,000 population in South East of England to 29.5 per 100,000 in London.⁶⁴

⁶⁰ Health Education England [The Ophthalmic Common Clinical Competency Framework](#) [Accessed 04 Jun 2021]

⁶¹ Clinical Council for Eye Health Commissioning (2018) [SAFE: Systems and assurance framework for eye health](#) [Accessed 24 May 2021]

⁶² Clinical Council for Eye Health Commissioning (2018) [Primary Care Framework](#) [Accessed 24 May 2021]

⁶³ Clinical Council for Eye Health Commissioning (2020) [Community Eye Service Framework](#) [Accessed 24 May 2021]

⁶⁴ NHS Digital (31 Dec 2019) [General Ophthalmic services workforce statistics](#) [Accessed 15 Jul 2021]

National Eye Care Restoration and Transformation Programme

Prior to the COVID-19 pandemic, improving eye health services was already a key part of the NHSE&I national outpatients transformation programme.⁶⁵ The NHS Long Term Plan⁶⁵ ambitions, stopping 30 million unnecessary outpatient appointments, offering digital outpatient care and scaling up system working and transformation, could not be achieved without transforming eye services.

The NHS is now moving quickly to restore and recover clinical services following the COVID-19 pandemic.⁶⁶ The National Eye Care Restoration and Transformation Programme brings stakeholders together to build on existing guidelines and recommendations to rapidly recover eye services and to drive forward long-term developments and solutions to improve services.

The programme aims to: Prevent irreversible sight loss as a result of delayed treatment and improve access to care for all based on clinical need; Deliver long-term transformation of eye health services across primary, secondary and community care; drive innovative, integrated, safe and sustainable ways of working and meet the needs of the population now and in the future, keeping patients at the centre of all decision making.

The programme resources and Eye Care Restoration Roadmap for 2020/21 will be hosted on the [FutureNHS Eye Care Hub](#).

How should we respond to variation?

The information contained within this atlas is a starting point for CCGs to examine their local outcomes, the quality of their eye services, and to benchmark themselves against other CCGs 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 simply to just rely on comparison with the national average, but instead to consider what the appropriate figure 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 this concentrated within certain groups or is it equal across the whole population?
(Consider undertaking a health equity audit)

⁶⁵ NHS England (Jan 2019) [NHS Long Term Plan](#) [Accessed 29 Jul 2021]

⁶⁶ NHS England (March 2021) [2021/22 priorities and operational planning guidance](#) [Accessed 29 Jul 2021]

RightCare's model of 'diagnose, develop, deliver' (Figure A4) outlines how local areas can respond to variation.

What is RightCare?

The RightCare delivery methodology is based around three simple principles;

Diagnose the issues and identify the opportunities with data, evidence and intelligence

Develop solutions, guidance and innovation

Deliver improvements for patients, populations and systems

Figure A4: RightCare Model



RightCare Methodology

RightCare's offer is aimed at systems and starts with a review of indicative data to identify opportunities to reduce unwarranted variation and improve population healthcare.

Diagnose

RightCare **data packs** (produced across a range of programme areas e.g. CVD, Respiratory, MSK,) allow local health systems to consider information from across patient pathways to identify the greatest potential improvements in spend and outcomes.

As most health conditions are linked to demographic factors such as deprivation and age, RightCare compares systems to their closest demographically similar geographies. This is to provide realistic comparisons, taking into account the need for healthcare of different populations. Deprived populations will have much higher rates of admissions and worse health outcomes for conditions such as Respiratory, CVD, Cancer, Diabetes.

By comparing 10 demographically similar CCGs, ensures that comparisons are fair and meaningful.

RightCare has developed the '[Similar 10 CCG Explorer tool](#)' which allows users to investigate all the different demographic variables that comprise the similar ten calculations and see how similar their CCG is to the similar 10 CCGs on each these factors. The tool also allows users to create their own bespoke similar ten grouping by changing the weightings of any of the different variables.

The three main data sources which make up a significant number of RightCare indicators combine Secondary Uses Service (SUS+) inpatient data, Quality and Outcomes Framework (QOF) and ePACT prescribing data supplied by the NHS Business Services Authority.

RightCare also provides STPs opportunity data by presenting the sum of all the equivalent opportunities of the CCGs in that area in one pack. They do not include negative opportunities or those which are statistically insignificant.

RightCare data is now included in the [Model Health System](#) - a data-driven improvement tool that supports health and care systems to improve patient outcomes and population health. As well as RightCare and GIRFT quality indicators, the Model Health System includes a wide range of health or health related information. These include population health; community, acute, and mental health services; ambulance service activity; prescribing; and electronic staff records. Data is available by trust or STP. RightCare indicators for Eye Care are available at STP level and can be accessed within the 'Ophthalmology' compartment within the 'Acute Hospital Services' lens and the 'Pathway Improvement Programme' compartment in the 'Policy Priorities' lens. All NHS staff can access the [Model Health System](#).

[RightCare Pathways](#) and [scenarios](#) are designed from a patient point of view starting with prevalence right through to end of life. They are developed in close collaboration with NHS England's National Clinical Directors, patient groups, Public Health England, Royal Colleges, and other key stakeholders.

The data and evidence provides a set of resources to support systems to concentrate their improvement efforts where there is greatest opportunity to address variation and improve population health.

[Develop and Deliver](#)

RightCare supplies systems with tools and products to identify improvements using evidence-based best practice, developed with our national partners, at the moment that local clinicians are considering what good looks like in that area of their system.

Data gaps

The first step in identifying unwarranted variation is the ‘systematic and routine collation, analysis and publication of such variations’.⁶⁷ However, much eye health activity is either not collected or not collected in sufficient detail to allow robust analysis. Significant data gaps that have been identified during the development of this atlas include:

Screening services

Child Vision Screening services are locally commissioned and provided. There is no central data collection and the only recent information available is from the 2019 freedom of information request.

Data on the outcome of eye checks from the Newborn and Infant Physical Examination Screening Programme is not available.

Primary Care Services

The activity and workforce statistics published by NHS Digital for the General Ophthalmic Services (GOS) have reduced in scope in recent years. The data quality no longer meets the standards to be classed as National Statistics and NHS Digital have ceased to publish detailed breakdowns, such as activity by area, as the data is not robust enough.⁵³ From 2020 a new provider is capturing the GOS data submitted to the Central Ophthalmic Payments System (COPS). NHS Digital have yet to announce what changes this may make to the published statistics.⁶⁸

There is no central collection of data on sight checks that are privately funded. This prohibits any analysis of the demand and uptake of sight checks across the whole population.

Secondary care services

Eye health care is provided predominately in outpatient services. However, the mandated data collection for outpatient activity is not as detailed as inpatient care. There is no mandatory requirement for hospital episode statistics outpatient episodes to be coded by diagnosis (ICD10) or by procedure (OPCS4).

⁶⁷ Appleby J, Raleigh V, Frosini F and others (2011) [Variation in Healthcare The good, the bad and the inexplicable](#) The King's Fund [Accessed 04 Jun 2021]

⁶⁸ NHS Digital (20 December 2019) [Consultation on plans to cease NHS Digital General Ophthalmic Services Workforce and Activity publications](#) [Accessed 04 Jun 2021]

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