



Public Health  
England

Protecting and improving the nation's health

# **Eye Health Needs Assessment**

Of people in Lincolnshire, Rutland,  
Leicestershire, Derbyshire,  
Nottinghamshire, Northamptonshire,  
Hertfordshire and Bedfordshire

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## 1.0 Foreword

Vision is a remarkable gift that has evolved over hundreds of millions of years but can be lost in seconds; a loss that can be life-changing. A lot of visual loss is avoidable and much eye disease can be attributed to environmental and/or socioeconomic factors. This Eye health Needs Assessment has been compiled by Public Health England (PHE) to explore the needs of the populations in Lincolnshire, Rutland, Leicestershire, Derbyshire, Nottinghamshire, Northamptonshire, Hertfordshire and Bedfordshire. The aim of this assessment is to improve knowledge of eye health in relation to the perceived needs of the population and to use this to improve the health and wellbeing of the local community and reduce inequalities.

Good vision care impacts on other aspects of health such as the ability of patients to manage other chronic conditions and the avoidance of injurious falls. People with visual impairment are more likely to require residential and community care and additional support through adaptations of their environment. Such support and the loss of quality of life incur considerable costs both to the individual and society. Because of this, specific initiatives to improve eye health, such as recommendations within this need assessment and the UK Vision Strategy, should not be considered in isolation. Rather, they should be integrated alongside the planning of other strategies designed to meet broader health and social care objectives as outlined in public health and NHS outcomes frameworks, and considered in the design of multi-professional services, such as those aimed at reducing falls or smoking cessation for example.

The authors hope that this report will inform the debate about resource allocation and highlight priorities to improve the ocular health of the patients we serve. It should be used to influence the commissioning of suitable eye care services and to help to determine what actions the NHS, local authorities and other partners need to take to meet eye health and social care needs and to address the wider determinants that impact on eye health. The challenge is now, for all involved, to use this opportunity to drive improvement in services and outcomes.



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## 2.0 Executive summary

This report presents an epidemiological health needs assessment of eye health across three LEHNs in the NHS England Central Midlands and NHS England North Midlands areas that are a part of the PHE East Midlands region. The aim of this assessment was to identify the main priorities for improving eye health, reducing preventable sight loss and narrowing eye health inequalities.

The assessment focused on children and young people; specifically eye screening and examinations which can detect eye health problems and prevent sight deficiencies, older people; specifically the 3 conditions of age-related macular degeneration (AMD), cataract and glaucoma which are all known to cause blindness if left undetected or untreated, diabetic retinopathy and retinal vascular disease which can be prevented or the effects minimised if adequately detected and managed and sight loss, specifically blindness.

The relationship between risk factors for poor eye health or sight loss and the chosen priority areas are presented alongside the prevalence of eye health risk factors in each LEHN. Descriptions of the universal services that protect and promote eye health and targeted services that detect, manage, treat conditions to improve eye health are shown against the life course.

While this assessment has gone some way to provide an understanding of eye health need across the region, it has been limited by the breadth of geography and the scarcity of robust data about key eye health conditions and health service delivery and uptake. Additional local intelligence - good quality and more complete data - and gap analysis is required to obtain understand these factors.

The primary recommendation is that each local area uses the data presented in this report, alongside supplementary data, to inform their Joint Strategic Needs Assessment (JSNA). A number of issues have been identified for consideration when developing strategies and plans relating to eye health. These include: prioritisation of early detection in eye health changes, awareness of an ageing population and need to plan and commission eye health services accordingly, equity of service access and gap in assessment of the quality and provision of eye health support services- including rehabilitation.

It is recognised that whilst eye health related social care need and provision was outside the remit of this assessment, an understanding of these services (and population needs) at a local level should be sought to ensure that priority setting encompasses a holistic perspective of eye health need.

## 3.0 Introduction, scope, constraints, key policy and drivers and the National Eye Health context

### 3.1 Introduction

#### 3.11 Outline, aim and purpose

A Health Needs Assessment (HNA) is a systematic method for reviewing the current and future health issues facing a population, leading to agreed priorities to improve health and reduce inequalities.

The aim of this Eye Health Needs Assessment (EHNA) is to identify the main priorities for improving eye health, reducing preventable sight loss and narrowing eye health inequalities in the NHS England Central Midlands and NHS England North Midlands areas that are a part of the PHE East Midlands region. The direction for the development of NHS eye care services to meet the future needs of the population over the next 5 to 20 years will be discussed.

The purpose of the HNA is to support commissioners in Local Authority Public Health (LA PH), NHS England and CCGs in their responsibilities for commissioning needs based eye health services and pathways.

#### 3.12 Background

Local Eye Health Networks (LEHNs) have been established by NHS England Area Teams to ensure that the contribution of eye health professionals is maximised in the design and delivery of eye health services. Three Local Eye Health Networks (LEHNs) - Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands - covered by this assessment. These networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands, 4 in the East of England and 1 in the South East.

This EHNA is defined as “epidemiological” (1). It describes need in relation to eye health problems using estimates of the incidence, prevalence, and other related surrogates of health impact for specific eye health risk groups and draws on existing data. Where possible, information is presented at county footprint geography. It is anticipated that this will enable comparative analysis, within and between LEHNs,

and will assist with the identification of variation in both population needs and commissioned service pathways.

This needs assessment is produced as a series of briefings (split by overview or priority area) which can be read as standalone documents or alongside the others in the series. Within each briefing, a review of epidemiological population need is presented and then a description of the overarching pathway of commissioned services explained. Recommendations about how local commissioners can use the HNA findings to perform local gap analyses and develop their commissioning of needs based eye health services are provided.

### 3.2 Scope

As eye health issues are multi-factorial, with sight affecting every aspect of health and wellbeing, it was imperative that the scope of this HNA was tightly defined from the outset for it to be fit for purpose.

The HNA process has been led by a steering group, chaired by PHE East Midlands, which has included representation from the 3 LEHNS, PHE East of England, LA PH and the Thomas Pocklington Trust. A project initiation document was produced by PHE EM and this was discussed and amended by the group at their first meeting. It was decided that the assessment should focus on the following eye health priority areas:

- Children and young people; specifically eye screening and examinations which can detect eye health problems and prevent sight deficiencies
- Older people; specifically the 3 conditions of age-related macular degeneration (AMD), cataract and glaucoma which are all known to cause blindness if left undetected or untreated
- Diabetic retinopathy and retinal vascular disease which can be prevented or the effects minimised if adequately detected and managed
- Sight loss, specifically blindness

These areas are chosen because they cover opportunities to give every child the best start in eye health and the major preventable sight threatening conditions in the UK (2).

### 3.3 Constraints

A large amount of data from a diverse range of sources is required if a complete picture of eye health is to be presented. Local knowledge and intelligence is necessary to access and make sense of much of this information. Given the wide geographical area covered by this HNA, this level of detail is beyond the scope of this work.

Although services that are commissioned to support a social eye health need will not be discussed in this assessment, this does not discount their importance in supporting the individuals who need them.

### 3.4 Key policy and drivers

The World Health Organisation's Vision 2020 (3) programme aims to eliminate preventable sight loss by 2020. It was originally supported in the United Kingdom by Vision 2020 UK and UK Vision Strategy; these bodies have recently been replaced by Vision UK (4). This independent partnership organisation, established in 2017, has the aim of collaborating in eye health and sight loss by working with and for other organisations in the eye health and sight loss sector. They have set 3 priority areas: improve the nation's eye health and end sight loss, improve support across eye health and social care services, and improve awareness of sight loss and create an inclusive society for all. In England the leading eye health and sight loss organisations are working together to deliver a plan for change called the England Vision Strategy. The England Vision Strategy is part of Vision UK's country led approach.

The annual update of the NHS Outcomes Framework (5) sets out the high-level national outcomes that the NHS should be aiming to improve year on year. The indicators are split into 5 domains; for which aspects of eye health fit within each one. The framework includes a duty on the NHS Commissioning Board and Clinical Commissioning Groups to have regard both to the need to reduce inequalities between the people of England and to National Institute of Health and Clinical Excellence (NICE) quality standards (6).

Alongside the NHS Outcomes Framework, the CCG Outcomes Indicator Set (7) provides clear, comparative information for CCGs, Health and Wellbeing Boards, local authorities, patients and the public about the quality of health services commissioned by CCGs and the associated health outcomes. The indicators are useful for CCGs and Health and Wellbeing Boards in identifying local priorities for quality improvement and to demonstrate progress that local health systems are making on outcomes.

Health & Wellbeing Boards (8) have statutory responsibility to conduct and identify priorities for health, wellbeing and social care across a health community. These are presented in Joint Strategic Needs Assessments (JSNA) and inform the commissioning of healthcare services.

NHS RightCare (9) is one approach adopted to support the development of sustainable systems. Through intelligence, innovation and implementation the programme aims to increase value and improve quality by reducing unwarranted variation and improve population planning. Additionally, NHS Improvement (10) is leading the support offer to providers to implement the Forward View to reduce the 3 gaps of health and wellbeing, quality and finance; described in the NHS Five Year Forward View (11).

The Royal College of Ophthalmologists and the College of Optometrists (12) are the professional bodies for ophthalmologists and optometrists respectively. Whilst aiming to support their members in all aspects of professional development, both bodies also advocate for improvements to ophthalmic public health. The Royal College of Ophthalmologists launched their Strategic Plan 2015–19 in March 2015 (13) and this outlines the 3 priority areas over the next 5 years that the college will focus on to help shape eye care services of the future and to raise eye care higher on the health agenda. These are:

- continue to develop and deliver the core services of training, education and assessment
- influence and uphold standards in eye health through proactive leadership and expertise in the field of ophthalmology
- better represent, support and engage with members to ensure that the college remains strong and better placed to improve services

The College of Optometrists have recently published 2 reports specifically related to ophthalmic public health. In May 2014, the “focus on falls” report (14) concentrated on the need to work with UK falls services to identify and support patients with failing vision. Subsequently, the College have been working with the Local Optical Committee Support Unit (LOCSU) to support local optical committees (LOCs) and local eye health networks (LEHNs) in prioritising falls awareness. Secondly, in May 2016, a summary on current evidence about uncorrected refractive error in deprived areas and its association with patient access to eye care services as well as practical recommendations was published (15). Whilst there was found to be a lack of evidence for an association between socio-economic status and patient access to uncorrected refractive error (URE) eye services, qualitative studies suggest that public perceptions of optometry and optical services are a key factor. It was

recommended that more public health education targeting deprived populations on eye health and eye services needed.

### 3.4.1 National standards and indicators

The Public Health Outcomes Framework (16) for England includes indicators for eye health and sight loss. Inclusion of the indicator, which measures the proportion of Certificates of Visual Impairment (CVI) registrations due to AMD, glaucoma and diabetic retinopathy, ensures that avoidable sight loss is recognised as a critical public health issue as well as allowing crude comparisons between local authorities and a benchmark against the England average.

The National Institute for Health and Clinical Excellence (NICE) (17) has produced a range of guidance including technology appraisals, interventional procedure guidelines and medtech innovation briefings on a range of eye health conditions. These cover cataracts, glaucoma and macular degeneration (amongst others). Additionally, in development are guidelines on health and social care support for “adults with lifelong ... visual impairments” and “serious eye conditions” (18). However the publication date for this guidance is yet to be released.

## 3.5 The National Eye Health Context

Sight loss is a major public health issue, affecting about 2 million people in the United Kingdom. Analysis in 2009 predicted that this number is expected to double to 4 million by 2050 (19). This increase is almost wholly attributable to an aging population, with over 80% of sight loss occurring in people aged over 60 years.

Whilst new technologies, for example in relation to AMD, have significantly improved the treatment hospital eye services can provide, estimates show that 50% of sight loss (19) can be avoided and for this reason commissioned pathways of eye healthcare are essential to achieve improvements in eye health. Historically this has not been reflected in NHS programme budgeting expenditure. A review of the total national 2013-14 NHS spend on “problems of vision”, performed by the RNIB (20), revealed that approximately 64% was classified as secondary care or urgent/emergency care spend whereas 0.1% was prevention or health promotion spend.

Preventable sight loss is a modifiable public health issue (16). Given the call in the NHS Five Year Forward View for a “radical upgrade in prevention and public health” (11) alongside the new models of health and care, that is, Sustainability Transformation Partnerships (STPs), Integrated Care Organisations (ICO) and Accountable Care Systems (ACS) (21), there are opportunities to rethink our approach to achieving optimal eye health for all. Shifting services upstream and

linking up existing preventative approaches could yield great benefits for both individuals and the public as a whole.

The challenge is how to ensure that any changes in pathways are needs based and that gaps or variation in either the commissioning or uptake of services are minimised. This HNA is the starting point to achieving this across the NHS England Central Midlands and NHS England North Midlands areas that are a part of the PHE East Midlands region.

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# 4.0 Population, demography, risk factors and overview of commissioned eye health services

## 4.1 Description of the population, demography and risk factors for eye health conditions

This is the first briefing in this series relating to eye health. This briefing provides an overview of the populations, demography and risk factors of the geographical area covered in this needs assessment. The analysis in this document relates to 3 local eye health networks (LEHNs); Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands. As shown in Figure 1, these networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands, 4 in the East of England and 1 in the South East.

**Figure 1: Geography**



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In all 3 areas, the population is expected to increase overall by 2039. In general, the populations of females are greater than the populations of males although there is some variation across age groups. The percentage change in population size tends to be similar between males and females until aged 65 and over, when the population of males in this age group is projected to increase more than the population of females. However, this may be because historically, the population of males has always been smaller and their life expectancy is now beginning to catch up with female life expectancy. Although the numbers of people within each age group are generally projected to increase by 2039, the overall structure of the populations are expected to change so that those aged less than 65 years old make up a reduced proportion of the population, whilst the proportion of people aged over 65 will increase. This change reflects the ageing of the population. The changes in the population structure between 2015 and 2039 are visualised in Figure 2.

### Derbyshire and Nottinghamshire

- The population in 2015 was 2,161,365, projected to increase by 12% to 2,417,900 by 2039
- The number of 0 to 19 and 20 to 39 year olds will increase by 8% and 6% respectively
- The number of people aged 40 to 64 will decrease by 4% overall, despite the number of males aged 40 to 44 years increasing by 1,221
- The number of people aged 65 and over will increase by 23%
- The number of people aged 90 and over is forecast to increase by 206%; the number of males aged over 90 will increase by 316%

### Leicestershire and Lincolnshire

- The population in 2015 was 1,547,085, projected to increase by 34% to 2,066,100 by 2039
- The number of 0 to 19, 20 to 39, and 40 to 64 year olds will increase by 33%, 32% and 13% respectively
- The number of people aged 65 and over will increase by 68%
- The number of people aged 90 and over is forecast to increase by 246% overall; the number of males aged over 90 will increase by 359%

### Hertfordshire and the South Midlands

- The population in 2015 was 2,806,111, projected to increase by 23% to 3,446,700 by 2039
- The number of 0 to 19, 20 to 39, and 40 to 64 year olds will increase by 16%, 8% and 15% respectively
- The number of people aged 65 and over will increase by 73%

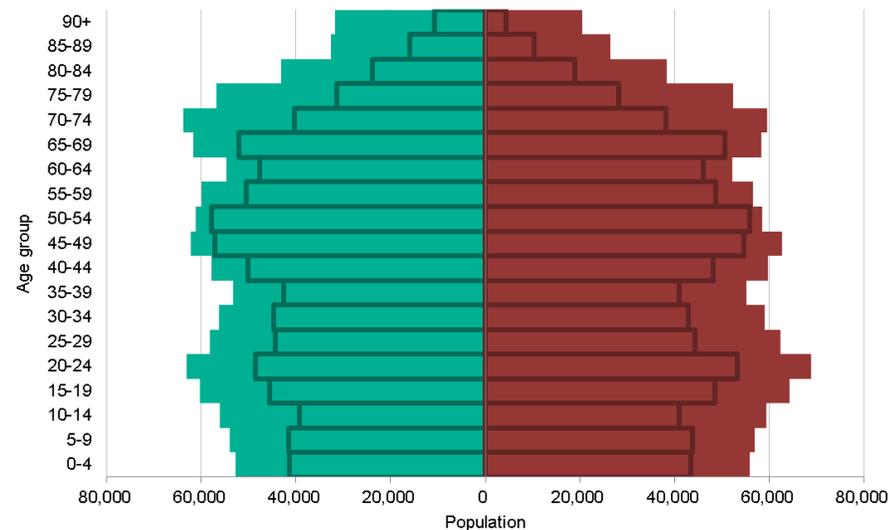
- The number of people aged 90 and over is forecast to increase by 234% overall; the number of males aged over 90 will increase by 351%

**Figure 2: Population pyramids by local eye health network; 2015 mid-year population estimates and 2039 population projections. Figures are aggregated from upper tier and unitary local authority figures.**

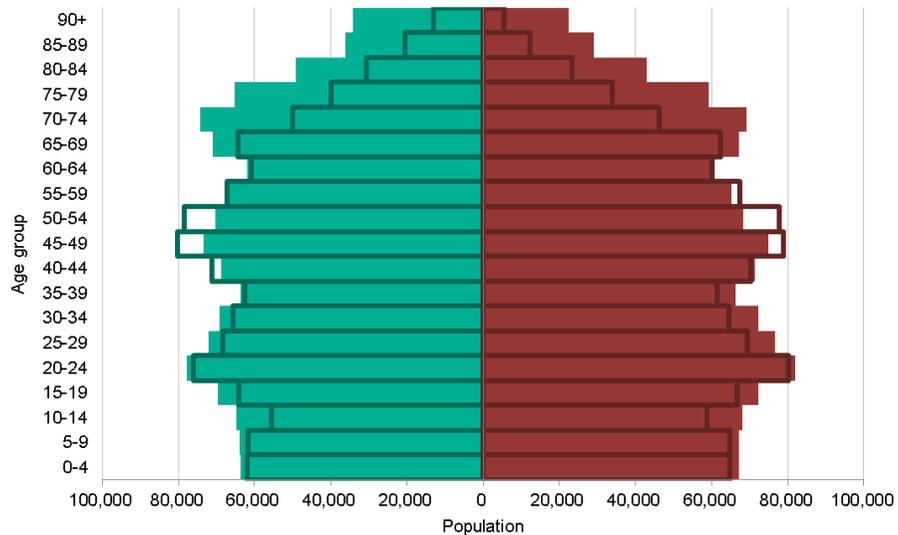
Source: ONS (22, 23)

■ Female 2015    
 ■ Female 2039    
 ■ Male 2015    
 ■ Male 2039

Lincolnshire, Leicestershire and Rutland



Nottinghamshire and Derbyshire



South Midlands and Hertfordshire

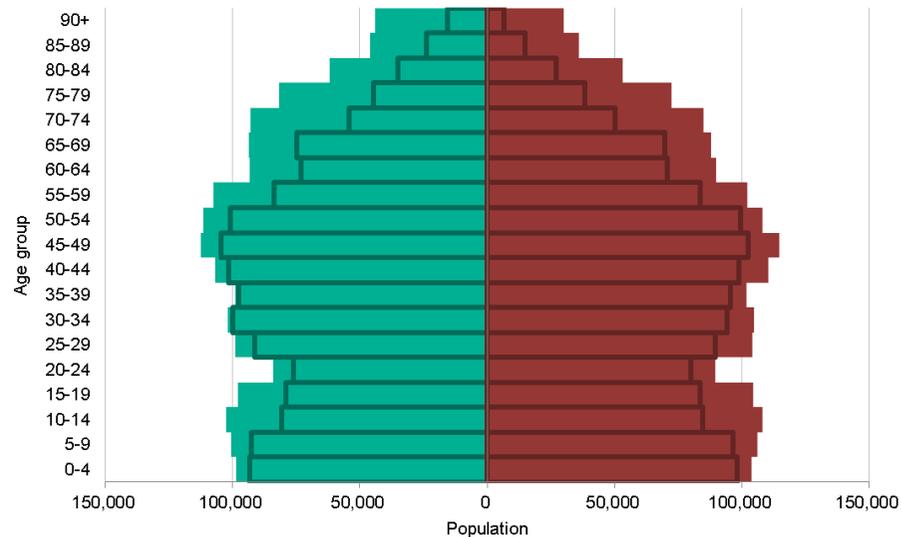


Figure 3 shows the proportion of the population in each middle super output area (MSOA) who are black and minority ethnic (BME) communities. BME populations are defined as people who state their ethnicity as not white, and these figures are obtained from the 2011 Census data. In 2011 in Derbyshire and Nottinghamshire and Leicestershire and Lincolnshire local professional networks, black and minority ethnic populations tended to live in or around the cities of Derby, Nottingham and Leicester, with up to 10% of the population outside the cities made up of BME populations. In Hertfordshire and the South Midlands, BME populations were more likely to live in and around Northampton, Wellingborough, Bedford, Milton Keynes and Luton. The distribution of black and ethnic minority populations was more varied across Hertfordshire, where BME populations tended to live more towards the south of the county.

**Figure 3: Black and minority ethnic population by middle layer super output area (MSOA). Source: Census 2011 via PHE Local Health (24, 25)**

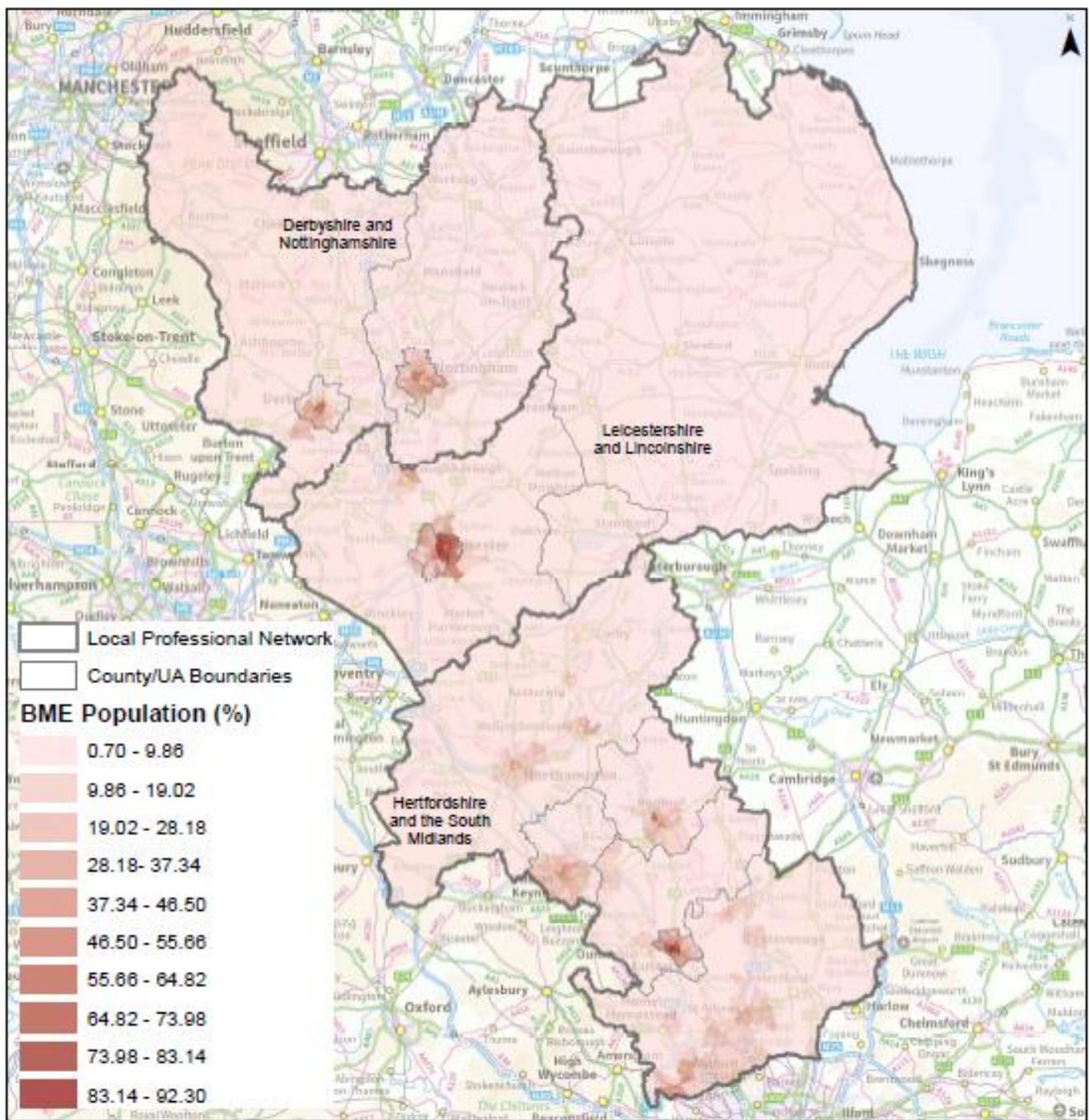
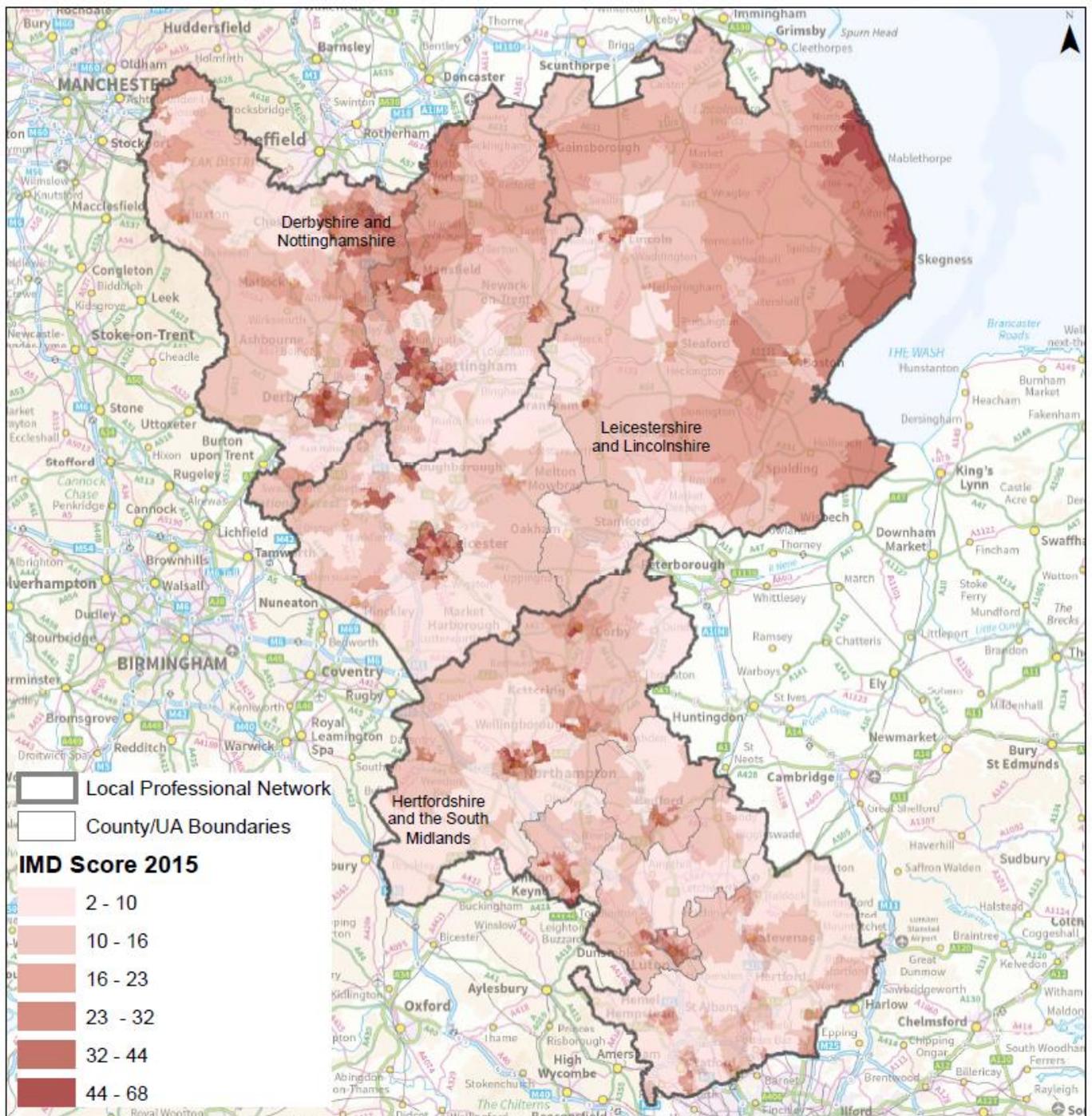


Figure 4 shows the index of multiple deprivation (IMD) scores from 2015 at MSOA level. There is wide variation in deprivation across the 3 local professional networks. The highest levels of deprivation tend to be in urban areas; however, there are also pockets of deprivation along the coast of Lincolnshire and in the coalfield areas of Nottinghamshire and Derbyshire.

**Figure 4: Index of Multiple Deprivation score by MSOA, 2015; the higher the score, the more deprived the area. Source: DCLG via PHE Local Health (25, 26)**



## Relationship between risk factors for poor eye health or sight loss and the chosen HNA priority areas

Although not exhaustive, the key risk factors for poor eye health or sight loss (relevant to this EHNA) are explained below.

### Age considerations

The prevalence of eye health conditions and sight loss increases with age. As the UK population is ageing, it is predicted that the number of people living with sight loss will double by 2050 (27).

### Ethnicity

The risk of developing diabetes, a precursor for diabetic retinopathy and potential for visual loss, is higher in South Asian populations. Additionally, the risk of developing glaucoma is higher in African and African-Caribbean populations (28) and people from South-East Asia and China are at higher risk of angle-closure glaucoma.

### Learning disabilities

There is evidence that people with learning disabilities have a higher incidence of eye and vision problems than the general population (29), yet do not access the required services more frequently than the general population. This gives rise to a health inequality and inequitable distribution of health resources.

### Health determinants

The impact of sight loss, both from uncorrected refractive error and eye conditions, coupled with other health determinants can dramatically increase risk and demand on health and social care services. The links between sight loss and other health determinants include:

- **Obesity** which has been linked to several eye conditions including cataracts and AMD (30). Obesity also has a strong link to diabetes and an exacerbation of sight deterioration in diabetic retinopathy (31).
- **Smoking** and AMD, the UK's leading cause of blindness. This association is as strong as the link between smoking and lung cancer (32). Smokers not only double their risk of developing AMD but also tend to develop it earlier than non-smokers. Additionally, smoking can make diabetes-related sight problems worse, and has been linked to the development of cataracts (33).
- **Blood Pressure/Hypertension** not only increases the risk of stroke but if uncontrolled can increase the risk of both retinal vein and retinal artery occlusion

(34). Both conditions can cause sudden loss of vision in one eye and can lead to further complications. Blood pressure is also an important risk factor in the incidence and progression of diabetic retinopathy (34).

- At least 100,000 people in the UK have both **dementia** and serious sight loss (35). This is set to increase as the UK population ages. Most are aged over 65 and among everyone of that age, normal ageing of the eye will reduce their vision to some extent.
- Damage as a result of **stroke** can impact on the visual pathway of the eyes which can lead to disruption of eye movement control causing diplopia, nystagmus, blurred vision and loss of depth of perception (36). In addition there may be inability to read (alexia) or to write (agraphia). Approximately 60% of stroke survivors have some sort of visual dysfunction following stroke (37).

### Socio-economic considerations

Evidence shows that there is a link between people on low incomes and living in deprivation and people living with sight loss; 3 out of four blind or partially sighted people are living in poverty or on its margins (38).

### Prevalence of eye health risk factors in each Local Eye Health Network

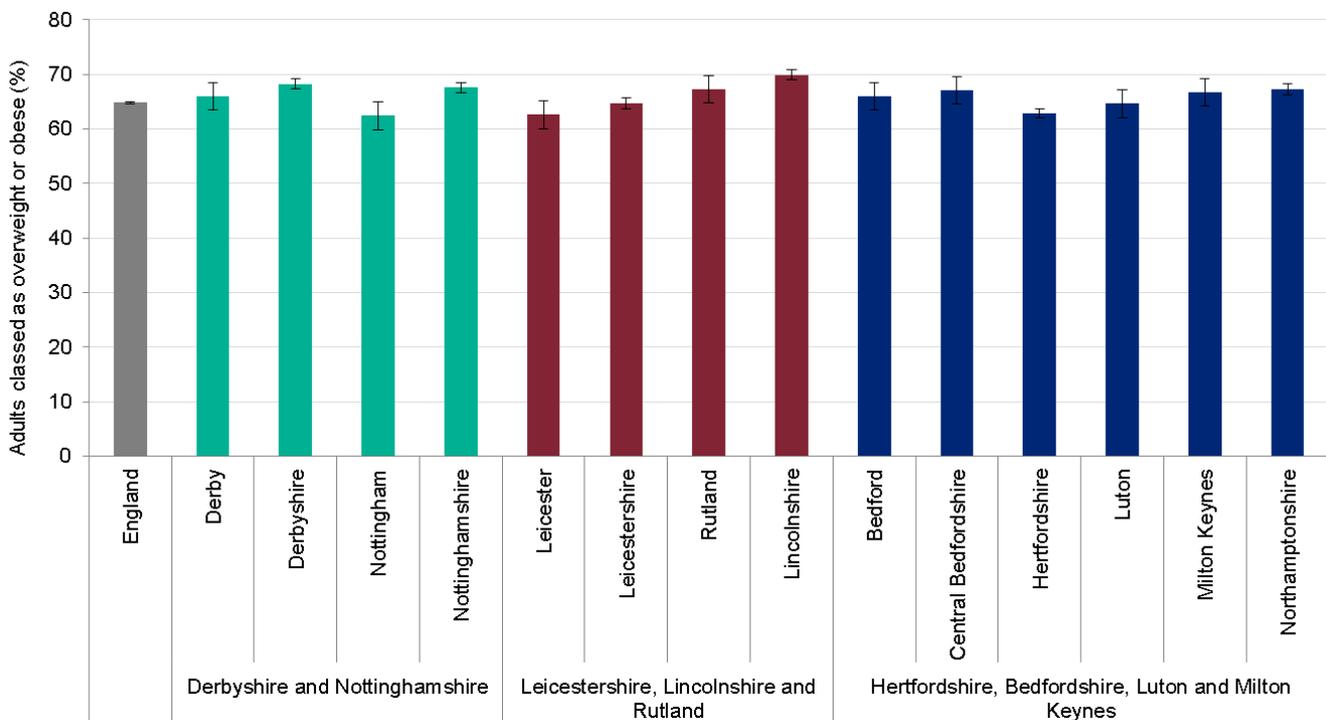
The prevalence of each of these risk factors varies across each of the three local professional networks as summarised in Figure 5. It should be noted that prevalence data from the Quality and Outcomes Framework (QOF) relates only to GP registered individuals who have been diagnosed with the condition, and does not take into account those who have not yet been diagnosed (39). QOF prevalence figures are therefore likely to be an underestimate, as they do not reflect true prevalence in a population but may indicate that some areas are better or worse at case finding than others. In some cases, there can be a large number of people predicted to be undiagnosed in a population. For example, it is estimated that only 58% of people with hypertension are currently diagnosed and recorded on GP hypertension registers (40).

- The proportion of adults classed as **overweight or obese** was generally similar across the 3 areas in 2013-15; however, in Lincolnshire, Derbyshire, Nottinghamshire and Northamptonshire the proportion was significantly higher than the national average
- The prevalence of **smoking** in adults in Nottingham and Lincolnshire was higher than the national average in 2016. All other local authorities across the 3 areas were similar to the national average, with the exception of Leicestershire, Central Bedfordshire and Hertfordshire. Here, the prevalence of smoking was significantly lower than the national average
- In 2015/16, the prevalence of recorded **hypertension** was significantly higher than the national average in all local authorities included here with the exception of Leicester, Nottingham, Hertfordshire, Milton Keynes and Luton, where it was significantly lower

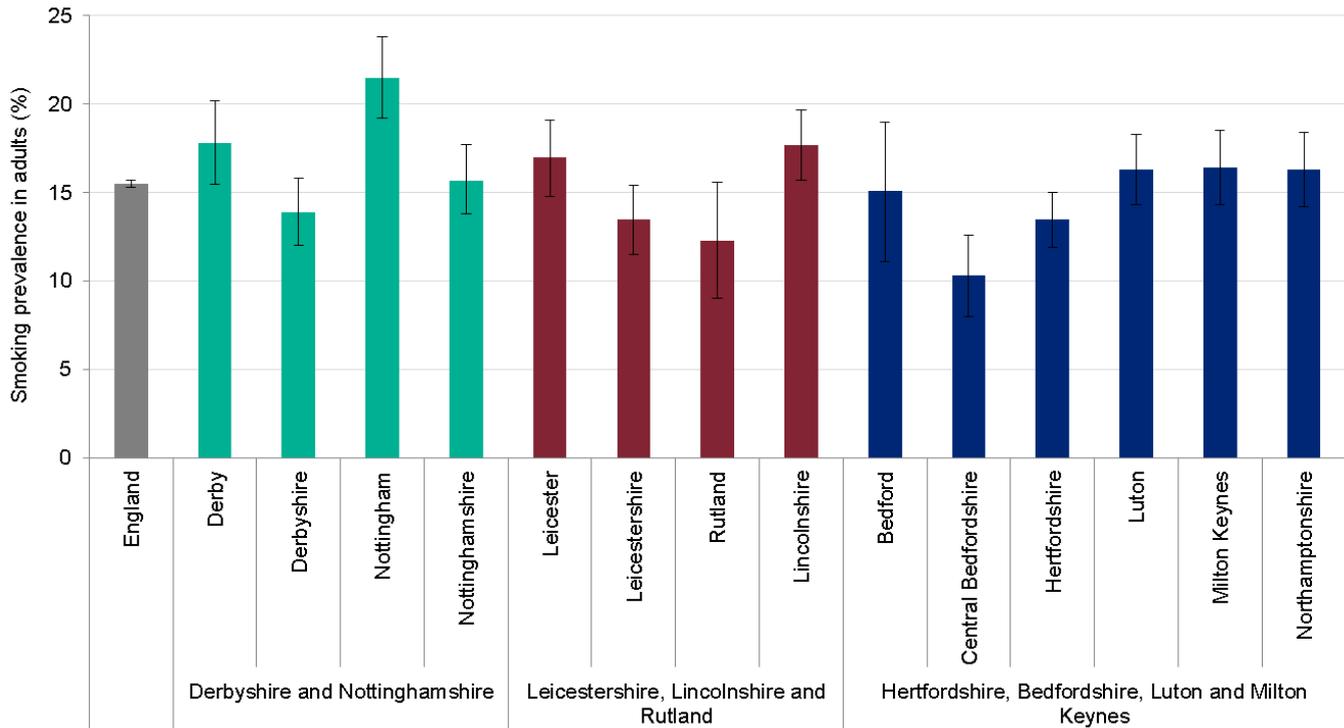
- The prevalence of recorded **dementia** was significantly lower than the national average in Leicester, Nottingham and the South Midlands local authorities in 2015/16
- In 2015/16, the prevalence of recorded **stroke** was significantly higher than the national average in Lincolnshire, Rutland, Derbyshire and Nottinghamshire and similar to the national average in Leicestershire and Derby. It was lower than national average in Leicester, Nottingham and all of the South Midlands local authorities
- The prevalence of recorded **diabetes** was significantly higher than the national average in 8 of the local authorities in 2015/16 – Leicester, Leicestershire, Lincolnshire, Derby, Derbyshire, Nottinghamshire, Luton and Bedford. It was similar to the national average in Rutland and significantly lower in Nottingham, Northamptonshire, Central Bedfordshire, Milton Keynes and Hertfordshire
- The prevalence of recorded **learning disability** was significantly higher than the national average in 8 of the local authorities in 2014/15 – Leicester, Lincolnshire, Derby, Derbyshire, Nottingham, Nottinghamshire, Northamptonshire and Bedford. It was similar to the national average in Rutland, and significantly lower than the national average in Leicestershire, Hertfordshire, Central Bedfordshire, Luton and Milton Keynes

**Figure 5: Risk factor prevalence**

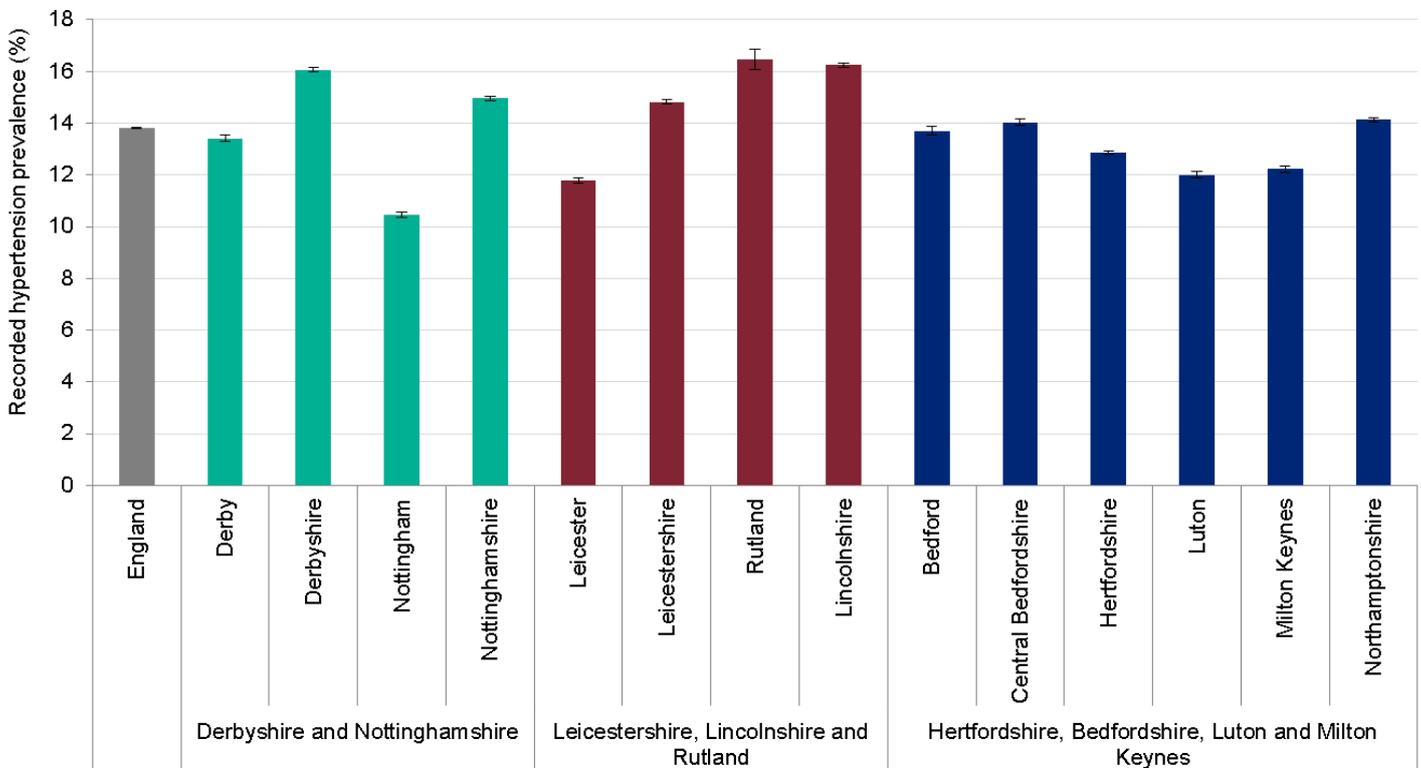
**i. Adults classed as overweight or obese, 2013-15. Includes 95% confidence intervals. Source: APS via PHE Fingertips (41)**



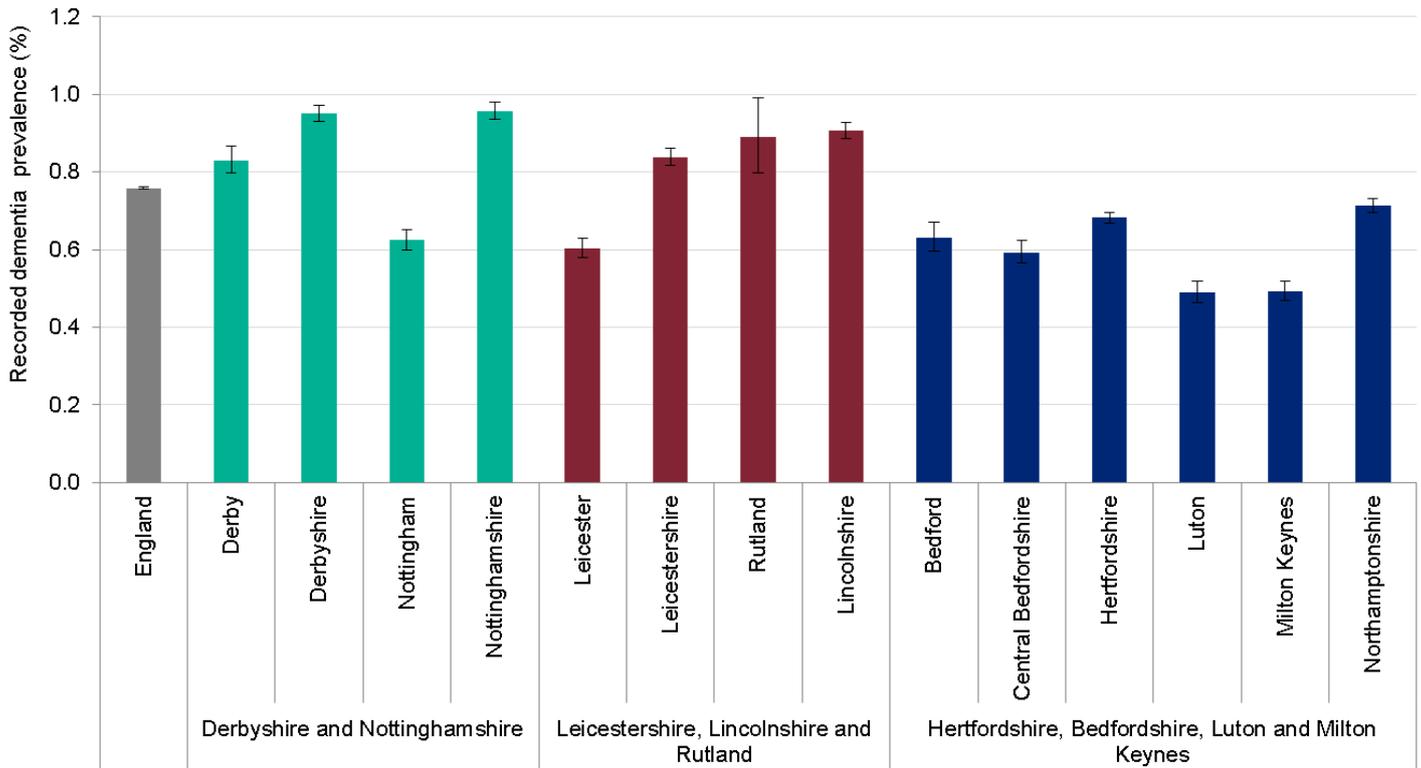
**ii. Prevalence of smoking, 2016. Includes 95% confidence intervals. Source: APS via PHE Fingertips (41)**



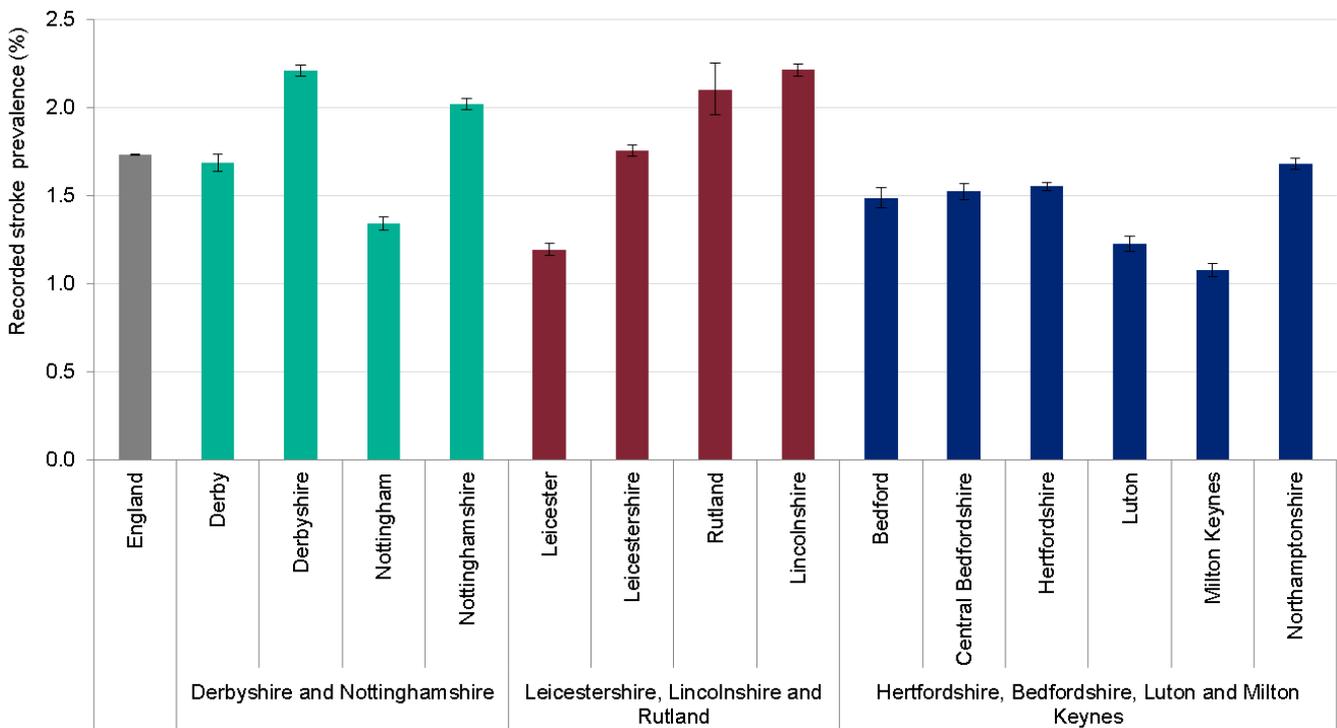
**iii. Prevalence of recorded hypertension, 2015/16. Includes 95% confidence intervals. Source: QOF via PHE Fingertips (41)**



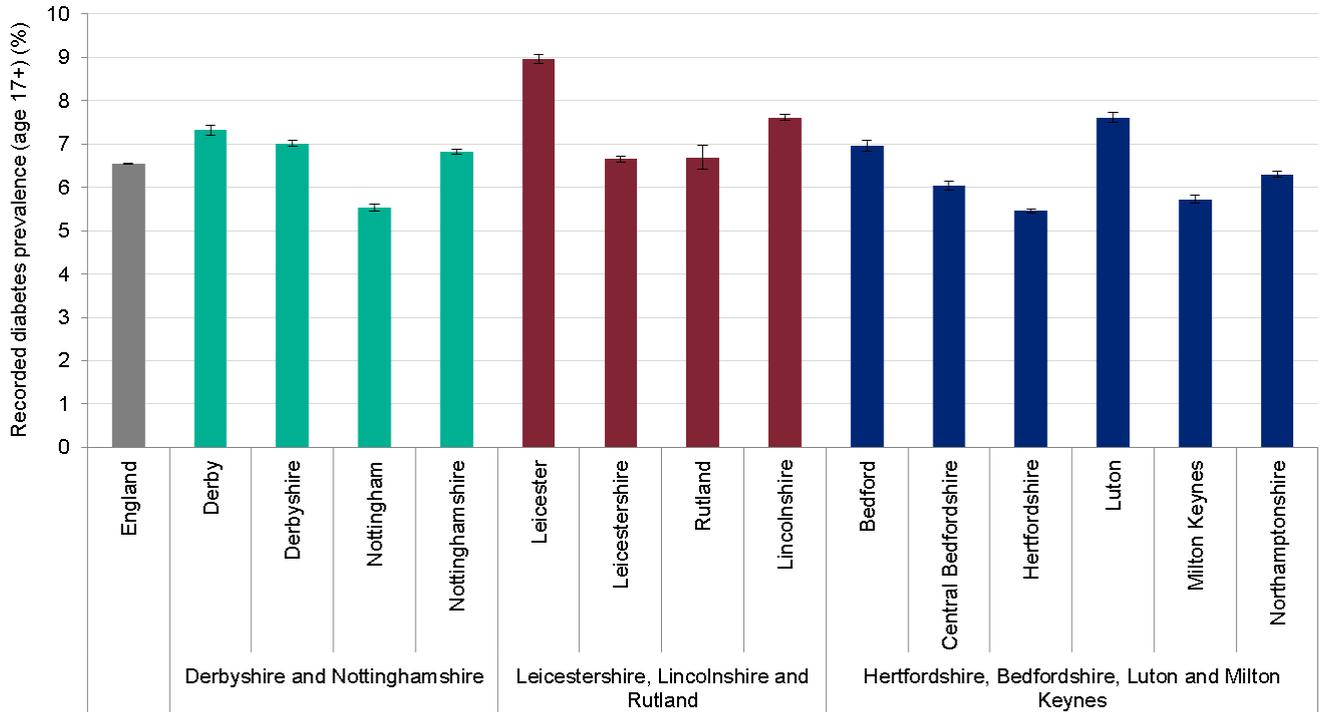
iv. **Prevalence of recorded dementia, 2015/16. Includes 95% confidence intervals. Source: QOF via PHE Fingertips (41)**



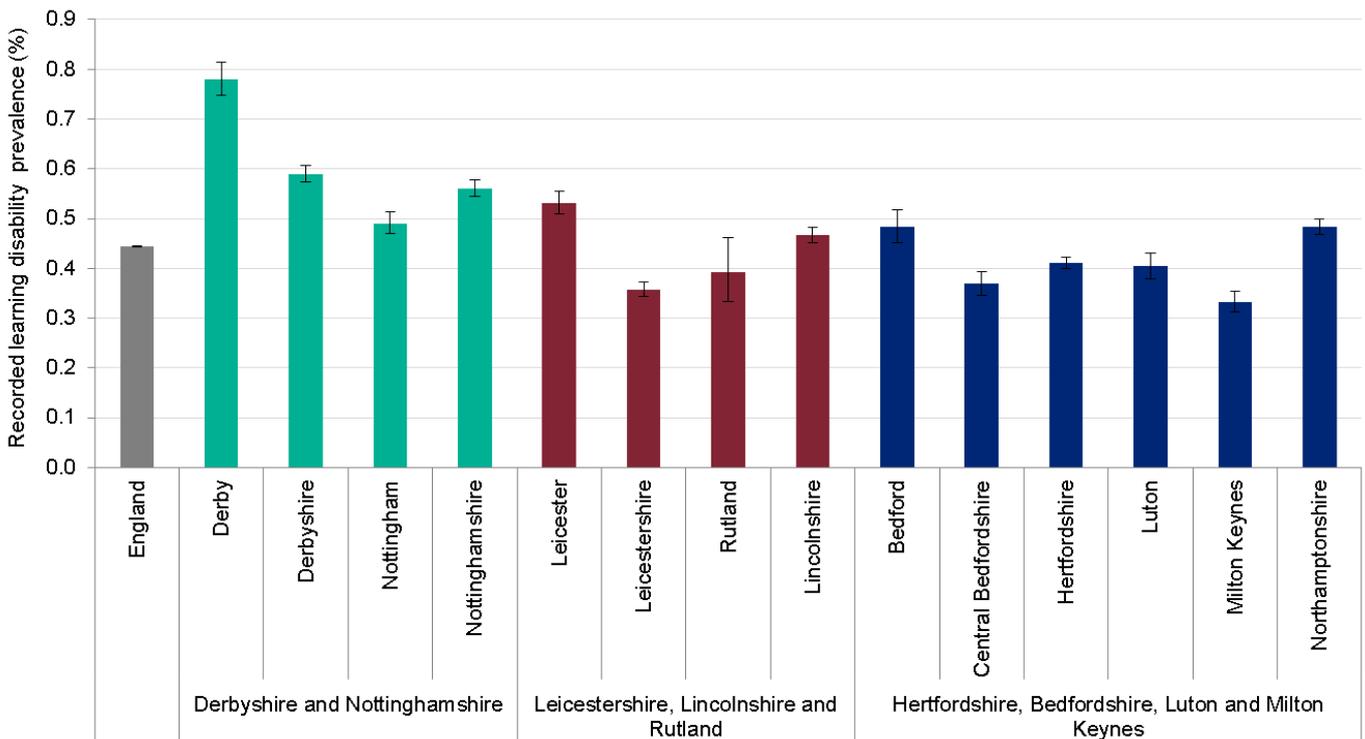
v. **Prevalence of recorded stroke, 2015/16. Includes 95% confidence intervals. Source: QOF via PHE Fingertips (41)**



vi. **Prevalence of recorded diabetes, 2015/16. Includes 95% confidence intervals. Source: QOF via PHE Fingertips (41)**



vii. **Prevalence of learning disability, 2014/15. Includes 95% confidence intervals. Source: QOF via PHE Fingertips (41)**



Disease or risk factor projections can be used to estimate the future burden of disease in a population. For the purpose of this analysis, recorded disease prevalence in 2030 was estimated by projecting the current GP list sizes to 2030 for each local authority area, assuming that GP list sizes will grow in line with the growth of the population of the area. The 2015/16 QOF prevalence was then applied to the estimated 2030 list size to obtain an estimate of the number of people on each disease register for each local authority assuming that prevalence remains the same over time. These estimates are shown in Figure 6. It should be noted that these are likely to be underestimates, as they only reflect those who have been diagnosed and placed on disease registers but do not take into account those in the population who are undiagnosed. This method is also very simplistic in that it does not take into account life expectancy increases over time which may lead to an increase in disease prevalence in a population, and it does not consider any changes in the prevalence or management of behavioural or lifestyle risk factors that may alter the susceptibility of the population to developing the disease. The projections are also not age standardised, and the conditions discussed here affect older people disproportionately more.

The numbers of people who are smokers or overweight in 2030 could not be projected from the annual population survey data as denominators are not given. Furthermore, the prevalence of these factors are likely to change over the coming years, perhaps due to changes in legislation, and this makes the calculation of accurate projections problematic.

**Figure 6: Estimated numbers of people on QOF disease registers by local authority. Source: Quality and Outcomes Framework via PHE Fingertips; ONS mid-2015 population estimates and mid-2014 based projections (22, 23, 41).**

**i. Dementia (all ages)**

	Recorded prevalence 2015/16 (%)	Number on disease register 2015/16	Projected list size 2030 (all ages)	Projected number on disease register 2030
Derby	0.83	2,266	299,059	2,485
Derbyshire	0.95	7,579	850,025	8,083
Nottingham	0.63	2,285	397,297	2,483
Nottinghamshire	0.96	7,542	855,308	8,187
Leicester	0.60	2,363	439,360	2,654
Leicestershire	0.84	5,766	761,406	6,390
Lincolnshire	0.91	6,928	835,333	7,571
Rutland	0.89	327	38,618	344
Northamptonshire	0.71	5,408	850,788	6,068
Bedford	0.63	1,111	206,421	1,305
Central Bedfordshire	0.59	1,577	319,228	1,893
Luton	0.49	1,184	282,257	1,382
Hertfordshire	0.68	8,506	1,436,115	9,797
Milton Keynes	0.49	1,462	348,670	1,720
England	0.76	436,805	63,576,705	482,553

## ii. Diabetes (ages 17+)

	Recorded prevalence 2015/16 (%)	Number on disease register 2015/16	Projected list size 2030 (age 17+)	Projected number on disease register 2030
Derby	7.32	15,896	240,647	17,613
Derbyshire	7.02	45,878	701,649	49,225
Nottingham	5.53	16,494	323,535	17,901
Nottinghamshire	6.82	43,654	695,972	47,445
Leicester	8.96	27,420	345,554	30,972
Leicestershire	6.65	37,266	622,554	41,414
Lincolnshire	7.61	47,728	687,618	52,349
Rutland	6.69	1,981	31,149	2,084
Northamptonshire	6.30	37,956	684,696	43,151
Bedford	6.96	9,668	164,178	11,425
Central Bedfordshire	6.04	12,814	255,248	15,429
Luton	7.61	13,906	216,049	16,446
Hertfordshire	5.46	53,982	1,137,170	62,090
Milton Keynes	5.72	13,103	274,150	15,692
England	6.55	3,033,529	51,437,440	3,367,562

## iii. Hypertension (all ages)

Hypertension	Recorded prevalence 2015/16 (%)	Number on disease register 2015/16	Projected list size 2030 (all ages)	Projected number on disease register 2030
Derby	13.41	36,561	299,059	40,089
Derbyshire	16.07	128,061	850,025	136,569
Nottingham	10.47	38,277	397,297	41,596
Nottinghamshire	14.96	117,852	855,308	127,929
Leicester	11.77	46,049	439,360	51,723
Leicestershire	14.81	101,757	761,406	112,775
Lincolnshire	16.25	124,240	835,333	135,774
Rutland	16.46	6,046	38,618	6,357
Northamptonshire	14.13	107,169	850,788	120,246
Bedford	13.70	24,087	206,421	28,287
Central Bedfordshire	14.03	37,306	319,228	44,785
Luton	12.00	29,013	282,257	33,864
Hertfordshire	12.84	160,138	1,436,115	184,451
Milton Keynes	12.22	36,219	348,670	42,606
England	13.81	7,949,274	63,576,705	8,781,821

#### iv. Stroke (all ages)

Stroke	Recorded prevalence 2015/16 (%)	Number on disease register 2015/16	Projected list size 2030 (all ages)	Projected number on disease register 2030
Derby	1.69	4,598	299,059	5,042
Derbyshire	2.21	17,619	850,025	18,790
Nottingham	1.34	4,915	397,297	5,341
Nottinghamshire	2.02	15,931	855,308	17,293
Leicester	1.19	4,674	439,360	5,250
Leicestershire	1.76	12,082	761,406	13,390
Lincolnshire	2.22	16,931	835,333	18,503
Rutland	2.10	772	38,618	812
Northamptonshire	1.68	12,755	850,788	14,311
Bedford	1.49	2,615	206,421	3,071
Central Bedfordshire	1.52	4,055	319,228	4,868
Luton	1.23	2,964	282,257	3,460
Hertfordshire	1.55	19,366	1,436,115	22,306
Milton Keynes	1.08	3,199	348,670	3,763
England	1.74	998,774	63,576,705	1,103,378

According to the estimated risk factor prevalence projections shown in Figure 6, the numbers of people diagnosed with dementia, diabetes, hypertension and stroke will increase if the recorded prevalence, GP case finding patterns and age structure of the populations remain the same from 2015 to 2030. The methodology used means that projections generally do not show any changes in the distribution of diagnosed patients over time; for example, in 2015/16, Hertfordshire had the most people diagnosed with dementia whilst Rutland had the least. These rankings would not change by 2030. Similarly, the largest increases in the numbers of patients on registers are predicted to occur in Hertfordshire, with the smallest increases in Rutland. This is driven by the fact that these areas have the largest and smallest populations anyway. If changes to the age structure of the population between 2015 and 2030 were taken into account, geographical variation across the areas may be different.

#### Summary

- The population is projected to increase within all 14 of the local authorities that are covered by the local eye health networks discussed in this briefing
- Population structure changes suggest an ageing population across the patches, with the greatest increase in the proportion of people aged 65 and over
- According to the 2011 census, black and minority ethnic populations tend to live mostly within Leicester, Derby and Nottingham with the PHE East Midlands

footprint. In Hertfordshire and the South Midlands, black and ethnic minority populations tend to be more dispersed, particularly towards the south of the patch

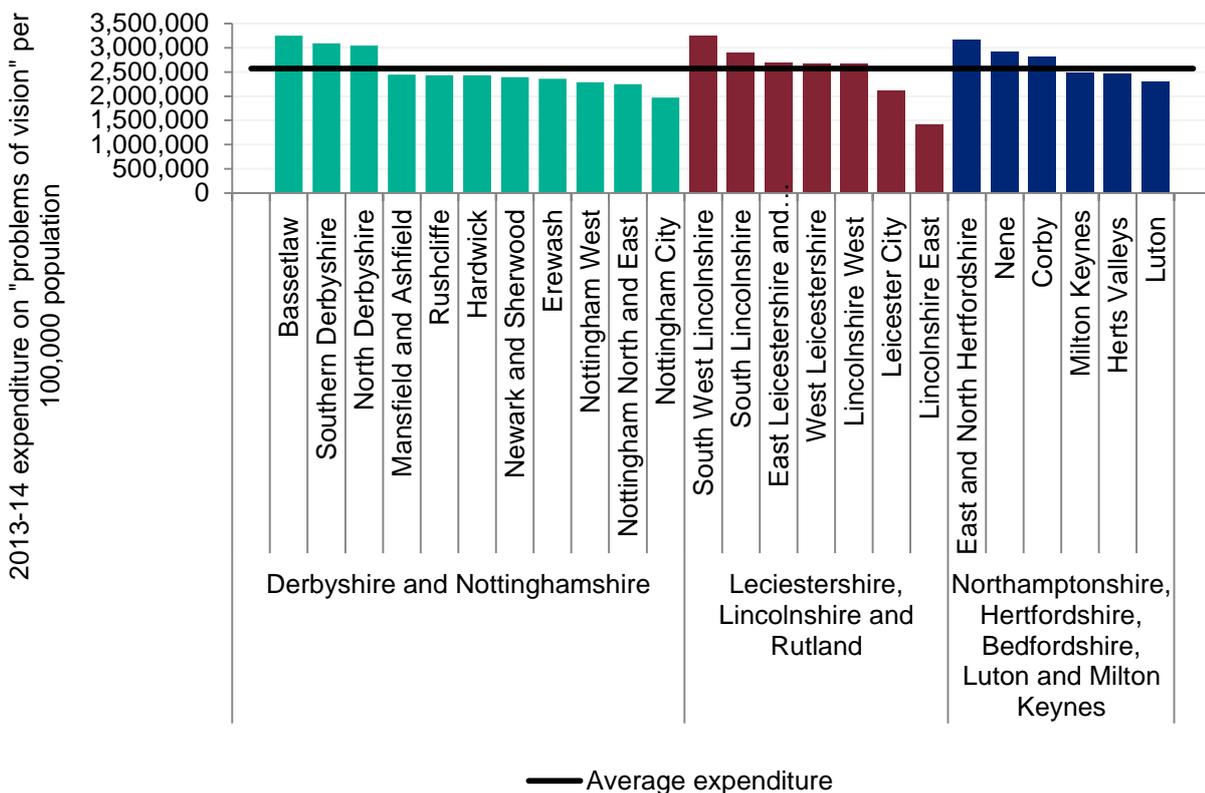
- Deprivation appears to be more widely dispersed, particularly in Derby and Derbyshire and Nottingham and Nottinghamshire, as well as in Lincolnshire. There are clear pockets of deprivation in urban areas in all three LEHNs
- Risk factor prevalence varies across the 14 local authorities. Outcomes are significantly higher than national average in many of the areas for multiple risk factors, and those local authorities sitting within the PHE East Midlands footprint tend to have higher prevalence or recorded prevalence of risk factors than those within the PHE East of England footprint
- Estimated numbers of people diagnosed with dementia, diabetes, hypertension and stroke are projected to increase across all 3 LEHNs by 2030. However, the estimates presented in this briefing are likely to be underestimates, as they do not take into account a number of factors that increase the complexity of the picture

## 4.2 Overview of commissioned services

Without a thorough knowledge of the existing services for a population, it is not possible to meaningfully measure and define their needs. As a Health Needs Assessment is largely about change, it is necessary to know what to change from, as well as what to change to. For a needs assessment, emphasis is usually placed on summarising the existing services as succinctly as possible.

The commissioning and delivery of eye health and sight loss services is complex; some pathways cross county boundaries and can involve many providers in a network of care, including specialist services. In this needs assessment, the service delivery landscape includes NHS hospital ophthalmology departments / sites, private ophthalmology providers offering NHS services, community provider organisations and optical / optometry practices. A range of providers hold contracts to deliver primary care services and there are borough based social care services for people with visual impairment. Although not covered in this assessment, a range of charity and voluntary organisations are involved in delivering sight loss support.

A graph of the total 2013-14 NHS programme budget (42) spend on “problems of vision” for CCGs in this assessment is shown below. The total expenditure figure is made up of 15 elements, including primary prescribing costs, scheduled and unscheduled care and running costs. The graphs demonstrates that variation exists in spend by CCGs across the patch and also within each of the three LEHNs.



\*NB. South Lincolnshire and Herts Valley CCGs had data quality warnings in place. These figures should not be used to make inferences or comparisons.

In the 2013-14 period, across CCGs in Derbyshire and Nottinghamshire there was a difference in expenditure per 100,000 population of £1,280,318 between the highest (Bassetlaw) and lowest (Nottingham City) spenders. In CCGs in the Leicestershire, Rutland and Lincolnshire LEHN, this difference in spend was £1,831,300 per 100,000 population and across the Hertfordshire, Bedfordshire, Luton and Milton Keynes LEHN was £878,967 per 100,000 population.

Whilst it is important to note that these expenditure figures are not standardised to account for the age structure of each CCG population (which will impact on vision service expenditure due to the increased prevalence of eye health disorders in older adults), nor do they include social and welfare costs (which are significant for individuals' who have visual impairment or sight loss), they do provide some indication of variation in NHS commissioned services by area.

The eye health commissioning process needs to ensure that services are delivered safely, by an appropriately trained workforce and compliant and compatible with both NICE guidance and advice from relevant national bodies including professional bodies. Pathways of care should be evidence-based and audited for outcomes and value for money. Roles and responsibilities in the processes of commissioning and provision of care need to be clear, to ensure safe and effective care based on clinical need. With this in mind, there are opportunities for greater efficiency by reducing the duplication of effort in commissioning, procurement and delivery through

commissioning at greater scale and the agreement of consistent and integrated eye care pathways within and across LEHNs may enable this.

This assessment aims to demystify current commissioning arrangements by providing both an overview of the services that are commissioned to identify and treat eye health conditions for those individuals displaying signs and symptoms and also services that protect and promote eye health across the life course.

# Targeted services across the life course to detect, manage and treat conditions to improve eye health

■ PRIMARY PREVENTION ★ SECONDARY PREVENTION ● TERTIARY PREVENTION

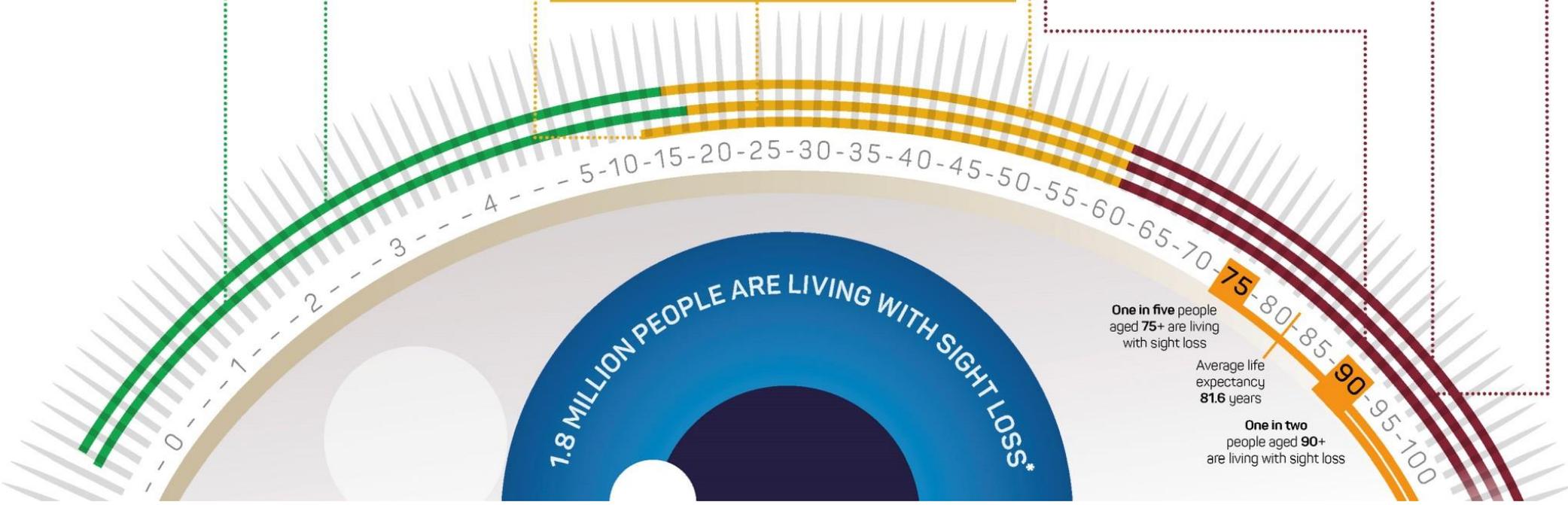
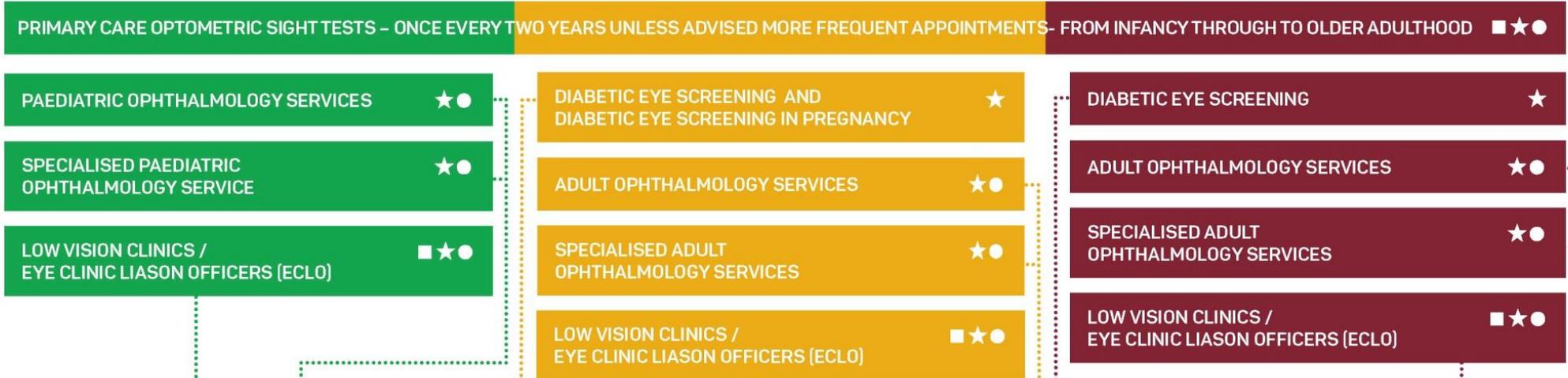
SERVICE NAME	WHAT IS THIS SERVICE AND WHY IS IT A PRIORITY FOR DETECTING, MANAGING AND TREATING EYE HEALTH?	COMMISSIONING RESPONSIBILITY	STANDARD PROVIDER ARRANGEMENTS
Sight tests ■★●	Examine the eye and test vision. Identify eye abnormalities and refer individuals on for further examination or commence prescribed treatment e.g. medications or corrections for refractive error.	NHSE/ Private	Most people should have a sight test once every two years from approx. 3 years old, unless advised by their optometrist to have a more frequent appointment. This may include people who are at greater risk of eye disease. The majority of people will be entitled to a free NHS test, according to their age, income or for other health reasons. Full details are available at <a href="http://www.nhs.uk">www.nhs.uk</a> or from optometrist or ophthalmic medical practitioners in optician practices.
Low vision clinics/ Eye clinic liaison officers (ECLO) ■★●	Following diagnosis and certification of vision impairment (CVI) there is a statutory requirement to support the registration of blind and partially sighted individuals and assess their social care needs. Early intervention, advice and support can be provided by eye clinic liaison officers (ECLO) or low-vision clinics. These services can bridge the gap between health and social care services.	CCGs although currently no standard responsibility	No standard provider arrangement
Ophthalmology services ★●	Ophthalmologist led service to investigate the cause of eye health disturbance and use evidence based guidelines to diagnose, manage and treat eye conditions.	CCGs and NHSE for specialised services	For individuals meeting referral criteria, delivered as per local commissioning arrangements by MDTs in an outpatient setting.
Diabetic Eye Screening programme ★	Screening involves examining the back of the eyes and taking photographs of the retina. Depending on the grade of the image, referral is made onto ophthalmology services for further investigations and diabetic retinopathy treatment (if required). Evidence shows that early identification and treatment of diabetic eye disease can reduce sight loss.	PHE however screening and immunisation commissioners (and other staff) are embedded within NHSE area teams	For all people with type 1 and type 2 diabetes aged 12 or over, delivered at least yearly (or after the first antenatal clinic visit and 28 weeks if women is pregnant) by screening teams in the ophthalmology outpatient setting.

\*Access Economics, 2009. Future Sight Loss UK 1: The economic impact of partial sight and blindness in the UK adult population. RNIB.

# Targeted services across the life course to detect, manage and treat conditions to improve eye health

■ PRIMARY PREVENTION   ★ SECONDARY PREVENTION   ● TERTIARY PREVENTION

FOETAL / INFANCY / CHILDHOOD      EARLY ADULthood      OLDER ADULTHOOD



50% OF SIGHT LOSS IS PREVENTABLE\*

One in two people aged 90+ are living with sight loss

Average life expectancy 81.6 years

One in five people aged 75+ are living with sight loss

POST DEATH CORNEA DONATION

**LIFESTYLE SERVICES IN PREGNANCY** ■  
Specifically smoking cessation and maternal obesity management

**FOETAL ANOMALY SCREENING PROGRAMME** ★

**INFECTIOUS DISEASES SCREENING IN PREGNANCY** ★

**5 PRESCRIBED HEALTH VISITING APPOINTMENTS** ■

**HEALTHY START PROGRAMME** ■

**EYE CHECKS AS PART OF THE NEWBORN AND INFANT PHYSICAL EXAMINATION** ★

**MMR VACCINATION** ■

**CHILD VISION SCREENING (WHEN STARTING SCHOOL)** ★

**LIFESTYLE SERVICES** ■★●  
Specifically smoking cessation and interventions to tackle obesity such as weight management services

**ANNUAL LEARNING DISABILITY HEALTH CHECK** ■★

**5 YEARLY NHS HEALTH CHECK** ■★

**DIABETES PREVENTION PROGRAMME** ■★

**ANNUAL REVIEW WITH PRIMARY HEALTHCARE PROFESSIONALS** ■●  
For those registered with: Hypertension, stroke or TIA, Diabetes, Dementia, Obesity and/or smokers.

**MEMORY CLINICS** ■●

**FALLS PREVENTION PATHWAY** ■★●

**PRIMARY CARE OPTOMETRIC SIGHT TESTS – ONCE EVERY TWO YEARS UNLESS ADVISED MORE FREQUENT APPOINTMENTS- FROM INFANCY THROUGH TO OLDER ADULthood** ■★●

FOETAL / INFANCY / CHILDHOOD

EARLY ADULthood

OLDER ADULthood

# Universal services across the life course that protect and promote eye health

■ PRIMARY PREVENTION   ★ SECONDARY PREVENTION   ● TERTIARY PREVENTION

# Universal services across the life course that protect and promote eye health

■ PRIMARY PREVENTION   ★ SECONDARY PREVENTION   ● TERTIARY PREVENTION

SERVICE NAME	WHY IS THIS SERVICE A PRIORITY FOR IMPROVING EYE HEALTH?	COMMISSIONING RESPONSIBILITY	STANDARD PROVIDER ARRANGEMENTS
Sight tests ■★●	Examine the eye and test vision. Identify eye abnormalities and refer individuals on for further examination or commence prescribed treatment e.g. medications or corrections for refractive error.	NHSE/ Private	Most people should have a sight test once every two years from approx. 3 years old, unless advised by their optometrist to have a more frequent appointment. This may include people who are at greater risk of eye disease. The majority of people will be entitled to a free NHS test, according to their age, income or for other health reasons. Full details are available at <a href="http://www.nhs.uk">www.nhs.uk</a> or from optometrist or ophthalmic medical practitioners in optician practices.
Lifestyle services; specifically smoking cessation and obesity management ■★●	Support people to make healthy lifestyle changes. Smoking doubles the chances of developing AMD; UK's biggest cause of blindness. Health campaigns that highlight link between sight loss and smoking increase the number of people who quit. Obesity has been linked to several eye conditions including cataracts and AMD. Obesity also has a strong link to diabetes and an exacerbation of sight deterioration in diabetic retinopathy.	LA (non-prescribed)	For individuals meeting eligibility, delivered as per local criteria by teams in community setting (depending on local commissioning arrangement).
Child vision screening ★	Identify children with impaired sight and enable timely intervention. Screen vision to identify those with altered sight or amblyopia. The optimal development of vision for children with amblyopia is through prompt access to treatment.	LA (non-prescribed: part of the Healthy Child Programme)	For all children, delivery as one off (or one second testing attempt) in year the child turns 5 by orthoptist-led service in community setting.
Diabetes Prevention Programme ■★	Support individuals' to reduce their risk of type 2 diabetes through education on healthy eating and lifestyle, support to lose weight and bespoke physical exercise programmes. Type 2 diabetes is a leading cause of preventable sight loss in people of working age. It is a major contributor to a range of health conditions that are a risk for sight loss e.g. stroke.	NHSE (currently being rolled out)	For individuals meeting eligibility, delivered as per local criteria by teams in community setting.
Falls prevention pathways ■★●	Deliver a range of interventions to minimise the risk and impact of falling. Reducing avoidable sight loss has been proven to reduce the risk of falls.	CCGs and LA dependent on local arrangements	For individuals meeting eligibility, delivered as per local criteria by teams in community setting.

\*Access Economics, 2009. Future Sight Loss UK 1: The economic impact of partial sight and blindness in the UK adult population. RNIB.

### 4.3 Reflection on summary of need in relation to description of commissioned services

The population is projected to increase within all 14 of the local authorities that are covered by the LEHNs in this briefing. The greatest increase is expected in the proportion of people aged 65 and over. With this in mind, all commissioned services, delivered across the life course, need to be robust and outcome focused if the proportion of preventable sight loss is to be reduced. Whilst services focusing on primary prevention are essential, strengthening the capacity and capability of a broad range of CVD prevention programmes (including smoking cessation), the Diabetes Prevention Programme (DPP) and falls prevention pathway are of particular importance given that the estimated numbers of people diagnosed with cardiovascular related diseases, dementia, diabetes, hypertension and stroke are projected to increase across all 3 LEHNs by 2030.

Within cities in Nottinghamshire, Derbyshire and Leicestershire, patients requiring further support or intervention following NHS health checks (including referral to the DPP) may be higher than in more rural areas. This is because the proportion of black and minority ethnic populations is higher in these areas and is based on evidence that some black and minority ethnic groups, including those of South Asian descent, are at increased risk of diabetes and CVD. Ensuring equity of access to NHS health checks (and other services) must be a high priority of both commissioners and providers if prevention aims are to be realised.

Across the 3 LEHNs in this assessment, deprivation appears to be more widely dispersed, particularly in Derby and Derbyshire and Nottingham and Nottinghamshire, as well as in Lincolnshire. Additionally, there was found to be clear pockets of deprivation in urban areas in all 3 LEHNs. Ensuring that commissioned service configuration and locality of provision does not perpetuate existing health inequalities is of paramount importance. Local knowledge and intelligence in the form of equity audits are required to determine where this is not currently the case. Where possible the impact of deprivation on achieving optimal eye health for all should be minimised.

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# 5.0 Children and young people

This is the second briefing in this series relating to eye health. The previous briefing covered population, demography and risk factors, while the subsequent briefings cover age-related macular degeneration, glaucoma and cataracts in older people, diabetic retinopathy, and blindness.

## 5.1 Needs review

The analysis in this document relates to 3 local eye health networks (LEHNs); Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands. As shown in Figure 1, these networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands and 4 are in the East of England, with 1 in the South East.

Figure 1: Geography



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## Risk factors in children and young people

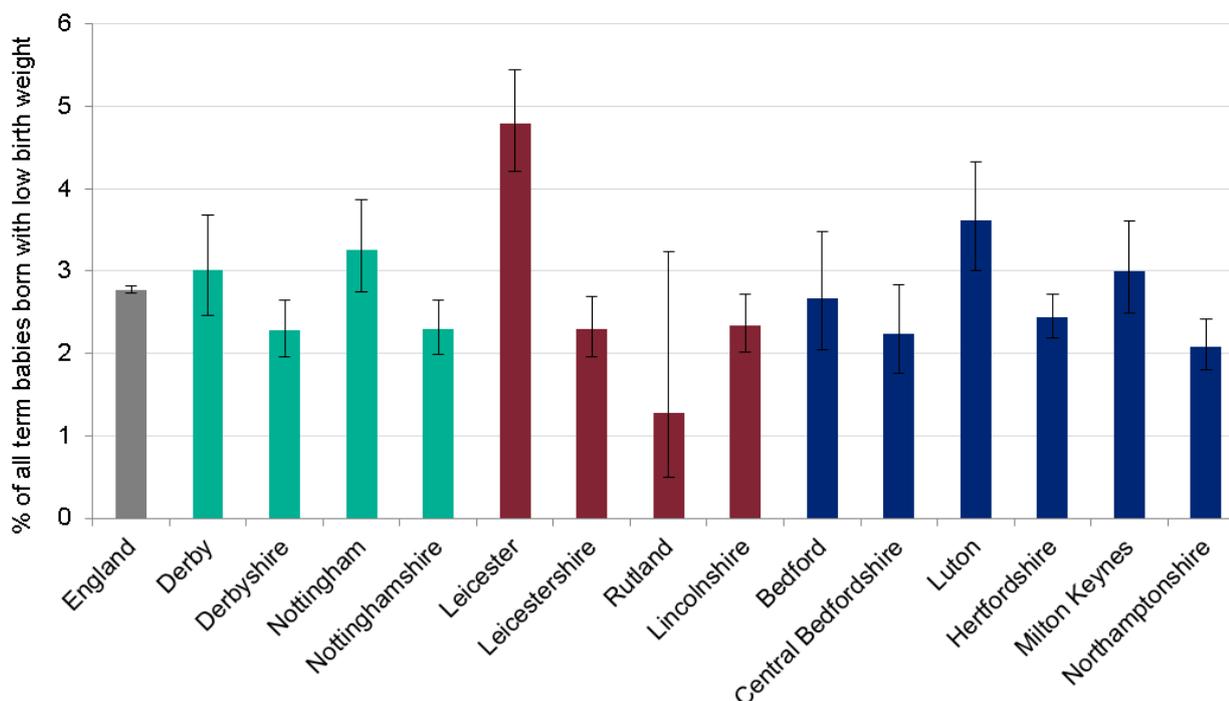
The risk factors for sight loss in children and young people tend to differ from the risk factors for sight loss in adults. Children and young people most at risk of vision impairment or sight loss are those who:

- Were born prematurely
- Had low birthweight
- Were exposed to maternal infections during pregnancy
- Were exposed to maternal drug and alcohol consumption during pregnancy
- Were exposed to maternal smoking during pregnancy
- Have certain genetic conditions, such as Down's syndrome
- Have learning disabilities

There is little data available on the prevalence of these risk factors in children and young people. The Public Health Outcomes Framework (PHOF) (43) includes indicators relating to low birthweight and maternal smoking at time of delivery and Department for Education data relating to learning disabilities is presented later on in this briefing.

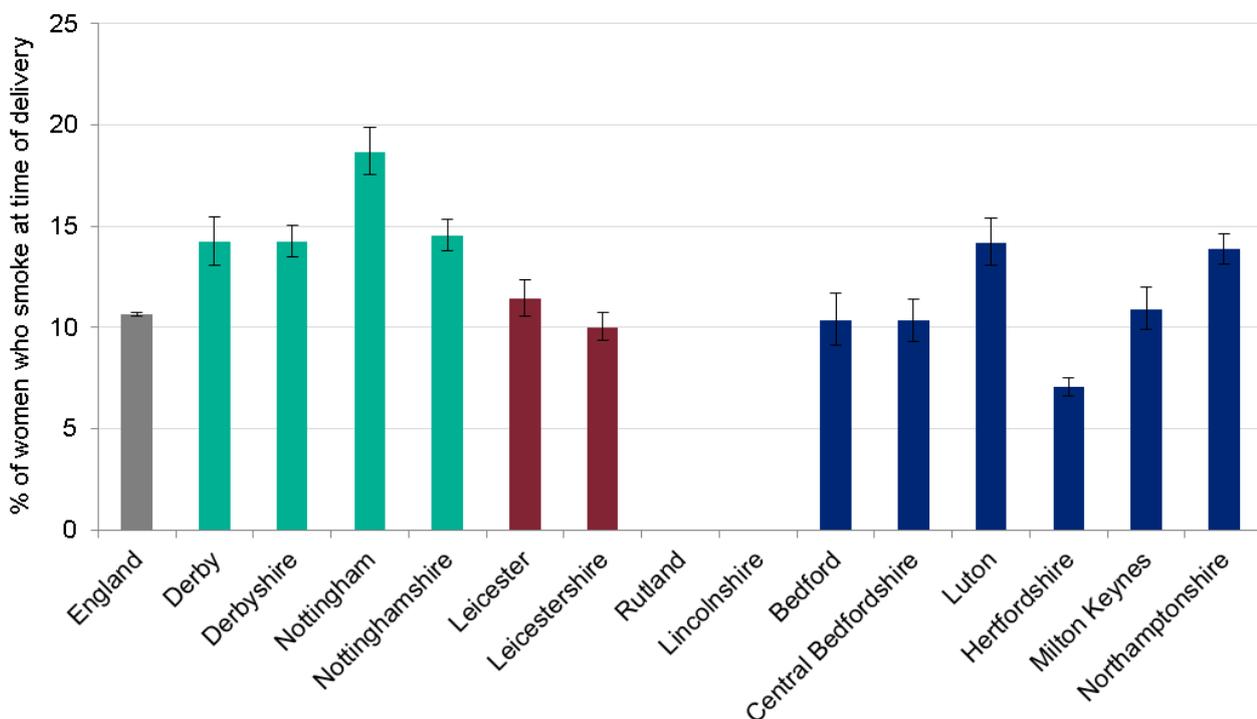
In 2015, 2.8% of babies in England were born with low birth weight. Of the 14 local authorities included in this briefing, the highest proportion of term babies born with low birth weight was in Leicester at 4.8%, whilst the lowest was in Rutland. Proportions were significantly higher than the national average in Leicester and Luton, similar in Bedford, Central Bedfordshire, Derby, Milton Keynes, Nottingham and Rutland, and significantly lower than the national average in Derbyshire, Hertfordshire, Leicestershire, Lincolnshire, Northamptonshire and Nottinghamshire.

**Figure 2: Proportion of term babies born with low birth weight, 2015. With 95% confidence intervals. Source: PHOF (43).**



In 2015/16, 10.6% of mothers in England smoked at time of delivery. Of the 14 local authorities discussed in this briefing, only one, Hertfordshire, was significantly better than national average at 7.0%. There were 6 local authorities with significantly higher levels of smoking at time of delivery; Derby, Derbyshire, Nottingham, Nottinghamshire, Northamptonshire and Luton. Smoking at time of delivery was similar to the national average in Leicester, Leicestershire, Bedford, Central Bedfordshire and Milton Keynes. There is no information on Rutland or Lincolnshire due to data quality issues.

**Figure 3: Proportion of women who smoke at time of delivery, 2015/16. Includes 95% confidence intervals. Figures for Rutland and Lincolnshire have been suppressed due to data quality issues. Source: PHOF (43).**



### Sight loss in children and young people

There is a scarcity of readily available and robust data relating to the eye health of children, therefore this briefing gives an overview of the accessible intelligence rather than a complete picture. Although eye screening is carried out for newborns and 6 week olds, there is no readily available data relating to the rate and outcomes of these examinations.

The UK National Screening Committee recommends that screening of children’s eyes should be offered to all children aged 4 to 5 years and that this service should be organised and led by specialists (orthoptists) (48). However, currently screening during the first year of school is dependent upon local commissioning arrangements

by each local authority. Readily available data on the commissioned offer and uptake is not easily accessible. Furthermore, information relating to the diagnosis of eye conditions common in children, such as amblyopia and strabismus, is also not readily available.

Local authorities maintain registers of residents in their area who are registered as blind or partially sighted and hold a certificate of visual impairment (CVI). These registers are intended to provide a formal route to obtaining support from social care services. However, there is no requirement to be on a local authority register which means that the numbers may be underestimates. It should also be noted that a higher rate of registration may not necessarily indicate that a local authority has a higher rate of visual impairment in 0 to 17 year olds, but could indicate that the residents of that local authority are more likely to register, possibly due to having better information on the process.

In 2013/14, there were 4,275 blind people aged 0 to 17 years on a register in England (Table 1). This corresponds to a rate of 37.2 children and young people registered as blind per 100,000 0 to 17 year olds in England, as shown in Figure 4(i). Of the 14 local authorities covered by this report, 9 had a rate of blindness registration that is higher than the national rate, with only Derbyshire, Nottinghamshire, Lincolnshire, Northamptonshire and Milton Keynes having a lower rate. The highest rate of blindness registration for 0 to 17 year olds in 2013/14 was in Derby, at 95.1 per 100,000, whilst the lowest was in Lincolnshire, at 21.3 per 100,000.

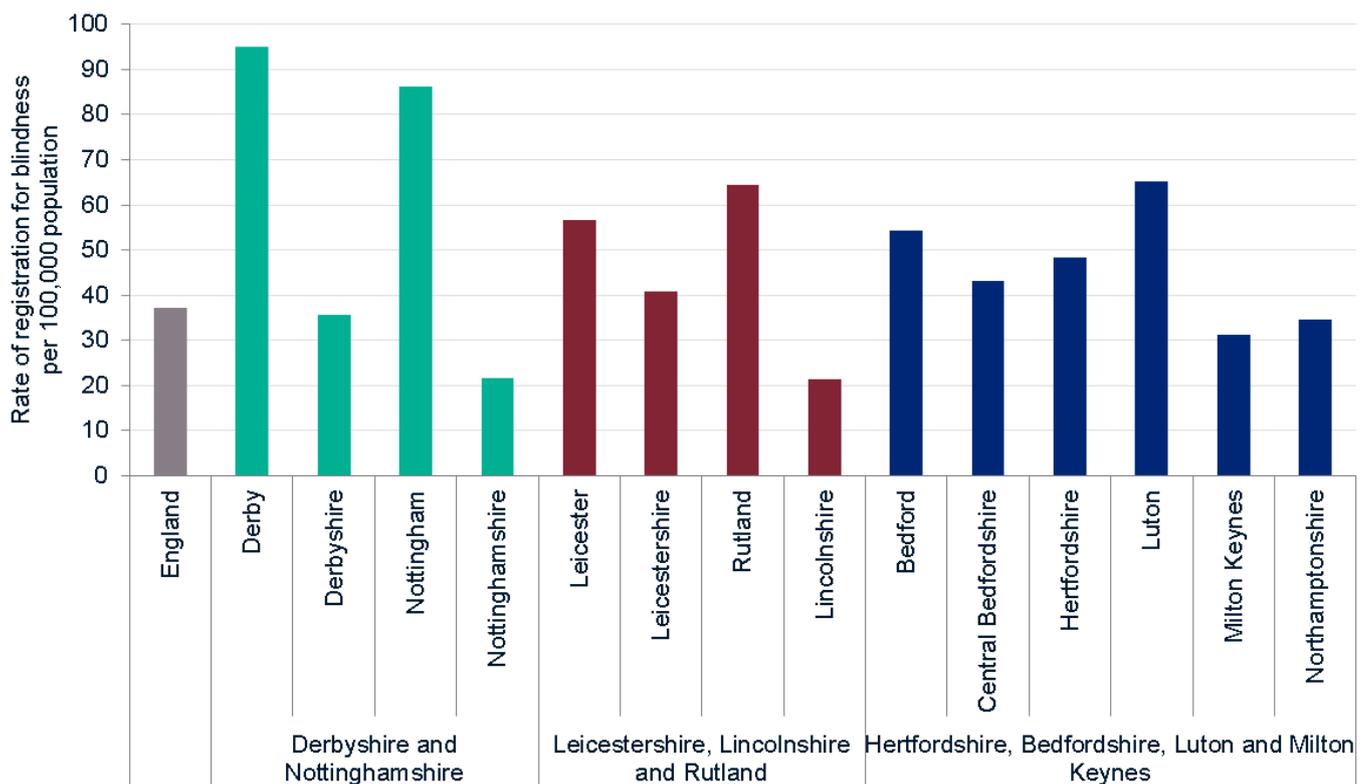
In the same year, there were 5,260 partially sighted people aged 0 to 17 years on a register in England (Table 1). This corresponds to a rate of 45.7 children and young people registered as partially sighted per 100,000 0 to 17 year olds in England, as shown in Figure 4(ii). Of the 14 local authorities covered, only Lincolnshire, Northamptonshire, Central Bedfordshire, Hertfordshire and Milton Keynes had a rate lower than the national rate. The highest rate of registration for partial sightedness in 0 to 17 year olds was in Luton, at 102.5 per 100,000, whilst the lowest was in Central Bedfordshire at 25.9 per 100,000.

**Table 1: Numbers of children and young people aged 0 to 17 on local authority registers for blindness and partial sightedness, 2013/14. Source: NHS Digital (44)**

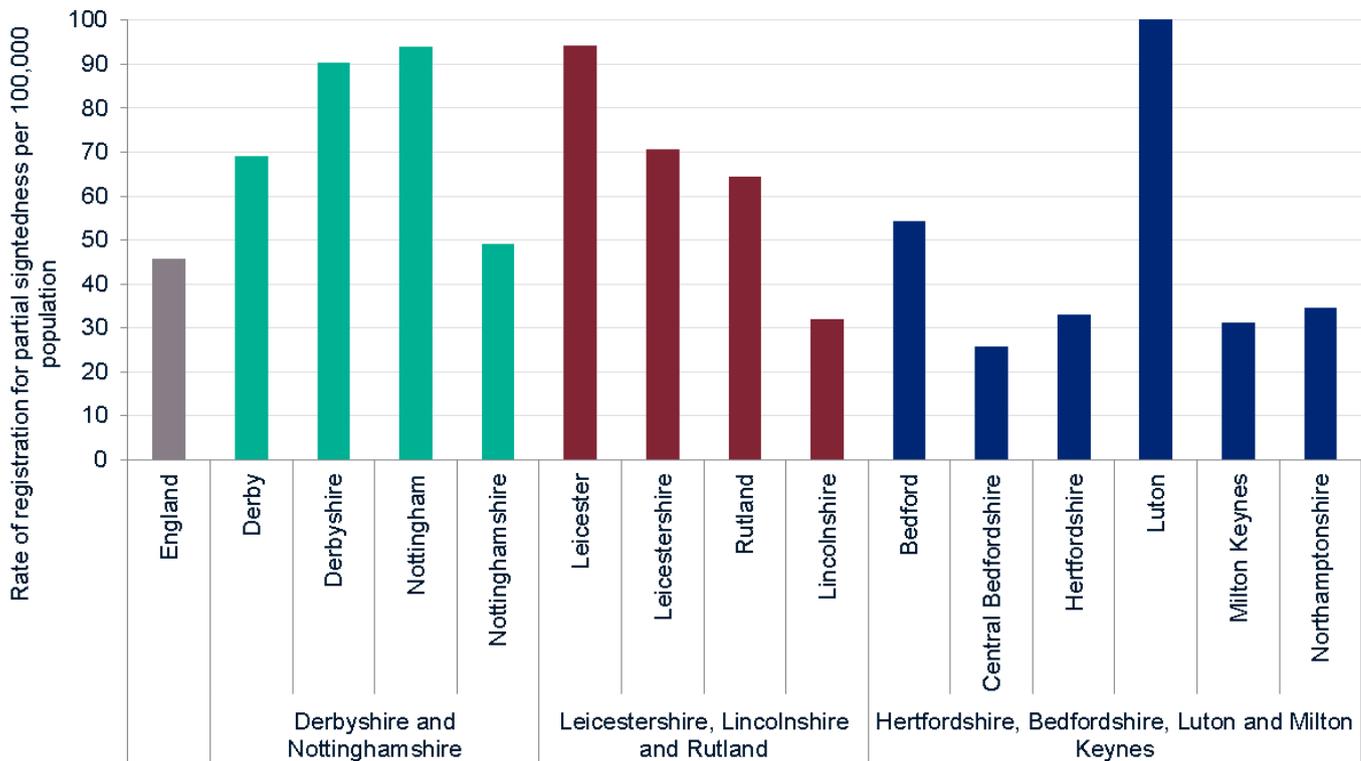
	Blind	Partially Sighted
England	4,275	5,260
Derby	55	40
Derbyshire	55	140
Nottingham	55	60
Nottinghamshire	35	80
Leicester	45	75
Leicestershire	55	95
Lincolnshire	30	45
Rutland	5	5
Northamptonshire	55	55
Bedford	20	20
Central Bedfordshire	25	15
Luton	35	55
Hertfordshire	125	85
Milton Keynes	20	20

**Figure 4: Crude rates per 100,000 children and young people aged 0 to 17 on local authority registers for blindness (i) and partial sightedness (ii), 2013/14. Source: NHS Digital and ONS mid-2013 population estimates (22, 43)**

i.



ii.



The Royal National Institute for the Blind People (RNIB) has produced estimates of the number of blind and partially sighted children and young people aged up to 16 in each local authority in 2015, as shown in Table 2. These figures assume a rate of 50 per 100,000 population for blindness, and 150 per 100,000 for partial sightedness, a ratio of 1:3 in blindness to partial sightedness. The numbers of 0 to 16 year olds estimated to have a visual impairment in 2015 generally do not match the numbers of 0 to 17 year olds on the local authority registers in Table 1, although it should be noted that the registration data is now 3 years old and is not directly comparable to estimates based on 2015 population estimates. The 2015 estimates shown in Table 2 suggest variation across each of the local professional networks; the highest number of blind children is in Hertfordshire, whilst the lowest is in Rutland.

The estimated prevalence rates used to calculate the numbers of blind and partially sighted 0 to 16 year olds in each local authority are generally higher than the rates of registration shown in Figure 4, suggesting that the registers may underestimate the numbers of blind or partially sighted children and young people in the area.

**Table 2: Estimated number of children aged 0 to 16 who are blind or partially sighted, 2015. Source: Keil, 2013, 'Key statistics on number of blind and partially sighted children and young people in England' via the RNIB (45, 46)**

	Estimated number of children aged 0-16	
	Blind	Partially sighted
England	5,429	16,286
Derby	27	82
Derbyshire	73	218
Nottingham	30	91
Nottinghamshire	77	230
Leicester	38	113
Leicestershire	63	190
Lincolnshire	66	198
Rutland	4	11
Northamptonshire	75	226
Bedford	17	52
Central Bedfordshire	27	82
Luton	25	76
Hertfordshire	122	366
Milton Keynes	31	92

The Department for Education produces statistics on the number of children attending state primary and secondary schools who have one or more special educational needs (SEN), and gives the primary reason for the need. This data is based on the area in which the child attends school, rather than the area of residence; this means that the data is not comparable with other datasets presented in this briefing. In 2016, 14.4% of all pupils in England had a special educational need, equating to 1,228,787 children as shown in Table 3. Across the 3 LEHNs covered here, children with special educational needs made up between 9% and 16.6% of all pupils in 2016, with the highest proportion in Derby and the lowest proportion in Nottinghamshire.

**Table 3: Pupils attending state primary, secondary and special schools who have a special educational need, and pupils who have a primary need of visual impairment,**

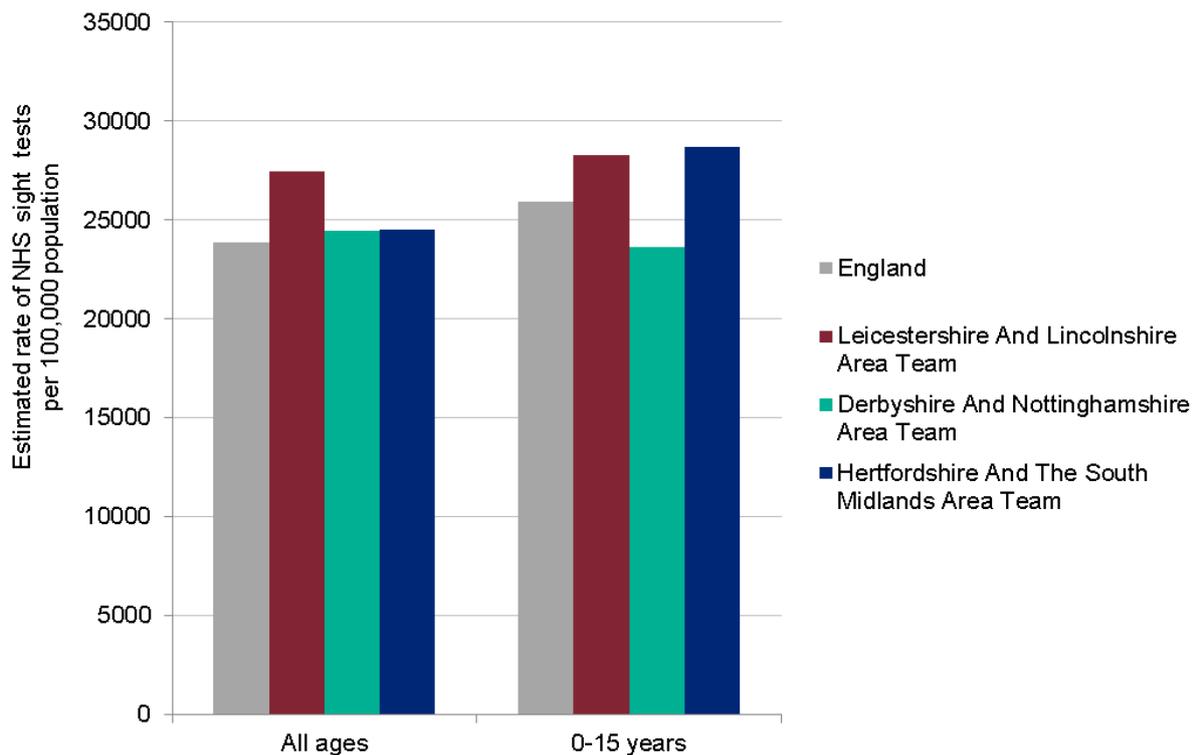
	Total number of pupils	Number of pupils with SEN	Proportion of pupils with SEN (%)	Number of pupils with visual impairment as primary need	Proportion of SEN pupils with visual impairment as primary need (%)
England	8,559,540	1,228,787	14.4	11,592	0.9
Derby	43,348	7,205	16.6	100	1.4
Derbyshire	111,466	16,079	14.4	172	1.1
Nottingham	47,045	7,176	15.3	60	0.8
Nottinghamshire	119,192	10,687	9.0	137	1.3
Leicester	55,876	8,589	15.4	121	1.4
Leicestershire	101,504	12,220	12.0	143	1.2
Rutland	7,813	1,137	14.6	3	0.3
Lincolnshire	108,779	17,140	15.8	138	0.8
Northamptonshire	119,208	13,636	11.4	140	1.0
Bedford	32,095	4,309	13.4	35	0.8
Central Bedfordshire	43,505	5,996	13.8	44	0.7
Luton	38,934	5,686	14.6	78	1.4
Hertfordshire	214,593	28,624	13.3	289	1.0
Milton Keynes	46,584	6,354	13.6	74	1.2

**2016. Source: Department for Education (47)**

Of those pupils with a special educational need in England, 0.9% had a primary need of visual impairment. This equates to 11,592 pupils. Considering the 3 LEHNs covered by this report, pupils with visual impairment as their primary need made up the greatest proportion of pupils with special educational needs in Leicester, Derby and Luton (1.4%), whilst they made up the smallest proportion in Rutland. In terms of numbers, the greatest number of pupils who have visual impairment as a primary need attended school in Hertfordshire, whilst the fewest attended school in Rutland. The geographical size of the county should be taken into account as well as the size of the population; Hertfordshire is a bigger county than Rutland and is likely to have more schools as well as a larger school-aged population.

Figure 5 shows the uptake of NHS sight tests in children aged 15 and under in 2015/16. The rate of NHS sight tests in this age group was highest in Hertfordshire, whilst the lowest rate was in Derbyshire. In Hertfordshire, NHS sight tests in 0 to 15 year olds made up around a quarter of all NHS sight tests carried out in the county, a proportion that is higher than the national average of 20.6%. The lowest proportion was in Derbyshire and Nottinghamshire, at 17.6%.

**Figure 5: Rate of NHS sight tests in 0 to 15 year olds, 2015/16. Source: NHS Digital via RNIB (46)**



	Total number of NHS sight tests	Number of NHS sight tests recorded for 0-15 year olds	% of all sight tests that were recorded for 0-15 year olds	Rate of NHS sight tests in 0-15 year olds, per 100,000 population
England	12,979,762	2,672,489	20.6	25,937.0
Leicestershire And Lincolnshire Area Team	487,215	91,149	18.7	28,294.8
Derbyshire And Nottinghamshire Area Team	489,270	85,993	17.6	23,661.4
Hertfordshire And The South Midlands Area Team	672,209	161,963	24.1	28,693.5

**In summary:**

- There is a scarcity of data relating to eye health in children and young people
- The types of datasets used in this briefing differ in terms of time period, age groups, purpose and geography, which means that it is difficult to relate the datasets to each other and build a more complete picture
- Risk factor data suggests babies are more likely to be born underweight in Leicester, whilst mothers are more likely to smoke at time of delivery in the Derbyshire and Nottinghamshire LEHNS
- According to 2013/14 local authority registration data, children with visual impairment are more likely to live in urban areas such as Derby, Nottingham and Luton
- This is supported to some extent by Department for Education data, which shows that in 2016, children with a special educational need due to visual impairment were more likely to live in Leicester, Derby and Luton

- Rates of NHS sight tests in 0 to 15 year olds in 2015/16 were lowest in Nottinghamshire and Derbyshire, and highest in Hertfordshire

## 5.2 Commissioned services

Access to paediatric ophthalmology services is predominantly post screening episodes (for example, newborn and infant physical examination (NIPE) and child vision screening) (48) or via referral from an optometrists or GP. Some referrals are made following emergency attendance in an A&E department or eye casualty clinic.

Paediatric ophthalmology services are delivered by multidisciplinary teams (MDTs), most often led by an ophthalmologist, in an outpatient setting with inpatient stays available as required. These services are standardly commissioned by CCGs as part of their core commissioned services (49). For rare paediatric eye disorders for example, . retinoblastomas or other eye tumours, specialised ophthalmology treatments are delivered by specialised providers and commissioned directly by NHS England (50). Provision of these treatments is over a wider footprint than a CCG and is delivered by a network of organisations and services.

The services commissioned to treat and manage each paediatric eye health condition are not discussed in any detail in this review. Any local gap analysis as a result of this needs assessment should consider secondary care service need; based on estimated and projected prevalence of eye health disorders.

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## **Appendix 1: Key Definitions**

### Children and Young People

#### 1. RNIB estimates

RNIB estimates for 0 to 17 year olds are based on base prevalence rates from Keil 2013 (45), in which definitions of blindness and partial sightedness are based on WHO definitions:

**Blindness** is defined as a presenting visual acuity of less than 3/60, or a corresponding visual field loss to less than 10° in the better eye with the available correction.

**Severe visual impairment** is defined as a presenting visual acuity of between less than 6/60 and 3/60

**Moderate visual impairment** is defined as a presenting visual acuity of less than 6/18 to 6/60.

In the children and young people briefing, “partially sighted” includes both severe and moderate visual impairment.

#### 2. Local authority registrations

The RNIB (51) explain that generally, to be certified as **severely sight impaired (blind)**, your sight has to fall into one of the following categories, while wearing any glasses or contact lenses that you may need:

- Visual acuity of less than 3 / 60 with a full visual field.
- Visual acuity between 3 / 60 and 6 / 60 with a severe reduction of field of vision, such as tunnel vision.
- Visual acuity of 6 / 60 or above but with a very reduced field of vision, especially if a lot of sight is missing in the lower part of the field.

To be certified as **sight impaired (partially sighted)** your sight has to fall into one of the following categories, while wearing any glasses or contact lenses that you may need:

- Visual acuity of 3 / 60 to 6 / 60 with a full field of vision.
- Visual acuity of up to 6 / 24 with a moderate reduction of field of vision or with a central part of vision that is cloudy or blurry.
- Visual acuity of 6 / 18 or even better if a large part of your field of vision, for example a whole half of your vision, is missing or a lot of your peripheral vision is missing.

# 6.0 Age-related macular degeneration, cataracts and glaucoma in older people

This is the third briefing in this series relating to eye health. The previous briefings covered population, demography and risk factors, and children and young people while the subsequent briefings cover diabetic retinopathy and blindness.

## 6.1 Needs review

The analysis in this document relates to three local eye health networks (LEHNs); Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands. As shown in Figure 1, these networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands and 4 are within the East of England, with 1 in the South East.

Figure 1: Geography



## Definitions:

There are a number of eye conditions that are more likely to occur in old age. This briefing will cover 3 of these conditions:

**Age related macular degeneration (AMD)** – a term applied to changes, without any other obvious precipitating cause, which occur in the central area of the retina (macula) in people aged 55 years and over (52). AMD is classified into early, intermediate and advanced. In the advanced stage, AMD is differentiated into “dry” (for example, geographic atrophy of the retinal pigment epithelium involving the macula) and “wet” (abnormal blood vessels, “neovascular”, growth underneath the retina risking swelling and damage to the macula due to fluid and blood leakage).

**Cataracts** – a condition defined as any opacity (cloudiness) in the lens of the eye (53). It can affect one or both eyes and the changes to the transparency and refractive index of the lens result in various levels of visual impairment.

**Glaucoma** – a condition where there is a characteristic optic neuropathy, producing visual field defects, which is often, but not always related to raised intraocular pressure. t (54 The condition is often asymptomatic until late in the disease and this leads to late diagnosis and treatment resulting in irreversible visual loss. can lead to loss of vision if not detected or treated late. Glaucoma can be broadly classified into a number of different types:

- primary open angle glaucoma – the most common type, which tends to develop slowly over many years
- primary angle closure glaucoma – a less common type that can develop slowly or quickly
- secondary glaucoma – glaucoma caused by an underlying eye condition, such as uveitis (inflammation of the eye)

## Note on the methodology:

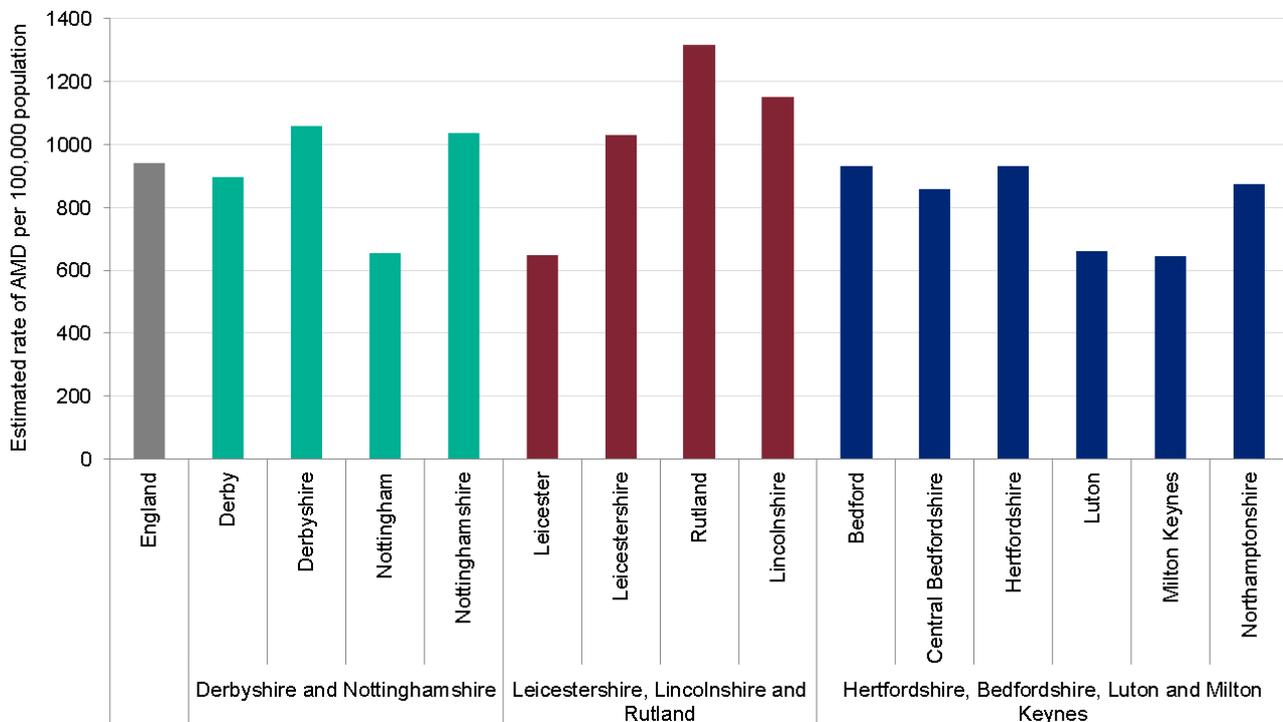
The estimated rates of AMD, cataracts and glaucoma presented in this briefing are based on estimates calculated by the Royal National Institute for the Blind People (RNIB) (46) using prevalence models taken from the National Eye Health Epidemiological Model (NEHEM) (55) and ONS mid-2014 based 2016 population estimates (22,23). As these estimates are not available by age group, it is not possible to calculate directly age standardised rates and therefore differences in rates between areas may be due to differences in age profiles, particularly when comparing urban and rural areas.

## Age-related macular degeneration

Figure 2 shows the estimated rate of people with AMD living in each upper tier local authority within the 3 LEHNs covered by this report, calculated using the NEHEM prevalence models. The data suggests that in 2016, the highest rates of AMD were

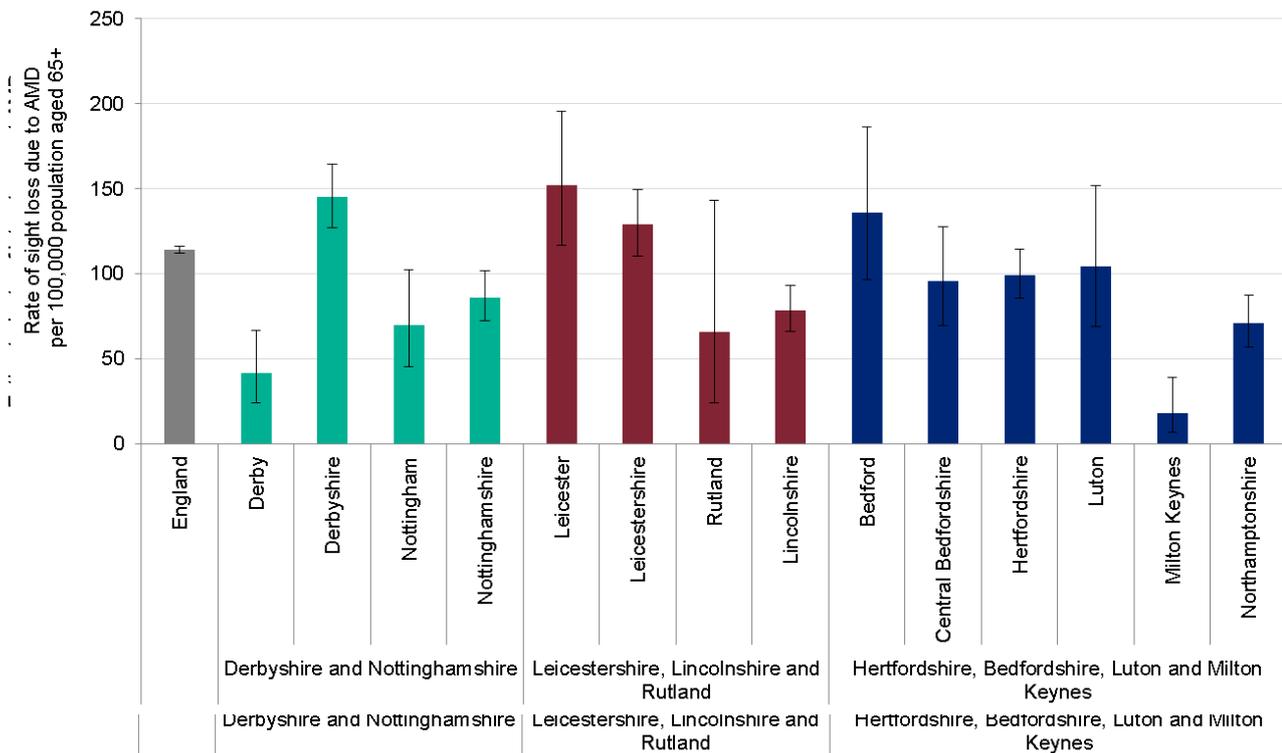
most likely to be in Rutland and Lincolnshire, which are rural counties with ageing populations. The lowest rate was in Milton Keynes, followed by Leicester, Nottingham and Luton.

**Figure 2: Estimated rate of AMD per 100,000 population by upper tier local authority, all ages, 2016. Calculated from ONS mid-2014 based population projections for 2016 (5) and prevalence models from NEHEM (3). Source: RNIB (46)**



Of the 2 types of AMD, wet AMD creates the greatest need for health services. In 2016, it is estimated that the rate of late stage wet AMD in England was 632.4 per 100,000 population as shown in Figure 3. Within the 3 LEHNs covered in this briefing, the highest rate was 894.7 per 100,000 in Rutland, whilst the lowest was 435.4 per 100,000 in Milton Keynes. Five of the 14 local authorities had an estimated rate of late stage wet AMD that was higher than the national average. In general, the lower rates were seen in Hertfordshire and the South Midlands.

**Figure 3: Estimated rate of late stage wet AMD per 100,000 population by upper tier local authority, all ages, 2016. Calculated from ONS mid-2014 based population projections for 2016 (23) and prevalence models from NEHEM (55). Source: RNIB (46)**



Sight loss can occur if wet AMD is not treated in time. Certifications of visual impairment record the reasons for sight loss, and the rate of new certifications for sight loss due to AMD in people aged 65 and over is one of the indicators in the Public Health Outcomes Framework. As shown in Figure 4, the rate of new certifications for sight loss due to AMD in 2015/16 was 118.1 per 100,000 population aged over 65. Across the 3 LEHNs, Leicestershire, Rutland, Luton, Bedford, Central Bedfordshire and Hertfordshire had rates similar to the national average. Lincolnshire, Nottingham, Nottinghamshire, Derby and Northamptonshire had rates significantly lower than the national average, and Leicester and Derbyshire had rates significantly higher than the national average. It should be noted that certification is voluntary; therefore the true rates may be higher than those shown in Figure 4.

**Figure 4: Rate of new certifications for sight loss due to AMD by upper tier local authority, ages 65 and over, 2015/16. Includes 95% confidence intervals. Source: PHOF (43)**

The RNIB data tool has also projected the numbers of people likely to be living with late stage wet AMD in 2030. The rates of people living with late stage wet AMD will increase across all 14 local authorities as shown in Table 1. Numbers of people living with late stage wet AMD will also increase in real terms, with increases ranging from 27.0% in Nottingham to 85.3% in Milton Keynes. The smaller increases in the numbers of people tend to occur in

more urban areas, where ageing populations are expected to increase to a lesser extent, although Milton Keynes is an exception to this.

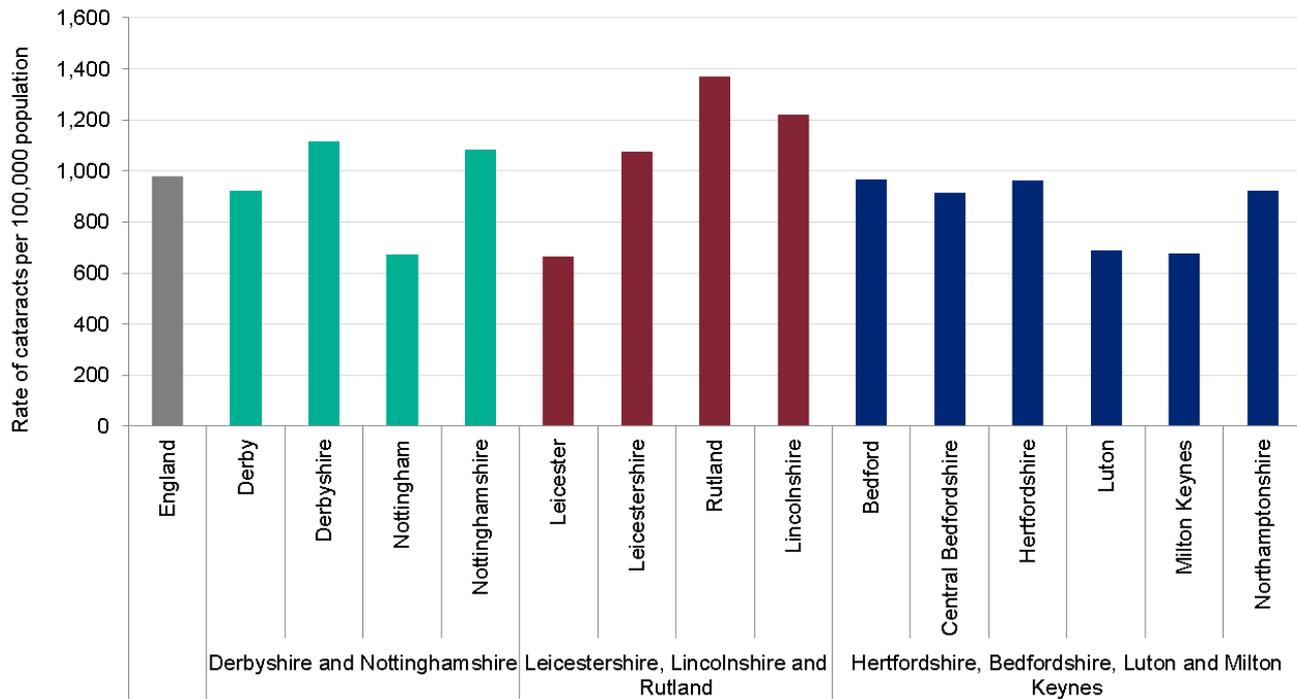
**Table 1: Numbers of people estimated to have late stage wet AMD and rates per 100,000 by upper tier local authority, all ages, 2016 and 2030. Source: RNIB (46)**

People living with late stage wet AMD					
Area	Rate per 100,000 population		Estimated number		% change in numbers 2016 to 2030
	2016	2030	2016	2030	
England	632.4	862.6	349,190	522,060	49.5
Derby	604.3	749.6	1,550	2,090	34.8
Derbyshire	710.4	1,066.8	5,580	8,900	59.5
Nottingham	440.5	516.6	1,410	1,790	27.0
Nottinghamshire	697.0	984.2	5,650	8,610	52.4
Leicester	436.3	543.1	1,510	2,090	38.4
Leicestershire	690.5	999.5	4,680	7,480	59.8
Rutland	894.7	1,325.0	340	530	55.9
Lincolnshire	774.2	1,121.6	5,740	9,030	57.3
Bedford	629.8	824.8	1,060	1,610	51.9
Central Bedfordshire	580.6	814.6	1,610	2,680	66.5
Hertfordshire	629.6	814.4	7,420	10,940	47.4
Luton	445.4	522.7	970	1,310	35.1
Milton Keynes	435.4	698.3	1,160	2,150	85.3
Northamptonshire	590.8	883.8	4,300	7,170	66.7

## Cataracts

In the majority of cases, cataracts are age-related and cause no permanent physical harm to the eye. The NEHEM notes that cataract prevalence can be defined as any opacity of the lens; lens opacity is common in older people and most suffer few or no visual problems. Figure 5 shows the estimated rate of people living with cataracts. As for AMD, these estimates were calculated using prevalence models taken from the NEHEM and ONS mid-2014 based 2016 population estimates. The NEHEM model has been designed to estimate the prevalence of surgical cataracts – cataracts that affect vision sufficiently to justify surgery.

**Figure 5: Estimated rate of cataracts requiring surgical interventions per 100,000 population, by upper tier local authority, all ages, 2016. Calculated from ONS mid-2014 based population projections for 2016 (23) and prevalence models from NEHEM (55). Source: RNIB (46)**



In 2016, the rate of surgical cataracts was estimated to be 979.6 per 100,000 population in England. Across the 3 LEHNS the highest estimated rate was in Rutland (1,368.4 per 100,000 population) whilst the lowest was in Leicester City (664.5 per 100,000 population). In general, rates were lower in more urban areas; however, this is most likely due to the differences in age structures of the populations living in urban areas compared with counties that have more rural areas.

Using population projections to estimate the prevalence of surgical cataracts in 2030, both rates and numbers are projected to increase as shown in Table 2. The number of people with surgical cataracts is projected to increase by 48.7% in England between 2016 and 2030. Across the 14 local authorities in this briefing, Milton Keynes will see the greatest increase (85.6%), whilst Nottingham will see the smallest (30.7%).

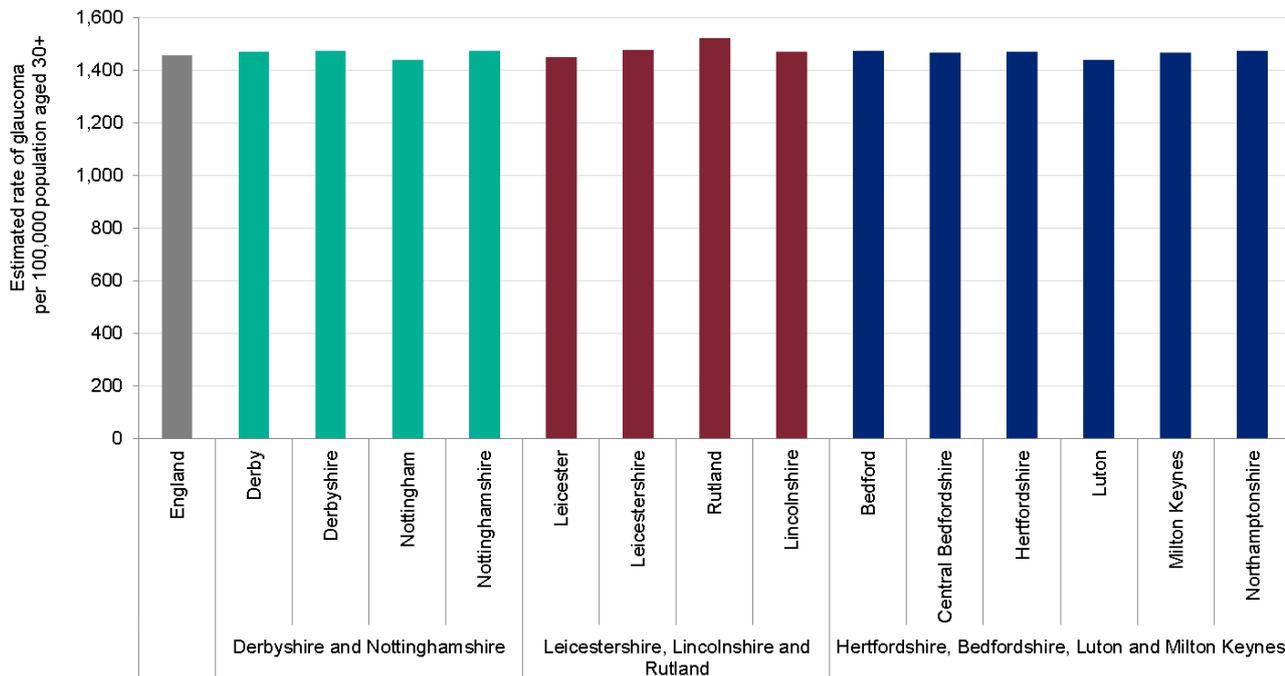
**Table 2: Numbers of people estimated to have cataracts requiring surgical intervention and rates per 100,000 by upper tier local authority, all ages, 2016 and 2030. Source: RNIB (46)**

People living with cataracts					
Area	Rate per 100,000 population		Estimated number		% change in numbers 2016 to 2030
	2016	2030	2016	2030	
England	979.6	1,328.8	540,930	804,220	48.7
Derby	924.0	1,151.4	2,370	3,210	35.4
Derbyshire	1,115.2	1,642.1	8,760	13,700	56.4
Nottingham	671.7	811.0	2,150	2,810	30.7
Nottinghamshire	1,084.4	1,518.1	8,790	13,280	51.1
Leicester	664.5	847.2	2,300	3,260	41.7
Leicestershire	1,074.1	1,535.3	7,280	11,490	57.8
Rutland	1,368.4	2,050.0	520	820	57.7
Lincolnshire	1,220.7	1,729.0	9,050	13,920	53.8
Bedford	968.5	1,270.5	1,630	2,480	52.1
Central Bedfordshire	916.0	1,270.5	2,540	4,180	64.6
Hertfordshire	961.4	1,245.3	11,330	16,730	47.7
Luton	688.7	814.0	1,500	2,040	36.0
Milton Keynes	675.7	1,084.8	1,800	3,340	85.6
Northamptonshire	923.3	1,363.2	6,720	11,060	64.6

## Glaucoma

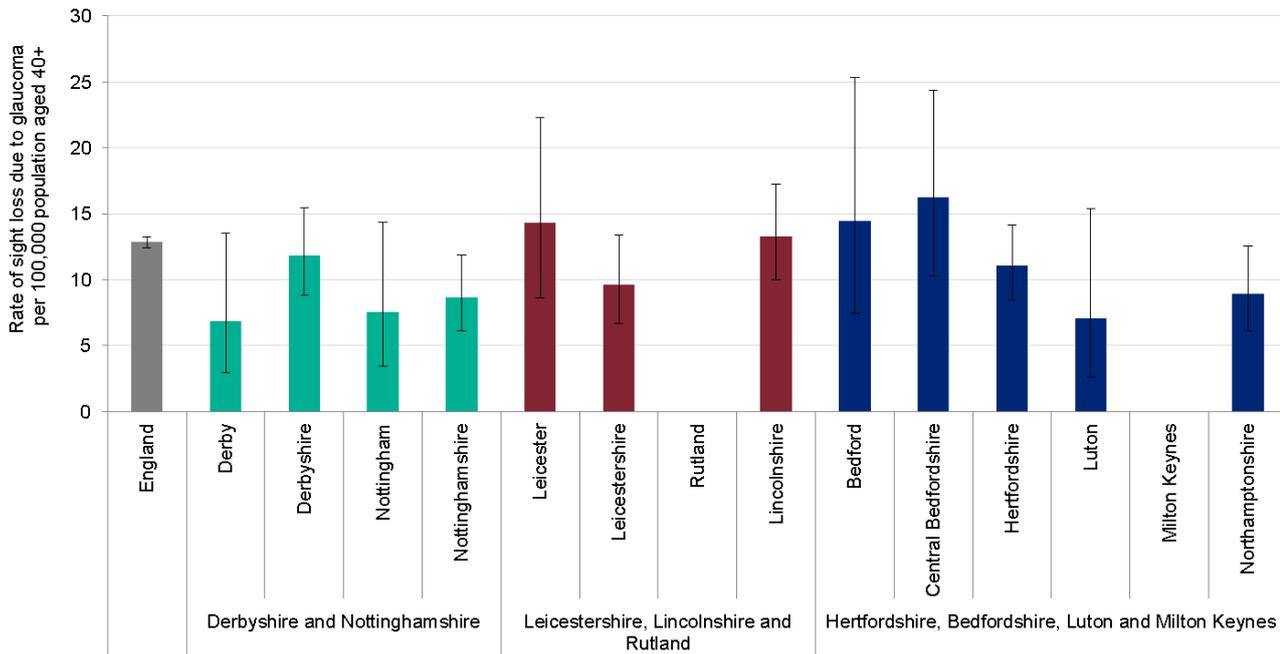
According to the NEHEM data shown in Figure 6, an estimated 505,890 people were living with glaucoma in 2016. This equates to a rate of 1,455.9 per 100,000 population aged over 30 years. Of the 14 local authorities in this briefing, the highest rate in 2016 was in Rutland (1,523.4 per 100,000 population), whilst the lowest was in Nottingham (1,438.2 per 100,000). Although rates tend to be higher in the more rural local authorities, the differences are not as pronounced as for cataracts and AMD and there is not as much geographical variation across the local authorities in general.

**Figure 6: Estimated rate of glaucoma per 100,000 population, by upper tier local authority, ages 30 and over, 2016. Calculated from ONS mid-2014 based population projections for 2016 (23) and prevalence models from NEHEM (55). Source: RNIB (46)**



Similarly to wet AMD, glaucoma can cause sight loss if left untreated. In 2015/16, the rate of new certifications for sight loss due to glaucoma was 12.8 per 100,000 population aged 40 and over, equating to 3,497 people. Of the 14 local authorities covered by this report, the majority had rates similar to the national average during 2015/16, although Nottinghamshire and Northamptonshire had rates significantly lower than the national average, as shown in Figure 7. Data for Rutland and Milton Keynes was suppressed due to small counts involved. Again, certification is voluntary therefore the rates in Figure 7 may not reflect the true rates of sight loss due to glaucoma.

**Figure 7: Rate of new certifications for sight loss due to glaucoma by upper tier local authority, ages 40 and over, 2015/16. Figures for Rutland and Milton Keynes have been suppressed due to small counts. Includes 95% confidence intervals. Source: PHOF (43)**



Using population estimates to estimate the prevalence of glaucoma in 2030, the rate of people living with glaucoma is predicted to increase in 6 of the upper tier local authorities covered by this report; Derby, Derbyshire, Nottingham, Lincolnshire, Luton, and Milton Keynes. Rates are predicted to decrease by 2030 in Leicester, Leicestershire, Rutland, Nottinghamshire, Northamptonshire, Hertfordshire, Bedford and Central Bedfordshire. This is shown in Table 3.

Although the prevalence rate of glaucoma may decrease in some local authorities over time, the numbers of people living with the condition are still projected to increase by 2030 across all 14 local authorities. This is driven by increases in the population aged 30 and over. The greatest percentage increase in the number of people living with glaucoma will be seen in Milton Keynes, with an increase of 20.9% by 2030, whilst the smallest increase will be seen in Rutland, with an increase of 5.1%.

**Table 3: Numbers of people estimated to have glaucoma and rates per 100,000 by upper tier local authority, ages 30 and over, 2016 and 2030. Source: RNIB (46)**

People living with glaucoma					
Area	Rate per 100,000 population		Estimated number		% change in numbers 2016 to 2030
	2016	2030	2016	2030	
England	1,455.9	1,463.8	505,890	572,860	13.2
Derby	1,470.2	1,483.0	2,220	2,490	12.2
Derbyshire	1,472.0	1,480.3	7,790	8,590	10.3
Nottingham	1,438.2	1,469.9	2,340	2,640	12.8
Nottinghamshire	1,472.3	1,458.8	7,880	8,610	9.3
Leicester	1,448.7	1,414.3	2,670	2,980	11.6
Leicestershire	1,476.4	1,441.4	6,530	7,210	10.4
Rutland	1,523.4	1,464.3	390	410	5.1
Lincolnshire	1,468.8	1,477.6	7,300	8,180	12.1
Bedford	1,473.1	1,424.0	1,560	1,790	14.7
Central Bedfordshire	1,468.3	1,420.8	2,640	3,130	18.6
Hertfordshire	1,469.8	1,461.4	10,990	12,770	16.2
Luton	1,439.2	1,440.6	1,740	2,060	18.4
Milton Keynes	1,465.4	1,476.0	2,390	2,890	20.9
Northamptonshire	1,474.6	1,453.9	6,860	7,780	13.4

**In summary:**

- AMD, cataracts and glaucoma are more likely to affect older age groups
- For this reason, the higher rates of prevalence tend to be in more rural local authorities where there are more likely to be ageing populations. However, Milton Keynes is estimated to have the largest increase in the number of people living with AMD, cataracts or glaucoma in 2030
- This briefing mostly uses estimates taken from the National Eye Health Epidemiological Model and the rates shown are crude rates. They should therefore be interpreted with caution as they do not take into account differences in the age structure of the population from one local authority to another
- Since the NEHEM and PHOF data refer to different age groups, caution should also be used when looking at these datasets side by side

**6.2 Commissioned services**

Access to adult ophthalmology services for AMD, cataracts or glaucoma treatment in England is predominantly via referral from an optometrists, or GP. Some referrals are post emergency attendance in an A&E department or eye casualty clinic.

Adult ophthalmology services are delivered by multidisciplinary teams (MDTs), most often led by an ophthalmologist, in an outpatient setting with inpatient stays available as required. Adult ophthalmology hospital services are provided by MDTs of ophthalmologists, optometrists, orthoptists, specialist nurses, and technicians. These services are standardly commissioned by CCGs (56). For specialised ophthalmology treatments, specialised providers (who develop networks of organisations and services over a wider footprint than a CCG) aim to optimise adult's vision and prevent avoidable visual disability of ophthalmic (eye and vision) disorders. These services are commissioned directly by NHS England.

## Treatment for AMD

Treatment for dry AMD is conservative. NICE guidelines (57) recommend consideration of referral of individuals with AMD causing visual impairment to low-vision services and additionally a group-based rehabilitation programme to promote independent living for people with AMD. Further local intelligence is needed to determine the commissioned low vision pathway(s) in each LEHN. There is some evidence that a diet high in vitamins A (beta-carotene), C and E may slow the progression of the condition in some patients (58a, 58b); however these vitamin supplements cannot be prescribed by NHS providers.

Treatment for wet AMD involves injecting anti-vascular endothelial growth factor (anti-VEGF) drugs in to the vitreous to prevent the growth of new blood vessels in the eye to destroy the abnormal blood vessels in the eye (59). Further local intelligence is needed to determine the difference between the estimated rate of wet AMD and the rate of treatment in each LEHN.

## Treatment for Cataracts

Treatment for age-related cataracts may initially be a new spectacle prescription and advice to use brighter lights for reading. Most cataracts are progressive, although the decline in visual function may be variable and unpredictable. As cataracts get worse, eventually surgery is required to remove and replace the affected lens. Surgery is the only treatment that's proven to be effective for cataracts (60).

The NHS Atlas of Variation (61) explores differences in the rate of admission to hospital for cataract surgery in people aged 65 years and over per population by CCG in England. It was found that in the 2012/3 period, the directly standardised rate (DSR) of admission to hospital for cataract surgery in people aged 65 years and over ranged from 1,596 to 4,610 per 100,000 population (a 2.9-fold variation). When the CCGs with the 5 highest rates and the CCGs with the 5 lowest rates are excluded, the range was 1998 to 4199 per 100,000 population aged 65 years and over, a 2.1-fold variation.

Further local intelligence is needed to review local variations alongside epidemiological population need for cataract surgery. Criteria for intervention should be in line with NICE cataracts guidelines (60) to ensure they are based on need (that is, a person's capacity to benefit) and evidence of effectiveness in terms of outcomes whilst ensuring that individuals do not have unnecessary surgery.

## Treatment for Glaucoma

Whilst it is not possible to reverse any loss of vision that occurs before glaucoma is diagnosed, treatment for glaucoma can help stop sight loss progression. Recommended treatment depends on the type of glaucoma, but standard management includes eye drops to reduce eye pressure, laser treatment of various types or surgery to reduce the intraocular pressure. (62).

Individuals diagnosed with glaucoma are advised to have regular ophthalmology appointments and referral may be made to a low vision clinic to obtain practical help and support (62).

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# 7.0 Diabetic retinopathy and Retinal Vascular Disease

This is the fourth briefing in this series relating to eye health. The previous briefings covered population, demography and risk factors, children and young people, and age-related macular degeneration, cataracts and glaucoma in older people, while the final briefing covers blindness.

## 7.1 Needs review

The analysis in this document relates to 3 local eye health networks (LEHNs); Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands. As shown in Figure 1, these networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands and 4 are within the East of England, with 1 in the South East.

Figure 1: Geography



## Definitions:

**Retinopathy** can be defined as any damage to the retina of the eyes, which may cause vision impairment. Retinopathy often refers to retinal vascular disease, or damage to the retina caused by abnormal blood flow(63).

**Retinal Vascular Disease** occurs as a result of direct damage, remodelling of small blood vessels or occlusion of blood vessels (65). There is a wide spectrum of such conditions but most commonly they involve blockage of the central retinal vein (CRVO) or branch retinal veins (BRVO). In addition on the arterial side of the circulation there can be blockages to both the central retinal artery (CRAO) or branches of it (BRAO).The risk factors for retinal vascular disease are similar to those that have a causative link to cardiovascular disease; behavioural risks include tobacco use and dietary risks, metabolic risks include high total cholesterol and high blood pressure. Exposure to these factors can result in the hardening and narrowing of blood vessels which in turn reduces blood flow to the retina. Unfortunately there is a scarcity of readily available and robust data on the prevalence of retinal vascular disease diagnoses. Therefore, no further analysis of need in this population is possible in this assessment.

**Diabetic Retinopathy** occurs as a complication of diabetes. Over time, the blood vessels that supply the retina become damaged by high blood sugar levels, in turn causing damage to the retina and resulting in loss of vision if left untreated (64). Diabetic retinopathy is broadly divided into diabetic maculopathy that affects central vision and proliferative diabetic retinopathy that causes growth of new blood vessels that can damage eyesight by bleeding and scarring.

As mentioned in the first briefing in this series, recorded diabetes prevalence was 6.5% in 2015/16 in England, meaning that there are 3,033,529 people in England who have been diagnosed with diabetes (41). This is predicted to increase over time, and so it might be expected that diabetic retinopathy will also increase to some degree.

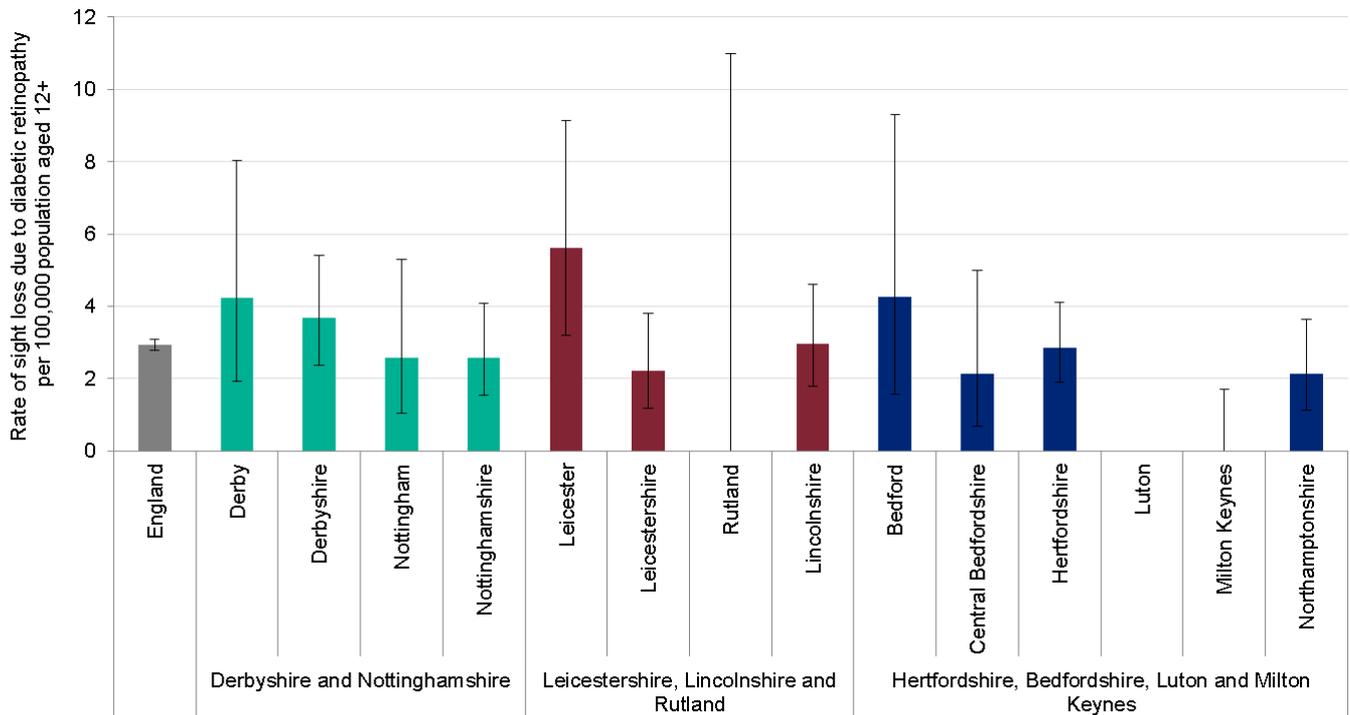
Based on 2016 population figures, the RNIB estimates that there are 1,089,490 people in England living with diabetic retinopathy; this data is shown in Table 1. By 2030, the number of people living with diabetic retinopathy is estimated to have increased by 9% in England. An increase is expected across all 14 local authorities included in this briefing, with the greatest increase seen in Milton Keynes (15.8%) and the smallest in Rutland (5.3%).

**Table 1: Estimated number of people living with diabetic retinopathy by upper tier local authority, 2016 and 2030. Source: RNIB (46)**

	Number of people living with diabetic retinopathy		% change 2016 to 2030
	2016	2030	
England	1,089,490	1,187,160	9.0
Derby	4,970	5,460	9.9
Derbyshire	15,770	16,890	7.1
Nottingham	6,140	6,710	9.3
Nottinghamshire	16,190	17,260	6.6
Leicester	6,610	7,030	6.4
Leicestershire	13,450	14,630	8.8
Rutland	760	800	5.3
Lincolnshire	14,880	16,270	9.3
Bedford	3,270	3,700	13.1
Central Bedfordshire	5,490	6,210	13.1
Hertfordshire	23,080	25,860	12.0
Luton	4,120	4,640	12.6
Milton Keynes	5,120	5,930	15.8
Northamptonshire	14,280	15,760	10.4

Without treatment, progression of diabetic retinopathy can lead to loss of vision. Figure 1 shows the rate of new certifications for sight loss due to diabetic retinopathy; in England in 2014/15, there were 3.23 new sight loss registrations per 100,000 population aged over 12 as a result of diabetic retinopathy. Of the 14 local authorities covered in this briefing, the rate of sight loss due to diabetic retinopathy was significantly higher than the national average only in Leicester City; elsewhere, the rates were not statistically significantly different. The rate for Luton has been suppressed due to small counts. Rates tend to be higher in more urban areas, although the wide confidence intervals mean that it is difficult to draw meaningful conclusions from this dataset. It should also be considered that certification is voluntary, therefore the true rates may be higher than those shown in Figure 1.

**Figure 1: Rate of new certifications for sight loss due to diabetic retinopathy by upper tier local authority, ages 12 and over, 2015/16. Includes 95% confidence intervals. Figures for Luton have been suppressed due to small counts. Source: PHOF (43)**



The NHS offers annual diabetic eye screening services to any patient over the age of 12 years who has a diagnosis of diabetes mellitus. Patients are referred through their GP to one of the 70 diabetic eye screening programmes, although take up of this screening is not compulsory. It may also be outside of the area, dependent on patient preference. Across the 3 LEHNs discussed in this briefing, there are 9 screening programmes as shown in Table 2. Each screening programme comprises screening sites in hospitals, clinics, GP services, mobile services, and optometrists, depending upon the service.

Screening uptake data is collected for performance monitoring purposes, with uptake rates of 70% and over considered acceptable and rates of 80% and over considered achievable. In 2015/16, all the diabetic eye screening programmes covering the 3 LEHNs in this briefing are over the acceptable threshold, with 7 also over the achievable threshold of 80%. The lowest uptake was in the Northamptonshire diabetic eye screening programme at 76.4%, while the highest was in the East and North Hertfordshire diabetic eye screening programme at 91.0%. The Leicester, Leicestershire and Rutland diabetic eye screening programme has the second lowest uptake rate, which is interesting given that Leicester has the highest rate of sight loss due to diabetic retinopathy, and also the highest recorded prevalence of diabetes. However, it should be considered that the certification data refers to 2014/15, whilst the screening data is for 2015/16.

**Table 2: Uptake of diabetic eye screening appointments by screening programme, 2015/16. Source: PHE (66)**

Diabetic eye screening programme	Invited for screening	Attended and completed screening appointment	Uptake of screening (%)
Derbyshire	52,430	42,642	81.3
Greater Nottingham	27,750	23,072	83.1
Leicester, Leicestershire & Rutland	59,950	46,965	78.3
Lincolnshire	42,790	38,059	88.9
North Nottinghamshire	23,345	19,998	85.7
Northamptonshire	31,676	24,211	76.4
Bedfordshire (including Milton Keynes and Luton)	29,490	23,997	81.4
East and North Hertfordshire	24,143	21,976	91.0
West Hertfordshire	21,112	17,669	83.7

**In summary:**

- Diabetic retinopathy is likely to increase as diabetes prevalence increases over the coming years
- Retinal vascular disease is likely to increase as related behavioural and metabolic risk factors; including tobacco, dietary risks, high total cholesterol and high blood pressure are leading causes of morbidity across the area. However, as there is a scarcity of readily available data about the prevalence of retinal vascular disease, an adequate assessment of need has not been possible.
- Thirteen of the upper tier local authorities considered here had rates of sight loss due to diabetic retinopathy that were not statistically significantly different to the national average in 2014/15. The exception of Leicester, where the rate was significantly higher than the national average
- All 14 local authorities are served by 9 screening programmes, although some patients may attend a programme that is out of the area but more convenient for them. All 9 screening programmes exceeded the acceptable level of 70%, and 7 exceeded the achievable level of 80%

**7.2 Commissioned services**

Evidence shows that early identification and treatment of diabetic eye disease can reduce sight loss (67). For this reason the Diabetic Eye Screening (DES) programme (67) is commissioned for all people with type 1 and type 2 diabetes aged 12 or over in England. The programme is co-ordinated and led nationally with local programme commissioners embedded within NHS England area teams. Screening involves examining the back of the eyes and taking photographs of the retina once a year (as a minimum). The programme offers pregnant women with type 1 or type 2 diabetes

additional screening after their first antenatal clinic visit and also after 28 weeks of pregnancy.

The cohort to be invited for screening is identified from GP registers; individuals diagnosed with diabetes who are already under the care of an ophthalmology specialist for the condition are not invited for screening. Following routine digital screening, 2 stage grading and the referral outcome grade, if “referable disease” is present and/or ungradable Slit Lamp Biomicroscopy (SLB), more frequent monitoring or referral to hospital eye services is offered. Ophthalmology hospital services are provided by multidisciplinary teams (MDT) of ophthalmologists, optometrists, orthoptists, specialist nurses, and technicians. This treatment (and related services) secondary to positive diabetic retinopathy screening is standardly commissioned by CCGs.

Access to services for vascular retinopathy identification and treatment is predominantly via referral from an optometrists or GP to an ophthalmologist. These services are standardly commissioned by CCGs.

### Treatment for Diabetic Retinopathy

Treatments for diabetic maculopathy include injections of anti-vascular endothelial endothelial growth factor (anti-VEGF) drugs and focal laser treatment depending on indication. Proliferative diabetic retinopathy (PDR) is for the most part treated with panretinal laser photocoagulation but injections of anti-vascular endothelial growth factor (anti-VEGF) drugs may also have a role. Further local intelligence is needed to determine the difference between the estimated rate of PDR and the rate of treatment in each LEHN.

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# 8.0 Blindness

This is the fifth briefing in this series relating to eye health. The previous briefings covered population, demography and risk factors, children and young people, and age-related macular degeneration, cataracts and glaucoma in older people.

## 8.1 Needs review

The analysis in this document relates to 3 local eye health networks (LEHNs); Derbyshire and Nottinghamshire, Leicestershire, Rutland and Lincolnshire, and Hertfordshire and the South Midlands. As shown in Figure 1, these networks incorporate 14 upper tier and unitary local authorities, of which 9 are in the East Midlands and 4 are within the East of England, with 1 in the South East.

Figure 1: Geography



## Definitions:

Blindness has various definitions. In the 10th revision of the WHO International Statistical Classification of Diseases, Injuries and Causes of Death (68), 'low vision' is defined as visual acuity of less than 6/18 but equal to or better than 3/60, or a corresponding visual field loss to less than 20°, in the better eye with the best possible correction. 'Blindness' is defined as visual acuity of less than 3/60, or a corresponding visual field loss to less than 10°, in the better eye with the best possible correction. 'Visual impairment' includes both low vision and blindness. A revision to this subcategorises the levels of visual impairment.

Given the use of routine data sources in this assessment, the following definitions have been used to categorise the population in subsequent figures. The 3 categories of severity of sight loss used in this report are taken from the "Future Sight Loss UK 1" report (69). They are as follows:

- **Severe sight loss (blindness)** is defined as best-corrected visual acuity of <6/60 in the better-seeing eye – this data is used in the blindness briefing.
- **Moderate sight loss (partial sight)** is defined as best-corrected visual acuity of <6/18 but better than or equal to 6/60 in the better-seeing eye.
- **Mild sight loss (partial sight)** is defined as best-corrected visual acuity of <6/12 but better than or equal to 6/18 in the better-seeing eye.

These definitions differ from those used in the Certification of Vision Impairment process. People who are blind or visually impaired are able to obtain a certification of visual impairment, and the rate of new certifications for sight loss in each financial year is included as an indicator in the Public Health Outcomes Framework (PHOF) (70). The RNIB (71) explain that generally, to be certified as **severely sight impaired (blind)**, your sight has to fall into one of the following categories, while wearing any glasses or contact lenses that you may need:

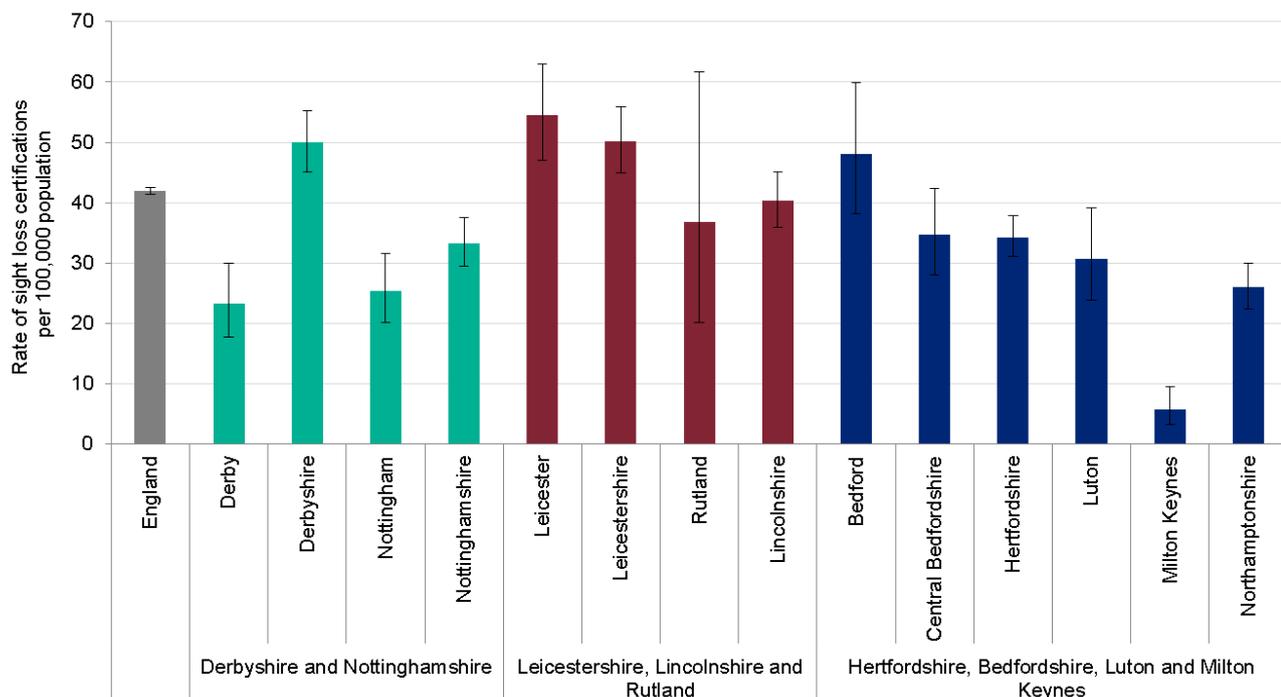
- Visual acuity of less than 3 / 60 with a full visual field.
- Visual acuity between 3 / 60 and 6 / 60 with a severe reduction of field of vision, such as tunnel vision.
- Visual acuity of 6 / 60 or above but with a very reduced field of vision, especially if a lot of sight is missing in the lower part of the field.

The process of certification +/- registration is subject to various conflicting factors. Some patients who are eligible for certification are not certified because they are outwith the health system. Some patients within the system are not offered the chance of certification because this need is not recognised in the clinic, either because the question is not raised or because of presumptions that this conversation has already taken place (72). Sometimes patients with deteriorating disease cross a certification

threshold that is not noted. The DVLA threshold is of more day to day relevance to the majority of patients and their families (at least 6/12 binocular vision / number plate test for group one drivers). Some patients decline certification because the benefits are modest and patients are wary of being stigmatised (72).

Practice is likely to vary across and within regions depending on local patient and health professional factors. There used to be an incentive for clinicians to certify patients which has now been withdrawn. Whether this has affected certification rates has not been studied. The process of registration is further dependant on appropriate submission and processing of the CVI documentation (73). In England in 2015/16, there were 41.9 sight loss certifications per 100,000 population as shown in Figure 1. This means that 22,973 people were given certifications of sight loss in 2015/16. Of the 14 local authorities discussed in this briefing, the rates of new certification for sight loss were significantly higher than the national average in Derbyshire, Leicester and Leicestershire, and significantly lower than the national average in Derby, Nottingham, Nottinghamshire, Hertfordshire, Luton, Milton Keynes and Northamptonshire. There were no statistically significant differences in certification rates in Lincolnshire, Rutland, Bedford and Central Bedfordshire when compared to the national average. Certification is voluntary and therefore the rates shown here are likely to be an underestimation of the true picture. Recent trend data in the PHOF suggests that certification rates are generally falling or staying the same, although they are increasing in Derbyshire.

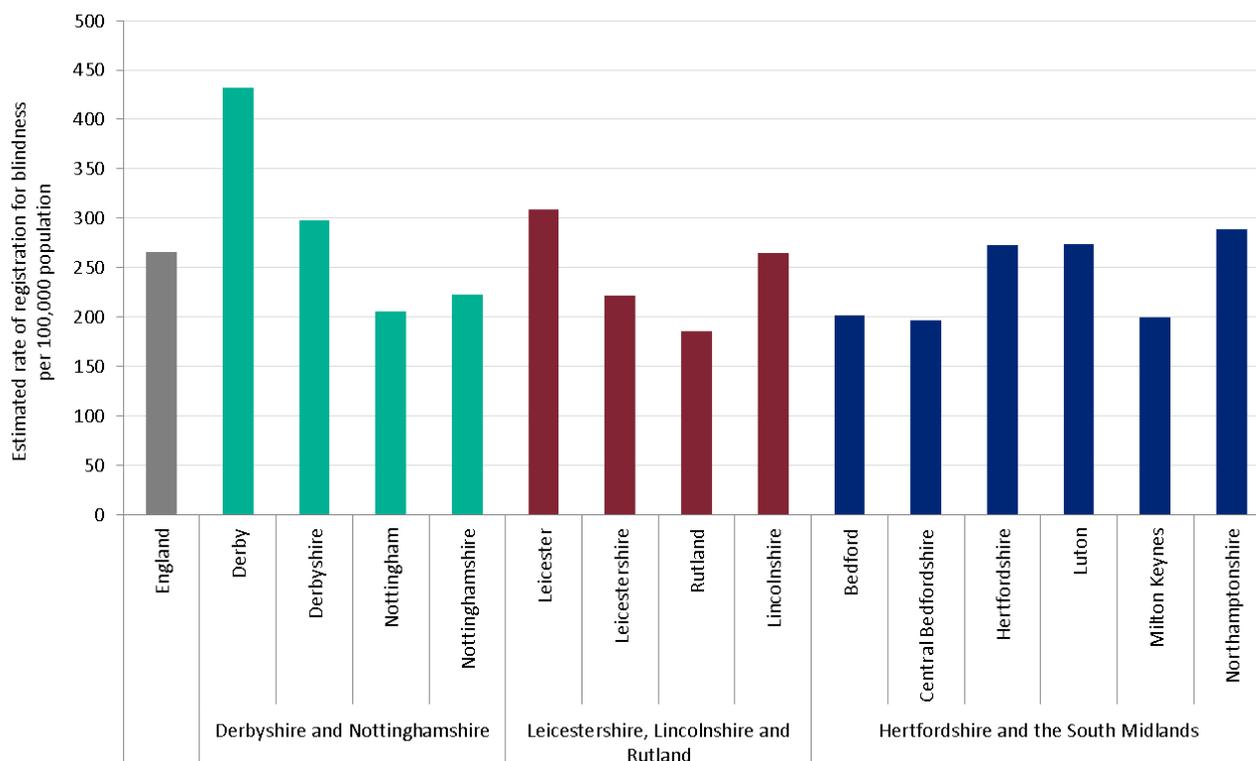
**Figure 1: Rate of new certifications for sight loss by upper tier local authority, all ages, 2015/16. With 95% confidence intervals. Source: PHOF (43)**



Once an individual has been certified with sight loss, they are able to apply to be placed on the local authority visual impairment registers. Although this allows access to social care support services, being on local authority registers is again voluntary. In England in 2013/14, there were 266.2 people per 100,000 population registered as blind with their local authority, as shown in Figure 2. Across the 14 local authorities covered in this briefing, the highest rate of registration for blindness as of the end of March 2014 was in Derby at 431.5 per 100,000 population, followed by Leicester at 308.6 per 100,000 population. The lowest rate was in Rutland at 186.1 per 100,000. This could suggest that the registration process is more accessible or better publicised in some local authorities compared with others, or could indicate differences in the need for social care support services in different populations.

It is interesting that Derby had one of the lowest rates of new certifications for sight loss in 2015/16, but had the highest rate of people registered blind in 2013/14. Between 2010/11 and 2012/13, the rate of new certifications for sight loss in Derby reduced significantly by more than half, whereas the rate in the majority of the remaining local authorities remained stable. Looking at the rates of new registrations in 2013/14 for each local authority (Table 1), Derby had the lowest rate at 9.9 new registrations per 100,000 population. This suggests that the majority of those on the blindness register in Derby were registered prior to 2013/14.

**Figure 2: Rate of people registered as blind per 100,000 population as of 31 March 2014 by upper tier local authority. Source: NHS Digital (44)**

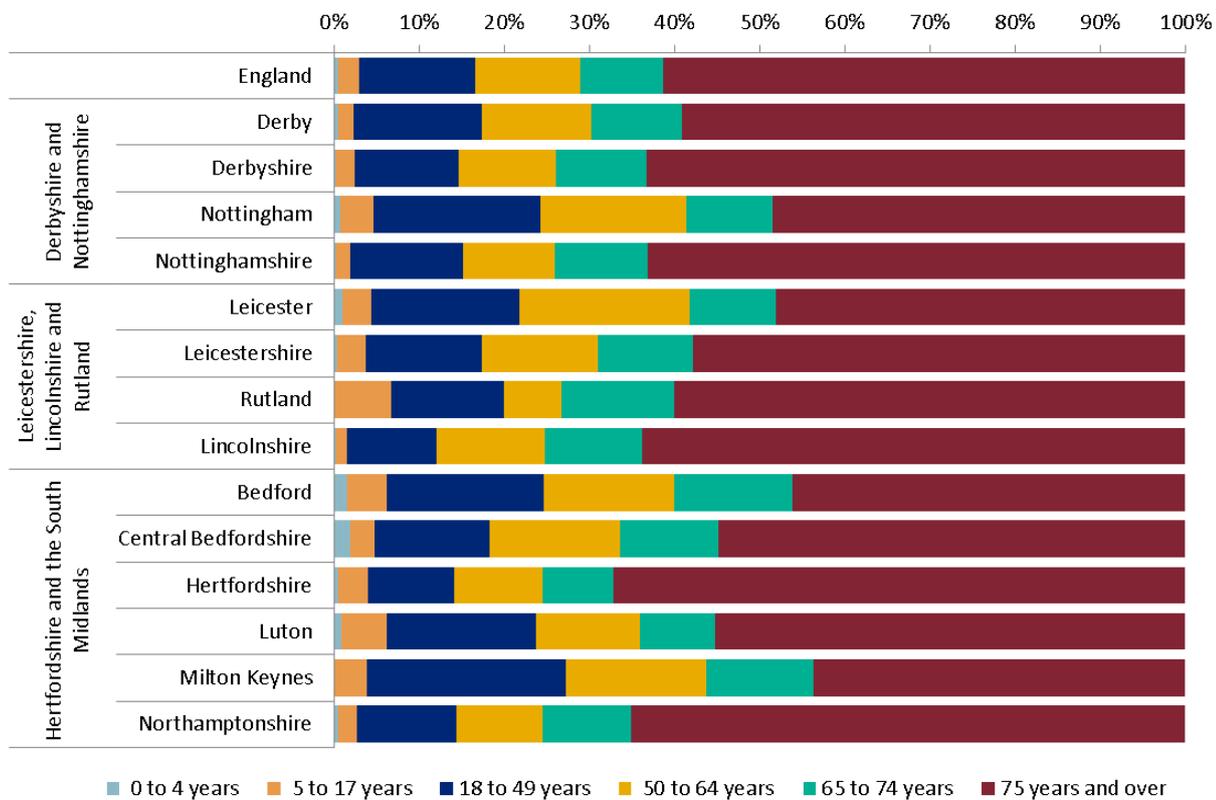


**Table 1: Numbers and rates per 100,000 of people newly registered as blind during 2013/14 by upper tier local authority. Source: NHS Digital (44)**

	Total number of people newly registered as blind 2013/14	Rate of new registrations per 100,000
England	8,875	16.5
Derby	25	9.9
Derbyshire	90	11.6
Nottingham	35	11.3
Nottinghamshire	90	11.3
Leicester	75	22.5
Leicestershire	115	17.4
Rutland	5	13.3
Lincolnshire	105	14.5
Bedford	35	21.7
Central Bedfordshire	45	17.0
Hertfordshire	170	14.9
Luton	25	12.0
Milton Keynes	50	19.6
Northamptonshire	95	13.4

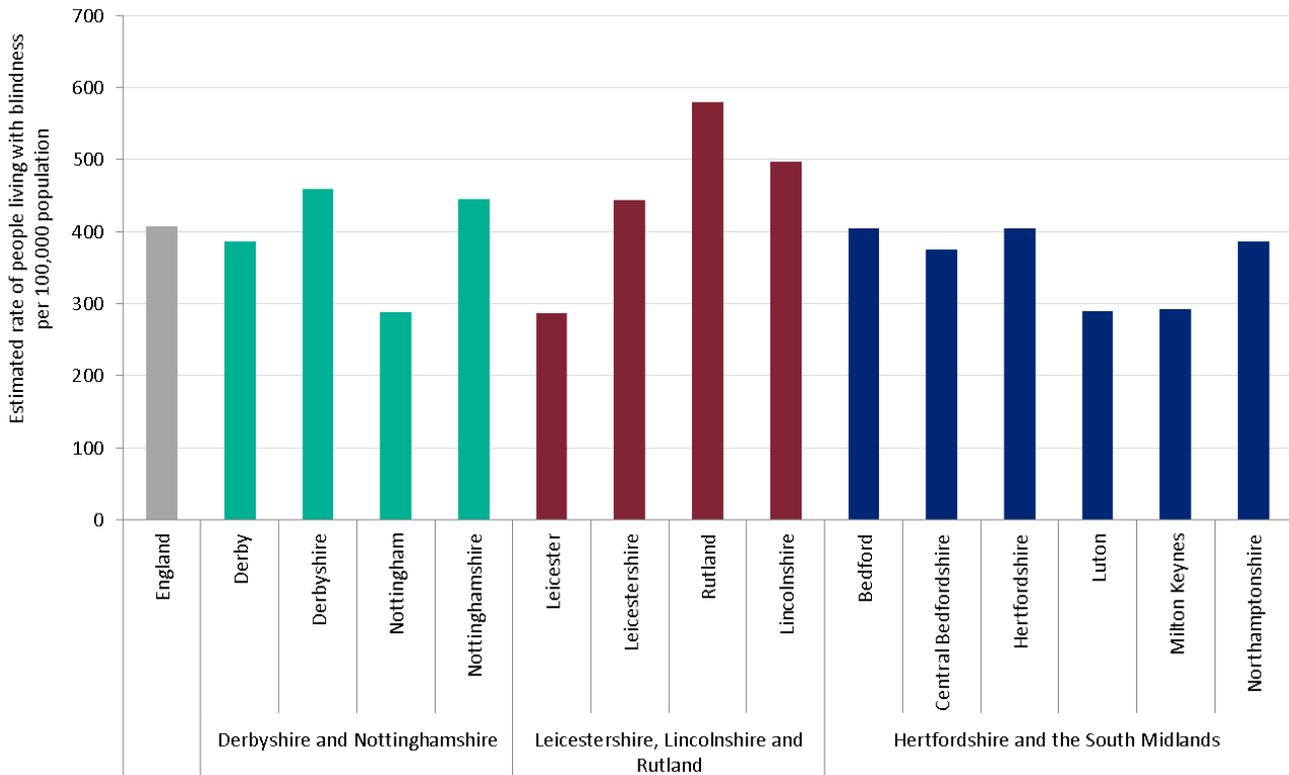
When considering the age profile of those registered blind, those aged 75 years and over made up between 44% and 67% of the register in 2013/14, as shown in Figure 3. Some of the more urban areas, such as Nottingham, Leicester, Bedford and Milton Keynes tended to have smaller proportions of those aged 75 and over than other areas, but had a greater proportion of 18 to 49 year olds on register than other areas. This is particularly evident in Milton Keynes, where 24% of those registered blind were aged between 18 and 49 years.

**Figure 3: Proportion of those registered blind by age group as of 31 March 2014 by age group and upper tier local authority. Source: NHS Digital (44)**



Using prevalence estimates from the National Eye Health Epidemiological Model (46), it can be estimated that there were 225,180 people living with blindness in 2016. This is a rate of 407.8 per 100,000 population, as shown in Figure 4. Across the 14 local authorities covered by the 3 LEHNs discussed in this briefing, the highest estimated rate was in Rutland, whilst the lowest was in Leicester. The lowest rates of blindness were generally in the more urban local authorities, with the exception of Derby. These prevalence rates are not age-standardised and so differences in the age profiles between areas have not been accounted for.

**Figure 4: Estimated rate of blindness per 100,000 population by upper tier local authority, all ages, 2016. Calculated from ONS mid-2014 based population projections for 2016 (23) and prevalence models from the RNIB. Source: RNIB (46)**



Based on RNIB prevalence estimates, the rate of blindness is expected to increase nationally from 407.8 per 100,000 population in 2016 to 534.4 per 100,000 population by 2030, as shown in Table 2. This means that by 2030, there will be an estimated 323,450 people living with blindness, corresponding to a percentage increase of 43.6%. The number of people living with blindness will increase across all 14 of the local authorities covered in this briefing by 2030, with the greatest percentage increase in Milton Keynes (70.5%), and the smallest percentage increase in Nottingham (27.2%).

**Table 2: Numbers of people estimated to be blind and rates per 100,000 by upper tier local authority, all ages, 2016 and 2030. Source: ONS and RNIB population projections (23, 46)**

People living with blindness					
Area	Rate per 100,000 population		Estimated number		% change in numbers 2016 to 2030
	2016	2030	2016	2030	
England	407.8	534.4	225,180	323,450	43.6
Derby	386.0	477.0	990	1,330	34.3
Derbyshire	459.6	641.3	3,610	5,350	48.2
Nottingham	287.4	337.7	920	1,170	27.2
Nottinghamshire	445.3	604.7	3,610	5,290	46.5
Leicester	286.0	348.2	990	1,340	35.4
Leicestershire	444.1	605.3	3,010	4,530	50.5
Rutland	578.9	800.0	220	320	45.5
Lincolnshire	496.4	674.5	3,680	5,430	47.6
Bedford	404.0	527.7	680	1,030	51.5
Central Bedfordshire	375.0	504.6	1,040	1,660	59.6
Hertfordshire	404.8	514.4	4,770	6,910	44.9
Luton	289.3	355.1	630	890	41.3
Milton Keynes	292.8	432.0	780	1,330	70.5
Northamptonshire	386.1	543.6	2,810	4,410	56.9

**In summary:**

- Estimated rates of blindness and rates of certifications for sight loss are currently estimated to be lower in more urban areas where the populations tend to be younger. Despite this, the rate of local authority registration for blindness was highest in the cities of Derby and Leicester in 2013/14
- However, rates of certification for sight loss appear to be decreasing or remaining the same in most of the local authorities
- RNIB estimates suggest that the rate of blindness in England is 407.8 per 100,000 population and increasing, with some geographical variation in the magnitude of the increase among the local authorities discussed in this briefing
- Although Milton Keynes had the lowest rate of certification in 2015/16 and was also among those authorities with the lowest estimated rates of blindness and registration, this area is projected to have the greatest percentage increase in the number of blind people living in the area. This may be driven by the age structure of the population, which is generally younger. Milton Keynes also had the greatest proportion of 18 to 49 year olds on the local authority register for blindness

## 8.2 Commissioned services

There is a statutory requirement to support the registration of blind and partially sighted individuals and assess their social care needs (74). In line with Clinical Council for Eye Health Commissioning (75) Framework for delivering low vision, rehabilitation, habilitation services, individuals with vision impairment, should, following diagnosis and certification of vision impairment (CVI) have the opportunity for a full low vision assessment as well as the required statutory assessment. Early intervention, advice and support about these processes can be provided by eye clinic liaison officers (ECLOs). Services for those with poor vision, including low vision assessments and aids, can bridge the gap between health and social care services and offer visually impaired individuals practical information, support and liaison based on the severity of their sight loss. There is currently no standard requirement to commission ECLOs or low vision assessments, however there is evidence to suggest that investment of £1 in an ECLO service can net a return of £10.57 to health and social care expenditure budgets; as per RNIB economic impact assessment (76).

Following an assessment of social care need, registered individuals may be offered visual impairment rehabilitation programmes and community care assessments, social care supports and services. Only community based social care support is statutorily provided (77). It is therefore likely that there will be variable provision of social care support for individuals with visual impairment across the patch.

Whilst provision of social care services are outside the remit of this needs assessment, local intelligence should be sought to better understand the impact of the prevalence of visual impairment or blindness on the need (and provision) of these services.

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## 9.0 Conclusion and recommendations

The aim of this EHNA was to identify the main priorities for improving eye health, reducing preventable sight loss and narrowing eye health inequalities in the NHS England Central Midlands and NHS England North Midlands areas that are a part of the PHE East Midlands region. The assessment focused on children and young people, specifically eye screening and examinations; older people, specifically age-related macular degeneration (AMD), cataract and glaucoma; diabetic and vascular retinopathy, and sight loss, specifically blindness.

An epidemiological approach was used and existing/ readily available data accessed to assess population need. Universal services that protect and promote eye health and targeted services to detect, manage and treat conditions are highlighted. Standard service provision arrangements are described through narrative descriptions of healthcare pathways.

It is apparent that a whole systems approach to eye health is necessary if a reduction in the proportion of avoidable sight loss is to be achieved. Patients' eye health needs should be assessed with their overall health needs, commissioners can add value to broader prevention and health risk assessment programmes by including a whole person approach, and sight loss risk factors can be modified at a population level to help achieve public health improvements.

While this assessment has gone some way to provide an epidemiological understanding of eye health need across the region, it has been limited by the breadth of geography and the scarcity of robust data about key eye health conditions.

The overriding purpose of any Health Needs Assessment is to gather the information required to bring about change that is beneficial to the health of the population, in the context of finite resources. This can be achieved by identifying the following 3 areas, and using this knowledge to reallocate resources:

- Where there is unmet need, that is, non-recipients of beneficial healthcare interventions
- Where resources can be released, that is, recipients of ineffective or inefficient health care
- Where outcomes could be improved, that is, recipients of inappropriate health care

Additional local intelligence - good quality and more complete data - and gap analysis is required to understand these factors. Once performed this could inform local priority setting. Whilst eye health related social care need and provision was outside the remit

of this assessment, an understanding of these gaps at a local level should be sought to ensure that priority setting encompasses a holistic perspective of eye health need.

In relation to Health and Wellbeing boards' statutory duty to have regard for health inequalities, it is recommended that this assessment should be considered for inclusion in local JSNAs. The onus on priority setting falls in the remit of local commissioners and health system leaders. It is suggested that local commissioners include findings from this assessment and local gap analysis work in their strategic planning and service procurement processes. All relevant local commissioning and provider organisations will need to work in partnership to deliver better eye health outcomes for the population of the Central Midlands and areas of North Midlands in the PHE East Midlands region.