Don’t lose sight

A Health Needs Assessment of Eye Health and Preventable Sight Loss in Stockport, United Kingdom

2014

Summary

Half of all sight loss in the UK is preventable and the impact within society is comparable to that of cardiovascular disease. By 2050, the number of people with sight loss will have doubled, in the most part due to our rapidly aging population as well as increasing rates of diabetes and obesity. Despite this, although attitudes are shifting, sight loss is not yet universally accepted as a public health priority. The epidemiology of sight loss is also changing with a relative shift in prevalence of the main causes of preventable sight loss and as such, the attributable burden and treatment costs. The implications for service provision are considerable and establishing an accurate picture of need in Stockport is essential to inform service planning.

This Health Needs assessment describes the modifiable population-level risk factors for preventable sight loss and quantifies the local burden of sight loss using published epidemiological models applied to local data, focusing on the five main causes – Age-Related Macular Degeneration (AMD), Glaucoma, Diabetic Retinopathy, Cataracts and uncorrected refractive error.

Modifiable Population Risk Factors

- **Smoking** - Current smokers are at a 2-3 fold increased risk of developing AMD compared to those who have never smoked and a 3-fold increased risk of developing cataracts and smoking is also a risk factor for Diabetic Retinopathy. Although smoking prevalence in Stockport is the same as the national average and the rate has decreased since 2010, a strong downward trend is not yet established.

- **Diabetes** – How long a person has had diabetes for is the most important risk factor for development of Diabetic Retinopathy and after 20 years, Diabetic Retinopathy will develop in almost all people with Type 1 and around 60% of people with Type 2 diabetes. Age-related cataracts also occur earlier in diabetic patients. Although levels of diabetes in Stockport remain statistically significantly lower than both the North West and England average, there has been a year-on-year increase since 2010/11.

- **Obesity -** Obesity represents a significant modifiable risk factor for visual impairment and has been demonstrated as an independent risk factor for AMD, Diabetic Retinopathy and cataracts. It is estimated that in Stockport, nearly two thirds of adults are overweight or obese.

Burden

1.1.1.1

Age-Related Macular Degeneration (AMD)

AMD is the commonest cause of severe sight loss amongst older adults in developed countries and accounts for over half of blindness registered in the UK. AMD results from changes that occur to the central area of the retina, generally in people aged over 55 years. It is a chronic degenerative disease which leads to (in many cases profound) loss of central vision. The impact of AMD on quality of life is dramatic, with very severe AMD being compared to advanced prostatic cancer with uncontrollable pain.

Epidemiological models estimate that there are currently between 2687 and 3160 cases of AMD in Stockport, with 126 new cases of Wet AMD arising each year. These numbers are significantly lower than those observed from treatment data in Stockport, which suggests that awareness of AMD and access to services in Stockport is good with people presenting and being identified early, at a point where the condition is treatable**.**

1.1.1.2

Glaucoma

Glaucoma is a group of eye diseases which cause progressive damage to the optic nerve and lead to impaired vision and sometimes blindness; damage is caused by raised intraocular pressure or weaknesses in the optic nerve. Glaucoma accounts for 5% of sight loss in the UK, but 11% of the burden and those at risk require lifelong monitoring.

Epidemiological models estimate that there are 6023 people living with Ocular hypertension (OHT) in Stockport and 2673 living with glaucoma, with 992 new cases of glaucoma expected to be diagnosed each year.

Diabetic Retinopathy

Diabetic retinopathy is a progressive disease of the blood vessels in the retina and is associated with the prolonged hyperglycaemia and hypertension experienced by people with diabetes.

In Stockport, 5.7% of ≥17 year olds have diabetes and are therefore at risk of developing Diabetic Retinopathy. Epidemiological models estimate that 417 people in Stockport are living with Diabetic Retinopathy in 2014.

Early identification (through the national screening programme) and treatment are central to avoiding sight loss from Diabetic Retinopathy. In Stockport, 83.1% of those invited for screening in 2011/12 took up the opportunity, which is higher than both the England and North West average. However access to screening in relatively more deprived areas may be limited by the variation in location of optometrists across Stockport.

Cataracts

A cataract is the development of opacity in the normally clear lens of the eye; it can affect one or both eyes and progressively obscures a person's vision. They are extremely common amongst older people and most will experience low levels of opacity with no or minimal sight problems – cataracts resulting in sight loss account for 14% of registered partial sight and blindness in Stockport.

Epidemiological models estimate that between 2846 and 10,315 older people in Stockport currently experience sight loss due to cataracts. Cataract surgery is considered one of the most cost-effective treatments available and accounts for nearly half of all ophthalmology inpatient admissions in Stockport, over 2000 cataract operations were undertaken in Stockport in 2012/13. Unlike elsewhere within the UK, no restrictions or thresholds are in place for the provision of cataract surgery in Stockport.

Uncorrected Refractive error

Partial sight arising from serious uncorrected refractive error accounts for >50% of avoidable sight loss in the UK[2]. Yet many perceive regular sight tests as unnecessary and do not equate them with preventing sight loss. The NHS funds free preventative and corrective eye care to children, people aged ≥60, on low incomes and those pre-disposed to eye disease (e.g. glaucoma family-history).
However despite this, analysis of NHS sight tests in Stockport suggests that take-up amongst key groups may not be as high as it should be.

Conclusions and Recommendations

Over the last 5 years, there has been a considerable shift towards community delivery models of eye health services in Stockport, which has brought much of the care closer to home. However a greater focus on preventative action, early identification and minimising the wider impact of sight loss is now needed and modifiable risk factors for sight loss including smoking, diet and obesity and diabetes, all provide opportunities for primary prevention.

Failings in local reporting of sight loss data in Stockport have been identified, with implications for both local and national indicators and immediate improvements in local arrangements are strongly recommended.

In addition to challenges in establishing accurate local population data on sight loss, the evidence base with respect to the cost-effectiveness of interventions is particularly lacking. Much of the evidence in this area is drawn from grey literature and in particular from the policy and campaign reports commissioned and produced by the RNIB. These reports play a significant role in shaping public policy, due to the prolific and high profile advocacy role undertaken by the charity. However, dominance by a single organisation and a lack of any opportunity for peer review removes the opportunity to identify bias in findings. Over-reliance on these reports by commissioners and policymakers may result in misguided public health decisions.

The recommendations from this HNA are set out below. They are not presented in any priority order.

1. **Recommendation 1: Increase reporting of CVI data** for epidemiological analysis

There are clear opportunities to improve the certification process and reporting of data in Stockport, particularly in relation to the CVI data submitted to Moorfield's Eye Hospital.

Recommendations:

- Undertake awareness raising amongst professionals on the public health value of reporting certifications data for epidemiological analysis
- Establish local annual audit cycle of CVI data reporting
- Consider commissioning levers if audits indicate data not being reported

2. **Recommendation 2: Establish local levels and drivers of** under-certification and registration

National evidence[27,65] suggests that a lack of professional (and potentially public) knowledge and understanding about when to certify a patient, contributes to observed levels of under-certification and registration and therefore presents an opportunity for intervention.

Conditional recommendations:

- Consider including outcome of certification (i.e. whether person was offered and took up registration) as part of CVI audit **(Recommendation 1)** to strengthen local understanding of drivers of under-certification/registration.

- Consider commissioning a local study to better understand local professional knowledge about purpose of certification and when to certify, as well as the benefits of certification and registration; and to explore public perceptions and attitudes to registration to better understand local barriers.
- Consider utilising tools developed by the Royal College of Ophthalmologists: http://www.rcophth.ac.uk/page.asp?section=165&sectionTitle=Certificate+of+Vision+Impairment

3. **Recommendation 3: Establish local costs and benefits of** an ECLO post

It has been suggested that ECLO's may improve the certification/registration process and have a positive impact on patient experience.

Conditional recommendation:

- Consider costs and benefits of funding an ECLO post in Stockport informed by the UK micro-costing study[67]

4. **Recommendation 4: Improve early identification and intervention for those at risk of falls due** to sight loss

The impact of falls within the older population in Stockport is likely to be sizeable. Reducing avoidable sight loss will in itself positively impact on the burden of falls. However, early identification and intervention for those at-risk of falls due to sight loss is also necessary. Further investigation into provision of falls prevention for those with sight loss through local services is required (hence conditional recommendations).

Conditional recommendations:

- Visual Acuity testing to be undertaken for high-risk falls populations through:
  - Inclusion as an indicator in the Integrated Care System
  - Named GP responsibilities for over 75s to include 'recommending a sight test where one has not been undertaken within the last 2 years or where indicated' and 'checking that visual acuity is 6/12 or better if still driving'.
- Visual Acuity testing to be included in multi-factorial falls risk assessments for recent fallers (may require community optometry support). Visual acuity should be checked and the date of last sight test confirmed with a recommendation for a full GOS sight test if indicated.
- Review referral routes to falls clinic to ensure all those at-risk of or who have recently fallen receive a falls risk assessment (to include visual acuity testing). (e.g. GP, Optometrists, Ambulance service, secondary care)[138].
- Home hazard assessments and safety training to be offered to all those with partial sight and blindness (if not already in place)
- Utilise general awareness raising resources for health and social care professionals such as those developed by ProFaNE, which highlight the link between visual impairment and falls http://profane.co/vision-and-falls-prevention-home-page/

5. **Recommendation 5: Identify and support people with sight loss at risk of low** wellbeing or depression

People living with sight loss in Stockport are at increased risk of depression and low wellbeing but a lack of monitoring may mean they are not routinely identified or supported. There is a lack of evidence to support recommendations around cost-effective interventions to improve wellbeing or identify those at risk of depression, despite demonstrable evidence of need. However if not already in place, consideration should be given to including wellbeing scores in assessments used by social care and NHS eye health services. Information on wellbeing would inform early identification of those at increased risk. Implementation of **Recommendation 8** and **Recommendation 2** around improving the identification of partial sight and blindness, and increasing uptake of registration may also have a positive impact on wellbeing indicators, by providing an opportunity for issues around social isolation to be identified, and for signposting to local support groups.

6. **Recommendation 6: Strengthen link between smoking cessation messages and** eye health.

The link between smoking and sight loss has not yet been exploited in Stockport; the opportunity and the evidence therefore exist to suggest that integration of these messages could be powerful – both in terms of population health and in terms of reducing health inequalities. Messages should particularly target those at greatest risk, for example relatives of those with AMD.

Recommendations:

- Introduce information about causal association between smoking and blindness into existing smoking cessation advice.
- Further investigate extent to which local eye-care professionals explore smoking status/provide smoking cessation advice/signposting.

Conditional Recommendations:

- Consider providing smoking cessation training for eye-care professionals
- Consider undertaking a cost-benefit analysis of a smoking cessation campaign incorporating messages around sight loss.

7. **Recommendation 7: Investigate variation in uptake of** Diabetic Retinopathy screening

Equal access to and uptake of screening are essential; geographic variation in screening locations and relatively high levels of exclusions/non-participation in screening may mean Diabetic Retinopathy in some groups within Stockport is identified late.

Recommendations:

- Review Diabetic Retinopathy screening exclusion rates following alignment of screening processes across the Greater Manchester Programmes. Undertake further investigation if levels of exclusion from screening for Stockport patients continue to be comparatively higher.
- Undertake further analysis of screening uptake in areas of higher deprivation and undertake qualitative assessment of barriers to explore whether lower availability of community-based

screening is a barrier to uptake. Analysis of screening uptake by other protected characteristics including ethnicity would also be of value to determine equity in uptake.

8. **Recommendation 8: Improve uptake of** regular sight tests

GOS data highlights at-risk populations who are not accessing free sight tests, and are therefore more likely to present late with preventable conditions. Mapping of services also indicates relatively less provision in areas of higher deprivation.

Recommendation:

- Utilise existing structures and contact with health services to raise awareness of the importance of regular sight tests, particularly amongst groups at greater risk of preventable sight loss, e.g. through NHS Health Checks for >40s, the Integrated Care System and Named GPs (as per **Recommendation 4**) and link to work being undertaken across Greater Manchester as appropriate through NHS England and the Local Eye Health Network (LEHN).

Conditional recommendations:

- Further explore uptake of GOS, particularly in relation to residents on JSA, claiming income support and tax credits; and examine reasons behind this e.g. barriers to access – knowledge/physical access due to location of services/perceived threat.
- In relation to those areas of Stockport currently poorly served by optometry practices; particularly in areas of high deprivation; consider whether satellite clinics or enhanced services could be delivered through existing healthcare provision such as GP practices (as per **Recommendation 7**) or whether optometry practices could be encouraged to open in areas of low provision.

9. **Review rehabilitation services and patient pathways across ophthalmology, adult social care and the third sector**

It was not possible to ascertain the extent to which the three key rehabilitation elements (low vision services, adult social care and third sector services) work together; or the ease with which individuals access services and move between them. Anecdotal reports indicate that links have been established over the last 2 years and there is active work being undertaken to strengthen these links for example through quarterly meetings; however a formal review of the patient pathway may help to elucidate the impact and effectiveness of this work. The conditional recommendations made in relation to rehabilitation services reflect this uncertainty over local arrangements.

Conditional Recommendations:

- Consider further mapping of third sector provision, using the Seeing it My Way Outcomes[i] to consider whether adequate support exists for self-management and employment, and wider health and wellbeing.
- Consider reviewing rehabilitation services (across both Ophthalmology and Adult Social Care), using an appropriate framework to identify any gaps in service/capacity and inform

[i] Available: http://www.vision2020uk.org.uk/ukvisionstrategy/page.asp?section=301&sectionTitle=Seeing+it+my+way

improvements to patient pathways. As part of the Low Vision Service Model Evaluation (LOVSME) project, RNIB developed a Low Vision Services Self Assessment Tool[ii] for assessing the quality of care offered by providers of low vision services, the assessment can be undertaken collaboratively across both aspects of Rehabilitation services and may provide a useful tool to inform service development going forward. There may be merit in considering the provision of rehabilitation services for the visually impaired in the broader context of services for people with disabilities, particularly given the level of comorbidity amongst those with partial sight and blindness identified in 4.2.3. The co-location of services such as social care, third sector support and low vision services would also warrant consideration.

- Expedite plans to re-establish the LVSC, particularly as this would provide an opportunity for service user influence on service delivery and planning.

Future Projections

An ageing population and increasing treatment effectiveness will result in a significant increase to the number of people at risk of, and living with, preventable sight loss. The implications of this projected increase on service capacity and treatment costs in Stockport will be important to consider in future service planning **(Table 1).**

FSUK 2 Projections 2010-2020[38]	2010	2020	Difference	% increase
Age Related Macular Degeneration (AMD)				
Early AMD	1493963	1821434	327471	22%
Wet AMD	414561	515509	100948	24%
Dry AMD	193652	240358	46706	24%
Total	2102176	2577301	475125	23%
Cataract	206224	248504	42280	21%
yearly no. operations	389000	473944	84944	22%
Diabetic Retinopathy				
Background	748000	938000	190000	25%
non-proliferative and proliferative	85484	107218	21734	25%
Diabetic maculopathy	187842	235602	47760	25%
Glaucoma				
Ocular hypertension	308,044	361,183	53139	17%
Glaucoma	265,973	327,440	61467	23%

Table 1: FSUK Projections by condition 2010-2020[38]

[ii] Available at: http://www.rnib.org.uk/services-we-offer-advice-professionals-health-professionals/eye-clinic-staff

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Glossary

AMD	Age-related macular degeneration
CVI	Certificate of Vision Impairment
COAG	Chronic open angle glaucoma
DH	Department of Health
DR	Diabetic Retinopathy
ECLO	Eye Clinic Liaison Officer
NEHEM	National Eye Health Epidemiological Model
NICE	National Institute for Health and Care Excellence
OHT	Ocular hypertension
OR	Odds Ratio
PANSI	Projecting Adult Needs & Service Information
PB	Programme Budget
PHOF	Public Health Outcomes Framework
POPPI	Projecting Older People Population Information
RCO	Royal College of Ophthalmology
RR	Relative Risk
RNIB	Royal National Institute of Blind People
Sight loss or Visual impairment (used interchangeably)	Partial sight and blindness (<6/12)
SPOT	Spend and outcome tool
VEGF	Vascular endothelial growth factor
QOF	Quality Outcomes Framework

2 Introduction

This Health Needs Assessment (HNA) aims to estimate the current and projected burden of preventable sight loss and eye health morbidity in the population of Stockport; in the context of a growing argument for sight loss to be recognised locally and nationally as a significant public health issue. The HNA will provide an analysis of whether current need is being accurately identified, and reflect on the evidence base and case for implementing interventions aimed at improving service delivery and efficiency.

Sight loss, particularly that which is preventable, is a major public health priority and is rightly increasingly being recognised as such[1]. Nearly two million people currently live in the UK with significant sight loss, of which 50% could have been prevented. By 2050, in line with population increases and our ageing population, that number is projected to double to 4 million[2]. Health inequalities exist within the pattern of sight loss nationally, particularly in relation to socio-economic position, disability, ethnicity and risk factors such as smoking; as such preventable sight loss clearly contributes to the widening health gradient[1].

2.1 Aims, Objectives and Scope

HNA's are defined as "systematic methods for reviewing the health issues facing a population, leading to agreed resource allocation that will improve health and reduce inequalities"[3].

The aim of this HNA is to identify and quantify the current and future burden of preventable sight loss in Stockport; focusing on the five main causes, modifiable risk-factors and wider impact of sight loss, balanced with the normative and expressed needs of those affected; set against the current political and socioeconomic context.

This HNA cannot and does not aim to provide an answer to every issue identified, nor does it identify every gap in the patient pathway. However wherever possible, it proposes areas for further consideration and frameworks that could be used to further investigate specific areas; and an appraisal of the evidence base for interventions and recommendations to enable commissioners to make informed, transparent decisions about resource allocation.

The scope of this HNA is sight loss within Stockport, with a particular focus on preventable sight loss. Preventable sight loss generally occurs as a result of conditions prevalent in the adult and particularly older adult population and as such ≥18s have not been considered within the scope.

There is no definitive international or indeed national definition of sight loss, however in the UK and for the purposes of this HNA it is commonly defined as:

- "Blindness (severe sight loss) - best-corrected visual acuity of <6/60 in the better-seeing eye.
- Partial sight - best-corrected visual acuity of <6/12 to 6/60 in the better seeing eye"[2]

- Sight loss - partial sight or blindness in the better-seeing eye[2]

Although acknowledged as a conservative measure, this definition reflects the reality that function tends only to be limited when sight loss becomes bilateral[2]. This definition only extends to visual impairment that cannot be corrected with glasses or contact lenses. However, broader eye health, particularly undiagnosed and therefore uncorrected refractive error, will additionally be considered.

2.2 Context

2.2.1 Preventable Sight Loss as a Public Health Issue

2.2.1.1 Impact on population health

The impact of sight loss at a population level has been ranked alongside cardiovascular disease and neurological disorders, and visual impairment accounts for 4% of all years lived with disability in those aged ≥70 years[4].

In terms of the overall societal burden of visual impairment, an individual's confidence in managing their own health is key and logically impacts on appropriate use of services (e.g. A & E admissions) with significant associated costs. The GP Survey for England found that amongst those aged ≥55 without sensory impairment, 91% felt confident managing their own health, compared to just 72% amongst those who were blind[5].

The wider impact of sight loss on wellbeing is discussed further in **4.2** and the population risk factors (both modifiable and non-modifiable), as well as the wider determinants, not least the social patterning of sight loss, are addressed in **4.3** and **4.4.** This HNA demonstrates that improving eye health will not only have a significant direct impact on population health, but also likely a synergistic effect on other aspects of population health and on reducing health inequalities.

2.2.1.2 Escalating need because of the ageing population

Nationally, by 2050, the number of people with sight loss will have doubled[2]. In the most part this is due to rapidly ageing population, although increasing rates of diabetes and obesity play a role. The epidemiology on a condition specific basis has already shifted, with the age-specific incidence of Age-Related Macular Degeneration (AMD), Glaucoma and Diabetic Retinopathy (DR) increasing significantly since 1990, particularly in the ≥65s[6]. These increases signal that without intervention, we will experience a dramatic rise in burden in the very near future, with an associated increased demand on services and detrimental impact at an individual and societal level.

2.2.1.3 *Economic argument*

The Future Sight Loss UK (FSUK) report[2] placed the annual cost of sight loss in the UK to be £7.88 billion, with direct healthcare costs accounting for £2.6 billion of this[iii]. However this is conservative compared to an Australian study[7] which estimated the cost to be 0.6% of a country's GDP. The absolute economic burden of sight loss has been ranked alongside arguably much higher-profile long-term conditions such as dementia, arthritis and cancer[8].

The direct costs of visual impairment at an individual level, and to an extent at the societal level, are relatively tangible. However, the wider indirect costs to the economy of visual impairment, particularly those related to reduced labour market participation and informal care, are less obvious, but are of relatively far greater economic burden (Figure 1)[2]. The FSUK costings do not even attempt to quantify the cost of loss to wellbeing, which the Australian study placed at 49% of the overall cost[7].

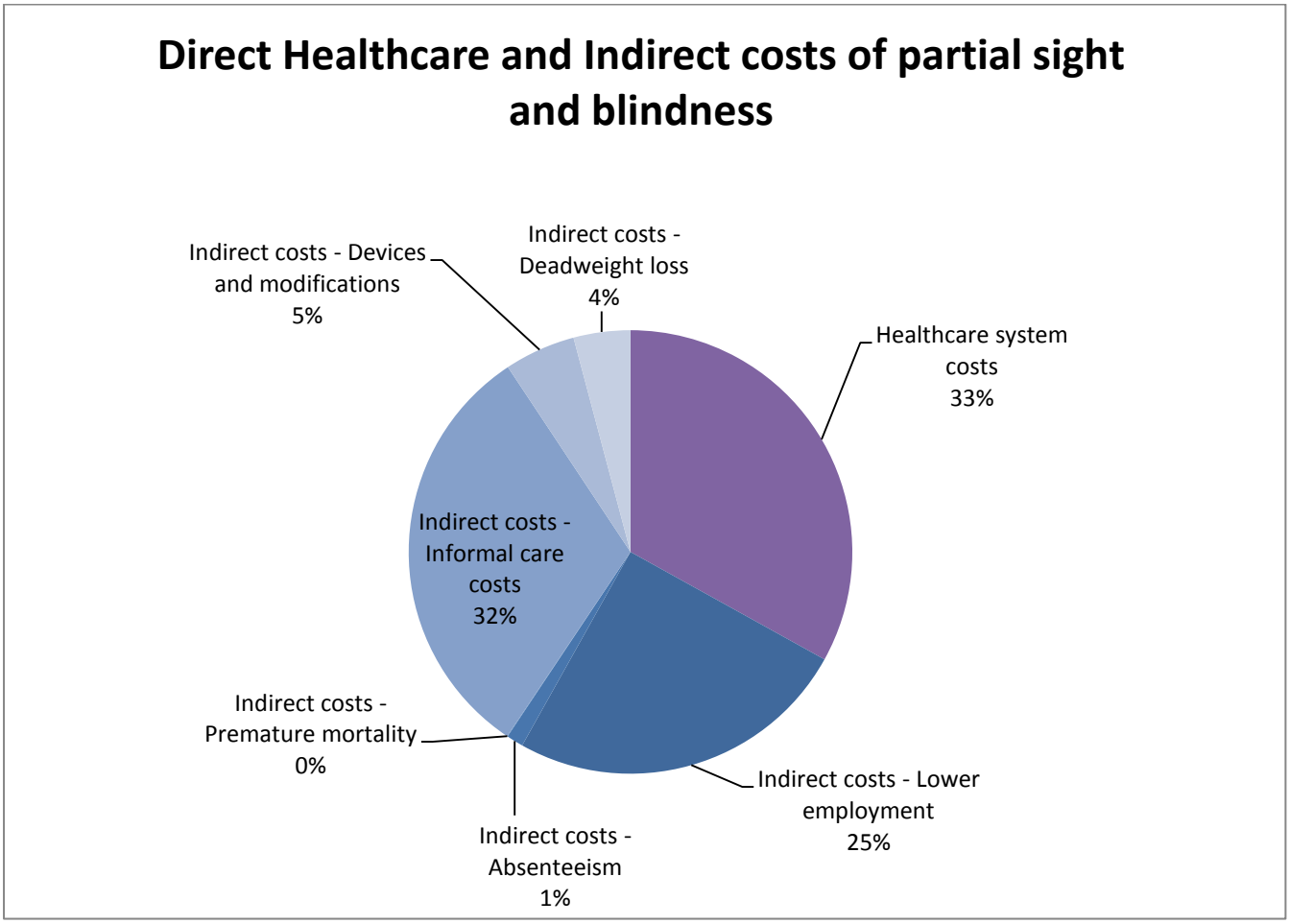


Figure 1: FSUK costs of partial sight and blindness[2]

Clearly the variation between costing studies underlines the difficulties in ascertaining the true cost and burden of sight loss, and where within society those costs are carried. However, what it demonstrates is that preventing sight loss would have considerable economic benefits, and that taking no action would risk demonstrably limiting economic development[8].

[iii] These figures are projected to 2013 and represent a 21.4% increase on the original published 2008 costing

2.2.1.4 Ethical

The social model of disability[9] argues that disabilities arise from impairment only where the barriers of social organisations do not take account of those with impairments. It should therefore follow that in a developed society, there is an ethical responsibility on decision-makers to fully understand the burden of sight loss within their population, and properly account for the impact of their decisions (for example around the built environment). Equality Impact Assessments can only effect change if the problem is truly understood, and if the process is truly collaborative. Recognising sight loss as a public health issue may go some way to raising its profile, and attracting the necessary time and resources needed to establish the true population burden.

2.2.2 National and International context and policy drivers

The World Health Organisation's launch of VISION 2020 in 1999, and the World Health Assembly's 2009 resolution, marked increasing global recognition and focus on the elimination of avoidable blindness as a public health problem. The Global Action Plan[10] set out an ambitious cross-sector programme of work and in response, in 2008 *The UK Vision Strategy*[11] was launched. Its aim is to reduce avoidable sight loss by 2020 and improve support and services for blind and partially sighted people. The refreshed strategy has three main outcomes:

- Everyone in the UK looks after their eyes and their sight
- Everyone with an eye condition receives timely treatment and, if permanent sight loss occurs, early and appropriate services and support are available and accessible to all.
- A society in which people with sight loss can fully participate[11]

The Strategy's Advisory Group is chaired by RNIB's Chief Executive and has reported significant progress in terms of improving current service provision and access to services, and in recognising sight loss as an important public health issue. However it has also identified a number of major persistent systemic gaps. In particular the lack of consistent care pathways and lack of a framework for prevention and early intervention, with resources still directed towards reactive treatment[12,11].

The introduction of preventable sight loss indicators into the new Public Health Outcomes Framework from April 2013 was further recognition that tackling sight loss from glaucoma, AMD and DR should be a public health priority. To date, the level of epidemiological data available on preventable sight loss has been lacking and although the quality of data remains poor, the introduction of national indicators and associated political interest should provide the impetus for improvements. Demonstrating breadth of impact, there are also links between sight loss and ten other outcomes in the Framework including Falls, Diabetes, Social Isolation and Quality of Life for Older People[13]. Additionally, reducing avoidable sight loss and improving eye health directly contributes to three of the five NHS Outcomes Framework 'domains' through which the effectiveness of healthcare is measured.

'*The NHS belongs to the people: a call to action*' was launched in July 2013, setting out the challenges faced by the NHS; "those of an ageing population with complex conditions against a backdrop of financial constraints"[14]. Separate 'call to action' engagements have since been held and the final strand of the campaign focuses on improving eye health. The consultation will run until 12 September 2014 and has already refocused the attention of commissioners on preventable sight loss[15].

The shift of care away from secondary care settings and into the community is gaining increasing momentum within healthcare services, motivated not least by challenging NHS savings targets. In eye health, the shift was instigated by the Eye Care Services Steering Group, which recommended a number of condition specific patient pathways with the aim of providing more efficient, accessible services. Although piloted, the evaluation of the pilot programmes reported significant issues with implementation and nationwide roll-out has been limited[16], despite clear arguments for increased community-based services[17].

The role of clinical guidance and recommendations play a dominant role in shaping the healthcare system in England and eye health is no exception. The Royal College of Ophthalmologist's (RCO) Clinical Guidelines describe best practice against which services are increasingly commissioned. NICE guidance also dictates what treatment options are open to commissioners and patients on the NHS. Public health guidance on the prevention of sight loss is however lacking and in the main, the focus remains on individual care, from a top down, medical model perspective. The influence of guidance or a lack thereof should not be underestimated, and particularly in a system reported to be 'fragmented' a consensus view against which to develop services and drive change would be valuable.

2.2.3 Local context

The 2011 census reported the Stockport population to be 283,275 - by 2020 it is currently projected to reach nearly 297,000. The population is older than average and although Stockport is classed by the ONS as a "prospering town", it is the third most polarised in terms of health inequalities[18]. A further consideration of Stockport's demography is provided in **4.4**.

Recent changes to commissioning arrangements for health services in Stockport have seen commissioning functions shift from the PCT to the CCG but have not impacted on the geographical boundaries of responsibility. However, commissioning of primary care (including optometry) and some more specialist services have transferred to NHS England. The responsibility for many aspects of public health now also sit with the local authority, providing an opportunity to review and reflect holistically on how services for eye health are delivered and how preventable sight loss is perceived, politically, professionally and by the public. Commissioning arrangements as at May 2014 are provided in **section 0**.

The introduction to Stockport's 2011 JSNA refers to the importance of "an active healthy ageing strategy"[18]. Clearly, preventing avoidable sight loss is central to achieving healthy ageing however further evidence of sight loss as a priority area for the Council is lacking.

NHS Stockport CCG's 5-year strategic plan focuses on better management within the community, in-line with the national drive towards reducing unnecessary admissions to secondary care and delivering care 'closer to home'. Although there is no mention specifically of sight loss within the strategic plan, the commissioning focus does demonstrate a desire to provide better, more efficient care through community settings. In particular, the development of the Glaucoma Repeat Readings Service, Cataract Direct Referral Scheme and Minor Eye Conditions Service demonstrate a proactive approach to eye health. The borough has an active Local Optical Committee, of which every optometrist is a member, and this has contributed towards this shift to community delivery[15].

Data derived from the 2011-12 Programme Budget benchmarking tool[19] indicates that Stockport PCT's (now CCG) spend on 'Problems of Vision' was higher than both national and ONS category benchmarks, at £49 per head. This rose to just under £50 per head in 2012/13[20]. A recent policy shift to align AMD treatment with NICE recommendations will have significant consequences for the cost of treatment and will either likely increase the spend per head or require a resource shift away from spending in other areas of eye health. However, without accurate data on incidence and prevalence of the main causes of sight loss (as highlighted in **4.1**), it will be difficult for commissioners to establish the impact on outcomes of any shift in spending.

When considering spend on eye health, it is also important to consider the opportunity costs in the context of spend on other programmes. For contextual purposes, the highest spend on programmes (excluding 'other') in 2011/12 were £173 per head on Mental Health, £144 on Circulation and £138 on Cancers and Tumours[21]. Equally, in the same way that preventable sight loss has a profound impact on other outcomes, such as wellbeing, spend in other areas, such as smoking cessation programmes, will have significant consequences for levels of preventable sight loss.

Comparative analysis **(section 0)** indicates that overall, inpatient activity is significantly above the national average and slightly below the SHA average for eye health. However, it is important to note that NHS Stockport CCG has higher hospitalisation rates than its comparator CCGs in many areas, as demonstrated by the Commissioning for Value 'deep dives' for CVD and respiratory disease[22]. Outpatient activity is comparatively lower than the SHA average, but higher than the national average[23]. However it would be expected that at least a proportion of the lower than SHA average is due the enhanced services that Stockport has in place diverting care away from secondary care (see condition specific services in **section** 4**.**

3 Methods

This Health Needs Assessment is underpinned by a review of both published and unpublished literature and evidence, to inform a number of key research questions and recommendations. The local burden of sight loss is described and assessed against comparator populations using published prevalence models applied to local population structures and local activity data. The available evidence and data are synthesised using an adapted GRADE framework to inform the development and grading of recommendations.

3.1 Defining the problem – finding the data

The breadth of quantitative data available to policymakers and commissioners of eye health services is vast. However, identifying and accurately interpreting meaningful and reliable indicators of burden from within this data is complex and hugely challenging. Data sources were identified from the UK Vision Strategy's JSNA guidance[24], a systematic search of the Health and Social Care Information Centre (HSCIC) database[25] and correspondence with NHS Stockport CCG commissioners and the performance team within Stockport Council.

3.1.1 Population Measures

The boundaries of Stockport Council and NHS Stockport CCG are co-terminus and are used interchangeably within this HNA – dictated by the terminology used within each data source. Wherever possible, comparator rates are provided using Office of National Statistics (ONS) cluster averages ('prospering smaller towns'), or SHA/North West, or England rates.

The population estimates and projections used have been taken from the ONS 2011 census data and accompanying analyses[63]. This was selected as the most accurate dataset available at the time of writing, and provides delineation in 1 year integers and projections to 2021. It was not considered reliable to attempt to project population size or structure beyond this point. The use of this delineated population profile also allows comparison across those models which use different 'at-risk' denominator populations when determining prevalence rates (sometimes this is ≥65 year olds but can be anything from 50 year olds upwards).

3.1.2 Measures of Sight Loss

In England the process of registering a person as sight impaired involves completion of a Certificate of Vision Impairment (CVI) by a consultant ophthalmologist (in Stockport, this would generally be completed by an ophthalmologist at Stepping Hill Hospital, or Manchester Royal Eye Hospital). The hospital should then send a copy to the Certifications Office at Moorfields Eye Hospital (Moorfields) for epidemiological analysis (referred to here as 'Certifications data')[26].

A copy should also be sent to the local Adult Social Care team who undertake an assessment of need and can register the person as blind/partially sighted. The data on persons registered with Adult Social Care are maintained as a separate dataset (referred to here as 'Registration data').

From April 2013, the Certifications data have been used to populate the Public Health Outcomes Framework (PHOF) preventable sight loss indicators. The indicators include a denominator of all certificated sight loss (all causes) as well as indicators for the three main causes of preventable sight loss:

- '4.12 i Wet AMD'
- '4.12 ii Glaucoma'
- '4.12 iii Diabetic eye disease'
- '4.12 iv sight loss certifications' (denominator)

Dedicated indicators in a national outcomes framework such as this should be a huge step forward in the epidemiological study and recognition of preventable sight loss as a public health issue; providing a valuable benchmark for local commissioners. However they are only as good as the data they are based on and the process is significantly flawed, making it intrinsically difficult to produce robust data for comparison and undermining the integrity of the indicators[27]. The considerable inaccuracy of the Stockport certifications data was uncovered as part of the research for this HNA and is explored further in **section** 6.

3.1.3 Prevalence and Incidence Measures and Models

Predicting the prevalence and incidence of conditions relating to preventable sight loss in the absence of robust surveillance mechanisms, is a complex challenge. Two recently developed UK epidemiological models are widely used, the Future Sight Loss UK (FSUK)[2] model and National Eye Health Epidemiological Model (NEHEM)[16]; both enable population-specific modelled prevalence rates to be derived at CCG level.

The RNIB data tool[29] produced to support the work of the UK Vision Strategy includes outputs from both models, however it was not possible to determine why the tool sometimes used one model over the other. Therefore, for transparency, rather than presenting the RNIB data tool output, where there is a lack of concordance between the two original models, the outputs from both are presented. Both models have also been applied to updated population estimates to provide a more accurate picture of prevalence for use in this HNA.

In addition, the Projecting Older People Population Information System (POPPI)[30] and Projecting Adult Needs and Service Information (PANSI)[31] tools are utilised to provide estimates of other relevant health needs within Stockport (such as falls).

Further critique of these models and their limitations are discussed in **section** 6 .

3.1.4 **NHS Activity** data

NHS activity data is held by the HSCIC[25] (key datasets include Hospital Episode Statistics and General Ophthalmic Services); from which a number of 'commissioning support tools' are derived, including NHS comparators and the NHS England Programme Budgeting Benchmarking Tool[20]. These sources were supplemented with local performance data sourced from NHS Stockport CCG.

Acknowledging the complexity of accurate healthcare data interpretation wherever possible additional data sources have been used to enable validation. However, there are still significant caveats to the data presented as discussed in **section** 6**,** and further analysis is recommended in order to add certainty to the conclusions drawn.

3.2 Developing recommendations

In an ideal world, comprehensive, robust evidence would exist to inform decisions around

- the need for intervention (including people's experience of the problem)
- policy options (e.g. studies assessing impact and cost-effectiveness)
- factors affecting implementation (e.g. user acceptability).

In reality, pragmatic public health decisions are necessarily based on the available evidence, which is often not comprehensive. It is therefore important to highlight the strength of the evidence available (taking account of the breadth of evidence), whilst also acknowledging gaps and weaknesses to give an indication of how much confidence can be placed in each recommendation.

3.2.1 Grading the evidence

This HNA has not attempted to appraise the evidence base using quality assessment frameworks such as CASP[52]. However, it presents a critical reflection of the evidence base, both published and grey. Where recommendations have been made, the published evidence has been graded using the GRADE quality assessment categories[53] (Figure 2) to give an indication of methodological strength and the likelihood of bias. However, as discussed in **6.1.1**, this grading should not be taken as indicative of the relative value of the study.

Study design	Quality based on design	Lower if	Higher if	Quality of evidence
Randomised trials	High	Risk of bias Inconsistency Indirectness Imprecision Publication bias	Large effect Dose response Plausible confounding and bias would reduce effect/ suggest spurious if no effect observed	High
				Moderate
Observational studies	Low			Low
				Very Low

Figure 2: Grading of evidence – GRADE categories[53]

3.3 Methodological Limitations

Considerable limitations have been identified in the development of this HNA, particularly in relation to data quality; these are explored in greater detail in **section** 6 along with an assessment of the utility of this framework approach in synthesising public health evidence.

4 Burden

4.1 Local prevalence of sight loss

Confusion persists amongst professionals around the process of certification and registration for blind and partially sighted people, and the terms are often used interchangeably within the literature, despite them being distinct elements within the same process[56]. As described in **3.1.2**, they are however discrete datasets. The extent to which they are able describe local prevalence of sight loss has been explored as part of this HNA.

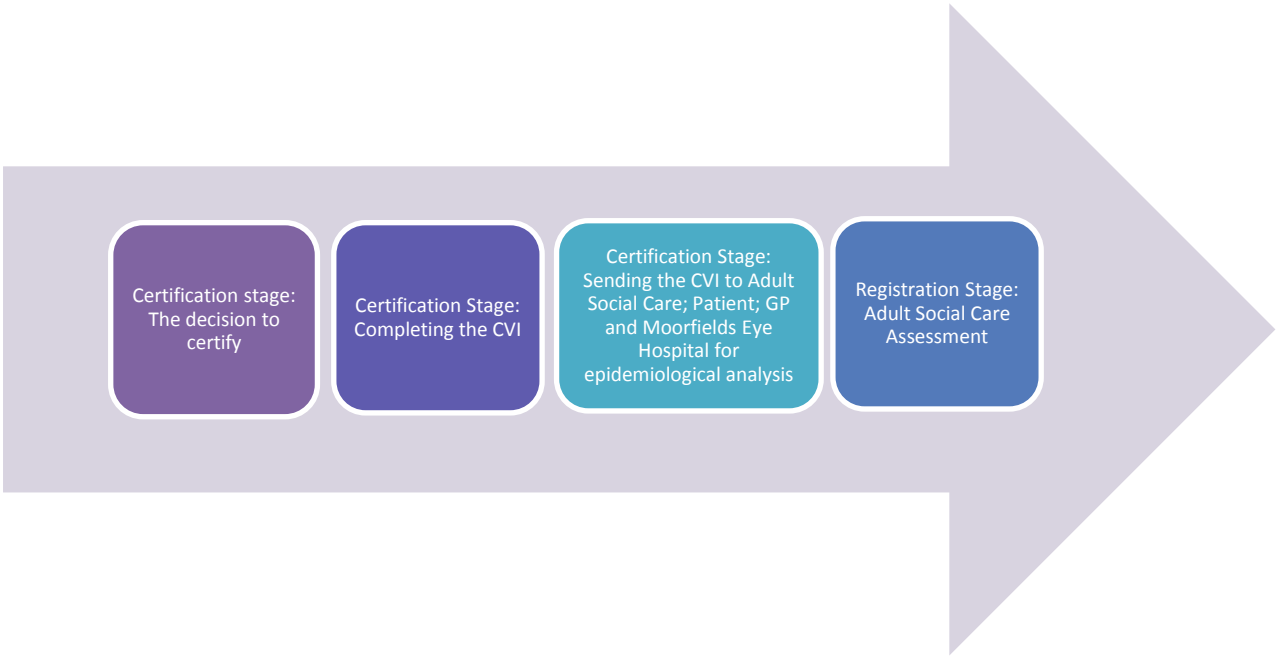


Figure 3: CVI Process, adapted from Certification and Registration Process: Stages, Delays and Barriers [27]

4.1.1 Sight Loss Certification

Analysis of Stockport's certification data as part of this HNA has identified significant underlying inaccuracies. Although Moorfields Eye Hospital report that nationally there is generally a high correlation between certification and registration figures, and only a few areas show considerable discrepancies; eye clinic hospitals in Greater Manchester, including Stockport have been particularly inconsistent in sending copies of the CVI for epidemiological analysis and inclusion in the certifications dataset[57].

A comparison of the 2011 data (Table 2) indicates that less than a quarter of those CVIs that were registered with Adult Social Care in 2011 were sent for epidemiological analysis. Moorfields report that this issue has been addressed by the RCO and the 2012 increase indicates it is gradually improving. However, there is still some considerable way to go and publication of the 2013 Moorfields certifications data will help to confirm whether improvements have continued[57].

Certifications and Registrations (Blind and Partially Sighted) Stockport			
New Registrations 2010/11[52] (triennial return)	New Registrations 2013/14 (triennial return – unpublished)	Certifications (received by Moorfields) 2011[13]	Certifications (received by Moorfields) 2012[51]
115	109	26	54

Table 2: Adult Social Care Registrations and Certificates of Visual Impairment 2010-2014

The national PHOF indicators (Figure 4) produced from this certification data consequently present the prevalence of preventable sight loss in Stockport as being very low. Until now, commissioners in Stockport had not been made aware of the inaccuracies in the baseline, and as such had been reassured by the comparatively low levels. Although the data has now been identified as inaccurate, the knock-on implications will persist for some time and are discussed further in **section** 6.

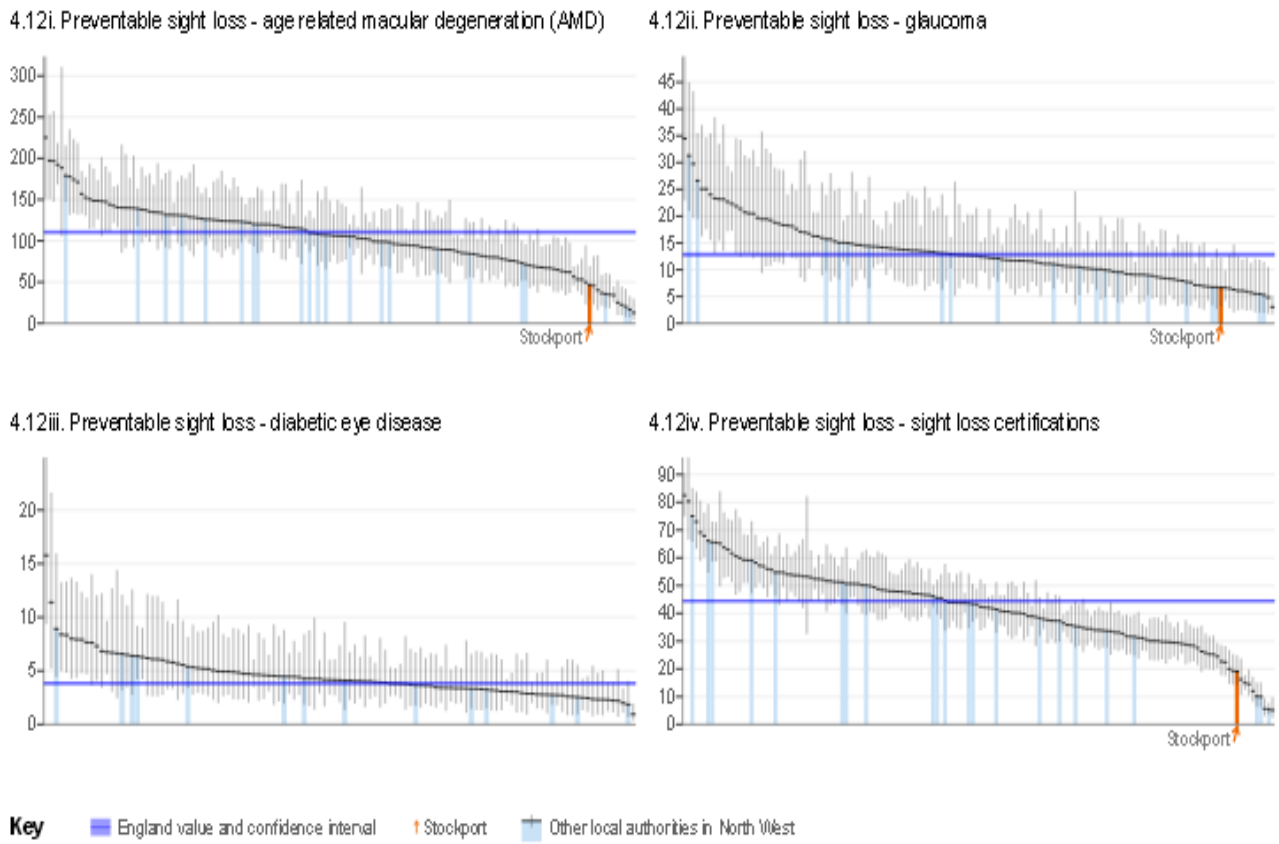


Figure 4: Reproduced from Public Health Outcomes Framework data tool - Preventable Sight Loss Indicators[13]

Conclusion: As the only national indicators of preventable sight loss by condition, establishing an accurate certifications dataset for Stockport is vital to inform action to address preventable sight loss. **(Recommendation 1)**

4.1.2 Sight Loss Registration

Registration with Adult Social Care enables eligible persons to access a number of benefits, including blind person's tax allowance, home assessment, help with the cost of travel and the blue-badge scheme. Equally as important, it also provides an access route into rehabilitation services and signposting to local support groups and networks[27].

The registration data collated by the HSCIC includes information on additional disability, as well as numbers by age group. It does not include information on condition or further demography, and as a voluntary process, cannot be taken as a definitive measure of sight loss. However, given the clear limitations of the certifications data for Stockport, it is the only overarching measure of prevalence available.

Nationally there has been a significant reduction in new registrations over the past 15 years[27] and this has generally been reflected in Stockport (Figure 5). However, although the number of new partial sight registrations declined between 2010/11-2013/14, the number of new blind registrations reported by Adult Social Care in Stockport, rose by over 35% 2010/11-2013/14[59iv,v].

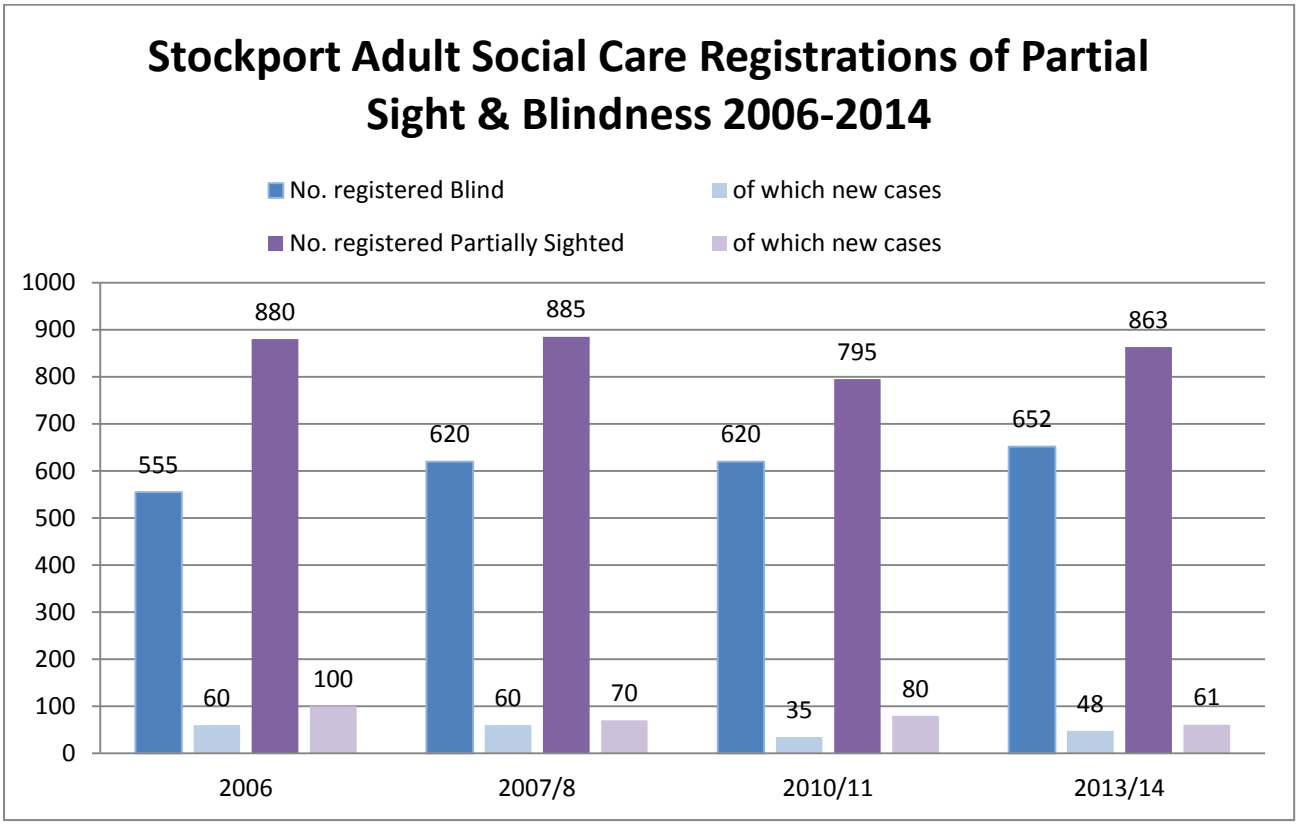


Figure 5: Stockport Adult Social Care Registrations of Partial Sight & Blindness 2006-2014 [58,60,61 ,59].

[iv] These figures are currently unpublished and may be adjusted as part of the HSCIC triennial return.

[v] Registration data reporting periods have changed across the time period presented – returns are now triennial, and reported by financial year.

Compared with the North West and England (Table 5) Stockport's registration rates are similar but generally lower (perhaps surprising given the older than average population). However, the GP Patient Survey[5] reports ~1% of people nationally identify as blind or severely visually impaired; in Stockport this was 1.3% (denominator 4576)[62].

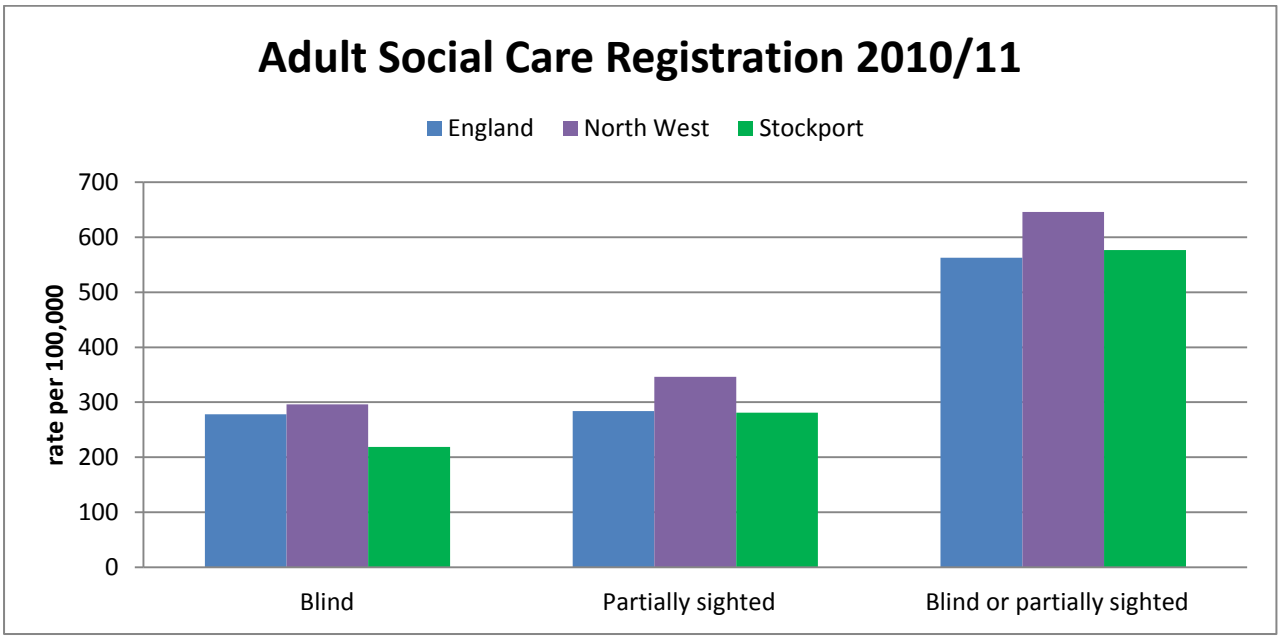


Figure 6: Adult Social Care Registration 2010/11 [28,29,59]

These data would indicate that prevalence in Stockport is generally similar to the national profile; however prevalence modelling suggests that both locally and nationally, these levels represent significant underreporting.

Modelled estimates of sight loss prevalence in Stockport vary considerably. However, there is approximate agreement between the NEHEM model of blindness and observed levels of blind registrations (655 persons ≥50 years expected[vi] versus 570 observed[59]). There is also clear consensus that a significant proportion of sight loss in Stockport appears to be unregistered (presumed to be partial sightedness given the above broad concordance between expected and observed levels of blindness). However, the level of this unidentified need varies significantly between models (Table 3) and very little consensus exists more broadly across prevalence studies. Although confidence in these estimates is therefore low, the potential for up to 83.6%[vii] of people in Stockport with sight loss above certifiable levels, being unidentified and without support is an alarming possibility.

[vi] NEHEM prevalence estimates updated using 2014 mid-year population projection[63]
[vii] Observed registrations 2013/14 compared to FSUK/RNIB modelled prevalence for all age-groups

Age-group	Observed registrations (2013/14)[53]	Modelled prevalence	Model (updated using 2014 mid-year projections)
All	1515	9228	RNIB/FSUK[29]
≥50 years	1344	3798	NEHEM[28]
≥75 years	1067	5237	MRC trial[58]
Age-group	Observed registrations (%)	Modelled prevalence (%)	Model
All	0.53%	3.21%	RNIB/FSUK[29]
≥50 years	1.21%	3.42%	NEHEM[28]
≥75 years	4.07%	20%	MRC trial[58]

Table 3: Observed and modelled prevalence of registerable/certifiable sight loss in Stockport

The process of certification and registration and the subsequent steps to ensuring the correct support is in place are complex and filled with delays[27]. Numerous people are involved including ophthalmologists, registrars, optometrists, medical secretaries, administrators, Rehabilitation Officers and Adult Social Care.

National evidence[27,65] suggests that the complexity of the process and a lack of professional (and potentially public) knowledge and understanding about when to certify a patient, contributes to observed levels of under-certification and registration and therefore presents a possible opportunity for intervention.

Eye Clinic Liaison Officers (ECLO) work both within Ophthalmology and across social care and the wider service structure, including non-medical staff such as administrators[66,67]. They provide practical and emotional support to those recently diagnosed with an eye condition and help them to navigate the complex certification and registration process. It has been suggested that ECLOs may increase the proportion of patients offered and taking up certification and registration through increased public and professional understanding about the certification and registration process[68]. There are currently no Eye Clinic Liaison Officer (ECLO) posts funded within Stockport.

Conclusion: Public and professional knowledge, attitudes and perceptions of the registration and certification process may be contributing to considerable under-reporting of sight loss in Stockport **(Recommendation 2, Recommendation 3).**

4.2 Impact on wider wellbeing

The impact and cost (both personal and societal) of visual impairment clearly extends far beyond the direct healthcare costs and burden of visual impairment alone. Although in many cases it is not possible to establish causal relationships between factors such as poor health and visual impairment, there is an undeniable association, and it likely works in both directions. However, in the case of both falls and depression, a causal relationship has been inferred and numerous studies have demonstrated that people with partial sight and blindness face a significantly increased risk of both[69,70].

4.2.1 Falls and injuries related to visual impairment

The number of falls in the elderly is increasing nationally and will likely continue to increase with the aging population; those with visual impairments are at particular risk. The FSUK[2] meta-analysis reported that the odds ratio (OR) of accidental falls for persons with a visual impairment was 1.59. For those with mild or moderate sight loss, the OR of hip fracture was 1.83 and for the blind OR=3.95. The findings from this robust study, which used extensive variation analysis to test external validity, can be extrapolated with some confidence to the Stockport population.

The POPPI[30] model estimates that in Stockport, in 2012, 14144 people aged ≥65 fell, 1119 (8%) of which are estimated to have resulted in hospital admission[viii], the majority of whom were aged ≥75 (Table 4).

Modelled estimate of people aged ≥65 predicted to be admitted to hospital as a result of falls projected to 2020	2012	2014	2016	2018	2020
Aged 65-69	83	87	88	80	79
Aged 70-74	112	117	123	140	144
Aged ≥75	924	964	997	1,034	1,089
Total no. of estimated hospital admissions due to falls amongst people aged ≥65	1,119	1,168	1,208	1,254	1,311

Table 4: Modelled estimate of number of falls in Stockport residents aged ≥65 and associated hospital admissions[30]

The PHOF indicator, an age-sex standardised rate of emergency hospital admissions due to falls in ≥65s, gives a higher rate (2353 per 100,000, versus 2101 per 100,000 from POPPI[ix]). Though the indicator demonstrates an encouraging downward trend in Stockport, rates remain statistically higher than the England average (Figure 7), reflecting generally higher hospitalisation rates in Stockport, as referred to in **2.2.3.**

[viii] The POPPI model uses prevalence rates from the Scuffham et al [71] study of 647,721 A&E attendances and 204,424 hospital admissions for injurious falls in people aged ≥60 years, applied to ONS population projections for ≥65s.
[ix] Crude rate per 100,000 calculated using 2014 mid-year population projections

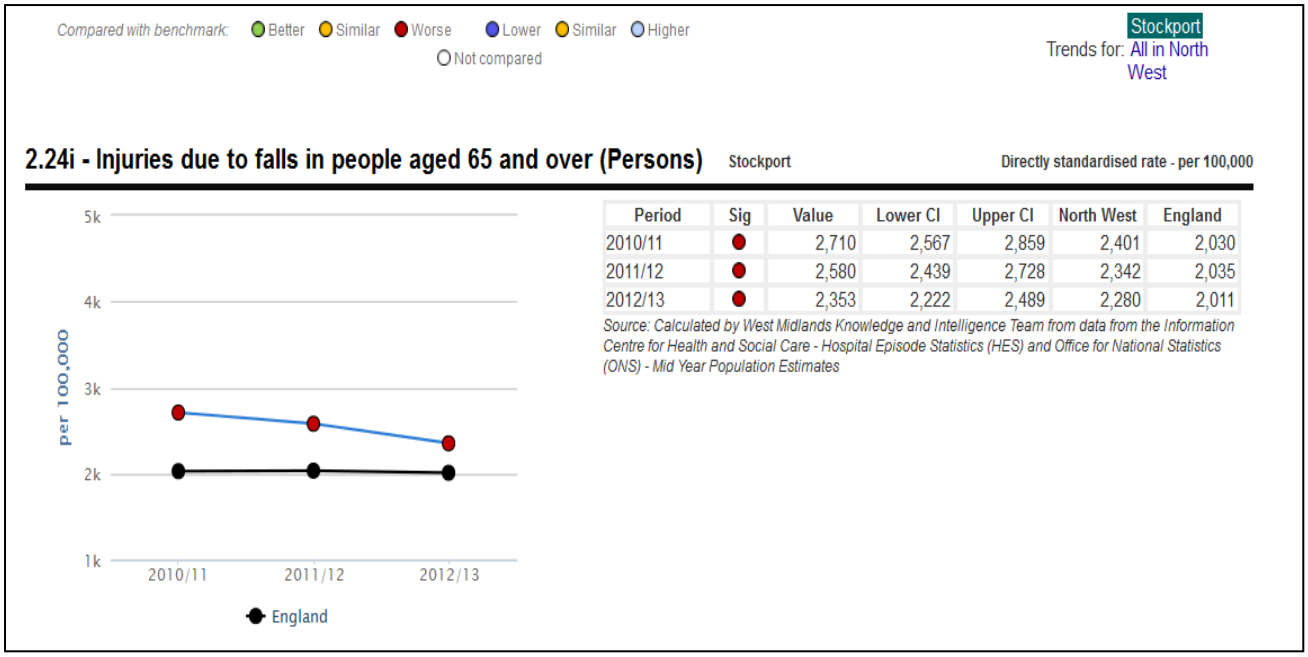


Figure 7: PHOF Injurious Falls in people aged over 65[13]

Scuffham's modified formula[72,73] estimates the burden of these falls directly attributable to sight loss and has been applied to the POPPI data for Stockport (Table 5).

People aged 65 and over predicted to be admitted to hospital as a result of falls, by age, projected to 2020	2012	2014	2016	2018	2020
Total population aged 65 and over predicted to be admitted to hospital as a result of falls	1,119	1,168	1,208	1,254	1,311
No. hospitalised falls of persons with sight loss (8.04%)	90	94	97	101	105
No. hospitalised falls directly attributable to sight loss (3.80%)	43	44	46	48	50

Table 5: Modelled estimates of hospital admissions from falls in Stockport directly attributed to visual impairment[73]

These figures appear considerably lower than anecdotally may be expected and may represent a significant underestimate. The authors acknowledge that the model is likely to be very conservative, in part because of uncertainty around the relative risk (RR) (estimated to be 1.9 based on non-UK studies). Additionally, the POPPI estimate of falls in Stockport is probably too low given the PHOF indicator rate and observed levels of hospitalisation in Stockport however was necessarily used in order to give projections to 2020. The proportion of falls in people with sight loss (8.04%) is also likely to be an underestimation given that the majority of fallers are ≥75 and the modelled prevalence of sight loss in the ≥75 population is 20%[64]. It should also be remembered that hospitalised falls account for less than 10% of falls and the majority of the impact and cost will likely therefore be felt in primary care and is not represented in this model.

Conclusion: Partially sighted and blind persons in Stockport (especially those that are currently unidentified) are likely to be at significantly increased risk of falls and injurious falls, providing an opportunity for preventative action. **(Recommendation 4)**

4.2.2 Mental Health and Wellbeing

Quantifying the attributable impact of visual impairment on a person's wellbeing is challenging in the absence of local or national measures. The English Longitudinal Study of Ageing (ELSA) provides cross-sectional data on the circumstances of people with visual impairments (self-reported). Those with good vision were twice as likely to report a good quality of life compared to those with poor vision or registered blind[74].

Three PHOF indicators[13] attempt to measure wellbeing in the general population and as such could be utilised by services for blind and partially sighted populations to identify service users at risk of low wellbeing; for example by inclusion in assessments.

In particular, the PHOF social isolation indicator relates to adults registered with adult social care (although it is not specific to sight loss). From a low baseline in 2010, the indicator suggests there has been an improvement in Stockport over the last few years and levels are now similar to the England average (Figure 8).

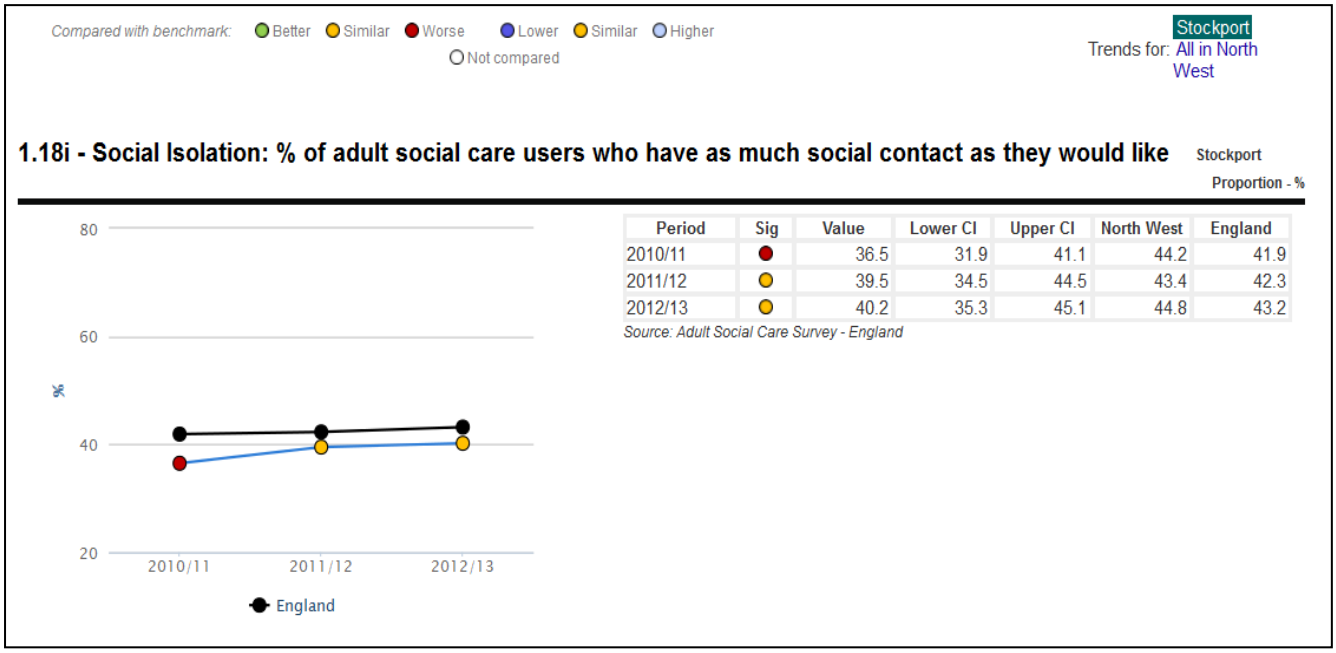


Figure 8: PHOF Indicator 1.18i – Social Isolation[13]

4.2.2.1 Depression

FSUK report the RR of depression to be 3.5 times higher for people with sight loss[2]. Although it is not possible to infer causality, numerous robust observational studies report a strong correlation between

depression and disability related to sight loss[2,69,75,76,77]. In a study of 151 elderly adults with advanced AMD, 32.5% were found to have a depressive disorder; twice as high as the general population and comparable with rates amongst cancer outpatients[69].

Although limited by small numbers, the GP Patient Survey[62] provides a tangible indicator of depression within the blind and partially sighted population in Stockport and suggests that depression and anxiety are considerably more prevalent compared to the general population (Figure 9). However, some caution should be exercised in interpreting these results as it is not possible to identify the proportion of anxiety/depression attributable to sight loss versus that which is attributable to comorbidities (as demonstrated later, this group are more likely to have multi-morbidities).

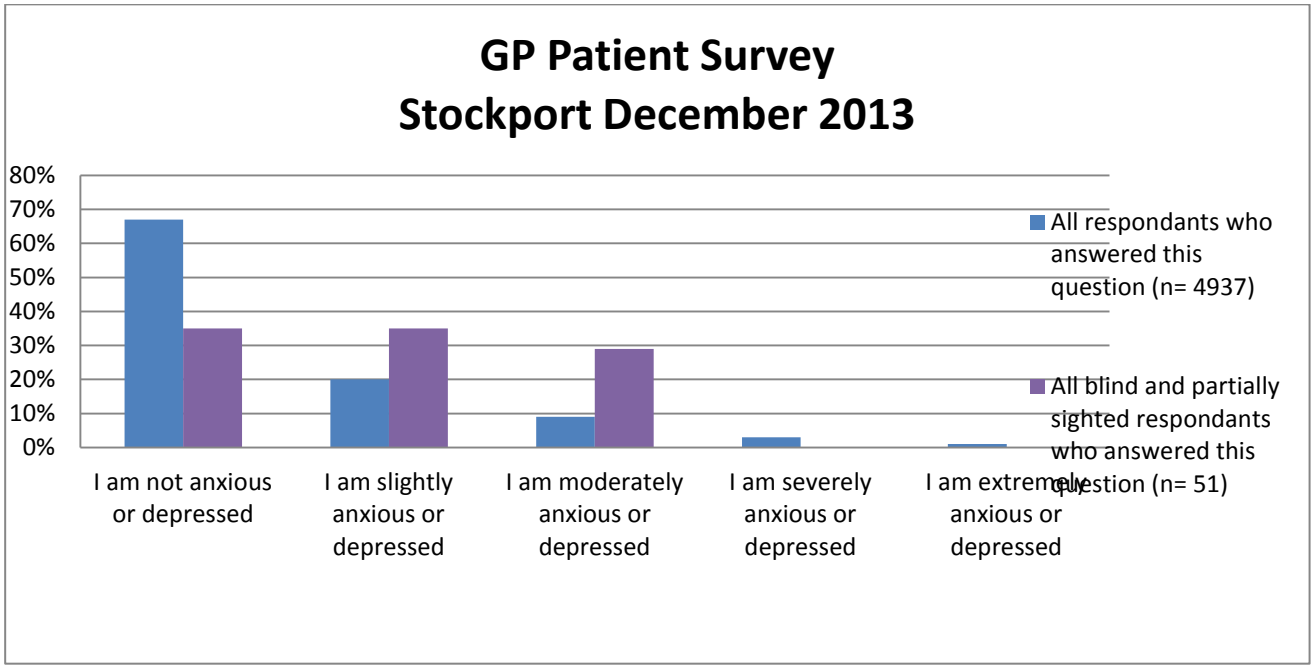


Figure 9: GP Patient Survey – Stockport December 2013[62]

Conclusion: People living with sight loss in Stockport are at increased risk of depression and low wellbeing but a lack of monitoring may mean they are not routinely identified or supported. **(Recommendation 5)**

4.2.3 Health and multi-morbidity

Sight loss is in itself a disability and as such impacts on a person's health. The burden of this disability can be quantified in terms of years of healthy life lost due to disability (YLD), measured in Disability-Adjusted Life Years (DALYs). In the UK, 189,039 DALYs were lost due to sight loss in 2008, costing £14.53 billion[x2]. Although theoretically possible, local application of this methodology to Stockport

[x] DALY valued at £76,866, calculated using a VSL value (value of a year of perfect health) derived from a Willingness to Pay study undertaken by the Department of Transport[78], adjusted to 2008 prices.

was not undertaken because of the lack of meaningful prevalence data against which to apply the disease burden weightings.

In addition to the direct impact on a person's health, people with sight loss are also three times more likely to report their general health as fair or poor and twice as likely to have a limiting long-term illness than those with vision rated good or better[74]. In part due to increasing life expectancies, the pattern of multi-morbidity in the general population is increasing and appears to be particularly acute for people with sensory impairment[79]. Nationally, 32% of those who report blindness, and 69% of those who report deafness and blindness, report four or more long-term conditions (including their sensory impairment), this compares to 3% in those without sensory impairment[5].

Cross-sectional data from an RCT found 78% of people with AMD reported a comorbidity (most frequently hypertension and heart disease)[69]. The GP Patient Survey also found that the OR of dementia or Alzheimer's for people with a sensory impairment was more than twice that of the general population (OR=2.74 95% CI 2.53-2.99)[62].

In Stockport, just over 30% of people registered blind or partially sighted have an additional disability[59] compared to 33% nationally[80]. Physical disability and hearing loss account for the vast majority (Figure 10,Figure 11). Unfortunately further stratification of this data is not available but it is plausible that a significant majority of this co-morbidity relates to age, as over 85% of blind or partially sighted persons registered as having an additional disability are aged ≥65[58].

We also know that there is a much higher incidence of eye and vision problems and lower levels of access to sight tests amongst people with learning disabilities. There are 1.5 million people in the UK with a learning disability and at least one in 10 has significant sight loss, with 6 in 10 requiring glasses. It is estimated that 96,500 adults with learning disabilities are blind or partially sighted in the UK today, however despite this, sight loss is often unrecognised amongst this group[68][xi]. Modelling undertaken in 2008 as part of the Stockport JSNA estimated that in 2014 there would be between 726 and 810 adult users of specialised adult health and social care services for people with learning disabilities. Stockport has developed a health passport[xii] and health booklet for people with learning disabilities. The passport includes details of the person's optician and whether or not they wear/ need glasses, the health booklet talks about what happens at the opticians. A template to capture information from the GP systems around the annual health check includes codes for seen or referred to optician. Once this is implemented, identification of those people who have not had a sight test will be possible.

It should also be noted that although additional and learning disabilities are considered comorbidities, not all comorbid conditions (e.g. hypertension) are considered disabilities. There is currently no local monitoring of comorbidities more broadly amongst those with sight loss.

[xi] https://www.seeability.org/
[xii] http://stockportccg.org/wp-content/uploads/2012/01/Health-Passport.pdf

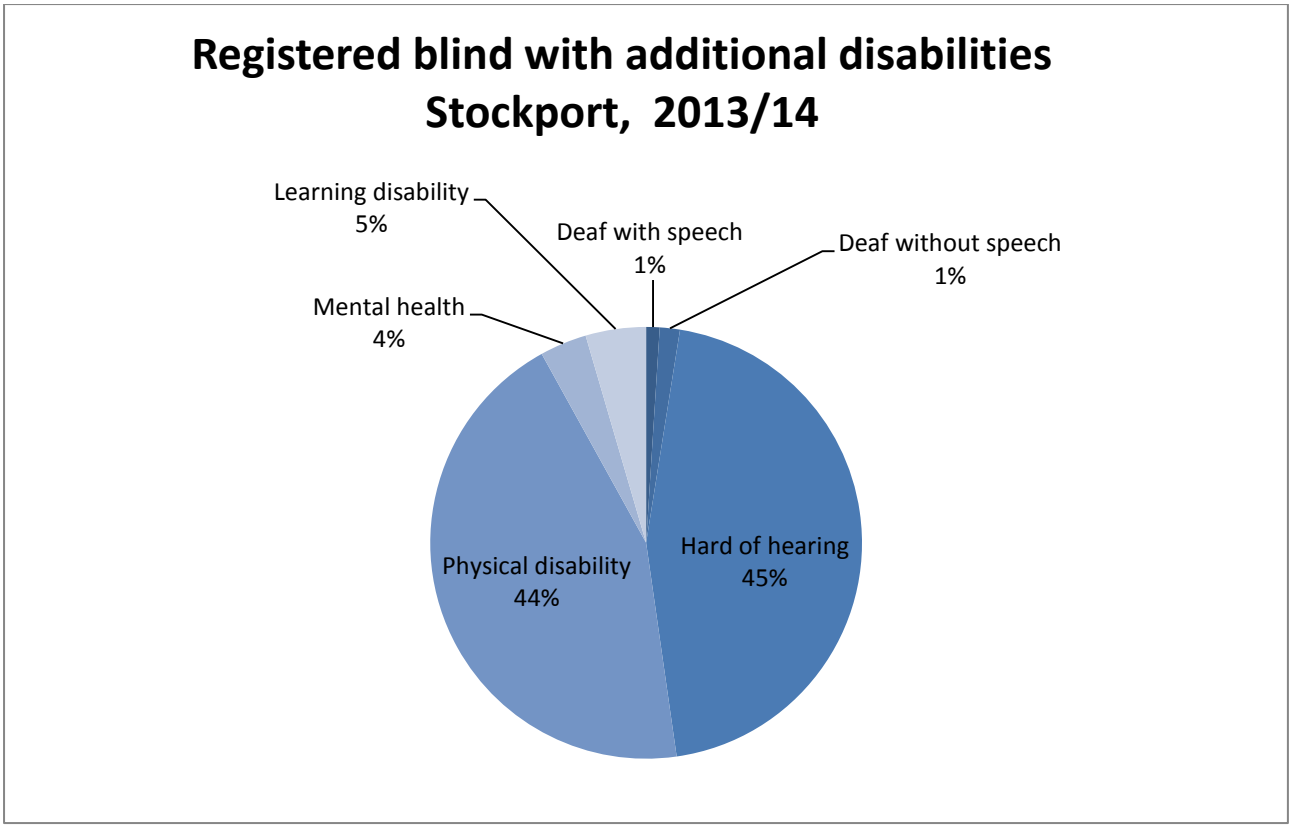


Figure 10: Additional disabilities by visual impairment (amongst adults registered blind with Adult Social Care)[59]

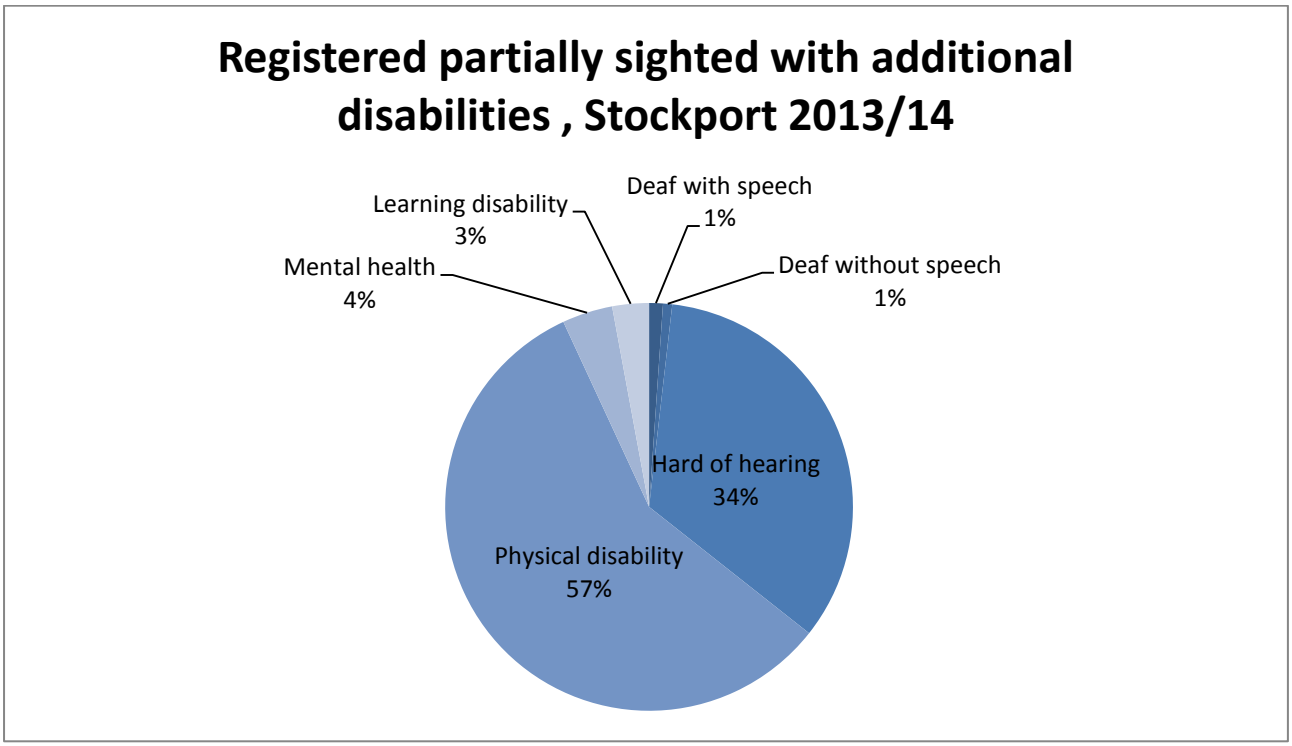


Figure 11: Additional disabilities by visual impairment (amongst adults registered partially sighted with Adult Social Care)[59]

Conclusion: Disentangling the impact of sight loss and associated increased risk of multi-morbidities is complex; however it is clear that those with sight loss are likely to have complex health needs beyond those directly related to sight loss.

4.3 Modifiable Risk Factors & Primary Prevention

Prevention and early intervention form the key public health interventions at our disposal to tackle the avoidable 50%[11] of sight loss. Identifying those populations at greatest risk can help inform targeted interventions to achieve this, including earlier identification and treatment. In addition, a number of key demographic (non-modifiable) factors which commissioners will need to be mindful of when planning services, are presented in **4.4**.

4.3.1 Smoking

The link between smoking and sight loss is well established clinically and academically; particularly in relation to AMD and cataracts, which are directly accelerated by smoking[81], but also with respect to DR[82]. There is robust evidence that demonstrates a 2-3 fold increased risk of developing AMD for current smokers compared to those who have never smoked[83,84] and a 3-fold increased risk of developing cataracts[85]. There is consistency of effect across numerous studies, strong biological plausibility[86] and a temporal and dose-response relationship[84,85,81]. For AMD, reversibility of effect has also been established; particularly important in terms of health promotion messages[87].

Smoking prevalence for Stockport as reported in PHOF indicator 2.14[13] is the same as the national average at 19.5% (95%CI 17.4-21.6%) and lower than the average for the North West (21.6%) although the difference is not statistically significant. This rate has decreased since 2010 (21.7%) but a strong downward trend is not yet established.

Assuming comparable incidence of exposure between Stockport and the population studies cited previously[83,84], up to 25% of cases of registerable AMD could be attributable to smoking in Stockport and therefore avoided if smoking was eliminated.

Conclusion: The link between smoking and sight loss has not yet been exploited in Stockport and successful interventions to reduce smoking would be powerful – both in terms of population health and in reducing health inequalities. Messages should particularly target those at greatest risk, for example relatives of those with AMD. **(Recommendation 6)**

4.3.2 Diabetes

Duration of diabetes is the most important risk factor for development of Diabetic Retinopathy[82]. After 20 years, Diabetic Retinopathy will develop in almost all people with Type 1 and around 60% of people with Type 2 diabetes[89].

Age-related cataracts also occur earlier in diabetic patients[41]. Although diabetes was also previously thought to be a risk factor for glaucoma[90]; recent evidence suggests that glaucoma may simply be identified more easily in diabetic patients[41].

The 2012/13 QOF dataset (based on GP practice data) reports 13,767 adults (aged ≥17) coded as diabetic in Stockport, indicating that 5.7% of the adult population are at-risk of Diabetic Retinopathy. Although levels of diabetes remain statistically significantly lower than both the North West and England average, there has been a year-on-year increase since 2010/11 (the earliest available trend data)[91].

4.3.3 Diet & Obesity

Obesity

As with smoking, obesity represents a significant modifiable risk factor for visual impairment and has been demonstrated as an independent risk factor for AMD, Diabetic Retinopathy and cataracts. Increased BMI is associated with an increased risk of developing advanced AMD (RR=2.35 95%CI 1.27-4.24)[92], whilst decreased waist:hip ratios are associated with reduced odds of developing AMD[93]. Obesity also increases the risk of a person developing Type 2 diabetes, putting them at greater risk of diabetic retinopathy; the lifetime risk of diabetes with BMI ≥35 is 80 times greater than for someone with a BMI <22[94]. The RR of developing cataracts with a BMI ≥30 can be double that of someone with a healthy BMI[95].

The PHOF Indicator (2.12) uses the Active People Survey to estimate the proportion of adults (aged ≥16) who are overweight or obese[13]; in Stockport the proportion is 65.9% (95%CI 61.4-70.4), similar to the North West (66%) and England (63.8%) averages.

Diet

There is some evidence to suggest antioxidant supplements may reduce the risk of progression of AMD amongst some specific groups, however a Cochrane review[96] identified four large, high quality RCTs which indicated that Vitamin E and beta-carotene supplements were unlikely to prevent the onset of AMD. In addition, there is conflicting evidence in relation to whether omega-3 fatty acids may reduce the risk of developing AMD[97]. However, as no harm has been identified, and eating oily fish is advised for other health reasons, it should be promoted as part of general health promotion around healthy diet. Lifestyle factors (e.g. control of glycaemia, blood pressure and lipid levels) also represent key modifiable risk factors for Diabetic Retinopathy and are amenable to population-level interventions[41].

Conclusion: Action to reduce obesity and improve diet will likely positively impact on preventable sight loss and health inequalities. However, no evidence was identified which specifically explored the impact or effectiveness of diet/obesity interventions on preventing sight loss. As these lifestyle factors form part of the wider health and wellbeing agenda for Stockport, it is recommended that they continue to be pursued within that broader context. Further research would be valuable as to whether antioxidants would be clinically and cost effective for those who have Wet AMD in one eye and poor nutrition in relation to reducing the risk to the fellow eye.

4.4 Demography – Important Considerations

4.4.1 Age

Age is perhaps the most significant risk factor for sight loss, as demonstrated by the age profile of registered blind and partially sighted persons in Stockport (Figure 12). 70% of registered people are ≥75 (compared to 65% nationally [58]) and 89% are ≥50.

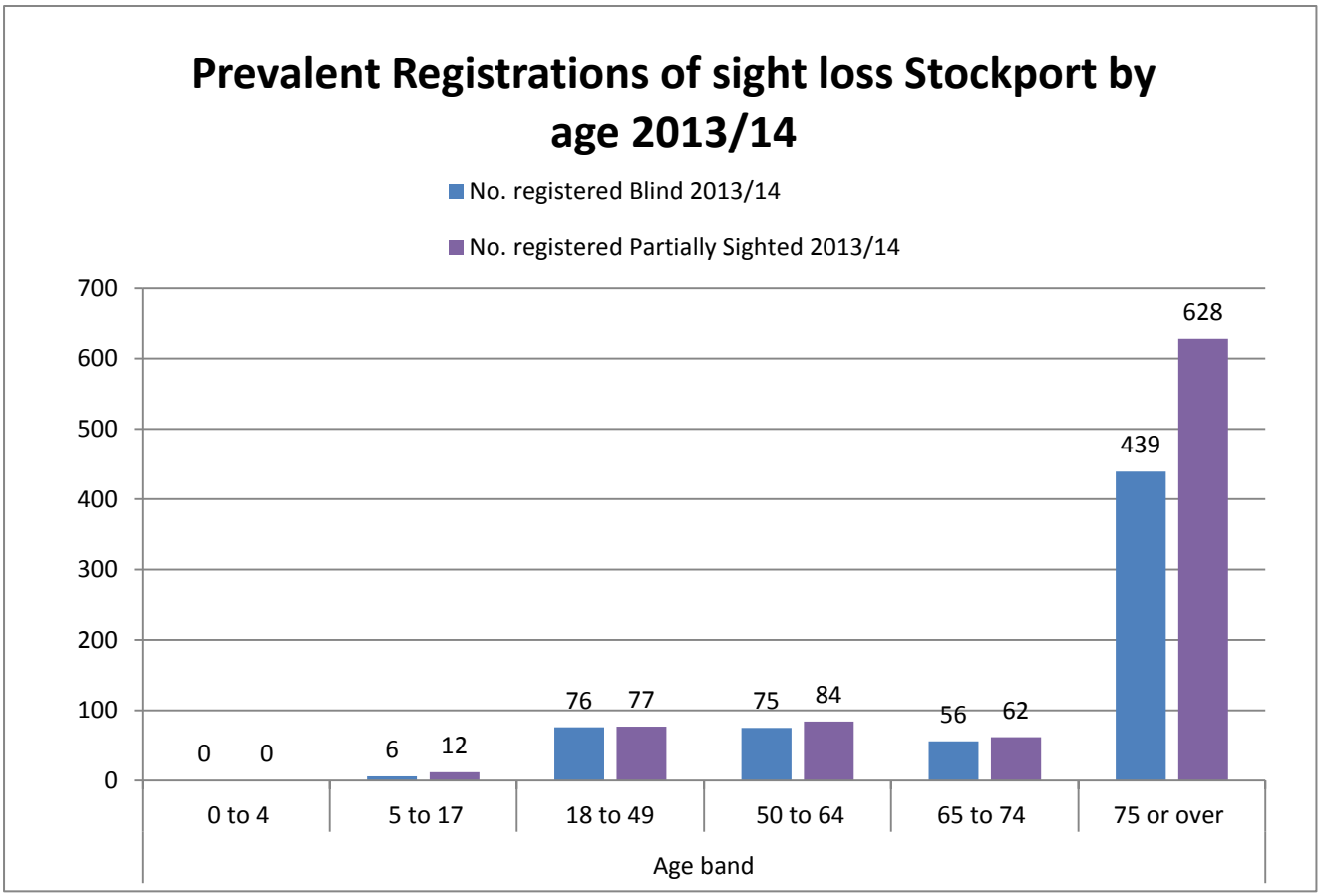


Figure 12: Prevalent partial sight and blind registrations by age[59]

Service utilisation reflects this age distribution (Figure 13); whilst all ages have hospital episodes related to eye health, the rate increases from the age of 50 for outpatient episodes and age 60 for inpatient admissions.

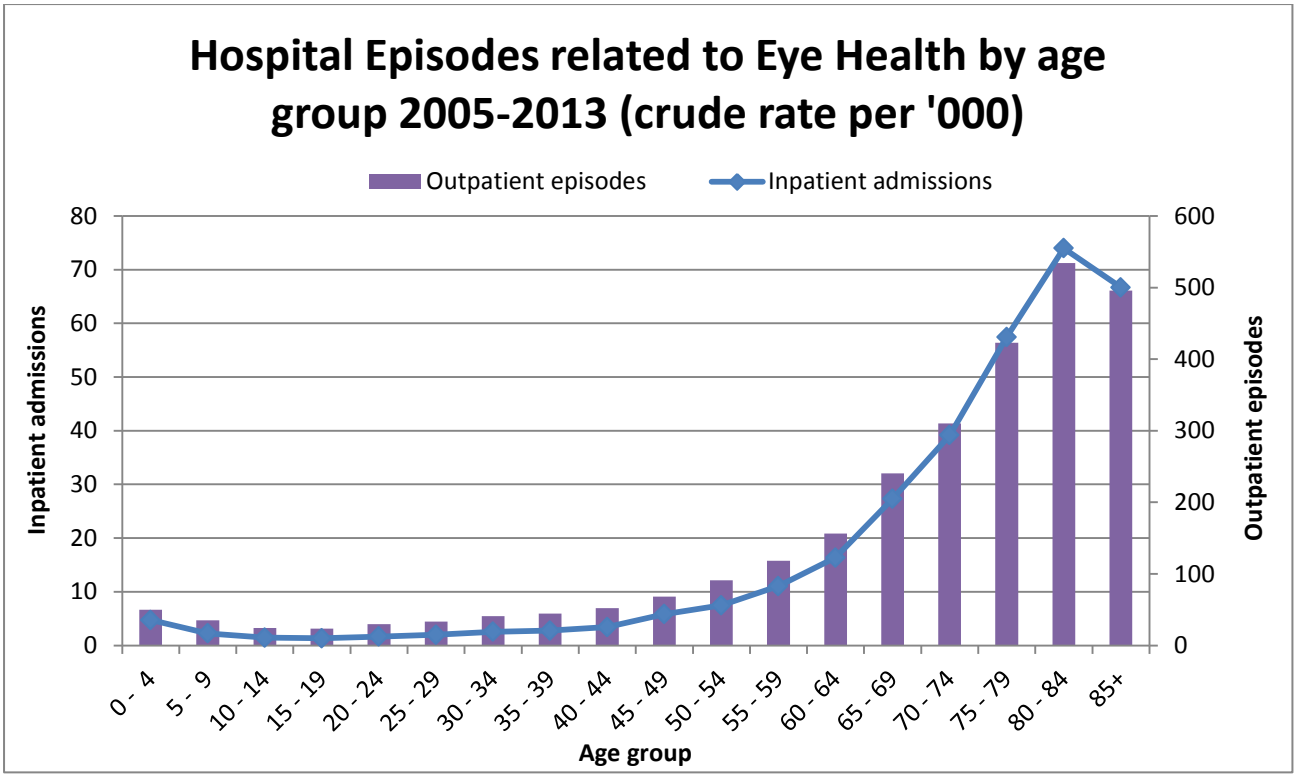


Figure 13: Hospital Episodes 2005-2013 by age

The current and projected age profile of Stockport, is therefore one of the biggest predictors of current and future burden. The population pyramid below (Figure 14)[167] shows a slightly larger ≥40 population and a relatively smaller 15-35 year old population for Stockport (in brown) than nationally (in blue).

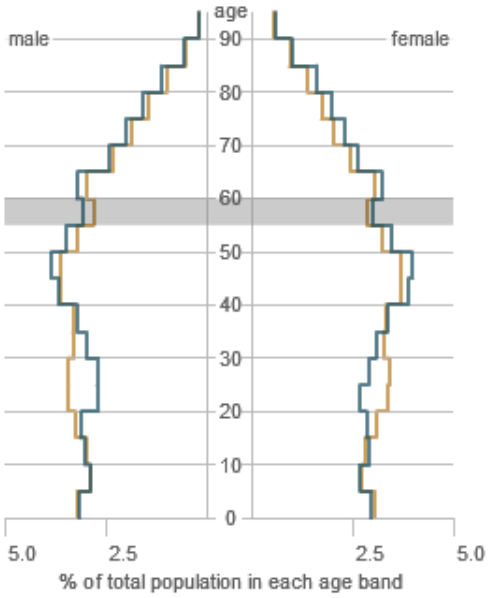
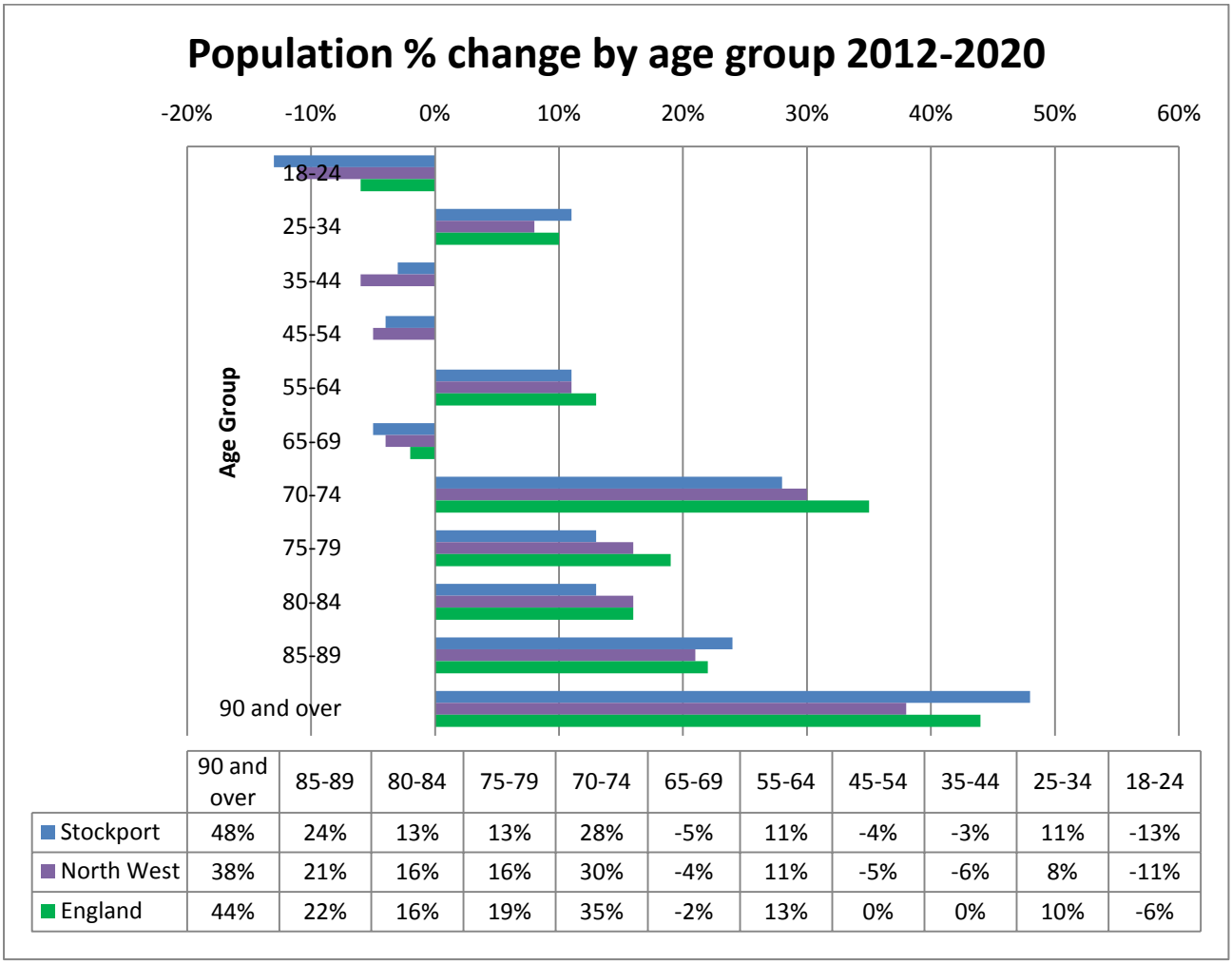


Figure 14: Stockport & England Population Pyramid 2011 Census Data[xiii]

[xiii] Reproduced from the Office for National Statistics licensed under the Open Government Licence v.2.0.

The population projections[30,31] for Stockport indicate that by 2020 the <54 population will have decreased further whilst the ≥55 population will have signficantly increased, with a particularly high increase in the proportion of ≥90s (although this is currently a very small population and when counts are taken together with the 85-89 age group increases are in-line with the North West and England averages).



	90 and over	85-89	80-84	75-79	70-74	65-69	55-64	45-54	35-44	25-34	18-24
Stockport	48%	24%	13%	13%	28%	-5%	11%	-4%	-3%	11%	-13%
North West	38%	21%	16%	16%	30%	-4%	11%	-5%	-6%	8%	-11%
England	44%	22%	16%	19%	35%	-2%	13%	0%	0%	10%	-6%

Figure 15: Population change by age-group 2012-2020[30,31]

4.4.2 Sex

Nationally (and internationally), females experience a disproportionate level of sight loss compared to males in an approximate ratio of 2:1[5,4]. Although the reasons behind this difference are unclear, a reasonable hypothesis would pertain to the differential age distribution across the sexes.

Sex is not collected as part of the registration dataset and is therefore not available for Stockport. However, analysis of Hospital Episode Data demonstrates that the crude rate for both inpatient admissions and outpatient episodes is higher for women than men. However not at a 2:1 ratio, indicating that either prevalence across the sexes differs in Stockport, or more likely that a relatively smaller proportion of women are in touch with secondary care for eye health services.

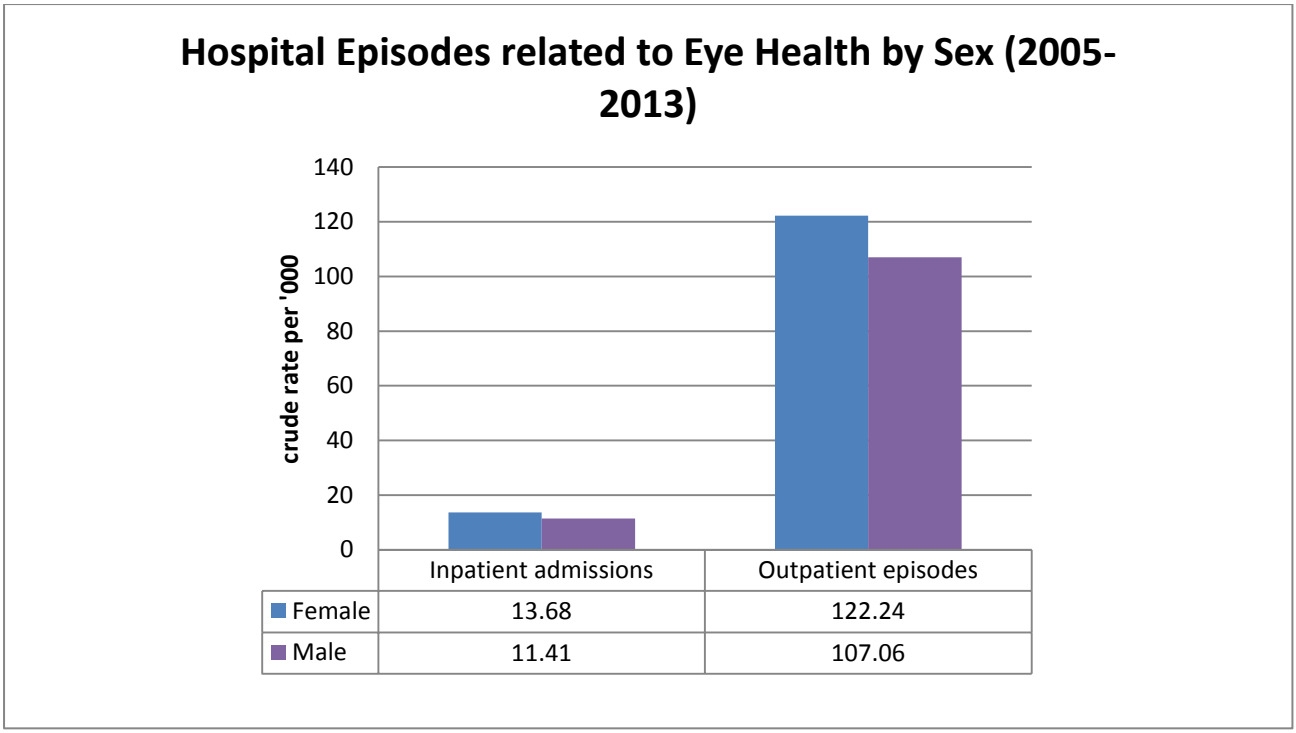


Figure 16: Hospital Episodes 2005-2013 by sex

4.4.3 Ethnicity

Regular sight tests are vital to early identification of preventable sight loss. In the general UK population, one third of adults have not had an eye test within the past two years; this rises to more than half in Black African and Black Caribbean populations[159]. Black Minority Ethnic (BME) individuals with partial sight or blindness are also three times more likely to be unregistered and therefore not accessing the available support associated with registration[130].

This inequity in service access places BME communities at an already greater risk of preventable sight loss. This is further compounded by biological predisposition to increased risk and early onset for many conditions associated with sight loss and overall, there is a higher age-standardised prevalence of visual impairment amongst Black and South Asian populations compared to white populations [168].

- Cataracts - Asian populations show a greater risk of developing cataracts and develop it on average 10 years earlier than black and white populations[2,169].
- Glaucoma - Relative risk of glaucoma is four to five times higher for Black Caribbean and Black African populations compared to white populations[170].
- Diabetic Retinopathy - Prevalence is increased in Black and Asian populations compared to white populations[2,169,171], and onset is also earlier in Asian populations[41].
- AMD - White populations are at a greater risk compared to Asian populations; and at a greater risk of developing AMD in later life compared to Black populations. However, Black populations are at a greater risk in younger age-groups.[2,172]
- Uncorrected refracted error – White populations are at greater risk of refractive error compared to Black populations[2,173].

The ethnic profile of Stockport is predominantly white, with 92.1% of residents recorded as White (89% White British) in the 2011 census (down from 95.7% in 2001)[123]; the largest BME group are Asian and Asian British, accounting for 4.9% of the population (up from 2.6% in 2001).

These data demonstrate that overall, Stockport is much less ethnically diverse than Greater Manchester, the North West and England overall. However, in ten years, the proportion of BME residents in Stockport has increased considerably (4.4% in 2001 to 8% in 2011). If trends continue, the current cohort of predominantly white ≥65s will in time be replaced, by a more ethnically diverse older population. The different needs, disease aetiology and relative risks related to different ethnic populations will be important to take account of when planning future services, particularly in relation to access and provision of information, acknowledging that to date services will have largely been developed with the needs of a majority white population in mind.

Of the 91% of inpatient admissions related to eye health that were coded for ethnicity (2005-2012), 94% were for people of white ethnicity (91% White British). Although variation in ethnic categorisation between datasets mean it is difficult to draw conclusions from this data; hospital episode statistics, as well as local service data should be used going forward as an indicator of equity in service utilisation for different ethnic groups, enabling identification of gaps in uptake and targeting of provision/interventions.

4.4.4 Deprivation

As with health and comorbidity, socioeconomic deprivation could justifiably be described under both 'wider impact' and as a key risk factor of sight loss. It is not possible to establish the direction of influence because deprivation is likely to be simultaneously both a risk factor and a consequence of sight loss and will vary at an individual level.

There is a strong correlation between visual impairment and poverty. Over two fifths of partially sighted or blind people are in the bottom income quintile for their age-group, the visually impaired are at increased risk of being without paid employment before retirement age and are much more likely to be renting their homes[74]. It is therefore vital to consider that those with sight loss not only have specific health needs, but are also likely to represent a particularly economically vulnerable population within Stockport. Although sight loss in the main affects older people, social factors across the life-course such as socioeconomic deprivation (including in childhood), maternal smoking and unemployment will influence outcomes later in life and are key factors in the epidemiology of visual impairment[174].

Action to reduce deprivation and associated lifestyle behaviours such as smoking, taken as part of the wider approach to health and wellbeing in Stockport, will likely positively impact on sight loss. Conversely population level interventions that do not account for the needs of the relatively more deprived populations in Stockport risk increasing health inequalities[41].

Deprivation indicators show that Stockport is ranked as the 151st most deprived local authority (LA) out of 326 LAs nationally, (most to least deprived) – with an average Index of Multiple Deprivation (IMD) score of 19.4, slightly lower (less deprived) than the England average of 21.5[175].

However these measures mask considerable variation across the population demonstrated by the huge variation between Income Deprivation Affecting Older People (IDAOPI)[176] scores across GP practices (Figure 17). Scores range from 87% in the more deprived areas such as Brinnington, down to 5.5% in more affluent Bramhall. This variation is mirrored in the Index of Multiple Deprivation scores (ranging between 5 and 58.5)[177] and Job Seekers Allowance claimant rates (ranging from 0.92 to 9.87).[178]

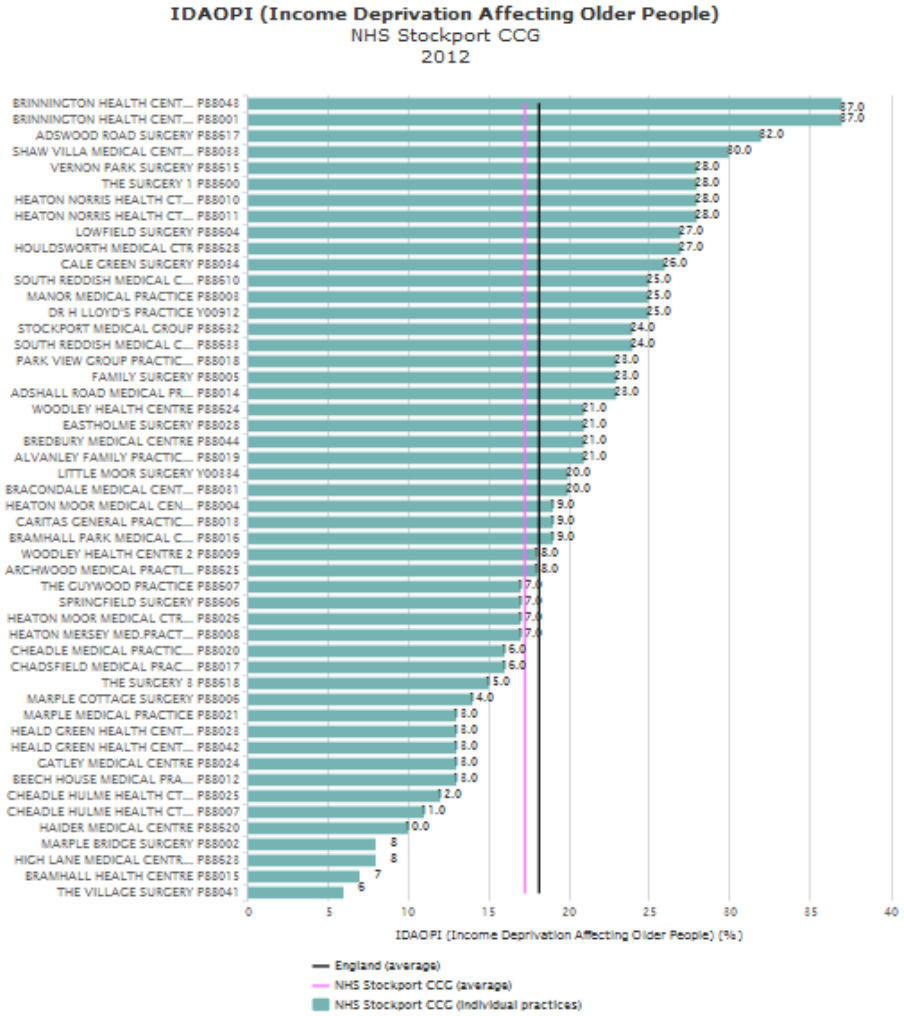


Figure 17: Income Deprivation Affecting Older People (2012)[175]

Analysis of inpatient and outpatient hospital episodes (Figure 18) shows that rates are highest for patients from the most deprived areas. A crude rate per 1000 population is calculated to account for the different population sizes in each area. However, further analysis to control for the age profile of these areas and to look at the statistical significance of the variation would be required before further definitive conclusions could be drawn.

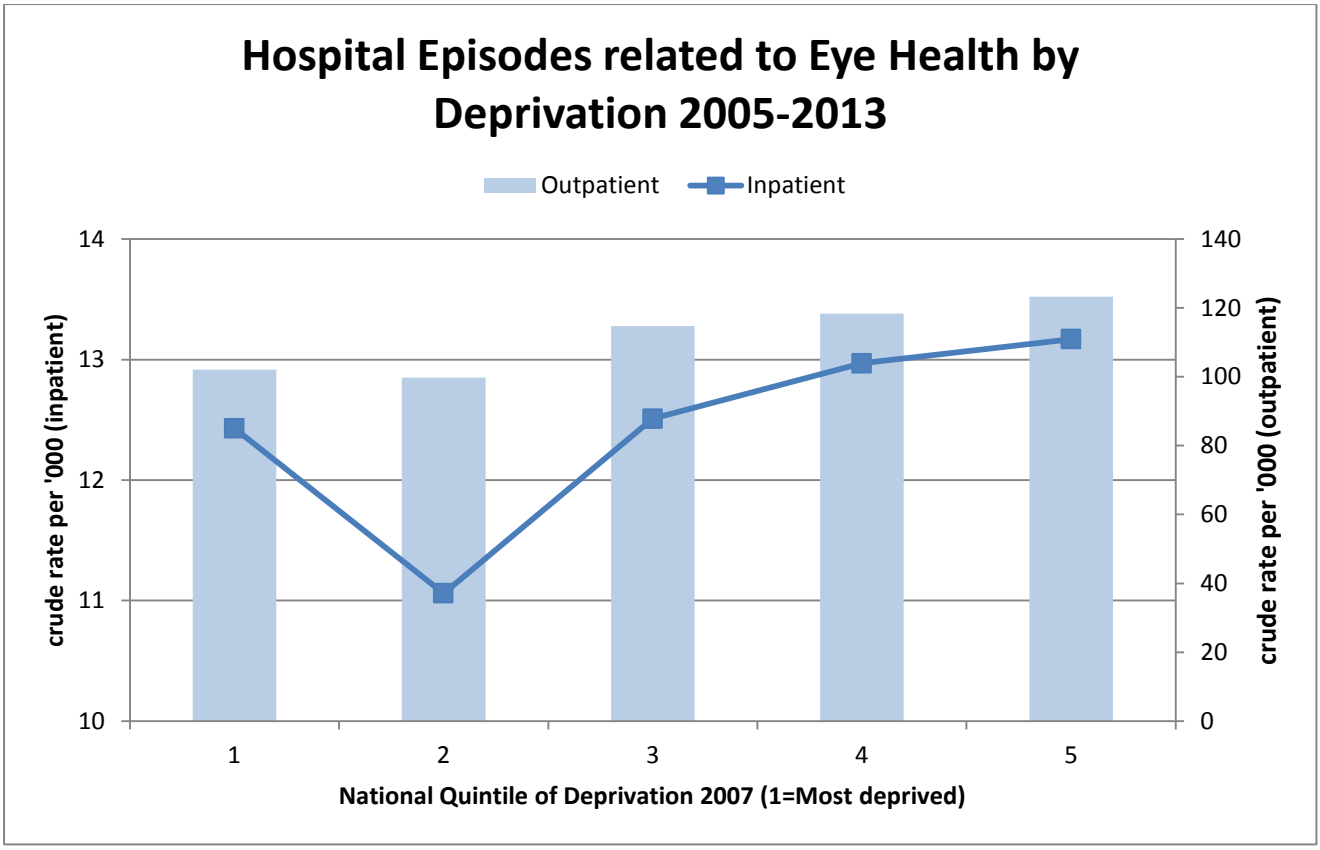


Figure 18: Hospital episodes 2005-2013 related to Eye health by Deprivation Quintile[119]

4.5 Local prevalence and health impact of preventable sight loss by condition

There has been a recent national shift in the relative prevalence of the main causes of preventable sight loss and as such, the attributable burden. The number of DALYs attributable to AMD and glaucoma have increased by 50% 1990-2010[4], whilst the number attributable to cataracts has fallen by 25%[98]. There are significant consequences of this shift, for the relative population burden and for cost of treatment, given that AMD and glaucoma are long-term conditions requiring constant monitoring[79]. Despite the epidemiological shift, the fact that a huge proportion of sight loss is preventable remains.

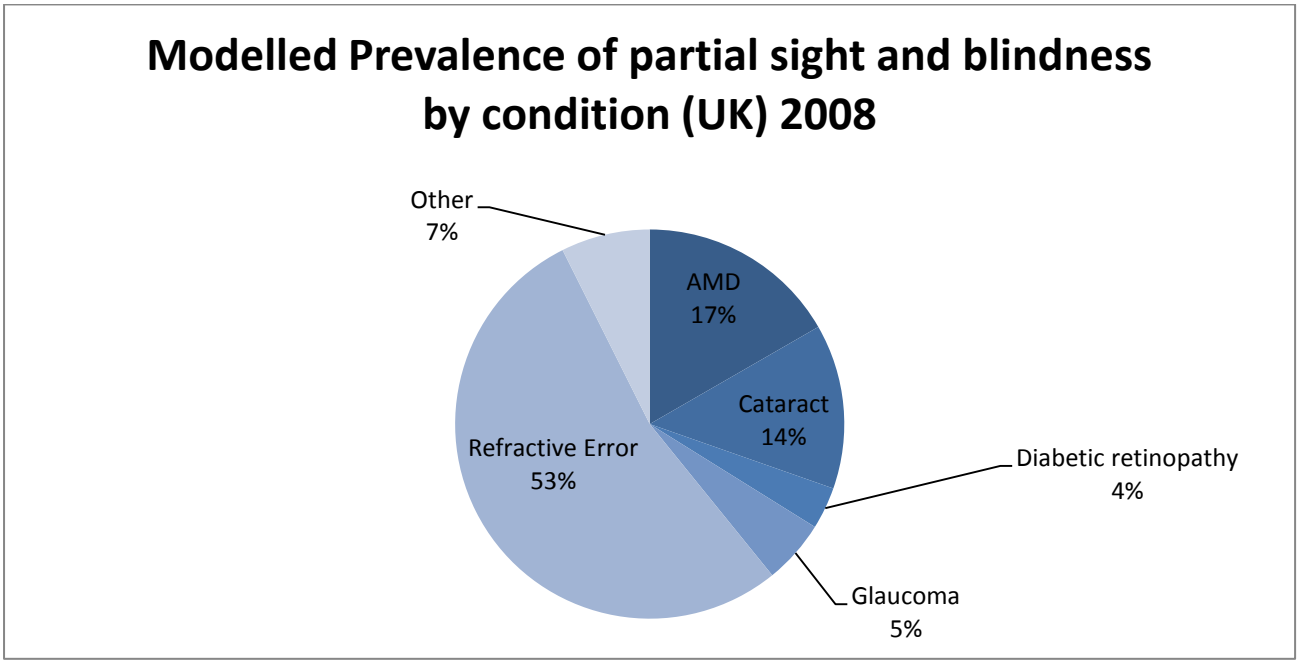


Figure 19: Sight loss by cause 2008 FSUK 1[2]

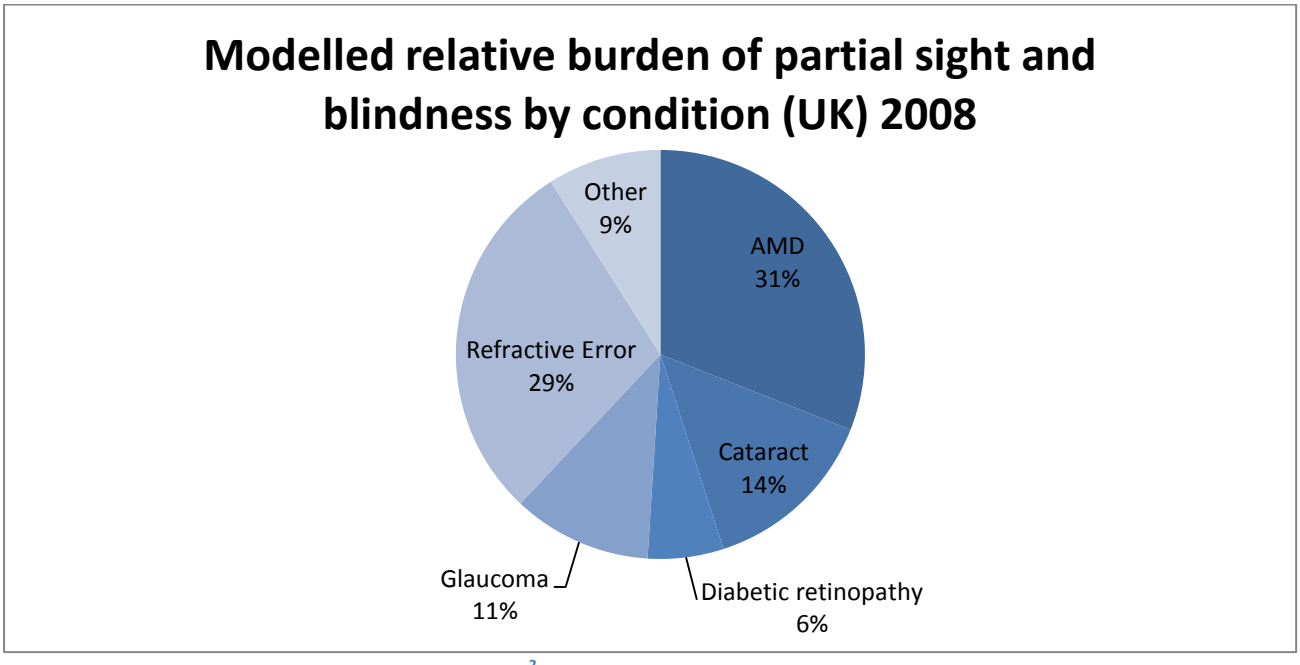


Figure 20: Sight loss by relative burden of condition 1[2]

4.6 Age-Related Macular Degeneration (AMD)

Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)

AMD is the commonest cause of severe sight loss amongst older adults in developed countries and accounts for over half of blindness registered in the UK[97]. AMD is defined as "changes that occur with ageing and without any other obvious precipitating cause that occur in the central area of the retina (macula) in people aged 55 years and above"[179]. It is a chronic degenerative disease which leads to (in many cases profound) loss of central vision. Peripheral vision is unaffected; however the ability to see well enough to recognise faces, drive and read is severely affected and vision can deteriorate rapidly.

4.6.1.1 Disease definition

Macular degeneration is classified in the ICD-10 under the H35.3 code[180] and is commonly classified according to severity, although terminology differs:

- Early AMD
  - **Drusen** — collections of lipid and protein underneath the outer layer of the retina. Drusen are associated with early AMD. Small drusen are amongst the elderly and are not necessarily associated with progression to advanced AMD;
  - Abnormalities of the retinal pigment epithelium (RPE) (outer layer of the retina)

- Intermediate AMD
  - Multiple medium sized drusen or one or more large drusen;
  - **Geographic atrophy (Dry AMD)** —partial or complete atrophy (depigmentation) of the RPE, not involving the fovea.

- Advanced AMD
    - **Geographic atrophy (Dry AMD)** —partial or complete atrophy of the RPE involving the fovea. Sight loss from this scarring is irreversible and there is currently no treatment. Dry AMD accounts for approximately 90% cases of AMD, but only 40% of advanced AMD [179];
    - **Neovascular (Wet AMD)** —the development of new blood vessels underneath and within the retina, which bleed resulting in scarring. Progression to sight loss can be rapid and if untreated, irreversible. Treatment can however stop the progression of sight loss and in some cases restore some sight[99]. Wet AMD accounts for approximately 10% of all AMD but 60% of advanced AMD[179], and despite being treatable, accounts for 90% of AMD blindness[181].

4.6.1.2 Risk Factors

- Age
- Sex
- Smoking
- Family history/genetic factors.
- A few genes have a large effect
- A mutation to a single gene is responsible for around half of the risk of AMD in the population
- Smoking has a synergistic effect with genetic factors[99]

4.6.1.3 Burden

A 2005 utility analysis of the burden of AMD, found that patient perceptions of how much their quality of life was impaired by their condition were up to 750% higher than the treating ophthalmologist perceived it to be. The study estimated that mild AMD caused a 17% decrease in quality of life, equivalent to symptomatic HIV or moderate cardiac angina; moderate AMD a 40% decrease, equivalent to permanent renal dialysis or severe cardiac angina; and very severe AMD a 63% decrease, equivalent to advanced prostatic cancer with uncontrollable pain or a severe stroke which resulted in the person being confined to bed, incontinent and requiring nursing[100].

4.6.1.3.1 Modelled Prevalence and incidence

Prevalence models estimate that there are currently between 2687[28] and 3160[29] cases of AMD in Stockport (Table 6).

Model		AMD Cases	Wet AMD	Dry AMD	Drusen Cases (generally early AMD)
NEHEM[xiv]	Number people affected (aged ≥50)	2687	1899	944	12315
	Prevalence	2.42%	1.71%	0.85%	11.09%
FSUK (RNIB data tool) [xv]	Number people affected (aged ≥50)	3160	2149	1001	
	Prevalence	2.85%	1.93%	0.90%	

Table 6: NEHEM[28] and FSUK[29,38] prevalence models of AMD

Applying Stockport population projections to the NICE AMD Costing Tool[101] **(**Table 7Table 7: NICE Costing Model incident Wet AMD in Stockport[185]**)**; estimates annual incidence of Wet AMD to be 126 patients in 2014, rising to 138 in 2020, with 80% of these cases being eligible for treatment.

	2014	2020
Total population	287,500	296,800
Estimated population aged older than 55 years	89,900	98,700
Estimated annual incidence of wet age-related macular degeneration (AMD)	0.14%	0.14%
Estimated annual incidence of wet AMD in England	126	138
Patients presenting with bilateral wet AMD	70%	70%
Patients presenting with bilateral wet AMD - one eye suitable for treatment	79	87
Patients presenting with bilateral wet AMD - two eyes suitable for treatment	9	10
Total number of eyes affected	97	107
Number presenting with one eye affected	38	41
Proportion of patients presenting with wet AMD in one eye developing wet AMD in their second	10%	10%
Number of eyes	4	4
Estimated proportion of eyes meeting NICE criteria for treatment	80.00%	80.00%
Estimated number of eyes treated in year 1	111	122

Table 7: NICE Costing Model incident Wet AMD in Stockport[185]

[xiv] Updated using 2014 mid-year population estimates
[xv] Updated using 2014 mid-year population estimates

The numbers modelled using this potentially conservative incidence, are indeed significantly lower than those observed from treatment data in Stockport, which indicates that approximately 214 patients received treatment for AMD in 2011/12[15]. This suggests that awareness of AMD and access to services in Stockport is good with people presenting and being identified early, at a point where the condition is treatable**.**

4.6.1.3.2 Costs

The FSUK model[38] estimated the total cumulative cost of detection, treatment and ongoing support for persons with AMD in England (for 2010-2020) to be £13,800,714,109 with 'social and personal costs' accounting for 76% of this. Informal care (over and above that which they may receive with no sight loss) accounted for 53%. Dividing the total cost by estimated prevalence[xvi] gives a crude estimate of cost per person/year of ~£2756. Application to estimated Stockport prevalence data (Table 6) indicates that the total societal cost of AMD in Stockport for 2014 is between £7.4 and £8.7 million[xvii].

4.6.1.4 Treatment and Services

Treatment for **Error! Reference source not found.** is very limited and consists mainly of psychological support and rehabilitation. In Stockport, patients diagnosed with Dry AMD are discharged after lifestyle/self-management advice and referral to **Low Vision Services** if required. The provision of good, relevant information before discharge, particularly around registration processes and the need for good nutrition and regular monitoring for other eye disease, is critical and should be routinely audited and reviewed by services.

In addition to laser treatment, treatment of Wet AMD is with vascular endothelial growth factor (VEGF) Inhibitors. NICE recommends ranibizumab (Lucentis®) and Aflibercept (EYELEA®) but not bevacizumab (Avastin®), which is not licensed for AMD (but is licensed for bowel cancer). However it is thought that bevacizumab may be as effective as the other treatments, and comparative trials are underway.

NICE cannot review bevacizumab until it has been licensed; in the meantime, there are complex underlying ethical issues around the ideal of evidence-based public health versus the opportunity costs of funding significantly more expensive treatments. Stockport was one of a few CCGs who previously commissioned bevacizumab 'off-label' (at less than 1/10 of the cost of current NICE recommended treatments) however this policy has now been revised.

The Wet AMD service in Stockport is currently out to tender. The new service specification reflects the change in treatment policy and stipulates that care must be delivered in-line with RCO and NICE

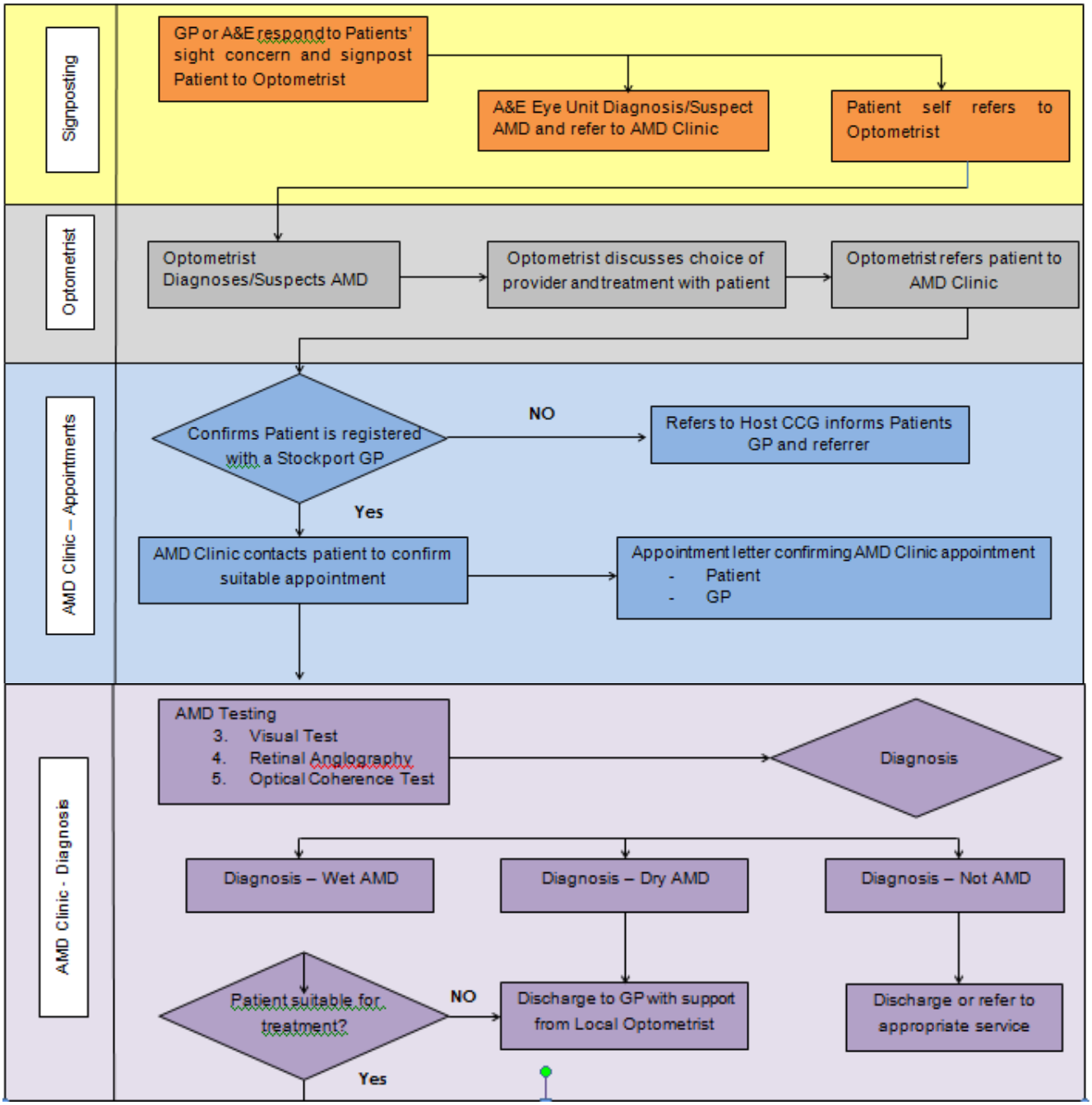
[xvi] AMD prevalence, England, 2010 - 510,166[38]
[xvii] This is a crude estimate and does not account for discounting or inflation

guidance; and accordingly requires the provider to undertake quality of life satisfaction surveys. These changes, if implemented and effectively contractually enforced, should deliver an evidence-based service that meets the expressed needs of the population. Additionally, the quality of life data should provide a valuable indicator of burden that can be used to inform future commissioning; however audit and review will be critical.

The referral criteria for the Wet AMD service are clinical evidence of wetAMD and/or a less than 3 month history of any of the following and vision must be better than 6/96 in the affected eye.

- Visual loss.
- Spontaneously reported distortion.
- Onset of a missing patch/blurring in the central vision"[186]

Stockport CCG AMD Referral and Diagnosis Pathway



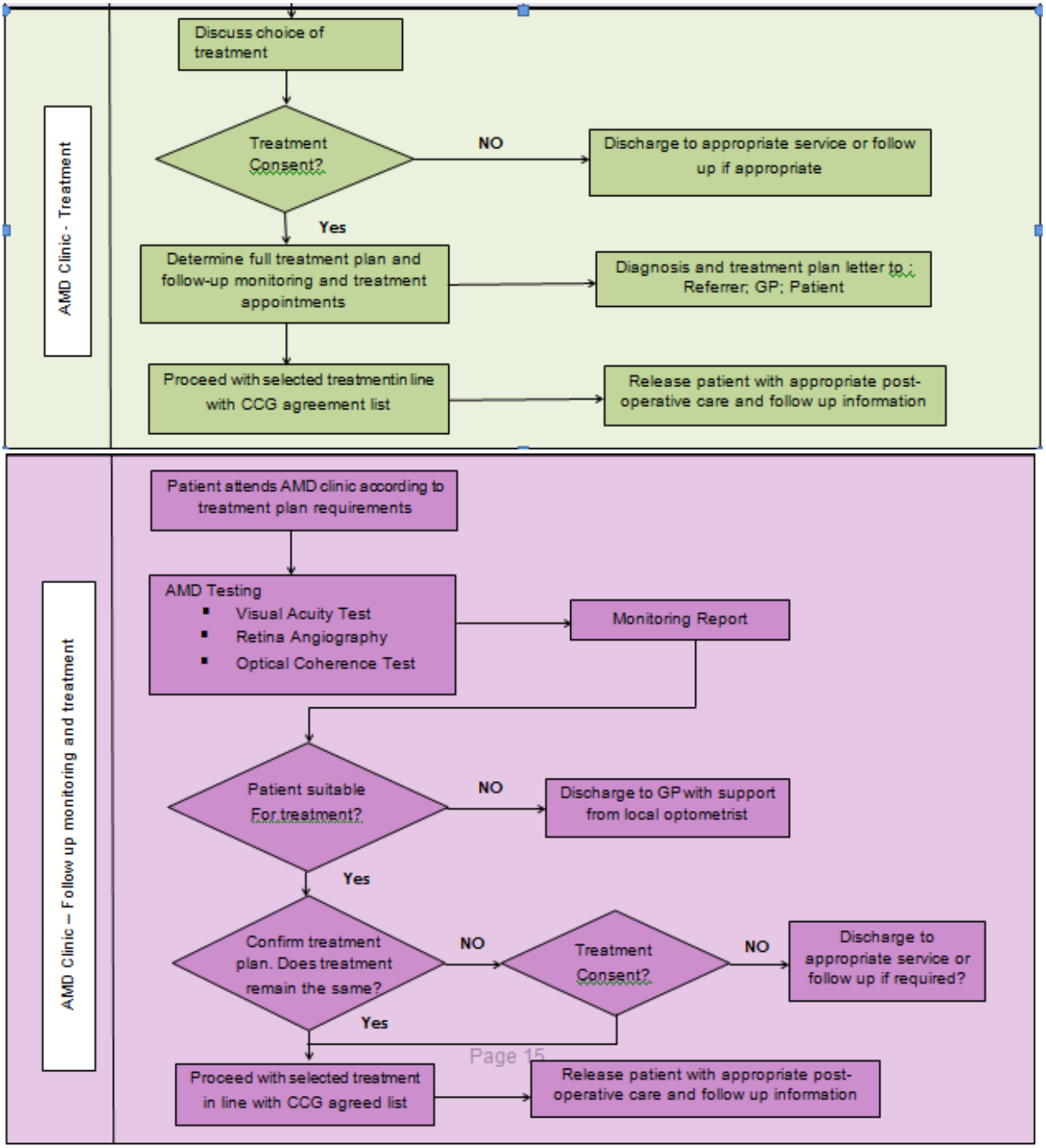


Figure 21: AMD Referral and Diagnosis Pathway Stockport[186]

4.6.1.5 Future Burden

An ageing population and increasing treatment effectiveness will result in a significant increase to the number of people living with, and requiring treatment for, AMD in the future. Epidemiological modelling[38] estimated a 22% increase in the number of early AMD cases by 2020, and a 24% increase in Wet and Dry AMD. The implications of this projected increase on service capacity and treatment costs in Stockport will be important to consider in future service planning.

4.7 Glaucoma

Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)

Glaucoma is a group of eye diseases which cause progressive damage to the optic nerve and lead to impaired vision and sometimes blindness[90]. Glaucoma damage is caused by raised IOP or weaknesses in the optic nerve[182], it accounts for 5% of sight loss in the UK, but 11% of the burden[2].

4.7.1.1 Disease definition

Glaucoma is classified under ICD-10[180] code H40 [183]:

- "Open angle glaucoma (H40.1 in ICD-10), where there is a gradual increase in internal eye pressure and worsening of vision over several years.
- Closed angle glaucoma (H40.2 in ICD-10), where there is a sudden increase in internal eye pressure, often needing immediate treatment in hospital.
- Secondary glaucoma (H40.3 to H40.5 in ICD-10), where increases in internal eye pressure which is a result of another eye condition.
- Glaucoma secondary to drugs (H40.6 in ICD-10)
- Other glaucoma (H40.8 in ICD-10)
- Glaucoma, unspecified (H40.9 in ICD-10)
- Congenital glaucoma (Q15.0 in ICD-10), where increases in internal eye pressure are due to a physical abnormality of the eye at birth"[180].

Ocular hypertension (OHT) is defined as consistently or recurrently raised intraocular pressure (IOP) but without clinical evidence of optic nerve damage or visual field defect.

Suspected Glaucoma is diagnosed when regardless of the intraocular pressure, there is some evidence to suggest damage.

Chronic Open Angle Glaucoma (COAG), also known as Primary Open Angle Glaucoma (POAG) is the most common type of glaucoma and occurs progressively over time, it can be classified as early, moderate or advanced.

Normally the amount of aqueous fluid produced by the eye and the amount that drains out is balanced, but in COAG, drainage does not occur properly and the pressure in the eye rises, causing a gradual loss of vision around the edges of the visual field. The effects often go unnoticed for an extended period, but without treatment, the damage caused can become permanent.

The rarer, acute form of glaucoma is called closed angle glaucoma or acute glaucoma and results from rapid pressure increases in the eye; this condition is very painful and requires urgent treatment.

4.7.1.2 Risk Factors

Risk factors associated with glaucoma include:[90]

- Age
- Ethnicity (black African and for acute AMD, South East Asian)
- Ocular hypertension
- Family history
- Short-sightedness

4.7.1.3 Burden

4.7.1.3.1 Modelled prevalence

The NEHEM model[28] estimates that there are 6023 people living with **Ocular hypertension (OHT)** in Stockport in 2014 and 2673 living with glaucoma (Table 8).

The NICE Glaucoma Costing Model[105] (Appendix 1) estimates the yearly incidence in Stockport of OHT or suspected Chronic Open Angle Glaucoma (COAG) to be 2155 and annual incidence of diagnosed COAG to be 992.

NEHEM applied to 2014 mid-year population projection			
Mean estimated number of people living with glaucoma (prevalence aged ≥30)	High (upper 95% CI)	Low (lower 95% CI)	Estimated number of people living with ocular hypertension (prevalence aged over 30)
2673	3784	1638	2673
1.42%[xviii]	2.01%	0.87%	3.20%

NICE Glaucoma Costing tool applied to 2014 mid-year population projection		
Annual incidence of OHT or suspected COAG aged ≥40	Proportion of OHT or suspected COAG presenting to / monitored by an optometrist	Annual incidence of COAG diagnosed and receiving treatment
2,155	1,077	992
1.4%	50%	

Table 8: NEHEM[28] and NICE[105] models of glaucoma prevalence and incidence

4.7.1.4 Diagnosis and Treatment

The most common route for the detection of glaucoma is via routine sight tests undertaken by community optometrists which include intraocular pressure (IOP) testing. Once a diagnosis has been made, a person will require monitoring throughout their lifetime. For the majority of people, COAG can be stabilised with eye drop medication and managed within the community, but surgery may be needed in a small proportion of cases.

4.7.1.5 Services and policy context

In response to widespread capacity issues in glaucoma services across the country, in 2009, the National Patient Safety Agency issued an alert to NHS provided which required them "to put in place measures to prevent inappropriate delays to glaucoma follow-up appointments"[45]. NICE also published guidelines for the diagnosis and management of COAG[45] in the same year and in 2011 followed these with a quality standard[44]. Historically many optometrists retained patients with raised IOP but no other signs of glaucoma. NICE, by defining an IOP[xix] above which diagnosis should occur, set a referral threshold, with significant consequences for secondary care.

A 2010 retrospective case note analysis of the two main providers of glaucoma services for Stockport[106xx] found that adherence to NICE standards was higher in the Manchester Royal Eye

[xviii] Yearly incidence rate could be varied between 0.5-2% as part of a local sensitivity analysis

[xix] repeatable pressure by contact tonometry of above 21mmHg

[xx] Available here: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3496094/

Hospital optometry-led shared-care delivery model than in the Stepping Hill Hospital secondary care model. The study compared 100 glaucoma patient case notes from Manchester Royal Eye Hospital, an optometry-led shared care setting providing support to the wider hospital eye service, with 100 from Stepping Hill Hospital, a District General Hospital clinic setting, providing secondary care to patients from two neighbouring counties.

The study looked at adherence against the seven standards set out in NICE C85 and found that adherence in the Stepping Hill Hospital setting was significantly lower across a number of the standards. This indicates that the MREH model of trained optometrists delivery specialised glaucoma care using pre-designed assessment sheets may better support implementation and delivery of care in line with NICE guidance.

Following the NPSA alert, the then PCT report that they worked closely with Stepping Hill Hospital to ensure that patients with glaucoma were being seen within safe follow-up limits. Progress was slow and the PCT issued a performance notice in November 2011. This was removed in May 2013 when the hospital had seen all patients overdue an appointment and developed systems to identify those on the outpatient list with glaucoma, so that they could track their wait times and ensure compliance with recommended follow up. In June 2014 the CCG became aware that there were 1,871 ophthalmology patients overdue follow up, 371 were patients with glaucoma. The CCG report that the issue is currently being pursued through the contract and quality meetings to ensure that there is no clinical risk and all patients have now been seen. Waiting times and performance for Manchester Royal Eye Hospital has not been made available[15].

Glaucoma Repeat Readings Service - In response to an anticipated increase in secondary care referrals arising from implementation of the NICE Guidelines, Stockport established the Glaucoma Repeat Readings Service. The aim of the service is to improve the accuracy of referrals to secondary care, thereby reducing unnecessary patient anxiety and enabling more care to be provided in the community, and ensuring a more cost-effective and efficient secondary care service.

The service is delivered by optometrists who provide repeat IOP measures[xxi] in-line with NICE CG85[45] to accurately confirm the risk of OHT or COAG before referral. Approximately 90% of optometrists in Stockport actively participate, although in-line with general optometry distribution, services are concentrated in west and central Stockport (Figure 22)[107].

[xxi] Applanation contact tonometry requires local anaesthetic and is the most accurate diagnostic measure of IOP, but was not previously widely used by optometrists

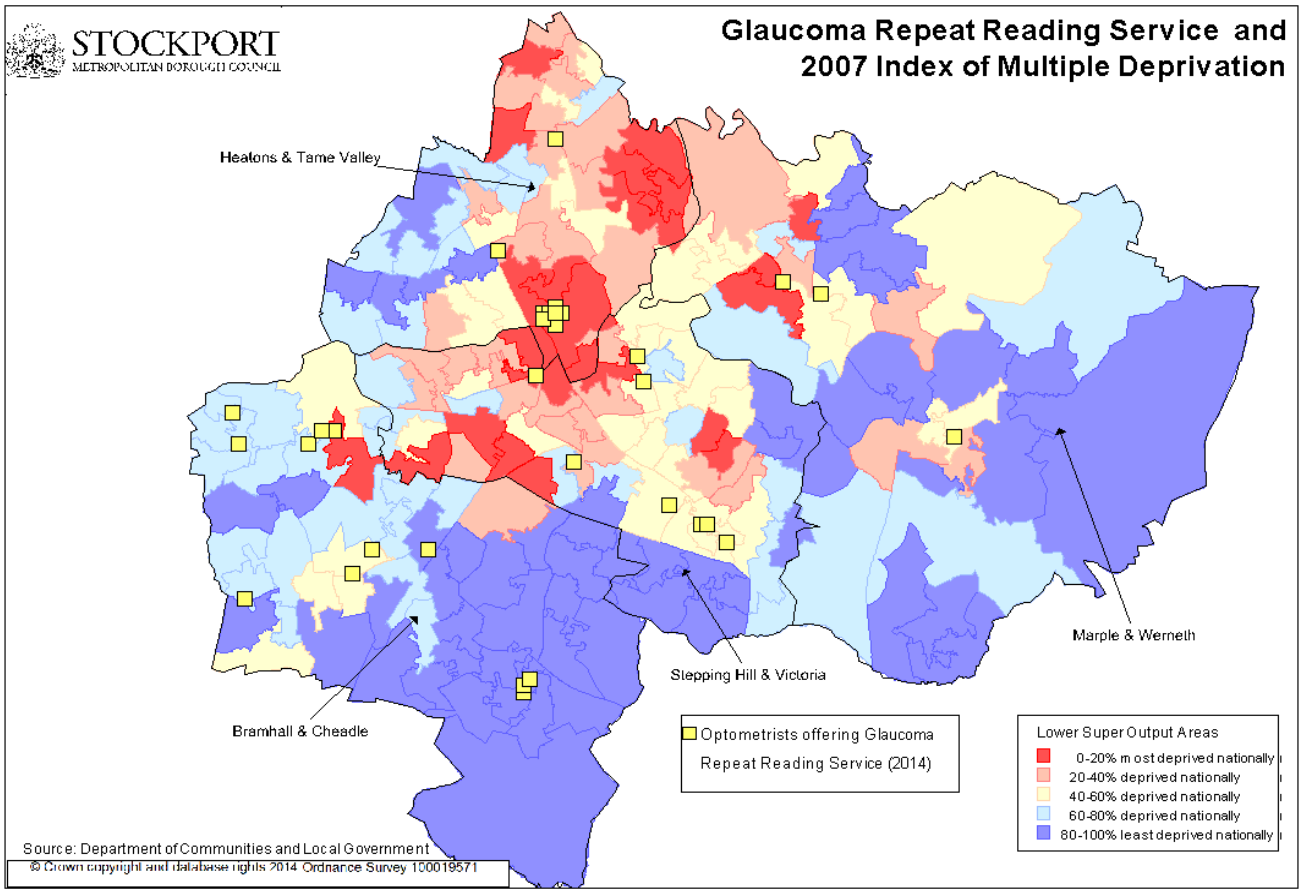


Figure 22: Optometrists offering Glaucoma Repeat Readings Service (Jan 2014)[107].

Since the service was established in March 2010 (to January 2014) 2182 patients have been assessed under the scheme. 1722 (79%) unnecessary referrals to secondary care have been deflected and those patients managed instead within primary care[107]. A QIPP Case study in Bexley demonstrated a 62% cost savings[44] through implementation of a similar (but not identical) scheme, based on a 76% deflection rate. The current rate of deflection in Stockport (year to date April 2013-January 2014) was 84% indicating savings could be even higher. The CCG intends to extend this service to include visual field defects and to allow assessment of patients referred by optometrists not participating in the service.

4.7.1.6 Future Burden

Epidemiological modelling[38] estimates a 17% increase in rates of OHT (2010-2020) and a 23% increase in diagnosed glaucoma with significant implications for services, given the requirement for lifelong monitoring.

4.7.1.7 Glaucoma Repeat Readings Referral Refinement Patient Pathway

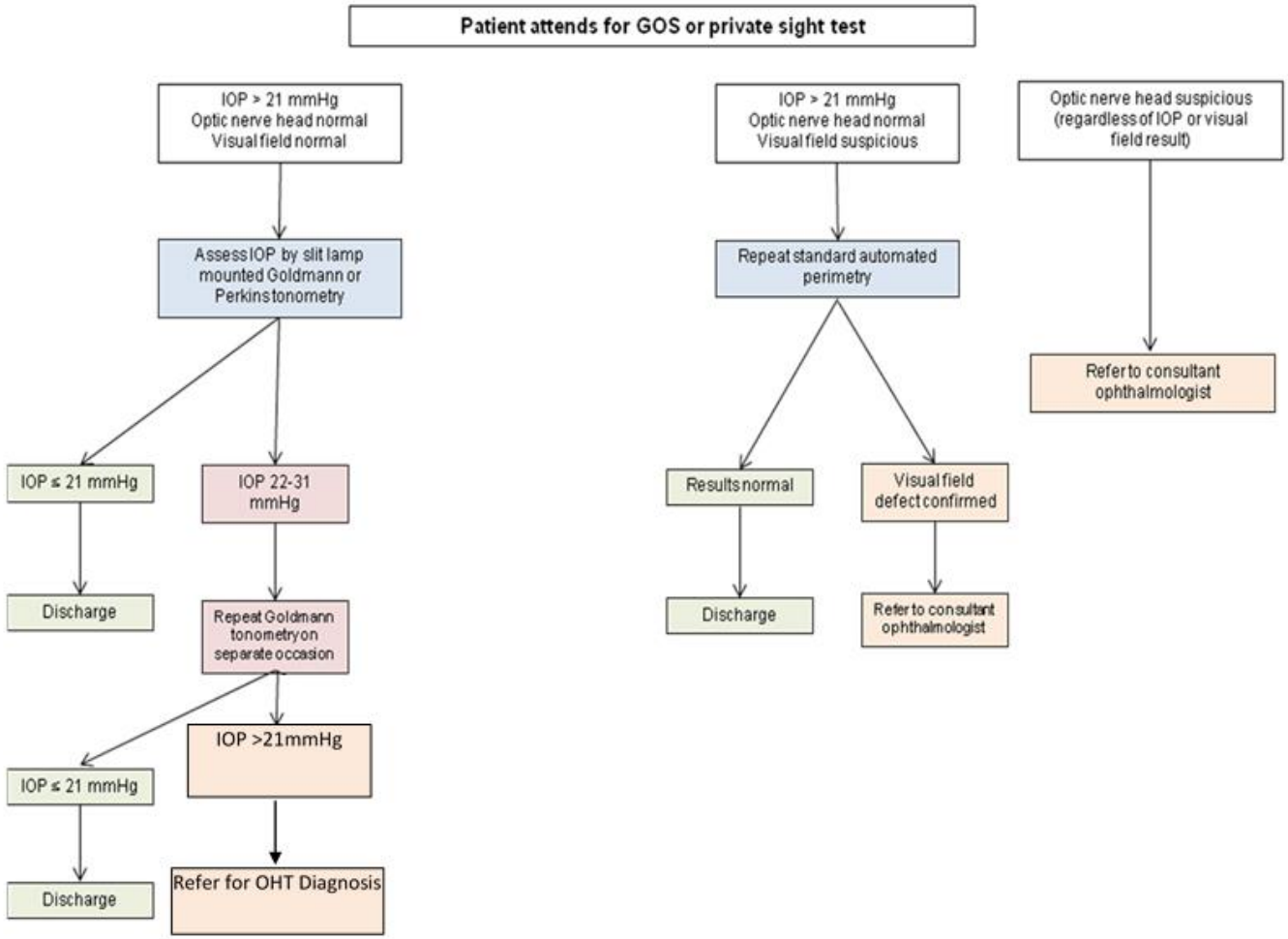


Figure 23: Glaucoma Repeat Readings Referral Refinement Patient Pathway (participating practice)

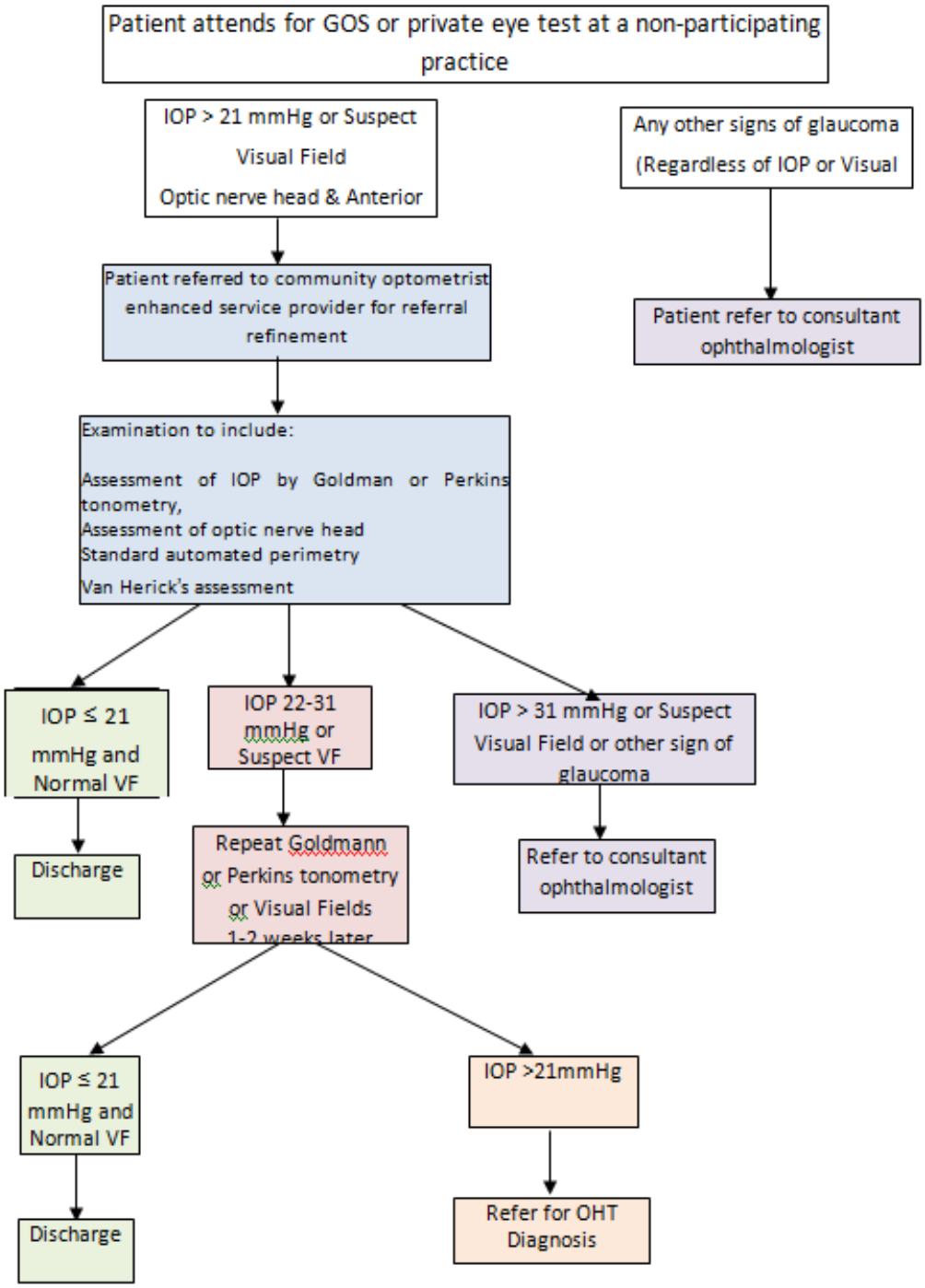


Figure 24: Glaucoma Repeat Readings Referral Refinement Patient Pathway (non-participating practice)

4.8 Diabetic Retinopathy

Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)

Diabetic Retinopathy persisted as the most prevalent cause of sight loss in the western working-age population for 50 years[108]. However, recent analysis of the UK certification data suggests that the epidemiology is shifting and blindness amongst this population is now most commonly caused by inherited retinal disorders[109]. This change may represent the first tangible impact of the national Diabetic Retinopathy screening programme, although the results should be interpreted with caution, given the previously highlighted issues with this dataset **(3.1.2, 4.1.1).**

4.8.1.1 Disease definition

Diabetic retinopathy is a progressive disease of the blood vessels in the retina and is associated with the prolonged hyperglycaemia and hypertension experienced by people with diabetes. Sight loss is caused by the growth of new abnormal vessels and their associated haemorrhage[41]. It is defined under ICD-10 codes E11.3(1-5) in those with Type 2 diabetes mellitus and E10.3(1-5) in those with Type 1 diabetes mellitus[180]. Severity of Diabetic Retinopathy is classified in terms of:

- **Background retinopathy** – asymptomatic stage characterised by very small leaks of fluid in parts of the retina, visible during an eye examination.
- **Pre-proliferative retinopathy** – characterised by signs of blood flow becoming restricted, without growth of new blood vessels
- **Maculopathy** – retinopathy which damages the macula.
- **Proliferative retinopathy** - damaged blood vessels produce growth factors which cause new very small, delicate blood vessels to grow; these vessels bleed easily which results in impairment of vision and require laser treatment.

4.8.1.2 Risk Factors

- Type 1 versus Type 2 diabetes
- Increased duration of diabetes
- Poor control of glucose levels
- Hypertension, Kidney disease, High cholesterol
- Pregnancy (particularly coupled with poor glucose control)
- Smoking
- Obesity[41]

4.8.1.3 Burden

The at-risk population for Diabetic Retinopathy (those with diabetes) in Stockport is 5.7% of ≥17 year olds[91] (which equates to 13,821 people).

4.8.1.3.1 Modelled prevalence

The FSUK[38,29] model predicted 'background Diabetic Retinopathy' prevalence in Stockport to be 5100 and 'pre-proliferative/proliferative Diabetic Retinopathy' prevalence to be 580 in 2011. However this model used a higher rate of diabetes for Stockport than the actual observed rate. When re-calculated using the actual rate of diabetes, the model predicts 3866 people are living with background Diabetic Retinopathy and 440 with 'pre-proliferative/proliferative Diabetic Retinopathy' in 2014.

4.8.1.3.2 Actual prevalence

Data from the Greater Manchester Diabetic Screening programmes indicates that the observed proportion of diabetics with referable retinopathy in Stockport is 8.2%, equating to 1209 people, this is higher than the Greater Manchester average of 7.7% (Table 9). However of those screened within the last 12 months, 319 (3%) were identified as having referable retinopathy, lower than the Greater Manchester average of 3.8% (Table 10).

Whole Diabetic Population	Referable Retinopathy						
CCG	YES		NO		Never Screened		Grand Total
	Count	%	Count	%	Count	%	
NHS CENTRAL MANCHESTER CCG	974	9.3%	8531	81.6%	946	9.1%	10451
NHS NORTH MANCHESTER CCG	838	8.3%	8333	82.6%	917	9.1%	10088
NHS SALFORD CCG	874	7.1%	10461	84.5%	1047	8.5%	12382
NHS SOUTH MANCHESTER CCG	676	8.3%	6816	83.9%	636	7.8%	8128
NHS STOCKPORT CCG	1209	8.2%	12612	85.8%	870	5.9%	14691
NHS TAMESIDE AND GLOSSOP CCG	805	5.7%	12318	87.6%	940	6.7%	14063
NHS TRAFFORD CCG	863	7.5%	9937	85.9%	774	6.7%	11574
Grand Total	6239	7.7%	69008	84.8%	6130	7.5%	81377

Table 9: Referable Retinopathy by CCG for Whole Diabetic Population (Data Source: HEA extract as at 31.8.14)

Profile by those patients screened within the last 12 months	Referable Retinopathy				
	YES		NO		Grand Total
CCG	Count	%	Count	%	
NHS CENTRAL MANCHESTER CCG	349	4.7%	7045	95.3%	7394
NHS NORTH MANCHESTER CCG	359	5.0%	6792	95.0%	7151
NHS SALFORD CCG	332	3.7%	8584	96.3%	8916
NHS SOUTH MANCHESTER CCG	241	4.2%	5498	95.8%	5739
NHS STOCKPORT CCG	319	3.0%	10479	97.0%	10798
NHS TAMESIDE AND GLOSSOP CCG	332	3.1%	10301	96.9%	10633
NHS TRAFFORD CCG	297	3.5%	8184	96.5%	8481
Grand Total	2229	3.8%	56883	96.2%	59112

Table 10: Referable Retinopathy by CCG for patients screened within last 12 months (Data Source: HEA extract as at 31.8.14)

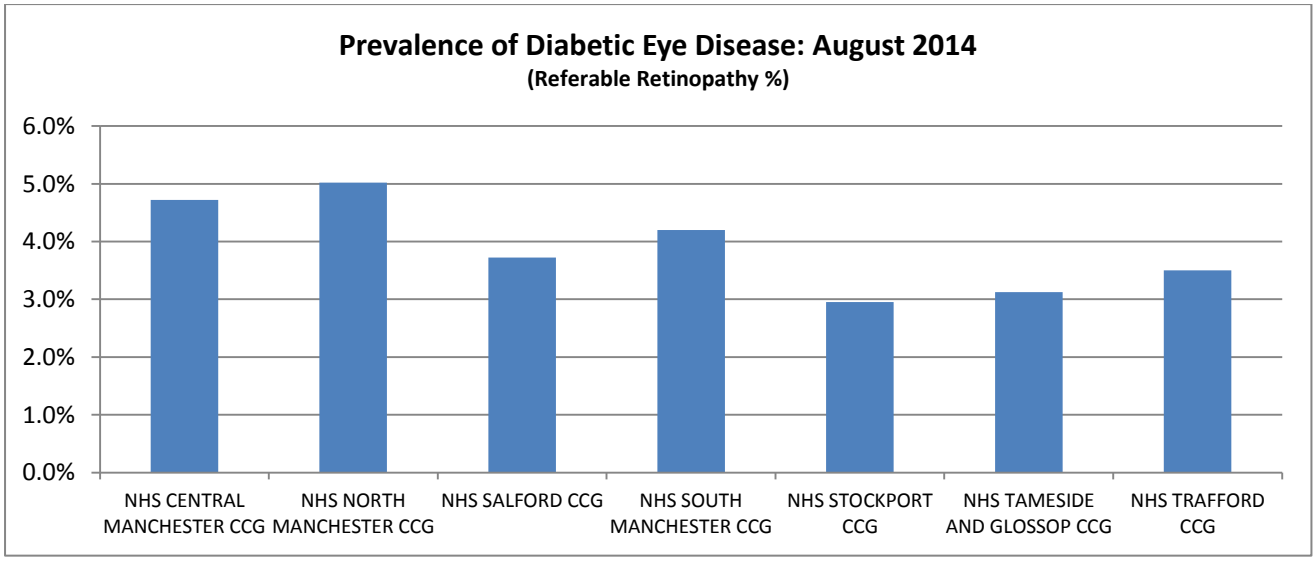


Table 11: Prevalence of Diabetic Eye Disease: August 2014 (Data Source: HEA extract as at 31.8.14)

4.8.1.4 Services and Clinical Activity

4.8.1.4.1 Diabetic Retinopathy Screening Programme

Early identification and treatment are central to avoiding sight loss from Diabetic Retinopathy. Laser treatment (photocoagulation) at the severe pre-proliferative stage is associated with a 50% reduction in the risk of significant sight loss[110]. Effective local implementation and uptake of the National Diabetic Retinopathy Screening Programme is therefore key to reducing avoidable sight loss.

Diabetic Retinopathy screening for Stockport is commissioned as part of the Greater Manchester Diabetic Eye Screening Programme by the NHS England Local Area Team. Screening involves a digital photograph of the retina and is offered annually to diabetic residents aged ≥12.

Optometrists within Stockport are commissioned to provide Diabetic Retinopathy screening within the community. Mapping of the practices offering the service against deprivation indices indicates a cluster in central and west Stockport but very few in the north, south or east; of particular concern in the north where deprivation levels are relatively higher (Figure 25).

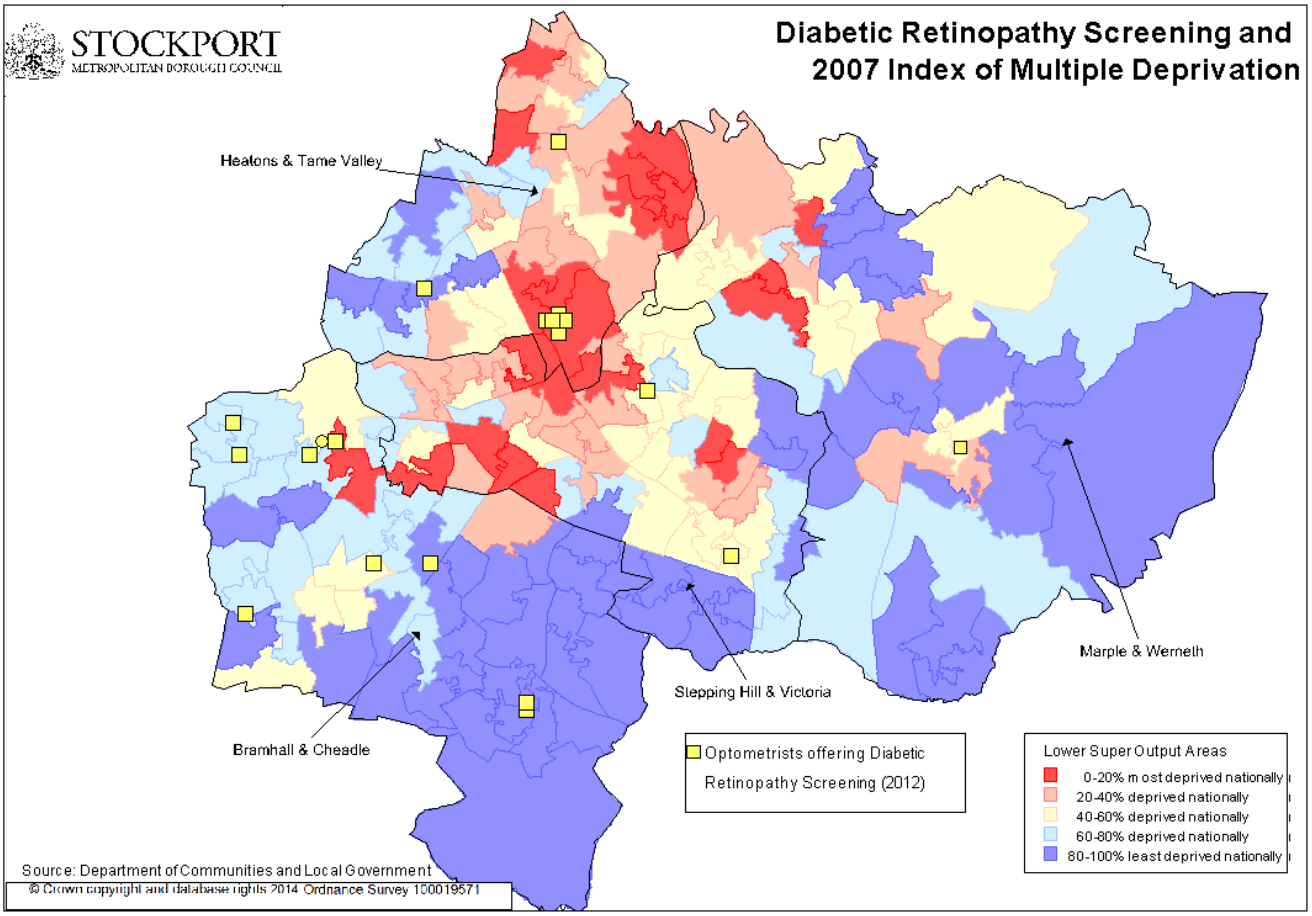


Figure 25: Optometrists offering Diabetic Retinopathy screening (2012)[111]

Screening coverage is the percentage of eligible patients (total diabetics minus exclusions) offered screening. 2012/13 coverage for Stockport was 100%, in-line with all but one of the other Greater Manchester CCGs, with 14033[xxii] patients identified and 12924 screened. However Stockport had the highest proportion of exclusions (1109 patients-7.9%) across all Greater Manchester[xxiii,112]. Patients should only be excluded from screening if they fulfil a number of limited criteria (Figure 26). Legitimate exclusions include those under the care of an ophthalmologist for the management of Diabetic Retinopathy (which may indicate a high proportion already identified in Stockport). However the criteria also include those who have actively declined screening and this group are likely to be at particular risk of late presentation. It is noted that new categories being introduced to the dataset will provide a breakdown of the reasons for exclusion, providing a more accurate picture and enabling action to be taken should a high proportion of exclusions be due to inability to attend screening or patients opting out.

Reasons for exclusion from the National DR Screening Programme [112]

Patients who:

- Have made an informed choice that they no longer wished to be invited for screening
- Are under the age of 12 years old
- Do not have perception of light in either eye
- Are terminally ill
- Have a physical or mental disability preventing either screening or treatment
- Are currently being treated by an ophthalmologist for diabetic retinopathy.

Figure 26: Reasons for exclusion from the National **Diabetic Retinopathy** Screening Programme

Screening uptake - The Liverpool conference[113] threshold of ≥80% screening was achieved Nationally in 2011/12 (80.9%)[13] and is exceeded in Europe only by Sweden (which achieves 90% through a paternalistic model, summoning patients rather than inviting them[114]).

In Stockport, the published 2011/12 PHOF indicator[13] (2.21vii Access to Diabetic Retinopathy Screening) reported 83.1% uptake (95%CI 82.5-83.8%); better than both the North West and England average and an increase from 79.2% in 2010/11. However the most recent uptake data shows that the overall uptake for 2013/14 in Stockport dropped to 79.8% of invited patients.

[xxii] Greater number than previously cited likely due to larger age-range (≥ 12 years)

[xxiii] This data is caveated with known variations in the criteria used across the Greater Manchester programmes making accurate comparisons difficult. Programmes have reported that they are working to align their interpretations of the DR Screening Guidance[41], to facilitate more reliable comparisons going forward[112]

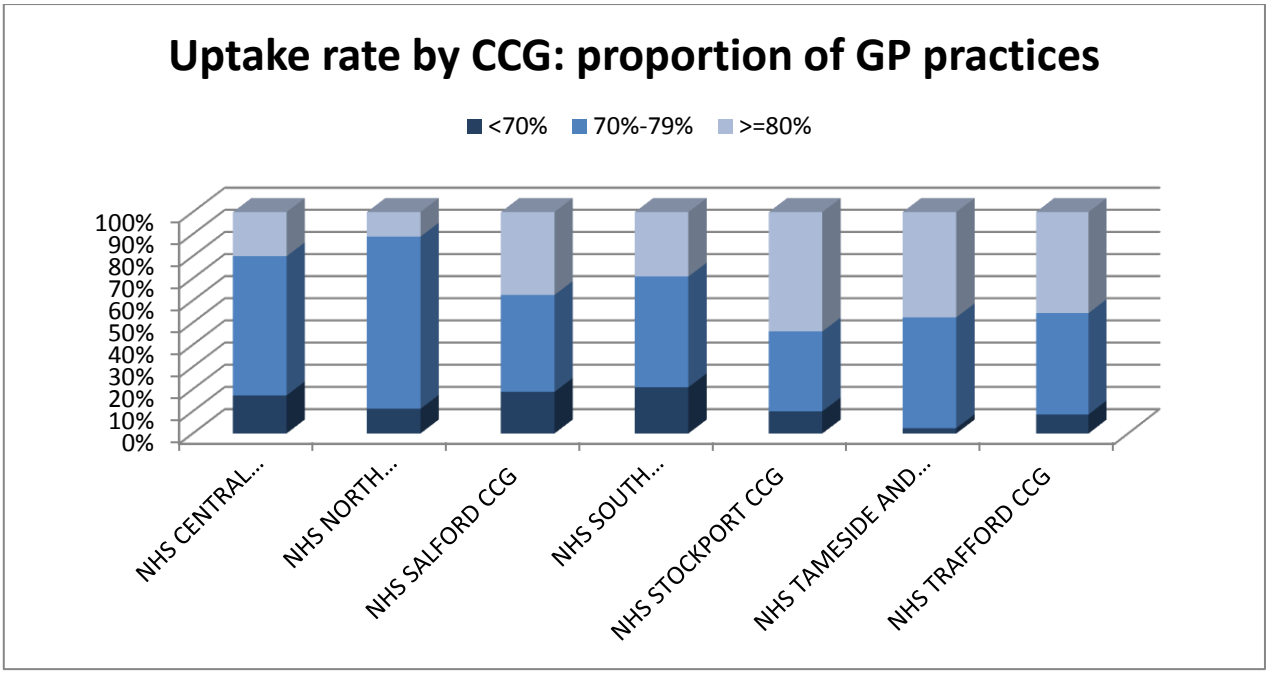


Table 12: Uptake rate by CCG: proportion of GP practices

Although the proportion of GP practices with uptake below 70% is relatively lower than for some other Greater Manchester CCGs, analysis by practice shows that those practices with the lowest uptake are located in some of the most deprived areas in Stockport (e.g. Brinnington) (Appendix 2).

The primary care QOF dataset[91] records the percentage of diabetic patients reporting a retinal screen in the preceding 15 months. This data indicates that although the proportion of exceptions (e.g. non-attenders, **Error! Reference source not found.**) in Stockport is lower than the England average (6.3% versus 7.5%), exceptions are particularly high amongst some practices in more deprived areas (e.g. Brinnington 11.2%; Cale Green 12.4%).

Definition of 'Exception' in the Quality Outcome Framework

"QOF includes the concept of exception reporting. This allows practices to pursue the quality improvement agenda and not be penalised, where, for example, patients do not attend for review, or where a medication cannot be prescribed due to a contraindication or side-effect. Exception rate is the number of recorded exceptions expressed as a percentage of the number of patients on a disease register who were qualified to be part of the indicator denominator."[91]

Figure 27: Definition of 'Exception' in the Quality Outcome Framework

4.8.1.5 Future Burden

Epidemiological modelling[38] estimates a 25% increase in background retinopathy between (2010-2020) and a 25% increase in proliferative and non-proliferative Diabetic Retinopathy.

Conclusion: Equal access to and uptake of screening are essential; geographic variation in screening locations and relatively high levels of exclusions/non-participation in screening may mean Diabetic Retinopathy in some groups within Stockport is identified late. **(Recommendation 7)**

4.9 Cataracts

Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)

Cataracts (i.e. any opacity of the lens), are extremely common amongst older people and most will experience low levels of opacity with no or minimal sight problems – cataracts resulting in sight loss account for 14% of registered partial sight and blindness in Stockport.

4.9.1.1 Disease definition

A cataract is the development of opacity in the normally clear lens of the eye; it can affect one or both eyes and progressively obscures a person's vision. The majority of cataracts are age-related and patterns of progression can be very variable. Cataracts are caused by cumulative biochemical damage to the lens protein throughout a person's life. If left untreated, cataracts will usually lead to severe visual impairment. However, surgery to replace the damaged lens with a synthetic one can return 6/12 best corrected vision (as measured on a Snellen chart) to 95% of people[38],[184]. In the ICD-10, cataracts (other than congenital) are defined under Disorders of lens H25-H28[180].

4.9.1.2 Burden

4.9.1.2.1 Modelled Prevalence

As the majority of cataracts do not significantly impact on sight, prevalence is most usefully defined in terms of surgical cataracts, i.e. where surgery would be considered by the patient[28]. However it should be noted that a significant number of people may have cataracts below this level that still negatively impact on their sight.

There is little agreement on prevalence rates and as such NEHEM[28] estimate the burden of surgical cataracts using a high and low level estimate. The high estimate (6.74% of the >40 population) equates to 10,315 in Stockport, the low level to 2846.

Local data to validate these models is limited; proxy data from cataract surgery can be used to indicate incidence but cannot be extrapolated to quantify the wider pool of sight loss from cataracts.

4.9.1.2.2 Cost

FSUK estimates the overall cost of cataracts to be approximately £4250 per person, including referral, surgery and personal and social care. The personal and social care elements account for 36% of costs and could theoretically be all but eliminated if everyone received surgery as soon as their eyesight started to impact on daily functioning –reducing the cost to £2700/person[2].

4.9.1.3 Services and Clinical Activity

4.9.1.3.1 Direct Referral Scheme

Stockport's Direct Referral scheme means that patients identified as suitable for cataract surgery are referred by participating optometrists directly to the treatment centre of their choice. The optometrist undertakes a pre-operative assessment, discussing risks and benefits and avoiding unnecessary and inappropriate referrals. The optometrist also undertakes the final post-operative check-up after surgery, enabling care closer to home. The majority of optometrists in Stockport are part of the scheme, however access is still limited in those locations where the number of optometrist practices are low (Figure 28).

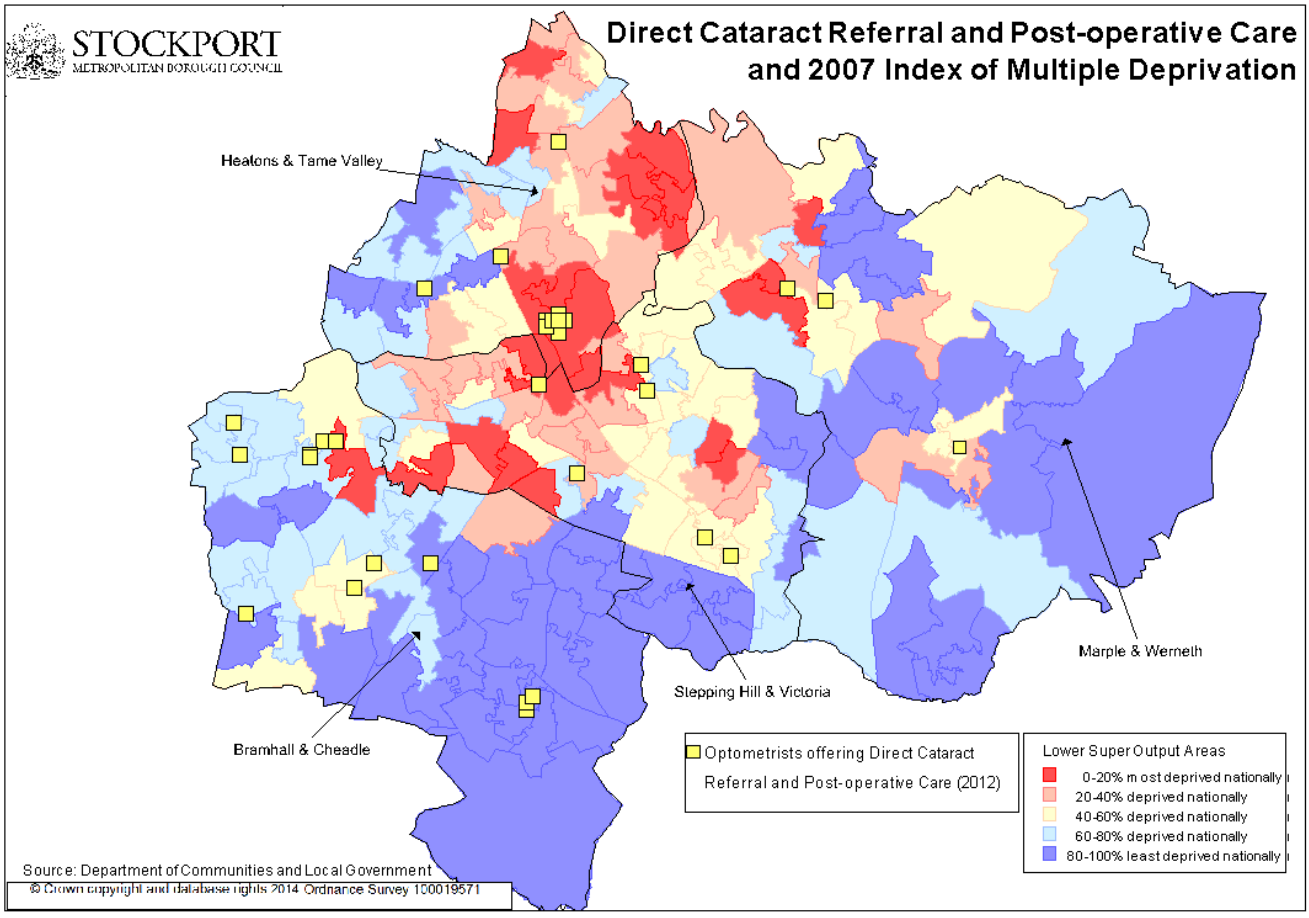


Figure 28: Optometrists offering Direct Referral and post-operative care (2013)[111].

4.9.1.3.2 Cataract Surgery

Surgery waiting times vary significantly according to the chosen treatment centre, from 1 month with a private provider to >4 months at Stepping Hill Hospital (as at February 2012)[111].

Cataract surgery is considered one of the most cost-effective treatments available[115] and the impact in terms of QALYs has been demonstrated to far exceed the costs[116]. Although rates of surgery have increased rapidly over the last 10 years[117], an RNIB audit[118] found surgical thresholds in place across England. No surgical thresholds are implemented in Stockport, meaning that access to surgery is not systematically rationed. However, modelling suggests the burden of unidentified surgical cataracts in the community could still be significant, and without equalities data, it is not possible to determine whether there is equity of access across all groups.

Stockport Hospital Episode Statistics[1,56] interrogated using Operating Procedure codes, indicate that cataract procedures account for 47% of all ophthalmology inpatient admissions in Stockport (2012/13) **(**Table 13**)**. The 2012/13 crude rate was 718 per 100,000 (count 2038) and there is an increasing year-on-year trend, as would be expected for an aging population. However this is lower than the 758 per 100,000 (count 2273) projected by the RNIB for Stockport over the same period[118,56,120].

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Count of Ophthalmology inpatient admissions	2779	3189	3368	3424	3482	3718	4055	4371
Count of Cataract admissions	1267	1351	1345	1486	1594	1704	1890	2038
RNIB total spells				1705	1733	1797	2044	2273
Proportion of inpatient admissions	46%	42%	40%	43%	46%	46%	47%	47%
Total cataract admissions per 100K population	451	482	479	528	565	603	667	718
RNIB cataract per 100K				606	616	609	684	758
RNIB – Spells per patient				1.26	1.3	1.27	1.31	1.33

Table 13: Stockport Council Performance Data and RNIB Surgery deferred, Sight Denied underlying data.[56,120]

This ostensibly suggests that over 200 people could be missing out on procedures each year. However, examination of the data revealed irregularities in the RNIB denominator data and analysis of the inpatient data using alternative queries (i.e. by alternative codes/categories) placed the number of observed admissions at similar levels to those published by RNIB – suggesting that the RNIB analysis may have been undertaken using these cruder queries. These data irregularities and

the complexity of the analysis required, underline some of the issues with relying on data published as part of grey literature which are further explored in **Error! Reference source not found.** .

The UK has seen rapid increases in rates of cataract surgery over the last two decades. However, although Stockport reports rates in-line with UK averages, when compared more broadly to European rates (where the UK has the 4th lowest number of operations of the 15 participating countries)[114], there appears to be scope to do more to increase surgery rates.

4.9.1.4 Future Burden

Epidemiological modelling[38] projects a 22% increase (2010-2020) in the number of cataracts operations that will be required. If we assume cataract procedures are currently matched to need (unlikely), a similar increase in capacity and resourcing would be needed to match the increased demand, and could prompt threshold introductions.

However, Figure 29 demonstrates that the projected increase would represent a slower rate (flatter gradient) than that seen in Stockport between 2005-13

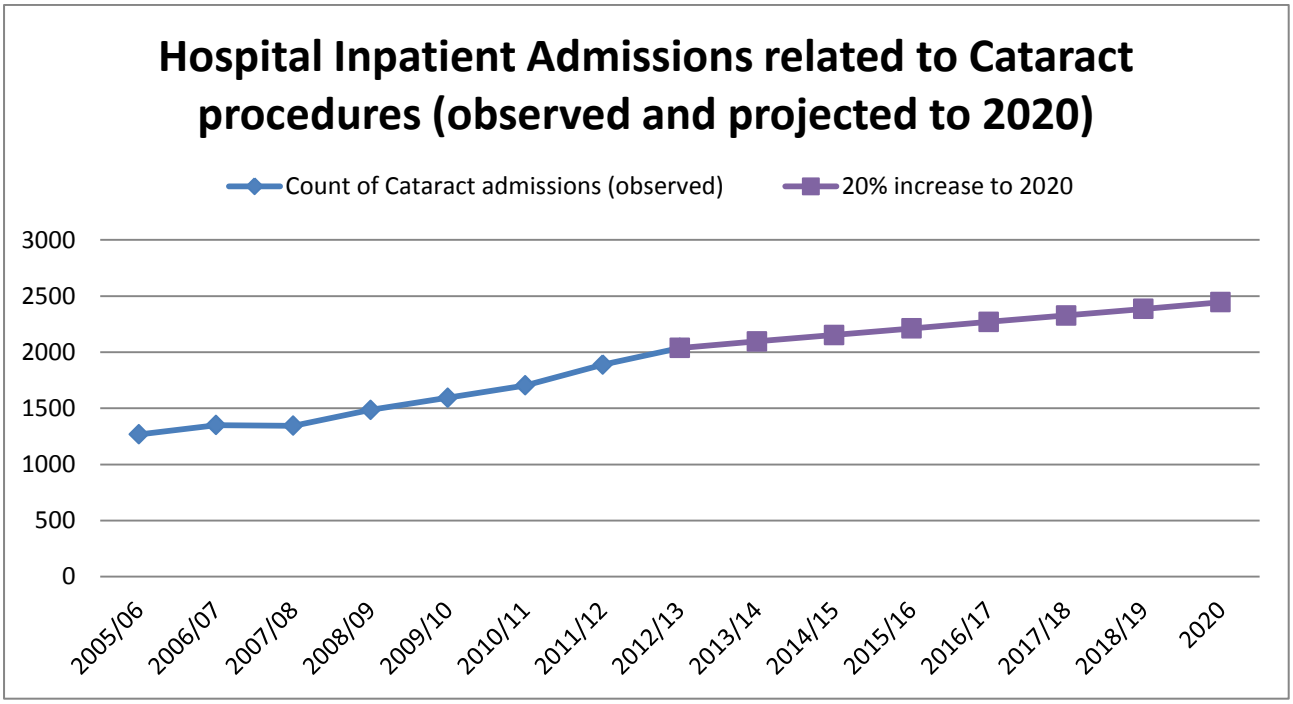


Figure 29: Projected cataract procedures 2005-2020[2,38]

4.10 Uncorrected Refractive error

Courtesy: National Eye Institute, National Institutes of Health (NEI/NIH)

Partial sight arising from serious uncorrected refractive error accounts for >50% of avoidable sight loss in the UK[2]. Yet many perceive regular sight tests as unnecessary and do not equate them with preventing sight loss; or fail to wear the glasses that have been prescribed for them. Those on low incomes (including those aged ≥60) are also more likely to delay attending for sight tests if they are asymptomatic.[121]

4.10.1.1 Access to General Ophthalmic Services

The NHS funds independent local optometry practices to deliver free preventative and corrective eye care to children, people aged ≥60, on low incomes and those pre-disposed to eye disease (e.g. glaucoma family-history). The evidence base for the optimum interval between eye tests is lacking but general consensus is that those aged ≥60 should be tested every 1-2 years[2] and the Department of Health Memorandum of Understanding states a minimum interval of 2 years for those aged over 60 and 1 year for those over 70 years old.

In theory, this service should promote equitable access and should mitigate against sight loss related health inequalities by enabling early identification in groups for whom cost represents an access barrier. However analysis of NHS sight tests in Stockport suggests that take-up amongst key groups may not be as high as it should be (Table 14). In 2012/3 there were 67,276 NHS sight tests in Stockport[122].

Eligible Group	No. NHS sight tests	Denominator Population	Proportion of population	Denominator Data source
Over 60s	26,923	70,279	38%	2012 mid-year population[120]

Children aged 15 and under	11,187	53,682	21%	2012 mid-year population[120]
Students aged 16-18	2,090			
Residents on income support	4,264			
Residents on tax credits	2,928			
Residents receiving Job Seekers Allowance (JSA)	1,054	6,100	17%	March 2013 JSA claimants[119]
Diabetic / Glaucoma sufferers	11,402	14,090	81%	QOF diabetes dataset and NICE costing COAG costing tool[98]
blind / partially sighted	126	1,415	9%	HSCIC Registered as blind or partially sighted[53]
Residents with complex eye conditions	381			
Residents with relatives who have glaucoma	6,612			
Domiciliary visits	2,370			

Table 14: Analysis of General Ophthalmic Services uptake in Stockport 2012/13 [18,30,31,58,122,123,105]

These data should only be taken as indicative. In particular, further investigation may be warranted to examine the low numbers of residents receiving JSA who access free sight tests (approximately 17%) and whether this group is aware of the entitlement. Denominator data was not available to make an assessment of take-up amongst residents on income support or tax credits, but these would equally warrant further investigation. The numbers of persons registered with sight loss accessing free sight tests is also extremely low, however this may be due to contact with secondary care services, negating the need for primary care sight tests. In addition, for the 38% of >60s that take up free sights tests, it is not possible to ascertain whether this represents the same 38% of patients attending yearly, or 76% attending every 2 years.

The reasons behind low take-up will likely vary significantly between individuals, however associated stigma of state benefits; knowledge about entitlement, and individual perception of importance have all been identified as barriers elsewhere[121,124,125,126]. In particular, as described by the Health Belief Model, if individuals do not believe sight loss to be a likely outcome, their perceived level of threat and therefore motivation to take preventative action will often be low, despite in many cases, the perceived level of seriousness of sight loss being very high[127].

Location of services and therefore physical access is also likely to be a significant barrier, particularly for older people who are unable to drive and may rely on others for transport.

Mapping optometrists in Stockport shows very few services in the relatively deprived north, or in the east, which although it is relatively more affluent, has a large proportion of older people[18]. However, domiciliary provision within Stockport is also provided by a large number of providers who cover Stockport but are not based in Stockport and are not therefore represented in the map below.

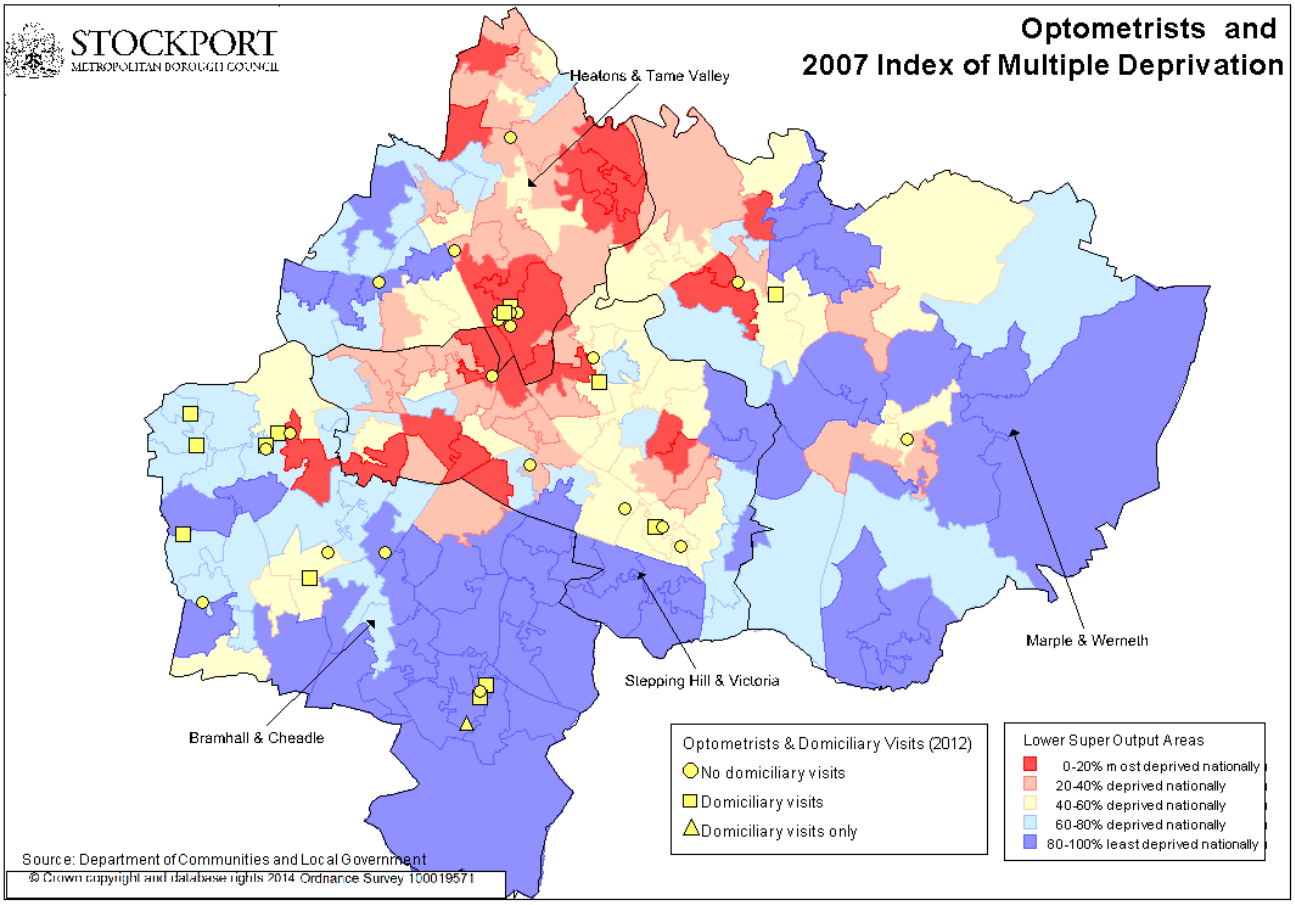


Figure 30: Optometrists in Stockport[111].

Conclusion: GOS data highlights at-risk populations who are not accessing free sight tests, and are therefore more likely to present late with preventable conditions. Mapping of services also indicates relatively less provision in areas of high deprivation. **(Recommendation 8)**

4.11 Service Provision

4.11.1Primary Care and Community Services

Stockport has clearly recognised that many eye care services are best placed in the community rather than within secondary care and the programme of enhanced services delivered through the LOC demonstrates this. Community based programmes are able to be more flexible than those based within secondary care; particularly in terms of increasing their profile within communities; and responding to changing demographics. In addition to General Ophthalmic Services provided through each optometry practice **(4.10.1.1),** enhance services include:

- Glaucoma Repeat Readings Service **(4.7.1.5)**
- Cataract Direct Referral and pre-and post-operative care **(4.9.1.3.1)**
- Diabetic Retinopathy Screening **(4.8.1.4.1)**

There is also the potential for stronger links between community based services and General Practice, providing an opportunity for eye health to sit more firmly within a holistic view of health and wellbeing and health promotion. In addition, cost comparisons indicate that provision within the community provides a more cost-effective model than provision in secondary care (£40- £60) compared to £106 for a first hospital appointment and £48 follow-up[17].

4.11.2Secondary Care

The Ophthalmology Department at Stepping Hill Hospital provides the vast majority of secondary care for Stockport residents (68% of admitted inpatient episodes, 61% of outpatient episodes (April 2012- Feb 14). Of the other providers of care, Manchester Royal Eye Hospital provides the majority (28% of admitted inpatient episodes, 36% of outpatient episodes April 2012- Feb 14)[187]. It should be noted that this picture is changing with an increasing number of private sector providers offering NHS care. Activity levels in secondary care are outlined further in **4.12.4.**

4.11.3Rehabilitation Services & Third Sector support

For those with sight loss that cannot be corrected through medical interventions or with glasses; perhaps the most important services are those focussing on supporting them to adapt and to best utilise their remaining vision.

4.11.3.1 Low Vision Service

The aim of the Low Vision Service, part of the Orthoptic Department at Stepping Hill Hospital, is to assess visual function, identifying the daily tasks and difficulties that the individual faces and providing advice, low vision aids and techniques to support them in their day to day life. This will include techniques for using magnifiers and helping the person to utilise the remaining healthy parts of the eye. For example, for a person who has lost their central vision, scanning across pages

and identifying the next line on a page can be very difficult because large areas of words are obscured. Techniques such as 'Steady Eye Strategy' and 'Tracking' can help to improve the person's ability to read.

In Stockport, patients are initially seen by an Optometrist and then reviewed within 3 months by a trained Orthoptist. A Low Vision Aid Assessment is undertaken in line with the British and Irish Orthoptic Society Low Vision Assessment Competency Guidelines[188].

Although the evidence suggests that Low Vision Services are vital to improving the functional ability of those with sight loss[189], capacity within the service in Stockport is limited. Referrals to the service are only taken directly from GPs or optometrists or from within Ophthalmology and self-referrals are not accepted. Referral criterion for the service is <6/12 corrected Snellen Acuity. However, there is some evidence from the National Welsh Low Vision Scheme to suggest that people require low vision services below this threshold[132] and that functional limitations to a person's daily life as judged by them could be used instead. There are currently no pathways for AMD patients with near normal vision (6/6 -6/9 Snellen Acuity).

The level of new patients seen by the service on a weekly basis equates to approximately 300 new patients per year. This would appear to exceed the level of need when judged based on the number of new registrations seen by Adult Social Care each year (~100) and would suggest that there is ample capacity within the service. However, when the modelled prevalence of visual impairment within Stockport is considered, and alongside for example the incident numbers of AMD cases per year to ascertain a 'truer' picture of visual impairment, it would suggest that current capacity within the service is unlikely to be able to meet true need. In addition to the new patients being seen, the service also need to follow-up existing patients as progressive disease means that different aids may be needed as their vision deteriorates.

A number of recommendations in this HNA focus on increasing identification of those with sight loss, through action to increase uptake of regular eye tests and to increase levels of certification and registration amongst those identified with sight loss. Implementation of these recommendations will/should therefore have a knock-on effect for the level of referrals into services such as the LVA service and capacity within these services will need to be considered.

The service has reported that it is in the process of developing a standard operating procedure, which will include aspects such as waiting times monitoring and patient experience measures. Review of this data at a service level will be vital in ensuring that service user needs are met and will support the business case for increased capacity if identified as needed.

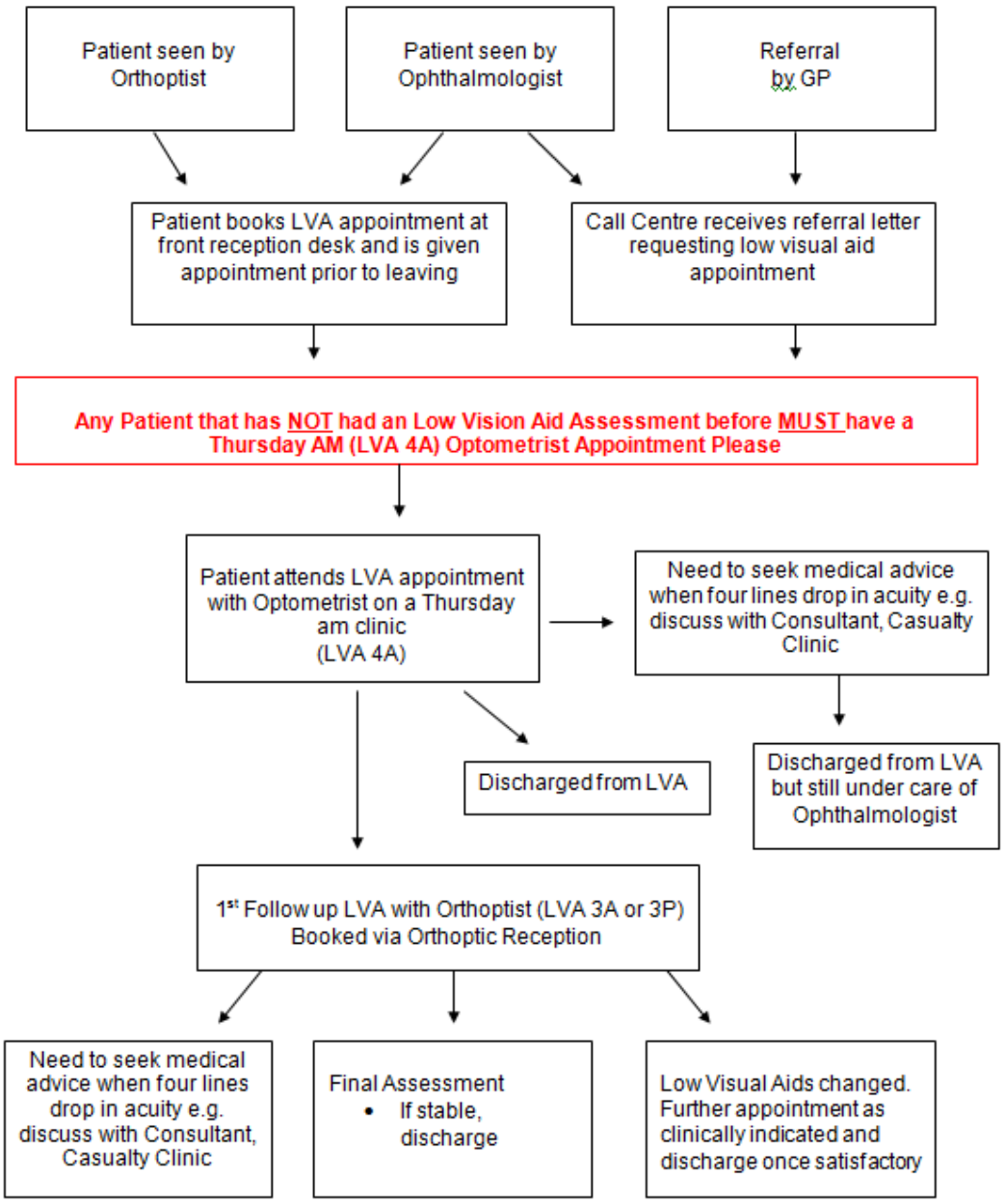


Figure 31: Stockport Low Vision Patient Pathway[190]

4.11.3.2 Adult Social Care

The Equipment, Adaptations and Sensory Loss Team are based within Stockport Metropolitan Borough Council. Within the team they have a Rehabilitation Officer for Visually Impaired people (ROVI) as well as two Occupational Therapists and a number of Equipment & Adaptations officers. In addition to its role in the Registration process **(4.1.2),** this service also plays an important rehabilitation role, signposting and providing services including:

- Information and advice about managing the individual's disability and about other services.
- Provision of simple items of equipment.

- Recommendation for major adaptations
- Handyperson Service who can fit minor adaptations, such as rails and help with minor repairs.
- Provision of specialist equipment for hearing or sight loss.
- Information, advice and training from our Rehabilitation Officers for visual impairment.

4.11.3.3 Third Sector Support

Although it was not possible to undertake a comprehensive review of the third sector support available in Stockport, a number of key local and national services were identified during the researching of the Health Needs Assessment

- Walthew House - an independent Stockport charity which supports people who are blind, visually impaired, deaf or hard of hearing or who have dual sensory loss. An information centre provides signposting to local and national services, as well as support with filling in forms, and the charity provides a not-for-profit resource centre. The charity also runs a programme of social classes and activities, provides a base for a number of groups and societies, and offers visual awareness training for people working with blind and partially sighted people. Walthew House receives 250 visits a week, with an additional 100 visits a month to the resource centre 100.
- The Stockport Branch of the Macular Disease Society (provided at Walthew House)
- Counselling from Beacon Counselling and Lynda Bradshaw, @ Walthew House (funded by a grant)
- Stockport Talking Newspaper (provided at Walthew House)
- Disability Stockport, providing advocacy, emotional, social and practical advice and support for people with disabilities and/or sensory loss.
- DisabledGo – providing access information about shops, pubs, restaurants and other services in Stockport for people with disabilities
- Age UK Stockport
- FLAG (Advice and Guidance) http://www.stockportflag.org.uk/helping-you.aspx
- Blue Badge Scheme – run by the local authority

Many of the national charities do not have a local base in Stockport, but provide services from Manchester.

- Action for Blind People – the closest Action team is based in Eccles (Salford/Manchester), although the nearest counselling provision provided by Action for Blind People is in Liverpool. manchester@actionforblindpeople.org.uk
- RNIB – Although RNIB do not have a local Stockport provision, the RNIB Emotional Support Service (ESS) can provide support over the telephone.
- Guide Dogs – Guide Dogs and My Guide volunteer guiding service - greatermanchester@guidedogs.org.uk

4.11.3.4 Low vision Services Committee (LVSC)

Acknowledging the complexity of low vision and rehabilitation services, and the number of organisations often involved, LVSCs were established nationally with the aim of improving quality and quantity of low vision services and joining up fragmented provision. Additionally, they provide a mechanism for service user input and influence in service planning. They also provide an opportunity for multi-agency collaboration; with representation from health, social care, education and other relevant voluntary sector groups [191]. Key aims of LVSCs include:

- Provision of integrated services;
- Raising awareness of available services and service user involvement in service development;
- evaluation and monitoring quality of provision

Stockport LVSC has been in existence for 14 years bringing together Stockport Macular Degeneration Society, Stockport Adult Social Care Sensory and Disability team and Stockport Stepping Hill Hospital Low Vision Clinic. However, activity in recent years has been limited and plans are in place to re-activate the LVSC. An active and strengthened LVSC could provide the necessary oversight of services and address many of the gaps in provision and unmet need identified in this HNA, as well as providing an opportunity for service user influence over future service provision.

Conclusion: A number of recommendations in this HNA focus on increasing identification of those with sight loss, through action to increase uptake of regular eye tests and to increase levels of certification and registration amongst those identified with sight loss. Implementation of these recommendations will likely have a knock-on effect for the level of referrals into services such as the LVA service and adult social care and capacity within these services will need to be considered further alongside consideration of current patient pathways. **(Recommendation 9)**

4.12 Residents Voice

To inform the development of this HNA, Stockport Council ran a focus group alongside two 'Have Your Say' consultations entitled 'Seeing It My Way' and 'Eye Health in Stockport'. The consultations ran from 4th November 2013 to 1st March 2014. A total of 88 residents participated in the online consultations which were run from www.citizenspace.com[xxiv]. Questions were mapped against the 'Seeing it My Way' outcomes and asked respondents about the impact of eye conditions on daily life and about their experience of services in Stockport. A summary of the responses to the consultation and focus group discussions can be found here: https://stockport-haveyoursay.citizenspace.com/consultation-and-engagement/eye-health - Seeing it my Way

[xxiv] http://www.citizenspace.com/stockport-haveyoursay/consultation-and-engagement/eye-health
http://www.citizenspace.com/stockport-haveyoursay/consultation-and-engagement/sk-eye-health

https://stockport-haveyoursay.citizenspace.com/consultation-and-engagement/sk-eye-health - Eye Health Care
Commissioning

4.12.1Arrangements for the commissioning of eye health services

NHS England (NHSE) – The NHSE Local Area Team commission General Ophthalmic Services and the Diabetic Retinopathy Screening programme for Greater Manchester.

Stockport CCG has responsibility for commissioning

- Secondary Care Services, with most residents accessing Stepping Hill Hospital in Stockport, but also Manchester Eye Hospitals and private access through choice. Within this, hospitals also subcontract provision to other providers
- Enhanced Services – in addition, the enhanced services including Direct Cataract Access referral scheme (and post-operative follow-up); and the Glaucoma Repeat Reading Service and the Minor Eye Conditions Service are all commissioned by the CCG.

Stockport Local Authority provides the Adult Social Care Sensory and Disability Service, responsible for Registration and support assessments.

The Local Optical Committee (LOC), of which all the optometrists in Stockport are members, work to "develop, negotiate and implement local objectives in respect of primary ophthalmic services" and deliver the enhanced services as outlined above[192].

4.12.2Programme Budgeting

The main direct healthcare costs associated with eye care include:

- Primary care
    - Primary ophthalmic services
    - Primary care ophthalmology prescribing.
- Secondary care
    - Inpatient episodes- all admitted ophthalmology activity which takes place in a hospital setting
    - Outpatient episodes - ophthalmology outpatient attendance or procedures[193].

The pattern of spend 2011/12-12/13 has remained similar in Stockport, with spend on Outpatient and Inpatient (elective and day case) being considerably lower compared to the ONS cluster average, and spend on 'other secondary care' and care provided in other settings remaining considerably higher.

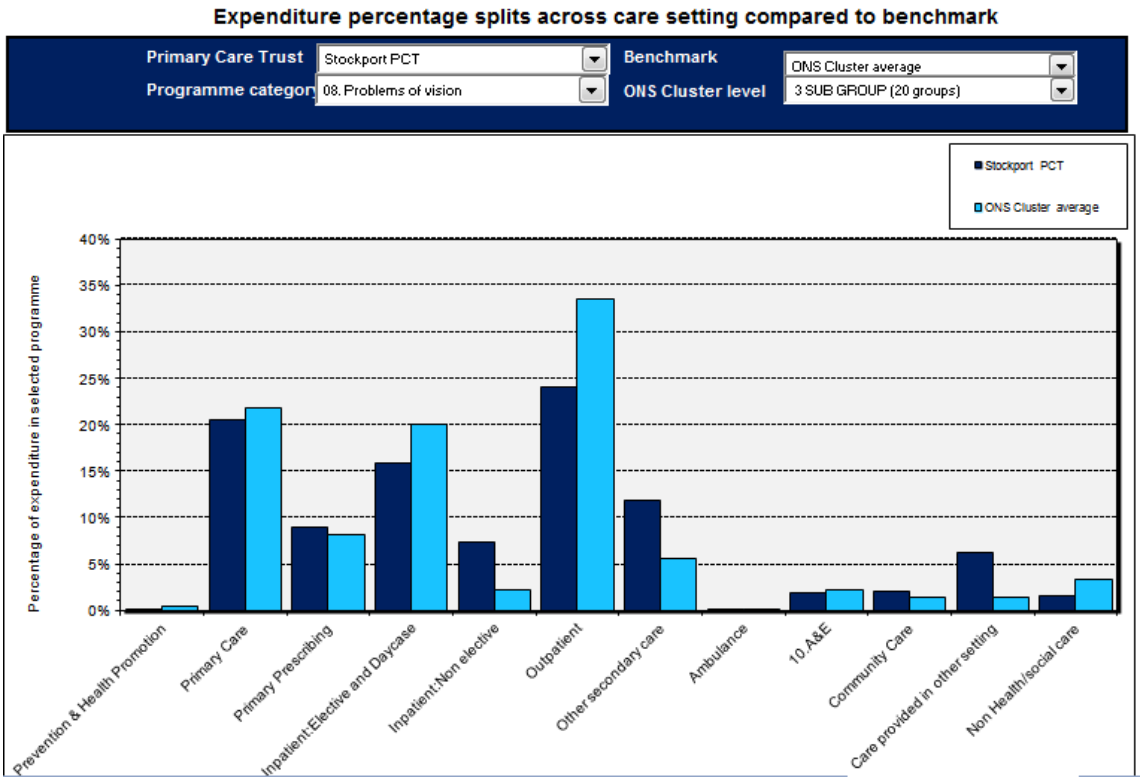


Figure 32: % distribution of expenditure across settings -comparison with ONS Cluster average 2012/13

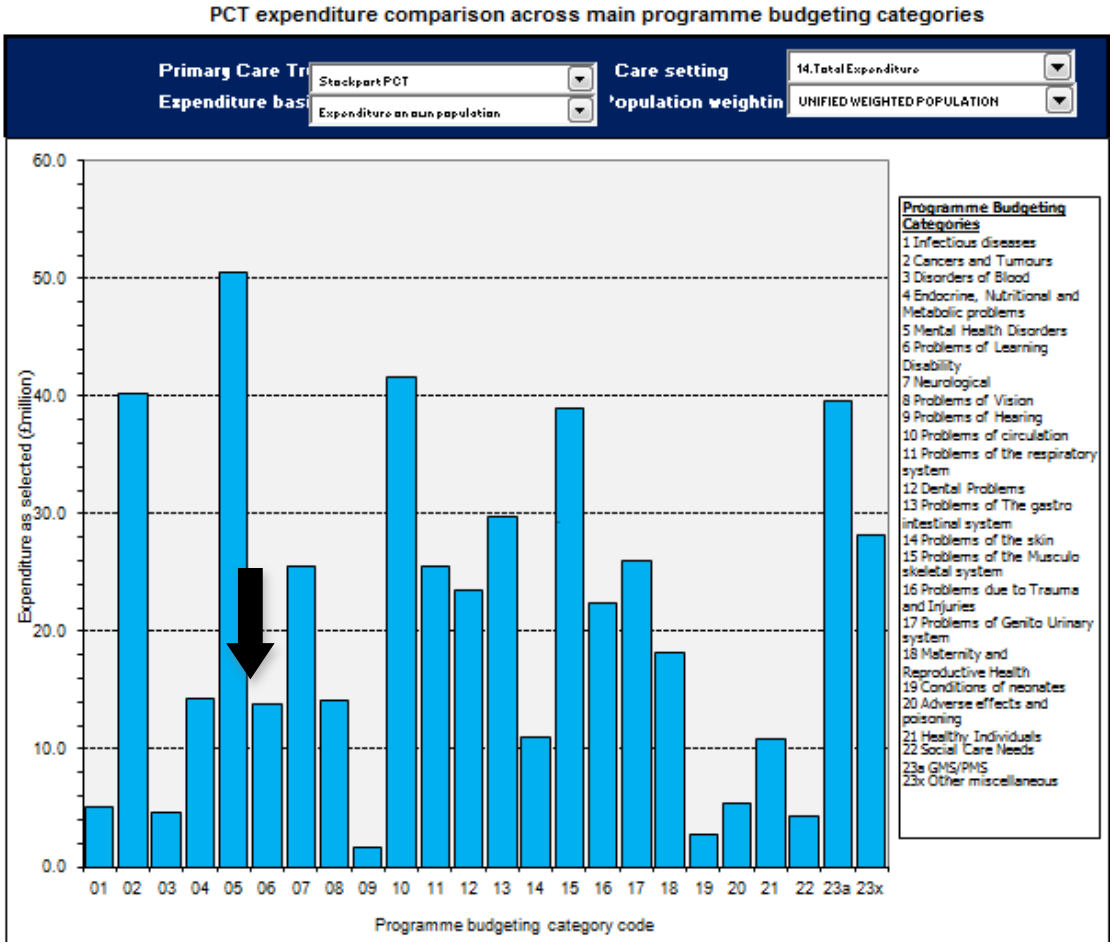


Figure 33: Comparison across all programme budgeting categories (2012/13)

4.12.3Spend and Outcome Tool (SPOT)

The SPOT is a commissioning tool developed to support CCGs in comparing spend and outcome relative to other CCGs in England. Left to right represents relative lower to higher spend and bottom to top worse to better outcomes. The 'Outcome' for Problems of Vision has remained the same over the last two years (2010/11-11/12), but spend has decreased relative to the ONS Cluster, the programme has remained within 1 standard deviation of the ONS cluster average and is therefore not identified as 'requiring attention'.

Ostensibly this is a positive and useful indicator, however further investigation revealed that the outcome measure used as a "reasonably representative" measure of the programme as a whole, was sight tests per 10,000 head of population. It could be argued that this does not provide any kind of useful outcome measure of the Problems of Vision programme, as General Ophthalmic Services (NHS sight tests) are not even commissioned by the CCG. Given this, the SPOT tool should be viewed with extreme caution and in reality cannot provide reassurance around relative spend and outcome in relation to problems of vision.

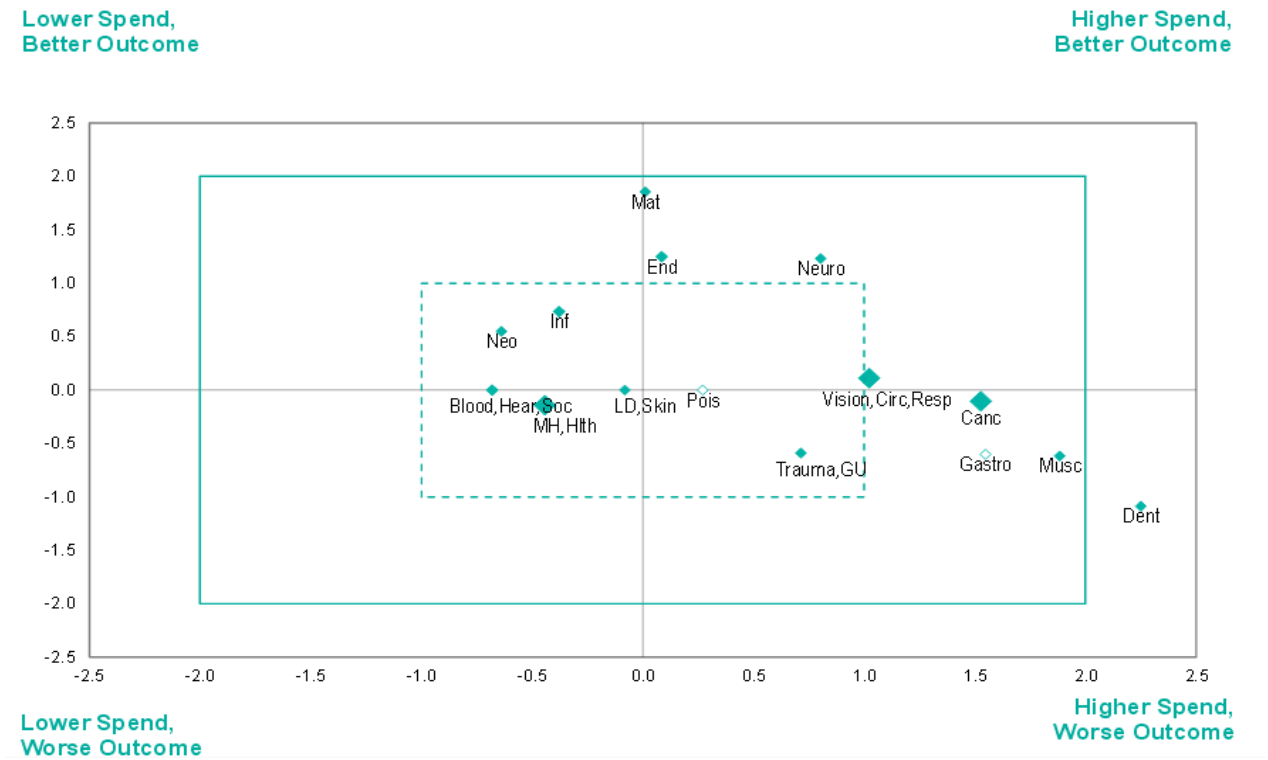


Figure 34: Stockport Spend and Outcome Tool 2010/11

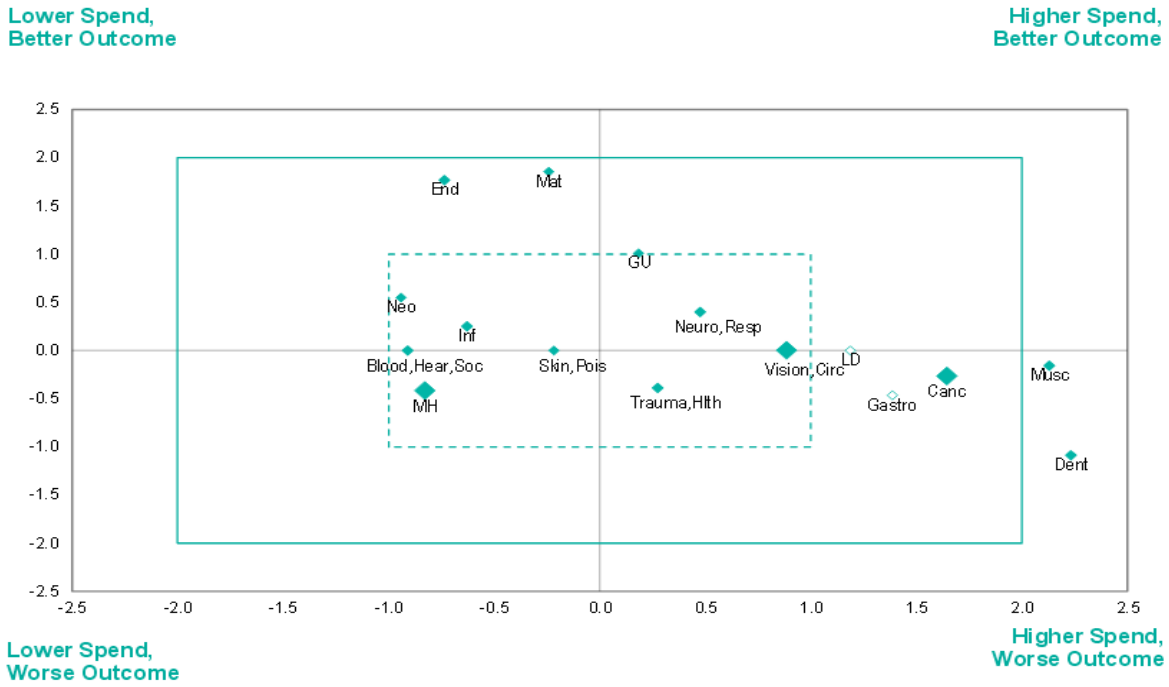


Figure 35: Stockport Spend and Outcome Tool 2011/12

4.12.4Comparative Inpatient and Outpatient Activity

NHS Comparators[23] provides a national comparison of relative activity against Programme Budget (PB) category (Problems of Vision) or by Specialty category (Ophthalmology). Both comparisons are shown here as although there is significant overlap between the two, the definitions for what is coded under each are slightly different.

4.12.4.1Inpatient Activity – 'Ophthalmology'/ Problems of Vision

The graphs below indicate that activity (blue bar) is significantly above the national average (black) and just below the Strategic Health Authority (SHA) average (light blue).

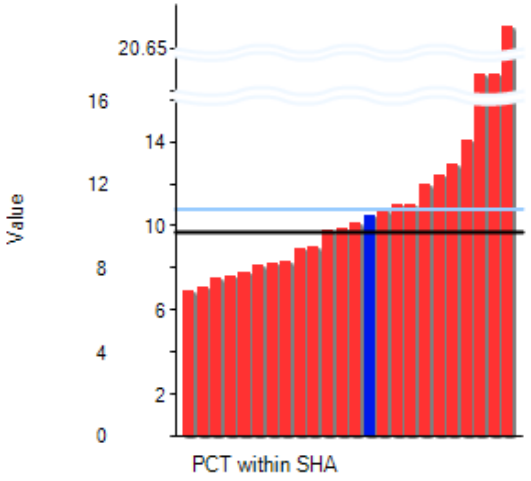


Figure 36: Inpatient activity by PB (Problems of Vision)[23]

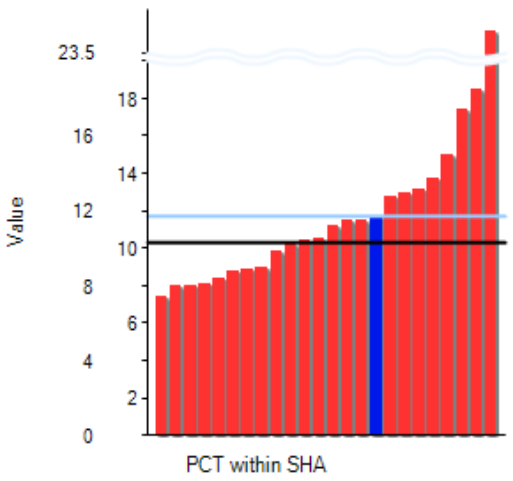


Figure 37: Inpatient activity by speciality (Ophthalmology) [23]

The level of inpatient activity within a population is influenced by a huge number of variables, including level of morbidity in the population, effectiveness of management in primary care and the level of private patients. However, given the very high proportion of inpatient admissions within this category attributable to cataracts procedures, it is very possible that in this case, the higher than national average levels reflect significant rationing of cataract surgery nationally (supported by RNIBs research[118]), and a lack of restrictive surgery threshold in Stockport, it has also been identified through local analysis that Stockport has higher levels of inpatient admission across the board than comparators[15].

The comparison of spend grouped by Programme Budget and Speciality Code indicates that Stockport's (blue) spend on inpatient admission related to eye health increased steadily 2010-2013, from a considerably lower baseline compared to the SHA (light blue), up to a comparable level, and is now at a level considerably higher than the national average (black).

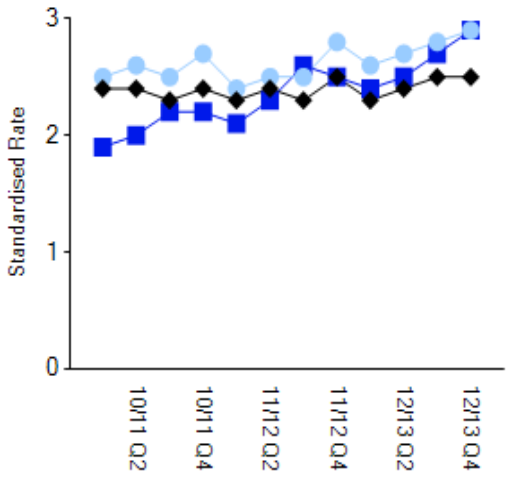


Figure 38: Time Series - Problems of Vision[23]

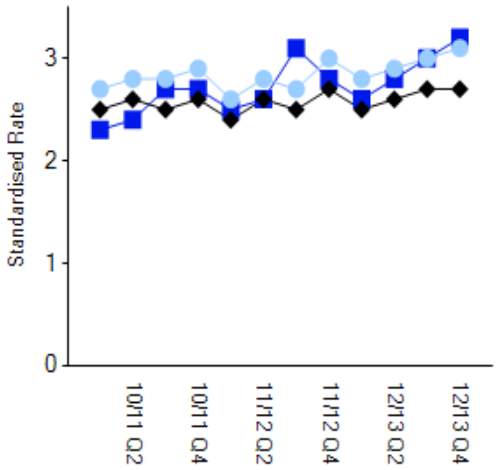


Figure 39: Time Series - Ophthalmology[23]

4.12.4.2 Outpatient Activity – 'Ophthalmology'

A lower than SHA average rate of Outpatient attendances per 1000 population could be the result of a large number of variables, and again, will certainly be the combined influence of multiple variables. However it would be expected that at least a proportion is due the enhanced services that Stockport has in place diverting care away from Secondary care (including the Glaucoma Repeat Readings Service, and cataract post-operative follow-up service). Spend over time on outpatient episodes tracks closely to the SHA and national averages.

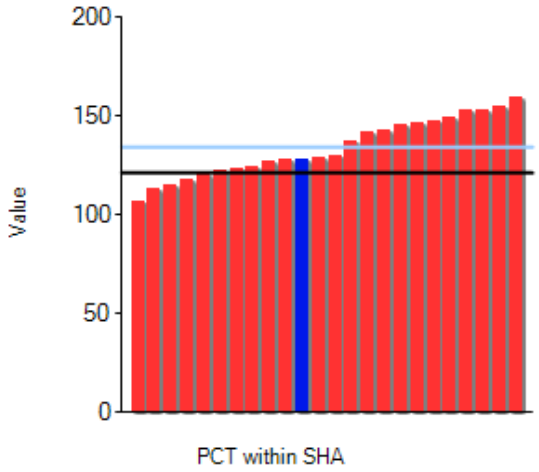


Figure 40: Total Outpatient Attendances per 1000 Population (2012/13) [23]

4.12.4.3 Caveats to NHS Comparators data

- Populations are based on the population registered on GP Practice lists, which may not be up to date and does not directly compare to many other data sets which generally use ONS population estimates.
- Specialities are grouped to enable comparison so do not equate directly to main specialties or treatment functions (e.g. ophthalmology/paediatric ophthalmology/medical ophthalmology have all been combined).
- In some cases, numbers are small and variation may not therefore be statistically significant
- Small numbers of patients admitted a large number of times will appear to represent large numbers of patients
- Local service organisation will impact on coding and may result in different services represented in different ways[23]

5 Conclusion and Recommendations

This section recommends changes to practice and policy direction to address the gaps identified throughout this HNA, providing an appraisal and synthesis of the evidence base to support commissioners/policymakers in making informed, transparent decisions.

5.1 Recommendation 1: Increase reporting of CVI data for epidemiological analysis

There are clear opportunities to improve the certification process in Stockport, particularly in relation to the CVI data submitted to Moorfield's Eye Hospital.

Recommendations:

- Undertake awareness raising amongst professionals on the public health value of reporting certifications data for epidemiological analysis
- Establish local annual audit cycle of CVI data reporting
- Consider commissioning levers if audits indicate data not being reported

Key Factor	Confidence in evidence/ conclusions	Appraisal of evidence
Quality of evidence	Low	The extent of underreporting or reporting bias cannot be established, but reported figures are lower than numbers registered with Adult Social Care indicating that underreporting is definitely occurring. The impact of this underreporting has not been ascertained, however it is inferred that improvements could be made to service provision and commissioning if relative prevalence by condition was known. NICE[44] and RCO[65] recommend regular audits of CVI data.
Balance of burden, &benefit vs. harm	High	No harm of intervention identified, significant benefits likely as will inform local epidemiological understanding, service planning and going forward, service and impact evaluation.
Values/ preferences of	Low	Reasons for lack of reporting not well understood. Professional education to improve understanding of purpose of submitting CVI data for epidemiological analysis may address this **(Recommendation 2)**

stakeholders		
Resource use / benefit	Medium	Limited administrative resource should be required as additional copy of CVI can be sent to Moorfields at the same time as submitted to Adult Social Care.
Feasibility of translation	High	Moorfields report that in the majority of areas nationally, reporting is good, indicating feasibility.
Implementation at systems level	Medium	Will require review of administrative processes. Reporting to Moorfields is not mandated, however is strongly encouraged by RCO[65].
Socio-political considerations	Medium	Will require understanding from commissioners that initial increases in certifications, even from preventable sight loss should be seen as a positive sign, in that they are being recognised and recorded appropriately.

Table 15: Critical analysis of evidence to support recommendation 1

5.2 Recommendation 2: Establish local levels and drivers of under-certification and registration

National evidence[27,65] suggests that a lack of professional (and potentially public) knowledge and understanding about when to certify a patient, contributes to observed levels of under-certification and registration and therefore presents an opportunity for intervention.

Conditional recommendations:

- Consider including outcome of certification (i.e. whether person was offered and took up registration) as part of CVI audit **(Recommendation 1)** to strengthen local understanding of drivers of under-certification/registration.
- Consider commissioning a local study to better understand local professional knowledge about purpose of certification and when to certify, as well as the benefits of certification and registration; and to explore public perceptions and attitudes to registration to better understand local barriers.
- Consider utilising tools developed by the RCO: http://www.rcophth.ac.uk/page.asp?section=165&sectionTitle=Certificate+of+Vision+Impairment

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	There is general consensus that significant levels of under-certification and registration exist nationally with most published studies supporting this conclusion[128, 129, 130, 131,] (medium and low quality GRADE). No robust evidence to indicate whether local certification and registration levels match actual prevalence as data and reporting are known to be poor. However, triangulation with other data sources such as the GP Survey seems to indicate that Stockport has similar prevalence rates to England and therefore similar levels of under-reporting would be plausible. **Due to lack of professional knowledge?** Some published evidence to suggest considerable levels of inappropriate certification and registration. Small scale studies have found poor intra- and inter-observer agreement amongst consultant ophthalmologists with regards to eligibility[129] with up to 40% of persons certified/registered innapropriately[130]; and 70% of persons using low-vision

		rehabilitation services, with visual acuity above the threshold for certification/registration[132] (low quality GRADE). **Due to lack of public awareness/understanding?** Limited qualitative research (very low quality GRADE) has focussed on the experience of those patients who have already been certified/registered, but there is a lack of evidence exploring whether patients actively decline certification/registration if offered.
Balance of burden, and benefit vs. harm	Medium	There are clear benefits to certification/registration and strong ethical arguments (every eligible person has a right to choose to be registered). However, similar ethical arguments exist around an individual's right to choose to not be registered, and these rights should be given equal consideration by ophthalmologists.
Values and preferences of stakeholders	Medium (need local experience)	No local indication of stakeholder views. Consistent evidence from two national qualitative reports[27,65] by RNIB and RCO where ophthalmologists reported; • Lack of understanding about the difference between certification and registration • Reported uncertainty around the right point at which to certify long-term conditions (Diabetic Retinopathy, Glaucoma) and conditions where treatment means impairment varies (AMD) • Seeing certification as an 'end-of-process' (to be pursued following end of treatment options), not a route to services • Poor awareness of the benefits of certification/registration • Incorrect assumptions about patient views of certification and whether patients 'need' to be certified. Qualitative feedback from the Macular Disease society also indicated eligible individuals were not offered choice of certification and in some cases, were actively discouraged[133]
Resource use / benefit	Not possible to quantify	Significant resource implications for Adult Social Care if numbers of registrations increase considerably, but significant potential benefit of registration for those who would otherwise would not receive support.

Feasibility of translation	Medium	Certification and registration processes are complex and under-registration appears to be a national issue, indicating significant challenges in ensuring the right people are offered certification/registration.
Implementation at systems level	Medium	Systems already in place for certification and registration processes – training and awareness-raising could be undertaken at service level and as part of individual CPD.
Socio-political considerations	Medium	Commissioners/policymakers will need to understand that initial increases in certification/registration (even from preventable conditions) should be seen as a positive sign, and indicate that previously unidentified cases are being certified/registered.

Table 16: Critical analysis of evidence to support recommendation 2

5.3 Recommendation 3: Establish local costs and benefits of an ECLO post

It has been suggested that ECLO's may improve the certification/registration process and have a positive impact on patient experience.

Conditional recommendation:

- Consider costs and benefits of funding an ECLO post in Stockport informed by the UK micro-costing study[67]

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	Despite high profile endorsement[42, 134] RNIB-led campaigns and lobbying[68], there is a dearth of high quality evidence looking at the cost-effectiveness or impact of ECLOs; however qualitative studies report positive feedback from professionals and patients (see stakeholder views).
Balance of burden, and benefit vs. harm	Low	Lack of evidence makes it difficult to balance public and professional stakeholder views with impact on outcomes. Formal evaluation was unable to establish a significant improvement on quality of life indicators but was restricted by methodological weaknesses.[135]
Values and preferences of stakeholders	Low (conflicting local and national evidence)	A published qualitative telephone interview study with health professionals and patients (n=43/46) (low quality GRADE) suggests that avoidable delays in the certification process can be mitigated by ECLOs who can better navigate the complex processes[56]. **Grey literature:** The formal evaluation of the ECLO role[135] utilised validated questionnaires and in-depth interviews n=8-84. A high proportion of professionals (90%) thought ECLOs improved patient experience, and 100% thought ECLOs made a positive difference to further patient management. Additionally, an RCO survey of ophthalmologists[65] reported a need for ECLOs in relation to easing pressure on consultant time. An RNIB patient experience questionnaire[136] (n=225) reported a high proportion (66%-90%) of people supported

		by an ECLO described increased awareness of services, increased understanding of their condition and better understanding of their own role in managing their condition, as well as space to discuss their feelings about diagnosis with reduced anxiety. However in local consultation 'Seeing it My Way' (very limited sample n=14), the majority of respondents reported that they understood their eye condition, had access to support and information if needed and had somebody to talk to about their eye condition. The majority obtained information from their optician or hospital doctor and some accessed support through local groups such as the local AMD Group.
Resource use / benefit	Low	UK micro-costing study (low quality GRADE) surveyed a third of the current ECLO workforce to establish cost, activity and impact – on average the cost per patient contact was found to be £17.94, although this varied significantly depending on context and was based on self-reported activity diaries[67].
Feasibility of translation	Medium	RNIB report that 90% of the ECLO posts delivered by RNIB are at risk of funding withdrawal in 2014/15 due to short-term funding arrangments[137]. This would indicate that elsewhere, local authorities and CCGs are struggling to make the case for these posts.
Implementation at systems level	Low	ECLO delivery models vary significantly and therefore a number of structures and funding arrangements could be considered[135].
Socio-political considerations	Medium	The RCO consider the role to be an "integral part of the effective delivery of Macular Disease Clinics"[42]; and the UK Vision Strategy-Commissioning for Eye care Guide recommends that CCGs build ECLOs into service specification[134].

Table 17: Critical analysis of evidence to support recommendation 3

5.4 Recommendation 4: Improve early identification and intervention for those at risk of falls due to sight loss

The impact of falls within the older population in Stockport is likely to be sizeable. Reducing avoidable sight loss will in itself positively impact on the burden of falls. However, early identification and intervention for those at-risk of falls due to sight loss is also necessary. Further investigation into provision of falls prevention for those with sight loss through local services is required (hence conditional recommendations).

Conditional recommendations:

- Visual Acuity testing to be undertaken for high-risk falls populations through:
  - Inclusion as an indicator in the Integrated Care System
  - Named GP responsibilities for over 75s to include 'recommending a sight test where one has not been undertaken within the last 2 years or where indicated' and 'checking that visual acuity is 6/12 or better if still driving'.
- Visual Acuity testing to be included in multi-factorial falls risk assessments for recent fallers (may require community optometry support). Visual acuity should be checked and the date of last sight test confirmed with a recommendation for a full GOS sight test if indicated.
- Review referral routes to falls clinic to ensure all those at-risk of or who have recently fallen receive a falls risk assessment (to include visual acuity testing). (e.g. GP, Optometrists, Ambulance service, secondary care)[138].
- Home hazard assessments and safety training to be offered to all those with partial sight and blindness (if not already in place)
- Utilise general awareness raising resources for health and social care professionals such as those developed by ProFaNE, which highlight the link between visual impairment and falls http://profane.co/vision-and-falls-prevention-home-page/

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Medium	NICE recommend all older people presenting for medical attention as a result of a fall should be offered a multi-factorial falls risk assessment, to include a visual assessment[139] (Medium quality GRADE). However, a national audit indicated low levels of inclusion of visual acuity assessment[140], and qualitative research reported assessments rarely involved visual acuity tests using a Snellen chart, with practitioners citing a lack of confidence in using these tools[138]. There is high quality evidence (GRADE) that home hazard assessments and safety interventions can reduce the risk of falls in those with sight loss, particularly when delivered by an occupational therapist[141,142]. There is contradictory evidence to suggest wearing glasses to correct refractive error reduces falls, and some to suggest sudden changes in prescriptions may contribute to falls[143] (medium quality GRADE). There is inconclusive evidence to suggest early cataract surgery can reduce the rate of falls[144] (High quality GRADE).
Balance of burden, and benefit vs. harm	Medium	No harm identified in any interventions considered, although sudden changes to prescriptions may be associated with increased risk and optometrists should be aware of this[143].
Values and preferences of stakeholders	Medium	Anticipating Future Needs consultation"[145] focusing on the health needs of Older People in Stockport (structured interviews n=22). Fear of falling was cited as an obstacle to going out, and falls and the resultant restriction of mobility was mentioned a number of times as a significant health need.
Resource use / benefit	Low - Not possible to	FSUK[2], calculates the direct healthcare cost per fall as just under £675[xxv]. Application of this to the number of estimated falls in Stockport directly attributable to visual impairment indicates that in 2014, direct healthcare costs

[xxv] Calculations of cost should be taken as a significant under-estimation, as the FSUK model only includes secondary healthcare and ambulance costs and the vast majority of falls are not reported and do not result in hospital admission, despite likely costs to primary care. The wider costs to society, cost of the unpaid carer time, and the impact on the confidence of fallers, which has a knock on effect on social isolation are also not recognised in this calculation.

	establish cost-benefit.	of avoidable falls was approximately £30K (very conservative estimate). However, NICE estimate the cost of falls to the NHS and local authorities to be as high as £2490 per visually impaired person[146]. An analysis conducted by Novartis[147] (manufacturer of ranibizumab for AMD) suggested that injuries amongst patients with active Ophthalmic disorders were costing Stockport an additional £812 per 1000 population in inpatient costs when compared to the national average (£2,166 compared to £1,354)[xxvi], although this may be due to higher inpatient admissions in Stockport across the board (as discussed previously).
Feasibility of translation	n/a	Options for intervention carry different translation requirements - feasibility will need to be considered further depending on chosen intervention.
Implementation at systems level	Low – further investigation needed	The Falls clinic at Stepping Hill Hospital provides multi-factorial risk assessments to those who have fallen. However how visual assessment is addressed was not identified as part of this HNA, nor were referral routes into the service. The Adult Social Care Disability and Sensory Loss Team report that they undertake assessments which include support from a Rehabilitation Officer (Visual Impairment) and the handyperson service who can carry out minor repairs. However, further insight into the extent of hazard assessments and home safety training as part of this work is needed.
Socio-political considerations	High	Reducing falls would also contribute to the PHO Indicator on falls and is a key priority given the ageing population. Recommendations align to Stockport's focus on 'Integrated Care'.

Table 18: Critical analysis of evidence to support recommendation 4

[xxvi] The study looked at the Hospital Episode Statistics for admissions relating to injury where there was a diagnostic code of ophthalmic disorder recorded and applied this data to the PbR National Tariff.

5.5 Recommendation 5: Identify and support people with sight loss at risk of low wellbeing or depression

People living with sight loss in Stockport are at increased risk of depression and low wellbeing but a lack of monitoring may mean they are not routinely identified or supported. There is a lack of evidence to support recommendations around cost-effective interventions to improve wellbeing or identify those at risk of depression, despite demonstrable evidence of need. However if not already in place, consideration should be given to including wellbeing scores in assessments used by social care and NHS eye health services. Information on wellbeing would inform early identification of those at increased risk. Implementation of **Recommendation 8** and **Recommendation 2** around improving the identification of partial sight and blindness, and increasing uptake of registration may have a positive impact on wellbeing indicators, by providing an opportunity for issues around social isolation to be identified, and for signposting to local support groups.

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	A systematic literature review[148] reported a scarcity of evidence (including grey literature) evaluating interventions to prevent/reduce or identify depression/low wellbeing in people with sight loss. No evaluations of anecdotally important interventions were identified, such as peer support groups, social activities, rehabilitation or support with employment. A small number of studies, some using validated measures, have evaluated counselling interventions, and demonstrated positive impact on outcome measures. However, as is often the case for interventions reported in grey literature, the sample sizes of these studies were very small and not powered to produce statistically significant results, nor did their methodologies generally attempt to control for bias.
Balance of burden, and benefit vs. harm	Low	Potential for significant harm if no action taken, however no evidence to support recommendations around interventions.
Values and preferences of stakeholders	Low	National stakeholder feedback in relation to the role of the ECLO has suggested that contact with an ECLO may improve patient experience of registration by providing essential emotional support at the point of diagnosis[56] and reduced anxiety[136].

		Open-ended interviews with people with sight loss from a UK cohort study (n=100, stratified random sampling), cited issues such as loneliness, feeling 'cut-off', and being unable to communicate effectively, for example by waving at people on the street as having a significant impact. Many also highlighted the need for support and counselling at the point of diagnosis[149].
Resource use/benefit	n/a	Lack of evidence to support recommendations around cost effective interventions.
Feasibility of translation	n/a	As above
Implementation at systems level	n/a	As above
Socio-political considerations	n/a	As above

Table 19: Critical analysis of evidence to support recommendation 5

5.6 Recommendation 6: Strengthen link between smoking cessation messages and eye health.

The link between smoking and sight loss has not yet been exploited in Stockport; the opportunity and the evidence therefore exist to suggest that integration of these messages could be powerful – both in terms of population health and in terms of reducing health inequalities. Messages should particularly target those at greatest risk, for example relatives of those with AMD.

Recommendations:

- Introduce information about causal association between smoking and blindness into existing smoking cessation advice.
- Further investigate extent to which local eye-care professionals explore smoking status/provide smoking cessation advice/signposting.

Conditional Recommendations:

- Consider providing smoking cessation training for eye-care professionals
- Consider undertaking a cost-benefit analysis of a smoking cessation campaign incorporating messages around sight loss.

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	A number of cross-sectional surveys (low quality GRADE) indicate that knowledge of smoking as a risk factor for sight loss is low (as low as 5% amongst teenagers)[150,151]. There is consistent evidence (low quality GRADE) that a fear of blindness is an effective incentive to quit smoking, equating to fear of lung cancer, stroke and heart disease in terms of motivation[127], and may be a particularly strong driver amongst the 25-39 age-group[151]. Despite this, in a recent UK cross-sectional survey of eye care professionals, generally optometrists(n=1,468, low quality GRADE), only 1 in 3 regularly assessed smoking status or provided smoking cessation advice[152]. Findings from a US pilot suggested this may be due to a lack of appropriate knowledge and training[153]. International reports that a journal article on smoking and blindness prompted significantly more calls to a Quitline[154] and a smoking cessation TV campaign linking smoking with sight loss in Australia was 'considered to be

		more successful' than others[155] are amongst the few direct interventions reported. A description of a UK multi-factorial research study and campaign, which resulted in the production of a patient information leaflet, and professional education resources stops short of an evaluation of impact[156]. A large cross-sectional survey (n=17,472, low quality GRADE) demonstrated a positive impact on knowledge of the causal link between smoking and blindness following health promotion campaigns[157]. However, further research is needed to determine whether increased knowledge and associated intention to quit are likely to translate into behaviour change.
Balance of burden, and benefit vs. harm	High	The potential impact on reducing preventable sight loss is further built on by the positive impact of reducing levels of smoking on wider health, the combination of which would likely result in a synergistic effect on health inequalities. No potential for harm was identified through the evidence review.
Values and preferences of stakeholders	Low	Local stakeholder views, particularly from optometrists, perhaps facilitated through the Local Optical Committee on attitudes towards providing smoking cessation advice would help inform decisions around interventions.
Resource use / benefit	Medium	Resource requirements could be kept minimal through integrating these messages with existing smoking cessation messages delivered through health promotion practitioners, particularly the stop-smoking service; and potentially providing training for optometrists to support smoking cessation messages. A larger scale health promotion campaign would likely require greater resources.
Feasibility of translation	Low	Would need to be informed by further insight into attitudes of optometrists/smoking cessation advisors.
Implementation at systems level	Medium	Would likely be implemented 'piggy-backed' onto existing systems.
Socio-political considerations	High	Integrating these messages is also a priority action in the UK vision strategy providing a potentially supportive political context and is in line with Stockport's wider Health and Wellbeing strategy. Positive impact on health inequalities is a key political driver.

Table 20: Critical analysis of evidence to support recommendation 6

5.7 Recommendation 7: Investigate variation in uptake of Diabetic Retinopathy screening

Equal access to and uptake of screening are essential; geographic variation in screening locations and relatively high levels of exclusions/non-participation in screening may mean Diabetic Retinopathy in some groups within Stockport is identified late.

Recommendations:

- Review Diabetic Retinopathy screening exclusion rates following alignment of screening processes across the Greater Manchester Programmes. Undertake further investigation if levels of exclusion from screening for Stockport patients continue to be comparatively higher.
- Undertake further analysis of screening uptake in areas of higher deprivation and undertake qualitative assessment of barriers to explore whether lower availability of community-based screening is a barrier to uptake. Analysis of screening uptake by protected characteristics including ethnicity would also be of value to determine equity in uptake.

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	Work is ongoing to ensure data is aligned to enable accurate assessment of outcomes for Stockport patients within the Greater Manchester screening programme: levels of exclusion are currently higher compared to other Greater Manchester programmes, making it difficult to judge accuracy of uptake data. Equity data is not available on uptake of Diabetic Retinopathy screening, however the Diabetic Retinopathy screening programme offered through optometrists will be less accessible to those living in areas with fewer optometrists. In Stockport, this includes areas of high deprivation. Further investigation is required to establish whether geographic variation in community optometrists creates a barrier to access in areas of higher deprivation, and therefore whether mobile-screening or a mixed model of mobile and fixed screening sites may be justified.
Balance of burden, & benefit vs.	Low	Potential for harm if people are being excluded from screening inappropriately.

harm		
Values/preferences of stakeholders	Low	No local views available. Qualitative investigation of perceptions of access and identified barriers to screening would inform recommendations around an intervention.
Resource use / benefit	Low	Minimal additional resource implications if uptake is increased for existing provision. However, mobile screening sites would require additional funding. A cost-effectiveness analysis of a systematic screening programme which included a supplementary mobile screening unit to provide screening within GP practices, reported the cost to be £209 per true positive case[158].
Feasibility of translation	Low	Not known, however mobile screening sites have been successfully implemented elsewhere and are a routine component of the national screening programme.
Implementation at systems level	Low	As above
Socio-political considerations	Low	If exclusion is systematically higher amongst more deprived populations, it will negatively impact on health inequalities.

Table 21: Critical analysis of evidence to support recommendation 7

5.8 Recommendation 8: Improve uptake of regular sight tests

GOS data highlights at-risk populations who are not accessing free sight tests, and are therefore more likely to present late with preventable conditions. Mapping of services also indicates relatively less provision in areas of higher deprivation.

Recommendation:

- Utilise existing structures and contact with health services to raise awareness of the importance of regular sight tests, particularly amongst groups at greater risk of preventable sight loss, e.g. through NHS Health Checks for >40s, the Integrated Care System and Named GPs (as per **Recommendation 4**); and link to work being undertaken across Greater Manchester as appropriate through NHS England and the Local Eye Health Network (LEHN).

Conditional recommendations:

- Further explore uptake of GOS, particularly in relation to residents on JSA, claiming income support and tax credits; and examine reasons behind this e.g. barriers to access – knowledge/physical access due to location of services/perceived threat.
- In relation to those areas of Stockport currently poorly served by optometry practices; particularly in areas of high deprivation; consider whether satellite clinics or enhanced services could be delivered through existing healthcare provision such as GP practices (as per **Recommendation 7**), or whether optometry practices could be encouraged to open in areas of low provision.

Key Factor	Confidence in evidence /conclusions	Appraisal of evidence
Quality of evidence	Low	No data is available on the demographics of those taking up NHS eye tests, however national cross-sectional surveys (low quality GRADE) indicate BME residents are less likely to have regular sights tests or be registered as blind/partially sighted than white residents[159, 130]. Data from epidemiological models indicates potentially very high levels of undetected sight loss within the Stockport population **(4.1).** Consistent qualitative evidence describes the barriers to uptake of sight tests in high-risk groups (low quality GRADE)[121-126]. However very little evidence evaluating interventions to increase uptake exists: • Evaluation of an Australian health promotion campaign reported a significant increase in the number of

		targeted adults taking up sight tests[157] (low quality GRADE). • In contrast, a UK study (low quality GRADE) showed that although a health promotion campaign improved awareness of glaucoma, it did not significantly impact on health-seeking behaviour (uptake of sight tests)[160]. • A systematic review and two cluster randomised trials (high quality GRADE)[161] have found that even where increased uptake is achieved, improved clinical outcomes do not automatically follow. Behaviour change theory dictates that in order to achieve behaviour change, messages will need to be sensitive to the target audience and tailored to align with theoretical drivers of health behaviour (e.g. perceived risk/relevance and social norms).
Balance of burden, and benefit vs. harm	Low	Although recent commentary has suggested that screening undertaken by optometrists nationally should be better regulated to reduce unnecessary referrals to secondary care/false positives[162]; Stockport has gone some way to mitigating against this through its local arrangements for Glaucoma Repeat Readings and Cataracts Direct Referral.
Values/preferences of stakeholders	Low	Local views of target groups should be sought to establish barriers to access and inform any proposed interventions, ensuring health promotion messages are appropriately targeted.
Resource use / benefit	Medium	Utilising existing structures for promotion of uptake should not require additional resource. Cost-effectiveness modelling from FSUK of a hypothetical educational campaign[2] to increase regular eye tests for the older population (≥60 years) reported a cost of £24,200 per DALY avoided. The modelling assumed a cost of £0.054 per person targeted. Based on 2014 mid-year population projections for Stockport, assuming the cost per person targeted remained the same, an equivalent campaign could cost approximately £3800 in Stockport (not accounting for inflation of prices since 2008) and may result in a 14.5% increase in the number of people who visited an optometrist during the following year.
Feasibility of translation	Low	Learning from other CCGs/NHSE Area teams who have successfully improved uptake should be sought.
Implementation at systems level	Medium	Systems exist within local structures to undertake targeted promotion, particularly in relation to utilising named GPs for >75s as per **Recommendation 4** and Health Checks.
Socio-political considerations	Medium	Targeting high-risk groups, particularly older people and those on income support should positively impact on health gradients.

Table 22: Critical analysis of evidence to support recommendation 8

5.9 Recommendation 9: Review rehabilitation services and patient pathways across ophthalmology, adult social care and the third sector

A number of recommendations in this HNA focus on increasing identification of those with sight loss, through action to increase uptake of screening and regular eye tests **(Recommendation 7, Recommendation 8)** and to increase levels of certification and registration amongst those identified with sight loss (**Recommendation 2**). Implementation of these recommendations will likely have a knock-on effect for the level of referrals into services such as the LVA service and adult social care and capacity within these services will need to be considered further alongside consideration of current patient pathways.

From the information available to complete the Health Needs Assessment, it was not possible to ascertain the extent to which the three key rehabilitation elements (low vision services, adult social care and third sector services) work together; or the ease with which individuals access services and move between them. Anecdotal reports indicate that links have been established over the last 2 years and there is active work being undertaken to strengthen these links for example through quarterly meetings; however a formal review of the patient pathway may help to elucidate the impact and effectiveness of this work.

It is also difficult to draw conclusions on the level of more generic support available in an accessible way for people with visual impairments, for example in relation to employment. The conditional recommendations made in relation to rehabilitation services reflect this uncertainty over local arrangements.

Conditional Recommendations:

- Consider further mapping of third sector provision, using the Seeing it My Way Outcomes[xxvii] to consider whether adequate support exists for self-management and employment, and wider health and wellbeing.

[xxvii] Available: http://www.vision2020uk.org.uk/ukvisionstrategy/page.asp?section=301&sectionTitle=Seeing+it+my+way

- Consider reviewing rehabilitation services (across both Ophthalmology and Adult Social Care), using an appropriate framework to identify any gaps in service/capacity and inform improvements to patient pathways. As part of the Low Vision Service Model Evaluation (LOVSME) project, RNIB developed a Low Vision Services Self Assessment Tool[xxviii] for assessing the quality of care offered by providers of low vision services, the assessment can be undertaken collaboratively across both aspects of Rehabilitation services and may provide a useful tool to inform service development going forward. There may be merit in considering the provision of rehabilitation services for the visually impaired in the broader context of services for people with disabilities, particularly given the level of comorbidity amongst those with partial sight and blindness identified in 4.2.3. The co-location of services such as social care, third sector support and low vision services would also warrant consideration.
- Expedite plans to re-establish the LVSC, particularly as this would provide an opportunity for service user influence on service delivery and planning.

[xxviii] Available at: http://www.rnib.org.uk/services-we-offer-advice-professionals-health-professionals/eye-clinic-staff

6 Discussion

The demonstrable burden of sight loss, future projections, and the evidence base for population-level prevention and intervention presented in this HNA demonstrate the importance of sight loss as a public health priority in Stockport, and more broadly for the UK. This HNA has identified a number of service innovations in Stockport which have brought care closer to home for people with sight loss; however a focus on preventative action and minimising the wider impact of sight loss is needed as set out in the recommendations.

There is a clear link between sight loss and persisting health inequalities and as such, preventative sight loss interventions have the potential to positively impact on the health gradient in Stockport. However interventions need to be targeted in-line with proportionate universalism[163] in order to avoid exasperating inequalities, particularly taking account of issues identified around access to services in more deprived areas.

Ostensibly, sight loss in Stockport appears to be broadly representative of the wider UK picture (based on the data available). However there is a risk that comparator based benchmarking limits the horizon of commissioners, and 'better than average' becomes good enough. Whilst acknowledging that differing health structures, demography, and funding arrangements make direct Europe-wide comparisons difficult, they do indicate potentially significant room for improvement. The 15 country Euro-Vision Scorecard[114] reports that whilst in some countries, people receive a good balance of prevention and treatment, with associated good outcomes; in the UK, services are fragmented "mixing noble intentions with mediocre performance and weaker outcomes"[114]. The scorecard ranks the UK alongside Italy and Spain, with only Hungary, Lithuania, Poland and Slovakia ranked lower.

6.1 Challenges of evidence-based public health

Grey literature is critical to evidence-based public health. Compared to much published literature, the outcomes reported are often more patient and service-user focussed and an emphasis on qualitative measures can provide a rich and nuanced insight into public health issues. Of particular relevance to this HNA have been the policy and campaign reports commissioned and produced by the RNIB. These reports play a significant role in shaping public policy, due to the prolific and high profile advocacy role undertaken by the charity. This RNIB-driven evidence-base underpins much of the UK Vision Strategy and dominates the available 'grey literature'. However, dominance by a single organisation and a lack of any opportunity for peer review removes the opportunity to identify bias in findings. Over-reliance on these reports by commissioners and policymakers may result in misguided public health decisions.

Exemplifying issues with using grey literature to inform commissioning

RNIBs campaign on the role of the ECLO, despite citing many different pieces of research in their campaign reports[68], is largely based on the findings from a single evaluation of the project, involving a number of structured questionnaires and interviews, alongside a handful of other qualitative reports[56,136,65]. These studies are repeatedly cited by the RNIB as entire pieces of research in their own right giving the impression of a far more comprehensive and robust evidence base than was actually identified through this HNA.

Reporting bias – Although presented as a review of the evidence, the main RNIB campaign report[68] is selective in its reporting. Whilst accurately citing the results of the formal evaluation[135], it gives a very positive view of the evaluation- selecting those statistics implying greatest impact and placing less emphasis on the critical points raised by the evaluation authors. For example the evaluation report states that no association between access to an ECLO and improved quality of life could be established (although the authors indicate a larger sample size, and more immediate measure of effect may change the conclusions). This finding is not reflected in the published RNIB campaign report, instead it cites alternative examples where quality of life improvements have been established.

Assumptions – The lack of peer review also means that many campaign reports are littered with statements and assumptions that are not based on discernible evidence but are still presented as fact rather than opinion. For example, the RNIB review paper suggests that ECLOs are cost-effective because of advice provided on falls prevention (which if it prevented one fall, would render the post cost-neutral). Although not illogical, no evidence is presented to suggest that ECLO roles are able to prevent falls.

6.1.1 Utility of the approach/framework

Particular challenges in the use and appraisal of evidence to inform public health include deciding the contextual relevance of evidence and placing appropriate relative confidence in different evidence sources[55].

Notwithstanding the above issues that can arise when utilising grey literature, as an evidence source, it remains critical to building an accurate picture of public health and in particular is a vital source of stakeholder views and assessments of feasibility/translation. Reconciling these evidence sources with published evidence is a necessity in the move towards truly evidence-based public health. The adapted-GRADE approach utilised in this HNA provides a meaningful framework within which to consider the breadth of available evidence around each recommendation, alongside community and provider views. However, it has not been without limitations.

Given the breadth of the subject area a full quality appraisal of every study was not feasible. Further assessment of the evidence may therefore be necessary in terms of considering the methodological strengths of weaknesses of each study when applying them to the Stockport context.

There are also challenges with grading recommendations, for example, those graded as 'conditional' risk not being considered by policymakers[37]. However, given the level of complexity in synthesising the evidence base, it was considered important to demonstrate this level of transparency to support informed commissioning. It is noted that a significant piece of research (DECIDE[165]) is ongoing to address some of the issues in relation to presenting and interpreting evidence-based recommendations to policymakers, which should provide a further tool for navigating similar complex decisions.

The relationship between recommendations and the complexity of multi-directional outcome impact (i.e. the impact of one outcome on another) may make the translation of recommendations into policy complex. Further exploration of the cumulative impact of adopting one combination of recommendations over another could be pursued using tools such as SUPPORT[166].

Despite these limitations, the utility of this approach in facilitating the production of a transparent, evidence-based HNA was considerable, especially in the absence of any other comparable framework. It is anticipated that drawing out the additional health-system-specific issues around translation, implementation and socio-political considerations will be particularly useful to commissioners/policymakers in their assessment of the recommendations. Although the issues identified in these areas were not exhaustive, it is hoped that their inclusion will prompt further consideration. Additionally, considering evidence around effectiveness separately from harm vs. benefit, and resource-use was helpful in highlighting the weight of evidence for/against recommendations. However in reality, relevant evidence relating to intervention cost was often lacking. Application of the framework also identified the need for further local evidence/stakeholder views in a number of areas. These will be useful in focussing engagement

efforts going forward; however, it highlighted an unavoidable weakness in this HNA's approach i.e. that it has been undertaken by an external professional without access to local networks. Further evaluation of the approach and its value to Stockport's commissioners/policymakers in implementing the recommendations would be valuable.

6.2 Further research required

The greatest limitation to translation of these recommendations is likely to be the lack of evidence, particularly in relation to targeted interventions and their cost-effectiveness; as well as local service user and professional views on some of the proposed interventions.

The lack of research into population-level interventions around sight loss is likely to persist. As such the most pragmatic approach may be to establish small-scale local action-research pilots to test stakeholder views, feasibility, and the effectiveness of recommended interventions, before full rollout. For the benefit of other areas, it is strongly recommended that any such approach is written-up and published in order to share learning.

In addition, three RNIB intervention projects are understood to be currently under formal evaluation by the London School of Tropical Hygiene[125] and will be of interest to commissioners/policymakers in Stockport. The interventions focus on increasing uptake of regular eye tests through:

- Community engagement strategies;
- Improving professional messages to people with diabetes
- Developing collaborative messages between communities and professionals

Appendix 1: NICE Costing Model for glaucoma

	Cost for selected population using standard assumptions		
	Stockport (2014)		
	Unit cost (£)	Units	Total cost (£)
Total population		287,488	
Population aged 40 and over		153,047	
Annual number of people with ocular hypertension (OHT) or suspected chronic open angle glaucoma (COAG)		1.41%	
Annual number of people with OHT or suspected COAG aged over 40		2,155	
Proportion of people with OHT or suspected COAG currently presenting to optometrist	50%	1,077	
Proportion who have OHT or suspected COAG who have been referred (one third)		33%	
Number of people referred to hospital eye service (HES) in need of more regular monitoring intervals in accordance with guideline		359	
Proportion of people with OHT or suspected COAG identified and being monitored by optometrist (50% of annual number of suspects in people aged over 40)	50%	1,077	
Proportion of people not referred who have OHT or suspected COAG (one third)		33%	
Number of people not referred to HES and presenting to optometrist		359	
Additional anticipated extra referrals as a result of implementation		55%	
Estimated additional annual patient numbers referred following implementation		198	
Estimated patients with OHT and suspected COAG in need of treatment and monitoring		557	
People diagnosed with OHT and COAG who are being managed by the HES			
Estimated number of people with COAG diagnosed and receiving treatment per year (average 648 cases per 100,000 people over 40)		992	
Estimated proportion of people with COAG being managed by	95%	943	

HES			
Estimated current annual incidence of people with OHT and suspected COAG referred to HES (as above)		359	
Estimated proportion of people with OHT and suspected COAG managed by HES	33%	120	
Predicted number of patients being managed by the HES		1,062	
Estimated proportion of people who have stable COAG and can be effectively managed in the community	26%	245	
Estimated proportion of people with OHT or suspected COAG who can be effectively be managed in the community	90%	108	
Estimated patient numbers that can be managed in community		353	
Additional number of people who can undergo surgery following implementation			
Annual number of people with OHT or suspected COAG aged over 40		2,155	
Estimated proportion of people with suspected glaucoma is suspected who are diagnosed with COAG		3%	
Number of people who are diagnosed with glaucoma annually and receive treatment		58	
Estimated current number of people diagnosed with glaucoma and receiving treatment per annum		992	
Estimated number of COAG cases		1,050	
Estimated % of currently treated patients where there is progression from moderate to advanced COAG	7%	74	
Estimated additional proportion offered surgery and accepting surgery as treatment after implementation	20%	15	
Additional demand for surgery		15	
ESTIMATED COSTS			
Surgery costs			
Proportion as inpatient		34%	
Proportion as day case		66%	
Inpatient cost	1,274		6,368
Daycase cost	595		5,774
Total additional cost of surgery			12,142
People with OHT and suspected COAG - estimated cost of additional demand			
Total additional demand per year - patient numbers		557	
Proportion who can effectively be managed in the community		90%	

Additional patient numbers		501	
Estimated average follow-up attendances per patient/year (average 2.5)	2.5	1,253	
2009–10 Tariff for follow-up attendances to the HES	53		66,384
Other costs (i.e. treatment costs/testing)			
Subtotal estimated costs – monitoring people with OHT and suspected COAG			66,384
Current number of people with OHT and COAG managed by HES – potential resource shift to community			
Existing patients managed by HES who may benefit from community schemes where appropriate		353	
Total number of follow-up attendances (average 2.5 per patient/yr	2.5	882	
2009–10 Tariff for follow-up attendances to the HES	53		46,746
Other costs (i.e. treatment costs/testing)			
Capacity released in HES from resource shift to community			
Current number of people with OHT and stable COAG who can be managed effectively in the community		353	
Number of visits	2.5	882	
2009–10 Tariff for follow-up attendances to the HES	53		-46,746
Other savings (i.e. referral refinement)			
Net cost of service realignment for current people with COAG & OHT			-
People with COAG managed by the hospital eye service			
Costs of providing capacity for recommended monitoring intervals			
Estimated proportion of people in need of increased monitoring			
Total number of people in need of increased monitoring			
Estimated average number of additional follow-up visits per patient/year			
2009–10 tariff for follow-up attendances to the HES			
Other costs of additional capacity for monitoring people with COAG			
Estimated total costs			78,526

Table 23: NICE Costing Model glaucoma in Stockport[146]

Appendix 2: Uptake of Diabetic Retinopathy Screening by GP Practice 2013/14

Practice Name	Invited	Screened	% Uptake
HOULDSWORTH MEDICAL CENTRE	*	*	20.0%
BRINNINGTON HEALTH CENTRE (P88043)	229	148	64.6%
DR H LLOYD'S PRACTICE	84	55	65.5%
VERNON PARK SURGERY	47	31	66.0%
THE SURGERY	121	83	68.6%
BRINNINGTON HEALTH CENTRE (P88001)	229	162	70.7%
CHEADLE HULME HEALTH CENTRE (P88025)	457	335	73.3%
SHAW VILLA MEDICAL CENTRE	99	73	73.7%
CALE GREEN SURGERY	177	132	74.6%
FAMILY SURGERY	367	274	74.7%
ADSHALL ROAD MEDICAL PRACTICE	252	189	75.0%
HEATON MOOR MEDICAL CENTRE (P88026)	485	364	75.1%
HEATON NORRIS HEALTH CENTRE (P88011)	348	262	75.3%
BRAMHALL PARK MEDICAL CENTRE	614	466	75.9%
SOUTH REDDISH MEDICAL CENTRE (P88633)	178	136	76.4%
STOCKPORT MEDICAL GROUP	449	344	76.6%
BRACONDALE MEDICAL CENTRE	220	169	76.8%
ADSWOOD ROAD SURGERY	192	148	77.1%
BREDBURY MEDICAL CENTRE	211	163	77.3%
SPRINGFIELD SURGERY	210	163	77.6%
HEATON MOOR MEDICAL CENTRE (P88004)	329	259	78.7%
LITTLE MOOR SURGERY	228	180	78.9%
MARPLE MEDICAL PRACTICE	383	304	79.4%
MARPLE COTTAGE SURGERY	230	184	80.0%
CHADSFIELD MEDICAL PRACTICE	331	265	80.1%
EASTHOLME SURGERY	209	168	80.4%
THE SURGERY (P88618)	92	74	80.4%
BEECH HOUSE MEDICAL PRACTICE	445	359	80.7%
MANOR MEDICAL PRACTICE	491	397	80.9%
PARK VIEW GROUP PRACTICE	403	326	80.9%
GATLEY MEDICAL CENTRE	443	359	81.0%
CARITAS GENERAL PRACTICE	627	509	81.2%
LOWFIELD SURGERY	173	141	81.5%
HAIDER MEDICAL CENTRE	71	58	81.7%
HEALD GREEN HEALTH CENTRE (P88042)	313	256	81.8%
HIGH LANE MEDICAL CENTRE	263	216	82.1%
ALVANLEY FAMILY PRACTICE	183	151	82.5%
HEATON NORRIS HEALTH CENTRE (P88010)	115	95	82.6%
ARCHWOOD MEDICAL PRACTICE	271	224	82.7%
THE VILLAGE SURGERY	140	117	83.6%
SOUTH REDDISH MEDICAL CENTRE (P88610)	159	133	83.6%

WOODLEY HEALTH CENTRE (P88009)	178	151	84.8%
CHEADLE MEDICAL PRACTICE	596	508	85.2%
HEATON MERSEY MEDICAL PRACTICE	304	262	86.2%
CHEADLE HULME HEALTH CENTRE (P88007)	523	451	86.2%
MARPLE BRIDGE SURGERY	254	222	87.4%
BRAMHALL HEALTH CENTRE	488	428	87.7%
HEALD GREEN HEALTH CENTRE (P88023)	402	360	89.6%
BL MEDICAL PRACTICE	107	96	89.7%
THE GUYWOOD PRACTICE	131	118	90.1%
	13,866	**11,071**	**79.8%**

*suppressed due to small numbers

	Uptake	Practices	% of Practices
	<70%	5	10.0%
	70%-79%	18	36.0%
	>=80%	27	54.0%

Table 24: Uptake of Diabetic Retinopathy Screening by GP Practice 2013/14

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