

National Clinical & Integrated  
Care Programmes  
*Person-centred, co-ordinated care*



## CLINICAL STRATEGY AND PROGRAMMES DIRECTORATE

# NATIONAL CLINICAL PROGRAMME FOR OPHTHALMOLOGY

## *Model of Eye Care*

May 2017

Tús Áite do  
Shábháilteacht **1** Othar  
Patient Safety **1** First



Irish College of  
Ophthalmologists  
*Eye Doctors of Ireland*  
*Protecting your Vision*

**CLINICAL STRATEGY AND PROGRAMMES  
DIRECTORATE**

**NATIONAL CLINICAL PROGRAMME  
FOR OPHTHALMOLOGY**

***Model of Eye Care***

**May 2017**

**Health Service Executive**

**Irish College of Ophthalmologists**

**Document info.**

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Version number: 1.0

Last saved on:

Document status: Final draft

Date effective: To be confirmed

Approval date:

Approved by: NCP Ophthalmology Clinical Advisory Group  
Clinical Strategy and Programmes Division, HSE

Responsible for implementation: All healthcare providers delivering eye care

Responsible for audit and monitoring: National Clinical Advisor and Group Lead for Primary Care and Acute Division

Revision date:

Associated documents: Primary Eye Care Services Review Group Report and Recommendations

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## Foreword:

First and foremost, I want to acknowledge the work of my immediate predecessor Peter Barry. Peter passed away suddenly in early summer 2016, and while his time as Clinical Lead was short, he fulfilled the role with commitment and great enthusiasm. May he rest in peace. Acknowledgment too must go to Peter's predecessor Paul Moriarty. It was Paul's foresight and persistence that resulted in the establishment of the Clinical Programme for Ophthalmology. I am in full agreement with his and Peter's assessment that, in line with Government policies such as Future Health, and with proper staffing and facilities, the majority of eye care can be provided within the primary care setting. This will require re-alignment of eye care services from the acute hospitals to the community, and this Model of Eye Care document is the blueprint for how that re-alignment will occur.

The aim of the National Clinical Programme for Ophthalmology is to reduce and ultimately eliminate avoidable sight loss. A sight-threatening condition can have a devastating impact on a patient and their family and friends. However, sight loss is not always inevitable, and in up to 50–60% cases it is preventable. This blueprint seeks to transfer the emphasis from treatment to early diagnosis and intervention.

The Irish College of Ophthalmologists (ICO) supported the development of a national model of eye care prior to the establishment of the Clinical Programme, funding research carried out by Professor Charles Normand and Dr Giulia Faedo in the Department of Healthcare Economics in Trinity College. As a result of this research, the ICO advised the HSE and the Department of Health of the need for a strategic and programmatic approach to the delivery of eye care into the future.

This Model of Eye Care is aimed at improving the quality of the service and expanding access to that service. Prevention of sight loss requires collaboration from all of the professionals involved in eye care: doctors, nurses, allied health professionals and technicians, with each working within their skill set in a multidisciplinary team underpinned by appropriate governance. This blueprint outlines these roles.

This Model of Eye Care is the product of a wide consultation with professional and patient groups who either provide or receive its services. The programme received input from all of the professionals involved in delivering eye care in this country, and from the patient groups representing those who receive care. I would like to thank all those who contributed to the development of this Model of Eye Care, particularly those who represented all of the various eye care professionals. Thanks also to the representatives from the patient groups for their advice and for the use of data from the Vision Coalition's framework document and the Cost of Blindness study. The views of all groups were considered in the development of this document, with the overall aim of designing systems that will provide quality care to every adult or child who requires it.

Thanks also to my colleagues in the specialty for their contributions to the Clinical Advisory Group and to Siobhan Kelly for her help. And finally, thank you to the Health Service Executive, particularly those in the Clinical Strategy and Programmes Directorate for their ongoing support and guidance: Dr Barry White, Dr Áine Carroll, Dr David Hanlon, Dr Colm Henry and Ms Emma Benton.

This document addresses the delivery of ophthalmology services in Ireland, and the integration between the three arms of eye care, namely care provided in the acute setting, care provided in the primary care setting and care delivered at the first point of contact for patients. It proposes how these three arms of the service should function and interact with each other, and it describes how the current services operate nationally. It outlines how the delivery of eye care should evolve and advance, with reference to best international practice, and it provides a vision for the future of eye care and describes how that vision can be implemented.

**Professor William Power**

*Clinical Lead*

*National Clinical Programme for Ophthalmology*

## Executive summary

Ireland has experienced and continues to experience significant population growth. The total population is expected to increase by up to 28% between 2016 and 2026. The greatest increases are projected in the over 65 years age group. Increasing patient numbers and the growing incidence of chronic diseases are placing an enormous strain on the current model of eye care delivery. Even with the current population, waiting lists for ophthalmology outpatient appointments and inpatient procedures are among the longest and most numerous in the health service. The diagnosis and treatment of many chronic eye conditions is currently delivered in acute hospitals, whereas much of these interventions could be delivered in the primary care setting in a decentralised model.

The National Clinical Programme (NCP) for Ophthalmology has determined that in line with Government policies such as Future Health, the majority of services should be provided within the primary care setting. As such, integration of acute and primary care services is essential in order to allow for rebalancing of access and delivery of eye care services from acute hospitals to primary care. The aim is to provide high-quality, consistent, efficient and effective care. The development of a regionalised model appears to be the best means of achieving this aim.

The NCP for Ophthalmology recommends the integration of hospital and community care, with clinicians and care providers working in teams, as the best approach to deliver care for patients and to address the structural deficits in the current system. The efficient operation of the multidisciplinary team (MDT) is critical to the delivery of primary eye care. The MDT must have the staff, support structures and electronic patient records (EPRs) in place to address the current challenges. Challenges which include long waiting lists for patients to be seen in the hospital when they could be diagnosed and managed safely and efficiently in the community. Implementing a more community-based model will improve access to care and will help address the current adult and paediatric waiting list crisis. A clear governance structure for the MDTs, with clinical audits, will ensure that the standards of clinical care are maintained.

Ophthalmology is currently the number one specialty by volume of patients waiting for procedures. The two connected reasons for this are over-commitment of ophthalmic surgeons to outpatient clinics and lack of access to theatre operating time. The first cause feeds into the latter, once a patient is diagnosed with a chronic eye condition, they remain within the acute service for their ongoing monitoring and treatment. This situation results in burgeoning outpatient clinics requiring long hours of the hospital doctors input. Better developed community-based service with MDTs working in fully staffed and resourced clinics will facilitate the movement of a significant cohort of patients back to the primary care setting for their ongoing management, freeing the hospital ophthalmologists to put more time into the surgical and procedural waiting lists.

### **The key recommendations of the Model of Eye Care are:**

1. Development of multidisciplinary primary eye care teams, enabling most patients to be seen in their own locality, and with all team members working in the same location. This model of eye care will require investment in community clinics, both in staff numbers and in equipment, and better integration between community and hospital care.
2. Investment in information technology, including standardised equipment and electronic patient records, to enable a hub-and-spoke regional delivery of care and an integrated system.
3. Expansion of theatre access and establishment of stand-alone high-volume consultant-led cataract theatres with a full complement of support staff in order to facilitate a timelier response from the surgical centres, thereby keeping waiting times to a minimum.
4. Establishment of clear and concise clinical referral pathways in order to minimise unnecessary referrals. This will include a focus on effectiveness and efficiency of eye care services delivery.

It is essential that appropriate structures are put in place to underpin effective teamwork and governance, and to

ensure quality and safety. Changes to the delivery of eye care must be complemented by the recording of all outcomes and the auditing of all interventions. In expanding the eye care team, appropriate audit and governance structures must be put in place to ensure quality and safety. The use of audit and a registry to record specific pre- and post-operative or treatment measurements is a critical component of shared care pathway. Assessment of outcomes should also include patient-reported outcomes.

The implementation of the recommendations of this Model of Eye Care will require engagement across the HSE Divisions as appropriate in order to ensure that diagnosis, treatment and management are integrated across the service, underpinned by an electronic patient record (EPR), which will allow ease of audit and collection of data. This will in turn allow standardisation of quality of care and assessment of effectiveness of the Programme. Aspects of the programme such as the MDTs will be progressed through the Primary Care Division, while other aspects such as expanded theatre access will be progressed through the Acute Division. Close cooperation and regular sharing of information will be necessary across both the Primary Care and Acute Divisions. A close relationship will identify any gaps in service and allow development of business cases for proposals to fill those gaps as well as informing ongoing service planning and delivery.

## Glossary

AOI = Association of Optometrists Ireland  
CHO = Community Healthcare Organisations  
CSPD = Clinical Strategy and Programme Directorate  
COP = Community Ophthalmic Physician  
COSS = HSE Community Ophthalmic Services Scheme  
COSMTS = HSE Community Ophthalmic Services Medical Treatment Scheme  
EPR = Electronic patient record  
GP = General practitioner  
HIPE = Hospital In-Patient Enquiry system  
ICGP = Irish College of General Practitioners  
ICO = Irish College of Ophthalmologists  
IOP = Intraocular pressure  
MDT = Multidisciplinary team  
NCP = National Clinical Programme  
NSS = National Screening Service

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## 1. Introduction

According to the World Health Organization (WHO), up to 80% of global blindness is avoidable or treatable. The corresponding figure for Europe is approximately 50% of visual impairment being avoidable with earlier and more targeted interventions.<sup>i</sup> The WHO also states that worldwide, 82% of those who are blind, and 65% of those with moderate and severe blindness, are aged 50 years of age or older.<sup>ii</sup>

To ensure a safe, effective eye service for Ireland’s expanding population, the National Clinical Programme for Ophthalmology (NCP) undertook a review of the current delivery of services and developed this plan for the future delivery of services.

## 2. Background

It is estimated that there are currently 225,000 people living with low vision and sight loss in Ireland. This is projected to increase to 272,000 by 2020. Within that figure, there are approximately 13,000 blind people living in Ireland today. This number is expected to increase to 18,000 by 2020.<sup>iii</sup>

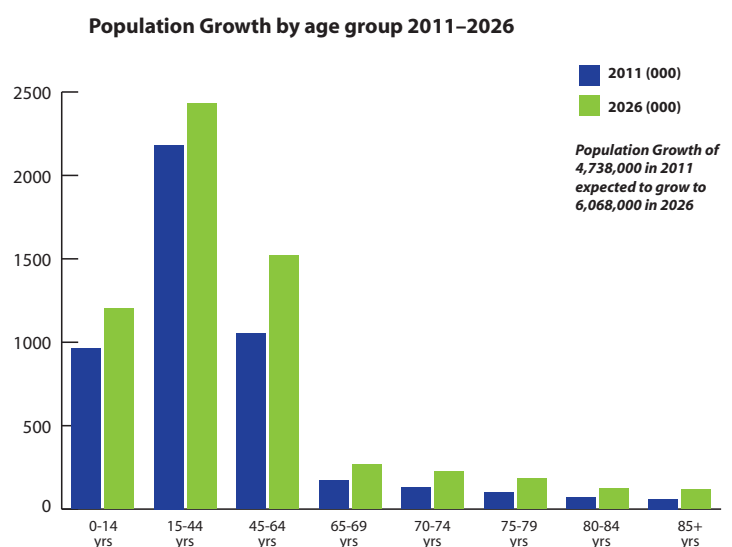
A significant proportion of the older population in Ireland experience sight loss which is to a large extent preventable.<sup>iv</sup> Blindness and vision impairment can significantly reduce quality of life by affecting physical, functional, emotional and social wellbeing. This translates into a significant economic impact on individuals, families, society in general and the State. Prevention requires appropriately resourced early detection and treatment approaches. It is also important to consider that with Ireland’s expanding ageing population, the impact of sight loss or vision impairment will become more evident as the incidence of visual loss increases with age.

Current CSO projections estimate that the number of people aged 65 years or older will almost double over the period 2006 to 2026 (increasing from approximately 462,000 people to 909,000 people). Therefore, the number of people in Ireland with sight loss is projected to increase substantially as the overall population ages. More people will need to avail of eye care services, and will expect such services to be locally accessible and provided in a timely manner.

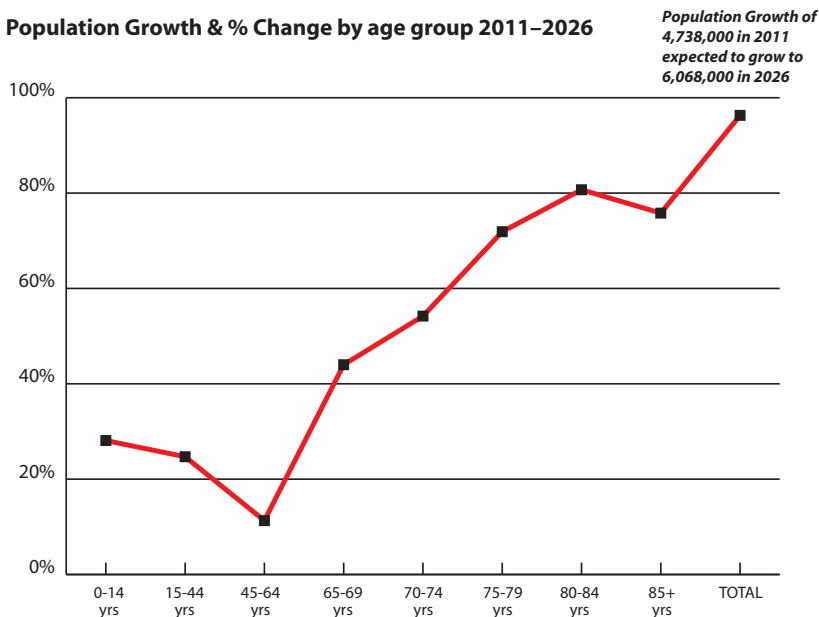
In the current situation, the demand for eye services outstrips the supply of available services. Many people are currently experiencing long waits for either an outpatient appointment or a day case or inpatient surgery. Ophthalmology is the number one specialty by volume of patients waiting for procedures, and the number four specialty by volume of patients waiting for outpatient appointments.<sup>v</sup> The waiting list figures compiled by the National Treatment Fund by specialty illustrate the pressure that exists within the services by detailing the numbers waiting for outpatient appointments. A comparison of the current waiting list for inpatient treatment and outpatient appointments for ophthalmology with the total figures on waiting lists reveals that the number waiting for treatment is nearly twice that of the number waiting for outpatient appointments. This indicates that there is a significant bottleneck for ophthalmic patients who have been diagnosed as requiring inpatient procedures in getting those procedures carried out.

To halt and reverse these waiting times, there is an urgent need for a new approach to improving access to care. This will only be possible where access to appropriate diagnostics and treatment are expanded.

Figure 1:  
Irish population projections



**Population Growth & % Change by age group 2011–2026**



**Figure 2: Population growth and percentage change by age group 2011–2016**

The HSE Chronic Illness Framework (2008) emphasises the need to integrate services for the patient and deliver them in the least complex and most appropriate setting. The programme of reform for the health services aims to ensure that patients receive treatment from appropriate personnel, in adequate locations, and in a timely manner. The HSE Transformation Programme (2008) identified key challenges in how we will deliver health and social care services, and improve health and social wellbeing into the future.<sup>vii</sup>

Both the Government and the HSE recognise that the current healthcare system is fragmented and too focused on episodic secondary care.<sup>viii</sup> A continuum of quality health services spanning health

promotion, prevention, self-management support, primary and specialist care should be provided to the whole population.

### 3. National Clinical Programme for Ophthalmology

The Strategy and Clinical Programmes Division was established by the HSE in 2009 with the aim of improving and standardising patient care by bringing together clinical disciplines and enabling them to share innovative solutions to deliver greater benefits to patients. Thirty-three National Clinical Programmes, including Ophthalmology, have been established by the Division.

The National Clinical Programme for Ophthalmology was established in 2013 as a collaboration between the Irish College of Ophthalmologists and the Health Service Executive (HSE). A clinical lead was appointed, supported by a programme manager. A multidisciplinary consultation group was convened, including all of the disciplines involved in eye care: ophthalmology, optometry, orthoptics, nursing, general practice, and parent and patient representatives.

Groups & Organisations involved in the Consultation Process	
Association of Optometrists Ireland	Child Vision
Federation of Ophthalmic and Dispensing Opticians	Guide Dogs for the Blind
Ophthalmic Nursing	Irish Association of Orthoptists
Community Ophthalmologists	Royal College of Surgeons
Fighting Blindness	General Practice
Feach	Community Ophthalmic Service
National Council for the Blind	Paediatric Ophthalmology
School of Nursing, RCSI	Ophthalmic Professorial Units
Manpower, Training & Education Committee ICO	

**Table 1: Organisations and groups involved in the consultation process**

The Consultation groups met on multiple occasions from October 2013 to October 2015.

An extensive consultation process was undertaken by the NCP across the country, with key stakeholders including eye doctors, optometrists, orthoptists, nurses, hospital and community management and administration, patient advocacy groups, Department of Health officials and representative bodies.

The National Clinical Programme for Ophthalmology reports to the Clinical Advisory Group in the ICO, the HSE National Clinical Advisor and Group Lead for Primary Care, and the HSE National Director for Clinical Strategy and Programmes. These progressive steps ensure that healthcare professionals are involved in healthcare planning and decision-making, which in turn improves patient outcomes.

## **4. Rationale for the Model of Eye Care**

In line with the policy for integrated care and the National Clinical Programmes, the NCP for Ophthalmology aims to rebalance access and delivery of eye care services from acute hospitals to a community setting.

The NCP for Ophthalmology has concluded that a regionalised community-based care model, with clear pathways of referral into acute care services and back to the community where clinically appropriate, should be implemented in Ireland. This should be accompanied by increased elective surgical activity in hospitals in order to address existing waiting lists.

A decentralised model of eye care requires appropriate workforce planning and management in order to reflect a greater level of care in the community. This transfer of care to the community will enable surgeons to have more time available to carry out procedures. Increased access to theatre is a key enabler for increasing the capacity for surgical procedures.

To ensure the effective functioning of this model of eye care, it is important that a new systematic approach to tracking patients is put in place. Electronic patient records (EPRs) are viewed as an essential feature of care provision. This will enable more effective and efficient treatment of patients in the community.

The NCP for Ophthalmology also aims to ensure rapid access to the acute hospital network for appropriate conditions, and to ensure that as many procedures as possible are carried out as day cases.

In implementing this strategy, a leaner, more cost-effective system which is responsive to patient needs will result. As part of the community team, GPs will be kept informed of a patient's progression.

To implement the objectives of the programme, standardised pathways of care have been developed for the main eye conditions. The aim of these pathways is to ensure equitable access to efficient, high-quality care, and to improve standards for supports and treatments. Given the challenge in responding to a growing demand for eye care brought on by an ageing population, the pathways are tools that can help eliminate avoidable sight loss and improve the quality of services provided to patients.

This Model of Eye Care is intended to ensure sustainability in eye care services in Ireland. It defines how services should be delivered, so that patients get the right care, at the right time, in the right place, and by the right staff. Expertise, capacity and access are the pillars of good practice. The model must respond to emerging innovations, and be able to evaluate and implement quickly into clinical practice. There must be high levels of integration between all primary care and acute sites delivering eye care. The NCP has made it possible to drive change in a way that is accepted and understood by both service users and healthcare professionals.

## 5. Aims and objectives

**The National Clinical Programmes are based on three main objectives:**

- Improve safety and quality in the delivery of patient-centred care
- Improve access to appropriate services
- Improve the cost-effectiveness of services delivered, which includes improved efficiencies and improved patient experience.

**To deliver on these aims, the following objectives have been determined for the ophthalmology programme:**

1. To increase capacity and equity of access to services.
2. To reduce the numbers of inappropriate referrals to specialist care.
3. To reduce waiting times for eye care.
4. To develop protocols for patient referral.
5. To ensure that quality of care in the redesigned model is equivalent to or superior to that delivered in the existing model.

Wide consultation with healthcare professionals, management, patient representatives and parents of paediatric patients has been central to the development process for this model of eye care. Many eye care units were visited at the outset of the process by the National Clinical Lead. The purpose of these visits was to collect demographic and operational data, to listen to staff, and to find out about each unit's vision for the future. Staff were asked to identify what was working well and what activities could be improved, with informal dialogue and a wide range of views sought. Meetings which focused on current and future workloads, referral patterns, challenges in infrastructure, manpower requirements, and standardisation of care were held. Meetings were also held with representatives of the allied health professionals involved in the delivery of eye care, to seek their views on how services should be structured and delivered.

The NCP for Ophthalmology liaised extensively with the HSE Primary Care Directorate on a review of primary care eye services. The deliberations of the Primary Care Eye Services Review Group (PCESRG), chaired by the Head of Planning, Performance and Programme Management of the Primary Care Division, were informed by the strategy developed by the NCP in Ophthalmology which underpins this Model of Eye Care document.

## 6. Core values and principles

Good health outcomes are delivered through high-quality clinical care, good governance, a stable effective workforce, a culture of teaching and training, succession planning, and being approachable, understandable and honest with patients.

The vision for eye care services delivered by the HSE in Ireland is of a high-quality, safe, effective and efficient service, meeting and responding to the changing needs of those of all ages, with actual or suspected ocular pathology with their vision. The service should be accessible without undue or unnecessary delay, and as far as possible, should be geographically convenient. It should offer clear and accurate information upon which patients (or carers) can exercise their rights to make informed choices, and it should result in a high level of patient (or carer) satisfaction. The service should be staffed by a well-trained, dedicated, caring and competent workforce with good governance and accountability, providing clinical leadership at both national and community levels, and a commitment to an evidence-based and evaluative service. The staff should work efficiently and in collaboration with closely allied disciplines as a multidisciplinary team.

## 7. Eye health services

**Eye care in Ireland encompasses a range of clinical, technical and rehabilitative services that include:**

- Vision surveillance and screening at birth, preschool and primary school
- Assessment, diagnosis and treatment of visual impairment and other ocular pathologies in adults and children
- Provision of spectacles for correction of vision
- Provision of therapy such as patching to correct amblyopia
- Provision of medical and surgical treatment surgery and injections to correct sight threatening conditions and other ocular pathologies
- Provision of low vision aids to maximise independence.

### 7.1 Eye disorders in children

A child's vision continues to develop up to approximately eight years of age. Early identification and intervention to treat a visual disorder maximises the long-term sight a child will have. Vision surveillance and screening are efficient and cost-effective methods of identifying children with visual impairment, or eye conditions that are likely to lead to visual impairment, so that a referral can be made to an appropriate eye care professional for further evaluation and treatment. Vision screening in Ireland is carried out under the guidance of Best Health for Children (BHfC), the HSE screening and surveillance programme. Screening checks for impairments in the following areas:

Eye Disorders in Children	
<b>Visual Acuity</b>	this is the ability to discriminate detail
<b>Amblyopia</b>	commonly known as 'lazy eye' is the reduction of visual acuity in one or both eyes. Amblyopia results in lifelong visual impairment if not treated in childhood
<b>Strabismus</b>	this is a misalignment of the visual axes i.e. condition in which the eyes are not aligned correctly
<b>Refractive Error</b>	this is a disturbance of the optical system of the eye leading to an out-of-focus image being formed on the retina. If a child has a significant refractive error uncorrected during the critical period of visual development, vision may not develop properly.
<b>Medical Conditions</b>	conditions such as congenital cataracts, retinopathy of prematurity (ROP), cerebral palsy, retinitis pigmentosa, optic nerve and retinal colobomata, optic nerve hypoplasia, cortical visual impairment, Down syndrome and juvenile idiopathic arthritis are also frequently associated with visual morbidity

Table 2: Eye disorders in children

### 7.2 Eye disorders in adults

With the expansion of Ireland's ageing population, the impact of sight loss or vision impairment will increase significantly in coming years. Several international studies have demonstrated the effects of population growth on the levels of eye care needed, and our ageing population is likely to lead to a significant increase in the demand for eye care and increase the direct costs of eye care. The following are the main visual impairments that adults can experience:

<b>Eye Disorders in Adults</b>	
<b>Refractive Error</b>	this is a disturbance of the optical system of the eye leading to an out-of-focus image being formed on the retina.
<b>Age Related Macular Degeneration (AMD)</b>	this is the leading cause of severe visual loss in patients over 50 years of age. It is responsible for 90% of cases of severe vision loss and whilst wet AMD can develop quickly, if diagnosed and treated early, as sight loss can be prevented and some people may even see an improvement
<b>Glaucoma</b>	is an eye condition that causes damage to the optic nerve, which transmits images to the brain. In its early stages there are few symptoms; loss of vision may only become apparent when the damage caused by the condition is advanced and irreversible.
<b>Cataract</b>	a cataract occurs when the lens, which focuses the image within the eye, becomes clouded. It usually develops over a period of time causing gradual eyesight deterioration; involving increasingly blurred and cloudy vision, glare, and untreated may eventually lead to blindness. Cataracts are a common problem which can occur at any age, but the incidence of which increases with age.
<b>Diabetic Retinopathy</b>	diabetes mellitus is associated with the development of a number of complications. Diabetic retinopathy is a common complication of diabetes which affects the small blood vessels in the lining at the back of the eye (the retina). It can cause the blood vessels in the retina to leak or become blocked and damage a person's vision.

**Table 3: Eye disorders in adults**

At present, the increasing patient numbers and the growing prevalence of chronic diseases, such as diabetes, are placing an enormous strain on the current Community and Acute Service Provision model of eye care. Hospital eye departments are overburdened by patients with chronic diseases, many of whom could be appropriately diagnosed, treated and managed in integrated eye clinics in the community. Community and hospital services are overloaded with high numbers of referrals for pre-school children and school-aged children, many of whom have nothing abnormal detected on examination. This delays access to the service for adults and children who more urgently require attention or care. The following account for some of the reasons why eye care services are currently overloaded:

- Existing capacity is inadequate to deal with the demands on the service.
- Inadequate levels of training and inconsistent implementation of protocols from surveillance and screening programmes.
- Inconsistent policies regarding provision of spectacles and low vision aids and appliances.
- Poorly-resourced community clinics, both staffing and equipment.
- Community ophthalmologists working in isolation without access to orthoptists, nurses and/or optometrists.
- Lack of an information and communications technology (ICT) system to facilitate communication between community and acute ophthalmology services.

Lack of well-developed and integrated ophthalmic services may result in, (a) children developing a long-term visual impairment that could have been resolved at an early stage; this may impact on their educational and lifelong development, or (b) adults suffering visual impairment from conditions that are preventable and treatable.

In order to deliver on the aims and objectives of the NCP for Ophthalmology, this Model of Eye Care has been developed, describing where and how the eye care services should be provided. The primary goal of this document is to inform future service planning and developments, and to eliminate duplication and fragmentation of services.

To design the most appropriate model of eye care for Ireland, the existing services were documented, with both strengths and weaknesses identified, the services required to meet patient needs were established, and best international and local practice were reviewed.

## **8. Current delivery of eye care in Ireland**

### **8.1 Primary care**

Primary eye care in the community is delivered by general practitioners (GPs), optometrists and ophthalmologists. At the primary care level, there are two publicly funded eye care schemes currently in place. The first is the Community Ophthalmic Services Scheme (COSS), delivered by optometrists and ophthalmologists, and for the purpose of Medical Card holders authorised by Local Health Offices and paid through the Primary Care Reimbursement Service (PCRS). The COSS includes a Community Ophthalmic Services Medical Treatment Scheme (COSMTS), which is a scheme for medical and surgical treatment delivered by ophthalmologists in a primary care setting. Only Medical Card holders are currently entitled to attend primary eye care clinics. Medical Card holders have an eye examination every two years unless a more frequent eye examination is determined to be clinically necessary.

The other scheme in place is the Optical Benefit Scheme run by the Department of Social Protection (DSP). The scheme provides services to persons who have made the required number of Pay Related Social Insurance (PRSI) contributions. Qualified persons are entitled to an eye examination every two years, unless a more frequent eye examination is determined to be clinically necessary. Dispensing fees are not currently covered by the scheme.

Local HSE offices are involved in implementation of the COSS scheme, and queries about the inequitable application of the scheme have been raised. The application of the Optical Benefit Scheme has been reported as efficient and equitable, due to a centralised application and authorisation process.<sup>ix</sup>

Under the General Medical Services (GMS) scheme, GPs receive an annual capitation fee to see Medical Card holders for a range of issues including ophthalmic care. It is difficult to determine the number of ophthalmic appointments carried out by GPs, as in many cases, the purpose of the visit is recorded as a general consultation or prescription.

#### **8.1.1 Paediatric eye care**

Children's vision is checked during the developmental clinics, and all school-going children are vision screened by public health nurses at junior infants or senior infants and in sixth class. Children who fail the screening are referred into the public system via the local health clinic. The screening methodology presently in use does not fit current needs. In many cases, the healthcare professionals carrying out the range of vision screening checks are inadequately trained to identify vision problems. This has resulted in high false positive rates, and consequently very long waiting lists for specialist review in the local health clinic.

A defined treatment window exists for the condition amblyopia. Due to long waiting lists, there are clear risks that amblyopic children may not receive the treatment they need within that window, thereby risking the possibility of lifelong visual problems.

The vision screening programme identifies many children with refractive errors, however in the current system, access to private eye examination or prescription for children who have been referred from the school screening system is inconsistent.

Some Local Health Offices will approve private optometric prescriptions for a publicly funded dispensing of spectacles, while others will only approve prescriptions from ophthalmologists. In some areas, children over nine years of age are given a voucher to attend a local optometrist, while in other areas, this provision is not in place. Access to the service is dependent on geographic location, and is inconsistent across the country. A uniform eligibility to services applied equally across the country will solve the inequity in access to the service.

The funding available for the older cohort of primary school children is similarly unevenly applied across the country. In some areas, funding is available to access optometry privately, while in other areas, children join the waiting list for the local clinic. Finally, children who are attending post-primary school and are under 16 years of age have no entitlement to eye care. Services are variable, depending on the geographical area, even for children of Medical Card holders.

## 8.2 Secondary care

In Ireland, there are 26.77 whole time equivalents (WTE) community ophthalmic physicians (COPs) employed by the HSE and currently assigned to primary care eye services (plus additional stand-alone sessions).

Community Healthcare Organisation (CHO)	Community Ophthalmic Physician WTE	Ophthoptist WTE	Nurse WTE	Administration on Staff WTE
CHO 1	7.7	3	0.5	8.85
CHO 2	5.1	0.6	2.6	4.6
CHO 3	2.3	0	0.18	3.16
CHO 4	2+sessions	0.98+sessions	2.12	4.5
CHO 5	4.2	3.1	2.6	7.4
CHO 6	1	0	0	0.5
CHO 7	0.87	0.57	0.75	2.1
CHO 8	2	0.64	0.6	3.7
CHO 9	1.6	2	1	1.6
TOTAL				

Table 4: Current staffing levels in community eye services (February 2016)

Most COPs work in Local Health Offices, whereas some also do a number of sessions in hospitals. In the community, COPs often work as single practitioners, in poorly resourced clinics with inadequate diagnostic equipment. A significant amount of their time is spent seeing children who have been referred from the developmental clinics and the school screening programme.

Due to the high rate of false positive referrals from both of these referral sources, the medical resource is not best utilised.



CHO	Sites where Community Ophthalmic Physicians Work from		
CHO 1	Cavan General Hospital Virginia Health Centre Mater Misericordiae University Hospital Monaghan Health Centre Sligo Primary Care Centre	Sligo Regional Hospital Mohill Health Centre, Leitrim Our Lady's Hospital, Manorhamilton Carrick On Shannon Health Centre Letterkenny Health Centre	Buncrana Health Centre Carndonagh Health Centre Dungloe Health Centre Donegal Town Health Centre Lifford Health Centre
CHO 2	Mayo County Clinic, Castlebar Ballina Health Centre Belmullet Health Centre Swinford Health Centre	Shantalla Health Centre Loughrea Ballinasloe	University Hospital, Galway Roscommon Hospital Boyle Health Centre
CHO 3	Ennis Health Centre Shannon Health Centre Kilrush Health Centre Ballynanty Health Centre	Newcastlewest Health Centre University Hospital, Limerick Nenagh Health Centre	King's Island Primary Care Centre Roscrea Health Centre Thurles Health Centre
CHO 4	Grattan Street Health Centre, Cork Cork University Hospital Dunmanway Health Centre Clonakilty Health Centre Skibereen Health Centre	Kanturk Health Centre Mallow Health Centre Kerry General Hospital Killarney Health Centre	Listowel Health Centre Killorglin Health Centre Dingle Health Centre Cahersiveen Health Centre
CHO 5	Waterford Community Services University Hospital, Waterford St. Joseph's Hospital, Dungarvan	Clonmel Health Centre Cashel Health Centre Kilkenny Health Centre	Carlow Health Centre New Ross Health Centre Gorey Health Centre Enniscorthy Health Centre Wexford Primary Community Care Centre
CHO 6	Shillelagh Health Centre Arklow Health Centre	Greystones Health Centre Wicklow Primary Care Centre	Bray Health Centre
CHO 7	Maynooth Health Centre Newbridge Health Centre	Athy Health Centre Blessington Health Centre	Baltinglass Health Centre Vista Primary Care Centre, Naas
CHO 8	Midland Regional Hospital, Tullamore Midland Regional Hospital, Portlaoise	Navan Health Centre Dunshaughlin Health Centre	Mater Misericordiae University Hospital Dundalk Primary Care Centre
CHO 9	Beaumont Hospital	Children's University Hospital, Temple St.	Ashgrove House

Table 5: Locations of community ophthalmology sites

A national audit of the source of referrals to community ophthalmic physician practices, indicates that GP referrals account for 22% of patients, with school nurses accounting for 25%, and public health nurses referring 21% of patients seen by the COP.<sup>x</sup>

Under the COSS scheme, there are approximately 20 private contractors providing primary and secondary care. The Community Ophthalmic Services Medical Treatment Scheme (COSMTS) is a scheme that delivers secondary care in a primary care setting. It was introduced in 2004 as a pilot scheme with four contractors, six practices, and eight WTE ophthalmologists. Optometrists and GPs may refer patients to the COSMTS. Despite being given Ministerial approval in 2007, the Scheme has not yet been rolled out nationally. The roll-out of COSMTS or an alternative, which will combine both existing medical schemes, is a priority as it will provide access on an equitable geographical basis.

### 8.3 Tertiary care

There are currently 24 hospitals with ophthalmic departments in Ireland, with 40 WTE consultant ophthalmologists.

Consultant Led Surgical Service	Consultant Led Medical Service	Medical Service
Cork Univeristy Hospital	AMNCH, Tallaght	Cavan General Hospital
Children's University Hospital Temple Street, Dublin	Beaumont Hospital	Connolly Hospital Blanchardstown
Mater Misericordiae University Hospital Dublin	Letterkenny General Hospital	County Hospital, Dundalk
Our Lady's Children's Hospital, Crumlin	South Infirmity Victoria University Hospital	Kerry General Hospital
Royal Victoria Eye & Ear Hospital Dublin	St. James's Hospital	Midland Regional Hospital Mullingar
Sligo General Hospital		Midland Regional Hospital Tullamore
St. Columcille's Hospital Loughlinstown, Dublin		Our Lady of Lourdes Hospital, Drogheda
St. Vincent's University Hospital Dublin		St. Michael's Hospital, Dun Laoghaire, Dublin
Univeristy Hospital, Galway		
Univeristy Hospital, Limerick		
Univeristy Hospital, Waterford		

Table 6: List of hospitals providing surgical and/or medical ophthalmic services

These units are mainly staffed by consultant ophthalmologists, non-consultant hospital doctors, orthoptists, nurses and technicians.

The increased workload due to the ageing population and new treatment modalities for conditions such as age-related macular degeneration has resulted in significant pressure on capacity in the acute hospitals. If no changes are made, this overburden is likely to continue to increase. There are also a small number of orthoptists working in the tertiary sector, however access to their expertise is hampered by lack of clear referral pathways.

### 8.4 Costs

In 2011, the economic impact of vision impairment and blindness in Ireland was estimated, and included costs to the healthcare system (direct costs), other financial costs to society such as the inability to work due to vision loss (indirect costs), and the burden of vision loss on individuals' wellbeing.<sup>xi</sup>

The direct cost of vision impairment and blindness to the Irish healthcare system was estimated at €116.75 million in 2010.<sup>xii</sup> This included both public and private hospital medical and surgical costs, prescription costs, and other costs including eye examinations for the vision impaired, appliances (e.g. spectacles), and other assessment and care funded by the public health care system.

As explained in the NCBI report on the Economic Cost of Blindness, in Ireland there are no available top-down data on total health expenditure by disease category.<sup>xiii</sup> The direct cost components for which data are available were estimated separately, and summed to estimate the total healthcare cost. Hospital cost per bed day, for example, was estimated using Australian public hospital cost data and then adjusted using the ratio of GDP per capita between the Republic of Ireland and Australia.

The indirect cost of vision impairment and blindness is estimated to add €269.34 million to the overall healthcare cost. This represents 70% of the total estimated cost, and includes three key components: informal care costs – €108.25 million (40%), deadweight welfare losses – €104.37 million (39%), and productivity losses – €56.72 million (21%).

The sum of direct and indirect costs is €386.08 million, and it represents the total financial cost of vision impairment and blindness in Ireland in 2010.<sup>xiv</sup> In order to calculate the economic cost of vision impairment and blindness, the cost of disease burden was added to the financial cost.

Cost Component	2010
Direct Health Care Costs (a)	€116,754,169
Indirect Costs (b)	€269,340,241
Productivity Losses	€56,719,003
Informal Care	€108,249,563
Deadweight Welfare Loss	€104,371,674
Total Financial Cost (a) + (b)	€386,094,409
Burden of Disease (c) No. of DALYs: 18,537	€1,757,157,890
<b>Total Economic Cost (a) + (b) + (c)</b>	<b>€2,143,252,300</b>

**Table 7:**  
**Total economic cost of vision impairment and blindness in Ireland (in 2010)**

The burden of disease from vision impairment and blindness is a measure of the loss of wellbeing from disability and premature death due to these conditions. It is measured using the non-financial metric of disability-adjusted life years (DALYs), and can be converted to a financial equivalent using the monetary value of a statistical life year.

In financial terms, the burden of disease from vision impairment and blindness in Ireland was estimated to be €1.76 billion in 2010.

The total estimated budget for eye care in Ireland using mainly 2011 data is approximately €156.8 million. The main component of the estimated eye care budget is hospital care, with inpatient and day care services representing 33.9% of the total budget, and outpatient services representing 31.9% of the total budget.

National Clinical Programme for Ophthalmology  
**Model of Eye Care**

Component	Value/ Estimate	Year of Data	%	Source of Data
Public Hospitals (Inpatients+Daycases)	€53,200,000	2011	33.9%	National Casemix Programme, Diseases & Disorders of the Eye, HSE, 2013
Public Hospitals (Outpatient)	€50,003,682	2011	31.9%	Conservative Estimate based on hospitals outpatient data and HSE average cost per out-patient visit
Hospital Drugs	€2,200,000	2011	1.4%	Conservative Estimate based on RVEEH and Limerick Hosp. Drug Expenditure 2011
<b>Community Reimbursement:</b>				
• Optometrists Eye exam and treatment	€5,705,521			
• Ophthalmologists Eye exam and treatment	€756,032			
COSMTS Treatments	€1,298,290			
• COPs (22 WTE) salaries	€1,899,106	2011	17.3%	Primary Care Reimbursement Service, HSE, 2012
• Appliances	€17,180,114			
• GPs special service	€270,875			
<b>Total Community Reimbursement</b>	<b>€27,109,938</b>			
Community Drugs	€15,916,920	2011	10.1%	Primary Care Reimbursement Service, HSE, 2011
NTPF: Expenditure on Ophthalmology (approx 85% of the amount is for Cataract)	€5,033,437	2012	3.2%	National Treatment Purchase Fund
Optical Benefit	€3,381,851	2012	2.2%	Dept. of Social Protection
<b>TOTAL</b>	<b>€156,845,828</b>			

Table 8: Provisional annual budget for eye care in Ireland

Community services constitute 17.3% of the total budget, including eye exams performed by optometrists and ophthalmologists, and appliances, while community drugs represent 10.1% of the total budget. The calculation of the COPs contribution is based only on the salary of 22 WTE COPs who are exclusively and fully working in community settings. An estimate of the facilities, equipment and other resources involved in their practice was not feasible (as data are unavailable).

The estimated €156.8 million total eye care budget represents approximately 1.17% of the total health budget. Considering a total population of 4.59 million people in Ireland in 2011 (CSO, 2011), the HSE budget per capita on eye care is €34.

Year	HSE Budget (€mil)	Eye care Health Expenditure (€mil)	Eye care Health Exp. as % of Total Health Exp.
2011	€13,456	€156.8	1.17%

Table 9: Eye care budget or expenditure as a proportion of total health budget

Year	Population (CSO, 2011)	Eye care Health Expenditure (€mil)	Eye care Health Exp. Per Capita
2011	4,588,252	€156.8	€34

Table 10: Eye care budget or expenditure per capita in Ireland

Although it can be informative and interesting to compare budget or expenditure figures for Ireland with other countries, such comparisons must be made with caution. Like with like comparisons are not always possible due to differences in service delivery models across these countries, and differences in determining individual cost components.

A reasonable attempt of comparison can be done between the annual budget for eye care in Ireland with cost data from England, as English data for 2011 are available, and the English 'Problems of Vision' programme budget represents the most comprehensive measure of expenditure on ophthalmic services. The 'Problems of Vision' programme budget covers inpatients, outpatients, general ophthalmic services (exams and appliances), GP prescriptions and community services.<sup>xv</sup> The expenditure on the 'Problems of Vision' programme has increased from £1.2 billion in 2003–2004 to £2.14 billion in 2010–2011. This represents an increase of 78% during this time period.

Year	"Problems of Vision" programme total expenditure £ billion	% of overall Programme Budget	"Problems of Vision" per capita expenditure
2008/09	£1.67	1.7%	£32.57
2009/10	£1.93	1.9%	£37.17
2010/11	£2.14	2.0%	£40.19

Table 11: 'Problems of Vision' expenditure trend in England

Table 11 also shows the increase in the percentage of the 'Problems of Vision' programme out of the overall total programme budget: from 1.7% in 2008–2009 to 2% in 2010–2011. Finally, the 'Problems of Vision' per capita expenditure has also increased; the average spend per person was £24.47 in 2003–2004, increasing to £40.19 in 2010–2011 in England. As shown in Figure 14, the percentage of the total health budget or programme spent on eye care is almost double in England as compared to Ireland, and the eye care expenditure per capita is almost 40% higher than Ireland (€46.30 in England versus €34 in Ireland).

2011	Ireland	England
Eye Care Total Expenditure	€156.8 million	£2.14 billion
% of Total Health Budget	1.17%	2.0%
Eye Care per capita Expenditure	€34	£40.19/€46.30 using average 2011 rate exchange

Table 12: Comparison between eye care budget or expenditure in Ireland and England

## 9. Demand for eye care services in Ireland

Accessing accurate data that capture the true level of activity across ophthalmic services is challenging. The Hospital In-Patient Enquiry system (HIPE) records information on the number of patients admitted for inpatient or day case procedures. It does not record the number of patients treated as outpatients, where a great deal of ophthalmic activity takes place. The HIPE system only records data from acute services, and does not take into account activity in community care. This is a significant gap in the system and must be addressed with urgency.

### 9.1 Paediatric conditions

#### 9.1.1 Brief description of conditions

Eye problems in children are very different than those of adults. Children are not born seeing, and the development and maturation of the visual pathways occur within the first five to seven years of life. Early identification and intervention in dealing with a visual disorder maximises the long-term sight that a child will have.

A number of common eye disorders can impact on the development of a child's vision. A refractive error is a disturbance of the optical system of the eye leading to an out-of-focus image being formed on the retina. Myopia (short sight) is where the image of an object is focused in front of the retina so that distance vision is blurred. Hypermetropia (long sight) is where the image of an object is focused behind the retina so that near images are blurred. Astigmatism is a mixture of refractive error at different axes caused by an irregularly shaped cornea at the front of the eye, preventing the formation of a sharp retinal image.

Strabismus (often referred to as squint) is the medical term for a misalignment of the eyes. The consequence of constant strabismus in childhood is that it may cause amblyopia, which is a reduction of visual acuity in one or both eyes, usually in an otherwise normal eye. If a child has blurred vision or a poorer quality of vision in one eye (due, for example, to uncorrected refractive error, strabismus, cataract or ptosis), then amblyopia may develop. Amblyopia results in lifelong visual impairment if not treated in childhood.

There are many other paediatric medical conditions that impact on the eye and vision, and require ophthalmic intervention. Examples include prematurity, Down syndrome, Stickler syndrome, neurofibromatosis, juvenile arthritis and tuberculosis.

#### 9.1.2 Patient cohort and prevalence

The number of children born in Ireland has increased significantly in recent years.

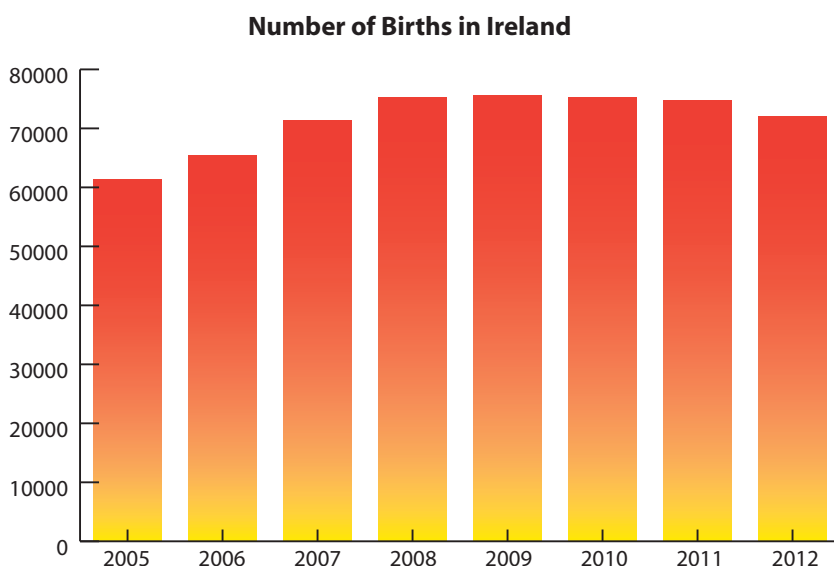


Figure 3: Number of births in Ireland

The aim of children's vision screening is to identify problems early in order to maximise visual benefit. In Ireland, the screening is carried out under the guidance of Best Health for Children. Screening at birth by paediatric services identifies non-refractive childhood disorders, e.g. congenital cataract.

Untreated amblyopia almost doubles the lifetime risk of bilateral visual impairment for patients with amblyopia as they have only one well-functioning eye. Accidental trauma is more common in individuals with only one 'good eye'. Career choices may be limited where good stereovision is a prerequisite, such as aviation.

### 9.1.3 Treatment

Treatment of a significant refractive error with spectacles is the cornerstone of therapy for strabismus and amblyopia. Optical correction alone will improve vision in amblyopia by two lines or more in two-thirds of children. In many cases, a child will need to undergo further therapy for amblyopia in the form of occlusion therapy, which is used to improve the vision in a lazy or amblyopic eye. The child's good eye will be covered with a patch, forcing the child to use their weaker eye to see. This allows the brain to re-establish the connection with the lazy eye. Occlusion therapy is prescribed for a set period of time per day, and this therapy is determined by the depth of amblyopia, the age of the patient, and the cause of amblyopia.

Once a child has had spectacles correction and therapy for amblyopia, if a significant misalignment persists, an operation may be required to improve ocular alignment. Surgery is usually performed under general anaesthetic as a day case procedure. The surgery will not improve vision in a lazy or amblyopic eye, and spectacles usually continue to be required after surgery. The suitability and timing of strabismus surgery varies on a case-by-case basis, taking into account clinical and parental opinion. It is not uncommon for more than one operation to be necessary.

## 9.2 Adult conditions

### 9.2.1 Age-related macular degeneration

Age-related macular degeneration (AMD) is an ageing change in the macula, which is the central part of the light-sensitive retina. The retina lines the inside of the back of the eye, and is responsible for vision. The macula is responsible for central vision such as reading and recognising facial details. There are two types of AMD, dry and wet, and both can cause loss of vision.

#### 9.2.1.1 Patient cohort and prevalence

AMD is the leading cause of severe visual loss in patients over 60 years of age. The prevalence of AMD increases steadily with age. With the number of people in Ireland aged over 65 expected to increase by two-fifths by 2026 and to treble by 2041, it is vital that those at risk are identified and treated or monitored early.

### AGE RELATED MACULAR DEGENERATION – Inpatient and Day Cases Age Profile

2015

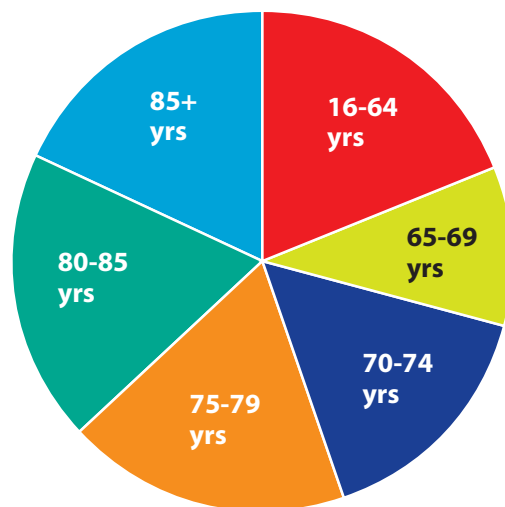


Figure 4: Age-related macular degeneration – age profile of patients

### 9.2.1.2 Treatment

Wet AMD is treatable, but there is currently no treatment for dry AMD. The advent of anti-vascular endothelial growth factor (VEGF) agents has drastically altered prognosis for wet AMD. As the window of opportunity for treating AMD is three to four weeks, patients who are diagnosed need rapid access to ophthalmic care. This is the only way they can achieve a good outcome which can potentially save their sight and maintain independent living. As can be seen in Figure 17, there has been a huge increase in treatments between 2005 and 2015.

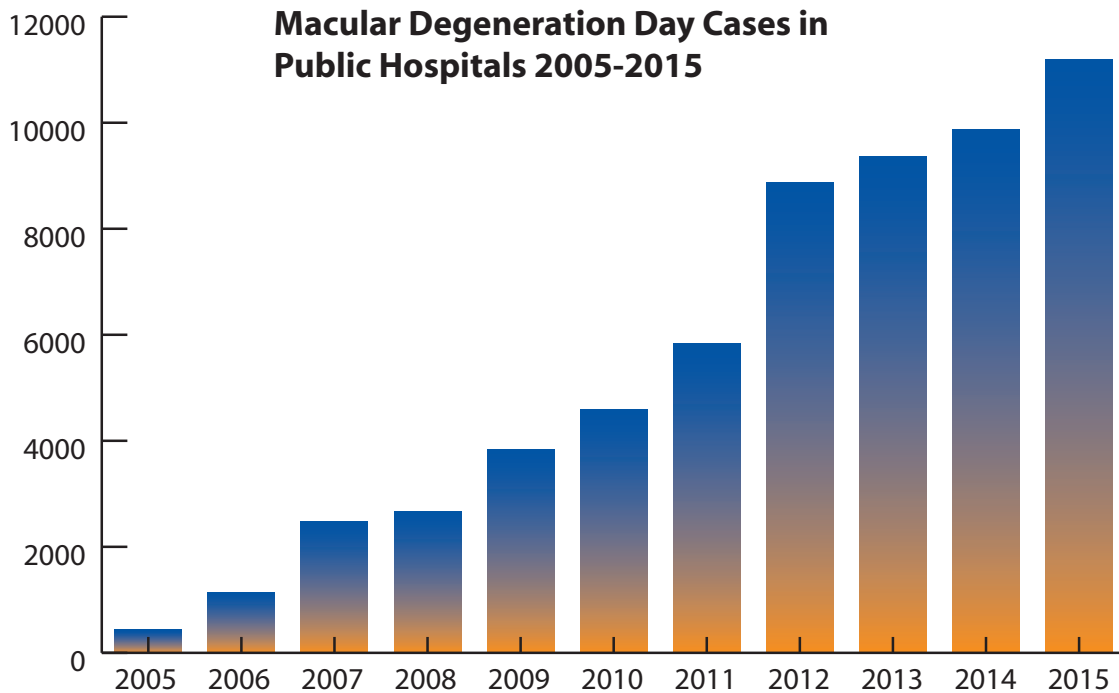


Figure 5: Number of patients treated as day cases in public hospitals

These data do not encompass treatments in the private sector. No additional funding has been allocated for this service, despite the increase in treatments which has necessitated the installation of cleanrooms, extra nursing and administrative staff, and a greatly-increased pharmaceutical budget. The use of Avastin (currently unlicensed for this indication and used off-label) instead of the licensed product Lucentis has helped containment of the budgetary increase by a factor of approximately 16. This leaves the liability of using an off-label product with the treating physicians, an issue that will be the source of a major debate in the near future.

### 9.2.2 Cataract

A cataract occurs when the lens, which is used to fine focus the image within the eye, becomes clouded. It usually develops over a period of time, causing gradual eyesight deterioration involving increasingly blurred and cloudy vision, glare, and it may eventually lead to blindness. Cataracts are usually bi-lateral but asymmetrical, and the rate of decline in vision is variable and unpredictable.

#### 9.2.2.1 Patient cohort and prevalence

Cataracts are a common problem. Although they can occur at any age, incidence increases with age, and by the age of 75, 25% of all people will have developed a cataract. In 2012, data from the Hospital In-Patient Enquiry (HIPE) scheme indicated that there were almost 12,000 day cases from public hospitals for patients who had undergone cataract surgery. Eighty percent of these patients were over 65 years of age, with 18% of all patients classified as private. Cataract surgery is a high-volume surgery in Ireland, with extracapsular crystalline lens extraction by phacoemulsification featuring in the top 20 day case procedures performed annually in public hospitals since 2005, and accounting for approximately 1% of all day case procedures.



## CATARACT – Inpatient and Day Cases Age Profile

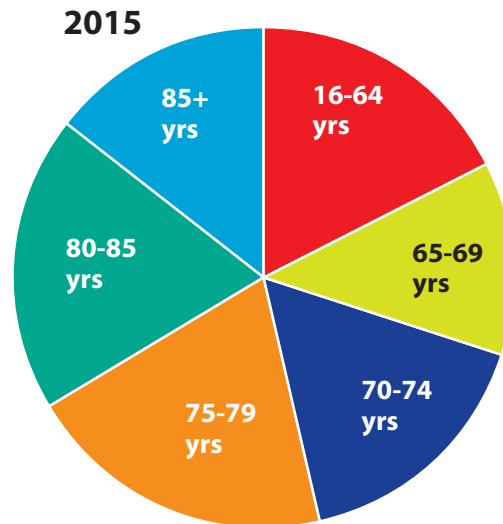


Figure 6: Cataract – age profile of patients

### 9.2.2.2 Treatment

Surgical treatment involves removing the patient's cloudy lens and implanting an artificial lens. Phacoemulsification is the preferred technique for cataract surgery. The surgery itself is a high-tech surgical procedure which is widely perceived to be very safe. Cataract surgery is recognised as one of the most successful operations in terms of outcome and patient satisfaction. Risks include anaesthetic and surgical complications, but the majority of cases are done under local anaesthetic, which has reduced the potential risks. Serious early complications include endophthalmitis, toxic anterior segment syndrome, cystoid macular oedema, persistent corneal oedema, retinal detachment, haemorrhage, decreased vision and general complications associated with surgery in the elderly.<sup>xvi</sup> The most common late post-operative complication is posterior capsular opacity which may occur in up to 40% of patients within 10 years, and which can be treated simply with YAG laser (yttrium aluminium garnet) capsulotomy surgery.

Modern cataract operations and modern hip replacements are the two surgical procedures that provide the greatest quality of life improvement for the patient. They are both equally successful and equally unforgiving if complications arise.

The majority of cataract patients are suitable for day case surgery, with a large shift from inpatient to day case surgery seen in recent years. In 2005, just 56% of cases were treated as day cases, however in 2015, just 429 or 3% patients had cataracts removed as inpatients, while 13,038 or 97% were day case procedures.

It is possible that the proportion treated as day cases will rise, but a small number of patients will continue to require surgery under general anaesthesia, and need inpatient treatment (e.g. those with co-existing ocular disease, deafness or cognitive impairment).

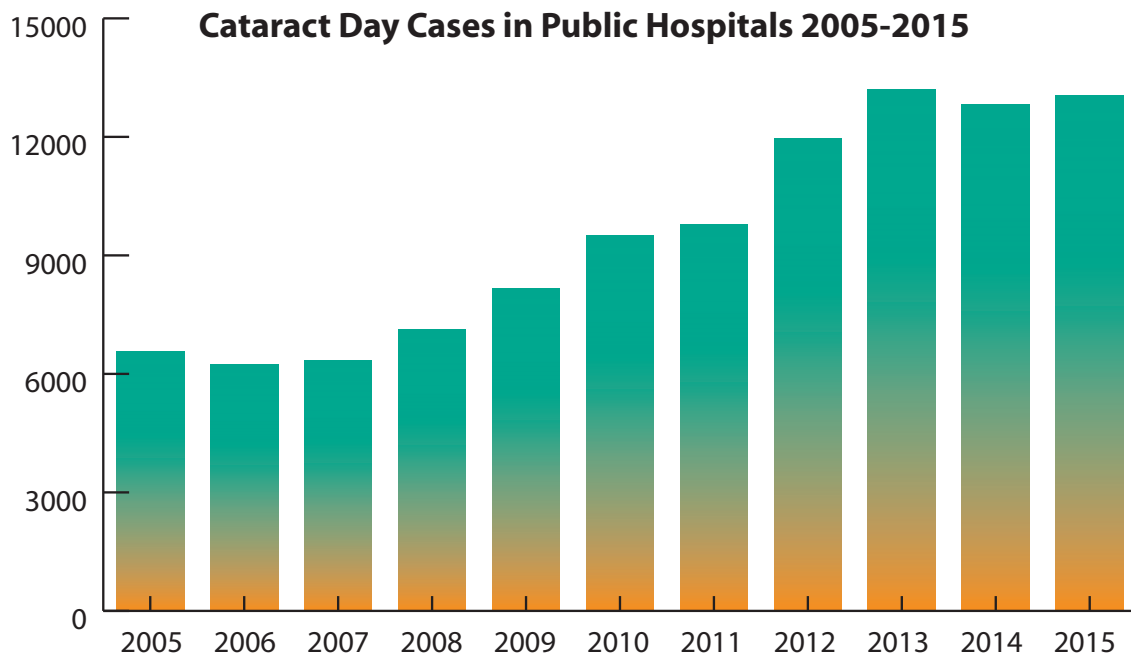


Figure 7: Number of patients treated as day cases in public hospitals

In the future, femto-laser cataract surgery has the potential to offer a robotic approach, but the current cost is considered too high. There may also be a place for newer intraocular lenses to concurrently correct presbyopia and astigmatism.

### 9.2.3 Diabetic retinopathy

Diabetes mellitus is associated with the development of a number of complications. One of these is the development of diabetic retinopathy, potentially resulting in blindness. Diabetic retinopathy is a very common cause of blindness and vision loss in Ireland, particularly in the under 65 years age group. Timely and appropriate care for people with diabetes can significantly reduce visual loss over time, improve patients' quality of life, and reduce the financial burden associated with the complications of visual impairment. Screening, followed by treatment of sight-threatening retinopathy where required, has been shown to be effective.

#### 9.2.3.1 Patient cohort and prevalence

In 2013, the HSE and National Screening Service (NSS) launched Retina Screen, the Irish National Diabetic Retinopathy Screening Programme linked to a system for referral of patients with sight-threatening retinopathy to designated eye departments in public hospitals. Currently, Retina Screen has a verified register of 145,000 diabetic patients, who are invited to participate in the screening programme. Two private companies have been contracted to provide the digital photographic screening and grading service for the country. Children under 12 years and pregnant diabetic patients will continue to be managed through existing pathways.

It is estimated that for a multi-cultural population of 3.8 million (aged 12+) that a projected 5.6% or 214,000 have either type 1 or type 2 diabetes. Based on an 80% uptake, it is expected that the photographic grading of 172,000 eligible individuals will be done yearly.

There are two patient groups excluded from the National Programme; diabetic patients under 12 years of age will be referred to a paediatric ophthalmologist for yearly screening from the age of five after initial diagnosis. Type 1 diabetic children can enter the national screening programme from 12 years of age. Children with type 2 diabetes should have fundus photography or clinical reviews yearly from diagnosis. Effectively, most diabetic children will be accommodated in the National Screening Programme as they will be less than 12 years old. Pregnant patients will be referred to the local eye unit for assessment, as appropriate, by the endocrinologist resident at the maternity hospital.

### DIABETIC RETINOPATHY – Inpatient and Day Cases Age Profile

2015

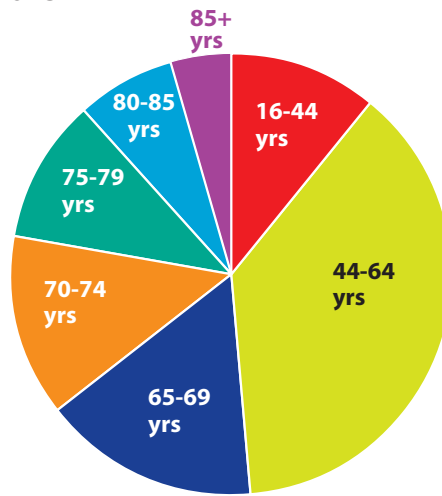


Figure 8: Diabetic retinopathy – age profile of patients

#### 9.3.3.2 Treatment

Effective treatment of diabetic retinopathy may include laser photocoagulation, intravitreal injections, or vitrectomy. Diabetic retinopathy (DR) screening is a population screening programme; it is not an ocular disease diagnosis and treatment service. Screening will not detect every individual with DR, and it will not be possible to offer screening to all people with diabetes. However, the intention is to deliver an overall reduction in sight loss due to DR in the population at risk.

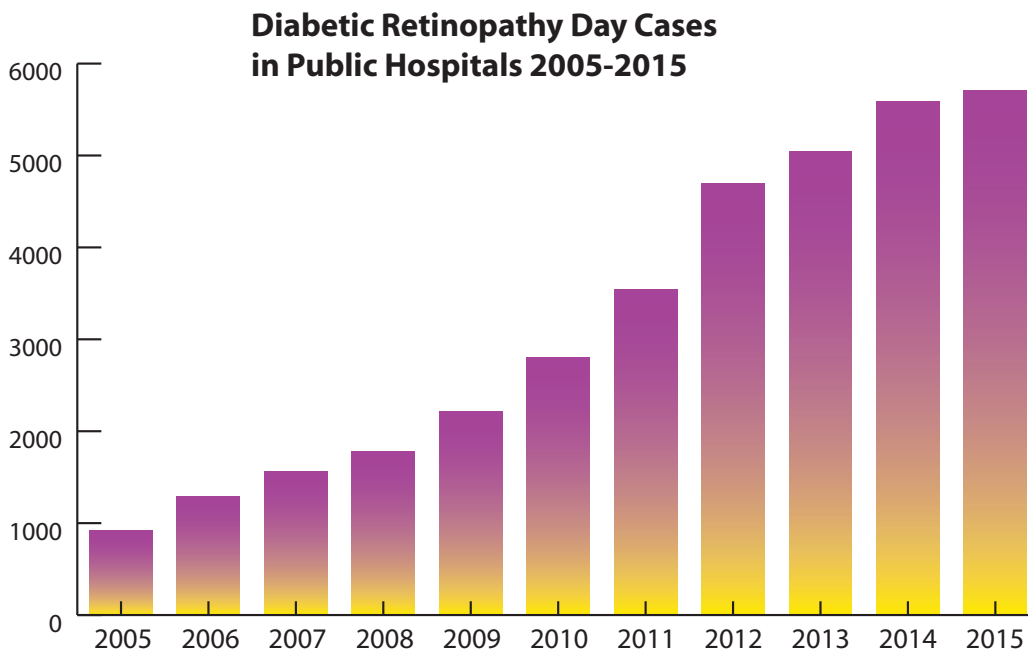


Figure 9: Number of patients with DR treated as day cases in public hospitals

### 9.2.4 Glaucoma

Glaucoma accounts for 12% of those registered as blind in Ireland, and is the second most common cause of blindness next to macular degeneration. In the advanced stages, the visual impairment is profound, as the entire field of vision is affected. Visual loss from glaucoma is preventable if it is diagnosed and treated in the early stages. Glaucoma patients require lifelong care, with ongoing assessment to ensure preservation of vision and good response to treatment.

#### 9.2.4.1 Patient cohort and prevalence

Glaucoma affects 2% of the population, with the prevalence rising with each decade in age to over 3% in those over 70 years of age. With the number of people aged over 65 expected to increase by two-fifths by 2026 and to treble by 2041, it is vital that those at risk are identified and treated or monitored early. Glaucoma is a silent disease in its early stages, with few symptoms until loss of vision is advanced and irreversible. The main risk factors for glaucoma are advancing age, family history, high intraocular pressure, and people of African descent.

#### 9.2.4.2 Treatment

Clinical glaucoma is a lifelong condition, and the sole objective is preventing further visual field loss. Glaucoma control is achieved in the majority of patients by topical drop applications alone.

### GLAUCOMA – Inpatient and Day Cases Age Profile

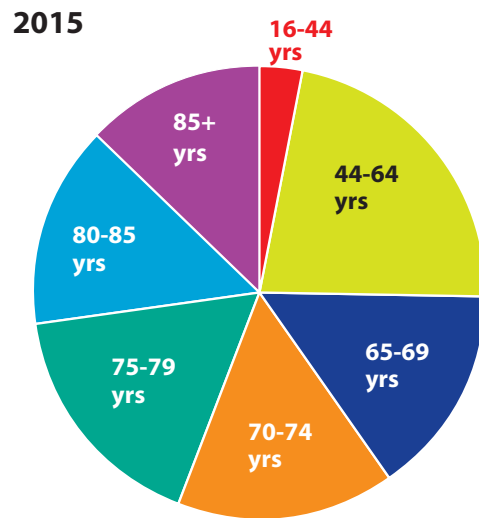


Figure 10: Glaucoma – age profile of patients

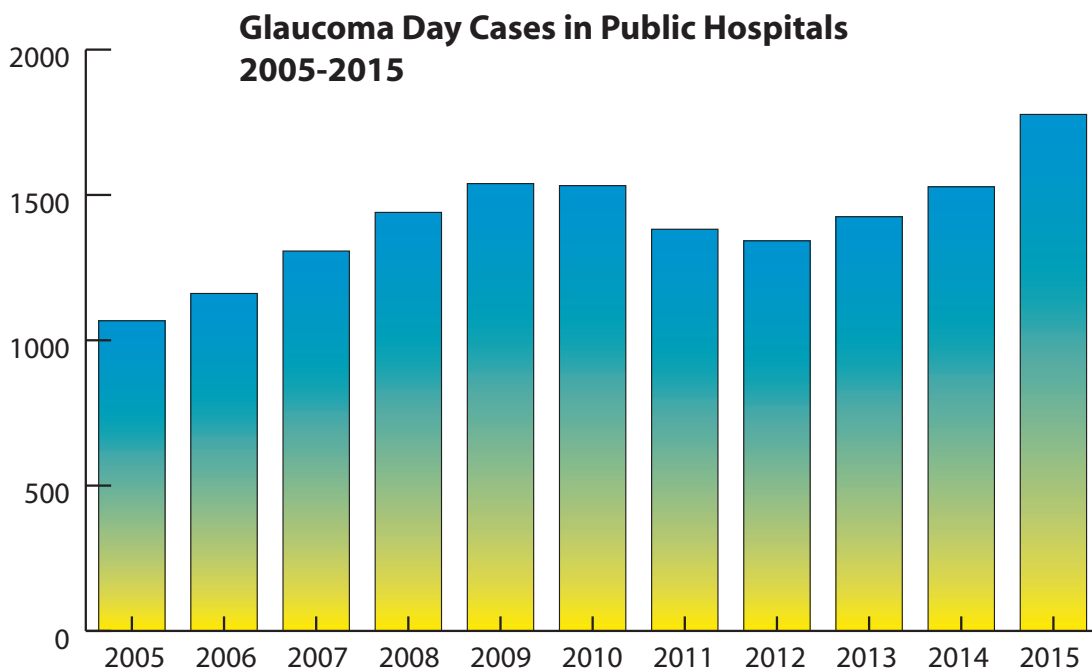


Figure 11: Number of glaucoma patients treated as day cases in public hospitals

### 9.3 Current demand

The current demand for eye care services is far in excess of the existing capacity. The waiting lists for community appointments, and the current waiting list data for both inpatient or day case treatment and outpatient appointments for patients in ophthalmology is significant.

<b>Number of Patients waiting for treatment</b>	<b>Dec-15</b>	<b>Dec-15</b>
<b>LHO</b>	<b>0-17 yrs</b>	<b>18 yrs+</b>
Cavan Monaghan	352	140
Donegal	588	1332
Sligo Leitrim	143	15
<b>CHO 1</b>	<b>1083</b>	<b>1487</b>
Mayo	366	155
<b>CHO 2</b>	<b>366</b>	<b>155</b>
Clare	74	168
Limerick	710	0
North Tipperary East Limerick	544	38
<b>CHO 3</b>	<b>1328</b>	<b>206</b>
Kerry	1998	1305
North Lee	0	0
West Cork	217	0
<b>CHO 4</b>	<b>2215</b>	<b>1305</b>
Waterford	0	0
Wexford	348	125
<b>CHO 5</b>	<b>348</b>	<b>125</b>
Wicklow	4293	0
<b>CHO 6</b>	<b>4293</b>	<b>0</b>
Louth	854	678
<b>CHO 8</b>	<b>854</b>	<b>678</b>
Dublin North Central	2612	0
<b>CHO 9</b>	<b>2612</b>	<b>0</b>
<b>National</b>	<b>13099</b>	<b>3956</b>

Table 13: Current waiting lists for community eye clinics (December 2015)

Figure 25 shows the current numbers of patients waiting, and the length of waiting list, for a hospital inpatient or day case treatment. Figure 27 shows the number of patients waiting for an ophthalmology inpatient or day case treatment with the total number of patients waiting for an inpatient or day case treatment. It shows that in the 0–18+ months timescale, ophthalmology patients represent more than 16% of the total inpatient day case treatment waiting list.

Ophthalmology Waiting List for Inpatient/Daycase Treatment, August 2016								
	Months							
Ophthalmology	0-3 Mths	3-6 Mths	6-9 Mths	9-12 Mths	12-15 Mths	15-18 Mths	18+ Mths	TOTAL
No. of Patients Waiting	3,108	2,460	2,173	1,978	1,335	984	849	12,887

Source: National Treatment Purchase Fund

Table 14: Number of patients awaiting inpatient or day case ophthalmic treatment (August 2016)

Proportion of the Ophthalmology Inpatient/Daycase Treatment Waiting List out of the Total Patients Waiting List, August 2016								
	Months							
	0-3 Mths	3-6 Mths	6-9 Mths	9-12 Mths	12-15 Mths	15-18 Mths	18+ Mths	TOTAL
Ophthalmology Inpatient/daycase	3,108	2,460	2,173	1,978	1,335	984	849	12,887
Total Inpatient/daycase	25,739	16,970	11,552	9,666	6,132	4,099	4,143	78,499
Proportion Opth./Total Inpatient/daycase waiting list	12.1%	14.5%	20.5%	20.5%	21.8%	24%	20.5%	16.4%

Source: National Treatment Purchase Fund (NTPF)

Table 15: Proportion of ophthalmology inpatient or day case waiting list (out of the total inpatient or day case patients waiting list (August 2016).

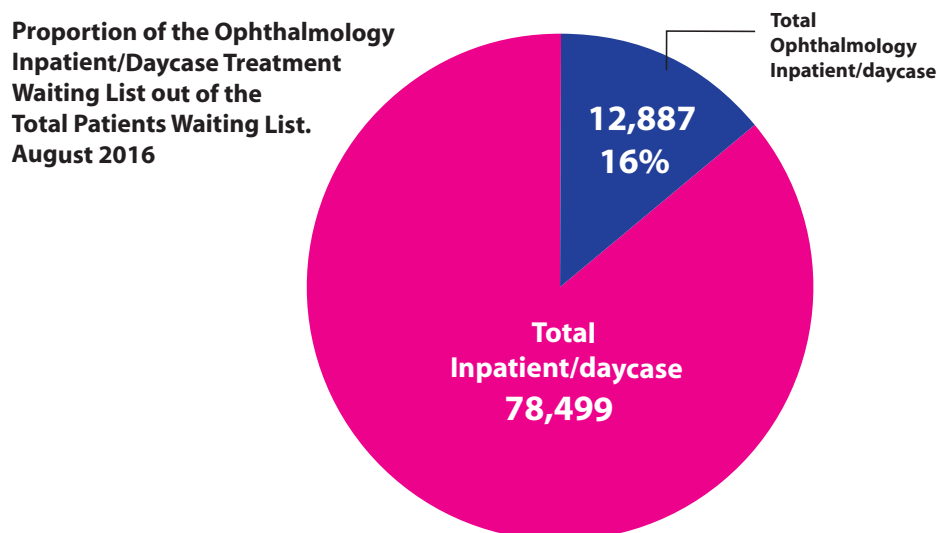


Figure 12: Proportion of total inpatient or day case patients waiting list waiting for ophthalmic appointments (August 2016)

Table 14 shows the current numbers of patients waiting, and the length of waiting list, for a hospital outpatient appointment. Table 15 shows the number of patients waiting for an ophthalmology outpatient appointment with the total number of patients waiting for an outpatient appointment. Figure 12 shows that in the 0–18+ month timescale, ophthalmology patients represent 7% of the total outpatient waiting list.

Ophthalmology Waiting List for Outpatient Appointment, August 2016								
	Months							
Ophthalmology	0-3 Mths	3-6 Mths	6-9 Mths	9-12 Mths	12-15 Mths	15-18 Mths	18+ Mths	TOTAL
No. of Patients Waiting	10,923	6,503	4,156	3,581	2,409	1790	1505	30,867

Source: National Treatment Purchase Fund

Table 16: Waiting list for ophthalmic outpatient appointment (August 2016)

Proportion of the Ophthalmology Outpatient Waiting List out of the Total Patients Waiting List, August 2016								
	Months							
	0-3 Mths	3-6 Mths	6-9 Mths	9-12 Mths	12-15 Mths	15-18 Mths	18+ Mths	TOTAL
Ophthalmology Outpatient	10,923	6,503	4,156	3,581	2,409	1790	1505	30,867
Total Outpatient	154,975	95,335	61,894	48,828	30,702	21,073	22,309	435,116
Proportion Ophth./Total Outpatient waiting list	7%	6.8%	6.7%	7.3%	7.8%	8.5%	6.7%	7%

Source: National Treatment Purchase Fund (NTPF)

Table 17: Proportion of total outpatient waiting list awaiting ophthalmic appointments (August 2016)

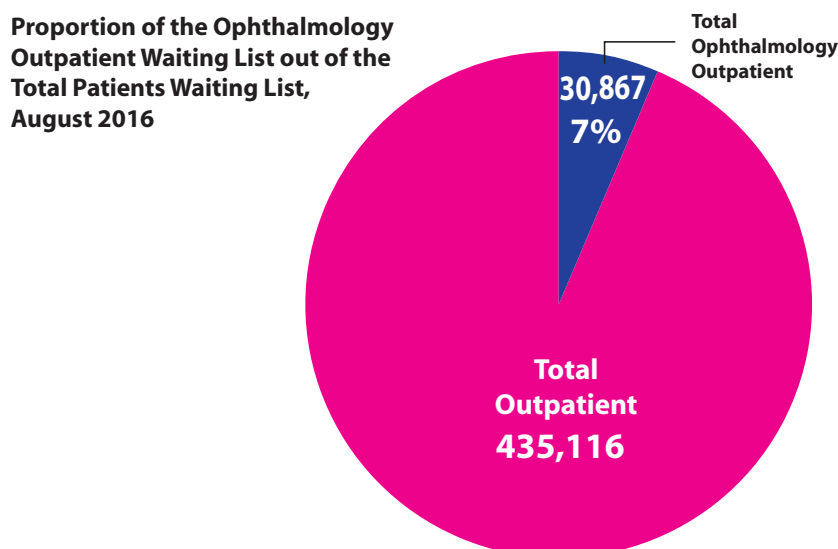


Figure 13: Proportion of total outpatient waiting list awaiting ophthalmic appointment (August 2016)

## **10. Evolution of the service – a blueprint for the future**

The next 25 years will see a record increase in the number of the population aged over 65 years, causing an unprecedented demand in eye care services. The greatest demand will be in the areas of medical retina, cataract surgery, and glaucoma. The need for cataract surgery in the public system alone is predicted to rise from 13,000 in 2015 to 17,000 in 2021, 23,000 in 2033 and 30,000 in 2041.

There will also be a significant increase in the 'oldest old' (i.e. over 85 years of age), increasing the prevalence of AMD, and with it, the need for intravitreal injections will rise from 11,000 in 2015 to an anticipated 32,000 in 2021.

Coupled with this increase in the over 65 years age group is a simultaneous but more modest growth in the paediatric population, and a steady increase in the number of the population with type 2 diabetes, currently at 160,000 but expected to increase by 80,000 by 2024. Add in the current backlog with over 15,000 patients on the waiting list for procedures, 25,000 awaiting outpatient appointments, and 13,000 awaiting primary eye care services, and the eye care demand can appear overwhelming.

The transition towards a more community-centred model, with the transfer of stable patients back to community care, will result in expanded capacity in hospitals to meet the increased demand for cataract operations. The delivery of that increased capacity will require additional access to theatre space and time, with full supporting staff.

To implement a fit-for-purpose model with an integrated and coordinated service for the general population, the following key recommendations, detailed in sections 10.1 to 10.10, have been identified.

### **10.1. Primary eye care clinics**

There is a clear need to move away from an over-reliance on care delivered in the acute sector. The NCP for Ophthalmology recommends a hub-and-spoke model of eye care.

As many of the diagnostic and treatment advances are technologically driven, equipment which carries capital cost implications will be required. It is preferable to have a smaller number of properly equipped clinics, where staff can work together and access appropriate resources, as opposed to the existing arrangements where there is a large number of outreach clinics with staff working in isolation in poorly equipped clinics. To ensure readings and results are comparable, the equipment used in the clinics must be standardised, e.g. Humphrey visual field analysis in glaucoma.

Each CHO will establish a primary eye care clinic, as appropriate for the population density and geographic spread in that area, to manage all primary care eye requirements for children and adults within that CHO. Each clinic will be resourced with adequate equipment for diagnosis and treatment, and with appropriate IT infrastructure.

The clinics will work closely with the appropriate Hospital Group, general practice and the contracted providers to ensure the provision of a well-defined service to children and adults.

The primary care clinics will be staffed by multidisciplinary teams based in locations with optimum accommodation, facilities, equipment and resources.

### **10.2 Primary eye care teams**

There is a clear need to move from the current over-reliance on medical ophthalmologists for the delivery and management of all care in the community, to a new model centred on a multidisciplinary primary eye care team.

The team will provide services along determined care pathways, in keeping with high quality standards, to both children and adults. The services will be delivered in a highly integrated fashion, and will be supported by an IT patient management system.



The primary care clinics will be staffed by medical ophthalmologists, optometrists, orthoptists, nurses and technicians. The medical ophthalmologist will be the lead clinician for the service, with responsibility for clinical governance and leadership within the team. The majority of the workload associated with initial assessment and ongoing monitoring will be completed by the optometrist, orthoptist, ophthalmic nurse and/or technician. The role of the medical ophthalmologist will primarily focus on medical issues, governance and safety.

A new development in the primary eye care team model is the inclusion of optometrists as team members, and their employment on site by the HSE. The purpose of introducing the team approach is efficiency; a community ophthalmic physician working alone can see approximately 12 patients per three-hour session if they are responsible for the history, visual acuity, refraction, tonometry, pharmacological dilatation of the pupils and fundus examination. Working in this way, each patient takes approximately 60 minutes, thus waiting lists will never be reduced.

Optometrists in Ireland are trained to diagnose vision defects due to errors of refraction, i.e. those defects correctable with spectacle lenses: myopia (short sight), hyperopia (long sight), astigmatism (distorted sight), and presbyopia (declining ability to focus for reading in middle age). While this is their core skill, they also receive training in the recognition of common intrinsic eye diseases such as strabismus (squint), amblyopia (lazy eye), cataract, glaucoma, macular degeneration and diabetic retinopathy. Incorporating these skills would greatly enhance the effectiveness of the primary eye care team, as the number of patients seen in a 'one-stop shop' could triple the number seen by a community ophthalmologist working alone. This is the only way to successfully reduce waiting lists. In the UK, NHS optometrists are centrally engaged in hospital and community-based service delivery, and many clinics could not function without them.

There are insufficient numbers of orthoptists in the current scheme, and they are unevenly spread around the country. Orthoptists possess as their core skill the assessment of visual acuity in pre-literate children and detection of the presence of any manifest or latent strabismus.

The role of orthoptists in adult care such as stroke patients and low vision patients would also be greatly enhanced by increasing the numbers of orthoptists working in specialised clinics.

Many patients with chronic eye diseases, for example glaucoma, do not require changes in treatment if the condition is stable, but must be monitored to ensure that the condition does not deteriorate. Optometrists have a role in this periodic monitoring, and also in the post-operative care of cataract patients and in the ongoing treatment of children who have been identified as having visual defects.

Ophthalmic technicians are trained to perform medical and diagnostic tasks under supervision. They perform measurements, administer medications, and assist in patient care, in addition to other administrative duties such as history taking.

While it is preferable to have a fully funded and equipped publicly delivered service, the existing COSS and COSMTS schemes are also appropriate mechanisms for the continuing delivery of primary and specialist care in the community.

### **10.3 Workforce planning**

Changing the skill mix of the PCET will provide an opportunity for having appropriately skilled but lower-cost healthcare professionals performing some of the tasks currently performed by the medical ophthalmologist without adversely affecting outcomes. Such substitutions would free up medical ophthalmologists to focus on those patients with the greatest medical need, including those referred out from hospitals, which in turn will free up capacity in the hospital eye departments.

Detailed workforce planning will be necessary in order to determine the required number of each of the different professions forming part of the team.

## **10.4 IT support and electronic patient records**

The successful reconfiguration of the delivery of eye care is dependent on the implementation of an electronic patient record (EPR). Regional IT links are essential for the programme to function by ensuring visibility of patient records in community practices, satellite clinics and hospital settings. Implementation of an EPR is essential in order to facilitate the treatment of patients in the community, so that all those involved in treating the patient can view the section of the patient's records necessary for their role in the eye care pathway.

Each unit must be equipped with appropriate IT infrastructure, so that patients can be easily recalled using an electronic database. This will avoid patients being lost to follow-up, and will allow easy intervention where patients miss appointments. The development of integrated care pathways will involve sending patient data, including photographs, to multiple locations, and a proven, robust software system will be needed instead of a paper-based system in all locations participating in the pathway.

Fundamental to having a quality model of eye care is procuring a national EPR that enables effective monitoring of performance (coverage, referral rates, outcomes, etc.). An EPR will help to underpin the service by allowing all professionals track where the patient is on his or her journey, and will facilitate the collation of metrics for better integration and communication between service providers, and for the conducting of research and audit.

## **10.5 Expanding capacity in the acute service**

Transition towards a more community-centred model, with the transfer of stable patients back to community care, will result in expanded capacity in hospitals to address waiting lists for specialist and surgical interventions. To deliver on that increased capacity will require increased access to theatre space and time, with full supporting staff.

An additional method of boosting service capacity, reducing waiting times and improving efficiency is through the introduction of standalone high-volume cataract centres. These centres are designed with state-of-the-art operating theatre facilities for operations in an ambulatory setting. Operations are performed with efficient workflow and standardised pathways and protocols for the same diagnosis. Designated staff undertake operations with efficiency and skill, and quality of service is enhanced through practice. These high-volume cataract centres not only reduce turnaround times between operations, but also enhance individual surgeons' efficiency.

Detailed workforce planning will be required in order to ensure adequate staff, both clinical and support, are available.

## **10.6 Audit, benchmarking and quality assurance**

Quality needs to be a fundamental priority in the redesign of the system and the resources utilised to ensure that eye care is delivered in line with best practice. Ongoing audit of practice is essential, and quality standards for eye care must be developed to measure quality and to enable adjustments to be made where necessary. Quality standards also assist in maintaining the efficiency and optimisation of the programme.

A clinical governance framework must be put in place to support the provision of quality services by ensuring integrated care via clear referral pathways and formalised networks, and enabling a culture of continuous quality improvement.

In the acute setting, the hospital Clinical Director is responsible for clinical governance. Within each CHO, a lead medical ophthalmologist should provide clinical governance for primary care eye services within that CHO. The lead medical ophthalmologist should report directly to the CHO Chief Officer or their designate. This role will require expertise in medical retina, glaucoma, paediatric ophthalmology and service management. The lead ophthalmologist requires a high degree of critical clinical decision-making to ensure the quality of the community-delivered service and to avoid unnecessary referral into the acute service.

The Irish College of Ophthalmologists (ICO) will develop a programme in medical ophthalmology appropriate to this position, and seek the establishment by the HSE of a community-based consultant grade in medical ophthalmology.

A national lead ophthalmologist should report directly to the National Director for Primary Care to ensure that work practices are consistent across the country.

### **10.7 Education and training**

Much of the resources of smaller community clinics are currently given over to seeing referrals from the National Childrens' Vision Screening Programme. Audits have shown that a significant cohort of the children referred are false positives and do not require medical intervention. An education programme for screeners must be implemented in order to reduce the number of false positives. The members of the PCET must support the enhancement and delivery of this education programme. Programmes of training and referral guidelines for general practice must also be developed in relation to the management of routine eye conditions and the conducting of the six-week baby eye check.

Each eye care professional must engage in continual professional development as required to maintain their professional registration. All newly introduced primary eye care clinic teams will benefit from training in concepts such as team work, communication, change management, developing standard operating procedures, vetting referrals, etc.

All members of the primary eye care team will be involved in continuing professional development, including multidisciplinary team meetings with referring GPs, optometrists, public health and school nurses, and hospital-based consultant surgical ophthalmologists.

### **10.8 Budget**

The resources required to deliver a fit-for-purpose eye care service will have budgetary implications. The development of well-equipped primary eye care clinics, with multidisciplinary teams, and the expansion of hospital capacity, will all require adequate funding.

Budgetary constraints may continue to impact on access to services and medicines. However, this should not impact in any way on the safety and quality of care within the healthcare system. As repeatedly stated by the Health Information and Quality Authority (HIQA), reductions in resource allocation should never be used to justify any compromises in this regard. An overarching strategy would assist with the development of nationally-agreed parameters in terms of patient safety and quality of care.

### **10.9 Contract and administrative changes**

The current HSE contracts for the delivery of eye care will have to be reviewed and amended in order to enable the delivery of the proposed pathways, and the additional examinations, that will be carried out for public patients.

The greatest volume of eye care examinations occurs at the primary care level, and every effort should be made to enable and to enhance service delivery at this level. Optometrists in practice detect many instances of eye diseases, therefore revised referral procedures are required so that an optometrist can make appropriate direct referrals to specialist care without cost to the patient.

Under the current optical schemes, there are restrictions on the number of visits that are funded. To allow for delivery of the new services envisaged under this Model of Eye Care these restrictions must be adjusted. Changing the legislative regulations to permit children of Medical Card holders to access appropriate community eye services – the COSS (optometry and ophthalmologists) and COSMTS schemes – is a key enabler.

The schedule of services that are allowed for under the contract will need to be expanded and developed. Additional examinations that are currently not allowed for will need to be taken into account to facilitate the successful implementation of this Model of Eye Care. Accordingly, changes will have to be made to administrative structures in order to service the new contracts.

A system must be developed to facilitate and fund treatment of children up to the age of 16 who require it and for children who have been discharged from medical care to optometry, as outlined in the paediatric pathway in this Model of Eye Care. All children up to the age of 16 years should be treated equitably nationally.

Application should be centralised to allow for equity in access, equal care, and to ensure standard response times (similar to the Department of Social Protection Optical Benefit Scheme). The use of PCRS for all payments to COSS and COSMTS contractors for all services (eye exams and dispensing) provided under HSE contract would increase transparency, and would also enable the collection of statistical data. Allowing medical HSE-COSS contractors to treat all children under the COSMTS could further address some of the access and eligibility issues.

### **10.10 Budget for the treatment of age-related macular degeneration(AMD)**

Age-related macular degeneration (AMD) was previously untreatable and caused irreversible sight loss. Treatment was largely ineffective and consisted of laser and photodynamic therapy. However, since the advent of vascular endothelial growth factor (VEGF) treatments, the number of patients who are being successfully treated has increased exponentially. There has been no additional funding to provide this treatment, and a specific budget for the care of patients with AMD is required. The significant growth in the patient cohort has put service delivery of other elements of eye care under extreme pressure, and financing needs to be rebalanced accordingly. Because of the large numbers of patients and the time required to provide their treatment, the time available for training has been negatively impacted.

## **11. Model of care**

Children's services, age-related macular degeneration (AMD), cataracts, diabetic retinopathy and glaucoma account for approximately 70% of the demand for eye care. The purpose of this Model of Eye Care is to describe the services that should be provided at each level of eye care delivery nationally. The purpose of this chapter is to inform future service planning and developments, and to eliminate duplication and fragmentation of services for the five main patient groups. Future work will focus on developing a model of care for the 30% of patients not affected by one of the five main conditions.

This chapter sets out how the service will work, who will provide the services, where they will be provided, and how they will be governed. As previously stated, the NCP for Ophthalmology believes that there is a clear need to move from an over-reliance on community ophthalmologists managing all referrals to a new model centred on a primary care eye services team with multidisciplinary members. This team will be based in a primary care location with optimum accommodation, facilities, equipment and resources, and will provide services along care pathways determined by this Model of Eye Care, in keeping with high quality standards, to both children and adults. The team will work in a highly integrated fashion, supported by an IT patient management system. The multidisciplinary team will liaise closely with local optometrists to agree referral criteria for patients to be referred from local optometry to the team and to reciprocally hand back the care of patients from the team to local optometry, when appropriate. The team will also liaise closely with the local hospital's ophthalmic services to ensure that all patients are managed within the most appropriate clinical service and location.

Implementation of the clinical pathway for the conditions detailed here, with the key recommendations identified by the NCP for Ophthalmology, will meet the aim of the programme designed to eliminate avoidable sight loss by providing high-quality integrated care as locally to the patient as possible.

### **11.1 First point of contact**

#### **11.1.1 Age-related macular degeneration (AMD)**

Patients are referred with a suspicion of this condition either by their optometrist or their GP. Many patients accidentally discover visual loss due to this condition, and present to ophthalmic departments as emergencies. The referral of a patient to the Primary Care Clinic should be based on the following criteria:

- the patient has moderate-sized confluent drusen and pigment change
- the patient has large-sized confluent drusen and pigment change
- the patient has RPE atrophy greater than agreed size
- the patient has symptoms such as distortion or loss of vision
- the patient has subretinal blood, regardless of symptoms
- patients about whom the optometrist or GP have concerns.

### **11.1.2 Cataract**

During early cataract development, visual improvement may be achieved through a number of non-surgical means, including changes in glasses prescriptions, strong bifocals, tinted lenses, dilation of the pupil for small central cataracts, magnifying lenses, and appropriate lighting. However, without cataract surgery, vision in the affected eye will continue to deteriorate, and the only effective means of restoring vision is the surgical removal of the affected lens. The majority of patients with early cataract present to optometry.

The decision to refer a patient to the Primary Care Clinic should be based on the following symptoms: glare and halos in night driving, visual acuity reduced to a level unacceptable to the patient and his or her lifestyle, or secondary anisometropia.

### **11.1.3 Children**

Eye problems in children are very different than those of adults, as children often cannot clearly communicate subjective visual handicap, and measuring their visual performance is a skilled exercise. Population-based screening has been shown to be an appropriate and cost-effective mechanism to identify children's visual problems.

Childhood surveillance and screening commences at birth, and involves nine assessments or checks until a child is 12 years of age. Screening checks are carried out by public health and school nurses, Area Medical Officers and GPs. During these childhood health surveillance checks visual development is noted. A universal visual screen is done in the early years of primary school. The screening process must be completed by the age of four to five years, as the window of opportunity to prevent amblyopia is closed by the age of six to seven years. To ensure screening is done within the window of opportunity it should take place in the first term of the child's first year in primary school (i.e. September–December in junior infants). There is no evidence that asymptomatic refractive errors should be treated in older children.

There is a very high level of false positive referrals from developmental clinics done at nine months and at three years. There is similarly a high level of false positive referrals from school screening. False positive referrals could be minimised by adequate and ongoing staff training, regular audit of referrals, and liaising with referrers.

### **11.1.4 Glaucoma**

Initial detection and referral of most cases of glaucoma will continue to be carried out by optometrists, to whom the majority of patients have access in their local community. The need for reading spectacles from the age of 40 years presents an opportunity to offer a basic examination for glaucoma in the at-risk age group. A diagnosis of glaucoma may be suspected by the optometrist if there is elevated intraocular pressure, glaucomatous visual field loss, or visible changes in the optic disc consistent with glaucomatous optic nerve disease. Positive or suspected cases should be referred to a primary eye care team for ongoing care and management. Hospital care should be reserved for those requiring further surgical intervention, laser, or where the opinion of a hospital-based glaucoma specialist is required.

### **11.1.5 Diabetic retinopathy**

People with type 1 or type 2 diabetes, aged 12 years or older and living in Ireland, are invited to take part in a screening and monitoring service if they are on the Diabetic Retina Screen register. The screening appointment takes place in a photography and grading centre, and involves taking two photographs of each eye. Photographs of the back of the eyes are taken with a digital camera, and the images are graded. Patients who are not identified as requiring follow-up are re-imaged in one year.

Patients are contacted for a further appointment if: the photographs are not clear enough to give a result, the person has diabetic retinopathy which needs to be assessed, or other eye conditions not caused by diabetes are detected and need to be assessed. These patients are referred to a treatment centre where they have a confirmatory clinic visit. The range of possible diagnoses include mild, moderate or severe non-proliferative diabetic retinopathy (NPDR) or non-clinically significant diabetic macular oedema (DME). A patient may have sight-threatening diabetic retinopathy (STR) or proliferative diabetic retinopathy (PDR) which requires laser or surgical treatment or clinically-significant DME (csDME) which requires laser treatment or injections.

## 11.2 Community-based care

### 11.2.1 Age-related macular degeneration (AMD)

Providing treatment for age-related macular degeneration (AMD) in the primary care setting, with referral into hospital for complex cases, is quite feasible, and would be more convenient for elderly patients with visual impairment. Once a patient presents with this condition, a full ophthalmic examination and additional diagnostic evaluation is required. The majority of patients are now treated with intravitreal anti-VEGF pharmacological agents. Treatment requires access to either a cleanroom or theatre to carry out the procedure. The initial treatment involves three consecutive monthly injections followed by a full ophthalmic examination, diagnostic evaluation, and likely further injections.

To deliver AMD care in the community will require the provision of the relevant diagnostics, Optical Coherence Tomography (OCT), fluorescein and/or OCT angiography, and an injection cleanroom. The lead clinician will require subspecialty expertise in medical retina.

### 11.2.2 Cataract

Much of the pre-operative and post-operative care of cataract patients can be performed in the primary eye care clinic. The team will assess the patient in more detail, determining the relevant contribution of cataract to the patient's visual impairment, and will identify any comorbidities.

Pre-operative assessments – medical, biometric and social assessments – can all be done by team members. The patient's blood pressure, blood sugar and MRSA status are all confirmed by the team, and comorbidities such as AMD, diabetic retinopathy, glaucoma, amblyopia, etc. will also be recorded.

For audit purposes, and to ensure the subsequent surgery is carried out by the most appropriately qualified surgeons, the following anticipated perioperative surgical difficulties are recorded: small pupil, pseudoexfoliation, white cataract, previous vitrectomy, corneal opacities, and other findings as appropriate.

The consent process will be initiated by the team for patients requiring cataract surgery, whereas patients not requiring cataract surgery will be discharged and asked to return when subjective visual handicap develops.

Following surgery, the PCET will review patients in a first post-operative visit. For the purposes of audit, the following must be measured at the first post-operative visit: best corrected distance visual acuity, biometry prediction error, surgically induced astigmatism (pre- and post-operative keratometry readings), elevated intraocular pressure requiring treatment, post-operative uveitis requiring treatment, corneal edema, and other findings as appropriate.

To ensure consistency of care and measurements, there must be standardised equipment and a standardised electronic reporting forms used in both primary care and in hospitals, e.g. Intra-Ocular Lens (IOL) Master for biometric testing.

### 11.2.3 Children

The NCP recognises the importance of the prompt assessment of children referred from the screening service. The team, comprising an ophthalmologist, optometrist, orthoptist and technician working together on a single site, will collaborate on the overall diagnosis and management of the child.

The ophthalmologist will triage the referrals, delegate accordingly, and will be responsible for dilated funduscopy in every new referral seen in order to ensure that subtle abnormalities such as papilloedema are not missed. The optometrist will be responsible for managing the refractive components, and the orthoptist will be responsible for treatment of amblyopia. Children requiring surgical intervention will be referred to the hospital service, as will children with non-refractive eye disorders such as white pupil, glaucoma, retinoblastoma, or those with special needs.

Whereas hyperopic (long sighted) children require early diagnosis to prevent and/or manage squint and/or amblyopia, their spectacle requirements reduce with age and may be eliminated in early adult life. Conversely, myopic (short sighted) children do not develop amblyopia, but their spectacle requirements increase with age particularly with the growth spurt of adolescence. Such children will require progressive alteration in their spectacles, which can be managed by optometry in the community. Children with refractive errors needing spectacle correction only, and those who have completed amblyopia or strabismic treatment and have no further eye disease, developmental or medical problems, should be referred to optometry in the community for review and follow-up from the age of nine years onwards. This follow-up can be delivered outside the remit of the primary eye care team in the existing Community Ophthalmic Services Scheme.

### **11.2.4 Glaucoma**

A diagnosis of glaucoma is confirmed in a patient with elevated intraocular pressure, glaucomatous visual field loss, and associated optic disc changes. However, this typical triad of symptoms is not always present, and there is thus a grey area which encompasses suspected glaucoma sufferers who do not yet require treatment. These patients require annual measurements of their visual fields, intraocular pressures, and optic disc changes in order to document progression from suspected to clinical glaucoma. This review can be performed by the optometrist if standardised visual field testing, such as with the Humphrey Field Analyser, is available to ensure consistency, reproducibility and comparison with hospital-based systems.

Patients who either fail to respond to treatment or who have progressive visual field loss need the care of a hospital-based glaucoma specialist so that a surgical solution can be considered.

More than 50% of glaucoma patients who currently attend hospital outpatient clinics are stable and could be safely referred back to primary care for annual review of their intraocular pressure, optic discs, and Humphrey Field analysis. Should the glaucoma become uncontrolled, referral back into the hospital specialist clinic is required.

## **11.3 Hospital-based care**

### **11.3.1 Age-related macular degeneration (AMD)**

The role of the hospital eye department will be in managing those patients for whom there are diagnostic difficulties, patients who have complicated macular degeneration, and patients who do not respond to treatment. The hospital will have a role in determining when treatment is to be discontinued in the case of patients who have not responded to any intervention.

The role of surgical intervention in the treatment of AMD may be expanded in the future. Following the success of anti-VEGF agents, there is an evolving trend internationally towards the surgical treatment of severe haemorrhagic macular degeneration with vitrectomy, subretinal TPA injections, and evacuation or displacement of subretinal blood. Hospital-based research is also ongoing regarding possible therapies for dry AMD (which accounts for 80% of macular degeneration). The NCP will monitor developing potential treatments for this condition as they become available.

### **11.3.2 Cataract**

The hospital will send out the information on the procedure to patients, and patients will attend the hospital to have the procedure carried out, having first been assessed by the primary eye care team. They will be admitted to the day care unit and their details checked for completion. The surgery will be carried out in the hospital, with all data entered into the relevant EPR and reported back to primary eye care team. Patients having uncomplicated cataract surgery will be reviewed by primary eye care team two weeks post-operatively. The outcomes will be measured for audit purposes.

The operating surgeon will be responsible for earlier review if surgical complications occur and/or the patient has ocular comorbidity, such as glaucoma and requires more frequent or more stringent monitoring. For audit

purposes, the following perioperative complications must be recorded: torn posterior capsule, vitreous loss, dropped nucleus, iris damage, and others as appropriate.

Each patient must receive written and verbal instructions for their post-operative care as they leave the hospital.

### **11.3.3 Children**

The primary responsibility for paediatric hospital services is to diagnose and treat children with non-refractive, non-strabismic, and non-amblyopic eye disorders such as congenital cataract, congenital glaucoma and juvenile arthritis or uveitis, retinoblastoma, stickler syndrome, and eye problems occurring in children with comorbidities and special needs.

Paediatric eye casualty services require a greater use of theatre time than adult services, and require general anaesthesia. A close working relationship is therefore needed between the primary eye care team and the consultant paediatric ophthalmic surgeon. Examples of urgent problems include corneal foreign bodies, corneal ulcers, or suspected corneal perforation. Non-surgical emergencies, such as preseptal or orbital cellulitis may require shared care between ophthalmic and ear, nose and throat services.

### **11.3.4 Glaucoma**

The hospital-based glaucoma specialist should be available to provide a second opinion on difficult, non-responding and progressing cases. They will make a decision on whether intraocular surgery or laser surgery is indicated, and will perform the surgery and follow-up. Glaucoma as a disease lends itself to tele-medicine, virtual clinics and obtaining an expert opinion from a distant location is generally possible.

## **11.4 Eye conditions and diseases**

60–70% of patients who present to an ophthalmic service will have one or more of the most common blinding eye conditions (age-related macular degeneration, cataract, glaucoma, or diabetic retinopathy), these conditions are not of an urgency requiring same-day access.

The remaining 30–40% of patients who present with an eye problem, either as an emergency or electively, do not fit into these five care pathways. Such patients may be suffering from perforating eye injury, endophthalmitis, corneal ulcer, or temporal arteritis. This cohort of patients requires same-day access to specialist care.

Patients with intraocular malignancy, e.g. choroidal melanoma, adnexal carcinomas and some cranial nerve palsies, require access within a month. These emergencies can be intrinsically ophthalmic, such as perforating eye injury, or they may be associated with systemic illness, such as temporal arteritis. These patients will require shared care, and collaboration with allied specialties such as neurosurgery (posterior communicating arterial aneurysm), maxillofacial surgery (blowout fracture), plastic surgery (adnexal carcinoma), ENT surgery (orbital cellulitis), obstetrics (diabetic retinopathy in pregnancy, ROP screening), and oncology (choroidal melanoma). Additional collaboration will frequently be required with microbiology, histopathology, and radiology.

In the general hospital setting, ophthalmology is an essential part of cross-specialty care involving many disciplines. Examples are rheumatology (giant cell arteritis, ocular toxicity of systemic medications), neurology (papilloedema, myasthenia gravis), endocrinology (pituitary tumours, thyroid disorders), and intensive care (fungal endophthalmitis in parenteral feeding).

The subspecialties intrinsic to tertiary referral centres are neuro-ophthalmology, cornea and external eye disease, uveitis, paediatric, orbital or plastic, and vitreoretinal.

Providing rapid access to these services is the responsibility of the tertiary referral centre in each Hospital Group. Currently, the CHO structure is not aligned with the Hospital Groups, and clear pathways of collaboration will have



to be defined. Operating theatre availability must be provided for these emergencies without compromising elective surgery. Access to theatre within hours should be available for perforating injuries, intraocular foreign bodies, corneal melt, corneal ulcer, endophthalmitis, and retinal detachment. International examples of this are available such as The Eye Hospital in Rotterdam which provides a dedicated operating theatre for vitreoretinal surgery every day, thus avoiding the compromise of elective surgical care by emergency cases.

Whilst the primary care eye team is the gateway to ophthalmic services for most routine conditions, many of the above emergencies will require prompt referral and immediate care in acute hospitals. The NCP for ophthalmology, in conjunction with the HSE Outpatient Improvement Flow programme, has categorised ophthalmic referrals and their degree of urgency, and the findings are contained in Appendix 4

The acute hospitals in turn can refer these patients back to the primary eye care team once their emergency treatment is complete.

## **12. Education, training and research**

Fundamental to the success of the delivery of world class ophthalmic care is the availability of a highly trained workforce, with the skills and knowledge required to provide the level of care appropriate to their role within that system. To have such skilled and motivated personnel requires that the continuum of education and training needs – from undergraduate education, postgraduate or specialist training, to continuing education – must be addressed, and must encompass medical, nursing, health and social care professionals, as well as pharmacy, diagnostic and support staff.

Trainees require direct and indirect supervision, teaching, monitoring, and continuous assessment. Time must be built into consultants' and trainees' busy service commitments to allow for trainees' clinical and operative education, didactic and clinical teaching, continuous assessments, and audit and research collaboration. To create such a culture, it is imperative that sessional time is included in future consultant contracts in order to reflect this training commitment for those who choose to be part of an educational postgraduate programme.

## **13. Governance**

Governance is an essential component in the delivery of high-quality care. Clinical governance structures for acute eye services are 'nested' in the clinical governance structure of each hospital, and in the relevant Hospital Group. Good governance is based on constant assessment of the unit's infrastructure, manpower and staff morale, knowledge of short-term and long-term ophthalmic outcomes through good metrics, analysis of outcomes through regular mortality and morbidity meetings, benchmarking nationally and internationally, and standardised algorithms, protocols and guidelines. While much of this is already occurring in tertiary units, there should be agreed national standards implemented in all units, including those in the community.

Ophthalmic teams should have regular departmental meetings where minutes are taken. Issues raised at departmental level should include manpower and staffing issues, unit activity statistics, infection rates, equipment, training and development, and audit and research. Deficiencies or concerns should be channelled to the appropriate manager for further action. Additional funding and support should be made available to any unit experiencing difficulties in meeting the set criteria for the level of care provided.

It is essential that appropriate structures are put in place to underpin effective teamwork and governance, and to ensure quality and safety. Changes to the delivery of care as proposed in this document must be complemented by recording all outcomes and auditing all interventions. In expanding the eye care team, audit and governance frameworks must be put in place to ensure quality and safety. The use of audit and registries to record specific pre- and post-operative or treatment measurements is a critical component of shared care pathways, as are patient-reported outcomes. For example, in a shared care cataract model, specific pre- and post-operative measurements are recorded to help assure the delivery of quality care. At the pre-assessment stage, certain factors such as small pupil, pseudoexfoliation, white cataract, previous vitrectomy and corneal opacities, which have a bearing on the

anticipated level of surgical difficulty anticipated, are recorded. This is done in order to ensure that the most appropriate surgeon performs the operation, and thus, the risk of perioperative complications is minimised.

All complications of the surgery are recorded by the surgical team, e.g. torn posterior capsule, vitreous loss, dropped nucleus, and iris damage. At follow-up, the primary eye care team records best corrected distance and near visual acuity, biometry prediction error, surgically induced astigmatism and post-operative cylinder, and complications which may arise, such as increased IOP requiring treatment, uveitis requiring treatment, cystoid macular oedema, and corneal oedema.

## **14. Programme metrics and evaluation**

Audit plays an important role in the quality assurance process, and also in measuring performance. Simple quality indicators such as unplanned inpatient admission following day case surgery, or complications following surgery or other interventions, can easily be measured, and the reasons for such admission or complication documented. This information should be collated and analysed, and can be compared usefully across CHOs or Hospital Groups. Participation in national audits should also be encouraged. Multidisciplinary audit and morbidity meetings should be held regularly. Audit activity should include regular analysis and multidisciplinary reviews of complications and other unfavourable outcomes.

## Appendix 1: Demand for eye care services in Ireland by condition

Source: Central Statistics Office, HSE Hospital In-Patient Enquiry (HIPE)

### Number of births in Ireland 2005–2012

2005	2006	2007	2008	2009	2010	2011	2012
61,372	65,425	71,389	75,173	75,554	75,174	74,650	72,000

### Age-related macular degeneration: Day cases in public hospitals 2005–2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
432	1,147	2,476	2,660	3,838	4,591	5,830	8,878	9,370	9,871	11,184

### Cataract: Day cases in public hospitals 2005–2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
6,573	6,241	6,350	7,132	8,167	9,494	9,787	11,966	13,210	12,831	13,038

### Diabetic retinopathy: Day cases in public hospitals 2005–2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
923	1,294	1,558	1,776	2,217	2,806	3,538	4,694	5,039	5,584	5,708

### Glaucoma: Day cases in public hospitals 2005–2015

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1,067	1,161	1,307	1,440	1,539	1,532	1,382	1,342	1,425	1,528	1,777

## Appendix 2: Patient age profile for the main eye conditions

Source: HSE Hospital In-Patient Enquiry (HIPE)

### Age-related macular degeneration: Inpatient and day cases age profile

	16-64	65-69	70-74	75-79	80-85	85+
<b>2011</b>	<b>13.7%</b>	<b>9.5%</b>	<b>15.1%</b>	<b>21.2%</b>	<b>21.6%</b>	<b>18.9%</b>
<b>2015</b>	<b>18.9%</b>	<b>10.4%</b>	<b>15.5%</b>	<b>18.3%</b>	<b>18.8%</b>	<b>18%</b>

### Cataract: Inpatient and day cases age profile

	16-64	65-69	70-74	75-79	80-85	85+
<b>2011</b>	<b>18.3%</b>	<b>11.2%</b>	<b>16.4%</b>	<b>20.2%</b>	<b>19.3%</b>	<b>14.5%</b>
<b>2015</b>	<b>17.5%</b>	<b>12.6%</b>	<b>16.3%</b>	<b>20%</b>	<b>19.1%</b>	<b>14.4%</b>

### Diabetic retinopathy: Inpatient and day cases age profile

	16-44	44-64	65-69	70-74	75-79	80-85	85+
<b>2011</b>	<b>11.4%</b>	<b>40.2%</b>	<b>13.9%</b>	<b>12.8%</b>	<b>11.9%</b>	<b>7%</b>	<b>2.7%</b>
<b>2015</b>	<b>11%</b>	<b>37.7%</b>	<b>15.7%</b>	<b>13.4%</b>	<b>10.5%</b>	<b>7.3%</b>	<b>4.3%</b>

### Glaucoma: Inpatient and day cases age profile

	16-44	44-64	65-69	70-74	75-79	80-85	85+
<b>2011</b>	<b>6.4%</b>	<b>26.3%</b>	<b>12%</b>	<b>14.8%</b>	<b>17.9%</b>	<b>12.6%</b>	<b>10%</b>
<b>2015</b>	<b>3.3%</b>	<b>22%</b>	<b>15.1%</b>	<b>15.7</b>	<b>16.8%</b>	<b>14.4%</b>	<b>12.7%</b>

## Appendix 3:

### Total bed days for the treatment of main conditions and average length of stay (AvLOS) per patient

Source: HSE Hospital In-Patient Enquiry (HIPE)

#### Age-related macular degeneration

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Bed days</b>	<b>737</b>	<b>625</b>	<b>718</b>	<b>518</b>	<b>422</b>	<b>429</b>	<b>394</b>	<b>528</b>	<b>506</b>	<b>519</b>	<b>554</b>
<b>Length of stay</b>	<b>5.8</b>	<b>4.8</b>	<b>4.4</b>	<b>4.4</b>	<b>3.6</b>	<b>3.6</b>	<b>3.9</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.1</b>

#### Cataract

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Bed days</b>	<b>737</b>	<b>625</b>	<b>718</b>	<b>518</b>	<b>422</b>	<b>429</b>	<b>394</b>	<b>528</b>	<b>506</b>	<b>519</b>	<b>554</b>
<b>Length of stay</b>	<b>5.8</b>	<b>4.8</b>	<b>4.4</b>	<b>4.4</b>	<b>3.6</b>	<b>3.6</b>	<b>3.9</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>	<b>3.1</b>

#### Glaucoma

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Bed days</b>	<b>2,023</b>	<b>1,947</b>	<b>1,670</b>	<b>1,360</b>	<b>1,069</b>	<b>735</b>	<b>636</b>	<b>597</b>	<b>554</b>	<b>545</b>	<b>506</b>
<b>Length of stay</b>	<b>5.1</b>	<b>4.5</b>	<b>3.9</b>	<b>3.4</b>	<b>3.4</b>	<b>3.1</b>	<b>2.6</b>	<b>3.2</b>	<b>2.5</b>	<b>2.6</b>	<b>2.4</b>

#### Diabetic retinopathy

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Bed days</b>	<b>730</b>	<b>698</b>	<b>625</b>	<b>624</b>	<b>552</b>	<b>473</b>	<b>448</b>	<b>380</b>	<b>259</b>	<b>330</b>	<b>302</b>
<b>Length of stay</b>	<b>4.7</b>	<b>4.5</b>	<b>4.4</b>	<b>3.8</b>	<b>3.2</b>	<b>2.9</b>	<b>2.6</b>	<b>2.5</b>	<b>2.0</b>	<b>2.7</b>	<b>2.7</b>

## Appendix 4: Title to come

First Assessment Acute Ophthalmology Surgical Team	
Clinical Prioritisation Category	Clinically Recommend Time Frame
Immediate	Same day access
Urgent	See within 28 days
Semi-Urgent	See within 13 weeks
Routine	See within 26 weeks
Excluded	
Immediate	Same day access
Criteria	Examples
Trauma not suitable for conservative management	Surgical trauma to the lids, orbit, ocular structures Penetrating eye injuries Retained intraocular foreign bodies Hyphema. Chemical burns. Orbital cellulitis Corneal foreign bodies. Orbital blowout fracture. Corneal abrasions. Blunt trauma.
Painful red eye with significant loss of vision.	Corneal ulcer. Acute glaucoma. Infections. Iritis. Mature cataract. Herpes Zoster/simplex.
Sudden vision loss.	Ischemic ocular conditions, eg temporal arteritis. Optic neuritis. Retinal detachment/haemorrhage. Vitreous haemorrhage.
Neurological conditions threatening permanent damage if treatment delayed.	Disc oedema. Other cranial nerve palsy. Acute field defects. Acute Glaucoma.
Diabetic conditions	Vitreous haemorrhage pregnancy
Paediatric Conditions	White pupil
Diplopia.	Third nerve palsy

## Appendix 4 (continued): Title to come

Urgent		See within 28 days
Criteria	Examples	
Sudden vision loss	Some age related maculopathy (ARM).	
Diabetic conditions	Retinopathy.	
Progressive/invasive cancers.	Intraocular malignancy. Squamous cell carcinoma. Some basal cell carcinomas.	
Infective conditions.	Unresponsive conjunctivitis.	
Paediatric conditions.	Persistent watering eye.	
Semi-urgent		See within 13 weeks
Criteria	Examples	
Chronic impairment of visual function.	Bilateral "hand movement" cataracts.	
Amblyogenic conditions.	Strabismus. Refractive conditions in children. Ptosis in children.	
Low grade non-progressive neoplasms	Benign tumours and low grade BCCs.	
Moderately progressive diabetic	Maculopathy.	
Misc conditions threatening permanent damage if treatment delayed.	Entropion. Severe ectropion. Cicatrizing disease.	
Infective disease.	Chronic dacryocystitis.	
Orbital disease.	Proptosis – displacement of globe. Thyroid eye disease.	
Neurological conditions.	Headache with ocular symptoms/signs.	

## Appendix 4 (continued): Title to come

Non-urgent	See within 26 weeks
Criteria	Examples
Chronic non-sight threatening conditions	Congenital/adult epiphora. Pterygium. Cosmetic ptosis. Cosmetic squint. Ectropion. Some ocular plastic procedures. Epiphora.
Diabetic conditions.	Routine fundus exam.
Refractive error with co-morbidity.	Keratoconus. High myopia.
Chronic non-sight threatening conditions.	Congenital/adult epiphora. Pterygium. Cosmetic ptosis. Cosmetic squint. Ectropion. Some ocular plastic procedures. Epiphora.
Excluded	
Adult refractive conditions alone, without co-morbidity. Minor cosmetic abnormalities without any other pathology. Presbyopia without co-morbidity.	



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- <sup>xv</sup> John Slade, Eye health data summary 2012, A review of published data in England, RNIB.
- <sup>xvi</sup> HIQA Cataract Surgery HTA, page 4.