



Royal Victoria Eye & Ear Hospital

Ophthalmology Strategy

October 2015



1. Table of Contents

1	Contents	
2	Executive Summary	5
3	Context and Background	11
3.1	The National Eye Care Plan	14
3.2	International experience and trends	15
3.3	Case Study	17
4	The Royal Victoria Eye and Ear Hospital 2009-2014	18
4.1	RVEEH Training and Academic Roles	20
4.2	Research Foundation	20
4.3	RVEEH Performance 2009-2014	20
4.4	Activity profile	21
4.5	Geographic catchment area	22
4.6	Community Links	22
5	Proposed RVEEH Hub-and-Spoke Care Delivery Model	24
5.1	Summary	24
5.2	Services available in the spoke unit	25
5.3	Hub-and-spoke model: Key enablers	26
5.4	Patient Flow Pathway in hub-and-spoke Model	27
6	Implications for RVEEH of the Key Growth Areas Identified Under the National Eye Care Plan 2014	29
6.1	Age-related macular degeneration (AMD)	29





2. Executive Summary

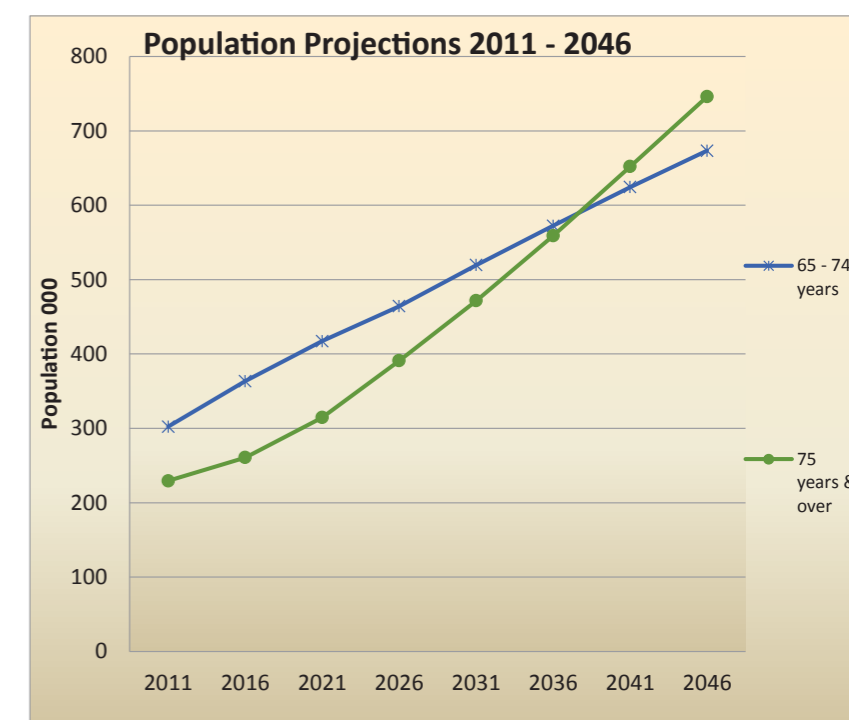
6.1.1 Future AMD Care Pathway.....	30
6.2 Cataract.....	31
6.2.1 Future Cataract Care Pathway.....	31
6.2.2 Cataract Care Pathway Limitation of RVEEH Theatre Access.....	33
6.3 Diabetic Retinopathy.....	34
6.3.1 Diabetic Retinopathy Screening.....	34
6.3.2 Future Diabetic Retinopathy Care Pathway.....	36
6.4 Glaucoma.....	37
6.4.1 Future Glaucoma Care Pathway.....	37
6.5 Children’s Eye Services.....	39
6.6 Complex Sub-specialty Services.....	39
7 RVEEH Management & Operational Structure.....	40
8 Appendices.....	42
Appendix A – Spoke Unit Model Requirements.....	42
Appendix B – Resource Challenges in the RVEEH.....	44
Appendix C – CASE STUDY: Moorfields Eye Hospital.....	45
Appendix D – Ealing Unit in the Hub-and-Spoke Model.....	46
Appendix E – Standalone Cataract Unit.....	47
Appendix F – Electronic Medical Record.....	49
Notes.....	50

RVEEH OPHTHALMOLOGY STRATEGY 2015/2025

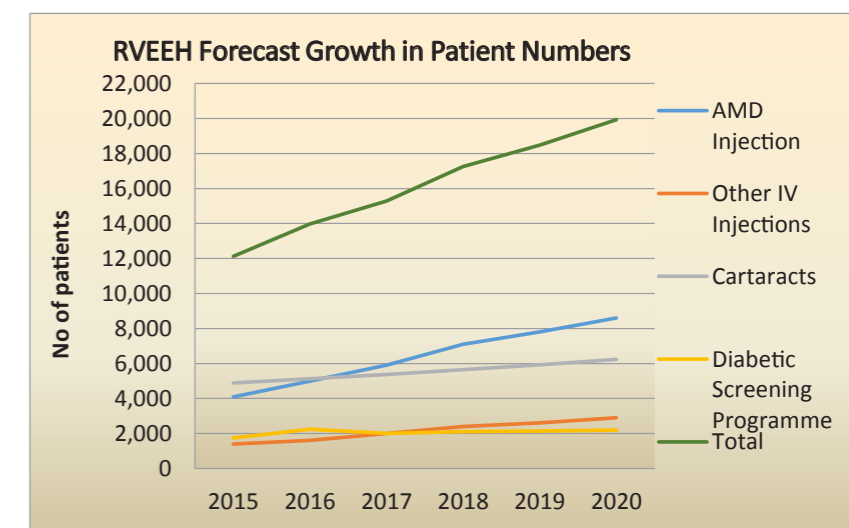
The RVEEH Strategy 2015/2025 is the Hospital’s plan for dealing with the challenges facing the Irish ophthalmology services, in particular the need to respond to the significant increase in the Irish population aged over 65 which is giving rise to a material growth in patient numbers.

The Strategy has 4 main reference points:

- The ‘National Eye Care Plan 2014’ which recommends the realignment of service away from the acute setting towards community based care;
- The Community Services review currently being undertaken by Mr. Brian Murphy, Head of Planning, Primary Care Division, HSE;
- The development of Hospital Groups in general and IEHG in particular;
- On an international level the best practice models of service delivery, and in particular the established hub-and-spoke



Source: (Prof B. Whelan/Tilda Project)



Source: (Prof B. Whelan/Tilda Project)



care model operational in Moorfields Eye Hospital in London, a world renowned independent Trust Hospital.

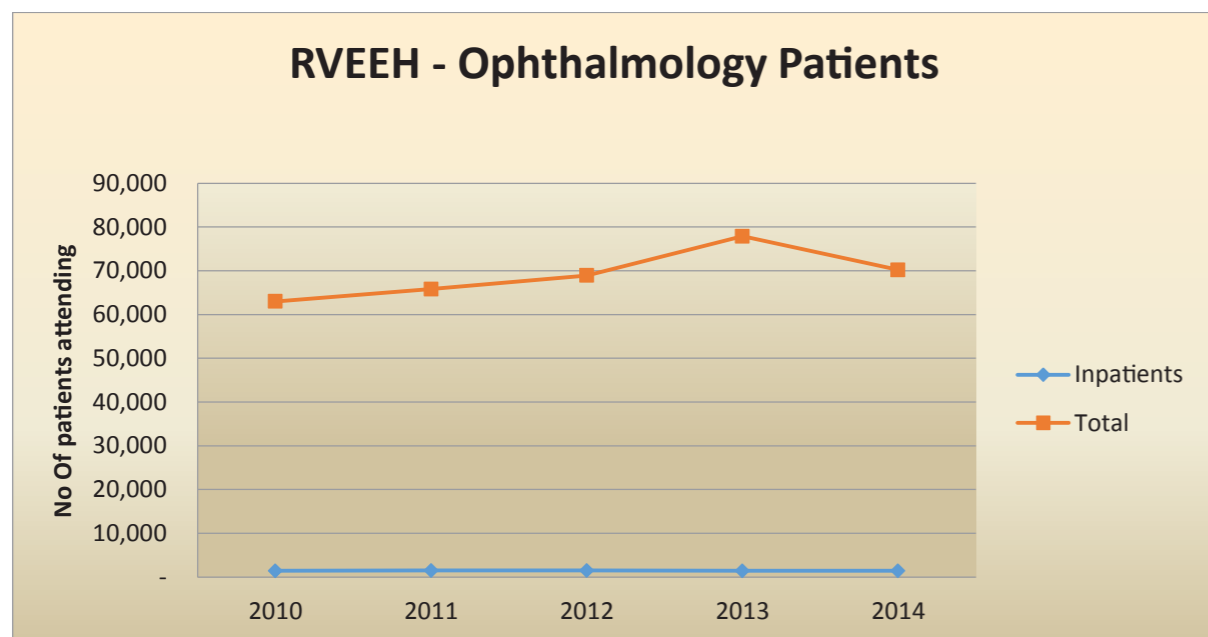
The capital costs of implementing the Strategy are modest while the outputs will result in

- Elimination of waiting lists
- Cost effective management of anticipated growth in patient numbers
- Patient assessment and treatment in their community when possible
- Considerable economic benefit to society by reducing risk of blindness in older people
- Upskilling of nurses

THE ROYAL VICTORIA EYE and EAR HOSPITAL

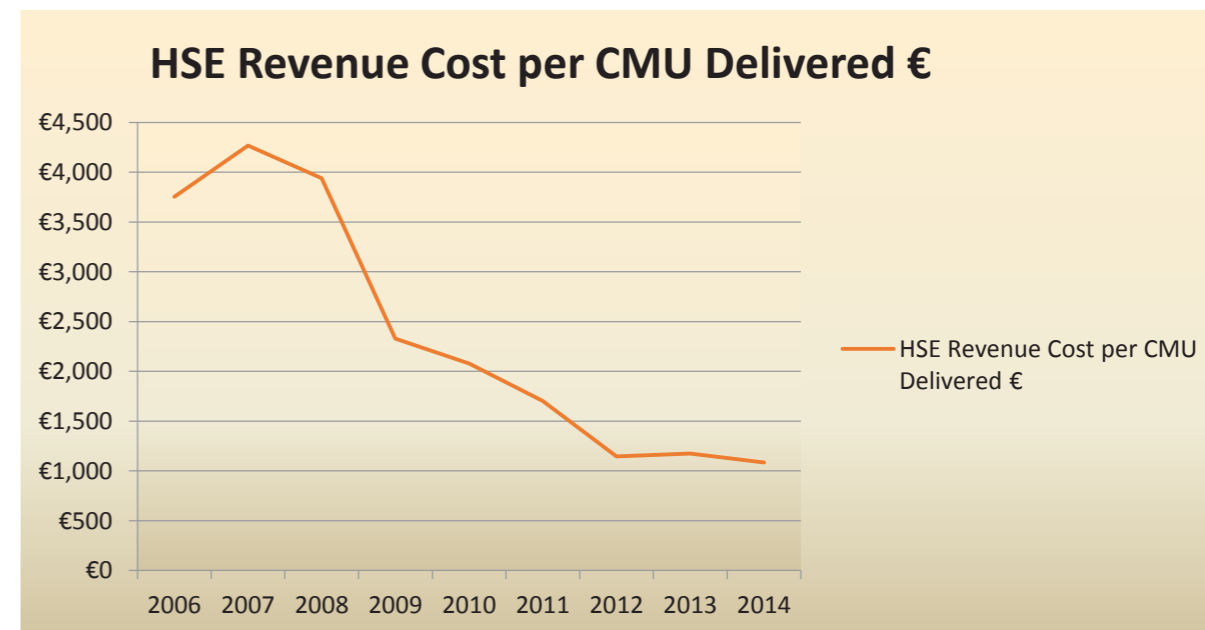
The RVEEH has been serving the people of Ireland for almost 120 years. It was established by public subscription under an Act of Parliament which brought together two existing eye and ear hospitals. One of these was Sir William Wilde's Hospital. Sir William was the father of Oscar Wilde.

Today the Hospital welcomes approximately 100,000 patient visits per year in total, 75,000 of which are ophthalmology patients. Patients are treated on a day care basis in the majority of cases with overnight stays averaging approximately only 30 patients per night maximum. (see following table)



Source: RVEEH

In recent years RVEEH has shown a significant reduction in the cost per unit of CMU delivered.



Source: HSE Allocation/RVEEH Hipe Statistics

STAND ALONE HOSPITAL

The top-ranked eye hospitals in the UK, USA and Australia are all stand-alone hospitals, distinct from general hospital complexes.

Since most procedures are elective and patients are treated on a day care basis, the potential for high volume and efficient throughput in theatres exists because surgeons know theatres will be available and can plan accordingly. This applies equally to ENT patients.

The RVEEH Strategy 2015/2025 is based on the Hospital continuing to operate on a standalone basis. The Hospital will remain the main tertiary provider for complex subspecialty eye disorders. At the same time it will develop community based units at regional hospitals and primary care units – a hub and spoke care delivery model with RVEEH at the hub.

HUB and SPOKE DELIVERY MODEL

Outpatient diagnostic interventional work would

The independently assessed top ranked eye hospitals in the US, UK and Australia in 2013 are all stand-alone eye hospitals. (US News and World Report).

Top-ranked eye hospitals in US:

1. Bascom Palmer, Florida
2. Wills Eye Hospital, Philadelphia
3. Massachusetts Eye & Ear Infirmary, Boston

Top-ranked UK Eye hospital:

Moorfields Eye Hospital, London

Top-ranked Australian Eye Hospital:

Royal Victorian Eye & Ear Hospital, Melbourne



be carried out at the satellite spoke unit. This would obviate the need for patients to make multiple trips to Dublin for routine eye care and would absorb some of the increased demand for eye care in the expanding over- 65-years population.

The preferred option is that the satellite spoke units would be under the management and clinical supervision of RVEEH to ensure a high standard of clinical care for patients.

All units would have integrated IT connected to RVEEH. An assessment of the most appropriate IT system is being carried out, led by the former IT director from Moorfields Hospital. Two systems are currently being assessed – Open Eyes (used by Moorfields) and Medisoft.

The physical size requirement of the satellite unit is small, at c. 2500 sq., feet. The cost of equipping a fully operational unit is approximately €150k. Personnel needs would be €460k. There would be an investment in IT but this would be a shared cost over multiple satellite units.

RVEEH has longstanding relations with Loughlinstown Hospital and Portlaoise Hospital. It is intended that the first satellite units be located at these hospitals. Discussions to that effect are underway and the intention is to have them operational in 2016.

Potential locations for other satellite units are Wexford, and Kilkenny. Collaboration with Waterford Hospital with whom RVEEH has had a long relationship would also be explored.

Meetings have taken place with HSE Primary Care services who have expressed interest in developing ophthalmology spoke clinics in suitable primary care settings e.g. Meath Health Center and Rialto.

DEDICATED CATARACT UNIT at RVEEH

The RVEEH capacity to handle the growing demand for cataract surgery cannot be met from existing theatre capacity. The establishment of a cataract only theatre would bring significant benefit in terms of efficient processing of an additional 3,000 cataract cases per annum and from the reduction in waiting lists.

It is planned to convert an existing administrative space at RVEEH into the dedicated cataract theatre. The cost of doing this is estimated as follows:

- Building refurbishment €900k.
- Equipment €200k.
- Operational costs €2,960K.

The operational costs include consultant costs (1 WTE surgeon and 1 WTE anaesthetist), 3 nursing WTE and consumables. The RVEEH has approval from IEHG for two new Consultant Ophthalmological Surgeon positions.

Planners from Dublin City Council have visited the site and although the Hospital building is a protected structure, the planners do not see a problem approving the conversion of the existing administrative space into a cataract theatre. The establishment of a cataract only theatre would free up space in the existing theatres for other ophthalmic work.

The new Cataract Theatre would be operational in 2016.

OUTPATIENT AREA

Both the JCI accreditation process and HIQA have commented on inadequate patient confidentiality in the outpatient area of the Hospital. It is intended to address this issue by reconfiguring the space so that multiple numbers of patients will not be examined in the same room at the same time. The opportunity will also be taken to improve patient experience by upgrading this area. The cost of this work is estimated at €750,000.

CLINICAL NURSE SPECIALISTS

The RVEEH Strategy 2015/2025 anticipates the increased involvement of clinical nurse specialists in patient care. This will enable faster access to care, shorter waiting times and a more cost effective service. For example, clinics for stable glaucoma patients can be run by nurse practitioners and technicians, both within the RVEEH and in satellite units. The same would apply for other routine eye treatments.

CHILDREN'S EYE SERVICES

The RVEEH has a dedicated paediatric ward and the hospital had 5,300 outpatient attendances and completed 260 surgeries (there were 316 at Crumlin) in 2013 for children under 16. There is little strategic overlap between the ophthalmology services at Temple Street, Crumlin and RVEEH. This should be reviewed with the various stakeholders.

RESEARCH FOUNDATION.

The Research Foundation was founded in 1972 as an independent institution and registered charity.



It works closely with the hospital to foster primary research, both clinical and laboratory based. The role of the Foundation is seen as essential in attracting high quality medical professionals and in promoting the international reputation of the Hospital.

NCHD and NURSE TRAINING.

RVEEH is a teaching hospital connected to the Royal College of Surgeons, Trinity and UCD Medical Schools. It is also the national centre for complex eye surgery and is engaged in research through the RVEEH Research Foundation.

RVEEH delivers the only higher diploma programme for Ophthalmic nurses in Ireland.

RVEEH ADELAIDE ROAD BUILDING

Built as an inpatient hospital, the RVEEH premises use has changed significantly over the years. With a total of 100,000 outpatient attendances per year the hospital has become an outpatient/daycare hospital. With the modifications outlined above, the building will be perfectly adequate for the period of the RVEEH 2015/2025 Strategy. It is noted that Moorfields main hospital is still located in its original 1804 building. Following the implementation of the 2015/2025 Strategy, RVEEH will still have surplus space both within the building and in the space at the back of the building. These areas have the potential to be better utilised. This is an issue which the Council of the Hospital will review during the period of the Strategy.

CONCLUSION

Recent experience and the significant increase in the number of 65+ year olds which is forecast over coming years means that ophthalmology services will be under severe strain with consequent pressure on waiting lists.

The RVEEH 2015/25 Ophthalmology Strategy seeks to put in place structures to deal with the rising demand now. It addresses the need to develop patient care closer to the community and is based to systems shown to have worked in other jurisdictions.

While the plan addresses long term issues it is capable of being up and running in 2016. At a very low cost the plan should lead to eliminating ophthalmology waiting lists.

The proposed structures could also be rolled out nationally as recommended by the National Eye Care Plan 2014.

3. Context and Background

Ireland has experienced and continues to experience significant population growth. The total population is expected to increase from 22% to 28% between 2011 and 2016 (Table 1). The greatest increases are projected in the over 65 age groups. The prevalence of eye disease is directly related to the size and age of the catchment population. Whilst the predicted growth in service demand in the U.K. is of the order of 2% annually across all major conditions,

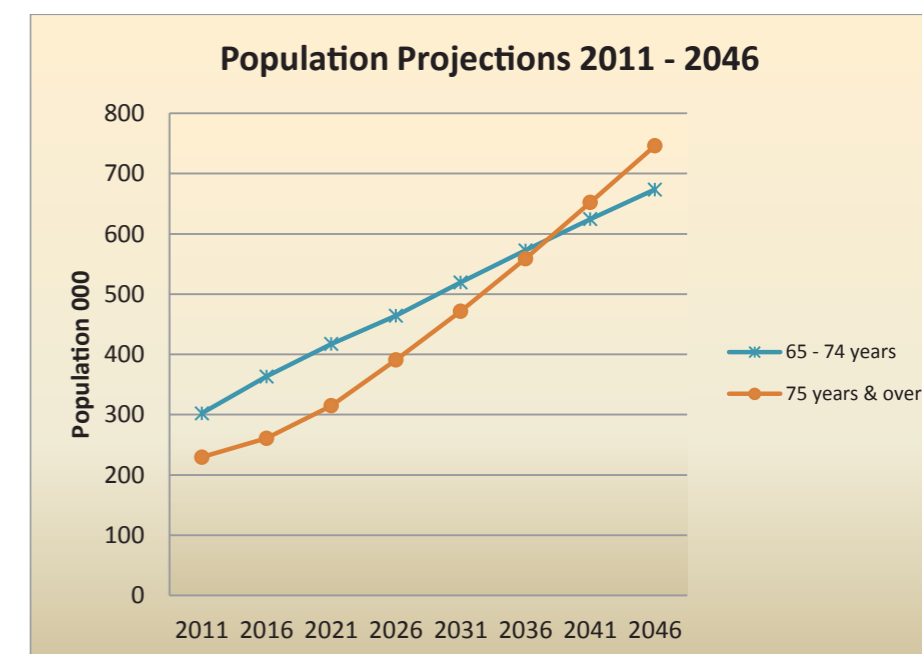


Table 1 – Graph of Population Projection Growth 2011-2046
Source: (Prof B. Whelan)

there are marked demographic differences evident in Ireland. The predicted annual compound growth rate for the population of England in the over 65 year category is estimated to be 1.5%. By comparison there is a predicted growth rate of 5% annually for each of the age bands over the age of 65 years in Ireland for cataract, AMD and glaucoma (Table 2). This has major implications for the planning of ophthalmic services in this country.

The increased incidence of chronic disease (Table 2) in an aging population will contribute significantly to the increase in numbers of patients presenting to RVEEH (Table 3) and will further strain the current model of eye care. Within the hospital context, delayed access to the system in general and to certain procedures remains a major problem. Hospital centers are overburdened by chronic disease, most of which could be appropriately diagnosed, treated and managed in the community. The numbers awaiting outpatient appointments and surgery are also growing.

Cork Eye & Ear Hospital closed in 1988 when ophthalmic services were transferred to Cork University Hospital. This transfer of services eventually proved disappointing; so much so that the Ophthalmology Department is now being transferred back to an elective hospital setting at The South Infirmary. Limerick, Galway and Waterford eye units (located in general hospitals) are

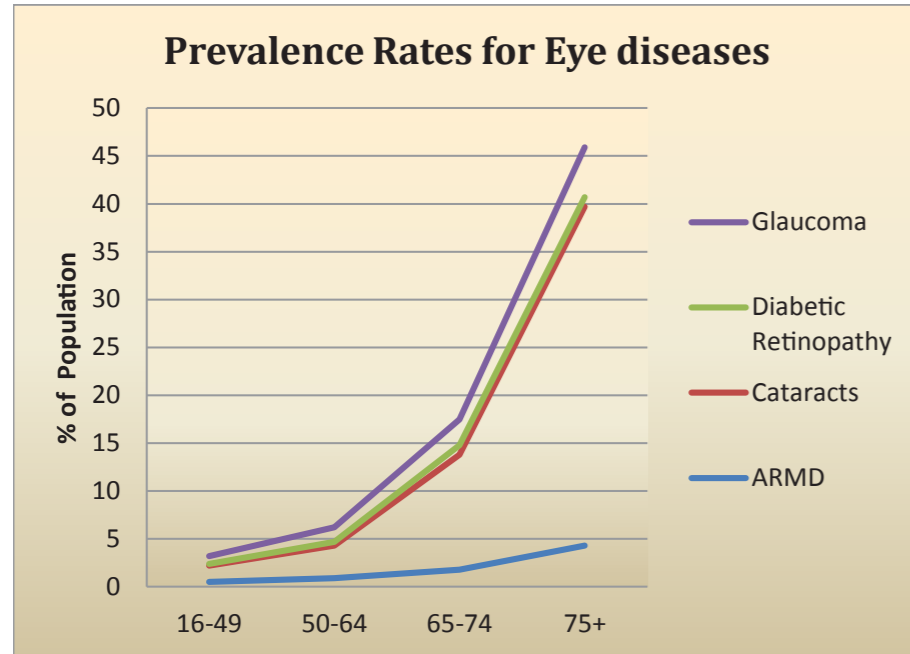


Table 2 – Graph of Prevalence Rates for Eye diseases
Source: (Prof B.Whelan/Tilda Project)

undergoing continuing rolling theatre and bed closures. Work from these units has been transferred on occasion to RVEEH.

Against this backdrop, the RVEEH budget has been reduced from €23.91 million to €20.34 million, a 15% reduction in the last five years. Despite this cut in funding, the accumulated deficit for 2009-2014 was only €614,000 on a cumulative budget of €107 million. In addition, the hospital has delivered activity

10% above the agreed service plan for three consecutive years. Combined IPDC case-mix activity has increased by 72% between 2009 and 2013; primarily as a result of increased retinal and lens procedures. There has also been a marked switch to Day Case activity in that period.

Indicative benchmarking figures for 2014 from the HSE show RVEEH generating an additional €2.3 million in funding based on Activity Based Funding This is a positive indicator of the relative efficiency on inpatient and daycase services within RVEEH.

However, the total percentage of the Irish Health budget spent on eye care is 1.17%¹. The comparable figure in the UK is 2%. The eye care per capita expenditure for Ireland is €34 while the UK figure is €46.30 (using average 2011 exchange rate)². In line with government policy, devolving services from acute hospitals to the primary care setting would enhance access and service delivery. Integration of current and future services between the acute and primary care sectors is vital to ensuring high quality, efficient and effective care and it is believed that a hub and spoke model is the best means of achieving this aim.

¹ John Slade, Eye Health and data summary 2012, A review of published data in England, RNIB.

² The total indirect costs of vision impairment and blindness in 2010 was €269.3 million, projected to rise to €292.3 million by 2015 and €312.2 million in 2020. Source: Economic Impact of Vision Impairment & Blindness in the Republic of Ireland, National Council for the blind in Ireland, May 2011.

The demographic changes in Ireland and increasing prevalence of diseases such as diabetes demand that the RVEEH adapts and provides integrated services in a streamlined, cost effective manner. The delivery of its services will continue to undergo significant change in the next 10-15 years with advances in treatment options, increasing patient numbers and demand for ever improving healthcare efficiencies. The development of community eye services delivered by specialist ophthalmologists, optometrists and general practitioners linked to and supported by the national center at RVEEH will be essential to the sustainability of the service.

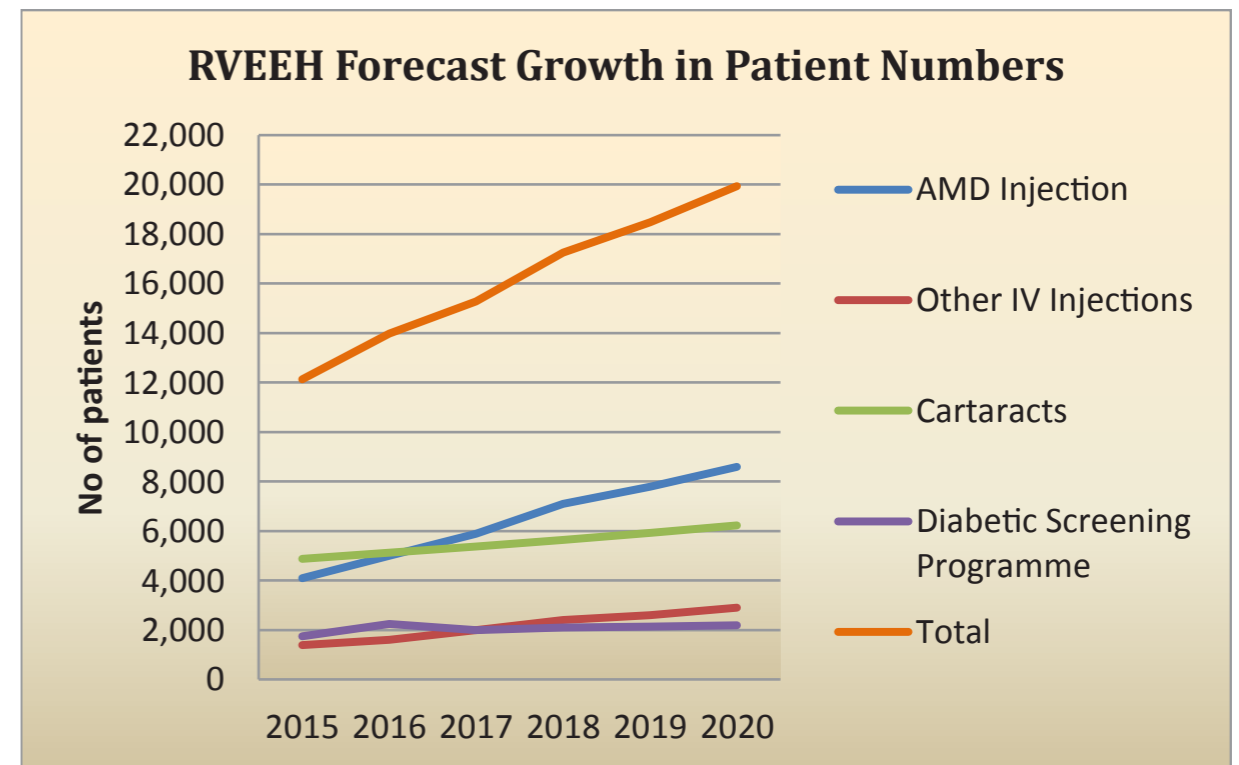


Table 3 – Graph of Growth in RVEEH Patient numbers



3.1 The National Eye Care Plan

The National Eye Care Plan 2014 (NECP) aims to rebalance the delivery of care to a more community-based model. Its objectives focus on eliminating avoidable sight loss, improving cost effectiveness and providing equitable access to efficient high quality care, supports and treatments. The NECP has established the following key enablers to achieve its objectives:

- A restructure of manpower balance between the hospital and community settings with increased numbers of community eye doctors enabling most patients to be seen locally.
- An improved response from the surgical centers to minimise waiting times.
- Increased responsibilities for optometrists and orthoptists within a structured model of care.
- Investment in community clinics both in medical manpower numbers and equipment.
- Investment in Information Technology and electronic medical records to enable a hub-and-spoke regional delivery of care.

The RVEEH not only supports the recommendations of the ‘National Eye Care Plan’ but, as the national centre for eye care, RVEEH can forge a leading role in the development of the hub-and-spoke model and deliver on the NECP’s stated objectives to:

1. Increase capacity and equity of access to services,
2. Develop protocols for patient referral reducing the number of inappropriate referrals to specialist care,
3. Reduce waiting times for eye care.

The management of chronic stable eye disease in the community with IT linked hospital eye services (remote viewing of diagnostics, imaging results, electronic patient medical records, video/ email consultation) will allow the RVEEH to focus on surgical care and management of complex eye disorders.

3.2 International experience and trends

The efficiency and cost benefits of this hub-and-spoke model are well established worldwide. International evidence suggests that the top ranked eye hospitals tend to be stand alone units (Table 4).

Top-ranked Eye Hospitals in the U.S.	1. Bascom Palmer 2. Wills Eye Hospital 3. Massachusetts Eye and Ear Infirmary
Top-ranked Eye Hospitals in the U.K.	Moorfields Eye Hospital
Top-ranked Eye Hospitals in Australia	Royal Victoria Eye and Ear Hospital, Melbourne

Table 4 – US News and World Report, 2013

Recent studies demonstrate that poor vision has a far greater impact on patient’s lives than was previously thought, comparable with major medical conditions such as stroke³. Decreased vision is also associated with subsequent physical disability, especially hip fractures in females⁴. Studies confirm that cataract surgery delivers a 4,567% financial return to society through cost savings⁵ and the same argument can be made for other sight restorative procedures.

In many health jurisdictions ophthalmology services (unlike other surgical specialties) are delivered through stand-alone units distinct from the general hospital complex. This system has many benefits. It is widely accepted that high patient throughput requires protection from the vagaries of a general hospital and its emergency department. The stand-alone unit eliminates competition for theatre access and beds from acute medical/surgical/casualty admissions. The self-contained nature of ophthalmology is also ideally suited to a day case model and obviates the need for ancillary general hospital services such as intensive care, coronary care or blood transfusion services⁶.

³ Chia et al 2004

⁴ Salive et al 1994.

⁵ Cataract surgery delivers a 4,567% financial return on investment to society. Ophthalmology AAO 2013.

⁶ Transfer of acutely ill patients from a stand-alone hospital to a general hospital a rarity (6 patients transferred from RVEEH over 3 years).



Furthermore, there is widespread recognition of the unique economic impact value of ophthalmology to society⁷.

Protected bed access in a standalone unit results in large volumes of patients being assessed and treated in a predictable manner. This leads to greater economic benefits and increased efficiencies with consequent financial savings, improved expertise in subspecialty ophthalmology areas, protected critical mass of subspecialty-trained staff (including nurse practitioners) and specialty-focused training and research opportunities.

A standalone facility acts as a central hub for delivery of eye services in conjunction with community/satellite centers. Such a unit has the ability to develop into a five day only facility due to the elective nature of most ophthalmic work. Centering such a model on the RVEEH, with its academic links to medical schools and universities would foster a culture of academic excellence.

The net result will be better clinical outcomes for patients.

3.3 Case Study

Moorfields Eye Hospital in London, founded in 1805, continues to operate from its original premises in City Road. With 127 ophthalmic consultants, almost 500,000 outpatient attendances annually and a pivotal research role, it is the largest and most successful eye trust in Britain and indeed in Europe. It delivers its care through an extensive network of satellite eye clinics linked closely to the main hospital and is consistently ranked as a world leader in its field. Moorfields Eye Hospital has satellite units throughout the greater London area. Its spoke/satellite unit in Ealing might be a blueprint for the RVEEH as it has a catchment population of 318,000 – albeit that it performs cataract surgery on site, which is not practical for RVEEH hub units at present. It assesses 30,000 outpatients, performs 2,000 intravitreal injections and administers over 1,000 laser treatments annually.

See appendix C for a more detailed description of the Moorfields model.

⁷ The indirect costs of vision impairment & blindness includes the economic impacts on wider society outside the health care system. In 2010 these costs included:

* Productivity losses of €6.7 million including lost earnings from lower employment and premature death.

* Informal care costs of €08.3 million.

* Welfare losses of €04.4 million – welfare payments to the blind and lost taxation costs.

⁸ RVEEH has academic links to all three Dublin Medical Schools – UCD, Trinity & the RCSI. The Professor of Ophthalmology of the latter two schools is based in the RVEEH.



4. The Royal Victoria Eye and Ear Hospital 2009-2014

Since its foundation in 1897, RVEEH has been synonymous with high quality care. It is the principal eye unit for the Republic of Ireland with 12 consultant ophthalmic surgeons and 7 ophthalmic physicians (hospital medical ophthalmologists). It is the country's largest secondary and tertiary service delivery provider for all 5 main patient groups including age related macular degeneration (AMD), Cataract, Diabetic Retinopathy, Glaucoma and Children's Eye Services.

The main clinical service strengths of the RVEEH include:

- The largest tertiary subspecialty consultant ophthalmologist cohort nationally.
- 3 specialised, fully equipped eye theatres (with 2 additional ENT theatres).
- 2 minor procedure theatres for intraocular injections and minor day case procedures.
- A dedicated anaesthesia service with a protected emergency rota.
- An outpatient department with dedicated eye diagnostics and imaging suite and laser facilities.
- An ophthalmic nursing school with clinical nurse specialist and advanced nurse practitioner expertise.

The RVEEH runs the only postgraduate ophthalmology nursing diploma course in Ireland and has academic links to the RCSI and TCD medical schools.

The RVEEH delivers on average 21% of the national surgical daycase demand.

The RVEEH is also the main tertiary service provider for complex subspecialty eye disorders (30% service use in Ireland) including Vitreo-Retinal Disorders, Cornea and External Eye Disease, Neuro-Ophthalmic Disorders, Adult Strabismus, Ocular Adnexal Disease, Uveitis and Ocular Oncology.

The RVEEH provides the only regional 24 hour manned eye Emergency Department with 24,616 annual attendances in 2013, an increase of 22% compared to 2009.

The RVEEH is a member of the World Association of Eye Hospitals (WAEH) a global association in

which all member-hospitals are centres of excellence in ophthalmology and commit to focus on delivering the best and safest ophthalmic care.

The RVEEH was awarded JCI accreditation in 2014, testimony to the Hospital's standards and commitment to excellence.

RVEEH WORKLOAD	Patient Numbers 2013	Trend Since 2009	Available Resources
OPD Attendances	42,000	9% increase	24 OPD sessions (multiple consulting suites per session)*
Day Care Surgery (case mix units)	16,200	23% increase	16 adult, 10 paediatric Day Care beds/daily
Inpatient Surgery	1,600	55% decrease reflecting the move to day care surgery	A mean of 15 inpatient beds 25 theatre sessions/week* 20 minor op. sessions/week*
A&E Attendances	24,616	20% increase	24 hour, 365 day staffed A&E department
Ophthalmology Surgical Waiting List	2,765	47% increase since 2012	

Table 5 – RVEEH Recent Trends in activity



4.1 RVEEH Training and Academic Roles

With seven basic specialist trainees, five higher specialist trainees and several fellowship training positions, the RVEEH is Ireland's largest ophthalmology training centre for postgraduate medical trainees. It is the only centre in Ireland that provides comprehensive training across all sub-specialty areas of ophthalmology and ophthalmic surgery.

The national teaching programme for the Irish College of Ophthalmologists is delivered from RVEEH using the Education and Conference Centre that is equipped with multi-site video-conferencing facilities.

A strong programme in basic science and clinical research involving long established collaborations exists with many third level institutions in Ireland and in Europe. Grant awards from the Health Research Board, European Commission, the RVEEH Research Foundation and Industry have helped RVEEH to develop into an academic research centre of excellence.

RVEEH/RCSI is in partnership with a European research consortium that received €6 million in 2013 from EU FP7 sponsorship for corneal research. This research focus also benefitted from HRB grants in 2012 and 2014.

4.2 Research Foundation

The RVEEH Research Foundation was founded in 1972, as an independent institution and registered charity. It works closely with the hospital to foster primary research, both clinical and laboratory based. This is essential in order to attract high quality medical professionals and to promote the international medical reputation of the hospital.

4.3 RVEEH Performance 2009-2014

The RVEEH annual budget for 2010 was €21.6m; comprising 31% of total direct hospital costs of €70.06m for vision impairment and blindness in the Irish health care system. However, the hospital carries out a larger proportion of procedural volume nationally, particularly for subspecialty care as evidenced by the National Inpatient Activity chart to the right.

4.4 Activity profile

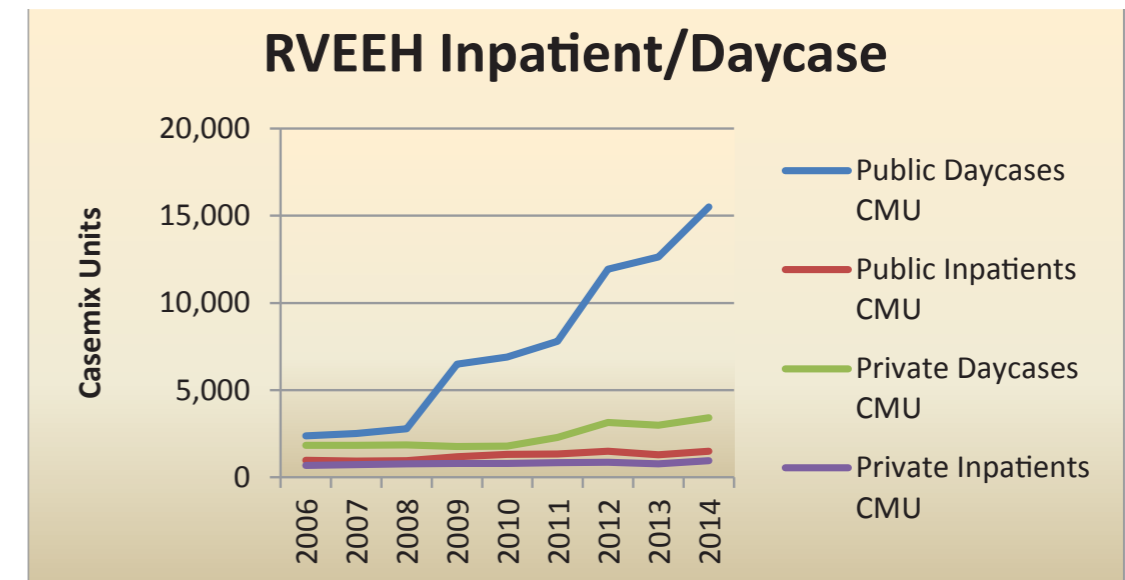


Table 6 – RVEEH Inpatient/Day case CMUs

The cost of delivering surgical services (as measured by the case-mix unit) has decreased by almost 70% per unit in the hospital over the last five years as a result of innovation and changes to the treatment pathways – including a promotion of day care treatment. These processes continue to be revised on an ongoing basis to drive further efficiencies. It needs to be recognised that all of the financial efficiencies have now been extracted and further increases in activity must be properly resourced if service quality is not to suffer.

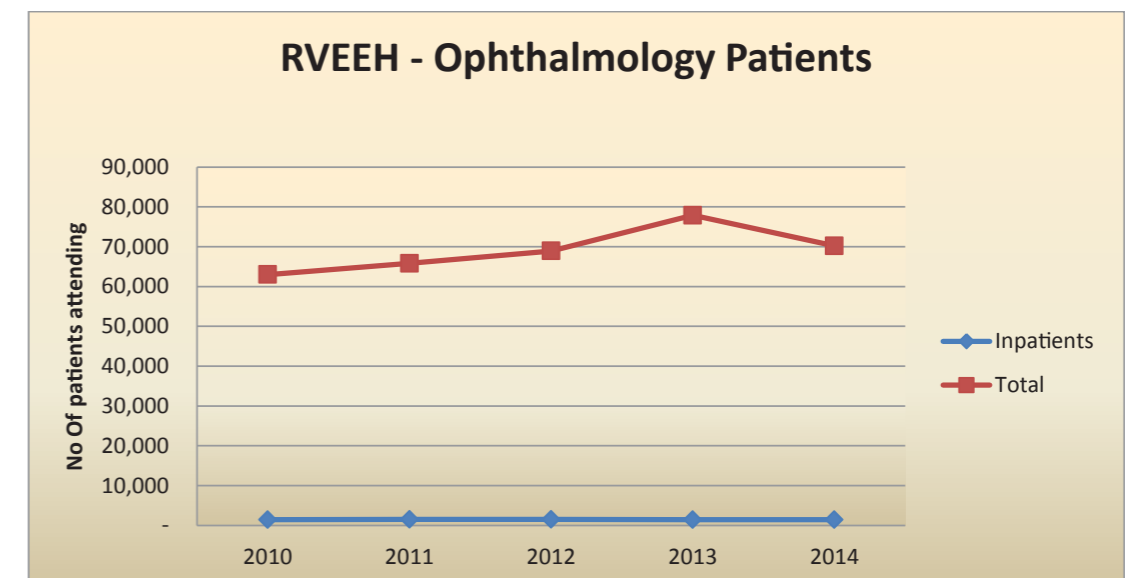


Table 7 – RVEEH Comparison of Inpatient and Daycase/OPD Activity

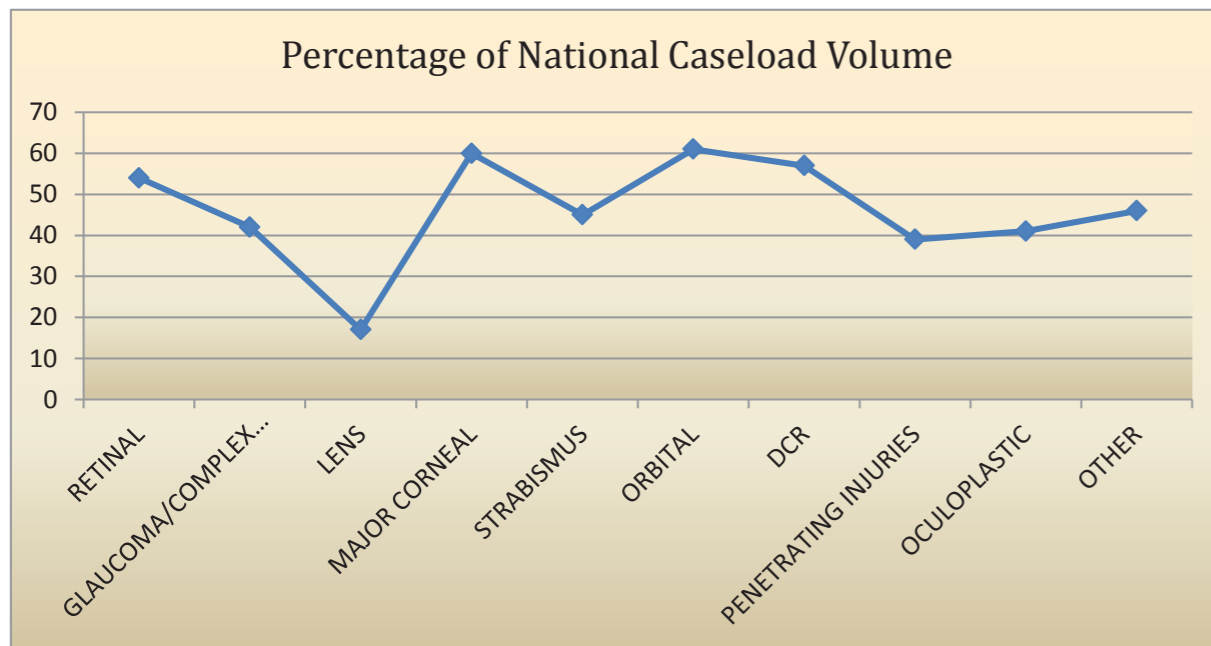


Table 8 – RVEEH % Share of National Caseload

Graph showing the percentage of national major ophthalmic work undertaken in the RVEEH by ophthalmic specialty. Taken from the HIPE Benchmarking Data (Jan 12 – June 14).

4.5 Geographic catchment area

As can be seen from the following table, RVEEH draws its patients from the South Dublin and Greater Leinster areas.

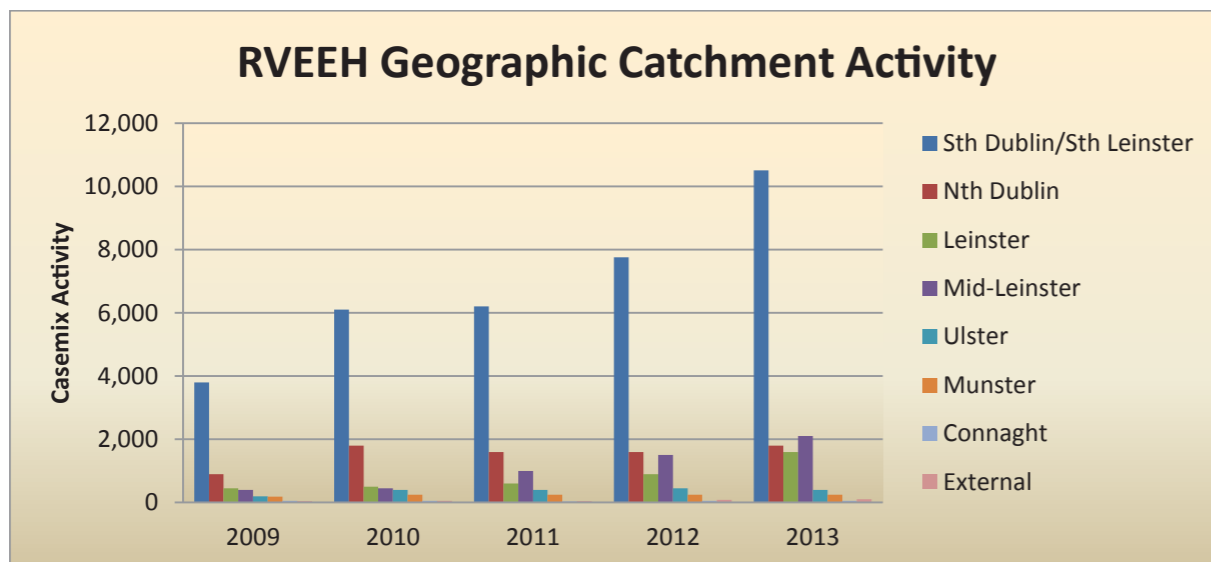


Table 9 – RVEEH Geographic Activity

4.6 Community Links

All ophthalmic consultants attached to RVEEH have joint appointments with other hospitals, creating links with regional and Dublin hospitals. These include St James' Hospital, St Vincent's University Hospital, Our Lady's Hospital in Crumlin, Tallaght Hospital, St Columcille's Hospital, St Michael's Hospital and Portlaoise General Hospital.

This arrangement affords access to the ophthalmology expertise in the RVEEH to those patients attending within the hospital network. Clinical links from these hospitals into the wider community are facilitated by medical ophthalmologists who work with a dual commitment to the hospital and community eye service in these areas. RVEEH also works closely with medical ophthalmology clinics in South Dublin, Wicklow and Kildare through the HSE Community Ophthalmic Services Medical Treatment Scheme.

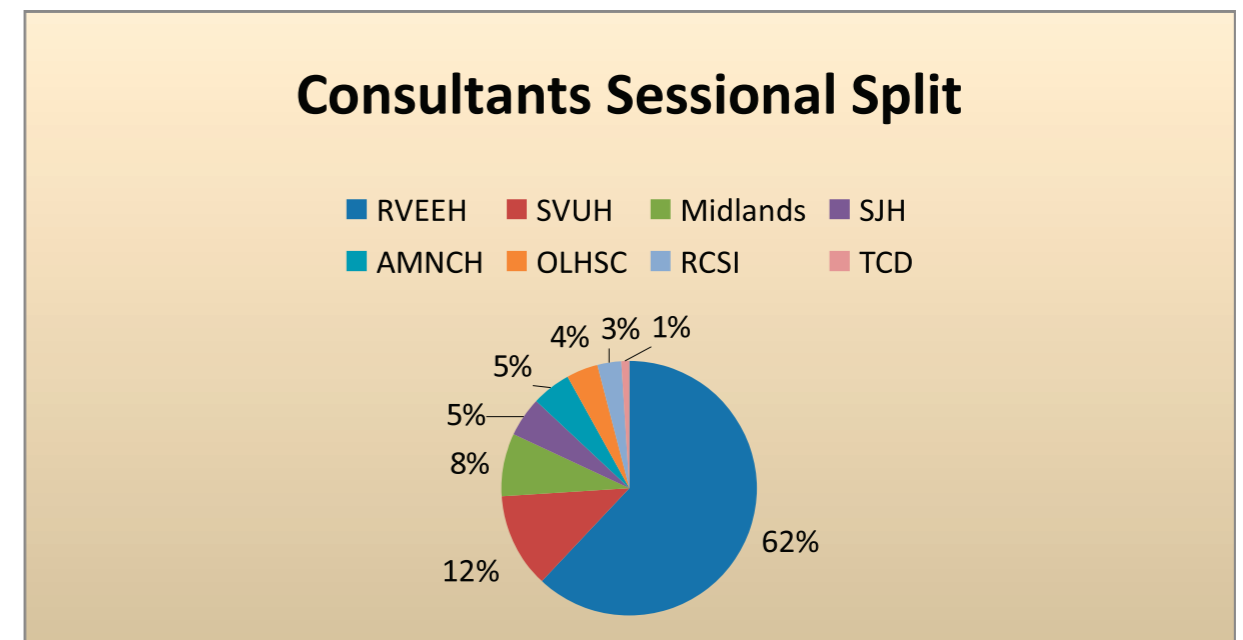


Table 10 – Consultants Sessional Split



5. Proposed RVEEH Hub-and-Spoke Care Delivery Model

5.1 Summary

To cater to the increasing demands, the RVEEH should function at the centre of a hub with a number of spoke units linking into it from the periphery. The precise location of such units would be decided in consultation with local Primary Care or Acute Care management. The number of sites will be dictated by the requirements of the catchment population and the ability of the RVEEH to service the numbers referred.

Outpatient, diagnostic and minor interventional work would be carried out in peripheral affiliated units with the specialised/complex caseload being referred centrally. This would decant significant patient volumes from an acute setting thereby allowing the hospital to concentrate on a more appropriate clinical caseload. This is consistent with the HSE policy to provide patient care at the appropriate facility level and would ensure that capacity in the RVEEH is not overwhelmed by an inappropriate caseload.

Each satellite unit would require fully independent diagnostic and treatment functionality with appropriate resources. All units would have integrated IT networks and EMR.

In an Irish context, the spoke units would provide outpatient assessments, pre and postoperative cataract work-up, intravitreal injections and certain laser treatments. Unlike Moorfields which performs cataract procedures on some satellite sites, the RVEEH cataract surgery would be performed centrally with all other aspects of the perioperative care delivered locally. In time, spoke units may perform cataract surgery should the patient numbers referred exceed the capacity of the RVEEH or should the cataract volume from the spoke unit justify an onsite surgical facility. The predicted cataract surgical capacity in the RVEEH (after commissioning of a standalone cataract theatre) is approximately 5,500 cases annually – 2,500 are currently performed and a potential 3,000 in a dedicated cataract theatre. A standalone peripheral cataract unit would need to perform 1,000 cases annually to justify its establishment.

The spoke units would operate on a 5 day basis without evening or weekend work. Combined with the elective nature of the work and the established referral patterns, this should allow predictable service level demands and economic efficiencies.

All hub-and-spoke units would have standardised policies, procedures and documentation (e.g. patient listing forms, patient information leaflets, 'correct-site' procedure policy etc.). The design and set-up should also be standardised (e.g. drug trolley layout, pharmacy, laboratory logistics etc.) with an integrated IT system allowing access to all diagnostic and medical records.

Without the impact of a standalone cataract theatre, such a model should increase the RVEEH surgical cataract activity and reduce outpatient attendances by between 15 and 25%. This is against a current ophthalmic theatre occupancy rate of 89%. Once the blueprint for the spoke unit is established and its efficiency verified, it can be replicated for all future spoke units.

5.2 Services available in the spoke unit

Outpatient clinics: Wet AMD/Medical Retinal Glaucoma
Cataract pre-op and post op clinics
Diabetic retinopathy treatment clinic
Children's Eye Clinic

Additional Services: Intravitreal Injection room
Biometry (pre-op cataracts)
Photography, fluorescein, OCT
Humphrey visual fields
Orthoptic clinic



5.3 Hub-and-spoke model: Key enablers

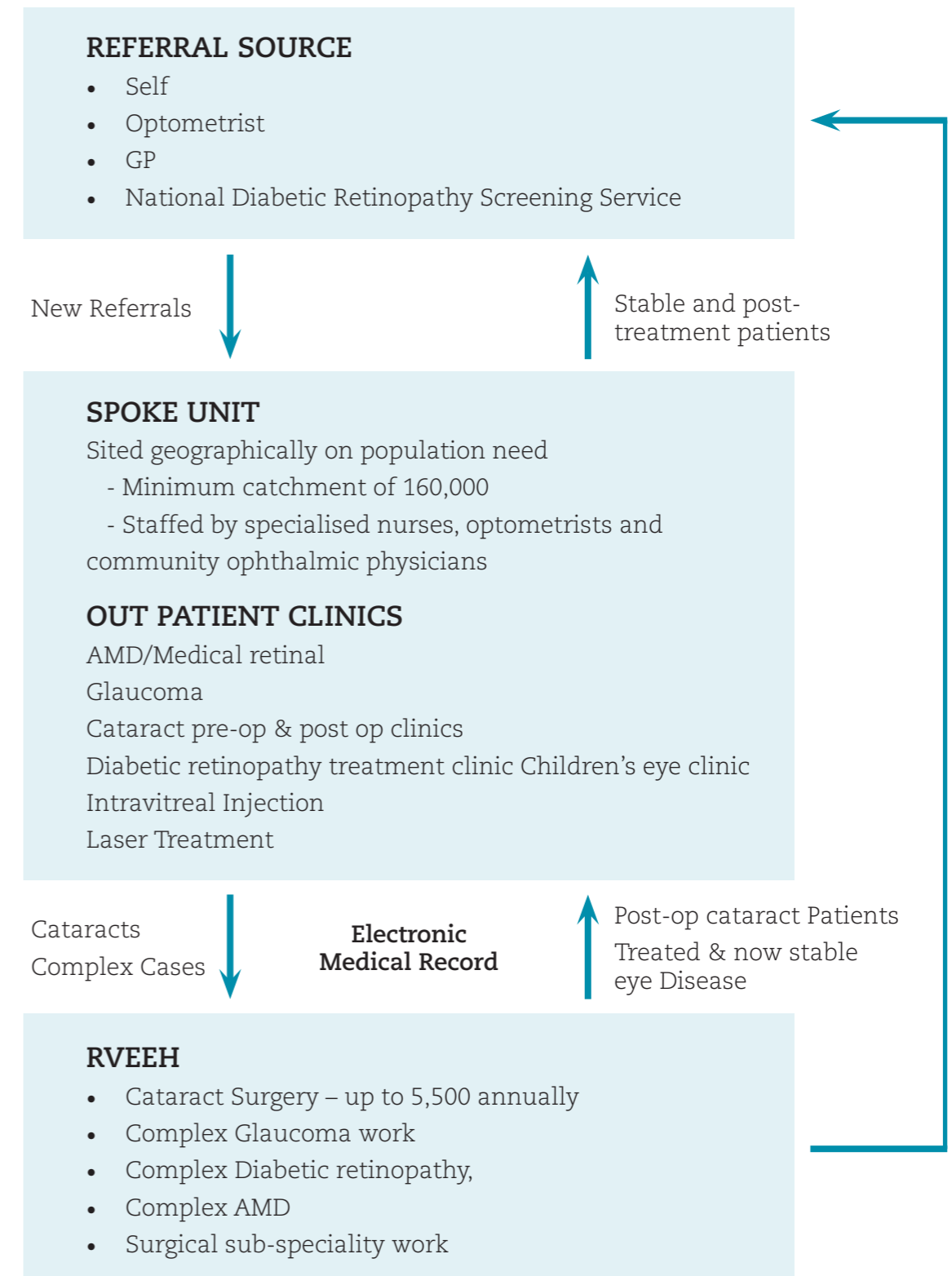
A number of key enablers are necessary for the implementation of the hub-and-spoke model:

- Modern spoke facilities;
- Adequate operating room and outpatient capacity in RVEEH;
- Electronic Medical Record (EMR);
- Ongoing audit with benchmarking of clinical key performance indicators;
- Appropriate manpower in both hub-and-spoke units;
- Upskilling of specially trained ophthalmic nurses, optometrists, COPs;
- RVEEH should lead the way in training and certification of ophthalmic technicians;
- Appropriate Clinical Governance arrangements.

The requisite number of spoke units depends on the disease demographics and catchment population size. A minimum catchment population of 160,000 is probably necessary to generate the necessary referral volume to make the unit viable from an economic standpoint (economy of scales) and clinical workload situation (prevent deskilling of staff). The initial proposal is to establish two or three units in either a Primary Care setting or in an acute setting where RVEEH already has a presence (e.g. St Columcille's Hospital or Midland Hospital Portlaoise). Both of these hospitals have a catchment population of approximately 160,000; this equates to 25% of the current Ireland East catchment population of 1.2 million.

Location of the primary care site will be determined in consultation with the HSE's Primary Care Planning section.

5.4 Patient Flow Pathway in hub-and-spoke Model





Anticipated Clinical Service Output:

A full scale peripheral unit (serving 160,000 people) would treat 2,500 new and 13,000 return outpatient referrals, 1,000 intravitreal injections and 500 laser treatments annually. In addition, 1,000 cases requiring cataract surgery would be referred centrally to the RVEEH each year.

	Current OPD Workload	2020 Anticipated OPD Workload	Current Surgical Workload	2020 Workload (anticipated)	Key enablers
AMD	4,000	4,500	4,600 IV	11,500 IV injections (AMD 8,600) 150% increase	- Standalone diagnostic & treatment function in spoke units - EMR - Manpower
Cataract	3,000	3,300	2,500	6,250 150% Increase	- Dedicated cataract operating room capacity in RVEEH - EMR - Manpower
Diabetic Retinopathy	2,500	2,750	IVitreals 432 Macular Laser 60 PRP Laser 180 Vitrectomy 46	IVitreals 800 Macular Laser 60 PRP Laser 190 Vitrectomy 60	- Capacity in spoke unit - EMR - Manpower
Glaucoma	3,000	3,400	800		
Children's Services	1,500	1,500	250		

Table 11 – RVEEH Clinical Services Growth

This table shows the anticipated growth in outpatient and theatre work in the RVEEH to 2020 across the five principal clinical areas identified in the National Care Plan for Eyes 2014. Together with the changes necessary to cater to the increased service demand.

6. Implications for RVEEH of the Key Growth Areas Identified under the National Eye Care Plan 2014

6.1 Age-related macular degeneration (AMD)

AMD is the leading cause of severe vision loss in those over 60 years with sharply increasing prevalence in the population over 75 years. Roughly one third of the latter have some form of AMD. The numbers at risk of developing AMD in Ireland are expected to double by 2020. There are two types of AMD: dry (90%) and wet (10%), the latter results in rapid, irreversible central vision loss if not detected and treated adequately. Since 2005, the mainstay of wet AMD treatment has been intravitreal injections of agents that block Vascular Endothelial Growth Factor (anti-VEGF). These drugs have been shown to have a major impact in reducing blindness.

In 2005, 430 AMD patient treatments were performed nationally and by 2012 this had increased twenty fold to 8,880. Recent RVEEH HIPE data shows an increase from 3,400 to 4,600 injections between 2011 and 2013, now forming 30% of the total national AMD injection number. The projected number of intravitreal injections in this hospital within 5 years is 11,500 – a 250% increase on our 2013 activity level.

Current RVEEH AMD care delivery

- Current Care delivery is initiated after triage of acute referrals from GPs, optometrists and other ophthalmologists to the RVEEH Emergency Department,
- It allows for rapid access to clinic care with spectral-domain OCT and fluorescein angiography,
- It provides for direct listing to consultant lists for intravitreal injections,
- The appropriate treatment mandates urgent access (within 3-4 weeks) and three consecutive monthly anti-VEGF injections with ongoing treatment and follow-up. The latter is provided through four retinal specialist consultant clinics.

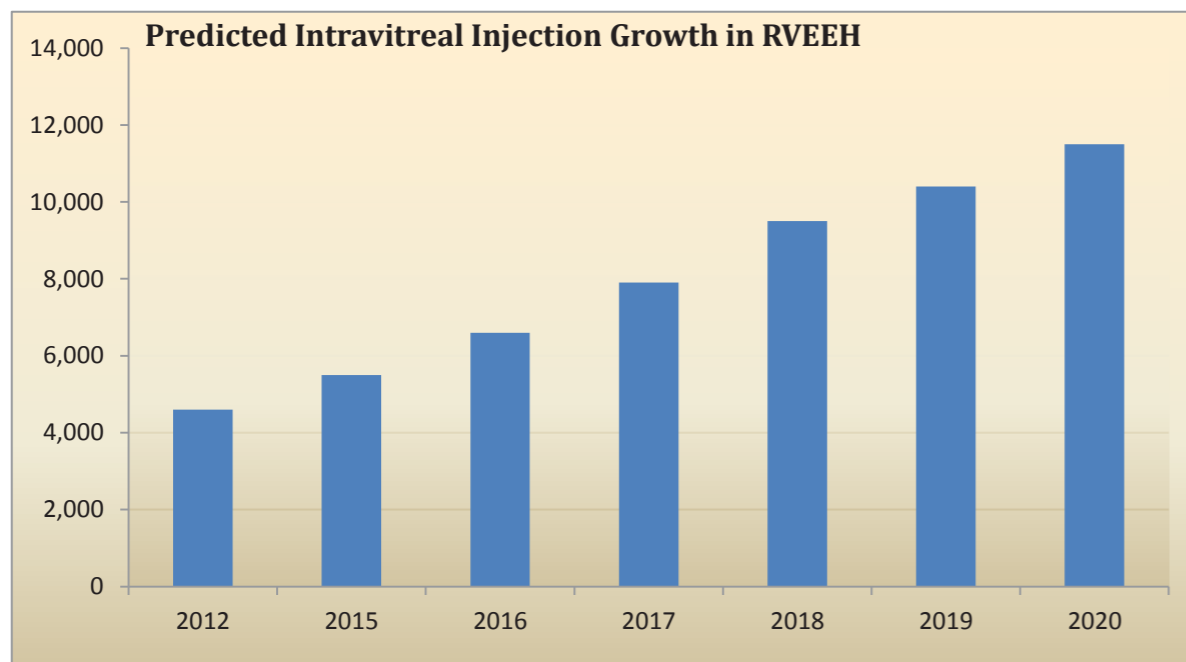


Table 12 – Predicted increase in intravitreal injection demand in the RVEEH catchment area over the next 5 years. Based on previous HIPE data 2011-2013 and projected population at risk.

6.1.1 Future AMD Care Pathway

The care pathway must consist of:

1. Agreed guidelines on identifying dry and wet AMD by established international standards using digital imaging and linked IT software.
2. Identification of treatable AMD in primary care units linked to the RVEEH.
3. Referral to community spoke units for diagnostic investigation and initial treatment.
4. Assessment by community retinal specialist (ideally within 3 weeks of referral) using fluorescein angiography/ optical coherence tomography (OCT).
5. Community spoke units to have 'clean' minor procedure room facilities to allow for treatment within 3 weeks of initial diagnosis if required.
6. Referral to RVEEH retinal specialist - using agreed guidelines - if the patient is not responding to treatment protocols or any concern arises.
7. The majority of treatable AMD cases require 3 consecutive monthly injections and extended treatment and monitoring over 4 years.

6.2 Cataract

In the developed world, cataracts are the main cause of decreased vision in the elderly. Cataract surgery is an effective and economical procedure with great benefits for the lives of the aging population. The incidence of cataracts increases with age, such that by 75 years approximately 25% of people will have a cataract. With a projected increase of 80% in those over 75 years in the next 15 years, the hospital faces an enormous increase in demand for its cataract services.

The care pathway must adapt to these increased demands. Referral pathways, pre-operative assessment, surgery and postoperative review need to be integrated with community ophthalmic services to provide a streamlined service. Allied to this, there must be sufficient operating capacity in the RVEEH to handle the increased volumes.

	RVEEH/ Midlands	SVUH	Total
Annual Cataract Surgery Cases	2,500	450	2,950
Current Waiting List	1,500	200	1,700
Current Clinical Requirement	4,000	650	4,650

Table 13 – Current cataract requirements in 2014

6.2.1 Future Cataract Care Pathway

Currently, 4,650 cataract cases are required annually to meet service demand within the RVEEH catchment area but this will increase by 1,000 annually (or 40% of the current cataract workload) within 5 years (table 14). By 2024, the demand will be approximately 7,570 cases annually – a 65% increase on the current cataract workload.

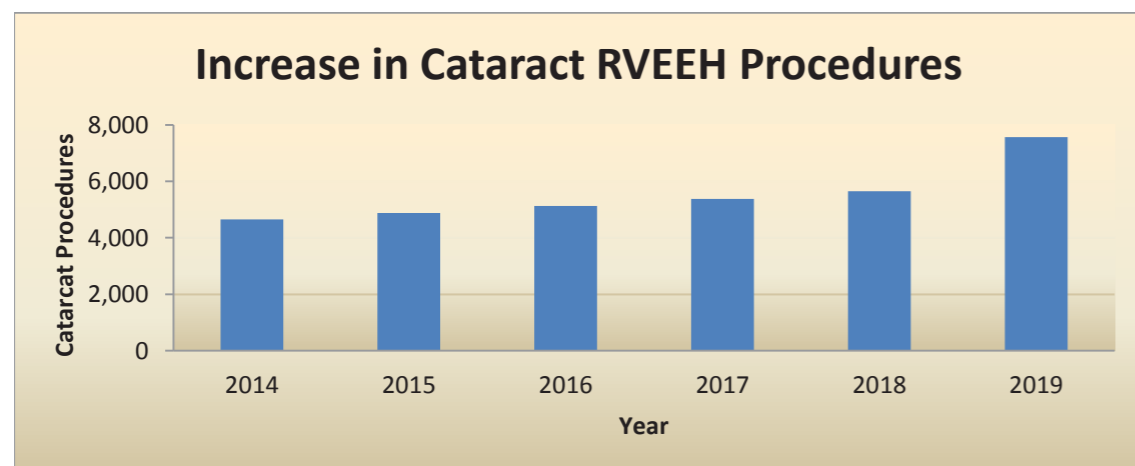


Table 14 – Graph showing the predicted year on year increase in cataract surgery numbers. This is based on a predicted 5% annual increase in the population over 75 years.

STEP 1: Patient referral

- General Practitioner
- COP
- Optometrist
- Self

Patients should be reviewed in the local spoke clinic with a same day pre-op assessment. If not locally available, patients should be seen in a special cataract assessment clinic in the RVEEH. All medical investigations and biometry should be performed on the day of the patient's clinic visit. The social circumstances of the patient should also be determined to ensure day case suitability. A surgical date should be assigned, all follow up appointments scheduled and a decision regarding the patient's second eye made. The patient leaves the clinic with an information booklet and a copy of the consent form and would be next seen on the day of surgery. All documentation is uploaded onto the patient's EMR. Best practice should be followed regarding the preoperative testing and relevant documentation.

STEP 2: Surgery

Patient admitted as day-case to the RVEEH cataract only service list.

Teaching cases or more complex cases should not be accommodated on these lists to facilitate a homogenous patient cohort and rapid patient throughput.

STEP 3. Patient review

In uncomplicated cases, a review at three weeks should be performed in the community ophthalmic clinic at which the preoperative assessment was undertaken. If a complication is detected, rapid access to the hospital facility should be available or a review date scheduled in the RVEEH by the operating surgeon.

Data from the pre, post and intra-operative visit should be electronically available to the hospital and community ophthalmology clinic. The surgical results should be the subject of an ongoing clinical audit (e.g. EUREQO).

6.2.2 Cataract Care Pathway Limitation of RVEEH Theatre Access

The establishment of a cataract only operating theatre will enhance the RVEEH's capacity to handle the demand for cataract surgery. One new fully serviced 'cataract only' operating theatre in RVEEH should be capable of undertaking 3,000 cataract cases per year based on the following data:

- 15 cases per day
- 5 days per week
- 40 weeks per year (holidays, servicing of theatres, equipment, sick leave etc.)

International practice guidelines are available to predict:

1. the medical and nursing staff numbers:
2. the nursing and clerical staff for the pre-operative assessment clinics:
3. the ancillary staff support:
4. the necessary staffing for the pre and post-operative assessment visits:

Communication between the community and hospital based specialists is central to this care pathway as lack of access to test results, GP referral notes etc. would hamper the service. A detailed assessment of the requirements of a standalone cataract unit including the anticipated staffing needs is outlined in appendix E below.



6.3 Diabetic Retinopathy

Diabetes affects 6% of the population and is the leading cause of visual impairment in the working-age population¹¹. By 2020, the number of adults aged 45+ years with diabetes (diagnosed and undiagnosed) is expected to rise to more than 175,000 - a 30% increase or an additional 40,000 adults in just ten years¹². The country faces an epidemic of diabetic related eye problems unless appropriate action with respect to prevention and early screening is instituted.

In 2013, the Health Services Executive (HSE)/National Cancer Screening Service (NCSS) launched the 'Irish National Diabetic Retinopathy Screening Programme' for referral of those with sight threatening retinopathy to designated screening centers. Its aims are earlier detection and treatment of sight threatening diabetic retinopathy, improved quality of life by maintaining better vision in diabetic patients and reduced cost of vision impairment and preventable blindness to the community.

The RVEEH is one of seven designated national centers (one of only two in Dublin) for the evaluation and treatment of such patients. This service is vital in reducing vision loss in the diabetic population through early detection and treatment.

6.3.1 Diabetic Retinopathy Screening

The HSE/NCSS anticipates that for a population of 3,820,000 (based on the 2006 census) a projected 214,000 (5.6%) nationally have either Type 1 or Type 2 diabetes. Based on an 80% uptake, it expects photographic/grading of 172,000 eligible individuals yearly. It currently has a verified register of 145,000 diabetic patients, 29,000 of whom live in the RVEEH catchment area.

An estimated 25% screen-positive rate (18% diabetes-related, 7% non-diabetes related) are expected to receive onward referral – equating to approximately 7,250 patients annually in the RVEEH area. Initial referral numbers during the 'roll-out' phase will be lower but should peak in year 2-3 before leveling off to a stable referral rate.

As many diabetic patients with sight-threatening disease already attend RVEEH clinics, NCSS impact on hospital services will be lower as any new referrals will represent predominantly "treatment-naïve" patients. A steady referral rate of 40 patients per week from the NCSS to RVEEH would be a conservative estimate from year four onwards, with an anticipated yearly increase of 3-5%.

¹¹ The National Diabetic Retinopathy Screening Programme

¹² Institute of Public Health Release REF IPHR

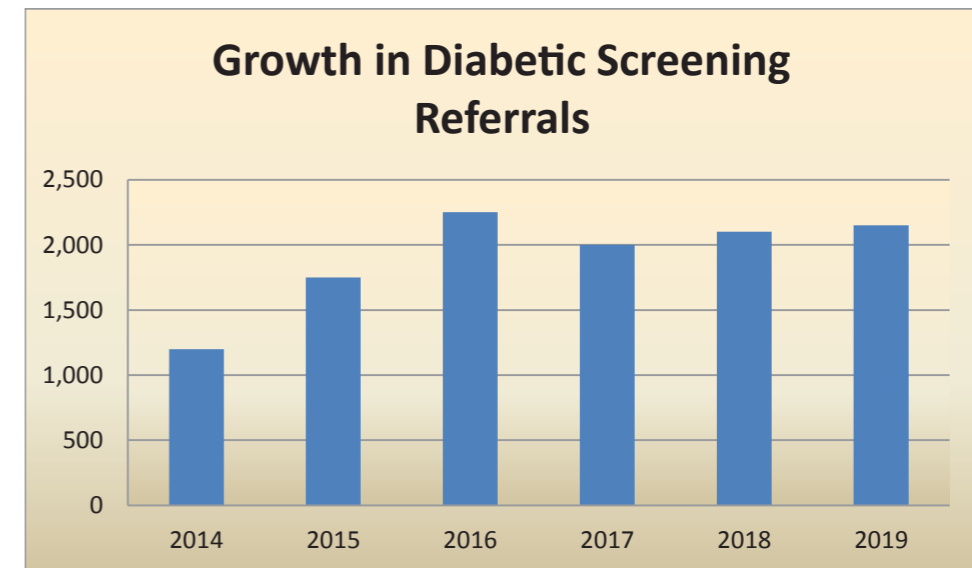


Table 15 - Growth in Diabetic Screening Referrals. Based on RVEEH / NCSS figures 2014 and increases based on predicted increase in diabetes prevalence

Treatment for diabetic eye disease

Diabetes causes vision loss through 'diabetic macular oedema' (DMO), whose estimated prevalence is 2.5% and through 'proliferative diabetic retinopathy' (PDR) (estimated 2% prevalence). DMO is now primarily treated by intravitreal injection, with macular laser being less commonly employed than previously. PDR is primarily managed by laser (PRP laser), but intravitreal injections and surgical vitrectomy may be indicated.

Treatments for Diabetic Eye Disease – Projected RVEEH numbers

Procedure	2006	2010	2014	2020
Intravitreal Injection ¹³	80*	223*	432*	800
Macular Laser ^{§14}	220	200	60	80
PRP Laser [§]	250	210	180	190
Vitrectomy ¹⁵	46	40	46	60

Table 16 - Diabetic eye disease treatments

¹³ source: HIPE intravitreal injection numbers, assuming 1 in 8 injections is for DMO

¹⁴ source: HIPE laser numbers, NCSS clinic laser numbers, outpatient record laser numbers

¹⁵ source: HIPE vitrectomy numbers, assuming 1 in 10 vitrectomies is diabetes-related



6.3.2 Future Diabetic Retinopathy Care Pathway

Referral

- National Diabetic Retinopathy Screening Service
- Optometrist
- COP
- GP
- Self – Emergency Department

The National Diabetic Retinopathy Screening Service will evolve as the primary referral source of diabetic eye disease. Onward referral to the RVEEH treatment clinic of screen-positive patients will allow timely diagnosis and treatment.

1. Assessment

Assessment should be undertaken in dedicated local clinics staffed by specialised nurses, clinical photographers and medical ophthalmologists. Clinics would offer on-site OCT, fluorescein angiography and intravitreal injection facilities.

Integrated IT communications and EMR systems would permit immediate remote viewing of medical investigations. Complex cases can be image-linked to the RVEEH for discussion when surgical intervention might be indicated; promoting efficient running of both the local clinic and the surgical services centrally.

2. Treatment

Along with the diagnostic/assessment capabilities, intravitreal injection and laser facilities (macular laser, PRP laser) should be available in the spoke unit. Complex cases would be referred onward to RVEEH.



6.4 Glaucoma

Glaucoma affects 2% of the population and is the second commonest cause of blindness in Ireland. Its incidence increases with age so the future demands arising from its management are enormous given our ageing population. ‘The Glaucoma Care Pathway’ proposed in the NCP involves community management of newly detected and long-term follow-up glaucoma patients by optometrists and medical eye specialists. Hospital based glaucoma consultant specialists will assist in the treatment of more complex cases and those requiring surgical intervention. They will also oversee the implementation of clinical governance measures to ensure safe and effective care.

6.4.1 Future Glaucoma Care Pathway

With two glaucoma consultant specialists, the RVEEH will be at the forefront of this new care pathway. The development of virtual clinics with increased involvement of clinical nurse specialists will enable faster access to care, shorter waiting times and a more cost-effective service. Clinics for stable glaucoma patients can be run by nurse practitioners and technicians; both within the RVEEH (for patients with stable glaucoma already attending consultants in other subspecialties) and in spoke units. Patient outcomes will improve if all care is supervised by glaucoma trained consultant ophthalmologists, as opposed to the current system where patients are distributed around other specialty/general clinics.

Broadly, the glaucoma service would involve the following:

STEP 1: Patient Referral

- G.P.
- DRS screening programme (increasing numbers)
- Optometrist
- Referrals through OPD



STEP 2: Assessment

A nurse led clinic at both hub-and-spoke centres will review the patients. More complex referrals from other units and other consultant services in the hospital will continue to attend the consultant led clinics in the RVEEH. Protocols will be established to clearly define the patient's disease status and direct the exact care delivered.

Nurse Lead Glaucoma Review Clinic:

- Clinical Review
- Visual Acuity Check and intraocular pressure measure
- Stereo optic disc photography (most OPD nurses are trained to do this already)
- +/- Anterior segment OCT to measure chamber depth
- +/- A visual field

STEP 3: Consultant virtual clinics

Data and images from the nurse led clinics would be reviewed electronically by glaucoma trained consultants in the RVEEH. Only patients with progressive disease or other morbidity would attend the consultant clinic for a second visit.

Approximately 10 patients per hour, or 30 patients in a 3 hour session, could be reviewed in this manner. The electronic medical (EMR) would generate a patient discharge letter detailing any change in management.

Required Equipment	
YAG, argon and SLT lasers	Anterior Segment OCT
Humphry field analyser – I-series with forum software	Kowa camera for disc imaging
UBM	Electronic software – communication with remote site & virtual clinics on patient data
OCT disc Analysis	

Table 17 – Equipment Required for Glaucoma Pathway (all equipment needed for stand alone unit)

6.5 Children's Eye Services

The paediatric ophthalmology service has developed in both Temple Street and Crumlin hospitals with a significant component of the work also performed in the RVEEH. Little strategic overlap exists between these services to date. The RVEEH provides paediatric ophthalmology services – both general paediatric ophthalmology and subspecialty services in paediatric retina, uveitis, oculoplastics and anterior segment. Surgery is undertaken on children over 2 years without comorbidity and those under 2 years by arrangement with the other in-hospital medical specialties. The RVEEH has a dedicated paediatric ward and shares a number of paediatric anaesthetic posts with Crumlin Hospital.

In 2013, there were 5,307 ophthalmology outpatient attendances at the RVEEH and 260 ophthalmic surgeries (56 inpatient, 204 day-case) undertaken on children under 16. This compares to 317 ophthalmic surgeries at Our Lady's Hospital for Sick Children, Crumlin for the same year.

The future direction of the Irish paediatric ophthalmology service is outlined in National Clinical Program for Paediatrics and Neonatology, May 2014. The RVEEH should be branded as a component part of the new children's hospital thereby allowing children access to specialised areas (e.g. corneal grafting, ocular oncology, vitrectomy etc.) in consultation with RVEEH ophthalmologists with expertise in these areas. This will require consultation with relevant stakeholders.

6.6 Complex Sub-specialty Services

Approximately 60% of patients accessing eye care in Ireland are in one or more of the five main patient groups described above, the remainder are affected by a wide variety of complex subspecialty disorders. These cases frequently demand the highest clinical resources in terms of expertise and financial cost. RVEEH provides a comprehensive tertiary referral service in all eye subspecialties performing 50-60% of all Irish complex subspecialty ophthalmic surgery. This concentration of expertise on one site is valuable in achieving the best clinical outcome for patients, training future specialists and facilitating clinical research.

Indeed, the requirement to concentrate sufficient complex surgery volume in designated 'centres of excellence' has been recognised as necessary to avoid de-skilling of clinical teams. This principal has been adopted as a cornerstone of the National Cancer Strategy by the Department of Health.



7. RVEEH Management & Operational Structure

The RVEEH is regulated by a Royal Charter granted in 1897, under which a hospital Council consisting of 20 lay and medical members is established each year. The Council elects a President who is responsible for overseeing the affairs of the hospital in conjunction with the Council members. The Chief Executive Officer (CEO) is accountable to Council for delivery of service plans and strategy.

In 2005, a management strategy review set up a number of directorates in the hospital – Medical Director, Director of Education and Research, Director of Nursing, Director of Finance and Organisational Services, Director of Human Resources and Operations, and Director of Corporate Affairs. These directors meet fortnightly at the Hospital Management Group (HMG); the group charged with the day to day running of the hospital. The CEO chairs the HMG.

The success of the Moorfields Hospital model is underpinned by a level of organisational flexibility not found in the RVEEH or in the Irish public healthcare system. Although primarily a public hospital (funded by the NHS on a per capital basis) Moorfields functions with a degree of operational flexibility more similar to a private healthcare setting. This is because of its status as a Foundation Trust, and its funding mechanism allows it to operate as a business rather than a traditionally-funded public hospital.

The significant areas of difference between Moorfields hospital and RVEEH are:

- Operations Management: Although Moorfields Hospital services are delivered on a number of different sites, the operation is managed from the principal City Road site. For example, the theatre manager in the main hospital organises the delivery of the appropriate theatre consumables and packs to the spoke units. RVEEH does not currently have the management resources to effectively operate spoke units. A review of RVEEH management roles is therefore necessary.
- Management IT Systems: The RVEEH management IT systems would need upgrading to a level that supports the hub-and-spoke model.

- Development of Nursing Roles: The spoke model necessitates delegation of certain clinical practices and decision-making to specialised nurses. The RVEEH must invest in its nursing staff to develop this capability. This change from medical to nurse- delivered clinical procedures (especially in high volume patient areas) will ultimately result in cost savings.
- Staff Rosters: Moorfields Hospital may roster nursing/administration staff across different sites. The logistics involved in this approach need to be examined for RVEEH.
- Theatre Utilisation: Theatre utilisation is maximised with three daily operating sessions – morning, afternoon and evening. Theatre utilisation is driven by service requirements.
- Staff Commitment: In the Moorfields Hospital model the staff working in the spoke units are all Moorfields Hospital staff. This appears to be an important factor in maintaining service quality and staff commitment and should be considered if RVEEH wishes to operate spoke units in the Irish context.
- The successful transition to a new hub-and-spoke model in the RVEEH will depend on the ability of the hospital management structures to facilitate change and to implement the new working arrangements. The management structures within the RVEEH must be modernised to expedite these targets, albeit that in the Irish healthcare system the contractual obligations and work practices are different to those in Britain.



8. Appendices

Appendix A – SPOKE UNIT MODEL REQUIREMENTS

Infrastructure required in spoke unit

A spoke unit footprint of 2,500 square feet should cater for the clinical activity of a 160,000 catchment population. The capital cost of such a unit is not anticipated to be excessive as the specification required is low unless injection rooms requiring air-exchanges are included.

The unit should encompass 4/6 consulting rooms, two injection rooms, a laser room, a visual field room and a treatment room. The injection rooms must satisfy the healthcare airflow circulation standards. The laser treatment rooms require no specific fit out features. There would be no necessity for patient changing facilities as all treatments would be on a 'walk in' basis. Toilet facilities and ancillary services should be available in the co-located hospital/primary care campus.

Injection Room:

- Air exchange (10 changes per hour)
- Piped oxygen
- Reclining chair
- Indirect ophthalmoscope
- 20 D lens

Fields Room:

- Humphrey visual field machine

Laser room:

- YAG laser
- Argon Laser
- Piped oxygen

Potential Spoke Unit Layout

Waiting Room Check-in Area	Exam 1	Exam 2	Visual Fields	Photo, Oct, Biometry
	Internal Access Area			
	Exam 3	Exam 4	Laser	Injection Room 1 & 2

Manpower required in spoke unit

The staffing should consist of a combination of permanent staff and visiting teams of specialists from the RVEEH so maximising flexibility and efficiency. The table below estimates the staffing that might be required.

The availability of two injection rooms will streamline resource utilisation. The aim would be to train specialised ophthalmic nurses to perform intravitreal injections as directed by the clinician responsible. This is a priority in the context of meeting the demands on the service.

Intravitreal injection preparatory courses for nurses are held regularly in Moorfields Hospital. A week long theoretical education session is followed by 100 supervised injections before the nurse can practice on their own. This facility could be used to fast-track upskilling of the RVEEH nursing staff.



The indicative costs for a Spoke Unit Model are as follows:

Staffing	Description	WTE	Total €
	COP	1	91,556
	Orthoptist	1	44,245
	Optometrist	1	44,245
	CNS	1	56,343
	ANP	1	67,845
	admin	4	154,554
	Total	9	458,787
Building	Leased Prefabricated Build - Per Annum		80,000
Equipment	Vision Charts Electronic	3	9,225
	Slit Lamps	3	49,815
	Autorefractor	1	12,300
	Humphrey Fields	1	43,050
	Kowa Disc Camera	1	3,690
	Lenses - Trial	4	4,428
	Prisms	2	984
	Examination Lenses	3	2,952
	Pachymeter	1	3,690
	Computers	8	6,396
	General Office Furniture	1	12,300
	Total	28	148,830

Clinic Activity			Total Patient Visits
	Cataract New patients	AHP - 2	1,680
		Orthop - 1	
		Optom - 1	
	Cataract pre-assessment	CNS	1,764
	Cataract Post Operative	AHP - 1	1,680
		Orthop - 1	
		Optom - 1	
		CNS - 1	
	Glaucoma - New Patient	COP - 1	840
		CNS - 1	
	Glaucoma Reviews	AHP - 2	2,016
		Orthop - 1	
		Optom - 1	
	Virtual Review Clinic	COP	3,024
	Glaucoma Recall	COP	105
	Paediatric new patient	Orthop - 1	1,008
		Optom - 1	
	Paediatric review	Orthop - 1	1,008
		Optom - 1	
	Field Clinic	Technician - 1	2,016
		Total patient visits	15,141



Appendix B - Resource Challenges in the RVEEH

The building and physical layout of the RVEEH present challenges in the delivery of module healthcare.

Notwithstanding the above, the hospital can safely increase its throughput of patients over the lifetime of this plan in many areas without major changes to the existing structure. As outlined above, an additional dedicated cataract only theatre is needed. The attached table quantifies what activity can be safely accommodated across the ophthalmology areas.

	2014 Activity	Proposed Capacity	Infrastructure changes required	Additional Comments
OPD	33,536	33,536	Reconfiguration of Ophthalmology OPD	
Cataract Surgery	2,950	2,950	Standalone theatre Manpower Increase	
Intravitreal Injections	4,600	4,600	Manpower Increase	An additional injection room would increase capacity by approximately 2,000 annually.

Table 19 - RVEEH resource challenges summary

The computer and IT systems need major upgrading to permit contemporaneous measurement of hospital activity in various clinical areas. This information will allow the RVEEH to track its KPI activity and benchmark performance levels. This detail is not provided by the current HIPE figures. This will necessitate a review of resources in the IT department to ensure there is capability to manage the increasing scope and complexity of the IT systems required to deliver the Hub and Spoke Model.

Appendix C - Case Study: Moorfields Eye Hospital

Moorfields Eye Hospital, City Road, London. This is the central London base, providing comprehensive general and specialist outpatient, diagnostic and surgical services, emergency surgery and a 24-hour A&E for eye conditions.

Community Eye Clinics (Community-based Outpatient Clinics) - these clinics focus predominantly on outpatient and diagnostic services in community-based locations.

- Barking Community Hospital
- Bedford Enhanced Services Centre (North Wing)
- Bridge Lane Health Centre, Battersea
- Loxford Polyclinic, Redbridge Teddington Memorial Hospital
- Purley War Memorial Hospital
- Sir Ludwig Guttman Health and Wellbeing Centre, Stratford

Eye Units (local surgical centres) - these centres provide outpatient and diagnostic services alongside day-case surgery for the local area and can be found in the following locations:

- Darent Valley Hospital, Dartford
- Mile End Hospital, Whitechapel
- Potters Bar Community Hospital
- Queen Mary's Hospital, Roehampton
- St Ann's Hospital, Tottenham

District hubs/spoke units - co-located with general hospitals, these units provide outpatient and diagnostic care as well as more complex eye surgery.

- Bedford Hospital
- Croydon University Hospital
- Ealing Hospital
- Northwick Park Hospital, Harrow
- St George's Hospital, Tooting

Moorfields Hospital Total Group Activity 2013

Total OPD attendances	415,209
A&E attendances	82,435
Total inpatient & day case admissions	31,180



Appendix D - Ealing Unit in the Hub-and-Spoke Model

Outpatient Attendances	2013/14	2014/15
New	5,402	5,062
Follow Up	25,506	26,042
Injections	867	1,896
Cataracts	1,247	1,930
Yag Laser	187	447
Argon Laser	952	643

Weekly Output

- 110 new and 566 return OPD visits
- 41 intravitreal injections
- 24 Yag / Argon lasers
- 42 cataracts*

*Based on 46 weeks work each year

Resources

- 18 consulting rooms 2 injection rooms
- Visual field room 2 laser rooms
- Preoperative assessment room Treatment room

Appendix E - Standalone Cataract Unit

The considerations for a 'Standalone Cataract Theatre' in the RVEEH include:

A. Theatre Options

- A 'drop-in' theatre to the rear of the hospital,
- Conversion of an existing hospital site to a cataract only theatre,
- Full redevelopment of the hospital site to include a cataract only theatre,
- Relocation of the entire hospital to a new site.

Reconfiguration of current administration area seems a reasonable proposition with a drop in modular theatre (with adjacent shell for additional theatre should demand require).

B. Operational Issues

- Circular patient flow: Check in/waiting area > Pre-op review room > Anaesthesia room > Theatre > Recovery > Discharge suite
- Schedule:
 - 3 days per week 8.00am – 4.30pm initially
 - 8 cases per am list; 7 cases per pm list = 45 cases per week.
 - 1,800 cases per year (based on 40 weeks/year)
- Referral sources:
 - Community ophthalmic physician (COP)
 - General Practitioner
 - Optometrist

Pre-op assessment and post-operative follow up performed by the community ophthalmic physician (COP) booking the case, whenever possible. GP/Optomotrist cases require pre & post-operative care in RVEEH in dedicated pre and post cataract clinics.

20-25% of cases will be second eyes and so not all surgeries require a preoperative assessment.



C. STAFFING

MEDICAL

Surgeon: One dedicated consultant post (on a job sharing model 50:50 time split). A Director of cataract service should be appointed with defined clinical targets, audit and clinical governance responsibility.

Each Surgical post: 3 Surgical lists per week,
1 pre/postoperative cataract review clinic per week,
1 speciality clinic per fortnight..

Hospital based COP: 3 sessions per week
2 sessions per week: pre/post cataract review clinics
1 Speciality Clinic per week

Anaesthesia: 1 WTE Consultant required – possibly on a job sharing basis. Responsibilities include all cataract surgery anaesthesia and the preoperative assessment clinic.

NURSING

Theatre Nursing Staff : Scrub/circulating nurses for each surgical session assisted by a nurse's aide. These positions should ideally be reimbursed on a sessional or fee per case basis.

Preoperative Assessment Clinic: 45 cataract surgeries/week of which 25% are 'second' eyes that need no preoperative assessment. So 34 new cases will require assessment weekly from GP and optometrist sources; COP referrals will already have been pre-op assessed. Three nurse led assessment clinics per week would suffice.

D. POTENTIAL COST

Staffing as above – plus ancillary staff support (clerical, household, porters etc.). Capital funding for theatre refurbishment.

Equipment: Operating microscope,
Phacoemulsification machine,
17 cataract sets,
Aneasthessia equipment.

Consumables for each case. Extra sterile supply department (CDU) instrument throughout.

The indicative costs associated with a Cataract Unit are as follows:

Staffing	Description	WTE	Total €
	Ophthalmic Surgeon	1	133,574
	Aneasthetist	1	136,499
	Aneasthetic NCHD	1	71,885
	Community Ophthalmic Physician	1	95,799
	Staff Nurse - Day ward	1	38,683
	Staff Nurses - pre-op	3	145,526
	Staff Nurses - Theatre	4	194,034
	HCA	1	38,763
	Total	13	854,762
Refurbishment	Conversion of Admin Area		900,000
Consumables	Sets/Packs		2,098,804
	Heat/Power/Light		100,000
	Total		2,953,566
Equipment	Lumera C Microscope	1	110,000
	General Theatre Furniture	1	184,500
	Total		294,500

