

Development of Ophthalmic Services
for Children
in Dublin, Kildare and Wicklow

Eastern Regional Health Authority



June 2000

Foreword

Following consultation with the Chief Executive Officers of hospitals providing paediatric ophthalmic services, Mr. Pat McLoughlin, Chief Executive Officer of the Eastern Health Board, set up a Steering Group in March 1999 to review the delivery of ophthalmic services for children across the region. The review was completed in early 2000, shortly after the functions of the Eastern Health Board were transferred to the Eastern Regional Health Authority and the three Area Health Boards.

I am personally indebted to the Steering Group and to each member of the Project Team for carrying out a very comprehensive review of the service and the production of such a well written report.

I am satisfied that the implementation of the recommendations in this report will provide a service, from the time of vision screening to the completion of treatment, that will be of the highest quality, and one that will be seen to be 'child friendly', transparent, accessible to the local community, have short waiting times for assessment by specialist services, and provide close integration of the hospital and community services.

Michael Walsh Assistant Chief Executive, Northern Area Health Board

The Terms of Reference

The terms of reference for the review were as follows:

- ❑ *To review existing services, facilities and resources used in the delivery of ophthalmic services from birth to 16 years of age within the Eastern Regional Health Authority area.*
- ❑ *To make recommendations for the development of a quality service to meet the priority needs of this population in the short, medium and long term.*

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Summary

The school vision screening programme and the ophthalmic assessment and treatment services have been sources of debate for some time. The areas of discussion have included apparently wide variations in screening procedures, the appropriateness of referral, and long waiting times for ophthalmic assessments. A review of the school vision screening service and the associated specialist services in the region was carried out in the summer/autumn of 1999.

School vision screening – the evidence base

A number of working parties internationally have produced guidelines on school vision screening. The recommendations are quite similar in many respects – to screen at the beginning, middle and end of primary school, the referral criteria, the importance of staff training, the need for ongoing audit of the service, the use of proper equipment and facilities, and the necessity of good communication between parents, teachers and health professionals. However, there are also notable variations - the choice of screening test, screening ages, and the value of colour vision screening. The lack of uniformity reflects the absence of a solid evidence base in determining the value of vision screening and the effectiveness of interventions. Hence, the working parties were forced to adopt a consensus approach in reaching many of their conclusions and the thinking has evolved over time to include the following:

- ❑ Standardisation of the vision screening programme.
- ❑ Use of detailed best practice guidelines.
- ❑ Use of age-appropriate tests (e.g. illuminated Snellen at 6 m, the Sonksen-Silver at 3 or 6 m).
- ❑ Standardised referral criteria (e.g. acuity 6/12 or worse in either eye).
- ❑ Training of staff providing the screening service.
- ❑ Short waiting times for specialist assessment.
- ❑ Ongoing quality review of the service.

School vision screening in the Area Health Boards

The legislative basis for the "health examination and treatment service" for national schools in this country, enshrined in the Health Act 1970, is not prescriptive. Over time the approach to vision screening came to vary significantly between and within health boards. To review the school vision screening programme in the region, all public health nurses and area medical officers providing the service were invited to participate in a detailed questionnaire survey.

Key findings

- ❑ Vision screening was not standardised.
- ❑ Comprehensive and up-to-date clinical guidelines were not available.
- ❑ Target classes for screening varied widely: most staff screen 1st and 5th class; in nine community care areas children were screened twice; and in one area children were screened on three occasions.
- ❑ Most public health nurses carried out vision screening to a greater or lesser extent.
- ❑ Vision was generally assessed using the illuminated Snellen test, but there was wide variation in how the test was used and interpreted. Other tests were used that are no longer considered appropriate (such as single letter tests). The Sonksen-Silver test was not used as an alternative test in any area.
- ❑ Screening was often carried out in the classroom or school corridor with other children present.
- ❑ Eye covering techniques may allow the child to "peep" so that poor visual acuity can be missed.
- ❑ Acuity of 6/12 or worse in either eye was the usual cut-off point for referral, but children with essentially 'normal' vision (i.e. 6/9 in either eye) or those already under the care of an ophthalmologist continued to be screened and referred.
- ❑ Significant delays in the referral process existed e.g. between screening by the public health nurse and referral by the area medical officer, followed by long waiting times for specialist assessment.
- ❑ Training of screening staff was limited, and was generally provided by peers.
- ❑ No system was in place to permit ongoing quality review of the service.
- ❑ Communication and feedback between the service providers, parents, and schools was limited.

Conclusions

The Area Health Boards devote significant resources to the school vision screening programme. The programme is generally being carried out along traditional lines, and because of this its full potential may not be fully achieved. Parents may have unrealistic expectations about the service, which may be further compounded by the length of waiting times for specialist ophthalmic assessment.

Key recommendations:

1. The school vision screening programme should be standardised across the Area Health Boards and include:
 - Development of best practice guidelines.
 - Vision screening at the beginning, middle and end of primary school.
 - Only an illuminated Snellen test (at 6 metres) or, if indicated, the Sonksen-Silver test (at 6 or 3 metres) should be used
 - Use of eye patches.
 - Referral at Snellen 6/12 acuity (or Sonksen-Silver 6/12 or 3/6) or worse in either eye.
2. Screening staff should refer directly to the specialist ophthalmic service.
3. All screening staff should undergo theoretical and practical training, and be accredited as agreed between the service providers and the relevant professional groups.
4. Vision screening should be carried out by only a small number of public health nurses, whose continuing professional training should be facilitated.
5. Standardised parental consent and referral forms should be used.
6. Quality review of the programme should be ongoing.

Specialist ophthalmic services

Ophthalmic services at varying levels of complexity are provided at 11 hospitals in the region and children are seen at eight of these hospitals. Discussions were held with the service providers, and surveys of ophthalmic outpatient clinics and waiting lists were carried out.

Key findings

- ❑ There was a broad consensus amongst the hospital staff that most of the children could be more effectively and efficiently managed in the community by a community ophthalmic physician working directly with an orthoptist.
- ❑ There was a broad consensus that the age of the initial school vision screening should be moved closer to school entry rather than in the third school year.
- ❑ Outpatient clinics:
 - The majority of children were assessed at the paediatric hospitals, but children also accounted for up to 20% of outpatient attendances at ophthalmic clinics at the general hospitals.
 - Most children were referred by Area Health Board staff.
 - Squint and refractive errors accounted for the majority of diagnoses.
 - Most children were recalled for a review visit and relatively few were listed for surgery.
 - The majority of children required the services of an orthoptist.
 - There were a large number of non-attenders, attributed largely to the lengthy waiting times, and most clinics were overbooked to compensate.
 - Children and adults were generally seen in combined clinics
- ❑ Outpatient assessment waiting lists:
 - The waiting time for outpatient assessment was generally well in excess of three months and over 12 months at some clinics.
 - There were approximately 1,500 children awaiting a first ophthalmic outpatient consultation.
 - ERHA staff accounted for 73% of the referrals, and general practitioners for 17%.
 - Approximately 50% of children were of pre-school age and 50% of school age.
 - Almost 50% of referrals were for suspected squint and 50% for "defective vision".
- ❑ Information systems were generally poor or non-existent.
- ❑ Feedback to the referring source was limited, and was largely attributed to a lack of clerical support.
- ❑ There was uncertainty regarding the local administration of the Children's Optical Scheme and the process was considered overly complex.

- ❑ In Kildare and Wicklow, a community ophthalmic physician service was provided on a sessional basis. Public health nurses generally referred directly to this service. The clinics tended to lack the full range of specialist equipment, the orthoptist may not be present at the same time as the community ophthalmic physician, and clerical and nursing support was limited.

Conclusions

Within the region, a wide range of specialist ophthalmic services are provided, and are primarily hospital based. Children account for a significant proportion of the patients seen and are mainly referred by the preschool and school health service of the Area Health Boards. Long waiting lists and lack of a child-focused and community based specialist ophthalmic service pose challenges in the provision of optimum care.

Key recommendations:

1. An integrated community ophthalmic physician service should be developed in the region, initially employing an additional 3 community ophthalmic physicians, 3 orthoptists, 3 clerical staff, and appropriate nursing staff.
2. The community ophthalmic service should be provided in well equipped and staffed clinics that are geographically situated to provide access to the community.
3. The community ophthalmic service should have a special association with the hospital ophthalmic services as agreed between the Area Health Boards and the hospital(s).
4. Waiting times for routine initial specialist ophthalmic assessment should be less than three months, and ideally should take place within the same school term.
5. The administration of the Children's Optical Scheme should be standardised and simplified, and a leaflet should be available for parents and service providers that fully describes the entitlements and procedures under the scheme.
6. Quality review of the service should be ongoing.
7. An Ophthalmic Services Forum should be established to promote the quality of service and research in ophthalmology.

Section 1 Background

The National Strategy “Shaping a healthier future” is underpinned by the key principles of equity, quality of service and accountability.⁽¹⁾ A fundamental review of the Child Health Services was recommended with the aim of developing the most effective service in tune with modern thinking and practice in child health.

1.1 Historical and Legislative Basis of the Child Health Services

The child health services in Ireland have their origins in the early part of this century when childhood mortality and morbidity were high and many children did not have ready access to medical care (see Box 1.1).

In 1967, the Study Group appointed by the Minister for Health produced its report on the child welfare clinic service and the school health service.⁽²⁾ In 1970, the Department of Health Circular 22/70 outlined the measures necessary to implement the main recommendations of this report. The Health Act 1970 forms the legislative basis for the current child health service.

Box 1.1. Legislative background to the child health services.

- The Public Health (Medical Treatment of Children, Ireland) Act, 1919, put the school health service in Ireland in motion. Local authorities were required to provide for the medical inspection and treatment of children attending national schools.
- The Local Government Act, 1925 provided for the appointment of county medical officers of health who were given responsibility for the maternity and child welfare services.
- The Health Act, 1953 provided for child welfare clinics in towns of over 3,000 population and also for the school health examinations.
- The Health Act 1970, Sections 63, 66, and 67 form the legislative basis for the current child health service.

1.1.1 Preschool Child Health Service

The 1967 Study Group recommended that the child health service should provide the following:⁽²⁾

- ❑ Developmental assessment clinics.
- ❑ Open access clinics.
- ❑ Domiciliary visiting by the district nurse (previously parents could avail of services only at child welfare clinics).

The stated objectives of the service were:

- ❑ To ensure by regular screening that preschool children develop both physically and mentally in a healthy and normal manner.
- ❑ To discover and arrange for the further investigation or treatment of any deviation from normal in physical and mental progress. Arrangements for the assessment of handicapped children would be included.
- ❑ To promote the proper management, feeding and care of infants and preschool children and of good health practices generally.

Under Section 66 of the Health Act 1970: Subsection (1): ***“A health board shall make available without charge at clinics, health centres or other prescribed places a health examination and treatment service for children under the age of six years”.*** Where children require referral for further specialist out-patient attention or for admission to hospital, the service is provided without charge.

1.1.2 School Health Service

The 1967 Study Group concluded that the school health service should be retained in a modified form and that the routine examination of large numbers of healthy children should cease.⁽²⁾

The Group recommended the following:

- ❑ Routine annual screening by the district nurse for vision.
- ❑ A comprehensive medical inspection of all children between the 6th and 7th birthday.
- ❑ Selected medical examinations of 9 year olds.
- ❑ The examination in any year of a child referred by the parent, teacher or district nurse or a child due for re-examination.

The following were the stated objectives of the service:

- ❑ To detect at the earliest possible stage any defect or disorder which would interfere with the child's educational progress and to see that effective remedial measures were taken.
- ❑ To ensure that schoolchildren develop both physically and mentally in a healthy manner.
- ❑ To concentrate particularly on the assessment of handicapped children and to arrange for their further investigation and care.

Under Section 66 of the Health Act 1970, Subsection (2), *"health boards shall make available without charge a health examination and treatment service for pupils attending a national school or a school to which this section has been applied by an order under Subsection (3)"*. Under Subsection (3), "when the governing body of a school which is not a national school, a health board may at its discretion by order apply this section to the school". Under Subsection (4), "a school manager may be required, when notice has been given to him by a health board, to provide reasonable facilities for an examination under this section". Children who are referred for further specialist out-patient attention or for admission to hospital are treated free of charge.

1.1.3 Ophthalmic Services

Under Section 67 of the Health Act 1970, Subsection (2): *"A health board shall make dental, ophthalmic treatment and aural treatment and dental, ophthalmic and aural appliances available in respect of defects noticed at an examination under the service mentioned in Section 66."* Health boards are required, therefore, to make ophthalmic treatment available without charge to pre-school and national school children referred from child health examinations.

Ophthalmologists are employed by health boards to provide sight testing services, examine eye defects, and prescribe glasses or refer patients to specialists. The health boards also contract to private opticians to provide services under the sight testing scheme.

1.2 Child Health Surveillance and Vision Defects

It is generally accepted that monitoring and promoting the growth and development of children, particularly in the early years of life is worthwhile. The process is usually referred to as 'child health surveillance'. The term is used flexibly, and may include some or all of the following: screening; secondary prevention; treatment; referral; prophylaxis; health education; accident prevention; care of special need groups; and collaborative activity involving parents, teachers, health care professionals.⁽³⁾

The purpose of surveillance for visual defects in childhood is the early detection and treatment of relevant ophthalmic disorders to minimise their impact on a developing child.⁽⁴⁾ The goals of the programme are twofold:

- ❑ Each child has the opportunity to realise his/her full potential in terms of good health, well-being and development.
- ❑ Remedial disorders are identified and acted upon as early as possible.

These goals may be achieved by the application of a health promotion approach, including a combination of observation by parents and professionals with access to a small core programme of screening tests of proven scientific validity. Surveillance for visual defects is carried out in a variety of ways which may reflect the manner in which the service has evolved over time in the region, the resources available, and the limited evidence base on which to guide the programme.

1.3 The Development of Hospital Ophthalmic Services

In 1977, a joint working group of the Department of Health and Comhairle na n-Ospidéal examined the development of specialist services (including ophthalmology) in the six general hospitals in Dublin.⁽⁵⁾ The concept of hospitals functioning as a integrated regional eye unit were described. It was recommended that structures be established so that specialist services were organised on a north city/south city basis and three levels of specialist services that should be provided within these structures were defined:

- ❑ Regional Unit - A regional unit to consist of consultant and full inpatient and outpatient facilities. The Regional Unit would be the focal point of the specialist service within the region and contain the most expensive resources.
- ❑ Hospital Unit - A hospital unit would exist in specialties where there was a large throughput of patients. The hospital unit would be fully supported by the regional unit and would function as an integral part of the Regional Unit. The unit would consist of consultants, beds and outpatient clinics but would not be highly staffed or contain the sophisticated equipment of the Regional Unit.
- ❑ Service Unit - A unit consisting of outpatient services with limited number of beds for minor procedures. There would be no consultant staff based at the service unit but they would provide a consultation and outpatient service on a regular basis.
- ❑ The need to develop ophthalmic medical services in the community in conjunction with the development of specialist services was acknowledged.

In relation to these recommendations the Minister of Health decided in 1980 that in Dublin a regional eye unit should be based in the Mater Hospital, with service units at Beaumont and James Connolly Memorial Hospitals. A regional unit should be also based at St. Vincent's Hospital with a hospital unit at St. James' Hospital and a service unit at Tallaght Hospital.⁽⁵⁾ At that stage the plans were for the physical transfer of the Royal Victoria Eye and Ear Hospital to the site of St. Vincent's Hospital, in keeping with the belief that a regional specialisation unit should be part of a general hospital where radiological, anaesthetic, and pathology facilities were readily available.

Comhairle na n-Ospidéal issued a further report in 1981 which reviewed and made recommendations for the development of hospital ophthalmic services.⁽⁵⁾ The report agreed with the decision to transfer the regional unit to the site of St. Vincent's Hospital and in view of the large population served (South Dublin, Kildare, Wicklow and the Midland Counties) recommended the development of hospital units at both St. James' Hospital and at Tallaght Hospital. It was also recommended that the services at Crumlin Hospital should be absorbed into those provided by the Royal Victoria Eye and Ear Hospital. In order to facilitate the transfer to St. Vincent's Hospital it advised the establishment of close links between the Royal Victoria Eye and Ear Hospital and St. Vincent's. However, for various reasons including the cost and capital expenditure required to move the ophthalmic services of the Royal Victoria Eye and Ear to the campus of St. Vincent's the plans for such a transfer were abandoned.⁽⁶⁾

1.4 Development of the Community Ophthalmic Service

A working group consisting of representatives of the Department of Health, the Irish Medical Association, the Medical Union and health boards published a report in 1981 entitled "Community Ophthalmic Physicians".⁽⁷⁾ The report dealt with matters pertaining to the need for such posts, the training required, the duties and numbers of staff required in each health board. An approximate guideline of one post per 100,000 total population was proposed. Duties would include the assessment of children referred by public health nurses from the school service. The appointment of one community ophthalmic physician in both Kildare and Wicklow was recommended. It was felt that the needs of patients in the Dublin region were being met by the hospitals in the area and so recommendations on community ophthalmic physicians in the Dublin area were not made at the time. However, it was recommended that the situation in the Dublin area should be reviewed "in two years time"; the review did not take place until this working group was established.

Other reports of the ophthalmic service provided a historical context and insight into the issues and evolution of the service in different health boards (see Box 1.2).

Box 1.2. Reports on the ophthalmic services.

- Fitzgerald M. Ophthalmology Review, Mid Western Health Board. Mid Western Health Board, 1997.
- Hayes C. Report on the need for a community ophthalmic physician service in North Dublin. Eastern Health Board, 1991.
- Rhatigan A. Day-case surgery in ophthalmology. A study to assess the need for and resource implications of developing a day surgery facility in ophthalmology. Thesis for Membership of the Faculty of Public Health Medicine of the Royal College of Physicians of Ireland. Dublin, 1993.
- O'Keefe B. Community Ophthalmology services in the North Eastern Health Board region. A review of services. North Eastern Health Board, 1995.
- Submission to the Expert Review Group on behalf of Orthoptists. Impact, Dublin, 1998.
- Houlihan M. Reduction of children's ophthalmic waiting list by means of orthoptic screening clinic. Midland Health Board, 1998.

Section 2 Vision Defects (Target Conditions)

Disorders of vision can be subdivided into two categories:^(4, 8-12)

- ❑ The common and usually less incapacitating defects including refractive errors, squint, amblyopia, and defects of colour discrimination.
- ❑ Serious defects likely to cause a disabling impairment of vision ranging from partial sight to complete blindness. These defects are uncommon.

Surprisingly little epidemiological data on vision defects are available, even for the common disorders found in children. Surveys require dilated examination of the eyes and can be expensive to conduct. Unfortunately, differences in case definitions and measurement tools, and use of clinic rather than population-based data pose many difficulties in interpreting the results of the studies.

2.1 Target Conditions

The primary purpose of vision screening of children is the early detection and treatment of defects in visual acuity before they become clinically significant. The specific defects that are sought, referred to as the 'target conditions' which can lead to a loss in visual acuity are refractive errors, squints, and amblyopia.

2.2 Visual Acuity

Visual acuity is a measure of how well a person is able to separate adjacent visual stimuli. Acuity is the most clinically valued characteristic in describing the quality of vision. Acuity measurement using a Snellen letter test at 6 metres is the main method used to identify the target conditions.

2.3 Refractive Errors

A refractive error is a disturbance of the optical system of the eye where the light rays are not focused on the retina and a blurred image is formed which reduces visual acuity. The image can almost always be focused with spectacles. Most people have some refractive error, which continues to alter throughout life. There is a genetic element in the development of refractive errors. The defects include myopia, hypermetropia, anisometropia and astigmatism.

The direct measurement of refractive error involves the technique of retinoscopy, for which cycloplegic agents must be instilled in the eye so as to paralyse accommodation. Techniques for automated detection of refractive error are under development.

Refractive errors may predispose to the development of squints, both of which may lead to amblyopia (see below). Severely impaired visual acuity may affect school work and sporting prowess, but minor impairments caused by slight refractive errors seem to have little impact on education or performance.

A refractive error may be treated to improve visual acuity or to prevent the development of squint or amblyopia. There is no precise relationship between refraction and visual acuity, and the decision as to when a refractive error should be regarded as abnormal depends on clinical expertise and judgement. The correction of impaired visual acuity related to refractive error usually involves spectacles.

2.3.1 Myopia

Myopia (short sight) occurs if the image is focused in front of the retina causing blurred distance vision. The prevalence of myopia changes considerably with age. It is uncommon in infancy, and when occurs it usually develops between 6-14 years of age. It stabilises in the early twenties and subsequently there is little change. It may be more common in females. Premature and low-birth weight infants have a higher risk of developing myopia in later life. Exposure to much close-up work and a family history of myopia have been proposed as risk factors for myopia. These theories remain unproven.

2.3.2 Hypermetropia

Hypermetropia (long sight) occurs when the image is focused behind the retina leading to blurred close-up vision. Children have strong powers of accommodation and generally have a degree of hypermetropia. However, the effort of accommodation in the presence of hypermetropia may predispose to developing a squint. There is a genetic element in the development of hypermetropia.

2.3.3 Anisometropia

Anisometropia occurs if the degree of refractive error is different between the two eyes. With a large difference, spectacles may be indicated with the intention of preventing amblyopia. The condition is referred to as "straight-eyed amblyopia" and may represent up to 50% of all cases of amblyopia.

2.4 Squint

Squint (strabismus) occurs if the visual axis of one eye is deviated from the point of fixation. It may predispose to amblyopia and impaired binocular vision. It may be constant or intermittent, and may become apparent only under conditions of stress, fatigue, or illness. It may be associated with refractive errors. The prevalence of squint in infancy is around 1% and in early childhood is between 3% and 7%.

Squint can be identified by inspection, by use of the cover-uncover test, the corneal reflections test, the prism test, examination of eye movements in tracking small objects through the horizontal, vertical and oblique planes, and by a stereopsis test.

Squints are usually managed through optical correction and occlusion therapy. Surgery may be indicated to restore binocular vision or for cosmetic reasons.

2.4.1 Manifest Squint

A manifest squint (heterotropia) is a squint which is apparent at the time of examination. It occurs where, with both eyes open, the visual axis of one eye is deviated from the point of fixation. Most of these squints are first recognised by parents who should always be asked if they have noticed any squint, laziness, or 'turning' of an eye. Some parents are incorrectly informed that squint is normal under six months of age, leading to delay in diagnosis of serious eye disease. A family history of high refractive error or squint in a first-degree relative may be significant and justify referral for more detailed examination.

2.4.2 Latent Squint

A latent squint (heterophoria) occurs where, with both eyes open, the visual axes of both eyes are aligned. It is detected when the two eyes are dissociated by testing using the alternate cover test. It is doubtful whether the detection of a small latent squint before it becomes a problem clinically is of significant benefit to the child.

2.4.3 Small Angle Squint

In small angle squint (microsquint, 5 degrees or less) the deviation is not obvious but its effect on visual acuity can be significant. It is associated with abnormal binocular function. It is usually associated with anisometropia, both of which may predispose to amblyopia.

2.4.4 Pseudosquint

A common difficulty is the distinction of pseudosquint (the appearance of squint caused by epicanthic folds). Squint and pseudosquint may coexist. Pseudosquint is a very common reason for referral to children's eye clinics.

2.5 Amblyopia

Amblyopia is a condition of reduced visual acuity which persists after correction of any refractive error and removal of any pathological obstacle to vision. The degree of severity varies and usually affects one eye only. It is commonly, but not necessarily, associated with squint or refractive errors. Amblyopia affects 1-3% of the general population and up to 5% of the pre-school age group. Children born prematurely and with neurological deficits may be at higher risk.

The cause of the condition is poorly understood. It may result from the brain either suppressing or failing to develop the ability to perceive a detailed image from the affected eye. It appears that quality vision is important for normal growth and development of the eye. Loss of vision in one eye may result in squint or loss of oculomotor balance. Refractive errors and squints may predispose to amblyopia because vision in one eye may be suppressed to prevent double vision. Experimental evidence from animal studies and clinical experience in humans suggests that there is a sensitive period in the human child up to the age of about eight years when this process may occur and may be subsequently reversible .

Amblyopia may be suspected in infants who present with other eye problems such as squint, but it is difficult to diagnose with confidence before the child can co-operate with visual acuity testing. Prompt referral of children with squint or other obvious vision problems may help to avoid the development of amblyopia or reduce its severity. However, in many cases amblyopia presents for the first time after the age of three years without any other obvious signs of eye problems.

The natural history of the condition is largely unknown, although it is generally thought that untreated amblyopia can result in permanent visual impairment. Some studies suggest that mild degrees of amblyopia may resolve spontaneously. Amblyopia diagnosed at three years is often associated with squint, whereas when diagnosed at five years it is more likely to be associated with anisometropia .

It has been suggested that amblyopia may interfere with a child's development, educational performance and sporting ability, with associated effects into adulthood. Adults with amblyopia may have difficulties with activities such as racquet sports, driving, or jobs requiring fine motor co-ordination. Imperfect vision may affect career options such as the armed forces or flying. Amblyopia may increase the risk of blindness due to injury or disease in the non-amblyopic eye.

Amblyopia is usually treated by occlusion of the other eye by eye-patching, with spectacle correction as necessary. Patching deprives vision in the good eye and encourages the use of the amblyopic eye. Regimes for patching can vary. Alternative treatments include penalisation or selective fogging of one eye using spectacles or cyclopegic drugs and stimulation of the amblyopic eye. Treatment may result in improved acuity, but the gains are not always maintained, and the development of binocular vision is not guaranteed. Amblyopia due to squint is not considered treatable after the age of eight years when breakdown of suppression can occur which can induce intractable diplopia. Some authorities question the efficacy of any treatment. The use of these treatments in clinical practice was derived from extensive clinical and basic research on stimulus deprivation amblyopia. The lack of evidence from controlled trials to support the effectiveness of treatments remains a challenge to the ophthalmic community

Screening and the management for antecedent causes such as hypermetropia in younger children may reduce the incidence of squint and amblyopia, but the overall impact of these cases may be small. Hence, the current approach is to screen for visual acuity at the appropriate age so that the management of amblyopia can be potentially effective, rather than to prevent the condition. In light of the presumed "window of opportunity" for the effective management of amblyopia, many authors stress the potential importance of vision acuity screening at a relatively young age (e.g. school entry).

2.6 Binocular Vision Defects

Binocular single vision is the simultaneous use of both eyes so that each eye contributes to a common image. There are grades of binocular single vision. In the highest form the object is fixated at the centre of the retina in both eyes and fusion of the two images allows depth perception (stereopsis). If there is not quality vision in both eyes, for example due to the defects discussed above, binocular vision may be lost.

2.7 Colour Discrimination Defects

Deficiencies in colour discrimination, primarily affecting the perception of reds and greens, occur in 8% of boys and 0.5% of girls. Blue deficiencies and total colour blindness are extremely rare. There is little evidence that colour vision defects cause learning difficulties, and most affected children can distinguish different coloured materials despite reduced colour discrimination. Some defects preclude people from entering certain careers, and so it is helpful for such persons to be aware of its presence in planning such careers. However, little is known about whether adolescents benefit from colour screening.

Section 3 Screening for Vision Defects

The purpose of screening is to identify defects that would otherwise go unnoticed, so that treatment may be initiated at an optimum time. Vision screening is, therefore, the prelude to the “secondary prevention” (early treatment) of vision defects.

3.1 Definition of Screening

Screening can be defined as *“the presumptive identification of unrecognised disease or defect by the application of tests, examinations and other procedures which can be applied rapidly. Screening tests sort out apparently well persons who may have a disease from those who probably do not. A screening test is not intended to be diagnostic”*.⁽¹³⁾

The key elements of the definition are that screening is concerned with the investigation of apparently healthy people, involving simple tests with easy application, with the aim of the presumptive identification of disease rather than its definitive diagnosis. It follows, therefore, that people with “positive” findings on screening should be referred for further investigation and treatment where indicated.

3.2 Criteria for Screening

The value of any screening programme should be considered in the light of a number of key criteria (see Box 2.1).⁽¹⁰⁾

As discussed in Section 2, vision defects are relatively common, with approximately 5-10% of primary school aged children being referred to the ophthalmology services for assessment of a suspected vision defect. Screening ‘captive’ populations, such as school children, helps to achieve high coverage of the programme. Vision screening is considered to be highly acceptable by parents, and good vision to be an important health attribute, with significant visual defects potentially limiting educational, social or career development. However, the natural history of the target conditions is largely unknown, and the value of early detection and treatment are uncertain.

Box 2.1. Criteria for screening programmes.

- Target condition should be clearly described.
- Target condition if left undetected would likely lead to significant disadvantage for the person.
- Condition is sufficiently common or severe to constitute an important health problem.
- Effective assessment and treatment should be available.
- Everyone who falls within the scope of the screen should be reached (i.e. deliberate efforts must be made to ensure as complete a coverage as possible).
- Screening procedures should be acceptable.
- Screening procedures should be simple.
- Screening procedures should have a known and acceptable level of sensitivity, specificity and positive predictive value.
- Programme cost (including assessment and treatment) should be justified by the benefits yielded and be economically balanced in relation to expenditure on medical care as a whole and in relation to alternative methods of dealing with the condition. It is a matter of policy judgement as to where the costs and the benefits are thought to balance, but an explicit judgement of that kind should be a conscious part of the decision to screen.

The overall worth of vision screening in preschool and school-aged children is unclear. Whilst screening is relatively inexpensive, the overall administrative, referral and down-stream costs are high. The approaches and tests used for vision screening vary. Hence, obtaining a solid evidence base to underpin the optimum approach to vision screening and the management of defects remains elusive.

3.3 Ethical Issues

The recognition that some screening activities are not merely of little value but potentially harmful because of the unnecessary worry, referrals and procedures that might result, has led to an increasingly critical approach to all forms of screening and surveillance.

A characteristic of screening is that it does not arise from a patient’s request for advice for specific complaints.⁽¹⁴⁾ Screening is initiated by the doctor, not the patient. This is important as it gives rise to a set of preconditions, not usually found in medical practice, which should be met as far as possible if a screening programme is to be regarded as ethical.

When the patient seeks medical advice, the doctor's position, ethically, is relatively simple: he undertakes to do his best with the knowledge and resources available to him. He cannot be fairly criticised when the state of medical knowledge does not enable him to treat effectively or even to diagnose accurately the condition for which his advice is sought; nor can he undertake in all cases to assemble the full range of facilities for investigation and treatment from which his patients might conceivably benefit.

The position is quite different in screening, when a health authority takes the initiative in investigating the possibility of illness or disability in persons who have not complained of signs or symptoms. There is then the presumptive undertaking, not merely that abnormality will be identified if it is present, but that those affected will derive benefit from subsequent treatment or care.

By offering to screen, the provider assumes the same duty of care as if the patient had initiated the contract. In order to give informed consent, the subject should understand the nature of the screening process.

Because of false positive and false negative findings (which may delay diagnosis) , parents should be informed about the limitations of screening. Otherwise, a parent wrongly reassured by a false negative result might bring a successful action if it were shown that the nature and limitations of the screening process had not been adequately explained or that the test had not been properly performed.⁽¹⁵⁾

3.4 Assessment of a Screening Test

In order to be considered for screening purposes, the screening test should have a high degree of accuracy and validity, and deliver a high yield.

3.4.1 Measurement Accuracy

Measurement accuracy has two dimensions, namely precision and bias. An accurate measurement is both precise and without bias so that the true result is obtained. It is essential to be aware of the potential sources of measurement inaccuracy in screening, and to take all reasonable steps to minimise them.

Precision refers to the amount of random variation in the test result (i.e. no obvious explanation or means of correction) that occurs between repeat measurements. Bias refers to a factor that produces a test result that differs consistently from the true value. Bias is usually a much more damaging source of inaccuracy than imprecision.

Measurement inaccuracy (variation), due to imprecision or bias, may involve the screener (observer), the screening test (instrument), or the child (subject), whether singly or in combination.

3.4.1.1 Observer Variation

- ❑ Precision: within (intra) observer variation refers to differences in test results when the same observer screens the same subject at different times, presuming the subject remains unchanged. Examples include setting up the test slightly differently each time, use of different distances, or just occasionally writing down the wrong number.
- ❑ Bias: between (inter) observer variation can occur if different screeners consistently adopt a different approach to testing e.g. using different tests (Snellen or single letter test) and distances, or interpreting results in different ways. Careful standardisation of methods of measurement and proper observer training are the only defence against this form of inaccuracy.

3.4.1.2 Instrument Variation

- ❑ Precision refers to the ability of the screening test to detect small changes in visual acuity (also called instrument sensitivity). Some tests can detect subtle differences in acuity (e.g. Snellen test), others can only reflect much greater differences (Stycar test). The choice of instrument should be influenced by these considerations.
- ❑ Bias refers to the instrument giving consistently misleading results, which may perhaps be due to the use of an inappropriate screening test for the age group or use of a non-illuminated chart. Calibration

against an instrument of known accuracy can identify such problems, and so minimise this source of inaccuracy.

3.4.1.3 Subject Variation

- ❑ Precision: in the clinical world, random, biological subject variation is common e.g. blood pressure varies from minute to minute. Visual acuity, however, is generally stable over short time periods.
- ❑ Bias occurs where a systematic factor influences the results. Examples may include such things as the environment in which the test is done (the child may be distracted if other children are present). If different ways of covering the other eye of the child are used, the ability of the child to “peep” may produce differing results. This source of inaccuracy is best controlled by standardisation of all such influences e.g. screening children in a room on their own using the appropriate eye covers.

Clearly, a standardised approach and appropriate staff training are essential requirements for conducting vision screening efficiently and effectively.

3.4.2 Measurement Validity

Whilst accuracy asks if we are measuring the true value, validity asks if we are really measuring what we are trying to measure - for example, how good is the screening test in determining whether a vision defect is actually present or not? An accurate test may not be a valid test, whereas inaccuracy may further reduce the degree of validity of the test. Validity is of crucial importance when it comes to making a clinical diagnosis (whether a defect is present or absent) and in classifying the results.

Only by relating the screening test to a gold standard that is known to be correct can the validity of the test be found. A ‘true’ diagnosis may be the opinion of an ophthalmologist or the result of a superior test etc.

To determine the validity of a test a number of parameters are calculated that compare the particular test to the gold standard, namely sensitivity, specificity, and positive predictive value.

3.4.2.1 Test Sensitivity

Test sensitivity is the degree to which the test classifies vision as normal when a defect is actually present. With lower sensitivity, more defects are missed leading to an ethical concern of failing to identify children for whom a promise of help has been implicit in the invitation to attend for screening.

The sensitivity of a test refers to its ability to detect disease when it is known to be present, and is calculated by taking a group of patients known to have the defect (using the gold standard), and counting how often the test is abnormal. Test sensitivity is expressed as the % with an abnormal test out of the group who are known to have the defect (i.e. true positives). Those who test normal are referred to as “false negatives”. As an example, for a test with a sensitivity of 80%, out of 100 children screened and known to have abnormal vision, 20 would be inappropriately classified as normal and not referred for assessment.

3.4.2.2 Test Specificity

Test specificity is the degree to which the test classifies vision as abnormal when a defect is actually not present. With lower specificity, more children are unnecessarily added to the ophthalmology assessment waiting list, generating unnecessary concern in children and their parents and unnecessary financial and other costs, including opportunity costs, involved in the follow-up process.

The specificity of a test refers to its ability to give a normal result when the defect is known to be absent and is calculated by taking a group of patients known not to have the defect (using the gold standard), and counting how often the test is normal. It is expressed as the % that have a normal test out of the group who actually do not have the defect (i.e. true negatives). Those who test abnormal out of the group are referred to as “false positives”. As an example, for a test with a specificity of 80%, out of 100 children screened and known to have normal vision, 20 would be inappropriately classified as abnormal and referred for assessment.

3.4.2.3 Test Sensitivity - Specificity Trade-Off

In the ideal world, a screening test would be 100% sensitive and 100% specific. In practice, there is a trade-off between sensitivity and specificity - as one rises, the other tends to fall. The sensitivity and specificity of a screening test should be high (well over 90%). A test with a low sensitivity would be unacceptable because substantial number of subjects with the target defect will be missed. On the other hand, a test with a low specificity would result in an unacceptably high number of false positives where subjects screening positive would later be found to have no defect.

In practice, the decision as to what is a "normal" or "abnormal" result is decided subjectively, taking into account the clinical implications of either type of misclassification. The risks in over-diagnosis and submitting children to unnecessary investigation are balanced against the problems arising from missing a diagnosis. Between the black and white of a normal or abnormal, a grey zone of diagnostic uncertainty is present and clinical interpretation as to when a defect is truly present remains important.

3.4.2.4 Multistage Testing

Test sensitivity and specificity can be modified by using two or more different tests to determine if a defect is present or absent (referred to as primary and secondary screening). If detecting a defect is based on two (or more) different tests both being considered abnormal, it is referred to as 'testing in series'. This approach tends to increase specificity at the expense of sensitivity so that the risk of making an incorrect diagnosis is reduced. Alternatively, detecting a defect based on the presence of either of two (or more) different tests being considered positive is referred to as 'testing in parallel'. This approach tends to increase sensitivity at the expense of specificity so the risk of missing a case is reduced.

3.4.2.5 Positive Predictive Value

A further measure of the productivity of a screening test is its positive predictive value, which is defined as the proportion of abnormal screening results that are actually correct. The positive predictive value poses the key clinical question - what is the chance for this child with an abnormal screen result in this environment of truly having a vision defect?

The positive predictive value is dependent on the test sensitivity and specificity, and also on the prevalence of the defect in the screened population. For a given sensitivity and specificity, the positive predictive value increases as prevalence increases, and decreases as prevalence decreases. A test with a high positive predictive value in a high prevalence setting may prove of little value in a low incidence setting - typically when applied to the general population.

As an example, at a prevalence of 5% and a specificity of 80%, the positive predictive value rises from 16% to 17% as the sensitivity increases from 70% to 80% (i.e. ~ 1 in 6 chance a child has a defect).

While high test sensitivity and specificity are important indicators of its validity, the clinical usefulness of a test in practice will primarily depend on its positive predictive value in the particular clinical setting. The positive predictive value reflects the overall efficiency of the test, and is therefore a key factor in determining whether a screening programme is economically viable.

3.4.3 Yield

The basic measure of productivity of a screening programme is its yield, defined as the number of cases of a condition accurately identified by the programme. Yield is usually expressed as the number of 'true positive' cases as a proportion of the total number of people screened.

Yield is mathematically related to the prevalence of the defect in the population group and the sensitivity of the test. The higher the prevalence of the condition in the population, and the higher the sensitivity of the test, the greater the yield of 'true positives'. As an example, at 80% sensitivity, a prevalence rate of 5% will produce a yield of 4%, and a prevalence of 10% will produce a yield of 8% etc.

A more detailed concept of yield involves the measurement not only of the total number of cases detected by the programme, but also the number that would have been detected without the aid of a screening programme. The difference between the two is referred to as the "incremental yield".

Section 4 Vision Screening Tests

Since their introduction by Snellen in 1862, distance test charts had become so diverse that they have ceased to provide a uniform test of visual acuity, and test standards have been published. In a screening programme, it is clearly essential to use a test that meets the required standards and is appropriate to the age and maturity of the child. However, data on the sensitivity, specificity, positive predictive value and yield of the tests are limited.

4.1 Test Standards

The essential requirements for a vision acuity test are included in the British Standard (BS 4274 : 1968) as shown in Appendix 5.⁽¹⁶⁾ Only D, E, F, H, N, P, R, U, V and Z as English (Roman) capital letters should be used, and be of 5 x 4 non-serif type. The sizes and spacing of letters and lines are designated, with 8 letters on the 6/6 line, and 6 letters on the 6/9 line. As luminance of the chart and its surround have a marked effect on vision, the lighting requirements are specified.

Snellen charts can vary considerably in their optometric design. It is therefore important that charts used in a screening programme meet the required standards. The International Standards (ISO 8596 and ISO 8597) define the standards for optotypes in visual acuity testing.

4.2 The Snellen Test

Visual acuity is usually measured using the Snellen test at 6 metres. The Snellen letter acuity chart is simple to perform and is sensitive to the most common sources of visual impairment such as uncorrected refractive error, cataract, macular disease and amblyopia. In using the test, it is considered essential to occlude each eye in turn (otherwise the result indicates only the vision in the better eye) and that acuity is tested at the right distance (6 metres) using an illuminated Snellen chart. Younger children can have difficulty in complying with the requirements (e.g. the ability to verbalise the letters and retain visual attention at 6 metres) for reading Snellen chart. Tests that are more "developmentally friendly" for such children have been developed (see below).

The line with the smallest display of letters that are all correctly identified gives the measure of acuity. Acuity of 6/12 or worse in either eye is the generally recommended level for referral. Where the child is able to correctly identify each and every one of the six letters on the 6/9 line, for example, the result is recorded as 6/9. When a child identifies half or more of the letters on the 6/9 line, it is sometimes been recorded as 6/9pt. This result is not the same as 6/9, and to avoid any ambiguity such a finding should be recorded as 6/12. While this approach is important in screening, it may not be as relevant to clinicians since in their method of recording acuity, for example, 6/9 -3 or 6/12 + 2, they would take into account the clinical examination including refraction, the diagnosis and whether or not the unidentified letters were at the end or in the middle of the rows of letters.

Snellen charts use a linear display of optotypes with specified spacing between each. Each optotype is based upon a five by five square with the width of each component equal to one fifth, and spacing between optotypes to four fifths on one square. Any variations introduce optometric errors. However, Snellen charts can vary considerably in their optometric design. The size 60m letter is single and considerable variation in spacing exists between other levels.

The Snellen chart, although widely regarded as the gold standard for visual acuity testing, has some drawbacks. The progression of letter sizes on the chart is irregular, the number of lines on the chart increases with each step so that the task becomes relatively easier with larger letters, and then becomes too coarse for precise measurement of small changes (instrument precision). LogMAR Snellen charts may measure acuity more accurately and are in use for research purposes.

4.2.1 Test Validity

The validity of the Snellen test using a Clement Clarke chart was assessed in a study of 180 children in 1st class (aged 6-7 years) carried out in 1988.⁽¹⁷⁾ Acuity was measured at 6 metres using artificial lighting

(ceiling lights) in addition to the available natural light. Illuminated Snellen charts were not available at the time. The assessment of all children by an ophthalmologist was used as the gold standard. Significant defects included amblyopia, manifest or micro-squints and anisometropia.

For significant defects, the test sensitivity for acuity of 6/12 was 82%, the specificity was 87%, and the positive predictive value was 31% i.e. each child referred had almost a one in three chance of having a defect. The yield was 5% (i.e. 5 in 100 children screened were found to have significant acuity defects).

The results indicated that referring children with a vision of 6/9 in one or both eyes was inappropriate – although sensitivity was 100% at both referral levels, the specificity was only 50% for 6/9 in both eyes and 31% for 6/9 in one eye, with a positive predictive value of 13% and 9% respectively. In other words, between 50-60% of children referred at these levels would have no defect of vision when examined by the ophthalmologist.

A key recommendation from the study was that an internally illuminated Snellen chart should be used to standardise the process, and would be expected to produce a higher positive predictive value. As an outcome from the study, it is understood that portable boxes with two 40 Watt bulbs placed behind the chart have been in common use in the Eastern Regional Health Authority area since 1994.

4.3 The Sonksen-Silver Test

The Sonksen-Silver test was developed to provide an accurate and easily administered means of testing acuity in less developmentally advanced children, whilst meeting the standard specifications of the Snellen 6 meter test to which it is directly comparable.⁽¹⁸⁾ The test overcomes many of the disadvantages of other tests. Geometric progression in the size of letters is achieved by having the same number of equally legible letters on every line of the chart. An important feature of the design is that it allows low levels of acuity to be measured with the same precision as higher levels. The test can also be used at either 6 or 3 metres. Unlike the Snellen test, it includes a matching card so that it is not necessary for the child to be able to name the letters – the child matches letters on a card in front of him/her to the ones on the test card held by the screener either verbally or by pointing.

The test is within the capabilities of above average 2½ year olds and nearly all 3½ year olds. Although designed with the developmental characteristics of pre-school children in mind, the test is also suitable for older children and adults, for disabled children and adults with mental ages greater than three years and for children and adults with whom it is difficult to communicate for reasons of language.

The test is comprised of two booklets of flip-over pages each having a single line of letters (3 to 60m in size) on each page, a keycard (6 size 18m letters in a widely spaced crescent) that the child uses to match letters, a training booklet, an instruction manual, and a pointer. The system is available as a screening pack and as a diagnostic pack (containing some further acuity levels). A near card (for near vision testing) is also available.

Rooms available for vision screening can be small (less than 4 metres long). Young children need to give their full attention to a matching task so corridors and open doorways are not an appropriate way of acquiring extra distance. To overcome this problem, the Sonksen-Silver test comes with two sets of guidelines – one set for a distance of 6 metres and one for a test distance of 3 metres. The result is a common test system which is directly comparable to the international standard when used at 6 metres and meaningful to everyone in terms of clinical practice at either distance. It is essential that the distance at which the test is conducted is clearly indicated by the numerator of the Snellen fraction.

Guidelines for handling the test booklet, lighting, assessing naming and matching skills, teaching the matching task, measuring acuity (the smallest display for which all five letters are correct), recording the findings (for example 3/9 should not be recorded as 6/18 as it is both inaccurate and misleading), and action levels are provided.

4.3.1 Test validity

The validity of the Sonksen-Silver test was assessed in a study of 207 children aged 4-6 years.⁽¹⁹⁾ Screening was carried out by one public health nurse. The assessment of all children by an

ophthalmologist was used as the gold standard. Significant defects included amblyopia, manifest or micro-strabismic and anisometropia. Acuity was measured at 3 metres using standardised illumination and hypo-allergenic eye patches. Children matched letters to the keycard. The test took 4 minutes on average to complete.

For significant defects, the test sensitivity for acuity of 3/6 (equivalent to 6/12) was 96%, specificity was 94%, and the positive predictive value was 69% (each child referred had a 7 in 10 chance of having a defect). The yield was 12% (more than one in ten children screened had a significant defect). For acuity of 3/4.5 (equivalent to 6/9), the test sensitivity remained at 96%, but specificity fell to 33% (i.e. 67% were false positives), and the positive predictive value fell to 16% (each child referred had less than a 1 in 5 chance of having a defect).

These results support the use of the Sonksen-Silver test for screening children too young or unable to use the Snellen test at 6 metres.

4.4 Single-Letter and Other Tests

The nature and integral proportions and spacing of optotypes and their topographical arrangement vary considerably from one test to another and from the specifications laid down by Snellen which led to diversity in the measure of acuity obtained. The developmental rationale behind some of the variations is questionable, such as the use of single letters, greater spacing, or pictures. In attempting to simplify the cognitive aspects of the Snellen test, considerable optometric accuracy was sacrificed.

A single letter is easier to identify than each letter in a row of letters due to the so called 'crowding phenomenon'. The crowding phenomenon refers to the difficulty in separating letters on a line of type or a test chart. It particularly affects those with strabismic amblyopia or macular degeneration. The end letters of the line may be read correctly but those in the centre are unclear. Hence, the single-letter Stycar or Sheridan Gardiner (and the 7-letter tests) are not recommended for screening as they may seriously overestimate acuity and therefore miss significant visual defects including amblyopia.

A range of other acuity tests have been developed, including the Keystone Test and Glasgow Acuity Cards. The Cambridge Crowding test is a matching test somewhat similar to the Sonksen-Silver test and can also be used at three and six metres. It has the additional advantage that the child only has to concentrate on the central letter in the surrounding array of four other letters.

4.5 Vision Screening Practice in Ireland

A survey by G Brophy in 1991 of the 31 community care areas in Ireland provided baseline information on vision screening practice throughout the country.⁽¹⁷⁾ The response rate was 93% (29 areas). One third of areas screened school children for visual defects on at least two occasions while over a third screened on four or more occasions. There was little consistency in the choice of classes or age groups screened. The criterion for an abnormal result was 6/12 with one eye in just over two-thirds of the areas. More significantly, it was considered in the remaining (one-third) of areas that vision acuity of 6/9, with both eyes or one eye only, was an abnormal result requiring referral to a specialist.

The results of a second study in 1996 by R O'Regan indicated that there had been little change in practice in the intervening period.⁽²⁰⁾ The study found that formal vision screening took place on at least three occasions - the first at the 9 month developmental examination, the second in either junior or senior infant class and the last in either 5th or 6th class in primary school. The 9 month check was the only test set at a definite age, with the others occurring on occasions that suited the administration of the system or depended on local public health nurse work load and the service she was able to provide. There was no definite set age for a formal first assessment of visual acuity. No area had a written screening protocol. A wide variety of acuity tests were in use.

The studies indicated that vision screening was not standardised with respect to age groups, screening tests or equipment. The lack of best practice guidelines and clinical audit were considered to be contributing factors. The challenge in changing time-honoured and established practice, despite the availability of scientific evidence, was highlighted.

Section 5 Overview of Best Practice Guidelines

A number of guidelines on vision screening in preschool and school aged children have been published in recent years, including the following:

- ❑ Ophthalmic Services for Children, Royal College of Ophthalmologists and the British Paediatric Association, 1994 (United Kingdom).⁽²¹⁾
- ❑ Health Needs of School Age Children, British Paediatric Association (Polnay Report), 1995 (United Kingdom).⁽²²⁾
- ❑ Health for All Children (Hall Report), 1996 (United Kingdom).⁽⁸⁾
- ❑ Best Health for Children - Developing a Partnership with Families (Best Health), 1999 (Republic of Ireland).⁽⁴⁾

To avoid unnecessary duplication, the detailed literature search and discussion undertaken by these groups is not repeated. The key recommendations of each group with regard to school vision screening are outlined in Table 5.1, with those contained in the Best Health report are described in further detail.

The recommendations and conclusions reached by the working parties are similar in many respects - in screening vision at three ages, the referral criteria, the importance of staff training, the need for ongoing audit of the service (from screening to final outcome), the use of proper equipment and facilities, the need to screen special risk groups, and the necessity of good communication between parents, teachers and health professionals within the service network.

Table 5.1. Recommended school vision screening programmes.

	Royal College of Ophthalmologists, British Paediatric Association, 1994	Polnay Report, 1995	Hall Report, 1996	Best Health, 1998
Acuity testing 1 st screen 2 nd screen 3 rd screen	School entry. 8 yrs. 11 yrs.	5 yrs (second term). 7-8 yrs. 11-12 yrs.	4-5 yrs (school entry).	5-6 yrs (senior infants). 7-8 yrs (2 nd class). 11-12 yrs (6 th class).
Test Usual If child less advanced	Snellen chart (illuminated) at 6 m. Sheridan-Gardiner (single letter).	Snellen chart at 6 m. Sheridan-Gardiner (single letter).	Snellen chart at 6m. Cambridge Crowding at 3 m, Sonksen-Silver test at 3 m. Picture (Kay, Elliott) or single letter tests (Strycar or Sheridan Gardiner) - but these may miss amblyopia.	Snellen chart (illuminated) at 6 m. Sonksen-Silver test.
Referral criteria	6/12 or worse in either eye. Retest if unequal vision less severe than 6/12, & refer only if deteriorated to 6/12.	6/12 or worse in either eye. 6/9 if also other concerns.	6/12 or worse in either eye. Review if unequal vision less severe than 6/12.	6/12 or worse in either eye. If unequal vision less severe than 6/12, retest at 3-6 mts. Refer only if deteriorated to 6/12.
Refer to	School entrants – orthoptist.. 8 yr olds – optometrist. 11 yr olds – optometrist.	Not specified. Children unable to cooperate with test - refer to orthoptist.	Not specified.	Ophthalmologist (community or hospital based). Potential role for optometrists, especially for older children and those who have a first assessment by the above.
Colour vision Age Sex Test	11 yrs. Boys only. Not specified.	11-12 yrs. Boys & girls. Ishihara plates & quantitative (e.g. City University Press).	No attempt should be made to screen in primary school.	6 th class (11-12 yrs). Boys & girls. Ishihara plates.

However, there are significant variations in other respects - the choice of screening test, screening ages, and the value of colour screening (see Table 5.1). This lack of uniformity reflects the absence of a solid evidence base, and the working parties were forced to adopt a consensus approach in reaching many of their conclusions. Indeed, it was generally acknowledged that research is required to answer the many outstanding questions on the epidemiology of visual defects, the choice of screening tests, and the effectiveness of screening programmes and interventions for visual defects at the different ages throughout childhood. A number of research projects are underway internationally, but it may be some years yet before sufficient evidence becomes available to determine the optimal screening programme.

In 1994, the Canadian Task Force on the Periodic Health Examination was in favour of pre-school visual acuity testing, but did not explore the issue of screening school aged children.⁽²³⁾ However, the authors acknowledged the lack of firm evidence to link poor visual acuity with poor school performance.

In 1996, the United States Preventive Services Task Force reviewed the value of vision in children.⁽²⁴⁾ Screening for amblyopia and strabismus in all pre-school children on one occasion between 3 and 4 years of age was recommended. Although screening for visual acuity (using Snellen charts) in children attending public schools was carried out in most states, referral criteria and procedures varied widely, and screening may have a false-positive rate of 30% or more. The authors went on to state that there was insufficient evidence to recommend for or against routine screening for diminished visual acuity among asymptomatic school children. Recommendations against such screening may be made on other grounds, including the inconvenience and cost, and the fact that refractive errors can be readily corrected when they produce symptoms.

5.1 Best Health For Children, 1998

At the request of the Chief Executive Officers of the Health Boards, the Directors of Public Health established a team to review the screening and surveillance services for children in Ireland. The report, *Best Health for Children, Developing a Partnership with Families*, was published in 1998.⁽⁴⁾ In making recommendations, the authors attempted to achieve a balance between the use of an evidence based approach and the need to bring about a gradual change that would have the support of parents and professionals, and not endanger the health and safety of any child.

The purpose of screening and surveillance for visual defects in childhood was stated to be the "early detection and treatment of relevant ophthalmic disorders to minimise their impact on a developing child".

Box 5.1. Current service problems.

- No nationally agreed screening programme.
- No uniform policy on referral criteria & locally agreed pathways of referral.
- Waiting time for assessment & treatment.
- Inappropriate referrals.
- Late diagnosis of certain conditions.
- Poor feedback to parents, GPs & professionals.
- Inadequate training in screening techniques.

The main problems with the childhood vision screening and referral services were outlined (see Box 5.1). In the absence of a sound evidence base, it was not recommended that preschool vision screening be implemented.

5.1.1.1 School Vision Screening

The authors recommended that a programme of school vision screening be retained, and standardised in relation to the age of the child, the testing, the referral guidelines and the training for professionals.

The current practice in Ireland in relation to the age of "school entrant" vision screening was stated to vary locally, with some areas screening in junior infants, others in first class, and most in senior infants. In selecting the target age groups, a number of issues were considered (see Box 5.2). Given the limited data on the value of screening for amblyopia, it was recommended

Box 5.2. Selection of screening groups.

- Objective(s) of the programme.
- Natural histories of target diseases.
- Efficacy/effectiveness of the intervention.
- Age appropriateness of the screening test(s).
- Sensitivity, specificity & predictive value of the screening test(s).
- Logistical factors (e.g. the staff requirements for testing at different ages)
- Provision of an integrated school health service (e.g. screening for hearing defects, educational requirements etc).

that school vision screening should not be solely influenced by the aim of detecting this vision defect alone, an aim that may be unrealistic.

5.1.1.2 Recommended Screening Ages

The recommended programme for vision screening in school children is shown in Table 5.1. As can be seen, the recommendations differ somewhat from the other guidelines, with the initial screen taking place about one year later.

It was recommended that senior infants (age 5-6 years) would be the most practical year in which to initially screen because:

- ❑ "Most children at this age would be old enough to co-operate with the Snellen test, a test which is easy to carry out and with which most staff are familiar.
- ❑ Senior infants is the optimal year for carrying out the 'school entrant' visit in terms of hearing screening and the consultation between the school nurse and the child's parents and teachers. It would be impractical to have the vision screening carried out as an additional visit."

The authors went on to state that they recognised "that the choice of this age group may be criticised by those who feel that screening in junior infants would allow for the earlier detection and treatment of amblyopia. Therefore it is essential that the screening programme recommended here would be evaluated on an annual basis, and that the service would be reviewed in the light of new evidence appearing regarding the value of screening and the optimal age for screening. In the meantime, it would be useful to investigate the feasibility of vision screening in junior infant children. This would involve the use of a new screening test, for example the Sonksen-Silver test (with the necessity to train staff in its use), and an additional visit to the school by the school nurse, thus incurring extra costs. This could be carried out as a pilot project in one area".

5.1.1.3 Colour Vision Screening

The authors recommended that children should be screened for colour vision defects. As outlined in Table 5.1, the guidelines vary greatly in the recommended approach to this topic (e.g. whether to screen boys only or both sexes, and the tests used).

This recommendation is in contrast to the conclusions reached by the authors of the Hall Report, who stated that "there is little evidence that colour vision defects cause learning difficulties, and most affected children can distinguish different coloured materials despite reduced colour discrimination. Some defects preclude people from entering certain careers, and it is helpful for a person to know that they have this deficiency at an early stage in career planning. However, little is known about whether adolescents benefit from such screening. It might be equally effective to provide health education - e.g. to advise those planning certain careers to be assessed by an optometrist." The authors went on to state that ***"no attempt should be made to screen for colour vision defects in primary school. The value and timing of screening for colour vision defects in older children is uncertain"***.

5.1.1.4 Parent and Teacher Involvement

The input of teachers, being aware of the educational and emotional needs of children in the educational setting, should be facilitated.

Parents should receive an information leaflet outlining the school health service, including the content and timing of the programme, be requested to complete a child health questionnaire at the three screening ages, and be encouraged to attend school health screening visits, particularly the initial visit, and be informed that a screening test is not diagnostic. Parents should be informed of any abnormality suspected or confirmed by the school health team.

5.1.1.5 Special Need Groups

Any child undergoing assessment for educational under-achievement or other school problems should have a visual acuity check. Vision screening should be undertaken in schools for children with hearing impairment.

5.1.1.6 Facilities

Rooms used for health visits should be suitable for the purpose, with adequate dimensions to allow for vision testing using the appropriate test.

5.1.1.7 Referral and Feedback

It was recommended that community ophthalmology services with appropriate accommodation and equipment be available in all areas. A wide range of recommendations were made in relation to the referral process and are shown in Box 5.3. It was also recommended that the potential role of optometrists in the assessment of children referred from the school health services should be explored, particularly in relation to children in the older age groups and children who have a first assessment carried out by an ophthalmologist.

5.1.1.8 Public Health Nurse and Area Medical Officer

Each primary school should have a designated school nurse and area medical officer. It is envisaged that the main body of the work of the school health service will be carried out by the designated school nurse, with the doctor having an advisory and referral role.

Box 5.3. The referral process.

- Referral guidelines should be developed by the Child Health Coordinator.
- Pathway of referral should be agreed locally.
- Standardised specialist referral form should be devised.
- Referral letter should specify the name/address of the child's GP who should get a copy of the letter.
- Referrals should be made in the name of the Child Health Coordinator, and state the name/title of the professional carrying out the examination.
- Child should be seen within 3 months of referral, with urgent referrals being seen at the earliest opportunity.
- Parents should be given written information on any abnormal results and be informed that a referral is being made.
- Ophthalmologists & optometrists to whom a child is referred should give a written report to the referring professional, the Child Health Coordinator and GP after the first assessment.
- Outcome of all health surveillance examinations (normal & abnormal), should be reported to the Child Health Coordinator.
- Programme should be monitored closely, with particular attention to quality indicators in terms of practice & outcomes.

The school nurse should have a formal meeting with the school principal towards the end of the school year to plan the child health surveillance programme for the coming year - this discussion should address the content and timing of screening examinations, facilities required for examinations, the programme for immunisation, consent forms and questionnaires, ways in which the nurse and doctor might facilitate and support the school in developing a health promoting ethos and in dealing with health issues arising during the year, and procedures for dealing with child protection issues. This meeting should also provide an opportunity to plan for new entrants and individual children with special needs.

5.1.1.9 Staff Training

Staff involved in screening should be adequately trained in the development of normal vision and in the techniques of visual assessment, with paediatric and ophthalmological input into the training.

5.1.1.10 Child Health Coordinator

The Child Health Coordinator should be responsible for coordinating the programme, including screening, service evaluation, training, and refresher courses. Liaison between the Coordinator and ophthalmologists was considered essential.

5.1.1.11 Service Review

The Child Health Coordinator should have overall responsibility for the management of the service, including planning and evaluation. With respect to ensuring the provision of a quality school health service, a number of recommendations were made including the need to keep the programme under review in the context of emerging evidence (see Box 5.4). It was recommended that referral services should be monitored locally to ensure that children are seen in a timely manner.

Box 5.4. Service review.

- Ongoing monitoring of screening & referral services to ensure services meet local needs, in both quality and quantity, in an efficient manner.
- Information to include coverage of the programme, number of appropriate/inappropriate referrals, delays between referral & diagnosis, diagnosis & treatment, age at which each child is diagnosed.
- Child Health Coordinator to produce an annual report on the service in a standardised format, including key performance data (indicators of health outcome), information on the health of the school population, identify local problems and suggest plans to address unmet needs.

Section 6 Review of School Vision Screening

Screening for vision defects in children attending national schools in the Area Health Boards is carried out by public health nurses and area medical officers. Anecdotal information suggested a varied approach to screening within the region. As part of the review of the ophthalmology services for children, a detailed study of the school-screening process in the region was carried out. The data may be helpful when comparing current practice with what is considered to be best practice (see Section 5), and so provide a basis for further enhancing the quality of the service.

6.1 Methods

In May 1999, all area medical officers (AMOs) and public health nurses (PHNs) involved in the routine school vision screening programme in the Area Health Boards were asked, through their respective heads of department, to participate in an anonymous self-administered questionnaire survey (see Appendix 1). The same questionnaire was used for PHNs and AMOs. Data are presented with respect to the community care areas (CCA's) as they existed in 1999.

The following issues were examined: the ages (classes) of children screened; the screening technique used; the criteria and process for referral; feedback from hospitals and community ophthalmic physicians; and staff training. Respondents were invited to comment on any problems they were aware of in the delivery of the service, and to make suggestions as to how the service might be enhanced.

Senior area medical officers (SAMOs) and superintendent public health nurses of each CCA were also requested to outline the local policies on school vision screening in their area and to supply copies, where available, of clinical guidelines, consent forms, referral letters, covering letters and return forms. Furthermore, routine demographic and service activity statistics relevant to the school vision screening programme were requested.

In the counties of Kildare and Wicklow, the community ophthalmic physicians were interviewed about local policies, staffing levels, accommodation and the equipment available.

Table 6.1. Demography and school vision screening numbers by Community Care Area. Sources: Census of Population 1996, Community Care Annual reports 1998, Senior AMOs, and Superintendent PHNs.

	Community Care Area										Total
	1	2	3	4	5	6	7	8	9	10	
Total population x 1000 (1996)	127	129	93	143	112	144	119	193	135	103	1296
Population aged 5-14 yr (1996)	18101	13756	12472	25028	20900	22998	14795	32268	25201	18062	203581
% population aged 5-14 yr (1996)	14.2	10.7	13.4	17.5	18.5	16.2	12.5	16.7	18.7	17.6	15.7
No. of births (1998)	1617	1879	1706	1974	2000	2699	2085	3320	2747	1770	21797
No. of schools	47	36	33	57	56	49	57	81	97	87	600
No. of private schools* (screened)	11 (0)	10 (0)	1 (0)	2 (2)	0	0	3 (3)	4 (0)	0	4 (0)	35 (5)
No. of children screened 97/98	2229	1477	2562	2624	807	3038	2534	7035	4573	3234	30113
No. referred 97/98	259	221	66	223	117	432	191	663	237	NA **	NA
Referred as % of screened	11.6	15.0	2.6	8.5	14.5	14.2	7.5	9.4	5.2	NA **	NA
No. of PHNs	35	33	32	44	26	40	41	58	30	29	368
No. PHNs vision screening	20	33	23	17	24	35	17	40	30	29	268
No. of AMOs (incl. part-time)	6	7	4	9	4	9	8	9	8	4	68
No. AMOs vision screening	3	7	4	7	4	4	5	7	0	3	44
COP*** sessions / mth	0	0	0	0	0	0	0	0	28	16	44

* Estimated. ** NA = not available as information (compiled with audio-screening data). *** COP = Community ophthalmic physician

6.1.1 Screening Policy and Activity Statistics by Community Care Area

Written clinical guidelines were provided by four (40%) of the 10 CCAs. The detail and content of the guidelines varied. Use of a lighted box was specified in four of the guidelines, the Snellen test (Clement Clarke) in three, vision testing at 20 feet in three, and the method of eye occlusion (with a card or spoon)

in one guideline. As an alternative test, the Stycar test at 10 feet was mentioned in two guidelines, the Keystone test in one, and one guideline stated no other test than the Snellen should be used. Three guidelines included criteria for urgent referrals (Snellen 6/36+ in either eye).

Policies on the target classes for screening varied across the region. Four community care areas recommended screening 1st and 5th class, two areas recommended 1st and 6th class, one area recommended senior infants, 1st, 5th, and 6th class, one area recommended 1st, 4th and 6th class, and one area recommended screening senior infants and 5th class.

Parent consent forms, return forms, and referral forms were designed and used within each area or by the individual AMO. The information that is requested or supplied on the forms was not standardised.

The demographic profile of the community care areas, together with the staff resources and routine school screening activity statistics are shown in Table 6.1, based on the available data. For children screened, the overall referral rate varied from 3% to 15%. Between 39% and 100% of PHNs in each area were involved in the programme. Repeat vision testing was carried out by AMOs in four areas.

6.2 Results

6.2.1.1 Response Rates

Out of a total of 368 PHNs, 268 (73%) were involved in the vision screening programme. Of these, 179 returned a completed questionnaire, giving a response rate of 66.8%. Out of a total of 65 AMOs, 44 were involved in the programme and all returned a completed questionnaire.

6.2.2 Screening Process

6.2.2.1 Classes Screened

As shown in Table 6.2, the majority of staff screened children in 1st, 5th and 6th class. The classes actually screened did not concur with the stated policy for seven of the community care areas.

6.2.2.2 Vision Parameters Tested

The majority of respondents indicated that the purpose of routine visual screening was to measure visual acuity, with approximately 15% of PHNs being unfamiliar with the term (see Table 6.2).

A minority of PHNs and AMOs screened for colour blindness or assumed that it took place. Screening for colour blindness was not specified in any of the local guidelines. However, the "school card" has a space for recording the colour vision test result.

Near vision was tested according to 11% of PHNs. Screening for near vision was not specified in any of the local guidelines.

Table 6.2. Vision screening process.

	PHNs n=179 %		AMOs n=44 %	
Classes routinely screened (n)	(179)		(44)	
Junior infants	1	0.6	1	2.3
Senior infants	50	27.9	9	20.5
1st class	129	70.1	38	86.4
2 nd class	13	7.3	0	0.0
3 rd class	28	15.6	0	0.0
4th class	23	12.8	7	15.9
5th class	100	55.9	27	61.4
6th class	62	34.6	18	40.9
Older	2	1.1	0	0.0
Unsure	0	0.0	2	4.6
Vision screen components (n)	(179)		(44)	
Visual acuity	151	84.4	43	97.7
Colour vision	16	8.9	4	9.1
Near vision	20	11.2	0	0.0
Squint	41	22.9	11	25.0
Re-screen unequal vision < 6/12	74	41.3	19	43.2
Known defect/spectacles	161	89.9	41	93.2
Number screened in a year (n)	(160)		(35)	
<50	15	9.3	25	71.4
50-99	47	29.4	6	13.7
100-199	52	32.5	2	17.2
200+	44	28.7	2	5.7
Testing visual acuity (n)	(160)		(39)	
Eyes examined separately	142	88.8	23	59.0
Eyes examined together only	0	0.0	0	0.0
Eyes examined both ways	18	11.2	16	41.0
Technique used to cover eye (n)	(179)		(44)	
Card/paper held by child	130	72.6	18	40.9
Card/paper held by other	57	31.8	24	54.5
Child's hand	22	12.3	3	6.8
Other's hand	5	2.8	5	11.4
Eye patch	4	2.2	0	0.0
Other	11	6.1	1	2.3
Places ever used for screening (n)	(179)		(44)	
School room with other children	83	46.4	12	27.3
Separate room in school	90	50.3	21	47.7
Corridor in school	33	18.4	8	18.2
Health centre room	39	21.8	13	29.5
Health centre corridor	34	19.0	21	47.7

Approximately one in four of the PHNs and AMOs either screened for squint or assumed that it took place. Testing for squint was not specified in any of the local guidelines.

Children with spectacles or a known eye-defect were generally included in the routine screening process, with only two respondents stating that this was not the case.

Re-screening of unequal vision less than 6/12 took place according to a third of the respondents, but after varying time intervals (1-24 months). Re-screening of unequal vision was specified in two of the local guidelines.

At least one in two of the PHNs screened more than 100 children each year, with only one in ten of the AMOs screening that number. The majority of AMOs tested less than ten children or none each year. Screening tests carried out by the AMOs were usually repeat vision tests of "failed" tests.

6.2.3 Screening Techniques

The eyes were usually tested separately, and never only with both eyes open (see Table 6.2).

Only 2% of PHNs and none of the AMOs used an eye patch or other special occluder to prevent the child from "peeping" with the eye that was not tested.

Screening was often carried out in a class room with other children or in a school corridor.

6.2.3.1 The Snellen Chart

The Snellen chart was used almost universally for vision screening (see Table 6.3). The majority of respondents did not state the type of the Snellen chart in use, suggesting unfamiliarity with the exact type of chart used. Hence, a variety of charts may be in use including those that are not of the Snellen type.

An illuminated chart was never or only sometimes used for screening by 15% of PHNs. Screening generally took place at the recommended distance. However, where class rooms were too small, the school corridor was used to obtain the required distance.

Although the majority of PHNs did not themselves make referrals to an ophthalmologist, approximately one in two of the PHNs were aware that referral at Snellen 6/12 in either eye was to be the recommended cut-off point. A third of PHNs considered referral to be appropriate for Snellen 6/9 in either eye or worse. The latter referral criterion was included in the guideline in one area.

	PHNs n=179		AMOs n=44	
		%		%
'Snellen' chart (n)	(166)		(37)	
Always/ usually used	157	94.6	35	95.6
Sometimes/never used	9	5.4	2	5.4
Name of Snellen chart (n)	(179)		(44)	
Not answered	83	46.4	29	65.9
Clement Clarke	69	38.5	10	22.7
Hamblin, Keeler or other	27	15.1	5	11.4
Done with another person (n)	(165)		(35)	
Always/usually	31	18.8	22	62.8
Sometimes/never	134	81.2	13	37.2
Illuminated chart used (n)	(172)		(36)	
Always	135	78.5	23	52.3
Usually	11	6.4	6	13.6
Sometimes/never	26	15.1	7	15.9
Distance of 20 ft/6 m available (n)	(175)		(36)	
Always/usually	173	98.9	33	91.7
Sometimes/never	2	1.1	3	8.3
Referral criteria (n)	(170)		(37)	
6/9 in either eye or worse	41	24.1	0	0.0
6/9 in both eyes or worse	17	10.0	2	5.4
6/12 in either eye or worse	93	54.7	35	94.6
6/12 in both eyes or worse	8	4.7	0	0.0
6/18 in either eye or worse	4	2.4	0	0.0
AMO decides	7	4.1	-	-
Keystone test (n)	(153)		(38)	
Always/usually used	5	3.3	0	0.0
Sometimes used	14	9.2	1	2.6
Referral criteria (n)	(22)		(1)	
6/9 in either eye or worse	3	13.6	0	0.0
6/9 in both eyes or worse	4	18.2	0	0.0
6/12 in either eye or worse	12	54.5	0	0.0
6/12 in both eyes or worse	1	4.5	0	0.0
6/15 in either eye or worse	1	4.5	1	100.0
Other	1	4.5	0	0.0
Stycar / single letter (n)	(141)		(33)	
Always/usually used	11	7.8	0	0.0
Sometimes used	43	30.5	11	33.3
Distance used (n)	(55)		(10)	
10 (ft)	14	25.5	7	70.0
20 (ft)	38	69.1	3	30.0
Other	3	4.4	0	0.0
Done with another person (n)	(62)		(11)	
Always/usually	26	53.2	9	81.8
Sometimes/never	29	46.8	2	18.2
Number charts (n)	(145)		(36)	
Always/sometimes used	32	22.1	12	33.3
Never used	113	77.9	24	66.7
Sonksen-Silver test (n)	(137)		(44)	
Ever used	1	0.7	0	0.0

6.2.3.2 The Keystone Test

The Keystone test was used by 13% of PHNs and 3% of AMOs (see Table 6.3). The criteria considered appropriate for referral were variable, with only one PHN being aware that visual acuity of 6/15 in either eye or worse was the recommended cut-off point for referral.

6.2.3.3 The Stycar Test

The Stycar (Sheridan-Gardiner) single letter test was used by one in three of the PHNs and one in five of the AMOs (see Table 6.3). The majority of AMOs and PHNs screened at a distance of 20 feet, although a distance of 10 feet is recommended. Sixty percent of PHNs were aware of the recommended referral criteria, compared with 20% of the AMOs. Approximately 50% of the PHNs using the test carried it out on their own. The test was usually used for younger children having difficulty naming the letters on the Snellen chart.

6.2.3.4 Other Tests

The Sonksen-Silver test was used by only one PHN. Apart from the occasional use of Snellen number charts, screening tests other than those mentioned above were rarely used.

6.2.4 Pre-referral Process

6.2.4.1 Urgent Referrals

Given the large numbers of children being referred for an ophthalmology opinion, and the long waiting periods for assessment, PHNs and AMOs were asked to specify what criteria they would use to prioritise cases.

Approximately 28% of PHNs and 18% of AMOs did not specify any criteria (see Table 6.4). There was no standardised approach to the prioritisation of referrals as indicated by the wide range of criteria mentioned, including the standard referral criteria, squint, double vision, nystagmus or other eye pathologies.

6.2.4.2 Repeat Testing

Children failing the screening test were re-tested according to approximately one in two of the PHNs and AMOs. Repeat testing was primarily carried out by the AMO (see Table 6.4).

6.2.4.3 Eye Examination

Approximately 46% of PHNs assumed that an AMO routinely performed an eye examination before the child was referred for an ophthalmology opinion (see Table 6.4). However, AMOs generally referred on the basis of the result of the screening result, rather than carrying out any further investigations themselves.

6.2.4.4 Information on Known Eye Defects

Approximately one in two of the respondents indicated that they had only sometimes or never sufficient information on children with known eye-defects in order to decide whether referral was appropriate (see Table 6.4). This lack of information may be attributable to consent forms that do not facilitate parents to make useful information available, and that information on pre-school findings may not be readily available to the school screening staff.

Table 6.4. Pre-referral process.

	PHNs n=179		AMOs n=44	
		%		%
Visual defects - urgent (n)	(179)		(44)	
Not answered	50	27.9	8	18.2
No distinction made	12	6.7	0	0.0
Cut-off Snellen 6/24 or better	63	35.2	11	25.0
Cut-off Snellen 6/36 or worse	36	19.8	14	31.8
Squint	35	20.1	17	38.6
Unequal vision >2 lines	2	1.1	3	6.8
Other eye pathology	12	6.8	18	40.9
Headache	3	1.7	0	0.0
Parent / teacher concerned	5	2.7	0	0.0
Policy for repeat testing (n)	(179)		(44)	
6/12 in either eye	103	57.5	19	43.2
Worse than 6/12 in either eye	71	39.7	12	27.2
Time interval before retest (mode)	1mth		1mth	
Repeat testing carried out by (n)	(137)		(22)	
AMO	63	46.0	14	63.6
PHN	22	16.0	3	13.6
Either	27	19.7	3	13.6
Unsure	6	4.4	2	9.2
Not relevant	6	13.9	-	-
AMO examines eye pre-referral (n)	(166)		(42)	
Yes	83	50.0	20	47.6
No	54	32.5	22	52.4
Unsure	29	17.5	0	0.0
Sufficient information on known defect to decide on referral (n)	(163)		(43)	
Always/usually	34	16.6	21	48.9
Sometimes	25	15.3	15	34.9
Never	15	9.2	5	11.6
Unsure	4	2.5	2	4.7
Not relevant	85	52.1	0	0.0

6.2.5 Referral Process

6.2.5.1 Referral Destination

The majority of AMOs referred to hospital outpatient departments, with the majority of PHNs referring to an AMO (see Table 6.5). In one community care area (Kildare), the PHNs referred directly to a community ophthalmic physician and AMOs were not involved in the process.

6.2.5.2 Referral Delays

As shown in Table 6.5, delays of one month or longer frequently occurred between intermediate stages in the referral process.

6.2.5.3 Referral Letter

Approximately one in two of the AMOs usually sent their referral letters to the parents, who then had the choice and responsibility to arrange a consultation (see Table 6.5). General practitioners were generally not informed that a referral had been made.

6.2.5.4 Estimated Waiting Times

The estimated waiting time for a hospital outpatient appointment was generally six months or longer (see Table 6.5). Approximately one in four of the AMOs indicated that the waiting time could be up to 12 months or longer. The estimated waiting time for a community ophthalmic physician clinic was generally two months, and less than one month for private ophthalmology practices.

6.2.5.5 Follow-up of Referrals

An individual record of referrals was kept by less than 50% of screening staff. Follow-up of referrals was not generally carried out even where a referral log was maintained (see Table 6.5). Little feedback on the outcome of referrals occurred throughout the referral chain. However, the screening staff were under the impression that approximately 80% of referrals attended the hospital or community ophthalmic physician clinics, 10% went to opticians, 5% attended the private sector, and 5% defaulted.

6.2.6 Staff Training

Where staff had received training in procedures for carrying out the school vision screening, it was usually provided by their own peers (see Table 6.6). A practical demonstration of the techniques was usually included. The training had generally taken place more than five years previously.

Approximately 15% of PHNs and 40% of AMOs indicated that they had not received any specific training in vision screening techniques.

Table 6.5. Referral process for an ophthalmic assessment.

	PHNs		AMOs	
	n=179	%	n=44	%
Usual referral destination (n)	(179)		(44)	
Hospital OPD	4	2.2	42	95.4
Private ophthalmologist	0	0	4	9.1
Community ophthalmologist	32	17.8	3	6.8
Optician service	1	2.8	0	0.0
GP	0	0	0	0.0
AMO/SAMO	130	72.6	0	0.0
SPHN	28	15.6	0	0.0
Delay before referral (n)	(153)		(44)	
2 wks	90	58.8	23	52.3
1 mth	35	22.9	14	31.8
2-4 mths	15	9.8	6	13.6
Longer	4	2.6	0	0.0
Unsure	9	5.9	1	2.3
Usual referral mechanism (n)	(168)		(43)	
Direct to ophthalmologist	14	8.3	16	37.2
Through parents	4	2.4	22	51.2
To AMO	137	81.5	-	-
Other	13	7.8	5	11.6
Test specified on card/ in letter (n)	(155)		(44)	
Always/usually	129	83.2	25	56.8
GP informed of referral (n)	(153)		(44)	
Always/usually	3	2.0	2	4.5
Referral register kept (n)	(165)		(44)	
Yes	65	39.4	22	50.0
Referrals routinely followed-up (n)	(161)		(42)	
Yes	31	19.2	4	9.5
Feedback usually received from (n)	(179)		(44)	
Hospital service	5	2.8	13	29.5
Community ophthalmologists	0	0.0	1	2.3
Private service	0	0.0	22	50.0
AMO/SPHN	30	16.8	-	-
Estimated waiting time (mode)	Mths		Mths	
Public hospital OPD	6		6	
Private ophthalmologist	<1		<1	
Community ophthalmologist	2		2	

Table 6.6. Staff training.

	PHNs		AMOs	
	n=179	%	n=44	%
Training received from (n)	(179)		(44)	
PHN / SPHN	108	60.3	2	4.5
AMO / SAMO	22	12.2	15	34.1
Paediatrician	3	1.7	5	11.4
Ophthalmologist	5	2.8	9	20.5
Other (incl. video)	23	12.8	0	0.0
None	27	15.0	18	40.9
Time since most recent training (n)	(126)		(23)	
<5 years	32	25.4	14	60.9
5-10 years	43	34.1	4	17.4
> 10 years	51	40.5	5	21.7
Demonstration included (n)	(137)		(26)	
Yes	103	75.2	20	76.9

6.2.7 Comments and Suggestions

Respondents were invited to comment on any problems in the delivery of the service that they were aware of and to make suggestions of ways to enhance the quality of the service. Many issues were identified including: the lack of suitable accommodation for screening in the schools; the lack of staff training; the waiting times for an ophthalmology assessment; the lack of nursing staff; the lack of feedback on referrals; and the lack of standardised clinical guidelines (see Table 6.7).

		Total		PHN		AMO	
		n=226	%	n=179	%	n=44	%
Problems	Unsuitable accommodation in schools for vision screening	77	34.5	64	35.8	13	29.5
	Length of waiting period for ophthalmology opinion	63	28.3	45	25.1	18	40.1
	Lack of training	46	20.6	37	20.7	9	20.5
	Lack of feedback / communication / audit / evaluation	40	17.9	26	14.5	14	31.8
	Lack of PHN staff to provide the programme	37	16.6	28	15.6	9	20.5
	Screening too infrequent / first screening too late	27	12.1	24	13.4	3	6.8
	Consent forms not returned / incomplete	26	11.7	23	12.8	3	6.8
	Lack of standardised clinical guidelines	25	11.2	17	9.5	8	18.2
	Long delay until referral by AMO	24	10.8	21	11.7	3	15.9
	No suitable test for illiterate children	13	5.8	12	6.7	1	2.3
	Absenteeism	12	5.4	11	6.1	1	2.3
	Lack of equipment	12	5.4	9	5.0	3	6.8
	Lack of follow-up	9	4.0	7	3.9	2	4.5
	Difficulties in fitting in with school activities / co-operation	7	3.1	7	3.9	0	0.0
	Lack of clerical support	6	2.7	6	3.4	0	0.0
	Lack of parental awareness of the importance of the test	5	2.2	4	2.2	1	2.3
	Re-screen ineffective	2	0.9	2	1.1	0	0.0
	Children not wearing glasses on day of the test	2	0.9	2	1.1	0	0.0
	Lack of information on pre-school findings	1	0.4	0	0.0	1	2.3
	Too many PHNs involved	1	0.4	0	0.0	1	2.3
Suggestions	Provide staff training	85	38.1	64	35.7	21	47.7
	Provide more staff for the screening programme	31	13.9	27	15.1	4	9.1
	Introduce detailed and standardised clinical guidelines	29	13.0	19	10.6	10	22.7
	Nominate a dedicated school team / school nurse	24	10.8	21	11.7	3	6.8
	Increase access to hospital services	20	9.0	15	8.4	5	11.4
	Improve liaison with schools, Department of Education re facilities	18	1.0	15	8.4	3	6.8
	Recruit community ophthalmologists	18	1.0	7	3.9	11	25.0
	Ensure feedback on referrals	17	7.6	10	5.6	7	15.9
	Provide more clerical staff	16	7.2	14	7.8	2	4.5
	Improve consent form, provide more information to parents	15	6.7	12	6.7	3	6.8
	Provide illuminated Snellen boxes for all	14	6.3	11	6.1	3	6.8
	PHNs to refer directly to ophthalmologist	12	5.4	10	5.6	2	4.5
	Introduce audit	11	4.9	8	4.5	3	6.8
	Provide special room in each school	10	4.5	7	3.9	3	6.8
	Introduce more frequent vision screening	9	4.0	9	5.0	0	0.0
	Introduce Sonksen-Silver test for children where appropriate	8	3.6	6	3.4	2	4.5
	Involve school clerk for consent forms	6	2.7	6	3.4	0	0.0
	Refer older children to opticians	6	2.7	0	0.0	6	13.6
	Introduce eyepatches	5	2.2	4	2.2	1	2.3
	Introduce vision screening at earlier age	2	0.9	1	0.6	1	2.3
	Screen in secondary school	2	0.9	2	1.1	0	0.0
	Referral to be sent straight to ophthalmologist	2	0.9	0	0.0	2	4.5
	Introduce carbon forms to facilitate feedback	2	0.9	0	0.0	2	4.5
	Provide a mobile clinic	1	0.4	1	0.6	0	0.0
	Repeat failed test in a health centre	1	0.4	1	0.6	0	0.0
	Introduce colour vision / near vision screening	1	0.4	0	0.0	1	2.3
	Encourage child to be accompanied	1	0.4	0	0.0	1	2.3
	Involve school liaison officer re absenteeism	1	0.4	1	0.6	0	0.0
	Arrange follow-up contact with parents	1	0.4	0	0.0	1	2.3
	Cater for special need children / vulnerable families	1	0.4	1	0.6	0	0.0
	Refer younger children to an orthoptist first	1	0.4	0	0.0	1	2.3
	Provide information on pre-school findings	1	0.4	1	0.6	0	0.0

Section 7 Community Ophthalmology Service in Kildare and Wicklow

Four community ophthalmic physicians were working on a sessional basis in the counties of Kildare and Wicklow (see Table 7.1). A total of 44 sessions per month were held between the two counties. There were 12 new and 12 review appointments scheduled for each three hour clinic session. There was no routine feedback to the referring source.

The case load was a combination of adults and children. Referrals came from PHNs, AMOs, and general practitioners. One community ophthalmic physician reported that approximately 40% of the referrals were from the school vision-screening programme, 30% from developmental assessment clinics, 8% from general practitioners and 10% from opticians.

The clinics varied with regards to the quality of accommodation, and the level of clerical, nursing and orthoptic support provided. The community ophthalmic physicians usually brought their own equipment to the clinic. However, slit lamps were not available in many health centres and were too awkward to be transported easily. There was one orthoptist employed between the areas, and so would be only occasionally present at each ophthalmology clinic. Generally the children were referred to the orthoptist by the community ophthalmic physician.

Most of the clinics sessions were for both adults and children, and such combined clinics were considered unsatisfactory by the community ophthalmic physicians.

All the community ophthalmic physicians reported that they saw many children referred with Snellen 6/9 in either eye. One community ophthalmic physician recommended this level of acuity as a referral criterion.

Three of the community ophthalmic physicians indicated that the system did not allow them to prioritise the referrals. The information provided on the referral card/letters was frequently considered to be insufficient.

A number of suggestions were made including the following: adequate equipment should be available at each clinic session; clerical/nursing should be available to enable prioritisation of referrals and feedback to the referring source; the quality of the data on referrals should be improved; and sessions dedicated for children should be scheduled to coincide with the availability of an orthoptist.

Table 7.1. Community ophthalmic service in Kildare and Wicklow.						
County	Location	Frequency	Nurse present	Secretary present	Orthoptist present	Waiting time (wks)
Kildare	Naas	16/ mth	✓	✓	(✓)	~0-4
	Newbridge	2 / mth	✓	✗	(✓)	~4
	Maynooth	6 / mth	✓	✗	(✓)	~4
	Athy	1/ mth	✓	✗	(✓)	~12
Wicklow	Wicklow	2/ mth		✓	(✓)	~6
	Arklow	4/ mth	✗	✓	(✓)	~6
	Baltinglass	1 / mth	✗	✗	✗	~6
	Bray	3 / mth	✗	✓	(✓)	~6
	Greystones	1 / mth	✗	✓	(✓)	~6
	Shillelagh	2 / mth	✗	✗	✗	~6
	Blessington	1 / mth	✗	✗	(✓)	~6
	Dunlavin	1 / mth	✗	✗	(✓)	~6

✓ = yes (✓) = occasionally ✗ = no

Section 8 Outline of Hospital Ophthalmic Services

The ophthalmic facilities in the hospital sector were examined as part of the overall review of ophthalmic services for children. These services are provided in 11 hospitals in the Eastern Regional Health Authority (ERHA) area, all of which are located in the county of Dublin. Eight hospitals provide a paediatric ophthalmic service.

The level and complexity of the service is variable. Some hospitals provide only a paediatric service, with other hospitals providing ophthalmology services for both children and adults that run side by side. There is no paediatric ophthalmology service provided in three hospitals, namely St. Vincent's Hospital, St. Colmcille's Hospital and St. James' Hospital. The following section provides a broad outline of the scope of the hospital ophthalmic services in the Area Health Boards.

8.1 Methods

In order to review the hospital ophthalmic services the Chief Executive Officer/Secretary Manager of each hospital in the region was contacted and the purpose of the study was outlined. Each hospital was asked to nominate a contact person from the ophthalmic department. Initial discussions were made with the contact persons in order to highlight issues that would be important to explore and to set up a mechanism to review the existing services and resources. From these initial discussions it was apparent that the organisation and provision of services differed from hospital to hospital and that in many cases data would not be readily available in sufficient detail to facilitate the review.

As much of the paediatric ophthalmology workload is of an outpatient nature, the review has concentrated on these services. Each hospital ophthalmology department was visited and a short report was compiled detailing the facilities, the staffing levels, the administration of the service, and the issues pertinent to each department. Particular emphasis was given to the services for children who are referred by the staff of the Area Health Boards.

In order to profile the outpatient caseload (e.g. age groups, sources of the referral, diagnoses), a one-week "snapshot" survey of the outpatient department of each hospital was carried out (see Section 9). In addition, a similar survey was carried out in the accident and emergency department of the Royal Victoria Eye and Ear Hospital (see Section 11). The waiting lists of new referrals of children to the outpatient ophthalmic service were reviewed in each hospital using a standardised approach (see Section 10).

8.2 Hospital Ophthalmic Services in the region

Children are seen at the outpatient clinics in the eight hospitals as shown in Box 8.1.

In the hospitals numbered 1-4, many consultant ophthalmologists hold joint appointments between the hospitals and share services such as investigative and surgical facilities. The hospitals numbered 5-8 function as a Regional Eye Unit, again with many consultants holding joint appointments and sharing investigative and surgical facilities.

Box 8.1. Hospitals with paediatric ophthalmic services.

1. Royal Victoria Eye and Ear Hospital
2. Our Lady's Hospital for Sick Children, Crumlin
3. St. Michael's Hospital
4. The Meath and Adelaide Hospitals incorporating The National Children's Hospital
5. The Mater Misericordiae Hospital
6. The Children's Hospital, Temple Street
7. Beaumont Hospital
8. James Connolly Memorial Hospital

8.3 Organisation of the Hospital Ophthalmic Services

On the north side of the city, the Mater Misericordiae Hospital functions as the Regional Eye Unit with links to the Children's Hospital, Temple Street, Beaumont and James Connolly Memorial Hospitals. The Mater Regional Eye Unit also provides a service for the North Eastern Health Board. Beaumont Hospital provides a national centre for neuro-ophthalmology.

On the south side of the city, the Royal Victoria Eye and Ear Hospital functions as the Regional Eye Unit, and has links with Our Lady's Hospital for Sick Children, Crumlin, St. Vincent's Hospital, St. James's

Hospital, and St. Michael's Hospital. In addition the Royal Victoria Eye and Ear Hospital catchment area includes the populations of Kildare, Wicklow and the Midland Health Board.

8.4 Hospital Ophthalmic Services – the General Issues

The children's ophthalmic service in the Dublin Hospitals (as outlined below) is complex and varied. By the nature of the disease processes of the eye, and requirements for equipment and training, much of the medical care associated with eye disorders is specialist based. The majority of the work in children's ophthalmology is outpatient based and relatively small numbers of children require surgery or inpatient treatment.^(12, 25) Hence, this hospital review was focused on the outpatient services.

A number of recurring themes emerged from discussions with the ophthalmic staff of the hospitals in relation to children's ophthalmology, and the key issues are outlined below.

8.4.1 Age of Referral

Concern was expressed in all hospitals about the age at which children tended to be referred to the ophthalmic service from the school vision screening programme (estimated mean age of seven years). This age was generally considered to be too late in most cases for the prevention of amblyopia. There was a widely held view that initial visual screening should take place at an earlier age, preferably at age 3.5 to 4 years. There was recognition that as there is no system in place at present to accurately identify three year olds, initial screening at school entry (i.e. junior infants at age 4-5) would be preferable to the present system (usually in 1st class at age 7).

8.4.2 Waiting Periods

There was concern expressed as to the length of waiting lists for the assessment of children in the outpatient departments. While all hospitals had a mechanism for seeing urgent referrals, the waiting period for other children was considered to be unacceptably long (up to 14 months in some centres).

8.4.3 Non-attenders

There was considerable concern expressed about the number of non-attenders at the ophthalmic outpatient clinics, which was estimated at up to 20% at some clinics. Clinics were pre-booked in a way to compensate for the non-attenders. In some hospitals, the non-attenders were not offered a second appointment. While non-attendance by some is considered to be self-discharge, it is argued that children do not self-discharge, but are not brought.⁽²⁶⁾ In an Irish context non-attendance has been shown to be associated with time and cost of travel, distance from the clinic, transport availability and social class.^(26, 27) In one study in a rural setting, the establishment of local outreach ophthalmic clinics reduced the non-attendance rate from 20% to 5%.⁽²⁶⁾ There is anecdotal evidence that non-attendance is also associated with the length of a waiting list. If an appointment is made for one year hence, the appointment may be long forgotten by the day of the clinic, patients may make appointments elsewhere or the problem may not be deemed to be important by the parents and they do not attend.

8.4.4 Community Ophthalmic Physician Service

The view was frequently expressed that many children referred to the hospital ophthalmic service do not require an assessment in a specialist centre located in a hospital. This was particularly applied to the referrals from the school screening service, as the vast majority of these children are referred for the assessment of suspected refractive errors. For referrals from the region, an ophthalmologist and an orthoptist in a hospital setting currently carry out secondary vision screening. It was suggested that secondary screening should ideally be carried out by a community ophthalmic physician, working with an orthoptist.

As can be seen with the data in Section 9, approximately half of the referrals are for pre-school children with suspected squints. Many of these children have pseudosquints. However, children referred with suspected squint require follow-up at an ophthalmic clinic until the ophthalmologist is satisfied that binocular visual development is satisfactory and that a squint is not present, creating a significant workload of patients requiring regular review at hospital clinics. It was suggested that this group could again be more effectively managed by a community ophthalmic physician, working with an orthoptist.

It was suggested that these clinics should ideally be located in a community setting. For reasons referred to above, local access to clinics should also help to lower the non-attendance rates. Few children require further investigation or surgery for their condition and most do not require all the services available in a hospital setting. It was suggested that hospital outpatient department waiting times would be considerably shortened by the management of these children in the community. Direct links should be established between the community and hospital service, so that investigative and surgical facilities are readily available and that the community service does not become isolated. It was also suggested that all hospitals should be fully aware of the community service provided both in Dublin and nationally, so that referrals could be made back to the local service when appropriate e.g. following surgery.

It was pointed out that in areas outside Dublin, access to community ophthalmic physicians has added greatly to the quality of the local ophthalmic service.

8.4.5 Referrals from the School Screening Programme

In some hospitals, there was a perception that there was a significant proportion of unnecessary referrals (i.e. false positives) being referred from the school screening programme. It was recognised that in any screening programme there are a percentage of false positives. However, the review and development of staff training, vision testing techniques and policies in the community were welcomed.

8.4.6 Dedicated Child Clinics

The ophthalmic services generally provide combined adult and child outpatient clinics. It was considered preferable to have clinics dedicated for children, with waiting and clinic areas appropriate for examining children, together with accommodation for family members.

8.4.7 Orthoptic Service

In some ophthalmic clinics there is no orthoptic service available on-site at the same time as the ophthalmologist is present. As a result, patients requiring the services of an orthoptist are referred to another hospital for this service or required to make an appointment for the orthoptic clinic on another day. It was generally agreed that the quality of the ophthalmic service for children (and adults) would be enhanced by the provision of joint ophthalmic and orthoptist clinics.

It was pointed out that in centres where an orthoptist is available, he/she provides a valuable role in monitoring the vision and treatment of children between the ophthalmic visits and provides a source of advice and encouragement for both children and their parents. Furthermore, orthoptists also provide a "fast-track" mechanism for assessing and prioritising new referrals.

8.4.8 Nursing Support

It was considered that nurses provide an invaluable service at ophthalmic clinics. At children's clinics nurses can provide a valuable source of information, and advice for parents, particularly when children are undergoing investigations, treatment or surgery. The role and staffing levels of nurses varied throughout the hospitals, from no nurse available for the outpatient clinics to the nursing staff having responsibility for vision testing and much of the administration of the ophthalmic department.

8.4.9 Secretarial Support

In general it was felt there was a shortage of clerical support in the ophthalmology services and much of the clerical time was occupied with administration of appointments. As a result, in many centres reports were not routinely sent to the referring doctor, unless the problem was of a serious nature or required ongoing care. However, feedback was considered an important feature of a quality service.

8.4.10 Health Board Optical Scheme

There was considerable uncertainty in the hospitals regarding the administration and requirements of the Health Board's optical scheme. It was also suggested that the administration of the scheme varies between community care areas. The necessity of the Health Board "stamping" an ophthalmology prescription before lenses can be dispensed by an optometrist was seen as unhelpful to parents and bureaucratic. It was suggested that the establishment of a direct link between Health Board administration and the optometrists for refund of spectacles/repairs should be explored.

8.5 The Children's Hospital, Temple Street

The Eye Unit at the Children's Hospital, Temple Street is located in the recently constructed outpatient department. The Unit provides both medical and surgical ophthalmic services for the inner city and county Dublin as well as the North-Eastern Health Board. It also provides an acute service for premature infants from the National Maternity and Rotunda hospitals in Dublin. The Unit is linked to the Regional Eye Unit at the Mater Hospital.

The outpatient department consists of two equipped main examination rooms. There is a third smaller examination room, if required. The orthoptic department uses an interlinked room. There is also a small office for paperwork etc. There are six inpatient beds and eight daycase beds/week for use by the ophthalmic service. These beds are not in a designated eye unit, but are located in the surgical and daycare wards.

The staffing levels of the service are shown in Box 8.2. There is limited clerical support for the outpatient and inpatient work.

There are nine outpatient clinics per week, including specialist clinics for contact lens wearers, children with severe visual impairment, cataract and glaucoma patients and a clinic for children born prematurely.

Approximately 200 children are seen at the outpatient clinics each week. There are two primary care clinics per week to deal with semi-urgent referrals.

Box 8.2. Temple Street Hospital ophthalmic department staffing levels.

- 2 Consultant ophthalmologists.
- 1 Fulltime registrar.
- 1 Part-time registrar.
- 1 Part-time senior house officer.
- 1 Fulltime nursing sister.
- 1 Fulltime nurse.
- 1 Part-time nurse.
- 1 Fulltime orthoptist.
- 1 Part-time orthoptist.

The orthoptic service runs in conjunction with the ophthalmic outpatient schedule and patients may see both the orthoptist and ophthalmologist at the one outpatient visit. In addition, the orthoptist monitors children if required at clinics run by the orthoptic service. This would include children with suspected squints, those undergoing occlusion therapy ("patching"), and children with significant refractive errors.

Nurses take an active role in the management and function of the ophthalmology clinics.

All referral letters are screened and appointments are prioritised accordingly. Approximately 2-10 new patients are seen at each clinic, depending on the nature of the clinic and the number of medical staff available.

According to data supplied by the ophthalmic department, 53% of new referrals in 1998 were from the Area Health Boards, 25% were from general practitioners, 10% were from the maternity hospitals and 12% were from other sources including the accident and emergency department (A&E), community ophthalmic physicians, inpatient consults and centres for children with special needs. Approximately 30-40 appointments are scheduled per clinic. In addition, inpatients are assessed at the clinics when possible. About one third of patients do not attend their clinic appointment.

Children who attend the A&E department with a significant eye problem are seen at the outpatient department. A registrar from the Mater Hospital provides an out-of-hours "on call" service.

There are three ophthalmic theatre sessions per week and children are admitted on Monday morning or Wednesday for surgery on Monday or Wednesday. The waiting list for routine (non-urgent) surgery is approximately nine months.

8.6 Beaumont Hospital

The ophthalmic department in Beaumont Hospital is linked to the Mater Regional Eye Unit. Within the hospital, there is close liaison between the ophthalmic and the neurosurgical departments. The ophthalmic department functions as the national centre for neuro-ophthalmology.

The staffing of the ophthalmic department is shown in Box 8.3.

Box 8.3. Beaumont Hospital ophthalmic department staffing levels.

- 1 Consultant ophthalmologist
- 3 Consultant locum sessions with cover from the consultant ophthalmologist
- 1 Part-time registrar
- 1 Part-time senior house officer
- 1 Fulltime ophthalmic nurse
- 1 Fulltime secretary
- 1 Part-time orthoptist

The outpatient facility consists of a small waiting area, three interlinked examination rooms, rooms for orthoptics, laser treatment and visual field examination and offices. In addition there is a room where minor procedures such as removal of cysts and ectropion repairs are performed. Adult patients who require minor procedures are booked into the minor procedure clinic in Beaumont, which takes place once a week. All other patients, both daycase and inpatient are referred to the Mater Hospital for surgery. There is one inpatient bed available to the Eye Unit.

All referral letters are screened and paediatric referral problems that appear urgent are fast-tracked for an assessment by the orthoptist. Following this assessment, the child can be referred urgently for an ophthalmic opinion if required.

There are nine clinics per week in the outpatient department including a neuro-ophthalmology clinic for children and adults combined. In addition there is one laser clinic and one minor procedure clinic for adults per week. Inpatients account for a significant proportion of the referrals to the ophthalmic department, due to the large neuro-surgical unit located in the hospital. Most of these patients are seen in the outpatient department. Approximately 18-40 patients are booked for each clinic, depending on the number of doctors present.

Patients who attend A&E with an ophthalmic problem are referred to the Mater Hospital if further specialist assessment or treatment is required. Patients attending A&E with a neuro-ophthalmic problem are assessed at Beaumont when possible.

8.7 Royal Victoria Eye and Ear Hospital

The Royal Victoria Eye and Ear Hospital was established in the early part of the nineteenth century and is the largest single site devoted to both ophthalmic and ear, nose and throat services in the country.

The catchment area includes south Dublin, counties Kildare and Wicklow and the Midland Health Board region. The hospital has links with St. James Hospital, St. Vincent's Hospital, Our Lady's Hospital for Sick Children, Tallaght Hospital, and St. Michael's Hospital.

The staffing levels of the ophthalmic service are shown in Box 8.4.

There are 32 clinics held on a weekly basis and two additional clinics for new adults and children are held every month.

All referral letters are screened and clinic appointments are scheduled depending on the nature and urgency of the problem. New appointments are made on the receipt of the referral letter. The outpatient department has recently been computerised. Previously, there were difficulties in locating appointments if misplaced by the patient and significant time was spent by the clerical staff checking old chart numbers, compiling clinic lists etc. Approximately 20-45 appointments are scheduled per clinic, depending on the sub-specialty involved. There are also a small number of appointments allocated to "directs" i.e. patients that have been seen in the casualty department in the

Box 8.4. Royal Victoria Eye and Ear Hospital ophthalmic department staffing levels.

- 11 Consultant ophthalmologists (most with joint appointments with the linked hospitals).
- 7 Registrars, including one employed in the A&E department.
- 7 Senior house officers
- 1 Fulltime orthoptist
- 2 Part-time orthoptists
- 7 Ophthalmic nurses

previous week and require urgent assessment. All new patients are scheduled for the beginning of the clinic, so that if investigations are required they can be performed on the same day. Non-attendance occurs to a significant degree, and clinics are booked to compensate for this factor. Clinic lists are only available for six months in advance, and therefore patients are required to telephone for an appointment if the review appointment date is outside this timeframe.

There are six clinic rooms in the outpatient department with the capacity to see two patients at a given time (consultant and registrar/senior house officer). There are two treatment rooms where minor procedures are performed e.g. sutures/cysts may be removed. There is also a visual fields room and two laser rooms.

The hospital runs an A&E service for both ophthalmic and ear, nose and throat disorders. In 1998 there were 30,257 patients who required an ophthalmic assessment. The A&E service operates 24 hours per day, seven days a week. There is a full-time registrar attached to A&E Monday to Friday, aided by a senior house officer. During busy times a second senior house officer may be called to A&E to provide cover. A senior house officer provides medical cover during the night and at weekends. A casualty sister is in charge of A&E and has a staff of 10 nurses. Clerical cover is provided from 8.30am to 5pm by a full time officer aided by a second clerical officer from 10am to 2pm Monday to Friday.

The A&E department consists of an office/reception area, a triage room where a staff nurse takes a preliminary history and checks visual acuity, an assessment room where up to three patients may be assessed at any one time, an examination room where further assessment may be carried out and a procedure room. Most patients are seen within two hours of checking in. Though no official figures are available it is thought that approximately 25% of patients are referred to A&E by general practitioners, with the majority of the remainder being self-referrals. The department is not computerised and all recording and filing is manually based. If a patient has previously attended the outpatient department, the chart is pulled and the casualty details are recorded in the chart. The lack of computerisation and information systems means that considerable time is spent on filing, and recording patient details. Though no figures are available, it is understood that some patients are using A&E in an attempt to by-pass the outpatient waiting list. However, in so far as is possible only patients requiring urgent assessment are slotted in as extras to the outpatient clinics.

There are 20 day case beds at present which have recently been upgraded. There are also 60 inpatient beds for ophthalmology, which are undergoing refurbishment. There are approximately 7,000 admissions per year. The estimated waiting time for surgical procedures is approximately six months for children and one year for adult patients. The waiting period may be longer for some highly specialised surgical procedures.

8.8 James Connolly Memorial Hospital

The ophthalmic department at James Connolly Memorial Hospital is a small unit with two outpatient clinics per week. There is one ophthalmic clinic for children held once a month and the other clinics are for adults. There is no ophthalmic surgery provided at the hospital

The clinics are staffed by a consultant ophthalmologist and a staff nurse from the outpatient department. An orthoptist from the Mater Hospital attends the children's clinic and children that require orthoptic assessment in between their ophthalmic appointments are seen at the Mater Hospital.

The clinics are held in a single room in the outpatient department at the hospital. There is no separate room for the orthoptist to work at the paediatric clinic. Approximately 15-20 patients are seen at each clinic with approximately five new patients scheduled in each session.

8.9 St. Michael's Hospital

St Michael's Hospital, DunLaoghaire provides an ophthalmic service for a catchment area from Wicklow to Sandyford. There is no ophthalmic surgery provided at the hospital.

The clinics are staffed by a consultant ophthalmologist. An orthoptist provides one clinic per week which is held on a different day due to lack of clinic space. Hence, children who require orthoptic assessment must

visit on a separate day for this service and there is a waiting list for the orthoptic service. The general clerical staff provides support for the outpatient clinics.

The special role of nurses at ophthalmic clinics is recognised, however, no nursing staff are provided for the ophthalmic clinics at the hospital. The clinics are held in a single room in the outpatient department.

The hospital provides three ophthalmic outpatient sessions per week. Approximately 12-18 appointments are booked for each session, which includes four new patient appointments and the remainder are for reviews. Most of the appointments are made following a phone call from the patient. All referral letters are reviewed by the consultant. Appointments are assigned according to priority as judged from the referral letters or phone call from the referring doctor.

Non-attendance is not perceived to be a major problem. It is estimated that approximately two thirds of clinic attenders are children and that most new patients are children. At present the clinics are combined adult and child sessions.

A&E patients that require further assessment and treatment are referred to the Royal Victoria Eye and Ear Hospital or the outpatient clinics at St. Michael's Hospital as deemed appropriate by the casualty officer. Children requiring surgery are referred to Our Lady's Hospital, Crumlin or the Eye and Ear Hospital.

8.10 The Adelaide and Meath Hospitals, incorporating The National Children's Hospital (Tallaght Hospital)

An ophthalmic service is provided at the hospital. At present the ophthalmic department primarily serves an adult population as prior to the amalgamation of the three hospitals patients of The Children's Hospital, Harcourt Street were seen at the Royal Victoria Eye and Ear Hospital. However, since the service has commenced at Tallaght Hospital, children have been referred to the service. Whilst the number of children referred to date has been small, demand for the service in Tallaght is increasing.

The staff of the ophthalmic department is shown in Box 8.5. Clerical support is provided as required. There is no orthoptist service and patients requiring an orthoptic assessment are referred to the Royal Victoria Eye and Ear Hospital.

Box 8.5. Tallaght Hospital ophthalmic department staffing levels.

- 1 Consultant ophthalmologist.
- 2 Community ophthalmic physicians providing 1 outpatient session per week.
- 2 Part-time ophthalmic nurses.

In the ophthalmic department there are two examination rooms and an office. There are two further rooms available for use by an orthoptist and for visual field testing, which are not yet operational.

Patients requiring surgery are referred to Our Lady's Hospital, Crumlin or the Royal Victoria Eye and Ear Hospital, depending on the age of the patient and the nature of the problem. A&E services for patients requiring specialist assessment and treatment are provided by the Royal Victoria Eye and Ear Hospital.

The development of the service to meet the needs of the catchment area of Tallaght Hospital is seen as a priority.

8.11 Our Lady's Hospital for Sick Children, Crumlin

The ophthalmic department at Our Lady's Hospital provides a service for the paediatric population of the hospital's catchment area and a service for both premature and term babies at the Coombe Hospital. In addition there is a considerable workload generated by referrals from other departments within the hospital. These include patients undergoing inpatient and outpatient assessment by other specialties.

The ophthalmic outpatient department at Our Lady's Hospital has undergone recent refurbishment and now consists of a separate waiting area, two interlinked examination rooms with examination equipment, a separate room used for instillation of drops and for holding charts. There is a room for use by the orthoptist and a room where visual field testing is performed.

Staff levels are outlined in Box 8.6. Appointments are generally made on receipt of the referral letter. All referral letters are screened by the consultant and appointments are allocated according to priority. The orthoptist at the hospital assesses referrals that appear urgent and these can be fast-tracked for an ophthalmology opinion when necessary.

Box 8.6. Our Lady's Hospital, Crumlin, ophthalmic department staffing levels.

- 1 Consultant ophthalmologist.
- 2 Medical ophthalmic sessions per week.
- 1 Part-time registrar (1 session per week).
- 1 Full-time orthoptist.
- 1 Part-time ophthalmic nurse.
- 1 Part-time secretary.

There are 9 orthoptic and 5 ophthalmic clinics per week.

There is one theatre session per week for ophthalmic patients at Our Lady's Hospital. There are 240 paediatric beds in the hospital. Beds are not assigned solely for use by the ophthalmic service, but are allocated as required. The hospital is fully equipped for all intraocular surgery.

The majority of referrals to the service are from the Area Health Boards for children with suspected squints and children referred from the school screening service for assessment of defective vision. It is felt that a community ophthalmic physician working with an orthoptist could manage these referrals more efficiently and effectively.

8.12 Mater Misericordiae Hospital

The Mater Hospital functions as a Regional Eye Unit for the north side of the city and is linked to The Children's Hospital Temple Street, James Connolly Memorial Hospital Blanchardstown and Beaumont Hospital.

There are 10 outpatient clinics per week in addition to other clinics for laser treatment, biometry, orthoptics and low visual aids. Approximately 40 patients are scheduled per clinic, with lower numbers for clinics where procedures are performed. Staffing levels are shown in Box 8.7.

In the outpatient department there is a large examination room with the capacity for four patients to be assessed at any given time. In addition there is a smaller examination room for single examinations. There is a reception area where testing of visual acuity is carried out by the nurses and a room where minor procedures may be carried out. In addition there are rooms for the orthoptic department, teaching of students, ultrasound examinations, fluorescein angiography and visual field examinations. There is a small waiting area for the patients and a reception area.

Box 8.7. Mater Misericordiae Hospital ophthalmic department staffing levels.

- 6 Consultant ophthalmologists.
- 3 Registrars.
- 5 Senior house officers.
- 1.5 Lecturers.
- 1 Full-time orthoptist.
- 3 Full-time ophthalmic nurses.

The department also houses a small A&E department, which operates Monday to Friday 9am–5pm. Patients are referred to the unit directly by their general practitioners, or by the main A&E of the hospital. The unit consists of a single small examination room and shares the reception area of the outpatient ophthalmology department. Outside of normal working hours patients are assessed by the on-call team, usually on the ophthalmology ward.

There is a single 32 bed ophthalmology ward in the hospital, which incorporates the ophthalmology day care facilities. As far as possible children who require admission are accommodated in a single room, which allows their parents to sleep over if required. Paediatric admissions are infrequent. There are 11 theatre sessions per week and admissions for surgery may be prioritised if appropriate.

Most of the patients at the ophthalmology clinics are adults with the exception of some highly specialised ophthalmic disorders referred to consultants with a special interest in paediatric ophthalmology.

Section 9 Hospital Outpatient Survey

Data on the demographic and clinical profiles of children attending the ophthalmology services were generally not available. To place the ophthalmology services for children in the context of the totality of the hospital services, especially with regard to referrals from the pre-school and school health service of the Area Health Boards, a number of standardised 'snapshot' reviews were carried out.

The throughput of the outpatient departments of all the hospitals is described in this Section, the waiting lists in Section 10, and the throughput at the accident and emergency department of the Royal Victoria Eye and Ear Hospital is described in Section 11.

9.1 Methods

As part of the overall review, routine hospital statistics were sought. In the snapshot survey, a sample of attendances at the ophthalmology outpatient clinics over a one week period in the Summer/Autumn of 1999 was obtained. A chart review was carried out using a standardised questionnaire (see Appendix 2). In the centres where larger numbers of patients were seen, data were collected on random samples of approximately 200 patients. The records departments in the hospitals agreed to keep aside the relevant charts for the period. Daily visits were made to the hospitals where large numbers of charts were involved, as it was not practical to store so many charts over the full study period.

The information recorded included the patient chart number, county of residence (postal area in Dublin), date of referral, date of the first appointment at the ophthalmology clinic, source of referral, referral diagnosis, the main active ophthalmology diagnosis, and the outcome. The medical card status and whether or not the patients were seen by the orthoptist on the day of the visit was recorded. Ophthalmology notes in most units were kept separately and thus it was relatively easy to access the information required. In some hospitals the ophthalmology notes were in the general outpatient notes or mixed with general inpatient notes and so data were not so readily accessible.

9.2 Results

9.2.1 Annual Activity Data

In order to quantify the throughput of each hospital, the total numbers of patients seen in the ophthalmology outpatient clinics during 1999 were provided by the hospitals (see Table 9.1). These data do not reflect the complexity of the cases or the numbers of individual patients seen (i.e. reviews are counted as a visit) but also provide an indication of the relative activity level of the hospitals and a context for the more detailed information originating from the snapshot survey.

Table 9.1. Annual throughput of the hospital ophthalmology outpatient departments, 1998.			
Hospital	New patients	Review patients	Total
Royal Victoria Eye & Ear	5,539	26,933	32,472
Beaumont	1,550	3,935	5,485
Our Lady's, Crumlin	1,118	1,651	2,769
Temple Street	2,125	7,107	9,232
Mater*	9,647	11,863	21,510
St. Michael's **	429	1,237	1,666
Tallaght	n/a	n/a	n/a
JCM Blanchardstown	n/a	n/a	n/a
* Includes 6,516 A&E patients. ** Over 8.5 month period			

9.2.2 Demography

In the two paediatric hospitals (Temple Street and Our Lady's, Crumlin), approximately 32% of the children were aged under four years of age, and 68% were school aged children (see Table 9.2). In the general hospitals, approximately 20% of patients were under 13 years of age.

Overall, 77% of patients resided in the Area Health Boards. As expected, there was a greater proportion of patients from outside the Area Health Boards in the hospitals that received tertiary referrals.

Medical card status was poorly recorded. Out of 650 charts studied, there was no record of the medical card status in 45%. Twenty six percent of patients were classed as Category 1 patients and 29% were classified as Category 2 or 3 patients.

9.2.3 Source of Referral

Approximately 22% of patients were referred by the Board's community care staff. Other departments within the hospitals accounted for the largest proportion of referrals (33%), including A&E and specialities such as neurology and endocrinology (e.g. diabetics). Twenty two percent of patients were referred by general practitioners and relatively few were referred by community ophthalmic physicians (see Table 9.2).

	Crumlin		Temple St		Eye & Ear		Beaumont		JCM		Mater		St Michaels		Tallaght	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total no. charts examined	58		198		204		116		9		153		31		38	
Age group (years) (n)	(55)		(182)		(200)		(112)		(9)		(152)		(30)		(37)	
<4	19	34.5	56	30.8	4	2.0	3	2.7	-	-	1	0.7	1	3.3	2	5.4
4-12	32	58.2	108	59.3	24	12.0	21	18.8	8	88.9	15	9.9	19	63.4	4	10.8
13-19	4	7.3	18	9.9	9	4.5	10	8.9	1	11.1	5	3.3	3	10.0	1	2.8
20-60	-	-	-	-	71	35.5	32	28.6	-	-	50	32.9	-	-	17	45.9
60+	-	-	-	-	92	46.0	46	41.0	-	-	81	53.4	7	23.3	13	35.3
Address area (n)	(58)		(198)		(204)		(116)		(9)		(153)		(31)		(38)	
ERHA area	50	86.2	146	73.7	171	83.8	91	78.4	9	100.0	93	60.8	30	96.8	35	92.1
Other	8	13.8	52	26.3	33	16.2	25	21.6	-	-	60	39.2	1	3.2	3	7.9
Referral source (n)	(54)		(163)		(164)		(88)		(8)		(119)		(27)		(32)	
Health Board	26	48.1	64	39.2	8	4.9	17	19.3	5	62.5	4	3.4	18	66.7	2	6.3
Other department	12	22.2	19	11.7	82	50.0	40	45.5	-	-	40	33.5	1	3.7	24	75.0
GP	9	16.7	41	25.2	32	19.5	16	18.2	3	37.5	37	31.2	4	14.8	4	12.5
Optician	-	-	3	1.8	19	11.6	3	3.4	-	-	8	6.7	2	7.4	2	6.2
COP	1	1.9	8	4.9	9	5.5	01	1.1	-	-	15	12.6	-	-	-	-
Other	6	11.1	28	17.2	14	8.5	11	12.5	-	-	15	12.6	2	7.4	-	-
Diagnoses (n)	(53)		(197)		(204)		(113)		(9)		(153)		(31)		(38)	
Squint	14	26.5	78	39.6	20	9.8	16	14.3	5	55.6	14	9.2	4	12.9	1	2.6
Refractive error	19	35.8	33	16.8	8	3.9	14	12.4	3	33.3	2	1.3	14	45.3	1	2.6
Macula, retina, uveal tract	-	-	-	-	42	20.6	18	15.9	-	-	48	31.4	5	16.1	21	55.3
Lid/tear	4	7.5	14	7.1	24	11.8	12	10.6	-	-	12	7.8	1	3.2	4	10.5
Glaucoma	-	-	1	0.5	37	18.1	11	9.7	-	-	21	13.7	1	3.2	2	5.3
Conjunctiva/cornea	-	-	12	6.1	26	12.7	1	0.9	-	-	9	5.9	1	3.2	1	2.6
Cataracts	3	5.7	5	2.5	24	11.8	4	3.5	-	-	28	18.3	1	3.2	3	7.9
Other	13	24.5	54	27.4	23	11.3	37	32.7	1	11.1	19	12.4	4	12.9	5	13.2
Outcome (n)	(58)		(197)		(204)		(116)		(9)		(151)		(31)		(38)	
Review	39	67.2	174	88.3	144	70.6	89	76.7	6	85.7	111	73.5	23	74.2	26	68.4
Discharged	5	8.6	11	5.6	26	12.7	13	11.2	1	14.3	14	9.3	2	6.5	3	7.9
List for surgery	3	5.2	9	4.6	17	8.3	5	4.3	-	-	14	9.3	1	3.2	4	10.5
Investigate	2	3.4	-	-	12	5.9	5	4.3	-	-	2	1.3	1	3.2	2	5.3
Unclear	9	15.5	3	1.5	5	2.5	4	3.5	2	-	10	6.6	4	12.9	3	7.9

In the paediatric hospitals (Temple Street and Our Lady's Hospital, Crumlin), a much higher proportion (42%) of the referrals were made by staff of the Area Health Boards. However, it was not possible to identify the source of referral or to find the original referral letter in 19% of the records. This was particularly the case in older charts or where the original records may have been microfilmed. In some hospitals the source of referral was indicated in the case notes at the first clinic visit.

9.2.4 Clinical Profile and Outcome

In the paediatric hospitals, squints accounted for 37% of the visits and refractive errors for 20%. In the other hospitals, 11% of the visits were for squints and 8% for refractive errors (see Table 9.2). Some patients, particularly in the older age groups, had two or three ophthalmic disease processes. In these patients the main diagnosis for that visit was selected.

Approximately 20% of patients seen at the clinics were new patients, with the remainder coming for return visits. Similar figures were found at the paediatric and other clinics.

The majority of patients (77%) were asked to make a review appointment. Review appointments were requested for greater than six months in advance in approximately half of the cases. Almost 10% of patients were discharged from the clinics following the visit, and approximately 6% were listed for surgery following the outpatient visit.

Section 10 Hospital Waiting List Survey

To place the ophthalmology services for children in the context of the totality of the services, the hospital ophthalmology waiting lists for children under 16 years of age are reviewed in this Section.

10.1 Methods

A review of the paediatric outpatient waiting lists was carried out in the summer/autumn of 1999 by the staff of Temple Street, Crumlin, Royal Victoria Eye and Ear, and the Mater Hospitals. A standardised questionnaire was used (see Appendix 3). The referral letters of all children under 16 years of age were studied. It was not feasible to obtain comprehensive information for the other four hospitals. In some centres patients bring the letter of referral on the day of the first appointment.

All the hospitals were requested to provide the next available date for a routine appointment at the outpatient clinic for a new patient. All hospitals see urgent referrals without delay at the request of the referring doctor.

10.2 Results

10.2.1 Waiting Times and List Sizes

The approximate waiting times for routine new ophthalmology outpatient appointments are shown in Table 10.1. The two paediatric hospitals (Temple Street Hospital and Our Lady's Hospital, Crumlin) had the largest waiting lists.

Due to differences in the number of clinic sessions, staffing levels, level of complexity of the ophthalmology unit etc. between the hospitals, waiting times do not correlate with list sizes.

10.2.2 Demography

Approximately half the children (48%) on the outpatient waiting lists were of school age (4-12 years), and half (46%) were pre-school children (< 4 years), as shown in Table 10.2. Children aged 13-16 years accounted for 6% of the referrals on the waiting lists. Most children (92%) on the waiting lists were residents in the Area Health Boards.

10.2.3 Source of Referral

The Area Health Boards accounted for the largest proportion (73%) of the new referrals to the ophthalmology services, with 17% being referred by their general practitioner (see Table 10.2). Referrals from community ophthalmic physicians accounted for only 2% of referrals.

Referrals from other departments within the hospitals were likely to account for a larger proportion than that reflected in the study, as many of these children are either accident and emergency patients or inpatients and would be seen without delay and therefore are not reflected on a waiting list for outpatient referrals. In addition, Area Health Board referrals are generally of a non-urgent nature and therefore account for a higher percentage of the outpatient waiting list.

10.2.4 Clinical Profile

Suspected squints and defective vision accounted for 90% of the referral problems on the waiting list (49% and 41% respectively). Both squints and suspected squints create a sizeable workload as most of these referrals tend to be followed up until approximately four years of age, or until it is established that no squint is present and that binocular vision is developing normally. Referrals from the school vision screening

Table 10.1. Waiting times for the next routine paediatric referral to the ophthalmology outpatient service (as of Oct 1999) and list sizes (summer - autumn 1999).

Hospital	Waiting time (mts)	List size
Beaumont	12	45
Crumlin	10	223
James Connolly Memorial	5	12
Mater	10	28
Royal Victoria Eye & Ear	6	188
St. Michael's	8	192
Temple Street	13	892
Tallaght	6	NA

programme are primarily for suspected refractive defects. If a refractive error is confirmed, the child also tends to be reviewed regularly until visual development is mature.

10.2.5 Waiting Times

Over 50% of children were found to be waiting in excess of three months and in some cases for up to 14 months (see Table 10.2).

Table 10.2. Profile of patients on ophthalmic waiting lists of Our Lady's Hospital, Crumlin, Temple Street Hospital, the Royal Victoria Eye and Ear Hospital, and the Mater Hospital.										
	Crumlin		Temple St		Eye & Ear		Mater		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total no. on list	223		892		188		28		1331	
Age group (n)	(214)		(859)		(187)		(28)		1288	
<4	97	45.3	406	47.3	55	29.4	5	17.9	563	43.7
4-12	107	50.0	405	47.1	110	58.8	11	39.3	633	49.2
13-19	10	4.7	48	5.6	22	11.8	12	42.9	92	7.1
Address area (n)	(223)		(892)		(188)		(28)		(1331)	
ERHA area	210	94.2	817	91.6	173	92.0	20	71.4	1220	91.7
Other	13	5.8	75	8.4	15	8.0	08	28.6	111	8.3
Referral source (n)	(221)		(884)		(187)		(27)		(1319)	
Health Board	145	65.6	670	75.8	143	76.5	06	22.2	964	73.1
Other department	19	8.6	14	1.6	-	-	-	-	33	2.3
GP	50	22.6	137	15.5	28	15.0	07	26.0	222	16.8
Optician	-	-	-	-	02	1.1	01	3.7	03	0.2
COP	1	0.5	16	1.8	07	3.7	10	37.0	34	2.6
Other	6	2.7	47	5.3	07	3.7	03	11.1	63	4.8
Referral Problem (n)	(222)		(891)		(187)		(23)		(1323)	
Squint	101	45.5	454	51.0	62	33.2	06	26.1	623	47.1
Refractive error	06	2.7	10	1.1	13	7.0	01	4.3	30	2.3
"Defective vision"	88	39.6	367	41.2	88	47.1	10	43.5	553	41.8
Lid/tear	17	7.7	16	1.8	14	7.5	02	8.7	49	3.7
Conjunctiva/cornea	04	1.8	05	0.6	01	0.5	01	4.3	11	0.8
Other	06	2.7	39	4.4	09	4.7	03	13.0	57	4.3
Waiting Times – months (n)	(218)		(881)		(184)		(28)		(1311)	
<3	147	67.4	364	41.3	71	38.6	14	50.0	596	45.5
3-6	61	28.0	320	36.3	99	53.8	05	17.9	485	37.0
6+	10	4.6	197	22.4	14	7.6	09	32.1	230	17.5

10.3 Orthoptic Clinics

It was evident from the case notes that most children, particularly the younger children, had been assessed by an orthoptist at some stage and that the orthoptist played an essential role in monitoring vision and progress of children undergoing treatment.

The orthoptists in some hospitals have a role in the triage of new paediatric referrals so that serious disorders are fast-tracked to the ophthalmology clinics. In many cases children are monitored between their ophthalmology visits by the orthoptist, thereby reducing the need for more frequent ophthalmology appointments. Orthoptists also function as an important source of information and encouragement for both children and their parents at the outpatient clinics.

There were two types of orthoptic clinic - those that ran side by side with the ophthalmology clinic and those that were run solely by the orthoptist for children who require orthoptic monitoring or assessment. In most hospitals there is the facility for children to be seen by both an orthoptist and ophthalmologist or by one or other depending on what is appropriate on the day. In St. Michael's Hospital children must attend the orthoptist on a different day and children attending Tallaght hospital who require orthoptic services are referred to the Royal Victoria Eye and Ear Hospital (see Section 8).

Section 11 Royal Victoria A&E Survey

The accident and emergency department (A&E) of the Royal Victoria Eye and Ear Hospital provides a 24-hour service. Patients are either referred or can self-refer to A&E (see Section 8). There were 30,257 ophthalmic attendances to A&E of the hospital in 1998.

To place the ophthalmology services for children in the context of the totality of the services, the throughput (adults and children) of A&E is described in this Section.

11.1 Methods

A review of attendances at A&E of the Royal Victoria Eye and Ear Hospital during a five day period (Monday through Friday) was carried out in the summer of 1999. A standardised questionnaire was used (see Appendix 2). Data were obtained from the casualty card and included the patients age, area of residence (county or postal area in Dublin), the source of referral, the diagnosis, and the outcome.

11.2 Results

11.2.1 Demography

Data were collected on 411 patients during the five day period. Children did not account for a significant proportion of patients, with the majority being adults aged 20-30 years (see Table 11.1). Most patients (84%) were residents in the region. The male:female ratio was 60%:40% .

11.2.2 Source of Referral

The majority of patients were self referrals (67%), and 22% were referred by their general practitioners (see Table 11.1). A minority was referred by opticians (4%). There were no Area Health Board referrals.

11.2.3 Clinical Profile and Outcome

Conjunctival or corneal disorders, usually due to acute infection or inflammation, accounted for 38% of the diagnoses (see Table 11.1). A similar proportion of patients (35%) presented with traumatic injuries to the eye, including the presence of foreign bodies. Lid and lacrimal disorders, including lid cysts, accounted for the majority of the remainder of patients. A normal examination was recorded for 4% of patients.

Most patients (66%) were discharged following examination and treatment (see Table 11.1). Thirty three percent of patients were requested to return to A&E again for review, usually within 10 days. Eight percent of patients were referred directly to the outpatient department when appropriate. It was generally stated on the casualty card whether patients were being routinely referred to the outpatient department or as an urgent case, so minimising any tendency of bypassing the outpatient waiting list by visiting A&E.

Table 11.1 Profile of patients attending A&E, Royal Victoria Eye and Ear Hospital.

	No.	%
Total no. of patients	411	
Age group (n)	(364)	
<4	03	0.8
4-12	10	2.7
13-19	25	6.9
20-29	100	27.5
30-39	67	18.5
40-49	50	13.7
50-59	51	14.0
60+	58	15.9
Address area (n)	(411)	
ERHA area	347	84.4
Other	64	15.6
Referral source (n)	(398)	
Self referral	269	67.6
Other hospital	24	6.0
GP	88	22.1
Optician	17	4.3
COP	-	0.0
Health Board	-	0.0
Diagnoses (n)	(408)	
Conjunctiva/cornea	156	38.2
Trauma	144	35.3
Lid/lacrimal	55	13.5
Other	35	8.6
Normal	18	4.4

***Section 12* Children's Optical Scheme**

Under the 1970 Health Act, health boards are obliged to make optical appliances available for children attending national primary school in respect of a defect noticed in the school health examination (see Section 1). The scheme is referred to as the "Optical Scheme".

The implementation of the scheme has been administered locally by the community care areas under the Eastern Health Board structure. There would appear to be no written guidelines available locally to assist the staff in providing the service. Statistics on the scheme are collated at regional level.

The Area Health Boards pay up to £29.90 towards a pair of spectacles with £7.20 towards plastic lenses (£3.60 per lens). Contact lenses are reimbursed where these are considered necessary by an ophthalmologist, and are ordered through the Medical and Surgical Appliances Section. Limitations in the content of the financial information systems prevented detailed analysis on the overall cost of the scheme.

To review the implementation of the children's optical scheme, the area administrators of the 10 community care areas were requested to describe how the scheme is administered in his/her area and to outline any problems that have been encountered with the scheme.

12.1 The General Procedure

In order to avail of the scheme, parents have to present a prescription from an ophthalmologist at the headquarters of the community care area where the primary school the child attends is located, irrespective of the child's home address. The stated reason for this is that the records of the school vision screening programme are kept in the community care area where the school is located. However, there would not appear to be any link made between the data held in the child health records and the optical scheme.

The claim is checked to ensure that the prescription is from an ophthalmologist who is registered with the Medical Council. An order for spectacles is then issued which the parents bring to an optician of their choice. The optician will be reimbursed subsequently.

The provision of spectacles under the scheme applies to children attending national primary school only. However, given the long waiting times for an ophthalmic assessment, the scheme is delivered with some degree of flexibility. For example, if a child is screened in 6th class who subsequently is prescribed glasses while in secondary school, he/she may avail of the scheme.

12.2 The Local Procedures

There is some variation between the community care areas with regard to the maximum number of spectacles/lenses that can be ordered on the basis of one prescription, varying from one per 12 month period plus one repair, two per 12 months, three per 12 months or two per 18 months. In some community care areas, a maximum number of spectacles/lenses is not specified.

In some areas an order can be based on an optician's prescription provided that the first prescription was made by an ophthalmologist. In other areas, an optician's prescription is never accepted.

In some areas, a second and subsequent order can be made from the original prescription for up to two years later, with a new ophthalmologist's prescription being requested subsequently.

Records are not computerised in any community care area. Some areas retain carbon copies or orders according to date of issue, others by the surname of the child. Copies of the prescription are kept in some areas.

12.3 Locally Perceived Difficulties and Suggestions

The mechanism for the provision of spectacles or lenses under the optical scheme can pose further hurdles for parents in the potentially lengthy process that is triggered off by vision screening in schools.

It was mentioned by most respondents that some parents can be unaware of their entitlements under the scheme and the procedure that should be followed. As a result, they may first go to their local area headquarters rather than to the area in which the school is located, they may present the prescription to the optician first, or attend an optician instead of an ophthalmologist. As a result, parents can undertake unnecessary journeys, and disappointment can result. It was suggested that order forms should be processed through the headquarters of the community care area in which the child resides.

The administrative staff of the community care area are often the "first port of call" for the parents whose children have been referred from the school vision screening programme. These staff indicated that they are "constantly" receiving complaints about the long waiting list for ophthalmologist's appointments.

The detailed implementation of the optical scheme for children varies between the community care areas, raising questions about the equity of the service. Area administrators have received complaints from the public, public representatives, and the ophthalmic services to the effect that the optical scheme appears to involve "unnecessary bureaucracy". The suggestions included clarification of the entitlements under the scheme (for all involved) and simplification of the process.

It was suggested that administration of the scheme should be standardised across the region and that entitlements under the scheme and the procedures from the point of referral to the ophthalmic service to the obtaining of spectacles/lenses should be clarified for the parents and those responsible for the administration of the scheme.

Furthermore, it was pointed out that simplification of the procedure for obtaining an order under the scheme, together with improved access for parents, would improve the quality of the service. In particular, the need for parents to visit the appropriate Area Health Board office for 'certification' of the ophthalmologist's prescription prior to the spectacles being dispensed by the optometrists was viewed as an unnecessary barrier in the provision of the service.

Section 13 Discussion, Conclusions & Recommendations

The last major report on hospital ophthalmology services was produced in 1981.⁽⁵⁾ Since that time, the demands on the ophthalmic services, which are primarily hospital based in the Eastern Regional Health Authority (ERHA) area, have risen in line with the increasing population served by these hospitals. Unlike other parts of the country, community based ophthalmic services have not developed within the Dublin region.

In 1998, a Steering Group was established to:

- ❑ Review the ophthalmic services for children in the region.
- ❑ Make recommendations for the development of a quality service.

The school vision screening programme and the downstream ophthalmic assessment and treatment services have been major sources of debate for some time. The key areas of discussion included the apparently wide variations in screening procedures, the appropriateness of referral, and long waiting times for ophthalmic assessments. Hence, the review focused on the school vision screening service and the associated specialist services in the region. It is appreciated that the issues and recommendations would also be relevant to the pre-school services and have a knock-on impact on post-primary and the adult ophthalmic services.

The school vision screening programme was reviewed in detail. All staff involved in the programme were provided with an opportunity to participate and to comment on the service. The hospital ophthalmic services were also examined, particularly with regard to the outpatient services and the waiting lists for assessment. There was excellent cooperation with the review from the staff in the community and in the hospitals. The Project Team met the professional bodies involved, and this process contributed significantly to our understanding of the issues involved and in identifying the best way forward.

Throughout the review the commitment of staff in the provision of services was apparent, as was their willingness to bring about further improvement through innovation and collaboration in a local and regional context. Such an attitude bodes well for the future of the service and provides a solid foundation for developing an integrated service of the highest quality.

13.1 School Vision Screening

13.1.1 Discussion

Vision screening in primary schools is a common feature in child health surveillance programmes internationally. The legislative basis for the "health examination and treatment service" for national schools in this country is enshrined in the Health Act 1970. The legislation is not prescriptive. Over time, the approach to vision screening came to vary significantly between and within health boards.

Recently published guidelines (see Section 5) generally recommend that vision acuity should be screened at the beginning, middle and end of primary school. The guidelines vary with regard to the exact screening ages, tests and procedures that should be used. One of the underlying difficulties in determining the optimum programme is the relative absence of information on the epidemiology of visual defects, on the validity of screening tests, and on the effectiveness of interventions. However, in reviewing the literature one can detect an evolution in thought that identifies a number of common quality elements:

- ❑ The vision screening programme should be standardised.
- ❑ Use of detailed best practice guidelines that take cognisance of local issues (such as referral pathways).
- ❑ Use of age-appropriate tests (such as an illuminated Snellen at 6 metres and the Sonksen-Silver at 3 or 6 metres).
- ❑ Standardised referral criteria (e.g. acuity 6/12 or worse in either eye).
- ❑ Training of staff providing the screening service.
- ❑ Short waiting times for specialist assessment.
- ❑ Ongoing quality review of the entire service.

There is wide variation in the recommendations on screening for colour vision defects. Of the four guidelines reviewed, three recommend colour vision screening, with one recommending it be done for boys only, and two

for boys and girls. The recommended test to be used also varied. In marked contrast, one guideline recommends that “no attempt should be made to screen for colour vision defects in primary school”. In this regard, it is important to note that colour vision screening would not appear to meet the major criteria for a screening programme (see Section 3), and there would appear to be little or no evidence available that would actually support its value. Indeed, the process may only serve to label some children as “abnormal” and trigger unnecessary concern due to the genetic factors involved. Colour vision screening is not routinely carried out in the region at present. In light of the many other priorities and the importance of developing new services underpinned by a sound evidence base, there would appear to be little justification in introducing such a programme at this point in time. Furthermore, as career guidance primarily generally takes place in secondary rather than in primary school, it would appear to be more appropriate that checking for colour vision defects would be an element in a comprehensive career guidance programme.

As described in Section 6, there is a notable lack of uniformity in almost every aspect of vision screening throughout the region. This variation may reflect the local evolution of child health services in response to locally perceived priorities and resource availability in the context of the overall range of community care based services. The programme is managed independently within each community care area. The majority of staff screen 1st and 5th class. Screening is generally carried out by the public health nurses, most of whom are involved in vision screening to a greater or lesser extent. Referrals to the ophthalmic services are generally made by the area medical officers.

The key problems areas identified in the review include:

1. Comprehensive and up-to-date guidelines for vision screening are not available.
2. There is little standardisation of the vision screening programme across the region
3. The target classes for screening vary widely within the region. In nine of the community care areas children are screened twice, and in only one area the children are screened on three occasions.
4. Vision is generally assessed using the illuminated Snellen test, but there is wide variation in how the test is used and interpreted. Other tests are used that are no longer considered appropriate (such as single letter tests). The Sonksen-Silver test is not used as the alternative test in any area.
5. Screening is often carried out in the classroom or school corridor, sometimes with other children present.
6. The eye covering techniques generally used may allow the child to “peep” so that poor vision acuity is missed.
7. Acuity of 6/12 or worse in either eye is the usual cut-off point for referral. However, children with essentially ‘normal’ vision (i.e. 6/9 in either eye) or those already under the care of an ophthalmologist continue to be screened and referred.
8. Significant delays in the referral process exist e.g. between screening by the public health nurse and referral by the area medical officer, followed by long waiting times for specialist assessment.
9. Training of screening staff is limited, and is generally provided by peers.
10. Information systems are limited, and generally consist of files of school cards stored in a variety of ways. There is no mechanism for linking the findings at screening to the eventual outcome of the ophthalmic examination. Furthermore, there is no system in place to permit ongoing quality review of the service.
11. Communication and feedback between the service providers (public health nurses, area medical officers, ophthalmologists, and general practitioners), the parents, and schools is very limited.
12. Written information about the purpose, process and limitations of vision screening is generally not available for parents at any stage. Hence, parents may have unrealistic expectations about the service, which may be further compounded by the length of waiting times for specialist ophthalmic assessment.

13.1.2 Conclusions

The Area Health Boards devote significant resources to the school vision screening programme. A detailed review of the programme in the context of the specialist hospital services has not been carried out in the past. The programme is generally being carried out along traditional lines, and without the use of detailed guidelines and a process of ongoing quality review. Hence, the programme may not achieve its full potential. The current process may also contribute to some of the difficulties ‘downstream’, where a degree of over-referral may lead to longer waiting times for specialist assessment and the delayed initiation of treatment.

13.1.3 Recommendations

It is acknowledged that many of the following recommendations will involve significant changes in current service provision. A phased and coordinated development of the vision screening and specialist ophthalmic service in the community is therefore envisaged.

It is recommended that:

1. The school vision screening programme should be standardised across the region.
2. Comprehensive best practice guidelines should be developed by staff responsible for the service and in cooperation with the relevant professional groups and in light of the recommendations of the "Best Health" report. Local requirements, such as referral pathways, should be included. The guidelines should be reviewed and updated in light of new information.
3. Vision screening should occur on three occasions - at the beginning, middle and end of primary school. The initial screen should be moved from 1st class to senior infants (5-6 year olds) over a one to two year period, with a view to screening in junior infants as logistical factors allow and in light of the evolving evidence base. The second screen should occur in 2nd class (7-8 year olds) and the third screen in 6th class (11-12 year olds).
4. Visual acuity should be assessed with the illuminated Snellen test at 6 metres using charts meeting the required standard (e.g. British Standard BS 4274, 1968) or the Sonksen-Silver test (at 6 or 3 metres) if required. No other test should be used unless for research purposes.
5. Eye covering techniques to prevent "peeping" should be used (e.g. use of hypo-allergenic eye patches, one per child).
6. Routine referral criteria should be Snellen 6/12 acuity (or Sonksen-Silver 6/12 or 3/6) or worse in either eye. If unequal vision less severe than 6/12, retest on another day (i.e. before completing the vision screening programme in the school) and refer if above criteria met.
7. Any child undergoing assessment for educational under-achievement or other school problems should have a visual acuity check, but should be classified separately from the routine screening described in 3 above.
8. Parents should be informed of the outcome of the screening test (whether "normal" or if referral is indicated).
9. Screening staff should refer directly to the specialist ophthalmic service.
10. Children currently under the care of the ophthalmic service should not be included in the routine vision screening programme (e.g. date of next specialist appointment should be sought on the consent form), and this feature should be explained to parents.
11. All screening staff should undergo initial and ongoing theoretical and practical training, with accreditation, as agreed between the service providers and the relevant professional groups. Training should include paediatric, specialist ophthalmic and orthoptic input. The programme should include: the development of normal vision and the significance of reduced vision; the concept of the "sensitive period"; the epidemiology of the target visual defects; the general principles of screening programmes; the validity of vision screening tests; history taking; practical training in vision screening techniques using the Snellen and Sonksen-Silver tests; the recording of the test result; referral criteria; quality review procedures (i.e. clinical audit); and the roles of each discipline involved in the provision of community and hospital based eye care.
12. Vision screening should be carried out by a relatively small number of public health nurses specialising in vision screening (perhaps as part of a wider school health service) who should develop a close working relationship with the specialist ophthalmic services (see below). The continuing professional education, including the training of staff to achieve qualifications such

as the Higher Diploma in Ophthalmology for Nursing, should be facilitated, together with an expansion of their role in the provision of specialist ophthalmic services (see below).

13. A standard parental consent form should be used to elicit relevant information to assist the vision screening and referral process, and include consent for the sharing of data within the context of the quality review process of the programme. A description of the process, purpose, and limitations of the programme, and all entitlements under the scheme should be included.
14. The minimum accommodation requirements for conducting vision screening, together with an explanation of the programme, should be specified and made available to the schools. Where special arrangements may be required, this should be discussed and agreed locally.
15. A standardised referral form should be used and include: the child's name, address, birth date; class and school name/code; relevant history; unique identifier (once available); referrers name, title and address; result and type of test and distance used; name/address of the general practitioner (GP); and authorisation for entitlements under the scheme. Copies should be sent to the GP and to the person responsible for the local review of the programme. A multipart form should be used to assist communication and feedback within the service. The manual system should be designed with the intention of developing an electronic information system in the future.
16. Quality review of the programme should be ongoing. The screening process questionnaire (see Appendix 1) should be used as a template as part of a rolling survey. One public health nurse and an area medical officer with a special interest in child health surveillance should be appointed to oversee the programme locally, in liaison with the Child Health Coordinator. The following data should be recorded for each school class (see Appendix 4): target population; number of exclusions; number screened; and the number referred. The outcome of each referral should be monitored to include: date referred; acuity level; test used; date of specialist assessment; and the outcome (diagnosis, discharged, recalled etc.). The later information should be person based and be part of an integrated child health information system. Acuity checks carried out for educational or other reasons should be classified separately.
17. The ophthalmic services for pre-school children, special need groups, and children in the post-primary school age group should be reviewed.

13.2 Specialist Ophthalmic Services

13.2.1 Discussion

Ophthalmic services at varying levels of complexity are provided at 11 hospitals in the region and children are seen at eight of these hospitals. The largest number of referrals of children originate from the preschool and school child health screening services.

There is a broad consensus amongst the hospital staff that most of the children could be more effectively and efficiently managed in the community by a community ophthalmic physician working directly with an orthoptist. Furthermore, there is a consensus that the age of the initial school vision screening should be moved closer to school entry rather than in the third school year.

The majority of children are assessed at the paediatric hospitals, but children also account for up to 20% of outpatient attendances at ophthalmic clinics at the general hospitals. Most children are referred by Area Health Board staff. Squint and refractive errors account for the majority of diagnoses. Most children are recalled for a review visit and relatively few are listed for surgery. The majority of children require the services of an orthoptist.

There are approximately 1,500 children awaiting a first ophthalmic outpatient consultation at hospitals in the region. The Area Health Board staff account for 73% of these referrals, and general practitioners for 17%. Approximately 50% of children are of pre-school age and 50% are of school age, with almost 50% referred for the investigation of a suspected squint and 50% for defective vision. The majority of children require the services of an orthoptist. The waiting time for outpatient assessment is generally well in excess of three

months and over 12 months at some clinics. In the context of the age group when vision is developing and maturing, the length of a school term, and the importance of earlier intervention for some vision defects, such waiting periods for specialist assessment are considered inappropriate. The large numbers of non-attenders, which may be largely due to the lengthy waiting times, is considered to be a major problem and most outpatient clinics are overbooked to compensate for this.

Other difficulties identified by the hospital staff included the quality of facilities for provision of a paediatric service, for example with children and adults being seen in combined clinics in most centres, and the lack of orthoptic, nursing and clerical support, and equipment at some clinics. Information systems were generally underdeveloped. Feedback to the referring source is acknowledged as sub-optimal, and is largely explained by the lack of clerical support.

There is uncertainty regarding the local administration of the Children's Optical Scheme and the apparent complexity of the process whereby prescriptions for lenses are required to be stamped by the administrative headquarters before the lenses are dispensed by an optometrist.

In Kildare and Wicklow, a community ophthalmic physician service is provided on a sessional basis. Public health nurses generally refer directly to the locally accessible service. However, the clinics tend to lack the necessary range of specialist equipment, the orthoptist may not be present at the same time as the community ophthalmic physician, and clerical and nursing support is limited.

13.2.2 Conclusions

Within the region a wide range of specialist ophthalmic services are provided, and are primarily hospital based. Children account for a significant proportion of the patients seen, and are primarily referred by the pre-school and school health service of the Area Health Boards. Long waiting lists and lack of a child focused and community based specialist ophthalmic service pose challenges in the provision of optimum care.

Integration of the vision screening programme with a community based ophthalmic and orthoptic service, working in close cooperation with the hospital services and optometrists, would provide the means of achieving a service of the highest quality throughout the region. To allow local flexibility in meeting priority needs, the "special association" between the community and hospital environments is not defined prescriptively but a two session/week hospital attachment of staff is suggested as a general guideline for promoting a seamless service across both environments. The required resources for developing the community ophthalmic services in the region are shown in Box 13.1.

It is envisaged that these developments would take significant pressure off the hospitals and allow a greater focus on secondary and tertiary referrals. Hence, the suggested staffing levels should permit a significant degree of flexibility in the overall management of routine pre-school and school referrals, GP referrals, special need groups (such as diabetics), whilst encouraging continuing professional education of staff across the community and hospital environments. It is considered essential that ongoing quality review should be an integral part of the entire service.

Box 13.1. Estimation of staff resources for developing a community based ophthalmic service in the region (in addition to the existing service in Kildare and Wicklow). COP = community ophthalmic physician.

No. of births in the Dublin area (~ remain relatively constant)	~ 18,000/yr	
Presuming 10% referral rate from the vision screening programme	~ 1,800/yr	
Screening at 4 ages (9 mth devel + start, middle, end of primary school)	~ 7,200 referrals/yr	i.e. 1,800×4
Each referral leads to an average of 2 outpatient visits per child	~ 14,400 visits/yr	
Presuming 90% will attend COPs (10% to hospital services)	~ 12,960 visits/yr	
Each COP sees 12 children/session X 8 sessions/wk* X 45 wks/yr	~ 4,320 visits	
Total COP staff requirement	~ 3 (WTE)	i.e. 12,960÷4,320
Associated support (on a 1:1 ratio)		
Orthoptists	~ 3 (WTE)	
Nursing staff	~ 3 (WTE)	
Clerical staff	~ 3 (WTE)	

*~2 additional sessions/week for hospital attachment/GP referrals/special need groups etc. as agreed locally

13.2.3 Recommendations

The following recommendations are made with a view to developing a child-centered ophthalmic service of the highest quality. However, together with the existing hospital and community based ophthalmic services, it should also provide the basis for the development of a community based service for priority groups of adults. It is acknowledged that the recommendations will involve significant changes in current service provision.

Refocusing of the screening programme is expected to exert a short to medium term downstream impact in terms of inpatient and surgical waiting lists, and this factor should be included when planning the development of the service. A phased and coordinated development of the vision screening and specialist ophthalmic service in the community is therefore envisaged.

It is recommended that:

1. An integrated community ophthalmic physician service should be developed in the region initially employing an 3 whole time equivalent staff.
2. The community ophthalmic physician service should be complemented by an equivalent orthoptic service (i.e. 3 whole time equivalent staff at senior level) so that both disciplines can work directly together.
3. The community ophthalmic physician service should be supported by an appropriate level of clerical staff (i.e. three full time equivalent staff) and nursing staff.
4. The community ophthalmic service should be provided in well equipped and staffed clinics that are geographically accessible to the community (e.g. two or three locations in each Area Health Board).
5. The community ophthalmic service should be primarily based in the community, and have a special association with the hospital ophthalmic service as agreed between the Area Health Boards and the hospital(s). The attachment of staff to a teaching hospital should provide an environment for fostering continuing professional education in paediatric/adult ophthalmology.
6. The community ophthalmic service in Kildare and Wicklow should be regularised in light of developments in the Dublin region.
7. The community ophthalmic service should be primarily focused on meeting the needs of children, and special need groups (e.g. diabetics) as determined locally.
8. The community ophthalmic service should develop a close working relationship with the vision screening service, and assist in their continuing professional education.
9. The community ophthalmic service should develop, in liaison with the vision screening, general practice and hospital services, detailed practice guidelines to complement the vision screening guidelines (e.g. clarifying the role of orthoptists in "screening" referrals, discharge and review criteria, management of waiting lists) .
10. The specialist ophthalmic service should provide feedback to the referrer and the general practitioner, and include as a minimum: the diagnosis; the acuity in each eye; the best corrected acuity in each eye; and spectacle correction (as appropriate).
11. A community ophthalmic physician within each Areas Health Board should be responsible, in partnership with his/her colleagues, for developing service plans and carrying out quality reviews of the service as and when required.
12. Waiting times for routine initial specialist ophthalmic assessment should be less than three months, and ideally should take place within the same school term.

13. Ophthalmic assessment and treatment waiting lists should be standardised and managed according to agreed guidelines in the region.
14. Specialist ophthalmic clinics should be available separately for children and adults.
15. Clinic appointments should be timed so that long waiting times are avoided, and children and accompanying siblings should have access to facilities for play, toileting and changing, as well as facilities for infant feeding.
16. The administration of the Children's Optical Scheme should be standardised and simplified to provide a more accessible and seamless service e.g. the one (multipart) form should incorporate all referral, specialist assessment, prescription and dispensing details.
17. A leaflet should be available for parents and service providers that fully describes the entitlements and procedures under the scheme.
18. The system of payment of optometrists should be harmonised with similar schemes as appropriate, whilst facilitating the financial monitoring of the scheme and be compatible with other health information systems (e.g. allow the tracking of individual clients).
19. Quality review of the specialist service should be ongoing, and be integrated with that of the vision screening service. The development of simple yet effective information systems that support and integrate the clinical and administrative aspects of the service are considered essential, including the making of referrals and appointments, the management of waiting lists, and feedback. The use of unique identifiers to track individuals from referral, assessment, and outcome should be of particular value in this regard.
20. An Ophthalmic Services Forum should be established to assist the development of an integrated and coherent community ophthalmic service for children in region, to foster a culture of quality in the provision of service (e.g. through "best practice" committees, staff training etc.), the development of information systems, and the promotion of research initiatives.

Section 14 References

1. Department of Health. Shaping a healthier future: A strategy for effective health care in the 1990s. Dublin: Stationery Office; 1994.
2. Study Group appointed by the Minister for Health. The Child Health Services. Dublin: Stationery Office; 1967.
3. Butler J. Child Health Surveillance in Primary Care: A Critical Review. London: HMSO; 1989.
4. Denyer S, Thornton L, Pelly H. Best Health for Children. Developing a partnership with families. A report to the Chief Executive Officers of the Health Boards of Ireland on behalf of the Directors of Public Health.; 1998.
5. Comhairle na n-Ospideal. Development of Hospital Ophthalmic Services - a discussion document. Dublin: Comhairle na n-Ospideal; 1981.
6. Crookes G. Dublin's Eye and Ear. The making of a monument. Dublin: Town House; 1993.
7. Report of Working Group. Community Ophthalmic Physicians. Dublin: Department of Health; 1981.
8. Report of the Third Joint Working Party on Child Health Surveillance. Health for all children. 3rd ed. Oxford: Oxford University Press; 1996.
9. Saw S, Katz J, Oliver DS, Chew SJ, Cha TK. Epidemiology of myopia. *Epidemiol Rev* 1996;18:175-87.
10. Snowdon SK, Stewart-Brown SL. Preschool vision screening. *Health Technology Assessment* 1997;1(8).
11. Sperduto RD, Seigal D, Roberts J, et. al. Prevalence of myopia in the United States. *Arch Ophthalmol* 1983;101:405-7.
12. Tongue AC. Refractive errors in children. *Paediatr Clin North Am* 1987;34:1424-37.
13. McKeown T. Validation of screening procedures. In: Screening in medical care published for the Nuffield Provincial Hospitals Trust, London. Oxford: Oxford University Press; 1968. p. 1-13.
14. Rose G, Barker DJP. Epidemiology for the uninitiated. Screening. *BMJ* 1978;1:1417-8.
15. Editorial, Edwards PJ, Hall DMB. Screening, ethics and the law. Ensure that subjects know what's going on. *BMJ* 1992;305:267-8.
16. British Standards Institution. Test charts for determining distance visual acuity. BS:1968. London: British Standards Institution; 1968.
17. Brophy G. School vision screening study: comparison of validity of Snellen and Keystone tests [Thesis for Membership of the Faculty of Public Health Medicine of the Royal College of Physicians]. Dublin; 1993.
18. Sonksen PM, Silver J. The Sonksen-Silver Acuity System. Windsor: Keeler Ltd. incorporating Hamblin instruments.
19. Brophy G, Houlihan M. The Sonksen-Silver vision screening test - a test method suitable for screening school entrants. In: Summer Scientific Conference, Faculty of Public Health Medicine; 2000; Dublin; 2000.
20. O'Regan R. Vision screening - a review of children's vision screening in the Republic of Ireland in North Eastern Health Board: North Eastern Health Board; 1996.
21. Report of a joint working party. Ophthalmic services for children. London: The Royal College of Ophthalmologists and The British Paediatric Association; 1994.
22. Report of a Joint Working Party. Health needs of school age children. London: British Paediatric Association; 1995.
23. Canadian Task Force on the Periodic Health Examination. The Canadian Guide to Clinical Preventive Health Care. Ottawa: Canada Communication Group; 1994.
24. US Preventive Services Task Force. Guide to clinical preventive services. 2nd ed. Baltimore: Williams & Wilkins; 1996.
25. Lavrich JB, Nelson LB. Diagnosis and treatment of strabismus disorders. *Paediatr Clin North Am* 1993;46:737-52.
26. O'Regan R. Nonattenders at community ophthalmic clinics in Cavan, Ireland [Thesis submitted for Diploma in Community Health]. Dublin; 1995.
27. McGlade K. Referrals to hospital by general practitioners. *BMJ* 1988;297:1246.

Review of School Vision Screening in the Eastern Health Board Region



EXPLANATORY COMMENT

1. As part of the review of the ophthalmology services for children, the purpose of the survey is to describe the process of school vision screening and referral throughout the region.
2. The survey is anonymous.
3. All area medical officers and public health nurses who are involved in the routine school vision screening programme are asked to participate – whether they carry out the test themselves or are involved in the referral process.
4. There is no need to review any records etc. to obtain exact data for completing the questionnaire – best guess estimates of some figures are all that are required.
5. The process of assessing children at clinics based on parental concern etc. are not part of this survey – only the routine screening programme is being studied.
6. Based on your own experience, your comments and suggestions are being sought so as help identify how the quality of the service might be further improved.
7. Completion of the questionnaire may take about 20 minutes.
8. Tick the boxes ✓ as appropriate.
9. It would be very much appreciated if the questionnaire (original – not a photocopy) could be returned in a sealed envelope marked 'Vision Screening Survey', via your senior area medical officer or superintendent public health nurse, by Wednesday May 19th, for forwarding to:

SCHOOL VISION SCREENING SURVEY

1 Are you an ☐AMO ☐SAMO ☐PHN ☐Sen PHN 2 In which community care area do you work CCA

3 In which of the following classes is vision screening carried out in your area: (tick more than one if appropriate):

☐jun. infants ☐sen. infants ☐1st ☐2nd ☐3rd ☐4th ☐5th ☐6th class ☐older ☐unsure

4 Which of the following is routinely done as part of the school vision screening in your area:

- visual acuity test ☐ yes ☐ no ☐ unsure
- test for colour vision defect ☐ yes ☐ no ☐ unsure → if yes in which class ☐ boys ☐ girls ☐ both
- near vision test ☐ yes ☐ no ☐ unsure
- test for detection of squint ☐ yes ☐ no ☐ unsure
- re-screening for unequal ☐ yes ☐ no ☐ unsure → if yes how soon after 1st screen
- are children with a known eye-defect or spectacles included in the screening? ☐ yes ☐ no ☐ unsure

5 In a year how many (school) vision screening tests would you personally carry out (your best estimate)

6 When testing visual acuity do you examine the eyes ☐ separately only ☐ together only ☐ both ways

7 Which of the following do you use to cover the eye that is not being tested? (tick one or more as appropriate)

☐card/paper held by child ☐card/paper held by other ☐child's hand ☐other's hand ☐eye patch ☐other

(if other specify)

8 In which of the following do you carry out the vision screening: (tick one or more as appropriate)

School: ☐ room with other children ☐ separate room ☐ corridor Health centre: ☐ room ☐ corridor

'Snellen' chart

9 Do you use a Snellen chart for testing visual acuity ☐ always ☐ usually ☐ sometimes ☐ never (if so skip to next Q)

● State the name of the Snellen chart you use - please check on the chart

● Do you carry out this test with another person ☐ always ☐ usually ☐ sometimes ☐ never

● Do you use an illuminated chart ☐ always ☐ usually ☐ sometimes ☐ never

● Is a distance of 20 feet (6 metres) available ☐ always ☐ usually ☐ sometimes ☐ never

● If 20 feet is not available, how do you proceed

● With a Snellen chart, what referral criteria do you apply: (tick only one)

☐ 6/9 in either eye or worse ☐ 6/9 in both eyes or worse ☐ 6/12 in either eye or worse

☐ 6/12 in both eyes or worse ☐ 6/18 in either eye or worse

Other vision tests

10 Do you use the Keystone test ☐ always ☐ usually ☐ sometimes ☐ never (if so, skip to next Q)

● If using this test, what referral criteria do you apply: (tick only one)

☐ 6/9 in either eye or worse ☐ 6/9 in both eyes or worse ☐ 6/12 in either eye or worse

☐ 6/12 in both eyes or worse ☐ 6/15 in either eye or worse

11 Do you use the Stycar/ single letter test ☐ always ☐ usually ☐ sometimes ☐ never (if so, skip to next Q)

● What distance do you use for this test (in feet)

● What referral criteria do you apply

● Do you carry out the test with another person ☐ always ☐ usually ☐ sometimes ☐ never

12 Do you use number charts ☐ always ☐ usually ☐ sometimes ☐ never

13 Do you use the Sonksen-Silver test ☐ always ☐ usually ☐ sometimes ☐ never

14 Do you use any other vision screening tests ☐ yes ☐ no (If yes specify)

Pre-referral

15 What visual defects would you act on immediately / urgently

--	--	--	--

16 In your area is the school vision test routinely repeated or checked after the following results:

- 6/12 in either eye 1 ☐ yes 2 ☐ no 3 ☐ unsure
- Worse than 6/12 in either eye 1 ☐ yes 2 ☐ no 3 ☐ unsure
- If re-tested, what would be the usual time interval between test and re-test
- If re-tested, is it carried out by 1 ☐ AMO 2 ☐ PHN 3 ☐ either 4 ☐ unsure 5 ☐ not relevant

17 Before referral to an ophthalmologist does an AMO routinely perform an eye examination 1 ☐ yes 2 ☐ no 3 ☐ unsure

--

18 Do you have sufficient information on children with a known eye defect to decide on referral?

- 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ unsure 6 ☐ not relevant

--

Referral process

19 To which of the following do you refer children who 'fail' the vision screening test:

- a hospital OPD 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- a private ophthalmologist 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- a community ophthalmologist 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- an optician service 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- to the GP 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- to an AMO/SAMO 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never
- to a senior PHN 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never

20 Following the 'failed test' how soon would you usually refer on a child to the next stage in the referral process

- (e.g. PHN to AMO, or AMO to ophthalmology service etc.) within: 1 ☐ 2 wks 2 ☐ 1 mth 3 ☐ 2-4 mths 4 ☐ longer 5 ☐ unsure

--

21 Which of the following best describes your referral process: (*tick only one*)

- 1 ☐ I forward the card to an AMO or senior PHN
- 2 ☐ I send a letter to an ophthalmologist requesting an appointment and I also notify the parents
- 3 ☐ I send a letter to the parents requesting that they arrange an appointment with an ophthalmologist
- 4 ☐ I arrange the actual appointment with an ophthalmologist and I then inform the parents of the date
- 5 ☐ other (*specify*)

--

22 Do you usually specify in the referral letter or chart the type of screening test that that was used

- 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ unsure

--

23 Is the GP informed of the referral

- 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ unsure

--

24 In order of frequency, which clinic(s) or hospital(s) do most of the referrals from your area attend (*your best estimate*)

- 1) 2) 3)

25 Once referred, what is your estimate of the usual waiting time for routine vision referrals to be seen

- At a public hospital OPD (*specify if weeks or months*)
- Community ophthalmology service (if available locally) (*if used*)
- Private ophthalmology clinic (*if used*)

Review process

26 Apart from the school/clinic card, do you keep a record of your vision referrals (e.g. in a note book) 1 ☐ yes 2 ☐ no

--

27 Do you follow-up your vision referrals 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never

--

28 Do you usually receive any feedback (report) of your vision referrals from:

- Hospital ophthalmology service 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ not used
- Community ophthalmology service 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ not used
- Private service 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ not used
- Area medical officer 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ not used
- Senior PHN 1 ☐ always 2 ☐ usually 3 ☐ sometimes 4 ☐ never 5 ☐ not used

29 What percentage of children you refer go to: (*your best estimate*)

- Public ophthalmology service% ● Private clinics% ● Opticians% ● Nowhere (default)%

Training

30 Have you ever received specific training in school vision screening from: *(tick one or more as appropriate)*

1 ☐ PHN or SPHN 2 ☐ AMO or SAMO 3 ☐ paediatrician 4 ☐ ophthalmologist 5 ☐ other 6 ☐ none

● If so, indicate the year of your most recent vision screening training

● If so, did that training contain a practical demonstration of vision screening techniques 1 ☐ yes 2 ☐ no 3 ☐ unsure

31 What do you see as the main problems/difficulties in delivering a quality school vision screening and secondary care ophthalmology service?

32 What suggestions do you have on how the service might be improved?

Thank you for completing this questionnaire.

Appendix 2

Ophthalmic OPD process review

Name of Hospital

☐1 New referral waiting list ☐2 Daycase waiting list ☐3 Inpatient waiting list ☐4 OPD snapshot ☐5 A&E snapshot

Personal data

1 Consultant (initials)

2 Patient chart/clinic no.

(Essential that a chart or file reference number is specified)

3 Year of birth

or age yrs mts

4 Sex

☐1 Male ☐2 Female

5 County of residence

If Dublin, include postal area or N/S Co. Dublin

6 Medical card

☐1 Yes ☐2 No ☐3 Unsure

Referral data

7 Date of original referral

(as on referral letter)

8 Date first seen

9 Referral source

- ☐1 Health board (public health nurse, AMO)
☐2 Community ophthalmologist
☐3 General practitioner
☐4 A&E department
☐5 Optician
☐6 Other department within the hospital
☐7 Other hospital
☐8 Self referral
☐9 Other (specify)
☐10 Not clear / not specified

10 Referral problem (as in referral letter)

(If acuity level specified, please include)

Diagnostic data (If OPD/A&E snapshot or surgery waiting list)

11 Current diagnosis/findings (as in chart)

12 Other major clinical condition ☐1 Yes ☐2 No If yes, specify:

If OPD or A&E snapshot survey

13 Date of the visit

14 Visit type

☐1 New patient ☐2 Review - date of last visit ☐3 Unplanned ☐4 DNA

15 Seen by

☐1 Consultant ☐2 Registrar ☐3 SHO ☐4 Unsure

16 Seen by orthoptist ☐1 Yes ☐2 No ☐3 Unsure

17 Outcome ☐1 Discharge ☐2 Review in mts ☐3 For investigation ☐4 Put on surgery waiting list ☐5 Admit

If inpatient or day case admission waiting list review

18 Date put on waiting list

19 Procedure awaited

Researcher data

20 Today's date

Researcher / reviewer initials

Comments:

Appendix 3

Specialist ophthalmic OPD waiting list review

(For new referrals of children up to 16 years of age / born since 1.1.1983)

Name of Hospital

Personal data

1 Consultant (initials)

2 Patient chart/clinic no.

(Essential that a chart or file reference number is specified)

3 Year of birth

or age yrs mts

4 Sex

☐₁ Male ☐₂ Female

5 County of residence

If Dublin, include postal area or N/S Co. Dublin

6 Medical card ☐₁ Yes ☐₂ No ☐₃ Unsure

Referral data

7 Date of original referral

8 Date of OPD appointment

(if scheduled)

9 Referral source

- ☐₁ Health board (public health nurse, AMO)
☐₂ Community ophthalmologist
☐₃ General practitioner
☐₄ A&E department
☐₅ Optician
☐₆ Other department within the hospital
☐₇ Other hospital
☐₈ Self referral
☐₉ Other (specify)
☐₁₀ Not clear / not specified

10 Referral problem (as in referral letter)

(If acuity level specified, please include)

Researcher data

11 Todays date

Researcher / reviewer initials

Comments:

Appendix 4

Eastern Regional Health Authority School Vision Screening Programme Monitor

Area Health Board

Community Care Area/District

School

School code

	Class							
	Junior infants	Senior Infants	1 st class	2 nd class	3 rd class	4 th class	5 th class	6 th class
Total no. of pupils								
No. consents returned								
No. exclusions *								
No. screened (routinely)								
No. referred (from routine screening)								
No. checked on special request **								
No. referred (from special requests)								
Date screening completed								

* Currently under the care of specialist ophthalmic services.

** Undergoing assessment for educational under-achievement etc.

Appendix 5

British Standards for acuity charts (1968)

Specification for Test Charts for Determining Distance Visual Acuity

The Standard (BS 4274 : 1968) is obsolescent, with amendments published and effective from 15 August 1996.

BS 4274 : 1968 is renumbered as BS 4274 : Part 1 as an interim measure to allow EN ISO 8596 and BS EN ISO 8597 to be published with the secondary identifiers BS 4274 : Part 2 and Part 3, respectively.

Revised Standards are available from the British Standards Institution.

