International Centre for Eye Health

The International Centre for Eye Health (ICEH) was started in 1981 by Professor Barrie Jones who was then Professor of Clinical Ophthalmology at the Institute of Ophthalmology in London. The aim of the Centre was to apply the knowledge of the prevention of eye disease gained at the Institute to a wider group of people. Today, the purpose of the Centre is 3-fold:

- to provide training for people from developing countries to become programme managers for the prevention of blindness in their own countries
- to research the main blinding diseases, particularly in developing countries where preventable blindness occurs more frequently than in the developed world
- to disseminate the information already available through the International Resource Centre. This involves the preparation of training materials and publication of a journal, *Community Eye Health*, with a readership of 16,000 people throughout the world.

Training

The training programmes at the ICEH started with a diploma course in 1981, which was initially for 3 months. The course has gradually evolved to become a modular course and, in 1991, a 1-year MSc in Community Eye Health was developed. There is also a 6-month diploma and 2 certificate courses. Approximately 700 students have attended these courses, many of whom are now leaders in eye health in their own countries.

The courses include topics such as epidemiology, planning and management, evaluation of programmes, manpower development, and critical assessment of the literature, as well as discussing the main blinding diseases and the risk factors.

Research

Research into the most frequent blinding disease is instigated by the ICEH and there have been a number of surveys into the common causes of blindness. ICEH research is often performed in conjunction with former students who are involved in prevention of blindness in their own countries. When students return to their countries after completing a course at the ICEH, the Centre continues to provide technical support to allow them to perform research that is relevant to their situation. For example, a survey is being planned for Pakistan in conjunction with the Pakistan Institute of Community Ophthalmology. Two former students of the ICEH will be involved in the survey, which is intended to give an indication of the relative burden of blindness throughout the country and to recommend a course of action. Further, a nationwide survey of blindness and visual impairment in Bangladesh has recently been completed by Drs Dineen and Bourne, Research Fellows at the ICEH, in conjunction with Professor Ali of the National Institute of Ophthalmology in Bangladesh.

Childhood Blindness in Asia

Dr Gilbert started work with the ICEH in 1990 when the interest in investigating childhood blindness first began. One of the first tasks was to collate the available data. It was found that surveys had been reported in different ways, using different definitions and methodologies, so work began in conjunction with the WHO to develop a standardised reporting form. The unique point about the form is that there are 2 ways of classifying the causes of childhood blindness: one describes the location of the problem in the eye, while the other describes the underlying cause. Information on the underlying cause is harder to obtain, but is more useful for planning interventions.

This standardised form was then used to examine children in schools for the blind throughout Asia to find out the major causes of blindness in the population. Approximately 3000 blind children have now been surveyed and the material was presented in 1999.[1] The pattern of blindness is different throughout the region and childhood blindness is more common in poorer areas. Indeed, the poorer the area, the more the children are likely to be blind from corneal scarring, while in more affluent areas, the pattern is similar to that of industrialised countries, with cataract and glaucoma being the most important causes of avoidable blindness (Table 1).

Vitamin A Deficiency

A study of congenital abnormalities of the eye in 168 Indian children has just been completed. Family members were examined and interviewed to ascertain the proportion of blindness due to genetic disease or problems during early pregnancy. The epidemiological part of the study is now complete and the information supports the hypothesis that vitamin A deficiency early in pregnancy may predispose certain children to blindness. An animal model of vitamin A-deficient pregnant rats and mice with a genetic predisposition to blindness is now being developed to ascertain how this affects the eye. The next stage will be to return to the surveyed population to test the hypothesis.

Table 1. Regional variation in distribution of avoidable blindness according to economic status.

High income (90,000 blind)		Middle income (290,000 blind)		Low income (1,020,000 blind)	
Cause	**Number (%)**	**Cause**	**Number (%)**	**Cause**	**Number (%)**
Retinopathy of prematurity	9000 (10)	Cataract	45,000 (15)	Corneal scar	200,000 (20)
Teratogens	5400 (6)	Retinopathy of prematurity	29,000 (10)	Cataract	133,000 (13)
Cataract	5400 (6)	Glaucoma	17,000 (6)	Glaucoma	60,000 (6)
Glaucoma	2000 (2)	Teratogens	12,000 (4)	Optic atrophy	60,000 (6)
Total avoidable	**21,800 (24)**		**103,000 (35)**		**453,000 (45)**

Congenital Rubella Infection

Rubella immunisation is a contentious issue, and there are various strategies for immunisation throughout the world. Treating cataracts in children with congenital rubella is difficult, as the eyes are often small, anaesthesia may be difficult since these children often have associated cardiac problems, and the children may be mentally retarded, making it difficult for them to wear glasses after the operation. In addition, the eyes tend to become inflamed after surgery. The preferred option is, therefore, to prevent congenital rubella infection.

When a child is born with signs and symptoms of congenital rubella, the diagnosis must be confirmed within 1 year — once a child is older than 1 year, it is impossible to distinguish between congenital and acquired infection. A test is therefore needed for children older than 1 year who may have congenital rubella. The purpose of such a test is 2-fold — to enable each country to know the extent of congenital rubella in the population, and to monitor the effectiveness of a rubella immunisation programme.

A study is being undertaken in India, which has recruited all children who presented to Aravind Eye Hospital with cataract due to congenital rubella during the past 7 years. Field workers have traced all the children, and surviving children have been examined. Blood, saliva, and urine samples have been taken, which are now being analysed in laboratories in the UK to ascertain which tests may be specific for congenital rubella in older children.

Childhood Blindness in Bangladesh

A new project has started in Bangladesh, which is being undertaken by a Bangladeshi ophthalmologist who has just finished the MSc at ICEH. The aim is to identify 1000 blind children and ascertain the cause of their blindness. Detailed examination of children with cataract will be performed, and will include clinical examination, treatment history, and follow up after 1 year. Since children with cataract often present late, mothers will also be interviewed and focus group discussions undertaken in order to more fully understand parent's knowledge and perceptions of cataract, and to identify the barriers to the uptake of services.

National Survey in Bangladesh

A national survey of blindness and low vision in Bangladesh has just been completed. This is the first survey of its type in the country. Preliminary data show that the main cause of preventable blindness is cataract (approximately 80%).[2] The reasons for this high cause-specific prevalence, indicative of a large cataract backlog, are related to state health care and service provision as well as social, economic and cultural barriers to seeking treatment, especially among women. However, the results of the survey will be used for the planning and provision of health care services in the country. Indeed, a national plan for prevention of blindness was drawn up earlier this year, only 2 months after the results were released.

The survey has raised the question of provision of eye care services in the country, and the need to train more ophthalmologists and other levels of eye health providers such as optometrists and ophthalmic assistants to work with an ophthalmologist. There is provision for 24 ophthalmic assistants to be trained and this is a step forward for delivery of eye health services in the country. One of the recommendations of the new national plan is to ensure that all ophthalmologists are adequately trained, which includes clinical and skills training as well as community eye health. A working group will be convened to ascertain how community eye health training could be incorporated into the current training programmes, with the possibility of specific courses for community eye health.

Thailand and Pakistan

Dr Bourne has just finished a population-based survey in Thailand, in collaboration with Prin Rojanapongpun and Paradon Sujudom of the Department of Ophthalmology at Chulalongkorn University, Bangkok, to collect data on the mechanisms of glaucoma in the country in adults aged >50 years. At present, there is little information on the prevalence or type of glaucoma among the indigenous populations of Southeast Asia. The data will be published shortly and was presented at the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting.[3] Primary open angle glaucoma accounted for 67% of all glaucomas, primary angle-closure 21% and secondary glaucomas 12%. Glaucoma was the second most common cause of blindness after cataract. 25 to 50% of people with the disease had not been

previously diagnosed. This implies that there is a large group of people who are not seeking medical attention, probably because they are not aware of having glaucoma. This result is surprising since Thailand has a good public health care system and eye care has been incorporated into the general health policy for some time.

Dr Bourne is due to start a survey in Pakistan with Brendan Dineen, in conjunction with the Pakistan Institute of Community Ophthalmology in Peshawar. This nationally representative survey of over 20,000 subjects older than 10 years intends to establish age and sex-specific prevalence rates of blindness and low vision, and the causes of this. Specific emphasis will be given to establishing the prevalence and epidemiological pattern of posterior segment disease such as age-related maculopathy and diabetic retinopathy, in addition to a detailed examination for glaucoma. The study will also investigate cataract surgical outcomes.

Screening for Glaucoma

Mongolia has an identifiable unique characteristic of blindness distribution. The first blindness survey among approximately 4000 Mongolians, performed by Dr Baasanhu, Professor of Ophthalmology at the University in Ulaanbaatar, found that the rate of blindness attributable to glaucoma was equal to that due to cataracts.[4] This finding was particularly unusual since it would be expected that there would be a greater incidence of cataract in a country where the people live at high altitudes with presumed high levels of ultraviolet radiation.

A second glaucoma survey was performed, which found that most of the glaucoma blindness was caused by angle closure glaucoma.[5] Approximately 1000 people in Hövsgöl province were examined and a survey was undertaken among 700 people in the South Gobi region, giving the prevalence of glaucoma and the various risk factors for the disease among the Mongolian population.

Further study has shown that screening for glaucoma is effective among this population.[6,7] People who had glaucoma or were at risk for the disease were treated with YAG laser iridotomy. Follow-up 1 year later found that treatment was effective if performed at an early stage and there were no significant complications.[8]

The next stage was to ascertain whether it was possible to detect glaucoma before it caused visual damage to prevent any loss of vision. A randomised trial of a screening test and prophylactic treatment was designed by Prof. Gordon Johnson and Dr Winnie Nolan of the Institute of Ophthalmology in London. Approximately 4500 people underwent a basic eye examination and all the people with glaucoma were excluded from the study. Of the remainder, 50% underwent a rapid screening test to measure the anterior chamber and the IOP. If this was found to be abnormal, they were treated with laser iridotomy. The remaining 50% of people were left untreated as a control group. These people will be reviewed in 5 to 10 years time to ascertain whether there is any difference in the rate of glaucoma progression between the treated and the untreated groups. If screening and laser treatment is effective for preventing glaucomatous damage, then this project could become a template for prevention programmes among similar groups of people from North Asia.

Currently, much of the information available on glaucoma comes from the western model, which may not adapt to different Asian groups. However, it is not yet known whether the whole of East and South Asia have a similar type of angle closure. It is clear from previous research that the characteristics of angle closure glaucoma in Singapore differ from those in Melbourne, Australia,[9] for example. There is therefore an increasing awareness that Southeast Asians may show a different pattern of disease. Interestingly, people from Bangladesh appear to have Caucasian glaucoma characteristics with more open angle glaucoma and less closed angle glaucoma than that of Chinese populations.

One of the cornerstones of the research in Mongolia has been to use anterior chamber depth as an indicator of risk of angle closure. It has, therefore, been surprising to find so much angle closure glaucoma in Singapore, since the Singaporeans have a relatively deep anterior chamber. However, the angle width is narrower than expected among Singaporeans, so the anatomy of the eye appears to be different among this population.

Therefore, while the screening techniques used in Mongolia could probably be extrapolated to other countries, they may need to be adapted for different populations. A population study would therefore have to be performed to ascertain the normal range of the anterior chamber depth for the screening test.

Cataract Surgery Outcomes

There is concern about the outcome of cataract surgery in some developing countries and the ICEH is developing a tool by which ophthalmologists can monitor their own cataract surgery outcomes. This project is being developed by Dr Limburg (Senior Research Fellow) in 2 pilot centres in Pakistan and West Bengal. The long-term goal is for ophthalmologists throughout the world to be able to use the forms and software to evaluate their results.

Anterior Chamber Lenses

In Nepal, Dr Hennig and Dr Pradhan have been investigating anterior chamber lenses to ascertain whether they are safe as an intraocular lens for short-term use after

International Resource Centre for the Prevention of Blindness

"The International Resource Centre for the Prevention of Blindness is committed to strengthening eye health education in developing countries through the provision of information services and the development and dissemination of educational materials. [The Centre works] closely with partners in developing countries to strengthen their capacity to provide information and educational resources for the prevention of blindness."

One of the major reasons for the continuing increase in avoidable blindness is the lack of trained health care professionals. Health care services are often vastly over-stretched with little provision for training and information resources for health workers in many developing countries. Raw materials, equipment, and skilled staff essential for the production of training materials are in short supply. In addition, access to foreign currency, and therefore to imported materials is limited. However, improving access to reliable information is potentially the most cost-effective strategy for sustainable improvements in health care in developing countries.

The International Resource Centre (IRC), in conjunction with the International Centre for Eye Health (ICEH), disseminates information of recent and current developments in cost-effective eye care and basic preventive methods, both on site at the ICEH and through the distribution of affordable educational materials and information resources. The Resource Centre's activities include:

- development of teaching of educational materials
- distribution of low-cost publications on eye health
- provision of an information and enquiry service
- well equipped resource centre, which is open to visitors
- publication of the Journal, *Community Eye Health*
- distribution of teaching slides, videos, books and pamphlets, and selected WHO publications.

Community Eye Health is an important resource for many ophthalmologists in developing countries. To ensure that information is disseminated as widely as possible, the Journal is available free of charge to eye health workers in developing countries. In addition, there is a wide selection of books, teaching slide sets, and videos available for purchase from the IRC. A recent collaboration between the ICEH, the IRC, the WHO, and partnership organisations has been established to develop community eye health resource centres in 6 key eye health training centres in Africa, Asia, and Latin America. Each centre will provide a range of information services and distribute publications. The 2 centres in Asia will be based at the LV Prasad Eye Hospital in India and The Pakistan Institute of Community Ophthalmology. The contact details are as follows:

India

Ms A Sameera Khundmiri
International Centre for the Advancement of Rural Eye Care (ICARE)
L V Prasad Eye Institute (LVPEI)
PO Bag No. 1, Kismatpur BO,
Rajendranagar PO
Hyderabad 500 030, Andhra Pradesh, India
Tel: (91 40) 401 1243
Fax: (91 40) 401 1293; (91 40) 354 8271
E-mail: brsham@hotmail.com
library/LVP@icare.stph.net
Website: www.lvpei.org

Pakistan

Dr Aliya Qadir
Pakistan Institute of Community Ophthalmology (PICO)
PICO Community Eye Health Resource Centre
PO Box 125
Hayat Abad Medical Complex
Phase 4, Hayat Abad, Peshawar, Pakistan
Tel: (92 91) 814 438
E-mail: pico@pes.comsats.net.pl
rlrc@pes.comsats.net.pk

The contact details for the London office of the IRC are as follows:
International Resource Centre for the Prevention of Blindness
International Centre for Eye Health
11-43 Bath Street
London EC1V 9EL
Tel: (44 20) 76086923
Fax: (44 20)7250 3207
E-mail: eyeresource@ucl.ac.uk
Website: www.ucl.ac.uk/ioo/ircpb/

intracapsular surgery until sufficient ophthalmologists have been trained in extracapsular surgery.[10] Interestingly, this approach was found to be successful, even in the long term.[11] As an example of how the collaboration works, Drs Hennig and Pradhan performed the surgery and organised the follow-up, while the ICEH was involved in the design and funding of the project, as well as analysing the results.

Community Ophthalmology

A programme on the development of community ophthalmology has recently been performed in India (with funding from the UK Overseas Development Agency, now

the Department for International Research), involving the Dr Rajendra Prasad Institute of Ophthalmology in New Delhi, and the Regional Institutes of Ophthalmology in Hyderabad and Calcutta, resulting in a separate Department of Community Ophthalmology at the Dr Rajendra Prasad Institute of Ophthalmology. As part of the programme, Drs Murthy and Gupta performed an intervention trial in urban slums in New Delhi to investigate the development of an effective eye care programme in a poor urban area. In Hyderabad, Dr Vishwanath has been testing screening for diabetic retinopathy, and a glaucoma survey has been performed in Calcutta by Dr Raj Chaudhury. Currently, there is very little information available from inner city populations in Asia, and community out-reach work in these areas is lacking. However, the problem is likely to increase as the world becomes more urbanised.

Infectious Keratitis

A primary area for research is infectious keratitis — a survey is being performed in association with Dr Thomas of the Joseph Eye Hospital in Tamil Nadu. The intention is to control these infections and provide prompt treatment on a district by district basis.

Conclusion

There is a mix of different projects run by the ICEH, but the Centre aims to address the primary eye health problems in Asia. As part of the MSc course, students perform fieldwork in their own countries, which is the basis for their dissertation. These surveys tend to act as pilot studies for more encompassing research.

References

1. Preventing blindness in children: report of a WHO/IAPB scientific meeting. Hyderabad, India, 13-17 April 1999. WHO/PBI./00.77.
2. Dineen BP, Bourne R, Modasser Ali S, *et al.* Prevalence and causes of visual impairment in Bangladeshi adults — results of the National Blindness and Low Vision Survey of Bangladesh. From a presentation at the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting; 2001 April 29-4 May; Fort Lauderdale, USA. Abstract # 3826.
3. Bourne RR, Sukudom P, Foster P, *et al*. The Rom Klao glaucoma survey — a

population based survey in urban Thailand. From a presentation at the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting; 2001 April 29-4 May; Fort Lauderdale, USA. Abstract # 553.
4. Baasanhu J, Johnson GJ, Burendei G, Minassian DC. Prevalence and causes of blindness and visual impairment in Mongolia: a survey of populations aged 40 years and older. *Bull WHO* 1994;**72**: 771-776.
5. Foster PJ, Baasanhu J, Alsbirk PH, *et al*. Glaucoma in Mongolia. A population-based survey in Hövsgöl Province, northern Mongolia. *Arch Ophthalmol* 1996;**114**:1235-1241.
6. Foster PJ, Devereux JG, Alsbirk PH, *et al*. Detection of gonioscopically occludable angles and primary angle closure glaucoma by estimation of limbal chamber depth in Asians: modified grading scheme. *Br J Ophthalmol* 2000;**84**:186-192.
7. Devereux JG, Foster PJ, Baasanhu J, *et al*. Anterior chamber depth measurement as a screening tool for primary angle-closure glaucoma in an East Asian population. *Arch Ophthalmol* 2000;**118**:257-263.
8. Nolan WP, Foster PJ, Devereux JG, *et al*. YAG laser iridotomy treatment for primary angle closure in east Asian eyes. *Br J Ophthalmol* 2000;**84**: 1255-1259.
9. Lowe RF. Primary angle closure glaucoma: geographic and racial variations. *Trans Ophthalmol Soc NZ* 1973;**25**:81-84.
10. Hennig A, Evans JR, Pradhan D, *et al*. Randomised controlled trial of anterior-chamber intraocular lenses. *Lancet* 1997;**349**:1129-1133.
11. Hennig A, Johnson GJ, Evans JR, *et al*. Long term clinical outcome of a randomised controlled trial of anterior chamber lenses after high volume intracapsular cataract surgery. *Br J Ophthalmol* 2001;**85**:11-17.

Acknowledgement

This report was based on conversations with:
Professor Gordon Johnson, Director
Dr Claire Gilbert, Senior Research Fellow
Mr Brendan Dineen, Research Fellow
Dr Rupert Bourne, Research Fellow
Dr Paul Foster, Research Fellow
Ms Ann Naughton, Administration Director for the International Resource Centre
at the International centre for Eye Health
Institute of Ophthalmology
Department of Epidemiology and International Eye Health
University College London, London, UK.