Screening for Diabetic Retinopathy in Europe 15 years after the St. Vincent Declaration

The Liverpool Declaration 2005

Report of Conference

Liverpool, UK

17th – 18th November 2005

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Summary

The Liverpool Declaration

European countries should:

Reduce the risk of visual impairment due to diabetic retinopathy by 2010 by:

- systematic programmes of screening reaching at least 80% of the population with diabetes
- using trained professionals and personnel
- universal access to laser therapy

Essential components to achieving the Liverpool targets

Organisation
High population coverage
Continuity of care
Adequate national health care funding
Communication between all health care providers
Good data including registers and data on rates of blindness
Minimisation of error (quality assurance)

Personnel
All individuals in a screening programme should be competent
Education of patients and professionals
Clear identification of responsibilities
Adequate number of trained ophthalmologists
Engagement of all stakeholders

Equipment, tests and treatment
Adequate lasers for population
Proper equipment
Timely application of therapy
Fast track treatment for advanced disease
Examination of the eye for diabetic retinopathy should be through a dilated pupil in all cases.
An effective test with demonstrated quality assurance (adequate sensitivity and specificity) comprising either of:

- digital photography
- biomicroscopy through dilated pupils by trained professionals

An examination of the eye should take place shortly after the diagnosis of diabetes.
Recommended systemic management targets

- HBA1c <7 % (European +IDF consensus)
- BP <135/85 mmHg (European +IDF consensus)
- total cholesterol <5 mmol/l

Ophthalmologists should measure or have ready access to HbA1c, BP and lipids

Implementation

The following specific recommendations to give the best chance of successful implementation in each country are made based on the experience of delegates over the last 15 years:

Establish joint meetings
Set up training programmes
Move from local to regional to national implementation
Establish policy including defined goals
Set national guidelines
Agree timeframe
Don’t give up!

Introduction

In Liverpool on the 17th and 18th November 2005 a conference took place to review progress in the prevention of visual impairment due to diabetic retinopathy since the writing in 1989 and publication in 1990 of the St. Vincent Declaration and to develop a new declaration to take the area forward. Formal invitations were sent to all known diabetes and ophthalmology organisations in 43 countries in Europe over a 12 month period leading up to the conference. Delegates who attended comprised the following groups:

- official national representatives of 29 European Countries
- invited experts from Europe and the US
- health professionals with expertise in the field of diabetic retinopathy and a commitment to the prevention of visual impairment of future patients

The conference aims were to achieve:

- an agreement between ophthalmologists and diabetologists to help set the agenda in diabetes eye care relevant to all countries throughout Europe
- challenging targets applicable to countries at different stages in the development of diabetes eye care pathways and based on the ethos of St. Vincent
- a review of the current status of epidemiology, screening and treatment
- disseminate top tips for success and advise on future implementation

A key component of the conference was to write a new declaration based on the above objectives but with the additional aim of aiding professionals to negotiate effectively with politicians and funding agencies.

Consensus methodology

The organising committee reviewed the potential methods for developing a consensus declaration. Formal approaches such as the Delphi technique, an evidence-based or explicit development method were deemed inappropriate.

A framework was developed and circulated to all delegates prior to the meeting. During the conference a series of statements were presented to delegates and discussed. When 75% of delegates agreed with a statement this was taken as a consensus view and 50-74% as a majority view. The final set of statements was reviewed prior to the end of the meeting.

Subsequent to the meeting the conference report was circulated to speakers and national representatives for their input before circulation to all delegates.

Commentaries

This section of the report provides a commentary on the Declaration, supporting statements and recommendations based on notes and records from the conference.

A. The Liverpool Declaration

European countries should:

Reduce the risk of visual impairment due to diabetic retinopathy by 2010 by:

- systematic programmes of screening reaching at least 80% of the population with diabetes
- using trained professionals and personnel
- universal access to laser therapy

Three components were identified as the most important elements that needed to be achieved as the next step in reducing the risk of blindness. The importance of coverage was identified by many of the speakers and national delegates as the most significant block to adequate care. To achieve a specific target several important factors from the list below will need to be addressed. Another crucial aspect is the need for trained personnel at all stages in the identification and treatment of patients. Finally by adding a requirement for universal access to laser therapy the importance of adequate treatment provision is included. Delegates placed less emphasis on the specific technology or test to be used.

A target of the introduction of these 3 components by 2010 sets a significant challenge for most countries.

Consensus was established by formal vote at the end of the conference.

B. Essential components to achieving the Liverpool targets

In presentations from expert speakers and the summaries of the national service provision posters presented by moderators, a number of components became apparent as essential to a successful reduction in the risk of visual impairment. These are presented below grouped by themes but not necessarily in any particular order.

<u>Organisation</u>

High population coverage

The most important goal to be achieved as identified by many speakers and national representatives

Continuity of care

Those people with diabetes who lose vision tend often to be those with multiple disease complications who are failed by referral and follow-up systems.

Adequate national health care funding

A cause of major frustration to many delegates

Communication between all health care providers

This is vital to the development of effective programmes and to continuity of care

Good data including registers and data on rates of blindness

Essential for effective identification of eligible patients and management of call/recall

Minimisation of error (quality assurance)

Systematic screening programmes rely on minimisation of error through quality assurance

Personnel

All individuals in a screening programme should be competent

This applies to all personnel involved in screening from ophthalmologist and diabetologist to clerk

Education of patients and professionals

The failure of patients to attend for screening and treatment can be addressed by development of active education programmes

Clear identification of responsibilities

Without clear lines of accountability many patients are lost to follow-up or errors are introduced into the programme.

Adequate number of trained ophthalmologists

Important in many countries

Engagement of all stakeholders

This should include patients and personnel involved in primary care, screening, systemic treatment, ophthalmological treatment and public health.

Equipment, Tests and Treatment

Adequate lasers for population

A precise number could not be identified due to the varying mix of public/private provision throughout Europe.

Proper equipment

Much equipment is in a poor state and needs regular maintenance

Timely application of therapy

National guidelines should develop target times between decision to treat and application of treatment for each category of retinopathy/maculopathy.

Fast track treatment for advanced disease

A rapid referral and treatment pathway is essential for patients presenting with advanced disease

Examination of the eye for diabetic retinopathy should be through a dilated pupil in all cases.

An essential baseline standard stated by several national delegates

An effective test with demonstrated quality assurance

Two test methods were considered acceptable

- *digital photography is the preferred technology*
- *biomicroscopy through dilated pupils by trained professionals is acceptable but problematic for quality assurance*

Direct ophthalmoscopy through dilated pupils is an accepatable interim test but should only be considered when other technologies are not possible.

An examination of the eye should take place shortly after the diagnosis of diabetes.

The frequency of sight-threatening retinopathy is higher at diagnosis of diabetes.

Recommended systemic management targets

- HBA1c <7 % (European + IDF consensus)
- BP <135/85 mmHg (European + IDF consensus)
- total cholesterol <5 mmol/l

For many clinical scenarios effective management depends on good systemic control

Ophthalmologists should measure or have ready access to HbA1c, BP and lipids

Delegates believed that ophthalmologists should take an active role in monitoring systemic control and communicating with primary care/diabetology/endocrinology

Emerging therapies

Systematic screening will be able to identify patients with appropriate levels of diabetic retinopathy who could benefit from emerging medical therapies

C. Implementation

Several specific and practical recommendations to give the best chance of successful implementation in each country were made based on the experience of delegates over the last 15 years.

Establish joint meetings

To begin to establish communications between diabetologists/endocrinologists and ophthalmologists, joint meetings should take place to acquaint each group with current treatment availability and pressures.

Set up training and links programmes

To improve levels of knowledge and skill throughout Europe a links programme is proposed to establish 3 month fellowships hosted by established treatment and screening centres. The ability to work in contact with one or more colleagues has a dramatic benefit on morale and professional standards.

Move from local to regional to national implementation

Delegates frequently reported that the introduction of national programmes was unachievable as a first step and that best success was initially achieved locally. This is followed by a gradual expansion to regional services before national programmes can be contemplated.

Establish policy including goals

Every country should develop local implementation programmes to include patient representatives and other key stakeholders.

Set national guidelines

Flows from previous goals being achieved.

Agree timeframe

Essential for all recommendations to ensure progress is made.

Enthusiasm and persistence of local people, doctors, technicians, and patients is the main key to progress so ……

Don't give up!

Delegates suggested several oranisations who should be approached to ask for their support.

- EU parliament
- EU council
- National Diabetes and Ophthalmology organisations
- IDF
- EASD
- EASDEC

Current status of screening in Europe

All European countries were invited to send two national representatives, one from diabetes/endocrinology and one from ophthalmology. Each country was asked to submit a poster for review by delegates at programmed review sessions. As part of the conference process countries were grouped by the organising committee and reviewed by four moderators selected for their extensive experience in the field. Their reports are presented below.

National service provision abstracts are provided in Appendix 1. The requested data for the posters included the following:

- Population of the country
- Number of patients with diabetes
- Number of patients blind from diabetic retinopathy
- Organized screening programs, including methodology and timelines
- Estimated number of patients covered in screening programs
- Estimated number of lasers in the respective country
- Progress that has occurred during the past fifteen years
- Tips for success

A principle finding from national representatives' reports was that since the St. Vincent Declaration much progress had been made throughout Europe but this was patchy.

C. Pat Wilkinson, MD

Professor of Ophthalmology, Johns Hopkins University, Baltimore, U.S.A

Report on posters from the following countries:
Denmark, England, Finland, Iceland, Northern Ireland, Norway, Scotland, Sweden, Wales

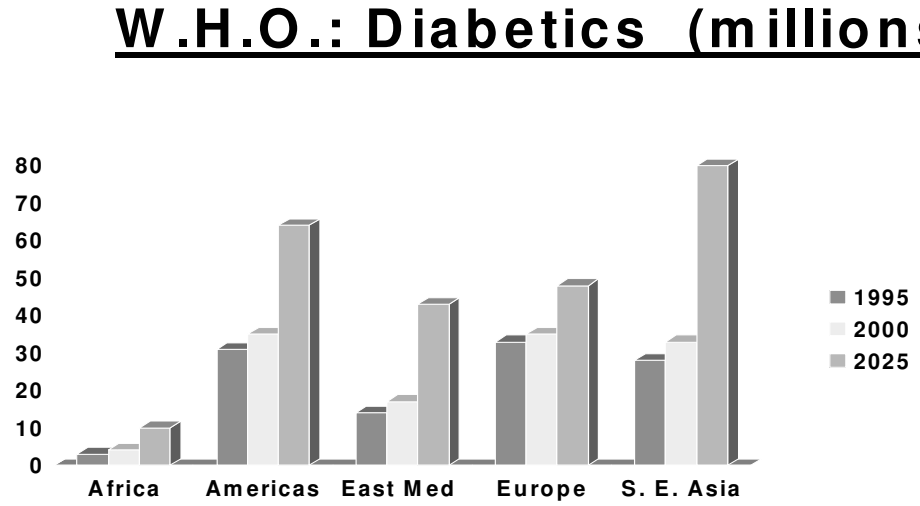
The following table provides selected estimates of some of the items listed earlier. Data regarding all topics were not available for all countries. Definitions of blindness differed from country to country.

Country	Population	Percentage Diabetic	Percentage Blind From Diabetes	Number Of Lasers
Denmark	5.3 million	3.8	2.5	20
England	50 million	3.0	12	100
Finland	5.2 million	4.3	9	30
Iceland	500,000	2.9	0.4	
Northern Ireland	1.6 million			4

Scotland	5.1million	3.2-4.7	2	15

These data cited are consistent with an estimated overall prevalence of diabetes in Europe approximating 4%. This rate is approximately half that of the United States, where more than 7% of the population have diabetes and more than 8% of patients with diabetes are legally blind due to this disorder. And a recent report from the Center for Disease Control and Disease Prevention (CDC) demonstrated that the prevalence of diabetes has increased by over 14% in the United States in the past two years.

Although the World Health Organization has described an expected "epidemic" in the world prevalence of diabetes in the decades ahead, the percentage increase is expected to be less significant in Europe than in other regions of the world, as demonstrated in the table below.



In terms of the ranges of coverage in Europe, diverse figures were presented in the posters. In Iceland, the vast majority of patients are closely screened. In England, it is predicted that 80% will be screened by March, 2006 and 100% by December, 2007. In Wales, approximately 80% of patients are expected to be screened in 2005. Scotland reported a 60% screening rate, and this is expected to reach 100% by March, 2006. Denmark, Finland, and Northern Ireland reported that approximately 50% of patients are currently being screened and that the rates are improving. However, in Norway the percentage of covered patients was stated as being quite "low". In the United States, it is estimated that well under 50% of patients are screened annually.

Over the past 15 years most countries appear to have made genuine progress in an effort to reduce blindness due to diabetic retinopathy. The potential results of intense screening are particularly well documented in a short publication in the American Academy of Ophthalmology Basic and Clinical Science Course Series (BCSC), Section 13, Chapter 17. In this chapter, authored by Einar Stefansson, the remarkable progress that occurred in Iceland is reviewed. The prevalence of legal blindness from diabetic retinopathy dropped from 4.0% to 0.5% over fifteen years, beginning in 1980. It should be noted that the prevalence of diabetes is relatively low in Iceland and that the country has a very

strong centralized medical system regarding all aspects of diabetes control and screening. Still, the important message is that optimal management is very effective in preventing and/or reducing severe complication of diabetes.

Barriers to optimal screening were described in several posters. These included costs, organization issues (including government, health care structure, physicians, and patients), "buy in " of all stakeholders, and patient access to screening. The establishment of appropriate policies for national screening remains a formidable task for us all.

Several posters contained important "tips for success". These included the following items:

- Establish specific policies, including goals.
- Remain dedicated to goals.
- Promote ("champion") the goals.
- Convince all stake holders.
- Maintain diligence.
- Establish cooperation between eye care providers and other diabetes caregivers.
- Don't give up!

The authors and the countries that contributed these posters are to be congratulated on 15 years of progress. It is quite evident that much more work needs to be done, but continued progress will provide a means of winning the battle against visual loss due to diabetic retinopathy.

Eva Kohner

Emeritus Professor of Ophthalmology, St. Thomas's Hospital, London, UK

Report on posters from the following countries:
Albania, Bulgaria, Georgia, Kazakhstan, Lithuania, Uzbekistan, St. Petersburg.

Population: Kazakhstan has a population of 15 million, Bulgaria 8 million, the others are all under 4 million.

Screening: Two provinces in Albania, Lithuania and Kazakhstan have guidelines for the management of diabetes including diabetic eye disease, but only in part of Albania is there an organised screening programme. No country has has established audit.

Cross sectional studies are reported from St.Petersburg and from 3 centres in Bulgaria.

Ophthalmologists: There are a number of ophthalmologists who see diabetic patients, but there is no evidence of dedicated medical retina or diabetic retinopathy clinics in any of the countries with the exception of St. Petersburg, where there is a dedicated ophthalmologist for the clinic.

Lasers: Bulgaria has 17, but there are insufficient in the other countries: Uzbekistan appears to have none and Kazakhstan only one or two. Lasers are available for the

'general' population in Lithuania with one in Albania, one in St. Petersburg and some in Bulgaria Other lasers are in private offices.

Cameras: Albania has an old Olympus, Lithuania has some, and St. Petersburg one which can take seven standard field stereo pairs. The other countries appear to have no facilities. Uzbekistan states they have no technical support whatever.

All complain of lack of money and the major problem appears to be absence of any communication between diabetologists and ophthalmologists.

Suggestions

- Drug companies should be asked to take one country each under its wing. They should arrange meetings where ophthalmologists and diabetologists meet together and plan diabetic retinopathy management.
- EASD, EU, Council for Europe should be approached to support 3 month fellowships for English speaking ophthalmologists to come to centres of excellence such as Cardiff, Liverpool, and Aberdeen, in UK, and Herlev, Copenhagen.
- A small group of experts from the UK should go to these countries and help them in 'how to approach your government' methodology, and possibly help set up one proper screening clinic in each country.

Amy Gray

Programme Manager, Eastern Europe, ORBIS

Report on posters from the following countries:
Czech Republic, Turkey, Hungary, Romania and Serbia Montenegro.

	Population	Percentage with diabetes	Percentage of diabetics with DR	Number/percentage blind due to DR
Czech Republic	10,236,000	7%	12%	2,364
Hungary	10,006,835	5%	n/a	16.8% of total blind
Romania	21,700,000	2%	n/a	not known
Serbia and Montenegro	10,000,000	3%	n/a	not known
Turkey	70,000,000	7.2%	Type 1 - 29.2% Type II - 34.6%	not known

With regard to diabetic retinopathy screening, the table above serves as a good indicator of the achievements and challenges of the countries listed[1]. Over the past 15 years, all of the countries have endeavoured to collect data on diabetic patients and their complications, as well as to diagnose diabetic retinopathy more effectively. As a result, there is more accurate information on the prevalence of diabetes and diabetic retinopathy. However, it is clear that there are also still gaps.

[1] It should be noted that the information in the table comes only from the posters. Therefore, information on the prevalence of diabetic retinopathy and blindness due to diabetic retinopathy may be available elsewhere.

Based on their experience since the introduction of the St. Vincent's Declaration, the country representatives highlighted some key aspects of diabetic retinopathy screening that they felt were critical to success:

- Awareness and education for healthcare providers, patients and the general population
- Good coordination and management
- Clear indicators and understanding of roles and responsibilities
- Proper equipment
- Good data

In terms of diabetic retinopathy screening programmes, the countries above have varying degrees of formalised systems. The Czech Republic has a national screening programme, while Hungary, Romania and Turkey have local or regional screening programmes. Serbia and Montenegro does not yet have a formalised screening programme, but has taken steps to introduce protocols along the lines of the Declaration.

	Achievement(s) since 1989
Czech Republic	• Diabetic retinopathy screening and treatment guidelines published in 2002 • ID cards for diabetics introduced • DRS/ETDRS guidelines used for treatment
Hungary (Southeast)	• Care coordinated through computerised patient management system • Public education and outreach provided by Szeged University • Nurses, GPs and diabetologists trained by Szeged University • 3 new laser clinics opened
Romania	• Screening programme for 40,000 diabetic patients at 7 centres • 16 participating ophthalmologists with 6 lasers
Serbia and Montenegro	• Screening guidelines adopted by National Ophthalmic Society in 2001 • Screening manual distributed to all ophthalmologists • National Committee on Prevention of Blindness established in 2005 • Proposal for diabetic retinopathy screening model submitted to Ministry of Health in 2005
Turkey	• Turkey Diabetes Epidemiology Project (TURDEP) and Turkish Diabetes Chronic Complications Study to examine prevalence of diabetes and related complications including diabetic retinopathy, respectively, carried out • Laser treatment available in all regions (est. 290 Argon lasers) • Sufficient number of ophthalmologists to treat the population

Although there has been a great deal of success in the above countries in terms of diabetic retinopathy screening, there remain significant challenges to further development of national screening programmes. This includes a lack of data, which is a result of a lack of data sources, e.g. blindness registers or diabetes registers and/or a lack of financial and human resources available to support research and data collection. This leads into another key challenge, which is inadequate resources – meaning financial, human, institutional, etc. This hampers the ability of institutions that would function within a diabetic retinopathy screening programme to develop their capacity, as well as the ability of the

programme itself to be comprehensive and sustainable. A lack of education and awareness amongst both patients and service providers also continues to present a challenge to the creation and success of diabetic retinopathy screening programmes. A final challenge highlighted by the countries above is the lack of coordination and communication within the health system, or among the institutions that would comprise a diabetic retinopathy screening programme.

Therefore, although the countries have made significant strides in terms of developing an organised approach for identifying those at risk for diabetic retinopathy and referring them for treatment, significant challenges remain. One interesting point to consider is the fact that, on the basis of the evidence presented through the posters, it could be argued that those countries considered "closer" to Europe have more developed diabetic retinopathy screening programmes, and it may be worth investigating this relationship further.

Challenges to Effective Screening

- Lack of data
- Inadequate resources
  capacity, sustainability, comprehensiveness
- Lack of awareness and education
  patients, service providers
- Lack of coordination and communication within health system

Henrik Lund-Andersen

Professor of Ophthalmology, University of Copenhagen, Denmark

Report on posters from the following countries:
Eire, France, Germany, Greece, Israel, Italy, Luxembourg, Netherlands, Portugal, Spain.

Key Messages

- There is a large inhomogenity of screening procedures in Europe
- No European country has a fully approved national screening programme.
- Local screening programmes are working in many European coruntries - they are based upon the initiatives of individual persons.
- The screening systems and classification of the retinopathy level are different from center to center.

Current status of key topics in screening and treatment for diabetic retinopathy

Experts lectured on the latest status and future developments in each topic and provided a summary with a series of key messages which are presented below.

The Epidemiology of Diabetic Retinopathy

Einar Stefánsson, MD PhD, University of Iceland

Diabetic retinopathy:

Country:

The prevalence of diabetic retinopathy is highly variable. The overall prevalence of retinopathy in diabetic populations has been reported anywhere from 12 to 88% in different countries. Similarly, the reported crude prevalence of proliferative diabetic retinopathy and diabetic macular edema varies manyfold between different studies.

Duration and type of diabetes:

As the prevalence of diabetic retinopathy is highly dependent on the duration of diabetes, the crude prevalence provides limited information. For example in the Icelandic type 1 diabetic population in 1994, the overall prevalence of any diabetic retinopathy was 52%, proliferative retinopathy was 13% and macular edema 8%. At the same time 30% of diabetic patients with duration of diabetes less than 20 years had retinopathy and only 1 and 2% respectively had proliferative retinopathy and macular edema, respectively. These numbers were 86%, 33% and 22% for patients with diabetes for more than 20 years.

Type 2 diabetes patients tend to develop diabetic retinopathy sooner after onset than type 1 and are more likely to develop macular edema and less likely to develop proliferative retinopathy.

Glycemic and blood pressure control:

The DCCT showed a dramatic difference in the incidence of retinopathy between those with conventional and intensive glycemic control. The UKPDS showed that blood pressure reduction lowers the incidence of retinopathy in type 2 diabetic patients.

Vision:

The variability in the prevalence of blindness is even greater than for retinopathy. Here the variable prevalence of diabetic retinopathy is amplified by the variable delivery of screening and preventive treatment in various countries. Legal blindness had been reported as high as 7.7% in type 1 with 9.3% partially sighted, and 6 and 13% for type 2. In other regions with systematic screening the prevalence of diabetic blindness is in many cases below 1%.

Conclusion:

We should see the variable prevalence of vision loss and diabetic retinopathy as an opportunity for the prevention of blindness. The public health planning and health care delivery in the countries that have the lowest blindness rates must be established in all countries.

Key Messages

- 1 in 2 type 1 and 1 in 3 type 2 diabetic patients develop sight threatening diabetic retinopathy requiring laser during their lifetime.
- Prevalence of diabetic retinopathy varies with duration of diabetes, blood glucose and pressure control and regions.
- The prevalence of blindness is influenced by all these factors, but in particular by the presence or absence of screening and preventive laser treatment.
- Achieving a high compliance (77% in Iceland) lowers risk of blindness to near zero
- We all know how to prevent diabetic blindness and it is being done in some regions.
- Why is everybody not copying the success?

The Organisation of Services for Diabetic Retinopathy Screening – Evidence for Screening from the Scottish HTA

Harpreet S Kohli, NHS Quality Improvement Scotland

Key Messages

- A three stage screening programme with visual acuity measurement has been selected on the basis of evidence for Scotland
- Sensitivity of the chosen method of non-mydriatic digital photography is 86%.
- The costs of implementation of a screening programme for Scotland will be £4.3 million in year 1 and £2.4 million in subsequent years

Varied Approaches to Screening

Lars B Bäcklund, MD PhD, Karolinska Institutet, Stockholm, Sweden

Screening for diabetic retinopathy in Europe shows variations in methods, organisation and funding, within and between countries.

Methods:
Descriptions of national programmes, national and regional guidelines were sought and PubMed, Embase, SciFinder, Dissertation Abstracts and EBM databases searched, views and information elicited via contacts in EASD, EASDEC, ISPAD, PCD Europe and diabetes associations as well as from participants in fundus photography and grading training courses, and by site visits. The UK NSC minimum quality criteria were used.

Results:
Enthusiasm remains. Many patients seem satisfied. There are signs of under-funding. *Coverage* remains incomplete; mobile teams in Gloucestershire, Wales and elsewhere report good attendance data. *Examination methods* resulting in a permanent image are increasingly used; monitoring of validity and repeatability of examination findings still uncommon. *Image quality*: variable. *Grading*: mostly based on global impressions; grading scales and terminology inconsistent; reference images rarely used. *Criteria for laser photocoagulation:* highly variable, delays frequent. Increasing *examination intervals* for subgroups of people with diabetes, *e.g.,* those diet-treated: may result in

confusion and losses to follow-up. *Re-screening*: frequently delayed; recall incomplete. *Diabetes registers*: not always updated; *communication* with primary care diabetes teams could be improved – good examples exist, *e.g.,* in Scotland. *Education* of patients and staff is improving. *Outcomes*: Reorganization and outsourcing in Stockholm and elsewhere apparently had a deleterious effect. Blindness data from Newcastle are encouraging.

Conclusion:
Screening remains underfunded. Gaps in continuity should be addressed and quality criteria monitored. Two-way communication between screening programmes and ophthalmology and diabetes care teams is essential.

Key Messages

- NO GAPS PLEASE
  Work with primary care teams to avoid gaps in continuity of care
- FULL DUPLEX
  Two-way communication ophthalmology/screening systems–diabetes care teams
- KEEP TABS ON EYE DOCS
  Ensure timely ophthalmic diagnosis, treatment and follow-up, and blindness registration

What Screening is and What it Isn't?

Sir J A Muir Gray, Programmes Director, UK National Screening Committee

Screening is the systematic identification of people at risk of disease or a serious complication of a disease but who have no symptoms to prompt their attendance at a clinic.

Screening involves the offer of a test to a defined group within the population. Those found to have a positive screening test are referred for further diagnostic investigations and then, if appropriate, for treatment.

The original meaning of the word "screen" was a sieve and, like any sieve, a screen sometimes lets through, that is gives a negative test result, people who in fact have the early signs of disease, and it also holds back, that is as a positive screening test result, people who do not in fact have the disease. These test results are called false negatives and false positives respectively and they are inherent in any screening programme. Screening programmes need to take steps to minimise the number of false positives and false negatives, and they do this through a process called quality assurance.

Key Messages

- Screening is "risk reduction"
- Programme management is distinct from service management
- The eternal verities of screening
  - Error prevention
  - Error management
  - Performance improvement

- Standard setting and resetting
- Clarifying responsibility

- 3 key components are: best coverage, competent individuals, single test

Training of graders / Grading Algorithms

Steve Aldington, Imperial College, UK

Topic Summary

Participants in the National Screening Programme(s) for Diabetic Retinopathy in the UK have been through many necessary changes to move locally-designed and driven services to ones which conform to and meet tough new national standards. Geographically and operationally disparate but well established local DR screening programmes have been through difficult times to achieve high levels of concordance and conformity, with a goal of offering suitable screening services to 100% of persons with diabetes. The first stages were to agree exactly what comprised and how to classify diabetic retinopathy (the grading algorithms). Next was to formulate a list of key skills, attributes and characteristics which make up the essential toolkit of a screener/grader (e.g. pattern recognition, close attention to detail, commitment, etc.). These raised more questions: how are we to ensure people already hold or can gain these skills and abilities; what are the most appropriate methods of assessment for each element; who is going to assess and validate the elements; how do the key skills relate to those found in other working areas and what can we learn from them; how and what should we prioritise; what potential benefits would accrue to a person who gained all the necessary skills and competencies; how transferable are the skills? It has been our intention to address these and other key issues through the development of a recognised and accredited formal qualification for diabetic retinopathy screeners, the results of which will be illustrated.

Key Messages

- Be absolutely clear what it is you are trying to detect/measure/prioritise
- Identify all the necessary components of an essential skills/abilities set
- Provide both clear guidance on what is required and consistent assessment
- Ensure all individuals is a screening programme are competent

Outcome Measures and Quality Assurance in the English Programme

Dr Linda Garvican, National QA Lead, English Diabetic Retinopathy Screening Programme; QA Director, NHS Cervical Screening Programme, Kent, Surrey & Sussex, UK

This presentation considered the need for quality assurance in the English national programme. The target is to reduce loss of sight in people with diabetes due to diabetic retinopathy, but this outcome measure is very difficult to obtain in the UK, and to use to monitor the effectiveness of the programme, due to

- Administrative processes connected with registration of those who have lost their sight or suffered severe visual impairment
- Social and economic factors which affect registration
- Time delay between screening failure and impact on vision

The English national programme has therefore developed a set of quality standards for monitoring the whole screening process from identification and issue of invitations to timely treatment of those with retinopathy detected through screening. These are process measures, but will be combined with local audit data on loss of visual acuity to provide a comprehensive picture of the impact of the service.

Internal quality assurance is required to ensure that grading is accurate. Lessons from screening programmes for other diseases have shown that where success is dependent on visual perception, there need to be a limited number of trained and accredited graders, with optimum workloads to maintain expertise. Their work needs to be checked on an ongoing basis, to ensure that subtle presentations of disease are not being missed. However it is also clear from other services that administrative and managerial errors are equally likely to lead to screening failures.

Key Messages

- A national programme cannot be monitored purely by decrease in visual impairment registration
- Quality assurance needs to include all stages of the screening process and all health professionals and administrative staff involved
- Screening failures in other programmes have cost the NHS £millions in compensation; the diabetic retinopathy programme has the opportunity to learn from these incidents.
- Internal QA is required to detect error in an image grading system. Types seen:
    - simple error leading to missed disease
    - subtle patterns of disease missed
    - overcompensate leading to swamping of referral clinics

Cost Effectiveness of Screening for Eye Disease

Dr Marilyn James, UK

The health economist's challenge is to determine the most cost effective screening regime. An efficient screening programme will maximise the benefits per unit of resource (or cost) available to the population.

This will depend on the type of screening; its sensitivity and specificity; location and timeframe. Its efficiency depends on both the costs and benefits of the screening regimes. The cost and benefits of screening will vary depending on the perspective adopted.

The following provides an example of comparisons of different screening modalities in diabetic retinopathy measured in terms of Cost per Sight Year Saved – a measure of effect and Cost per Quality Adjusted Life Year (QALY) – a measure of utility. The

results were calculated using data from the Liverpool study [1] and Markov modelling [2].

Table. Cost effectiveness and cost utility of screening

	Cost per Sight Year Saved (£)		Cost per QALY (£)		Additional years of sight gained per person
	NHS	Total	NHS	Total	
No screening				61.75	
Digital photography-van	241.06	406.84	20.98	35.42	44.7
Slit lamp optometrists	268.24	449.63	22.91	38.40	31.9
Digital photography-optometrists	364.25	530.03	31.71	46.14	44.7

The figures are calculated for a cohort of patients with diabetes from a population of 1 million. Costs and benefits are discounted [2].

The clear message from this table is screening saves sight and is a cost effective option, with a mobile digital van representing the most cost effective option. A cost per QALY of less than £50 falls well below the £30,000 NICE threshold.

References
*1. James M., Turner D., Broadbent D., Vora J., Harding S. (2000) Cost effectiveness analysis of screening for Sight Threatening Diabetic Eye Disease. BMJ **320**: 1627 – 1631*
2. James M., Little R. (2001) Screening for Diabetic Retinopathy Report to the National Screening Committee www.diabetic-retinopathy.screening.nhs.uk/decision-analysis.html

Key Messages

- Diabetic retinopathy screening is a cost effective strategy
- The results are sensitive to the sensitivity and specificity of the screening technology
- Results will be sensitive to any change in the cost structure of screening options
- At a cost per QALY of < £65 per eye screen, screening is well within the £30k NICE threshold

Screening for Diabetic Retinopathy in the United States
or
"How to Eat an Elephant"

Professor Lawrence Merin, Vanderbilt University, Nashville, USA

As diabetes in the United States approaches pandemic levels, there is currently no national plan for retinopathy screening using digital technology. Conventional physician-provided care currently reaches only about 9 million patients yearly, and it may not be able to adequately expand to meet this growing public health problem.

In America, healthcare delivery is chiefly driven by market forces, and the key to any new preventive health program is reimbursement. Provision of medical care is based on private insurance for those who can pay for it, and a patchwork of Federal programs for the indigent and the elderly. Cutbacks in Federal and state funding for the poor and increasingly expensive private insurance has resulted in more than 43 million Americans who have no healthcare insurance whatsoever.

The Center for Medicare and Medicaid Services (CMS) sets reimbursement standards for Federal programs and also influences private insurers' reimbursement policies. Currently, CMS does not offer reimbursement for image-based diabetic retinopathy screening, and only a few private insurers do so.

Since 2003, we have initiated two parallel attempts to change CMS policy. The first is a Congressional bill, which, if passed, will achieve a legislative remedy. The second is an attempt to obtain administrative agreement within the government for a national coverage decision. In support of these efforts, endorsements from the American Diabetes Association and seven other healthcare and social justice organizations have been obtained.

Although we have not yet achieved an effective national program, we have learned some valuable lessons:

Key Messages

- Determine the scope of the problem. Adopt existing delivery models. If a large-scale effort is out of reach, begin with smaller demonstration projects.
- Do not be dissuaded. Steadfast effort will attract attention and allies.
- Think strategically. Bureaucracies may be malleable. Given the correct lever and a well-placed fulcrum, you can move the world!

Acquiring and Managing the Population

Dr Graham Leese, UK

A lot of work has been performed identifying the most effective tool for screening diabetic eye disease. Population coverage however is at least as important. The first part of this is to identify the total population requiring screening, and subsequently trying to encourage them to attend. Most screening programmes look to diabetes registers for their source of patients, but these can be fragmented and incomplete. Record linking can help unify data to provide a single robust patient registers. We show how this can be done by linking the Scottish Diabetes Register (SCI-DC) to retinal screening databases. We show what impact it has at identifying patient numbers as shown in the Scottish Diabetes Survey. We demonstrate how integration between retinal screening databases with diabetes management systems can act to the advantage of both.

Key Messages

- Population coverage more important than the technology used for screening

- Linking different datasets electronically can be effective at identifying the total diabetes population
- Electronic links between diabetes records and retinal screening records enhance the value of both.
- Ensure adequate IT personnel if the system is to be reliable

Digital Imaging

Dr Peter Scanlon, UK

In the UK a Minimum Camera Specification has been developed by a Four Nations Working Group. The Working Group considered that non-mydriatic digital cameras were the preferred camera to use in a Diabetic Retinopathy Screening Programme even for programmes in which mydriasis is routinely undertaken.

The recommendations are that:

1. Image File formats should not result in the loss of any clinically significant information.
2. Camera Resolution - the original images, as output by the camera, should be a minimum of 20 pixels per degree of retinal image, both horizontally and vertically.
3. The field of view, as permanently recorded, should be a minimum of 45° horizontally and 40° vertically.
4. All retinal cameras have to be CE marked.

The English Screening Programme considered that the software modules required to manage a Retinal Screening Programme are:

Module 1: Capture / Process / View.
Module 2: Grading.
Module 3: Archiving / Backup.
Module 4: Call / Recall.
Module 5: Clinic Tracking.
Module 6: Referral / Treatment Tracking.
Module 7: Audit / QA.
Module 8: Reporting.

The English Screening Programme has developed Guidance for:

1. The storage of digital Images, both in terms of storage formats and recommended minimum duration for which the images should be stored.
2. Methods of transporting the images to a grading centre
3. Back up of the server and images after capture.

Messaging protocols have also been developed to standardise the exchange of retinopathy screening data.

Telemedicine

Prof David Owens, Cardiff, UK

Summary outstanding from David Owens

Automated Grading

Keith Goatman, UK

Until recently the automated analysis of retinal images for diabetic retinopathy has been only an academic curiosity. The lack of commercial interest has given weight to the argument that it should remain so. However, the situation is changing due to the introduction of nationwide screening programmes, coupled with the relentless rise in the prevalence of diabetes. If we, and manufacturers, do not begin to develop a strategy for automated analysis now, it is unlikely that we will be able to cope with future service demand.

Automated retinal image analysis is not a new idea; work in the area spans almost 25 years. Microaneurysms (MAs) were one of the first lesions to be analysed. However, detection of MAs (or indeed any combination of lesions) alone cannot be used to reduce manual screening workload. This is one reason for the unenthusiastic response to commercial products; all images still need to be checked manually for clarity and correct field of view alignment, lest lesions be missed due to a blurred image, or macular lesions missed in an otherwise clear image because the macula is outside the photograph.

We have developed a comprehensive "level one" screening system, which determines image clarity and field of view before determining if the image contains microaneurysms. Results from a recent study involving over 10,000 images from the Grampian screening programme showed that the system can significantly reduce both the manual workload and costs of the screening service. The evidence shows that automation can work, but what will it take to make it a clinical reality?

Key Messages

- Clinical necessity will drive automated techniques from being just an academic curiosity to become an essential tool in service delivery.
- Image quality assessment (both image clarity and verification of correct field of view) is a prerequisite for successful automation.
- Commercial problems in the past should not discourage future investment in automation: the clinical need and the available technology mean that the time is now right for automation.

Assessment of Diabetic Macular Edema by Macular Imaging

Professor José Cunha-Vaz, Portugal

Diabetic macular edema is the must frequent cause of vision loss in diabetic patients. In order to choose the best therapeutical strategies it is fundamental to characterise well what subtype of diabetic macular edema is present in a given patient.

New methods of macular imaging are now available which together with fundus photography and fluorescein angiography have changed completely our understanding of diabetic macular edema. These methods include optical coherence tomography, retinal thickness analysis and retinal leakage analysis. It is now possible to identify the location

and extent of alterations occurring in the Blood-Retinal Barrier, changes in retinal thickness and volume, and, even, structural alterations occurring in the retina.

Using these methodologies it is possible to subtype diabetic macular edema according to its distribution in the retina, evolution, involvement of the fovea, alteration of the BRB, presence of ischemia, presence of large cysts and evidence of vitreous traction.

An assessment table of diabetic macular edema using combined macular imaging was presented

Key Messages

- 8 features of diabetic macular edema allow subtyping by macular imaging:
    - distribution of edema (focal or diffuse)
    - evolution (response to tx) (chronic or non-chronic)
    - status of blood retina barrier (intact or open)
    - foveal involvement (none or x%)
    - extent involved (<1 DD vs. ≥1DD)
    - cysts (absent or present)
    - traction (absent or present)
    - ischemia/capillary closure (absent or present)
- subclinical DME is a frequent finding in preclinical retinopathy

Laser Treatment for Diabetic Macular Oedema

Francesco Bandello, Professor of Ophthalmology, University of Udine, Italy

Diabetic macular edema (DME) is a sight-threatening complication of both type 1 and type 2 diabetes mellitus. Development of macular edema is dependent on glycaemic control and on the duration of diabetes. Once DME has developed, laser treatment remains the mainstay of treatment, reducing the risk of moderate visual loss by 50%, as was shown by large-scale, randomized, controlled clinical trials.

DME has traditionally been classified into focal and diffuse types. Following recent improvements in diagnostic techniques, with the advent of Optical Coherence Tomography, it has been possible to recognise three different components in the pathogenesis of DME: prevalently retinovascular, prevalently tractional, prevalently associated with taut, attached posterior hyaloid. Each one has its own particular biomicroscopic, angiographic and OCT characteristics, that facilitate the diagnosis. A correct diagnosis is crucial in determining which treatment is most appropriate.

Laser photocoagulation is indicated in DME with a prevalently retinovascular component. Different wavelengths can be used with the same efficacy to perform laser treatment, and new photocoagulation modalities are under investigation in order to reduce side effects. Novel pharmacological approaches using agents that could slow the progression of DME in early stages are now being tested.

Key Messages

- Diabetic macular oedema can be divided into three main groups according to its pathogenesis: prevalently retinovascular, prevalently tractional, prevalently associated with taut, attached posterior hyaloid
- Currently laser photocoagulation for diabetic macular edema is the only treatment whose efficacy has been proven by large-scale, randomized, controlled clinical trials. Efficacy of laser treatment is limited by its potential side effects and small chance of visual improvement
- Experimental therapeutic approaches are aimed at preventing the development of diabetic macular edema and at limiting the side effects of laser treatment

When to Consider Surgery and Therapeutic Adjuncts

Pascale Massin, Professor of Ophthalmology, Hopital Lariboisiere, Paris, France

Macular edema is the main cause of visual impairment in diabetic patients. Its treatment is mainly based on laser photocoagulation which has shown limited efficacy for diffuse diabetic macular edema (DME). Alternative treatments to laser photocoagulation for diffuse DME are thus currently under investigation. Intravitreal injection of triamcinolone acetonide has recently been introduced to treat macular edema refractory to laser photocoagulation. The rationale for the use of corticosteroids to treat DME is that they might reduce retinal capillary permeability by increasing the activity and/or density of the tight junctions in the retinal capillary endothelium; it has also been reported that corticosteroids might inhibit the metabolic pathway of the vascular endothelial growth factor (VEGF).

This treatment for DME seems extremely effective to reduce macular thickness and improve visual acuity; however, its has several drawbacks, as its needs repeated injection every 4 to 6 months, it can induce increased intraocular pressure or cataract, and complications due to the injection. This approach needs to be evaluated in large randomized trials. Other alternative treatments include Anti-VEGF therapy. Two therapeutic strategies are under evaluation. Pegaptanib –an anti-VEGF aptamer, binds to $VEGF_{165}$, sequestering it and preventing VEGF receptor activation. The aptamer has demonstrated significant inhibition of vascular permeability and retinal neovascularization in animal models. Encouraging results of repeated intravitreal injections of pegaptanib for diabetic macular edema in a phase II trial have been recently reported. Ranizibizumab is a recombinant humanized monoclonal antibody fragment with specificity for all isoforms of human VEGF. Promising results on intravitreal injections of this treatment on ARMD have been demonstrated in phase II trials; phase II trials on diabetic macular edema are starting. A major limitation of both treatments is the need for repeated intraocular injection, with its risks including endophtalmitis and retinal detachment.

Key Messages

- Macular edema remains a major therapeutic problem in diabetic patients

- Several alternative treatments are under evaluation, some of them raising great hope for better outcome of DME
- Are repeated intra vitreal injections appropriate for a chronic disease like DME ?

Challenging Cases

Ann Katrin Sjolie, Professor of Ophthalmology, Denmark

Two cases with diabetic maculopathy were presented for discussion. A number of important points were emphasised by Professor Sjolie and delegates.

Key Messages

- It is reasonable to observe patients with maculopathy after initial laser treatment
- Careful review is required when the HbA1c is lowered rapidly
- The reduction in HbA1c in response to treatment is unpredictable
- Consider vitrectomy with intravitreal triamcinolone in advance disease
- Watch the patient with a foot ulcer and diabetic retinopathy

Pathogenesis – What's new?

Eva Kohner, UK

Increased leukocyte-endothelial cell adhesion is a key early event in the development of diabetic retinopathy. Raised activity of glycosylating enzyme [beta] 1,6-Acetylglucosaminyltransferase (core 2 GlcNAc-T) is responsible for increased leukocyte-endothelial cell adhesion and capillary occlusion in retinopathy. Elevated glucose increases the activity of core 2 in the leucocytes of both type1 and type 2 diabetic patients and increases their adhesion to retinal capillary endothelial cells in a dose-dependent manner. Inhibitionof Cor-2 enzyme by a PKC-ß2 inhibitor and prevented increased leukocyte-endothelial cell adhesion. and capillary occlusion in diabetic retinopathy.

Besides high glucose, serum of diabetic patients was also fund to increase Cor-2 activity in cultured leucocytes. This increased activity could be inhibited by TNFα antibodies. This suggests that diabetic retinopathy has an inflammatory basis, and its inhibition early in the disease process could prevent the development of sight threatening retinopathy.

Key Messages

- Diabetic retinopathy is the result of capillary occlusion by white blood cells
- White blood cells become more sticky because of increase in core 2 enzyme activity.
- Core-2 is activity is increased by both high glucose and TNFα, which is also increased in diabetes

Diabetic Retinopathy Systemic Management

Dr Jiten Vora, Consultant Diabetologist, Royal Liverpool University Hospital, UK

Whilst screening for diabetic retinopathy is undoubtedly important, the management of patients' systemic risk factors is equally so. Patients identified to have significant retinopathy must have their systemic risk factors addressed in order to reduce the rate of progression of retinopathy and consequently visual impairment. Without such a link between screeners and the patients' physician, screening becomes an active observation of deline of the patients' retinae. Systemic risk factors that require targetting include glycaemic control, management of elevated blood pressure and lowering of plasma lipid levels. Other factors to consider include the blockade of the renin-angiotensin system per se, the presence of abnormal renal function and associated anaemia, pregnancy and smoking.

Data for the beneficial effect of improved glycaemic in reducing the primary development and secondary progression of retinopathy emanate from the DCCT (Type 1), UKPDS (Type 2) and Kumamoto (Type 2 patients commencing insulin therapy). With a reduction of between 0.9 and 2% glycosylated haemoglobin, retinopathy was reduced by 20 – 69%. Reduction of blood pressure is also protective in terms of development/ progression of retinopathy. For example, a 10 mm Hg reduction in systolic blood pressure produced a 13% reduction in retinopathy, and more importantly a reduction in the decline of visual acuity. Elevation of various components of the standard lipid profile have being implicated in the development of retinopathy. However, it is only recently that studies have demonstrated the benefit of lowering lipid levels in reducing progression of retinopathy, as exemplified by the FIELD study. When all these risk factors are targeted, even in the high risk patient with Type 2 diabetes and microalbuminuria, a 60% reduction in the progression of retinopathy is evident over a study periof of 8 years (STENO-2 study)

Thus, there is now a large body of data for the management of systemic risk factors for diabetic retinopathy that should be applied to patients in whom retinopathy is detected.

Key Messages

- Recommended systemic management endpoints
  - HBA1c <7 % (European +IDF consensus)
  - BP <135/85 mmHg (European +IDF consensus)
  - total cholesterol <5 mmol/l
- Ophthalmologists should measure or have ready access to key markers of systemic control: HbA1c, BP and lipids
- Links need to be established between screeners and the patients' primary physician in order to reduce systemic risk factors for diabetic retinopathy, especially in those patients at the highest risk of visual impairment.

Novel Therapies for Retinopathy – an Update

Dr Paul Dodson, UK

Diabetic retinopathy is not only a major cause of blindness in people with diabetes, but also in working-age adults in the Western world. Major modifiable risk factors for diabetic retinopathy include poor glycaemic control, hypertension, proteinuria, and hypercholesterolemia. Therapy is therefore directed at controlling these risk factors, and includes regular screening to detect early retinal changes.

There are many factors that influence the development of diabetic retinopathy, which include increased levels of vascular endothelial growth factor (VEGF), growth hormone, insulin-like growth factor-1, and angiotensins. VEGF in particular has been identified as a major factor. Recent research interest has been directed to the protein kinase enzyme system (PKC). Hyperglycaemia has been demonstrated to stimulate PKC, which results in increased production of VEGF and its subsequent deleterious effects on retinal endothelial cells. Large randomized trials of a specific PKC beta inhibitor have been performed in man with positive results, which will be outlined.

Other newer therapies directed at the causative mechanisms of diabetic retinopathy are currently being investigated in clinical trials. These therapies include VEGF aptamers, growth hormone antagonism and growth hormone receptor antagonists. In addition, steroids and lipid-lowering agents (statins and fibrates) are being re-evaluated for their effects on diabetic retinopathy.
It is hoped that these new therapies, together with more aggressive screening and control of risk factors will lead to better outcome of diabetic retinopathy in the near future.

Key Messages

- Systemic medical therapies targeted for microvascular disease are on the horizon
  - PKC beta 1 & 2 inhibition, Sandostatin LAR)
- PKC programme continues, investigating retinopathy and nephropathy
- Interesting licensing issues and cost pressures are likely

Report from debates and votes

Two debates took place during the conference and a number of consensus votes were taken:

Debate 1

"One field is adequate for photographic screening."

For the motion

Dr. John Olson, MD FRCP Edin., National Services Division, NHS National Services, Scotland

Historically seven-field stereoscopic photography has been the diagnostic gold-standard for diabetic retinopathy. This is impractical in screening leading to varying, and usually empirical, two-field protocols. The two-field EURODIAB protocol has been scientifically validated, but only with very small numbers of patients (48).

Studies of ophthalmology patients show that nasal field new vessel formation is accompanied by referable retinopathy in the macular field. Recently three large screening studies compared one-field vs. two-field digital photography compared to slit lamp examination by ophthalmologists. All showed equivalent sensitivity for detecting referable ("sight-threatening") retinopathy, with one-field having a lower technical failure rate. Although adopted in Scotland, other screening programmes in the United Kingdom have been reluctant to adopt a one-field photographic protocol. Throughout the United Kingdom the second nasal field is, however, regarded as a "bonus", its absence not invalidating the screening examination.

This bonus field is not without cost. It incurs a significant time cost, either through the use of mydriasis (incurring an additional cost to society) or allowing the eye to recover from the effect of flash photography. It incurs a significant grading cost, additional fields mean additional grading. Assuming a prevalence of diabetes of 4% in a European population of 870 million, this means an additional 70 million images to be graded annually. In 2002, the Health Technology Board for Scotland showed that, even with rapid turnaround, multiple field photography requiring mydriasis is 43-50% more expensive that one-field photography. If screening is to be introduced into Europe it is imperative that we promote cost-effective programmes that reflect the wider economic and health concerns of Europe rather than the comfort zones of professionals. One-field is adequate for photographic screening.

Key Messages

One-field photography:

- detects referable retinopathy
- is patient-friendly
- is grader-friendly

- is a cost-effective use of scarce resources

Against the motion

Professor Toke Bek, Aarhus, Denmark

Screening for diabetic retinopathy includes fundus photography with the purpose of documenting the morphological lesions in the retina. It is inherent in the screening concept that the screening examination should have a sensitivity close to 100%. Consequently, fundus photography for retinopathy screening should cover all areas of the ocular fundus where retinopathy lesions can occur that may influence the clinical decision taken on the basis of the examination. The clinical decisions that have to be made are: 1) The definition of the time interval to the next examination, and 2) Possible referral for further diagnostic procedures and/or treatment. The speaker will argue and show clinical examples in favour of the notions:

Key Messages

- The definition of the control interval in early diabetic retinopathy and decision about referral for diabetic maculopathy can be done on the basis of fundus images covering the central 50-60 degrees of the fundus.
- The detection of proliferative diabetic retinopathy requires that the fundus photographs cover the area nasal to the optic disk, e.g. using 50-60 degrees fundus photographs centered on the disk.

After the presentations and discussion there was majority (90:64) against the motion a change from the position prior to the debate of >75% against the motion.

Debate 2

"Screening should be annual."

For the motion

Professor Massimo Porta, Department of Internal Medicine, University of Turin, Italy

Such influential bodies as the American Diabetes Association and the American Academy of Ophthalmology recommend annual screening. Some general considerations support that an annual approach may be more prudent. Longer appointments (eg. every 2-3 years or more) are harder for clinics to organize and for patients to keep, possibly resulting in even longer intervals, and may convey to patients the impression that retinopathy is unimportant. Finally, since the accepted sensitivity of most screening programmes is 80%, hazardously delayed appointments may be given to patients in whom minimal lesions were not seen.

Our own experience of 13 years, with 14,894 screening episodes according to the 1990 European recommendations, suggests that the 5-year cumulative incidence of new DR requiring referral, in most cases with lesions near the macula, was higher than 8%. Hence, if appointments had been given every 2-3 years, and some patients had failed to attend for another 1-2 years, the risk of developing sight-threatening RD would have become consistent. The outcome would have been far worse for false-negatives. Rare microaneurysms are easily overlooked in clinical practice, and the cumulative incidence of DR requiring referral developing from mild retinopathy was 8% within 1 year, more than 30% after 3 years and almost 60% at 5 years, with lesions near the macula in 5% of patients after 1 year and more than 50% after 5 years. Being on insulin treatment and older-onset (diagnosis at age $\geq$ 30) increased the risk of progression. The European guidelines definition of non-proliferative retinopathy requiring referral carried a consistent risk of progression to sight-threatening DR, with more than 60% of patients lasered for macular oedema within 5 years.

Key messages:

- Screening every other year may be reasonably safe in patients without DR who are not on insulin, assuming the procedure has near 100% specificity in ruling out mild retinopathy and a sound system is in place to recall non-attenders.
- Prudentially, patients on insulin should be screened yearly, because they may be at increased risk of new retinopathy, if they have none, and definitely at risk of worsening, should they be false negatives.

Against the motion

Dr. Naveed Younis, Consultant Diabetologist, Manchester, UK

Current guidance on screen intervals for diabetic retinopathy (DR) are based on consensus opinion. Most guidelines recommend annual intervals of screening for those without retinopathy and annual or more frequent in those with DR. A number of guidelines recommend two-yearly intervals of screening for those without DR including the European Retinopathy Working Party.

In longitudinal studies, using sensitive techniques, in both Type 1 & Type 2 DM in those with no DR there is a low risk of progressing to STDR, PDR or macular oedema within a 12 months period often with a risk of 1 in 300 or greater.

The risk of progression to STDR in those with the earliest grade of non-proliferative diabetic retinopathy (background retinopathy) is around 1 in 20, yet guidelines still recommend annual screening in these individuals, the same interval as in those with no retinopathy.

Based on cost effectiveness, a number of reports have indicated that the optimal approach to screening for DR is two or three yearly in those without DR. This can result in similar reductions in years of sight saved per lifetime and QUALY compared to annual screening but at highly reduced screening costs.

Screening intervals in other disease settings such as cervical and breast screening programmes are determined from incidence of disease and cost effectiveness. Thus it is justifiable to screen at two or three yearly intervals and efforts should be made to ensure high compliance and good coverage in programmes, rather than to screen a smaller number more frequently.

Key messages:

- Existing intervals of screening from guidelines on DR are based on consensus opinion rather than incidence of disease and cost effectiveness.
- A number of longitudinal studies indicate that those without DR have a very low risk of progression to STDR in 1-year.
- Based on cost-effectiveness the optimal interval of screening is two or three yearly in those without DR, resulting in similar gains in years of sight-saved per lifetime compared to annual screening.

After the presentations and discussion there was a consensus (108:29) in favour of the motion:

"A maximum screen interval of 1 year should be offered to all patients."

Consensus vote

Technical approach to screening

At the end of session 5 a vote was held on the method of screening. The following statements achieved consensus (>95%) amongst delegates
"Digital photography is the way forward"
"Automated grading is a way forward for the future"

Organising committee

The conference was lead by an organising committee with the following members listed in alphabetical order with their contributions:

Deborah Broadbent	local organiser, publicity, national representatives
Simon Harding	local organiser, treasurer, consensus, organising committee chair
Pat Hart	programme committee
Eva Kohner	programme committee, publicity
Graham Leese	sponsorship/exhibition
John Olson	programme committee
David Owens	programme committee
Ian Pearce	local organiser, programme committee chair
Massimo Porta	scientific committee
Peter Scanlon	programme committee
Jiten Vora	local organiser, sponsorship/exhibition

Official national representatives

Mr	Pajtim	Lutaj	Ophthalmologist	UHC of Tirana	Albania
Dr	Florian	Toti	MD	University Hospital Center "Mother Theresa "	Albania
MD	Tatyana	Hergeldzhieva		University Eye Department	Bulgaria
MD	Donyo	Donev		Center for Sight 'Acad. K. Pashev"	Bulgaria
Prof	Tomas	Sozna	Ophthalmologist		Czech Republic
Prof	Anne Katrin	Sjolie	Ophthalmologist		Denmark
Miss	Fionna	O'Leary	Programme Manager	English Programme for Diabetic Retinopathy Screening	England
Dr	Dinesh	Nagi	Consultant Diabetologist	English National Project Group	England
Prof	Pascale	Massin	Ophthalmologist	Paris	France
Dr	Paula	Summanen	Chief of service	Department of Ophthalmology	Finland
Prof. MD	Ramaz B.	Kurashvili	Director	Georgian Diabetes Center	Georgia
Dr	Aleksandre T.	Aleksidze	Ophthalmologist	Georgian diabetes Center	Georgia
MD	Bernhard Otto	Boehm	Head of Division of Endocrinology	University of Ulm	Germany
Prof Dr	Gabriele	Lang	Head of Division of Medical Retina	University of ULM	Germany
Mrs	Tina	Xirou	Consultant Ophthalmologist	Red Cross General Hospital	Greece
Dr.	Rozsa	Degi	Assistant Professor	University of Szeged	Hungary
Prof	Einar	Stefansson	Ophthalmologist		Iceland
Mr	Robert	Acheson	Consultant Ophthalmic Surgeon	Irish College of Ophthalmologists	Ireland
Ms	Margaret	Morgan	Ophthalmologist	HSE North West area	Ireland
MD, MPH	Irit	Rosenblatt	Head of Ophthalmology Service	Rabin Medical Center - "hasharon" campus	Israel
Prof	Francesco	Bandello	Ophthalmologist		Italy
Prof	Massimo	Porta	Associate Professor	Department of Internal Medcine, Universtiy of Turin	Italy

MD, PhD	Vilma Jurate	Balciuniene	Ophthalmologist	Eye Clinic of Kaunas University of Medicine	Lithuania
MD	Jurate	Lasiene	Endocrinologist	Institute of Endocrinology, Kaunas University of Medicine	Lithuania
Doctor	Sandra	Cardillo	Diabetes Mellitus in Luxemburg	CHL	Luxemburg
Dr	Pat	Hart	Consultant Ophthalmologist	Royal Hospital Trust, Belfast	Northern Ireland
Miss	Susan	Johnston	Locum Consultant	Royal Hospital Trust, Belfast	Northern Ireland
Dr	Geir	Hanken	MD	NOF (Norwegian Opht Soc)	Norway
Dr	Elzbieta	Bandurska-Stankiewicz	Associate Professor	Regioanal Specialized Hospital, Olsztyn	Poland
Dr.	Luis	Cristovao	Ophthalmologist	AIBILI	Portugal
Doctor	Cristina	Zamfir	Ophthalmologist	National Institute of Diabetes "N. Paulecsu"	Romania
Doctor	Tiberius	Mogos	Diabetologist; Head of Intensive Care Unit	National Institute of Diabetes "N. Paulecsu"	Romania
Mrs	Nicola	O'Keefe	Project Manager	National Services Division, NHS National Services	Scotland
Dr	John	Olson	Lead Clinician	National Services Division, NHS National Services	Scotland
Professor	Svetislav	Milenkovic	Consultant ophthalmologist	Institute of Ophthalmology	Serbia and Montenegro
Prof. Dr	Vasilije	Misita	Chief of Department for Vitreoretinal Surgery	University of Belgrade School of Medicine	Serbia and Montenegro
Dr.	Enrique	Soto-Pedre	Project Coordinator	European Innovative Biomedicine Institute	Spain
Dr	Evgeny	Skylarov			St. Petersburg
MD	Ingrid	Johansson	Ophthalmologist		Sweden
Dr	Dic	Aronson	Diabetologist	SFD	Sweden
Dr.	Maria	Suttorp-Schulten	Ophthalmologist	Vrije Universiteit Amsterdam	The Netherlands
Assoc.Prof	Sehnaz	Karadeniz	Ophthalmologist	Turkish Diabetes Foundation	Turkey
MD	Nilay	Alacali	Op. Dr.	Turkish Diabetes	Turkey

				and Obesity Foundation	
Prof	David	Owens	Consultant Diabetiologist	Cardiff	Wales
Dr	Djamshid	Safarov	Ophtalmosurger	Eyes Lazer Surgery Center	Uzbekistan

Registering Delegates

See Appendix 2

National organisations invited to send representatives

Diabetes

Shoqata Shqipëtare Diabetike
Albanian Diabetes Association
Azerbaijan Diabetes Society

Belarussian Humanitarian Organisation
Georgian Union of Diabetes and Endocrine Associations
Diabetes Association of the Republic of Kazakhstan

Diabetes Association of Kyrgyzstan
Macedonian Diabetes Association
Russian Diabetes Federation
Ukrainian Diabetic Federation
Diabetes UK
Hrvatski Savez Dijabeticka Udurga
Croatian Diabetes Association
Cyprus Diabetic Association
Diabetesforeningen
Danish Diabetes Association
Finnish Diabetes Association
Estonian Diabetes Association
Association Française des Diabétiques AFD
Deutsche Diabetes Union
German Diabetes Union

Magyar Diabetes Tarsasag
Hungarian Diabetes Association
Samtök Sykursjúkra
Icelandic Diabetic Association

Ophthalmology

Albanian Ophthalmological Society

Scientific Society of Ophthalmologists of Azerbaijan
Belarussian Ophthalmology Society
Georgian National Ophthalmological Society

Kazak Association of Ophthalmologists
Institute of Eye Diseases
Kazakh Ophthalmological Society
Krygyzstan Society of Ophthalmology
Macedonian Ophthalmological Society
All Russian Society of Ophthalmologists
Ukrainian Ophthalmological Society
Royal College of Ophthalmologists
Croatian Society of Ophthalmology

Cyprus Ophthalmological Society
Dansk Oftalmologisk Selskab (Danish Ophthalmological Society)
Finnish Ophthalmological Society
Estonian Ophthalmological Society
Societe Francaise d'Ophtalmologie

Deutsche Ophthalmologische Gesellschaft (DOG)
EURORETINA
Hungarian Ophthalmological Society

Icelandic Ophthalmological Society

Israel Diabetes Association	Israel Ophthalmological Society
Lithuanian Diabetes Association	Lithuanian Ophthalmological Society
Association Luxembourgeoise du Diabète ALD Luxembourg Diabetes Association Ghaqda Kontra D-dijabete Maltese Diabetes Association	Societe Luxembourgeoise d'Ophtalmologie (Luxembourg Society of Ophthalmology)
Norges Diabetesforbund Norwegian Diabetes Association	Norwegian Ophthalmological Society
Zveza Drustev Diabetikov Slovenije SLODA	Slovenian Society of Ophthalmology
Schweizerische Diabetes-Gesellschaft Swiss Diabetes Association	Retina International Switzerland Schweizerische Ophthalmologische Gesellschaft / Société Suisse d'Ophtalmologie
Österreichische Diabetes-Gesellschaft Austrian Diabetes Society Österreichische Diabetiker Vereinigung Austrian Diabetes Organization	Austrian Ophthalmological Society
Association Belge du Diabète ABD Belgian Diabetes Association	Union Europienne Des Medecins Specialistes (U.E.M.S.), Section Specialisie D'Ophtalmologie
Vlaamse Diabetes Vereniging VDV Flemish Diabetes Association	Belgian Society of Ophthalmology BOG-SBO
Ceska Diabetologicka Spolecnost Czech Diabetes Society SVAZ Diabetik ù Ceské Republiky Union of Diabetics of the Czech Republic	Czech Society of Ophthalmology
Hellenic Diabetes Federation Hellenic Diabetologic Association	Hellenic Ophthalmological Society
Diabetes Federation of Ireland Irish Endocrine Society	Irish College of Ophthalmologists
Associazione Italiana per la Difesa degli interessi dei diabetici (AID) Associazione Medici Diabetologi (AMD) FAND - Associazione Italiana Diabetici Societa Italiana di Diabetologia (SID)	Societa Oftalmologica Italiana
Diabetesvereniging Nederland DVN Dutch Diabetes Association Nederlandse Vereniging Voor Diabetesonderzoek NVDO Dutch Association for Diabetes Research	Nederlands Oogheelkundig Gezelschap (NOG)
Polskie Stowarzyszenie Diabetyków Polish Diabetes Association Polskie Towarzystwo Diabetologiczne Polish Diabetological Association	Polish Ophthalmological Society
Associação Protectora dos Diabéticos de Portugal APDP Sociedade Portuguesa de Diabetologia Potuguese Society of Diabetology	Sociedade Portuguesa di Oftalmologia
Slovenska Diabetologicka Spolocnost	Slovak Ophthalmological Society

Slovak Diabetes Society ZVAZ Diabetikov Slovenska Association of Diabetic Patients of Slovakia	
Federación Española de Diabetes Spanish Federation of Diabetes Sociedad Española de Diabetes Spanish Diabetes Society	Sociedad Espanola de Oftalmologia
Svenska Diabetes Förbundet Swedish Diabetes Association Swedish Society for Diabetology	Swedish Ophthalmological Society
Bulgarian Diabetes Association Bulgarian Society of Endocrinology	Bulgarian Society of Ophthalmology
Association for Protection of Romanian Societatea Romana de Diabet, Nutritie si Romanian Society of Diabetes, Nutricion and Metabolic Disease	Romanian Society of Ophthalmology
Diabetes Association of Serbia and Montenegro	Association of Ophthalmologists of Serbia and Montenegro
Yugoslav Association for the Study of Diabetes	
Türk Diabet Cemiyeti Turkish Diabetes Association Turkish Diabetes Foundation	Turkish Ophthalmological Society (TOS)

Sponsors and exhibitors

The organising committee are grateful to the following commercial organisations for their support without which national representatives and experts would not have been able to participate.

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Exhibitors

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Support was provided as educational grants and commercial organisations had no control over the content and subsequent communications from the conference.

Endorsements

The following organisations indicated their endorsement of the conference aims:

International Diabetes Federation (Europe)
European Association for the Study of Diabetes (EASD)
European Association for the Study of Diabetic Eye Complications (EASDEC)

SPH/21.12.05

National Abstracts

The Republic of Albania

Presenting authors: Pajtim Lutaj[1], A. Ylli[2], F. Toti[2], V. Mema[1]
[1] Service of Ophthalmology; [2] Service of Endocrinology & Metabolic diseases, University Hospital Center "Mother Theresa "Tirana, ALBANIA

Basic Demographic Characteristics
Data from REgistration of POpulation and Building (REPOBA Dec 2001) in INSTAT (National Albanian Institute of Statistics):

- Total Albanian population 3 069 275
- Urban population 1 294 196 (42.1%)

Population by age:

- Below 20 years 1 194 304 (38.9%)
- Above 65 years 231 363 (7.54%)

Estimated diabetic prevalence: 0.97% (ALBDIAB 2004)
Estimated diabetics number: approx. 30 000
Type 1: Diabetes 8.4%, **Type 2:** Diabetes 90.7% **Other Types:** of Diabetes 0.9%

ALBDIAB 2004. Is the first nationwide program with the aim to create the National Registering of Diabetics through an informatized program, having as background the program DIABCARE Europe. 12 of the greatest districts of Albania (3 in the North, 5 in the South and 4 in the Central part of the country) were included for a total population of approximately 2 200 000 habitants. This program was organized, supervised and conducted by the Service of Endocrinology & Metabolic diseases, with a grant supported by Novo Nordisk Office Albania.

The screening for Diabetic Retinopathy (DR) is part of the protocol of the follow up for every patient with type 2 Diabetes at the time of diagnosis and for the type 1 diabetes every 5 year for diabetes duration of less than 10 years and annually after this time. The stages of retinopathy were defined by trained ophthalmologists by ophthalmoscope after papillary dilatation. As the classification of diabetic retinopathy severity scale was used the classification proposed at the International Congress of Ophthalmology in Sydney in April 2002 by the Global Diabetic Retinopathy Group. For simplification's reason for the computerized program, we had put only three stages of Retinopathy: No Retinopathy, Non proliferative DR, Proliferative DR. Blindness and Macular edema were apart entities.

Fluorescein angiography is not used widely in the outpatient clinics, but only at the Service of Ophthalmology, unique University Center in the country (University Hospital Center "Mother Theresa" in Tirana). An old machine (OLYMPUS) is still operable in the Service of Ophthalmology despite great difficulties to maintain it in working conditions.

A last generation angiograph type TOPCON TRX 50 is installed in a private clinic in the capital of the country.

Laser therapy: available only in two private clinics in the capital, Tirana.

Prevalence of Diabetic Retinopathy:

	Type 1 diabetes	Type 2 diabetes	Total	First time diagnosed Type 2 diabetes an presence of DR
No DR	53.6%	71.26%	69.93%	87.38%
Non Proliferative DR	29.64%	24.37%	24.68%	10.57%
Proliferative DR	14.15%	3.73%	4.59%	1.16%
Blindness	2.54%	0.38%	0.55%	0.21%
Macular oedema	0.07%	0.26%	0.25%	0.68

Difficulties:

1. The lack of appliance for laser therapy in different regions of the country makes difficult the early treatment of Diabetic Retinopathy as part of the prevention for this threatening complication of diabetes.
2. The introduction of more sophisticated methods such as stereoscopic seven-field color photography and training of the ophthalmologists with these new procedures.
3. The unification and the training of all the ophthalmologists with the new guidelines for screening, treatment and follow up of Diabetic Retinopathy.
4. The lack of a closer collaboration between endocrinologists, ophthalmologists and GP for the follow up of diabetic patients with or without Diabetic Retinopathy.

Projects for the near future:

1. Organization of a National Conference of Ophthalmologists and Endocrinologists for the Implementation of a National Program for the Screening and the follow-up of Diabetic Retinopathy.
2. Guidelines for the follow-up of Diabetic Retinopathy and unification of the stages for the DR.

Creating a task force for the problems of DR, involving epidemiologists, endocrinologists, ophthalmologists and decision-makers institute such as Ministry of Health, insurance companies and Institute of Public Health

Bulgaria

Presenting authors: Prof. P. Vassileva, Dr. Ch. Grupcheva, Dr. D. Donev, Dr. T. Hergeldjieva

Population: Republic of Bulgaria has population of 8 million and territory of 111,000 sq. km.

Estimated number of people with diabetes: National Diabetes Registry indicates that 4.5% of people have diabetes. It is estimated that the number of diagnosed diabetics

needing regular eye examination nationally is 360,000. At present there is no national screening program for diabetic retinopathy (DR). University clinics around the country organize their random screening programs.

A description of systematic screening:
Till now two projects on screening for DR were undertaken: in two cities of Sofia district 730 patients with diabetes have been examined locally by ophthalmologists from University Department, Sofia using ophthalmoscopy. DR was diagnosed in 226 (31%) diabetics: mild NPDR - in 141 (19.3%), moderate to severe NPDR in 16 (2%), PDR – 79 (10.8%). 109 (15%) of the screened patients needed urgent treatment: laser and/or surgical. For the screening of diabetic patients in Varna 1000 referred by GP's diabetics were examined in Eye Department Varna for a period of 6 months. DR was diagnosed in 750 (75%) diabetics: NPDR – 450 (45%), PDR - 250 (25%). Only 25% of the examined patients had previous eye examinations and 17% had previous laser. 620 (62%) of the referred diabetics needed urgent treatment: laser and/or surgical. There are 17 lasers - 1 for 471,000 people.

Population based survey demonstrates DR as the leading cause of blindness in 40-60 age group. Health system does not finance screening for DR. Our team has designed a national screening program. Funding is critical issue for its realization and prevention of blindness for DR.

Czech Republic

Presenting authors: Tomas Sosna, Petr Boucek, Leos Rejmont, Antonij Slavcev
Center of Diabetology, Institute for Clinical and Experimental Medicine, Prague; Central Military Hospital, Prague

Population: 10 236 000

Estimated number of people with diabetes: Until 2004 is 712079. From this number diabetes type 1. have 6.7 %males, females 6.5%; with type 2. diabetes suffered 91.9 %(males) 92.2% (females); secondary diabetes – 1.4% (males), 1.3% (females).

A description of systematic screening:
From the year 2002, the Czech Diabetelogical Society and the Czech Vitreoretinal Society published guidelines for screening and treatment of diabetic retinopathy. It consists of recommendations for diabetologists about the periodicity of ophthalmologic examination. In the same time it recommended use of printed guidelines ("Identity card") for patients where basic periodic examinations are write down (type of diabetes, HbA1c, cholesterol level, blood pressure, etc.) which are informative also for the ophthalmologist. The first ophthalmologic examination is performed at diabetes onset even in type 1 diabetes and juvenile diabetes. If diabetic retinopathy (DR) is not present, or is incipient, every year a control examination is performed. In case of mild to moderate retinopathy, the diabetologist sends the patients every six months for ophthalmologic examination. In case of advanced DR, the ophthalmologist takes over the care for patients and fixes the schedule of controls. He also is guided by the degree of diabetes compensation.
If laser therapy is necessary, ophthalmologists are guided by the recommendations which are based on the DRS and ETDRS. By this system all the diabetic patients have to be screened.

Screening method used:
Ophthalmoscopy, biomicroscopy, photography, stereophotography, fluoroangiography.

Basic screening is performed by all ophthalmologists (approximate number of ophthalmologists in the Czech Republic is 800). Fourteen centers with laser are engaged in treatment of DR. However, the total number of laser workplaces is probably higher. In the last year, 20 263 laser photocoagulations were performed for diabetic retinopathy, which is a 15% increase in comparison with the year 2003. In contrast, pars plana vitrectomy for diabetic complications decreased from 1284 operations to 1166 in this year.

DR affects 84 077 individuals, 22 % with proliferative DR, 3 % are blind as a result of DR. In absolute numbers, it is 2364. Nevertheless, the main problem is compliance with this system, furthermore, innovation of ophthalmological devices and continual education of ophthalmologists and diabetologists. Beyond doubt, according to statistical data, there is an improvement in the screening and treatment of DR in the Czech Republic.

Denmark

Presenting authors: Anne Katrin Sjolie
Dept. of Ophthalmology, Odense University Hospital, Sdr. Boulevard 29, DK – 5000 Odense C, Denmark

Population: Denmark has a population of approx. 5.3 million

Estimated number of people with diabetes: Roughly 200.000, about 15.000 with type 1 and the remainder with type 2 diabetes.

Estimates for prevalence of legal blindness are 2% in type 1 and 0.5 % in type 2.

A description of systematic screening:
For the time being, 12 of 13 counties have some screening activities, covering more than 50% of the patients, but exact figures on screening does not yet exist.

A nationwide database for screening for diabetic retinopathy has been planned by the Danish Ophthalmological Society, and has been supported by the National Board of Health to start 2005 or early 2006. This database will include data on photographic as well as clinical screening, the former was recommended officially in a report to the Danish Diabetes Association in 2000. All practicing ophthalmologists (approx. 150) as well as all departments of ophthalmology take part in screening. All 14 departments of ophthalmology and few private practices have access to lasers.

During the last 15 years screening plans have been formalized in 12 of 13 counties, and photographic screening for diabetic retinopathy is the recommended basis for the planned nationwide database.

Top tips: Dedicated ophthalmologists, co-operation with primary treating colleagues, and awareness of health authorities.

Eire

Presenting authors: Robert Acheson, Irish College of Ophthalmologists
John Nolan, Irish Endocrine Society

Population: 3,917,203

Estimated number of people with diabetes: 195,860 (5% of population)

A description of systematic screening:
Counties Donegal, Sligo, Leitrim and west County Cavan (population: 222,762) in the North Western Health Area are the only parts of Ireland wit systematic screening. In 2001, the Irish College of Ophthalmologists prepared a plan for national screening based on digital camera screening in stationary (major hospital eye and diabetes centres an community health clinics) and mobile units. It was publicised as part of a national service plan by the Diabetes Federation of Ireland, and presented to the Minister of Health in 2002. No progress has been made since then.
Participated in TOSCA (Tele-Ophthalmological Services Citizen-centred Application), EU funded project from January 2000 to December 2002. Software was developed to send images over the internet and assist in grading, quality control and image analysis.

Estimated coverage of population by systematic screening: 5,162 people with diabetes in the North Western Health Area.

Screening method(s) used: Mobile photographic digital screening

Ophthalmologists involved in the programme; 1

Lasers available in the programme; 2

Diabetes-related blindness: 322 people registered blind in the Republic of Ireland in 2003 (4.4% of all blind registrations). Diabetic retinopathy was the third greatest cause of blind registrations in 2003.

Principal needs to develop full national screening: The Department of Health and Children are required to fund a national Diabetic Retinopathy Screening Programme following the outline in the publication described above.

Progress over the last 15 years: Systematic screening started in 2004 in the North Western Health Area as above. 7 other centres have ophthalmic physicians, nurses and photographers using digital cameras and grading retinopathy: Cork University Hospital, Loughlinstown Hospital, Mater Hospital, Mullingar, Portlaoise, Royal Victoria Eye and Ear Hospital, St James Hospital.
Whether 1990 guidelines helped to make progress: Helped to introduce a retinopathy screening protocol and perhaps to provide funding by Department of Health and Children for North Western Health area programme.

Top tips for success: 1) Adequate funding 2) Good programme administration 3) Good software for integration of medical and ophthalmic parts of the programme 4) Diabetes

patient register 5) Collaborative prescriptions for non-medical staff to instill drops 6) Good communications between ophthalmologists / GPs / physicians.

England

Presenting authors: Fionna O'Leary, Dinesh Nagi

Population: 50 million

Estimated number of people with diabetes: 1.5 million people

A description of systematic screening:
A National Screening Programme for Sight-threatening Diabetic Retinopathy was announced in England in 2003. The aim is to reduce the risk of sight loss among people with diabetes by the prompt identification and effective treatment of sight-threatening retinopathy at the appropriate stage during the disease process.

A Project Advisory Group has recommended 16 basic standards which will need to be regularly reviewed, so that quality is progressively increased.

Retinopathy competencies were approved as National Occupational Standards in November 2004. The pilot phase of the accreditation process for screener/graders, overseen by City & Guilds, will commence in November 2005.

A nationally negotiated price and lists of camera and management software suppliers was agreed with framework contracts being provided by NHS Purchasing and Supply Agency (PASA). The approved management software has all the quality assurance and audit requirements for the programme, and the appropriate messaging structures to link with the developing NHS Care Record Service.

102 Screening Programmes have been identified in England at various stages of development. 2004-2005 has seen significant advancements in planning and to a lesser extent in implementation of screening programmes as there is an increasing awareness of the National Service Framework targets of offering annual retinopathy screening to 80% of the population of people with diabetes (over the age of 12 years) by March 2006 and 100% by December 2007.

Estimated coverage of population: 30% and rising

Screening method: Mydriatic two 45 degree fields Digital photography

Number of ophthalmologists involved: 102 – one lead ophthalmologist per programme.

Number of lasers available in the programme: Approximately 100

Any data on diabetes related blindness: In 1995, Evans reported that, among people of working age, diabetic retinopathy was the most important cause of blindness (11.9%) in England & Wales.

Principal needs to develop a full national screening programme:
1.Funding

2.Enthusiasm and drive of leaders in the field.
3.General acceptance that this is a worthwhile use of limited resources.
4.Government support

Progress made over the last 15 years: Progress from ad hoc screening to a Systematic National Programme supported by the English Government and with targets that have to be met within the NHS.

Whether the guidelines from 1990 helped your country to make progress: Yes

Top tips for success: Never give up

Finland

Presenting authors: Paula Summanen, MD, FEBO
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Population: 5.2 million inhabitants

Estimated number of people with diabetes: There were in 2002 145.731 persons using medication for diabetes mellitus (DM) (2,8 %); 3.203 aged 0 to 14 years (0,3 %), 69.206 aged 15 to 64 years (2,0 %), and 73.322 aged ≥65 years (9,2 %). In all age groups, there were more males than females (0,4 % vs. 0,3 %; 2,4 % vs. 1,5 % and 9,8 % vs. 8,7 %, respectively (Klaukka 2003). This number has raised to 152.584 in 2003 and to 161.305 in 2004 (Klaukka 2005). In addition, in 2000 there were 62.500 persons with DMT2 treated with diet only (500 aged <30 years, 34.000 aged 30 to 64 years, and 28.000 aged ≥65 years) (Reunanen 2002). The number of patients using DM medication is higher in Eastern Finland (4,6 %) as compared to the capital area and especially Ahvenanmaa (2 %) (Klaukka 2005). DMT1 is more common in children and teen-agers in Finland than anywhere in the world (40-50/100 000/year) (Karvonen et al. 2000).
In the Finnish national register for visual impairment, DM is the fifth most common cause of visual impairment in all age groups (9 %), the leading ones being aging (44 %), hereditary diseases (15 %), neurological (12 %) and congenital (10 %) disorders, followed by glaucoma (8 %) (Ojamo 2000). The number of diabetic patients with visual impairment had raised from 1040 from 1982-1990 to 2000 in 1991-2000. The median age when vision was <0,3 in the better eye due to NPRP raised from 69 in 1982-1990 to 72 years in 1991-2000, and from 35 to 54 years, respectively, due to PRP. The proportion of blind diabetic patients (VA <0,05 in the better eye) decreased from 40 % in 1982-1990 to 21 % in 1991-2000, and that of totally blind from 13 % to 3 %, respectively (Laatikainen, Rudonko, Ojamo 2001).

A description of systematic screening:
National guidelines emphasizising the annual fundus examination for all persons with DM recommonding the use of photographic screening was published and distributed to all authorized physicians in Finland in 1992 (Karma et al. 1992). New evidence based medicine recommendations are currently under preparation. Fundus examination is recommended at the time of diagnosis of DM. For children, regular srcreening should be

started at the age of 10 years and done every other year if no changes were detected and annually or more often according to the severity of retinopathy. For those with DMT2, the interval may be 3 years if no retinopathy is detected, 2 years if only few microaneurysms are detected, and annually or more often when more advanced retinopathy is detected. Two 45°-60° photographs per eye, one macula and one optic disc centered are recommended, and the superiority of red-free images over colour slides in detecting hemoglobin containing structures such as microaneuryss and haemorrhages, IRMA:s and venous beading, all important in determining the severity of NPRP, as well as early new vessels, has been shown (von Wendt et al. 1999, 2000). In 1997, the use of photographic screening was evaluated throug a questionnaire sent to all 455 communities. At that time, photographic screening was done in 179 communities (57 %), plans to start it in 103 (33 %), and in 41 communities it was not used, nor any plans were made (13 %). This corresponded to 71.510 (47 %), 8.937 (6 %) and 23.379 (15 %) of persons with DM at that time (Summanen, Kivelä, Laatikainen 1997). Since then many more communties have started photographic screening and digital imaging has become common.

Laser equipment is available in all public sector hospital (5 university and 15 central and some local hospitals) as well as in several private sector offices. Treatment for PRP is recommended to be started at the time the diagnosis is made and for macular edema within 2-3 months depending on the severity.

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France

Presenting authors: P Massin,[1] G Slama.[2]
[1]Ophthalmology Department, Hôpital Lariboisiere, Paris, France; [2] Diabetology Department, Hôpital Hôtel Dieu, Paris, France.

Estimated number of people with diabetes: Approximately 2.5 million of individuals are affected by diabetes in France (90% type II and the rest type I). The prevalence of the disease is now 3% , with an increase of 4.8% over the past 5 years, and a 50% increase is expected by 2025. There are approximately 4500 ophthalmologists in France, but a 50% decrease in their number is expected by 2015. Right now, the period of waiting to see an

ophthalmologist can be as much as one year in some areas. There are no optometrists. However, a large number of laser devices is available (between 500 and 1000).

A description of systematic screening:
Following the St Vincent Declaration, French recommendations for screening for diabetic retinopathy were published in 1996 by the ALFEDIAM (Association de Langue Française poiur l'Etude du Diabete et des Maladies Métaboliques), the French Society of Diabetology. In 1999, the French National Health Agency (ANAES, Agence Nationale d'Accréditation et d'Evaluation du Soin) also published recommendations to improve the management of patients with type 2 diabetes in France. The guidelines issued by both the ALFEDIAM and ANAES recommend annual fundus examination for all diabetic patients. However, this screening is insufficiently performed. Thus, in 1999, the French National Health Insurance for salaried workers, (Caisse Nationale d'Assurance Maladie des Travailleurs Salariés), showed that fewer than 50% of diabetic patients had had an eye examination during the previous year, and this proportion did not increase during the next two years. In a study which has just been published, the ENTRED (Echantillon National Représentatif des personnes diabétique) Study, similar results were reported.

In France, screening for diabetic retinopathy (DR) is usually performed using fundus examination by an ophthalmologist. A color fundus photography camera is not widely used for this purpose. However, since 2000, some local projects using fundus photography with a nonmydriatic camera, sometimes combined with telemedicine, have started to become operational, such as the OPHDIAT project in the Ile de France region around Paris. In this project, about 10 screening centers are linked to an ophthalmological reading center through the Internet.

Last year, screening for diabetic retinopathy was declared to be a priority by the French Health Authorities (Direction Générale de la Santé) , which have asked for further evaluation of this screening, using fundus photography before it recommends its use more widely. As yet, no full national screening program for DR has been developed in France.

Germany

Presenting authors: Prof. Bernhard O. Boehm (Head, Division of Endocrinology and Diabetes, Ulm University), Prof. Reinhard Holl (DPV-Cohort Study Centre, Ulm University), Prof. Gabriele Lang (Head of Division of Medical Retina, Department of Ophthalmology, Ulm University).

Population: 82.5 million.

Estimated number of people with diabetes: 5.7 million with know diabetes, that is ~ 7% of the total population. 1.55 million people with diabetes are insulin treated.

CURRENT STATUS IN GERMANY

Primary care setting: In people with T1DM and T2DM treated by general practitioners, screening rate is ~30 – 40%. A population-based survey in 1997 revealed that only 32 per cent of diabetic patients received a retinal examination. Further questioning even showed that many of these patients were seen by an ophthalmologist only because of a refraction test or a red eye, and only 25 per cent were referred or urged by their general practitioner

or diabetologist. Recently, nationwide a Disease Management Program (DMP Diabetes mellitus) for T2DM has been implemented. As of 2004 an increase in screening to almost 75% of all T2DM probands was reported.

Diabetes specialists: A team approach is used; people with T1DM and T2DM are referred to trained eye doctors, who are also team members (yearly screening rate in special programs: approx. 83%).

Ulm diabetes clinic (outpatient clinic; tertiary centre): A team approach is used, eye doctor is constantly available to screen all patients with diabetes mellitus for DR. Yearly screening rate is 98.3% of all patients. No misses, ophthalmologists see the remainder 1.7% outside the hospital-based setting.

Blind Registration (data from population data on Wurttemberg-Hohenzollern, Southern-Germany)**:** Standardised results in the diabetic population (incidence rates per 100,000 person-years; standard: diabetic population; 95 % CI): 1990: 72 (61;82); 1991: 88 (76;100); 1992: 77 (67;88); 1993: 82 (71;93); 1994: 62 (53;72); 1995: 82 (71;93); 1996: 70 (60;80); 1997: 69 (59;79); 1998: 59 (49;68). The Poisson model estimated a 3 % decrease of incident blindness in the diabetic population for each year (Relative risk per year 0.97; CI: 0.95; 0.99).

STRATEGIC OBJECTIVE

"*To reduce the incidence of visual impairment due to diabetes through universal access to retinopathy screening and treatment*". St Vincent's Declaration (SVD) - Implement your National Diabetes Programme.
To reach this goal, a new monitoring and treatment program was started in 1993.

Ulm experience 1993-2005:
429 new-onset patients with Type 1 diabetes mellitus and 671 newly diagnosed Type 2 diabetes mellitus were treated at the outpatient clinic of Ulm University.
Procedures:
Screening interval: at least yearly by a hospital-based ophthalmologist.
(a) blood pressure control (target <130/85 mmHg using ACE inhibitors, low-dose thiazide diuretics, AT-blockers, long-acting calcium antagonists, cardioselective ß-blockers); (b) blood glucose control (target HbA1c < 7%; diet, exercise, ICT, OAD); (c) blood lipid control (target LDL < 2.6 mmol/l; statins); (d) smoking (cessation recommended).
Outcome:

- T1DM: no case of proliferative diabetic retinopathy; no laser treatment after 11 years of follow-up; 12/429 (~3%) developed mild-nonproliferative retinopathy after 8 years of T1D. Mean HbA1c 7.1%; mean LDL: 2.34 mmol/l; smoking prevalence 24%. Data from the Children`s Hospital demonstrate that mild nonproliferative retinopathy was present in 72/441 patients (16%) after a mean diabetes duration of 6.5 years. According to diabetes onset before or in puberty (> 10.4 years in girls, > 12.2 years in boys) children with a prepubertal onset of diabetes, retinopathy occurred after disease duration of 10.9 years, compared with 15.1 years in children with onset of diabetes in puberty ($p<0.01$), demonstrating the additional risk conveyed by the prepubertal years of diabetes.
- T2DM: 60/671 (~8.9%) with proliferative retinopathy and/or macular oedema that had to be treated by laser surgery after 11 years of follow-up; mean HbA1c 7.8%; mean LDL 2.68 mmol/l; smoking prevalence 32%.

Access to Effective Treatment: In Germany around 5000 ophthalmologists are available. On average, one ophthalmologist takes care of ~ 1000 patients with diabetes. The number of available laser treatment instruments is not known.

RECOMMENDATIONS

We strongly recommend a team-approach in treating diabetic patients, including ophthalmologists.
Interval of screening: At least yearly interval as already recommended.
Importance of systemic control: Systemic control should be based on a structured recall system; only well-trained ophthalmologists should see and treat patients with diabetes mellitus.
Importance of population coverage: In Germany the number of ophthalmologists seems to be sufficient in Germany. Constant training procedures are strongly recommended leading to the use of laser treatment at the recommended stages.
Effective screening tests: Standard screening by well-trained ophthalmologists.
Emerging therapies: Blood pressure and lipids should be strictly controlled. Optimize glucose control, i.e. ICT or CSII in T1DM patients, intensified regimens in T2DM patients, including early insulin use.
In addition, measures for secondary prevention (e.g., early detection and optimal treatment of patients with diabetic retinopathy) should be intensified, especially in females, to prevent visual loss and blindness.

Georgia

Presenting authors: Ramaz Kurashvili, Aleksandre Aleksidze

Population: 4 500 000

Estimated number of people with diabetes: 7.3%, approx. 280 000 for all population of Georgia

A description of systematic screening:
Systematic (organized) screening was/is carried out. Patients supervised at 5 main centers and at the Regional Center of Ajara (autonomous republic) are regularly screened for presence/progression of diabetic retinopathy

Estimated coverage of population by systematic screening:
None

Screening method(s) used:
Fundus Camera, Slit Lamp

Number of ophthalmologists involved in the program:
There are around 500 ophthalmologists in Georgia, up to 20 work in diabetes retinopathy

Number of lasers available in the program:

There are 5 lasers in Georgia

Any data on diabetes related blindness:
No data accumulated

Principal needs to develop a full national screening program:
European/International Guidelines on Prevention, Revealing and Management of Diabetes Retinopathy; training of ophthalmologists; Fundus Cameras (at least)

Progress made over the last 15 years:
Consultants of the WHO, were dealing with old, Soviet/post Soviet governmental structures, these structures were often changed, and decisions accepted by the previous ones was neglected. We knew, that diabetes was financed by the WHO, but we never received a penny. Now all those people, who started to work on the initiative 15 yrs ago are not there

Whether the guidelines from 1990 helped your country to make progress:
Today all situation, new drugs, new methods of treatment and new generation of HCP, policy and decision makers permit us to look into the future quite optimistic

Top tips for success:
- Close co-operation of diabetologists and ophthalmologists
- New guidelines
- Education of patients and HCP
- Repeated/continuous post-graduate training

Greece

Presenting authors: Mrs Tina Xirou. Consultant Ophthalmologists Vitreoretinal Unit Red Cross Hospital, Athens, Greece

Population: 11,000,000

Estimated number of people with diabetes: Approximately, there are 600,000 – 800,000 diabetic patients in the country.

A description of systematic screening:
There is not a National systematic screening for the incidence of Diabetic Retinopathy, but there are sixteen Diabetology Centers throughout the country that deal with diabetic patients and refer them to Ophthalmologists systematically. It is estimated that only 100.000 of the diabetic patients attend to these Diabetology Centers. The rest of the patients attend either Diabetologists or Endocrinologists or Physicians who co-operate with their insurance provider. The Insurance doctors refer the patients either to individual Ophthalmologists or to NHS Ophthalmic clinics. It is estimated that about 75% of diabetic patients are undergo screening for diabetic retinopathy. Only qualified Ophthalmologists examine the referred patients for diabetic retinopathy and keep their own records either with simple notes or fundus photographs or fluorescein angiographies. On May 2005 there were 2036 qualified Ophthalmologists in Greece and they all accept diabetic patients referrals. There are 240 lasers available in the program. It is known that there are 23000 legally registered blind people in Greece but it is not known how many of

those are related to diabetes. To develop a national screening program we need to develop a communication system between the Ophthalmologists and the Physicians who deal with diabetes. The lack of General Practitioners in Greece may be an important reason for the non-existence of an effective communication system between the involved doctors in the care of diabetic patients. A comprehensive computer network could play a key role in the development of any screening program. Over the last fifteen years the Diabetology Centers were established and the diabetic population was better informed about the necessity of Ophthalmological examination. The 1990 guidelines have helped but the extend of their influence cannot be estimated.

Hungary

Presenting authors: Authors: R Degi[1], BB Toth[1], Zs Fulop[1], L Kolozsvari[1] and T Peto[1,2].
[1]Department of Ophthalmology, Szeged University, Szeged, Hungary. [2]Reading Centre, Moorfields Eye Hospital, London, England.

Aims: In 1989, when the Declaration was signed, South-East Hungary had 1.4 million inhabitants; 4.9% had diabetes. There was no data diabetes related blindness, prevalence of diabetic retinopathy (DR), type of diabetes care or education, or on personnel dealing with them. We present out efforts and difficulties during the process of establishment of DR screening in South-East Hungary.

Methods: The Department of Ophthalmology at Szeged University (DOSZU) played a pivotal role in establishing necessary baseline requirements to achieve the goals of the St Vincent Declaration.

Results: Although we still have no data on prevalence of DR, we confirmed that DR was responsible for 16.8% of all blindness, and was the leading cause in the working age-group. In 1989, diabetes care was fragmented and no diabetes education was available. Since then, computer based patient management system made care co-ordinated. DOSZU now educates both adults by attending clubs and nursing homes and young people via camps. Patients are examined and referred for treatment if needed. DOSZU is training nurses, family doctors and diabetologists in DR. Fifteen years ago there was only one laser and fluorescein angiography (FFA) service available for this population and a handful of ophthalmologists were trained to use them. DOSZU was instrumental in training eye doctors in management of DR and helped other departments to open laser clinics.

Conclusions: Based on the results of our work during the previous 15 years we can now start lobbying for funds for establishing DR screening services in South East Hungary and thus start reducing the burden of illness both on the individual and on the community.

Iceland

Presenting authors: E Stefánsson
University of Iceland, Reykjavik, Iceland.

Purpose: A systematic nationwide screening program for diabetics has existed in Iceland for 25 years. All ophthalmologists in the country are involved with diabetes screening and 5 take part in the centralized program and run the 2 lasers. The prevalence of diabetic blindness has come down from 2.5% to 0.4%.

We study the diabetics who are listed in The National Registry for Blindness (visual acuity: <0.05) and Low Vision (visual acuity: <0.3 and ^{3}0.05) and examine the causes of vision loss and participation in the screening program.

Methods: 21 diabetics who were alive on November 1, 2002 have blindness or low vision in their better eye. We examined the demographic characteristics, retinopathy states, visual acuity, adherence to screening program and preventive treatment and the reason for visual loss. There are approximately 600 type 1 and 4000 type 2 diabetics in Iceland. In a case control study a group of diabetics with comparable type and duration of diabetes, age and gender without significant visual loss was compared in terms of adherence to the screening program and preventive treatment.

Results: One type 1 diabetic is blind and 2 have low vision. All are male, mean age is 47 years (31-55 years) and the mean duration of diabetes was 35 years (16-48 years). 18 type 2 diabetics with blindness or low vision. Two are blind in both eyes and 16 have low vision in their better eye. 14 are female, mean age 75 years (50-85 years) and duration of diabetes 17 years (4-40 years). Out of 21 blind and visually impaired diabetics only 29% (n=6) had adhered strictly to the screening program, compared to 77% compliance in the seeing control group. Three diabetics lost vision in spite of adhering completely to the screening program.

Conclusion: These results confirm a very low prevalence of diabetic blindness and low vision in Iceland. The majority of those who go blind have not participated fully in the public health program and this has probably contribute to their loss of vision.

Israel

Title
1) Diabetic Retinopathy (DR) screening in Israel
2) Screening for glycemic control in DR patients

Presenting authors: Irit Rosenblatt
Department of Ophthalmology, Rabin Medical Center, Beilison Campus, Petah-Tikva, Israel

Population: 7,000,000

Estimated number of people with diabetes: 7-8%, meaning 500,000 diabetic patients.

A description of systematic screening:
The National Board for Diabetes was established 1 1/2 years ago. A systematic, organised screening using fundus cameras and telemedicine communicating systems is now in its final planning stages.

Local screenings are regularly taking place on regional bases. **No nationwide screening** program is on going.

In Israel there are 600 ophthalmologists spread in 24 hospitals and in many community clinics. Around 100 lasers are available.

Registry of blindness for 2004 shows 14.4% is due to diabetic maculopathy and retinopathy. 53% of blind diabetics are age 40-65 years

Participation Purpose: To gather experience from on-going national screenings and apply the "hints and tips" in building our planned "ISRAELI DR SCREENING PROJECT"

Local Screening study – example:

Screening for glycemic control (GC) in diabetic retinopathy (DR) patients

Irit Rosenblatt , MD [1,2] Ruth Axer-Siegel, MD,[1,2] Zvi Herscovici ,MD, [1], Meirav Gabbay ,MD,[1], Karin Mimouni, MD, [1] , Dov Weinberger, MD [1,2] Uri Gabbay, MD ,MPH[2.] Tel-Aviv, Israel

Purpose: 1) Assess the hospital patients' awareness of the impact of GC on DR.
2) To evaluate GC and risk factors in patients treated for DR.
3) To compare the findings with patients followed at a community clinic.

Patients and Methods: 178 consecutive type 2 diabetes mellitus (DM) patients treated in the Retinal Vascular Service in Rabin Medical Center and 107 type 2 DM consecutive patients followed in a community clinic, were examined. A questionnaire including awareness to serum HbA1c, glucose, lipids, blood pressure (BP), medical data, and ophthalmologic examination was filled for each patient.

Results: The hospital patients had earlier onset, longer DM duration and more vascular complications. 48% of the hospital patients versus 14% of the community patients were treated by Insulin. Although only 43% of the patients in both groups were acquainted with HbA1c, 98% of them had undergone this analysis. HbA1c mean level was 8.2$\pm$1.9% hospital group and 7.7$\pm$1.6% community group (p=0.01) . HbA1c $\leq$7% was recorded in 29% - and 35% - respectively. Correlations were found between visual acuity, DR , laser treatment and HbA1c$\leq$7%, cholesterol level < 200 mg%, and BP of < 130 / 85 mmHg,

Conclusions: The level of education of our patients was inadequate. The level of HbA1c was not satisfactory. There is an additional role for the ophthalmologist in educating patients about glucose, lipids and BP control as part of the treatment for DR.

Italy

Presenting authors: Francesco Bandello, Giorgio Grassi, Massimo Porta

Population: 57,321,070 (year 2003).

Estimated number of people with diabetes: According to the Central Institute of Statistics (ISTAT), the standardized prevalence of known diabetes is 3.44%, corresponding to about 2 million people. At least another million people may have undiagnosed diabetes.

A description of systematic screening:
A set of national guidelines has been issued in 2002 by all parties involved (national diabetes, ophthalmology and general practitioner professional societies, diabetic patient associations), which adheres, with updates, to the recommendations issued in London in 1990.

Screening method(s) used: No standardized test is used countrywide and different clinics rely on local arrangements for screening. All procedures, from simple ophthalmoscopy to digital photography are used, according to local attitudes and resources.

Estimated coverage of population by systematic screening: no overall data available but a number of studies offer some clues. According to INTERCARE (Diab Med 19,594-601,2002), 76% of a sample of patients followed by 19 diabetes clinics or general practices in Italy have an eye examination at least every two years. The QUED study (Diabetes Care 27,398-406,2004) showed that between 38.5% (general practice) and 57.9% (diabetes clinics) of 3,437 patients with type 2 diabetes receive a dilated eye examination at least once a year. The QUADRI study, issued in 2005 but not yet published, indicates that 58% of a sample of 3200 patients nationwide had had an eye examination.

Number of ophthalmologists involved in the programme: Not known.

Number of lasers available in the programme: No shortage but no data either.

Data on diabetes related blindness: Data have been collected in the province of Turin, diabetes is the second commonest cause of blindness, 11.5% of all causes. The incidence of diabetes-related blindness was 3,16/100.000 (CI 95% 2,64-3,80) in 1988-1992 and 3,25/100.000 (CI 95% 2,72-3,88) in 1993-1997, among patients aged 40-69. Among older patients, however, the trend was upwards, being 6,35/100.000 (CI 95% 5,02-8,03) and 12,35/100.000 (CI 95% 10,56-14,44), respectively. Data from other areas confirm that diabetes-related blindness ranks among the main causes of sight loss.

Principal needs to develop a full national screening programme: further dissemination among physicians (sometimes prone to “guideline fatigue”); awareness campaigns aimed at patients but finalised to reach administrators and decision makers.

Progress made over the last 15 years: in the absence of baseline data, it is impossible to make any qualified statement. The general impression is that screening campaigns may have helped curb new blindness among people with type 1 diabetes. However, raising prevalence of type 2 diabetes, coupled with prolonged patient survival and limited effectiveness of therapy for macular involvement, may be more than counteracting any positive effect of early detection of STDR.

Did the guidelines from 1990 help to make progress?: The 1990 guidelines were translated into Italian and widely disseminated by presenting them at national and local

meetings and, with the support of industry, sending the "Field Guide-Book" to all diabetologists in the country and running interactive CD-ROM based courses attended by more than 1,000 specialists. As mentioned above, they still form the backbone of the present national guidelines.

Top tips for success: Never give up. Never give up. Never give up.

Lithuania

Presenting authors: Balciuniene VJ and Lasiene J. Institute of Endocrinology, Kaunas University of Medicine.

Population: 3.4 million [March 2005].

Estimated number of people with diabetes: 64,000. Type 1 diabetes - 5000 adult patients and about 700 children. About 10 000 type 2 diabetes patients are treated with insulin. Prevalence of type 2 diabetes is increasing – 2,1% in 1987; 4,1% in 2002 and about 5% in 2004 [Institute of Endocrinology, Kaunas University of Medicine, 2004].

A description of systematic screening:
Systematic (organised) screening in the country does not exist. All ophthalmologists, diabetologists and GP's are trained to follow up diabetes patients' eyes according to "A protocol for screening for DR in Europe". So some GP's and diabetologists are referring their patients to ophthalmologists periodically, but some do not.

Ophthalmoscopy is the most frequent screening method, in some cases fundus photography can also be used.

Number of ophthalmologists in the country: 350 (100 /million population).

Number of lasers available in the country: 5.

Prevalence of common blindness: 0.5% of total population. We do not have data on diabetes related blindness, but we can estimate that in Lithuania about 1000 diabetics are blind. About 40 percent of all people with diabetes have at least mild signs of diabetic retinopathy [Lithuanian health information centre, 2004].

Principal needs to develop a full national screening programme:
- National type 2 diabetes register (which currently exists only in some regions)
- Data on diabetes related blindness
- National guidelines approved by local health care authorities for managed care by ophthalmologists and general practitioners and financing of the programme.
- Closer cooperation between GP's, diabetologists and ophthalmologists.

Progress made over the last 15 years: This is huge. Our country has turned from Soviet to EU health care standards. The guidelines from 1990 helped our country to make progress because it was the only set of guidelines which it was possible to follow.

Top tips for success: Increasing awareness and information among public, patients and specialists; increase qualifications and expertise of medical personnel; use of modern equipment.

Luxemburg

Presenting authors: S Cardillo, G Michel and C de Beaufort; CHL de Luxemburg

In a recent study the overall prevalence of diabetes mellitus (insulin and non insulin treated) in Luxemburg (general population: n : 451.600 inhabitants) is 3.05 % *ie* 13,671 inhabitants (95 percent Cl 1.91-3.77 % *ie* Cl 8,6000 -17,000 inhabitants). (Diab Metab 2005) Using two sources (doctors and drug sales) the results of this study are compared with a previous investigation using the same sources. An increase of diabetes of 63% is shown over the last 11 years. This is mainly due to an increased prevalence of type 2 diabetic patients, although insulin dependent diabetes prevalence increases from 0.53 to 0.73 %. The total amount of anti diabetic drugs shows a four -fold increase in biguanide tablet prescription which represents a substantial and positive change in therapy. In an European Health Monitoring Project, key indicators for diabetes and its complications have been identified among which blindness. (EJPH 2003; European Union diabetes indicators: fact or fiction 1).

Only one of the 15 participating countries has a national registry, identifying the incidence of blindness in patients with diabetes mellitus. Using as definition a visual acuity <1/10 of the normal sight in both eyes after correction or visual field inferior to 10° - almost 1400/1000.0000 blind persons are identified in the general population in Luxemburg.

(data:1994). No data about diabetes related blindness is available 80 far. Since diabetes mellitus is one of the major causes of morbidity and mortality in the EU countries, it is very important to improve data collection of the major indicators of this disease. In 2006 a study is started with the goal to establish a national registry of diabetes and its complications in Luxemburg. On voluntary basis, medical doctors will be invited to participate and fill out a questionnaire on diabetes and its complications (DiabCare/Luxemburg) during a 3 month period on all their diabetic patients. This study represents the first step to establish a national diabetes registry improving long term follow up and outcome of diabetes mellitus.

Northern Ireland

Presenting authors: PMA Hart (Lead Clinician DRSSNI), S Johnston (Locum Consultant Ophthalmologist DRSSNI)

Population: approx 1.6 million.

Estimated number of people with diabetes: 40-50,000 people.

Systematic Screening Model*:*

- Digital Retinal Imaging with local protocols and compliance with 4 nation QA standards.
- Pharmacological dilatation to those over 50years
- Visual acuity not assessed at time of screening
- Two fields captured each eye.
- Centralised grading and QA
- NI grading protocol which maps accurately to the English grading protocol.
- Call –recall model to be agreed
- Community based. - Secondary screening clinics for those with poor quality images.

Aim: By 2007 –ability to offer screening to all aged 12 and over with diabetes, delivered via mix of static and mobile units by a fully trained staff.

Estimated Population Coverage at present using systematic screening (call recall and access to QA):
Total 05-06: approx 50% will have call-recall within organised screening . Service does not meet full QA standards as yet.

Ophthalmolgists:
Currently 2 part time (approx 0.6WTE) ophthalmologists involved in the screening programme and 30 consultant ophthalmologists providing assessment and treatment . 4 Lasers are available for treating those with sight threatening DR.

Blind Registration: Approx 50 new cases per year.

Principal needs to develop a fully comprehensive screening programme:
Co-operative efforts with appropriate prioritisation of tasks to ensure an ordered and timely implementation process once key decisions have been made.

Top Tips:
1. Maintain a balance between sense of urgency and patience. Expect great things/expect nothing!
2. An identified champion to drive development and implementation of the programme.
3. Co-operation between key stakeholders:
4. Focus on the main point of screening, discourage /postpone other agendas
5. Detailed understanding of the strengths and weaknesses of screening process
6. QA drives the service model. Incorporate funding for QA early.
7. Identify the weak links in the implementation chain of events and strengthen them!

Progress within last 15years:
1990 Non mydriatic camera and Polaroid images introduced as a screening option by DUK.
1995 DRSS established – Funded to screen approx 2,500 Type 2 managed in primary care. Consultant Ophthalmologist appointed as Clinical Lead
1995 Non Mydriatic Camera and Polaroid prints/35mm images. Mobile unit.
1998 Digital Imaging adopted. Funded to screen 5000 per year. Protocols established.
2002 NI Chief Medical Officer established a working group to submit a bid for a fully comprehensive quality assured screening programme. Funding approved 2003.
2004 Funded to screen 10,000 per year. First phase of programme roll-out
2005 Formal project management (yikes!) for completion of implementation process by 2007

Norway

Presenting authors: MD Geir Hanken
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Population: 4.6 million

Estimated number of people with diabetes: 90.000-120.000, that is 2,3% of the total population. (Tidsskr Nor Laegeforen. 2004 Jun)

A description of systematic screening:
There is no organised screening for retinopathy. In the national budget plan for 2006 there is a chapter dealing with "National plan for prevention, research and treatment related to diabetes." The limited knowledge of how specialist care is functioning is stressed, as is the demand for developing "registers of quality". The (five) regional health care systems are responsible for developing these. There is no time schedule or more detailed specification concerning screening for diabetic retinopathy.

The Norwegian College of General Practitioners has revised their recommendations in 2005. The need for regular fundus photography or fundus-examination by an ophthalmologist is stated. In type II diabetics without retinopathy both annual and biannual examinations are accepted. (Referral of type II-patients by time of diagnosis, type I within 5 years of diagnosis)

In several regions there exists screening systems based on photography. One municipality has a tele-screening system. The photos are taken by specially trained nurses in Alta and evaluated at the Eye Department of the University Hospital in Tromsoe. Many diabetics are regularly examined by ophthalmologists working as private practitioners. (almost half of the Norwegian ophthalmologists work in a setting like this)

We do not know what coverage (by systematic screening) we have, but it is probably very low. Nevertheless, the percentage of diabetics being in some kind of ophthalmological examination system is higher. The situation is complex, and our overview is poor. The register over blind or partially sighted people "fell apart" some years ago.

A prospective multicenter study (DiaBoeye) is planned by a group of ophthalmologists in cooperation with Norges Diabetesforbund (the patient organisation). The group is lead by Harald Bergrem. (internist) We hope to include about 1250 diabetics in 5 different areas of Norway. Our aim is to estimate more accurate the situation in Norway concerning the above mentioned coverage, prevalence of retinopathy and related blindness.

In the so-called "Eigersund-study" Hapnes and Bergrem found 223 (1,8 %) diabetics among 12447 inhabitants in this municipality at the southwest of Norway. (Acta

Ophthalmol Scand 1996:74:497-500) Only13,8% had diabetic retinopathy, 2,4% had proliferativeretinopathy.
In Sunnmoere (Northwest coast of Norway) I have registered 3201 diabetics in our screening and control system at the Eye dep of Aalesund Hospital. (394 dia-I , 2807 dia-II) The overall prevalence of retinopathy was 43,5%. 5,25% had clinically significant macular oedema and 3,8% had proliferative retinopathy. (unpublished data)

The status in this field in Norway does not urge me to give any "top tips for success."

Romania

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Population: 21.7 mil. (March 2002).

Estimated number of people with diabetes: 420,000 (July 2005).

A description of systematic screening:
There is no national screening program for diabetic retinopathy in Romania. There are few centers (4) functioning near diabetic clinics where the patients with diabetes are seen by ophthalmologist and the results are registered in their personal ophthalmologic files. Otherwise, diabetic patients are examined at random, when they address to an ophthalmologist for different problems. Most of them see an ophthalmologist for low visual acuity, in stage of advanced DR and then they address directly or they are referred to highly specialized ophthalmologic clinics for laser or for vitreoretinal surgery.

A very low number of diabetic patients are enrolled in a organized screening program, about 40 000 (10 %); patients rarely know that they should have a periodical ophthalmologic exam.

In those centers where a screening program works, there is used fundus biomicroscopy for screening. Fundus photographs are taken only for selected patients and there are not used for screening. In the rest of the country, direct ophthalmocsopy is generally used.

There are few ophthalmologists involved in screening program: 12. Otherwise, almost all ophthalmologists examine and some of them treat diabetic patients, but without having an evidence of them.

There are 6 lasers available in organized screening program. There are 15 lasers in all over the country, some of them in private clinics.

There are no available dates regarding diabetes related blindness.

To developing a full national screening program we need first of all to state who has to preoccupy for this, which institution; maybe to create a committee to organize this; also, we need to registered and collected the dates from all over the country; and then to try to develop other screening centers.

Over the time, there appeared centers of screening (in 1989 there were none); more diabetic patients were enrolled in a screening program, more of them benefit from specialized assistance; there was increased the number of lasers and the number of patients attending laser therapy.

Scotland

Presenting authors: John Olson, David Cline, Nicola O'Keefe.

Population: 5.1 million

Estimated number of people with diabetes: The Scottish Diabetes Survey 2004 found that 3.2% of Scotland's population has diabetes. Modelling suggests this is an underestimate and the true current prevalence may be as high as 4.7%.

A description of systematic screening:
The 2004 Diabetes Survey reported 60% of the population screened within the previous 15 months. A variety of methods are likely to have been used including digital imaging, slit lamp biomicroscopy and direct ophthalmoscopy.

Since 2000 there has been government commitment to improve diabetic retinopathy screening – a target was set in 2003 for all 15 Health Boards to introduce systematic screening using digital imaging by March 2006.

Siemens Ltd have been commissioned to deliver software to perform image capture, grading, patient management and recall. This centrally funded software will be made available to all Health Boards from January 2006. Implementation is co-ordinated by National Services Division. A collaborative network consisting of an executive group, a service managers group, a clinical/grading group and a patient group ensure good communications and rapid feedback.

The model uses one-field photography. Mydriasis is used as required. Current estimates indicate that adequate images for screening can be obtained in 75% of patients without the need for mydriasis.

The programme has built on the advice laid out by the Health Technology Board for Scotland's Health Technology Assessment on Diabetic Retinopathy Screening (April 2002), the Diabetic Retinopathy Screening Implementation Group report (June 2003) and clinical standards published by NHS Quality Improvement Scotland (March 2004).

All patients who require laser treatment have access to laser treatment. Exact figures are not available but there are probably 15 lasers in Scotland.

It is believed that perhaps 0.5% of the diabetic population meets the legal definition for blind registration (as a consequence of diabetes) although the quality of data is very poor. Evidence published in 2004 would suggest that diabetic retinopathy remains the commonest cause of blindness in the working age population in Scotland.

Considerable progress has been made over the last 15 years. From March 2006 all eligible people with diabetes in Scotland will have access to systematic diabetic retinopathy screening. The target is to ensure that "a minimum of 80% of eligible people with diabetes are screened within the last year".

Top tips for success:
- Involve all stakeholder including patients, patient organisations, ophthalmologists, diabetologists, public health consultants, primary care practitioners, optometrists, retinal screeners.
- Clarify and acknowledge the different perspectives and priorities of the stakeholders.
- Change is a slow process and resistance is natural and to be expected.
- Wherever possible use evidence based medicine as a route to consensus.

Serbia and Montenegro

Presenting authors: V Misita
University Eye Clinic, Belgrade, Serbia and Montenegro

Population: 10 million

Estimated number of people with diabetes: 250 to 300 thousand of them have diabetes with significant increasing tendency.

A description of systematic screening:
Until the year 2001 St. Vincent Declaration was not discussed at Ophthalmological society and not implemented in practice. In the year 2001 the main guidelines for screening of diabetic retinopathy based on St Vincent declaration were presented and recommended during the National Ophthalmological society meeting. The guidelines for the screening included:

- Schedule for screening (first and following examinations)
- Ophthalmologists responsible for screening
- Methods of fundus examination
- Changes at the fundus to be checked during examination
- Indications for laser treatment

As a result, an increased number of diabetic persons with preserved vision but with vision threatening retinopathy are being referred to the laser specialists. In spite of that a large number of diabetic persons coming for the first time with symptoms of advanced maculopathy or vitreous haemorrhages, have never been previously examined by any ophthalmologist. main problems are the shortage of laser equipment (only 5 lasers are functioning in the whole country) and insufficient information and education of diabetic population about diabetic disease and its complications.

Spain

Presenting authors: Soto-Pedre, Enrique (EIBI, Spain)
Hernaez-Ortega, Maria Concepcion (EIBI, Spain)

Population: There are approximately 42,000,000 people in Spain.

Estimated number of people with diabetes: 2,500,000.

A description of systematic screening:
At this time no systematic screening programs have been described in our country in order to improve detection of diabetic retinopathy. However, there could be organised screening programs at private High Resolution diabetes centers. Since 1992 (National Conference on Diabetes Mellitus- Spanish Ministry of Health, that set a series of major five-year targets for the care of people with diabetes) no further proposals from official organizations have been disclosed.
Several studies reported protocols for providing appropriate retinal screening to a diabetic population, and retinal photography was the screening test of choice. The protocols used nonmydriatic retinal cameras with Polaroid® instant film or digital images, with or without mydriatic drops.

Laser photocoagulation as the treatment for diabetic retinopathy is currently provided at tertiary level hospital services and private specialized centers, but the number of laser machines in the country has not been documented.

Reliable epidemiologic data on diabetes related blindness is lacking, but about 20-30% of registered blindness in Spain could be related to diabetic retinopathy.

An efficient recall system of patients, an appropriate set of screening intervals for the different subgroups of patients, and a consensus between endocrinologists and ophthalmologists are among the principal needs to develop a program. Besides, sharing the results of the screening test with the patient may increase patient's adherence to the program.

The progress made over last 15 years in Spain in reducing blindness secondary to diabetic retinopathy has not been reported.

Saint-Petersburg, Russia

Presenting authors: Evgeny B. Shklyarov,[1] Olga N. Alexandrova,[2] Yuri S. Astakhov,[1] Nyurguyana N. Grigoryeva,[1] Irina A. Karpova,[2] Olga Ya. Kryaneva,[2] Elena L. Rutenburg,[2] Fedor E. Shadrichev;[2] State Pavlov Medical University [1] and Regional diabetological center, [2] Saint-Petersburg.

Population of Saint-Petersburg: At present the population exceeds 4.5 million.

Estimated number of people with diabetes: 95730 citizens are registered as having diabetes mellitus, 10530 (11%) of them having type 1 and 85200 (89%) – type 2 diabetes. 6318 type 2 diabetic patients are on insulin therapy. According to the results of previous screening (2000-2004), the number of patients with type 2 diabetes is supposed to be two times greater.

A description of systematic screening: In 1994 the Saint-Petersburg regional diabetological centre was set up, being the first one in the Russian Federation. Since that

time the development of municipal eye care system for diabetic patients in Saint-Petersburg was started, and now it can be used as a model for other metropolises in Russia. Today the diabetes care system in the city consists of one regional, three municipal and nineteen minor district centres. Several other institutions of federal subordination (eye hospitals of Medical Universities, Fedorov's affiliated Centre and others) are also engaged in the treatment of diabetic patients, but they do not take part in screening.

In 1998 the management algorithms of patients with diabetic retinopathy based on WHO and IDF recommendations were elaborated, approved and published. In October 2000 the Law of Saint-Petersburg "On special medical and social program of Saint-Petersburg: Prevention of diabetes and its complications for 2001-2005" was put in force. This gave the possibility to start in 2003 screening for diabetic retinopathy in regional diabetological centre. According to this screening program our goal is to examine all patients receiving insulin therapy, i.e. about 17 thousand of diabetics. More than 3000 of them have been examined by now.

The reference screening method we use is seven-field standard stereo retinal photography (Topcon TRC-50IX fundus camera), the results are being compared with slit-lamp biomicroscopy with aspheric lenses and direct ophthalmoscopy. 6 ophthalmologists are engaged in the centre for diabetic retinopathy screening, 3 laser machines (Zeiss 532s) are available for appropriate treatment.

In comparison with 1994 we now have more than twice the number of visits per year (14,000 versus 6,000) and more than eight times the number of laser photocoagulation sessions per year (4500 versus 520).

Sweden

Presenting authors: Ingrid Johansson[1] and Dic Aronson[2]

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Population: 9 million. Most people in Sweden attend the public healthcare system.

Estimated number of people with diabetes: 360,000 diabetics (a prevalence of 4%).

To get to know more detail about screening intervals, screening methods and treatment of diabetic retinopathy in different parts of Sweden a questionnaire was sent to the public eye clinics in Sweden. (40 out of 42 clinics replied).

Description of systematic screening including the presence of national proposals and timeliness:

- In every region there is a diabetes screening programme with photo screening and possibilities to perform laser treatment.
- In 1999 The National Board of Health and Welfare in Sweden published "National Guidelines in Care and Treatment of Diabetes Mellitus" which also includes guidelines for screening for diabetic retinopathy.

- General guidelines: Type 1 diabetes (from the age of 10) and type 2 diabetes (from diagnosis): screening controls at least every second year if no retinopathy. More frequent controls as retinopathy progresses and during pregnancy.
- All clinics are screening insulin as well as tablet treated diabetics and most clinics also control diabetics without pharmacological treatment.
- To most of the clinics patients are referred from internists, general practitioners and private doctors.
- Most clinics follow the general guidelines concerning the insulin and tablet treated diabetics with the first photo at diagnosis (or from the age of 10) and then every second year as long as no retinopathy is seen. A few clinics control their patients on tablet treatment every third year if no retinopathy.
- In most clinics the patients continue in the screening programme as long as the photos are good enough to grade and the cooperation of the patient is good (= no age limit) but a few clinics have an age limit (72 years, 80 years, 85 years) if no diabetic retinopathy is seen.
- With the diet controlled patients the screening interval differs. Most clinics examine the patients at diagnosis. If there is no retinopathy on the first photos the screening interval varies a lot. There is a scale from no more photos, new photos every 5 – 4 – 3 to 2 years as long as no retinopathy has revealed.

Estimated coverage of population by systematic screening:

- In the majority of sites it is estimated that 80 % or more of the diabetics are in the screening programme but a few sites still have a low coverage.

Screening method used:

- Mostly digital photo screening.
- Most clinics use digital red-free photos but some use colour photos or a mix of the both types.
- In the majority of clinics the photos are evaluated by ophthalmic nurses/photographers and doctors. Hereby the doctors just have to estimate the photos with more serious changes – and get more time to perform laser treatment.
- Most clinics are informed by the general diabetes care about the actual values of HbA1c and blood pressure when estimating the screening photos.
- Almost all ophthalmologists in training get education in assessment of diabetic retinopathy, interpretation of fluorescein angiography and some experience in laser treatment.

Numbers of ophthalmologists involved in the programme:

- In every clinic there is at least one ophthalmologist responsible for the screening.

Numbers of lasers available in the programme:

- At least 62 laser units (which means 1 laser unit per 5800 diabetics or 1 unit per 145 000 inhabitants).

Any data on diabetes related blindness:

- No data available.

Progress made over the last 15 years:

- Over the last 15 years there has been at progress in coverage of the diabetes screening programme but still there are regional differences in the percentage of diabetics getting their eyes controlled.
- In some clinics there was already in 1990 a well functioning screening programme. Even in those clinics it has been a change in the screening procedure with a shift to a digital photo system and an education of the ophthalmic nurses to estimate and grade diabetes photos.

Treatment:

- The treatment of diabetic macular oedema differs very much between the clinics. Some of the clinics almost always perform fluorescein angiography before starting treatment of macular oedema; some almost never do.
- In most clinics the patients are given panretinal laser treatment within one month from the diagnosis of proliferative diabetes retinopathy on the photos.
- In most clinics the patients return to photo controls if they have been laser treated and the retinopathy has returned calm.

Top tips for success:

- Photo screening – fast and secure.
- Educate nurses, photographers or other ophthalmic personnel to evaluate the photos. Hereby the doctors just have to estimate the photos with more severe changes – and get more time to perform laser treatment.
- Strict guidelines, easy to follow.
- Identify the best ways to catch the patients for investigation at diagnosis and at follow-up screening controls.
- Inform the personnel responsible for the general diabetic care to refer all diabetics to the screening programme at diabetes diagnosis.
- Good logistics in screening controls, diagnosis of sight-threatening diabetes retinopathy and laser treatment.
- Good communication between the ophthalmic care and the general diabetic care.
- One interested doctor responsible for the screening.
- Education in diabetic retinopathy and laser treatment.
- Patient information.

The Netherlands

Presenting authors: M. Suttorp-Schulten, M.D., Ph.D., Ophthalmologist, Amsterdam

Population: 16.3 million

Estimated number of people with diabetes: 480,000 known with the diagnosis**.** 200,000 not diagnosed yet but do have disease. In 2010 expected to increase up to 1,000,000

A description of systematic screening:
Screening on diabetes has recently been refused by the ministry of health on advice of the national scientific advisory board for cost effectiveness reasons.

Screening on retinopathy is recommended but not obligatory, initiative is now in the hands of the GP, 50% of patients is probably not screened.

Insurance companies take initiatives, as a new fianancial system is introduced and will only pay GP for diabetes care fromm 2006 on if they can prove that they take care of screening.

New evidenced based national guidelines have been developed, and will be introduced end of November 2005, together with the Cochrane Institute, recommending screening by photography as a very good alternative as compared to consulting an ophthalmologist or optometrist.

Laser Machines: Every general hospital has a laser machine except one, to my knowledge, the exact number is not known.

New clinics, specialising in private care and cataracts do not have laser machines, therefore they are not equipped to offer the total amount of care for all their patients unfortunately, a disturbing development.

Diabetes related blindness: Recently there has been a very thorough report on preventable blindness in The Netherlands. The Netherlands is one of the only two European countries that participate in Vision 2020, an initiative of the WHO, to reduce preventable blindness.

The estimated number of blind is 4000, of visually handicapped is 8200 and of persons with a vision threatening retinopathy is 55.800

Needs to develop screening program: self-fulfilling prophecy

Progress made over the last 15 years: development and (slow) acceptance of camera screening

Top tips:
- Join Vision 2020 of the WHO, this will give a tremendous input on epidemiological data that will put preventable blindness in diabetes on the agenda
- Translate the Cochrane guidelines that we developed in the Netherlands and consider whether you can make European guidelines, as there are European guidelines for glaucoma
- Look at and talk to those who pay the bill, the insurance companies. They will have to pay all the bills for the complications of diabetes and ocular screening is the most cost effective way to detect the patient at risk and prevent complications in an early stage.

Turkey

Presenting authors: Nilay Alacali[1], Sehnaz Karadeniz[2], Nazif Bagriacik[1], M. Temel Yilmaz[2]
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Population: 70 millions

Estimated number of people with diabetes: Diabetes and related complications are also one of the major health problems of Turkey. Turkish Diabetes Epidemiology Project (TURDEP) carried out in 24.788 subjects showed that the crude prevalence of diabetes is 7.2% among the population aged 20 or more years. The ratio of known to newly diagnosed diabetes was 68.1% to 31.9%.

A description of systematic screening:
There is no national diabetes register or a nationally implemented screening program for diabetes and related complications in Turkey. There is also no nationwide blindness register regarding the diabetic retinopathy, but in a retrospective study carried out in the Diabetes Hospital of the Turkish Diabetes and Obesity Foundation the prevalence of diabetic patients with best corrected visual acuity of 6/60 or less in the better eye was 8.7%.

As to the one of the major chronic complications of diabetes, diabetic retinopathy was present in 29.2% of subjects with type 1 Diabetes Mellitus (DM) and 34.6% with type 2 DM in the multicentric Turkish Diabetes Chronic Complications Study. The prevalence of diabetic retinopathy increases from 11.5% in subjects with duration of DM 0-5 years to 60.2% with duration of DM more than 20 years.

In Turkey, there is a sufficient number of ophthalmologists to undertake annual retinal examination for all diabetics. The laser treatment for diabetic retinopathy is available in all regions of Turkey with an estimated number of 290 Argon laser machines.
As a result, applicable nationwide screening programs should be implemented to reduce the rate for diabetes related visual impairment. Key issues in the future will be increasing the awareness on diabetic retinopathy among diabetic patients, improving collaboration between diabetes health care team, and meeting the cost of screening in general and individually for people without any health insurance

Uzbekhistan

Presenting authors: Djamshid Safarov

Activity of UMID association in Samarkand region.

Our association consists of 220 members. They are patients with diabetes from childhood. Children members have regular important endocrinology treatment. About eye diseases in percents: vision of 60 % from them without any changes, 15 % of them have pathology of refraction, 14 % have pathology of retina. 70 % of patients with retina pathology have angiopathy, 30 % of patients with retina pathology have retinopathy, half of patients with retinopathy have proliferation destruction. We direct half of these patients to the specialized medical centers, because of we have not modern technologies.

Wales

Authors: Owens DR, Gibbins R, Keigwen-Harris R, Isles S, Hart S, Knowles P.

The Diabetic Retinopathy Screening Service for Wales (DRSSW) was launched by the Minister for Health and Social Services for Wales, Jane Hutt, AM, in June 2001. Prior to this, there was a local community-based screening service which served a population of 20,000 persons with diabetes in South Wales, providing annual, digial photography remotely using mobile units, followed by central grading. This model was adopted as the basis for the all-Wales screening service.

Wales has a population of 3 million with approximately 90,000 persons known to have diabetes. The DRSSW has a central office based near Cardiff, the capital city of Wales. The centre houses administrative staff, graders, IT personnel, along with photographers and health care assistants. The service works in close collaboration with all primary care practices thoughout Wales, the hospital-based eye services (HES) and has a joint board with ophthalmologists to define and review the service at regular intervals. In addition, the DRSSW has the benefit of an advisory board, consisting of representatives from primary and secondary care, public health, advocacy groups and, especially, persons with diabetes. The DRSSW is responsible to a host hospital and finally the Welsh Assembly Government, which provides central funding for the service.

All persons with diabetes registered with a general practitioner located in Wales are entitled to be screened annually, unless they are receiving active treatment for diabetic retinopathy under the local Hospital Eye Service. After the DRSSW is provided with details of persons with diabetes by primary care, invitations are offered to all aged 12 years and over at a location near to their home. At the screening location, informed consent is obtained prior to assessment of visual acuity by a health care assistant before a minimum of two digital images of the eyes are taken by a dedicated photographer. At the end of the day, each mobile unit down-loads the retinal images from their laptop onto a central server. The images are then available for the dedicated graders, ranging from primary to tertiary graders, supported by clinicans and ophthalmologists, working in the centre on a sessional basis. Reports are generated for the primary care team and where relevant, hospital-based diabetes specialists and ophthalmologists for assessment and treatment, if necessary.

Since its inception, the service has now provided screening for over 70,000 persons with diabetes in Wales achieving the set target for 2005, aiming to invite 100% by the end of 2006.

Currently, there are 16 mobile units covering most of Wales; each unit consists of a health care assistant and photographer who work out of the main centre and also regional offices on the north (Caernarvon) and west (Carmarthen) of Wales. There are twelve full-time graders, supported by sessional clinicians as stated above. Quality assurance is undertaken at monthly intervals. The DRSSW is underpinned by an initial and on-going multi-disciplinary education for all staff. The service subscribes to the principles of screening, including grading and clinical standards as defined by national guidelines and, along with member nations, will participate in defining future training needs of personnel involved in screening. The service is now in a position to offer training in the many facets of screening such as planning/administration, photography and grading both nationally and internationally.

The service is also involved in a number of research projects designed to better describe the natural history of diabetic retinopathy and examine many issues in an attempt to

improve the cost-effectiveness of the screening service to ensure its sustainability in the process of reducing the incidence of new blindness and prevent the outset and progression of diabetic retinopathy.

Registering Delegates

Delegates

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