



Screening for Diabetic Retinopathy in Europe – Progress Since 2011

Satellite meeting to EASDec, Manchester 2016

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Report of Meeting



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Contact Conference Administrator:
Gaynor Richards +44 151 706 4837
Gaynor.Richards@rlbuht.nhs.uk
www.drscreening.eu @LivOphth

Executive Summary

Background

In Liverpool in November 2005 a conference took place to review progress across Europe in the prevention of visual impairment due to diabetic retinopathy since the publication in 1990 of the St. Vincent Declaration. National representatives of diabetology and ophthalmology attended from 29 European countries and reached consensus on the Liverpool Declaration.

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.

Further meetings of European representatives were held to review progress in Amsterdam in 2008, Gdansk in 2011, and Manchester in 2016 as satellites to the annual EASDec conference.

The 2016 meeting reviewed progress in screening and looked at the impact of new technologies. 49 delegates comprising 40 national representatives, 4 organising committee members and 5 expert observers, attended the meeting. Abstracts were submitted from 27 European countries describing progress since 2011 and addressing experiences in engaging with health providers, extended screen intervals, implementation of new technologies, relationships between health professionals involved in the care of people with diabetes and tips for success. Discussions took place with the aim of producing key messages and actions. These are summarised in this report.

Key messages

Access to treatment

Access to treatment remains surprisingly variable in Europe and needs urgent attention. Key factors are the discrepancies between urban/rural and the difficulties in countries with low resources.

Screen intervals

Many countries are still advising annual screening or eye examinations.

Extended intervals are fairly widespread but with significant variation in models including fixed, annually or 2 yearly, and stratified or individualised based on retinopathy level, type of diabetes and / or systemic risk factors.

National representatives supported the move to extended intervals but identified the following concerns:

- in order to implement extended intervals good quality images and high attendance rates are essential;
- in countries where diabetic control is poor, extending the intervals may be unsafe;
- there may be an unintended negative impact of extended intervals on attendance and/or control which requires further research.

Screening in remote areas

Representatives identified that a major barrier to successful implementation is the lack of ophthalmologists in remote and rural settings, both for treatment and for screening, especially in low to middle income countries.

Identifying and targeting poorly served areas requires a major focus.

In poorly resourced settings the following need to be urgently developed:

- approaches to increasing numbers of ophthalmologists in remote areas;
- consideration of incentives, financial and other, for primary and secondary care practitioners;

- new ways of working.

In well-resourced settings resources saved from extending screen intervals should be redeployed to improve access in remote areas.

Service development

It is proposed that a package of tools, based on progress in certain countries, is developed to encourage effective engagement with commissioners and politicians in order to deliver population based screening applicable to all nations. Essential elements are:

- the cost of blindness in the country to the overall economy and society;
- the cost of the service to detect and treat STDR using a trickle down or ingredient approach;
- identification of the cross over point, the year where the cost of screening and treatment + the cost of vision loss passes below the costs without screening.

Ophthalmologists should join with diabetologists in the care of people with diabetes to be part of a “rapid reaction force” i.e. at a time when there is an acute change in control or rapid worsening of complications.

New technologies

Optical coherence tomography (OCT):

- there is no clear definition of screen +ve diabetic maculopathy on OCT;
- OCT should be considered as a technology for secondary identification of diabetic macular oedema (DMO) in screen +ve maculopathy in order to lower false +ve rates;
- visual acuity (VA) remains the primary indicator for treatment of DMO.

Automated grading:

- introduction of automated grading had widespread support;
- support was at present only for disease/no disease grading;
- automated feature specific grading is not yet sufficiently developed.

Hardware:

- developments in portable cameras are worth exploring but are not yet sufficiently well-developed:
- smart phones as cameras have insufficient resolution for screening as yet;
- wide-field imaging can be valuable in populations with a high prevalence of peripheral disease.

Action plan

To support the development of and share best practice in targeted screening

To promote the design of models of screening and treatment appropriate to remote and poorly-funded settings.

To implement new technology within screening programmes, as appropriate.

To continue to promote access to treatment in areas with poor provision.

To mobilise political action on DR, including involving key international organisations

To hold the next meeting in 3 years in an Eastern European country

Simon Harding s.p.harding@liv.ac.uk @simonpharding @LivOphth

Deborah Broadbent deborah.broadbent@rlbuht.nhs.uk deb.doc@btinternet.com

www.drscreening.eu

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Introduction

Background

A conference took place in Liverpool in 2005 to review progress in the prevention of visual impairment due to diabetic retinopathy since the publication in 1990 of the St. Vincent Declaration. 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 primary output of the conference was a new declaration:

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.

A set of essential components to successful implementation were identified under three broad headings: i) organisation, ii) personnel and iii) equipment, tests and treatment.

In Amsterdam in 2008 a satellite meeting of the annual EASDec conference was held to review Liverpool Declaration targets and to report on progress, describe barriers to implementation, develop further guidance and engage stakeholders. National representatives of ophthalmology and diabetology were invited once again from countries within the WHO Europe Zone. Sixty-seven delegates attended including representatives from 26 European countries. The World Health Organisation, European Union and International Diabetes Federation also sent representatives.

By 2008, significant progress had been made. Nearly all countries had taken a step forward and had either established a systematic screening programme or were in the process of developing local to regional to national programmes. However, progress had been patchier regarding the development of national guidelines, the establishment of training programmes and the development of regional and national implementation groups. Access to laser treatment remained poor in a few countries. There were problems with continued secure funding in some long established programmes.

Four sets of recommendations were made, relevant to countries with different characteristics:

- countries with developing organised national health services and adequate personnel, where more rapid development of screening was the aim;
- countries with established screening programmes where improvement of quality and coverage was the aim;
- countries with mixed public and private insurance based health care, where a different approach was required because of the lack of a public health system ensuring universal coverage;

- countries with limited health resources where progress with the roll out of screening was the aim.

Another meeting was held in 2011, as a satellite to the annual EASDec conference in Gdansk, to review progress since 2008. 30 official delegates from 21 European countries attended. There had been progress towards the Liverpool Declaration in all countries that provided the information, although progress varied between countries. Rural areas often had poor access to ophthalmologists. Two main themes emerged as barriers to progress and continuation: involving health insurance companies and private ophthalmologists in the context of a primarily health insurance-base system; and sustainability of funding in the light of increasing prevalence of diabetes. Where success had been achieved, this had been through the involvement of local and national champions, and initial implementation of local programmes, later scaling up to regional and national programmes.

Specific recommendations were made to address the two main themes arising. An action plan was formulated, and it was agreed that another meeting to review progress would be organised.

The agreed review meeting, the subject of this report, was held in Manchester in 2016, again as a satellite to the EASDec meeting. The impact of new technologies was a major theme of the meeting. Points for discussion included links to systemic diabetes care; the role of optical coherence tomography; the impact of new treatments; automated grading; telemedicine; the use of wide-field imaging and portable imaging hardware; and home monitoring. 49 delegates comprising 40 national representatives, 4 organising committee members and 5 expert observers, attended the meeting. Abstracts were submitted from 27 European countries describing progress since 2011 and addressing experiences in engaging with health providers, extended screen intervals, implementation of new technologies, relationships between health professionals involved in the care of people with diabetes and tips for success.

About this report

Section 1 describes the content of the symposium sessions including a summary of the national abstracts which are given in detail in Section 4.

In Section 2 we set out the main discussion points including those covered in Section 1.

In Section 3 we present the main messages and an action plan for the future.

The report was drafted by the medical writer, Dr Katharine Abba and edited by Simon Harding and Deborah Broadbent. A first full draft was circulated to all delegates for comment.

Full copies of all the current and previous reports, and presentations delivered at the 2016 symposium can be found at www.drscreening.eu

Organising committee:

Deborah Broadbent (Liverpool), Simon Harding (Liverpool), Yvonne D'Souza (Manchester), Tunde Peto (London)

Section 1: Presentations and facilitated discussions

Session 1: Current Status of Screening Programmes: Summary of abstracts

Presenter: Dr Deborah Broadbent

Introduction

Deborah Broadbent presented a review of the current status of screening programmes throughout Europe, prepared from structured abstracts provided by national representatives of 27 countries. Copies of the abstracts are available in Section 4.

Summary

An increasing prevalence of diabetes was reported in all countries. Reported prevalence ranged from 3.8% in Sweden to 13.1% in Portugal, 4 countries had a prevalence >10% and 10 countries < 6%. The relative proportions of Type 1 and Type 2 diabetes also varied, with Finland in particular reporting a high prevalence of Type 1 diabetes. A number of countries provided accurate data from national registers or national surveys. In some countries between $\frac{1}{4}$ and $\frac{1}{3}$ patients were estimated to be undiagnosed.

Most countries screened using either dilated funduscopy by ophthalmologists or digital colour fundus photography, with a fairly even split between the two methods. Two countries were using dilated funduscopy with the direct ophthalmoscope. Finland, France, Portugal, Spain and Sweden were using electronic transfer of images. Albania, Hungary, Italy, Lithuania and Norway were also using electronic transfer in specific situations.

Many countries were still implementing annual screening. Denmark, Italy and the Netherlands used two-yearly intervals. A few countries had introduced stratified screening intervals, or were considering doing so. England, Scotland and Northern Ireland were considering a move from annual to two-yearly screening for a subgroup of patients with no diabetic retinopathy (DR) on two consecutive screen visits. Finland and Sweden had introduced intervals of between one and three years stratified by type of diabetes and level of retinopathy. Belarus and Czech Republic screened yearly for no DR and 6-monthly for mild to moderate DR. Individualised screening was being introduced in Germany, Norway, Denmark and parts of Finland. Germany screened 2-yearly if there were no ocular or systemic risks, annually if no DR but systemic risk factors (\uparrow HbA1c, \uparrow BP, nephropathy), and according to ophthalmologist recommendation if DR was present. Norway and parts of Finland had introduced risk based screening.

Progress towards the 2005 Liverpool Declaration was considered next. Every country had made some progress in implementing screening, although few had a systematic screening programme or a diabetes register. Documented coverage ranged from 11% to 100%, although many countries had no national data so these were estimates. Well established programmes reported coverage of 70% or higher.

Almost all represented countries had access to laser treatment, although in a few it was only available in the cities or in private clinics, restricting access in rural areas. Most also had access to anti-VEGF treatment and vitrectomy.

Specific comments relating to progress towards achievement of the Liverpool Declaration extracted from the abstracts are:

“Progress is very slow but we feel optimistic about even better results in the coming years. Compared with 2005 we think that the situation has improved, and the target objectives are attained more than 60%.” *Albania*

“Great progress has been made, especially in communication between diabetologists and ophthalmologists and the use of new technologies.” *Czech Republic*

“Despite the uncertainty of overall screening coverage we estimate that we meet the requirements from the Liverpool Declaration.” *Denmark*

“We are meeting the requirements set out in the Liverpool Declaration.” *England*

“Much progress has been made as in many areas digital cameras and electronic data transfer systems became available, reaching 80% coverage in some areas and improving visual prognosis for patients with diabetes reported.” *Finland*

“Still no systematic screening, no recall system and no diabetes register, but on the plus side better coverage with screening and the beginning of systematic quality assurance and evaluation of epidemiologic data.” *Germany*

“We manage new diagnostic equipment using trained professionals and personnel.” *Lithuania*

“Progress has been made towards the Liverpool Declaration for children, whilst establishing a national programme is a realistic goal for all in the near future.” *Luxembourg*

“Even though not available nationally the biggest breakthrough was the introduction of systematic screening using retinal photography and OCT, and making it available for the general population through the National Health Insurance Fund.” *Moldova*

“Systematic fundus screening in patients with diabetes is available. All patients have access to ophthalmological care if necessary. This care is assured for the coming years.” *Netherlands*

“The next 2-3 years will see the NIDESP well on the way to attaining the objectives of the Liverpool Declaration.” *Northern Ireland*

“Mentally there has been some progress both within the ophthalmological milieu and among health authorities.” *Norway*

“We have made progress in the ophthalmology care of patients with diabetes in increasing the number of diabetologists and diabetes out-patients clinics; guidelines for care; development of an Eye Complications in Diabetes Study Group; and universal access to treatment.” *Poland*

“We are still far from the target to provide DR screening to 80% of the population, but a growing number are being covered with the help of technology.” *Portugal*

“In the last 3 years, since introducing the National Screening and Treatment programme, we have made considerable progress to reach the goals of the Liverpool Declaration.” *Republic of Ireland*

“There has been a trend towards better control of chronic diabetes complications, but in the field of the diabetic eye there is only a slight improvement in screening as coverage of the population remains low. Access to lasers has improved.” *Romania*
Since 2005 we have introduced a systematic screening programme. Staff have a recognised training programme. There remains universal access to laser.” *Scotland*

“Progress varies according to region but awareness is increasing nationwide and DR screening is established.” *Spain*

“The Liverpool Declaration is fulfilled but the future may be challenging! Success is ascribed to national guidelines, a National Diabetes Register and the driving spirit of a few influential specialists within the fields of ophthalmology and diabetology.”
Sweden

A copy of the presentation slides is available on the website www.drscreening.eu

Following the presentation, there was an open discussion of the issues raised, led by Deborah Broadbent and Simon Harding. Areas covered included the challenges of implementing screening in countries with fewer resources and in rural areas; the potential impact of wider screening intervals on attendance and visual outcomes; and potential roles of new technologies in screening. A more detailed summary of these discussions is presented in the second part of this report.

Top tips for success

The following selected top tips for success were provided by delegates in their abstract:

- a close and regular co-operation and collaboration between ophthalmologists, diabetologists, general practitioners and patient organisations;
- improve the ascertainment of people with diabetes;
- increase public, patients and specialists understanding of diabetic retinopathy;
- build relations with public health authorities / lobby / include all stakeholders / keep the topic in meetings;
- communicate, communicate, communicate some more;
- ensure adequate funding of screening;
- provide modern equipment for diagnostics and treatment of DR;
- ensure access to treatment;
- implement locally – evaluate – spread;
- prepare National Guidelines / integrate guidelines from all specialities;
- implement new technologies including electronic transfer of data;
- quality assure;
- patient power is critical, especially if your minister has diabetes!
- never give up!

Session 2: Case study from Republic of Ireland – Delivering success in a private public health service

Presenter: David Keegan, Dublin

David Keegan presented on the economic case he had made to senior policy-makers for a publicly-funded and systematic screening programme in the Republic of Ireland. The Republic of Ireland has a mixed public and private healthcare system with a relatively proportion of people seen in private clinics. Economic modelling based on data from other countries showed that, following some initial investment, screening had the potential to create substantial financial savings, due primarily to a reduced incidence of blindness.

Following the commencement of the screening programme in Scotland, the incidence of blindness due to DR had halved.

Key features of the programme include:

- systematic quality assured screening;
- referral into designated treatment centres;
- further follow-up by non-designated centres restricted to agreed patient pathways, audit and QA.

Economic modelling estimated a net cost to start the screening programme, running costs of screening, investigation and treatment costs, direct costs associated with blindness and costs of consequences of blindness (e.g. increased admission to nursing homes). A “trickle down” approach was used.

Key data from Republic of Ireland (ROI)

The Cost of Blindness in the Republic of Ireland 2010–2020, J Ophthal 2016:

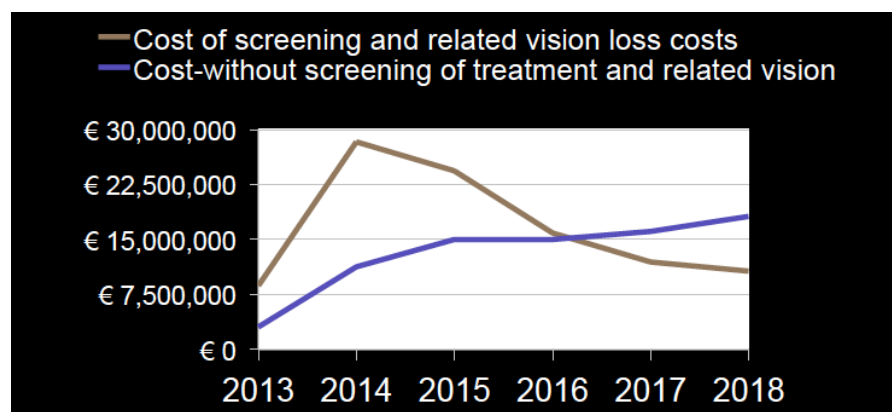
- visually impaired population n = 224,832, blind individuals n = 12,995 (5.78%);
- financial cost per person: VI = €1,717 (28.4%), blind = €21,288 (71.6%);
- economic cost per person: VI = €9,533 (62.2%), blind = €62,270 (37.8%);
- majority of costs to society are outside healthcare.

Estimates:

- RESTORE treatment regimen (7,4,3), cost of licensed drug, experience of laser numbers;
- 4.5% STDR, 1.25% commence injections, 0.34% require VR surgery.

Calculated costs/benefits over 5 years (Figure)

- compared costs of screening + treatment + vision loss vs no screening + treatment + vision loss
- after 3 years a cross over point is reached after which cost of not screening outweighs cost of screening



The economic case was presented to senior politicians in ROI, including one who had experience of a family member losing their sight due to DR. This led to the introduction and successful implementation of a publicly funded screening programme within a combined public/private health service. Two private companies were funded to provide screening, one in remote areas and one in urban centres, and to feed the results into the designated hospitals.

Key features of the economic case:

- include societal costs of visual impairment and blindness;

- model effects of reduction of rates of visual impairment due to early ascertainment and treatment;
- present the costs to the overall economy.

A copy of the presentation slides is available on the website www.drscreening.eu

Session 3: Links to systemic care

Facilitator: Professor Massimo Porta

Massimo Porta presented points for discussion about links between screening, ophthalmology and systemic diabetes care. These included possible unintended consequences to diabetes care of separating screening from general diabetes care; the role of diabetologists and GPs; and how multidisciplinary care can best be provided for people with diabetic retinopathy.

A copy of the presentation slides is available on the website www.drscreening.eu

Massimo then led an open discussion on the issues raised in the presentation. A summary of these discussions is presented in the second part of this report.

Session 4: Optical Coherence Tomography (OCT)

Presenter: Professor José Cunha-Vaz

José Cunha-Vaz presented a short introduction to the case for the use of OCT in screening. In the case of macular oedema, OCT provides a more precise diagnosis than non-stereoscopic photographic screening using surrogate markers, giving more confidence that macular oedema is present. However, there is currently no evidence that identifying very early oedema is clinically useful; photographic grading might identify it early enough for effective treatment.

A copy of the presentation slides is available on the website www.drscreening.eu

José then led an open discussion on the issues raised in the presentation. A summary of these discussions is presented in the second part of this report.

Session 5: Software developments

Facilitator: Dr Sam Philip

Sam Philip presented a summary of recent developments in software relevant to screening, and discussion points arising from these. In the last 10 to 12 years, software has become available to facilitate image visualisation and automated grading; maintaining disease registers; call recall; management of patient records; data sharing and telemedicine/ electronic image transfer. These developments could ensure that all eligible patients are invited for screening at the recommended interval; improve access and uptake of screening in remote areas; decrease the cost of screening; and improve work satisfaction for retinal grading staff.

Three different types of development were presented for discussion; automated grading; remote imaging; and development of risk algorithms for setting screen intervals. There has been a steady increase in interest in automated grading, and studies suggest it has an acceptable level of accuracy. It is already implemented throughout Scotland and in parts of

Spain, Portugal, Denmark and Hungary. Remote imaging, based on internet cloud based data storage, has already been implemented in parts of Spain, France, Sweden and Albania. Remote imaging could reduce costs and increase uptake in rural areas, and facilitate quality control by grading at central reading centres. Research in the UK has suggested that using risk-algorithms to set screen intervals could reduce costs by 40%, whilst maintaining safety.

Points for discussion included:

- Should automated grading be routinely implemented within systematic screening programmes?
- Is there a role for feature based automated grading or is disease / no disease grading the best that can be achieved?
- Which locations in Europe require remote imaging and use telemedicine in screening for Diabetic eye disease?
- Is there a role for risk prediction algorithms for developing personalised Screening intervals?

A copy of the presentation slides is available on the website www.drscreening.eu

Sam then led an open discussion on the issues raised in the presentation. A summary of these discussions is presented in the second part of this report

Session 6: Hardware developments

Facilitator: Dr Dag Fosmark

Dag Fosmark presented a summary of recent hardware developments of relevance to screening for DR, and discussion points arising from these.

The recent developments presented included:

- OCT, although the role of OCT in screening is currently unclear;
- Easyscan, which can grade in the presence of media opacity;
- Ultra Wide Field (UWF) photography, which covers 82 degrees of the retina, giving a good view of the periphery, but which can have some blurred areas;
- Smartphone based technology, including retinal cameras for iPads, and home-made magnifiers for iPhone - these might be used for home monitoring;
- Smartphone apps, such as PEEK retina.

A copy of the presentation slides is available on the website www.drscreening.eu

Dag then led an open discussion on the issues raised in the presentation. A summary of these discussions is presented in the second part of this report

Section 2: Discussion of Progress and Issues

Facilitator: Professor Simon Harding

The final session of the conference was an overall discussion of the issues raised throughout the previous six sessions, led by Simon Harding. To avoid duplication, this section reports a summary of both the final discussion and discussions raised earlier in the meeting.

Service models

There was some discussion as to whether screening was best provided, options being direct ophthalmoscopy or slit lamp biomicroscopy by ophthalmologists or by trained technicians using photography, with or without electronic transfer of images and possibly assisted by automated grading software. There was a fairly even split between countries in which these methods were used, and no common agreement as to whether one method was better than another.

Screening intervals

Extended screening intervals (more than 12 months between each recall period) are now fairly widespread, although their implementation varies. Some countries also use six monthly intervals for high-risk patients. Extended intervals can free up resources to provide better care, but there are some concerns around this. The potential impact on screening attendance and disease progression is currently unclear. There is some concern that if the recall interval is more than one year some patients might think it is not important. In Sweden, attendance has fallen since the introduction of extended intervals, but the cause is not clear, as there have also been wider political changes. Denmark and Finland have not experienced any problems associated with extended intervals.

There was general consensus that extended screen intervals depended on both good diabetes care and a high quality screening programme. In relatively low-resource countries, where diabetes might often be poorly controlled, extended screen intervals might not be safe. Where glycaemic control is generally good, extended intervals were considered safe provided the quality of the photographic images, grading and call-recall system were good. Two and three year intervals have worked well in Finland, and the quality of the photographic images had been important in this.

Screening and treatment in low to middle income countries with smaller economies

There was optimism that some of the funding issues currently experienced by countries with relatively lower GDPs will improve as retinal cameras and other equipment become cheaper and economies recover from the 2008 financial crash. However, more advanced technology, such as automated grading, might remain unaffordable for a longer period. There was discussion over whether, in this context, presence/absence disease grading would be adequate, or whether feature specific grading will become necessary. Non-attendance might also be a problem where travel and time off work might be less affordable to patients (also potentially an issue in remote areas of higher income countries, see next section). The meeting agreed that a working group should be set up to summarise the best economic solutions for screening where funding is limited.

Screening and treatment in remote areas

There were three models described for screening provision in remote areas, which are not mutually exclusive:

- electronic transfer of images for grading at a central location;
- use of mobile screening vans;
- screening at GP practices using portable cameras.

Representatives' comments

Electronic images from screening stations in Greenland are transferred to grading centres in Denmark. This works well for most patients, but does not work for those with media opacities, so some near-patient provision is needed.

Mobile screening vans were used in the UK, although mainly programmes have moved towards fixed sites. Mobile screening vans might still be useful, as they are not expensive and the photographer could drive the van.

In France screening in rural areas is provided by an orthoptist with a "truck". Local mayors are expecting them, publicise the service, and people come and queue for screening.

In Italy small retinal cameras have been sent out to GP surgeries, and the photographs are taken there. As the technology improves, cameras are getting smaller. There may soon be an adequate camera device for smartphones, so that photographs might be taken by patients themselves.

However more advanced screening/ diagnostic technology may be prohibitively expensive in remote areas, for example in ROI where the use of a mobile OCT was stopped because it took too long to unpack and re-pack the equipment.

There seems also to be a problem with access to ophthalmologists in many remote areas, and with patient costs associated with travel to cities. Proposed incentives for ophthalmologists to work in remote areas include greater investment in rural health services, and possibly contracting practising or retired ophthalmologists to work part-time in a remote area. Electronic data transfer for remote grading or telemedicine are other options. This has been implemented in ROI and has been less expensive than relocating ophthalmologists. In parts of Greenland, where there are no ophthalmologists, telemedicine is conducted using OCT for remote diagnosis. In France there is no financial incentive for ophthalmologists to undertake screening.

Engagement with commissioners and health funders

Successful engagement with politicians often includes presenting the business case (how screening can save money in the medium and long term) alongside some guidelines on the staff and equipment needed to provide a screening and treatment service. Public funding might be needed even where health systems are private or insurance-based, as screening costs tend to fall on health services whilst savings are realised in welfare and social services (silo servicing). The St Vincent and Liverpool Declarations could be a useful tool to galvanise action. Doctors can have an influence as campaigners; in Albania a group of doctors organised a session for parliament for World Diabetes day in 2015. Following this parliament saw diabetes and its complications as more important. At the time the Director of the Health Fund was an ophthalmologist, the right person in the right place at the right time. In ROI a minister who had seen a relative go blind due to DR was also instrumental in changing policy. In the UK patient power has been important and influential with ministers. In summary, politicians tend to respond to both voter opinions and economic arguments.

Relationship between diabetology and ophthalmology

There was a view that, as an unanticipated consequence of screening programmes, diabetologists have become less interested and less involved in diabetic eye care. In the UK the national screening programme was introduced at the same time as the majority of diabetes care was being moved from secondary into primary care, which was seen as a way of improving services and saving money. In the training of diabetologists there was always a great interest in the eye, but this is no longer seen in the younger generations coming

through, because screening is seen as separate from diabetes care. Diabetologists also tend to be more focussed on macrovascular disease, particularly as these are the life-threatening complications. This may also be driven by the agendas of pharmaceutical companies. This is not necessarily a problem, as separating screening can free up time in diabetes clinics for diabetologists to talk to patients about systemic diabetes care. However it is still unclear as to whether improved systemic diabetes control can improve macular oedema, and it can be useful for diabetologists to look at the eye if patients do not attend for routine screening.

Communication between screening programmes, ophthalmology, diabetes clinics and primary care is important. All practitioners involved in the care of a person with diabetes should have access to the screening results. Visual outcomes are usually very important to patients, and attending regular screening is a good indicator of engagement. Computer and software systems can be an important aid to communication and data sharing. In England currently there is no link to patient records between diabetologists and ophthalmologists, resulting in ophthalmologists moving to taking on the management of glycaemic control. Austria and Germany emphasised the sharing of eye and systemic data as the combined data is used to set screen intervals. The meeting agreed that sharing of ideas in relation to information sharing would be useful.

New technologies in screening

Automated grading

Automated grading can be used to assess whether there is the presence or absence of DR, and also to assess severity. Studies have shown that it can have a high degree of accuracy. Automated disease/ no disease grading has been implemented in 13/14 health boards in Scotland since 2013. It is quality assured on a regular basis and has resulted in a 40-50% reduction in manual grading. England is also considering automated grading, pending results of a Health Technology Assessment. Countries need to decide whether or not to implement automated grading before deciding whether to go beyond disease/ no disease. There is some concern that the sensitivity of detection of DR may not be sufficient, and it could be difficult to assign responsibility if images are wrongly graded. In France screening is complicated by health ministry demands for data on other eyes diseases detected, which rules out automated grading. There was a general agreement that, ideally, screening programmes would focus on diabetic eye disease only. It was also suggested that currently we should focus only on disease/ no disease grading and not grade for severity.

Electronic data transfer

The technology for electronic data transfer is now reliable and generally affordable. It can be useful for both remote grading of photographic imaged and consultation at a distance (telemedicine).

OCT

It was agreed that OCT is key in providing a 3D optical assessment where maculopathy is already suspected, but its potential role in screening is currently unclear. There is no evidence that treatment of very early-stage maculopathy is more effective than treatment at a later stage, when it is detectable by photographic grading.

- In Copenhagen, OCT is routinely used in screening, and has provided a higher sensitivity than photographic grading alone, but they do not yet know whether this has led to improved visual outcomes.
- In Denmark, OCT is used to improve specificity in remote screening with telemedicine such as in Greenland.

There was concern at the high 'false positive' rate, as the use of surrogate markers for maculopathy in non-stereoscopic photographic screening picks up potential cases of maculopathy of whom only less than 20% have macular oedema, generating many unnecessary referrals. Visual acuity is currently considered a better indicator of macular oedema requiring treatment. More research is needed to evaluate the role of OCT in screening before any recommendations can be made. OCT devices are also large and expensive. Most countries have access to some OCT but not enough for routine screening. OCT will probably become more widely available in the future as devices get smaller and cheaper.

The value of treating patients with DMO on OCT but minimal thickening and normal vision was not supported. OCT should be reserved as a secondary "screen" for cases of maculopathy with reduced vision.

Portable cameras

Portable and hand held devices and various home-made devices which can be attached to smartphone cameras are currently available. However they do not currently produce a large enough image for screening. They may become useful in the future with improved resolution, including potentially enabling home monitoring. However, the image tends to be better when the device is fixed than when it is hand-held.

Ultra-wide field photography

Ultra-wide field cameras include the wide field 200° used in Greenland in screening for both DR and other eye diseases. It has led to a 16-17% increase in detection of DR in the peripheral fundus in people with Type 1 diabetes, a group more likely to have changes in the periphery. However, the numbers are small and it is unclear whether peripheral disease significantly affects visual outcome. Images from ultra-wide field cameras tend to have some blurry patches. There was consensus that simple wide field 200° does not provide an adequate view of the macula. An additional, high resolution, 30° image of the macula is therefore needed to detect maculopathy.

Section 3: Recommendations and action plan

Facilitator: Simon Harding

An open discussion was held to formulate an action plan for further progress. The agreed plan is summarised below.

- To continue to develop and share findings and best practice on targeted screening, such as introducing risk-based or stratified screening interval.
- To design models of screening and treatment appropriate to remote and poorly-funded settings.
- To implement new technology within screening programmes, as appropriate, and to share findings and best practice associated with this.
- To continue to promote access to treatment in areas with poor provision.
- To mobilise political action on DR, including involving key international organisations.

Key topics for future research include:

- the role of OCT in screening;
- how to address non-attendance;
- appropriate models of care for different settings;
- the impact of improved diabetes control on macular oedema.

It was agreed that the National Representatives meetings should continue, and expressions of interest were sought for future organising committees. Anybody wishing to be involved should let the organisers know. Tunde Peto and Caroline Styles have already offered their involvement in future meetings.

It was agreed that the next meeting should be held in Eastern Europe, and would focus more on the needs of countries with fewer resources. Ideally it was felt that at least a 3 year frequency of meetings was required.

Delegates

Conference organisers

Deborah Broadbent (Liverpool)
Simon Harding (Liverpool)

Yvonne D'Souza (Manchester)
Tunde Peto (London)

National representatives attending

Florian Toti (Albania)
Julinda Jaho (Albania)
Sonja Prager (Austria)
Helmut Brath (Austria)
Werner Dirven (Belgium)
Tomas Sosna (Czech Republic)
Katarina Kesslerova (Czech Republic)
Jakob Grauslund (Denmark)
Henrik Lund-Anderson (Denmark)
Peter Scanlon (England)
Charles Fox (England)
Paula Summanen (Finland)
Ali Erginay (France)
Lika Tsutskiridze (Georgia)
Ramaz Kurashvili (Georgia)
Klaus Lemmen (Germany)
Gabriele Lang (Germany)
Tina Xirou (Greece)
Adrienne Csutak (Hungary)
Miklos Kaplar (Hungary)
Massimo Porta (Italy)
Roberto Perilli (Italy)
Irmante Derkac (Lithuania)
Natalia Palarie (Moldova)
Tatiana Pasenco (Moldova)
Michael Quinn (Northern Ireland)
Hamish Courtney (Northern Ireland)

Reinier Schlingemann (Netherlands)
Dag Fosmark (Norway)
Elzbieta Bandurska-Stankiewicz (Poland)
Joao-Filipe Raposa (Portugal)
Jose Cuhna-Vaz (Portugal)
David Keegan (Republic of Ireland)
Tiberius Mogos (Romania)
Caroline Styles (Scotland)
Sam Philip (Scotland)
Dijana Risimic (Serbia)
Alicia Pareja Rios (Spain)
Rafael Simo (Spain)
Karl-Johan Hellgren (Sweden)

Abstract received but no delegate present

Liudmila Marchanka (Belarus)
Volha Zaleskaya (Belarus)
Sandra Cardillo (Luxembourg)

Guests

John Smith (Republic of Ireland)
Susan Johnston (Northern Ireland)
Anne-Catherine Sederberg (Sweden)
Paul Dodson (UK)
Gavin Tan (Singapore)

Conference secretariat

Gaynor Richards, Conference Administrator
Lindy Gee, Finance Administrator
Katharine Abba (Report writer)

Section 4 National Abstracts

ALBANIA

National representatives

Professor Florian Toti
Professor Vilma Mema
Dr Julinda Jaho

Population size

Surface 28 000 km²

Population size: 2.81 million inhabitants (females 49.9%)

Population structure:

- under 15 years old 578 566 (20.6% of population);
- above 65 years old 317 585 (11.3% of population);
- between 20-65 years old 1 635 241 (58.3% of population).

Estimated number of people with diabetes

75 000 (2015)

Type 1 Diabetes approx. 6 500 (8.7%)

Type 2 Diabetes approx. 67 500 (90%)

Other forms of diabetes approx. 1 000 (1.3%)

Insulin treated approx. 20 000 people with diabetes (26.6%)

Prevalence of unknown Diabetes 4%

The current status of screening

Coverage of population

Actually in Albania, all the regional hospitals (12 in total) have at least one ophthalmologist and one endocrinologist. Screening of Diabetic Retinopathy (DR), based on the National Diabetes Guideline, is part of the first evaluation for diabetes complications from the moment of diagnosis for type 2 diabetes and after 5 years from diagnosis for type 1 diabetes. Actually, at least 75% of the diabetic population is covered for screening of DR. In a recent regional study, only 60% of PWD has attained ocular control in the last two years. The most used method is the eye examination with the help of a direct ophthalmoscope, after the dilatation of the pupil. Since 2008, and especially in Tirana - the capital of Albania, where the greatest number of specialists and private clinics are concentrated, more frequently digital photography and angiography are used.

Training for professionals and personnel

There are regular 4 year postgraduate courses for ophthalmology or endocrinology at UHC and the Faculty of Medicine, with approx. 10-12 residents each year.

The Albanian Diabetes Association has organised different training programmes for PWD, GPs and pharmacists, on managing diabetes and its complications.

A series of postgraduate lectures with residents in Ophthalmology and Endocrinology was organised with Dr Ali Erginay on 2012. It will be repeated this year in September-October.

In 2014 the National Diabetes Conference was organised in collaboration with The Service of Ophthalmology, with the theme: Diabetic retinopathy and macular oedema. Unfortunately, we still **lack retinal surgeons** in Albania.

Screen interval

Annual check-up campaign for age group 40-65 years old. In the first year 300 000 persons were screened. Regular check-ups for people with diabetes (PWD), but HbA1c is available regularly only in Tirana, while lacking in other regions. No regular screening for other diabetic chronic complications.

Access to lasers

Actually there are 10-15 laser machines in Albania (almost triple since 2005), but more than half of them are concentrated in Tirana and especially in the private clinics. There are two laser machines at UHC, but they are not working properly half of the time. In 2015 the Ministry of Health and Health Fund introduced reimbursement for the treatment of macular oedema, but in a restricted number of patients. Till now, more than 50 patients have profited from treatment with Lucentis or Eylea.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

A hearing session at the **Health Commission of Albanian Parliament** was held on 14th of November 2014, by the Albanian Diabetes Association. Among other issues a special interest was put on Diabetes complications, especially on DR and diabetic foot. From this hearing session began the procedure for including on the reimbursement list the treatment for macular oedema. Screening campaigns for DR took place in May 2013 and 2014 with a private hospital. More than 1000 PWD have benefited from these campaigns.

Implementation of new technologies into systematic screening

A pilot study has been initiated with the Telemedicine Centre at UHC in 2015 regarding the use of telemedicine for DR screening. Till now more than 250 patients living in remote areas have benefited from the project.

The relationship between screening and systemic diabetes care

The Public Health Institute is creating the programme for the National Diabetes Register. A forum on Diabetes, including endocrinologists, pharma companies, cardiologists, ophthalmologists and decision makers was initiated in 2014. The first product is the new Guidelines on Diagnosis, Treatment and Follow-up of Diabetes for GPs, published in 2015.

Progress towards the Liverpool Declaration since 2005

The progress is very slow, but we feel optimistic about even better results in the coming years. Comparing with 2005, we think that the situation has improved, and the target objectives are attained more than 60%.

Top tips for success

A close and regular **co-operation and collaboration** between ophthalmologists, diabetologists, general practitioners and patient organisations.

The role of Ministry of Health, Institute of Public Health and Health Fund is fundamental for improving coverage of DR screening, better metabolic control, reliable database, easily accessible.

AUSTRIA

National representative

Dr Sonja Prager

Population size

8 699 730

Estimated number of people with diabetes

645 000 (total prevalence of 8-9%: 6% diagnosed and 2-3% undiagnosed cases).

Currently we do not have a national register of diabetic patients in Austria, so numbers can only be estimated.

Current status of diabetes screening and patient care

Diabetes screening is part of a regular medical check-up at the primary care doctor for people aged 45yrs or older. Diabetes screening is recommended in obese patients at any age, who present with additional risk factors including: hypertension, hyperlipidaemia, cardiovascular disease, family history of diabetes. Costs for diabetes screening are shared between public health insurance (43%), federal state funding (30%), national funding (16%) and local funding (11%). Type 2 diabetic patients are managed and educated by primary care doctors and can be involved in a national disease managing programme (6 of 9 federal states are currently participating). If necessary patients can be assigned to any one of 95 outpatient clinics specialising in diabetes care. 95% of adult patients with diabetes can reach one of these specialised outpatient clinics within 30min driving time. In total one outpatient clinic accounts for a mean of 4500 people with diabetes (range 2000-8200).

Training for professionals and personnel

A special diabetes-advisor training programme for health care providers (medical doctors, nurses and dieticians) was established in 1990. So far 850 participants have completed the programme.

Screen interval

DR screening is done by eye doctors exclusively: at least an annual eye examination including fundoscopic at a private eye doctor's office is recommended for type 2 diabetic patients and can be adapted individually dependent on the level of diabetic retinopathy or on change in systemic medication.

Access to lasers

Patients can be assigned to eye clinics for laser-/injection treatment or surgery if necessary.

Implementation of new technologies into systematic screening

Currently we do not use OCT, automated grading or electronic data transfer for diabetic retinopathy (DR) screening.

National progress since Liverpool declaration in 2005

First changes in quality management were induced by the St. Vincent Declaration in 1989 (WHO+IDF).

BELARUS**National representatives**

Dr Volha Zaleskaya
Professor Liudmila Marchanka

Population size

According to the Ministry of Statistics and Analysis of Belarus the population size in 2015 was 9 498 198

Estimated number of people with diabetes

In 2015, the number of patients treated for diabetes mellitus (DM) in the Republic of Belarus was 304100 (4% of the population). Diabetes was classified as type 1 and type 2 in 6 % and 94% of the patients respectively.

Diabetic retinopathy (DR) was present in 19893 patients, diagnosed as proliferative stage in 3845 (1.34%) cases with almost 602 (0.21%) of diabetic patients being blind.

The current status of screening*Screen interval*

The first ophthalmologic examination is recommended to be performed at the time of the diagnosis of diabetes. If diabetic retinopathy (DR) is absent or incipient ophthalmologic examinations should be performed on a yearly basis. In cases of mild to moderate

retinopathy periodicity is reduced to every 6 months. In more advanced DR, the frequency of visits is scheduled by an ophthalmologist.

If there is a need in fundus camera examination or OCT, the patient is forwarded to nearest Centre of diabetic retinopathy and ophthalmology situated in Minsk, Minsk region, Gomel, Vitebsk, Brest, Grodno and Mogilev.

Allocation of eye departments providing tertiary services for patients with diabetic retinopathy in Belarus

Access to laser

System of treatment DR in the Republic of Belarus:

1. general treatment in conjunction with diabetologists;
2. retinal laser surgery;
3. injection of avastin, aflibercept and ranibizumab.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Current financing of eye care services in the Republic of Belarus: Medical care is free of charge for citizens of Belarus. Current financing of medical services is from the national budget. The patient is also free to contact any private centre and pay for the specialist's consultation or laboratory analysis on his own.

Top tips for success

Ways to improve services to patients at risk of visual loss due to diabetic retinopathy in Belarus:

- improve the diagnostics of patients with DM and DR in regional areas;
- make the medical assistance more available for patients with DM in small cities and towns;
- equip a larger number of cities with modern equipment for diagnostics and treatment of DM and DR, as well as for the Hba1c level control;
- aggressive public education;
- development of the national database of all patients with DM and DR, including every single analysis and treatment that have been carried out.

BELGIUM

National representative

Dr Werner Dirven

Population size

11.250.585 (01/01/2016)

Estimated number of people with diabetes in Belgium

1 million

Estimated prevalence type 1 & 2 diabetes in Belgium (IDF): 8%

The current status of screening

The situation for screening has not altered a lot over the last 5 years.

Coverage of population

Following the latest IKED-report (results 2011, published 2013) 79.6 % of PWD (type 1 & 2) received an ophthalmological examination in this period (34.7% type 1 and 33.5% type 2 patients showed any retinopathy).

Training of professionals and personnel

Belgium has just over 1000 registered ophthalmologists (about 1 per 10.000). Screening is carried out by many of the so called "general ophthalmologists", who can refer to "retinal specialists" for further examinations and/or laser.

Screen interval

Yearly examinations are mandatory within the described programmes.

Access to lasers

No specific data available. Most general hospitals have ophthalmologists qualified for laser treatment linked to them. If not they refer to “medical retina “centres. Overall there is an adequate coverage for treatment, although regional differences may apply.

Implementation of new technologies into systematic screening

OCT is not mandatory, but is available widespread and can be implemented in screening. Automated grading is not in use.

The relationship between screening and systemic diabetes care

In 1998 “Diabetes Convention” was started between “RIZIV” (Belgian National Institute for Disease and Invalidity Insurance => Belgian social security system) and diabetes care centres. This programme concerns both type 1 and 2 people with diabetes (PWD) with minimally 2 insulin injections per day, and offers funding for blood glucose test material, educational programmes and complications screening. It contains at least one eye examination per year. Data from this Diabetes Convention are processed in “IKED” (Initiatief voor Kwaliteitsbevordering en Epidemiologie voor Diabetes), a quality improvement project. In 2010 the “Zorgtraject Diabetes” was started for type 2 PWD where the GP controls the diabetes care and can refer directly to the diabetologist in case of complications. Yearly eye examinations are included in this programme as well. Written reports on eye examinations are mandatory in these programmes.

CZECH REPUBLIC**National representatives**

Professor Tomas Sosna

Dr Katerina Kesslerova

Population size

2015: 10,538,275

Estimated number of people with diabetes

In the year 2013, the number of patients treated for diabetes mellitus in the Czech Republic was 861 647 (8.2 % of the population). Diabetes was classified as type 1 and type 2 in 6.8% and 91.7% of the patients respectively, the remaining 1.5% being considered as secondary or other types of diabetes. The prevalence was about 20 000 patients higher than last year. At the same time, the number of patients with impaired glucose tolerance was 65 269.

The number of treated people with diabetes (PWD) increases in long-term trend as well as the number of chronic complications. The number of registered chronic complications of diabetes was more than 251 000 in the year 2013. The number of patients treated only with diet decreased from 120 000 in 2012 to 107 000.

Diabetic retinopathy (DR) was present in 102 783 (12%) patients, proliferative stage was diagnosed in 27 073 (26.3%) cases with almost 2 458 (2.3%) of PWD being blind.

The relatively low percentage of diabetic retinopathy and high percentage of proliferative form is probably related to the lack of discipline when filing statistics by ophthalmologists. Conversely, very accurate is the number of blindness as consequence of diabetes, agreeing to European statistics. These statistical data are based on sources of social insurance.

The current status of screening

Screening methods used: ophthalmoscopy, biomicroscopy, photography, stereo photography, fluoroangiography and OCT. Basic screening is performed by all ophthalmologists (approximate number 800).

Coverage of population

Since 2002, the Czech Diabetological Society and the Czech Vitreoretinal Society have been publishing the Guidelines for screening and treatment of DR and its complications. The last update was in 2015. In 2016 was issued the 2nd edition of a comprehensive monography: Management diabetic retinopathy.

Training for professionals and personnel

Training of professionals and personnel organized via the Czech Vitreoretinal Society consists in annual congresses, vitreoretinal surgery workshops. Each year we organize bilateral ophthalmology-diabetologic symposium which takes place in Prague and Olomouc. These places are easily reachable from both parts of Czech Republic.

Screen interval

The first ophthalmologic examination is recommended to be performed at the time of the diagnosis of diabetes **even in childhood diabetes**. If DR is absent or incipient, ophthalmologic examinations should be performed on a yearly basis. In cases of mild to moderate retinopathy, periodicity is reduced to every 6 months. In more advanced DR, the frequency of visits is scheduled by an ophthalmologist. We do not recommend extending the period of screening more than once per year because of patient noncompliance (they do not consider this examination is important).

Access to lasers

If laser therapy is necessary, ophthalmologists should follow the recommendations based on the DRS and ETDRS.

Approximately fourteen laser centres are engaged in treatment of DR.

We established centres which provide laser treatment in combination with anti-VEGF applications that would be covered by the health insurance programme. We created the AMADEuS project (Age related MACular DEgeneration And MACular Diabetic Edema USed in patients treated with anti-VEGF treatment in the Czech Republic) which is focused on monitoring of patients with age-related macular degeneration and diabetic macular oedema.(1)This project is part of the National Diabetes Program that was created in 2015.

Progress towards the Liverpool Declaration since 2005

From the Liverpool Declaration in 2005 Czech Republic made great progress, especially in communication between diabetologists and ophthalmologists, as well as in the use of new technologies such as OCT, microperimetry and photographic and electronic transfer systems. These technologies are already easily accessible in common practice.

The problem which remains is communication with health insurance coverage of anti-VEGF treatment. Insurance companies have set very strict criteria for implementation of this treatment.

In the Czech Republic the use of Avastin is prohibited!

Solving these problems is the main task for the future.

References

1. <http://amadeus.registry.cz>

DENMARK**National representatives**

Professor Jakob Grauslund

Professor Marit Jorgensen

Professor Henrik Lund-Anderson

Population size

2016: 5,707,251

Estimated number of patients with diabetes

2012: 320,545 (5.6% of population).

The current status of screening*Coverage of population***Introduction of systematic (organised) screening**

The Danish Registry of Diabetic Retinopathy is a nation-wide quality assurance project, and it is mandatory to report screening results into the system. The most relevant standard (to be met by 90%) is screening for adults at least every second year. In 2014/15 this was met for 92% of patients attending diabetologists in outpatient clinics, and 75% of patients attending general practice. There were however wide variations in attendance rates across clinics ranging from 28-100%.

In 2014/15 the Danish Registry of Diabetic Retinopathy included data on 78,276 patients. For various reasons it is not possible to calculate an exact coverage of the diabetes population.

Training for professionals and personnel:

It is estimated that the vast majority of screeners have been trained, and that screening by digital colour fundus photos are used almost universally throughout the country.

Screen interval

For adults at least every second year

Access to lasers

There is full access for all patients to laser treatment and intravitreal treatment.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

According to the latest report from the Danish Registry of Diabetic Retinopathy (2014/15), 74.1% were screened by private practicing ophthalmologists, and 25.9% of patients were screened by retinal experts, trained nurses and trained optometrists at public hospitals. In general, patients with uncomplicated type 2 diabetes are screened in the private sector, and patients with type 1 and complicated type 2 diabetes are screened in the public sector.

Implementation of extended or risk based screen intervals

In general, risk-based screening intervals are used at most hospital settings, as opposed to most private practicing ophthalmologist that use annual screening for the majority of patients.

Implementation of new technologies into systematic screening

Facilities like OCT, wide field photography and automated grading are used at a few units on a limited basis.

Relationship between screening and systemic diabetes care

At most public facilities the screeners have access to information about systemic diabetes care for the patient. Conversely, it is mandatory for those who screen to inform the patient's practicing physician about the results. However, the latter demand is not always met.

Progress toward Liverpool Declaration since 2005

Despite the uncertainty of the overall screening coverage, we estimate that Denmark overall meets the requirements from the Liverpool declaration.

Top tips for success

Optimal communication between general practitioners, diabetologists and ophthalmologists and use of data from quality registers lead to optimal screening based on individualized intervals.

Electronic data transfer is the key.

ENGLAND

National representatives

Professor Peter Scanlon
Dr Charles Fox

Population size

64.5 million people in England.

Estimated number of people with diabetes

Approximately 2.8 million people have been diagnosed with diabetes in England.

The current status of screening

Coverage of population

98% of eligible people diagnosed with diabetes have been offered screening in the last 12 months and 81% have been screened as a result.

Training for professionals and personnel

All image grading staff working for the National Screening Programme (NSP) are required to become accredited and to participate in regular tests to ensure competency. These results are fed back to each Programme Manager for monitoring purposes. All staff are expected to complete the City & Guilds Diabetic Retinopathy Screening Qualification for accreditation, which is due to change provider this year.

Screen interval

Currently annual however there is a plan (approved by the UK National Screening Committee) to extend the screening interval to two yearly for low risk groups with 2 consecutive negative screens but this has not yet been implemented.

Access to lasers

All patients screened in England that would benefit from laser treatment have access to it.

Experience of engaging with health providers

There has been a change in commissioning arrangements in England so that screening services are commissioned by NHS England and not the local area as was previously the case. There is some variation across the country in how these commissioning arrangements are undertaken.

Implementation of new technologies into systematic screening

These have not yet been given official approval. Some areas have implemented OCT in surveillance clinics for screen positive maculopathy patients.

The relationship between screening and systemic diabetes care

This is variable across England with a strong relationship in some areas and a weak relationship in others.

Progress towards the Liverpool Declaration since 2005

England is meeting the requirements set out in the Liverpool Declaration.

Top tips for success

Increasing communication across the country is the key to a successful national screening programme. This can be facilitated by standardising IT solutions, robust failsafe and Quality Assurance procedures.

FINLAND

National representatives

Dr Paula Summanen
Professor Pirjo Ilanne-Parikka

Population size

5.4 million

Estimated number of people with diabetes

circa 500 000 (50 000 with Type 1 Diabetes Mellitus [T1DM]).

Use of diabetes medication in 2015: 360 658 people with diabetes (PWD).

Highest incidence of T1D in children <15 yrs of age, 64.3/100 000 in 2015, i.e. N=514 in 2015.

The current status of screening

The introduction of systematic (organised) photographic screening has been encouraged since 1992. Recent National Guidelines were published in 2006 (revised in 2014, www.kaypahoito.fi > diabeettinen retinopatia) but there is no single national programme nor national diabetes register.

Coverage of population

Exact coverage of population with diabetes is unknown.

Training for professionals and personnel

Training in national and regional workshops but there is no national certificate yet for photographers or graders.

Screen intervals

Extended screening intervals according to National guidelines since 2006: 3-year intervals in T2DM without DR, 2-year with mild, and annually with more advanced DR; 2-year intervals in T1DM without DR, annually with DR, and if mild DR or stable after PRP at 2-year intervals again. Risk-based screening intervals: up to 4-year intervals current practise in some communities.

Access to lasers

Single spot and pattern laser delivery systems available nationwide at all eye departments in the public sector hospitals; also in private sector where diabetic retinopathy (DR) treated in limited scale.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Experience with health providers varies: commissioners who outsourced have now started their own fundus photography service for better overall control. Health insurance companies not directly involved. Private companies sell fundus photography and grading also to public sector to some extent.

Implementation of new technologies into systematic screening

The OCT is currently used but on an individual basis and not in systematic screening. There is no automated grading of photographs or electronic data transfer systems.

OCTs will be incorporated into screening in the Uusimaa Health District. Automated grading not yet used. Fundus imaging electronic data transfer systems operating. Wide field imaging used to limited extent, but not currently encouraged, neither hand-held smartphone technologies, for systematic screening. Home monitoring is not available.

The relationship between screening and systemic diabetes care

The relationship between screening and systemic diabetes care is very good: primary care physicians are mainly responsible for treating T2DM patients and diabetologists for T1DM patients and refer patients for screening with data including latest laboratory results.

Progress towards the Liverpool Declaration since 2005

Much progress has been made towards the Liverpool Declaration since 2005 as in many areas digital cameras and electronic data transfer system became available, 80% coverage reached in some areas (e.g. the Northern Ostrobothnia Hospital District), and improving visual prognosis of patients with diabetes reported (Laatikainen L et al. Acta Ophthalmol 2016;94:226-231).

Top tips for success:

Prepare National Guidelines.
Keep the topic in meeting programmes.
High quality screening speaks for itself.

FRANCE**National representative**

Dr Ali Erginay

Population size

There are about 67 million inhabitants in France (January 2016) (www.insee.fr)

Estimated number of people with diabetes.

There is no diabetes registry in France. There is no recent national survey. The estimated prevalence of diabetes is about 5.0%. 2% of total deaths in France are related to diabetes (1).

The current status of screening*Coverage of population*

Screening for diabetic retinopathy (DR) in France, is usually performed using fundus examination by an ophthalmologist. In 2015, there were 5173 ophthalmologists in France (2). Recommended annual fundus examination cannot be performed sufficiently. Actually less than 50% of patients with diabetes had an eye examination during the previous year. Considering the increasing number of diabetic patients and the decreasing number of ophthalmologists, this situation should not improve over the next 15 years.

Screen interval

Recommended annual.

Access to lasers

Laser and intravitreal injection treatments are available for diagnosed diabetic patients in all university departments, central hospitals and in several private offices.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Regulation of the health care system in France is conducted by the statutory health insurance funds and the state, which consists of the parliament, the government and ministries.

See below.

Implementation of new technologies into systematic screening

OCT is not used yet for screening.

Telemedicine is validated for populations of less than 70 years old and must respect the quality-assurance standards (quality of the transmission of the images or the results, the proportion of nongradable photos, intergrading agreement, duration of reading by an ophthalmologist within one week maximum).

Progress towards the Liverpool Declaration since 2005

There has been some progress since the Liverpool Declaration 2005.

High Authority for Health (Haute Autorité de Santé-HAS) recommended the screening for diabetic retinopathy (DR) using two fields fundus photography in 2007.

The law "Hospital, patients, health and territories" n° 2010-1226 (October 2010) has defined officially the "Telemedicine" in France.

The HAS (February 2011) developed recommendations to improve DR screening:

- Coordination between general practitioner, diabetologist and ophthalmologist (circulation of patient's medical information as HbA1c, blood pressure, rhythm of screening).
- A periodicity of the screening to be adapted according to the patients. So far, the annual screening of DR was recommended. This rhythm can be carried in two years at certain diabetics with low risk of eye complication: those who are not treated by insulin, among which the HbA1c and the blood pressure are controlled, and a normal fundus examination. On the other hand, for all other diabetics, the annual fundus examination remains necessary.
- A regional adaptation of the screening for the problems of access to healthcare bound to the medical demography of the ophthalmologists or to the economic factors. For some of these situations, a screening programme itinerant or fixed can be a solution.
- The techniques of screening: Biomicroscopy, color fundus photography and telemedicine.

Color fundus photography is not widely used to screen for DR. However, since 2000, some local projects using fundus photography with a nonmydriatic camera, some combined with telemedicine, started to develop, such as a mobile diabetic retinopathy screening programme in Burgundy, the OPHDIAT project in Ile de France (16000 screenings/year) and some other departments. But no full national screening programme for diabetic retinopathy has yet been developed in France. And, the objective of screening at least 80% of the population with diabetes could not be reached. There are still problems:

- Reimbursement of screening (Ophthalmologist is underpaid).
- Find ophthalmologists for grading images.
- Using orthoptists as graders (create a training programme).
- Communication between all health care providers.
- Education of patients and professionals.
- Developing software for reading digital images and grading diabetic retinopathy.

References

1. http://www.who.int/diabetes/country-profiles/fra_en.pdf?ua=1
2. <http://www.profilmedecin.fr/contenu/chiffres-cles-ophtalmologue/>

GERMANY

National representatives

Professor Klaus Lemmen
Professor Gabriele Lang

Population size

82.5 million

Estimated number of people with diabetes:

7-8 million

Prevalence of diabetic retinopathy

Typ-2-Diabetes 9 - 16 %

Typ-1-Diabetes 24 - 27 %

The current status of screening*Methods used*

Visual acuity measurement and binocular biomicroscopy of the fundus with dilated pupil.

OCT: optional if diabetic macular oedema is suspected or present.

Coverage of population

According to data of Disease Management Programme Diabetes Mellitus:

Type 2 - 68%.

Type 1 - no data.

Data from 2014, based on "North-Rhine Area" (western part of Germany, 9.9 million inhabitants).

Training for professionals

Screening mainly performed by 6,000 ophthalmologists in private practice, trained during curriculum of ophthalmological education and further continuous medical education.

Screen interval

Implementation of risk based intervals in 2015:

2 yearly if no ocular or systemic risks.

Annually if no diabetic retinopathy but systemic risk factors present (raised Hba1c; raised blood pressure; vascular complications especially nephropathy).

According to recommendation of ophthalmologist if diabetic retinopathy present.

Access to lasers

Sufficient number of lasers available.

Acceptable time period between screening, referral and treatment (< 4 weeks).

Experience of engaging with health providers

Some more interest by health providers, but no real progress ...

Implementation of new technologies into systematic screening

OCT: optional if diabetic macular oedema is suspected or present.

Wide field imaging/ angiography: only in specialised centres if retinopathy is suspected or present.

No automated grading, no electronic data transfer systems in common use.

The relationship between screening and systemic diabetes care

Good co-operation concerning scientific exchange and continuous medical education.

Referral of patients: no problems with diabetologists, widely varying degrees of success rates with general practitioners.

Progress towards the Liverpool Declaration since 2005

On the plus side - better coverage of screening, better exchange of patient related information, beginning of systematic quality assurance / evaluation of epidemiologic data by Disease management programmes.

On the minus side - still no systematic screening, no recall system and no register of diabetes patients.

Your top tips for success

Keep on running

Acknowledgements

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GREECE

National representative

Mrs Tina Xirou

Population size

Greece is a country of 11,128,000 inhabitants (2013).

Estimated number of people with diabetes

It is estimated that the Greek diabetic population is approximately 850,000 – 1,100,000 (8-10% of the total).

The current status of screening

Coverage of the population

Despite the fact that a national screening programme has yet to be implemented, the Hellenic National Centre of Research, Prevention and Treatment of Diabetes and its Complications (HNDC), is participating in the European initiative *HORIZON 2020*. As a result of this participation, it has conceptualised a plan, which is partitioned into 4 pillars: 1- Population Awareness,; 2-Education of certain professional groups; 3-Quality Assurance of diabetic institutions; and 4-Auditing of existent structures. Currently the HNDC supervises 19 diabetic centres, based at public hospitals in Athens and 63 diabetic clinics in the rest of the country. In 2012 a total of 99,587 patients were recorded to have visited these centres. Aside from the HNDC, there are endocrinologists, diabetologists and general practitioners, who refer a plethora of diabetic patients to liaising ophthalmologists.

In sight of the lack of prospective funding, great emphasis has been placed on the first two HNCD pillars. Population awareness through certain professional groups is considered to be a primary target for combating the rising diabetes epidemic. Amongst the professionals involved are Pharmacists (National Pharmacists Association) and Ophthalmologists (Greek Vitreoretinal Society), who, combined, are promoting the Pharmacists' raised awareness for DME disease management. Part of this incentive, is the education of retail Pharmacists through webinars that aid in the identification and referral of diagnosed diabetic patients, who are not aware of the necessity of regular ophthalmic examinations. As of today, there are 460 retail Pharmacists involved in the programme.

Lastly, dispersed throughout the Greek mainland, are a multitude of public and private ophthalmic clinics.

Access to lasers

These clinics offer specialist services, such as lasers and OCT scanning, performed by trained personnel and are of easy access to the general public. However, it needs to be said, that such services are scarce in the Greek islands.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

In light of the HNDC and the upcoming *HORIZON 2020*, an attempt has been made regarding the implementation of a screening programme. Until then, commissioners and specialists are making a collective effort to raise awareness amongst healthcare professionals and the general public.

The relationship between screening and systemic diabetes care

Due to the current absence of a national screening programme, a relationship between screening and systemic diabetic care has yet to be established.

HUNGARY

National Representatives

Dr Adrienne Csutak
Dr Miklós Káplár
Dr Tünde Pető

Population size

9.9 million

Estimated number of people with diabetes

We describe the Diabetic Retinopathy Screening Programme (DRSP) available in Hungary where an estimated 600,000 out of 9.9 million inhabitants are affected by diabetes mellitus (DM).

The current status of screening

Coverage of population

Collecting information the 4 main Universities are tasked to facilitate DRSP.

There is no organised population-based DRSP in Hungary. General practitioners send their patients with DM to ophthalmology and those high risk for DM-related complications are seen by diabetologists and referred to eye-care.

In 2013, DRSP started at 13 locations in different parts of the country. The fundus cameras were placed in optometrists' offices where the images were taken by trained opticians and the Reading Centre of Semmelweis University, Budapest, Hungary graded the photos. Due to high costs associated with optometry services, the uptake remains low despite image reading being quick and reliable. Those patients with DM attending University Hospitals have fundus images taken and read by ophthalmologists.

Training for professionals and personnel

University staff train the optometrists and general ophthalmologists regularly, however, the number of trained staff using these skills remains low.

Access to lasers

Laser treatment is only available at selected centres, but there is enough capacity to increase numbers should DRSP be better utilised. Up to 30-33% of vitrectomies are for high risk proliferative diabetic retinopathy. Anti-VEGF treatment for diabetic macular oedema is only available in research studies or for those who can afford it.

Implementation of new technologies into systematic screening

There is no universal availability of OCT-s despite these being included in the University pathway.

In order to extend the capacity both the automated grading and the electronic image and grading data transfer are being developed, but all only at research level.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

DRSP in Hungary has low coverage and poor organisation, despite the country having full electronic patient record coverage. This would allow for standardised DRSP to be rolled out, as identification of the full cohort of patients with DM is possible. DRSP at opticians put an unacceptable financial burden on patients and therefore is not a viable option in Hungary. There are ongoing negotiations with the Ministry of Health for a fully funded DRSP including a national laser programme based on DRSP using a telemedicine approach. However, logistics of DRSP and finding the patients requiring laser treatment are yet to be worked out.

ITALY

National representatives

Dr Roberto Perilli

Professor Massimo Porta

Population size

Italy is a country of 59,801,000 inhabitants, of whom almost 3 million are affected by diabetes (latest national survey of 2011).

The current status of screening

Coverage of the population

Screening for diabetic retinopathy is not systematic, yet, and is mostly on an opportunistic basis with some centres performing systematic fundus examination. The largest survey on process indicators in diabetes care (ARNO Study) carried out in 2014 on a population of about 11 million in 8 Italian regions was published in 2015 and showed that only 11% of patients had their eyes examined over the previous year. An encouraging development was the Retina And Diabetes (ReAD) initiative, a non-institutional screening exercise that delivered screening to a total of 25,428 patients in 33 diabetic clinics in Italy. The programme was terminated in December 2015 but the centres still have the equipment to continue the work. Systematic screening is carried in a number of diabetes and eye clinics in the country, including those headed by the authors of this report.

A set of National guidelines was developed first in 2003, care of the major diabetes, ophthalmic, GP and patient associations in Italy. Updates were issued in 2013 and 2015. The guidelines are being disseminated through the scientific and lay society websites and the Italian NIH (Istituto Superiore di Sanità) will be involved in a project to further promote screening by including it among non-renounceable health care provisions.

Training for professionals and personnel

Despite the discouraging rate of systematic screening, efforts are under way to implement adequate training to improve integrated care involving diabetologists, general practitioners and ophthalmologists.

Screen interval

With reference to screening intervals, we published a report on retrospective analysis of the screening data in Turin, confirming safety of two-yearly intervals (1).

Implementation of new technologies into systematic screening

In Pescara, Perilli et al (Ann Ist Super Sanità, in press) made teleretinography – graded by an ophthalmologist - part of the integrated diabetes care process, with encouraging results in diabetologist-general practitioner data exchange. The same author is testing the use of portable digital retinal cameras in the general practitioners' practices, with images being sent to the diabetes clinic and graded by an ophthalmologist. The results show satisfactory interobserver agreement in comparing classical and portable fundus cameras.

References

1. Porta et al, Diabetologia 56, 2147-2152, 2013

LITHUANIA

National representatives

Dr Irmante Derkak

Professor Vilma Jurate Balciuniene

Population size

2015: 2,921,300

Estimated number of people with diabetes

116,900 cases of diabetes mellitus (DM) in Lithuania in 2015

The current status of screening

Systematic diabetic retinopathy (DR) screening in the country does not exist.

Coverage of population

70-80 % known DM cases.

Training for professionals and personnel

The residency of ophthalmology lasts 3 years. There are no subspecialties and fellowships.

Screen interval

National DR screening programme and DR guidelines are approved by local health care authorities.

In these guidelines it is stated that type 1 patients should be checked by an ophthalmologist 5 years after diagnosis of DM and type 2 patients immediately after diagnosis is made. Later the eyes should be checked regularly, but not less frequently than once per year.

Access to lasers

There are 6 licensed institutions (including the biggest health care centres, Kaunas UHS Eye Clinic and Vilnius Santariskes University Eye Clinic), where DR can be treated with lasers.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Lithuania has put in place the compulsory health insurance system which means that residents of Lithuania are obliged to obtain health insurance coverage. The compulsory health insurance is a guarantee for all insured that when needed their healthcare expenses will be compensated from the budget of the Compulsory Health Insurance Fund. There are two types of insurance in Lithuania: [National Health Insurance Fund](#) and private insurance.

Implementation of new technologies into systematic screening

New optical coherence tomography (OCT) equipment is available and can be accessed by patients in many public and private sectors. In some private general practitioner sectors there is the possibility to use a telemedicine system with a portable fundus camera.

The relationship between screening and systemic diabetes care

There are no direct relationship between ophthalmologists and endocrinologists. If an ophthalmologist finds subtle changes related to DR the patient is directed to an endocrinologist for tight glycaemic control.

Progress towards the Liverpool Declaration since 2005

We manage new diagnostic equipment, like OCT using trained professionals and personnel and more specialists for the diagnosis and treatment of DR in patients with DM.

Top tips for success

Increase public, patients and specialists understanding about development of diabetic retinopathy.

Build relations with health authorities.

Implement new technologies (telemedicine system, automated grading, etc.) for national systemic screening.

Develop National DR and Diabetic Macular Oedema registers.

LUXEMBOURG

National representative

Dr Sandra Cardillo

Population size

Luxembourg has a total population of 567 000 inhabitants

Estimated number of people with diabetes

Overall prevalence of diabetes mellitus estimated at 6.8%.

The current status of screening

There are 63 ophthalmologists, mainly in private practice.

Coverage of the population

There is actually no systematic screening for diabetic retinopathy for the adults but the high number of ophthalmologists, combined with the fact that 95% of the people are insured, makes the access of care not a real problem.

The situation is better for children: the paediatric clinic of Luxembourg was one of the 20 Eurodiabcentres which created a paediatric registry during 1989-2003.

Since 2008 the clinic participates to the SWEET project (the acronym stands for better control in paediatric and adolescent diabetes) with a medical database including full eye examination. So it offers the possibility to evaluate indicators at any moment.

For example, from 2008 until 2015, 273 patients have been included (which represents mostly the entire population of children with diabetes in Luxembourg) and in 2015, 56.2% (104/185) were screened for retinopathy. 0.73% were found to have a background retinopathy; no proliferative retinopathy was seen. Screening for retinopathy was done in patients older than 10 years and with diabetes duration longer than 2 years. The patient's ophthalmologist transfers the result to the endocrinologist through a pre-established ocular template.

Access to lasers

Laser treatment and anti-VEGF therapy are available in all major hospitals and in some private clinics.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Negotiations with the Ministry of Health concerning the project of creating a national diabetic programme are ongoing.

Implementation of new technologies into systematic screening

The OCT is currently used but on an individual basis but not in systematic screening. There is no automated grading of photographs or electronic data transfer systems.

Progress has been made towards the Liverpool Declaration in 2005

Progress has been made towards the Liverpool Declaration in 2005 for children with diabetes, whilst establishing a national diabetic programme is a realistic goal in the near future for all diabetic patients in Luxembourg.

MOLDOVA

National representatives

Dr Natalia Palarie

Prof Eduard Bernaz

Population size

4 million people (2015).

Estimated prevalence of people with diabetes

7.7% (IDF Atlas 2015).

In a RAAB study performed in Moldova in 2012 prevalence of diabetic retinopathy (DR) in patients with diabetes consisted 56 %, prevalence of macular edema 35% and sight threatening condition was met in 14%.

The current status of screening*Methods used*

The most used screening method is ophthalmoscopy or fundus biomicroscopy. Since 2012 retinal photography, angiofluorography and OCT examinations are covered by the National Health Insurance Fund, which made them available for general population. Systematic DR screening is performed only in the International Clinic of Diabetes, Nutrition and Metabolic Diseases in Orhei, which covers all central and northern part of the country and in Ophthalmology Department of Chisinau Municipal Hospital, which covers the capital.

Coverage of population

There is a huge disproportion between access to eye care in rural and urban areas. While 80% of ophthalmologists work in the capital, some regional hospitals don't have ophthalmologist for many years. Thus at least 30-35% of population is not covered by ophthalmological care.

Training of professionals and personnel

Moldova has just over 220 registered ophthalmologists. In 2012-2014 all ophthalmologists and endocrinologists were trained under "Diabetes Eye and Foot Care" project in detection and management of DR. Also there are continuous education courses in DR at the State University of Medicine and Pharmacy.

Screen intervals

Screening is implemented according to the ICO Guidelines for Diabetic eye Care 2014.

Access to lasers

Very poor. Most lasers are concentrated in the capital city Chisinau (3 in private settings and 2 in state clinics). There is only 1 laser outside the capital - in Orhei. Thus most of population living in rural areas don't have access to laser treatment.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

National Health Insurance funding is usually limited, segmented and distributed unevenly through the year. It creates obstacles for many insured patients to access systematic screening by retinal photography and OCT.

Implementation of new technologies into systematic screening

OCT of macula and optic nerve are included in the systematic screening.

The relationship between screening and systemic diabetes care

There is only one specialised diabetes clinic in Moldova, which offers integrated care for patients with diabetes. Generally diabetes is managed by family doctors, patients are referred to endocrinologists either initially for confirmation of diagnosis, or in case of uncontrolled diabetes or for management of complications. Overall management of diabetes is not satisfactory, especially in rural areas. This happens mainly due to lack of patients education; inadequate training of family doctors; and lack of interaction between family doctor, endocrinologist and ophthalmologist.

Progress towards the Liverpool Declaration 2005

Even though not available nationally, still the biggest breakthrough was the introduction of systematic screening through retinal photography and OCT and making it available for general population through the National Health Insurance Fund.

Our top tips for success

- Patient education.
- Good interaction between family doctors, endocrinologists and ophthalmologists.
- Adequate funding of screening and universal access to laser treatments.

NETHERLANDS

National representatives

Prof. dr. Reinier O. Schlingemann

Dr Suzanne Yzer

Population Size

The Dutch population consists of approximately 17 million people with a population density of 408 people per km².

Estimated number of people with diabetes

The number of patients with any type of DM in the Netherlands in 2011 was 834,100 diagnosed (+25% not yet diagnosed), 90% of them had DM2 (Source: Nationaal Kompas Volksgezondheid). More recent estimates go as high as 1.4 million (8.2%).

The current status of screening

Health insurance in the Netherlands is mandatory and everyone has to have a general practitioner. For help by medical specialists a GP referral is mandatory. General practitioners have to register all diseases of their patients in order to get reimbursement by insurance companies for the care they provide. When a patient is registered as having diabetes, general practitioners have to refer a patient yearly to a pedicure specialized in diabetic problems and to an ophthalmologist or optician/optometrist for bi-annual (standard) screening for diabetic retinopathy (DR). Primary health care takers are cut on their income when patients do not comply with these agreements. By that it has become the general practitioners responsibility to refer patients for diabetic retinopathy screening. Therefore, when patients with diabetes mellitus in the Netherlands don't get fundus screening, it is usually because of patients' non-compliance.

Methods used

Most patients are screened by opticians or optometrist or designated medical diagnostic centers (usually by fundus pictures read by graders or ophthalmologists). When patients are considered to have "more than mild diabetic retinopathy" they are referred to an ophthalmologist.

Coverage of the population

Screening availability coverage is 100%; the goal for actual screening is > 80% (part of GP's contract with healthcare insurers; actual not known).

Screen interval

Bi-annual

Access to lasers

Due to the high population density, high insurance rate and 862 registered ophthalmologists, every patient can be referred to have OCT imaging or fluorescein angiography photography taken, if necessary. This also allows for anti-VEGF treatment and laser photocoagulation treatment being available to every patient in the Netherlands.

The use of anti-VEGF in patients with diabetic retinopathy has significantly increased the burden of this patient population on ophthalmic practices in the country in comparison to

2005, and the Dutch Ophthalmic Organization has increased the capacity of residency programmes in the coming years.

Progress towards the Liverpool Declaration since 2005

There has been progress since 2005, but screening coverage was already ahead of many other countries at that time.

In summary: in the Netherlands systematic fundus screening in patients with diabetes mellitus is available. All patients have access to ophthalmological care if necessary. It is anticipated that this care is assured for the coming years.

Tips for success

- Automation, to further improve efficiency and (depending on the DR-screening setting) quality
- Integration of the various and sometimes contradicting guidelines (primary care, specialty care, specialized diabetes care)
- Continue focus on the essence of DR-screening: fast, reliable and efficient split between patients who need specialty care because they show signs of referable DR and patients who do not.

NORTHERN IRELAND

National representatives

Mr Michael Quinn

Dr Hamish Courtney

Population size

The population of N. Ireland is just under 1.9 million.

Estimated number of people with diabetes

84,836 patients with diabetes

Current status of screening

Coverage of the population

There is one diabetic eye screening programme, which is provided by the Belfast Health and Social Care Trust.

The programme is undergoing a significant modernisation with a change to Optimize software [version 3.6] from EyeCap. The move to this software has necessitated a change in the grading of images to align the service with the rest of the 5 Nations in the UK and Ireland.

The delivery of the service is a mixed model with the majority using mobile units visiting GP surgeries but there are also 6 fixed locations in the West of the Province.

Training for professionals and personnel

At present the photographers do not grade but over the next six months it is hoped that they will become screener/graders.

Training for staff is via monthly meetings in the form of formal teaching, e-learning and feedback sessions to review the service. All staff will have completed City and Guilds training by July 2016.

Screen interval

Annual. Extended intervals are being assessed but will not be adopted until the introduction of Version 4.1 of the software.

Access to lasers

Patients who require onward referral for hospital treatment now have ring fenced appointment slots to allow more timely treatment to be available. This also links in with the

introduction of direct referrals from the screening service. Prior to this the patients were referred to their GP for onward referral.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

The modernisation project is being undertaken in partnership with Public Health, the commissioners. Phase 2 of this will include the setting up of surveillance clinics and OCT clinics to allow refinement of the referrals.

Implementation of new technologies into systematic screening

From an IT perspective links are being established with the Electronic Care Records and Medisoft in the hospital eye service.

Progress towards the Liverpool Declaration since 2005

The next 2-3 years will see the NIDESP well on the way towards attaining the objectives of the Liverpool Declaration.

NORWAY

National representatives

Dr Dag Sigurd Fosmark

Dr Per Medbøe Thorsby

Population size

Our population size is 5.214.000 as of January 2016.

Estimated number of people with diabetes

There is no unifying diabetes register in Norway; hence *prevalence* data for diabetes are based on combining information from different registers and health surveys. The official estimate of *diagnosed* diabetes is around 4% of the population (200 000). In addition, there is a considerable number of people undiagnosed, almost doubling the likely estimate (and 9% had diabetes in the population based Tromsø Eye study). Precise *incidence* data are known from the Type 1 register for children, whereas the total annual number also *including* adults is estimated around 600.

The current status of screening

Coverage of the population

No systematic/organised screening has been introduced, hence screening and follow-up is both random and local. There is a suspected inequality in the screening offered due to demography.

Training for professionals and personnel

Some clinics and ophthalmologists are more devoted in herding “their” diabetic patients, although there is no specific training for professionals and screening personnel.

Screen Interval

Given the great variety of risk factors within the diabetic population, a tailored approach is sought, the national guidelines being advisory. There is no automated risk assessment

Access to lasers

The access to lasers is fairly good, most lasers being localised to hospitals.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

There is an increasing dialogue on the topic *Diabetes care* between the Health authorities and the medical community over the last few years. Other professional groups (e.g. opticians) are also lobbying their interest in order to screen. The ophthalmological society

has only a few devoted members trying to implement a unified screening. No endocrinologist is involved in applying screening for diabetic retinopathy, and there are no organised joint meetings between diabetologists and ophthalmologists.

Implementation of new technologies into systematic screening

Telemedicine is used in a few places; OCT is applied whenever the patient is at a clinic that has one, but mostly it is used in treatment decision and surveillance.

The relationship between screening and systemic diabetes care

There is no automatic dialogue between the ophthalmologist and the general practitioner or diabetologist. However, feed-back both ways is encouraged. Today, the individual *patient* has easier access to and control over his own electronic medical files than the doctors.

Progress towards the Liverpool declaration of 2005

Mentally, there has been some progress both within the ophthalmological milieu and among health authorities.

Top tips for success

Aside from never giving up, the tips for success remain unaltered: Educate on all levels and arenas – cooperate – lobby – implement locally – evaluate – spread.

POLAND

National representative

Prof.dr Elzbieta Bandurska-Stankiewicz

Population size

38 611 000 (2015)

Estimated number of people with diabetes

Population of diabetic patients: 1 740 318 (base on National Health Fund)

Prevalence of diabetes: 5.20%

Prevalence of diabetic retinopathy: in general – 25.48%; in DM1 – 32.50%; in DM2 – 23.04%.

The current status of screening

Coverage of the population

In Poland there is no National Screening Programme for Diabetic Retinopathy(DR). However, as there are 4219 ophthalmologists, fundoscopic examinations are performed with direct ophthalmoscopy (direct screening); only seldom are diabetes care centres equipped with fundus cameras. Diabetic retinopathy screening is conducted with the use of non-mydratic fundus cameras (colour retinal picture) in the region of Warmia and Mazury. Comprehensive Out-Patient Diabetes Care introduced by the National Health Fund (NHF) in 2008 obliges doctors specialising in treatment of diabetes to perform regular ophthalmological examinations of their patients. If they do not follow the recommendations the NHF imposes fines. Comprehensive Out-Patient Diabetes Care are found in 11 out of 16 Polish regions and include 236 149 patients with diabetes. This means that documented screening for diabetic retinopathy encompasses 14% of the diabetic population in Poland.

Access to lasers

All diabetic patients in Poland have access to laser retinal photocoagulation procedures. In every region there are ophthalmological centres which have equipment for laser therapy at their disposal. However, there are still considerable delays when it comes to providing patients with cataract a surgical treatment. Vitrectomy is also performed in every region.

Implementation of new technologies

Modern techniques in DR screening achievable in Poland are as follows:

- Color fundus digital imaging (typical 45 - 50° field);
- Ultra wide field imaging (to 180° field) with the use of scanning laser ophthalmoscopy;
- Retina pictures obtained with the use of smartphones;
- Automated assessment of DR status.

Progress towards the Liverpool Declaration since 2005

In Poland progress in ophthalmology care in patients with diabetes over the last 10 year was:

- Increased number of diabetologists and diabetes out-patients clinic with laser therapy equipment;
- Comprehensive Out-Patient Diabetes Care;
- Organisation - Study Group Eye Complications in Diabetes in Polish Diabetes Association.

Successes:

- Study Group Eye Complications in Diabetes in Polish Diabetes Association;
- Annually, the Polish Diabetes Association issues Clinical Guidelines, which also include recommendations concerning ophthalmological care that should be provided to diabetic patients;
- Comprehensive Out-Patient Diabetes Care;
- Universal access to laser therapy;
- Anti-VEGF treatment in diabetic macular oedema.

Top tips for success

National Screening Programme

Educate diabetologists about diabetic eye complications.

Better cooperation between diabetologist and ophthalmologist.

PORTUGAL**National representatives**

Professor João Filipe Raposo

Professor José Cunha-Vaz

Population size

7.7 million adults

Estimated number of people with diabetes

The estimated prevalence of Diabetes in Portugal is 13.1% with almost 700.000 people diagnosed and under treatment. The Portuguese National Health System is covering fewer than 15% of the recognized population.

The current status of screening

We present the experience of Coimbra and Lisbon regions.

Coverage of population

The screening program in the central region of Portugal started in 2001 and in Lisbon region in 2009. Each area has portable non-mydratic cameras and photographers. The screening site changes location to cover all geographic areas. The primary care unit summons all diabetic patients for a diabetic retinopathy (DR) screening appointment within their residence area. The photographers are requested to make a general quality assessment of the images. Images are transferred electronically to Reading Centers and reports are returned to the Patient Electronic Clinical File.

Screen interval

According to the grading scale (R0- No retinopathy; RL-Nonproliferative DR (without maculopathy); M- Maculopathy; RP- Proliferative retinopathy) patients/eyes who are classified as R0 or RL are scheduled to come back for screening one year later. Patients classified as M or RP are referred for an ophthalmological appointment for adequate diagnosis and treatment.

Implementation of new technologies into systematic screening

In 2011, The Coimbra - Ophthalmology Reading Center (ORC) of AIBILI, introduced the Retmarker Screening automated technology (RetmarkerSR). APDP-ORC uses an ophthalmologist based graded system. The first assessment performed by RetmarkerSR identifies signs of DR pathology in all image sets received. It separates those with no signs of DR pathology or no evolution of DR from those with signs of DR pathology/evolution. It includes a proprietary co-registration algorithm that allows comparison within the same retinal location between different screening visits. Image sets identified as having signs of DR pathology in the 1st assessment are sent to human grading for classification of DR level. With this system, Coimbra ORC has 77,356 patients screened and graded as R0 - 76.1%, RL – 17.8%, M - 2.0% and RP - 0.2%. APDP-ORC has screened 52,739 people that were graded: R0-83.7%; RL- 18.1%; M-1.4%; RP- 1.8%.

Progress towards the Liverpool Declaration since 2005

Portugal is still far from the Liverpool Declaration target of providing DR screening for at least 80% of the population with diabetes. Still, a growing number of people is covered (223% more than in 2009) with different strategies implemented with a different human grading burden (RetmarkerSR reduces this factor).

Increasing awareness in diabetes and its complications including DR has made Diabetes a national priority program with greater involvement of primary care physicians, diabetologists, ophthalmologists and health policy makers.

REPUBLIC OF IRELAND

National representative

Mr David Keegan

Population size

The current population of Ireland is 4.3 million people.

Estimated number of people with diabetes

Between 190,000 – 210,000

We have a register of patients with diabetes established for this programme.

The current status of screening

We introduced systematic (organised) screening in 2013 and phased in the first screening cycle over 2 years (2013 /14). We completed the full second screening in cycle in 2015 and are currently in the 3rd cycle.

The programme is underpinned by a set of Quality assurance standards and Treatment Centre guidelines (www.diabeticretinascreen.ie).

We use an annualised call / recall system similar to that employed historically in UK screening programmes. Two private providers (Global Vision and EMIS healthcare) are contracted to carry out our screening. Screening is provided at 122 screening locations across the country in a mix of clinical, non-clinical and mobile settings to ensure as complete coverage as possible. Grading is performed by trained graders and senior retinal specialists provide arbitration and oversight.

We use the Optimize electronic record system with a modification to expand the clinical side of the programme to allow hospital based entry.

Coverage of the population

We initially covered (screened and final graded) 38% of the population on our register (145,000) in the first cycle. This rose to 52% in the 2nd cycle.

Training for professionals and personnel

The training and quality standards are covered in our documents.

Screen interval

As we are in the early stages we have elected to stick with 5 cycles of annualised call – recall without altering the screening interval or moving yet to risk based intervals.

We shall pilot two surveillance (OCT and photography) models later this year (community and hospital based).

Access to lasers

The patients that are identified as requiring assessment at hospital eye services are referred for assessment and care. We have 7 treatment centres operational nationally (existing public health units) that operate diabetic retinopathy care for the programme under central governance on an activity based funding model. Each unit has full treatment facilities including injection facilities, laser and access to vitreo-retinal surgery.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

I will present aspects of our programme such as the negotiations to fund completely, the engagement of private providers linked to public health system and roll out of treatment clinics.

Progress towards the Liverpool Declaration since 2005

In the last 3 years, since introducing the National Screening and Treatment programme, we have made considerable progress to reach the goals of the Liverpool declaration.

Top tips for success

1. Generate a solid economic argument in your own country (the health argument is already made).
2. Be open minded and flexible in negotiations. Goal is reduction of sight loss and blindness due to diabetic retinopathy, that is all!
3. Communicate, communicate and communicate some more.

ROMANIA**National representative**

Mogos Tiberius Viorel

Population size

20,121,641 inhabitants – (51.4% women; 48.6% men) - 55.2 % in the urban area and 44.8% in the rural area (2011, <http://www.recensamantromania.ro/>)

Estimated number of people with diabetes

No official national data available. according to the PREDATORR study published in 2016 (<http://www.ncbi.nlm.nih.gov/pubmed/25850521>), the prevalence of diabetes in our country, for the age group 20-79 years old is 11.6 %, which means about there are 1,535,413 Romanians, of which 3 quarters have known diabetes (about 1,125,000), the rest are suspected of unknown DM. The estimated prevalence of prediabetes: 16.5%, with the highest percentage in the 60-79 year age group and in women.

The current status of screening

A systematic/organised screening programme has not been introduced. Patients with diabetes are managed through primary and secondary care. They are referred to the

ophthalmologist for screening by their attending diabetologist and sometimes by their GP. There are no national guidelines for DR screening.

Methods used

Mostly biomicroscopy of fundus through dilated pupil. Only one centre existed where retinal photography was used for screening a few years ago, but that was abandoned due to lack of funds.

Coverage of population

No official national data available. As far as we know there is no national registry for patients with diabetic retinopathy (DR), so we would estimate about 200,000 patients included in screening. Romania has a few specialized regional Diabetic Eye Centers, connected to the regional diabetic centers. The largest one, founded in 1997 is in Bucharest and has 32,000 charts of patients in screening and treatment.

Screen interval

Screening for DR is recommended to be performed once a year for type 1 and type 2 diabetics with no DR, every 6 months for mild-moderate non proliferative DR (NPDR), every 3 months for severe NPDR and proliferative DR (PDR). Screening management is difficult, as there are not enough diabetologists (some counties only have one or two for thousands of patients) and the GPs are overcrowded.

Training for professionals and personnel

Ophthalmologists are trained during curriculum of ophthalmological education. Even if there were funds allocated for new laser equipment, only a small amount were for training health professionals on how to use them.

Access to lasers

There are 55 lasers all over the country, 15 in the public "Diabetic Eye" Centers (5 in Bucharest, 2 in Cluj and Timisoara, 1 in Dolj, Iasi, Constanta, Brasov, Mures, Braila, but there are several regions that have none – such as Olt, Hunedoara, Gorj, Tulcea and Vaslui); about 40 lasers in the private sector.

Describe your experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Working in a public hospital, I see plenty of patients with chronic complications, including different degrees of DR and I refer them to the ophthalmologist. Screening is a part of systemic diabetes care, but at this time it doesn't reach the necessary level, compared to the number of diabetics. RD screening through biomicroscopy is fully reimbursed by the National Health Insurance House (CNAS) for the majority of patients. However, public facilities as well as number of health professionals are very poor.

Implementation of new technologies into systematic screening

Newer technologies such as OCT, automated grading, electronic data transfer systems are not in use for screening, due to the lack of funding.

Progress towards the Liverpool Declaration since 2005

Even if there is a trend towards better control of chronic diabetes complications, in the field of the diabetic eye, there is only a slight improvement in screening, as the coverage of population remains low. Access to lasers is better compared to 2005.

Top tips for success

A national registry for those with diabetic retinopathy.

Training of GPs, diabetologist and ophthalmologist towards including and keeping patients in the screening programme.

Better patient education – more compliant to screening and treatment.

Training in other centres outside the country where screening is established and working well.

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SCOTLAND

National representatives

Dr Caroline Styles
 Dr Sam Philip

Population size

5,347,600 (mid 2014)

Estimated number of people with diabetes

307,876 (an increase of 3.8% in the last 12 months)
 Number eligible for screening: 263,928

The current status of screening

Systematic screening was introduced in 2006.

Automatic electronic referral from all GP practices via national diabetes information system (SCI-diabetes) followed by an invitation to attend screening. Non-mydratic fundus photography- one macula centred image taken. Inadequate photographs then have pupil dilation. If there is still a technical failure slit lamp examination takes place (2.5%).

All images initially graded by automated grading. Technical failures and microaneurysms detected (about 60% of images) pass to level-1 grader. Graders from nine grading centres including autograder participate in internal quality assurance and twice yearly external quality assurance.

Coverage of population

2015-16 coverage of population.

Screening Invitation rate = 98.3%

Screening Uptake = 77.9%

Successful Screening = 76.0%

Referral rate to ophthalmology = 3.8%

Training for professionals and personnel

All staff participate in City and Guilds training programme.

The DRS collaborative has slit lamp standards and has accredited more than 20 slit lamp examiners for the programme.

Screen interval

Standard recall interval is 12 months. There is also a 6 month recall interval for higher risk.

Extended or risk based screen intervals.

Awaiting Scottish screening committee decision to move to 2 yearly screening intervals for low risk.

Access to lasers

Universal access to laser treatment and other Scottish Medicine Consortium approved treatments for diabetic maculopathy.

Experience of engaging with health providers (commissioners, health insurance companies, private and public sector)

Not applicable in Scotland.

Implementation of new technologies into systematic screening

OCT is not currently implemented in the national screening programme but many boards are using OCT surveillance pathways,

Automated grading- implemented in 2013 in 13 out of 14 boards

The relationship between screening and systemic diabetes care

Sci-diabetes allows all staff involved in diabetes care to access results. Patients can also access their results through *my diabetes my way*. The DRS collaborative involves ophthalmologists, diabetologists, public health clinicians, programme managers, system specialists and patient representatives.

Progress towards the Liverpool Declaration since 2005

Since 2005, Scotland has introduced a systematic screening programme. Staff have a recognised training programme. There remains universal access to laser.

Top tips for success

A shared national database of all people with diabetes.
A collaborative approach with all stakeholders involved.
Evidence based adoption of new technologies like automated grading and OCT.
Robust quality assurance.

SERBIA

National representative

Ass. dr Dijana Risimić

Estimated number of people with diabetes

According to Institute of Public Health of Serbia data it is estimated that in Republic of Serbia without Kosovo and Metohija approximately 710,000 persons or 12.4% of adult population suffer from diabetes (2015).

In our country, approximately 2500 persons die from this disease each year. In 2014, on the basis of a standardised mortality rate of 12.6 per 100 000 population, Serbia belonged to the group of European countries with the highest diabetes mortality rates.

The current status of screening

A Diabetes Registry was set up in Serbia in 1980 further to the Plan of Statistic Research of Interest for the Republic.

On the basis of the national importance of the Diabetes Registry and statutory regulations, in the course of 2006 a team of experts from the Institute of Public Health of Serbia in cooperation with the experts for diabetes prevention and treatment of the School of Medicine in Belgrade and the members of the National Expert Commission for Diabetes, initiated the reorganisation of Serbian Diabetes Registry. The new setup of the Serbian Diabetes Registry implied its decentralisation. The regional Registries are kept on the level of the administrative districts and are located at the Institutes of Public Health. The database for the entire Serbia is managed by the Institute of Public Health of Serbia.

Unfortunately, we still do not have an adequate database for diabetic retinopathy (DR) and maculopathy in Serbia. According to data of the Institute of Public Health of Serbia diabetic retinopathy as a microvascular complication, is present in approximately 3.6% diabetic patients (3.2% in Central Serbia and 4.4% in Vojvodina).

Access to lasers

We have eight retinal lasers in Serbia, and six OCTs in Public Hospitals and approximately eleven lasers and seven OCTs in private hospitals. In Serbia there are five FA cameras in Public hospitals and only one ICG camera in a private clinic. The most of lasers and diagnostic machines are localised in Belgrade, capital of Serbia and often patients have to travel long for a diagnostic procedures and treatment. Approximately 2300 laser intervention are done per year in Clinic for Eye Diseases, CCS, and the equivalent number, all together, in all other centres.

The first anti-angiogenic therapy was given in a Clinic for Eye Diseases, CCS, Belgrade (bevacizumab-Avastin®) in 2006. The Clinic had approval of the Ethics Committee, CCS and the Ministry of Health. In September 2011 bevacizumab was prohibited by the Ethics Committee because ranibizumab-Lucentis® was approved for the treatment of AMD and DR in Serbia. Until now there is no reimbursement for anti-VEGF therapy in Serbia and patients can be treated only in private hospitals (approximately 200 EURO per injection).

SPAIN

National representatives

Professor Rafael Simo
Dr Alicia Pareja

Population size

46.5 million

Estimated number of people with diabetes

6.4 million (13.8%), nearly half of whom have undiagnosed diabetes: 2.8 million (6.0%) (1)
Estimated number of ophthalmologists: 5,000
Estimated number of endocrinologists: 1,600

The current status of screening

The national health system is funded by taxes and offers free universal coverage. In many regions, DR screening is performed by fundus examination by an ophthalmologist annually from the diagnosis of type 2 DM (T2D) or from 5 years after the diagnosis of Type 1 DM (T1D). In other regions, this system co-exists with the use of non-mydratic photography and teleophthalmology. In some regions (the Canary Islands, Andalucía, Catalonia, Asturias and Navarra) (2,3) the latter type of screening has been in operation for many years, while in others (La Rioja, Galicia, Valencia, Madrid, Aragón and Balearic Islands) (4,5) it has just been initiated, remains pending or has not been implemented in the whole region. Pilot studies with automated retinograph reading have been initiated in at least one region of the country (Valencia). (6)

Methods used

The most widely used DR screening method involves a combination of non-mydratic fundus photography and tele-ophthalmology. Basically, a camera is installed in Primary Health Centers and patients are referred there by their Family Physicians (opportunistic screening by family physicians, not systematic screening). Mobile retinography units are used in certain non-urban populations (rural areas). Retinography is generally performed by trained registered nurses, or in some cases, professional photographers or opticians. The number of retinographies per patient varies according to region: only one in the Canary Islands, two in Catalonia, but the norm is three retinographies per patient (Navarra, Galicia, Valencia, Madrid, La Rioja and Asturias). Generally, tropicamide is only used when the retinography quality is not optimal. The retinographies are assessed by Family Physicians and only those suggestive of retinopathy or of doubtful interpretation are sent to an ophthalmologist. However, in some regions the retinographies are assessed directly by an ophthalmologist.

Coverage of population

Only regional but not national data are available. In Andalucía 54% of patients with diabetes (PWD) are included in the early detection of DR programme. In Catalonia 33% of PWD have been screened with retinal photography. In the Canary Islands, although the DR screening programme Retisalud (non-mydratic fundus photography + tele-ophthalmology) only includes 38% of PWD, the sum of these patients added to those undergoing traditional screening means that periodic ocular funduscopy has been and is performed in the great majority (82%) of PWD.

Training for professionals and personnel

Canary Islands, Navarra and Catalonia - Short courses at Primary Health Centres given by Hospital Retinologists (a) for Family Physicians 2 x 4hr per week, electronic practice tests, final examination; (b) for Nurses 1 x 1hr practical course on the use of the camera.

Access to lasers

There is universal access to laser therapy but the waiting list is increasing, mainly because of limited resources due to the economic crisis. With 17 autonomous geo-political regions, this varies widely.

Management of diabetes

Most of T1D patients and T2D with severe and complex comorbidities are managed by hospital specialists in Endocrinology and Nutrition. The remainder are managed by Family Physicians at health centres. In several autonomous communities when insulin treatment is initiated a significant proportion of T2D patients are referred to Endocrinologists.

The relationship between screening and systemic diabetes care

Joint meetings between ophthalmologists and diabetologists.

In some hospitals there are multidisciplinary diabetic units with endocrinologists and ophthalmologists, but in general these joint meetings take place informally. The Spanish Society of Diabetes organizes annual meetings attended by all health professionals involved in the care of diabetic patients (Endocrinologists, Family Physicians, ophthalmologists, cardiologists, neurologists and podiatrists). In this regard, a consensus document on DR screening has been elaborated and approved by the Spanish scientific societies of endocrinologists, ophthalmologists and family physicians. (7) In addition, the Retinaplus+ Foundation has launched an on-line Multidisciplinary Diabetes Platform. The objective is to facilitate communication and information sharing between health professionals who treat diabetic patients, and ultimately, to reduce the economic burden associated with the number of visits to medical centres. In addition, patients can access the results of their routine control tests, thus stimulating greater implication in the management and follow-up of their disease. Special emphasis is therefore placed on patient education about diabetes. This Platform forms part of the general program "2017: Year of the Retina in Spain" considered by the Government to be of "exceptional public interest" as expressed in the law on State General Budget Expenditure.

Finally, a new group has been created in the setting of the Spanish Society of Diabetes (SED) which consists of members of the SED, the Spanish Society of Ophthalmology (SEO) and the Spanish Society of Retina and Vitreous (SERV) aimed at searching synergies to optimize the management of diabetic patients with DR.

Progress towards the Liverpool Declaration since 1995

This varies according to region. However, awareness is increasing nationwide and DR screening is established.

In spite of an overall increase in the prevalence of T2D in Spain, a decrease in the prevalence of DR has been observed (8). In addition, the incidence of sight-threatening DR (proliferative diabetic retinopathy + diabetic macular oedema) is currently estimated at 6.5-7%.

Many regions of the country now have electronic medical records which are shared between Primary and Specialist healthcare professionals. This is essential for optimizing the diabetes care.

Particular difficulties

- Family physicians, essential for DR screening, are already over-burdened. Requesting them to perform extra, unremunerated work is a major obstacle.
- Patient collaboration is often difficult. Many fail to appear for their non-mydratic fundus photography appointments. This is often associated with low cultural level.
- DR screening continues to be opportunistic, despite the possibility to implement it in a systematic manner.

- There is no standardised flow-chart between Endocrinologists/Diabetologists and Ophthalmologists
- Private medical insurance companies are not involved in DR screening.

Top tips for success

We need incentives for family physicians.

We need an improved patient reminder system and education programmes for diabetic patients.

A close relationship between ophthalmologists and endocrinologists/diabetologists under the umbrella of the scientific societies and healthcare providers is urgently needed.

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SWEDEN

National representatives

Dr Karl-Johan Hellgren
Professor Johan Jendle

Population size and estimated number of people with diabetes

In Sweden with a population of 9.75 million people, 2014, approximately 370,000 have been diagnosed with diabetes and registered in the Swedish National Diabetes Register (NDR).

The current status of screening

In the 1970s and 1980s local screening programmes for diabetic retinopathy started in most of Sweden's 20 counties responsible for providing health care. Screening for diabetic retinopathy for type 1 and type 2 diabetes was recommended by the Swedish Agency for Health Technology Assessment in 1993 and the National Board of Health and Welfare published guidelines concerning screening for diabetic retinopathy 1999.

Coverage of the population

In 2014 94% of type 1 and 90% of type 2 diabetic patients had a retinal examination according to these guidelines. *Training for professionals and personnel*

The screening organisation varies among the Swedish counties, however, most often the county council is the principal of the ophthalmological departments responsible for screening diabetic retinopathy but they may also commission private caregivers for retinal examinations and grading. Retinal photographs are assessed by trained nurses and to some extent by opticians/photographers. Only ophthalmologists or specially trained nurses grade retinopathy.

Screen interval

The current national guideline recommends retinal examination for type 1 and type 2 diabetes without known retinopathy every other and every third year, respectively, and more often if retinopathy is present. In most counties extended and risk based screening intervals are adopted based on the graders discretion considering patient characteristics such as type of diabetes, diabetes duration, metabolic controlled measured as HbA1c, blood pressure and fasting serum lipid levels.

Access to lasers

All counties provide access to photocoagulation treatment.

Implementation of new technologies into systematic screening

Electronic data transfer including photographs is common.

The relationship between screening and systemic diabetes care

Most ophthalmologists describe a functioning relationship to the health care providers responsible for the diabetes care.

Progress towards the Liverpool Declaration since 2005

The Liverpool Declaration is fulfilled since many years but the future may be challenging e.g. the reported decline of retinal examinations within three years for type 2 diabetes from 94% in 2010 to 90% in 2014. The National Board of Health estimates that another 9000 retinal examinations per year should be performed and concludes that extra resources for this purpose are needed for ophthalmic health care. Furthermore a dialogue between the Swedish ophthalmologists and the specialists in diabetology has started aiming at a consensus for one single grading scale in all counties and to improve registration of visual outcome. Hitherto the screening for diabetic retinopathy in Sweden has been a success, which ascribes to national guidelines, NDR and a driving spirit of a few influential specialists within the fields of ophthalmology and diabetology.

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