WHAT ELSE CAN YOU DO ONCE YOU CAN SCREEN AND GRADE?

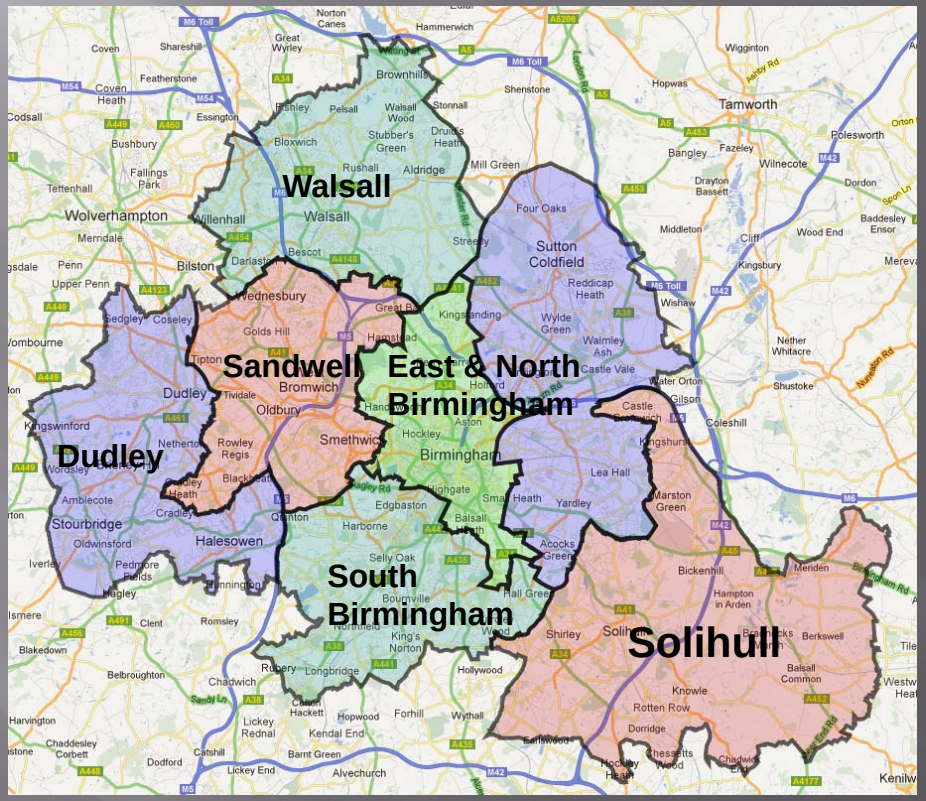
Surjit Golar
Stephany Osei-Amoako

Birmingham, Solihull and Black Country Diabetic Eye Screening Programme

7 PCTS, in April changes 2 Clusters

8 Hospital sites

23 graders (primary, secondary, arbitration



80 Optometry practices

132,000 registered patients

Supported by 8 referral outcome graders

Total graded annually 156,000

More than sitting in the dark!

What else do our graders do?

- Audits
- Research
- Training
- Screening Promotion, Publicity and Education
- Continual Professional Development

Why do audits/research within retinal screening programmes?

- To help set local/national guidelines
- Improve quality of care and service delivery
- Evaluate existing standards
- Decreasing the pressure on hospital eye services

Audits

- Effectiveness of OPDR virtual clinics for managing patients with early maculopathy
- Accuracy of surrogate markers to predict CSMO with OCT
- Screening intervals for patients with no or background diabetic retinopathy
- Management of inadequate images

Optic Disc Haemorrhage (ODH) Audit: Should morphology determine referral?

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Introduction

Diabetic Eye screening provides opportunistic identification of other ocular lesions such as glaucoma. Certain characteristics indicative of possible glaucoma include cupped disc, asymmetric optic disc and optic disc haemorrhage (ODH).
The aim of this audit is to evaluate the current patient referral pathway for ODH and whether morphology of the ODH should determine the outcome i.e. a referral or no referral, in the Birmingham and Black Country Diabetic Eye Screening Programme.

Results

•119 patients presented with an ODH
• All 119 were subsequently graded by a clinical outcome grader (Diabetologists/Ophthalmologists).

• 42 patients were deemed safe to continue with annual screening (i.e. not referred).
• 77 patients were referred for further assessment for possible glaucoma.

Outcome for the 77 Referred Patients

• 11 were found to have Glaucoma confirmed by a Glaucoma specialist.

• 34 were unassessed for Glaucoma even though they were referred by the clinical outcome grader. This was due to the referral being made to a non-glaucoma clinic. Table below is a list of the different clinics patients were referred to.

Referred To	Number of patients
Diabetic Eye Clinic	16
General Ophthalmic Clinic	3
Ophthalmic Photographic Diabetic Review	1
Optician	1
General Practitioner	4
Did Not Attend (DNA)	6
Lost to follow up (appointment never made)	3

Method

A retrospective analysis of 119 randomly selected patients who presented with ODH at screening over a 10 month period. Follow up was one year.

Conclusion

- Patients who present with ODH should be referred to a Glaucoma Clinic as 26% of those assessed for glaucoma were positive.
- Inconsistency in referral pathway between clinical outcome graders resulted in a large number of patients being unassessed for glaucoma supporting the need for a standardised pathway.
- Referral should not be dependent on morphology as this appeared similar in those confirmed with glaucoma and those with no glaucoma.

Morphology of ODH in Glaucoma and non-Glaucoma Patients

Characteristic	Glaucoma n=11	No Glaucoma n=32
Blot shaped	4 (36%)	10 (31%)
Flame shaped	7 (64%)	22 (69%)
In the OD	3 (36%)	8 (25%)
On the OD margin	8 (64%)	24 (75%)
Cup:Disc Ratio	0.46 (0.33 - 0.57)	0.47 (0.30 - 0.65)
Symmetrical OD	11 (100%)	28 (87%)
Assymetric OD	0	0
Incomparable OD	0	4 (13%)

- Flame shaped ODH were most common in both groups.
- The ODH tended to be on the margin of the OD.
- There were no cupped discs (i.e. cup/disc ratio did not exceed o.8)
- Due to over exposure or dense cataracts, some OD were incomparable.

One Year Follow Up of the 77 Referred Patients

	Resolved	Present	HES	DNA	Deceased	Moved PCT
Referred (n=77)	45	10	15	0	6	1

- One year follow up revealed that the ODH resolved in 58% of the 77 referred patients while 13% still had an ODH present.
- 21% were still under hospital eye service (HES) hence digital retinal photos were not available for assessment.
- 8% Died (age range 71-91 years) within the year.

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Presented at:

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Retinal Thickness in Pregnant Women with Diabetes

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Introduction

Women with diabetes are at an increased risk of developing proliferative diabetic retinopathy (DR) and macular oedema during pregnancy. As a consequence NICE guidelines suggest that women should be screened more regularly for DR during their pregnancy.

It is not known what happens to the thickness of the macula during pregnancy in women with diabetes.

The aim of the audit is to assess whether foveal thickness (FT) and total macula volume (TMV) alter during pregnancy in women with diabetes.

Methods

The audit consisted of pregnant women with diabetes who completed their antenatal care at Birmingham Heartlands Hospital between February 2010 and May 2011.

The Zeiss Stratus Optical Coherence Tomography (OCT) was performed on patients attending diabetic eye screening at intervals throughout their pregnancy.

Inclusion criteria
- No maculopathy present on fundus images throughout pregnancy
- At least one OCT scan during pregnancy

Statistical analysis used was the unpaired t-test.

Results

30 patients were included in total, 8 had type 1 diabetes and 22 had type 2 diabetes. Mean diabetes duration at the start of pregnancy was 6 years (range 1-20).

The number of patients screened in each trimester and the average weeks of gestation when screened can be seen in table 1.

Table 1	Number of Patients screened	Average week of gestation	Range
1st trimester	22	9.7	(6 -13)
2nd trimester	25	23.4	(16-26)
3rd trimester	15	31.1	(27-36)

None of the patients showed any signs of macula oedema on the OCT scans during their pregnancy.

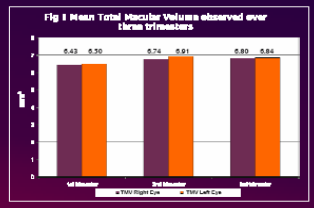
Conclusion

* The results suggest there is no significant change in foveal thickness in pregnancy in patients with diabetes.

* There was a significant statistical difference in total macular volume in the second trimester in one eye, however this would not be important clinically.

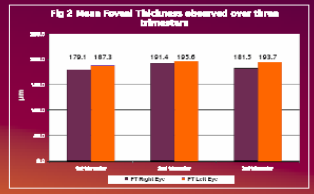
* This is an important observation proven by the OCT which has not been previously studied.

Fig 1 Mean Total Macular Volume observed over three trimesters



* There was a significant difference in TMV between the first and second trimesters for the left eye only ($p=<0.05$) but not between the second and third trimesters (fig 1).

Fig 2 Mean Foveal Thickness observed over three trimesters



* There was no significant difference in FT between the three trimesters in both eyes (fig 2).

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Is twelve years old an acceptable age at which to begin Diabetic Retinopathy Screening?

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Introduction

The NHS Diabetic Eye Screening Programme recommends that "All people with diabetes aged 12 years and older should be offered screening for sight-threatening diabetic retinopathy using digital photography ".

The main aims of the audit were:
- To assess the validity and appropriateness of the current recommendation in use by the UK Diabetic Eye Screening Programme.
- To determine whether diabetes duration should be taken into account when deciding at what age to start screening patients, as some schemes are using a calculation with diabetes duration to define an age to start screening young patients.

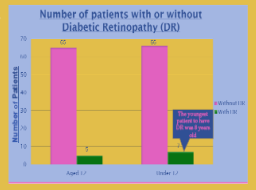
Methods

A retrospective analysis of randomly selected patients under the age of 13 who have attended diabetic eye screening over the past 9 years (2003-2011) .
Statistical analysis was performed using the independent t-test, a p value <0.05 was considered significant.

Results

Fig 1. Total amount of patients with or without diabetic retinopathy.

Fig 1



No patient had sight threatening diabetic retinopathy.

Conclusions

- The audit demonstrates that patients under 12 years develop diabetic retinopathy.
- No patients had sight threatening diabetic retinopathy.
- The data illustrates that the duration of diabetes is a significant risk factor in the development of diabetic retinopathy in young patients.

Our data suggests that screening could begin at six years from diagnosis (or age 12 whichever is earlier) for pre-pubertal onset type 1 diabetes.

98% had Type 1 diabetes and 97% of the patients were attending a Diabetic Paediatric Clinic at the time of their first screen. The mean visual acuity was 6/5 (6/4-6/36).
In total 12 (8.4%) patients under the age of 13 developed diabetic retinopathy. Only one patient was referred to ophthalmology, this was for poor visual acuities (6/12 right eye, 6/18 left eye) and was diagnosed with optic atrophy so returned to annual diabetic eye screening.

Fig 2. Mean diabetes duration for those with or without diabetic retinopathy.

Fig 2.

	Mean diabetes duration for those without DR	Mean diabetes duration for those with DR	p value
Aged 12 n=70	4.3 years (1mth –11yrs)	8.2 years (6 – 11yrs)	0.002
Under 12's n=73	5.1 years (6mth – 6yrs)	6.6 years (6 - 8 yrs)	0.004
Total n=143	4.8 years (1mth – 11yrs)	7.3 years (6yrs – 11yrs)	0.001

No patient with diabetic retinopathy had a diabetes duration of less than 6 years.

Is it safe to increase the Diabetic Retinopathy screening interval for patients with no/background Diabetic Retinopathy?

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Aim

To evaluate the safety of increasing the screening interval for patients with no diabetic retinopathy (DR) or with background DR.

Introduction

The current guidelines state that all patients aged 12 and above with diabetes require screening for diabetic retinopathy on an annual basis. In this audit we question the necessity of annual screening for patients who have no DR and for those with background DR by evaluating the safety of biannual screening in terms of DR progression.

Method

This audit is a 4 year retrospective follow up of 996 patients who presented with no DR and 500 with background DR at baseline digital DR screening in 2006. DR progression was recorded for both cohorts.

Conclusions

- Patients who present with background DR should continue to be screened annually as a high proportion of patients with background DR at baseline developed sight threatening DR (STDR) (12%)
- A relatively low proportion of patients with no DR at baseline were referred for STDR (1.3%). 50/51 referrals had observable retinopathy as just one patient required laser treatment.
- It could be recommended that it is safe to screen patients with no DR biannually due to low risk of developing STDR
- The rates of patients who did not attend (DNA) was between 10-20% each year for both cohorts. If screening biannually was to be implemented then the importance of attending screening should be stressed to patients in order to prevent sight loss due to diabetes.

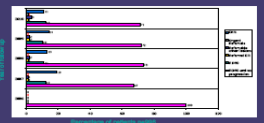
Results

Background DR cohort:

Of the 500 subjects that had background DR in 2006, 231 were referred for DR, with an average DR routine referral rate of 12% (46 subjects) per year as shown by figure 1.

Figure 1: DR progression (500 patients R1M0 at baseline)

Figure 2: DR progression (996 patients R0M0 at baseline)



No DR cohort:

Of the 996 patients who had no DR at baseline:
51 were referred over the 4 years for sight threatening DR (STDR)

→ of these 45 patients have definite STDR confirmed by ophthalmological examination, 6 were placed back on annual recall.
→ 78% had type 2 diabetes
→ Mean age at referral: 60 years (25-87)
→ Mean diabetes duration:10.7 years (3-32)
→ Mean HbA1c: 7.8 % (5.7-11.3 %)

As figure 2 shows, there was a relatively low risk of DR progression compared with the risk amongst patients who had background DR at baseline.

DR referrals
Year 1: 8 patients (0.9%)
Year 2: 9 patients (0.9%)
Year 3: 19 patients (1.9%)
Year 4: 15 patients (1.5%)

} 86% of referrals were for maculopathy and 14% were referred for retinopathy

50/51 of the referrals had observable retinopathy as none of the 51 referrals required laser treatment apart from just one patient who developed proliferative DR (PDR) in year 4 (2010) and had background since 2007.

If biannual screening was adopted for patients with no DR at baseline, a total of 7 (0.7%) patients out of the 51 that were referred would not have been appropriately referred for STDR and would have waited a further year for identification. The other patients had developed background DR prior to referral so would have reverted back to annual screening.

Current Clinical Status of Diabetic Patients Identified with Early Macular Lesions

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[2]School of Health and Life Sciences, Aston University, Birmingham- UK

Introduction

On magnification of digital diabetic eye screening retinal images, a pale yellow circular rim around a single macula microaneurysm may be observed; these we term MAYR (microaneurysm with yellow rim) (or previously lone lesions) (Figure 1).

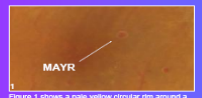


Figure 1 shows a pale yellow circular rim around a single macula microaneurysm (MAYR)

As the significance of these lesions is unclear, patients are re-photographed at six monthly intervals in the Birmingham, Black Country and Solihull diabetic eye Screening Programme.

Aim

To monitor the natural history of MAYR to determine whether they are predictors of the development of diabetic macular oedema (DMO).

Method

All patients discovered with MAYR within the macula at diabetic eye screening were included.

135 patients with MAYR were followed up over a minimum of five years.

Morphology of the lesions and clinical outcomes of the patients were recorded.

Results

There were 135 patients with MAYR. Patients were aged between 25 and 93 years (mean age 61.4 years). 54 (40%) were female and 81 (60%) were male.

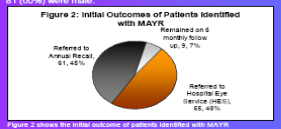


Figure 2 shows the initial outcome of patients identified with MAYR

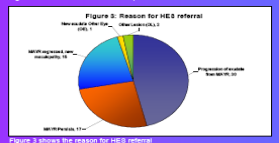


Figure 3 shows the reason for HES referral

Conclusions

- **A high number of patients with MAYR were referred to HES due to progression of exudation from the lesion.**
- **However, most do not require immediate referral and in some cases the MAYR improves and referral is not necessary.**
- **The data suggests monitoring MAYR in re-photography clinics is appropriate, reducing unnecessary referrals HES.**

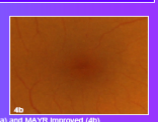
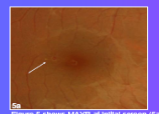


Figure 4 shows MAYR at initial screen (4a) and MAYR improved (4b)



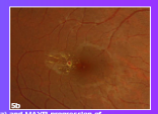


Figure 5 shows MAYR at initial screen (5a) and MAYR progression of exudate (5b)

Figure 2 shows that sixty one (45%) patients were placed on annual recall after an average of 14 months (4-36 months) after MAYR identification as the lesion improved or resolved (example fig. 4a, 4b) 14 (23%) of these patients were referred to HES at a later date, three due to the MAYR progressing.

Figure 3 shows that forty seven (72%) of the referrals were due to a persistence of the MAYR or progression of exudation from the lesion after an average of 13 months (4-56 months) after MAYR identification (example fig 5a, 5b). Of these 47, 16 (34%) developed DMO and nine (56%) required laser treatment for this.

There was no significant difference between the spatial distribution and lesion outcome.

Overall of the 135 patients identified with MAYR;
- 36% were discharged from six monthly photography follow up and remained on annual recall.
- 37% were referred to HES due to the MAYR persistence or progression of exudate from the lesion (example fig 5a, 5b).
- 21% were referred to HES for other reasons.
- The remaining 7% failed to attend their last photography appointment so do not have a definite outcome.

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Presented at:

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Evaluating digital diabetic retinopathy screening in people aged 90 years and over.

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Introduction

The NHS Diabetic Eye Screening Programme determines that all people with diabetes aged 12 and over should be screened annually for diabetic retinopathy (DR) until they die.

The aim of this study was to evaluate digital DR screening in patients aged 90 and over to establish whether it is appropriate to cease screening at age 90.

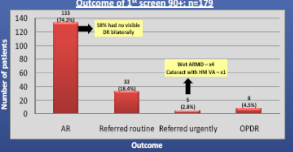
Methods

A retrospective analysis of 200 randomly selected patients with diabetes aged 90 and over within the Birmingham and Black Country Screening Programme.

Results

- 179 (90%) patients attended screening at least once after turning 90 years of age
  - mean age of first screen 90+ = 91 years (range 90-98 years)
  - mean number of screens per person 90+ = 2 (range 1-6)

Outcome of 1st screen 90+: n=179



- A total of 38 (21%) patients were referred to ophthalmology after their first screen 90+

Reasons for referral to ophthalmology: n=38

Conclusions

Patients with diabetes aged 90 and over are at low risk of sight threatening DR and annual screening in this age group may be unjustified.

However, annual screening does provide opportunistic identification of non-DR eye conditions which may improve patient care, but is this a duty of the screening programme?

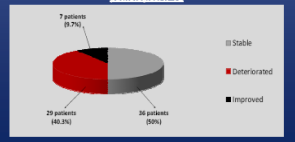
- DR referrals – all 3 patients were referred for maculopathy. None were urgent and 1 received treatment (focal laser).

Fundi images showing maculopathy in the 3 patients referred to ophthalmology – exudative or microaneurysm/haemorrhages within 1DD of the fovea with best corrected VA of 6/12 or worse.

- The majority (61%) of patients were referred for unassessable images.
- Cataract was the most common cause and accounted for 50% of all referrals to ophthalmology.

- Of the 133 patients put on AR after their first screen 90+, 75 (56%) patients were screened at least once more.
- 3 of these patients became unsuitable for digital screening due to physical or mental disability.

Progression in terms of level of DR, assessability or other ocular pathologies: n=72



- Of the 29 patients who deteriorated, 18 were referred to ophthalmology; one of these for DR (R2).

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10 October 2012

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The Heart of England Diabetic Retinopathy Screening Centre was created as a new healthcare initiative within the Heart of England NHS Foundation Trust in 2005. The new state of the art grading centre located at Birmingham Heartlands Hospital Diabetes Centre is the central hub for the whole of the scheme, managing over 130,000 patients, making this the largest urban scheme in Europe. All levels of grading are undertaken: primary, quality assurance, arbitration and tertiary/ophthalmology grading.

Both the centre and its multidisciplinary staff are internationally recognised for patient care, research into diabetes, diabetic retinopathy and other related eye diseases.

The scheme has been led from initial concept by Professor Paul Dodson, Diabetes and Ophthalmology consultant. Dr Margaret Clarke now has taken his place as Clinical Lead. Dr Dodson will remain a key member of staff for future training and research purposes.

The Diabetes Centre at HEFT is one of the oldest and largest diabetes units in the UK providing a wide range of diabetes services to over 10,000 patients annually. The unit is supported by an accomplished team of clinicians and academics from the Universities of Birmingham and Aston and has produced high quality research in diabetes for over 25 years.

Done

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100%

Research

Birmingham, Solihull and Black Country
Diabetic Eye Screening Programme

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HRTG
Heart of England Retinal Trials Group

EVICR.net
EUROPEAN VISION CLINICAL RESEARCH

Birmingham and the Black Country
NIHR Comprehensive Local Research Network

Aston University
Birmingham

Clinical trials

- RELIGHT - Lucentis multicentre UK dosing clinical trail for diabetic macular oedema. Sponsor: Novartis
- CRYSTAL & BRIGHTER - Lucentis global trial in retinal vein occlusions with macular oedema. Sponsor: Novartis
- EUROCONDOR - Eye drops as prevention of diabetic retinopathy. Funded by EC FP-7 Health Call. Sponsor: EVICR.net
- LUMINOS - Global data collection study in age-related macular degeneration. Sponsor: Novartis
- IMPACT - Data collection in diabetes. Sponsor: Novartis

Research into Retinal Conditions

Making a Difference, Protecting Vision…

We are conducting research for new treatments in diabetic retinopathy, age related macular degeneration and retinal vein occlusions – *some of the most important causes of visual loss.*

We are carrying out clinical trials into retinal disorders, which in some cases will enable patients to get new state of the art treatments before they become available in the NHS

If you would like to be considered for a retinal clinical trial please mention this to the doctor in the eye clinic

Heart of England NHS Foundation Trust is one of the leading units in the UK for research into retinal disorders. We are based in the new MIDRU Centre at Birmingham Heartlands Hospital and at Aston University.

Please take an information sheet with details of how you can support this research or contact Sister Jane Pitt, Retinal Trials Co-ordinator via: jane.pitt@heartofengland.nhs.uk

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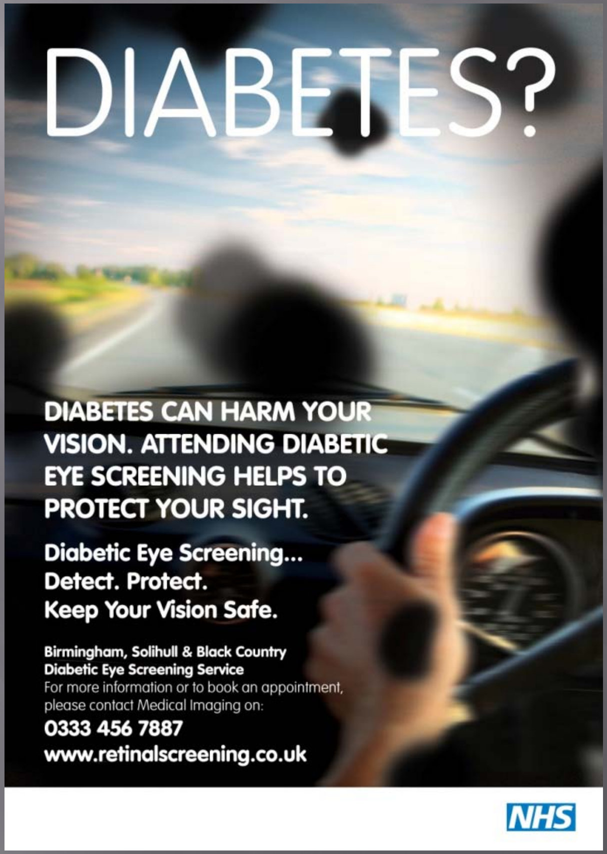
Training

- Graders teach on the various training courses we offer
- Current courses include:
  - Diabetic Retinopathy screener/grader course (5 days)
  - Master Class (2 Days)
  - Screener Course (2 Days)
  - OCT Course (2 Days)
  - YDF Course (2 Days)
- Training abroad

Screening Promotion and Education

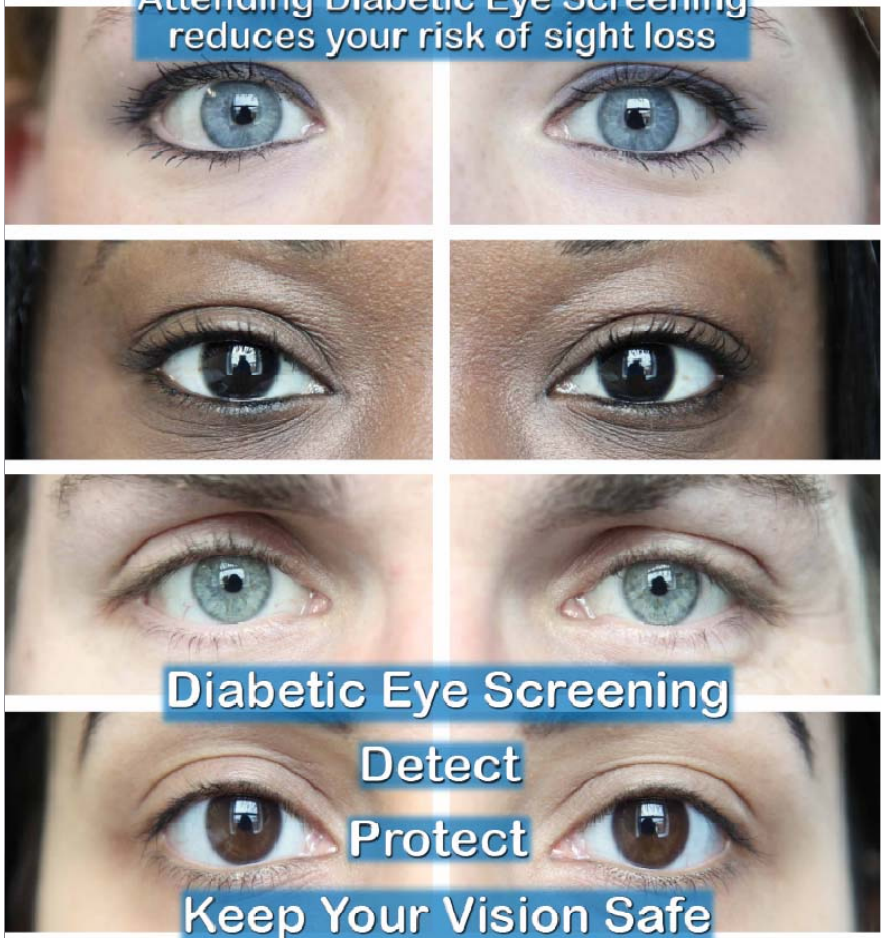
- Radio
- Designed posters and leaflets
- Road shows, Health care events, Hospitals e.t.c.
- Screening risen from 71% to 78% since promoting the service

Poster Designs



Diabetes?

Attending Diabetic Eye Screening reduces your risk of sight loss



Diabetic Eye Screening

Detect

Protect

Keep Your Vision Safe

For more information, talk to your GP, your diabetes nurse, or visit http://diabeticeye.screening.nhs.uk

NSC UK National Screening Committee

NHS

NHS Diabetic Eye Screening Programme

Professional Development

- City and Guilds
- MDT
  - To enhance graders education on DR and Other Lesions (OL)
- DR Journal Club
  - To expand knowledge and expertise in DR and keep up to date with current research

What other screener/graders have progressed onto

- Eye technician role
  - Virtual ARMD monitoring clinic within the Solihull eye clinic
- Diabetes MSc
  - Sponsored to continue onto MSc in Diabetes after completing Post Graduate Diploma in Diabetes
- Topcon course
  - General maintenance and repairs of cameras

Ethiopia (Leopard Programme)

- LIONS
- ETHIOPIAN
- OPHTHALMIC
- PROGRAMME
- AGAINST
- RETINAL
- DISEASE
- and
- DIABETES

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THANK YOU

Any questions