Diabetic Eye Screening
Revised Grading Definitions

Version 1.3, 1 November 2012

To provide guidance on revised grading definitions for the NHS Diabetic Eye Screening Programme
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Grading

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Revised Grading Definitions

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### Owner
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Core NDESP team

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### Audience
NHS DESP, Clinical Leads, Programme Managers, Graders, Ophthalmology providers, management software suppliers

## Distribution

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<tr>
<th>Name / group</th>
<th>Responsibility</th>
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<td>NHS DESP, Clinical Leads, Programme Managers, Graders, Ophthalmology providers, management software suppliers</td>
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## Amendment history

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<th>Version</th>
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<tr>
<td>V1.0</td>
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## Review / approval

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Classifying Retinopathy in the Diabetic Eye Screening Programme

The grading assessment committee of DESP have produced guidance in the form of Revised Grading Definitions for the DESP.

Features Based Grading

From 2013 all graders will identify individual features of diabetic retinopathy. Selecting a given feature will then produce a grade which is determined by rules applied in the grading software. Features based grading forms for routine digital screening; digital surveillance and SLB surveillance are found in Operational Guidance on Feature Based Grading Forms v1.

Questionable Features

Grading should be conducted in line with national guidance. Equipment should meet national specifications and should be used in line with recognised procedures for grading, this includes avoiding excessive enhancement of images.

A lesion should only be recorded if it is definitely present.

Microaneurysms should be differentiated from pigment spots by viewing in colour and red free and from artefacts by viewing on overlapping images where possible.

IRMA should not be recorded unless visible on colour images in addition to red free images.

Cotton Wool Spots

Isolated cotton wool spots (one or more) in the absence of any microaneurysm or haemorrhage should be counted as no DR (R0).

Any number of cotton wool spots (CWS) in the presence of other non-referable features of DR should be graded as background DR (R1).

Where CWS are detected, graders should ensure that they have checked for features of referable DR in particular IRMA and early venous beading.

Venous Loops

A venous loop should no longer be referred and should be regarded as a feature of R1.

Photocoagulation scars

If there is no evidence of previous photocoagulation, P0 grade is assigned. If there is evidence of previous photocoagulation (focal/grid to macula or peripheral scatter) a P1 grade is assigned.
**Definition of the macula**

The macula is defined as that part of the retina which lies within a circle centred on the centre of the fovea whose radius is the distance between the centre of the fovea and the temporal margin of the disc.

**Revised Grading Classification for Pre-proliferative DR (R2)**

**Venous beading**

*(N.B. Venous beading from ischaemia in diabetic retinopathy does not occur in isolation)*

**Venous reduplication**

**Multiple blot haemorrhages**

*(N.B. If uncertain, refer only in the presence of IRMA that are definitely seen)*

**Intraretinal microvascular abnormality (IRMA)**

*(N.B. Check that they can still be seen on the colour image)*

Three image sets (macula and disc centred images) are shown in photos MBH 1, MBH 2, and MBH 3 where referral for multiple haemorrhages should be made.

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**A Multiple Blot Haemorrhages**

Three image sets (macula and disc centred images) are shown (photos MBH 4, 5, 6). The amount of haemorrhage present in the 3 image sets does not warrant a referral.

However, a careful search for IRMA should be made when the amount of haemorrhages is equal to that shown in the images.

If an IRMA is definitely seen, then a referral should be made. If an IRMA is not seen, the patient should be screened again in 12 months.

It should be noted that IRMA are not present in any of these example images.
A. Intraretinal microvascular abnormality (IRMA)

Patients with IRMA that are definitely seen should be referred into the Hospital Eye Service.

Examples of one IRMA are shown in example IRMA 1 and two IRMA in IRMA 2, 3, 4, 5
Two IRMA in examples IRMA 2, 3, 4, 5
Only IRMA that are definitely seen should be referred.

a) If an IRMA is found, the grader should return to the colour image. IRMA is considered present if the IRMA can still be seen on the colour image as well as on the red free.
b) If an IRMA can only be seen on a red free image and not on the colour image a referral should not be made (returned to annual screening).
a) and b) assumes screen settings, colour balance, monitor, software and camera settings are optimal according to the recommendations of the NHS Diabetic Eye Screening Programme.
c) If there is a localised patch of possible IRMA in one area of the retina with very little other signs of diabetic retinopathy, consider whether a small branch vein occlusion may have occurred in this area and that these might be small collaterals. If it is judged that small collaterals are present from an old small vein occlusion instead of IRMA, this would not warrant a referral.

B. **Venous beading** – patients with venous beading should be referred. Venous beading does not occur in isolation from multiple blot haemorrhages or IRMA.
C. **Venous reduplication** – patients with venous reduplication should be referred.
Revised Grading Classification for Proliferative DR (R3)

The new classification consists of two categories **R3A** (Active Proliferative Retinopathy) and **R3S** (Stable Treated Proliferative Retinopathy).

This allows for urgent attention where disease is active and a robust monitoring pathway outside the hospital eye service for discharged patients once treatment has allowed the condition to stabilise.

**R3A**

The following patients will be classed as R3A (Active)

- Patients with newly presenting proliferative retinopathy
- Patients where previous treatment has not been deemed stable by the treating ophthalmologist.
- Any patient where new features indicating reactivation of proliferation or potentially sight threatening change from fibrous proliferation are seen with respect to a previously obtained reference image set.

**R3S**

The Definition of R3S (Stable) will be

- Evidence of Peripheral Retinal Laser Treatment
- AND
- Stable retina with respect to reference images taken at or shortly after discharge from the HES

A Referral Outcome Grader (ROG) will always be responsible for the decision as to whether the presentation can be considered stable and may make that decision based on photography and patient history when encountering patients who have moved from other screening services.

In any case where there is doubt then a referral should be made as R3A.

**Pathway**

On discharge, the HES must either place a benchmark set of images on the Screening Service software, supply a benchmark set of images electronically for the service to import or arrange for a set of benchmark images to be taken by the Screening Service within 3 months. These should be graded by the discharging clinician to ensure they represent a stable condition.

When such patients are screened subsequently, their images must be compared with the benchmark image taken on discharge before deciding the grade. Patients who are graded as R3S following discharge from the HES should be managed in digital surveillance pathway. Patients with stable treated retinopathy currently in routine annual screening should
be graded as R3S at their next routine annual screen, have benchmark images taken and transferred to digital surveillance pathway for their next and subsequent routine appointments.

The only R grades that will be allowed for such patients are R3A and R3S.

The Grading would be R3S if there are no significant changes from the baseline discharge images.

If there are significant changes then the patient would revert to R3A (Active) and be urgently referred back to the HES. *It is accepted that not all changes will in fact be clinically urgent but the grading committee were of the opinion that it is better to keep things simple and not introduce the concept of routine referral of R3.*

“Significant changes” requiring urgent re-referral would include:-

- Signs of active neovascularisation including active new vessels, pre-retinal or vitreous haemorrhage.
1. Revised Grading Classification for Groups of Exudates

A group of exudates is an area of exudates that is greater than or equal to half the disc area. And this area (of greater than or equal half the disc area) is all within the macular area.

*How to work out the area*

The outer points of the exudates are joined and compared to half the area of the optic disc.

Examples of referable groups of exudates are given below as well as example photographic images that are not referable.
Example of an area of exudates that is less than half a disc area is given in photo GE 1 and would not be referred.

Photo GE 1

Example of an area of exudates that is less than half a disc area which is borderline in size but there is less than half a disc area within the macular area is given in photo GE 2 and would not be referred.

Photo GE 2
Example of an area of exudates that is greater than half a disc area is given in photo GE 3 and this would be referred.

Photo GE 3

Example of an area of exudates that is greater than half a disc area is given in photo GE 4 and this would be referred.

Photo GE 4
Classifying the macula where Amblyopia and Age related macular degeneration (AMD) are known.

If the VA is ≤ 6/12 and the screener has documented Amblyopia from the patient or there is AMD to account for the poor VA and there are haemorrhages or microaneurysms (or hard exudate in the case of AMD) within one disc diameter of the centre of the fovea:

1. These images should be graded by the ROG Grader and a decision made from the available information whether it is considered that the reduced vision is due to the amblyopia, the AMD or diabetic maculopathy.

2. If the ROG decides that the reduced vision is due to the amblyopia or AMD, the maculopathy should be graded as M0. Local protocols should be followed for referral of non-DR lesions.

3. If the ROG decides that the reduced VA could be caused by diabetic maculopathy the maculopathy should be graded as M1 and the patient should follow the nationally recommended pathway.
# Relationship of English Diabetic Retinopathy Classification of Progression to Proliferative DR with ETDRS & Scottish ETDRS final Retinopathy Severity Scale

<table>
<thead>
<tr>
<th>ETDRS final Retinopathy Severity Scale</th>
<th>ETDRS (Final) Grade</th>
<th>Lesions</th>
<th>Risk of progression to PDR in 1 year (ETDRS Interim)</th>
<th>ETDRS Screening / Clinic follow up intervals</th>
<th>English Screening Programme levels</th>
<th>Scottish Grading Classification</th>
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<tbody>
<tr>
<td>No apparent retinopathy</td>
<td>10, 14, 15</td>
<td>DR absent DR questionable</td>
<td>R0 Currently screen Annually</td>
<td>R0 Currently screen Annually</td>
<td></td>
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<tr>
<td>Mild NPDR</td>
<td>20</td>
<td>Micro aneurysms only</td>
<td>Level 30 = 6.2% 4-6 months</td>
<td>R1 Screen annually</td>
<td>R1 Screen annually</td>
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<td></td>
<td></td>
<td>One or more of the following:</td>
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<td>Background microaneurysm(s)</td>
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<tr>
<td></td>
<td></td>
<td>Venous loops &gt; definite in 1 field</td>
<td></td>
<td>Retinal haemorrhage(s) ± any exudate</td>
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<tr>
<td></td>
<td></td>
<td>SE, IRMA, or VB questionable</td>
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<tr>
<td></td>
<td></td>
<td>Retinal haemorrhages present</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>HE &gt; definite in 1 field</td>
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<tr>
<td></td>
<td></td>
<td>SE &gt; definite in 1 field</td>
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<tr>
<td>Moderate NPDR</td>
<td>43a, b</td>
<td>H/Ma moderate in 4-5 fields or severe in 1 field or IRMA definite in 1-3 fields (ETDRS: Grade 0 = no evidence of IRMA Grade 1 = questionable IRMA Grade 2 = IRMA present &lt; standard photo 8A Grade 3 = IRMA present &gt; standard photo 8A but &lt; standard photo 8B Grade 4 = IRMA &gt; standard photo 8B)</td>
<td>Level 41 = 11.3% 3-6 months</td>
<td>R2 Refer to ophthalmologist Pre-proliferative multiple blot haemorrhages intraretinal microvascular abnormality (IRMA) venous beading venous reduplication It is recommended that venous loop is removed</td>
<td>R2 Background diabetic retinopathy BDR – observable</td>
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<td></td>
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<td>Rescreen 6 months</td>
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<td>Four or more blot haemorrhages (i.e. AH standard photograph 2a – in one hemi-field only)</td>
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<tr>
<td>Moderately severe NPDR</td>
<td>47</td>
<td>Both level 43 characteristics – H/Ma moderate in 4-5 fields or severe in 1 field and IRMA definite in 1-3 fields or any one of the following: IRMA in 4-5 fields HMA severe in 2-3 fields VB definite in 1 field</td>
<td>Level 45 = 20.7%</td>
<td>4 months</td>
<td>from the English Diabetic Eye Screening Programme referral criteria.</td>
<td>R3 Background diabetic retinopathy BDR – referable Any of the following features: Four or more blot haemorrhages (i.e. _AH standard photograph 2a – in both inferior and superior hemi-fields Venous beading standard photograph 6a IRMA standard photograph 8a</td>
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