



Central Mersey  
Diabetic Retinopathy Screening Programme

# GRADING PROTOCOL 2011

**Review: March 2011**

***Please note that adherence to this protocol forms part of the contractual arrangement between providers and the programme.***

***Failure to comply with the protocol constitutes a breach of contract.***

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# 1. Grading Procedure

Typical grading procedure should include the following for each image in the set:

- Look at comments
  - If there are recent comments, the tab will be coloured blue
  - If no comments, the tab will remain grey
- Look at Grading form and consider:
  - VA
  - Age
  - Screening date
  - Screening venue
- Look at first image in colour at normal size
  - Enlarge
  - Examine carefully
  - Adjust contrast and brightness as required
- Change to green setting
  - Examine carefully
  - Reduce image size for wider view
  - Adjust contrast and brightness as required
- Change to Grey/Plane
  - Increase image for closer view
  - Examine carefully
  - Adjust contrast as brightness as required
- Make a decision on features
- Click all features seen in electronic grading form, as per criteria
- Make comments as appropriate
- Use annotation to demonstrate your decisions. Ensure the new image is given the correct title, e.g. RM, LN

**Grading decisions should be consistent, in line with the grading form, including all lesions seen. This protocol should assist and guide these decisions, but graders must record the correct features if sufficiently sure they are present, regardless of other considerations.**

## **2. Grading Sessions**

- Choose the urgent cases filter on the grading list. This will bring up all flagged patients in the list
- Graders should choose all “Urgent” patients and grade these first before grading others on the list.
- If there are no “Urgent” patients present in the list, graders should choose all “Fairly Urgent” patients next and grade all of these first before grading others on the list
- Choose next patients in chronological order, whether first or second grade
- If grades cannot be completed, follow the procedures in Section 11 and exit the capture screen

### **3. R0/R1 Borderline**

There is sometimes an element of doubt whether there is a dot haemorrhage or Microaneurysm on the images. A small lesion should become darker and more obvious using the Green and Grey/Plane enhancements.

The element of doubt is often due to artefacts. Check all images in the set to see if this appears at the same point, although sometimes it may be obscured by vessels on one or more image. If you are sure it is an artefact, make a note of this in comments. If there are persistent artefacts on images from a particular screening venue, flag this up with the Clinical Adviser and Failsafe Manager via email, so this can be rectified.

As a rule of thumb, graders should grade the patient as R1, if there is at least 50% likelihood that there is R1 retinopathy. Over-grading is safer than under-grading, but we do also need to consider the potential impact on some patients hearing even a small amount of bad news. This is particularly relevant with younger patients (under 35), where it may be better to err on the side of R0 if there is sufficient doubt to the presence of a haemorrhage.

As general guidance, when considering a single lesion, if it can be identified both in regular colour setting, as well as green or Grey Plane, then this makes it >50% likely, so should be graded as R1. If it is only identified in colour or green/grey plane and not both, then it is <50% likely and should be graded as R0.

Some patients may have a single haemorrhage on the optic disc. This may not be due to diabetes, but a possible feature of glaucoma. If the patient is known to have glaucoma, or you suspect they may be at risk, grade the patient as R0 and make comments. Please note the protocol for other eye conditions in Section 15.

## 4. Exudates

Drusen can sometimes be mistaken for exudates and vice versa. As a general rule, Drusen are duller, more likely to be yellow and more diffuse in nature. Exudates tend to be whiter in colour and appear as a distinct patch, although it is more usual to get a single exudate <1DD from the fovea. Using the Green and Grey/Plane enhancements can help in deciding whether there are exudates present, as Drusen tend to go duller still.

When making a decision if the lesions seen are actually Drusen, you need to consider the patient's age and other features. Drusen are less common on a younger fundus (under 40).

When making a decision if the lesions are actually exudates, you need to consider that exudates are less likely to be present without at least some amount of other background retinopathy on the same image. If there is any doubt, make a note in comments and contact the Clinical Adviser for advice.

## 5. Maculopathy

For consistency, Graders should consider the confines of the Macula to be the area within a circle with the radius of 2 Disc diameters (2DD) from the centre of the fovea. Graders should always stick rigidly to the descriptions when considering if Maculopathy is present, even if there is very little other retinopathy.

- Annotate the image with the 2 concentric rings, save the images as new images with the relevant title, so any further graders are clear about your rationale
- A single Exudate within 1 Disc Diameter of the macula is usually likely to be present with nearby Microaneurysm or haemorrhages, so their lack should increase the grader's level of suspicion that they may be other lesions, such as Drusen or artefacts, such as dust
- Graders should use the second concentric ring as the confines of the macula. An obvious group of exudates between the 1<sup>st</sup> and 2<sup>nd</sup> rings should be considered to be Maculopathy
- If there are exudates present that don't fit in with the above, tick the box for exudates in the R1 category
- If 2 or more or lesions, as described above exist ensure you tick each relevant box

The NSC has now altered their criteria where there is a dot or Microaneurysm within 1 disc diameter of the fovea as well as best VA of 6/12 or less:

- If the VA is known to be reduced for an unrelated reason, e.g. Amblyopia or cataract and the grade would be no worse than R1 otherwise, the grader can now grade as M0
- When the grade is set as M0 in these cases, the grader **must always** make a note in comments

As a general rule Maculopathy is unlikely to be present without R1 as well. However, if the macular lesion is the only lesion, ensure that you also tick the R1 box as well. If you are satisfied that there is no Maculopathy, always mark the grading form as M0. If there is any doubt, make a note in comments and contact the Clinical Adviser for advice.

## **6. Retinal Vein Occlusion**

If Retinal Vein Occlusion is suspected, there should be several retinopathies usually following the course of the vessel arcades, including flame shaped and blot haemorrhages, exudates, collateral vessels and cotton wool spots.

These tend to be more widespread for a full vein occlusion, covering most of the 2 images for that eye, including the macula. The VA is more likely to be significantly reduced. Retinopathy is more localised for a branch vein occlusion, following either the superior or inferior arcade and sometimes only partially, VA may be reduced in most cases, but not all, and possibly to a lesser extent.

If you are satisfied that occlusion is present, this should be selected in the grading form for this eye. Ring the Failsafe Officer and email the Clinical Adviser if this has not been diagnosed or reported in comments and they will consider whether further action is required.

Graders should also take careful note of any retinopathy elsewhere that may be unrelated to the RVO and record also. However, if there is no other retinopathy otherwise, R0 and/or M0 should be selected.

If there is any doubt, make a note in comments and contact the Clinical Adviser for advice.

## **7. R2 Features**

### **R2 Haemorrhages**

In R2, there should be multiple larger and deeper haemorrhages. The word blot has been removed from this category, as there can often be larger, blot like, but essentially more superficial haemorrhages, which should not be considered as R2.

The size of these haemorrhages should be around 1/6<sup>th</sup> of the disc diameter and the colour should be deeper and darker. I would advise that multiple means 3 or more over both images for one eye. Ensure that in deciding this, you do not double count such haemorrhages that overlap and appear in each image.

### **Cotton-Wool Spots with no R2 Features otherwise**

If there are any cotton wool spots, but the images have no other R2 features, grade as R0 or R1 as appropriate. The grader should also note the presence of CWS in comments.

This circumstance can often occur due to a short period of poor diabetes control. Optometry Screener/Graders who are also carrying out an eye test at the same time should consider advising the patient to consult their GP for further checks.

## **8. IRMA/Loops/Beading/Reduplication**

Intra-Retinal Microvascular Anomalies (IRMA) can be very fine and difficult to detect and differentiate from other normal retinal features.

They have an appearance of a group of tortuous, abnormally shaped vessels between branches of larger vessels. They are usually associated with other retinopathy nearby and possibly signs of laser scarring. The term intra-retinal means they remain within the retinal structure.

IRMA indicates vessels which have altered their normal path in an attempt to provide new blood supply to an ischemic or damaged part of the retina. Therefore, they are mostly going to be combined with significant retinopathy also indicating progression of diabetic eye disease, such as haemorrhages, exudates and cotton wool spots. They are highly unlikely to be present as a single sign.

It can often be difficult to differentially interpret IRMA from New Vessels Elsewhere (NVE). As a general rule, it is safer to grade as NVE if there is a high level of retinopathy and a reasonable likelihood that NVE are present. If the level of retinopathy is fairly low otherwise or there is a significant amount of laser treatment scars, it is more likely that the lesion is IRMA.

Loops, beading and reduplication can sometimes be very obvious if there's a high level of retinopathy present or significant laser scars. However, they can be very subtle if only milder background retinopathy is present and no previous laser treatment. Careful examination at higher magnification and with green/grey plane setting will be required to be more certain.

If there is any doubt, make a note in comments and contact the Clinical Adviser for advice.

## 9. New Vessels

When the retinal blood supply is seriously impaired, a pattern of new vessels can occur on the optic disc or in the mid-periphery. They may have associated fibrosis and are usually associated with other retinopathy nearby and possibly signs of laser scarring.

**New Vessels on the Disc (NVD):** On the optic disc they can often be more subtle and may be better recognised by comparing the relative appearance of each disc and old images if available.

**New Vessels Elsewhere (NVE):** Away from the optic disc they are usually larger than IRMA, consisting of a tree of finer vessels with a more florid appearance, generally associated with a vessel branch.

If graders are in any doubt about the possible presence of new vessels, make a note in comments and contact the Clinical Adviser for advice.

## **10. Photocoagulation**

Some screener/graders are reporting photocoagulation even though there are no obvious signs on the image sets. This is probably because they are familiar with the patient's history and know that the patient has had laser photocoagulation. The treatment may have been carried out in a part of the retina not covered by the NSC standard images. The important rule is to record what you see, not what you know.

Graders should remember to record both parts of the "P" sub-category if applicable. Due to the position of scars, it can sometimes be difficult to decide whether both are present. If there is an element of doubt, graders should record both. Central scars can be very fine and difficult to detect. They may appear similar to Dry AMD. Central pigmented lesions in a younger patient with vessel changes are more likely to be laser scars than non-diabetic macular disease.

## 11. Flagging Image Sets

There are 6 flags in use in the Capture screen. Procedures for flagging up image sets are contained in Chapter 6 of the DRSS manual on Image Capture.

- The default flag is “non-urgent”
- If the grader finds R3, they **must** set the flag to “Urgent” **and** ring the Failsafe Officer at the Screening Office immediately quoting the patient’s NHS number and date of screening. They should also send an email to the Clinical Adviser. NB: these are the only circumstances where this flag should be used
- If the grader finds R2 or M1, they **must** set the flag to “Fairly Urgent”. NB: these are the only circumstances where this flag should be used
- If there is one or more images missing or there are 4 images present, but a part of the images are not visible, graders should set the flag to “Incomplete Images” and **must** also contact the Screening office **NB. These images should not be graded and this must only be reset by the Screening office**
- Once the Screening office has contacted the screening venue to rectify problems, the office will set the flag to “Uploaded Images requested”. **NB. These images should not be graded and this must only be reset by the Screening office**
- There is a new “Grading on Hold” flag. Circumstances where this should be used include, e.g. if the VA is missing from the grading form or images do not correspond with those from previous years. If this is the case, graders should set the flag to “Grading on Hold”. Graders **must** also contact the Screening office, who will go back to the screening venue to rectify the situation. **NB. These images should not be graded and this must only be reset by the Screening office**

**The flags must be used strictly as above as incorrect use will misguide graders and affect the correct outcome. If any grader has concerns about an image set, they should contact the Failsafe Officer and Clinical Adviser.**

## 12. Image Quality

There will still always be an element of judgement required when considering image quality. They should be graded according to image position and ability to see the features well enough to make a grading decision.

- **Image Position**
  - Macular image
    - Good: Centre of fovea  $\leq 1$ DD from centre of image
    - Adequate: Centre of the fovea  $> 2$  DD from the edge of the image
  - Nasal Image
    - Good: Centre of disc  $\leq 1$ DD from centre of image
    - Adequate: Complete optic disc  $> 2$ DD from edge of image
  
- **Clarity**
  - Macular image
    - Good: Vessels clearly visible within 1DD of centre of the fovea and across  $> 90\%$  of image
    - Adequate: Vessels are visible within 1 DD of the fovea
  - Nasal Image
    - Good: Fine vessels clearly visible on surface of disc and across  $> 90\%$  of image
    - Adequate: Fine vessels visible on surface of disc
  
- **Fair** One of either the position or clarity is good and the other adequate
  
- **Poor** Both the image positions and clarity are just adequate
  
- **Unacceptable** Clarity or Image Position do not meet even the adequate criteria above

When considering between poor and unacceptable, please take note of any notes in comments stating difficulties in obtaining images, as it is likely that SL-BIO screening will also be difficult and the images may still be the best option available.

The image quality should be considered unacceptable if the grader feels they impair their ability to make a sufficiently confident decision. **The exception is if the grader has reasonable suspicion that there are signs of referable retinopathy-please see the section on “referable retinopathy”.**

### **13. Referable Retinopathy**

There are some instances when significant retinopathy can still be seen even if the image position and clarity is inadequate overall. If referable retinopathy appears to be visible anywhere on the 4 images, but the images or those of one eye alone are otherwise ungradable, the following procedure should be followed:

- In the grading form, set the images as “Poor”, rather than “unacceptable”
- Grade the retinopathy as appropriate, e.g. R3, R2 or M1
- Flag the image set as appropriate
- Make a note in the comments section that the image is really unacceptable but still requires referral
- The patient can then be referred to the HES within the correct timeline and avoids an unnecessary Slit Lamp BIO screening

There may be other instances, where one eye is ungradable, but the other eye has referable retinopathy. Even 1 eye set as ungradable will lead to an initiation for Slit Lamp, which will delay the referral. In these cases, the following procedure should be followed:

- Set the image as “Poor”, rather than “unacceptable”
- Set the ungradable eye as R0 (or R1 if some retinopathy is visible)
- Grade the eye with referable retinopathy, as per the usual criteria.
- Flag the image set as appropriate
- Make a note in the comments section that one or more images are really unacceptable but this procedure is being followed to ensure timely referral
- The patient can then be referred to the HES within the correct timeline and avoids an unnecessary Slit Lamp BIO screening

NB. In some cases, it may be necessary to follow both of the procedures above to ensure a prompt referral. If required, please contact the Clinical Adviser for advice.

## **14. Making Comments**

Graders should note all significant details in the comments section of the capture screen. Comments are internal to the Screening programme and should be kept concise and factual. Comments can also be made in the “Episode Notes” tab of the DRSS record card. As a general rule, only the programme administration should make comments in the “Patient Notes” tab, although graders can read these comments to assist in grading.

If a recent comment has been made in this episode, the comments tab will be highlighted in blue. Graders should always look at these comments when grading.

**Whilst graders should regularly make comments, they should avoid making long, incoherent, critical or frivolous comments.**

## 15. Other Ocular Conditions

We are a retinopathy screening programme, so have no formal obligation to detect, refer or treat other ocular conditions during the screening process. If the patient was screened at an Opticians premises and has had a sight test at the same time, the screening venue is fully responsible for detecting and referring other conditions as per local protocols.

- **Melanoma:** This is likely to be difficult to differentiate from a Naevus, but no grader will be expected to find melanomas purely from the images. It would require urgent assessment and referral to the Hospital Eye Service. *If you do record a Melanoma, you must inform the Screening Office on the same day*
- **Glaucoma suspect:** This should only be recorded if fairly obvious, e.g. CD ratio of 0.8 or there are new features common in glaucoma, e.g. disc flame haemorrhages. It should also be used if the history or suspicion is already known from comments
- **Naevus:** These should always be recorded, but are totally benign and congenital
- **Dry AMD:** This should only be reported if there are pigment changes, as well as Drusen with a VA less than 6/6. It shouldn't be recorded if there are a few Drusen only and the VA is good
- **Wet AMD:** It may be harder to differentiate between this and the dry form based entirely on images. This should be mostly used only if there is a family history, or the grader has strong reason to believe it is present. If in doubt regarding lesions, but still sure they are not diabetic retinopathy, it would be better to tick "Dry AMD"

If any graders feel there is another ocular condition present, which may require further attention and they are satisfied it is not due to diabetes, they should:

- Check if there is any indication on the DRSS record that the patient has recently had an eye test
- If they have had a sight test at the time of screening, the practitioner undertaking the sight test has the sole responsibility to identify and manage non-diabetic conditions
- If in doubt, contact the Failsafe Officer and email the Clinical Adviser for further advice. The Clinical Adviser will decide what action, if any, is required
- If further advice is required, flag the grading as "Grade on hold"

## **16. Online External Quality Assurance**

Each grader is required to carry out the online EQA grading, as prescribed by the programme management. Please inform the Clinical Adviser of any circumstances which would preclude from you satisfying this duty in any month, e.g. illness, leave, IT problems.

The system will give you a final score for each series once completed. The Programme Manager and Clinical Adviser will collate all results and report to the Programme board.

## **17. Resources**

### **Connection Problems**

The correct procedure if you experience any problems is:

- Contact IT
- Contact the Screening Office

### **DRSS Problems**

The correct procedure if you experience any problems is:

- Contact the Screening Office
- Contact Orion
- Contact IT

### **Failsafe Officers**

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