Clinical notes for RANZCO Screening and Referral Pathway for Diabetic Retinopathy (including Diabetic Maculopathy)

This document should accompany the RANZCO Screening and Referral Pathway for Diabetic Retinopathy (including Diabetic Maculopathy) flow chart.

RANZCO recognises that screening for diabetic retinopathy (DR) is mostly carried out by optometrists and ophthalmologists. General practitioners and physicians with adequate training, experience and equipment are able to perform diabetic retinopathy screening as part of comprehensive diabetes care. However, wherever possible, all patients with diabetes mellitus should have a comprehensive eye examination by an ophthalmologist or optometrist.

1. Patient Presentation

a. All patients with diabetes mellitus should undergo screening for diabetic retinopathy (DR) at the time of diagnosis of diabetes and then every 2 years if no retinopathy is detected (NHMRC 2008, UK Guideline 4, p 72), provided no other risk factors for DR or its progression are present.
b. Children with Type 1 Diabetes should begin screening for diabetic retinopathy when they reach puberty (NHMRC 2008, UK Guideline 5, pg 72).
c. Pregnant women with a history of diabetes should be screened for the presence of diabetic retinopathy in the first trimester of pregnancy (NHMRC 2008, UK Guideline 10, p72).
d. Pregnant women who develop gestational diabetes do not require screening for diabetic retinopathy during the pregnancy.
e. The source of referral for the patient having diabetic retinopathy screening should be recognised and recorded.
f. Patients with diabetes who present ‘opportunistically’ for optometric review should be screened for diabetic retinopathy and the results of the screening examination communicated to their general practitioner and other caring physicians in the same way as a patient who is referred specifically for diabetic retinopathy screening.
g. Patients already under the care of an ophthalmologist or optometrist, for monitoring of diabetic eye disease, do not require repeat screening provided they are taking part in a regular program of monitoring and treatment.

2. Screening Examination

a. Collect appropriate demographic data
    i. Source of referral (contact details)
    ii. Contact details for all caring physicians (e.g. general practitioner, endocrinologist, ophthalmologist)
    iii. Date of most recent screening examination for diabetic retinopathy i.e. interval since last diabetic retinopathy screening examination. Failure to attend diabetic retinopathy screening examinations is a risk factor for vision loss. (Screening attendance, age group and diabetic retinopathy level at first screen. PH Scanlon et al; Four Nations Diabetic Retinopathy Screening Study Group. Diabet. Med. 2016; 33: 904-11).

b. History
    i. Duration of diabetes, medications, control
    ii. Vascular risk factors: hypertension, lipids, smoking
    iii. Systemic disease and complications of diabetes:
        - cardiovascular
        - cerebrovascular
        - renal
        - neuropathy
    iv. Past ocular history
        - diabetic retinopathy treatment
        - other
    v. Clinical modifiers (factors that increase the risk of progression of diabetic retinopathy).
        - Patients at higher risk of progression of diabetic retinopathy should be evaluated annually, even if there is no evidence of diabetic retinopathy on examination. (NHMRC 2008, UK Guideline 6, p 72). These "clinical modifiers" include:

            – Duration of diabetes greater than 15 years
            – Suboptimal glycaemic control (HbA1c > 8% or 64 mmol/mol)
            – Systemic disease:
                - poorly controlled hypertension, abnormal serum lipids;
                - other diabetic complications (cardiac disease, cerebrovascular disease, renal disease, neuropathy, peripheral vascular disease, foot ulcers)
            – Pregnancy
            – Aboriginal and Torres Strait Islanders and overseas born Australians from the South pacific, Middle East, North Africa, Southern Asia and Southern Europe (AIHW (Issue 9 October 2003))

c. Assessment of Visual Acuity
    i. Best corrected visual acuity (pinhole vision is acceptable).
    ii. Recent or rapid deterioration in visual acuity should prompt referral even if vision is > 6/9.

d. Digital Fundus Photography is the expected standard for fundus examination
    i. Pupil dilatation increases the sensitivity and specificity of detection of diabetic retinopathy.

    It is however:
        - not mandatory if a high-quality image is obtainable with a non-mydriatic camera or Ultra-Wide Field (UWF) camera. (Identification of Diabetic Retinopathy and Ungradable Image Rate with Ultrawide Field Imaging in a National Teleophthalmology Program. PS Silva et al. Ophthalmology 2016; 123: 1360-1367; Ultra-wide-field imaging in diabetic retinopathy; an overview. KG Falavarjani et al. Journal of Current Ophthalmology 2016;28: 57-60)

- mandatory if a high-quality image cannot be obtained with a non-mydriatic camera or UWF camera
  - 0.5 to 1% Tropicamide eye drops should suffice to dilate the pupil in most circumstances Practitioners should be aware that the potential to induce acute angle closure glaucoma from the use of mydriatic drops is very low. Its incidence is 1 to 6 per 20,000 people, and tropicamide alone has not been reported to cause this problem (NHMRC 2008, UK Guidelines p 16)
- The decision to dilate the pupil while taking photos should be based on the image quality obtained, equipment used and protocols. Dilatation of the pupil is required for slit lamp biomicroscopy and a comprehensive eye examination (NHMRC 2008, UK Guidelines p 16)

ii. Recommended fundus images
- Ultra Wide Field (UWF) Image, or:
- Two 45-degree fundus images should be captured:
  - Centred on the macula
  - Nasal fundus, showing at least 3 disc diameters of the nasal fundus from the edge of the optic disc. (This is the standard for the UK National Diabetic and the New Zealand diabetic screening program)
- The Use of Optical Coherence Tomography (OCT) for assessment of the macula aids in the detection of diabetic macular oedema. It has good reproducibility and accuracy and correlates with biomicroscopic examination and fluorescein angiography in clinically significant macular oedema (NHMRC UK Guidelines 2008 p 18). Its routine use in diabetic retinopathy screening programs, however, is not yet validated and therefore OCT imaging is not mandatory or recommended as part of a routine screening examination. It has a greater role to play in the diagnosis and management of diabetic macular oedema by providing quantitative and qualitative information about the macula and guiding therapy.

3. Grading of Diabetic Retinopathy

Should be undertaken by the ophthalmologist, optometrist, general practitioner or physician who is conducting the screening examination. The screener will therefore also be responsible for determining:

a. Screening interval (i.e. interval until the patient should return for the next diabetic retinopathy screening examination)
b. Referral for review by an ophthalmologist, if required.
   i. It is recommended that all professionals involved in the screening and grading of diabetic retinopathy should be familiar with the epidemiology and clinical features of the condition. This could involve completion of an on-line diabetic retinopathy grading course (e.g. University of Melbourne Self Directed Retinopathy Grading Course: http://drgrading.iehu.unimelb.edu.au/cera/index.asp).
   ii. Grading of diabetic retinopathy has 3 components:

- Assessment of Visual Acuity
  Referral is recommended if visual acuity is less than 6/12 and no obvious cause for the reduction in vision is determined. It should be noted that:
  - Substantial centre-involving diabetic macular oedema can be present despite normal vision.
  - If visual acuity has decreased recently by one line on the Snellen Chart or if there is a qualitative change in vision, referral should also be considered.

- Assessment of image quality

  - The image should be of sufficient clarity and extent to allow reliable detection of diabetic retinopathy. The small retinal vessels should be visible.
  - The images should cover an adequate area of the fundus (two 45-degree images as detailed earlier).

- Assessment of the severity of diabetic retinopathy
  - Grading is based upon the International Clinical Diabetic Retinopathy and Diabetic Macular Oedema Severity Scale. (Proposed International Clinical Diabetic Retinopathy and Diabetic Macular Edema Disease Severity Scales. C. P. Wilkinson et al. Ophthalmology 2003; 110: 1677–1682)
  - Grading should focus separately on the two aspects of diabetic retinopathy that cause most vision loss:
    - Diabetic Macular Oedema
    - Non-proliferative and Proliferative Diabetic Retinopathy.

- Patients assessed to have Diabetic Retinopathy should:
  - Have a comprehensive ophthalmic examination, including dilated examination of the fundus. It should be noted that:
    - Many patients with diabetic retinopathy will have changes that are outside the 45 degrees of a standard single field non-mydriatic retinal camera.
    - 8-15% have retinopathy only present outside this zone.
    - 27% with proliferative diabetic retinopathy have neovascularisation outside this zone. (Diabetic retinopathy as detected using ophthalmoscope, a nonmydriatic camera and a standard fundus camera. R Klein et al. Ophthalmology 1985; 92: 485-491).
  - Routine referral, if possible, to an ophthalmologist with an interest in the management of diabetic retinopathy is recommended.
  - A collaborative regimen of monitoring of patients with moderate non-proliferative diabetic retinopathy could be established between the screening optometrist and the ophthalmologist.

4. Communication of Results of Screening Examination for diabetic retinopathy

a. The result of diabetic retinopathy screening should be communicated, in a timely fashion (within 2 weeks) to the patient, and the patient's health care provider(s) (general practitioner, endocrinologist, optometrist and ophthalmologist). In particular, GPs are responsible for the longitudinal and coordinated care of patients with diabetes, and should always be informed about health findings related to diabetic retinopathy screening and any recommended interventions. The development/presence of diabetic retinopathy is an important finding, with implications for an increased risk of vision loss, and other related conditions including myocardial infarction, stroke and renal disease (*Diabetic retinopathy and the risk of coronary heart disease: The Atherosclerosis Risk in Communities Study Diabetes Care. N Cheung et al. 2007; 30: 1742-1746*).
b. Proper communication allows appropriate steps to be taken to improve diabetes management (blood glucose control), as well as manage other risk factors, to slow the progression of diabetic retinopathy and other complications of the disease (e.g. myocardial infarction, stroke, renal disease and foot disease).

5. Role of General Practitioners in Screening for diabetic retinopathy

General practitioners are well placed to carry out screening for diabetic retinopathy based on the RANZCO referral pathway. GPs play a significant role in regional and rural areas in screening for diabetic retinopathy. There are Medicare item numbers for the use of non-mydriatic retinal cameras for screening (12325 or 12326) (http://www.health.gov.au/internet/budget/publishing.nsf/Content/budget2016-factsheet07.htm)
Examples of standard grading photographs are available and can be used as a reference. (Proposed International clinical diabetic retinopathy and diabetic macular oedema disease severity scales. CP Wilkinson et al. Ophthalmology 2003; 110: 1677-1682.)

General practitioners carrying out diabetic retinopathy screening may sometimes encounter a situation where the best corrected visual acuity (with spectacles or a pin hole, or both) is <6/12 and the fundus photograph is normal and no cause for this reduced acuity is obvious. If an ophthalmologist is not available to review the patient, it is recommended that the patient should first be referred to an optometrist (if possible) to rule out other causes of the reduced vision, before referring the patient to an ophthalmologist.