Diabetic Retinal Photography (DRP) Screening Technical Reference Guide

Guidelines for DRP Screening

in Private Primary Care Settings

Version 2.1: 16 November 2023, information accurate as of November 2023.

Disclaimer:

The contents of this publication are accurate based on the best available information at the time of publication. It is subject to changes and may be overtaken by policy changes.

Issued by Ministry of Health

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1. Preface

Diabetic Retinopathy (DR) is a microvascular complication associated with Type 1 and Type 2 Diabetes Mellitus (DM) that may result in vision impairment and blindness. Undergoing Diabetic Retinal Photography (DRP) Screening is paramount in the clinical management of DR as early detection and treatment of DR can reduce this risk.

Today, there is substantial variability in the way DRP Screening services are delivered in the private sector. This DRP Screening Technical Reference Guide is intended to **recommend the minimum standards of care for the provision of DRP Screening services** in Singapore's private healthcare landscape.

The first version covers 3 key areas:

a) ***DRP Image Capture Workflow*** including that of the assessment of Visual Acuity (VA), the Pupil Dilation Protocol, and the 2-field fundus photography. Having a good image capture workflow ensures that retinal abnormalities can be accurately assessed; increasing the reliability of diagnostic assessments;

b) ***DRP Clinical Report Template*** which recommends the **Baseline DRP Clinical Report Template** that DRP providers should document and share with referring GPs.
   - Report template must capture **essential clinical information** for patient management.
   - Report template should be **consistent across providers** to allow for better comparison of patients' results overtime and across providers.
   - Report template should be in **a structured data format** (i.e., defined, discrete values) to enable system-to-system sharing of data; hence removing the need for manual transcription of results at different touchpoints.

c) ***Referral Framework for Abnormal DRP*** to guide GPs and DRP providers on the clinical management process for different severities of DRP and the clinical indicators for escalation to specialists or the emergency department.

The above recommendations are important for GPs and DRP providers to provide safe and reliable services to patients. Although currently, these guidelines are not regulatory requirements, GPs and DRP providers are advised to adopt them as part of good clinical practice, and also in preparation for future service or regulatory requirements. The documentation of reliable, structured clinical data sets the foundation for future contribution to the National Electronic Health Records (NEHR), enabling healthcare professionals from a patient's other medical touchpoints to better monitor the patient's DR progression and treatment. Data shared with administrators will also facilitate collaboration for DM care among researchers, clinicians, and healthcare systems, advancing our solutions in the War against Diabetes.

As evidence and practice continues to evolve, this technical guide will also be reviewed periodically to ensure relevance.

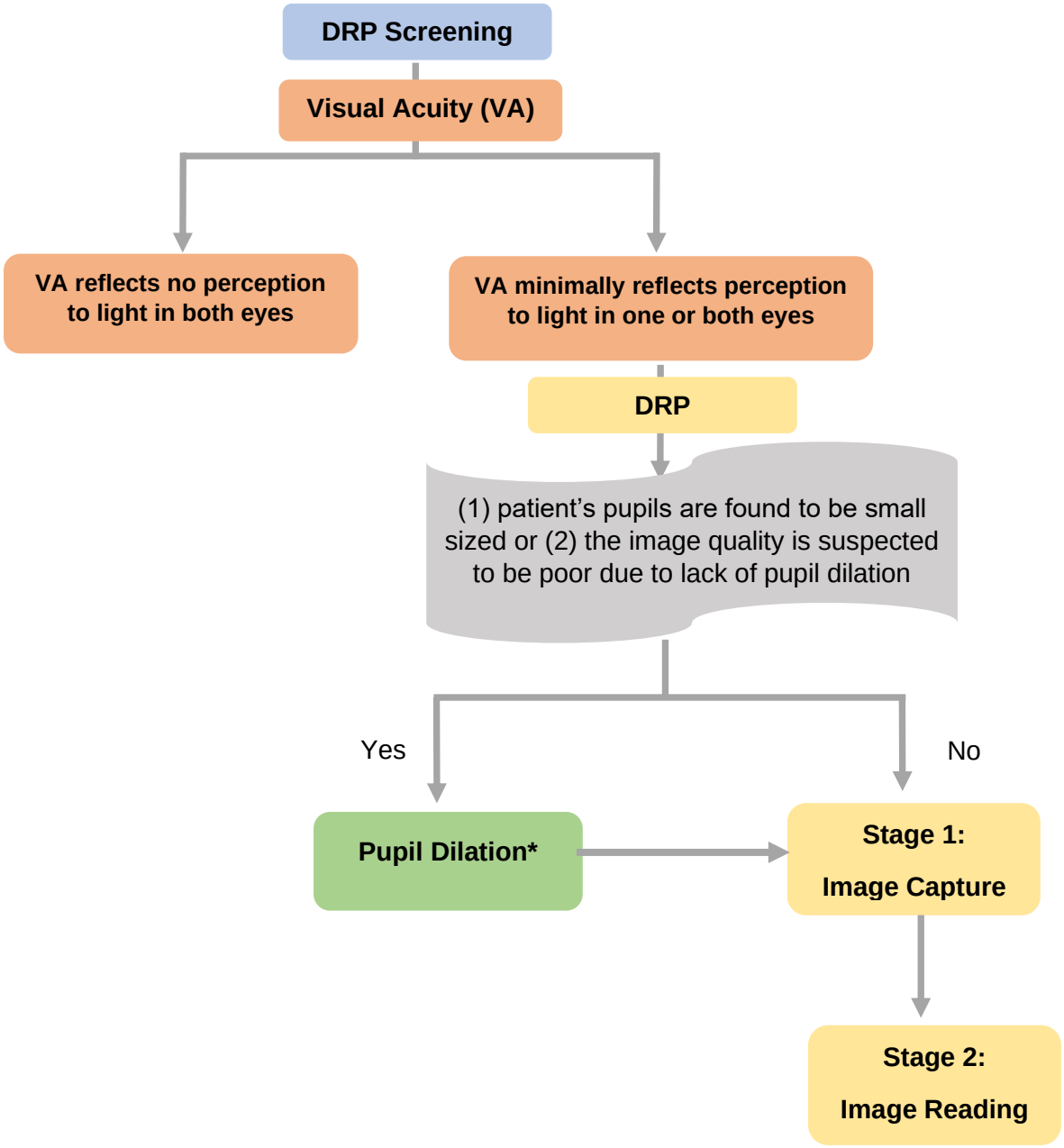
We thank the SiDRP Steering Committee, College of Ophthalmologists and Chapter of Family Medicine Physicians from the Academy of Medicine Singapore, Primary Care Network (PCN) leaders as well as the Agency for Integrated Care (AIC) for their collaboration and efforts in co-developing this DRP Screening Technical Reference Guide with MOH.

2. DRP Screening Services in Private Primary Care

2.1 Overview of DRP Screening

It is recommended for DM patients to undergo DRP Screening at least annually or at appropriate intervals thereafter as recommended by a healthcare provider. Figure 2.1 below shows the processes involved in DRP Screening.

Figure 2.1: Processes Involved in DRP Screening



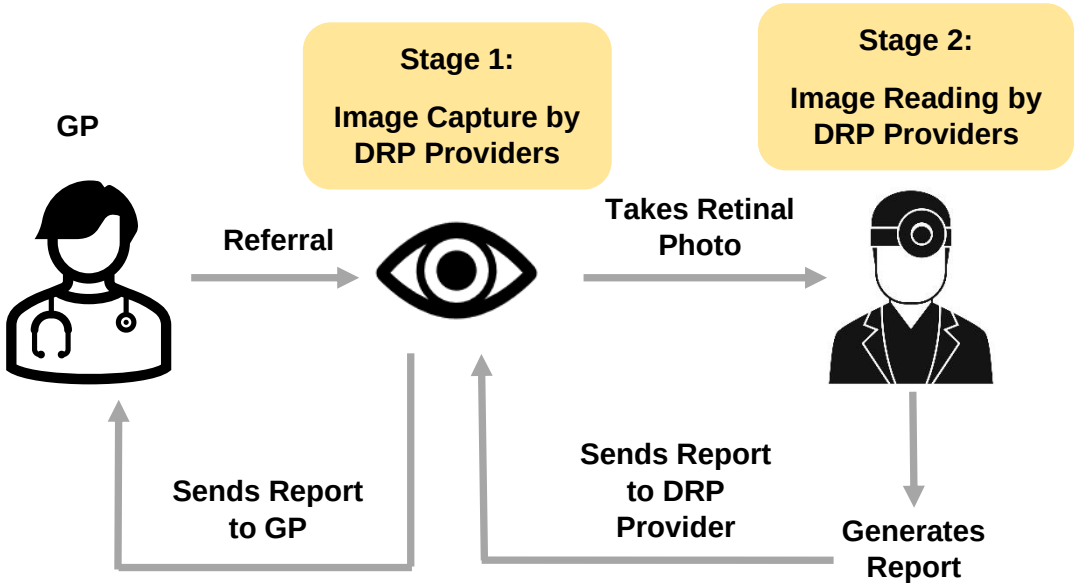
**Providers should rule out any contraindications before performing pupil dilation. Please refer to Table 3.1 for further details.*

2.1.1 DRP Workflow

Today, GPs may provide DRP as an in-house service or refer patients to an external DRP provider. The external DRP providers may provide image capture service and conduct image reading themselves or outsource the image reading to other parties. See Appendix A for the list of DRP providers commonly used by GPs in the Primary Care Network (PCN).

All clinical service provision, data storage and data sharing activities must adhere to prevailing national regulations and standards. Figure 2.2 below illustrates the 2 stages DRP workflow.

Figure 2.2: DRP Workflow [For GPs who do not provide in-house DRP services]



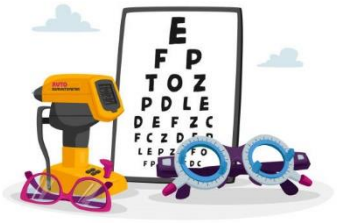
3. Guidelines for DRP Service Providers

3.1 Visual Acuity (VA)

VA is an objective measurement of the ability of the eye to distinguish shapes and the details of objects at a given distance. It reflects the degree of functional impairment and severity of DM. It may also assist to identify patients who should be excluded from DRP screening (e.g. Individuals whom are unable to perceive light in both eyes)**.**

VA can be conducted by any trained personnel including clinic assistants. Based on best practice guidelines, **it must be performed for all patients undergoing DRP Screening**.

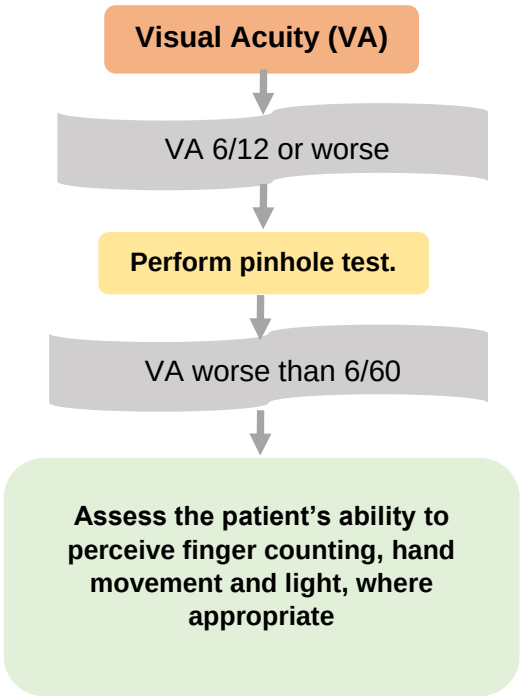
3.1.1 How to Conduct VA



- Perform VA at 3 metres.
- If VA is equal to or more than 6/12, perform pinhole test.
    - To perform a pinhole test, perform the following:
        a. Clean the pinhole occluder with alcohol wipes;
        b. Ask the patient to cover one eye with the occluder and position the pinhole so they can see through it;
        c. Test one eye at a time by following the same procedure used to test VA.
- If patient's VA is worse than 6/60, perform the steps of fingers counting, hand movement, perception to light and non-perception to light.

Figure 3.1 below shows the steps involved in VA.

Figure 3.1: Steps Involved in VA



3.2 DRP Image Capture

During the image capture, performing **2-field fundus photography (optic disc and macular centred views) is recommended** as the capture of only one image may lead to an ungradable DRP result.

Staff performing DRP capture should go through adequate competency training and clinical practice for a reasonable period before capturing DRP images independently. Do clean DRP camera chin rest, head rest and pinhole occlude with alcohol wipes after each patient has completed the image capture.

Remember: Always capture a 2-field fundus photography!

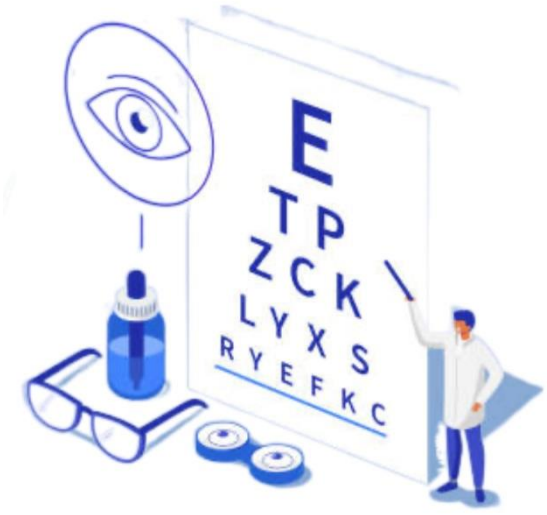
3.2.1 Pupil Dilation

If (1) the patient's pupils are found to be small sized or (2) the image quality is suspected to be poor due to lack of pupil dilation, pupil dilation through the use of mydriatic eyedrops must be carried out before capturing another DRP image. The risk of pupil dilation is typically low if proper processes are in place. Please note that in accordance to medico-legal considerations,

- Only a doctor may prescribe mydriatic eyedrops;
- Only personnel trained in performing pupil dilation (e.g., trained nurses) may apply the mydriatic eyedrops.

While the prescribing doctor need not be physically present, there must be proper processes in place for the nurse to consult the doctor regarding the suitability for prescription and escalation for emergencies, e.g., tele means.

Note: Escalation pathways must be in place to manage patients who may develop complications either during or after pupil dilation.



3.2.2 Recommended Pupil Dilation Protocol

The following detailed steps as shown in Tables 3.1 to 3.3 are recommended when performing pupil dilation for patients.

Table 3.1: Preparation Phase of Pupil Dilation

S/N	Preparation Phase – Prior to Mydriatic eyedrop instillation
1	Confirm the patient's identity.
2	Explain to the patient that recommendations to dilate their pupils with mydriatic eye drops is to improve the DRP image quality. Scenarios where this would happen include: Small pupil size, poor quality of initial DRP.

3	Check for contraindications and explain the indications, alternatives, and potential side effects and complications of the procedure to the patient.
	• Absolute contraindications to pupil dilatation with mydriatic eyedrops include:
	  ○ Age < 16 years old
	  ○ Drug allergy to mydriatic eye drops e.g., Tropicamide eye drops
	  ○ Known history of narrow angle glaucoma or raised intra-ocular pressure.
	• Relative contraindications: Clinicians are to consider via a risk-benefit analysis whether pupil dilation is necessary and only to proceed with informed consent, and where benefits outweigh the risk.
	  ○ Contact lens wearers who are unable to remove contact lens before pupil dilation
	  ○ Pregnant patients and mothers who are lactating

4	Obtain and document verbal consent for the pupil dilation.
5	Inform the patient that their vision will be temporarily blurred for 4 to 6 hours after eyedrop instillation. He/she will be observed in the clinic for 15 minutes and advised not to drive. • If the patient is not accompanied by a caregiver or family member, ask the patient to provide the contact number of any family member who is able to bring the patient home.

Remember: Check for contraindications and explain the side-effects for mydriatic eyedrops!

Table 3.2: Performance Phase of Pupil Dilation

S/N	Performance Phase – Mydriatic Eyedrop instillation
1	Perform hand hygiene.
2	Ensure adequate lighting and inform the patient that there will be a bright camera flash during the photography. Ensure that patient removes contact lenses (if any)
3	Handling of Mydriatic eyedrops a. Check the name and expiry date of the eye drops. b. Indicate the opening and expiry date and time on the bottle of the eye drop solution. Discard the eye drop if contaminated. c. Shake the bottle of eye drop solution. d. Place the cap of the eye drop bottle in a clean area to prevent contaminating the inside of the cap during eye drop instillation.
4	Instillation of Mydriatic eyedrops a. Place the dropper slightly above the eye (about 1.5 to 2.5 cm) and instill one drop into the centre of the lower fornix. b. Ensure the tip of the bottle does not touch the patient or his/her eyes during instillation. c. Instruct the patient to: • Close their eyes immediately and gently. • Do not to rub their eyes. • Inform staff if he/she experiences any discomfort. d. Check the pupil size for 15 minutes after instillation of eye drops. e. Instill a 2nd eye drop if the pupil size has not adequately dilated. f. Do not instill eye drops after 3 drops.

Table 3.3: Follow up phase of Pupil Dilation

S/N	Follow up Phase – Post mydriatic eyedrop instillation
1	Inform the patient that the DRP will take place 15 minutes post-instillation of the eye drops.
2	Document the number of mydriatic eye drops and the time of eye drop instillation in the patient's clinical records.
3	Assess the patient for post eye dilation complications, i.e. redness or itchiness of the eyes, nausea, or vomiting.
4	Review the patient for risks of falls associated with blurred vision. Give the patient/caregiver a leaflet on "Pupillary Dilation for DRP Screening" (if available) and educate the patient/caregiver on signs and symptoms suggestive of acute glaucoma to watch out for (Refer to Appendix B for an example of the leaflet).
5	Advise the patient to seek medical attention immediately if they have feel unwell in any way: e.g., eye pain, nausea/vomiting, headache, sudden worsening of vision.

3.3 DRP Image Reading

There are generally four categories of DRP readers:

- Ophthalmologists;
- Medical practitioners (non-ophthalmologists);
- Lay extenders or non-medical practitioners; and
- Artificial Intelligence (AI)

To ensure accurate results are recorded and for the safety of patients, DRP readers must be appropriately trained to assess retinal photos. We strongly encourage DRP providers to perform due diligence to ensure that the DRP readers they engage are competent. Both medical practitioners and DRP readers should be mindful of the adverse risks of incorrect reading of DRPs on patient care and outcomes. Where needed, DRP providers should consider conducting an audit of a sample of DRP reports such that with time, the quality and accuracy of reports continue to remain of high standards. In addition, for non-medical practitioners reading DRPs, there must be proper workflow in place for non-medical practitioners to escalate reports to partnering medical practitioners for discussion. We highly recommend for partnering medical practitioner to vet through and sign-off all the reports read by non-medical practitioners.

MOH is currently working with relevant stakeholders to recommend a competency-based assessment and accreditation framework for DRP readers. This framework will likely include a competency-based assessment for all non-ophthalmologist readers. Readers who do not meet the passing criteria for the assessment will need to go through further training to ensure they have the required knowledge and skills to perform accurate reading. MOH will also explore the appropriate accreditation and audit framework to maintain good DRP reading standards to ensure patient safety. The Technical Guide will be reviewed to include such recommendations at the next juncture.

For providers that are using AI, please note that the AI must meet all regulatory requirements including obtaining approval from the Health Sciences Authority (HSA) and comply with the Artificial Intelligence in Healthcare Guidelines published in October 2021. The use of AI must also meet certain minimum clinical standards, for example, it must achieve high specificity and sensitivity in identifying abnormalities. The DRP Providers must ensure that medical practitioners trained in DRP readings sign-off for AI-read reports. There should also be proper escalation workflows for example sending complex DRP images to ophthalmologists for verification.

Note: Referring physicians who contract services with DRP providers should find out about the categories of DRP readers who are engaged by the DRP service provider, and the level of training received by readers.

4. DRP Care Reporting Data

4.1 Overview of DRP Results Report Templates

As part of good clinical service provision, it is important for DRP providers to record pertinent findings and communicate them with referring doctors for review. In consultation with various expert groups, MOH has come up with the **minimum set of data fields that DRP and DFS providers should make available in their reports to referring physicians** (thereafter referred to as **baseline clinical report template**). This ensures the essential clinical results are shared back with referring physicians so that appropriate health planning and reviews can be done for patients, and there could be better comparability of patient's status across visits and medical touchpoints. Providers who are already providing more comprehensive reports to referring physicians and patients can continue to use their report template, provided that all the essential fields in MOH's baseline report template are fully incorporated. Apart from the baseline clinical report template, there is a separate Healthier SG care report template for DRP which HSG clinics submit to MOH. The **HSG care reporting is a subset** of the baseline clinical report template as it serves as a summary of the significant DRP findings.

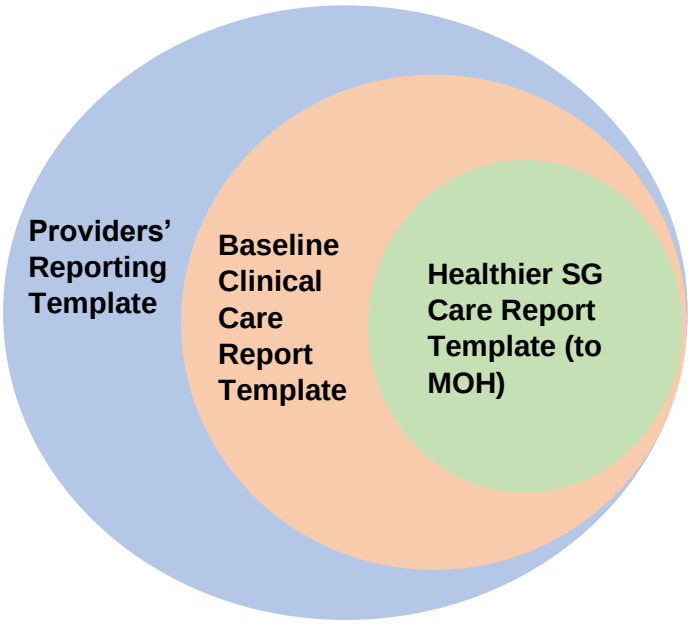
In summary, there are 3 levels of care reporting for DRP (Figure 4.1):

1. **Healthier SG (HSG) Care Reporting Dataset (to MOH)** is a subset of fields required for clinical care. The main purpose is to allow system-level tracking of DRP provision and performance (e.g. DRP uptake rates), as well as payment to HSG clinics.

2. **Baseline Clinical Care Report Template** includes **essential** clinical information that all DRP providers are strongly encouraged to provide in their DRP reports back to the referring physician. This is to facilitate appropriate clinical management by the physician-in-charge of the patient, and further escalation to specialists where needed.

3. **Providers' Report Template** includes additional data components as required or requested by referring physicians, beyond the Baseline Clinical Report Template.

Figure 4.1: Different Levels of Care Reporting for DRP



4.1.1 HSG Care Reporting Dataset (to MOH)

GPs participating in HSG are required to report **selected** DRP data fields (Table 4.1) for their enrolled patients to MOH. For this HSG reporting, **GPs will cite the DRP providers' returned report and key in the selected dataset as shown in Table 4.1** into their HSG-compatible Clinic Management System (CMS)[1] or Primary Care Delivery Solution (PCDS) for submission to MOH. GPs are eligible for the Diabetes Bundle component of the HSG Annual Service Fee if the DRP and Diabetic Foot Screening (DFS) care components are completed; a care component is considered complete only if the requisite data fields are submitted to MOH. Please refer to HSG GP SOP or HSG Care Protocol for more information.

Table 4.1: HSG Care Reporting Dataset (to MOH) for DRP Results

DRP Data Field	Options
Mandatory Fields	
Conducted?	Drop down options: 1. Yes 2. No 3. Not applicable: (i) Patient is on active follow up with ophthalmologist OR (ii) Patient has no perception of light in both eyes (complete blindness)
Date of DRP/Visit	Allow option to select 'unknown' if this is the case^
Outcome	Checkboxes *(>1 option may be selected)*: 1. No abnormality detected 2. Ungradable 3. Non-proliferative diabetic retinopathy (NPDR) a. Mild NPDR b. Moderate, severe or very severe NPDR c. Unknown severity 4. Proliferative retinopathy 5. Diabetic maculopathy 6. Other abnormalities (e.g. cataract, glaucoma) 7. Unknown^
Optional Fields [For HSG care reporting]	
Follow-Up Actions	Drop down options: 1. Annual screening OR 2. Refer to ophthalmologist (indicate with or without urgency) OR 3. Repeat DRP in 6 months OR 4. Refer to A&E OR 5. Others (free text) _____
Other Findings	*Free text*

^For "Outcome", select "Unknown" if GPs are unable to obtain DRP/eye assessment results. GPs will not be eligible for payment if this is selected as decisions on further clinical care may not be conclusive.

[1] This set of data requirements is accurate as of Jul 2023. CMSes that are Healthier SG-compatible will be able to transmit care reporting data seamlessly to MOH data systems after enhancements are made. Please refer to HSG Care Protocols on AIC Primary Care Pages for further updates.

4.1.2 Baseline DRP Clinical Report Template

DRP service providers are strongly encouraged to adopt the baseline clinical reporting template as shown in Table 4.2. This Baseline DRP Clinical Report Template contains all essential clinical data that should be shared with referring GPs so that appropriate patient management can be carried out. Providers may include additional data components as required by their clients, but their reports should fully incorporate the fields in the Baseline Clinical Report Template.

Retention of Patient Clinical Report

DRP providers should retain all patients' DRP clinical reports based on PDPA guidelines and for as long as there is a business or legal requirement to do so. In line with the Limitation Act, providers are encouraged to keep records for a minimum of 6 years.

Table 4.2: Baseline Clinical Report Template for DRP Results

Visual Acuity		
	Right eye	**Left eye**
Habitual Visual Acuity (unaided/aided with glasses)	6/__ *[Free text box to allow assessor's input for qualitative responses such as finger counting, hand movement for those with VA worse than 6/60]*	6/__ *[Same free text box]*
Habitual Visual Acuity (with pinhole) *(optional)*	*Free text box*	*Free text box*
Retinal Assessment		
Image Captured by: *(optional)*		
Dilation Performed	Yes/No	Yes/No
Fundus Image Quality	Gradable/Ungradable	Gradable/Ungradable
Media Opacity *(optional)*	No media opacity/Media opacity	No media opacity/Media opacity
Diabetic Retinopathy	☐ No diabetic retinopathy ☐ Mild non-proliferative diabetic retinopathy (NPDR) ☐ Moderate NPDR ☐ Severe NPDR ☐ Proliferative diabetic retinopathy	☐ No diabetic retinopathy ☐ Mild non-proliferative diabetic retinopathy (NPDR) ☐ Moderate NPDR ☐ Severe NPDR ☐ Proliferative diabetic retinopathy
Diabetic Maculopathy	☐ No diabetic maculopathy ☐ Diabetic maculopathy present	☐ No diabetic maculopathy ☐ Diabetic maculopathy present
Treated Diabetic Retinopathy or Diabetic Maculopathy	Yes/No	Yes/No
Evidence of Previous Laser Treatment	Yes/No	Yes/No
Other Incidental Findings e.g. Glaucoma, Retinal Detachment *(optional)*	*Free text*	*Free text*
Recommended Management Plans		
Main Findings	*Free text*	*Free text*
Follow-Up Actions	☐ Normal screening results – continue annual screening ☐ Requires referral to Ophthalmologist/additional actions ○ A&E ○ 2 weeks ○ 1 month ○ 3 months ○ Others (*free text*) _____	
Other Remarks *(optional)*	*Free text*	
Graded by	*Free text*	

4.2 Future contribution into NEHR

Setting the data reporting format. MOH is exploring mandatory contribution of DRP reports into NEHR in the next phases of Health Information Bill (HIB). Ingestion into NEHR will allow the reports to be available to all care providers and analysed as part of the National Diabetes Dashboard (NDD). To enable such contribution, all reports will need to be submitted in a **standard, machine-readable format** to **facilitate the ingestion of the reports into NEHR and potentially into other clinic management systems to reduce admin burden of manual transcription**. In preparation for NEHR contribution, providers should start reviewing their current data template structure and ensure early adherence to (i) the baseline set of fields as shown in Table 4.2 above; and (ii) fields are in standard, machine-readable format. In the meantime, MOH will also explore voluntary contribution to NEHR for providers who are ready to do so.

5. Referral Framework for Abnormal DRP

5.1 Overview of DRP Referral Framework

The referral framework for abnormal DRPs (Tables 5.1 to 5.6) has been recommended by the Singapore Diabetic Retinal Photography (SiDRP) Steering Committee based on international guidelines and input from ophthalmologists from SingHealth, National Healthcare Group (NHG) and National University Health System (NUHS). GPs and community providers should reference this framework when considering referral to tertiary centres for follow up.

The quoted referral framework timeframe and pathway serves as a reference. The actual timeline for referrals is dependent on capacity of tertiary eye centers as well as the assessed urgency of referral.

Note: The DRP referral framework serves as a guide and clinicians should ultimately use their clinical discretion to determine the appropriate clinical care required for their patients based on their DRP results.

Legend for Tables 5.1 to 5.6	
CWS	Cotton wool spots
DH	Dot hemorrhage
FH	Flame hemorrhage
HE	Hard exudates
IRMA	Intraretinal microvascular abnormalities
MA	Microaneurysm
NVD	New vessels on disc
NVE	New vessels elsewhere

Table 5.1: Referral Framework Based on Fundus Image Quality

FUNDUS IMAGE QUALITY			
Classification	**Category**	**Features**	**Timeframe & Pathway**
Ungradable	Overall	• Uncorrectable under or over exposure • Severe obscuration of 1 or more quadrant, or of macula by artifacts • Wrong positioning of the optic disc or the macula • Insufficient focus (optic disc details, 3rd order retinal vessels and choroidal details not clear) • No view of fundus up to 1DD beyond vascular arcade	3 months referral to Community Eye Clinics (CECs) (New) 1 month referral: Diabetic retinopathy with no visible PDR features seen (Revised) 1 week referral: One of the following: • Any visible PDR features seen • Vision of 6/60 or worse • Other visible pathology, refer as recommended.
	Disc View (Nasal Field/F1)	• Complete optic disc <2DD from edge of the image and fine vessels are not visible on surface of the disc.	
	Macula View (Temporal field/F2)	• Centre of fovea <2DD from edge of image Obscuration	
Normal Gradable Fundus	No Media Opacity with VA better than 6/60 (New)	No media opacity/no poor vision	Annual Rescreen
	Poor Vision/ Media Opacity	No media opacity with VA 6/60 or worse	3 months referral to CEC
		Media opacity with VA better than 6/60	Annual rescreen
		Media opacity with VA 6/60 or worse	3 months referral to CEC

Table 5.2: Referral Framework Based on Presence and Extent of DR

DIABETIC RETINOPATHY		
Classification	**Features**	**Timeframe & Pathway**
No Diabetic Retinopathy	• Normal fundus • Any FH, CWS in the absence of DH/MA • Any HE in the absence of DH/MA (outside of outer zone)	Annual rescreen
Mild Non-Proliferative Diabetic Retinopathy (NPDR)	One or more of the following: • DH/MA • ≤4 BH • Less than 5 FH with presence of DH/MA • Up to 2 CWS with presence of DH/MA • HE with presence of DH/MA	Annual rescreen
Moderate NPDR	One or more of the following: • ≥5 BH • More than or equal to 3 CWS with presence of DH/MA • More than or equal to 5 FH with presence of DH/MA • Venous beading in 1 quadrant	3 months referral to CEC
Severe NPDR	One or more of the following: • 4 quadrants with each 10 or more haemorrhages (BH/DH/MA) • 2 or more quadrants of venous beading • Any IRMA	1 month referral to SOC
Proliferative Diabetic Retinopathy (PDR)	One or more of the following: • Any NVE • Any NVD • Tractional membranes / pre-retinal fibrosis • Vitreous or pre-retinal haemorrhage	1 week referral to SOC
Treated Diabetic Retinopathy	Laser scars	Grade as above

Table 5.3: Referral Framework for Diabetic Maculopathy Suspect

DIABETIC MACULOPATHY (DME) SUSPECT		
Classification	**Features**	**Timeframe & Pathway**
No DME (M0)	No DR within the macula (2DD radius of fovea)	Annual rescreen
DME Suspect (M1)	Any MA/DH/BH within inner AND outer zone with VA better than 6/12	Annual rescreen
	• Any HE within outer zone • Any MA/DH/BH within outer zone with VA 6/12 or worse	3 months referral to CEC
	• Any HE within inner zone • Any MA/DH/BH within inner zone with VA 6/12 or worse	1 month referral to SOC

Table 5.4: Referral Framework for Glaucoma Suspect

GLAUCOMA SUSPECT		
Classification	**Features**	**Timeframe & Pathway**
Glaucoma Suspect	One or more of the following: • Cupped disc ratio (CDR) ≥0.8, either eye • Disc asymmetry ≥0.2 • Disc haemorrhages • Any notching or rim thinning	3 months referral to CEC

Table 5.5: Referral Framework for Age-related Macular Degeneration

AGE RELATED MACULAR DEGENERATION (AMD)			
Classification	**Category**	**Features**	**Timeframe & Pathway**
AMD	Early AMD	• Drusen outside 2DD • Drusen within 2DD but ≤125 microns	Annual rescreen
	Intermediate AMD	• Drusen within 2DD and >125microns • Significant pigment abnormality	Annual rescreen
	Advanced AMD	• Geographic atrophy within 2DD of macular centre • Subretinal fibrous scar	1 month referral to SOC
		• Pigment Epithelial Detachment • Subretinal or subretinal pigment epithelium (RPE) fibrovascular lesions • Choroidal neovascular membrane	1 week referral to SOC

Table 5.6: Referral Framework for Other Ocular Conditions

OTHER OCULAR CONDITIONS		
Classification	**Features**	**Timeframe & pathway**
Disc Swelling	Yes/No	Immediate (A&E)
Macula Haemorrhage		1 week referral to SOC
Retinal Detachment		Immediate (A&E)
Retinal Emboli		2 weeks referral to SOC
Branched retinal artery occlusion (BRAO)/ Central retinal artery occlusion (CRAO)		Immediate (A&E)
Branched retinal vein occlusion (BRVO) / Central retinal vein occlusion (CRVO)		2 weeks referral to SOC
Collaterals		2 weeks referral to SOC
Central Serous Retinopathy		2 weeks referral to SOC
Pseudo/Mac Hole	Better than VA 6/18	3 months referral to CEC
	VA 6/18 and worse	1 month referral to SOC
Retinitis Pigmentosa	Yes/No	1 month to SOC
Epiretinal membranes (ERM)	Better than VA 6/18	Annual rescreen
	VA 6/18 and worse	3 months referral to CEC

5.2 DRP Referral to Community Eye Clinics (CECs)

CECs are eye clinics conveniently located in the community. They can diagnose, treat and monitor patients with stable and non-complex eye problems that do not require management at Specialist Outpatient Clinics (SOCs).

5.2.1 Referral Indicators for DRPs to CECs

The following is a list of indicators for DRPs to be referred to CEC for review in 3 months:

- Ungradable fundus on DRP
- Normal gradable fundus with poor vision (VA 6/60 or worse)
- Moderate non-proliferative diabetic retinopathy
- Diabetic macula edema with hard exudates within outer zone, with VA 6/12 or worse
- Any microaneurysm, dot hemorrhage or blot hemorrhage within outer zone with VA 6/12 or worse
- Glaucoma suspect detected
- Pseudo-macular or macular hole with VA better than 6/18
- Epiretinal membrane detected

Table 5.7 provides details on the CECs and clinic for stable eye conditions from the public healthcare institutions.

Table 5.7: Details on CECs and Stable Eye Conditions' Clinic

Institution	CEC	Accepts CHAS GP subsidised referrals?	GPs make appt via	Enquiries
SNEC	HPB Building	Yes	GP hotline, fax or email	6227 7255
	Punggol Polyclinic	Yes	GP hotline, fax or email	6227 7255
NHGEI	Hougang Polyclinic	Not currently	NA	NA
	Geylang Polyclinic	Not currently	NA	NA
	AMK Specialist Centre *[This is a stable eye conditions' clinic]*	Yes	Phone, email or fax	Tel: 6554 6500 Email: AMK_specialist_centre@ttsh.com.sg Fax: 6554 0227
NUH	Choa Chu Kang Polyclinic	Yes	Email NUH referral letter	Tel: 6908 2222 Email: communityeyeclinic@nuhs.edu.sg
	Pioneer Polyclinic			

6. Appendixes

6.1 Appendix A: List of DRP Providers Engaged by Primary Care Networks

Some DRP providers perform both DRP capture and reading, while others will sub-contract the DRP reading to other providers. Table 6.1 shows the list of commonly engaged DRP Providers and whether they sub-contract DRP reading service to external parties.

Table 6.1: List of DRP providers in GP setting

S/N	Provider Name	External Provider(s) Engaged for DRP Reading
1	7 Vision	No
2	Ang Mo Kio Thye Hua Kwan CHC	Yes*
3	Assurance PCN	No
4	Central North PCN	Yes
5	Class PCN	No
6	Diabetes Singapore	Yes*
7	Frontier PCN	Yes*
8	I-CARE PCN	No
9	NUHS PCN	Yes*
10	Parkway Shenton PCN	No
11	Raffles PCN	Yes*
12	SATA CommHealth @Chai Chee	Yes*
13	SATA CommHealth @Fernvale	Yes*
14	SingHealth DOT PCN	Yes*
15	SingHealth Regional PCN	Yes*
16	Speedoc	Yes
17	St Luke ElderCare Salem Centre CHC	Yes*
18	Tampines CHC	Yes*
19	Tiong Bahru CHC	Yes*
20	United PCN	No
21	SATA Mobile CHC	Yes*

The above table is accurate as of May 2023
**Reflects that the DRP Provider engages Public Healthcare Institutions such as SNEC Ocular Reading Centre (SORC) for DRP reading*

6.2 Appendix B: Leaflet on Pupillary Dilation for DRP Screening

Example of a leaflet on “Pupillary dilation for DRP screening” to give the patient/caregiver:

Pupil Dilation

Patient information sheet

Take note:

Trained staff will examine the pupils of the eye and instill eye dilation drops 1-3 times.

Alert us if you are driving today.

Your vision will be blurred for 4-6 hours.

Wearing sunglasses may help.

Your near vision will be more affected than distance vision.

You may experience eye pain, blurred vision associated with headache and vomiting.

This is a general guide. Please contact the clinic (Tel: 6XXX XXXX) if you need help.

Type of Mydriatic eyedrop instilled: _____
Which eye(s) instilled: _____

Example - Patient Information leaflet