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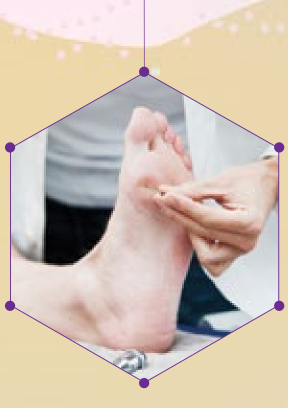
Diabetes Care

Continuous Glucose Monitoring for Diabetes in Primary Care

Ramadan, Fasting and Diabetes Care

Managing the Diabetes Foot in Primary Care

How to Manage Migraines in Primary Care



Continuous Glucose Monitoring:

A Useful Tool for Diabetes Management in Primary Care

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Primary care physicians are central to the care of people with diabetes. Through an in-depth case study, the SingHealth Duke-NUS Diabetes Centre shares how general practitioners can leverage on continuous glucose monitoring to achieve optimal glycaemic control for their patients.

INTRODUCTION TO CONTINUOUS GLUCOSE MONITORING

Glucose monitoring is vital to achieving optimal glycaemia in diabetes care. Glucose monitoring has evolved over the last century from urine glucose measurement and self-monitored capillary glucose measurements to **continuous glucose monitoring (CGM)**.

Haemoglobin A1c (HbA1c) remains an essential surrogate for glycaemia as it strongly correlates with long-term diabetes complications. HbA1c also has a strong correlation with 24-hour mean glucose. However, HbA1c does not predict the risk of hypoglycaemia or postprandial hyperglycaemia.

RECENT ADVANCEMENTS IN CGM

CGM has improved rapidly in terms of accuracy as well as the duration of wear. Most CGM devices available currently can be worn for seven to 14 days, and require twice daily calibration or are factory-calibrated.

Sensor accuracy is constantly improving, and sensor technology is moving towards not requiring calibration as a standard. A CGM provides a sensor glucose every five to 15 minutes, translating to 96 to 288 readings per 24 hours.

Through a comprehensive case study, this article will discuss the use of CGM in a person with type 2 diabetes.

PATIENT BACKGROUND

John, a 55-year-old male banker, is under your care. He has had type 2 diabetes for 15 years, a myocardial infarction ten years ago treated with percutaneous coronary intervention, dyslipidaemia and fatty liver.

Since adding a sodium-glucose cotransporter-2 inhibitor (SGLT2i) two years ago, his HbA1c has improved from an average of 10% to 8.5%. His latest HbA1c is 8.7%.

He weighs 72 kg with a BMI of 27 kg/m^2. He takes 26 units of U100 glargine, linagliptin 5 mg, dapagliflozin 10 mg and gliclazide MR 120 mg, all once in the morning, and metformin 1000 mg twice daily. His estimated glomerular filtration rate (eGFR) is 63 ml/min/1.73 m^2.

THERAPEUTIC CONSIDERATIONS

How would you further intensify John's therapy to achieve optimal glycaemia?

John's oral medications are at maximal / near maximal doses. His glargine dose of 26 units is 0.36 u/kg/day and could be increased further if there is persistent fasting hyperglycaemia.

What does an HbA1c of 8.7% tell you about John's current glycaemia?
The HbA1c of 8.7% suggests that John's 24-hour mean glucose is 12.5 mmol/L *(mean glucose [mmol/L] = A1c x 2.32 - 7.68, using the updated glucose management indicator (GMI) equation)*. However, the HbA1c does not give you any information about his fasting glycaemia, hypoglycaemia or postprandial hyperglycaemia.

John is not keen to do more intensive capillary glucose monitoring, and in discussion with him, you decide to use a CGM to understand his glycaemia better.

1. CONTINUOUS GLUCOSE MONITORING

John uses a flash glucose monitoring system capturing 97% of data over 14 days.
At least 70% of data captured over 14 days is considered representative of three months.

TIME IN RANGES

What it is

Time in range (TIR) is the recommended glucose metric to quickly analyse a large amount of CGM data. TIR is the percentage of glucose readings between 3.9 and 10 mmol/L. A target of **> 70%** is recommended, which correlates to a HbA1c of < 7%.

Equally important is **time below range (TBR)** (level 1: < 3.9-3.0 mmol/L, level 2: < 3.0 mmol/L). Time below range is the sum of level 1 and level 2.

The recommended target for TBR is < 4%. Additionally, a stricter target of < 1% is recommended for level 2 TBR (< 3 mmol/L).

Results

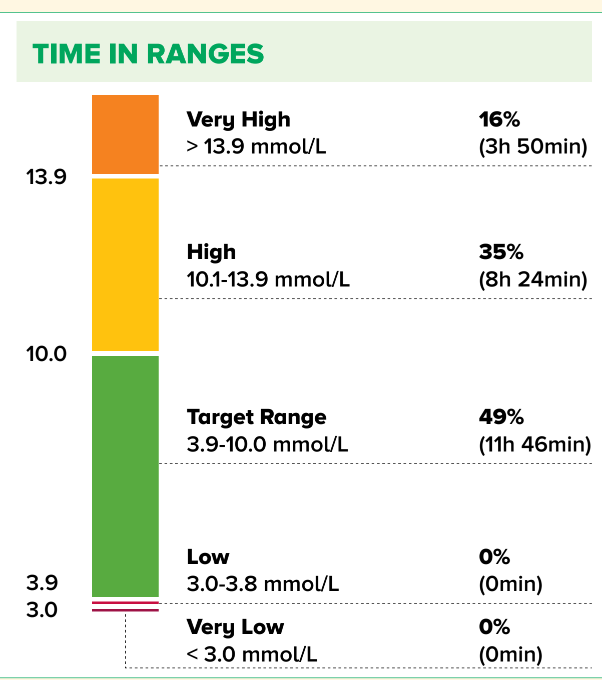
GLUCOSE STATISTICS AND TARGETS

18 May 2020 - 31 May 2020	**14 Days**
% Time Sensor is Active	**97%**
Ranges and Targets for	**Type 1 or Type 2 Diabetes**
Glucose Ranges Target Range 3.9-10 mmol/L	**Target** % of Readings (Time/Day) Greater than 70% (16h 48min)
Below 3.9 mmol/L	Less than 4% (58min)
Below 3 mmol/L	Less than 1% (14min)
Above 10 mmol/L	Less than 25% (6h)
Above 13.9 mmol/L	Less than 5% (1h 12min)

Each 5% increase in time in range (3.9-10 mmol/L) is clinically beneficial.

Average Glucose	**10.1 mmol/L**
GMI	**7.7% or 60 mmol/mol**
Glucose Variability	**35.6%**

Defined as percent coefficient of variation (% CV); target ≤ 36%



1. CONTINUOUS GLUCOSE MONITORING (continued)

Interpretation

John's TIR is only 49% (target > 70%), his TBR is 0% and he has significant **time above range (TAR)** (> 10 mmol/L, 16 + 35 = 51%).

Time in ranges lets you immediately understand the major glycaemic issue from a CGM download. For John, it is **hyperglycaemia**. He does not have any hypoglycaemia.

However, time in ranges alone does not tell whether John's fasting glycaemia is optimal, neither does it tell the periods of the day when he has hyperglycaemia. For this, we look at the ambulatory glucose profile.

AMBULATORY GLUCOSE PROFILE

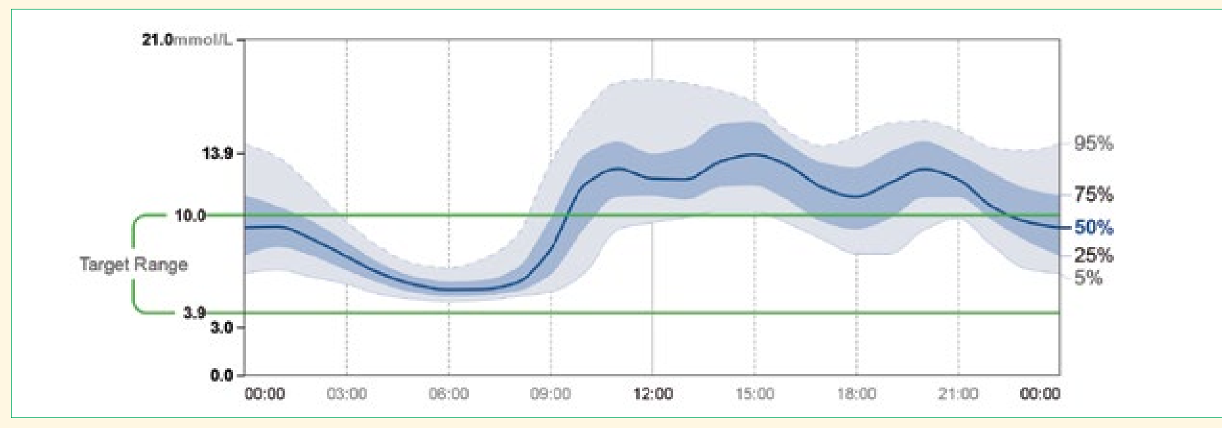
What it is

The ambulatory glucose profile (AGP) is a 24-hour glucose overlay graph that summarises glucose data collected throughout the sensor wear period, depicting the distribution of glucose in different periods.

The x-axis denotes the time, and y-axis the glucose levels. The bold central line indicates the median glucose level, while the dark and light blue shaded areas represent the 25th to 75th and 5th to 95th percentile distribution of glucose, respectively.

AGP helps to identify the periods in a day when significant hypoglycaemia or hyperglycaemia occurs.

Results



Interpretation

John's overnight glucose level is within target and steady with no hypoglycaemia. However, he has **significant postprandial hyperglycaemia during the day**. His fasting glycaemia is in target; hence, no further increase of his basal insulin dose is necessary.

John is not surprised at his higher glucose levels in the daytime. At your advice, he has previously tried to limit his daytime meal portions but reports extreme hunger resulting in him reverting to his usual dietary habits.

Management implications

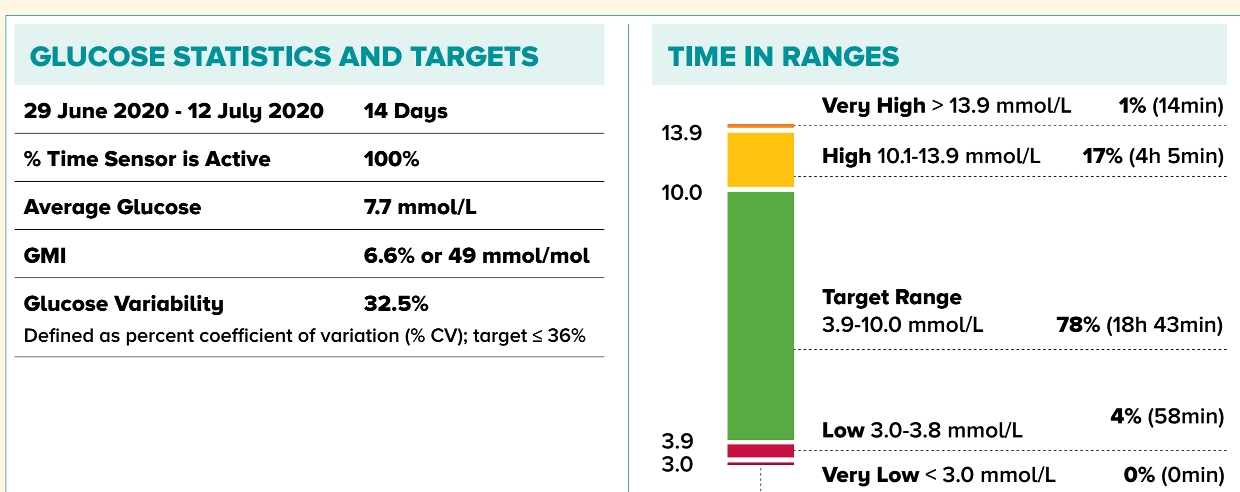
You start glucagon-like-peptide-1 receptor agonist (GLP1-RA) injections after stopping linagliptin to target the predominant postprandial hyperglycaemia.

2. FOLLOW-UP FOUR WEEKS AFTER THE INTRODUCTION OF GLP1-RA

John reports some nausea with the GLP1-RA but has persisted with it.
He notes much less hunger and has worn another CGM sensor.

TIME IN RANGES

Results



GLUCOSE STATISTICS AND TARGETS

29 June 2020 - 12 July 2020	14 Days
% Time Sensor is Active	100%
Average Glucose	7.7 mmol/L
GMI	6.6% or 49 mmol/mol
Glucose Variability Defined as percent coefficient of variation (% CV); target ≤ 36%	32.5%

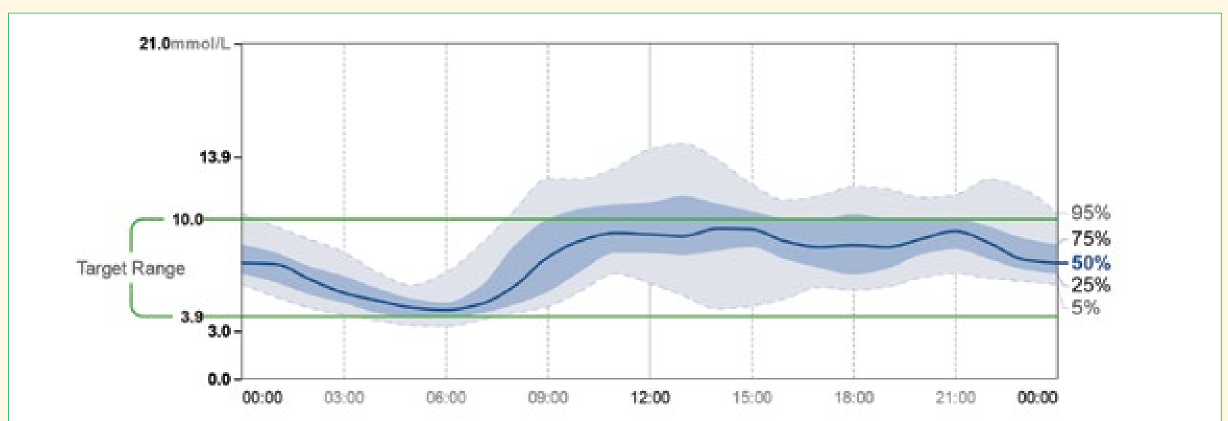
TIME IN RANGES

Range	% (time)
Very High > 13.9 mmol/L	1% (14min)
High 10.1-13.9 mmol/L	17% (4h 5min)
Target Range 3.9-10.0 mmol/L	78% (18h 43min)
Low 3.0-3.8 mmol/L	4% (58min)
Very Low < 3.0 mmol/L	0% (0min)

Interpretation There is a significant improvement in TIR from 49% pre-GLP1-RA to 78%. However, the level 1 TBR is now 4%. John does not report any symptomatic hypoglycaemia but reports waking up with a bad headache on some days. **Does John have nocturnal hypoglycaemia?**

AMBULATORY GLUCOSE PROFILE

Results



Interpretation The AGP shows that John has episodes of nocturnal hypoglycaemia between 4am and 6am. Significant improvement in postprandial hyperglycaemia is also evident.

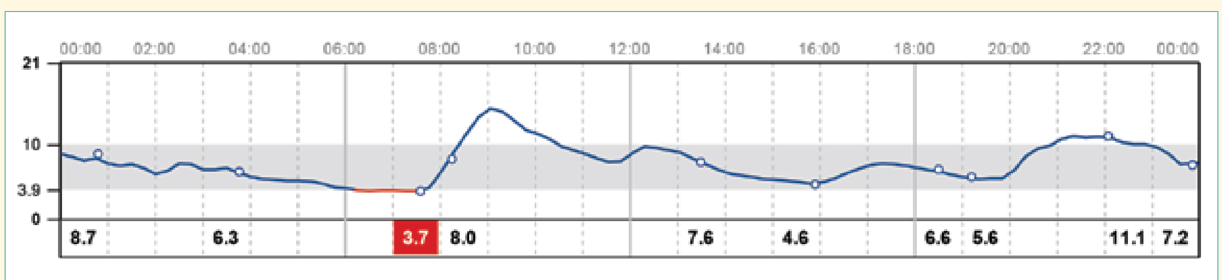
Management implications You recommend a reduction of the dose of U100 glargine from 26 to 20 units to avoid nocturnal hypoglycaemia.

2. FOLLOW-UP FOUR WEEKS AFTER THE INTRODUCTION OF GLP1-RA (continued)

DAILY GLUCOSE CURVES

What it is

Daily glucose curves are a valuable educational tool for going through diabetes self-care behaviours.



The graph shows that John had an episode of hypoglycaemia around 7.30am, followed by a rapid rise in glucose to about 16 mmol/L.

Management implications

Hypoglycaemia should be treated with 15 g of quick-acting glucose (e.g. half a glass of fruit juice, three teaspoons of sugar or two to three pieces of jelly sweets). Overtreatment of hypoglycaemia can result in post-treatment hyperglycaemia.

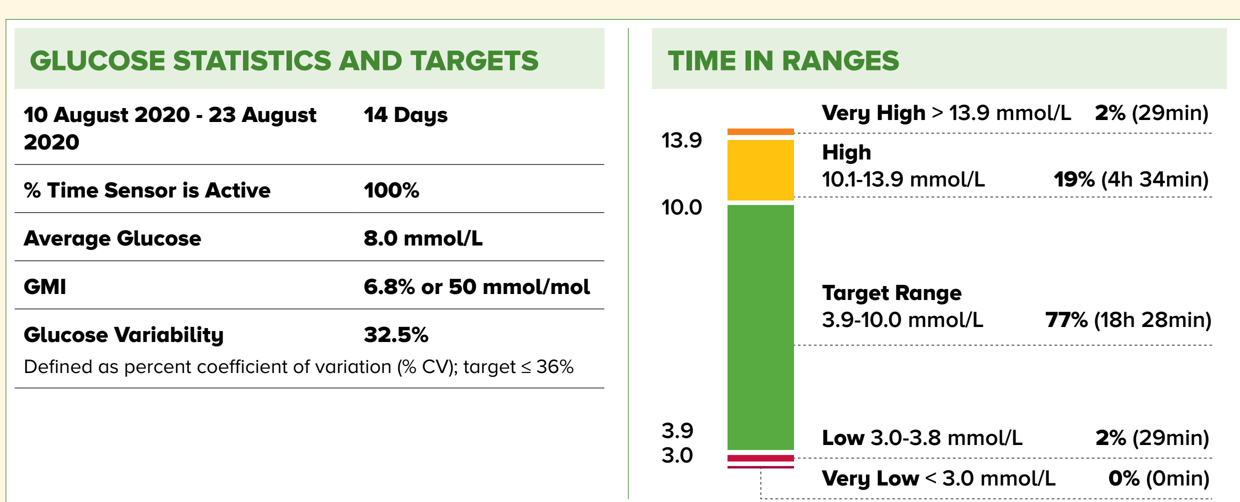
3. FOLLOW-UP THREE MONTHS LATER

John returns with a HbA1c of 7.8%. He now weighs 66 kg and has self-reduced his U100 glargine dose to 14 units based on his fasting glucose.

John was advised to monitor his fasting glucose for a few days every week and reduce his basal insulin dose by 10% (approximately 2 units) each time he developed recurrent fasting glucose readings < 4 mmol/L.

TIME IN RANGES

Results



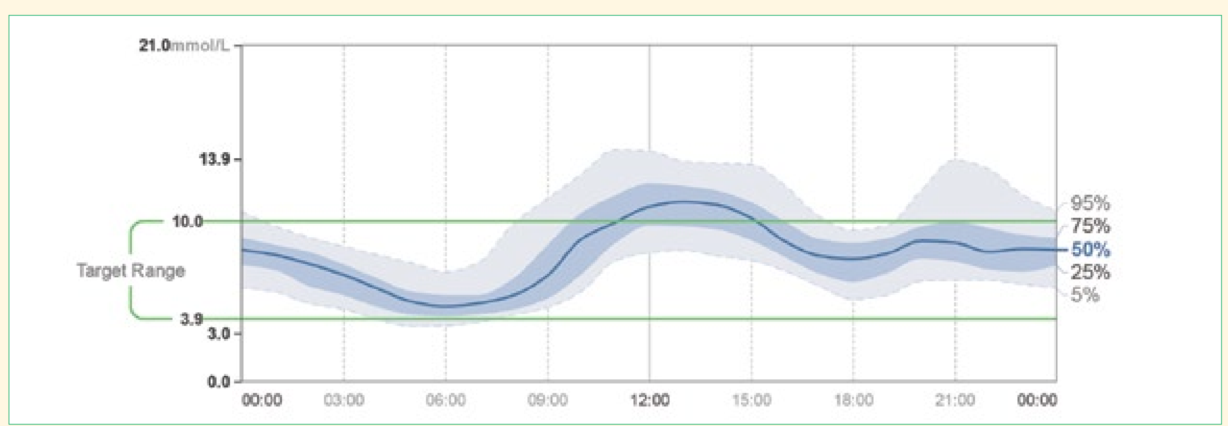
GLUCOSE STATISTICS AND TARGETS

10 August 2020 - 23 August 2020	**14 Days**
% Time Sensor is Active	**100%**
Average Glucose	**8.0 mmol/L**
GMI	**6.8% or 50 mmol/mol**
Glucose Variability Defined as percent coefficient of variation (% CV); target ≤ 36%	**32.5%**

Interpretation John's TIR is 77% with a TBR of 2%, well within the recommended target of < 4%.

AMBULATORY GLUCOSE PROFILE

Results

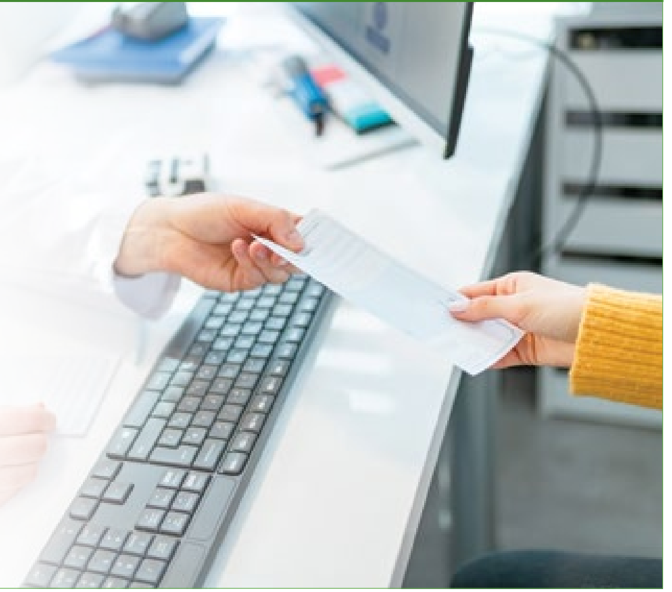


Interpretation John's AGP depicts much better glycaemia with minimal hypoglycaemia and much better postprandial hyperglycaemia. He does have post-breakfast hyperglycaemia, which could be improved further.

KEY TAKEAWAYS

- HbA1c alone does not provide a complete picture of a person's glycaemia.
- HbA1c does not provide information on the extent of hypoglycaemia, postprandial hyperglycaemia or glucose variability.
- Continuous glucose monitoring (CGM) provides a detailed view of a person's glycaemia and is a valuable complement to HbA1c.
- Time in ranges provides a quick overview of a large amount of CGM data and identifies the major glycaemic issue. A time in range of > 70% correlates to an HbA1c of < 7%. A time below range of < 4% is recommended.
- The ambulatory glucose profile helps to identify the specific periods of the day dysglycaemia is occurring. It also helps to match the diabetes therapy to the glycaemic patterns observed.
- Daily glucose curves are a valuable tool to identify suboptimal diabetes self-care behaviours and educate people with diabetes.

WHEN GPs CAN CONSIDER SPECIALIST REFERRAL



When intensive insulin therapy is required

- Insulin-deficient type 2 diabetes
- All people with type 1 diabetes
- Post pancreatectomy diabetes

For technology-assisted optimisation of diabetes care

- CGM
- Insulin pump therapy

For patients with obesity and diabetes

- Obesity resistant to initial lifestyle and therapeutic interventions

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He completed his specialist training in diabetes and endocrinology at SGH in 2016. He completed a one-year clinical research fellowship at the King's College Hospital, London, focusing on the holistic care of people with type 1 diabetes, and the use of technology to improve outcomes for people with type 1 diabetes while reducing the burden of self-care. His research interests are in the optimal use of continuous glucose monitoring and the integration of technology into the daily lives of people with diabetes to improve their care.

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Dr Daphne Gardner is a Senior Consultant with the Department of Endocrinology in Singapore General Hospital (SGH). She graduated from Oxford University, United Kingdom (UK) and was a clinical lecturer in Plymouth, UK before attaining specialist accreditation in endocrinology in Singapore. Her fellowship year was spent in the Oxford Centre for Diabetes, Endocrinology and Metabolism, UK.

Dr Gardner is the lead clinician for the Young Adults with Diabetes and Intensive Insulin therapy programme at SGH. She is on the physician faculty for the SingHealth Endocrinology Senior Residency Programme and is the Director of Education at the SingHealth Duke-NUS Diabetes Centre.

She has held two grants aimed at stratifying diabetes to direct personalised therapy and is the lead investigator for GLiMPSE (Glucose Monitoring Programme Singapore) which aims to use flash glucose monitoring and structured education to advance diabetes outcomes.

GPs can call the **SingHealth Duke-NUS Diabetes Centre** for appointments at the following hotlines, or scan the QR code for more information:

Singapore General Hospital	Changi General Hospital	Sengkang General Hospital	KK Women's and Children's Hospital	Singapore National Eye Centre
6326 6060	6788 3003	6930 6000	6692 2984	6322 9399

How to Optimise Diabetes Care During Ramadan Fasting

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General practitioners are the essential link to managing diabetes in the community. Read about the important role you can play in helping Muslim diabetic patients navigate the challenges faced in their diabetic management during the fasting month.

RAMADAN FASTING

Ramadan fasting is an annual month-long consecutive-day fasting performed as one of the five pillars of Islam.

Whilst it is a religious obligation for adult healthy Muslims, there are exemptions and alternative practices when faced with health challenges to fasting safely, both acutely or in the longer term, including for people with diabetes mellitus (DM).

In Singapore, the duration of fasting is fixed at approximately 14 hours daily for 29 or 30 consecutive days annually, according to the Muslim calendar. In the month of Ramadan, there are changes in daily routines, with extended periods between meals due to an earlier morning meal before dawn (Sahur) and a later evening meal at sunset (Iftar).

Whilst locally, daytime physical activity may not differ much, there is an average of a twofold increase in supplementary prayers performed at night, due to the attraction of increased spiritual rewards when performed in the month. With the increased number of night-time prayers, sleep patterns are altered and sleep durations are reduced.

PREVALENCE OF DIABETES AMONG SINGAPORE MUSLIMS

The latest National Population Health Survey 2019 reported the prevalence of diabetes amongst Malays at 14.4%, compared to Indians at 14.2% and Chinese at 8.2%.

Considering that the General Household Survey 2015 reported that 99.2% of Malays and 21.3% of Indians make up most of the Muslim population in Singapore, which is 14% of the resident population, this accounts for a substantial proportion of people with diabetes potentially undergoing Ramadan fasting year by year.

THE IMPACT OF RAMADAM FASTING ON PEOPLE WITH DIABETES

Abstaining from food and fluid intake during fasting hours poses challenges for Muslims with comorbidities.

It was previously reported that people with diabetes were found to have:

- A multifold increased risk of acute diabetes complications without adequate preparation for Ramadan fasting
- A daily glucose trend showing increased hypoglycaemia during fasting hours
- Increased hyperglycaemia during eating hours

Whilst the duration of fasting remains constant from year to year in Singapore, the altered meal patterns and circadian rhythms with differing sleeping durations and potentially varying levels of physical activity **necessitate dietary and treatment adjustments to sustain good control for diabetes**, even in those with previously uneventful experiences during Ramadan.

As such, a yearly pre-Ramadan reassessment can provide the latest risk assessment, as this chronic condition may change each year with chronic complications setting in.

Patient background

In Singapore, a large proportion of people with diabetes are being managed by primary care.

Similarly, Mdm A has been managed by her primary care doctor for the last 20 years since diagnosis. At 64 years old now, she has moved in with her daughter to be involved in the care of her grandchildren.

She has also minimised her clinic visits during the COVID-19 pandemic, opting to self-medicate and relying on medication deliveries for diabetes, hypertension and hyperlipidaemia when they run out, due to fear of exposure after she caught the COVID-19 infection earlier in the year.

Diabetes screening results

During her first visit to the nearby general practitioner (GP) clinic, she underwent the annual diabetes screening and investigations.

Her glycaemic control showed a glycated haemoglobin level (HbA1c) of 10.5% which is markedly raised compared to her previous screening six to 12 months ago, with levels ranging between 7% to 7.3%.

Mdm A is on basal insulin twice daily, with subcutaneous Levemir 24 units pre-breakfast and 10 units at bedtime (total daily dose insulin 0.51 units per kg body weight per day), with **episodes of hypoglycaemia during her regular twice weekly fasting.**

This was discovered when her astute GP initiated her on self-monitoring of capillary blood glucose.

Parameters assessed	Results
Body mass index (kg/m^2)	34.4
Blood pressure (mmHg)	130/80 *Target/laboratory range: < 130/85 without hypotension*
HbA1c (%)	10.5 *Target/laboratory range: < 7 without hypoglycaemia*
Total cholesterol (mmol/L)	5.96 *Desirable range: < 5.2*
LDL cholesterol (mmol/L)	3.27 *Optimal range: < 2.6*
Triglycerides (mmol/L)	4.97
HDL cholesterol (mmol/L)	0.38
Serum creatinine (umol/L)	95 *Target/laboratory range: 50-90*
CKD-EPI estimated glomerular filtration rate (eGFR) (ml/min/1.73 m^2)	53
Urine albumin to creatinine ratio (mg/mmol creatinine)	8.6 *Target/laboratory range: 0.2-3.3*
Foot screening	• Normal monofilament sensation and normal pulses • Low risk category
Fundal photography	Mild non-proliferative diabetic retinopathy
Smoking	Never
Flu vaccination	Not since 2020
Pneumococcal vaccination	PPSV23 in 2019
Dental	Not since 2019
Glucose-lowering treatment	• Levemir 24 units pre-breakfast, 10 units at bedtime • Metformin 850 mg thrice daily after meals • Sitagliptin 50 mg every morning

Table 1 Baseline screening results

HOW GPs CAN MANAGE DIABETES WITH RAMADAN FASTING

Pre-Ramadan preparation and risk calculation

With pre-Ramadan preparation[2], studies have shown that the risk of acute diabetes complications is reduced with consequent safer fasting during Ramadan, and improved self-care with resultant sustained improvement in glycaemic control.

Hence, international experts recommend that people with diabetes are **assessed with risk stratification pre-Ramadan** in the latest guidelines[1].

Patient education and management

It is crucial for patients to make an informed decision on whether to fast. In order to reduce the risk of complications, it is also important to optimise their glycaemic control, focus on education and provide appropriate treatment adjustments with close monitoring and patient empowerment.[2]

This can be performed at the primary care level where patients can have easy access to their GP clinic.

WHEN TO REFER TO A SPECIALIST

For **patients who are at moderate or high risk of complications during fasting**, it is recommended to refer them to the specialist clinic to undertake the pre-Ramadan preparation at least two to three months before Ramadan starts.

CASE STUDY

Risk calculation

Mdm A's GP performed her risk calculation. Her risk score was 11 ***(Table 2)*** which puts her in the **high risk level** for fasting.

Factor	Risk elements	Risk score	Mdm A's risk score
1.	**Diabetes type**		
	Type 1	1	
	Type 2	0	0
2.	**Duration of diabetes**		
	≥ 10 years	1	1
	< 10 years	0	
3.	**Presence of hypoglycaemia**		
	Hypoglycaemia unawareness	6.5	
	Recent severe hypoglycaemia	5.5	
	Multiple weekly hypoglycaemia	3.5	3.5
	Hypoglycaemia < 1 time per week	1	
	No hypoglycaemia	0	
4.	**Glycaemic control (HbA1c)**		
	> 9.0% (11.7 mmol/L)	2	2
	7.5-9.0% (9.4-11.7 mmol/L)	1	
	< 7.5% (9.4 mmol/L)	0	

Factor	Risk elements	Risk score	Mdm A's risk score
5.	**Type of treatment**		
	Multiple daily mixed insulin injections	3	
	Basal bolus / insulin pump	2.5	
	Once-daily mixed insulin	2	
	Basal insulin	1.5	1.5
	Glibenclamide	1	
	Gliclazide MR or glimepiride or repaglinide	0.5	
	Other therapy not including sulfonylurea or insulin	0	
6.	**Self-monitoring of blood glucose**		
	Indicated but not conducted	2	
	Indicated but conducted suboptimally	1	1
	Conducted as indicated	0	

Factor	Risk elements	Risk score	Mdm A's risk score
7.	**Acute complications**		
	Diabetic ketoacidosis (DKA) / hyperosmolar hyperglycaemic syndrome (HHS) in last 3 months	3	
	DKA/HHS in last 6 months	2	
	DKA/HHS in last 12 months	1	
	No DKA/HHS	0	0
8.	**Microvascular decompression (MVD) complications/ comorbidities**		
	Unstable MVD	6.5	
	Stable MVD	2	
	No MVD	0	0
9.	**Renal complications/ comorbidities (eGFR)**		
	< 30 mL/min	6.5	
	30-45 mL/min	4	
	45-60 mL/min	2	2
	> 60 mL/min	0	
10.	**Pregnancy**		
	Pregnant not within targets	6.5	
	Pregnant within targets	3.5	
	Not pregnant	0	0
11.	**Frailty and cognitive function**		
	Impaired cognitive function or frail	6.5	
	> 70 years old with no home support	3.5	
	No frailty or loss in cognitive function	0	0
12.	**Physical labour**		
	Highly intense physical labour	4	
	Moderately intense physical labour	2	
	No physical labour	0	0
13.	**Previous Ramadan experience**		
	Overall negative experience	1	
	No negative or positive experience	0	0
14.	**Fasting hours**		
	≥ 16 hours	1	
	< 16 hours	0	0
	Total score		**11**

Table 2 Risk calculation for Mdm A based on the recommended risk calculation for people with diabetes planning to fast during Ramadan[1]

Recommendation for specialist referral

After discussing with Mdm A and noting her insistence on fasting, in view of the concern regarding her fasting without guidance and to reduce her risk of acute complications as well as improve her overall glycaemic control and control of comorbidities, she was referred to Sengkang General Hospital.

An appointment was booked at the **Diabetes and Ramadan Clinic** for the **Diabetes Education and Medication Adjustment in Ramadan (DEAR) programme**[3].

Risk score	Risk level	Medical recommendations	Religious recommendations
0-3	**Low**	Fasting is probably safe. 1. Medical evaluation 2. Medication adjustment 3. Strict monitoring	• Fasting is obligatory. • Advice not to fast is not allowed, unless the patient is unable to fast due to the physical burden of fasting or needing to take medications or food or drink during the fasting hours.
3.5-6	**Moderate**	Fasting safety is uncertain. 1. Medical evaluation 2. Medication adjustment 3. Strict monitoring	• Fasting is preferred, but patients may choose not to fast if they are concerned about their health after consulting the doctor and taking into account the full medical circumstances and the patient's own previous experiences. • If the patient does fast, they must follow medical recommendations including regular blood glucose monitoring.
> 6	**High**	Fasting is probably unsafe.	• Advise against fasting.

Table 3 Risk score, risk categories and medical and religious recommendations for fasting[1]

THE DIABETES EDUCATION AND MEDICATION ADJUSTMENT IN RAMADAN (DEAR) PROGRAMME

The DEAR programme is an outpatient service consisting of clinics, education sessions and remote monitoring by a diabetes care team consisting of specialist nurses and allied health professionals.

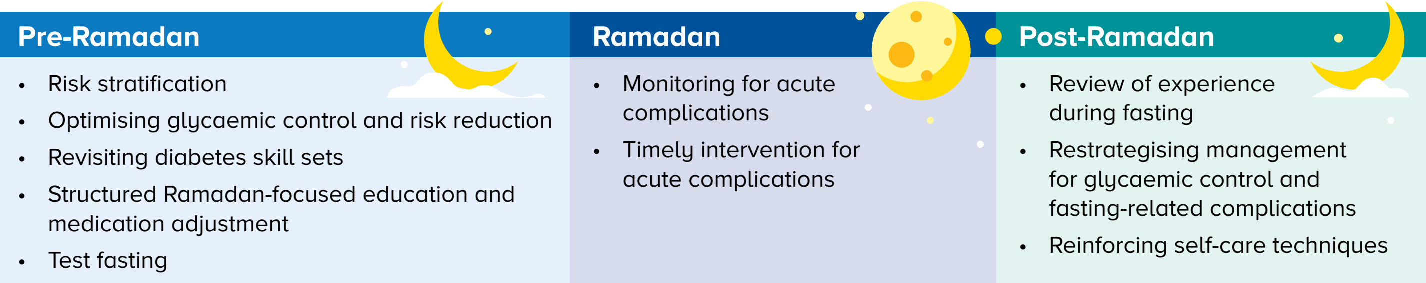

Figure 1 *DEAR programme for Ramadan fasting*

Patient education

A local survey had previously shown that there is a diabetes knowledge-to-practice gap relevant to Ramadan[4]. Hence, revisiting general diabetes education followed by providing pre-Ramadan education is of essence.

The general education should be provided annually, revising the diabetes skill sets such as understanding medications, treatment of complications, keeping physically active, healthy meal planning and coping skills with the support of a dietitian, physiotherapist, psychologist, medical social worker and when needed, a pharmacist.

Ramadan-focused education

Focused education *(Figure 2)* is performed by a multidisciplinary team and provided after ensuring general diabetes education and general diabetes management is optimised.

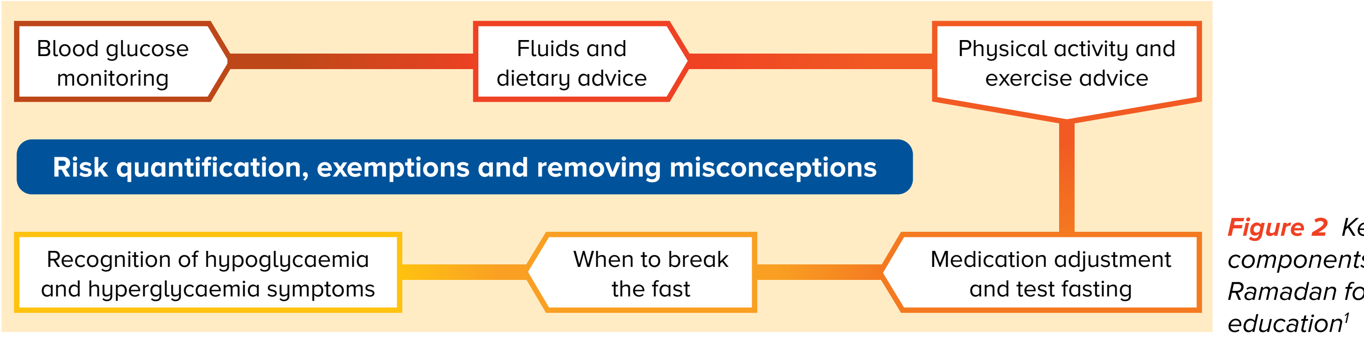

Figure 2 *Key components of Ramadan focused education[1]*

Assessment and management

The DEAR programme also consists of **pre-Ramadan assessment for risk stratification**, **optimisation of glycaemic control** and the **reduction of risks of complications** through adjustment of the treatment regimen, test fasting and glucose monitoring.

Continued follow-up and monitoring

This is followed by feedback through remote glucose monitoring or if needed, further consultations to optimise and reduce risks further. The experience of patients fasting is reviewed after the fasting period.

Benefits of the DEAR programme

The DEAR programme is an outpatient service that was launched in 2016. Our study of moderate- to high-risk patients in this programme at the specialist outpatient clinic showed improvement in acute diabetes complications for both hypogly-caemia and hyperglycaemia with sustained improve-ment in glycemic control[3]. This is likely related to improved glycaemic control and skill sets through self-empowerment.

CASE STUDY (continued)

Pre-Ramadan assessment and management

The discussion of Mdm A's plans to fast was again revisited, and she was advised not to. However, her diabetes care team concurrently worked with her to manage her risk of diabetes complications, should she decide to proceed with fasting.

She was assessed to have irregular insulin administration, poor understanding of diabetes and her treatment, as well as poor matching of insulin to her meals despite a total daily dose of insulin of 0.5 units/kg/day.

She was initiated on a basal bolus insulin regimen to target each component. Empagliflozin was also added on.

Management during Ramadan fasting

She was started on **insulin coformulation** due to her larger meals at dinner and during sunset meals (Iftar), with **better glycaemic control and less hypoglycaemia during test fasting** through feedback of glucose readings.

She had better glucose control with reduced amplitude of her glucose swings to acceptable targets with capillary glucose levels ranging between six to ten mmol/L. **Her risk level was reduced to moderate risk.**

During remote glucose feedback when performing Ramadan fasting, no episodes of hypoglycaemia were found during capillary and flash glucose monitoring. She was able to cope with further weekly fasting after Ramadan with no further episodes of hypoglycaemia.

Parameters assessed	Pre-Ramadan after optimisation	Post-Ramadan
Body mass index (kg/m^2)	34.4	33.8
Blood pressure (mmHg)	130/80	129/74
HbA1c (%)	7.4	6.9
Total cholesterol (mmol/L)	5.96	3.92
LDL cholesterol (mmol/L)	3.27	2.69
Triglycerides (mmol/L)	4.97	1.8
HDL cholesterol (mmol/L)	0.38	0.89
Serum creatinine (umol/L)	92	–
Urine albumin to creatinine ratio (mg/mmol creatinine)	8.6	2.7
Flu vaccination	Administered	–
Dental	Self-arranged	–
Foot screening	• Normal monofilament sensation and normal pulses • Low risk category	–
Fundal photography	Mild non-proliferative diabetic retinopathy	–
Glucose lowering treatment	Ramadan and fasting dosing: • Ryzodeg (insulin degludec and aspart) 28 units pre-Iftar • Insulin aspart 10 units pre-Sahur • Sitagliptin 25 mg at Sahur • Empagliflozin 25 mg at Iftar	• Ryzodeg (insulin degludec and aspart) 32 units pre-dinner • Insulin aspart 14 units pre-breakfast and pre-lunch • Sitagliptin 25 mg OM • Empagliflozin 25 mg OM

Table 4 Results during DEAR clinic visits

Post-Ramadan shared care with GP

She was reviewed post-Ramadan with improved glycaemic control without hypoglycaemia and some weight loss. This may concur with previous local data suggesting that improved glycaemia is related to reduced body fat mass and reduced visceral adiposity in females[5]. Her care was transferred back to her GP through the GP Partners programme to enable fast track referrals and support for special circumstances such as Ramadan fasting[6].

THE GP'S ROLE IN DIABETES MANAGEMENT FOR RAMADAN FASTING

A large proportion of people with diabetes are managed in primary care and are likely to be able to fast safely if they are of low risk.

GPs are the essential link as the first line in the care of people of diabetes in the community.

Early referral of patients who are deemed moderate to high risk but planning to fast enables better preparation of these patients to understand their risk and improve self-care during the challenging period.

Thereafter, shared care with GPs as the first line will complete the puzzle in the comprehensive care of the diabetes patient.

CONCLUSION

Ramadan fasting may be challenging for people with diabetes. Pre-Ramadan assessment to optimise glycaemic control and promote self-care, coupled with easy access to primary care providers for necessary intervention to avert complications, is of essence. Specialist care provides a multidisciplinary team necessary to prepare and support those at moderate to high risk to undergo fasting more safely.

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She plays an active role in the education, research and clinical care regarding fasting during Ramadan including healthcare professional education through close networking with the alliance.

GPs can call the **SingHealth Duke-NUS Diabetes Centre** for appointments at the following hotlines, or scan the QR code for more information:

Singapore General Hospital	Changi General Hospital	Sengkang General Hospital	KK Women's and Children's Hospital	Singapore National Eye Centre
6326 6060	6788 3003	6930 6000	6692 2984	6322 9399

How to Manage Acute Diabetes Foot Problems in Primary Care

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General practitioners are at the core of diabetes care, risk factor modification and complication monitoring. When it comes to diabetes foot complications, the stakes are high and thus need to be carefully managed. The SingHealth Duke-NUS Diabetes Centre shares tips on primary care treatment and when referral to a specialist is needed.

THE DIABETES FOOT IN SINGAPORE

Prevalence

Lower limb amputations are one of the most feared diabetes complications and unfortunately, **Singapore has one of the highest amputation rates in the developed world**[1].

Diabetes mellitus affects approximately one in six adults between 21 and 69 years of age in Singapore, but the lifetime risk is projected to reach one in every two adults by 2050.[2]

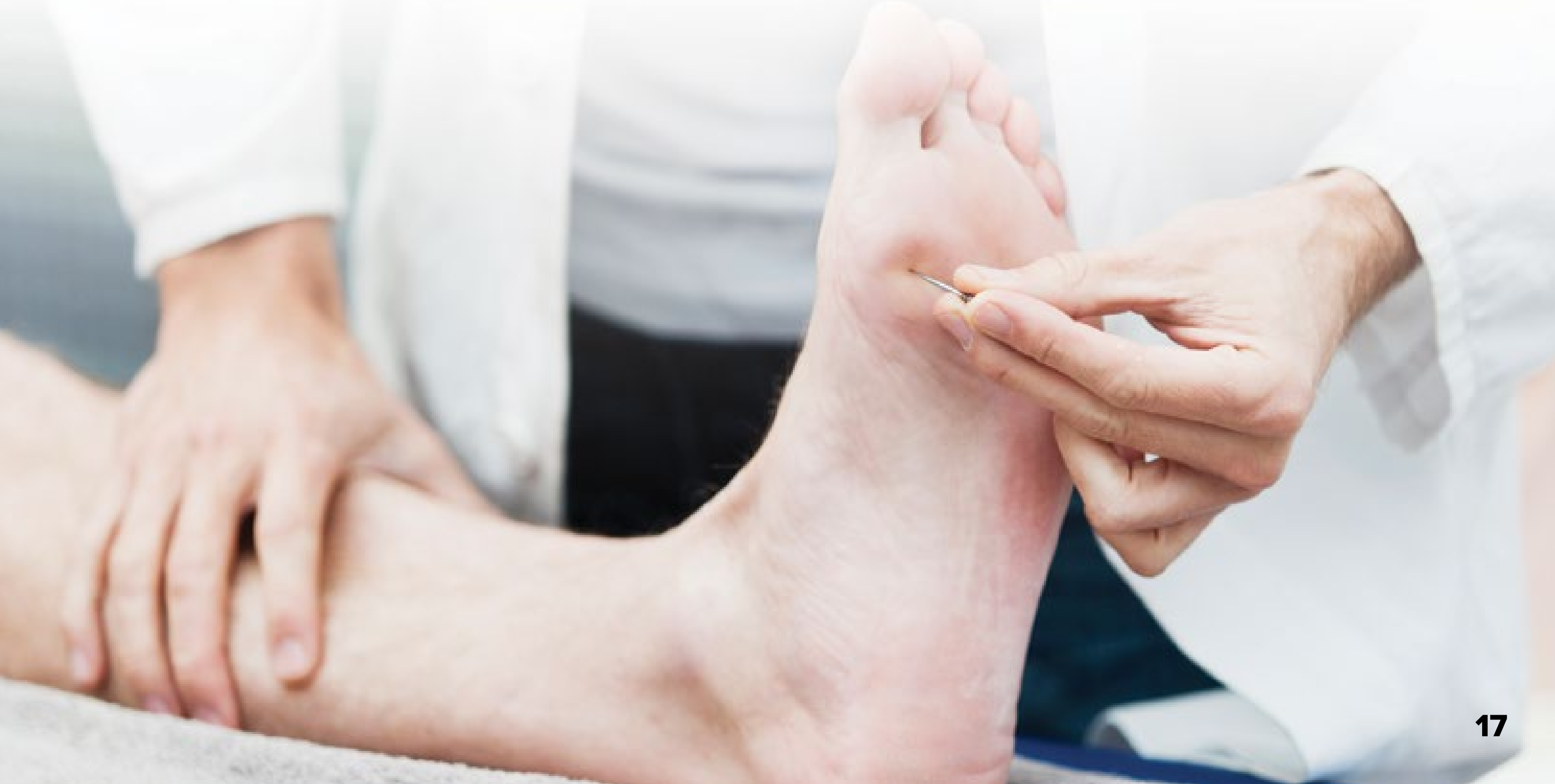
The lifetime risk of developing a foot ulcer ranges from 15% to 25% of those with diabetes, while foot ulcers precede 80% of all lower limb amputations in those with diabetes.[3]

Risk factors

The risk factors for developing a foot ulcer and lower limb amputation are well-established in Singapore.[4]

In addition to traditional cardiovascular risk factors (e.g., dyslipidaemia, hypertension, smoking and poorly controlled diabetes), a younger age at diagnosis (longer duration of diabetes) and those with chronic kidney disease are at the highest risk of diabetes foot complications.

Diabetes foot problems make up a large proportion of all hospital days due to diabetes, but **integrated diabetes foot pathways with early access to care can significantly reduce the morbidity associated with diabetes foot disease.[3]**



Patient background

Ms F is 53-year-old Malay ex-smoker working as a store attendant. She was noted to have a painless right foot callus during her regular review with her general practitioner (GP).

She has had type 2 diabetes for 12 years, complicated by mild non-proliferative diabetic retinopathy bilaterally, chronic kidney disease and peripheral neuropathy noted on a diabetes foot screen four years ago.

She failed to attend regular diabetes foot screening as she did not see its value.

Symptoms

Ms F noticed a painless red discolouration around a callus that had formed over the base of her right foot under the first metatarsophalangeal (MTP) joint. The callus was ascribed to her recent change in footwear and had progressively darkened over the preceding week.

She was pain-free and did not restrict her activities. She did not wish to miss time at work, and thus only consulted her primary care team six days later at her scheduled chronic disease review.

Presentation

At presentation to her GP, there was a fluctuant callus on the dorsal aspect of the first MTP on the right. She had fallen arches bilaterally with poor nail hygiene.

She also had weak but palpable pulses bipedally, and absent sensation up to the medial malleolus bilaterally when assessed using a 10 g monofilament.

The tissue surrounding the callus was erythematous and warm, but she was apyrexic without signs of systemic infection or joint involvement.

Medical History

Type 2 diabetes (diagnosed at the age of 41 years)
- HbA1c 8.2%

Diabetic retinopathy
- Mild non-proliferative diabetic retinopathy bilaterally

Chronic kidney disease (CKD)
- CKD stage 3b (40 ml/min)
- Albumin creatinine ratio 92 mg/g

Peripheral neuropathy
- Reduced 10 g monofilament sensation

Hypertension
- 124/76 mmHg

Dyslipidaemia
- LDL cholesterol 2.86 mmol/L

Obesity
- Body mass index (BMI) 35.6 kg/m^2

Medications

- Metformin 850 mg twice daily
- Linagliptin 5 mg once in the morning
- Losartan 100 mg once in the morning
- Fluvastatin 10 mg once at night
- No known drug allergies or traditional medicine use

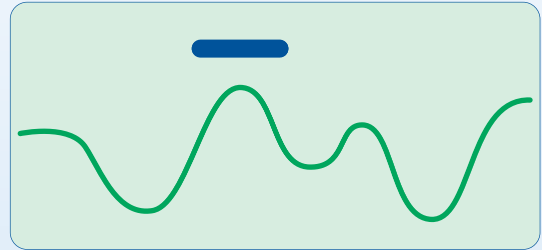


Table 1 Ms F's medical history and medications

Clinical course

Ms F was treated with oral co-amoxiclav, advised to avoid weight bearing on the foot and was referred to the **Rapid Access FooT (RAFT) Clinic** at Singapore General Hospital (SGH).

Initial review and education

She was reviewed by the vascular, podiatry and diabetes teams three days later.

Vascular review

Non-invasive vascular imaging was arranged on the same day and a clinical assessment was performed.

Podiatry review

Local debridement and evacuation of a pus-filled cavity under the callus, nail care and education (off-loading, dressing plan, nail care plan and footwear guidance) was performed.

Diabetes review

Cardiovascular risk factors and glycaemic control were addressed.

Her atheromatous changes were distal and there was not any focal proximal arterial stenosis noted on imaging to merit considering revascularisation options.

Some misconceptions about the role of regular foot screening were addressed in addition to giving guidance on wound care and dressings. Ms F and her family were educated regarding appropriate footwear, the red flags / warning signs to look out for and what actions to take if concerned.

Follow-up review and recovery

Her employer allowed her to take sufficient time off work to facilitate wound healing and she was also able to perform her duties while seated when she returned to work.

Her wound healed well after five weeks with regular podiatry review and wound dressings.

Her statin therapy was changed to a more potent statin to achieve an LDL under 1.8 mmol/L, and she commenced a sodium-glucose cotransporter-2 inhibitor (SGLT2i) after her wound healed to address her CKD with microalbuminuria, raised BMI and suboptimal glycaemic control.

Her LDL and HbA1c had both improved three months later when reviewed by her primary care team. She was advised that while her wound was 'healed', the recurrence rate within one to five years is extraordinarily high, and she will remain in the highest risk group for developing a future foot ulcer.

TREATMENT OPTIONS BY GPs

The key initial approach is to:

- Offload the foot
- Treat any underlying infection
- Consider local treatments to accelerate healing
- Escalate care if necessary

GPs can consult the **Appropriate Care Guide**[5] by the Agency for Care Effectiveness when assessing an individual's risk of diabetes foot complications.

Table 2 outlines the various assessment and treatment options available.

An experienced wound nurse and podiatrist are invaluable when considering local treatments and choosing the most appropriate dressings and footwear for acute diabetes foot injuries.

Often, patients presenting with an acute foot ulcer have been infrequent attenders to the clinic. Many have poorly controlled cardiovascular risk factors or have missed screening for other diabetes complications, and this represents an opportunity to re-engage the patient.

Diabetes Foot Ulcer Assessment and Treatment	
Initial assessment and reassessment	• Look for risk factors, evidence of infection, arterial insufficiency, neuropathy, pedal oedema and bony deformities • Footwear assessment • Wound assessment: depth, surrounding tissue, exudate, evidence of gangrene • Assessment for ischaemia
Local treatments	• Debridement and treatment of the callus • Wound culture prior to broad spectrum antimicrobials
Infection treatment	• Targeted therapy based on wound culture rather than superficial swab • Empiric antimicrobial in the absence of tissue culture
Education	• Wound care • Nail and foot care • Red flags and emergency contacts
Offload	• Footwear (insole/orthotics) • Avoid walking or other weight-bearing activities
Revascularisation/ Surgery	• Endovascular options • Bypass procedures • Deformity correction (e.g., hammertoe, bunion) • Amputation
Opportunistic diabetes complications and cardiovascular risk factor screening	

Table 2

WHEN GPs SHOULD REFER A PATIENT

Referral to the emergency department

Signs or symptoms of acutely ischaemic foot or evidence of systemic infection due to a foot infection should prompt immediate referral to the emergency department.

Referral to a diabetes foot specialist

- A **new ulcer, any tissue loss or foot infection in patients at higher risk** should prompt early review by a diabetes foot specialist.
- Even those at lower risk with **wounds that worsen at any stage of treatment or fail to improve after four weeks of initial therapy** should also be referred.
- Those with **intermittent claudication or rest pain** should be seen early by a vascular surgeon.
- Absent or reduced pulses and lower ankle brachial index (ABI) scores without tissue loss are common findings. If these are noted in those without symptoms or tissue loss, invariably, early specialist review is unnecessary.

Rapid access clinics

There is an array of rapid access clinics available with the appropriate option dependent on the physician's level of concern and the primary complaint.

In SGH, patients like Ms F can be referred to the:

- Rapid Access FooT (RAFT) Clinic
- Rapid Access Vascular Clinic
- Diabetes Fast Track Clinic

Similar services are available in Sengkang General Hospital and Changi General Hospital.

TREATMENT OPTIONS BY SPECIALISTS

The main advantage of a dedicated diabetes foot clinic is the coordination of investigations and care with multidisciplinary input on treatment decisions.

These clinics reduce the number of hospital visits for patients and have repeatedly been shown to reduce the morbidity associated with diabetes foot disease.[3]

Revascularisation, skin grafting and foot deformity corrective surgery are some of the surgical options available in addition to surgical debridement, and major or minor lower extremity amputation.

REASSESSMENT AND FOLLOW-UP

Continued monitoring and timely referrals

Diabetes care, risk factor modification and complication monitoring should be centred in primary care for the majority of patients.

Those with a history of foot ulcers will remain at high risk of recurrence. Therefore, four-to-six-monthly foot assessments augmenting the patients' and carers' daily examination of the patients' feet are necessary.

Rapid access to a multidisciplinary team assessment when necessary can reduce the need for lower extremity amputations.

Improving patient education

Each touchpoint in clinics and hospitals is an opportunity to improve patient knowledge. We have demonstrated that a collaborative approach in patient education can yield a greater increase in knowledge retention and self-care behaviours.[6]

Giving patients the tools to recognise diabetes foot problems and the appropriate actions to take are key factors in reducing morbidity in Singapore.

Lower health literacy in older patients, challenges around missing work and fear of amputations are some of the common reasons observed for delayed presentation with an acute diabetes foot problem in Singapore. This can be minimised through **coordinated care, regular screening** and **targeted education.**

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His current clinical and research interests focus primarily on atypical forms of diabetes mellitus and complications of diabetes mellitus.

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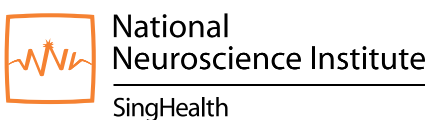

Effective Management of Migraine in Primary Care

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Most migraines can be effectively managed in primary care with the initiation of appropriate acute symptomatic treatment and first-line migraine preventives. Read all about the various forms of migraine and the appropriate management measures, and when referral for specialist care is needed.

INTRODUCTION TO MIGRAINE

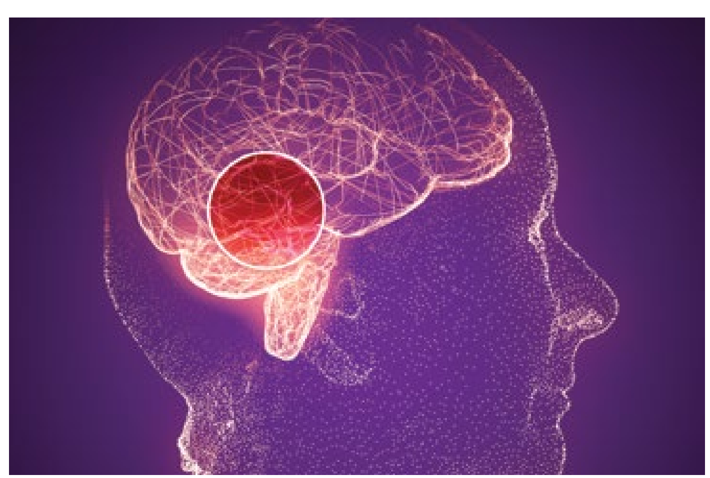
Migraines are the second leading medical condition that contributes to years lived with disability and affects almost one billion people around the world.[1] In a 2018 Singapore study, the direct and indirect costs due to migraines were estimated to be S$1.04 billion.[2]

The high prevalence of the disease, as well as economic burden from healthcare cost and loss of productivity makes it crucial for migraines to be treated effectively, with a growing demand for high quality healthcare access across all levels of the healthcare system in Singapore.

PREVALENCE IN SINGAPORE

Migraines are common in Singapore, with a **lifetime prevalence of 8.2%** in one recent 2020 Singapore study.[3]

This prevalence is similar between boys and girls before puberty, at around 3-7%. However, post-puberty, due to the influence of hormones, the prevalence becomes higher in females, with migraines being three times more common than in males. This higher prevalence amongst females continues till menopause with a decline in statistics thereafter, but remains slightly higher than in males.[4]



In the 2020 Singapore study, it was also noted that the following groups were more likely to experience migraine headaches:

- Malay ethnicity (compared to Chinese)
- Diploma holders (compared to degree holders)
- Younger age group of 18-34 years (compared to 65 years and above)
- Employed people (compared to economically inactive people)

SYMPTOMS, HISTORY TAKING AND DIAGNOSIS

The mean age of onset of migraines in Singapore is 26.4 years,[3] with a bimodal distribution of peaks in the late teens and twenties and around 50 years of age[4].

However, patients with migraines can present at any age, and a **careful history taking is needed** to differentiate primary headache disorders, such as migraines and tension-type headaches, from secondary headache disorders.

Identifying red flags

Common red flags can be elicited from patients using the acronym 'SNNOOP10' to snoop for red flags ***(Table 1)***.[5]

SNNOOP10 list of red and orange flags[5]			
	Sign or symptom	**Related secondary headaches (most relevant ICHD-3b* categories)**	**Flag colour**
1	**Systemic symptoms including fever**	Headache attributed to infection or nonvascular intracranial disorders, carcinoid or phaeochromocytoma	Red (orange for isolated fever)
2	**Neoplasm in history**	Neoplasms of the brain; metastasis	Red
3	**Neurologic deficit or dysfunction (including decreased consciousness)**	Headaches attributed to vascular, nonvascular intracranial disorders; brain abscess and other infections	Red
4	**Onset of headache is sudden or abrupt**	Subarachnoid haemorrhage and other headaches attributed to cranial or cervical vascular disorders	Red
5	**Older age (after 50 years)**	Giant cell arteritis and other headache attributed to cranial or cervical vascular disorders; neoplasms and other nonvascular intracranial disorders	Red
6	**Pattern change or recent onset of headache**	Neoplasms, headaches attributed to vascular, nonvascular intracranial disorders	Red
7	**Positional headache**	Intracranial hypertension or hypotension	Red
8	**Precipitated by sneezing, coughing or exercise**	Posterior fossa malformations; Chiari malformation	Red
9	**Papilledema**	Neoplasms and other nonvascular intracranial disorders; intracranial hypertension	Red
10	**Progressive headache and atypical presentations**	Neoplasms and other nonvascular intracranial disorders	Red
11	**Pregnancy or puerperium**	Headaches attributed to cranial or cervical vascular disorders; postdural puncture headache; hypertension-related disorders (e.g., preeclampsia); cerebral sinus thrombosis; hypothyroidism; anaemia; diabetes	Red
12	**Painful eye with autonomic features**	Pathology in posterior fossa, pituitary region, or cavernous sinus; Tolosa-Hunt syndrome; ophthalmic causes	Red
13	**Post-traumatic onset headache**	Acute and chronic post-traumatic headache; subdural haematoma and other headache attributed to vascular disorders	Red
14	**Pathology of the immune system such as HIV**	Opportunistic infections	Red
15	**Painkiller overuse or new drug at onset of headache**	Medication overuse headache; drug incompatibility	Red

*ICHD-3b: International Classification of Headache Disorders 3b

Table 1

Past or current medical conditions of immunocompromised state, pregnancy, malignancy or recent head trauma can alert the physician to a possible secondary headache.

Headache characteristics such as those below are also suggestive of a potential intracranial pathology that may need to be further evaluated in a tertiary setting:

- Early morning headaches
- Presence of blurring of vision or focal neurological symptoms
- Headache that changes with posture
- Headache that worsens with the Valsalva manoeuvre

Diagnostic criteria

Based on the International Classification of Headache Disorders 3 (ICHD-3),[6] migraines last about four to 72 hours and are characterised by a unilateral, throbbing-quality headache that is worsened with physical activity, and of moderate to severe intensity.

These may be associated with nausea and/or sensitivity to light, sound, smell or movements.

The criteria require two attacks for migraines with aura, and at least five attacks for migraines without aura.

It is useful to elicit the above characteristic features and associated symptoms during history taking, to assist in the diagnosis of migraines.

Migraine triggers

In addition to the diagnostic criteria, headaches with a clear trigger such as alcoholic beverages, menstruation, sleep deprivation, stress, missed meals, dehydration and other commonly known migraine triggers ***(Table 2)*** also give clues to the diagnosis of migraines.[7]

Common migraine triggers[7]	
Migraine trigger	**Percentage (%)**
Stress	79.7
Hormones	65.1
Missing a meal / hunger / fasting	57.3
Weather change	53.2
Sleep disturbance	49.8
Perfume or odour	43.7
Neck pain	38.4
Light	38.1
Alcohol	37.8
Smoking	35.7
Sleeping late	32.0
Heat	30.3
Food	26.9
Exercise	22.1
Sexual activity	5.1

Table 2

Family history

Evaluating a patient's family history for headache conditions also allows one to see the presence of familial aggregation and the patient's genetic predisposition to migraines.

Migraines are commonly associated in first-degree relatives[8], with one study showing that a strong family history predisposes an individual to a lower age at onset, higher number of medication days and presence of migraine with aura.[9]

Medication history

A careful medication history helps to evaluate for drugs that can potentially provoke a headache attack. Documenting the type and frequency of analgesia use helps to rule out the possibility of medication overuse headaches, which are often seen in patients with chronic migraine.[10]

Medication overuse headaches, by the diagnostic criteria of ICHD-3, are a secondary headache disorder that happens in patients with a pre-existing primary headache disorder, as a result of regular overuse of acute headache medications for more than three months.[6]

Hence it is important to identify this group of patients early, to allow for appropriate treatment.

TYPES OF MIGRAINE

By the ICHD-3 criteria, migraines can be subdivided into **episodic migraines** and **chronic migraines**.

- Patients with **episodic migraines** experience migraines at a frequency of four to 14 days a month, over a period of at least three months.
- Patients with **chronic migraines** have headache days occurring at more than 15 days a month over a period of three months.

Chronic migraines represent a more severe form of migraine, with neurophysiology studies and functional neuroimaging showing changes in the brain that are different from that of patients with episodic migraines or patients with no migraines.[11]

As such, treatment differs between patients with episodic migraines and patients with chronic migraines.

MANAGING MIGRAINES IN PRIMARY CARE

The treatment of migraines is largely divided into **non-pharmacological** and **pharmacological management**.

1. Non-pharmacological management

For the non-pharmacological approach, **trigger identification** and **lifestyle modification** play significant roles in limiting the progression and chronification of migraines.

A **SMART lifestyle** ***(Table 3)*** is advocated for migraine patients with low-frequency episodic migraines (four to nine headache days per month) or infrequent migraines (less than four headache days per month).

A healthy lifestyle with avoidance of triggers allows for less frequent attacks of headache, hence minimising the risk of chronification of migraines into that of higher frequency migraines or chronic migraines.

SMART LIFESTYLE RECOMMENDATIONS				
SLEEP	**MEALS**	**ACTIVITY**	**RELAXATION**	**TRIGGERS**
Fixed sleeping timing; recommended duration of 7-9 hours of good quality sleep	Eating meals punctually, not skipping meals, and staying well-hydrated	Staying physically active – the Health Promotion Board recommends 150 minutes of moderate-intensity physical activity per week[14]	Mindfulness practices for stress reduction	Identification and avoidance of triggers

Table 3 SMART lifestyle for migraine patients

2. Pharmacological management

The pharmacological approach comprises:

- **Acute symptomatic treatment** for abortion of migraine attacks
- **Migraine preventive therapy**, which is usually used for patients with high-frequency episodic migraines or chronic migraines to decrease the headache frequency and intensity over a period of time

Acute symptomatic treatment

Adequate abortive treatment is needed to ensure a good quality of life for the patient.

Physicians can consider acute pain management of migraines using either a step-care approach or a stratified-care approach.

- In a **step-care approach**, patients are given first-line abortive treatments such as acetaminophen before escalating to nonsteroidal anti-inflammatory drugs (NSAIDs) or triptans should the first-line medications fail.
- For a **stratified-care regimen**, physicians can use the Headache Impact Test-6 (HIT-6) or Migraine Disability Assessment (MIDAS) questionnaire[12] to assess severity and disability from migraine attacks, and thereafter be better able to predict analgesia needs.

  A low MIDAS or HIT-6 score indicates that the patient is less likely to require escalation of treatment and can be started on acetaminophen or NSAIDs first. Patients with a higher score may respond better to migraine-specific treatments such as triptans as first-line therapy.[13]

Migraine preventive therapy

The choice to start preventive treatment requires proper discussion between the physician and patient. While it is common to start preventive treatment for patients with high-frequency episodic migraines or chronic migraines, preventive treatment can also be considered for low-frequency episodic migraine patients if each attack is severe, prolonged and debilitating.

The discussion needs to be based on the benefit of preventive treatment versus the harm from its side effects. The choice of preventive is largely dependent on the patient's comorbidities, ease of administration and side effects.

Table 4 highlights some common migraine preventives used in tertiary centres, the starting doses and common adverse effects.

Commonly used migraine preventives				
Drug	**Starting dose**	**Relative indications / comorbidities to consider**	**Adverse effects**	**Contraindications to consider**
Propranolol	10 mg BD	Hypertension	Lethargy, nausea, postural giddiness	Asthma, depression, congestive cardiac failure
Amitriptyline/ Nortriptyline	5-10 mg ON / 10 mg ON	Insomnia, depression, anxiety, pain disorders	Drowsiness, dry mouth, weight gain	Urinary retention, heart blocks
Flunarizine	5 mg ON	Hypertension	Drowsiness, parkinsonism, weight gain, depression	Parkinson disease, depression
Topiramate	25 mg ON	Epilepsy, obesity	Paresthesia, altered taste, cognitive complaints	Renal stones, glaucoma
Valproate	200-500 mg BD	Epilepsy, depression	Weight gain, tremors, lethargy	Liver disease, thrombocytopaenia

Table 4 ON: once every night; BD: twice daily

Background

Ms Tan is a 32-year-old Chinese female holding a managerial role in a large company. She has no significant past medical history.

Symptoms, history taking and diagnosis

She has had headaches since her school days, but reported noticing a recent increase in headache frequency for the past six months.

Her headache is characterised as throbbing in nature, with sensitivity to light and sound, as well as nausea. Her reported visual analogue scale (VAS) pain score was seven to eight out of ten.

Out of the four average attacks she has per month, about half of them are severe and debilitating enough to stop her from working, and can last up to two days.

She also noticed a trend of headache attacks about one to two days prior to her menstruation, and those are usually more severe and prolonged headache attacks. She has no other red flags noted on history.

Based on the ICHD-3 criteria, she fulfils the diagnosis of **low-frequency, episodic migraines**.

Initial management

Using the **stratified-care approach**, sumatriptan 50 mg was recommended for her as **abortive treatment**.

Although her current headache frequency was about four days per month, the attacks were severe and prolonged, hence there was a **discussion of starting preventive treatment** with the patient. However, the patient opted not to start preventive treatment yet.

Patient education was provided to the patient to identify triggers and modify her lifestyle as much as possible, despite her busy work schedule.

Follow-up and management reviews

She was reviewed in the clinic again after six months. During the next clinic visit, she reported an increase in migraine frequency to four to five days a week, with frequent usage of sumatriptan.

The analgesia had helped to abort the attacks, but her headache would recur as soon as the analgesia effect wore off. As such, she was taking sumatriptan about 20 days a month to cope with her headache attacks.

Migraine preventive medication was strongly advised in the clinic consult due to worsening migraine frequency and the concern of medication overuse headaches. She was started on topiramate 25 mg once every night due to her comorbidity of obesity.

She was also advised to concurrently cut down her analgesia usage due to diagnosis of medication overuse headaches in her situation.

In the next review four months later, her use of analgesics and her frequency of migraine reduced dramatically.

TREATMENT OPTIONS BY SPECIALISTS

Tertiary hospitals have a **larger range of oral preventive treatments** available in formulary, including preventives in the category of antidepressants, antihypertensives and antiepileptics.

In addition, **Botox** is also available for the treatment of chronic migraines.

The Health Sciences Authority (HSA) has in recent years approved the use of four **calcitonin gene-related peptide (CGRP) monoclonal antibodies** – erenumab, fremanezumab, galcanezumab and eptinezumab – in preventive treatment of migraines. Most of these CGRP monoclonal antibodies are available in tertiary hospitals.

These antibodies are specifically designed for the treatment of migraines, and hence are more targeted with less side effects and offer a non-oral route of administration.

In addition, at the time of writing, rimegepant, which is an oral CGRP small molecule antagonist, is also seeking approval from HSA for use in acute and preventive treatment of migraines.

THE GP'S ROLE IN TREATMENT

Evaluation

GPs can evaluate a patient's migraine severity based on migraine questionnaires such as HIT-6 and/or MIDAS to assess its impact on the patients' life.

Patient education and initial treatment

From there, we advocate patient education and a discussion with the patient on the need for migraine prophylaxis. Abortive treatment can be given to patients in a stratified-care regimen to allow for more tailored treatment.

If a migraine preventive is initiated, it should be kept on a minimum duration of four to six months before tapering or stopping, with review in between to assess for efficacy and allow for titration of doses.

Referral and shared care

If the patient fails to respond to the first-line preventives in ***Table 4***, referral to a tertiary centre can be considered for further evaluation and treatment.

A shared care approach between the patient's primary care physician and tertiary specialists can be considered during the period that the patient is on migraine preventives. Eventually, when the patient's migraine is well controlled, the GP can be the patient's primary healthcare provider to titrate preventives as and when needed during a patient's lifetime, in the event of relapses.

WHEN TO REFER TO A SPECIALIST

Referral to a tertiary institution can be considered **when patients present red flags of headaches** and **an underlying secondary headache disorder is suspected**.

Most primary headaches can be managed at a primary care level with initiation of appropriate acute symptomatic treatment, as well as first-line migraine preventives.

However, **migraines that are progressing and not responding to preventive medications** that are of adequate doses and duration can be considered for tertiary institution referral.

Lastly, **patients with medication overuse headaches** are a special group of patients that requires patient education, analgesic withdrawal and concurrent initiation of preventive therapy. If withdrawal of medication is difficult and preventive treatment is inadequate, referral to a tertiary institution can also be considered.

MIGRAINE MANAGEMENT AT THE NATIONAL NEUROSCIENCE INSTITUTE

The National Neuroscience Institute (NNI) is the national centre for treatment of neurological diseases in Singapore, with its two main campuses located in Singapore General Hospital and Tan Tock Seng Hospital, and outpatient clinics in Changi General Hospital, Sengkang General Hospital and Khoo Teck Puat Hospital.

NNI sees at least 2,500 outpatient referrals for headaches a year, and is equipped to handle primary and secondary headaches as well emergency headache disorders. With expertise in neuroradiology and neurosurgery, NNI provides multidisciplinary management for our patients who require complex care.

Hotline: 6326 6060 (SGH Campus)
6330 6363 (TTSH Campus)
Email: gpnetwork@sgh.com.sg
appointments@nni.com.sg

TAKE PART IN OUR
GP SURVEY

NNI is studying the burden and care of migraine in Singapore.

We would like to invite practising GPs in Singapore to take part in an anonymous online survey to understand current treatment practices in the management of migraine.

Please scan the QR code to participate. A one-page summary on migraine management is included at the end of the survey for your use.

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3. Jeyagurunathan, Anitha, Edimansyah Abdin, Janhavi A. Vaingankar, Boon Y. Chua, Saleha Shafie, Shi H. S. Chang, Lyn James, et al. “Prevalence and Comorbidity of Migraine Headache: Results from the Singapore Mental Health Study 2016.” Social Psychiatry and Psychiatric Epidemiology 55, no. 1 (2019;2020;): 33–43.
4. Victor TW, Hu X, Campbell JC, Buse DC, Lipton RB. Migraine prevalence by age and sex in the United States: a life-span study. Cephalalgia. 2010 Sep;30(9):1065-72. doi: 10.1177/0333102409355601. Epub 2010 Mar 12. PMID: 20713557.
5. Red and orange flags for secondary headaches in clinical practice: SNNOOP10 list - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/SNNOOP10-list-of-red-and-orange-flags_tbl1_329939433 [accessed 16 Sep, 2022]

To view all references, please refer to the online version of Defining Med by scanning the QR code on the cover page.

Dr Zhao Yi Jing
Consultant, Department of Neurology,
National Neuroscience Institute;
Department of Neurology, Singapore General Hospital;
NNI @ CGH, Changi General Hospital

Dr Zhao Yi Jing is a Consultant at the Department of Neurology, National Neuroscience Institute (Singapore General Hospital Campus) who specialises in the assessment, treatment and prevention of headaches and migraines in adult and adolescence.

Dr Zhao is the Singapore representative principal investigator for several international and local clinical trials involving novel therapy for headaches. She also sits on several medical advisory boards for new migraine treatments in Singapore. She is the treasurer for the Headache Society of Singapore, and a member of the Asian Regional Consortium for Headache.

GP Appointment Hotline: **6330 6363**
GPs can scan the QR code for more information about the department.

Delivering Holistic, Integrated Care in the War Against Diabetes

The SingHealth Duke-NUS Diabetes Centre

Diabetes in Singapore is a growing concern. It can deeply affect your quality of life if not well-controlled, and cause complications. The Ministry of Health has declared 'war on diabetes' and has committed to help Singaporeans live free from diabetes, as well as help those with the condition control it better. SingHealth fully supports this.

ABOUT THE DIABETES CENTRE

The SingHealth Duke-NUS Diabetes Centre aims to deliver better care and outcomes for our patients by adopting a new, transformational model of care.

We bring together different specialists and allied health professionals across SingHealth to organise care around our patients and their needs. This integrated model of care enables us to set new standards for diabetes-related patient care, education and research.

The Centre was formed in 2015 to oversee and coordinate the delivery of diabetes care within the SingHealth Hospitals and National Specialty Centres, including Singapore General Hospital, Changi General Hospital, Sengkang General Hospital, KK Women's and Children's Hospital, Singapore National Eye Centre and SingHealth Polyclinics. It forms a unique platform for the collaborative work of a multidisciplinary team of healthcare professionals.

MEETING PATIENTS' NEEDS THROUGHOUT THE DIABETES CONTINUUM OF CARE

The Centre aims to meet the needs of our patients throughout the diabetes continuum of care – from prediabetes to late-stage diabetes with complications.

We are dedicated to achieving the best outcomes for our patients by combining clinical expertise with the latest advances in treatment, research and education.

Our team of primary care physicians and specialists are experienced in the assessment and management of diabetes and its associated complications. They are supported by a strong and dedicated team of diabetes nurse educators, dietitians, pharmacists, podiatrists, medical social workers and psychologists.

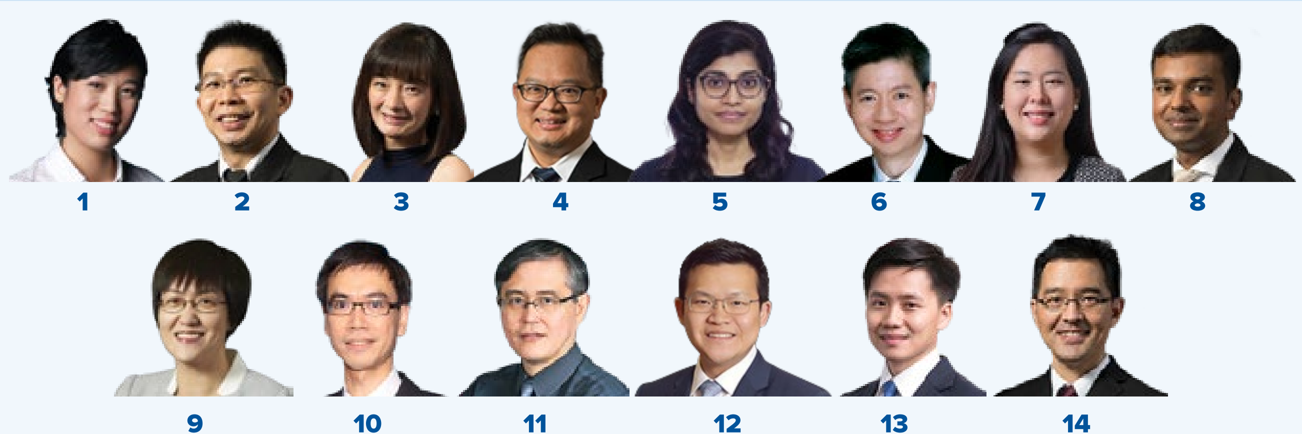
Our multidisciplinary approach ensures that people with diabetes get comprehensive medical care, patient education, and aggressive prevention and management of complications.

For GP referrals, please contact the SingHealth Duke-NUS Diabetes Centre:

Singapore General Hospital	Changi General Hospital	Sengkang General Hospital	KK Women's and Children's Hospital	Singapore National Eye Centre
6326 6060	6788 3003	6930 6000	6692 2984	6322 9399

Website: www.singhealth.com.sg/diabetescentre

Our Executive Committee



Head

1. **Assoc Prof Goh Su-Yen**
   Senior Consultant,
   3D Design and Printing Centre (3DPC);
   Dept of Endocrinology, SGH

Director, Research

2. **Dr Tan Hong Chang**
   Senior Consultant,
   Dept of Endocrinology, SGH

Director, Education

3. **Dr Tan Su-Lyn Daphne**
   Senior Consultant,
   Dept of Endocrinology, SGH

Co-Leads, Primary (Diabetes) Care

4. **Dr Tan Choon Seng Gilbert**
   Director,
   Regional Clinical Services (South East), SHP

5. **Dr Brindha Balakrishnan**
   Family Physician, SHP

6. **Dr Shum Jin-Wen Eugene**
   Director, Community Partnerships,
   SingHealth Office of Regional Health

Co-Leads, Specialist (Diabetes) Care

7. **Dr Loh Wann Jia**
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   Dept of Endocrinology, CGH

8. **Dr Rama Chandran Suresh**
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   Dept of Endocrinology, SGH

9. **Dr Koh Fang Yung Angela**
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   Dept of General Medicine;

   Senior Consultant,
   Dept of Endocrinology, SKH

10. **Clin Assoc Prof Lek Ngee**
    Senior Consultant,
    Endocrinology Service, KKH

11. **Prof Tan Kok Hian**
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    Dept of Maternal Fetal Medicine;
    Perinatal Audit & Epidemiology Unit;

    Co-Director,
    Antenatal Diagnostic Centre/ Antenatal Monitoring Clinic, KKH

Co-Leads, Diabetic Complications

12. **Assoc Prof Tan Siew Wei Gavin**
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    Surgical Retina Dept;
    Cataract & Comprehensive Ophthalmology Dept;

    Clinical Director,
    SNEC Ocular Reading Centre (SORC);
    SIDRP / Polyclinic;

    Co-Head,
    Ocular Imaging Dept, SNEC

13. **Dr Kwek Jia Liang**
    Senior Consultant,
    Dept of Renal Medicine, SGH

14. **Dr Chee Hoe Kit**
    Senior Consultant,
    Periodontics, Dept of Restorative Dentistry,
    NDCS

A Unique Clinician-Led Lactational Practice in Tertiary Care

Providing Holistic Care for the Breastfeeding Mother and Baby

Breastfeeding is universally recognised as the normative and preferred method of infant feeding, and has important short- and long- term benefits for both infant and mother.

For many women, difficulties in breastfeeding such as perceived low supply and development of breast complications result in early termination of breastfeeding before the recommended period of time. However, with the right advice, support and treatment, most of these difficulties can be overcome, and breastfeeding can be successfully sustained for longer periods.

FIRST MULTIDISCIPLINARY CLINICIAN-LED BREASTFEEDING PRACTICE IN A TERTIARY CENTRE IN SINGAPORE

ABOUT THE CLINIC

The **Breastfeeding Clinic @ OGC** (Obstetrics & Gynaecology Centre) in Singapore General Hospital was established in February 2022 to provide an outpatient lactational medicine specialist service led by a breast surgeon and an obstetrician trained in lactational care.

This is the first, and currently the only, **clinician-led lactational practice in a tertiary centre** in Singapore. The team providing individualised and holistic care for our patients comprises:

- Clinicians
- Lactation nurses
- Neonatologists
- Neonatal speech therapists

EVIDENCE-BASED SUPPORT

Our clinic strives to improve patient care by providing comprehensive, holistic and evidence-based support for our breastfeeding dyads – both mother and baby.

In building our service, we strive to increase awareness of lactational medicine as a specialty service within both the patient and medical community.

QUALITY IMPROVEMENT, EDUCATION AND RESEARCH

In addition to the clinical front, our team is active in the areas of quality improvement, education and research.

With the support of the SingHealth Duke-NUS Academic Medical Centre grant, the clinic conducts **educational workshops** for clinicians and nurses such as residents from the various specialties involved in the care of mother and baby.

We are looking towards establishing **educational resources** and **collaborative forums** for our specialist and primary care clinicians as well as patients to raise awareness of optimal breastfeeding practices, basic knowledge of infant nutrition as well as recognition and management of early breastfeeding complications.

Our Care Team

Dr Julie Liana Hamzah
Consultant,
Dept of Breast Surgery

Dr Yang Liying
Consultant,
Dept of Obstetrics & Gynaecology

Lactation Nurses

Ms Liow Peck Hoon
Nurse Clinician,
Obstetrics & Gynaecology Ward

Ms Tan Ah Biah
Assistant Nurse Clinician,
Obstetrics & Gynaecology Centre

Ms Bebe Zaiton Bte Abdullah
Senior Staff Nurse,
Obstetrics & Gynaecology Centre

Our Services

Referral to lactation nurses

- Assessment of the breastfeeding dyad, including establishing optimal latch and milk expression techniques
- Management of common breastfeeding issues such as low milk supply, oversupply and blocked ducts
- Breastfeeding support
- Breastfeeding education

Referral to lactation-trained clinicians

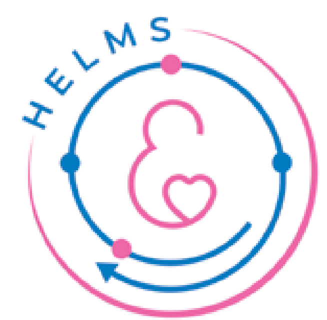
- Antenatal and postpartum consultations for breastfeeding in patients (mother and/or baby with high-risk medical and surgical conditions)
- Early recognition and medical management of breastfeeding complications (e.g., blocked ducts, mastitis, abscesses and inadequate infant intake)
- Minimally invasive techniques for managing early complications such as ultrasound-guided fine-needle aspiration
- Surgical management of late complications such as the incision and drainage of breast abscesses
- Breastfeeding education

HOW GPs CAN REFER

To refer a patient, please contact the SGH GP Network at:

Tel: **6326 6060**
Email: **gpnetwork@sgh.com.sg**

Supporting Your Patients for a Healthier Pregnancy



The HELMS Programme Invites GPs to Refer Patients for Research Study

AN INTERVENTIONAL STUDY TO OPTIMISE CARE THROUGHOUT THE PRECONCEPTION, PREGNANCY AND POSTPARTUM JOURNEY

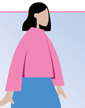
The **Healthy Early Life Moments in Singapore (HELMS) programme** by KK Women's and Children's Hospital (KKH) is a research study which aims to optimise the metabolic health and mental wellness of women, to:

1. Improve fertility
2. Lower the risk of premature delivery and developing hypertension and diabetes
3. Promote the healthy growth of the child

HELMS supports women who are planning to conceive, aged between 21 and 40 years, and with a BMI of 25 to 40 kg/m², through an integrated maternal-child care plan from preconception, throughout pregnancy and for the first 18 months after delivery.

THE HELMS PROGRAMME AT A GLANCE

Pre-pregnancy care plan



1. Weight monitoring
2. Physical examinations & blood tests
3. Health nutrition promotion
4. Supplementation
5. Active lifestyle promotion
6. Mental health support
7. Sexual health assessment

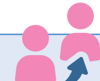
Pregnancy care plan

8. Continue plans 1-6
9. Prenancy symptoms management

Mother & child care plan

10. Continue plans 1-6
11. Child health examination
12. Child growth assessment
13. Breastfeeding support
14. Child nutrition milestone
15. Child eating habit formation
16. Birth recovery & readiness

HOW GPs CAN REFER PATIENTS FOR THE STUDY



We invite general practitioners to refer interested patients to join HELMS.

GPs can **scan the QR code** or **contact the study team** to find out more about the programme and the eligibility criteria.

Tel: 8044 4556 (Monday to Friday, 9am to 5pm)
Email: helms@kkh.com.sg

HELMS is supported by the KKH Health Services Model of Care Transformation Fund and Lien Foundation.

Specialist Promotions & Appointments

Appointments: 6326 6060 | **Email: gpnetwork@sgh.com.sg**

PROMOTIONS – SENIOR CONSULTANTS

Dr Negar Asadi
Senior Consultant
Dept
Anaesthesiology

Dr Yeo Yi Wei
Senior Consultant
Dept
Dermatology

Dr Chan Jing Jing
Senior Consultant
Dept
Emergency Medicine

Dr Faraz Zarisfi
Senior Consultant
Dept
Emergency Medicine

Dr Shen Yuzeng
Senior Consultant
Dept
Emergency Medicine

Dr Lim Weiying
Senior Consultant
Dept
Endocrinology

Dr Lim Yi Ying Adoree
Senior Consultant
Dept
Endocrinology

Assoc Prof Low Lian Leng
Senior Consultant
Dept
Family Medicine & Continuing Care

Dr Chen Yunxin
Senior Consultant
Dept
Haematology

Dr Krithikaa d/o Nadarajan
Senior Consultant
Dept
Internal Medicine

Dr Khor Yiu Ming
Senior Consultant
Dept
Nuclear Medicine & Molecular Imaging

Dr Henry Soeharno
Senior Consultant
Dept
Orthopaedic Surgery

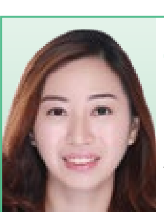
Dr Kwek Jia Liang
Senior Consultant
Dept
Renal Medicine

Dr Mok Yanjia Irene
Senior Consultant
Dept
Renal Medicine

Dr Teo Su Hooi
Senior Consultant
Dept
Renal Medicine

Dr Hong Fong Yi
Senior Consultant
Dept
Rheumatology & Immunology

PROMOTIONS – CONSULTANTS



Dr Steffi Chan Kang Ting
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Dept
Anaesthesiology

Dr Chen Jinghui
Consultant
Dept
Anaesthesiology

Dr Margaret Chong Yanfong
Consultant
Dept
Anaesthesiology

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Dr Ma Wai Wai Zaw
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Anaesthesiology

Dr Quak Su Min
Consultant
Dept
Anaesthesiology

Dr Tan Zihui
Consultant
Dept
Anaesthesiology

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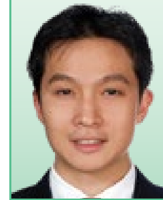
Consultant
Dept
Anatomical Pathology

Dr Lee Shuhui, Melissa
Consultant
Dept
Diagnostic Radiology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Consultant
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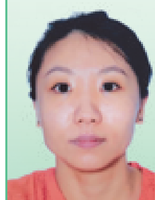
Dr Tay Wei Ming, Ian
Consultant
Dept
Diagnostic Radiology

Dr Jeevan Raaj S/O S. Thangayah
Consultant
Dept
Emergency Medicine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Emergency Medicine

Dr Lim Chong Teik
Consultant
Dept
Gastroenterology & Hepatology

Dr Lim Miao Shan
Consultant
Dept
Gastroenterology & Hepatology

Dr Tan Si Yun, Melinda
Consultant
Dept
Haematology

Dr Chung Sze Ryn
Consultant
Dept
Hand & Reconstructive Microsurgery

Dr Szymon Andrzej Mikulski
Consultant
Dept
Head & Neck Surgery

Dr Li Zongxian
Consultant
Dept
Orthopaedic Surgery

Dr Lim Yee Gen
Consultant
Dept
Orthopaedic Surgery

Dr Tang Zhi'En, Joyce
Consultant
Dept
Otorhinolaryngology - Head & Neck Surgery

Dr Xu Shuhui
Consultant
Dept
Otorhinolaryngology - Head & Neck Surgery

Dr Lim Zhen Wei
Consultant
Dept
Pain Medicine

Dr Cindy Goh Siaw Lin
Consultant
Dept
Plastic, Reconstructive & Aesthetic Surgery

Dr Hui Li Yu, Cheryl
Consultant
Dept
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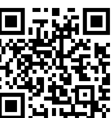


PROMOTIONS – CONSULTANTS

Dr Eng Yong Tai, Leonard
Consultant
Dept
Psychiatry

Dr Tan Pei Ling
Consultant
Dept
Rehabilitation Medicine

Dr Liew Ian Tatt
Consultant
Dept
Renal Medicine

Dr Lim Michelle Leanne
Consultant
Dept
Surgical Intensive Care

Dr Tan Sheng Ming, Alexander
Consultant
Dept
Vascular & Interventional Radiology

Dr Wang Qi Wei, Mark
Consultant
Dept
Vascular & Interventional Radiology

APPOINTMENT – SENIOR CONSULTANT

Dr Anupama Roy Chowdhury
Senior Consultant
Dept
Geriatric Medicine

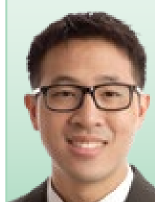
APPOINTMENT – CONSULTANT

Dr Cheong Wei Kiong
Consultant
Dept
Diagnostic Radiology

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Rahalkar Kshitij
Associate Consultant
Dept
Emergency Medicine

Dr Teo Zhongyang
Associate Consultant
Dept
Emergency Medicine



Dr Chan Tyson Kin-Chung
Associate Consultant
Dept
Occupational & Environmental Medicine

Dr Vincent Wong Khung Hoon
Associate Consultant
Dept
Psychiatry

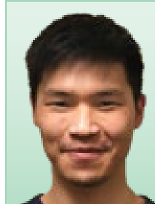
Dr Young Si Ling
Associate Consultant
Dept
Respiratory & Critical Care Medicine

Dr Lim Ee Jean
Associate Consultant
Dept
Urology

Specialist Promotions & Appointments

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Lu Yadong
Associate Consultant
Dept
Urology



Dr Heng Tseng Hui
Associate Consultant
Dept
Vascular & Interventional Radiology

Appointments: 6788 3003 | **Email:** cgh.com.sg

NEW APPOINTMENTS

Adj Assoc Prof Yeo Kuei Siong Andy
Chief & Consultant
Dept
Orthopaedic Surgery

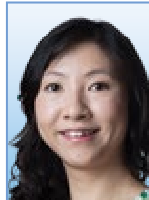
Dr Teo Jin Kiat
Chief & Senior Consultant
Dept
Urology

Dr Tan Chien Sheng
Head & Senior Consultant

Division of Anatomical Pathology

PROMOTIONS – SENIOR CONSULTANTS

Dr Leong Bao Yu, Geraldine
Senior Consultant
Dept
Accident & Emergency



Dr Ng Hui Xin Marilyn
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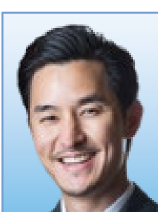
Dept
Anaesthesia & Surgical Intensive Care

Dr Chow Weien
Senior Consultant
Dept
Cardiology

Dr Mok Vanessa Wai Ling
Senior Consultant
Dept
Psychological Medicine



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PROMOTIONS – CONSULTANTS

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Consultant
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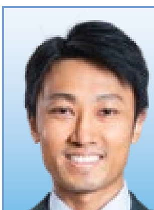
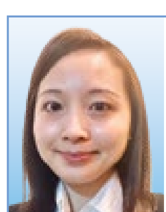
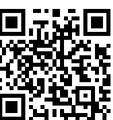
Diagnostic Radiology



Dr Liu Jingkai Joel
Consultant
Dept
Diagnostic Radiology



Dr Yew Jielin
Consultant
Dept
Endocrinology



PROMOTIONS – CONSULTANTS

Dr Tan Chin Kimg
Consultant
Dept
Gastroenterology & Hepatology

Dr Yee Xianguang, Joel
Consultant
Dept
Internal Medicine

Dr Boo Ho Chin
Consultant
Dept
Orthopaedic Surgery

Dr Chew Zhihong
Consultant
Dept
Orthopaedic Surgery

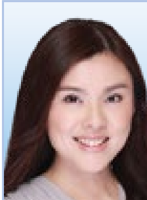
Dr Roche Tze-Lee Glen Cedric
Consultant
Dept
Psychological Medicine

Dr Hui Li Yan Sandra
Consultant
Dept
Respiratory & Critical Care Medicine

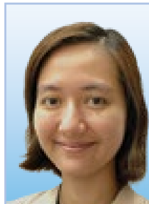
Dr See Huimin, Amanda
Consultant
Dept
Surgery

APPOINTMENTS – ASSOCIATE CONSULTANTS

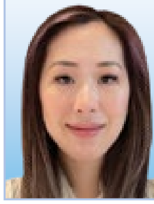
Dr Muthuwadura Waruni Subashini De Silva
Associate Consultant
Dept
Accident & Emergency



Dr Ang Wan Chen
Associate Consultant
Dept
Internal Medicine

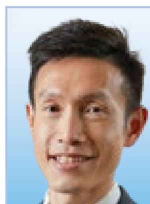


Dr Siti Mastura Binte Rahim
Associate Consultant
Dept
Orthopaedic Surgery



Dr Leong Jing Yun
Associate Consultant
Dept
Psychological Medicine

Dr Rayan Mohamed A M Alsuwaigh
Associate Consultant
Dept
Respiratory & Critical Care Medicine



Dr Li Zhongyi, Joshua
Associate Consultant
Dept
Sport & Exercise Medicine

Dr Ho Wei Guang Christopher
Associate Consultant
Dept
Surgery

Dr Sim Kher Ru, Sarah
Associate Consultant
Dept
Surgery

Specialist Promotions & Appointments

Appointments: 6930 6000 | **Email:** appointments@skh.com.sg

PROMOTIONS – SENIOR CONSULTANTS

Dr Moy Wai Lun
Senior Consultant
Dept
Internal Medicine

Dr Tan Woon Woon Pearlie
Senior Consultant

Plastics & Reconstructive and Aesthetic Surgery Services

Assoc Prof Rawtaer Iris
Senior Consultant
Dept
Psychiatry

Dr Sandeep Halagatti Venkatesh
Senior Consultant
Dept
Radiology

Dr Tarun Mohan Mirpuri
Senior Consultant
Dept
Radiology

Dr Foo Fung Joon
Senior Consultant
Dept
Surgery

Dr Ng Jia Lin
Senior Consultant
Dept
Surgery

Dr Tan Jianhong Winson
Senior Consultant
Dept
Surgery

PROMOTIONS – CONSULTANTS

Dr Ang Hui En, Hannah
Consultant
Dept
Emergency Medicine

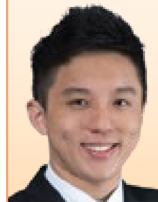
Dr Lam Sze Jia
Consultant
Dept
Emergency Medicine

Dr Lum Huey Ming Johnathan
Consultant, Gastroenterology
Dept
General Medicine

Dr Loo Khang Ning
Consultant
Dept
Internal Medicine

Dr Wong Hai Liang Marc
Consultant
Dept
Internal Medicine

Dr Koh Minghe, Moses
Consultant, Rehabilitation Medicine
Dept
General Medicine

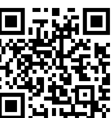


Dr Lim Wei-An Joel
Consultant
Dept
Orthopaedic Surgery

Dr Wong Wei Jiat, Allen
Consultant

Plastics & Reconstructive and Aesthetic Surgery Services

Dr Guo Weiwen
Consultant
Dept
Renal Medicine



PROMOTIONS – CONSULTANTS

Dr Lee Pei Shan
Consultant
Dept
Renal Medicine

Dr Chan Kong Ngai Thomas
Consultant
Dept
Urology

APPOINTMENT – CONSULTANT

Dr Ong Chong Yau
Consultant
Dept
Transitional Care and Community Medicine

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Yan Zhi Hao
Associate Consultant, Gastroenterology
Dept
General Medicine

Dr Cheow Xunqi
Associate Consultant
Dept
Orthopaedic Surgery

Dr Neo Ghim Hoe
Associate Consultant
Dept
Orthopaedic Surgery

Dr Kalpana Vijaykumar
Associate Consultant
Dept
Surgery

Dr Lim Tze Ying Benjamin
Associate Consultant
Dept
Urology

KK Women's and Children's Hospital
SingHealth

Appointments: 6692 2984 | **Email:** centralappt@kkh.com.sg

NEW APPOINTMENTS

Dr Wang Junjie
Head & Consultant
Dept
Gynaecological Oncology

Prof Teoh Tiong Ghee
Director, Maternal & Child Global Health & Care Transformation; Senior Consultant

Division of Obstetrics and Gynaecology

Specialist Promotions & Appointments

PROMOTIONS – SENIOR CONSULTANTS

Dr Chong Kok Wee
Senior Consultant

Allergy Service

Dr Chan Meng Fai
Senior Consultant

General Paediatrics Service

Dr Lee Meijuan Dawn
Senior Consultant

General Paediatrics Service

Dr Odattil Geetha
Senior Consultant
Dept
Neonatology

Dr Kang Hean Leng
Senior Consultant
Dept
Obstetrics and Gynaecology

Dr Lee York Tien
Senior Consultant
Dept
Paediatric Surgery

Dr Singaraselvan Nagarajan
Senior Consultant
Dept
Women's Anaesthesia

PROMOTIONS – CONSULTANTS

Dr Tan Sher Kit, Juliet
Consultant

Adolescent Medicine Service

Dr Tan Liling, Lynette
Consultant

Allergy Service

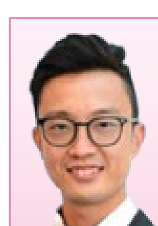
Dr Ang Siok Hoon (Hong Shuwen)
Consultant
Dept
Emergency Medicine

Dr Charanya Rajan
Consultant

Gastroenterology, Hepatology and Nutrition Service

Dr Cheah Sue Mei
Consultant

General Paediatrics Service



Dr Chow Wen Hann
Consultant

General Paediatrics Service

Dr Raymond Reinaldo Tanugroho
Consultant

General Paediatrics Service

Dr Tan Hui Yin Jessica
Consultant

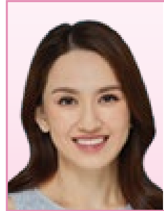
General Paediatrics Service

Dr Fong Wen Yan, Nikki
Consultant

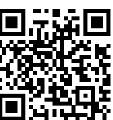
Genetics Service

Dr Ng Zheng Yuan
Consultant
Dept
Gynaecological Oncology

Dr Ng Wei Di (Huang Weidi)
Consultant
Dept
Neonatology



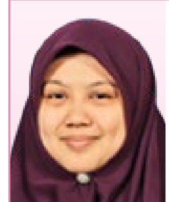
Dr Chua Hui Kiang, Angeline
Consultant
Dept
Obstetrics and Gynaecology



PROMOTIONS – CONSULTANTS

Dr Chuah Theng Theng
Consultant
Dept
Obstetrics and Gynaecology

Dr Yeo Mei-E Samantha Rachel
Consultant
Dept
Obstetrics and Gynaecology



Dr Siti Nur Hanim Binte Buang
Consultant

Paediatric Palliative Service

Dr Hong Lin Feng
Consultant
Dept
Psychological Medicine

Dr Wong Ker Yi
Consultant
Dept
Reproductive Medicine

Dr Tan Hon Sen (Chen Fengcheng)
Consultant
Dept
Women's Anaesthesia

APPOINTMENT – SENIOR CONSULTANT

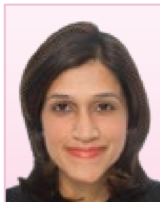
Prof Teoh Tiong Ghee
Director, Maternal & Child Global Health & Care Transformation; Senior Consultant

Division of Obstetrics and Gynaecology

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Lynn Chua Ting Ling
Associate Consultant
Dept
Dermatology

Dr Goh Mei Ching
Associate Consultant
Dept
Emergency Medicine



Dr Anuradha Pandey d/o Rabindra Nath Pandey
Associate Consultant
Dept
Emergency Medicine

Dr Toh Liying
Associate Consultant
Dept
Emergency Medicine

Dr Wong Ailyne Sarah
Associate Consultant

Gastroenterology, Hepatology and Nutrition Service

Dr Cher Yuqin
Associate Consultant

General Paediatrics Service

Dr Ler Yan Ling, Grace
Associate Consultant

General Paediatrics Service

Dr Samuel Lim Zhi Rui
Associate Consultant

General Paediatrics Service

Dr Noda Misa
Associate Consultant

General Paediatrics Service

Specialist Promotions & Appointments

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Thomas Adi Kurnia Susanto
Associate Consultant

General Paediatrics Service

Dr Chong Yi Xin Debbra Jayne
Associate Consultant

Haemotology/ Oncology Service

Dr Natasha Charan
Associate Consultant
Dept
Neonatology

Dr Lam Jun Liang, Derrick
Associate Consultant
Dept
Orthopaedic Surgery

Dr Davies Lucy Jennifer
Associate Consultant
Dept
Paediatric Anaesthesia

Dr Kong Yik Hang Aaron
Associate Consultant
Dept
Women's Anaesthesia

Appointments: **6436 8288** | **Email:** **gpnetwork@nccs.com.sg**

PROMOTIONS – SENIOR CONSULTANTS

Dr Tan Jing Ying Tira
Senior Consultant
Dept
Breast & Gynaecology, Division of Medical Oncology

Dr Nazir Babar
Senior Consultant

Division of Oncologic Imaging

PROMOTIONS – CONSULTANTS

Dr Poh Shuxian Sharon
Consultant
Dept
Gastrointestinal, Hepato-Pancreato-Biliary & Urology, Division of Radiation Oncology

Dr Lee Suat Ying
Consultant
Dept
Gastrointestinal & Neurology, Division of Medical Oncology

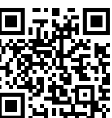
Dr Tan Ya Hwee
Consultant
Dept
Lymphoma & Sarcoma, Division of Medical Oncology

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Chua Ji Guang Bernard
Associate Consultant
Dept
Breast & Gynaecology, Division of Medical Oncology

Dr Hoe Tian Ming Joshua
Associate Consultant
Dept
Lymphoma & Sarcoma, Division of Medical Oncology

Dr Ng Yao Yi Kennedy
Associate Consultant
Dept
Gastrointestinal & Neurology, Division of Medical Oncology



APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Wong Yi Ting Evelyn
Associate Consultant
Dept
Gastrointestinal & Neurology, Division of Medical Oncology

Appointments: 6324 8798 | **Email:** appointment@ndcs.com.sg

PROMOTIONS – CONSULTANTS

Dr Ng Chee Wee, Benjamin
Consultant
Dept
Oral & Maxillofacial Surgery

Dr Sabrina Ng Livia
Consultant
Dept
Oral & Maxillofacial Surgery

APPOINTMENTS – ASSOCIATE CONSULTANTS

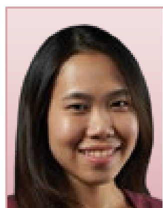
Dr Lim Si Yu
Associate Consultant
Dept
Oral & Maxillofacial Surgery

Dr Chen Shuyu Arella
Associate Consultant
Dept
Orthodontics

Dr Hor Kang Li, Jocelyn
Associate Consultant
Dept
Orthodontics

Dr Chew Huimin
Associate Consultant
Dept
Restorative Dentistry

Dr Khoo Shi-Tien
Associate Consultant
Dept
Restorative Dentistry



Dr Quek Shumin, Judith
Associate Consultant
Dept
Restorative Dentistry

Dr Tan Heng Seh, Gabriel
Associate Consultant
Dept
Restorative Dentistry

Specialist Promotions & Appointments

Appointments: 6704 2222 | **Email:** central.appt@nhcs.com.sg

PROMOTIONS – SENIOR CONSULTANTS

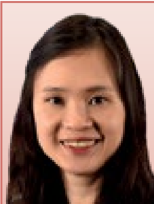
Dr Chan Lihua (Laura)
Senior Consultant
Dept
Cardiology

Dr Lohendran Baskaran
Senior Consultant
Dept
Cardiology

PROMOTIONS – CONSULTANTS

Dr Iswaree Devi D/O Balakrishnan
Consultant
Dept
Cardiology

Dr Keh Yann Shan
Consultant
Dept
Cardiology



Dr Lim Chiw Yeh
Consultant
Dept
Cardiology

Dr Yan Limin
Consultant
Dept
Cardiology

APPOINTMENTS – ASSOCIATE CONSULTANTS

Dr Zhu Ling
Associate Consultant
Dept
Cardiothoracic Surgery

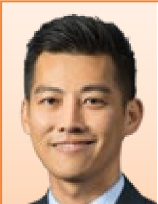
Dr Leung Jason Hongting
Associate Consultant
Dept
Cardiothoracic Surgery

National
Neuroscience Institute
SingHealth

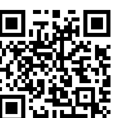
Appointments:
(SGH Campus) 6326 6060
(TTSH Campus) 6330 6363

Email:
gpnetwork@sgh.com.sg
appointments@nni.com.sg

NEW APPOINTMENT



Dr Koh Yeow Hoay
Head &
Senior Consultant
Dept
Neurology, NNI@CGH



PROMOTIONS – SENIOR CONSULTANTS

Dr Koh Yeow Hoay
Head &
Senior Consultant
Dept
Neurology, NNI@CGH

Dr Yong Kok Pin
Senior Consultant
Dept
Neurology

PROMOTIONS – CONSULTANTS

Dr Cheng Sze Yan, Newman
Consultant
Dept
Neurology

Dr Dang Jiaojiao
Consultant
Dept
Neurology

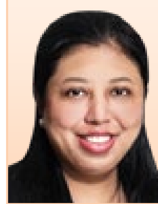
Dr Li Weishan
Consultant
Dept
Neurology

Dr Ng Gee Jin
Consultant
Dept
Neurology

Dr Shen Jia Yi
Consultant
Dept
Neurology

Dr Kee Tze Phei
Consultant
Dept
Neuroradiology

APPOINTMENT – ASSOCIATE CONSULTANT



Dr Khin Hnin Su Wai
Associate Consultant
Dept
Neurology

Appointments: 6322 9399 | **Email:** appointments@snec.com.sg

PROMOTIONS – SENIOR CONSULTANTS

Dr Chan Jin Hoe
Senior Consultant
Dept
Cataract & Comprehensive Ophthalmology
Sub-specialty
Ophthalmology

Dr Woo Jyh Haur
Senior Consultant
Dept
Cornea & External Eye Diseases
Sub-specialty
Ophthalmology

Assoc Prof Ting Shu Wei Daniel
Senior Consultant
Dept
Surgical Retina
Sub-specialty
Ophthalmology

Specialist Promotions & Appointments

PROMOTIONS – CONSULTANTS

Dr Fenner Beau James
Consultant
Dept
Medical Retina
Sub-specialty
Ophthalmology

Dr Foo Chao Ming, Reuben
Consultant
Dept
Neuro-Ophthalmology & Glaucoma
Sub-specialty
Ophthalmology

Dr Chiam Pei Yu, Nathalie
Consultant
Dept
Paediatric Ophthalmology & Strabismus
Sub-specialty
Ophthalmology

Dr Ng Wei Yan
Consultant
Dept
Paediatric Ophthalmology & Strabismus
Sub-specialty
Ophthalmology

Dr Tan Peng Yi
Consultant
Dept
Refractive Surgery
Sub-specialty
Ophthalmology

APPOINTMENT – ASSOCIATE CONSULTANT

Dr Loo Yunhua
Associate Consultant
Dept
Cataract & Comprehensive Ophthalmology
Sub-specialty
Ophthalmology

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- **RESIDENT PHYSICIANS**
- **STAFF REGISTRARS/ SERVICE REGISTRARS**

Interested applicants are to email your CV with full personal particulars, educational and professional qualifications (including housemanship details), career history, present and expected salary, names of at least two professional references, contact numbers and email address together with a non-returnable photograph.

Please email your CV to the respective institutions' email addresses/online career portals with the Reference Number DM2301.

The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of SingHealth and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible, quality healthcare.

With 42 clinical specialties, a network of 4 Hospitals, 5 National Specialty Centres, 8 Polyclinics and 3 Community Hospitals, it delivers comprehensive, multidisciplinary and integrated care.

Singapore General Hospital

Departments seeking:
Resident Physicians and Staff Registrars
- Anaesthesiology
- Breast Surgery
- Colorectal Surgery
- Diagnostic Radiology
- Emergency Medicine
- ENT- Head & Neck Surgery
- Family Medicine & Continuing Care (FMCC)
- Gastroenterology & Hepatology
- General Surgery
- Haematology
- Hand & Reconstructive Microsurgery
- Infectious Diseases
- Orthopaedic Surgery (Sport & Exercise Medicine Centre)
- Plastic, Reconstructive & Aesthetic Surgery
- Rehabilitation Medicine
- Renal Medicine
- Rheumatology & Immunology
- SPRinT (Sarcoma, Peritoneal & Rare Tumours)
- Staff Clinic
- Vascular Surgery
- Urology

Associate Consultant/Consultant/ Senior Consultant
- Anatomical Pathology
- Occupational & Environmental Medicine
- SPRinT (Sarcoma, Peritoneal & Rare Tumours)
- Clinical Epidemiologist
- Microbiology (Diagnostic Bacteriology Section)

Website: www.sgh.com.sg
Career Portal: www.sgh.com.sg/careers
Email: careers.medical@sgh.com.sg

Changi General Hospital

Departments seeking:
Resident Physicians and Staff Registrars
- Accident & Emergency
- Anaesthesia & Surgical Intensive Care
- Breast Surgery
- Cardiology
- Dermatology
- Diagnostic Radiology
- Endocrinology
- Geriatric Medicine
- Medicine
- Neurosurgery
- Ophthalmology
- Orthopaedic Surgery
- Otorhinolaryngology - Head & Neck Surgery
- Psychological Medicine
- Rehabilitation Medicine
- Surgery
- Urology

Associate Consultants
- Anaesthesia & Surgical Intensive Care
- Cardiology
- Dermatology
- Diagnostic Radiology / Interventional Radiology
- Infectious Diseases
- Laboratory Medicine - Histopathology
- Orthopaedic Surgery
- Otorhinolaryngology - Head & Neck Surgery
- Rheumatology
- Surgery
- Urology

Dental Surgeon
- Oral & Maxillofacial

Website: www.cgh.com.sg
Email: medical_hr@cgh.com.sg

Sengkang General Hospital

Departments seeking:
Resident Physicians and Staff Registrars
- Anaesthesiology
- Cardiology
- Emergency Medicine
- Surgery
- General Medicine
- Intensive Care Medicine
- Orthopaedic Surgery (with interest in Hand Surgery and Orthopaedic Surgery)
- Otorhinolaryngology - Head & Neck Surgery
- Plastic, Reconstructive & Aesthetic Surgery Service
- Urology

Senior Consultant, Consultant, Associate Consultant
- Emergency Medicine
- Gastroenterology
- Infectious Diseases
- Intensive Care Medicine
- Otorhinolaryngology - Head & Neck Surgery
- Pathology
- Radiology

Website: www.skh.com.sg
Career Portal: www.skh.com.sg/careers/Pages/careers.aspx
Email: careers@skh.com.sg

KK Women's and Children's Hospital

Departments seeking:
Associate Consultants/Consultants/ Senior Consultants
- Pathology & Laboratory Medicine (Gynaecologic & Breast Pathologist, Microbiologist and Chemical Pathologist)
- Diagnostic & Interventional Imaging

Consultants
- Psychological Medicine

Associate Consultants/Consultants
- Dermatology

Staff Registrars
- Child Development
- Diagnostic & Interventional Imaging
- Neurology Service
- Paediatric Surgery

Family Physician
- Family Medicine

Resident Physicians
- Diagnostic & Interventional Imaging
- Emergency Medicine
- Obstetrics & Gynaecology
- Ophthalmology Service
- Orthopaedic Surgery
- Otolaryngology
- Paediatric Medicine
- Paediatric Surgery
- Psychological Medicine
- Women's Anaesthesia

Website: www.kkh.com.sg
Email: medical.hr@kkh.com.sg

National Cancer Centre Singapore

Departments seeking Resident Physicians
- Radiation Oncology
- SingHealth Investigational Medicine Unit (IMU)

Website: www.nccs.com.sg
Email: HR-Clinical@nccs.com.sg

National Heart Centre Singapore

Departments seeking:
Consultant (Electrophysiology & Pacing)
- Cardiology

Resident Physicians and Staff Registrars
- Cardiology
- Cardiothoracic Surgery

Website: www.nhcs.com.sg
Email: falicia.tui.y.x@nhcs.com.sg / goh.bing.xue@nhcs.com.sg

National Neuroscience Institute

Departments seeking Resident Physicians and Service Registrars
- Neurology
- Neuroradiology
- Neurosurgery

Website: www.nni.com.sg
Email: nni_hr@nni.com.sg

Singapore National Eye Centre

Department seeking
- Clinical Associate
- Resident Physician, Ophthalmology
- Staff Registrar, Ophthalmology

Senior Consultant, Consultant, Associate Consultant
- Oculoplastic
- Ocular Inflammation and Immunology

For more information, please visit the Career Opportunities section on the Singapore National Eye Centre website.

Website: www.snec.com.sg
Email: recruitment@snec.com.sg

SingHealth Community Hospitals
(Sengkang Community Hospital, Outram Community Hospital and Bright Vision Hospital)

Department seeking:
Staff Registrars, Resident Physicians
- Family Medicine

Website: http://www.singhealthch.com.sg/
Career Portal: www.singhealth.com.sg/SCH/careers/Pages/Careers.aspx
Email: schrecruitment@singhealthch.com.sg

SGH Lunchtime
GP Q+A Sessions 2023

Meet our specialists as they address your questions on the latest updates in their specialty area, patient care and the referral process.

Date	Time	Hosted via	Free
Wednesdays	1pm to 2pm	Zoom Webinar	admission

Date	Session 1 (1pm to 1.30pm)	Session 2 (1.30pm to 2pm)
8 Mar	**Dept of Colorectal Surgery** Dr Khor Shao Nan (Associate Consultant)	**Dept of Renal Medicine** Dr Liew Ian Tatt (Consultant)
12 Apr	**Dept of Hand & Reconstructive Microsurgery** Dr Chong Chew Wei (Consultant)	**Dept of Pain Medicine** Dr Chen Xuanxuan (Senior Consultant)
10 May	**Dept of Obstetrics & Gynaecology** Dr Pamela Sandriany Partana (Associate Consultant)	**Dept of Rheumatology & Immunology** Dr Yeo Siaw Ing (Senior Consultant)
14 Jun	**Dept of Orthopaedic Surgery** Dr Ou Yang Youheng (Consultant)	**Dept of Plastic, Reconstructive & Aesthetic Surgery** Dr Hui Li Yu, Cheryl (Consultant)
12 Jul	**Dept of Gastroenterology & Hepatology** Dr Ravishankar Asokkumar (Consultant)	**Dept of Head & Neck Surgery** Dr Gerald Tay Ci An (Senior Consultant), Dr Rena Dharmawan (Consultant), Dr Rahul Nagadia (Consultant)
16 Aug	**Dept of Respiratory & Critical Care Medicine** Dr Young Si Ling (Associate Consultant)	**Dept of Vascular Surgery** Dr Chng Siew Ping (Senior Consultant)
13 Sep	**Dept of Urology** Dr Lu Yadong (Associate Consultant)	**Dept of Haematology** Clin Assoc Prof Ng Heng Joo (Head & Senior Consultant)
11 Oct	**Dept of Breast Surgery** Dr Christina Yang Shi-Hui (Associate Consultant)	**Dept of Psychiatry** Assoc Prof Leslie Lim Eng Choon (Senior Consultant)
8 Nov	**Dept of Hepato-pancreato-biliary and Transplant Surgery** Dr Tan Hwee Leong (Associate Consultant)	**Dept of Nuclear Medicine and Molecular Imaging**

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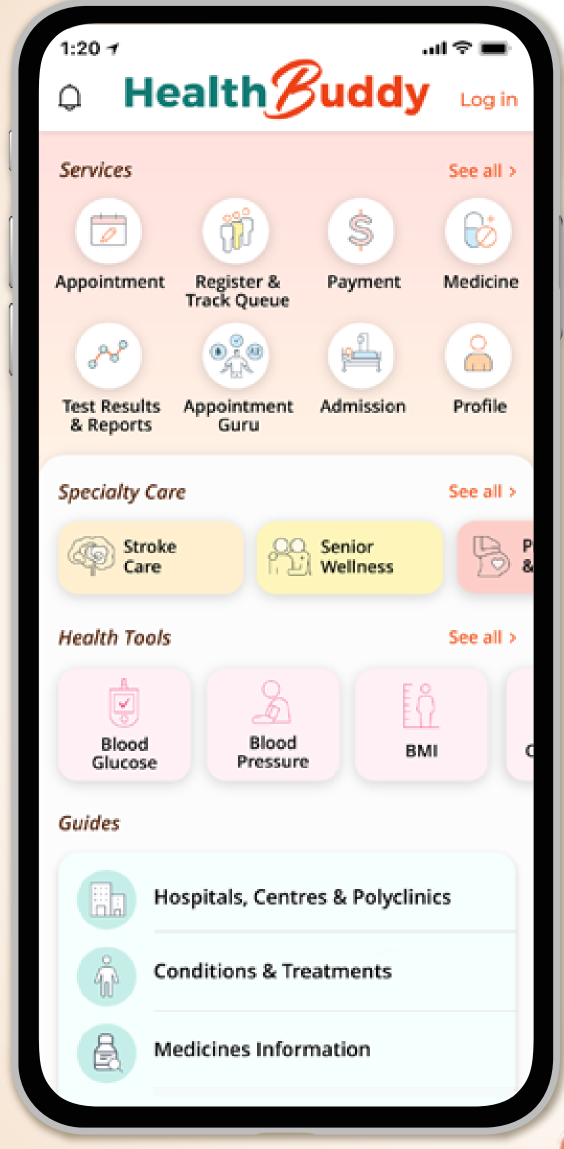

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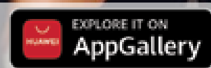

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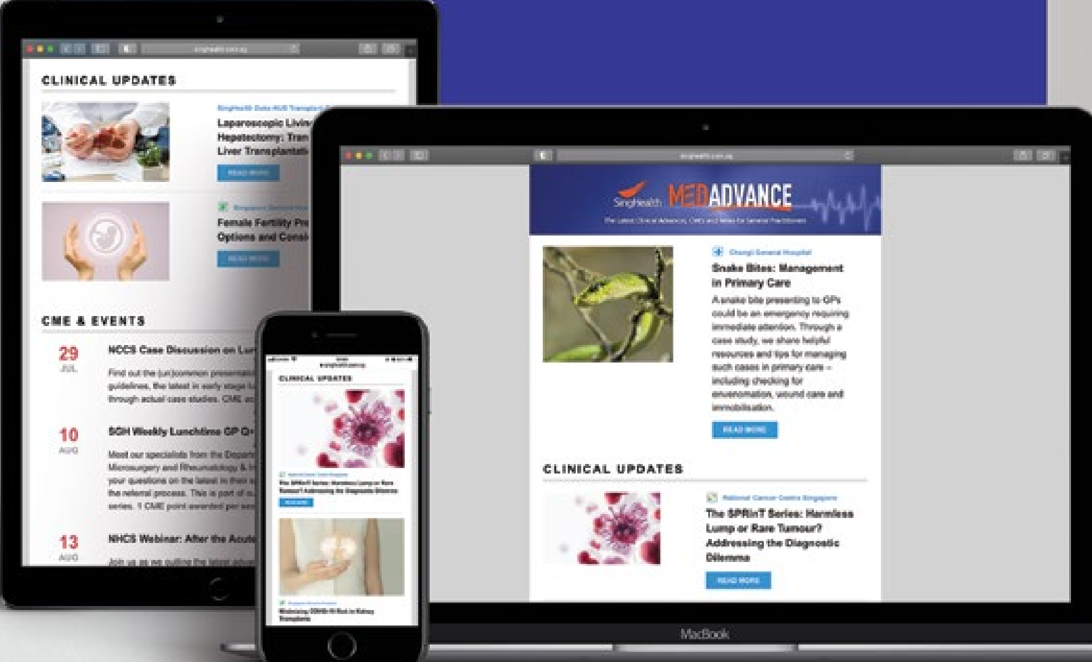
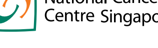


HOTLINES

GP Fast Track Appointment Hotlines

Singapore General Hospital	**6326 6060**	KK Women's and Children's Hospital	**6692 2984**	National Heart Centre Singapore	**6704 2222**
Changi General Hospital	**6788 3003**	 National Cancer Centre Singapore	**6436 8288**	National Neuroscience Institute	**6330 6363**
Sengkang General Hospital	**6930 6000**	National Dental Centre Singapore	**6324 8798**	Singapore National Eye Centre	**6322 9399**

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