



MINISTRY OF HEALTH MALAYSIA  
PHARMACEUTICAL SERVICES PROGRAMME



# DMTAC POCKET GUIDE

TO INSULIN OPTIMISATION

FIRST EDITION

2023



## FIRST EDITION

OCTOBER 2023

Published by:

Pharmaceutical Services Programme  
Ministry of Health Malaysia  
Lot 36, Jalan Prof Diraja Ungku Aziz,  
46200 Petaling Jaya,  
Selangor, Malaysia  
Tel: 603-7841 3200  
Website: [www.pharmacy.gov.my](http://www.pharmacy.gov.my)

© All Rights Reserved

This document is copyrighted. The publication of the DMTAC Pocket Guide to Insulin Optimisation was coordinated by the Pharmaceutical Care Branch of the Pharmacy Practice & Development Division, Ministry of Health Malaysia. The publisher reserves copyright and renewal on all published materials and such material may not be reproduced in any form without permission from the publisher.

e ISBN 978-967-2854-32-6



### Disclaimer

This pocket guide is designed to serve as a quick guide for pharmacists managing diabetes cases. All information presented in this pocket guide is constantly evolving concurrently with ongoing research and clinical experiences, which are often subjected to professional judgements and interpretation according to specific clinical situations. The editors and publisher of this pocket guide have made every effort to ensure the accuracy and completeness of the contents. However, the editors and publisher are not responsible for any errors or omissions, and/or consequences arising from the use of this pocket guide. The application of information from this pocket book in any situation remains the professional responsibility of the practitioner.

This page is intentionally left blank



# FOREWORD



**Wan Noraimi binti Wan Ibrahim**  
Director  
Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health

Welcome to the **"DMTAC Pocket Guide to Insulin Optimisation"**! In a world where the prevalence of diabetes is on the rise, understanding how to manage this condition has never been more crucial. This compact yet comprehensive guide has been meticulously crafted to be your reliable companion in navigating the complex landscape of insulin therapy.

As the role of pharmacists continues to evolve and expand in the realm of healthcare, this pocket guide act as a resource designed to empower pharmacists with the knowledge and tools to enhance diabetes management through effective insulin therapy.

In the face of the global diabetes epidemic, pharmacists have emerged as key partners in the journey toward better health outcomes. This pocket book serves as a valuable asset, equipping pharmacists with the information needed to collaborate more closely with patients and healthcare teams. By understanding the nuances of insulin therapy, pharmacists can play a pivotal role in optimizing treatment plans, improving adherence, and ultimately contributing to the overall well-being of individuals with diabetes.

I extend my heartfelt appreciation to the experts and practitioners whose insights have shaped the content of this pocket book. Their dedication to advancing diabetes care is evident in every page, and their contributions will undoubtedly enhance the capabilities of pharmacists across the spectrum of diabetes care.

While this pocket book is a comprehensive tool, it is important to recognize that each patient's journey with diabetes is unique. As such, collaboration with other healthcare providers remains essential. To my fellow pharmacists, I encourage you to seize the opportunities that this pocket book presents. Your expertise has the power to transform lives, and by working together, we can make a substantial impact on diabetes care.

Here's to a future where pharmacists stand at the forefront of diabetes management, armed with knowledge and dedicated to making a difference.

## ACKNOWLEDGEMENT

### **WAN NORAIMI BINTI WAN IBRAHIM**

Director of Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health Malaysia

### **FUZIAH BINTI ABDUL RASHID**

Former Director of Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health Malaysia

### **SYAHIDA BINTI CHE EMBI**

Deputy Director of Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health Malaysia

## EDITORIAL BOARD

### **MASFIZA BINTI ABDUL HAMID**

Senior Principal Assistant Director  
Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health Malaysia

### **DR. ALIZA BINTI ALIAS**

Senior Principal Assistant Director  
Pharmacy Practice & Development Division  
Pharmaceutical Services Programme  
Ministry of Health Malaysia

# CONTRIBUTORS

**Albert Ting Siong Hung**  
Petra Jaya Health Clinic

**Brendy Lee Wai Han**  
Hospital Tuanku Ampuan Najihah

**Cheryl Yong Wai Yin**  
Hospital Raja Permaisuri Bainun

**Fiona Tong Hui Ling**  
Hospital Kuala Lumpur

**Jason Kam Lye Hin**  
Hospital Pulau Pinang

**Seow Cui Jiun**  
Hospital Sultanah Bahiyah

**Tai Chia Woon**  
Mahmoodiah Health Clinic

**Aziani binti Yacob**  
Hospital Raja Perempuan Zainab II

**Dr. Navin Kumar Loganadan**  
Hospital Putrajaya

**Dr. Shamala Ayadurai**  
Sultan Ismail Health Clinic

**Noorul Aimi binti Daud**  
Hospital Sultan Idris Shah

**Wan Ruwaida binti Wan Mokhtar**  
Hospital Tuanku Fauziah

**Nur Diniah binti Shahrarum**  
Hospital Melaka

**Ng Sin Ye**  
Hospital Tengku Ampuan Afzan

**Annie Soong Tse Yeen**  
Hospital Duchess of Kent

**Khairunnisa binti Zamri**  
Hospital Sultanah Nur Zahirah

# EXTERNAL REVIEWERS

**Dr Florence Tan Hui Sieng**

Consultant Endocrinologist & Physician,  
Sarawak General Hospital

**Dr Noor Lita Adam**

Consultant Endocrinologist  
Tuanku Ja'afar Hospital

**Dr Shamharini Nagaratnam**






Endocrinologist  
Putrajaya Hospital

# TABLE OF CONTENT

Types of Insulin	9
Various Insulin Regimen Options	10
General Recommendations for Insulin Use	11
Initiating and Optimising <b>Basal Insulin</b>	12
Initiating and Optimising <b>Premixed Insulin</b>	13
Initiating and Optimising <b>Prandial Insulin</b>	14
Initiating and Optimising <b>Basal Bolus Insulin</b>	15
Intensification: <b>Basal to Basal Plus Regimen</b>	16
Intensification: <b>Basal to Basal Bolus Regimen</b>	17
Intensification: <b>Basal to Premixed Regimen</b>	18
Intensification: <b>Premixed to Basal Bolus Regimen</b>	19
Intensification: <b>Premixed OD to BD</b>	20
Intensification: <b>Premixed BD to TDS (Analogues Only)</b>	21
Intensification: <b>Premixed OD Plus Pre-meal Bolus</b>	22
Intensification: <b>Premixed BD Plus Pre-meal Bolus</b>	23
Intensification: <b>Prandial TDS Plus Basal Insulin</b>	24
SMBG Timing in <b>Basal / Basal Bolus Regimen</b>	25
SMBG Timing in <b>Premixed Regimen</b>	26
Case Simulations	27
Abbreviations	28
References	29



# 1. TYPES OF INSULIN

Types	Examples	Onset	Peak	Duration
Short-acting	 <p>Insugen® R Insuman® Rapid Actrapid®</p>	30-60 mins	2-4 hrs	6-10 hrs
Intermediate-acting	 <p>Insugen® N Insuman® Basal Insulatard®</p>	1-2 hrs	4-8 hrs	8-12 hrs
Premixed	 <p>Insugen® 30/70 Insuman® Comb 30 Mixtard® 30</p>	30 mins	Dual	18-23 hrs
Rapid-acting Analogue	 <p>Glulisine (Apidra®) Aspart (Novorapid®) Lispro (Humalog®)</p>	0-20 mins	1-3 hrs	3-5 hrs
Long-acting Analogue	 <p>Detemir (Levemir®) Glargine U100 (Lantus®) Glargine U100 (Basalog One®) Glargine U300 (Toujeo®) Degludec (Tresiba®)</p>	30-60 mins 30-60 mins 30-60 mins Up to 6 hrs 30-90 mins	Less peak	16-24 hrs 16-24 hrs 16-24 hrs 24-36 hrs 24-40 hrs
Premixed Analogue / Co-formulation	 <p>Novomix® 30 Humalog® Mix25 Humalog® Mix50 Ryzodeg®</p>	10-20 mins 15 mins 15 mins 10-20 mins	1-4 hrs 0.5-2.5 hrs 0.5-2.5 hrs 1-4 hrs	18-23 hrs 16-18 hrs 16-18 hrs 24-40 hrs



## 2. VARIOUS INSULIN REGIMEN OPTIONS

No. of injections / day	Insulin regimen	Type of insulin and usual timing
<b>1</b>	<b>Basal</b>	Intermediate-acting (NPH) insulin pre-bed / Long-acting analogue once daily
	<b>Premixed OD</b>	Premixed / Premixed analogue pre-dinner
	<b>Co-formulation</b>	Pre largest carbohydrate meal of the day
<b>2</b>	<b>Basal</b>	Intermediate-acting (NPH) pre-breakfast and pre-dinner
	<b>Premixed BD</b>	Premixed / Premixed analogue pre-breakfast and pre-dinner
	<b>Basal + 1</b>	Basal insulin OD + 1 prandial insulin
	<b>Co-formulation OD + 1</b>	Co-formulation insulin pre largest carbohydrate meal + 1 prandial insulin
	<b>Co-formulation BD</b>	Co-formulation insulin pre 2 main meals
	<b>Basal + 2</b>	Basal insulin OD + 2 prandial insulin
<b>3</b>	<b>Prandial</b>	Prandial insulin pre-breakfast, pre-lunch and pre-dinner
	<b>Premixed Analogue TDS</b>	Premixed analogue pre-breakfast, pre-lunch and pre-dinner
	<b>Premixed BD + 1</b>	Premixed / Premixed analogue pre-breakfast and pre-dinner + 1 prandial insulin pre-lunch
	<b>Premixed OD + 2</b>	Prandial insulin pre-breakfast and pre-lunch + 1 premixed / premixed analogue pre-dinner
	<b>Co-formulation OD + 2</b>	Co-formulation pre largest carbohydrate meal + 2 prandial insulin
	<b>Co-formulation BD + 1</b>	Co-formulation insulin pre 2 main meals + 1 prandial insulin
<b>4</b>	<b>Basal bolus</b>	Basal insulin OD + prandial insulin pre-breakfast, pre-lunch and pre-dinner
<b>5</b>	<b>Basal bolus</b>	Intermediate-acting (NPH) insulin pre-breakfast and pre-bed + prandial insulin pre-breakfast, pre-lunch and pre-dinner

Modified from "Ministry of Health; Malaysia (2020) "Clinical Practice Guidelines. Management of Type 2 Diabetes Mellitus (6th Edition) p.74 ."

### 3. GENERAL RECOMMENDATIONS FOR INSULIN USE

1) **Assessment of the followings shall be done before initiating / optimizing / intensifying insulin regimen :**

- Medication adherence
- Diet and lifestyles
- Injection technique (timing / frequency of needle change / rotation of injection sites / lipodystrophy / insulin storage)
- Hypoglycaemia
- Faulty glucometer or expired glucose strips
- Other factors (e.g. drug-induced hyperglycaemia, Somogyi or Dawn phenomenon, infections)

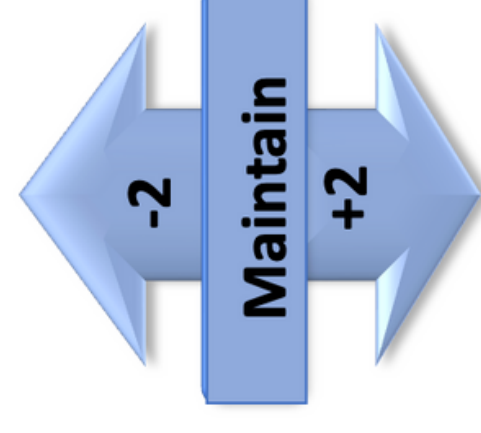
2) **Target BG and HbA1c should be individualised based on patient profile.**

3) **TDD of insulin for most patients is 0.5 - 1.0 IU/kg/day.** However, some patients may require more than 1.0 IU/kg/day. TDD shall be individualised and take into consideration of several factors (e.g. patient's BMI, dietary habits, glycaemic target, glycaemic control, insulin resistance, adherence, hypoglycaemia risk, etc).

## 4. INITIATING AND OPTIMISING BASAL INSULIN



<b>Initiation</b>	<b>10 IU or 0.2 IU/kg at bedtime (0.1 IU/kg if higher risk for hypoglycaemia)</b>
<b>Monitoring</b>	<b>Monitor FPG</b>
<b>Adjust basal insulin dose after 3 consecutive FPG values obtained (every 3 – 7 days)</b>	
<b>Optimisation</b> (Optimal dose) 0.2 – 0.3 IU/kg in lean patients 0.4 – 0.5 IU/kg in most patients Up to 0.7 IU/kg in obese patients	
<b>Basal insulin dose adjustment (IU) :</b>	
<b>If BG level (mmol/L) :</b>	
<b>&lt; 4.0 mmol/L (&gt; 1 value)</b>	
<b>4.0 – 7.0 mmol/L (all values)</b>	
<b>&gt; 7.0 mmol/L (&gt; 1 value, no hypoglycaemia)</b>	

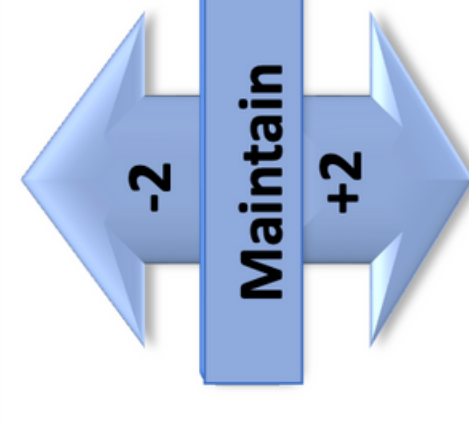




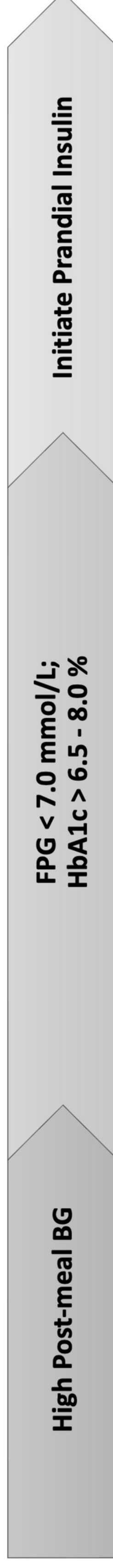
## 5. INITIATING AND OPTIMISING PREMIXED INSULIN




<b>Initiation</b>	<p>Once daily : 10 IU or 0.2 IU/kg at pre-dinner</p> <p>Twice daily : 10 IU or 0.2 IU/kg at pre-breakfast and pre-dinner (0.1 IU/kg if higher risk for hypoglycaemia)</p>								
<b>Monitoring</b>	<p>Once daily : Monitor FPG / pre-bed BG</p> <p>Twice daily : Monitor FPG / pre-meal / pre-bed BG</p>								
<b>Optimisation</b>	<p><b>Adjust Premixed insulin doses after 3 consecutive BG values obtained (every 3 - 7 days)</b></p> <p><b>Premixed insulin dose adjustment (IU) :</b></p> <table border="1"> <tr> <td><b>If BG level (mmol/L) :</b></td> <td></td> </tr> <tr> <td>&lt; 4.0 mmol/L (&gt; 1 value)</td> <td>-2</td> </tr> <tr> <td>4.0 – 7.0 mmol/L (all values)</td> <td>Maintain</td> </tr> <tr> <td>&gt; 7.0 mmol/L (&gt; 1 value, no hypoglycaemia)</td> <td>+2</td> </tr> </table>	<b>If BG level (mmol/L) :</b>		< 4.0 mmol/L (> 1 value)	-2	4.0 – 7.0 mmol/L (all values)	Maintain	> 7.0 mmol/L (> 1 value, no hypoglycaemia)	+2
<b>If BG level (mmol/L) :</b>									
< 4.0 mmol/L (> 1 value)	-2								
4.0 – 7.0 mmol/L (all values)	Maintain								
> 7.0 mmol/L (> 1 value, no hypoglycaemia)	+2								

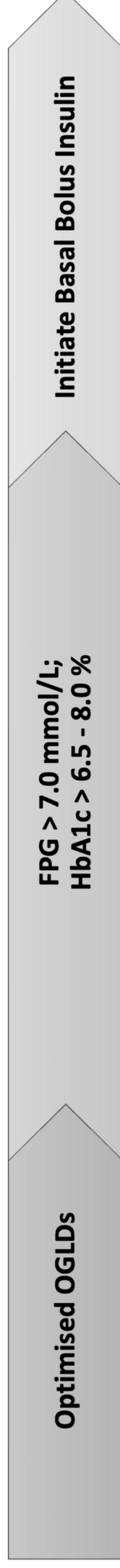


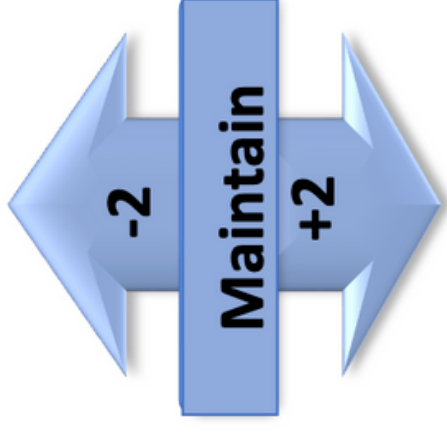
## 6. INITIATING AND OPTIMISING PRANDIAL INSULIN



<b>Initiation</b>	6 IU or 0.1 IU/kg for each meal with Short Acting or Rapid Acting Analogue
<b>Monitoring</b>	Monitor pre-meal / pre-bed BG Monitor post-meal 2 hours if using Rapid Acting Analogue
<b>Optimisation</b>	Adjust prandial insulin doses of the preceding meal after 3 consecutive BG values obtained (every 3 – 7 days) (e.g. if pre-lunch BG is high, adjust pre-breakfast prandial insulin)
(Optimal dose) Prandial dose for each meal will vary according to meal carbohydrate content and amount. Dose should ideally not exceed 0.5 IU/kg/dose *Stop SU if on full insulin	Prandial insulin dose adjustment (IU) :  <div style="text-align: center;">  </div>
	If BG level (mmol/L) :  < 4.0 mmol/L (> 1 value)  4.0 – 7.0 mmol/L (all values)  > 7.0 mmol/L (> 1 value, no hypoglycemia)

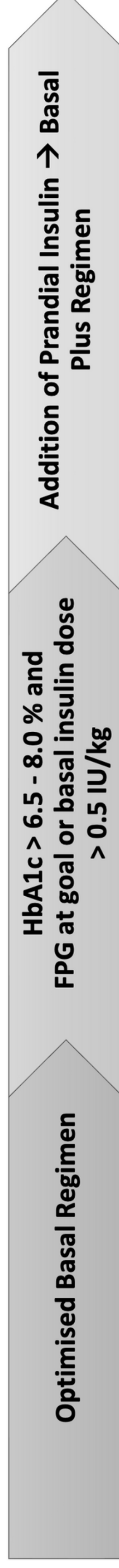
## 7. INITIATING AND OPTIMISING BASAL BOLUS INSULIN



<b>Initiation</b>	<p>Prandial Insulin : 6 IU or 0.1 IU/kg before each meal Basal Insulin : 10 IU or 0.2 IU/kg at bedtime</p>	
<b>Monitoring</b>	<p>Monitor FPG / pre-meal / pre-bed BG</p>	
<b>Optimisation</b>	<p><b>Prandial insulin : Adjust prandial insulin doses of the preceding meal after 3 consecutive BG values obtained (every 3 – 7 days)</b> (e.g. if pre-lunch BG is high, adjust pre-breakfast prandial insulin)</p>	
	<p><b>Basal Insulin : Adjust basal insulin doses after 3 consecutive FPG values obtained (every 3 – 7 days)</b></p>	
	<p><b>Insulin dose adjustment (IU) :</b></p>	
<p>Aim for normal FPG first by adjusting the dose of basal insulin before adjusting the prandial (bolus) insulin dose</p> <p>*Stop SU if on full insulin</p>	<p><b>If BG level (mmol/L) :</b></p>	
	<p>&lt; 4.0 mmol/L (&gt; 1 value)</p>	
	<p>4.0 – 7.0 mmol/L (all values)</p>	
	<p>&gt; 7.0 mmol/L (&gt; 1 value, no hypoglycaemia)</p>	



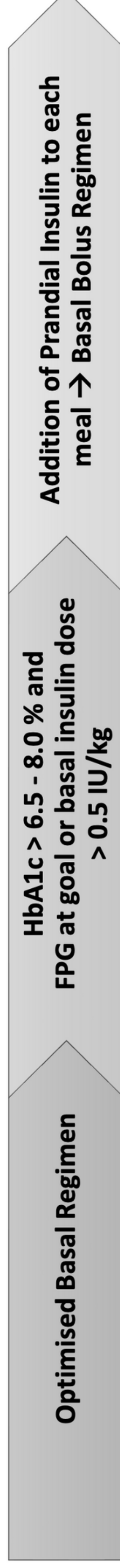
## 8. INTENSIFICATION: BASAL TO BASAL PLUS REGIMEN



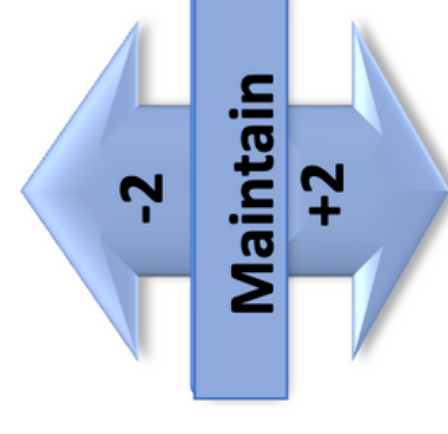
<b>Intensification</b>	Add prandial insulin 6 IU or 0.1 IU/kg at the largest meal
<b>Monitoring</b>	Monitor pre-meal / pre-bed BG
<b>Optimisation</b>	<p>1. Adjust prandial insulin doses after 3 consecutive BG values are obtained (every 3 – 7 days)</p> <p>2. If HbA1c &gt; 6.5 - 8.0 % after 3 months despite dose optimisation, consider:</p> <ul style="list-style-type: none"> <li>• Add second prandial insulin at 6 IU or 0.1 IU/kg at 2nd largest meal and titrate as before</li> <li>• Repeat 3<sup>rd</sup> prandial insulin dose at the final meal of the day</li> </ul>
*Stop SU if on full insulin	<b>Prandial insulin dose adjustment (IU) :</b>
	If BG level (mmol/L) :
	< 4.0 mmol/L (> 1 value)
	4.0 – 7.0 mmol/L (all values)
> 7.0 mmol/L (> 1 value, no hypoglycaemia)	



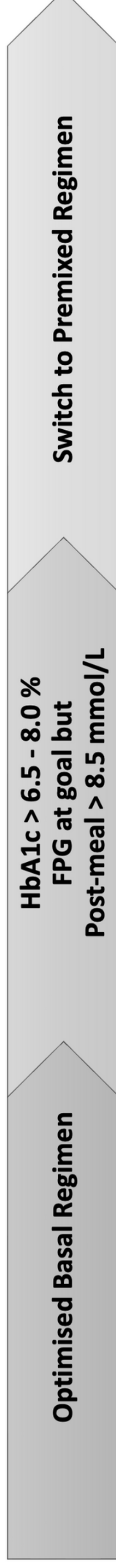
## 9. INTENSIFICATION: BASAL TO BASAL BOLUS REGIMEN



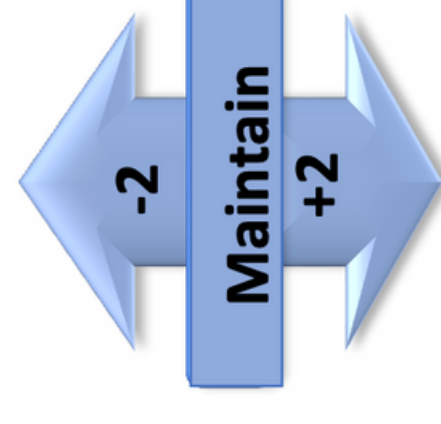
<b>Intensification</b>	Add prandial insulin 6 IU or 0.1 IU/kg at each meal	
<b>Monitoring</b>	Monitor pre-meal / pre-bed BG	
<b>Optimisation</b>	<ol style="list-style-type: none"> <li>Adjust prandial insulin doses after 3 consecutive BG values are obtained (every 3 – 7 days)</li> <li>If HbA1c &gt; 6.5 - 8.0 % after 3 months despite dose optimisation, consider: <ul style="list-style-type: none"> <li>Perform 4-7 points BG profile</li> <li>Resume titration / optimisation of Basal insulin up to 0.7 IU/kg</li> </ul> </li> </ol>	
*Stop SU if on full insulin	If BG level (mmol/L):	Insulin dose adjustment (IU) :
	< 4.0 mmol/L (> 1 value)	-2
	4.0 – 7.0 mmol/L (all values)	Maintain
	> 7.0 mmol/L (> 1 value, no hypoglycaemia)	+2



## 10. INTENSIFICATION: BASAL TO PREMIXED REGIMEN



<b>Intensification</b>	Switch to twice daily Premixed insulin Total daily dose transfer → Split dose 50 : 50 (pre-breakfast : pre-dinner)	
<b>Monitoring</b>	Monitor FPG / pre-meal / pre-bed BG	
<b>Optimisation</b>	<ol style="list-style-type: none"> <li>1. Adjust Premixed insulin doses after 3 consecutive BG values are obtained (every 3 – 7 days)</li> <li>2. Titrate dose once / twice a week to next pre-meal goal</li> <li>3. Consider premixed analogue in patients experiencing hypoglycaemia with conventional premixed insulin</li> </ol>	
*Stop SU if on full insulin	<b>If BG level (mmol/L) :</b>	<b>Premixed insulin dose adjustment (IU) :</b>
	< 4.0 mmol/L (> 1 value)	-2
	4.0 – 7.0 mmol/L (all values)	Maintain
	> 7.0 mmol/L (> 1 value, no hypoglycaemia)	+2

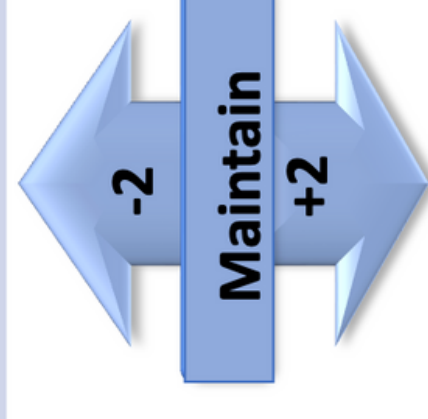




## 11. INTENSIFICATION: PREMIXED TO BASAL BOLUS REGIMEN



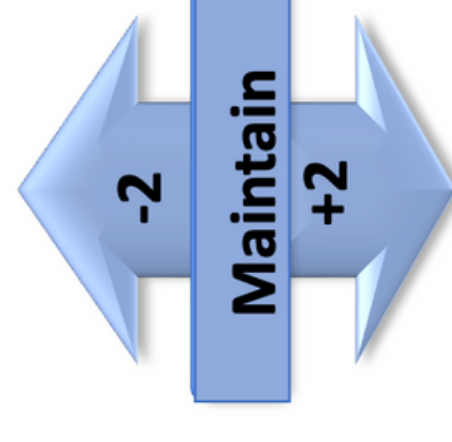
<b>Intensification</b>	<p style="text-align: center;">Switch to Basal Bolus Regimen</p> <p style="text-align: center;">Starting dose 0.5 IU/kg/day or total daily dose transfer → Split dose 50 : 50 (basal : prandial)</p> <p style="text-align: center;">Divide prandial doses into 3 main meals</p>
<b>Monitoring</b>	<p style="text-align: center;">Monitor FPG / pre-meal / pre-bed BG</p>
<b>Optimisation</b>	<p style="text-align: center;">1. Adjust basal and prandial insulin doses after 3 consecutive BG values are obtained (every 3 – 7 days)</p> <p style="text-align: center;">2. Fix FPG &lt; 7.0 mmol/L using basal insulin (Fix Fasting First)</p> <p style="text-align: center;">3. Titrate prandial dose once / twice a week to achieve FPG and pre-meal goal &lt; 7.0 mmol/L</p>
	<p style="text-align: center;">Basal Bolus insulin dose adjustment (IU) :</p>
	<p style="text-align: center;">If BG (mmol/L) :</p>
	<p style="text-align: center;">&lt; 4.0 mmol/L (&gt; 1 value)</p>
	<p style="text-align: center;">4.0 – 7.0 mmol/L (all values)</p>
	<p style="text-align: center;">&gt; 7.0 mmol/L (&gt; 1 value, no hypoglycaemia)</p>



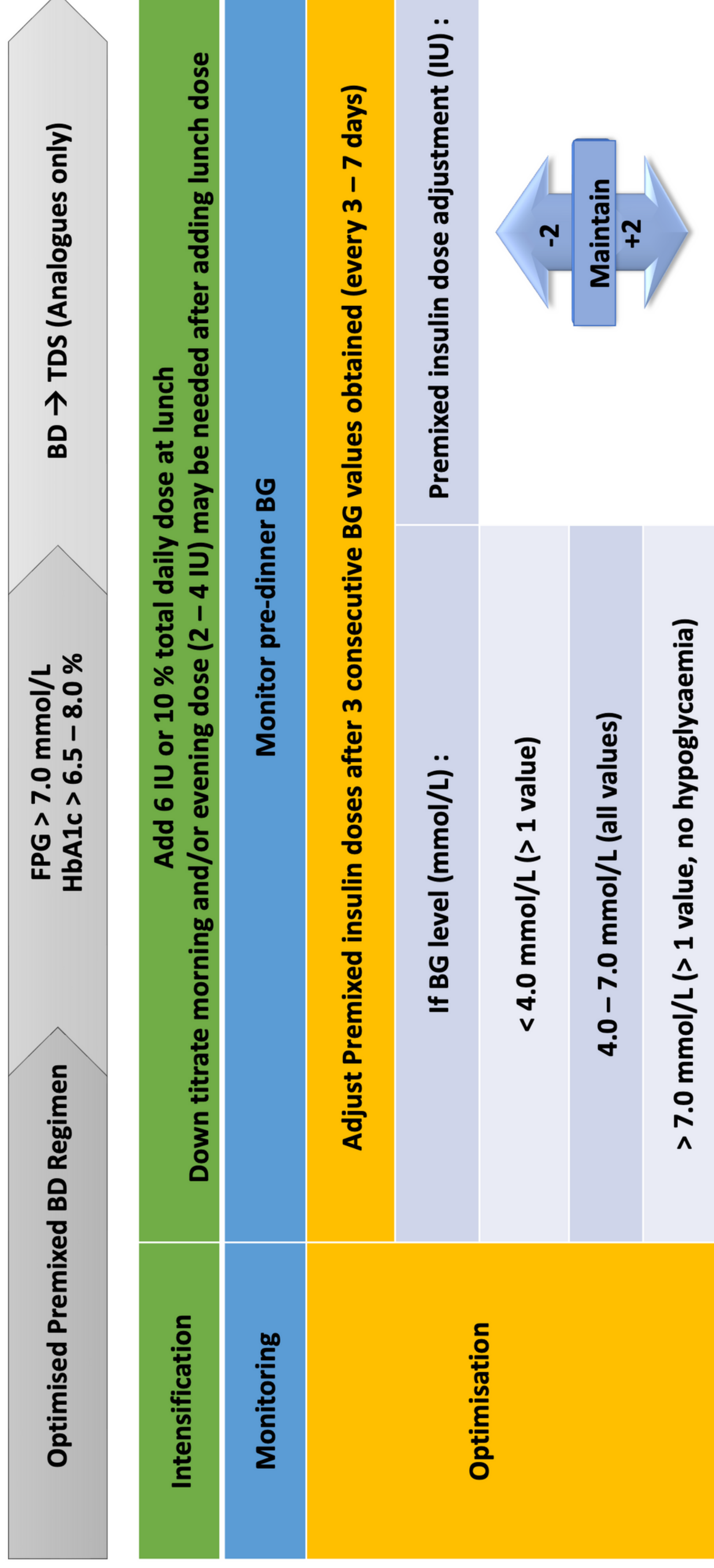
## 12. INTENSIFICATION: PREMIXED OD TO BD



<b>Intensification</b>	Starting dose 0.3 IU/kg/day or total dose transfer Split the dose 50 : 50 (pre-breakfast : pre-dinner)
<b>Monitoring</b>	Monitor FPG / pre-meal / pre-bed BG
<b>Optimisation</b>	Adjust Premixed insulin doses after 3 consecutive BG values obtained (every 3 – 7 days)
	Premixed insulin dose adjustment (IU) :
	If BG level (mmol/L) :
	< 4.0 mmol/L (> 1 value)
	4.0 – 7.0 mmol/L (all values)
	> 7.0 mmol/L (> 1 value, no hypoglycaemia)



## 13. INTENSIFICATION: PREMIXED BD TO TDS (ANALOGUES ONLY)

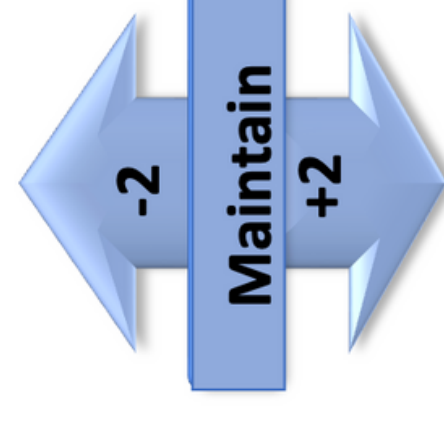




## 14. INTENSIFICATION: PREMIXED OD PLUS PRE-MEAL BOLUS



<b>Intensification</b>	Add prandial insulin 6 IU or 0.1 IU/kg at breakfast and lunch
<b>Monitoring</b>	Monitor pre-lunch / pre-dinner BG
<b>Adjust prandial insulin doses after 3 consecutive BG values obtained (every 3 – 7 days)</b>	
<b>Optimisation</b>	<b>Prandial insulin dose adjustment (IU):</b>
	<b>If BG level (mmol/L) :</b>
	< 4.0 mmol/L (> 1 value)
	4.0 – 7.0 mmol/L (all values)
> 7.0 mmol/L (> 1 value, no hypoglycaemia)	



## 15. INTENSIFICATION: PREMIXED BD PLUS PRE-MEAL BOLUS



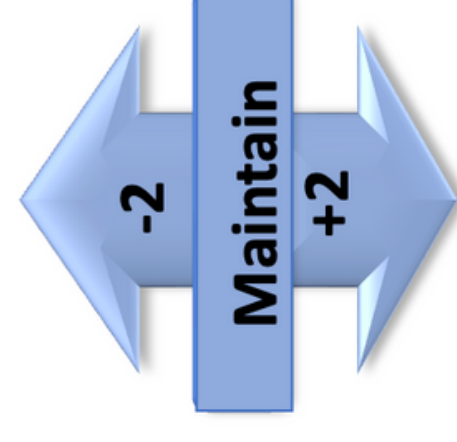
<b>Intensification</b>	Add prandial insulin 6 IU or 0.1 IU/kg at lunch
<b>Monitoring</b>	Monitor pre-dinner BG
<b>Optimisation</b>	Adjust prandial insulin doses after 3 consecutive BG values obtained (every 3 – 7 days)
	If BG level (mmol/L) :
	< 4.0 mmol/L (> 1 value)
	4.0 – 7.0 mmol/L (all values)
> 7.0 mmol/L (> 1 value, no hypoglycaemia)	Prandial insulin dose adjustment (IU):



## 16. INTENSIFICATION: PRANDIAL TDS PLUS BASAL INSULIN
























<b>Intensification</b>	Start basal insulin 10 IU or 0.2 IU/kg at pre-bed
<b>Monitoring</b>	Monitor FPG
<b>Optimisation</b>	Adjust basal insulin doses after 3 consecutive FPG values obtained (every 3 – 7 days)
	If BG level (mmol/L) :
	< 4.0 mmol/L (> 1 value)
	4.0 – 7.0 mmol/L (all values)
> 7.0 mmol/L (> 1 value, no hypoglycaemia)	Basal insulin dose adjustment (IU) :





## 17. SMBG TIMING IN BASAL / BASAL BOLUS REGIMEN

	Breakfast		Lunch		Dinner		Bedtime
	Pre	Post	Pre	Post	Pre	Post	Pre
<b>Basal only</b>							
<b>Basal bolus (short acting)</b>							
<b>Basal bolus (rapid acting)</b>							

### Notes:

- Pre-breakfast BG reflects adequacy of pre-bed basal insulin
- Pre-lunch BG reflects adequacy of pre-breakfast prandial insulin
- Pre-dinner BG reflects adequacy of pre-lunch prandial insulin
- Pre-bed BG reflects adequacy of pre-dinner prandial insulin
- Post-meal BG reflects adequacy of the respective pre-meal prandial insulin
- Once pre-prandial glucose levels are achieved, postprandial (PPG) testing is recommended for fine tuning of insulin dosage
















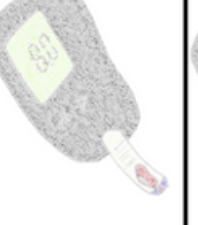







Preferred timing



Optional timing



# 18. SMBG TIMING IN PREMIXED REGIMEN

	Breakfast		Lunch		Dinner		Bedtime
	Pre	Post	Pre	Post	Pre	Post	Pre
<b>Premixed (BD)</b>							
<b>Premixed Analogue (BD)</b>							
<b>Premixed Analogue (TDS)</b>							

**Notes:**

- Pre-breakfast BG reflects adequacy of pre-dinner premixed insulin
- Pre-lunch BG reflects adequacy of pre-breakfast premixed insulin
- Pre-dinner BG reflects adequacy of pre-breakfast premixed insulin
- Pre-bed BG reflects adequacy of pre-dinner premixed insulin
- Post-meal BG can be used to fine tune the respective pre-meal premixed insulin analogue



Preferred timing



Optional timing

## CASE SIMULATIONS



**Please scan this QR code to try  
the provided simulation example**



## ABBREVIATIONS

<b>BD</b>	Twice daily
<b>BG</b>	Blood glucose
<b>BMI</b>	Body mass index
<b>FPG</b>	Fasting plasma glucose
<b>HbA1c</b>	Glycosylated haemoglobin
<b>OD</b>	Once daily
<b>OGLD</b>	Oral glucose lowering drug
<b>SMBG</b>	Self-monitoring blood glucose
<b>SU</b>	Sulfonylurea
<b>TDD</b>	Total daily dose
<b>TDS</b>	Three times daily

## REFERENCES

Ministry of Health; Malaysia (2020) **“Clinical Practice Guidelines: Management of Type 2 Diabetes Mellitus (6th Edition).”**

Ministry of Health; Malaysia (2011) **“Practical Guide to Insulin Therapy in Type 2 Diabetes Mellitus (1st Edition).”**

Malaysian Diabetes Educators Society (2020) **“Diabetes Education Manual (2nd Edition).”**





Published by:  
**Pharmaceutical Services Programme  
Ministry of Health Malaysia**

**Lot 36, Jalan Profesor Diraja Ungku Aziz,  
46200 Petaling Jaya  
Selangor, Malaysia**

**[www.pharmacy.gov.my](http://www.pharmacy.gov.my)**

**FIRST EDITION, 2023**

e ISBN 978-967-2854-32-6

