



Pharmacy Information System (PhIS) and Clinic Pharmacy System (CPS)

User Manual TDM Calculator

Version	: 13th Edition
Document ID	: PB_U. MANUAL_TDM CALCULATOR



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1.0 Introduction

1.1 Overview of PhIS

Pharmacy Information System or better known as PhIS, is a complete and comprehensive system that integrates pharmacy related services geared towards pharmacy excellence. PhIS implementation would transform most of current manual process to electronic system would benefit facility end user in the health care sector.

There are 12 modules to assist services delivery by the health care sector which comprises of:

1. Order Management
2. Inpatient Pharmacy
3. Outpatient Pharmacy
4. Medication Counselling
5. Ward Pharmacy
6. Pharmacy Inventory
7. Manufacturing of Cytotoxic Drug Reconstitution, Parenteral Nutrition, IV Admixture & Eye Drop , Radiopharmaceuticals and Extemporaneous
8. Adverse Drug Reaction & Drug Allergic (ADR & DAC)
9. Clinical Pharmacokinetics Services (TDM)
10. Drug Information & Consumer Education (DICE)
11. Medication Therapy Adherence Clinic (MTAC)
12. Data Mining (PhARM)

1.2 Purpose and Objectives

This user manual outlines the TDM Calculator module and its key features and functionalities. The primary objective is to guide user through the process of completing PhIS application process.

User will understand the following activities in details:

- Calculator for Vancomycin
- Calculator for Gentamicin
- Calculator for Valproic Acid
- Calculator for Aminophylline /Theophylline
- Calculator for Carbamazepine
- Calculator for Digoxin
- Calculator for Phenobarbitone
- Calculator for Phenytoin



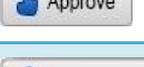
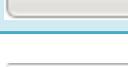
1.3 Organized Sections

These are the sections within this document:

- Section 1: Introduction
- Section 2: Application Standard Features
- Section 3: Calculator for Vancomycin
- Section 4: Calculator for Gentamicin
- Section 5: Calculator for Valproic Acid
- Section 6: Calculator for Aminophylline /Theophylline
- Section 7: Calculator for Carbamazepine
- Section 8: Calculator for Digoxin
- Section 9: Calculator for Phenobarbitone
- Section 10: Calculator for Phenytoin
- Section 11: Acronyms
- Section 12: Links to Clinical Modules

2.0 Application Standard Features

2.1 PhIS Legend

Standard Legend			
	Login to PhIS		Logout from PhIS
	Change Login Password		Reset Login Screen
	Expand Menu		Collapse Menu
	Display Home Tab		Expand Module
	Collapse Module		Close All Open Tabs
	Refresh Screen		Search Record
	Add/Create New Record		Show Help
	Print	*	Mandatory Field
	Calendar Icon		Search Icon
	Close Window		Radio Button
<input type="checkbox"/>	Checkbox		Edit Record
	Cancel		Delete Record
	Save		Export and Open Report in Excel Format
	Add Item to the list		Delete Item from the list
	Request for Approval		Cancel the Request
	Approve Transaction		Reject Transaction
	Send for Approval		Dropdown Box
	Automatically Display/Retrieve Box		Empty Text Box



Therapeutic Drug Monitoring Module Legend			
Acknowledge	To Acknowledge	Drug Info	Drug Info
New	To Do New Order	Verify	To Verify
Cancel Order	Cancel the Order	+ Add New Sample	To Add New Sample
Send	To send request	CP2	Ward Pharmacy

Note

To learn more about Login Information, kindly click [Login Information](#) module for descriptive steps.

3.0 Calculator for Vancomycin

To view the calculator in the system, perform the steps below:

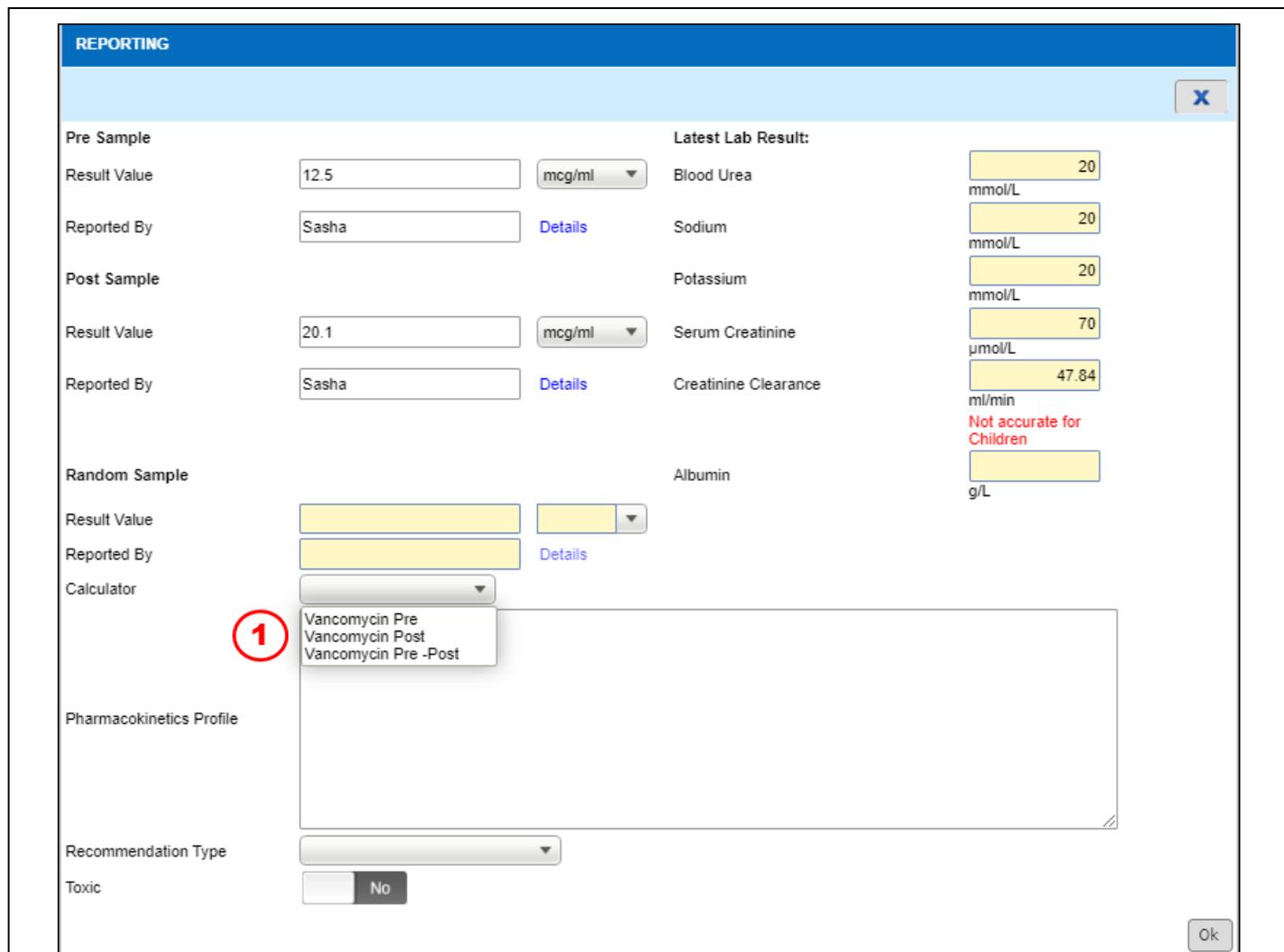


Figure 3.0-1 Pre Calculator for Vancomycin Detail

STEP 1

Select calculator from dropdown box example:

- Vancomycin in Pre
- Vancomycin in Post
- Vancomycin in Pre-Post

Note

- Choose the calculator and fill the result in the box as per Figure 3.0-1. Sample Details consists of:
 - Calculator for **Vancomycin Pre**
 - a. Dose medication in mg
 - b. Interval Time
 - c. Pre level result concentration
 - d. Serum Creatinine
 - e. Vd
 - f. CrCl - user can select option to use Adult or paediatrics calculation
 - g. Expected Cmax if assuming Expected Cmin = Pre level result

➤ **Calculator for Vancomycin Post**

- a. Dose medication in mg
- b. Interval Time
- c. Sampling Time: Duration between time after complete infusion and post sampling(t)
- d. Serum level: Post level result concentration, Serum Creatinine
- e. CrCl - user can select option to use Adult or paediatrics calculation
- f. New dose and Cmin based on desired Cmax
- g. Expected Cmin and Cmax based on new suggested dose

➤ **Calculator for Vancomycin Pre & Post**

- a. Dose medication in mg
- b. Interval Time
- c. Sampling Time: Duration between time after complete infusion and post sampling(t) and Duration between completion time of pre and post sampling (t2-t1)
- d. Serum level: Pre level result concentration, Post level result concentration and Serum Creatinine
- e. CrCl - user can select option to use Adult or paediatrics calculation
- f. Vd, Ke and t1/2
- g. Area Under Curve (AUC) Over 24hrs
- h. New dose and Cmin based on desired Cmax
- i. Expected Cmin and Cmax if Vd varies
- j. Expected Cmin and Cmax based on new suggested dose

- After save the calculator, the result will appear at the Pharmacokinetics Profile box
- Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 3.0-1

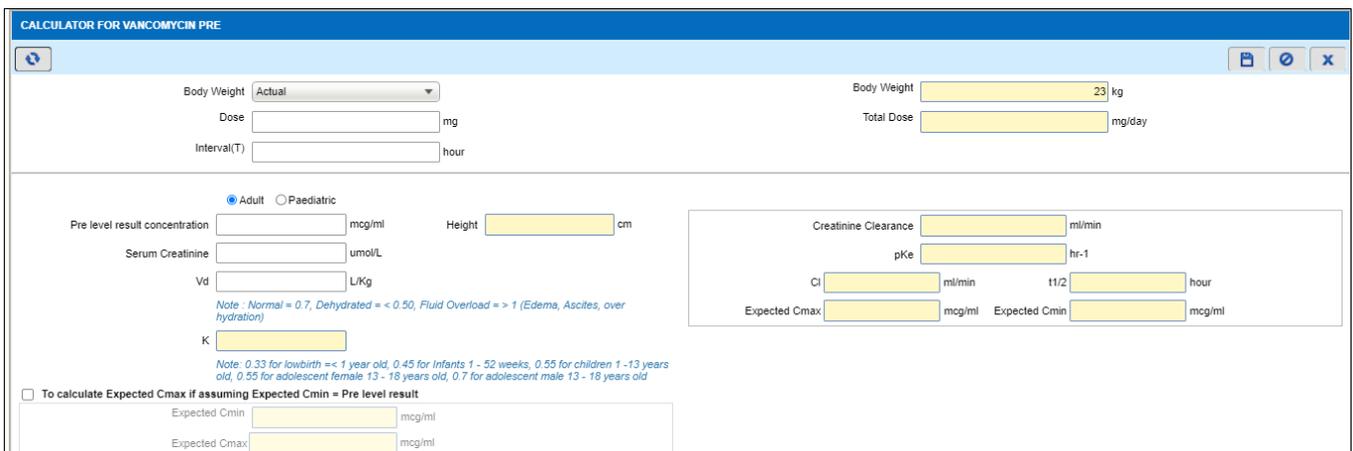


Figure 3.0-2 Pre Calculator for Vancomycin Detail

CALCULATOR FOR VANCOMYCIN POST

Body Weight Actual ▼

Dose mg

Interval(T) hour

Body Weight kg

Total Dose mg/day

Sampling Time

Duration between time after complete infusion and post sampling(t) hour

Serum level

Post level result concentration mcg/ml

Serum Creatinine umol/L

Creatinine Clearance ml/min

pKe hr-1

Vd L/kg

Cl ml/min t1/2 hour

Cmax mcg/ml Cmin mcg/ml

To calculate new dose and Cmin based on desired Cmax

Desired Cmax mcg/ml

Desired Interval hour

Expected Cmin mcg/ml New Dose mg

To calculate Paediatric Creatinine Clearance

Height cm Creatinine Clearance ml/min/1.73m2

K

Note: 0.33 for lowbirth =< 1 year old, 0.45 for Infants 1 - 52 weeks, 0.55 for children 1 -13 years old, 0.55 for adolescent female 13 - 18 years old, 0.7 for adolescent male 13 - 18 years old

To calculate expected Cmin and Cmax based on new suggested dose

New suggested dose mg

New Interval hour

Expected Cmax mcg/ml Expected Cmin mcg/ml

Figure 3.0-3 Post Calculator for Vancomycin Detail

CALCULATOR FOR VANCOMYCIN PRE & POST

Body Weight Actual ▼

Dose mg

Interval(T) hour

Body Weight kg

Total Dose mg/daily

Sampling Time

Duration between time after complete infusion and post sampling(t) hour

Duration between completion time of pre and post sampling (t2-t1) hour

Serum level

Pre level result concentration mcg/ml

Post level result concentration mcg/ml

Serum Creatinine umol/L

Creatinine Clearance ml/min

To calculate Vd, Ke and t1/2

Ke hr-1

Vd L/Kg

Cl ml/min t1/2 hour

Cmax mcg/ml Cmin mcg/ml

To calculate Area Under Curve (AUC) Over 24hrs

Vd L/kg

MIC mg/L

Note MIC < 2mg/L AUC > 400

AUC

To calculate new dose and Cmin based on desired Cmax

Desired Cmax mcg/ml

Desired Interval hour

Expected Cmin mcg/ml New Dose mg

To calculate Paediatric Creatinine Clearance

Height cm Creatinine Clearance ml/min/1.73m2

K

Note: 0.33 for lowbirth =< 1 year old, 0.45 for infants 1 - 52 weeks, 0.55 for children 1 -13 years old, 0.55 for adolescent female 13 - 18 years old, 0.7 for adolescent male 13 - 18 years old

To calculate expected Cmin and Cmax if Vd varies

Vd L/kg

Expected Cmax mcg/ml

Expected Cmin mcg/ml

To calculate expected Cmin and Cmax based on new suggested dose

New suggested dose mg

Every Hour hour

Expected Cmax mcg/ml Expected Cmin mcg/ml

Figure 3.0-4 Pre & Post Calculator for Vancomycin Detail

PB_U. MANUAL_TDM CALCULATOR-13th E

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4.0 Calculator for Gentamicin / Amikacin

To view the calculator in the system, perform the steps below:

REPORTING

X

<p>Post1 Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Post2 Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Random Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Calculator <input style="width: 150px;" type="text"/></p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>1 Aminoglycoside Pre</p> <p>Aminoglycoside Pre -Post</p> <p>Aminoglycoside Post</p> <p>Aminoglycoside Post1-Post6</p> </div> <p>Pharmacokinetics Profile</p>	<p>Latest Lab Result:</p> <p>Blood Urea <input style="width: 100px;" type="text"/> mmol/L</p> <p>Sodium <input style="width: 100px;" type="text"/> mmol/L</p> <p>Potassium <input style="width: 100px;" type="text"/> mmol/L</p> <p>Serum Creatinine <input style="width: 100px;" type="text"/> µmol/L</p> <p>Creatinine Clearance <input style="width: 100px;" type="text"/> ml/min</p> <p style="color: red; font-weight: bold;">Not accurate for Children</p> <p>Albumin <input style="width: 100px;" type="text"/> g/L</p>
--	---

Recommendation Type

Toxic No

Ok

Figure 4.0-1 Calculator for Gentamicin / Amikacin

STEP 1

Select calculator from dropdown box example:

- Aminoglycoside Pre-Post
- Aminoglycoside Pre
- Aminoglycoside Post
- Aminoglycoside Post 1- Post 6

Note

- Choose the calculator and fill the result in the box as per Figure 4.0-1. Sample Details consists of:
 - Calculator for **Aminoglycoside Pre**
 - a. Dose medication in mg
 - b. Interval Time
 - c. Pre level result concentration

- d. Serum Creatinine
- e. CrCl - user can select option to use Adult or paediatrics calculation
- f. Vd
- g. Expected Cmax if assuming Expected Cmin = Pre level result

➤ **Calculator for Aminoglycoside Post**

- a. Dose medication in mg
- b. Interval Time
- c. Sampling Time: Duration between time after complete infusion and post sampling(t)
- d. Serum level: Post level result concentration, Serum Creatinine
- e. Vd, Ke and t1/2
- f. CrCl - user can select option to use Adult or paediatrics calculation
- g. New dose and Cmin based on desired Cmax
- h. Expected Cmin and Cmax based on new suggested dose

➤ **Calculator for Aminoglycoside Pre & Post**

- a. Dose medication in mg
- b. Interval Time
- c. Sampling Time: Duration between time after complete infusion and post sampling(t) and Duration between completion time of pre and post sampling (t2-t1)
- d. Serum level: Pre level result concentration, Post level result concentration and Serum Creatinine
- e. CrCl - user can select option to use Adult or paediatrics calculation
- f. Vd, Ke and t1/2
- g. New dose and Cmin based on desired Cmax
- h. Expected Cmin and Cmax based on new suggested dose

➤ **Calculator for Aminoglycoside Post 1 & Post 6**

- a. Dose medication in mg
- b. Interval Time
- c. Sampling Time: Duration between time after complete infusion and post 1 sampling(t) and Duration between completion time of post6 and post1 sampling (t6-t1)
- d. Serum level: Post 1 level result concentration, Post 6 level result concentration and Serum Creatinine
- e. CrCl - user can select option to use Adult or paediatrics calculation
- f. Vd, Ke and t1/2
- g. New dose and Cmin based on desired Cmax
- h. Expected Cmin and Cmax based on new suggested dose

- After save the calculator, the result will appear at the Pharmacokinetics Profile box
- Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 4.0-1

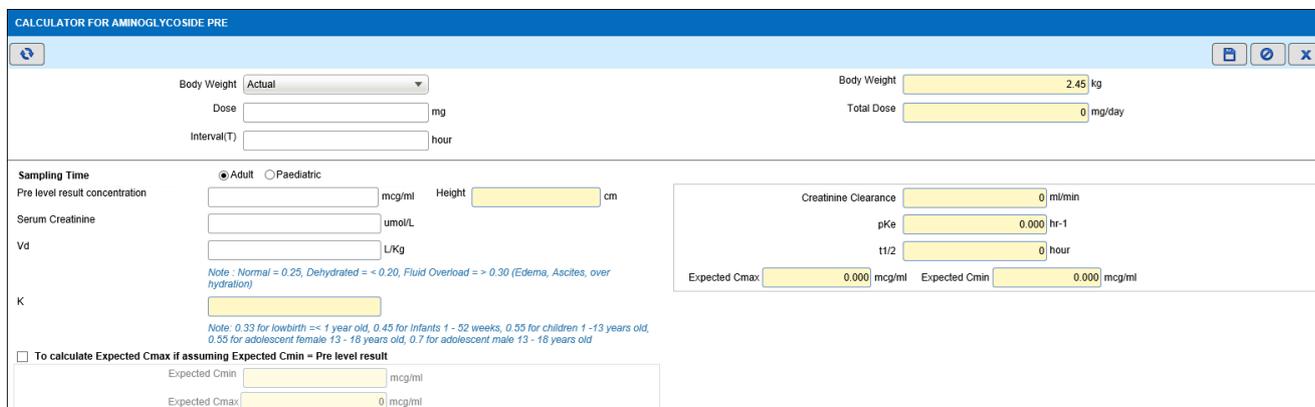


Figure 4.0-2 Calculator for Aminoglycoside Pre Detail (Adult)

Note

- If adult selected shall display calculation as shown in Figure 4.0-2
- K and height field will disable
- Serum Creatinine, system shall auto calculate value for Creatinine Clearance (CrCl)
- If paediatric selected shall display calculation as shown in Figure 4.0-3

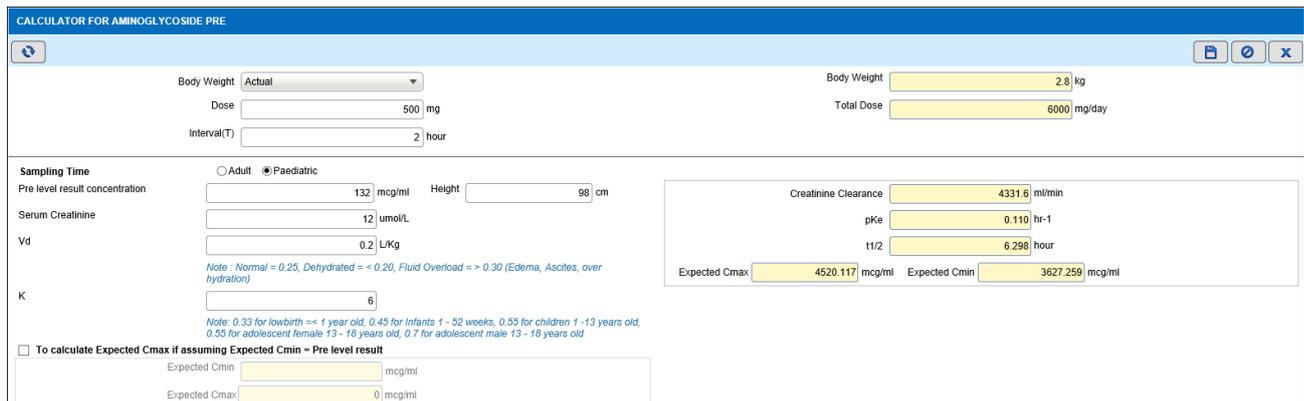


Figure 4.0-3 Calculator for Aminoglycoside Pre Detail (Paediatric)

Note

- User able to insert value for:
 - Serum Creatinine
 - K
 - Height
- System shall auto calculate value for Creatinine Clearance (CrCl) based on formula as below:

$$\text{Formula} = \frac{K \times \text{height (cm)}}{88.4} \text{ Secr umol/L}$$

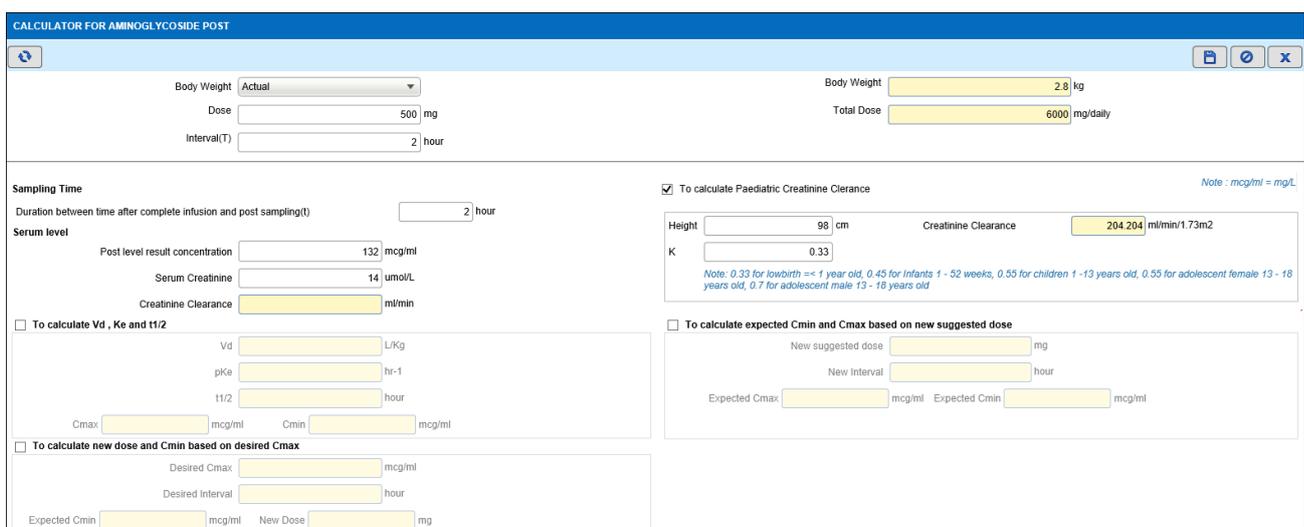


Figure 4.0-4 Calculator for Aminoglycoside Post Detail

CALCULATOR FOR AMINOGLYCOSIDE PRE POST

Body Weight: Actual | Body Weight: 2.8 kg

Dose: 500 mg | Total Dose: 6000 mg/daily

Interval(T): 2 hour

Note : mcg/ml = mg/L

Sampling Time

Duration between time after complete infusion and post sampling(t) : 2 hour

Duration between completion time of pre and post sampling (t2-t1) : 1 hour

Serum level

Pre level result concentration : 132 mcg/ml

Post level result concentration : 100 mcg/ml

Serum Creatinine : 32 umol/L

Creatinine Clearance : ml/min

To calculate Vd , Ke and t1/2

Ke : hr-1

Vd : L/Kg

t1/2 : hour

Cmax : mcg/ml | Cmin : mcg/ml

To calculate new dose and Cmin based on desired Cmax

Desired Cmax : mcg/ml

Desired Interval : hour

Expected Cmin : mcg/ml | New Dose : mg

To calculate Paediatric Creatinine Clearance

Height : 98 cm | Creatinine Clearance : 121.826 ml/min/1.73m2

K : 0.45

Note: 0.33 for lowbirth <= 1 year old, 0.45 for Infants 1 - 52 weeks, 0.55 for children 1 -13 years old, 0.55 for adolescent female 13 - 18 years old, 0.7 for adolescent male 13 - 18 years old

To calculate expected Cmin and Cmax based on new suggested dose

New suggested dose : mg

New Interval : hour

Expected Cmax : mcg/ml | Expected Cmin : mcg/ml

Figure 4.0-5 Calculator for Aminoglycoside Pre Post Detail

CALCULATOR FOR AMINOGLYCOSIDE POST1 & POST6

Body Weight: Actual | Body Weight: 2.8 kg

Dose: 500 mg | Total Dose: 6000 mg/daily

Interval(T): 2 hour

Note : mcg/ml = mg/L

Sampling Time

Duration between time after complete infusion and post1 sampling(t) : 1.5 hour

Duration between completion time of post6 and post1 sampling (t6-t1) : 2 hour

Serum level

Post 1 level result concentration : 23 mcg/ml

Post 6 level result concentration : 243 mcg/ml

Serum Creatinine : 34 umol/L

Creatinine Clearance : ml/min

To calculate Vd , Ke and t1/2

Ke : hr-1

Vd : L/Kg

t1/2 : hour

Cmax : mcg/ml | Cmin : mcg/ml

To calculate new dose and Cmin based on desired Cmax

Desired Cmax : 0 mcg/ml

Desired Interval : 0 hour

Expected Cmin : 0.000 mcg/ml | New Dose : 0.000 mg

To calculate Paediatric Creatinine Clearance

Height : 123 cm | Creatinine Clearance : 223.86 ml/min/1.73m2

K : 0.7

Note: 0.33 for lowbirth <= 1 year old, 0.45 for Infants 1 - 52 weeks, 0.55 for children 1 -13 years old, 0.55 for adolescent female 13 - 18 years old, 0.7 for adolescent male 13 - 18 years old

To calculate expected Cmin and Cmax based on new suggested dose

New suggested dose : 0 mg

New Interval : 0 hour

Expected Cmax : 0.000 mcg/ml | Expected Cmin : 0.000 mcg/ml

Figure 4.0-6 Calculator for Aminoglycoside Pre 1-Post 6 Detail

PB_U. MANUAL_TDM CALCULATOR-13th E

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5.0 Calculator for Valproic Acid

To view the calculator in the system, perform the steps below:

REPORTING
X

<p>Pre Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Post Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Random Sample</p> <p>Result Value <input style="width: 100px;" type="text"/> <input style="width: 100px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Calculator <input style="width: 150px;" type="text" value="Valproic Acid"/> 1</p> <p>Pharmacokinetics Profile <div style="background-color: #ffffcc; height: 150px; border: 1px solid gray; margin-top: 5px;"></div></p> <p>Recommendation Type <input style="width: 150px;" type="text" value="Refer to Pharmacist Notes"/></p> <p>Toxic <input type="checkbox"/> <input checked="" type="checkbox"/> No</p>	<p>Latest Lab Result:</p> <p>Blood Urea <input style="width: 100px;" type="text"/> mmol/L</p> <p>Sodium <input style="width: 100px;" type="text"/> mmol/L</p> <p>Potassium <input style="width: 100px;" type="text"/> mmol/L</p> <p>Serum Creatinine <input style="width: 100px;" type="text"/> µmol/L</p> <p>Creatinine Clearance <input style="width: 100px;" type="text"/> ml/min Not accurate for Children</p> <p>Albumin <input style="width: 100px;" type="text"/> g/L</p>
---	--

Ok

Figure 5.0-1 Calculator for Valproic Acid

STEP 1

Select calculator from dropdown box example:

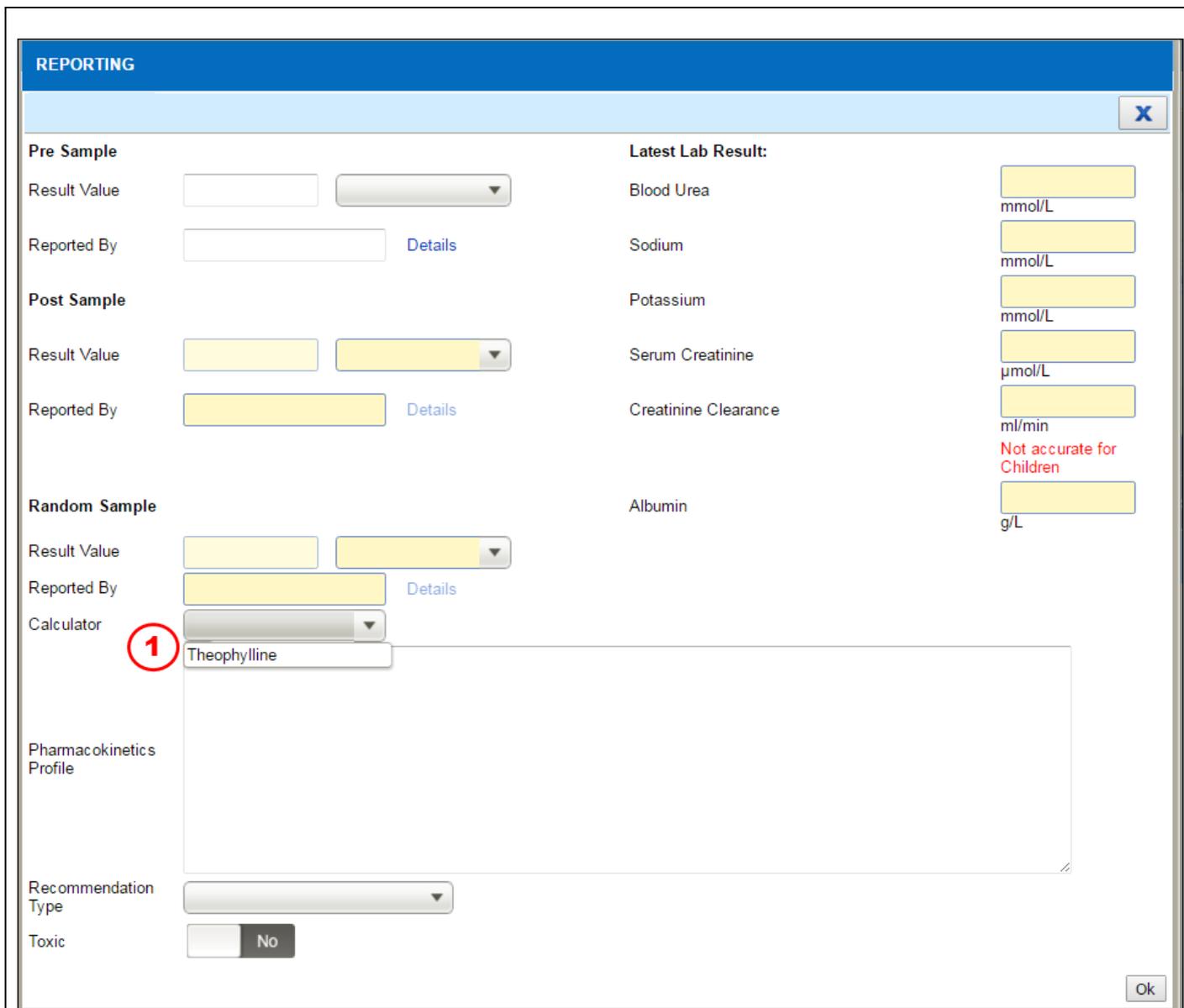
- Valproic Acid

Note

- Choose the calculator and fill the result in the box as per Figure 5.0-1. Sample Details consists of:
 - **Valproic Acid** calculator
 - Dose medication in mg
 - Interval (T) in Hours
 - Total Dose in mg/day
 - Choose between monotherapy or polytherapy
 - ✓ **Monotherapy**- single or combination therapies of different enzyme activities
 - ✓ **Polytherapy** - combination therapies of similar enzyme activities
 - Cp Measured in mcg/ml

6.0 Calculator for Aminophylline / Theophylline

To view the calculator in the system, perform the steps below:



The screenshot shows a web-based reporting interface. At the top is a blue header with the word 'REPORTING' and a close button (X). Below this are several input sections:

- Pre Sample:** Includes 'Result Value' (text input and dropdown) and 'Reported By' (text input and 'Details' link).
- Post Sample:** Includes 'Result Value' (text input and dropdown) and 'Reported By' (text input and 'Details' link).
- Random Sample:** Includes 'Result Value' (text input and dropdown), 'Reported By' (text input and 'Details' link), and a 'Calculator' dropdown menu. A red circle with the number '1' is around the 'Theophylline' option in this dropdown.
- Latest Lab Result:** A list of lab tests with corresponding input fields: Blood Urea (mmol/L), Sodium (mmol/L), Potassium (mmol/L), Serum Creatinine (µmol/L), Creatinine Clearance (ml/min, with a red note 'Not accurate for Children'), and Albumin (g/L).
- Pharmacokinetics Profile:** A large empty text area.
- Recommendation Type:** A dropdown menu.
- Toxic:** A toggle switch currently set to 'No'.

An 'Ok' button is located at the bottom right of the interface.

Figure 6.0-1 Calculator for Aminophylline / Theophylline

STEP 1

Select calculator from dropdown box Aminophylline / Theophylline

Note

- Choose the calculator and fill the result in the box as per Figure 6.0-1. Sample Details consists of:
- **Theophylline** calculator
- Choose between oral or iv

Oral

- Dose medication in mg
- Cp measured in mcg/ml
- Clearance based on patient's factor(s)
- Ke and t1/2 based on CI

- e. Cpss level based on current dose and CI
- f. Loading Dose (LD) if Theophylline given within 24 hours
- g. Incremental Loading Dose (ILD) if level is SUB-therapeutic based on Cp desired and Vd
- h. Infusion rate (Ko) based on Cp desired and CI
- i. New Maintenance Dose (IMD) based on Cp desired and CI
- j. New Dose (Ko) based on Cp and CI when convert Oral to IV Aminophylline

Intravenous (iv)

- k. Dose medication in mg/hr
- l. Cp measured in mcg/ml
- m. Clearance based on patient's factor(s)
- n. Ke and t1/2 based on CI
- o. Loading Dose (LD) based on Cp desired and Vd
- p. Incremental Loading Dose (ILD) if level is SUB-therapeutic based on Cp desired and Vd
- q. Cpss level based on current dose and CI
- r. Loading Dose (LD) if NO Theophylline given within 24 hours
- s. Withold Therapy Period (T) if level is SUPRA-therapeutic based on Cp desired and Ke
- t. New dose (Ko) based on Cp desired and CI

- After save the calculator, the result will appear at the Pharmacokinetics Profile box.
- Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 6.0-1

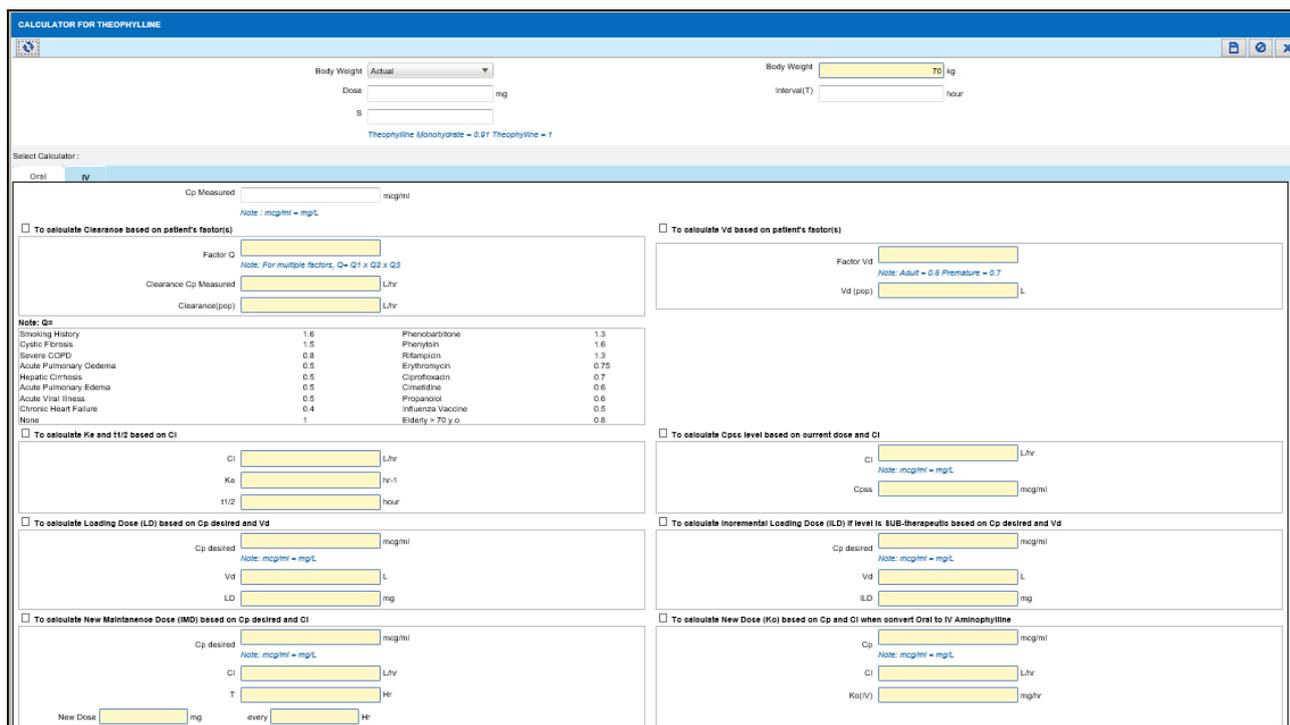
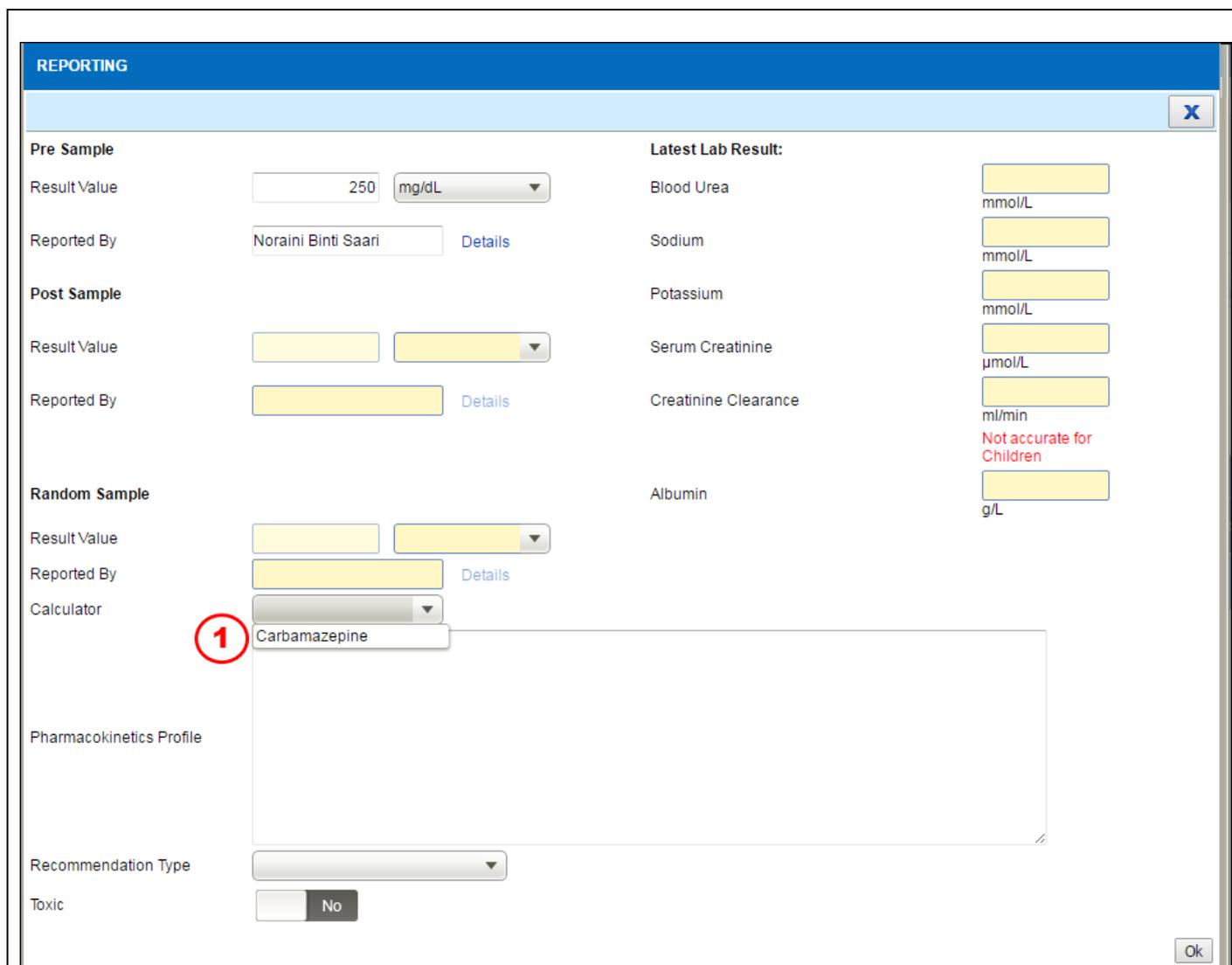


Figure 6.0-2 Calculator for Theophylline for Drug Aminophylline

7.0 Calculator for Carbamazepine

To view the calculator in the system, perform the steps below:



The screenshot shows a web-based reporting interface. At the top, there is a blue header with the word 'REPORTING' and a close button (X). Below this, the interface is divided into several sections:

- Pre Sample:** Includes 'Result Value' (input: 250, unit: mg/dL) and 'Reported By' (input: Noraini Binti Saari, with a 'Details' link).
- Post Sample:** Includes 'Result Value' (empty input) and 'Reported By' (empty input, with a 'Details' link).
- Random Sample:** Includes 'Result Value' (empty input) and 'Reported By' (empty input, with a 'Details' link).
- Calculator:** A dropdown menu is highlighted with a red circle containing the number '1'. The selected option is 'Carbamazepine'.
- Latest Lab Result:** A list of lab tests with empty input fields: Blood Urea (mmol/L), Sodium (mmol/L), Potassium (mmol/L), Serum Creatinine (µmol/L), Creatinine Clearance (ml/min, with a note 'Not accurate for Children'), and Albumin (g/L).
- Pharmacokinetics Profile:** A large empty text area.
- Recommendation Type:** A dropdown menu.
- Toxic:** A radio button labeled 'No'.

An 'Ok' button is located at the bottom right of the window.

Figure 7.0-1 Calculator for Carbamazepine

STEP 1

Select calculator from dropdown box example:

- Carbamazepine

Note

- Choose the calculator and fill the result in the box as per Figure 7.0-1. Sample Details consists of:
 - **Carbamazepine** calculator
 - Dose medication in mg
 - Interval Time in Hours
 - Total Dose in mg/day
 - Choose between monotherapy or polytherapy
 - ✓ **Monotherapy**- single or combination therapies of different enzyme activities
 - ✓ **Polytherapy** - combination therapies of similar enzyme activities
 - Cp Measured in mcg/ml
 - Vd , Ke and t1/2

- *New Maintenance Dose (NMD) based on Cp measured and Cp desired*
 - *Cpss level based on current dose and CI*
 - *Expected Cp based on New Suggested Dose*
- *After saving the calculator, the result will appear at the Pharmacokinetics Profile box.*
 - *Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 7.0-1*

CALCULATOR FOR CARBAMAZEPINE

Body Weight Actual ▾

Dose mg

Interval(T) Hr

Body Weight kg

Total Dose mg/day

Select Calculator :

Monotherapy

Note: single or combination therapies of different enzyme activities.

Cp Measured mcg/ml

Note : mcg/ml = mg/L

Clearance CP measured L/day

κ L/hr

Clearance (Population) L/day

κ L/hr

To calculate Vd , Ke and t1/2

CI L/hr

Vd L/hr

Ke hr⁻¹

t1/2 hour

To calculate Cpss level based on current dose and CI

CI L/hr

Note : mcg/ml = mg/L

Cpss mcg/ml

To calculate New Maintenance Dose (NMD) based on Cp measured dan Cp desired

Cp Desired mg/L

Note : mcg/ml = mg/L

CI L/day

New Dose mg/day

To calculate Expected Cp based on New Suggested Dose

CI L/day

Note : mcg/ml = mg/L

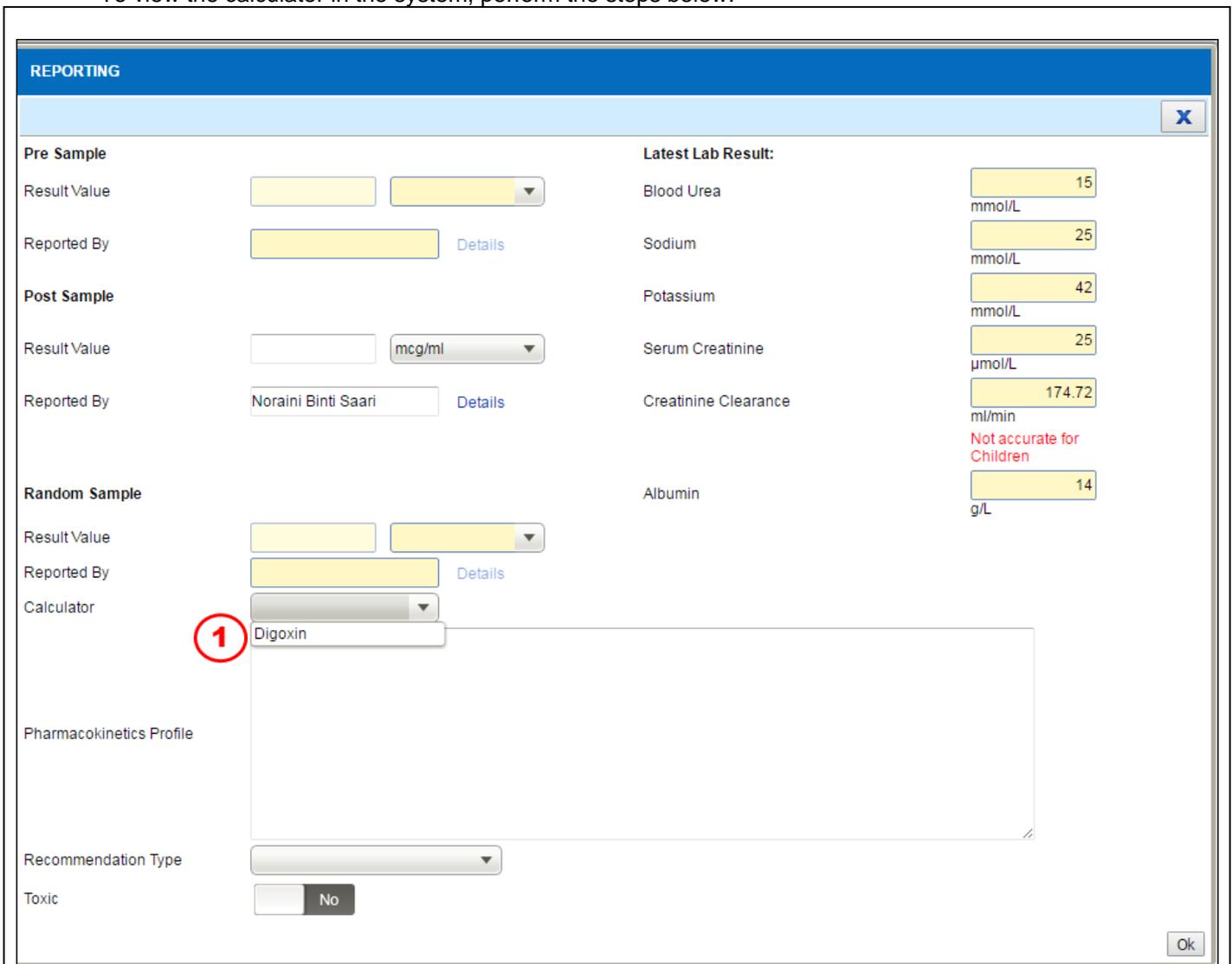
Suggested dose mg/day

Expected Cp mg/L

Figure 7.0-2 Calculator for Carbamazepine for Drug Carbamazepine

8.0 Calculator for Digoxin

To view the calculator in the system, perform the steps below:



REPORTING

Pre Sample

Result Value: [] []

Reported By: [] Details

Post Sample

Result Value: [] [mcg/ml]

Reported By: Noraini Binti Saari Details

Random Sample

Result Value: [] []

Reported By: [] Details

Calculator: **1** Digoxin

Pharmacokinetics Profile

Recommendation Type: []

Toxic: [] No

Latest Lab Result:

Blood Urea: [] 15 mmol/L

Sodium: [] 25 mmol/L

Potassium: [] 42 mmol/L

Serum Creatinine: [] 25 µmol/L

Creatinine Clearance: [] 174.72 ml/min
Not accurate for Children

Albumin: [] 14 g/L

Ok

Figure 8.0-1 Calculator for Digoxin

STEP 1

Select calculator from dropdown box example:

- Digoxin

Note

- Choose the calculator and fill the result in the box as per Figure 8.0-1. Sample Details consists of:
 - **Digoxin** calculator
 - Total Dose in mg/day
 - Serum Creatinine in umol/L
 - CrCl - user can select option to use Adult or paediatrics calculation
 - Choose patient condition:
 - ✓ **Without CHF and not renally impaired**
 - ✓ **Without CHF and renally impaired**
 - ✓ **With CHF and not renally impaired**
 - ✓ **With CHF and renally impaired**
 - Cp Measured in mg/ml
 - Ke and t1/2 based on Cl
 - Cl based on Patient's Factor(s)

- *Vd based on Patient's Factor(s)*
 - *Cpss level based on current dose and CI*
 - *Expected Cp based on CI and New Suggested Dose*
 - *Loading Dose(LD) based on Vd and Cp desired*
 - *New Maintenance Dose(NMD) based on CI and Cp desired*
- *After save the calculator, the result will appear at the Pharmacokinetics Profile box.*
 - *Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 8.0-1*

CALCULATOR FOR DIGOXIN

Body Weight: Actual Body Weight: 70 kg

Total Dose: mg/day

Serum Creatinine: umol/L Creatinine Clearance: ml/min

F:

Note : Tablet = 0.7; Etor = 0.6; Soft Gelatin capsule / Injection = 1

Select Patient's Condition

Without CHF and not renally impaired
 Without CHF and renally impaired
 With CHF and not renally impaired
 With CHF and renally impaired

Cp measured ng/ml

Note : mcg/ml = mg/L = 10⁻³ mcg/ml = 10⁻³ mg/L

= mg/L

To calculate CI based on Patient's Factor(s)

Factor CI

Note : None = 1 Quinidine= 0.5 Amiodarone=0.50 Versipam=0.75 Clinically hypothyroid=0.7 Clinically hyperthyroid=1.3

Clearance CP measured L/day

Clearance (Population) L/day

To calculate Vd based on Patient's Factor(s)

Factor Vd

Vd (pop) L

Note : None = 1 Quinidine= 0.7 Clinically hypothyroid=0.7 Clinically hyperthyroid=1.3

To calculate Ke and t1/2 based on CI

CI L/day

Ke hr⁻¹

t 1/2 hour

To calculate Loading Dose(LD) based on Vd and Cp desired

Cp Desired ng/ml

LD mg/day

To calculate Cpss level based on current dose and CI

CI L/day

Cpss mg/L

= ng/ml

To calculate New Maintenance Dose(NMD) based on CI and Cp desired

CI L/day

Cp Desired ng/ml

New Dose mg/day

To calculate Expected Cp based on CI and New Suggested Dose(NSD)

CI L/day

New Suggested dose mg/day

Expected Cp mg/L = ng/ml

Figure 8.0-2 Calculator for Digoxin for Drug Digoxin

9.0 Calculator for Phenobarbitone

To view the calculator in the system, perform the steps below:

REPORTING

X

<p>Pre Sample</p> <p>Result Value <input style="width: 80px;" type="text"/> <input style="width: 80px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Post Sample</p> <p>Result Value <input style="width: 80px;" type="text"/> <input style="width: 80px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Random Sample</p> <p>Result Value <input style="width: 80px;" type="text"/> <input style="width: 80px;" type="text"/></p> <p>Reported By <input style="width: 150px;" type="text"/> Details</p> <p>Calculator <input style="width: 150px;" type="text" value="Phenobarbitone"/> 1</p> <p>Pharmacokinetics Profile <div style="border: 1px solid #ccc; height: 100px; width: 100%;"></div></p> <p>Recommendation Type <input style="width: 150px;" type="text"/></p> <p>Toxic <input type="checkbox"/> No</p>	<p>Latest Lab Result:</p> <p>Blood Urea <input style="width: 80px;" type="text"/> mmol/L</p> <p>Sodium <input style="width: 80px;" type="text"/> mmol/L</p> <p>Potassium <input style="width: 80px;" type="text"/> mmol/L</p> <p>Serum Creatinine <input style="width: 80px;" type="text"/> µmol/L</p> <p>Creatinine Clearance <input style="width: 80px;" type="text"/> ml/min Not accurate for Children</p> <p>Albumin <input style="width: 80px;" type="text"/> g/L</p>
--	--

Ok

Figure 9.0-1 Calculator for Phenobarbitone

STEP 1

Select calculator from dropdown box example:

- Phenobarbitone

Note

- Choose the calculator and fill the result in the box as per Figure 9.0-1. Sample Details consists of:
 - **Phenobarbitone calculator**
 - Dose medication in mg
 - Interval Time in Hours
 - Total Dose in mg/day
 - Cp Measured in mcg/ml
 - Constant Cl in ml/kg/hr
 - Vd , Ke and t1/2 based on Cl
 - New Maintenance Dose (NMD) based on Cl, Cp measured and Cp desired

- *Cpss level based on current dose and CI*
- *Expected Cp based on CI and New Suggested Dose (NSD)*

- *After save the calculator, the result will appear at the Pharmacokinetics Profile box.*
- *Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 9.0-1*

CALCULATOR FOR PHENOBARBITONE

Body Weight Actual	Interval(T) hour
Body Weight 70 kg	S
Dose mg	Total Dose mg/day

Note : Oral / IV = 1

Cp measured mcg/ml

Note : mcg/ml = mg/L

Clearance CP measured L/day

≈ L/hr

Constant CI ml/kg/hr

Note : Adult = 4 ml/kg/hr Children (≤ 12years 11month) = 8 ml/kg/hr Neonate = 4 ml/kg/hr

Clearance (Population) L/day

≈ L/hr

To calculate Vd , Ke and t1/2 based on CI

CI L/hr

Constant Vd L/kg

Note : Adult = 0.6 L/kg, Neonate = 0.8 - 1 L/kg

Vd L

Ke hr-1 t 1/2 hour

To calculate Cpss level based on current dose and CI

CI L/hr

Cpss mcg/ml

Note : mcg/ml = mg/L

To calculate New Maintenance Dose (NMD) based on CI, Cp measured and Cp desired

Cp desired mcg/ml

Note : mcg/ml = mg/L

CI L/day

New Dose mg/day

To calculate Expected Cp based on CI and New Suggested Dose(NSD)

CI L/day

NSD mg/day

Expected Cp mcg/ml

Note : mcg/ml = mg/L

Figure 9.0-2 Calculator for Phenobarbitone for Drug Phenobarbitone

10.0 Calculator for Phenytoin

To view the calculator in the system, perform the steps below:

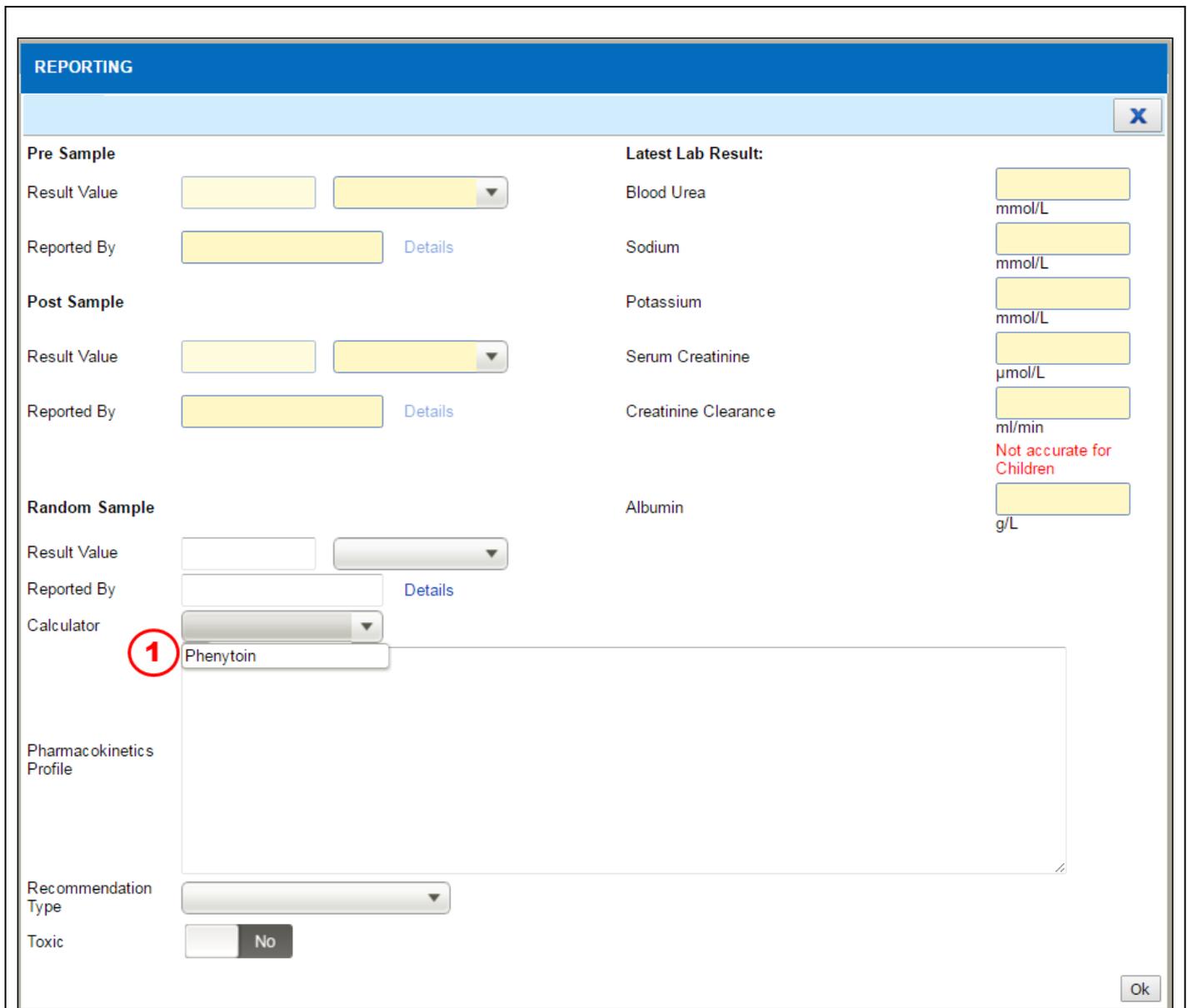


Figure 10.0-1 Calculator for Phenytoin

STEP 1

Select calculator from dropdown box example:

- Phenytoin

Note

- Choose the calculator and fill the result in the box as per Figure 10.0-1. Sample Details consists of:

➤ Phenytoin calculator

- Total Dose in mg/day
- Albumin g/dl
- Choose patient condition between **Without Hypoalbuminemia, Hypoalbuminemia or Hypoalbuminemia with ESRF**

a. *C_p* Measured in mcg/ml

- b. V_{max} (population)
- c. V_d , K_e , $t_{1/2}$ and Cl based on V_{max}
- d. C_{pss} level based on V_{max}
- e. Incremental Loading Dose (ILD) based on C_p desired and C_p measured
- f. Loading Dose (LD) based on C_p desired
- g. therapy withhold period (T) when level is toxic
- h. New Maintenance Dose (NMD) based on V_{max} and C_p desired

Hypoalbuminemia/Hypoalbuminemia with ESRF

- a. C_p Measured in mcg/ml
- b. Corrected C_p Measured in mcg/ml
- c. V_{max} (population)
- d. V_d , K_e , $t_{1/2}$ and Cl based on V_{max}
- e. C_{pss} level based on V_{max}
- f. Incremental Loading Dose (ILD) based on C_p desired and C_p measured
- g. Loading Dose (LD) based on C_p desired
- h. therapy withhold period (T) when level is toxic
- i. New Maintenance Dose (NMD) based on V_{max} and C_p desired

- After save the calculator, the result will appear at the Pharmacokinetics Profile box.
- Calculator is optional only user can direct type at the Pharmacokinetics Profile box without using the calculator as per Figure 10.0-1

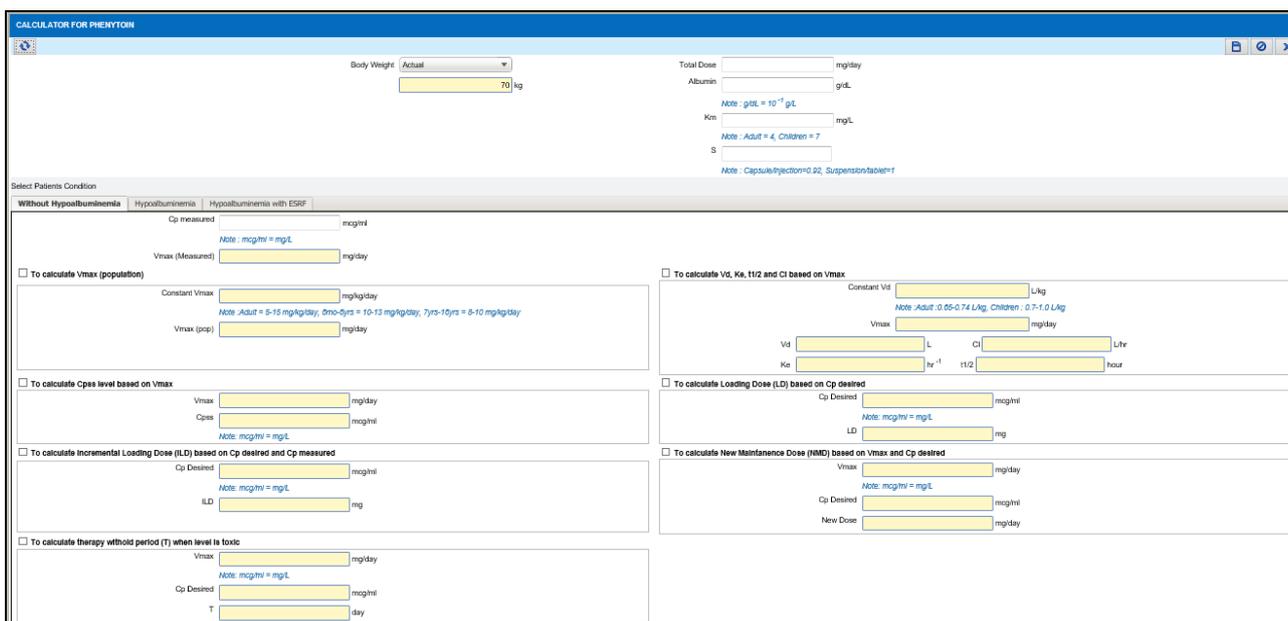


Figure 10.0-2 Calculator for Phenytoin for Drug Phenytoin



11.0 Acronyms

Abbreviation	Definition
PhIS	Pharmacy Information System
CPS	Clinical Pharmacy System
PM	Patient Management
eGL	Electronic Guarantee Letter
HRMIS	Human Resource Management Information System
MRN	Medical Record Number
MOH	Ministry Of Health

12.0 Links To Clinical Modules

No	Module	PDF Links	No	Module	PDF Links
1	<i>Inpatient</i>	Click Here	12	<i>CDR Dispensing</i>	Click Here
2	<i>CDR Order</i>	Click Here	13	<i>Methadone Dispensing</i>	Click Here
3	<i>TDM Order</i>	Click Here	14	<i>PN Dispensing</i>	Click Here
4	<i>PN Order</i>	Click Here	15	<i>Order Management</i>	Click Here
5	<i>IV Order</i>	Click Here	16	<i>Patient Management</i>	Click Here
6	<i>Prepacking</i>	Click Here	17	<i>Radiopharmaceuticals</i>	Click Here
7	<i>Galenical</i>	Click Here	18	<i>Outpatient</i>	Click Here
8	<i>MTAC</i>	Click Here	19	<i>Special Drug Request</i>	Click Here
9	<i>ADR & DAC</i>	Click Here	20	<i>MAR</i>	Click Here
10	<i>Medication Counselling</i>	Click Here	21	<i>DICE</i>	Click Here
11	<i>Ward Pharmacy</i>	Click Here	22		