



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

User Manual Therapeutic Drug Monitoring (TDM)

Version	: 13th Edition
Document ID	: U. MANUAL_THERAPEUTIC DRUG MONITORING



PhIS & CPS Project
User Manual – Therapeutic Drug
Monitoring



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Reference ID : U. MANUAL_THERAPEUTIC DRUG MONITORING-13th E

Application reference: PhIS & CPS v2.6.1



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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 that geared toward 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 Clinical Pharmacokinetics Services (TDM) sub-module, its key features and functionalities. The primary objective is to guide users through the process of completing PhIS application process.

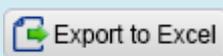
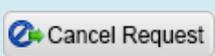
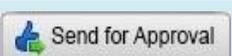
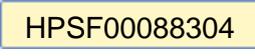
1.3 Organised Sections

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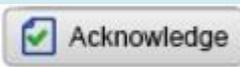
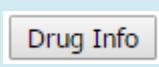
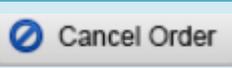
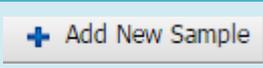
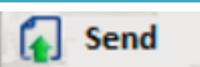
- Section 1 : Introduction
- Section 2 : Application Standard Features
- Section 3 : Clinical Pharmacokinetics Services (TDM)
- Section 4 : Acronyms
- Section 5 : Links to clinical modules

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
	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



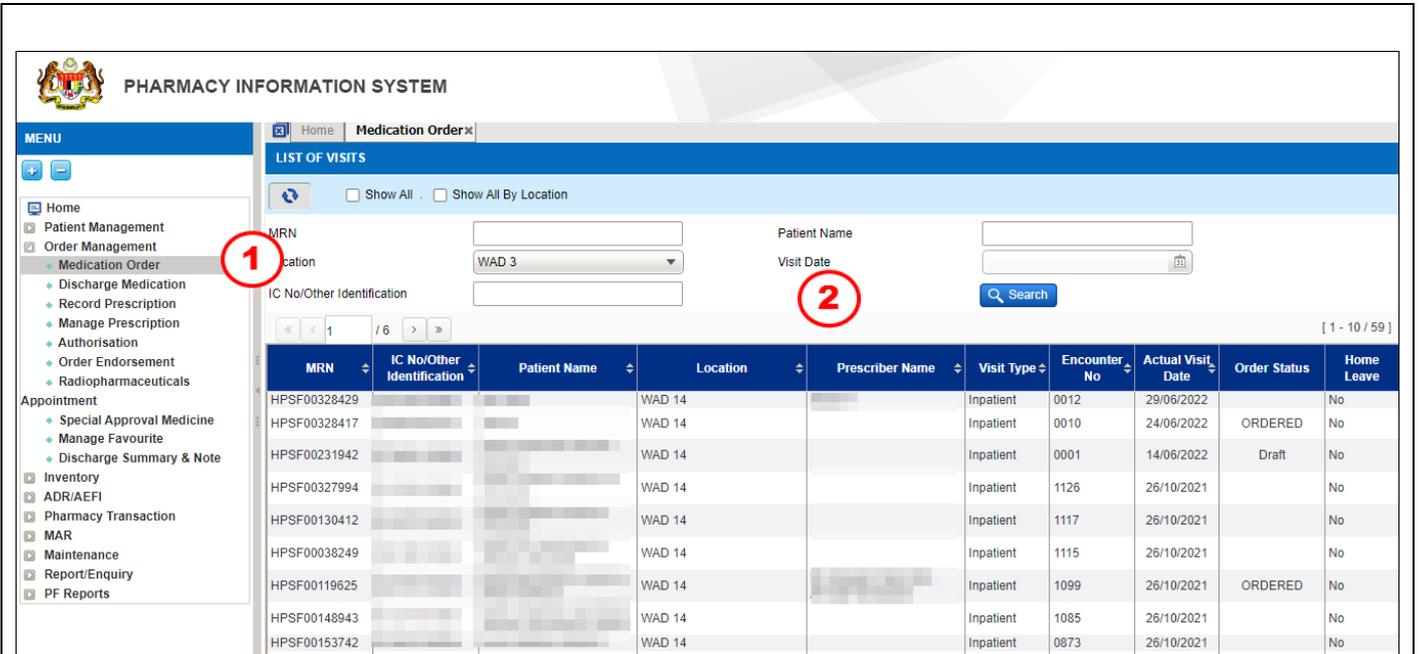
Therapeutic Drug Monitoring Module Legend			
	To Acknowledge		Drug Info
	To Do New Order		To Verify
	Cancel the Order		To Add New Sample
	To send request		Ward Pharmacy

Note

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

3.0 Therapeutic Drug Monitoring (TDM) Order

TDM Order screen allows Prescriber to place TDM Services order. The order will be sent to Pharmacist for verification and reporting.



PHARMACY INFORMATION SYSTEM

Home Medication Orderx

LIST OF VISITS

Show All Show All By Location

MRN: Patient Name:

Location: WAD 3 Visit Date:

IC No/Other Identification:

[1 - 10 / 59]

MRN	IC No/Other Identification	Patient Name	Location	Prescriber Name	Visit Type	Encounter No	Actual Visit Date	Order Status	Home Leave
HPSF00328429			WAD 14		Inpatient	0012	29/06/2022		No
HPSF00328417			WAD 14		Inpatient	0010	24/06/2022	ORDERED	No
HPSF00231942			WAD 14		Inpatient	0001	14/06/2022	Draft	No
HPSF00327994			WAD 14		Inpatient	1126	26/10/2021		No
HPSF00130412			WAD 14		Inpatient	1117	26/10/2021		No
HPSF00038249			WAD 14		Inpatient	1115	26/10/2021		No
HPSF00119625			WAD 14		Inpatient	1099	26/10/2021	ORDERED	No
HPSF00148943			WAD 14		Inpatient	1085	26/10/2021		No
HPSF00153742			WAD 14		Inpatient	0873	26/10/2021		No

Figure 3.0-1 Medication Order Listing Page

STEP 1

Click on 'Order Management' module and click on 'Medication Order' sub-module

STEP 2

Search for patient records by:

- MRN
- Patient's Name
- Location
- Visit Date
- IC No/Other Identification

Note

- Location is defaulted to user's login ID but user is allowed to change to other assigned location.
- Select on Show All checkbox to display all patients' records based on user's assigned locations.
- Select on Show All By Location checkbox to display all patients' records based on user's login location.

LIST OF VISITS									
<input type="checkbox"/> Show All <input type="checkbox"/> Show All By Location									
MRN	<input type="text"/>	Patient Name	<input type="text"/>						
Location	WAD 3	Visit Date	<input type="text"/>						
IC No/Other Identification	<input type="text"/>			<input type="button" value="Search"/>					
[1 - 10 / 59]									
MRN	IC No/Other Identification	Patient Name	Location	Prescriber Name	Visit Type	Encounter No	Actual Visit Date	Order Status	Home Leave
HPSF00328429			WAD 14		Inpatient	0012	29/06/2022		No
HPSF00328417			WAD 14		Inpatient	0010	24/06/2022	ORDERED	No
HPSF00231942			WAD 14		Inpatient	0001	14/06/2022	Draft	No
HPSF00327994			WAD 14		Inpatient	1126	26/10/2021		No
HPSF00130412			WAD 14		Inpatient	1117	26/10/2021		No
HPSF00038249			WAD 14		Inpatient	1115	26/10/2021		No
HPSF00119625			WAD 14		Inpatient	1099	26/10/2021	ORDERED	No
HPSF00148943			WAD 14		Inpatient	1085	26/10/2021		No
HPSF00153742			WAD 14		Inpatient	0873	26/10/2021		No

Figure 3.0-2 Medication Order Listing Page

STEP 3

Click on the button to search for patient records

STEP 4

Double-click on selected patient to display the Medication Order screen

MEDICATION ORDER

Age 71 Years 03 Days Gender Male MRN HPSF00328429

Address Phone And Email Diagnosis Allergy: No Known Allergies Vital Sign

Height 170 cm Weight 70 kg BMI/BSA 24.2 / 1.82 m² G6PD Deficiency Update (Last Updated : 26/01/2023) Nationality : Warganegara

Demographic | Medication Profile | Pharmacist Notes | Monitoring Parameter | Counselling History | Other Appointment | VAS History

Encounter No: 0012 Actual Admission Date: 29/06/2022 Attending Practitioner: Visit Location: WAD 14 Prescriber Dept: General Medicine Pensioner -SELECT- Update

Patient Diagnosis

Allergy

Adverse Drug Reaction

Nutritional Assessment

Normal Order

Infusion Order

Parenteral Nutrition

Cytotoxic Drug Reconstitution

Therapeutic Drug Monitoring

TDM ORDER

Patient Condition:

Oedema Burn

Smoker Liver Disease

Dialysis Dehydration

Others, Please Specify

Latest Lab Result:

Blood Urea mmol/L Serum Creatinine µmol/L

Sodium mmol/L Creatinine Clearance ml/min

Potassium mmol/L Albumin g/L

Not accurate for children

New
Clear
Confirm

Indication For Request

Therapeutic Drug Monitoring

TDM Guidelines

Figure 3.0-3 Medication Order

STEP 5

Click on the button to create TDM order

Note

- User have to enter patient's height and weight and click on the button and system will automatically calculate the BMI/BSA in m².

- Visit Record will display Breast Feeding and Pregnant checkboxes only if the patient is a female.
- User is allow to do multiple TDM Order



Figure 3.0-4 TDM Order

STEP 6

Select **Patient Condition** checkbox(es):

- Oedema
- Burn
- Smoker
- Liver Disease
- Dialysis
- Dehydration
- Others

Note

- User may select more than one condition.
- If 'Others' is selected, user needs to state the patient's condition in the text box provided.
- Fill in Order **Remarks** if applicable.

STEP 7

Enter **Latest Lab Result** which consists of:

- Blood Urea
- Sodium
- Potassium
- Serum Creatinine
- Creatinine Clearance
- Albumin

Note

- Creatinine Clearance will be automatically calculated by system in ml/min when Serum Creatinine is filled.
- Lab result data will be updated in the **Lab Result** hyperlink



Figure 3.0-5 TDM Drug Details

STEP 8

Select **Indication For Request** from dropdown box:

- Non Compliance
- Poor Response
- Therapeutic Monitoring
- Suspected Toxicity

Note

- Selected Indication For Request will be the search key for TDM Drug field.

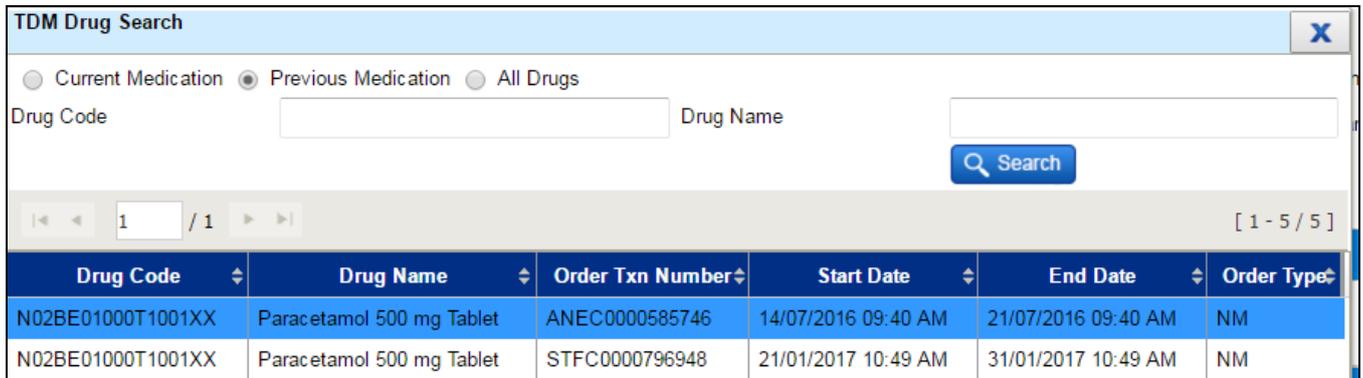
STEP 9

Click on the  button to search for TDM drug based on:

- Current Medication
- Previous Medication
- All Drugs

Note

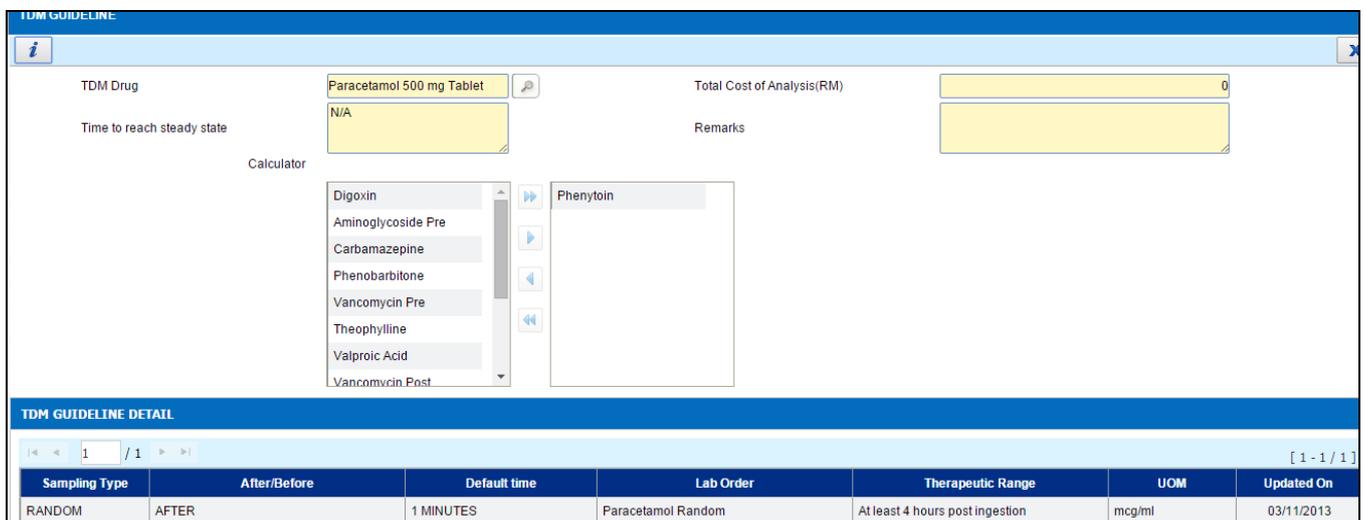
- If the selected Indication for Request 'Non Compliance/ Poor Response/ Therapeutic Monitoring', TDM Drug search can be select from three (3) sources :
- Current Medication
 - Medication which patient still take and active in the system as drug classified as TDM drug only
- Previous Medication
 - Medication which patient taken before and completed in the system as drug classified as TDM drug only
- All Drugs
 - All medication classified in TDM drug
- If the selected TDM Drug is the Current Medication or Previous Medication, system will automatically display the Drug Details as per Figure 3.0-6.
- Click on [TDM Guidelines](#) hyperlink to view TDM Guideline details on the selected TDM Drug as per Figure 3.0-7.
- TDM Guideline master setup is controlled by HQ.
- If the selected Indication for Request is 'Suspected Toxicity', TDM Drug search will default to 'All drugs' which comes from drugs that have been set in TDM Guideline master.
- The Drug Details field will be a free text field for user to enter the current dosage and frequency as per Figure 3.0-8.



The screenshot shows a 'TDM Drug Search' window with radio buttons for 'Current Medication', 'Previous Medication' (selected), and 'All Drugs'. It includes input fields for 'Drug Code' and 'Drug Name', a 'Search' button, and a table of results.

Drug Code	Drug Name	Order Txn Number	Start Date	End Date	Order Type
N02BE01000T1001XX	Paracetamol 500 mg Tablet	ANEC0000585746	14/07/2016 09:40 AM	21/07/2016 09:40 AM	NM
N02BE01000T1001XX	Paracetamol 500 mg Tablet	STFC0000796948	21/01/2017 10:49 AM	31/01/2017 10:49 AM	NM

Figure 3.0-6 TDM Drug Search



The screenshot shows the 'TDM GUIDELINE' window. It includes fields for 'TDM Drug' (Paracetamol 500 mg Tablet), 'Time to reach steady state' (N/A), 'Total Cost of Analysis(RM)' (0), and 'Remarks'. A 'Calculator' section lists various drugs like Digoxin, Aminoglycoside Pre, Carbamazepine, etc. Below is a 'TDM GUIDELINE DETAIL' table.

Sampling Type	After/Before	Default time	Lab Order	Therapeutic Range	UOM	Updated On
RANDOM	AFTER	1 MINUTES	Paracetamol Random	At least 4 hours post ingestion	mcg/ml	03/11/2013

Figure 3.0-7 TDM Guidelines

- Patient Diagnosis
- Allergy
- Adverse Drug Reaction
- Nutritional Assessment
- Normal Order
- Infusion Order
- Parenteral Nutrition
- Cytotoxic Drug Reconstitution
- Therapeutic Drug Monitoring
- Radiopharmaceuticals
- View MAR
- Referral Visit

Patient Condition:

Oedema
 Smoker
 Dialysis
 Others, Please Specify

Burn
 Liver Disease
 Dehydration

Latest Lab Result:

Blood Urea	<input type="text" value="20"/> mmol/L	Serum Creatinine	<input type="text" value="200"/> µmol/L
Sodium	<input type="text" value="20"/> mmol/L	Creatinine Clearance	<input type="text" value="49.08"/> ml/min
Potassium	<input type="text" value="2"/> mmol/L	Albumin	<input type="text" value="23"/> g/L

Not accurate for children

DRUG DETAILS

New
Clear
Confirm

Indication For Request	<input type="text" value="Non Compliance"/>		
TDM Drug	<input type="text" value="Acetylsalicylic Acid 100 mg, Glycine 45"/>	TDM Guidelines	
Order Remarks	<input style="width: 100%;" type="text"/>		
Drug Details	<input style="width: 100%;" type="text"/>		

(Please specify current Dosage, Frequency, Start Date & End Date)

+ Add
Modify
Clear

	Drug Name	Drug Details	Order Remarks	Drug Info	
Add Samp	Gentamicin 80mg/2ml Injection	80mg bd		i	🗑️

Figure 3.0-8 TDM Drug Detail

MEDICATION ORDER

Upload Photo

Age 71 Years 03 Days	Gender Male	MRN HPSF00328429	
Address	Phone And Email	Diagnosis	Allergy: No Known Allergies
Height <input type="text" value="170"/> cm	Weight <input type="text" value="70"/> kg	BMI/BSA 24.2 / 1.82 m ²	G6PD Deficiency <input type="checkbox"/>

(Last Updated : 26/01/2023) Nationality : Warganegara

Encounter No: 0012
Actual Admission Date: 29/06/2022
Attending Practitioner
Visit Location: WAD 14
Prescriber Dept.: General Medicine
Pensioner
-SELECT-
Update

Demographic | Medication Profile | Pharmacist Notes
Monitoring Parameter
Counselling History | Other Appointment | VAS History

Figure 3.0-9 Monitoring Parameter Hyperlink

- Patient Diagnosis
- Allergy
- Adverse Drug Reaction
- Nutritional Assessment
- Normal Order
- Infusion Order
- Parenteral Nutrition
- Cytotoxic Drug Reconstitution
- Therapeutic Drug Monitoring
- Radiopharmaceuticals
- View MAR
- Referral Visit

Patient Condition:

Oedema
 Smoker
 Dialysis
 Others, Please Specify

Burn
 Liver Disease
 Dehydration

Latest Lab Result:

Blood Urea	<input type="text"/> mmol/L	Serum Creatinine	<input type="text"/> µmol/L
Sodium	<input type="text"/> mmol/L	Creatinine Clearance	<input type="text"/> ml/min
Potassium	<input type="text"/> mmol/L	Albumin	<input type="text"/> g/L

Not accurate for children

DRUG DETAILS

New
Clear
Confirm

Indication For Request	<input type="text"/>		
TDM Drug	<input type="text" value="Acetylsalicylic Acid 100 mg, Glycine 45"/>	TDM Guidelines	
Order Remarks	<input style="width: 100%;" type="text"/>		
Drug Details	<input style="width: 100%;" type="text"/>		

(Please specify current Dosage, Frequency, Start Date & End Date)

+ Add
Modify
Clear

	Drug Name	Drug Details	Order Remarks	Drug Info	
Add Samp	Acetylsalicylic Acid 100 mg, Glycine 45 mg Tablet	300mg OD 3/12		i	🗑️

Figure 3.0-10 Drug Details

STEP 10
Fill the **Order Remark** if necessary.

STEP 11
Fill the **Drug Detail**.

Note

- Please specify current **Dosage, Frequency, Start Date & End Date** if choose '**All Drug**' for TDM Drug Request.

STEP 12

Click on the  button to added drug and will be display as Figure 3.0.10

Note

- Click on the  button to change any information.
- Click on the  button to clear the drug detail part before added any new information.



Figure 3.0-11 Sampling Details

STEP 13

Click on the  hyperlink to fill in sampling details, sampling details screen will be displayed as Figure 3.0.11.

Note

- There are several sampling type that can be choose
 - Post 1
 - Post 2
 - Post
 - Pre
 - Random
- Screen for Sampling Details will be displayed differently based on selected 'Indication For Request' below:
- Sampling Type will be displayed differently based on choosen medication together from TDM guideline
Example:
 - Paracetamol for random and pre sampling .
 - Vancomycin for Pre ,post and random sampling
- If 'Suspected Toxicity', Sampling Type is defaulted to 'Random' and the 'Suggested Sampling Date/Time' field will be displayed as per Figure 3.0-12.
- System allow user to select 'before' or 'after' when random level is selected as per Figure 3.0-11
- If sample type 'Random' is selected, Sampling Date/Time field will appear, user can select date and time of suggested sampling

STEP 14

Click on the  button to select **Drug Administration Date/Time**

Note

Drug Administration Date/Time to be default as empty and change the time format to 12 Hour format

STEP 15

Select **Sampling Time** from dropdown box and enter **Interval** and select Hours/Minutes and select **Before/After** from drop down

Note

The Interval field is only enable if user choose the Indication for Request as Non Compliance/Poor Response/Therapeutic Monitoring.

Figure 3.0-12 Sampling Details

STEP 16

Click on the to view the sampling details added as Figure 3.0.13

Figure 3.0-13 Drug Details

STEP 17

Click on the to confirm TDM order and TDM Order No. will be generated.

STEP 18

Click on the button to save record

Figure 3.0-14 Confirmation alert message

STEP 19

Click on the button to print TDM Request Form as per Figure 3.0-13

Note

- Click on the button to clear all entered data.
- Click on the button to create a new TDM Order and the system will reset all fields in TDM Order screen.



CLINICAL PHARMACOKINETICS SERVICES
Therapeutic Drug Monitoring (TDM) Request Form

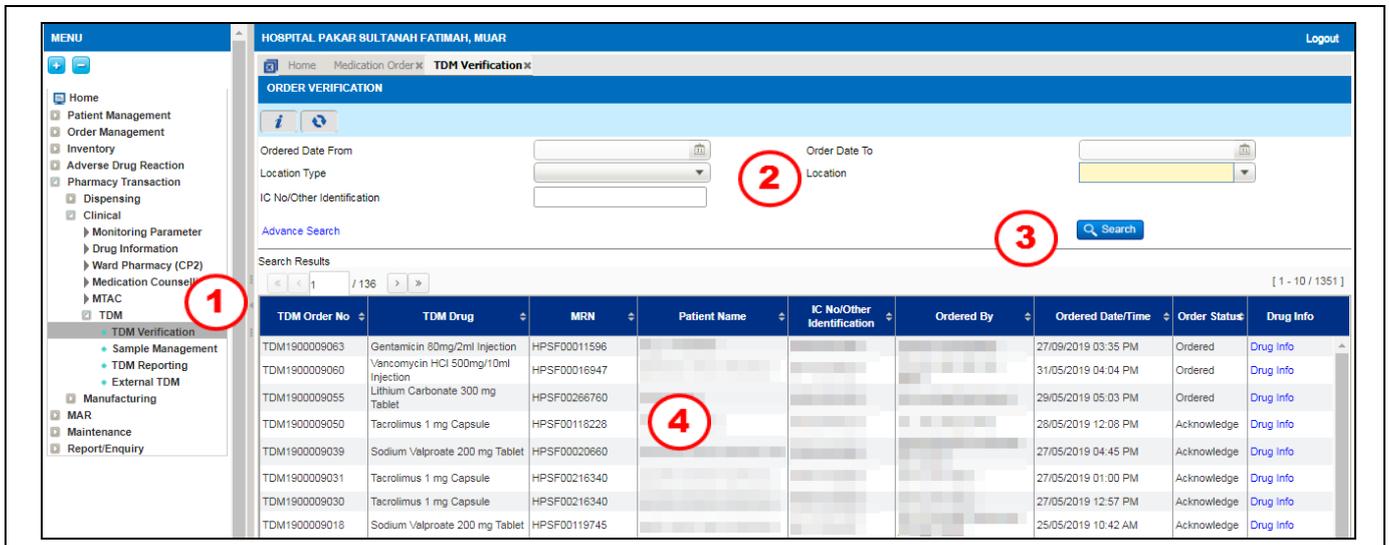
Ordered By [REDACTED] TDM Order No : TDM2300000002
Ordered Date/Time 26/01/2023 12:39 PM

PATIENT DETAILS					
Name:	[REDACTED]	MRN NO:	HPSF00328429	IC:	[REDACTED]
				Race:	
Age:	71 Years 03 Days	Sex:	Male	Ward/Unit:	WAD 14
Weight:		Height:			
LATEST LAB RESULT :					
Blood Urea	Sodium	Potassium	Serum Creatinine	Creatinine Clearance	Albumin
PATIENT CONDITION					
Oedema:	NO	Smoker:	NO	Dehydration:	NO
Dialysis:	NO	Burn:	NO	Liver Disease:	NO
Others:	NO	Details:			
TDM DRUG DETAILS					
No	TDM No	Drug Name	Drug Details	Indication Request	Remarks
1	TDM2300000002	Acetylsalicylic Acid 100 mg, Glycine 45 mg Tablet	300mg OD 3/12	Poor Response	
Sample Type	Lab Test Order	Drug Administration Date/Time	Suggested Sampling Date/Time	Interval	
RANDOM	Salicylate Random	25/01/2023 12:49 PM	26/01/2023 12:49 PM	24 Hours	

Figure 3.0-15 TDM Request Form

4.0 Therapeutic Drug Monitoring (TDM) Verification

TDM Verification module is for user to acknowledge and verify TDM order



TDM Order No	TDM Drug	MRN	Patient Name	IC No/Other Identification	Ordered By	Ordered Date/Time	Order Status	Drug Info
TDM1900009063	Gentamicin 80mg/2ml Injection	HPSF00011596	[REDACTED]	[REDACTED]	[REDACTED]	27/09/2019 03:35 PM	Ordered	Drug Info
TDM1900009060	Vancomycin HCl 500mg/10ml Injection	HPSF00016947	[REDACTED]	[REDACTED]	[REDACTED]	31/05/2019 04:04 PM	Ordered	Drug Info
TDM1900009055	Lithium Carbonate 300 mg Tablet	HPSF00266760	[REDACTED]	[REDACTED]	[REDACTED]	29/05/2019 05:03 PM	Ordered	Drug Info
TDM1900009050	Tacrolimus 1 mg Capsule	HPSF00118228	[REDACTED]	[REDACTED]	[REDACTED]	28/05/2019 12:08 PM	Acknowledge	Drug Info
TDM1900009039	Sodium Valproate 200 mg Tablet	HPSF00020660	[REDACTED]	[REDACTED]	[REDACTED]	27/05/2019 04:45 PM	Acknowledge	Drug Info
TDM1900009031	Tacrolimus 1 mg Capsule	HPSF00216340	[REDACTED]	[REDACTED]	[REDACTED]	27/05/2019 01:00 PM	Acknowledge	Drug Info
TDM1900009030	Tacrolimus 1 mg Capsule	HPSF00216340	[REDACTED]	[REDACTED]	[REDACTED]	27/05/2019 12:57 PM	Acknowledge	Drug Info
TDM1900009018	Sodium Valproate 200 mg Tablet	HPSF00119745	[REDACTED]	[REDACTED]	[REDACTED]	25/05/2019 10:42 AM	Acknowledge	Drug Info

Figure 4.0-1 TDM Verification Listing Page

STEP 1

Click on 'TDM' module and click on 'TDM Verification' function

STEP 2

Search for TDM orders by:

- Ordered Date From
- Order Date To
- Location Type
- Location
- IC No./Others Identification

STEP 3

Click on the  button to search for TDM orders

STEP 4

Double click on selected record to display TDM Verification screen

Note

- Click on [Advance Search](#) hyperlink for advance search using below criteria:
 - TDM Order No
 - Status
 - TDM Drug
 - Ordered By
 - Acknowledged By
 - MRN
- Click on [Basic Search](#) hyperlink for basic search as per Step 2.

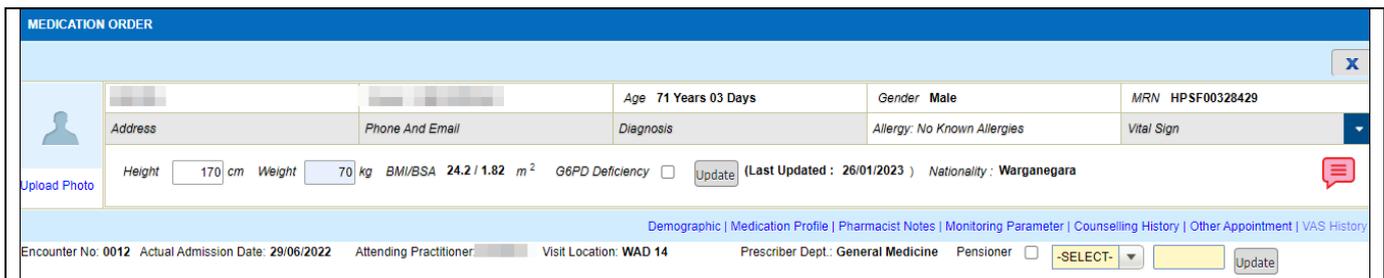
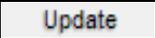


Figure 4.0-2 Patient's Banner

Note

TDM Verification consists of:

- a) Patient's Banner
 - Patient's Banner display patient's profile. User can update patient's height and weight.
 - Click on the  button and system will automatically calculate the BMI/BSA in m².

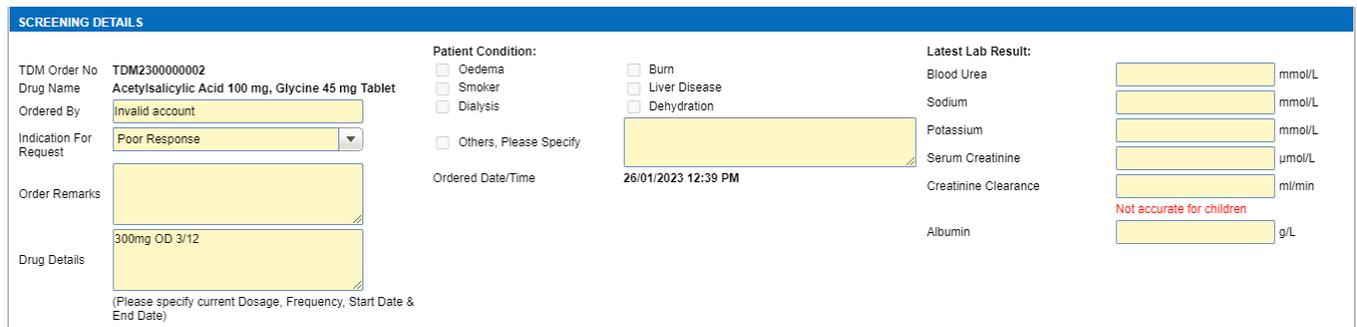


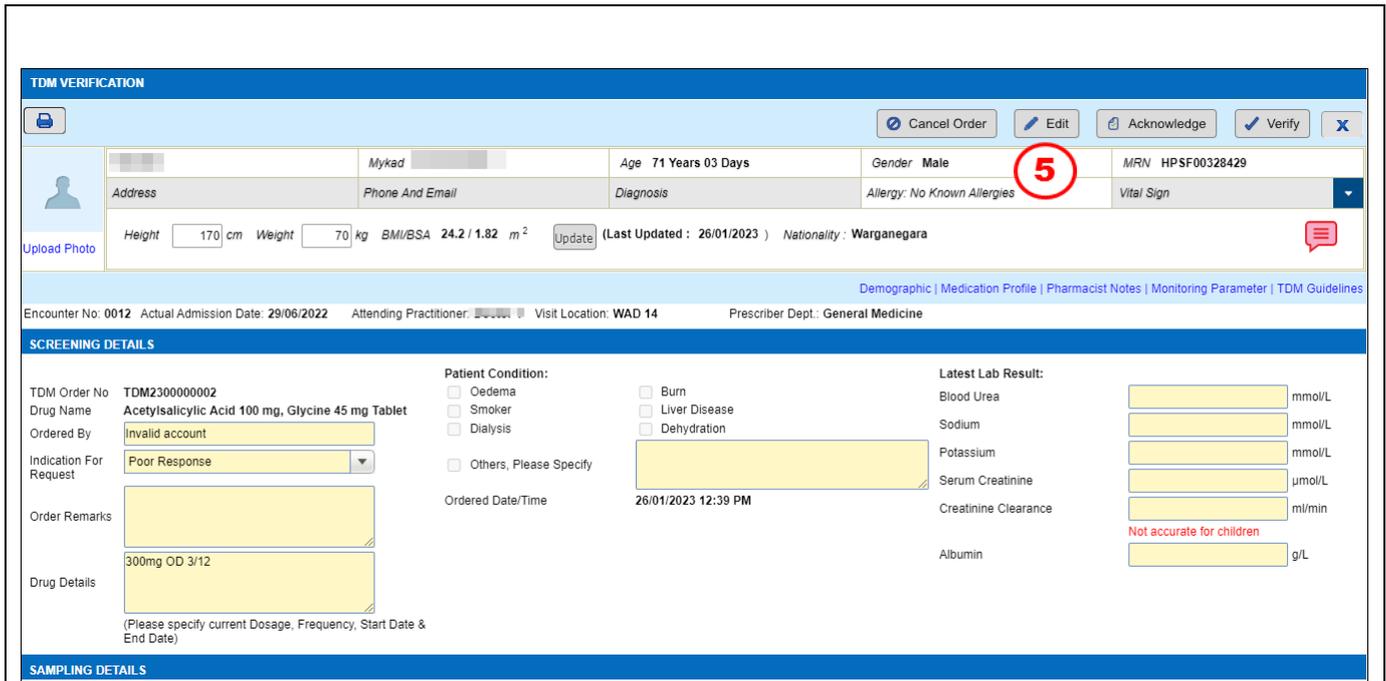
Figure 4.0-3 Screening Details

- b) Screening Details
 - Screening Details consists of:
 - TDM Order No.
 - Drug Name
 - Drug Details
 - Ordered By
 - Indication For Request
 - Order Remarks
 - Patient Conditions
 - Ordered Date/Time
 - Latest Lab Result



Figure 4.0-5 Sampling Details

- c) Sampling Details
 - Sampling Details consists of:
 - Sampling Type
 - Drug Administration Date/Time
 - Suggested Sampling Date/Time
 - Lab Test Order
 - Sample Status



TDM VERIFICATION

Cancel Order Edit Acknowledge Verify X

Mykad: [Redacted] Age: 71 Years 03 Days Gender: Male **5** MRN: HPSF00328429

Address: [Redacted] Phone And Email: [Redacted] Diagnosis: [Redacted] Allergy: No Known Allergies Vital Sign: [Redacted]

Height: 170 cm Weight: 70 kg BMI/BSA: 24.2 / 1.82 m² Update (Last Updated: 26/01/2023) Nationality: Warganegara

Encounter No: 0012 Actual Admission Date: 29/06/2022 Attending Practitioner: [Redacted] Visit Location: WAD 14 Prescriber Dept.: General Medicine

SCREENING DETAILS

TDM Order No: TDM230000002
 Drug Name: Acetylsalicylic Acid 100 mg, Glycine 45 mg Tablet
 Ordered By: Invalid account
 Indication For Request: Poor Response
 Order Remarks: [Redacted]
 Drug Details: 300mg OD 3/12
 (Please specify current Dosage, Frequency, Start Date & End Date)

Patient Condition:
 Oedema
 Smoker
 Dialysis
 Others, Please Specify [Redacted]
 Ordered Date/Time: 26/01/2023 12:39 PM

Latest Lab Result:
 Blood Urea: [Redacted] mmol/L
 Sodium: [Redacted] mmol/L
 Potassium: [Redacted] mmol/L
 Serum Creatinine: [Redacted] μmol/L
 Creatinine Clearance: [Redacted] ml/min
 Albumin: [Redacted] g/L
 Not accurate for children

SAMPLING DETAILS

Figure 4.0-6 TDM Verification

STEP 5

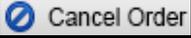
Click on the  button to edit record

Note

- User able to edit details in Screening Details section as below:
 - Order Remarks
 - Drug Details
 - Patient Condition
 - Latest Lab Result
- These are additional functions in TDM Verification (If applicable):
 - Edit Sampling Details
 - Add new sample
 - Reject sample
 - Cancel Order

Edit Sampling Details as per Figure 4.0-7:

- Double click on sample record to display sampling details.
- Click on the  button to edit record as per Figure 4.0-8.
- Edit sampling details as below:
 - Sampling Type
 - Drug Administration Date/Time
 - Suggested Sampling Time/Date
- Click on the  button to save sampling details
- Click on the  button to add new sample
- Edit sampling details as below:
 - Sampling Type
 - Drug Administration Date/Time
 - Interval
- Click on the  button to save new sample record.

- Click on the  button to cancel order.
- User able to cancel just 1 sample and remain other sample's in same TDM order
- Order Status will be changed to "Cancelled" and users not necessary to place new order.

SAMPLING DETAILS					
+ Add New Sample					
[1 - 1/1]					
Sampling Type	Drug Administration Date/Time	Sampling Time	Suggested Sampling Date/Time	Lab Test Order	Sample Status
Random	25/01/2023 12:49 PM	24 Hours	26/01/2023 12:49 PM	Salicylate Random	Ordered
Acknowledged By :		Acknowledged Date/Time :			

Figure 4.0-7 Sampling Details

SAMPLING DETAILS					
Sampling Type	RANDOM	Drug Administration Date/Time	26/01/2023 03:00 PM	Suggested Sampling Date/Time	26/01/2023 03:59 PM
					After

Figure 4.0-8 Edit Sampling Details

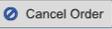
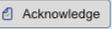
TDM VERIFICATION					
   					
	Mykad	Age 71 Years 03 Days	Gender Male	MRN HPSF00328429	
Address	Phone And Email	Diagnosis	Allergy: No Known Allergies	Vital Sign	
Upload Photo	Height 170 cm Weight 70 kg BMI/BSA 24.2 / 1.82 m ²	Update (Last Updated : 26/01/2023) Nationality : Warganegara			
Demographic Medication Profile Pharmacist Notes Monitoring Parameter TDM Guidelines					
Encounter No: 0012 Actual Admission Date: 29/06/2022 Attending Practitioner: Visit Location: WAD 14 Prescriber Dept: General Medicine					
SCREENING DETAILS					
TDM Order No	TDM230000002	Patient Condition:	Latest Lab Result:		
Drug Name	Acetylsalicylic Acid 100 mg, Glycine 45 mg Tablet	<input type="checkbox"/> Oedema	<input type="checkbox"/> Blood Urea		
Ordered By	Invalid account	<input type="checkbox"/> Burn	<input type="checkbox"/> Sodium		
Indication For Request	Poor Response	<input type="checkbox"/> Smoker	<input type="checkbox"/> Potassium		
Order Remarks		<input type="checkbox"/> Liver Disease	<input type="checkbox"/> Serum Creatinine		
Drug Details	300mg OD 3/12	<input type="checkbox"/> Dehydration	<input type="checkbox"/> Creatinine Clearance		
	(Please specify current Dosage, Frequency, Start Date & End Date)	<input type="checkbox"/> Others, Please Specify	<input type="checkbox"/> Albumin		
		Ordered Date/Time	26/01/2023 12:39 PM		
			Not accurate for children		
SAMPLING DETAILS					

Figure 4.0-9 Cancel Order Function

TDM VERIFICATION

Cancel Order Edit Acknowledge Verify X

	Mykad	Age 71 Years 03 Days	Gender Male	SF00328429
Address	Phone And Email	Diagnosis	Allergy: No Known Allergies	Vital Sign

Height cm Weight kg BMI/BSA 24.2 / 1.82 m² Update (Last Updated : 26/01/2023) Nationality : Warganegara

6 8

7

SCREENING DETAILS

TDM Order No: TDM230000002 Drug Name: Acetylsalicylic Acid 100 mg, Glycine 45 mg Tablet Ordered By: Invalid account Indication For Request: Poor Response Order Remarks: Drug Details: 300mg OD 3/12 <small>(Please specify current Dosage, Frequency, Start Date & End Date)</small>	Patient Condition: <input type="checkbox"/> Oedema <input type="checkbox"/> Smoker <input type="checkbox"/> Dialysis <input type="checkbox"/> Others, Please Specify Ordered Date/Time: 26/01/2023 12:39 PM	Latest Lab Result: Blood Urea: <input type="text"/> mmol/L Sodium: <input type="text"/> mmol/L Potassium: <input type="text"/> mmol/L Serum Creatinine: <input type="text"/> µmol/L Creatinine Clearance: <input type="text"/> ml/min Albumin: <input type="text"/> g/L <small>Not accurate for children</small>
---	--	---

SAMPLING DETAILS

Figure 4.0-10 Save and Acknowledge Function

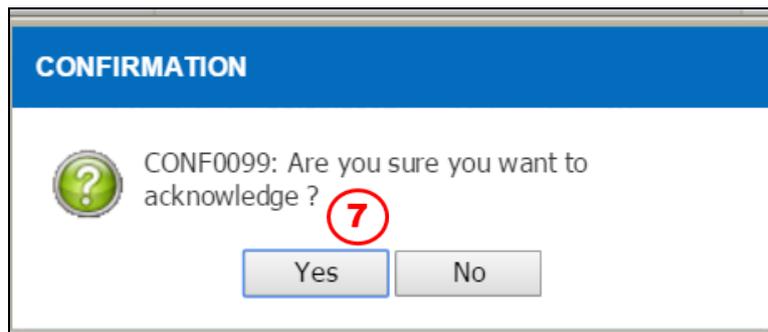
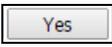


Figure 4.0-11 Confirmation alert message

STEP 6

Click on the  button to acknowledge order

STEP 7

Click on the  button to save record

Note

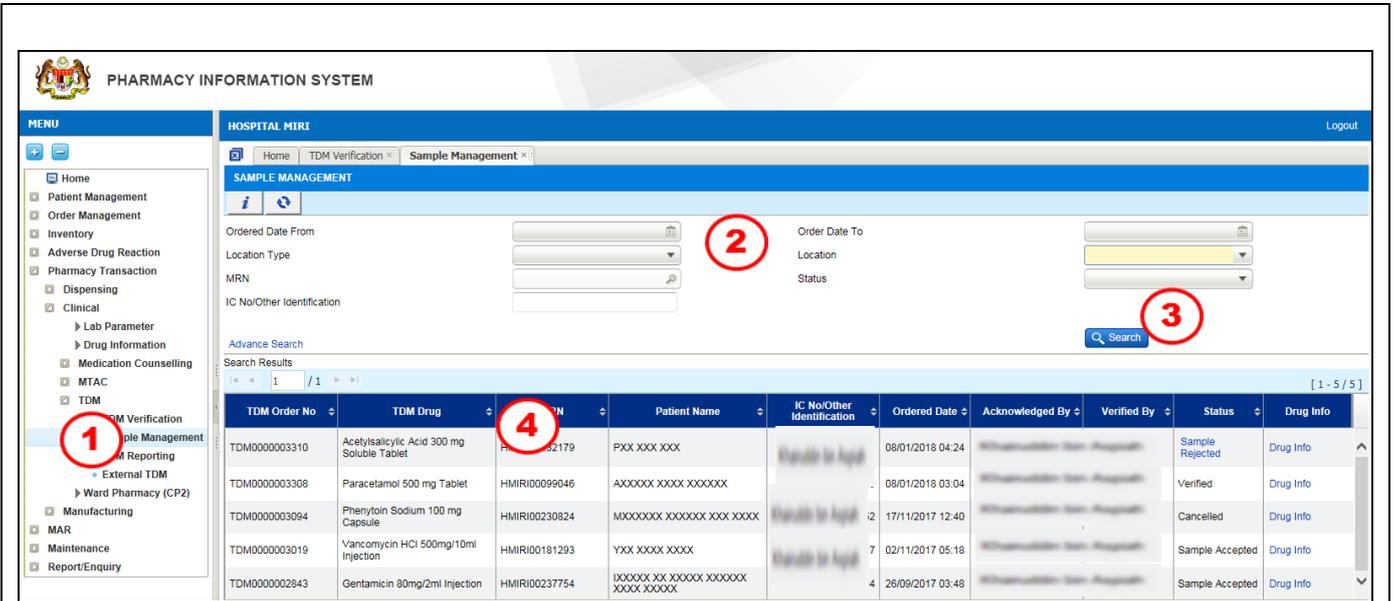
- Order Status changed from “Ordered” to “Acknowledge”.
- User still can update sampling details.
- Acknowledged By and Acknowledged Date/Time will be displays.
- If user click “verify’ button without Acknowledge, status will be updated as Verified, system will auto update Acknowledge date/time as Verify date/time

STEP 8

Click on  button to verify order

5.0 Sample Management

This sub-module is to record the movement of the sample.



PHARMACY INFORMATION SYSTEM

HOSPITAL MIRI

Home TDM Verification Sample Management

SAMPLE MANAGEMENT

Ordered Date From [] Order Date To []
 Location Type [] Location []
 MRN [] Status []
 IC No/Other Identification []

Advance Search [Search]

Search Results [1 - 5 / 5]

TDM Order No	TDM Drug	MRN	Patient Name	IC No/Other Identification	Ordered Date	Acknowledged By	Verified By	Status	Drug Info
TDM0000003310	Acetylsalicylic Acid 300 mg Soluble Tablet	H2179	PXX XXX XXX	[]	08/01/2018 04:24	[]	[]	Sample Rejected	Drug Info
TDM0000003308	Paracetamol 500 mg Tablet	HMIRI00099046	AXXXXX XXXX XXXXXX	[]	08/01/2018 03:04	[]	[]	Verified	Drug Info
TDM0000003094	Phenytoin Sodium 100 mg Capsule	HMIRI00230824	MXXXXX XXXXXX XXX XXXX	[]	17/11/2017 12:40	[]	[]	Cancelled	Drug Info
TDM0000003019	Vancomycin HCl 500mg/10ml Injection	HMIRI00181293	YXX XXXX XXXX	[]	02/11/2017 05:18	[]	[]	Sample Accepted	Drug Info
TDM0000002843	Gentamicin 80mg/2ml Injection	HMIRI00237754	XXXXXX XX XXXXXX XXXXXX XXXX XXXXXX	[]	26/09/2017 03:48	[]	[]	Sample Accepted	Drug Info

Figure 5.0-1 Sample Management Listing Page

STEP 1

Click on 'TDM' module and click on 'Sample Management' function

STEP 2

Search for TDM order using basic search:

- Ordered Date From
- Order Date To
- Location Type
- Location
- MRN
- Status
- IC No./ Other Identification

Note

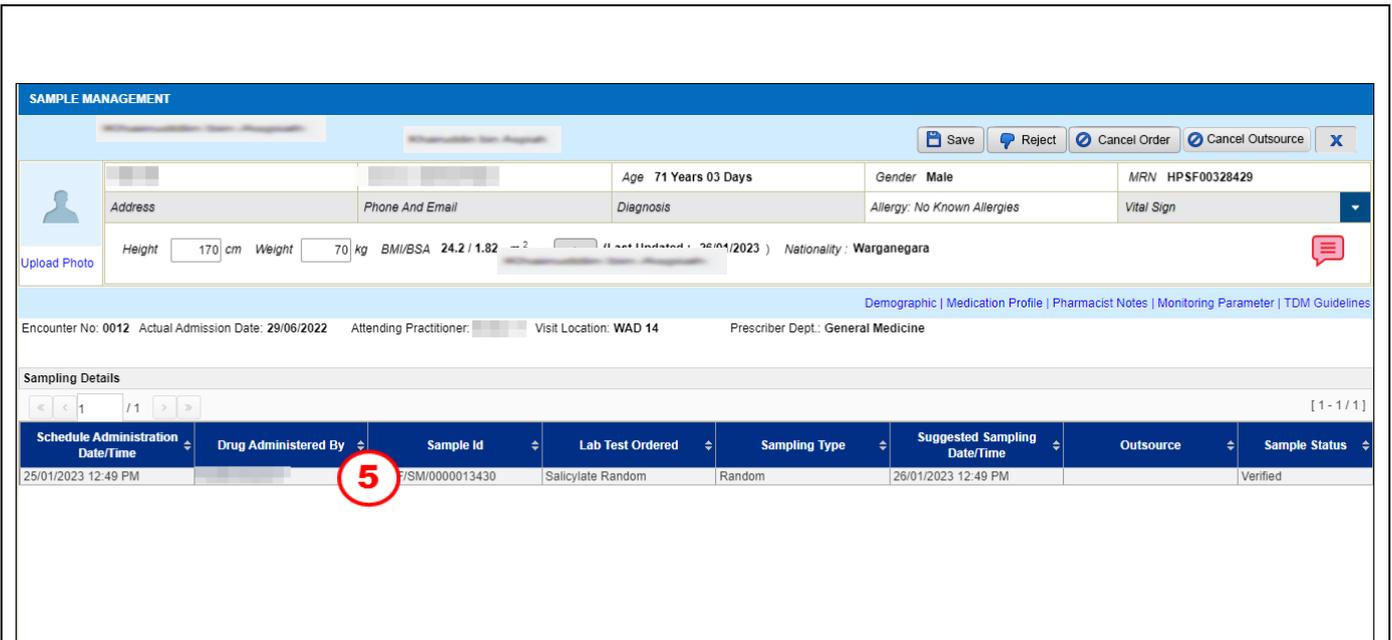
Click on the [Advance Search](#) hyperlink for advance search and [Basic Search](#) for basic search

STEP 3

Click on the  button to search for records

STEP 4

Double-click on the record to display Sample Management screen



SAMPLE MANAGEMENT

Save Reject Cancel Order Cancel Outsource X

Age 71 Years 03 Days Gender Male MRN HPSF00328429

Address Phone And Email Diagnosis Allergy: No Known Allergies Vital Sign

Height 170 cm Weight 70 kg BMI/BSA 24.2 / 1.82 Last Updated: 26/04/2023 Nationality: Warganegara

Demographic | Medication Profile | Pharmacist Notes | Monitoring Parameter | TDM Guidelines

Encounter No: 0012 Actual Admission Date: 29/06/2022 Attending Practitioner: Visit Location: WAD 14 Prescriber Dept: General Medicine

Sampling Details [1 - 1 / 1]

Schedule Administration Date/Time	Drug Administered By	Sample Id	Lab Test Ordered	Sampling Type	Suggested Sampling Date/Time	Outsource	Sample Status
25/01/2023 12:49 PM	5	7/SM/0000013430	Salicylate Random	Random	26/01/2023 12:49 PM		Verified

Figure 5.0-2 Sample Management

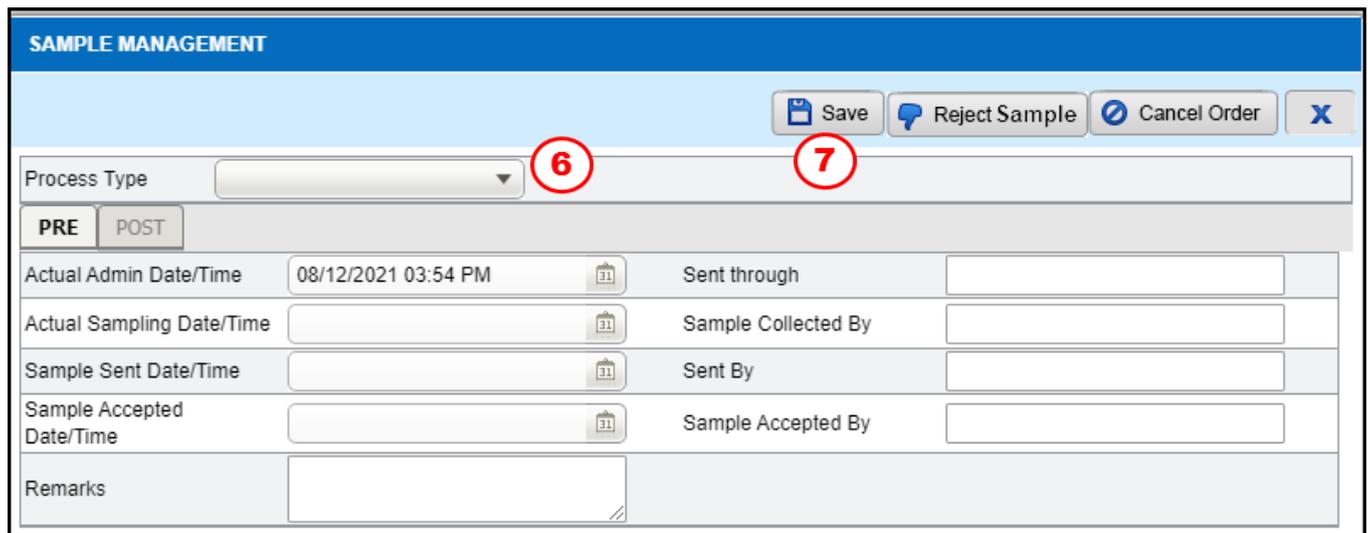
STEP 5

Double-click on the record to proceed to next step

Note

These fields are inserted by the Nurse for the sampling process:

- Actual Admin Date/Time
- Actual Sampling Date/Time
- Sample Sent Date/Time
- Sent Through
- Sample Collected By
- Sent By



SAMPLE MANAGEMENT

Save Reject Sample Cancel Order X

Process Type 6 7

PRE POST

Actual Admin Date/Time 08/12/2021 03:54 PM Sent through

Actual Sampling Date/Time Sample Collected By

Sample Sent Date/Time Sent By

Sample Accepted Date/Time Sample Accepted By

Remarks

Figure 5.0-3 Sampling Process

STEP 6

Select Process type from the drop down box and fill in details in these fields:

- Sample Accepted Date/Time
- Sample Accepted By
- Remarks

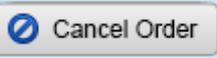
Note

- These field are entered by Pharmacist/Assistant Pharmacist when receiving the sample.
- User allowed to cancel or reject just 1 sample

STEP 7

Click on the  button to save record

Note

- The system will change order status from “Verified” to “Sample Accepted”
- ‘Actual Admin Date/Time’ is captured from ‘Drug Administration Date/Time’ from TDM Order Screen
- User able to cancel just 1 type of sampling by clicking at the type of sampling and click 
- Cancel sample is only applicable in TDM verification
- User able to reject just 1 sample type by clicking at the type of sampling and click  and then fill in the reject reason to confirm reject sample process

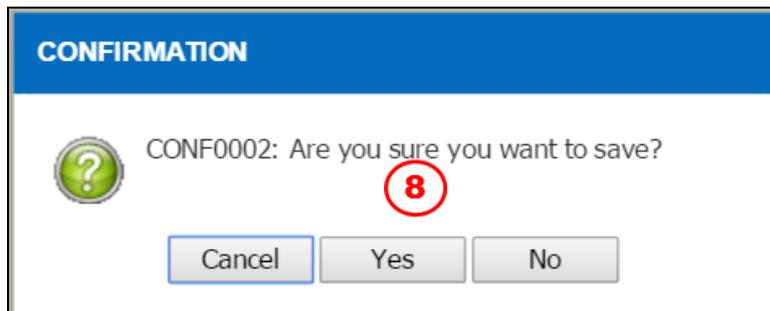
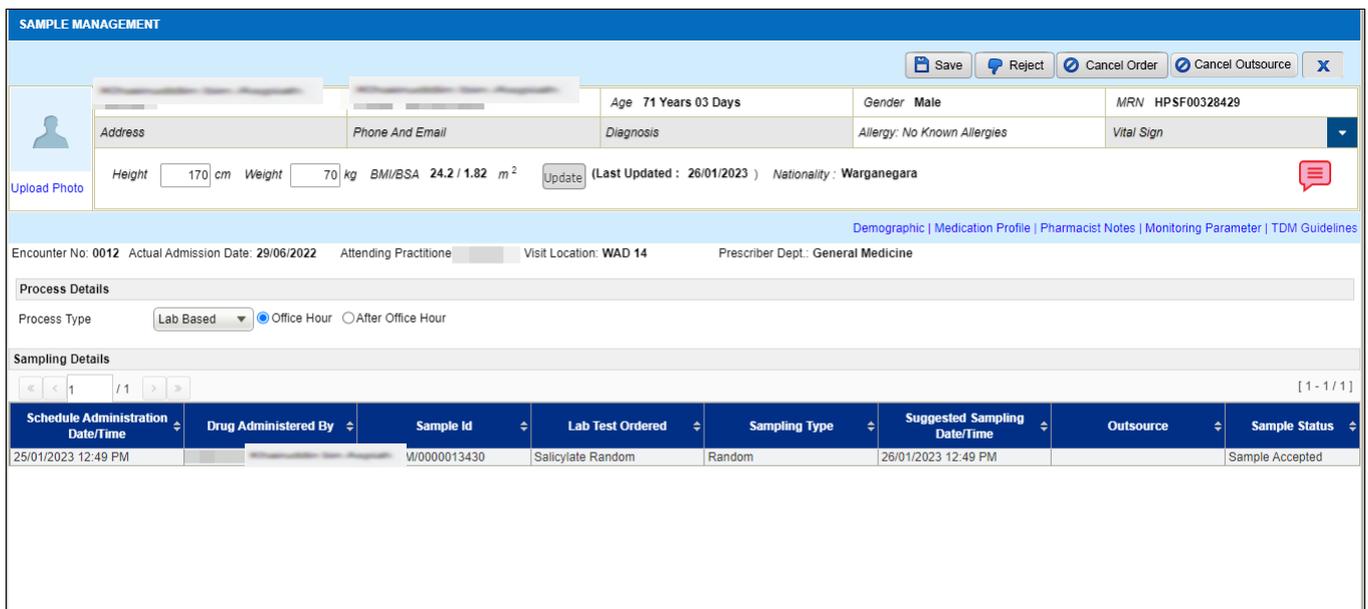


Figure 5.0-4 Confirmation alert message

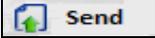


The screenshot displays the "SAMPLE MANAGEMENT" interface. At the top, there are buttons for "Save", "Reject", "Cancel Order", and "Cancel Outsource". Below this is a patient information section with fields for "Age" (71 Years 03 Days), "Gender" (Male), "MRN" (HPSF00328429), "Address", "Phone And Email", "Diagnosis", "Allergy: No Known Allergies", and "Vital Sign". There are also fields for "Height" (170 cm), "Weight" (70 kg), "BMI/BSA" (24.2 / 1.82 m²), and "Nationality" (Warganegara). The interface includes a "Process Details" section with "Process Type" set to "Lab Based" and "Office Hour" selected. Below that is a "Sampling Details" section with a table showing one sampling record.

Schedule Administration Date/Time	Drug Administered By	Sample Id	Lab Test Ordered	Sampling Type	Suggested Sampling Date/Time	Outsource	Sample Status
25/01/2023 12:49 PM		W/0000013430	Salicylate Random	Random	26/01/2023 12:49 PM		Sample Accepted

Figure 5.0-5 Sample Management

Note

- If Process Type is “Outsource”, the system will display **Send To** dropdown box and  button
- **Send To** dropdown box will list down all facilities that will receive the Outsource request.
- Select **Process Type** from dropdown box:
 - Pharmacy Based
 - Lab Based
 - Outsource

Process Details

Process Type Lab Based Office Hour After Office Hour

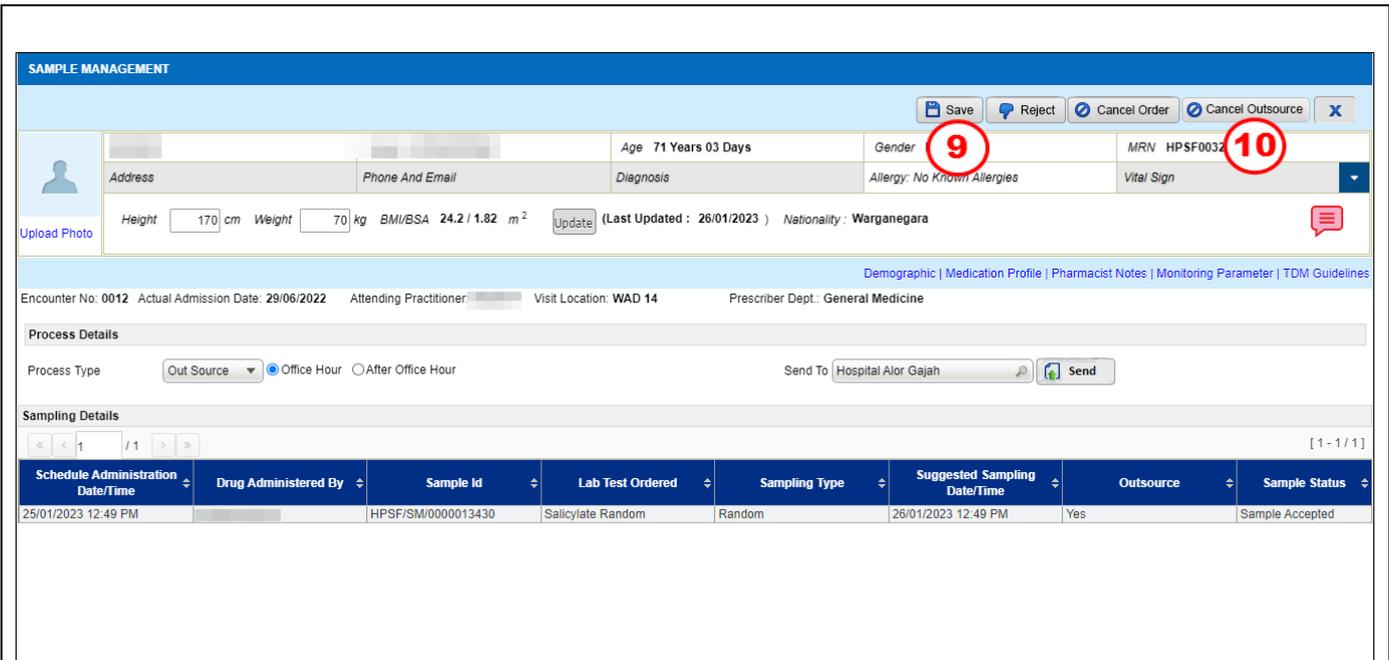
Figure 5.0-6 Process Type

- For Outsource the Change Facility field from drop down menu to Auto complete search drop down menu as Figure 5.0.7



Facility Name	State
Hospital Alor Gajah	Melaka
Hospital Ampang	Selangor
Hospital Bahagia Ulu Kinta	Perak
Hospital Balik Pulau	Pulau Pinang
Hospital Baling	Kedah
Hospital Banting	Selangor
Hospital Batu Gajah	Perak
Hospital Bau	Sarawak
Hospital Beaufort	Sabah
Hospital Beluran	Sabah

Figure 5.0-7 Search Other Facility



SAMPLE MANAGEMENT

Save Reject Cancel Order Cancel Outsource X

Age 71 Years 03 Days Gender **9** MRN HPSF0032 **10**

Address Phone And Email Diagnosis Allergy: No Known Allergies Vital Sign

Height 170 cm Weight 70 kg BMI/BSA 24.2 / 1.82 m² Update (Last Updated : 26/01/2023) Nationality : Warganegara

Demographic | Medication Profile | Pharmacist Notes | Monitoring Parameter | TDM Guidelines

Encounter No: 0012 Actual Admission Date: 29/06/2022 Attending Practitioner: Visit Location: WAD 14 Prescriber Dept: General Medicine

Process Details

Process Type: Out Source Office Hour After Office Hour Send To: Hospital Alor Gajah Send

Sampling Details

Schedule Administration Date/Time	Drug Administered By	Sample Id	Lab Test Ordered	Sampling Type	Suggested Sampling Date/Time	Outsource	Sample Status
25/01/2023 12:49 PM		HPSF/SM/0000013430	Salicylate Random	Random	26/01/2023 12:49 PM	Yes	Sample Accepted

Figure 5.0-8 Outsource

STEP 9

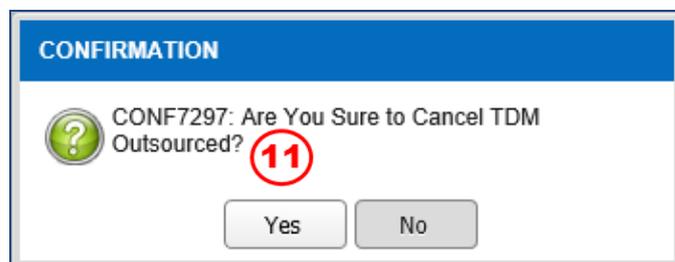
Click on the  button to save record (Repeat Step 8)

Note

- If Process Type is "Outsource", in the Outsource column under Sampling Details will be set as "Yes". Otherwise Outsource will be set as "No".
- If "Outsource", user needs to select which facility to send the order to under Send To dropdown box and click on the  button.
- Click on the  button to cancel the order. User may not need to place new order.

STEP 10

Click on the  button to cancel outsource and pop up will appear as per Figure 5.0-9



CONFIRMATION

CONF7297: Are You Sure to Cancel TDM Outsourced? **11**

Yes No

Figure 5.0-9 Cancel Outsource

STEP 11

Click on the  button to cancel outsource and pop up will appear as per Figure 5.0-10

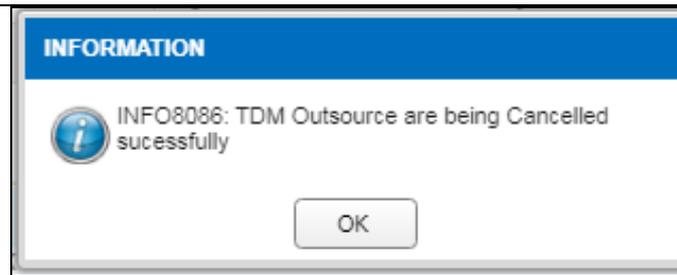
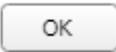
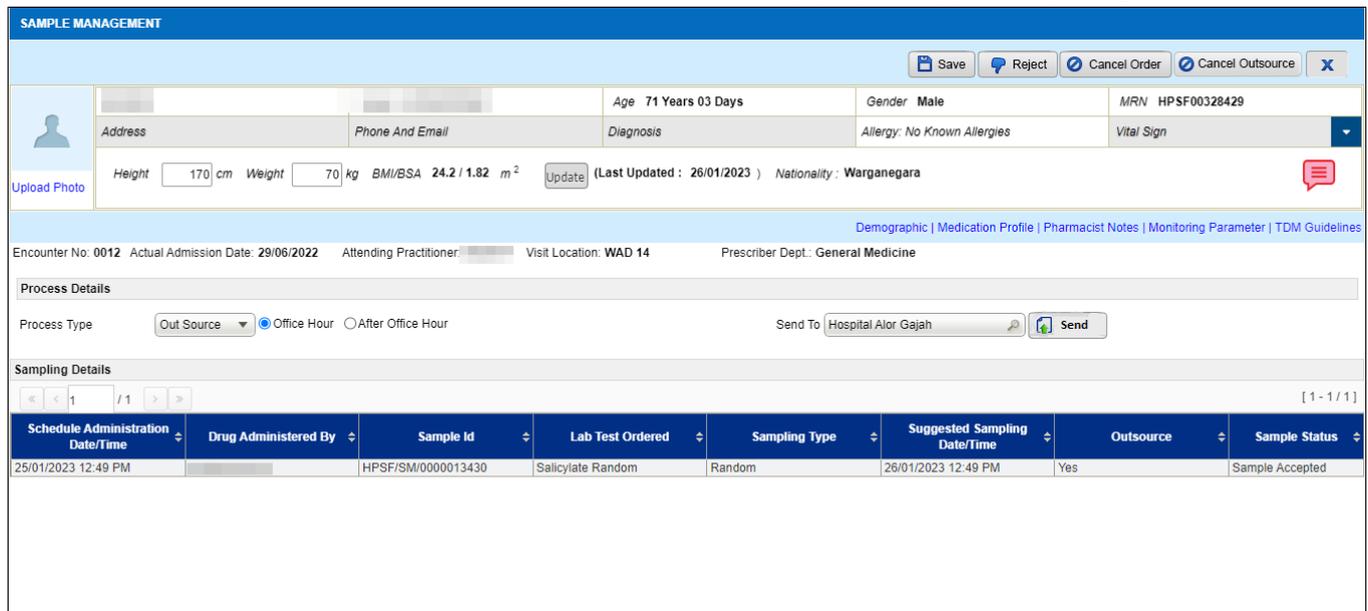


Figure 5.0-10 Cancel Outsource

Note

- Click on  button to confirm Cancel Outsource
- The cancellation is only valid if the record not yet register by the receiver.
- Status at sending facility will be '**Sample Accepted**' as shown in Figure 5.0-12
- User can proceed to reporting or send outsource to other facility
- Click on the  button to reject outsource and pop up will appear as per Figure 5.0-12

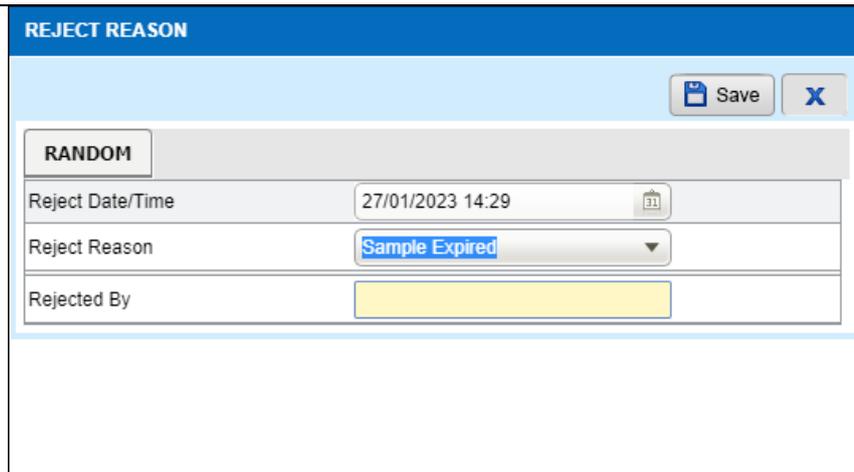


Schedule Administration Date/Time	Drug Administered By	Sample Id	Lab Test Ordered	Sampling Type	Suggested Sampling Date/Time	Outsource	Sample Status
25/01/2023 12:49 PM		HPSF/SM/0000013430	Salicylate Random	Random	26/01/2023 12:49 PM	Yes	Sample Accepted

Figure 5.0-11 Sample Management

Note

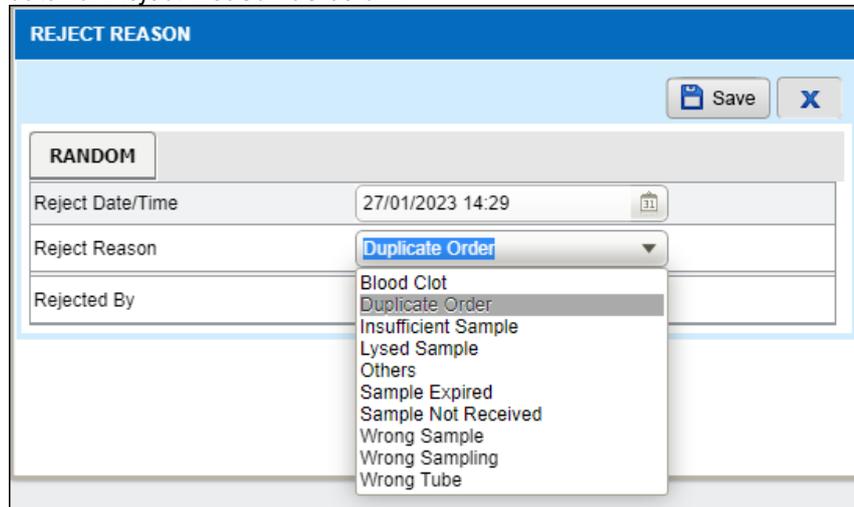
- Click on the  button to reject the sampling details. User needs to place a new order.
- User can see hyperlink to view reject reason if the status is 'Reject'. Click on the Sample Rejected Hyperlink to view the reason such as below:



The screenshot shows a web form titled "REJECT REASON". At the top right, there are "Save" and "X" buttons. Below the title bar is a "RANDOM" tab. The form contains three input fields: "Reject Date/Time" with the value "27/01/2023 14:29", "Reject Reason" with a dropdown menu showing "Sample Expired", and "Rejected By" with an empty yellow field.

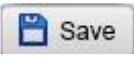
Figure 5.0-12 Reject Reason

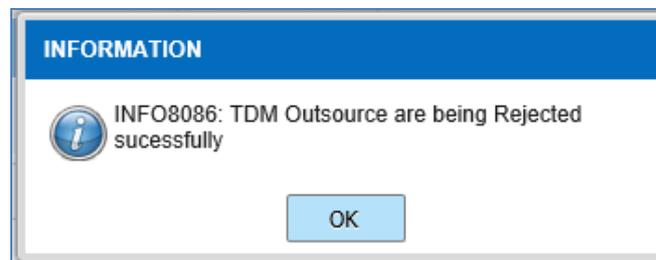
- To add new data for Reject Reason as below:



This screenshot shows the same "REJECT REASON" form, but the "Reject Reason" dropdown menu is open, displaying a list of options: "Duplicate Order", "Blood Clot", "Insufficient Sample", "Lysed Sample", "Others", "Sample Expired", "Sample Not Received", "Wrong Sample", "Wrong Sampling", and "Wrong Tube". The "Duplicate Order" option is currently selected.

Figure 5.0-13 Add Reject Reason

- Click at  button to save the reject reason and pop up will appear as Figure 5.0-14



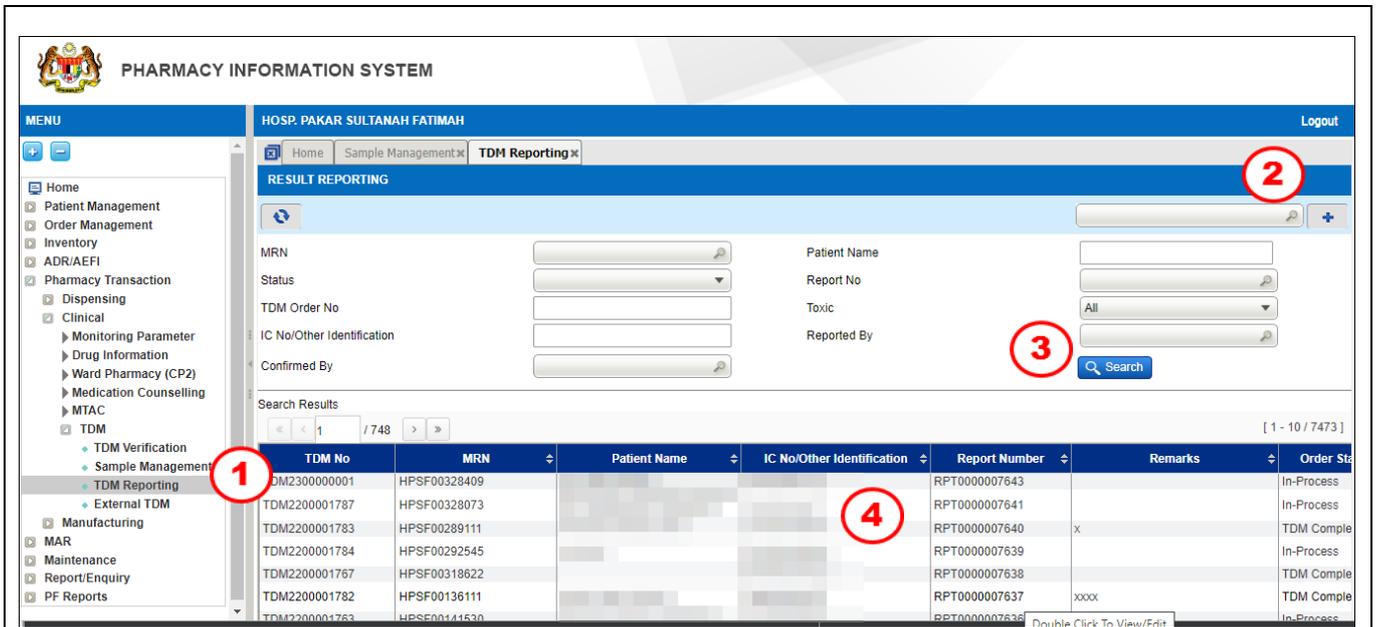
The screenshot shows an "INFORMATION" dialog box with a blue header. It contains an information icon (i) and the text "INFO8086: TDM Outsource are being Rejected successfully". At the bottom center, there is an "OK" button.

Figure 5.0-14 TDM Outsource Rejected

- Click on  button to confirm Reject Outsource

6.0 TDM Reporting

TDM Reporting module is for user to record the TDM results and Pharmacist Recommendation.



PHARMACY INFORMATION SYSTEM

HOSP. PAKAR SULTANAH FATIMAH

Logout

Home Sample Management TDM Reporting

RESULT REPORTING

MRN: Patient Name:
 Status: Report No:
 TDM Order No: Toxic:
 IC No/Other Identification: Reported By:
 Confirmed By:

Search Results [1 - 10 / 7473]

TDM No	MRN	Patient Name	IC No/Other Identification	Report Number	Remarks	Order Sta
TDM2300000001	HPSF00328409			RPT0000007643		In-Process
TDM2200001787	HPSF00328073			RPT0000007641		In-Process
TDM2200001783	HPSF00289111			RPT0000007640	x	TDM Comple
TDM2200001784	HPSF00292545			RPT0000007639		In-Process
TDM2200001767	HPSF00318622			RPT0000007638		TDM Comple
TDM2200001782	HPSF00136111			RPT0000007637	xxxx	TDM Comple
TDM2200001763	HPSF00144530			RPT0000007636		In-Process

Figure 6.0-1 TDM Reporting Listing Page

STEP 1

Click on 'TDM' module and click on 'TDM Reporting' function

STEP 2

Click on the  button to search patient MRN

STEP 3

Enter Patient MRN or Patient Name or ID no and click on the  button

STEP 4

Double click on patient name

PHARMACY INFORMATION SYSTEM

HOSP. PAKAR SULTANAH FATIMAH Logout

Home Sample Management TDM Reporting

RESULT REPORTING

MRN: Patient Name: 5

Status: Report No:

TDM Order No: Toxic:

IC No/Other Identification: Reported By:

Confirmed By:

Search Results [1 - 10 / 7473]

TDM No	MRN	Patient Name	IC No/Other Identification	Report Number	Remarks	Order Sta
TDM230000001	HPSF00328409			RPT0000007643		In-Process
TDM2200001787	HPSF00328073			RPT0000007641		In-Process
TDM2200001783	HPSF00289111			RPT0000007640	x	TDM Comple
TDM2200001784	HPSF00292545			RPT0000007639		In-Process
TDM2200001767	HPSF00318622			RPT0000007638		TDM Comple
TDM2200001782	HPSF00136111			RPT0000007637	xxxx	TDM Comple
TDM2200001763	HPSF00144530			RPT0000007636		In-Process

Figure 6.0-2 TDM Reporting Listing Page

STEP 5

Click on the button

Note

Reporting screen will be displayed as Figure 6.0-3

REPORTING

Address: Phone And Email: Age: Gender: Female MRN: HPSF00328409

Diagnosis: Allergy: No Known Allergies Vital Sign:

Height: cm Weight: kg BMI/BSA: m² (Last Updated:) Nationality:

Encounter No: 0007 Actual Admission Date: 24/06/2022 Attending Practitioner: Visit Location: WAD 13 Prescriber Dept: + Add CP2

TDM No.	Drug Name	Drug Details	Order Remarks	Actual Sampling Time	Actual Drug Admin Date/Time	Reporting	Pre	Post
TDM230000001	Vancomycin HCl 500mg/10ml Injection	500mg od	Remarks	26/01/2023 09:42 AM	25/01/2023 08:41 AM	Details		

Pharmacist Note:

Remarks:

Total Cost of Analysis:

TDM service Charge in RM:

Figure 6.0-3 TDM Reporting

STEP 6

Click on the  button to display TDM Add Result screen

TDM ADD RESULT
X


Upload Photo

Address	Phone And Email	Age 45 Years 01 Months 02 Days	Gender Female	MRN HPSF00141530
Diagnosis		⚠️ Known Allergies[1]		Vital Sign

Height cm Weight kg BMI/BSA 0/0 m² (Last Updated : 14/06/2022) Nationality : Warganegara

Select	TDM No.	Drug Name	MRN	Patient Name	Gender	Age	Order Status
<input type="checkbox"/> 7	M2200001758	Digoxin 0.25 mg Tablet	HPSF00141530	XXXXXXXX XXXXXX XXXXXXXX	F	46	Out Sourced
<input type="checkbox"/>	DM2200001765	Digoxin 500 mcg/2ml Injection	HPSF00141530	XXXXXXXX XXXXXX XXXXXXXX	F	46	Sample Accepted

8 

Figure 6.0-4 TDM Add Result

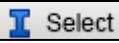
STEP 7

Select on checkbox(es) for selected TDM order

Note

The system will display all the active TDM order for the patient. User can combine the TDM orders in one reporting process.

STEP 8

Click on the  button to proceed with TDM reporting process

REPORTING
X


Upload Photo

Address	Phone And Email	Age	Gender Female	MRN HPSF00328409
Diagnosis		Allergy: No Known Allergies		Vital Sign

Height cm Weight kg BMI/BSA 13.2 / 0.92 m² Update (Last Updated :) Nationality :

Demographic | Medication Profile | Pharmacist Notes | Monitoring Parameter | TDM Guidelines

Encounter No: 0007 Actual Admission Date: 24/06/2022 Attending Practitioner: Visit Location: WAD 13 Prescriber Dept:

TDM No.	Drug Name	Drug Details	Order Remarks	Actual Sampling Time	Actual Drug Admin Date/Time	Reporting	Pre	Post
TDM2300000001	Vancomycin HCl 500mg/10ml Injection	500mg od	Remarks	26/01/2023 09:42 AM	25/01/2023 08:41 AM	9		

Pharmacist Note

1950 characters allowed

Remarks

Total Cost of Analysis

TDM service Charge in RM

Save Report Confirm
+ Place TDM Order Save

Figure 6.0-5 Reporting Details Hyperlink

STEP 9

Click on [Details](#) hyperlink to display Reporting screen

REPORTING

i
X

<p>Post1 Sample</p> <p>Result Value <input type="text"/> <input type="text"/></p> <p>Reported By <input type="text"/> Details</p> <p>Post2 Sample</p> <p>Result Value <input type="text" value="21"/> <input type="text" value="mcg/ml"/> 10</p> <p>Reported By <input type="text"/> Details</p> <p>Random Sample</p> <p>Result Value <input type="text"/> <input type="text"/></p> <p>Reported By <input type="text"/> Details</p> <p>Calculator <input type="text"/> 11</p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> Aminoglycoside Pre -Post Aminoglycoside Pre Aminoglycoside Post1-Post6 Aminoglycoside Post </div> <p>Pharmacokinetics Profile</p> <p>Recommendation Type <input type="text"/></p> <p>Toxic <input type="checkbox"/> No</p>	<p>Latest Lab Result:</p> <p>Blood Urea <input type="text" value="25"/> mmol/L</p> <p>Sodium <input type="text" value="31"/> mmol/L</p> <p>Potassium <input type="text" value="33"/> mmol/L</p> <p>Serum Creatinine <input type="text" value="35"/> µmol/L</p> <p>Creatinine Clearance <input type="text" value="152.87"/> ml/min Not accurate for Children</p> <p>Albumin <input type="text" value="37"/> g/L</p>
---	--

Figure 6.0-6 Reporting

Note

- User needs to enter sample details for pre sample, post sample or random sample based on TDM order.
- Latest Lab Result will display the latest lab results recorded for:
 - Blood Urea
 - Sodium
 - Potassium
 - Serum Creatinine
 - Creatinine Clearance
 - Albumin

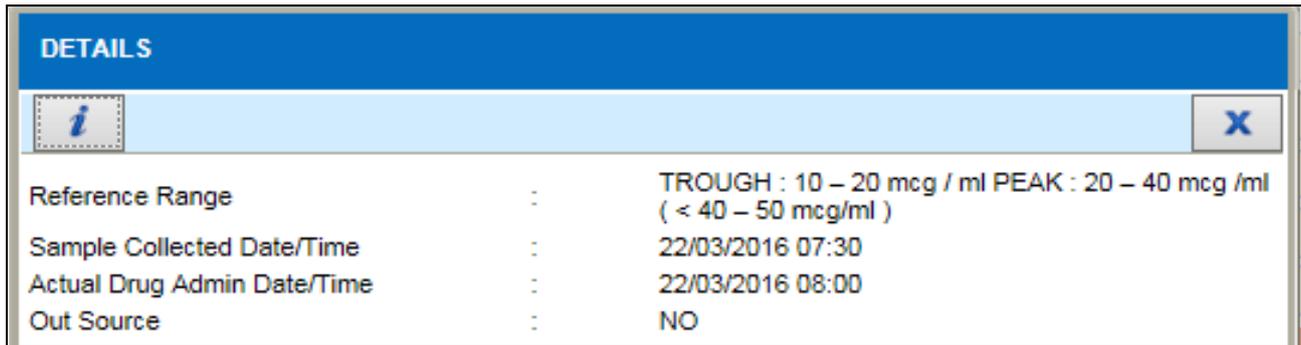
STEP 10

Enter sample details as below:

- a. Result Value
- b. Resulted By

Note

- Click on [Details](#) hyperlink to view sample details as per Figure 6.0-7. Sample Details consists of:
- Reference Range
- Sample Collected Date/Time
- Actual Drug Admin Date/Time
- Outsource



DETAILS	
Reference Range	TROUGH : 10 – 20 mcg / ml PEAK : 20 – 40 mcg /ml (< 40 – 50 mcg/ml)
Sample Collected Date/Time	22/03/2016 07:30
Actual Drug Admin Date/Time	22/03/2016 08:00
Out Source	NO

Figure 6.0-7 Sample Details

STEP 11

Select calculator from dropdown box. Please refer to [TDM Calculator](#) to view sample calculator calculation.

REPORTING

i
X

<p>Post1 Sample</p> <p>Result Value <input type="text"/> <input type="text"/></p> <p>Reported By <input type="text"/> Details</p> <p>Post2 Sample</p> <p>Result Value <input type="text" value="21"/> <input type="text" value="mcg/ml"/></p> <p>Reported By <input type="text"/> Details</p> <p>Random Sample</p> <p>Result Value <input type="text"/> <input type="text"/></p> <p>Reported By <input type="text"/> Details</p> <p>Calculator <input type="text"/></p>	<p>Latest Lab Result:</p> <p>Blood Urea <input type="text" value="25"/> mmol/L</p> <p>Sodium <input type="text" value="31"/> mmol/L</p> <p>Potassium <input type="text" value="33"/> mmol/L</p> <p>Serum Creatinine <input type="text" value="35"/> µmol/L</p> <p>Creatinine Clearance <input type="text" value="152.87"/> ml/min Not accurate for Children</p> <p>Albumin <input type="text" value="37"/> g/L</p>
--	--

Pharmacokinetics Profile

t_{1/2} : 24.89 hour
C_{max} : 72.658 mcg/ml
C_{min} : 66.835 mcg/ml

To calculate expected C_{min} and C_{max} based on new suggested dose
 Expected C_{max} : 54.403 mcg/ml
 Expected C_{min} : 47.333 mcg/ml

To calculate new dose and C_{min} based on desired C_{max}
 New Dose : 70.309 mg
 Expected C_{min} : 39.152 mcg/ml

Recommendation Type 13

Toxic Yes No 14

15

Figure 6.0-8 Reporting

STEP 12

Enter **Pharmacokinetics Profile**

STEP 13

Select **Recommendation Type** from dropdown:

- Increase The Dose
- Maintain The Dose
- Reduce The Dose
- Refer to Pharmacist Notes
- Stop The Dose
- Withhold The Dose

Note

Recommendation Type will be copied and displayed in Pharmacist Notes.

STEP 14

Select **Toxic**:

- a. Yes
- b. No

STEP 15

Click on the  button to proceed with TDM reporting process

REPORTING




	Age	Gender Female	MRN HPSF00328409
Address	Phone And Email	Diagnosis	Allergy: No Known Allergies
Vital Sign 			
Height <input type="text" value="132"/> cm	Weight <input type="text" value="23"/> kg	BMI/BSA 13.2 / 0.92 m ²	<input type="button" value="Update"/> (Last Updated :) Nationality :

Upload Photo 

[Demographic](#) | [Medication Profile](#) | [Pharmacist Notes](#) | [Monitoring Parameter](#) | [TDM Guidelines](#)

Encounter No: 0007 Actual Admission Date: 24/06/2022 Attending Practitioner: Visit Location: WAD 13 Prescriber Dept:

<< 1 / 1 >> [1 - 1 / 1]

TDM No.	Drug Name	Drug Details	Order Remarks	Actual Sampling Time	Actual Drug Admin Date/Time	Reporting	Pre	Post
TDM230000001	Vancomycin HCl 500mg/10ml Injection	500mg od	Remarks	26/01/2023 09:42 AM	25/01/2023 08:41 AM	Details		

Pharmacist Note 

1950 characters allowed

Remarks 

Total Cost of Analysis

TDM service Charge in RM

16

17

Figure 6.0-9 TDM Reporting

Note

- Pharmacist Notes field will automatically display:
 - Drug Name
 - Recommendation Type
- User may edit Pharmacist Note.
- Enter Remarks if applicable.
- Total Cost of Analysis will be based on TDM Guideline master setup.

STEP 16

Click on the  button to save report

Note

The status will be set as "In-Process".

STEP 17

Click on the  button to confirm report

Note

- The status will change to "TDM Completed".

- button and button will be enabled.

Figure 6.0-10 TDM Reporting

STEP 18

Click 'Yes' or 'No' at the button under **Recommendation accepted**

STEP 19

Click on the button to authorize the report

Note

- The status will change to "Result Viewed".
- Click on the button to place new TDM order.
- User can click on the button to print the external TDM resulting as Figure 6.0-11. The TDM report will be display as in Figure 6.0-12.

Figure 6.0-11 Print Report



PhIS & CPS Project
User Manual – Therapeutic Drug
Monitoring



CLINICAL PHARMACOKINETICS SERVICES
Therapeutic Drug Monitoring (TDM) Report
Hosp. Pakar Sultanah Fatimah

Report No: RPT0000007643

PATIENT DETAILS

Name : [REDACTED] MRN NO : HPSF00328409 IC : [REDACTED]
Age : null Sex : Female Race :
Weight : 23 Kg Height : 132 Cm Ward/Unit : WAD 13

No	TDM No	Drug Name	Drug Details	Indication Request	Recommendation Type	Recommendation Accepted	Toxic
1	TDM2300000001	Vancomycin HCl 500mg/10ml Injection	500mg od	Poor Response	Reduce The Dose	Yes	No

Sampling Id	Sample Type	Actual Sampling Date	Actual Drug Admin	Result Value	Therapeutic Range
HPSF/SM/0000013428	PRE	25/01/2023 09:42 AM	25/01/2023 09:41 AM	12 mcg/ml	AUC24/MIC : 400 ? 600 mg.h/L Trough: Non-complicated infection : 10 ? 15 mcg/ml Complicated infection : 15 ? 20 mcg/ml Peak: 25 ? 40 mcg/ml
HPSF/SM/0000013429	POST	26/01/2023 09:42 AM	25/01/2023 08:41 AM	21 mcg/ml	AUC24/MIC : 400 ? 600 mg.h/L Trough: Non-complicated infection : 10 ? 15 mcg/ml Complicated infection : 15 ? 20 mcg/ml Peak: 25 ? 40 mcg/ml

Pharmacist Note: TDM Completed : 27/01/2023 03:25 PM
TDM2300000001 - Vancomycin HCl 500mg/10ml Injection - Reduce The Dose
Result Value :-Pre :12 mcg/ml
Post :21 mcg/ml

TDM Completed 27/01/2023 03:25 PM

Printed Date : 27/01/2023 Printed By : [REDACTED] Unit Name : FARMASI Source : PhIS
Page 1 of 1

Figure 6.0-12 TDM Report

7.0 External TDM

7.1 External TDM Online

External Notification	
External TDM Request Received:	1
External TDM Result Received:	0
Online SPUB R1 Request Received:	0

Figure 7.1-1 External Notification

External TDM module is for user to record external TDM resulting (Outsource) via online or offline.

It will be recorded online if both facilities use PhIS to perform TDM processes.

STEP 1

Click on the **External TDM Result Received** 1 button to view Outsource information

OUTSOURCE LISTING							
Hosp/Clinic	Mrn No	Patient Name	Patient ID	TDM Drug	Sample Type	Date/Time	Register
<input type="checkbox"/> Hospital Pakar Sultanah Fatimah, Muar	HPSF00007006	[Redacted]	[Redacted]	carBAMAZepine 200mg Tablet	RANDOM	22/07/2014 13:26	Register 2
<input type="checkbox"/> Hospital Pakar Sultanah Fatimah, Muar	HPSF00017231	[Redacted]	[Redacted]	Sodium Valproate 200 mg Tablet	PRE	22/09/2014 15:48	Register

Figure 7.1-2 Outsource Listing

STEP 2

Click on **Register** hyperlink to register the patient in the system

Note

The status will change to 'Registered' as per Figure 7.1-2

OUTSOURCE LISTING							
Hosp/Clinic	Mrn No	Patient Name	Patient ID	TDM Drug	Sample Type	Date/Time	Register
<input type="checkbox"/> Hospital Pakar Sultanah Fatimah, Muar	HPSF00007006	[Redacted]	[Redacted]	carBAMAZepine 200mg Tablet	RANDOM	22/07/2014 13:26	Register
<input checked="" type="checkbox"/> Hospital Pakar Sultanah Fatimah, Muar 3	HPSF00017231	[Redacted]	[Redacted]	Sodium Valproate 200 mg Tablet	PRE	22/09/2014 15:48	Registered

Figure 7.1-3 Outsource Listing – Registered Patient

STEP 3

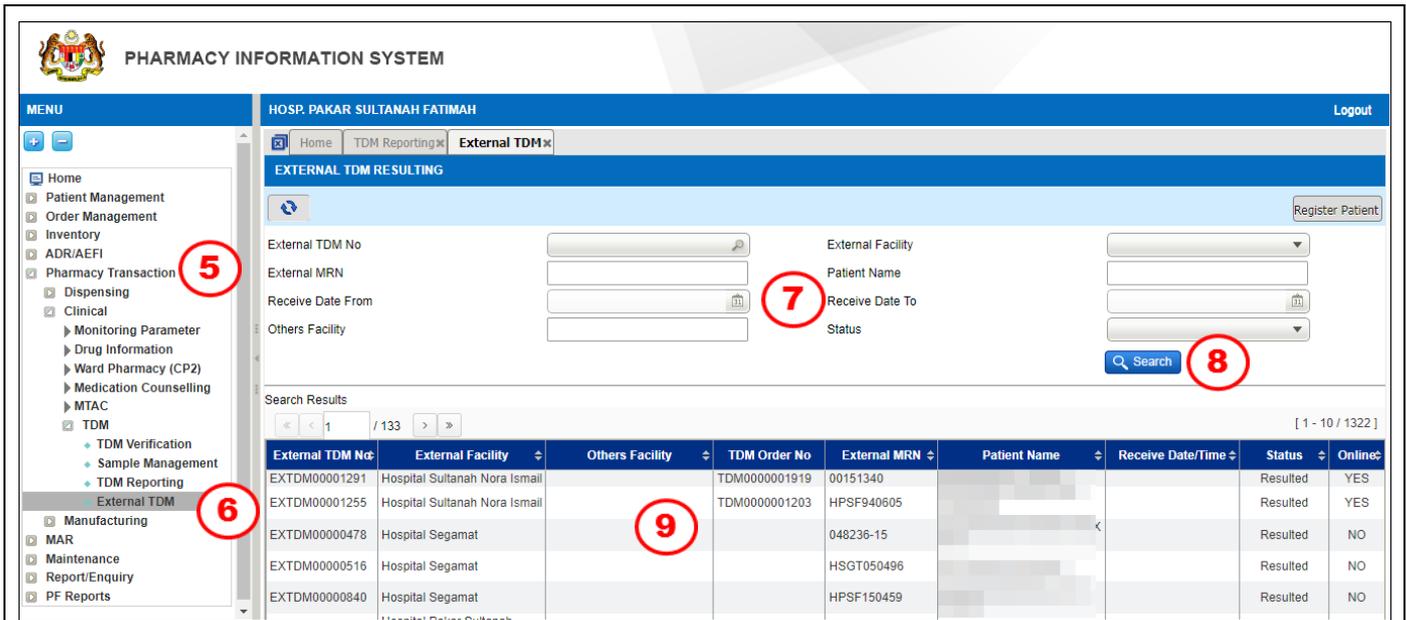
Click on the checkbox for selected patient

STEP 4

Click on the  button to save the record

Note

Registered patient will be uploaded to the External TDM listing page.



PHARMACY INFORMATION SYSTEM

HOSP. PAKAR SULTANAH FATIMAH Logout

Home TDM Reporting External TDM

EXTERNAL TDM RESULTING Register Patient

External TDM No: External Facility:

External MRN: Patient Name:

Receive Date From: Receive Date To:

Others Facility: Status:

Search Results [1 - 10 / 1322]

External TDM No	External Facility	Others Facility	TDM Order No	External MRN	Patient Name	Receive Date/Time	Status	Online
EXTDM00001291	Hospital Sultanah Nora Ismail		TDM0000001919	00151340			Resulted	YES
EXTDM00001255	Hospital Sultanah Nora Ismail		TDM0000001203	HPSF940605			Resulted	YES
EXTDM00000478	Hospital Segamat			048236-15			Resulted	NO
EXTDM00000516	Hospital Segamat			HSGT050496			Resulted	NO
EXTDM00000840	Hospital Segamat			HPSF150459			Resulted	NO

Figure 7.1-4 External TDM Listing Page

STEP 5

Click on 'Pharmacy Transaction' menu follow by 'Clinical' sub-menu

STEP 6

Click on 'TDM' and click on 'External TDM' function

STEP 7

Search for patient records by:

- a. External TDM No.
- b. External Facility
- c. External MRN
- d. Patient Name
- e. Receive Date From
- f. Receive Date To
- g. Others Facility
- h. Status
 - Recorded
 - Rejected
 - Resulted

STEP 8

Click on the button to search for patient records

STEP 9

Double-click on the selected patient and External TDM Resulting screen will be displayed as per Figure 7.1-5

Note

button is for offline External TDM (refer to [section 7.2 External TDM Offline](#))

EXTERNAL TDM RESULTING

External TDM No : EXTDM00000014
X

Patient Details

External MRN : HTAR00068908
Patient Name : [REDACTED]
Patient ID Number : [REDACTED]
External Facility : Hospital Tengku Ampuan Rahimah, Klang

Delivery Details

Sample Sent By

Sample Received By

Sample Sent Date/Time

Sample Received Date/Time

Drug Details

TDM Drug

Sampling Type + Add

< 1 / 1 >
[1 - 1 / 1]

Drug Name	Actual Sampling Date/time	Sample Type	Result Value	UOM	Lab Based	Toxic	Status	Delete	Reject
Ciclosporin 25mg Capsule Microemulsion	05/05/2021 11:20 AM	Random	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recorded	<input type="checkbox"/>	<input type="checkbox"/>

Prepared By

Remarks

Figure 7.1-5 External TDM Resulting

STEP 10

Enter **Delivery Details** as below:

- a) Sample Sent By
- b) Sample Sent Date/Time
- c) Sample Received By
- d) Sample Received Date/Time

Note

Actual Sampling Date/Time will auto captured from outsourcing sample management screen

STEP 11

Enter **Result Value** and select **UOM** from dropdown box :

- mcg/ml
- mg/dl
- mmol/l
- ng/ml

Note

- Select on **Lab Based** checkbox if TDM resulting process is done at a laboratory.
- Select on **Toxic** checkbox if TDM results show toxicity for selected patient.
- Select on **Reject** checkbox to reject sampling received.
- Select on **Delete** checkbox to delete TDM order.
- Enter **Remarks** if applicable.

EXTERNAL TDM RESULTING

External TDM No : EXTDM00000004

Patient Details

External MRN : HPSF00017231 Patient Name Patient Id Numl External Facility : Hospital Pakar Sultanah Fatimah, Muar

Delivery Details

Sample Sent By Sample Sent Date/Time
Sample Received By Sample Received Date/Time

Drug Details

TDM Drug Sampling Type + Add

1 / 1

Drug Name	Sample Type	Result Value	UOM	Lab Based	Toxic	Status	Delete	Reject
carBAMAZepine 200mg Tablet	PRE			<input type="checkbox"/>	<input type="checkbox"/>	Recorded	<input type="checkbox"/>	<input type="checkbox"/>

Prepared By Tan Sin Li Remarks contact DR Ismail

12 13

Save Confirm

Figure 7.1-6 External TDM Resulting

STEP 12

Click on the  button to save external TDM resulting

STEP 13

Click on the  button to confirm external TDM resulting

Note

- The status will change to “Resulted”.
- Outsource TDM Resulting will be sent back to the requester.
- To receive an **External TDM Result Received**:
- Click on the **External TDM Result Received**  button to view the outsource listing.
- Select on checkbox(es) on selected outsource request.
- Click on the  button to upload the patient record in order to proceed with TDM Reporting processes.(refer to [section 6.0 TDM Reporting](#))

External Notification

External TDM Request Received: 1	External TDM Result Received: 1
Online SPUB R1 Request Received: 0	

Figure 7.1-7 External Notification

OUTSOURCE LISTING

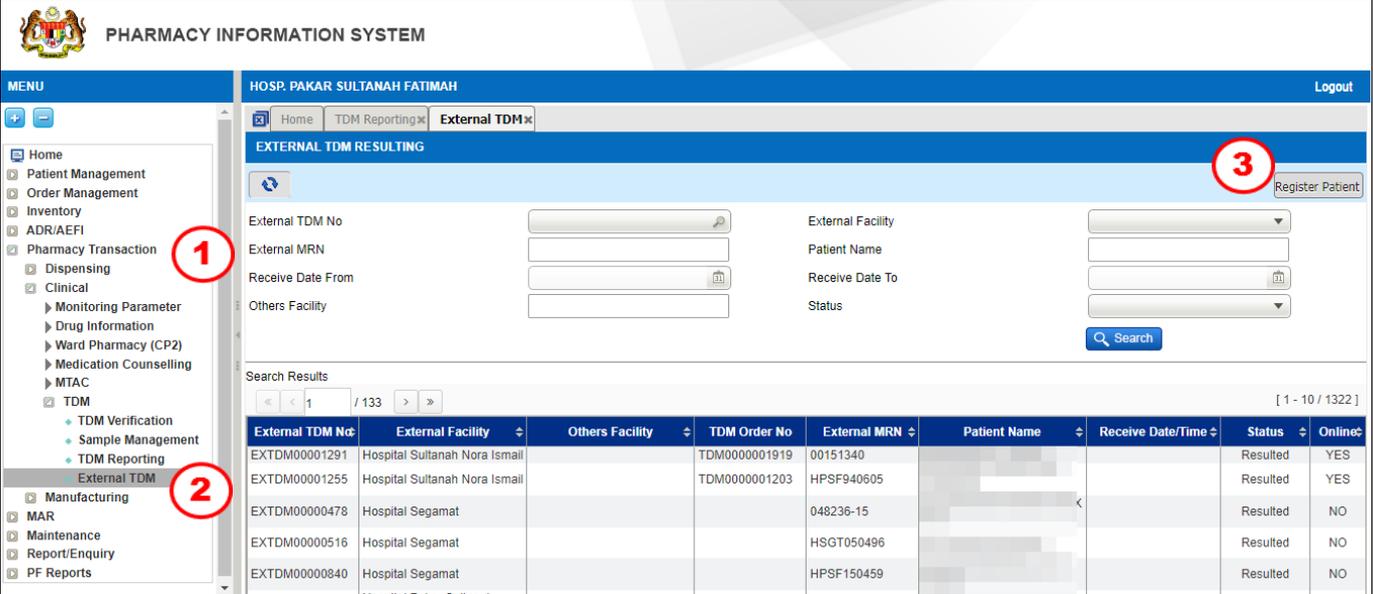
1 / 1

TDM Order No	Mrn No	Patient Name	Patient ID	TDM Drug	Sample Type	Result	UOM	Date/Time
<input checked="" type="checkbox"/> EXTDM00000001	HPSF00017231		790719015422	Sodium Valproate 200 mg Tablet	PRE	13.3	mcg/ml	22/09/2014 16:22

Figure 7.1-8 Outsource Listing

7.2 External TDM Offline

External TDM module is for user to record external TDM received via offline.



PHARMACY INFORMATION SYSTEM

HOSP. PAKAR SULTANAH FATIMAH Logout

Home TDM Reporting External TDM

EXTERNAL TDM RESULTING Register Patient

External TDM No: External Facility:

External MRN: Patient Name:

Receive Date From: Receive Date To:

Others Facility: Status:

Search Results [1 - 10 / 1322]

External TDM No	External Facility	Others Facility	TDM Order No	External MRN	Patient Name	Receive Date/Time	Status	Online
EXTDM00001291	Hospital Sultanah Nora Ismail		TDM0000001919	00151340			Resulted	YES
EXTDM00001255	Hospital Sultanah Nora Ismail		TDM0000001203	HPSF940605			Resulted	YES
EXTDM00000478	Hospital Segamat			048236-15			Resulted	NO
EXTDM00000516	Hospital Segamat			HSGT050496			Resulted	NO
EXTDM00000840	Hospital Segamat			HPSF150459			Resulted	NO

Figure 7.2-1 External TDM Listing Page

STEP 1

Click on 'Pharmacy Transaction' menu follow by 'Clinical' sub-menu

STEP 2

Click on 'TDM' and click on 'External TDM' function

STEP 3

Click on the button to register external patient

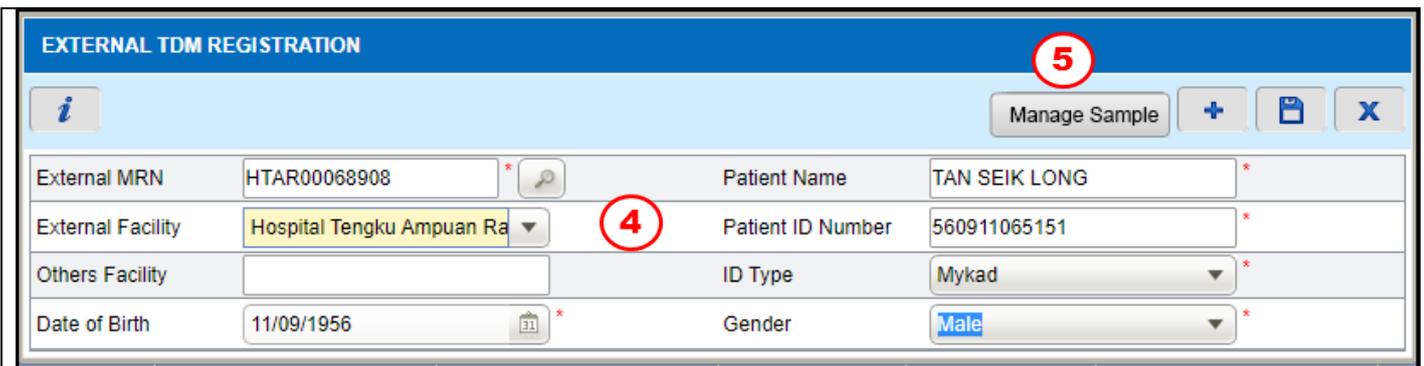


Figure 7.2-2 External TDM Registration

STEP 4

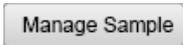
Enter details in the fields below:

- a. External MRN
- b. Patient Name
- c. External Facility
- d. Patient Id Number
- e. Other Facility
(If the sample come from private sector or facility which is not listed under MOH facilities)
- f. Id Type

Note

Click on the External MRN  button to search for registered patient and all fields will be automatically retrieved.

STEP 5

Click on the  button and External TDM Resulting screen will be displayed as per Figure 7.2-3

Note

Click on the  button to save the record

EXTERNAL TDM RESULTING

External TDM No : X

Patient Details

External MRN : HTAR00068908 Patient Name : Patient ID Number : External Facility : Hospital Tengku Ampuan Rahimah, Klang

Delivery Details

Sample Sent By : 6 Sample Sent Date/Time : 🗄️

Sample Received By : Sample Received Date/Time : 🗄️

Drug Details

TDM Drug : 7 Sampling Type : + Add 8

Drug Name	Actual Sampling Date/Time	Sample Type	Result Value	UOM	Lab Based	Toxic	Status	Delete	Reject
No Records Found!									

Prepared By : Remarks :

Save Confirm

Figure 7.2-3 External TDM Resulting

STEP 6

Enter **Delivery Details** as below:

- a. Sample Sent By
- b. Sample Sent Date/Time
- c. Sample Received By
- d. Sample Received Date/Time

STEP 7

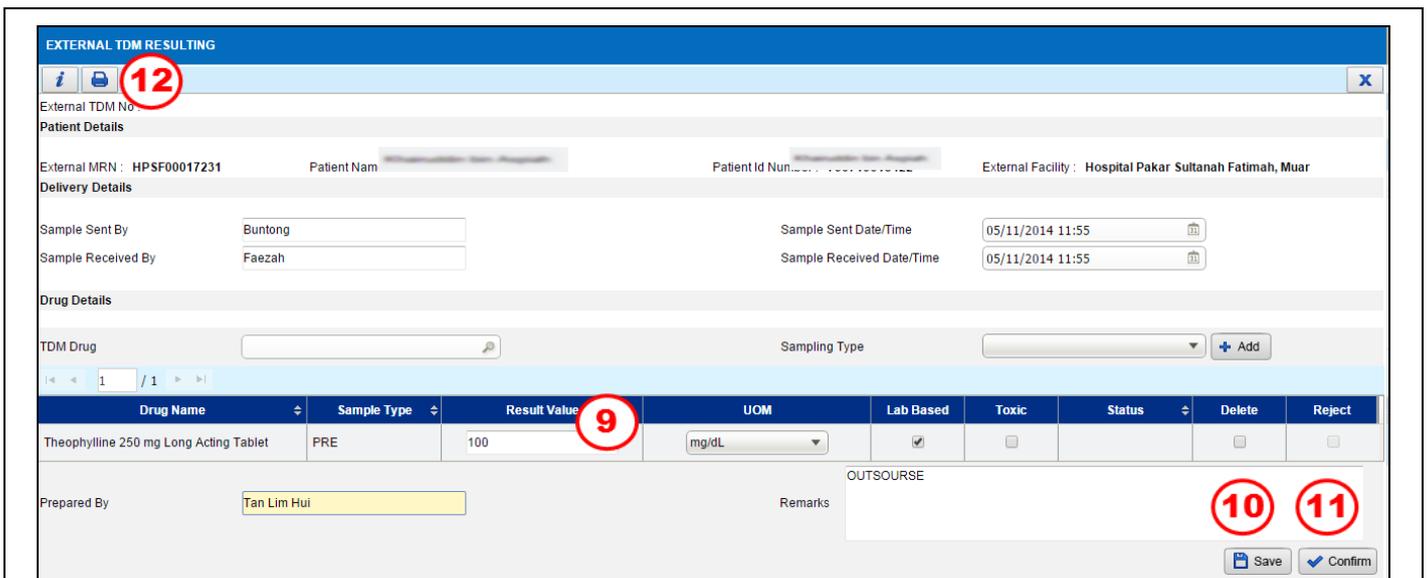
Click on the **TDM Drug**  button to search for drug

STEP 8

Select **Sampling Type** from dropdown box:

- Pre
- Post
- Random

and click on the  button to add the information



EXTERNAL TDM RESULTING

External TDM No. [12]

Patient Details

External MRN : HPSF00017231 Patient Name [Redacted] Patient Id Num. [Redacted] External Facility : Hospital Pakar Sultanah Fatimah, Muar

Delivery Details

Sample Sent By: Buntong Sample Sent Date/Time: 05/11/2014 11:55
 Sample Received By: Faezah Sample Received Date/Time: 05/11/2014 11:55

Drug Details

TDM Drug: [Redacted] Sampling Type: [Redacted] + Add

Drug Name	Sample Type	Result Value	UOM	Lab Based	Toxic	Status	Delete	Reject
Theophylline 250 mg Long Acting Tablet	PRE	100	mg/dL	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Prepared By: Tan Lim Hui Remarks: OUTSOURCE

[10] [11] Save Confirm

Figure 7.2-4 External TDM Resulting

STEP 9

Enter **Result Value** and select **UOM** from dropdown box :

- mcg/ml
- mg/dl
- mg/ml

Note

- Select on **Lab Based** checkbox if TDM resulting process is done at a laboratory.
- Select on **Toxic** checkbox if TDM results show toxicity for selected patient.
- Select on **Reject** checkbox to reject sampling received.
- Select on **Delete** checkbox to delete TDM order.
- Enter **Remarks** if applicable.

STEP 10

Click on the  button to save external TDM resulting

STEP 11

Click on the  button to confirm external TDM resulting

STEP 12



Click on the  button to print the external TDM resulting as per Figure 7.2.5



MINISTRY OF HEALTH, MALAYSIA
Hospital Miri
External TDM Resulting

Patient Name : OXX XXXX XXX **Patient ID** :

Age : **MRN** : HLBG00005547

Gender : **Sample Sent** :

External Facility : Hospital Limbang **Sample Received** : 29/07/2016 03:20 PM

External TDM No : EXTDM00000001

NO.	Drug Name	Sample Type	Result Value	UOM
1	Paracetamol 500 mg Tablet	RANDOM	0.5	mcg/ml

Remarks:
OUTSOURCE

Resulted By : 31

Designation : PF

Department : Pharmacy

Page 1 of 1

Figure 7.2-5 External TDM Resulting



8.0 Acronyms

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

9.0 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>Radiopharmaceutical</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			