



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

System Design Document (SDD)

Medication Administration Record – Mobile Application

| | |
|-------------|---------------------------|
| Version | : 1.0 |
| Document ID | : PhIS_CPS/SDD/MAR_MOBILE |



CONFIDENTIAL COPYRIGHTED MATERIAL – *The information includes all concepts, comments, recommendations, and material, contained herein shall remain the property of Pharmaniaga Logistics SdnBhd (PLSB). No portion of this document shall be disclosed, duplicated or used in whole or in part of any purpose other than the purpose of the Pharmacy Information System & Clinic Pharmacy System (PhIS& CPS) Project execution only.*

**REVISION HISTORY**

| Version No | Date of Release | Prepared by | Reviewed by | List of changes from Previous Version |
|-------------------|------------------------|------------------------------------|--------------------|--|
| 1.0 | 16/05/2018 | Sitinoor Megawati bt Saurani | Zainura Said | Document baseline for MAR Mobile and follow PhIS version 1.7 |



Table of Content

| | |
|--|-----------|
| 1. INTRODUCTION..... | 3 |
| 2. PURPOSE | 3 |
| 3. DETAILED SYSTEM DESIGN..... | 4 |
| 3.1 MEDICATION ADMINISTRATION RECORDING (MAR) OVERVIEW | 4 |
| 3.2 MAR MOBILE OVERVIEW | 4 |
| 3.2.1 MAR Overview..... | 4 |
| 3.2.2 Block Diagram | 5 |
| 3.2.3 Purpose | 5 |
| 3.2.4 Screen Navigation Diagram..... | 5 |
| 3.2.5 Detail Functionality and Screen | 6 |
| 3.2.6 Integration..... | 12 |
| 3.3 VIEW MAR OVERVIEW | 13 |
| 3.3.1 Overview..... | 13 |
| 3.3.2 Block Diagram | 13 |
| 3.3.3 Purpose | 13 |
| 3.3.4 Screen Navigation Diagram..... | 14 |
| 3.3.5 Detail Functionality and Screen | 14 |
| 3.3.6 Integration..... | 18 |
| 4. REFERENCES..... | 18 |
| 5. ACRONYMS | 18 |
| 6. APPENDIX..... | 19 |



1. Introduction

Pharmaniaga Logistics Sdn. Bhd. executes software development, enhancement and maintenance projects for its clients. The term “project” is used to describe the full set of activities from the time the proposal is accepted and project initiation note or contract is signed to the time all the software and services are delivered according to the acceptance of the proposal/contract.

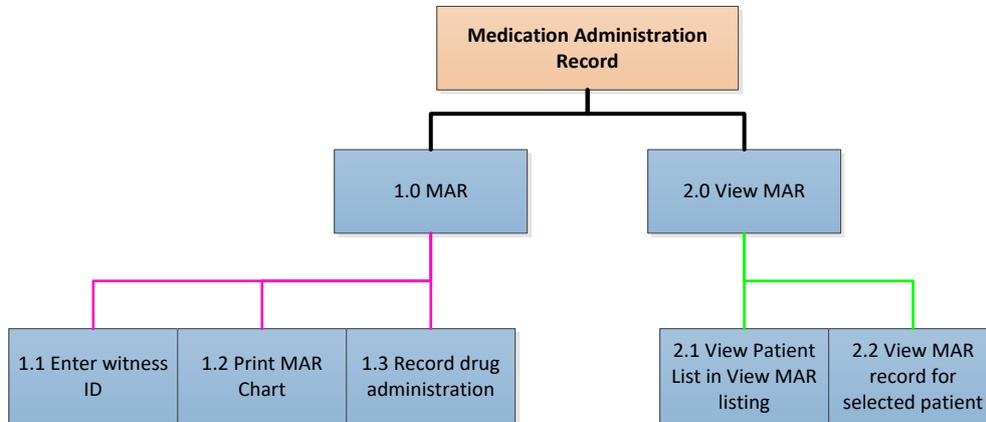
This process is to ensure both user requirements and software requirements of the projects developments are gathered appropriately from stakeholders and are documented in User Requirements Specification (URS) and System Design Documentation (SDD) specifically.

2. Purpose

The purpose of the document is to describe the purpose and functionality of the software product requested by client. This document outlines the project's details, requirements, interface, design issues, and components to ensure that each requirement has been met.

3. Detailed System Design

3.1 Medication Administration Recording (MAR) Overview

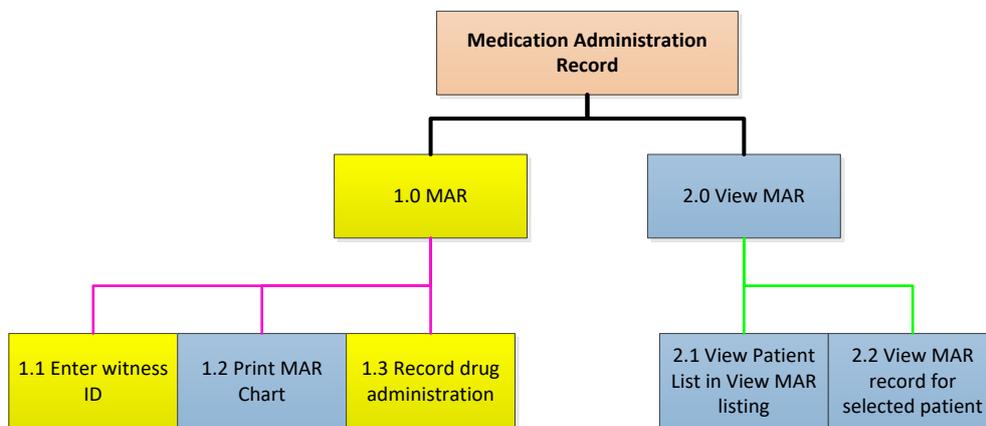


MAR.OVW1: MAR Overall Overview

3.2 MAR Mobile Overview

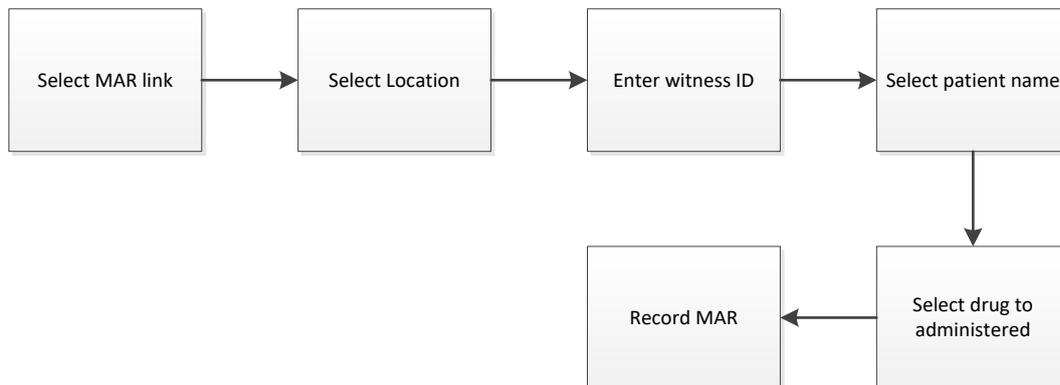
MAR Mobile is another PhIS application for MAR using Ipad. It was mainly used by nurse and doctors who do workaround in ward since they need to move in mobile.

3.2.1 MAR Overview



MAR.OVW2: MAR Mobile Overview

3.2.2 Block Diagram

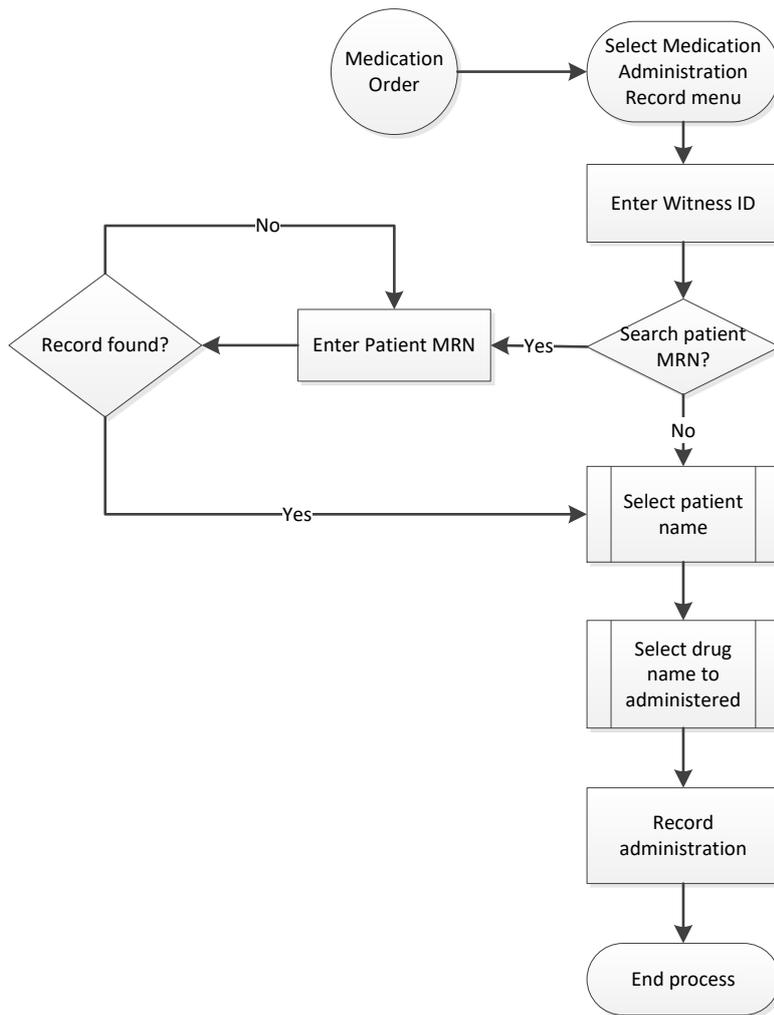


MAR.BD1: MAR Mobile block diagram

3.2.3 Purpose

Medication Administration Record screen allows Nurses to administer patient based on drug and time. The patient name will appear based on granted location of the nurse ID. MAR screen is used for inpatient order only. For MAR mobile application, user can record or admin the drug but cannot do printing of medication chart.

3.2.4 Screen Navigation Diagram



MAR.SND1: MAR Mobile Flow

3.2.5 Detail Functionality and Screen

3.2.5.1 Medication Administration Record

3.2.5.1.1 Screen Design

| | |
|---|-------------------|
| ID | MAR.SD1 |
| Description | MAR Mobile screen |
| Diagram | |
| <p>i. <i>Witness Login ID screen</i></p>  | |



ii. MAR Listing

Medical Ward

Guideline (for current medication administration): ■ Overdue ■ Recorded on time ■ Not yet recorded

Search MRN Filter..

| | |
|-------------------------|----------------------------------|
| Male / 66 HMIRI0018 | ■ |
| Male / 84 HMIRI0013 | ■ |
| Male / 45 HMIRI00240 | ■ |
| Male / 70 HMIRI0013 | ■ |

iii. MAR Dialog Screen (normal order)

Medication Administration Recording

Height: 0 cm Weight: 60 kg BSA: 0 m² BMI: 0 kg/m²

Guidelines : ■ Served ■ Overdue ■ Withhold ■ Not Serve ■ Due ■ Late ■ Future Dose ■ Discontinue

| Drug Name and Dosage Details | Stock | Past | Current | Future |
|--|-------|---|----------------------------|---------------|
| Salbutamol 100 mcg/dose Inhaler (200 doses) Dosage: 2 puff, 20/02/2018 - 20/06/2018, PRN, Inhalation Order date: 20/02/2018 09:21 AM Prescriber: DR | | 21/03/2018 03:46 pm 2 puff Complete | 17/04/2018 2 puff Start | -No schedule- |
| Ipratropium Br 20 mcg Fenoterol 50 mcg/dose Inhalation Dosage: 2 puff, 20/02/2018 - 20/06/2018, TDS (3 times a day), Inhalation Order date: 20/02/2018 09:21 AM Prescriber: DR | | 24/02/2018 05:00 am 2 puff | -No schedule- | -No schedule- |



iv. MAR Dialog Screen (Infusion order)

Medication Administration Recording

Height: 0 cm Weight: 0 kg BSA: 0 m² BMI: 0 kg/m²

Guidelines : ■ Served ■ Overdue ■ Withhold ■ Not Serve ■ Due ■ Late ■ Future Dose ■ Discontinue

| Infusion Drug | 16/04/2018 | 17/04/2018 |
|---|--|------------------------------|
| Doxorubicin HCl 10mg/5ml Injection Dosage: 10 mg, 16/04/2018 - 21/04/2018, OD (once daily), Intravenous Slow Bolus Order date: 16/04/2018 02:56 PM Prescriber: DR | 16/04/2018 03:01 pm 10 mg Complete S 3:01 pm S 3:04 pm | 17/04/2018 03:00 pm 10 mg |
| Kabiven Central 1400kcal, 1.54L Dosage: 1540 ml, 16/04/2018 - 21/04/2018, OD (once daily), Intravenous Infusion Order date: 16/04/2018 02:56 PM Prescriber: DR | 17/04/2018 05:00 am 1540 ml | -No schedule- |

v. Notes screen

Notes

Frusemide 10mg/ml Oral liquid
10 mg BID 5days

Dose administered: 10 mg

Scheduled Administration Start: 17/04/2018 5:00 am

Actual Administration Start: TBA

Administered by: TBA

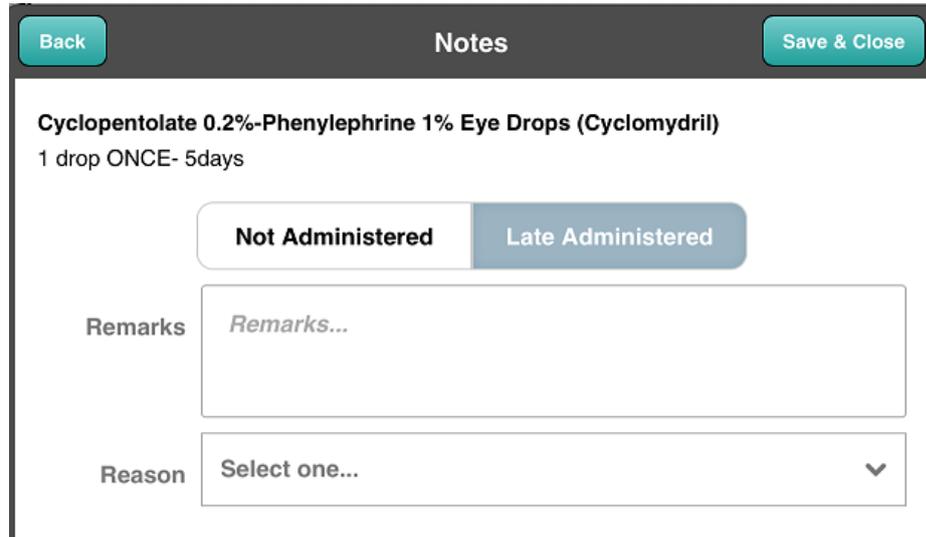
Witness: TBA

Authorized By: N/A

Authorized Time: N/A

Discontinue Doctor: N/A

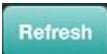
vi. *MAR Late Administered Remarks screen*

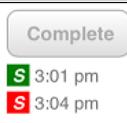


| | |
|--------------------------------|---|
| <p>Notes</p> | <ul style="list-style-type: none"> • Tab on MAR link, witness id screen will appear first. • Tab on Done button to confirm witness id login. • Tab on Close button to close the witness id window. • Tab on Refresh list icon to refresh the MAR patient list. • Tab on patient name to open Mar Dialog screen. • Tab on overdue drug to open Late Administered screen. • Tab on Record button to administered the drug. |
| <p>Cross References</p> | <p>Medication Order Web – PhIS_CPS_SDD_OM_FB_v1.0. Medication Order Mobile – PhIS_SDD_OM_Mobile_v1.0 MAR Web – PhIS_SD_CPS_MAR_Mobile_v1.0</p> |

3.2.5.1.2 *Application Business Rules*

| No. | Name | Description |
|-----|----------------|---|
| 1. | Search Patient | <ul style="list-style-type: none"> • MAR listing screen is displayed for user to select patient based on user's granted location and patient's visit location. • User shall be able to search patient by Patient MRN . • On tab of Patient MRN search icon, user shall be able to search the patient by MRN number of patient name. • By default, patient's record is displayed based on the visit type as below: <ol style="list-style-type: none"> Inpatient: Patient record is displayed until the patient discharge. Daycare: Patient record is displayed until the patient discharge. Emergency: Patient record is displayed until the patient discharge. System auto discharge after 24 hours. • Record in MAR listing can come from Order Management module web or mobile. |

| No. | Name | Description |
|-----|----------------------------|--|
| 2. | Witness ID | <ul style="list-style-type: none"> User must enter a valid witness ID before open MAR screen. Witness ID should come from a pharmacist or doctors that has the same granted location with patient location but with higher roles. Tab on Done button  to confirm the witness ID and MAR listing screen will appear. Click on Close  button to close the witness ID screen and go back to desktop menu. 'Admin' user is prohibited to be witnessed id. An alert will appear if user try to enter admin id as a witness id. Below are the rules on witness id: <ol style="list-style-type: none"> If user did not enter the witness, system should not open the administration screen. Witness criteria; <ul style="list-style-type: none"> Witness must have system access login. Witness must be different with user login. Witness can be anybody from the same discipline only. If user did not enter the witness, system should not open the administration screen. If the MAR screen has been close, then user is required to key-in the witness login again in order to access the patient list. |
| 3. | Refresh listing | Click on the Refresh button to reset all searched records and searching criteria to default value. |
| 4. | MAR Dialog | Tab on Allergy, ADR and Diagnosis to add or enter details. Refer to PhIS_CPS_SDD_OM_Mobile_v1.0 for details. |
| 5. | Administered drug record | <ul style="list-style-type: none"> User shall be able to administered the drug record by tab on Record  button for a due record (yellow color) . Once tab on Record button, Notes screen will appear. Then tab on Save & Close button to record. User shall be able to admin the due drug within one hour before the actual admin time and 1 hour after the actual admin time. For future dose which describe in dark green color , user shall able to enter the remarks only. For overdue drug, it will be describe in red color  and user able to enter the late administration remarks only. Refresh button , used to refresh the drug order, in case if other user has administer the record but not updated automatically to the current page. For a discontinue/stopped drug, the drug name will be strike through with red and the drug will be sort to last page. User shall not be able to admin the discontinue drug. |
| 6. | Administered Infusion Drug | <ul style="list-style-type: none"> User shall be able to administered infusion order by start button . After tab on Start button, Notes screen will appear, then tab on Save & Close button to record the admin time. Once infusion drug record is being recorded, Complete button  will appear. User can tab on Complete button to complete the admin time. Once complete, system should show the start time and complete time as below and Complete button will be disable: |

| No. | Name | Description |
|-----|--------------------|--|
| | |  |
| 7. | Late Admin Remarks | <ul style="list-style-type: none"> User also shall be able to enter remarks for late administration record by tab on Past column which display red indicator . Once tab on this column, Notes screen will pop up and user need to tab on Add/Edit Remarks button to enter the remark. For overdue drugs, user shall be able to update the drug as Not Administered or Late Administered through MAR Remarks screen. Save the drug remarks by tab on Save & Close button. |
| 8. | MAR color code | <p>Administration of drug inside MAR screen is differentiate by a color code. Below is the standard color code used in MAR:</p> <ul style="list-style-type: none">  Served Green – drug record has been administered on time;  Overdue Red – drug admin time has passed/overdue;  Withhold Blue – drug with ‘hold’ status;  Not Serve Purple – drug record is being updated as not serve;  Due Yellow – drug record need to be admin on time (+- 1 hour);  Late Turquoise – drug record is being updated as late serve;  Future Dose Light Green – drug record admin time is for future dose;  Discontinue Orange – drug record has been stopped/discontinue by prescriber. |
| 9. | MAR Drug list | <ul style="list-style-type: none"> By default, MAR screen will display those active drug record for the current visit/referral visit. For stop/discontinue drugs, the drug list will be sorted at the end of active drug record. The drug name will be strikethrough. Drug information display in web shall be same as what display in MAR mobile. Any update in MAR web shall also update to MAR mobile. |

3.2.5.1.3 Input Validation Rules

| No. | Name | Description | Mandatory | Format |
|--------------------------|-------------|---|-----------|------------------------------|
| Witness ID Screen | | | | |
| 1. | Witness ID | User shall be able to enter witness ID. | Yes | Text field |
| MAR Listing | | | | |
| 1. | Patient MRN | MAR listing shall be retrieved from the database for all inpatients with confirmed ordered drug. It will display the patient name that match with the query MRN and based on user granted location. | No | Text field (searching field) |
| MAR Dialog Screen | | | | |
| 1. | Past tab | Shall display the past admin time of the drug. If the drug is not administered, this column will display red color | Yes | Column |

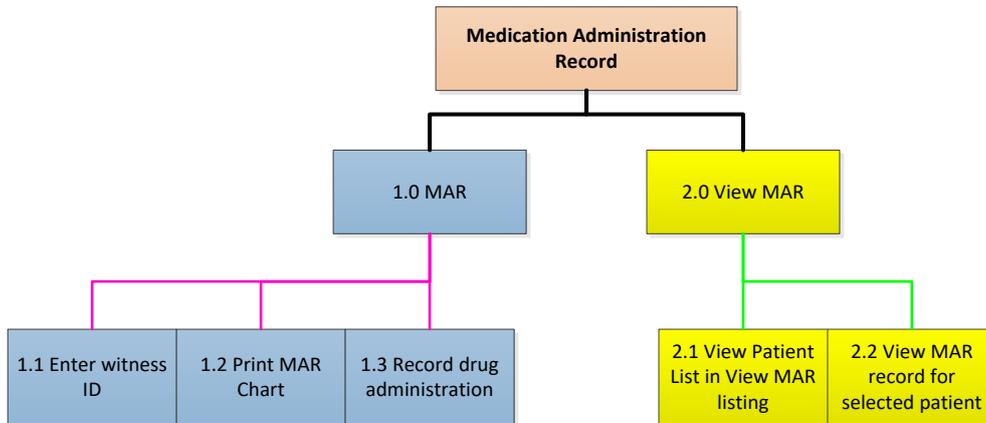
| No. | Name | Description | Mandatory | Format |
|--------------------|--|--|-----------|--------------|
| | | box indicator. | | |
| 2. | Current tab | Shall display the current admin time of the drug and indicate with yellow color box. User able to administered the drug by tab on Record button. | Yes | Column |
| 3. | Future tab | Shall display future dose admin time of the drug. User shall be able to enter the remarks only if user tab on this column. | Yes | Column |
| 4. | Administered drug: Record button | User shall be able to admin the drug by tab on Record button and admin date and time will be displayed under Past tab. | Yes | Button |
| 5. | Administered infusion drug: Start time | User shall be able to administer the infusion drug by tab on Start button and start time will auto fill into the start time text field. It is non editable field. | Yes | Read only |
| 6. | Administered infusion drug: End time | User shall be able to administer the end time for infusion drug by tab on Complete button and end time will auto fill into the end time text field. It is non editable field. | Yes | Read only |
| MAR Remarks | | | | |
| 1. | Not Administered | User shall be able to update the drug to 'Not Administered' which means no drug given to the patient. | Yes | Tab function |
| 2. | Late Administered | User shall be able to update the drug to 'Late Administered' which means drug is given to patient but at later time. | Yes | Tab function |
| 3. | Reason | User shall be able to enter the reason for late admin or not admin. Reason consists a dataset of: <ul style="list-style-type: none"> • Allergy • Changed Drug, • Haemodialysis • Medication/Drug With Hold • Nil By Mouth • Nil In Stock • No IV Access, • Not In Bed • Others • Patient Discharged • Refused | No | Drop down |
| 4. | Remarks | User shall be able to enter any remarks regarding the update. | No | Text field |

3.2.6 Integration

None.

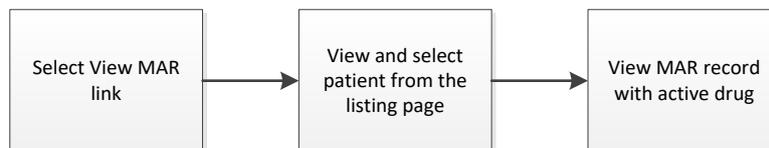
3.3 View MAR Overview

3.3.1 Overview



VM.OVW1: View MAR Mobile Overview

3.3.2 Block Diagram

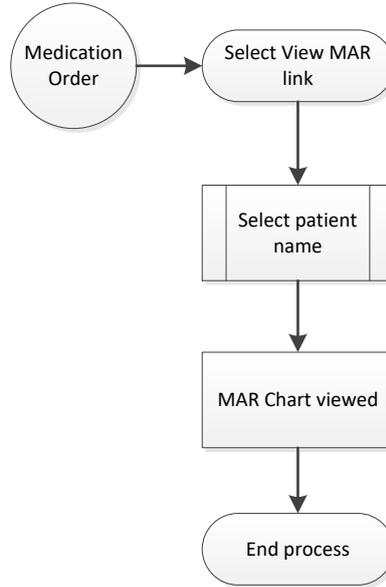


VM.BD1: View MAR Mobile block diagram

3.3.3 Purpose

This screen for user to view all medication administration details as a chart. The data should show only for the active patient visit where patient visit as inpatient. Once patient discharged, system should not show in this MAR.

3.3.4 Screen Navigation Diagram

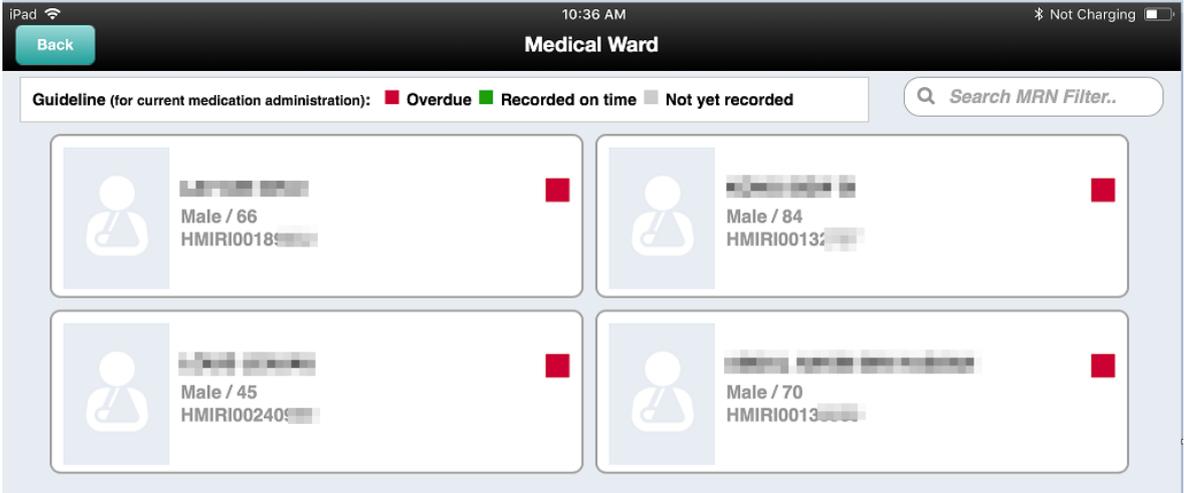


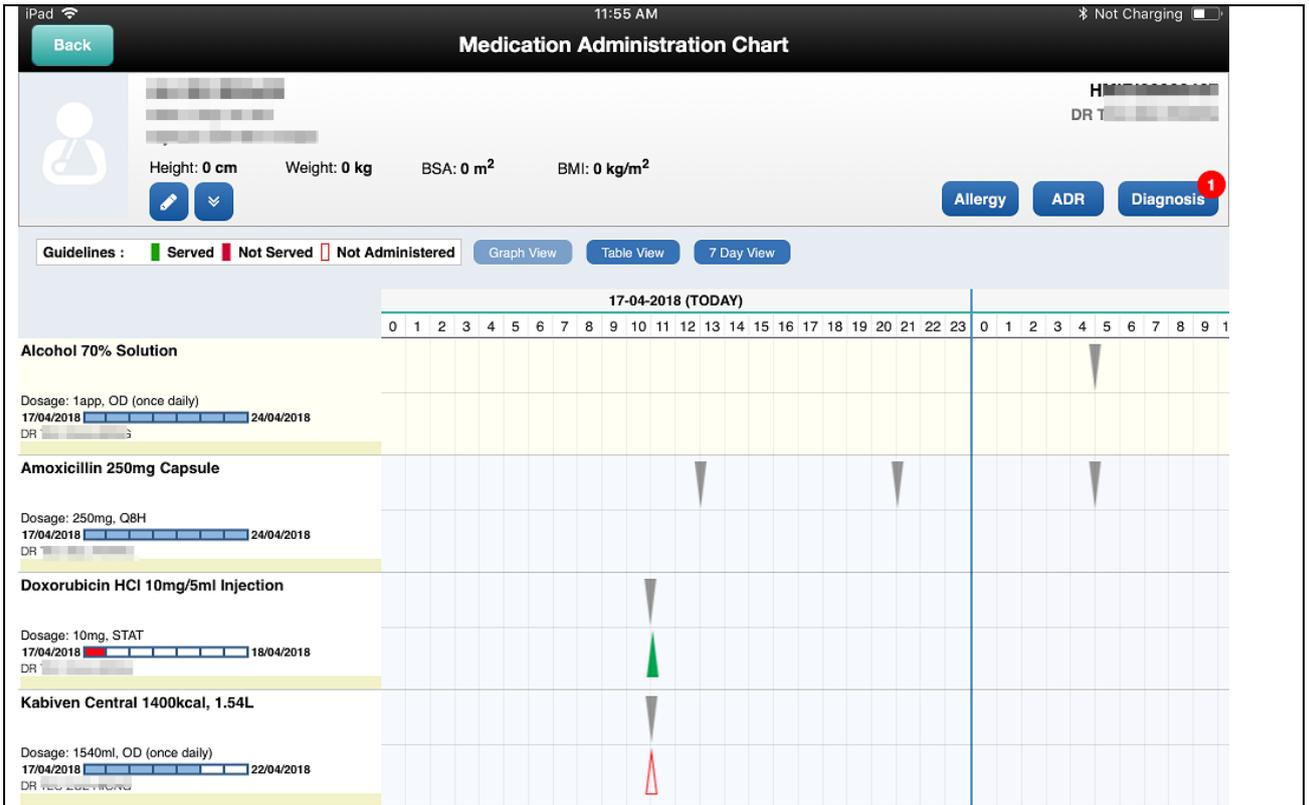
VM.SND1: View MAR Mobile Flow

3.3.5 Detail Functionality and Screen

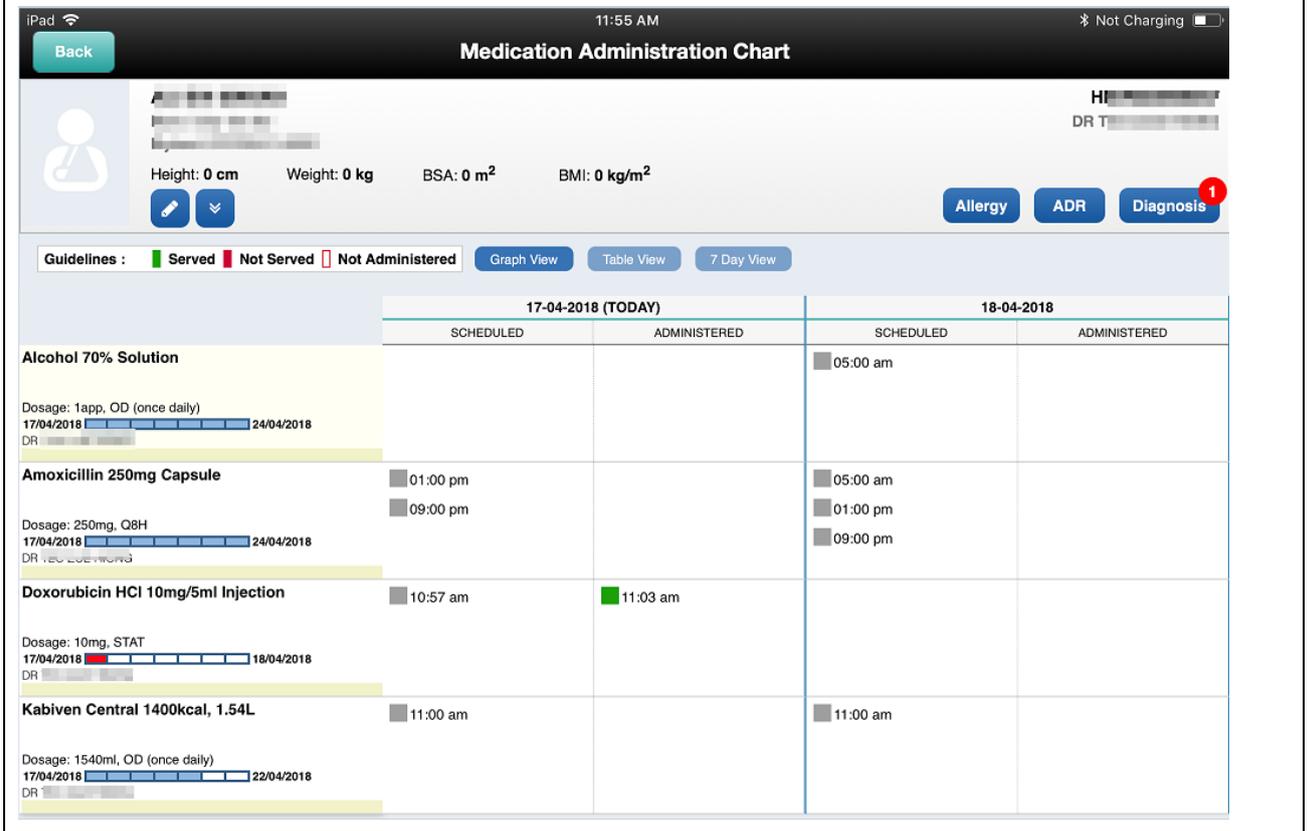
3.3.5.1 View MAR Mobile

3.3.5.1.1 Screen Design

| | |
|--|-----------------|
| ID | VM.SD1 |
| Description | View MAR Mobile |
| Diagram | |
| i. View MAR Listing | |
|  | |
| ii. View MAR Mobile (Graph View) | |



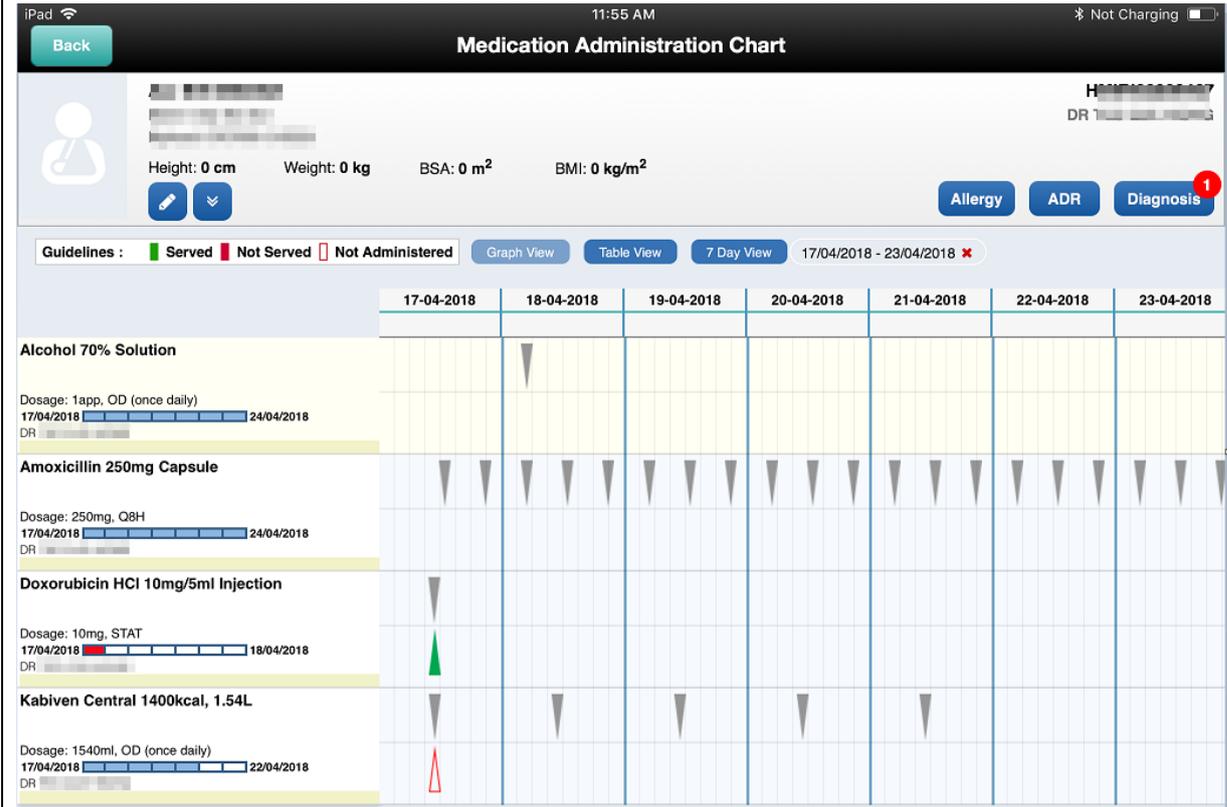
iii. View MAR Mobile (Table View)



iv. View MAR Mobile (7 days View)

Start Date

End Date



| | 17-04-2018 | 18-04-2018 | 19-04-2018 | 20-04-2018 | 21-04-2018 | 22-04-2018 | 23-04-2018 |
|--|------------|------------|------------|------------|------------|------------|------------|
| Alcohol 70% Solution Dosage: 1app, OD (once daily) 17/04/2018 <input type="checkbox"/> 24/04/2018 DR | | ▼ | | | | | |
| Amoxicillin 250mg Capsule Dosage: 250mg, Q8H 17/04/2018 <input type="checkbox"/> 24/04/2018 DR | ▼ | ▼ | ▼ | ▼ | ▼ | ▼ | ▼ |
| Doxorubicin HCl 10mg/5ml Injection Dosage: 10mg, STAT 17/04/2018 <input checked="" type="checkbox"/> 18/04/2018 DR | ▼ | | | | | | |
| Kabiven Central 1400kcal, 1.54L Dosage: 1540ml, OD (once daily) 17/04/2018 <input type="checkbox"/> 22/04/2018 DR | ▼ | ▼ | ▼ | ▼ | ▼ | | |

| | |
|-------------------------|---|
| Notes | <ul style="list-style-type: none"> • Tab on Search to search patient name based on filter criteria. • Tab on the patient record to open MAR chart (read only). |
| Cross References | <p>Medication Order Web – PhIS_CPS_SDD_OM_FB_v1.0.</p> <p>Medication Order for Mobile – PhIS_CPS_SDD_OM_Mobile_v1.0</p> <p>MAR Web – PhIS_CPS_SDD_MAR_Web_v1.0</p> <p>MAR.SD1 – MAR mobile screen</p> |

3.3.5.1.2 Application Business Rules

| No. | Name | Description |
|-----|------------------|---|
| 1. | View MAR Listing | <ul style="list-style-type: none"> • By default, the listing will show patient based on granted location by user with active drugs. • In the patient listing, the list will show only the patient with active visits (where patient discharged flag is false) and the active prescription (one of the drugs end date is greater than current date and status not equal to |

| No. | Name | Description |
|-----|-------------------------|---|
| | | <p>discontinue or cancelled.</p> <ul style="list-style-type: none"> The medication administration chart is for read only. Tab on Allergy, ADR and Diagnosis to add in info. Refer to PHIS_CPS_SDD_OM_Mobile_v1.0 for more details. For stop/discontinue drugs, the list will be sort at the end of active drug record. The drug name will be strikethrough. |
| 2. | Refresh Listing | Click on the Refresh button to reset all searched records and searching criteria to default value. |
| 3. | Search View MAR record | <ul style="list-style-type: none"> System shall provide the filtering function for user to search on specific record. By default, system shall display MAR record with Active medication. Enter value at Patient Search MRN column to search specific patient name by MRN. |
| 4. | View MAR Dialog | <ul style="list-style-type: none"> By default the drug name will be listed in alphabetical order. All active and inactive drug will be displayed. Click on Refresh button to refresh the list. User shall be able to view on MAR chart for the active drug and inactive drug. The serve drug will be highlight with green color  with date and time display. Drug with no color  indicate that it was not being administered at all. Drug with red color  indicate that it was updated to 'Not Serve'. For a discontinue/stopped drug, the drug name will be strike through with red and the drug will be sort to last page. |
| 5. | View MAR Display format | <p>There were 3 types of View MAR screen available in mobile:</p> <ul style="list-style-type: none"> Graph View – display the record in graph view by showing first on current date. Tab on Graph View button to view this. Table View – display the record in table view with 2 columns; current date and next date. Each column has 'Schedule' column to show the schedule time and 'Administered' column to show the actual administered time. Tab on Table View button. 7 Days View – display the MAR record in 7 days. Before that user has to enter the start date and end date to display the record. Once tab OK, View MAR will display the record in 7 days at one page. |
| 6. | View MAR Color Code | <p>Administration of drug inside View MAR screen is differentiate by a color code. Below is the standard color code used in View MAR:</p> <ul style="list-style-type: none">  Green – drug record has been administered whether on time or not on schedule time;  Red – drug is updated as 'Not Administered'.  Blank – drug is not administered at all |

3.3.5.1.3 Input Validation Rules

| No. | Name | Description | Mandatory | Format |
|-------------------------------|------------|---|-----------|--------------------------------|
| View MAR screen | | | | |
| 1. | MRN | Manage Prescription listing shall be retrieved from the database for all registered patients with visit based on matching MRN and related to original prescriber/pharmacist name that create the order. | No | Text field (search field) |
| View MAR 7 Days format | | | | |
| 1. | Start Date | Enter the start date to view chart. User shall be able to select from the date format in Ipad. | Yes | Calendar format in dd-mon-yyyy |
| 2. | End Date | Auto populate the end date once user enter the start date. This field is non editable field. | Yes | Read only |

3.3.6 Integration

None.

4. References

| Document | Description/ Expansion |
|-----------------------------|---|
| PhIS_CPS_SDD_OM_FB_v1.0 | System Design Document (SDD) for Order Management module for Full Based |
| PhIS_CPS_SDD_OM_Mobile_v1.0 | System Design Document (SDD) for Order Management Module of mobile |

5. Acronyms

| Item | Description |
|------|-------------------------------------|
| URS | User Requirement Specification |
| SDD | System Design Documentation |
| SPUB | <i>Sistem Pendispensan Ubat</i> |
| IWP | Integration Web Portal |
| KPK | <i>Ketua Penolong Pengarah</i> |
| IV | Intravenous |
| CDR | Cytotoxic Drug Reconstitution |
| MTAC | Medication Therapy Adherence Clinic |
| PN | Parenteral Nutrition |
| TDM | Therapeutic Drug Monitoring |



| Item | Description |
|------|----------------------------------|
| URS | User Requirement Specification |
| MAR | Medication Administration Record |

6. Appendix

None.