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1 SCOPE

1.1 Identification

The issues to be addressed are related to the Information Technology needs of the RightCare Hospital. Currently the hospital is faced with the task of upgrading its systems, making major changes to make the jobs of the staff easier, and to improve the function of the hospital in several ways.

After analysing the case study given, there were several major problems that were found. Different staff members of the hospital have different Information Technology issues that they would like addressed. Some of the problems identified are listed below:

- The current pharmacy management system being used by the hospital is inadequate because it does not suit the nurses. Their workload is increased considerably due to the amount of searching they have to do for medicines to be delivered.
- When patients are transferred or discharged, the standing orders have to be adjusted or cancelled accordingly.
- The prescription form may need adjustments with “to fill” and “filled and delivered” fields for out door patients.
- The doctors have to use a COCKTAIL system for checking for dangerous combinations of drugs. COCKTAIL should be advisory and the doctor must be able to override the advice given by COCKTAIL.
- The Pharmacists have to produce a single preparation list sorted by drug to display what is to be prepared for the next shift.
- The Pharmacists have to produce dose labels that specify the name of patient, the room number, the name of medication, the size of the dose, dose number of total medications, the time it is to be administered and the doctor who prescribed it .

- The Pharmacists have to produce a schedule for distribution of medications so that the pharmacist can arrange the medications in the order of floor, wing and room.
- The Pharmacists have to produce a list of all medications needed for a single shift at a nursing station (to place the prepared doses on delivery carts).
- The Pharmacists have to record dispatch of prescriptions (filled & delivered) to out door patients.
- The Pharmacists have to record dispatch of Prescriptions for emergency orders.
- The system should produce a Drugs Administered List (that can be uploaded by the Central Accounting System).
- The system should cancel all standing orders for a patient when he/she is discharged

1.2 System overview

PharmaCare will address issues related to the management of medication given to patients. Other IT areas of the hospital, such as admitting, discharging and maintaining the medical history of patients will not be within the scope of the PharmaCare system. Not all of the Information Technology needs of RightCare Hospital are addressed by the PharmaCare System.

The new PharmaCare system that was proposed by Jack Smith, Director of Systems Development at RightCare Hospital will be a "three tier" system. Using a system of this type avoids data flow issues, such as the pharmacist not getting information immediately. It also allows easy expansion of system to other branch hospitals.

COCKTAIL is just one of several external systems that PharmaCare will have to interface with. PharmaCare has to interact with a Hospital Patient Care Data System, a Central Accounting System, and a Cocktail Vendor System. In order to facilitate the easy re-use of

data and to make the system as flexible as possible; XML is to be used to exchange data between these systems. Different XML data structures are to be created that are suitable for interacting with each of the external systems and actors. These data structures are outlined in this document.

A system for the creating of dose labels will also be part of the PharmaCare system. This is to assist the nurses when delivering medicines to patients.

To assist with stock taking and auditing purposes, PharmaCare will have to interact with a Central Accounting System. This is so that a record of the amount of drugs administered can be maintained. The exact details of the accounting process are not part of the scope of this project.

Finally, the system has to properly handle the cancellation of drug orders. It has to cancel all standing orders for drugs when a patient is discharged, and also has to be able to move orders to different rooms when a patient is moved.

1.3 Document overview

This document contains a detailed model of how the PharmaCare system is to work.
The sources of information used in this document are listed in the next section.

A large section of this document is used to list and give detail about the requirements found. PharmaCare should have certain capabilities, which are expanded upon. The system has to be used by several actors and interact with external systems. These are all explained and a use case diagram is used to show how this all comes together.

Terms used are explained in the glossary.

The architectural design is where the layout of the structure of the system is defined. XML and DTDs are used for showing how data will be interchanged between the PharmaCare System and the external systems. Object definitions are used to specify the basic data entities and simple object schema outlines for the classes' objects of the model and interface components of the system.

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- Potter, B., Sinclair, J., Till, D., "An Introduction to Formal Specification and Z", Prentice Hall International, ISBN 0-13-478702-1, 1991
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3 REQUIREMENTS

3.1 CSCI capability requirements

3.1.1 Write Prescription

System or Component: PharmaCare System Date: 27-3-2004

Scenario: Write Prescription Version: 1.0

Extends: at Step :

Actor(s): Doctor	Alternates: 1. Patient Not Registered 2. 3.

Precondition:
Doctor registered with HPCDS and logged into the system.
The relevant screen is displayed and active for the Doctor to start writing the Prescription

Source:	No.	Action:	Comments:
Doctor	1	Enter Patient Name or ID	
PMS	2	Authenticate Patient	If authentication successful go to next step, otherwise display error message and return to Step 1
PMS	3	Display Patient Details	Patient details retrieved from HPCDS
Doctor	4	Enter Prescription Details	
Doctor	5	Check cocktail	With external system CVS
PMS	6	Display Cocktail verification message	If cocktail acceptable go to next step, otherwise return to step 4
Doctor	7	Place Standing Order (if necessary)	For indoor patients
Doctor	8	Place Digital Signature	
Doctor	9	Complete writing prescription	Update all necessary records
PMS	10	Display original screen	

3.1.2 Modify Prescription

System or Component: PharmaCare System Date: 27-3-2004

Scenario: Modify Prescription Version: 1.0

Extends: at Step :

Actor(s): Doctor	Alternates: 1. Patient Not Registered 2. Prescription not found

Precondition:
Doctor registered with HPCDS and logged into the system.
The relevant screen is displayed and active for the Doctor to start modifying the Prescription

Source:	No.	Action:	Comments:
Doctor	1	Enter Patient Name or ID	
PMS	2	Authenticate Patient	If authentication successful go to next step, otherwise display error message and return to Step 1
PMS	3	Display Prescription	If Prescription not found display error message and go to step 1
Doctor	4	Change Prescription Details	
Doctor	5	Check cocktail	With external system CVS
PMS	6	Display Cocktail verification message	If cocktail acceptable go to next step, otherwise return to step 4
Doctor	7	Place Standing Order (if necessary)	For indoor patients
Doctor	8	Place Digital Signature	
Doctor	9	Complete modifying prescription	Update all necessary records
PMS	10	Display original screen	

3.1.3 Cancel Prescription

System or Component: PharmaCare System Date: 27-3-2004

Scenario: Cancel Prescription Version: 1.0

Extends: at Step :

Actor(s): Doctor			Alternates: 1. Patient Not Registered 2. Prescription not found
Precondition: Doctor registered with HPCDS and logged into the system. The relevant screen is displayed and active for the Doctor to cancel the Prescription			
Source:	No.	Action:	Comments:
Doctor	1	Enter Patient Name or ID	
PMS	2	Authenticate user	If authentication successful go to next step, otherwise display error message and return to Step 1
PMS	3	Display Prescription	If Prescription not found display error message and go to step 1
Doctor	4	Cancel Prescription	
PMS	5	Display confirmation message	
Doctor	6	Confirm cancellation	Update all necessary records
PMS	7	Display “Successfully Canceled”	
Doctor	8	Complete canceling prescription	
PMS	9	Return to original display	

3.1.4 View/Print Prescription

System or Component: PharmaCare System Date: 27-03-04

Scenario: View/Print Prescription Version: 1.0

Extends: at Step:

Actor(s): Staff			Alternates: 1. Patient Not Registered 2. Prescription not found
Precondition: Staff registered with HPCDS and logged into the system. The relevant screen is displayed and active for the Staff to view the Prescription			
Source:	No.	Action:	Comments:
Staff	1	Enter Patient Name or ID	
PMS	2	Authenticate Patient	If authentication successful go to next step, otherwise display error message and return to Step 1
PMS	3	Display Prescription	If Prescription not found display error message and go to step 1
Staff	4	Print Prescription	If not necessary to print go to step 6
PMS	5	Send Prescription to Pinter	Printer linked with PMS
Staff	6	Complete view/printing	
PMS	7	Return to original display	

3.1.5 View/Dispatch Prescription (Pharmacist)

System or Component: PharmaCare Date: 27-03-04

Scenario: View/Fill prescription Version: 1.0

Extends: at Step :

Actor(s): Pharmacist			Alternates: 1. Patient Not Registered 2. Prescription not found
Precondition: Pharmacist registered with HPCDS and logged into the system. The relevant screen is displayed and active for the Pharmacist to view the Prescription			
Source:	No.	Action:	Comments:
Pharmacist	1	Enter Patient Name or ID	
PMS	2	Authenticate Patient	If authentication successful go to next step, otherwise display error message and return to Step 1
PMS	3	Display Prescription	If Prescription not found display error message and go to step 1 If indoor Prescription go to step 6
Pharmacist	4	Mark “Filled & Dispatched”	For outdoor Prescriptions Only
PMS	5	Print Dose label	For outdoor Prescriptions Only
Pharmacists	6	Complete view/fill prescription	
PMS	7	Return to original display	

3.1.6 Print Medication Labels for OPD Patients

System or Component : Pharmacy Management System Date : 03/28/2004

Scenario : to print medication labels for OPD patients Version : V2.0

Extends : at Step :

Actor(s) : Pharmacist	Alternates : 1. Pharmacist not registered 2. Patient not registered 3. Drug Dose details not found

Precondition : every patience's medication information has been stored in Oracle Database, including ID , name, age, gender, content of the prescription given by the doctor, drug details.

Source :	Step :	Action :	Comments :
Pharmacist	1	Enter username and user password at PMS user login interface	
PCM	2	validate the user name and password, and display the main PCM user menu interface	If not valid , display error message
Pharmacist	3	Choose Medication label function, and patient's name and ID number	
PCM	4	Authenticate Patient	If authentication is successful and also that is a OPD Patient, go to next step; If authentication fails, display an error message and return to Step 3
CAS	5	Return the dose label information with the patient's details	
PCM	8	Print out the result	After print out the required dose label information , return to PCM main menu

3.1.7 Print Medication Labels for Indoor Patients

System or Component: PharmCare System Date: 27-03-04

Scenario: Print Medication Labels for Indoor Patients Version: 1.0

Extends: at Step :

Actor(s): Pharmacist	Alternates: 1. Pharmacist Not Registered 2. Patient Not Registered 3. Drug Dose details not found

Precondition: Patient registered with the HPCDS, Doctor registered with HPCDS, the Doctor has already entered a prescription for the Patient and doctor have to provide the digital Signature

Source:	Step:	Action:	Comments:
Pharmacist	1	Enter Patient Name or ID	
PMS	2	Authenticate Patient	If authentication is successful and also that is a Indoor Patient, go to next step; If authentication fails, display an error message and return to Step 4
PMS	3	Display the Medication Labels for Indoor Patients	
Pharmacist	4	Select print function	
PMS	5	Send the Current Medication Labels for Indoor Patients to Printer	Printer linked with PMS
Pharmacist	7	Complete view/printing	
PMS	8	Return to Pharmacist Menu	

3.1.8 Produce preparation list

System or Component: PharmCare System Date: 27-03-04

Scenario: Produce preparation list Version: 1.0

Extends: at Step :

Actor(s): Pharmacist	Alternates: 1. Pharmacist Not Registered 2. Patient Not Registered 3. Drug Dose details not found

Precondition: Patient registered with the HPCDS, Doctor registered with HPCDS, the Doctor has already entered a prescription for the Patient and doctor have to provide the digital Signature
And the patient has been allocation to room and also a indoor patient. Pharmacist has logged in the PMS.

Source:	Step:	Action:	Comments:
Pharmacist	1	Select "Produce Preparation List" from Main Menu	
System	2	Retrieve prescriptions data in XML format from HPCDS	If access fail, the system will display an error message, then return to Pharmacist Menu page
System	3	Compute quantity needed by each type of drug. Sort the list of drug by number and name of drug and produce preparation list of drug for next shift.	Sorting is requested by pharmacists to ease their job.
System	4	Update the data to CAS in XML format	
System	5	Output the preparation list	
Pharmacist	6	Prepare medications according to the preparation list.	
Pharmacist	7	Go back to Main Menu after finishing the preparation.	

3.1.9 Produce List for Nursing Station

System or Component:	Pharmacy Management System	Date:	27-03-04
Scenario:	Produce List for Nursing Station	Version:	1.0
Extends:		at Step :	

Actor(s): Pharmacist	Alternates: 1. Pharmacist Not Registered 2. Database error 3.

Precondition: every patience's location and prescription information has been stored in PMS, including patience' floor and ward number, name, age, gender, content of the prescription given by the doctor, expire date of the prescription.

Doctor registered with HPCDS, the Doctor has already entered prescriptions for the patients and doctor has to provide the digital Signature.

Pharmacist has logged in the PMS.

Source:	Step:	Action:	Comments:
Pharmacist	1	Select "Print List for Nursing Station"	
System	2	Retrieve data and sort the data against floor and room number.	
System	3	Display the list	Pharmacist is given an option to print the list on paper
Pharmacist	4	View / Print the list. After that, go back to Pharmacist Menu	
System	5	Return to Pharmacist Menu	

3.1.10 Get Drugs Administered List

System or Component: PharmCare System Date: 27-3-04

Scenario: Get Drugs Administered List Version: 1.0

Extends: at Step :

Actor(s): CAS	Alternates: 1. 2. 3.
Precondition: CAS requests “Drugs Administered List”	

Source:	Step:	Action:	Comments:
CAS	1	Access stored drugs list.	
PMS	2	Read drug name and quantity administered.	
PMS	3	Summarise and sort data gathered from drugs list into (XML format containing) a list of drugs (in alphabetical order) and the quantity of each drug administered since CAS last requested a report.	
PMS	4	Produce “Drugs Administered List” (in XML format) and output to CAS	
CAS	5	Updated CAS	
PMS	6	Change quantity administered in drugs list for all drugs to 0.	

3.1.11 View Distribution Schedule

System or Component :	Pharmacy Management System	Date :	03/28/2004
Scenario :	To generate a distribution schedule sorted by the floor and ward number for distribution of medications	Version :	V2.0
Extends :		at Step :	

Actor(s) : Nurses	Alternates : 1. invalid password 2. Database error

Precondition : all the patience's information has been stored in the Oracle database already, including patience' floor and ward number, name, age, gender, content of the prescription given by the doctor.

Source :	Step :	Action :	Comments :
Nurse	1	Enter username and user password at the user login interface	
PMS	2	validate the user name and password, and display the Nurse menu	If not valid , display error message
Nurse	3	Select "distribution schedule" function from the main menu	
PMS	4	Return a distribution schedule, sorted by floor, ward number the wing	
Nurse	5	Press "print" button	If press close buttom, return to the Nurse menu. All buttons are provided.
PMS	6	Print out the schedule generated by the system	

3.1.12 View List for Nursing Station

System or Component:	Pharmacy Management System	Date:	27-03-04
Scenario:	View List for Nursing Station	Version:	1.0
Extends:		at Step :	

Actor(s): Nurse	Alternates: 1. 2.

Precondition: every patience's location and prescription information has been stored in PMS, including patience' floor and ward number, name, age, gender, content of the prescription given by the doctor, expire date of the prescription.

Doctor registered with HPCDS, the Doctor has already entered prescriptions for the patients and doctor have to provide the digital Signature.

Nurse has registered and logged in the PMS.

Source:	Step:	Action:	Comments:
Nurse	1	Select "Print List for Nursing Station"	
System	2	Retrieve data and sort the data against floor and room number.	
System	3	Display the list	Nurse is given an option to print the list on paper
Nurse	4	View / Print the list. After that, go back to Nurse Menu	
System	5	Return to Nurse Menu	

3.1.13 Transfer Patient

System or Component: PharmCare System Date: 27-03-04

Scenario: Transfer Patient Version: 1.0

Extends: at Step :

Actor(s): HPCDS	Alternates: 1. 2. 3.
Precondition: Patient is transferred to another hospital room.	

Source:	Step:	Action:	Comments:
HPCDS	1	Request update of patient details	
PMS	2	Acknowledge receipt of patient details	
PMS	3	Change patient records - new floor, new wing, and new room in the prescription records.	The relevant data will be updated in the prescription records
PMS	4	Confirm update	With the HPCDS
HPCDS	5	Acknowledge confirmation	

3.1.14 Cancel Prescription

System or Component: PharmaCare Date: 27-03-04

Scenario: Cancel Prescription Version: 2

Extends: at Step :

Actor(s): HPCDS			Alternates: 1. 2. 3.
Precondition: HPCDS is discharging a patient.			
Source:	Step:	Action:	Comments:
HPCDS	1	Request update of patient details	
PMS	2	Acknowledge receipt of patient details	
PMS	3	Remove patient prescription records	The relevant prescription records will be deleted or disabled
PMS	3	Confirm deletion	With HPCDS
HPCDS		Acknowledge confirmation	

3.2 CSCI external interface requirements

3.2.1 Definition of Actors

The tables shown below define the various actors of the PharmaCare system. Although the patient is the main actor of the PharmaCare system, they do not directly act on the system. Staff or the Doctors maintain patient records. The Pharmacist and the Nurse mainly view or list various details of the patient.

Actor:	Doctor
Description:	• Create/edit/cancel prescription • Place a digital signature on prescriptions • Create/edit/cancel standing orders for in-door patients • Check the medicine cocktail
Alias:	None
Contact Details:	

Actor:	Pharmacist
Description:	• Produce a single preparation list for what drugs to prepare for the next shift • Produce dose labels • Produce a schedule for distribution of medications • Produce a list of all medications needed for a single shift at a nursing station • Record dispatch of prescriptions • Record dispatch of Prescriptions to rush orders
Alias:	Head Pharmacist
Contact Details:	Larry Larkin

Actor:	Nurse
Description:	• View a distribution schedule • View preparation list for nursing station
Alias:	Chief of Nursing Staff and Head Nurse
Contact Details:	Mary Maclean

Actor:	Staff
Description:	• Enter patient general information • Print OPD prescription
Alias:	Chief Administrator
Contact Details:	Mike Munrows

3.2.2 Definition of External Systems

The tables shown below define the external systems of the PharmaCare system. Although most of the systems are passive, since we are suggesting three-tier architecture the external systems too can be active. In this aspect the HPCDS acts on the PharmaCare system to change the patient status and the CAS system acts on the PharmaCare system to retrieve drugs administered details.

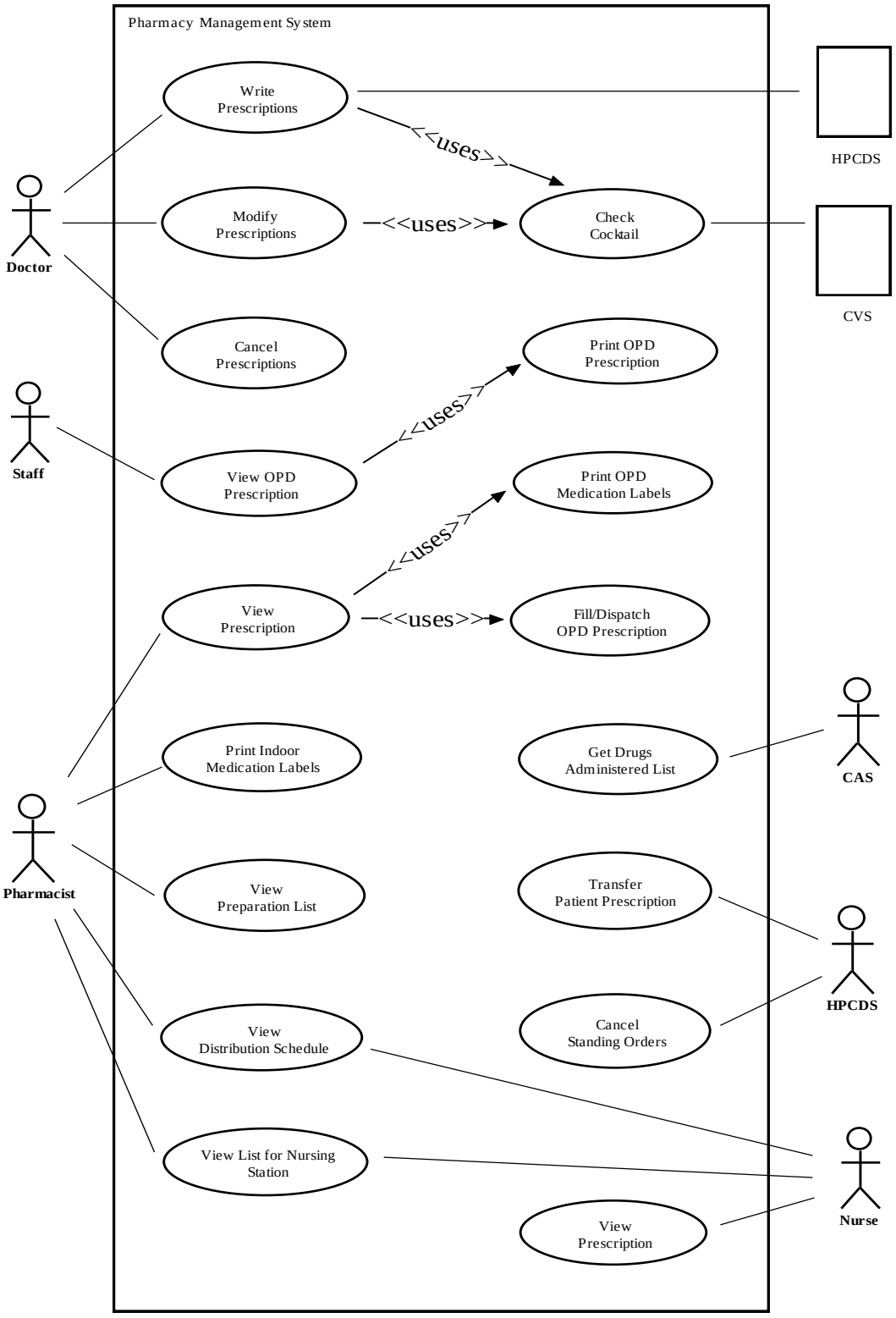
External System	Hospital Patient Care Data System (HPCDS)
Description	• Records all information related to the present and past patients of the Hospital. It contains the patients' personal data as well as the medical history.
Aliases	None
Contact Details	

External System	Central Accounting System (CAS)
Description	• The central accounting system will include stocktaking, • Ordering • Auditing a • Billing and payment receipt.
Aliases	None
Contact Details	

External System	Cocktail Vendor System (CVS)
Description	• The Cocktail Vendor System keeps information about the combination of drugs that might react unfavourably when consumed together. • The system can be accessed to download up-to-date information about these drug mixtures.
Aliases	
Contact Details	

3.2.1 Functional Use Case Diagram

The functional use case diagram for the PharmaCare System is shown below. It shows the various functionalities of the system and the interaction of actors and the external systems with PharmaCare.

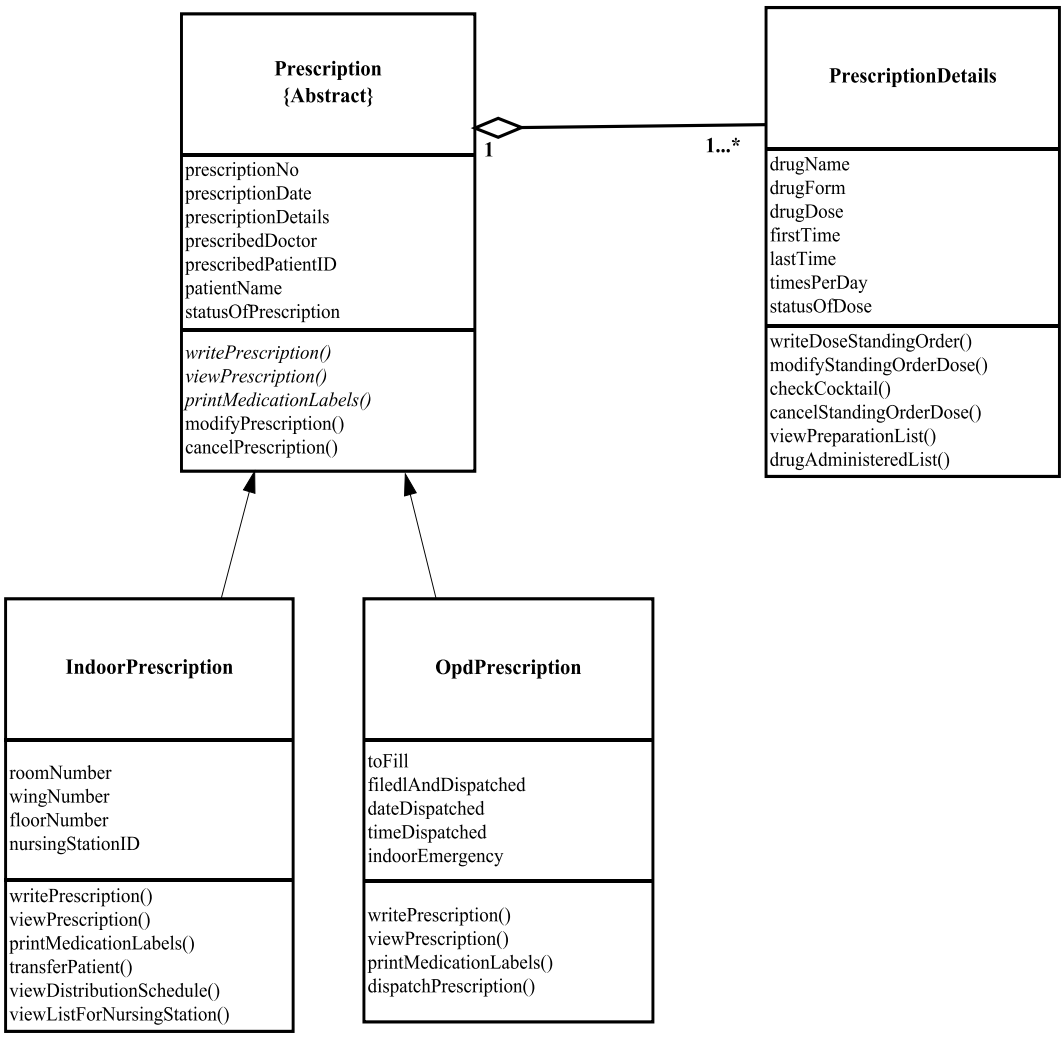


4 CSCI-WIDE GLOSSARY

Term	Description
PMS	PharmaCare System
CVS	Cocktail Vendor System
HPCDS	Hospital Patient Care Data System
CAS	Central Accounting System
OPD	Outdoor Patient
DTD	Data Type Definition
XML	Extensible Markup language

5 CSCI ARCHITECTURAL DESIGN

The diagram below shows the architectural design of the PharmaCare system. It consists of four classes out of which one is an abstract class.



The IndoorPrescription and OpdPrescription classes inherit the Prescription class. The Prescription class is an abstract class and therefore the system will not have any instance of Prescription. This implies that a patient can either hold an IndoorPrescription or an OpdPrescription at any given time. PrescriptionDetails is an aggregate of the Prescription. Each instance of an IndoorPrescription or OpdPrescription can have a number of instances of PrescriptionDetails.

The classes include several methods used by the PharmaCare system to satisfy all the requirements as shown in the use case diagram. Class details and functional description of the associated methods are further described in the Object specifications outlined in section 6.2.

6 CSCI DETAILED DESIGN

6.1 Fundamental data set definitions

The Prescription, PrescriptionDetails, IndoorPrescription and OpdPrescription are the fundamental data sets stored in the PharmaCare System. The Patient data set is stored in the HPCDS system and retrieved by the PharmaCare system at the time of creating a new Prescription.

- **Prescription** is a power set of prescriptions
- **PrescriptionDetails** is a power set of medication details
- **IndoorPrescription** is a sub set of prescriptions
- **OpdPrescription** is a sub set of prescriptions
- **Patient** is a power set of people

The following XML definitions and the associated DTDs show the structure of the above data sets in detail. Following the data set definitions the various interfaces and reports are defined using XML and DTD. These interface data set definitions are used to transfer data between the PharmaCare System and the actors. The Reports are viewed or retrieved by the various actors of the PharmaCare system

6.1.1 Prescription

The following XML definition and the associated DTD show the data structure for the Prescription.

The Prescription consists of a header and one or more Prescription detail lines.

```
<!DOCTYPE Prescription
[
        <!ELEMENT Prescription (prescriptionNo, prescriptionDate, prescribedDoctor,
                prescribedPatientID, patientName, statusOfPrescription)>
        <!ELEMENT prescriptionNo (#PCDATA)>
        <!ELEMENT prescriptionDate (#PCDATA)>
        <!ELEMENT prescribedDoctor (#PCDATA)>
        <!ELEMENT prescribedPatientID (#PCDATA)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT statusOfPrescription (#PCDATA)>
        <!ATTLIST statusOfPrescription status (ON|OFF) "ON">
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>

]>
<?xml version="1.0"?>
<!DOCTYPE Prescription SYSTEM “Prescription.dtd”>
<Prescription>
        <prescriptionNo>RFD36384</prescriptionNo>
        <prescriptionDate>12-2-2004</prescriptionDate>
        <prescribedDoctor>Valantina John</prescribedDoctor>
        <prescribedPatientID>FDJ58586</prescribedPatientID>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <statusofPrescription></statusofPrescription>
</Prescription>
```

6.1.2 PrescriptionDetails

The following XML definition and the associated DTD shows the data structure for the Prescription Details. This data set is an aggregate to the Prescription data structure defined above. When a new Prescription is written the medication detail lines are stored as shown in this definition.

```
<!DOCTYPE pescriptionDetails
[
        <!ELEMENT pescriptionDetails (medicationDetails)+>
        <!ELEMENT medicationDetails (drugName, drugForm, drugDose,
                firstTime, lastTime, timesPerDay, statusofDose)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>
        <!ELEMENT drugDose (#PCDATA)>
        <!ELEMENT firstTime (#PCDATA)>
        <!ELEMENT lastTime (#PCDATA)>
        <!ELEMENT timesPerDay (#PCDATA)>
        <!ELEMENT statusofDose (#PCDATA)>
        <!ATTLIST statusofDose status (ON|OFF) "ON">

]>

<?xml version="1.0"?>
<!DOCTYPE pescriptionDetails SYSTEM “pescriptionDetails.dtd”>
<pescriptionDetails>
        <medicationDetails>
                <drugName>Zithrin</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>100mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>19-2-2004</lastTime>
                <timesPerDay>3</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
        <medicationDetails>
                <drugName>Vitamine C</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>500mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>26-2-2004</lastTime>
                <timesPerDay>2</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
</pescriptionDetails>
```

6.1.3 IndoorPrescription

The following XML definition and the associated DTD shows the data structure for the Indoor Prescription inherited from Prescription. New Indoor Prescription details are stored as shown in this definition. IndoorPrescription consists of Prescription header, medication detail lines and indoor patient room details.

```
<!DOCTYPE indoorPrescription
[
        <!ELEMENT indoorPrescription (patientName, prescribedDoctor,
                prescriptionDate, roomFloor, roomWing, roomNo,
                statusofPrescription, medicationDetails+)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT prescribedDoctor (#PCDATA)>
        <!ELEMENT prescriptionDate (#PCDATA)>
        <!ELEMENT roomFloor (#PCDATA)>
        <!ELEMENT roomWing (#PCDATA)>
        <!ELEMENT roomNo (#PCDATA)>
        <!ELEMENT statusofPrescription (#PCDATA)>
        <!ATTLIST statusofPrescription status (ON|OFF) "ON">
        <!ELEMENT medicationDetails (drugName, drugForm, drugDose,
                firstTime, lastTime, timesPerDay, statusofDose)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>
        <!ELEMENT drugDose (#PCDATA)>
        <!ELEMENT firstTime (#PCDATA)>
        <!ELEMENT lastTime (#PCDATA)>
        <!ELEMENT timesPerDay (#PCDATA)>
        <!ELEMENT statusofDose (#PCDATA)>

        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>
        <!ATTLIST statusofDose status (ON|OFF) "ON">
]>

<?xml version="1.0"?>
<!DOCTYPE indoorPrescription SYSTEM “indoorPrescription.dtd”>
<indoorPrescription>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <prescribedDoctor>Valantina John</prescribedDoctor>
        <prescriptionDate>12-2-2004</prescriptionDate>
        <roomFloor>1st</roomFloor>
        <roomWing>North</roomWing>
        <roomNo>72</roomNo>
        <statusofPrescription></statusofPrescription>
```

```
        <medicationDetails>
                <drugName>Zithrin</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>100mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>19-2-2004</lastTime>
                <timesPerDay>3</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
        <medicationDetails>
                <drugName>Vitamine C</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>500mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>26-2-2004</lastTime>
                <timesPerDay>2</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
        <medicationDetails>
                <drugName>Piriton</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>100mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>19-2-2004</lastTime>
                <timesPerDay>1</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
        <medicationDetails>
                <drugName>Insuline</drugName>
                <drugForm>IV</drugForm>
                <drugDose>50mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>19-2-2004</lastTime>
                <timesPerDay>1</timesPerDay>
                <statusofDose></statusofDose>
        </medicationDetails>
</indoorPrescription>
```

6.1.4 OpdPrescription

The following XML definition and the associated DTD shows the data structure for the OPD Prescription inherited from Prescription. New OPD Prescription details are stored as shown in this definition. The OpdPrescription consists of Prescription header, medication detail lines and OPD patient details.

```
<!DOCTYPE OpdPrescription
[
        <!ELEMENT OpdPrescription (patientName, prescribedDoctor,
                prescriptionDate, indoorEmergency, toFill,
                filledAndDispatched, medicationDetails+)>
        <!ELEMENT patientName (#PCDATA)>
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>
        <!ELEMENT prescribedDoctor (#PCDATA)>
        <!ELEMENT prescriptionDate (#PCDATA)>
        <!ELEMENT indoorEmergency (#PCDATA)>
        <!ATTLIST indoorEmergency status (YES|NO) "NO">
        <!ELEMENT toFill (#PCDATA)>
        <!ATTLIST toFill status (YES|NO) "YES">
        <!ELEMENT filledAndDispatched (#PCDATA)>
        <!ATTLIST filledAndDispatched status (YES|NO) "NO">
        <!ELEMENT medicationDetails (drugName, drugForm, drugDose,
                firstTime, lastTime, timesPerDay)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>
        <!ELEMENT drugDose (#PCDATA)>
        <!ELEMENT firstTime (#PCDATA)>
        <!ELEMENT lastTime (#PCDATA)>
        <!ELEMENT timesPerDay (#PCDATA)>
]>

<?xml version="1.0"?>
<!DOCTYPE OpdPrescription SYSTEM “OpdPrescription.dtd”>
<OpdPrescription>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <prescribedDoctor>Valantina John</prescribedDoctor>
        <prescriptionDate>12-2-2004</prescriptionDate>
        <indoorEmergency></indoorEmergency>
        <toFill></toFill>
        <filledAndDispatched></filledAndDispatched>
        <medicationDetails>
                <drugName>Zithrin</drugName>
```

```
            <drugForm>Oral</drugForm>
            <drugDose>250mg</drugDose>
            <firstTime>12-2-2004</firstTime>
            <lastTime>19-2-2004</lastTime>
            <timesPerDay>2</timesPerDay>
        </medicationDetails>
        <medicationDetails>
            <drugName>Vitamine C</drugName>
            <drugForm>Oral</drugForm>
            <drugDose>500mg</drugDose>
            <firstTime>12-2-2004</firstTime>
            <lastTime>26-2-2004</lastTime>
            <timesPerDay>1</timesPerDay>
        </medicationDetails>
        <medicationDetails>
            <drugName>Piriton</drugName>
            <drugForm>Oral</drugForm>
            <drugDose>100mg</drugDose>
            <firstTime>12-2-2004</firstTime>
            <lastTime>19-2-2004</lastTime>
            <timesPerDay>1</timesPerDay>
        </medicationDetails>
        <medicationDetails>
            <drugName>Insuline</drugName>
            <drugForm>IV</drugForm>
            <drugDose>100mg</drugDose>
            <firstTime>12-2-2004</firstTime>
            <lastTime>19-2-2004</lastTime>
            <timesPerDay>1</timesPerDay>
        </medicationDetails>
</OpdPrescription>
```

6.1.5 Patient

The following XML definition and the associated DTD shows the data structure of the Patient. This data set is received from the HPCDS by the PhamaCare System at the time of writing a new Prescription.

```
<!DOCTYPE patientDescription
[
        <!ELEMENT patientDescription (patientName, patientAddress, roomFloor,
                roomWing, roomNo, statusofPatient, assignedDoctorID)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT patientAddress (streetNo, streetName+, cityName,
                postalCode)>
        <!ELEMENT streetNo (#PCDATA)>
        <!ELEMENT streetName (#PCDATA)>
        <!ELEMENT cityName (#PCDATA)>
        <!ELEMENT postalCode (#PCDATA)>
        <!ELEMENT roomFloor (#PCDATA)>
        <!ELEMENT roomWing (#PCDATA)>
        <!ELEMENT roomNo (#PCDATA)>
        <!ELEMENT statusofPatient (#PCDATA)>
        <!ELEMENT assignedDoctorID (#PCDATA)>

        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>
        <!ATTLIST statusofPatient status (IN|OUT|SELF) "IN">

]>

<?xml version="1.0"?>
<!DOCTYPE patientDescription SYSTEM “patientDescription.dtd”>
<patientDescription>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <patientAddress>
                <streetNo>"49"</streetNo>
                <streetName>"Callabonna St."</streetName>
                <streetName>"off Horizon Drive"</streetName>
                <cityName>"Westlake"</cityName>
                <postalCode>"QLD 4074"</postalCode>
        </patientAddress>
        <roomFloor>1st</roomFloor>
        <roomWing>North</roomWing>
        <roomNo>72</roomNo>
        <statusofPatient></statusofPatient>
        <assignedDoctorID>CP4536</assignedDoctorID>
</patientDescription>
```

6.1.6 Interface (cocktailDetails)

The following XML definition and the associated DTD show the interface data definition. The prescribed drug details are transferred to the external system CVS to check for dangerous drug combinations.

```
<!DOCTYPE cocktailDetails [
        <!ELEMENT cocktail (cocktailDetails, statusofDrug)>
        <!ELEMENT cocktailDetails (drugName, drugForm, drugDose)>
        <!ELEMENT drugName (drugName+)>
        <!ELEMENT drugForm (drugForm+)>
        <!ELEMENT drugDose (drugDose+)>
        <!ELEMENT statusofDrug (#PCDATA)>
        <!ATTLIST statusofDrug status (POSITIVE|NEGATIVE) "NEGATIVE">
]>

<?xml version="1.0" >
<!DOCTYPE cocktailDetails SYSTEM “cocktailDetails.dtd”  >

        <cocktail>
                <cocktailDetails>
                        <drugName> Zithrin </drugName>
                        <drugForm> Oral </drugForm>
                        <drugDose>100mg </drugDose>
                </cocktailDetails>
                <cocktailDetails>
                        <drugName> Vitamine C </drugName>
                        <drugForm> Oral </drugForm>
                        <drugDose>500mg </drugDose>
                </cocktailDetails>
                <cocktailDetails>
                        <drugName> Piriton </drugName>
                        <drugForm> Oral </drugForm>
                        <drugDose>100mg </drugDose>
                </cocktailDetails>
                <statusofDrug></statusofDrug>
          </cocktail>
```

6.1.7 Interface (drugAdministered)

The following XML definition and the associated DTD show the interface data definition. The drugs administered list is transferred to the external system CAS on request, for stocktaking and auditing purposes.

```
<!DOCTYPE drugsAdministered
[
        <!ELEMENT drugsAdministered ((patientID, drugs+)+)>
        <!ELEMENT patientID (#PCDATA)>
        <!ELEMENT drugs (drugID, drugName, drugForm)>
        <!ELEMENT drugID (#PCDATA)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>

]>

<?xml version="1.0"?>
<!DOCTYPE drugsAdministered SYSTEM "drugsAdministered.dtd">
<drugsAdministered>
        <patientID>AJD34567</patientID>
        <drugs>
                <drugID>ADC-123945</drugID>
                <drugName>Zithrin</drugName>
                <drugForm>Oral</drugForm>
        </drugs>
        <patientID>RSG24567</patientID>
        <drugs>
                <drugID>dfC-093843</drugID>
                <drugName>Vitamine C</drugName>
                <drugForm>Oral</drugForm>
        </drugs>
        <drugs>
                <drugID>fdC-485963</drugID>
                <drugName>Piriton</drugName>
                <drugForm>Oral</drugForm>
        </drugs>
        <drugs>
                <drugID>kAC-485731</drugID>
                <drugName>Insuline</drugName>
                <drugForm>IV</drugForm>
        </drugs>
</drugsAdministered>
```

6.1.8 REPORT (indoorMedicationLabels)

The following XML definition and the associated DTD show the report data definition of the medication labels produced by the system for indoor patient medication.

```
<!DOCTYPE indoorMedicationLabels
[
        <!ELEMENT indoorMedicationLabels (patientName, prescribedDoctor,
                roomFloor, roomWing, roomNo, medicationDetails+)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT prescribedDoctor (#PCDATA)>
        <!ELEMENT roomFloor (#PCDATA)>
        <!ELEMENT roomWing (#PCDATA)>
        <!ELEMENT roomNo (#PCDATA)>
        <!ELEMENT medicationDetails (drugName, drugForm, drugDose, timesPerDay)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>
        <!ELEMENT drugDose (#PCDATA)>
        <!ELEMENT timesPerDay (#PCDATA)>
        <!ELEMENT numberOfTotalmedications (#PCDATA)>
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>

]>

<?xml version="1.0"?>
<!DOCTYPE indoorMedicationLabels SYSTEM " indoorMedicationLabels.dtd">
<indoorMedicationLabels>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <prescribedDoctor>Valantina John</prescribedDoctor>
        <roomFloor>1st</roomFloor>
        <roomWing>North</roomWing>
        <roomNo>72</roomNo>
        <medicationDetails>
                <drugName>cccccc</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>100mg</drugDose>
                <timesPerDay>3</timesPerDay>
        </medicationDetails>
        <medicationDetails>
                <drugName>Vitamine C</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>500mg</drugDose>
                <timesPerDay>2</timesPerDay>
        </medicationDetails>
</indoorMedicationLabels>
```

6.1.9 REPORT (distributionSchedule)

The following XML definition and the associated DTD show the report data definition for the distribution schedule. The pharmacists use this list to arrange the medications in the order of wing, floor and room numbers and the nursing staffs use it to distribute the medications to the patients.

```
<!DOCTYPE distributionSchedule
[
        <!ELEMENT distributionSchedule ((patientName, wardDetails)+)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT wardDetails (wingNumber, floorNumber, roomNumber)>
        <!ELEMENT wingNumber (#PCDATA)>
        <!ELEMENT floorNumber (#PCDATA)>
        <!ELEMENT roomNumber (#PCDATA)>
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>

]>

<?xml version="1.0"?>
<!DOCTYPE distributionSchedule SYSTEM "distributionmSchedule.dtd">
<distributionSchedule>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <wardDetails>
                <wingNumber>1</wingNumber>
                <floorNumber>2</floorNumber>
                <roomNumber>11</roomNumber>
        </wardDetails>
        <patientName
                lastName="Vitan"
                firstName="Kelly" />
        <wardDetails>
                <wingNumber>1</wingNumber>
                <floorNumber>2</floorNumber>
                <roomNumber>12</roomNumber>
        </wardDetails>
</distributionSchedule>
```

6.1.10 REPORT (OpdMedicationLabels)

The following XML definition and the associated DTD show the report data definition for the OPD patient medication labels.

```
<!DOCTYPE OpdMedicationLabels
[
        <!ELEMENT OpdMedicationLabels (patientName, prescribedDoctor, prescriptionDate,
                medicationDetails+)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT prescribedDoctor (#PCDATA)>
        <!ELEMENT prescriptionDate (#PCDATA)>
        <!ELEMENT medicationDetails (drugName, drugForm, drugDose, firstTime,
                lastTime, timesPerDay)>
        <!ELEMENT drugName (#PCDATA)>
        <!ELEMENT drugForm (#PCDATA)>
        <!ELEMENT drugDose (#PCDATA)>
        <!ELEMENT firstTime (#PCDATA)>
        <!ELEMENT lastTime (#PCDATA)>
        <!ELEMENT timesPerDay (#PCDATA)>
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>
]>

<?xml version="1.0"?>
<!DOCTYPE OPDpatientdoseLabel SYSTEM " OPDpatientdoseLabel.dtd">
<OpdMedicationLabels>
        <patientName
                lastName="Black"
                firstName="Pressman" />
        <prescribedDoctor>Ken</prescribedDoctor>
        <prescriptionDate>12-2-2004</prescriptionDate>
        <medicationDetails>
                <drugName>cccccc</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>100mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>19-2-2004</lastTime>
                <timesPerDay>3</timesPerDay>
</medicationDetails>
<medicationDetails>
                <drugName>Vitamine C</drugName>
                <drugForm>Oral</drugForm>
                <drugDose>500mg</drugDose>
                <firstTime>12-2-2004</firstTime>
                <lastTime>26-2-2004</lastTime>
                <timesPerDay>2</timesPerDay>
        </medicationDetails>
</OpdMedicationLabels >
```

6.1.11 REPORT (preparationList)

The following XML definition and the associated DTD show the report data definition for the preparation list. The pharmacists use the preparation list collect drugs from the shelves to prepare medications for the next shift.

```
<!DOCTYPE prepareationList
[
<!ELEMENT preparationList (ShiftDate, ShiftTime, drug+)>
<!ELEMENT ShiftDate (#PCDATA)>
<!ELEMENT ShiftTime (#PCDATA)>
<!ELEMENT drug (#PCDATA)>
<!ATTLIST drug drugName CDATA #REQUIRED>
<!ATTLIST drug drugForm CDATA #REQUIRED>
<!ATTLIST drug totalDose CDATA #REQUIRED>
]
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE preparationList SYSTEM “preparationList.dtd”>
<preparationList>
        <ShiftDate>8-4-2004</ShiftDate>
        <ShiftTime>Noon</ShiftTime>
        <drug drugName="Panadol" drugForm="Oral" totalDose="18" />
        <drug drugName="Weed" drugForm="Inhale" totalDose="58" />
        <drug drugName="Estacy" drugForm="Oral" totalDose="34" />
</preparationList>
```

6.1.12 REPORT (nursingStationList)

The following XML definition and the associated DTD show the report data definition for the nursing station list. This list is used by the pharmacist to arrange the medications for each nursing stations.

```
<!DOCTYPE nursingStationList
[
        <!ELEMENT nursingStationList ((nursingStationID, (patientName, wardDetails)+)+)>
        <!ELEMENT nursingStationID (#PCDATA)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT wardDetails (wingNumber, floorNumber, roomNumber)>
        <!ELEMENT wingNumber (#PCDATA)>
        <!ELEMENT floorNumber (#PCDATA)>
        <!ELEMENT roomNumber (#PCDATA)>
        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #IMPLIED>

]>
```

```
<?xml version="1.0"?>
<!DOCTYPE nursingStationList SYSTEM “nursingStationList.dtd”>
<nursingStationList>
        <nursingStationID>1</nursingStationID>
        <patientName
                lastName="Rita"
                firstName="Silva" />
        <wardDetails>
                <wingNumber>1</wingNumber>
                <floorNumber>2</floorNumber>
                <roomNumber>71</roomNumber>
        </wardDetails>
        <patientName
                lastName="Bill"
                firstName="Camp" />
        <wardDetails>
                <wingNumber>1</wingNumber>
                <floorNumber>2</floorNumber>
                <roomNumber>72</roomNumber>
        </wardDetails>
        <nursingStationID>2</nursingStationID>
        <patientName
                lastName="Kim"
                firstName="David" />
        <wardDetails>
                <wingNumber>2</wingNumber>
                <floorNumber>1</floorNumber>
                <roomNumber>13</roomNumber>
        </wardDetails>
</nursingStationList>
```

6.1.13 Interface (transferPatient)

The following XML definition and the associated DTD show the interface data definition of the data received from HPCDS to transfer patients from one room to another. This information is sent by the HPCDS to the PMS to update the prescription data.

```
<!DOCTYPE transferPatient
[
        <!ELEMENT transferPatient (patientID, patientName, newRoomFloor,
                newRoomWing, newRoomNo)>
        <!ELEMENT patientID (#PCDATA)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT newRoomFloor (#PCDATA)>
        <!ELEMENT newRoomWing (#PCDATA)>
        <!ELEMENT newRoomNo (#PCDATA)>

        <!ATTLIST patientName lastName CDATA #REQUIRED>
```

```
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #REQUIRED>
]>

<?xml version="1.0"?>
<!DOCTYPE transferPatient SYSTEM “transferPatient.dtd”>
<transferPatient>
        <patientID>TDVF34785</patientID>
        <patientName
                lastName ="William"
                firstName="Who"
                middleName="Is" />
        <newRoomFloor>1st</newRoomFloor>
        <newRoomWing>North</newRoomWing>
        <newRoomNo>72</newRoomNo>
</transferPatient>
```

6.1.14 Interface (cancelPrescription)

The following XML definition and the associated DTD show the interface data definition of the data received from HPCDS to cancel an indoor prescription. This information is sent by the HPCDS to the PMS to update the prescription data.

```
<!DOCTYPE cancelPrescription
[
        <!ELEMENT cancelPrescription (patientID, patientName, fromDate, fromTime)>
        <!ELEMENT patientID (#PCDATA)>
        <!ELEMENT patientName (#PCDATA)>
        <!ELEMENT fromDate (#PCDATA)>
        <!ELEMENT fromTime (#PCDATA)>

        <!ATTLIST patientName lastName CDATA #REQUIRED>
        <!ATTLIST patientName firstName CDATA #REQUIRED>
        <!ATTLIST patientName middleName CDATA #REQUIRED>
]>

<?xml version="1.0"?>
<!DOCTYPE cancelPrescription r SYSTEM “cancelStandingOrder.dtd”>
<cancelStandingOrder>
        <patientID>TDVF34785</patientID>
        <patientName
                lastName ="William"
                firstName="Who"
                middleName="Is" />
        <fromDate>North</fromDate>
        <fromTime>72</fromTime>
</ cancelPrescription r>
```

6.2 Object Specifications

The data type definitions used in the Object specifications are defined below:

- ID is a set of identification names
- DATE is a date
- PRESCRIPTIONS is a set of all prescriptions
- PRESCRIPTION_DETAILS is a set of medication details
- PATIENTS is a set of all patients
- TIME is time of day
- FORM = {ORAL, IV}
- PRESCRIPTION_STATUS = {ACTIVE, CANCELED}
- YESNO = {YES, NO}
- DOSE_STATUS = {ON, OFF}
- COCKTAIL_STATUS = {POSITIVE, NEGATIVE}

6.2.1 Prescription

Data Structures
The prescription state space will consist of a collection of patients and prescriptions. For each patient there is an associated prescription.

prescriptionNo: seq ID prescriptionDate: DATE prescriptionDetails: PRESCRIPTION_DETAILS prescribedDoctor: NAME prescribedPatientID: seq ID patientName: NAME statusOfPrescription: PRE_STATUS Patients: P PATIENTS Prescriptions: P PRESCRIPTIONS Treatment: PATIENTS $\rightarrow$ PRESCRIPTIONS

#prescriptionNo = #ran prescriptionNo
Patients = dom Treatment
Prescriptions = ran Treatment

- prescriptionNo is a unique ID assigned to each prescription
- prescriptionDate is the date when the prescription was first created
- prescribedDoctor is the name of the doctor who prescribed the prescription

- prescribedPatientID is the unique identification number of the patient to whom the prescription belongs
- patientName is the name of the patient to whom the prescription belongs

Treatment is a partial function between PATIENTS and PRESCRIPTIONS

INIT()

modifyPrescription()
The currently active prescription associated to the patient is replaced into the state space after modification

cancelPrescription()
The prescription associated to the patient is removed from the state space. This implies that the patient has no active prescription.

6.2.2 PrescriptionDetails

A Prescription is a composition of PrescriptionDetails

The PrescriptionDetails state space consists of a collection of medication details associated to prescriptions. For each patient there can be many associated medication details.

Data Structures

drugName: DRUGS drugForm: FORM drugDose: N firstTime: DATE lastTime: DATE timesPerDay: N statusOfDose: DOSE_STATUS Medication: PRESCRIPTIONS → PRESCRIPTION_DETAILS
dom Medication = Prescriptions PrescriptionDetails = ran Medication

- drugName is the name of the drug
- drugForm is the form in which the drug is absorbed by the patient
- firstTime is the date to start medication
- lastTime is the date to stop medication
- timesPerDay is the number of times the drug is to be administered
- statusOfDose is to indicate whether the dose is active for medication

Medication is a partial function between PRESCRIPTIONS and PRESCRIPTION_DETAILS

writeStandingOrder()

The prescription details are a list of medication for the patient. It can consist of one or medications for a particular prescription. The data interchanged is described by prescriptionDetails.dtd

modifyStandingOrder()
This method is used if any particular prescription detail (medication) needs to be changed.

checkCocktail()
This method is used to check cocktail medication for any particular prescription detail (medication).

cancelStandingOrder()
This method is used if any particular prescription detail (medication) needs to be cancelled.

viewPreparationList()
PreparationList is a report used by the pharmacist to view/list the details of drugs for preparing the ward patient medications for the next shift. The sample report format is described by the XML file preparationList.xml

drugAdministrationList()
DrugsAdministered is a report used by the CAS to get details of all the drugs administered during a particular shift. The sample report format is described by the XML file drugsAdministered.xml

6.2.3 IndoorPrescripiton

A IndoorPrescription inherits from Prescription

The IndoorPrescription state space consists of a collection of patient details associated to patients who are presently treated in wards. For each patient there is an associated prescription.

Data Structures

roomNumber: seq N wingNumber: seq N floorNumber: seq N nursingStationID: seq N statusOfPrescription: PRE_STATUS IndoorPrescription: P PRESCRIPTIONS
IndoorPrescription $\subseteq$ Prescriptions

- roomNumber is the ward room number of the indoor patient
- wingNumber is the wing where the room is located
- floorNumber is the floor on which the room is located

- nursingStationID is the number of the nursing station which administers the patient
- statusOfPrescription is an indication whether the prescription is active for medication

writePrescription()
A new prescription associated to the patient is added to the state space. The prescription storage details are defined by indoorPrescription.dtd

viewPrescription()
PrescriptionCopy is a report used by the pharmacist to view the prescription of a particular patient. The sample report format is described by the XML file indoorPrescription.xml

transferPatient()
When a patient is transferred from one room to another the prescription needs to be updated accordingly. The transferPatient.dtd describes the new patient information received from the HPCDS for this purpose.

printMedicationLabels()
MedicationLables is a list of drug details for patient medication. The description of the report is defined in indoorMedicationLabels.dtd. The example XML file is indoorMedicationLabels.xml

viewDistributionSchedule()
The DistributionList is a report used by pharmacist to arrange the medication in order of wing number, floor number and room numbers. The description of the report is defined in distributionSchedule.dtd. The example XML file is ndistributionSchedule.xml

viewListForNursingStation()
The NursingStationList is a report used by nurses for distributing medicine to indoor patient. The list is sorted by the nursingStationID, wingNumber, roomNumber and floorNumber. The description of the report is defined in nursingStationList.dtd. The example XML file is nursingStationList.xml. This list supersedes the DistributionList.

6.2.4 OpdPrescription

A OpdPrescription inherits from Prescription

The OpdPrescription state space consists of a collection of patient details associated to patients who are treated in OPDs or those who do self medications. For each patient there is an associated prescription.

Data Structures

toFill: YESNO
filledAndDispatched: YESNO
dateDispatched: DATE
timeDispatched: TIME

indoorEmergency: YESNO OpdPrescription: P PRESCRIPTIONS
OpdPrescription ⊆ Prescriptions

- toFill is to indicate whether the prescription is to be filled at the pharmacy
- filledAndDispatched is to indicate whether the prescription is filled and dispatched by the pharmacist
- dateDispatched is the date on which the prescription was filled and dispatched
- timeDispatched is the time at which the prescription was filled and dispatched
- indoorEmergency is to indicate whether the patient is an emergency patient or not

writePrescription()
A new prescription associated to the patient is added to the state space. The prescription storage details are defined by OpdPrescription.dtd

viewPrescription()
PrescriptionCopy is a report used by the pharmacist to view the prescription of a particular patient. The sample report format is described by the XML file OpdPrescription.xml

printMedicationLabels()
MedicationLabels is a list of drug details for patient medication. The description of the report is defined in OpdMedicationLabels.dtd. The example XML file is OpdMedicationLabels.xml

dispatchPrescription()
The outdoor prescription has to be manually dispatched by the pharmacist. The data interchanged here is described by OpdPrescription.dtd

------ End Of Report ------