



MedSys EcoSystem

- Saving lives through MedSys

More than 50% of heart attack cases reach hospital late, govt data shows

Beyond 180 minutes, the heart muscles suffer irreversible damage due to lack of blood supply.

Chennai: Delayed ambulance service claims girl's life in hospital

DECCAN CHRONICLE.

THIS STORY IS FROM MARCH 26, 2019

'Bad' blood kills 15 pregnant women in Tamil Nadu in 4 months

Pushpa Narayan | TNN | Updated: Mar 25, 2019, 23:51 IST

Family members stage protest alleging medical negligence after boy dies in TN hospital

TNN | Updated: Nov 1, 2019, 8:02 IST

Chennai: 'Wrong' injection claims young woman's life

DECCAN CHRONICLE.

Second Tamil Nadu woman claims she contracted HIV through blood transfusion at Chennai hospital

HEALTH HAZARD

TN woman dies after giving birth to boy, relatives protest medical negligence

Transfusion of wrong blood type kills woman at Anantapur GGH

THIS STORY IS FROM FEBRUARY 8, 2018

20,500 got HIV through blood transfusion in 11 years: Data

Ram Sundaram | TNN | Updated: Feb 7, 2018, 20:15 IST

Chennai: Only three of every 10 calls to '108' a medical emergency

Pushpa Narayan | TNN | Updated: Nov 21, 2019, 23:44 IST

Problem Statement

- People residing in small towns in and around Chennai ,Tamil Nadu, India find it difficult to connect with the emergency services and nearby hospitals or blood banks.
- Emergency Service – In today's time, the patient's life depends on how fast they can be brought under medical supervision and treatment.
- Blood Bank – There are widespread fatal incidents in Tamil Nadu owing to incorrect blood transfusions. Blood banks play a vital role in ensuring that the correct and quality blood components are supplied to the patients.
- Hospital – There have been cases of medical negligence by providing incorrect medications to the patients hence hospital enterprise ensures utmost medical care for the patients.

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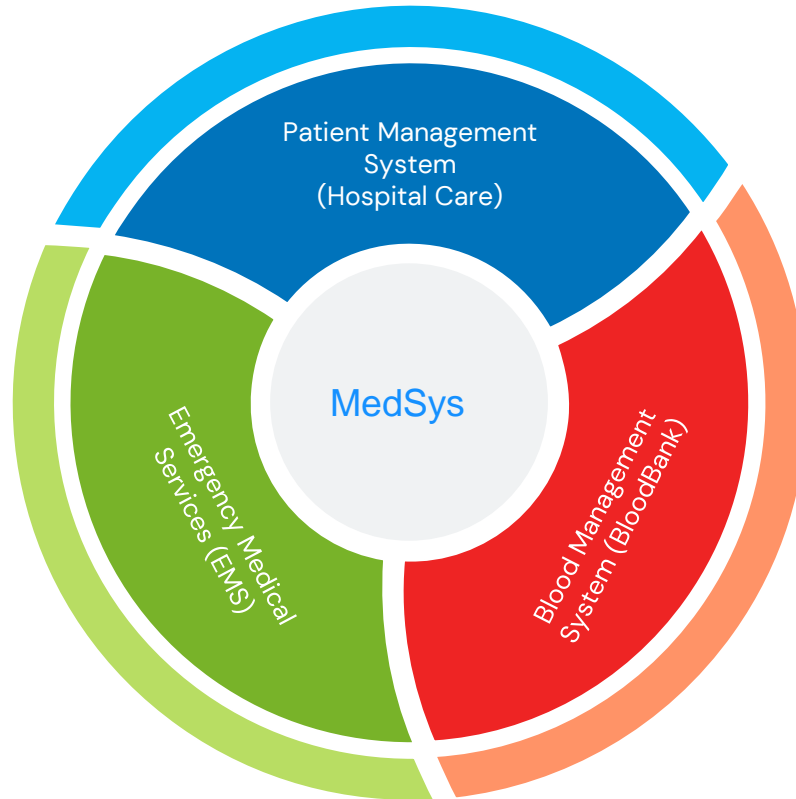
There is the need for an effective healthcare system with good facilities and pre-arrival notifications.

Needless to say that in order to augment the productivity of a patient's treatment in an emerging economy such as India, it is essential to create general awareness about the ecosystem

MedSys EcoSystem



MedSys EcoSystem

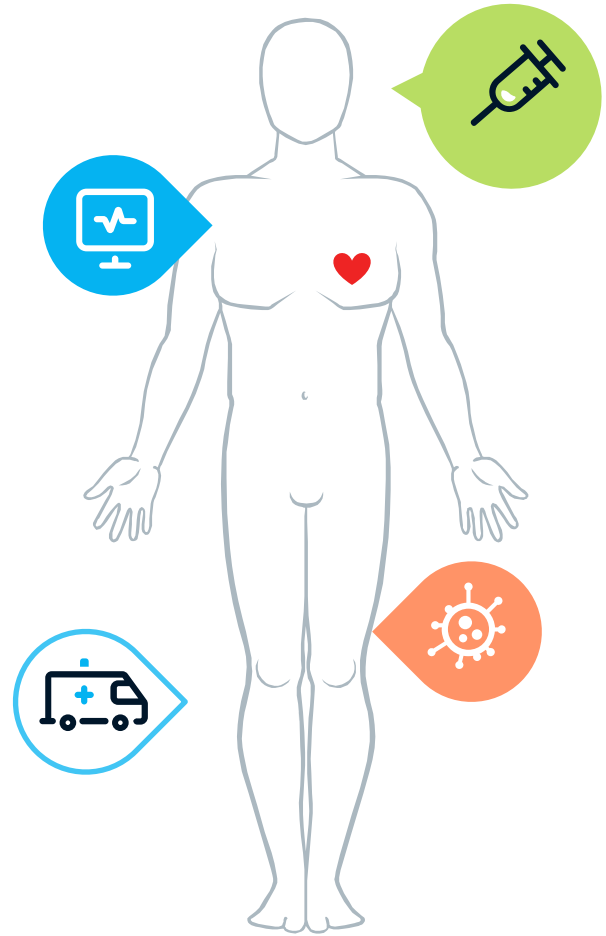


Proposed Solution

- MedSys EcoSystem is an user friendly Java Swing Application which integrates Emergency Services with the Hospital and the Blood Bank for providing efficient and timely medical services to the patients.
- Blood Bank enterprise performs clinical tests on blood and maintains a statistical data on the available blood samples, Hospital enterprise provides prompt warnings when doctor is trying to prescribe a medication which is allergic to the patient, and EMS provides timely response to the patients in case of emergency.
- We believe that adopting a common integrated platform and upgrading healthcare value system would benefit the people living in the outskirts of Chennai.
- Key Features : Offline Distribution Service, Blood Analytics, Substance UI.
- Development Key Features : Junit Testing, Logger, Multithreading, JFreeCharts, Regex.

Approach

- Emergency medical providers will help the patient reach the hospital. The hospital and the blood bank will be notified prior time on the patients health and the required blood with the help of emergency caretaker.
- The hospital performs diagnosis and treats the patient until recovery while the blood banks provides the required blood needed for the patient.
- Timely communication between the enterprises to give medical care to the patients in a quick manner.
- Human errors are handled and minimized by the system and notified to the appropriate person in charge.



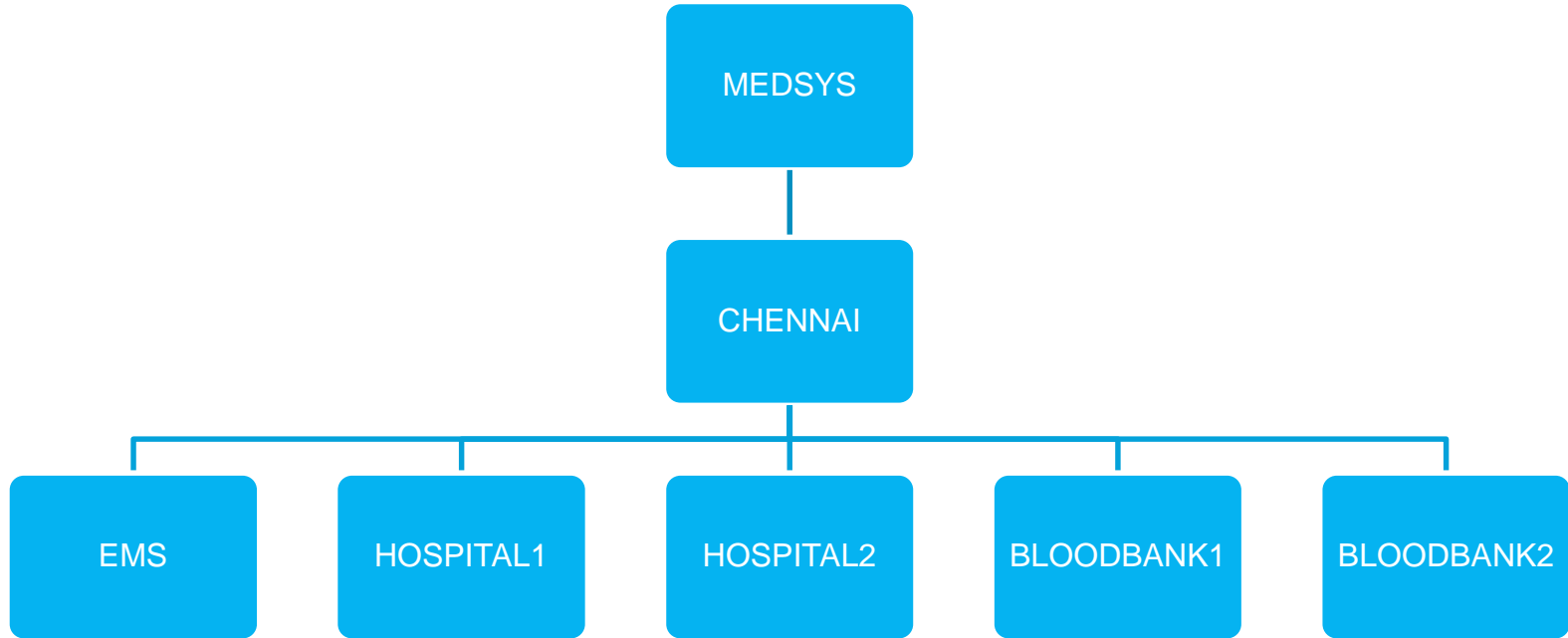
Areas to Focus

- ▣ The application focuses on performing work requests in all phases of healthcare value chain from ems to hospital and blood bank until patient's treatment and recovery.
- Data management
- Procurement – providing A method for inventory tracking
 - ▣ Information sharing & collaboration- sending the patient-related information from the ems to the hospital and to the lab and vice versa.
 - ▣ Involving blood samples for clinical testing.
- Provide a dashboard for MedSys to view patients medical situation, allergies, view available blood samples, predominant blood group available in a network.

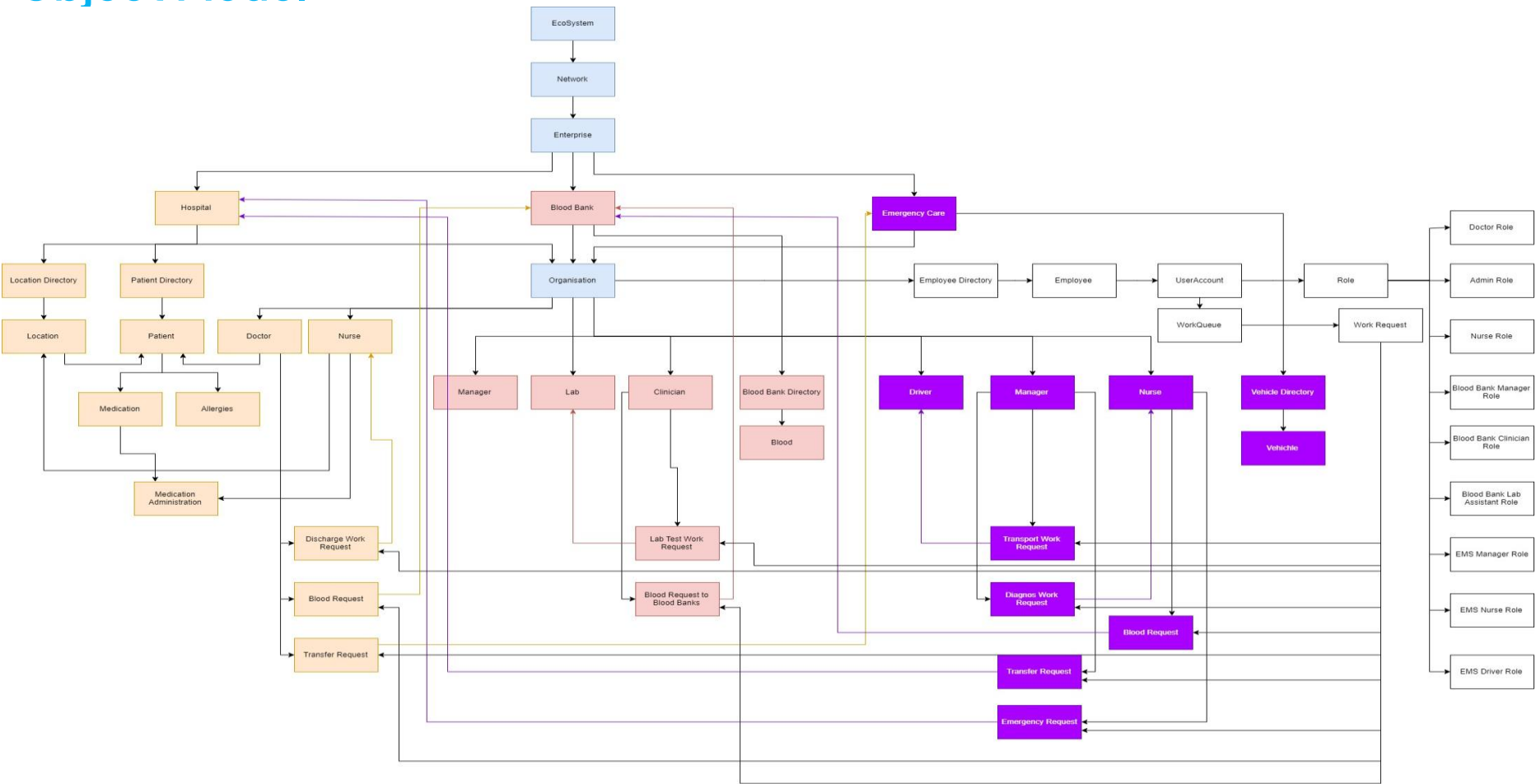




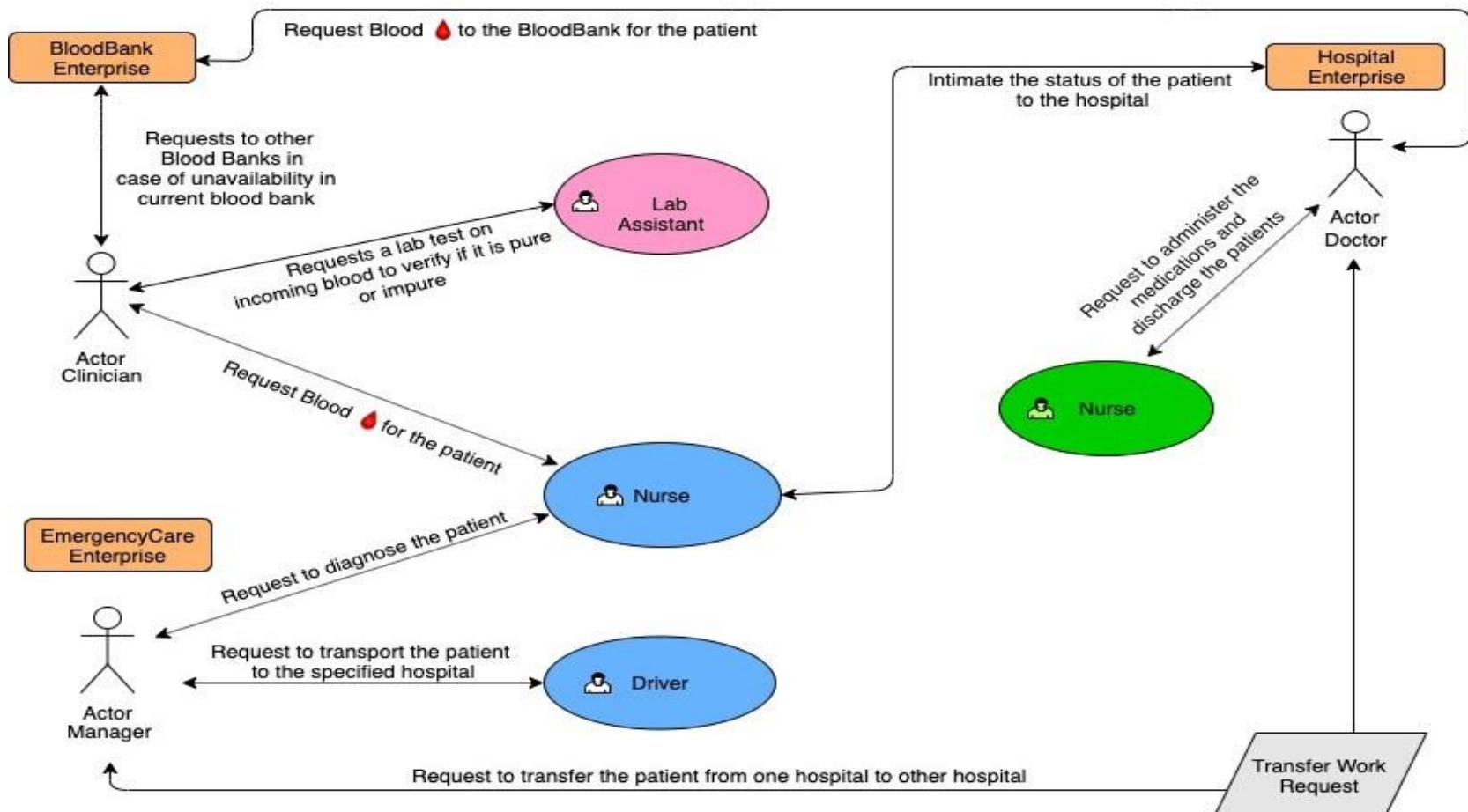
HIERARCHY STRUCTURE



Object Model



Use Case



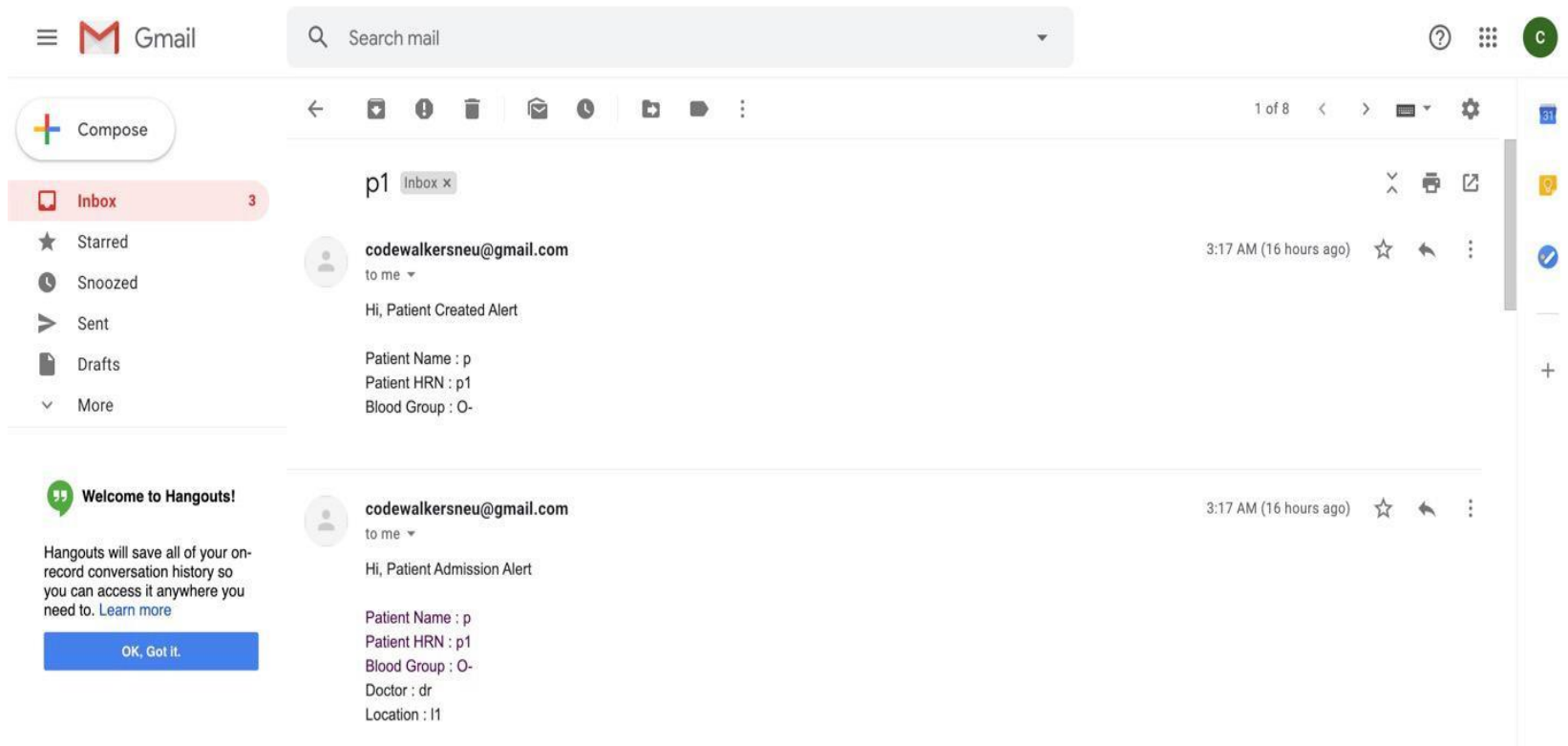
Application User Interface

- We have used Substance UI for the look and feel of the system with minimalist mild colors .
- The reason being the application has to be used in a frequent and consistent manner.
- The users need to feel more comfortable to get things done more quickly.

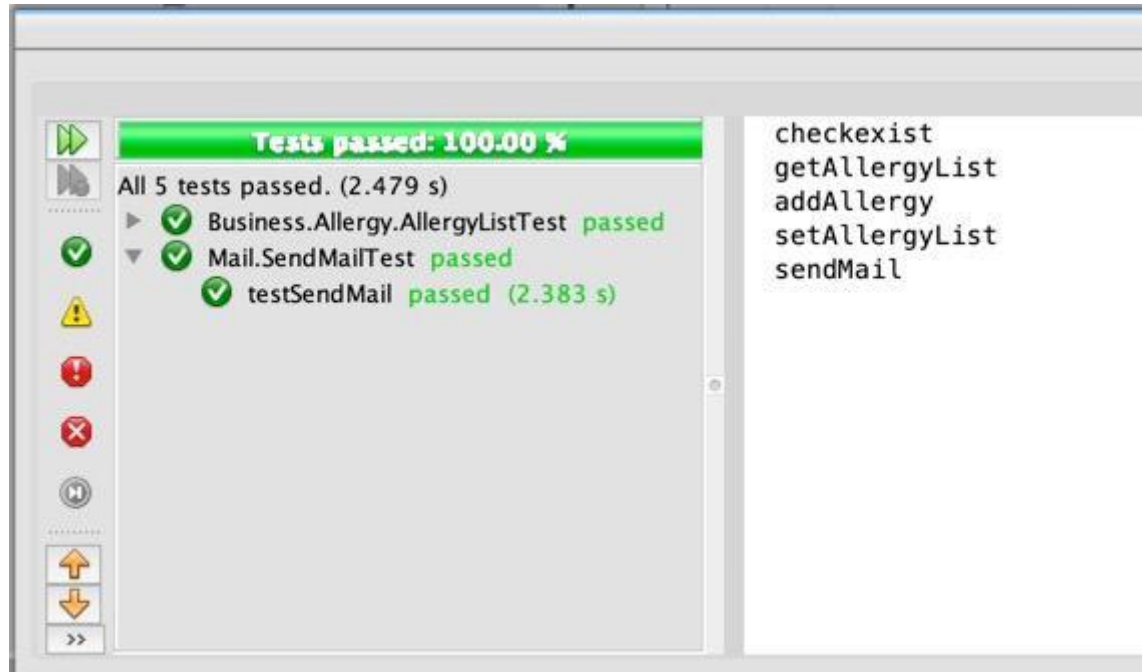
‘The best interfaces are almost invisible to the user’

Key Features

- Offline Distribution System :



▣ *JUnit Testing :*

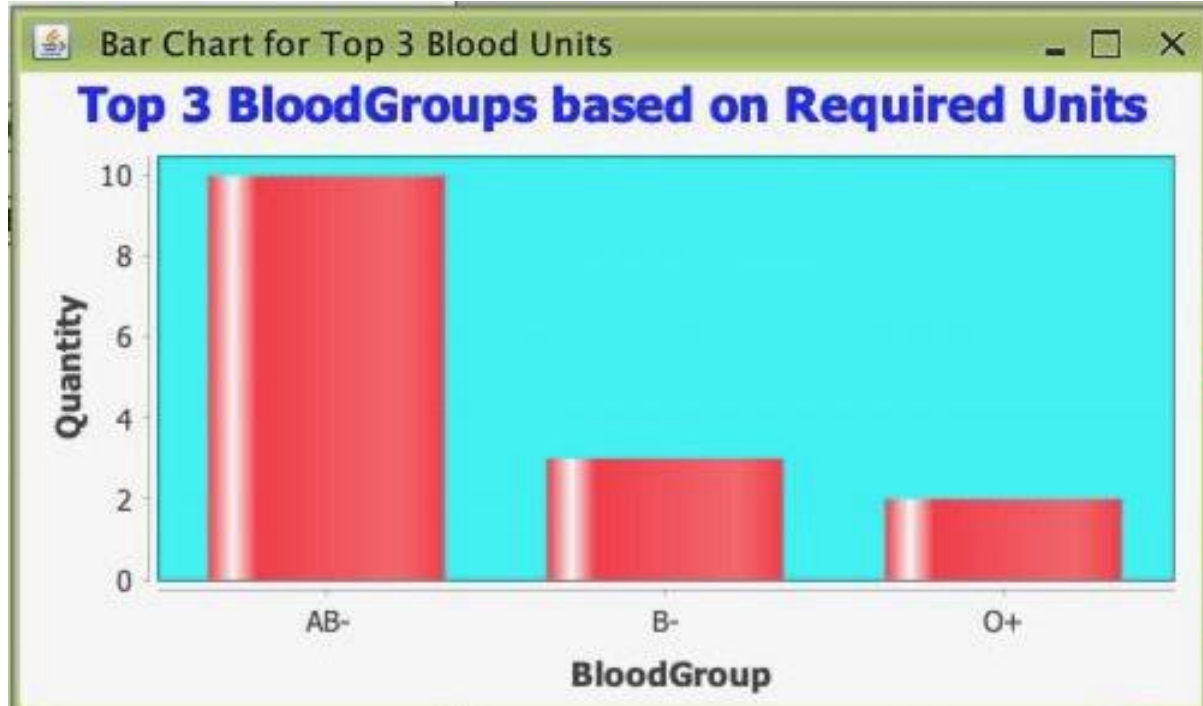


▣ *Logger :*

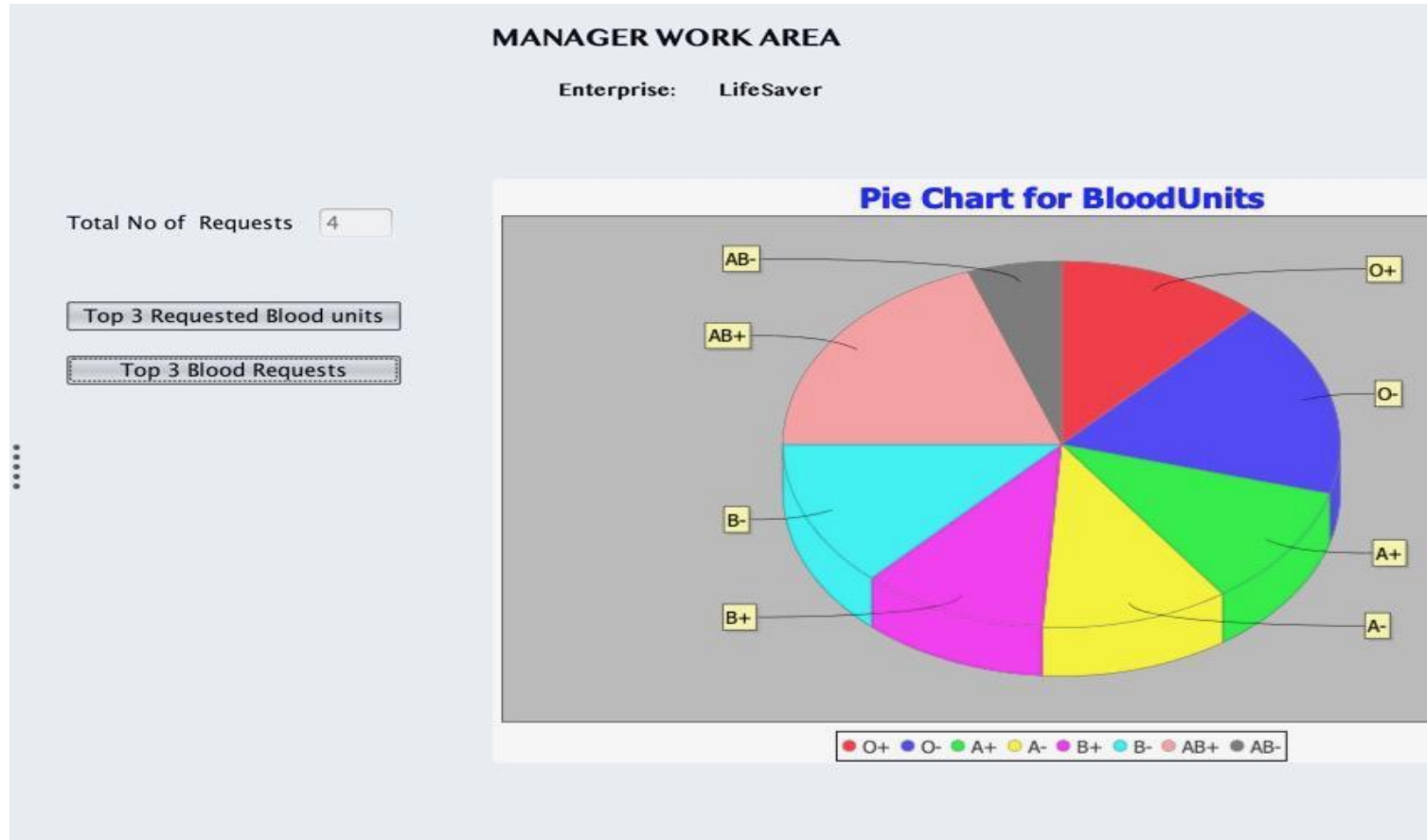
```
Dec 07, 2019 7:52:51 PM userinterface.Bloodbank.ClinicianWorkAreaJPanel populateTable
INFO: populateTable --ClinicianWorkAreaJPanel
Dec 07, 2019 7:53:41 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:53:42 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:53:45 PM userinterface.LabAssistantRole.ProcessWorkRequestJPanel jTextField1KeyTyped
INFO: reqUnitsTextFieldKeyTyped --SendReqJPanel
Dec 07, 2019 7:55:15 PM userinterface.SystemAdminWorkArea.SystemAdminWorkAreaJPanel <init>
INFO: Sysadmin Started
Dec 07, 2019 7:55:15 PM userinterface.SystemAdminWorkArea.SystemAdminWorkAreaJPanel populateTree
INFO: Populate Tree SysadminWorkArea
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel <init>
INFO: ManageEnterprise Started
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateComboBox
INFO: populateComboBox --ManageEnterprise
Dec 07, 2019 7:55:20 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel btnDeleteActionPerformed
INFO: btnDeleteActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:22 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:24 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel btnDeleteActionPerformed
INFO: btnDeleteActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:27 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:55:47 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel submitJButtonActionPerformed
INFO: submitJButtonActionPerformed --ManageEnterprise
Dec 07, 2019 7:55:51 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
INFO: populateTable --ManageEnterprise
Dec 07, 2019 7:56:17 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel submitJButtonActionPerformed
INFO: submitJButtonActionPerformed --ManageEnterprise
Dec 07, 2019 7:56:18 PM userinterface.SystemAdminWorkArea.ManageEnterpriseJPanel populateTable
```

Statistical Analysis

- *Bar Chat :*



■ Pie Chart :



Work Flow

Enterprise – Blood Bank

CLINICIAN WORK AREA

Blood Details

Blood Group	Available Units
O+	11
O-	16
A+	10
A-	10
B+	10
B-	12
AB+	18
AB-	5

Back

UPDATE BLOOD DETAILS

Blood Group

Available Units

No of Units to be added

Verified Blood? ☐ Yes ☒ No

Back

CLINICIAN WORK REQUEST AREA

Requested Items

Blood Group	Total Units	Request Status	Assigned To	Impure Units
O+	2	Completed	bb1lab1	1
AB-	5	In Progress	bb1lab1	

LAB ASSISTANT WORK AREA

Message	Receiver	Status	Total Units
O+	bb1lab1	Completed	2
AB-	bb1lab1	In Progress	5

LabTestWorkRequests – To Verify the Blood purity

Back

LAB ASSISTANT WORK AREA

Result

No of Impure Units

Enterprise – Blood Bank

Blood Requests with other Blood Banks

Back

CLINICIAN REQUEST AREA

Refresh

Blood Requests

Blood Group	Requestor	No of Units	Request Status	Assigned To
AB-	bb2cli1	5	Accepted and Co...	bb1cli2
B-	bb2cli1	3	Accepted and Co...	bb1cli2

Assign to me

Accept

Decline

Requested Items

Blood Group	Requestor	No of Units	Request Status	Assigned To
O-	bb1cli1	4	Accepted and Co...	bb2cli1
B-	bb1cli1	5	Accepted and Co...	bb2cli1
AB+	bb1cli1	8	Accepted and Co...	bb2cli1
O-	bb1cli1	2	Accepted and Co...	bb2cli1

Blood Requests from Hospitals

Back

CLINICIAN REQUEST AREA

Refresh

Hospital Requests:

Blood Group	No of Units	Request Status	Assigned To	Requested Hospital
O-	2	In Process	No Assignee yet	KMC

Assign to me

Accept

Decline

Back

CLINICIAN REQUEST AREA

Refresh

EMS Requests:

Blood Group	No of Units	Request Status	Assigned To	Requested Hospital
O+	6	Completed	bb1cli1	LifeSaver
O-	4	Pending	No Assignee yet	LifeSaver
O+	7	Pending	No Assignee yet	LifeSaver

Assign to me

Accept

Request Blood

Enterprise - Hospital

ADMINISTRATIVE WORK AREA

EnterPrise : Apollo

Manage Organization

Manage Employee

Manage User

Create Patient

Create Appointment

Manage Locations

Emergency Request

Transfer Request

- Admin can add patient, create locations and assign nurses to the locations.
- Appointments are created by the admins which connects the doctor, nurse and the patients.

Hospital Work Flow (contd)

Back

Patient Name	Patient HRN	Location

Medications Add Allergy

Discharge

Patient	Discharge Status

Patient Name	Status
patienta	Transferred

Select Hospital Transfer

Select Blood Bank Request Blood

Patient	Blood	Units	Status
patienta	O-	2	Requested

Back

Allergy	Compounds
Lactose Intolerance	clemastine, Sugar, Sucrose

Add Allergy

Override Warning

Currently medication has been prescribed which is allergic to the patient. Do you want to discontinue medication and add allergy

Yes No

Remove Allergy

Back

Route of Administration Oral

Frequency (per day) 2

Duration (Days) 2

Prescribe

Medication List						
Danazol						
Paracetamol						

Medication	Frequency	Duration	Route	Completed	Discontinued
Paracetamol	2	2	Oral	No	

Administration Details

Day	Frequency	Administered	Administered By
1	1	false	
1	2	false	
2	1	false	
2	2	false	

Back

Patient

patientb

Medications to Administer Clear Selection

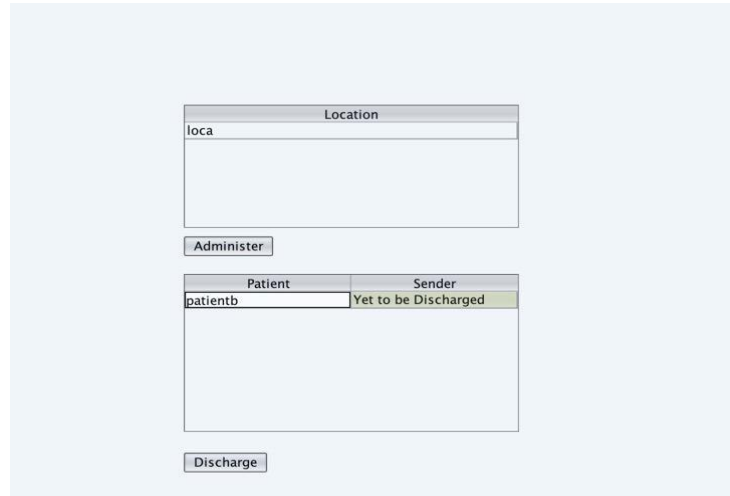
Medication	Route	Frequency	Duration	Discontin...	Completed
Paraceta...	Oral	2	2	No	No

Administer Medication

Medication	Day	Sequence
Paracetamol	1	1
Paracetamol	1	2
Paracetamol	2	1
Paracetamol	2	2

Administer Dose

Hospital Work Flow (contd)



Location

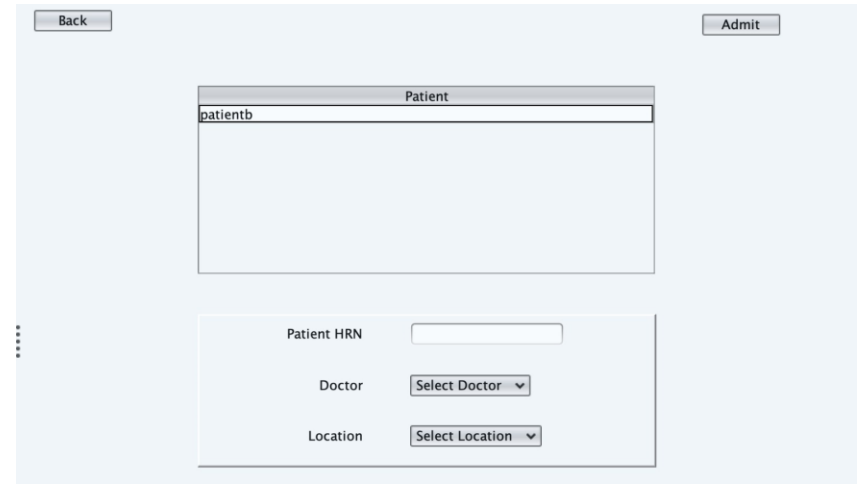
loca

Administer

Patient	Sender
patientb	Yet to be Discharged

Discharge

Discharge Requests



Back

Admit

Patient

patientb

Patient HRN

Doctor

Location

Transfer Requests



Back

Admit

Patient

Arjun Mohan

Patient HRN

Doctor

Location

Emergency Requests

Work Flow

Enterprise – EMS

EMSManager Scheduled work requests to EMSDriver and EMSNurse

EMS MANAGER WORK AREA

EnterPrise : EMS

SCHEDULED DRIVER WORK REQUESTS

Patient Name	ContactNo	Source	Destination	VehicleNo	DateTime	Raised by	Assigned to	Status
patientb	9896712309	Apollo Hos...	KMC Hospit...	EMS3	2019-12-0...	emsmanage...	emsdriver1	Completed
Arjun Mohan	9567487965	No 2, Vaiga...	Apollo Hos...	EMS2	2019-12-0...	emsmanage...	emsdriver1	Completed
Vedha	8095827082	apollo hosp...	kmc hospit...	EMS1	2019-12-0...	emsmanage...	emsdriver1	Completed
Harshi Sekar	9894791476	226 Parker ...	KMC hospit...	EMS2	2019-12-0...	emsmanage...	emsdriver1	Completed

SCHEDULED NURSE WORK REQUESTS

Patient Name	Message	DateTime	Raised by	Assigned to	Status
patientb	Emergency Patient	2019-12-07T21:3...	emsmanager1	emsnurse1	Completed
Arjun Mohan	Emergency Patient	2019-12-07T21:3...	emsmanager1	emsnurse1	Completed
Vedha	Emergency Patient	2019-12-07T22:0...	emsmanager1	emsnurse1	Completed
Harshi Sekar	Emergency Patient	2019-12-07T22:0...	emsmanager1	emsnurse1	Completed

EMSManager Scheduling a transfer work request to EMSDriver and EMSNurse

SCHEDULE EMERGENCY REQUEST

Locality:

Vehicle No:

Patient Name:

ContactNo:

Source:

Destination:

INCOMING HOSPITAL TRANSFER REQUESTS

Patient Name	Transfer from	Transfer to	Request DateTime	Assigned to	Status
patientb	Apollo	KMC	2019-12-07T21:3...	emsmanager1	In Progress

Enterprise - EMS

Driver Work Requests

EMERGENCY REQUESTS

EnterPrise : EMS

Refresh

Patient Name	ContactNo	Source	Destination	VehicleNo	Request Da...	Raised by	Assigned to	Status
patientb	9896712309	Apollo Hos...	KMC Hospit...	EMS3	2019-12-0...	emsmanag...	emsdriver1	In Progress

Assign to me & Process

Message

The request is now assigned to you! Kindly process it

OK

Complete

Nurse Work Requests

EMERGENCY REQUESTS

EnterPrise : EMS

Refresh

Patient Name	Message	Request DateTime	Raised by	Assigned to	Status
patientb	Emergency Patient	2019-12-07T21:3...	emsmanager1	emsnurse1	Completed

Assign to me

Process

SCHEDULED NURSE REQUESTS TO BLOODBANK

Requested Nurse	Patient Name	Blood Group	Required Units	Requested Status
emsnurse1	patientb	O+	6	Pending

Nurse Process Work Request Area

NURSE WORK AREA

Message to Hospital

Patient Name : patientb

Message : transferred from Apollo to KMC

Hospital : KMC

Send Message to Hospital

Request to BloodBank

Blood Needed : ☒ Yes ☐ No

Patient Name : patientb

Required Blood Group : O+

No of units : 6

BloodBank : LifeSaver

Send Request to Blood Bank

Future Scope

- We will predict the medications to be given to the patient based on the medications that has been given to diagnose allergies.
- Automated request to the blood banks when the threshold is met.
- Ability for the enterprise to extend medical services such as mobile hospital feature, increasing hubs around the country
- We can integrate this application with mobile apps such as swiggy, ubereats and we can provide a warning to the users to avoid certain foods.
- Using the barcode reader to avoid administration of incorrect medications.
- Based on a patient's gene and medical history, predict the possibility of a disease to occur.

Benefits

- We believe that adopting a common integrated healthcare value system would benefit patients with a improved medical care.
- safer and cost effective healthcare can be provided to millions of patients across the country.
- Keeping track of inventory across multiple enterprises helps in prompt treatment to patients.



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Thanks!