# Medical Device Inventory Management for a Medical Establishment Network of Service Providers

## Problem Statement

As we know that there are a number of medical devices that are extremely complex and very expensive to buy and maintain but are crucial for patient safety. Therefore, here we try to develop a system to manage an inventory of such medical devices in order to facilitate sharing of this equipment among various hospitals under the Partners Healthcare Network of service providers, thus, reducing the need for each hospital in the network to buy and maintain such expensive devices individually. In order to manage the inventory effectively, it must be updated continuously so that it provides at any given moment, a correct look at the status of medical equipment present.

## Scope

The project serves to facilitate sharing of devices and operating rooms among various hospitals in a network. The network may cover all the hospitals and suppliers within a city or state. Multiple networks may be created for the PHS Medical Device Inventory. There is one Inventory in each network and this inventory can have multiple warehouses.

## Assumptions

- PHS has enough funds for buying and maintaining all the devices in the inventory.
- The Admin of each network will have access to the list of all the available operating rooms in all the hospitals that are part of that network so that these rooms can also be shared among all the hospitals in the network.
- Once a device in the inventory has been reserved by the staff of a particular hospital, it will be physically transported to the hospital.
- The reserved devices will be returned to the inventory and the reserved operating rooms will be available as soon as the reservation time is over within half an hour.
- For consecutive reservations of a device between two hospitals, PHS will be responsible for ensuring that the device is sent to the second hospital within half an hour.
- There will be Maintenance staff responsible for ensuring that all the medical devices are maintained properly within a network of the PHS Medical Device Inventory.
- If a device has been removed from the inventory for maintenance, it will be returned after completion of the maintenance procedure.
- In order to carry out an operating procedure, both an operating room as well as all the required devices must be available. The Care Team Leader of a surgery team will ensure this.
- The hospital may have some of the medical devices in its own inventory (the system we are developing is for a network of hospitals who will be sharing the PHS Medical Device Inventory) or might arrange to procure them from some other source in case they not available for reservation in the common inventory.

# Solution

In order to address the above mentioned problem, a software needs to be developed that will facilitate sharing of operating rooms, inventory devices and their maintenance among various hospitals in the PHS Network.

## Software Functional Requirements:

- **Association of medical devices and operating rooms with operating procedures**

    The Admin of a network in the PHS Medical Device will be able to define which devices and operating rooms are required for carrying out a particular operating procedure. While making a reservation, the hospital staff (Care Team Leaders) will enter the operating procedure into the system, the available operating rooms for that operating procedure will be displayed and all the required devices will be displayed as a checklist if available for reservation. The Care Team Leaders will then be able to select whichever devices they require. This functionality has been incorporated considering the fact that in case some of the devices required are not available, the hospital employee will still be able to make a reservation for the remaining devices(in case the hospital might have the unavailable devices in its own inventory or might arrange to procure them from some other source).

- **Device/Operating Room Scheduling**

    In order to carry out an operating procedure, the hospital staff must reserve an operating room and all the required devices at least three days in advance.

- **Device Maintenance**

    The Maintenance Staff will be able to keep track of problems and repair history of each device. They will also receive alerts when the due date for maintenance of a device has arrived and will be able to remove those devices off the inventory catalog for reservation. Since maintenance is not a daily task, the number of maintenance employees in a network are not necessarily equal to the number of warehouses. Therefore, all the maintenance employees in the network will be able to share the responsibility of maintenance of all the devices among themselves.

- **Device Tracking**

    At any point, the Warehouse Manager of a warehouse will be able to track the current location of a medical device and view all the reservations of all the devices in his warehouse.

# Use Cases

The software will have the following roles. Each role is followed by their respective use cases:

- **System Admin:**
    - Create new Networks.
    - Create Network Admin and their User Accounts.

- **Network Admin:**

- Manage associated Hospitals for his network.
- Manage Hospital rooms.
- Manage Employees (Warehouse Managers, Maintenance Employees, Care Team Leaders of a hospital).
- Manage Suppliers.
- Manage Warehouses within his network.
- Define what devices and rooms will be suitable in order to carry out a surgery procedure.
- Manage User Accounts.
- Receive alerts for any Supplier Enrollment Requests.
- Approve/Reject Supplier Enrollment Requests.
- Place Device Order Requests with suppliers.
- View previous order bills.
- View Device Usage based on number of reservations for each type of device.

- **Warehouse Manager:**
  - Track location of each device.
  - Keep track of history of repairs of problems/fixes of each device in his warehouse.

- **Care team leader:**
  - View and reserve medical devices and operating rooms available for an operating procedure.

- **Maintenance Employee:**
  - Keep track of history of repairs of problems/fixes of each device.
  - Receive alerts when the due date for maintenance of a device has arrived.
  - After completion of the maintenance procedure for the device, update its status so that it can be added back to the Inventory Catalog.

- **Supplier:**
  - Manage devices in his Product Catalog.
  - Send request to Network Admin for Approval.
  - Receive order requests from Network Admin for new devices.
  - View Sales performance according to number of pieces sold for each device type.
  - View Payment details and bills for all orders.