Patient Tracking Module of the Horizon Surgical Manager (HSM)

Planning and Design Project

By

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Acknowledgement and Endorsement

This report has been written by Maya Sunil Nair in partial fulfillment of the requirements for the Master of Health Informatics Program at the Dalhousie University. It has not previously in its entirety or in part been submitted at this or any other institution for academic credit.

First, I thank my supervisor Mr. Jim MacLean, for his continuous support, guidance and for placing me in this exciting and challenging position. I would like to thank Ms. Sandra Crosby and Mr. Brian McNeil for their constant encouragement and sharing their experiences. I am also grateful to all the staff of the Capital District Health Authority (CDHA) facilities for their valuable time, participation and for the interesting discussions.

Executive Summary

One of the major challenges faced by healthcare organizations are the surgical wait times and the impact it has on the quality of patient care. Healthcare leaders have realized and are now investing resources in key areas like the surgical department in order to improve efficiency and access to healthcare services. One way to improve efficiency of the surgical service delivery is to find solution to the existing hospital-wide problem called “patient flow”. The Capital District Health Authority aims to improve the workflow and communication processes in all its facilities with operating rooms (The Dartmouth General Hospital, Victoria General Hospital, Halifax Infirmary and The Hants Community Hospital) by implementing patient tracking monitors throughout their perioperative services area.

Patient Tracking is a module of the Horizon Surgical Manager project. It provides easy to read, reliable and up-to-the minute information of the surgical case status to the defined user groups (staff of the each department of the surgical services) who rely on this information to provide streamlined and efficient patient care. With the proper planning, developing and implementing of the tracking board, there would be an increase in the perioperative efficiency – decrease in operating room over utilization time and turn-over times, reduction in communication errors and an improvement in staff satisfaction.

The planning and design of the tracking board requires increased collaboration between the information technology professionals and the medical staff. Some of the potential factors identified for the success of this system are real time documentation, proper system interfacing, end-user involvement throughout the process from planning to implementation of the system, proper testing, training, implementation and maintenance.

CONTENTS

Overview of the Organization

The Capital District Health Authority (CDHA) is the largest healthcare district in Atlantic Canada. It comprises of the Dartmouth General Hospital, Victoria General Hospital, Halifax Infirmary, the Hants Community Hospital, the Cobequid Community Health Centre and other facilities that deliver health services to the population of Nova Scotia. [1]

The Information Technology and Communication Services (120 staff) department plans, develops, implements and maintains the information systems at all CDHA facilities. By implementing these systems it aims to provide accurate and timely access to information in order to enhance decision making, improve the quality of patient care and improve healthcare outcomes. [2]

Internship work description

This internship was performed at the Department of Information Technology and Communication Services in the Capital District Health Authority. The internship's objective was to "Plan and Design" the Patient Tracking module of the Horizon Surgical Manager Project. This tracking board would ultimately provide easy-to-read, up-to-the-minute views of surgical cases to defined 'view groups' who rely on this information to provide streamlined, more efficient patient care. The responsibilities of the intern were to:

- Research and Design Patient Tracking boards for the identified 'View Groups'.
- Develop detailed documentation regarding Patient Tracking decisions.
- Develop a "CH Patient Tracking Administrator Guide" based upon the (Capital Health)CH design

- Position Capital Health with the ability to realize the following benefits of using Patient Tracking:
    - Fewer communication errors
    - Faster response time for patient needs
    - Increased usage of critical and expensive resources
    - Improved patient and staff satisfaction through visual, up-to-the-minute communication
    - Improved patient throughput

- Create a completed table containing the following information on Patient Tracking requirements:
    - Specific locations of proposed Patient Tracking display devices;
    - Type of Patient Tracking board to be used in each location (Big Board vs. Little Board)
    - Recommended type/model of feasible alternative display devices options;
    - Recommended priority for device deployment.
    - Process for which the views will be accessed by approved users in each deployed area.

The author's approach for this project were as follows:

- Developed an understanding of the Horizon Surgical Manager (HSM) application and specifically self-educated on the Patient Tracking Module.

- Familiarized with the hardware and software tools already available, and the options for their deployment (e.g. Size of tracking board, Big Board display or Little Board display, etc).

- Presented preliminary Patient Tracking board to enhance nursing staff understanding.

- Interviewed key staff, as identified by managers, to determine how Patient Tracking would be used in each area (e.g. what does one Peri-Operative phase need to know from a preceding Peri-Operative phase in terms of preparing for patients in the queue. Issues like room cleanup and preparation, Anaesthetist ready, surgeon ready, etc…)

- Interviewed clinical staff to determine requirements for Patient Tracking information for each Perioperative phase.

- Researched how other healthcare institutions have implemented Patient Tracking in HSM (discussion groups and user groups).

- Worked with clinical staff to select/develop appropriate Patient Tracking icons.

- Presented Patient Tracking boards to clinical staff for assessment

- Document findings and recommendations, including priorities, for deployment.

Relationship to Health Informatics

The internship work focused on understanding of the information flow process and use of milestone information in the Perioperative environment to streamline patient flow. Its been proven that putting information systems in to a hospital department without understanding the clinical process and staff buy-in could result in poor design, lack of staff acceptance and ultimately would result in resource waste. So investigations were done to identify the required technology for each patient area and how to best deploy that technology to complement the human processes**.**

The author gathered the milestone information through presentations, discussions, interviews and working collaboratively with the nursing staff of each phase (Preoperative phase, Intraoperative phase, Recovery phase and Post recovery phase) of the CDHA facilities. The author then served as a liaison between the information technology professionals and medical staff for designing the patient tracking board**.** The key to this project was to capture the essential milestone information and standardize them so that it could be beneficial to the staff of all CDHA facilities in a way that would facilitate functional, up-to-the- minute information to streamline the patient care process.

1. Introduction

The challenges encountered by all healthcare organizations across the developed nations are manifold. Other than the steeply rising healthcare costs, acute shortage of healthcare professionals and increasing demands for quality healthcare services, the top concerns are about wait-times for surgeries and the impact it has on the quality of patient care. [3] It has been estimated that approximately 42 percent of the hospital's revenue is generated by the surgical services department.[3]So optimum use of resources must be invested in this key area, surgical department, in order for the healthcare organizations to yield significant revenue and reduce surgical wait times. Being able to schedule an additional surgical case per day could result in $1.8 million additional annual revenue for an organization. [4] The healthcare leaders must target their resources to improve efficiency throughout the Perioperative environment. One way to improve the efficiency of healthcare service delivery is to find solution to the existing hospital-wide problem called "Patient Flow". [5] Optimizing patient flow is essential to maximize productivity and improve clinical outcomes so it should be tracked, managed and measured. [6]

This report deals with the Patient Tracking module (Planning and Design) of the Horizon Surgical Manager Project which will be implemented at Capital District Health Authority (CDHA) facilities, the QEII Health Science Centre (the QEII has two main sites where surgical services are performed: Halifax Infirmary (HI) Site, Victoria General Site (VG Site), Dartmouth General Hospital (DGH) and Hants Community Hospital (HANTS) consisting of approximately 40+ Operating Rooms. Section 2.0 and 3.0 of this report gives a broad overview of the workflow process and the challenges faced in the Perioperative environment at the CDHA facilities. Section 4.0 and 5.0 discusses the Horizon Surgical Manager project and the Patient Tracking module. The remaining sections (6.0 – 8.0) explain the essential milestones identified the design and the working of the tracking board.

2. Workflow Process in the Perioperative Environment *(Victoria General, Halifax Infirmary, Dartmouth General Hospital and Hants Community Hospital)*

The Perioperative nursing care starts from the time patient enters the hospital, through surgery and recovery to discharge. [7] It consists of:

Preoperative Period (PreOp)*:* The time before surgery
Intraoperative Period (OR): The time spent during the actual surgical procedure**.**
Postoperative Period (PACU and Post Op recovery*)*:** The time spent after surgery.

Routine surgical screening which includes blood work, X-rays and other tests are performed two weeks before the surgical date in the Preadmission Clinic (PAT).

2.1 Preoperative phase

On the day of surgery, the patient arrives two hours ahead of the surgery scheduled time and is directed from the registration department to the PreOp area. When the patient is admitted to the PreOp, the nurse assesses his or her vital signs, verifies informed consent, administers any medications if needed and answers patient's questions regarding the perioperative experience. [8] After the clinical assessment and chart documentation are

complete, the OR staff members are notified, and a patient attendant transports the patient to the OR. [9]

2.2 Holding Area

The patient attendant brings the patient to the OR's holding area/hallway where the charge nurse reviews the chart. [9] The circulating nurse, surgeon and anaesthetist visit the patient in the holding area. [9] The surgeon does the verification and identification of patient and marks the surgical site. The anaesthetist educates the patient about the type of anaesthesia and discusses any concerns the patient may have. The circulating nurse does a final confirmation of the patient, again reviews the charts, confirms surgical consent form and other legal documents. The patient waits in the holding area for about 15 to 30 minutes before entering the operating room.

2.3 Intra operative phase (OR)

Meanwhile, patient attendants and other technicians clean the OR rooms and check for proper functioning of specialized equipment. The circulating nurse helps the scrub nurse in preparing of instruments and other supplies for the procedure. The nurse then transports the patient from the Holding Area to the OR room.

The Perioperative team members move the patient onto the OR bed. Vital sign monitors are put in place and the patient is monitored throughout the procedure. The anaesthesia care provider reviews the patient record and administers anaesthesia based on the patient's surgery. After this is accomplished, the nurse assesses the patient's condition throughout the procedure. The circulating nurse documents all the procedure times from the Room Available time until the Patient Leaves Room time. The surgeon and the resident(s) arrive and position the patient for surgery. Then a "time out" briefing is done prior to the incision where the surgical team does a final verification of the patient's name, surgical procedure and surgical site. [8] The surgeon preps and applies sterile drapes to the patient. The surgical incision site is marked and the procedure begins. The scrub nurse passes the surgical instruments and assists the surgeon throughout the procedure. After the surgical closure, the dressings are applied. The OR nurse calls the holding area requesting the next patient and calls the PACU to notify that the surgical patient is ready to move to that unit.

2.4 Post Operative Phase I (PACU)

The Perioperative team transfers the patient to the Post Anaesthesia Care Unit (PACU). Occasionally delays occur while waiting for the patient attendants and/or lack of PACU space. In PACU, the anaesthetist and the OR circulating nurse transfer the patient and their report to the PACU nurse. The PACU staff review the charts, carefully monitor the surgical site and continue documenting the vital signs until the criteria for discharge are met. When the criteria for discharge are met, the nurse calls the accepting RN (Floor Nurse or PostOp Phase II Nurse) and reports the patient details to the receiving unit. Then patient attendants transfer the patient to the receiving units according to protocol. [10]

2.5 Post Operative Phase II-Recovery

Depending on the surgical procedure performed (if it is a day surgery) the patient is transferred to PostOp Phase II. In Post-Recovery, staff monitor patient vital signs until the patient meets the specific discharge criteria i.e. discharge scoring level of above 9. [10] Finally, the patient is discharged after PostOp education is given.
Diagram: Please see Appendix A.

3. Challenges faced in this Workflow Process

The key issues identified in this fast paced surgical environment are:

- Increase of the number of phone calls;
- Increase of communication errors;
- Case delays due to staffing issues, resulting in Surgeries cancelled [8];
- Over utilization of approved OR time resulting in increased costs;
- Under-utilization of approved OR time resulting in opportunity cost;
- Inefficient OR turn-over times [8];
- Delay in PACU admission due to unavailability of PACU beds [8];
- Increase staff burnout;

All factors combined, account for less surgeries being performed and an increased costs for to the healthcare organization. In order to handle these challenges in an efficient manner, there needs be a powerful information system that facilitates the communication process and streamlines the work flow process across the "continuum of Perioperative care". McKesson's Horizon Surgical Manager is designed to manage these complex requirements of the surgical services environment.

4. Horizon Surgical Manager (HSM)

Horizon Surgical Manager is a browser-based surgical information system that coordinates surgical scheduling, peri-operative clinical documentation, supply management, fiscal management and business analysis throughout the peri-operative environment.[11] HSM helps healthcare organizations optimize their surgical services resource utilization to improve patient safety, reduce non-patient care time, enhance decision making and ultimately, reduce costs.[11] This system's tracking capabilities allow communication between all phases of the patient's surgical experience from the Preadmission Clinic to discharge.[4]

5. Patient Tracking

Patient tracking is a component of Horizon Surgical Manager. It combines the use of colors, images and text to provide easy to read, up-to-the-minute information of patient status to healthcare providers and patient family members. [12] This system displays real-time information of the surgical case and room status on the monitors located throughout the perioperative environment and in the family waiting rooms. Once the patient is

registered in the Registration System (STAR), as clinical staff chart electronically, milestone fields (fields programmed to update the Tracking Board) update the patient's Tracking Board status as the patient moves from one phase to another, until the patient is discharged to their respective units/homes.

The objective of using the Patient Tracking Board is to:

- Streamline patient flow throughout the perioperative environment;
- With real-time access and dissemination of information, the number of phone calls will be reduced [5];
- Provide instant communication of the surgical case status;
- Reduce non-operative times in the OR;
- Automatically tell the healthcare staff when and where they are needed;
- Improve healthcare providers, patient and family satisfaction [13];

5.1 Benefits of using Patient Tracking Board

5.1.1 OR efficiency

The Operating room (OR) is considered the largest cost centre for all health care organization. With the escalating costs and the struggle to reduce surgical wait times, hospitals are trying various methods to increase the volume of additional cases during the scheduled OR times.

In order to improve the OR efficiency, there is an increased need to reduce turnover times. Non-operative Time, which consists of OR Anesthesia Time, OR Emergence time and Turnover Time, should be identified, captured and monitored to enhance OR process efficiency.

Interval	**Description**
Nonoperative Time	Previous patient Out of Room to current Patient ready for Surgical Prep plus Surgery Finish to Patient Out of Room [14]
Turnover Time	Last Procedure Stop of the previous patient to the First Procedure Start of the current patient except for the first case of the day. [14]
OR Anesthesia Time	Anesthesia Start to Ready for Surgical Prep. [14]
OR Emergence Time	Surgical closure to Patient leaves the OR room. [14]

5.1.2 Staff Performance

With the implementation of the tracking board there will be a change in established staff (Surgeons and Anaesthetist) practice patterns. It has been proven that people improve their performance when they are being monitored ("The Hawthorne Effect" phenomenon) [7]. The Patient Tracking board will display the progress of surgical cases in the entire OR

Suite. This will provide a visual feedback to the OR staff on their daily job performance related to turnover time and overall OR utilization throughout the day.

5.1.3 Communication Tool

Patient tracking board is an excellent communication tool. Based on the information displayed on the electronic grease board:

- PreOp can notify the OR of when a patient is ready for surgery [15];
- The OR can notify PACU when the surgical procedure is complete and PACU can then assign/prepare a bed [15];
- PACU can notify Post Recovery the patient is clinically fit for discharge and Post Recovery need to be prepare to accept the patient;
- The entire surgical department can see the list of patients registered and those yet to arrive. They can even visualize the patient's progress in any operating room to help them streamline work flow;

5.1.4 Turnover times

There is a shortage of patient attendants and/or nurse attendants in the Perioperative area causing delays. After the completion of every surgical procedure the staff wait approximately 5-10 minutes for the attendants to arrive. If there are surgical 8 cases performed per day Per OR Room, 5 minutes lost per case results in a total loss of 40 minutes/day/OR Room. With the use of the reliable information from Patient Tracking, the patient attendants can improve their service efficiency. This may allow the OR management to utilize this time for additional cases.

5.2 Patient Tracking Board is useful for Multiple Users

The Patient Tracking Board displays the status of the surgical cases in each unit. This information can be utilized by Managers, Charge Nurses, Supervisors, Anaesthesiologists, Residents, Surgeons, Patient attendants and Nursing staff in a different ways such as:

5.2.1 Charge Nurses

The charge nurses coordinate multiple disciplines of healthcare workers to ensure that patients move seamlessly through the surgical process. [16] With the use of a Patient Tracking Board they can make informed decisions based on how the patients are distributed around the units and spot inefficiencies such as case delays, perioperative staff delays and the OR rooms that are running overtime. Charge nurses would be able to decide if changes should be made to the surgery schedules during the day. [17]

5.2.2 Perioperative Managers

The tracking board is an easy-to-use management tool and a decision support tool for the Perioperative Manager as they can determine how well the department is functioning. It will also help the organization improve in productivity and standards of patient care.

5.2.3 Staff

The use of this system will improve communication and reduce the number of phone calls between staff members. Knowing where the patients are at the touch of a mouse-pad can help speed the tasks of staff to reduce unnecessary delays.

The patient attendants can see the visual displays on the tracking board and can prepare to help staff in transferring the patient from the OR to PACU, cleaning in between procedures, stocking supplies, and moving specialty beds to the OR.

In the SPD (Sterile Processing Department) the patient tracking board would be useful for staff to prepare the supplies and instruments required for the next surgical case ahead of time.

5.2.4Family Members

In the Family lounge, the tracking board provides patient's family members, via confidential code, with real-time information on where the patient is in the perioperative process.

6. Essential Milestones Identified in the Patient Flow Process

Milestones	**Description**
PreOp In	Patient in Preoperative phase
PreOp Out	Patient is out of PreOp and is ready for surgery.
Patient in the OR room	Patient entered the OR room
Nursing Ready	Scrub and Circulating Nurses ready for the Anaesthetist
Anesthesia Induction	Anaesthetist begins administration of anesthesia.
Ready for Surgical Prep	Patient ready for surgeon to begin positioning and Skin Prep [9]
Procedure Start time	Surgical incision made.
Procedure Stop time	Closure of the surgical procedure.
Patient Out of the OR room	Patient leaves OR.
OR Cleanup time	Time from the patient exits until the cleanup is complete.
OR Setup time	Time from the start of the setup to when the patient enters the room.
PACU in	Patient in Post Anesthesia Care Unit (PACU).
Ready for Discharge	Patient is clinically ready for discharge.
PACU Discharge	Patient is out of PACU.
PostOp in	Patient in PostOp Recovery
PostOp Discharge	Patient is discharged from the hospital.

7. Design of the Patient Tracking Board

The design of the tracking board is made very simple, easily readable and customized according to the various information needs of each department staff within perioperative services.

When the in-room care providers enter data fields in the perioperative documentation screen, this causes a color or icon change on the Patient Tracking Board which will display peri-operative progress. The Patient Tracking Board displays status of individual OR rooms, the OR suite as a whole, patient status, and patient location by means of symbols. When charting electronically during routine clinical care, the Small Board, Big Board, Public and Grid views comes alive with color and icon changes corresponding to the patient's surgical progress. [7]

The design comprises of the following characteristics: [12]

1. Building Milestones
2. Building Milestone sets
3. Setting patient tracking for usage location
4. Assigning users to view groups
5. Opening Patient Tracking

7.1 Building Milestones

The tracking board shows three types of milestones: the **location** of the patient, the **event** that occurs in the respective phase and the **icons** that show the status of the patient. Each milestone is linked to a surgical case data entry field or another milestone. They are activated and removed from the views based on the **start** and the **stop** conditions assigned to them [12]. The tracking board is constantly updated so that the information is current.

In the Build Milestones page **three** types of Milestones are constructed:

Event Milestone (Displayed only in Grid view)

- Indicates an event that occurs during a surgical case such as injection given, consent signed. [12]
- An event milestone is represented by a color.

Location Milestone (Displayed in Small Board, Big Board, Public View and Grid view)

- Indicates where a patient is during a surgical case such as Operating room, Recovery room. [12]
- A location milestone is represented by a color.

Symbol Milestone (Displayed in Small Board, Big Board, Public View and Grid view)

- Indicates an event that occurs during a surgical case. [12]
- A symbol milestone is represented by an image.

The figure 1 shows the location, event and the symbol (active file name) milestones that were built. The figure 2 shows the start and stop conditions assigned for a single milestone.

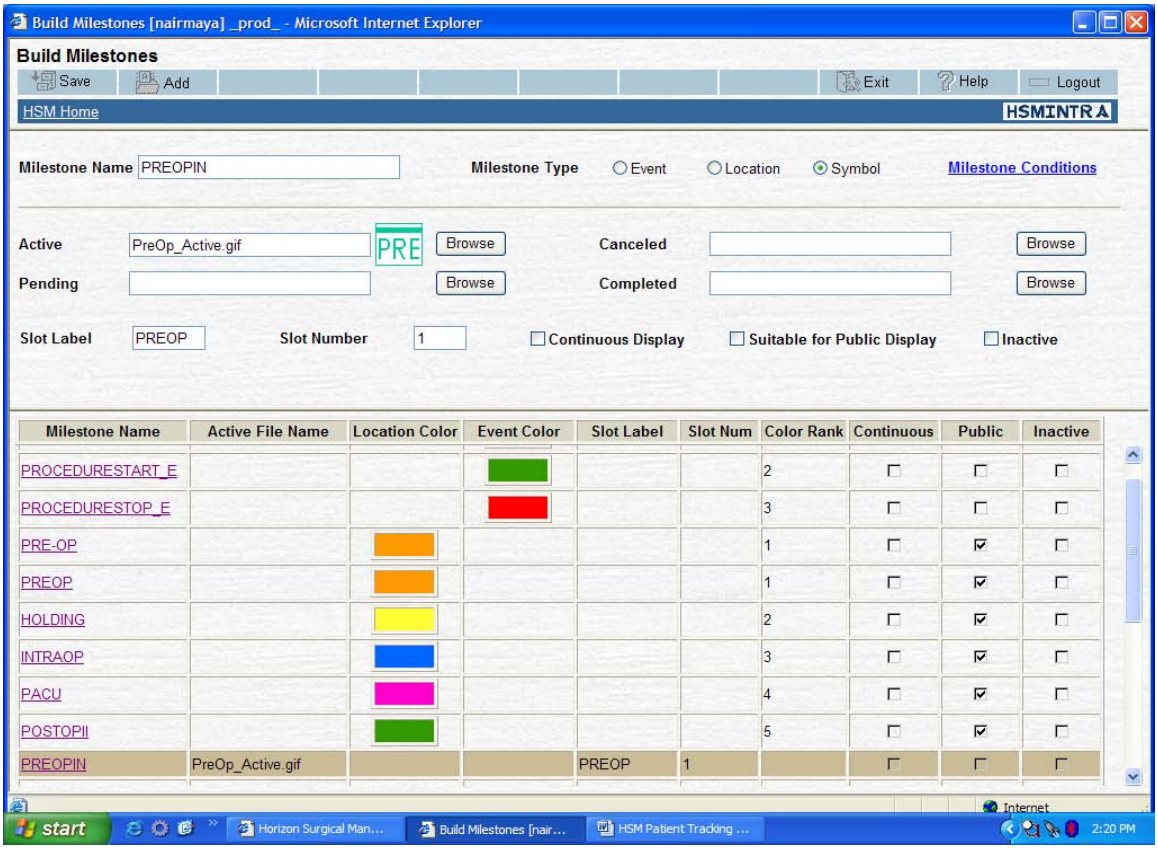

Figure 1: Location, Event and Symbol milestones.

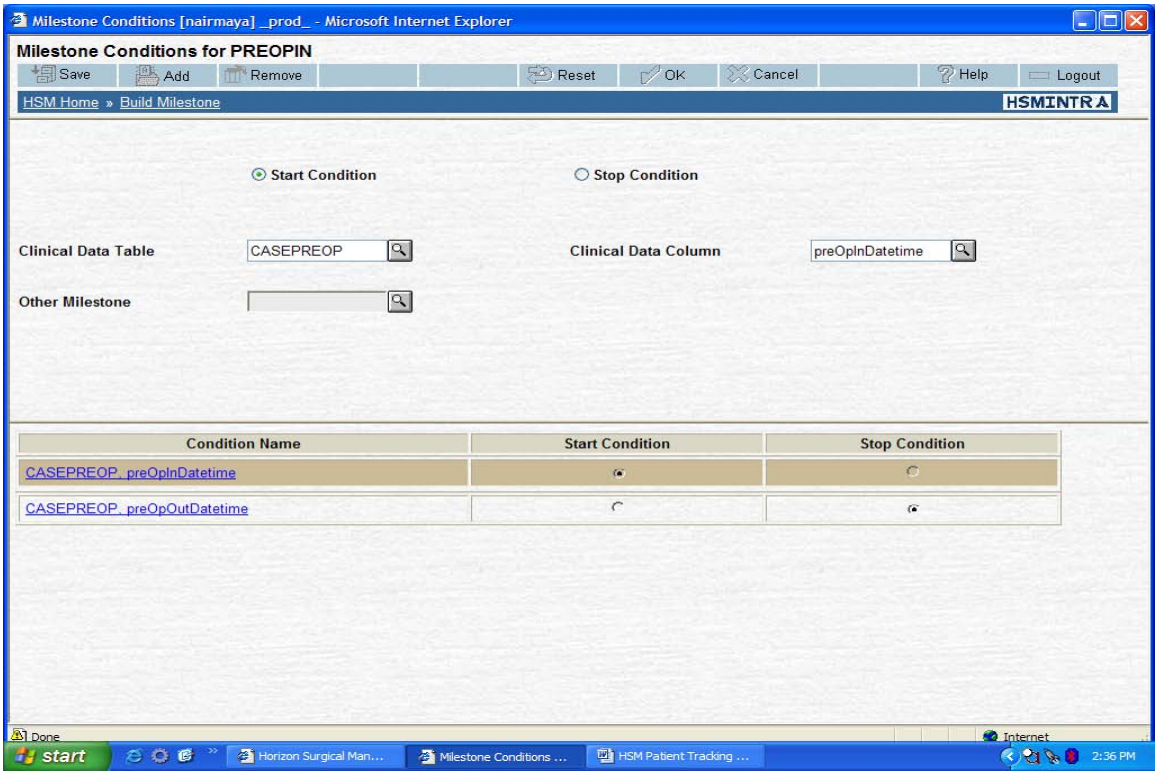

Figure 2: Start and Stop conditions built for “Preop In” milestone.

7.2 Building Milestone Sets

Once the milestones are constructed, the milestone sets are built. A milestone set is a group of milestones that represent a cluster of conditions and events that occur during a surgical case. [12] Milestone sets are built based on the Holding Unit (the room where the patient waits before the scheduled surgery time). Some of the CDHA facilities like Dartmouth General Hospital and Victoria General Hospital (10^{th} floor) do not have a holding unit so they have a separate milestone set. The figure 3 shows the milestone set for a CDHA facility with no holding unit.

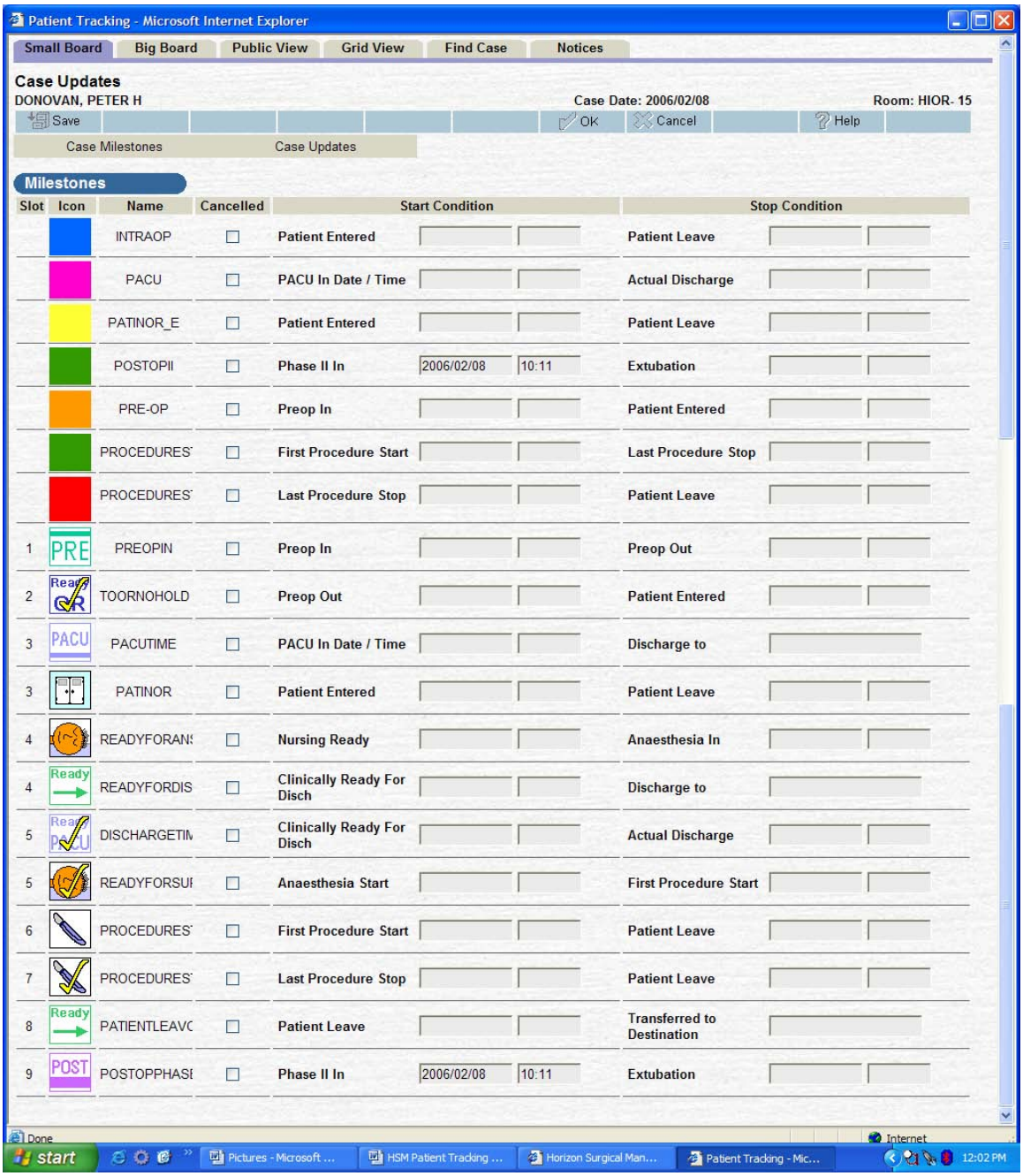

Figure 3: Milestone Set

7.3 Setting Patient Tracking for Usage Location

The patient tracking is set for various CDHA sites differently based on the number of operating rooms and the type of milestone sets. The different Usage Locations are the Dartmouth General Hospital, Victoria General Hospital – VG 10 and VG 11A, Hants Community Hospital and the Halifax Infirmary. The figure 4 shows the various usage locations.

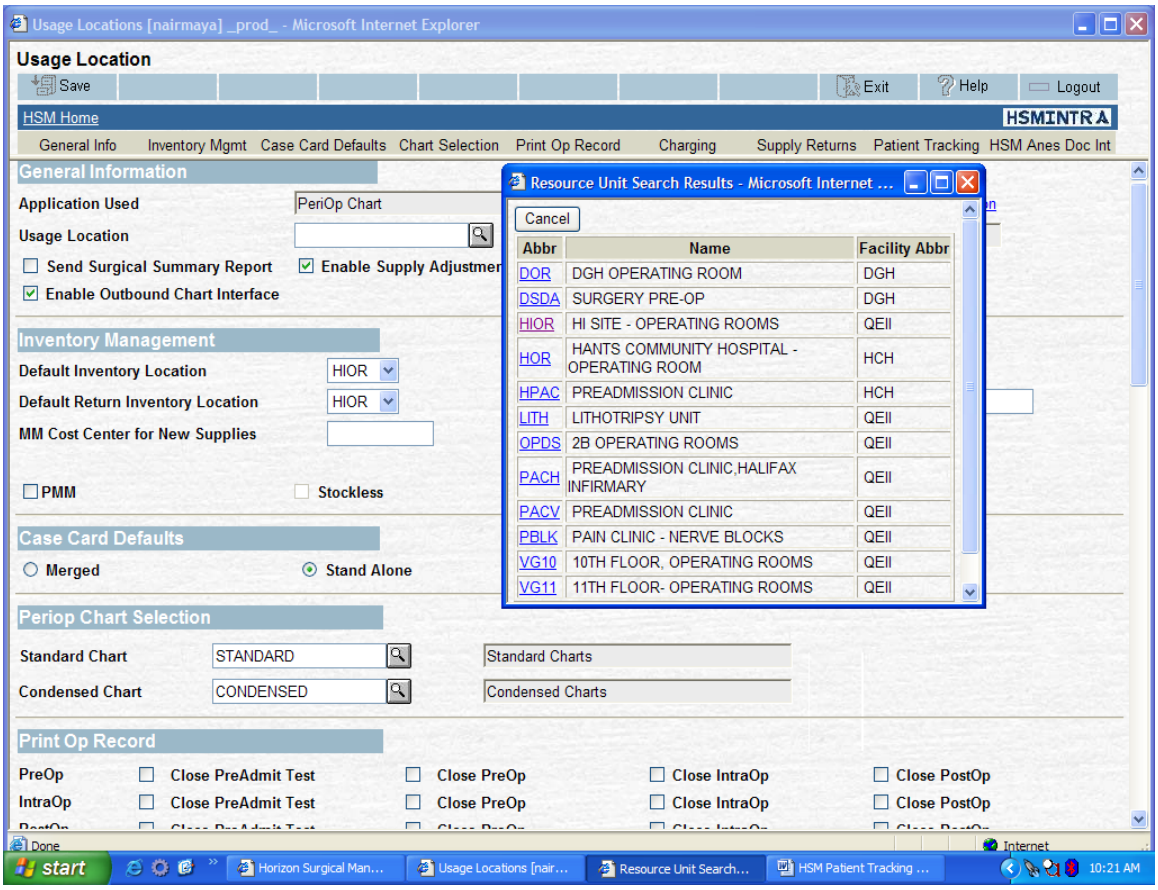

Figure 4: Usage Locations.

7.4 Assigning users to the view group

Each nursing staff member is given a username and password to ensure system security and are assigned groups based on the department (preoperative phase, intra-operative phase, recovery phase or post recovery phase) of the Perioperative services and sites (the Halifax Infirmary or Victoria General Hospital). They are given limited access to specific views (small board, big board, public and grid view). The figure 5 shows the username of each staff member and the group to which they belong. The figure 6 shows the views assigned to each group.

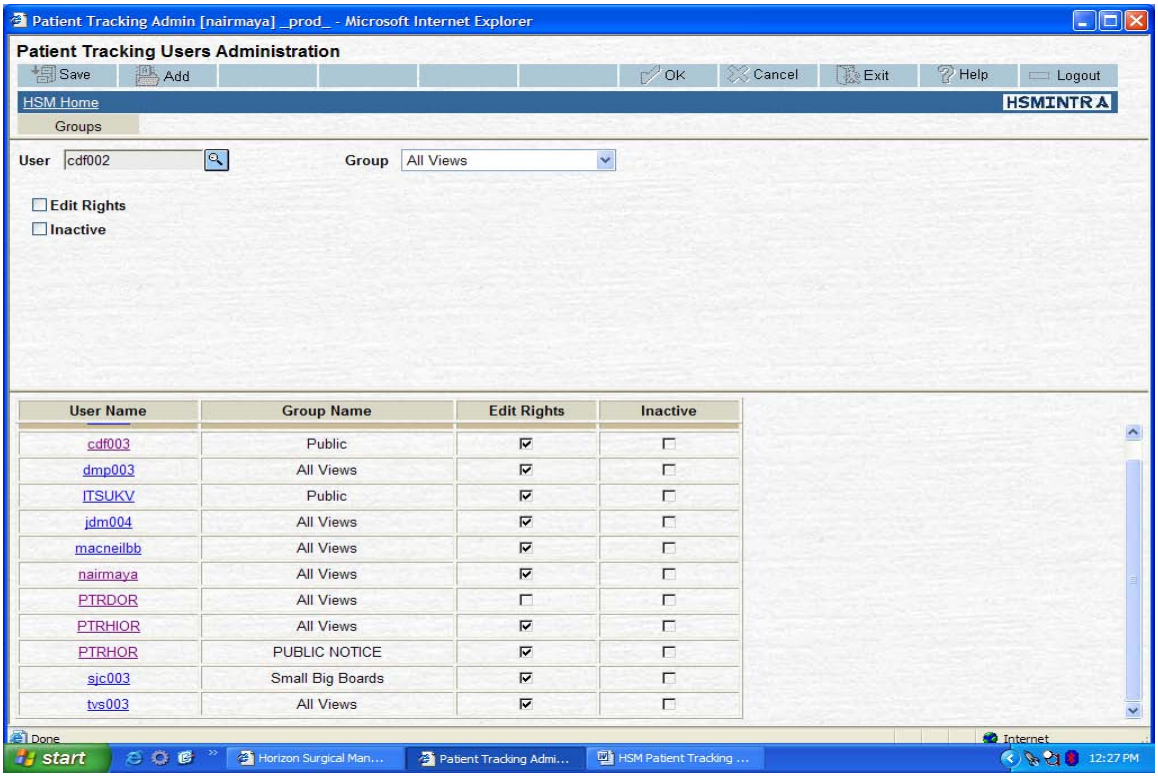

Figure 5: Users assigned to groups.

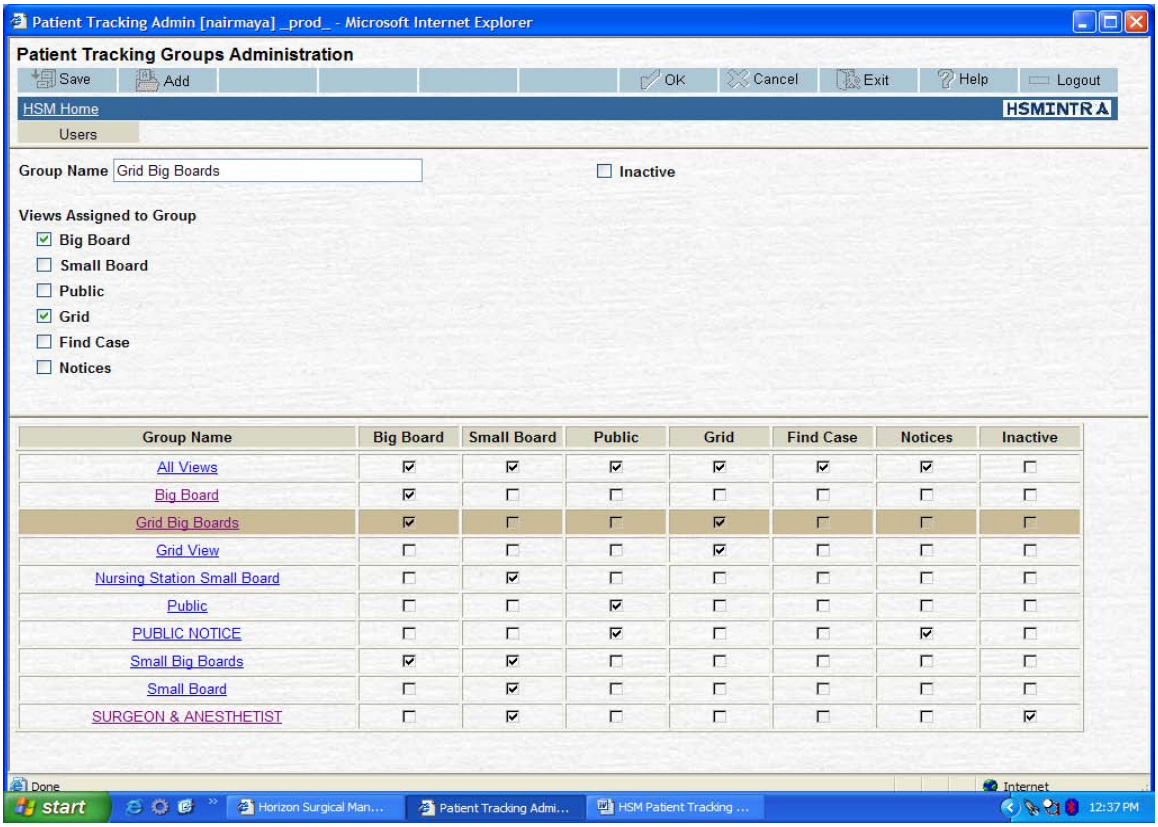

Figure 6: Views assigned to groups.

7.5 Opening Patient Tracking

There are four Patient Tracking views that display surgical case status for a usage location. [12]

- Small Board
- Big Board
- Grid View
- Public View

Clinical Views:

The small board, big board and grid view are clinical views that display patient and resource information that assists in tracking a patient's progress throughout a surgical case from the preoperative phase to the post operative phase. [12] This view provides a way to spot potential room conflicts when surgical cases run over the scheduled time. The edit rights to these views are given to the Perioperative Managers and Charge nurses in order to use the system effectively.

Public View

This view is designed to display generic information about a patient's progress that is suitable for viewing by the patient's family members and friends waiting in a public area. [12] Only location milestones are used for the public view and a patient code is used to maintain patient confidentiality. Figure 7 shows a small board view and figure 8 shows a grid view.

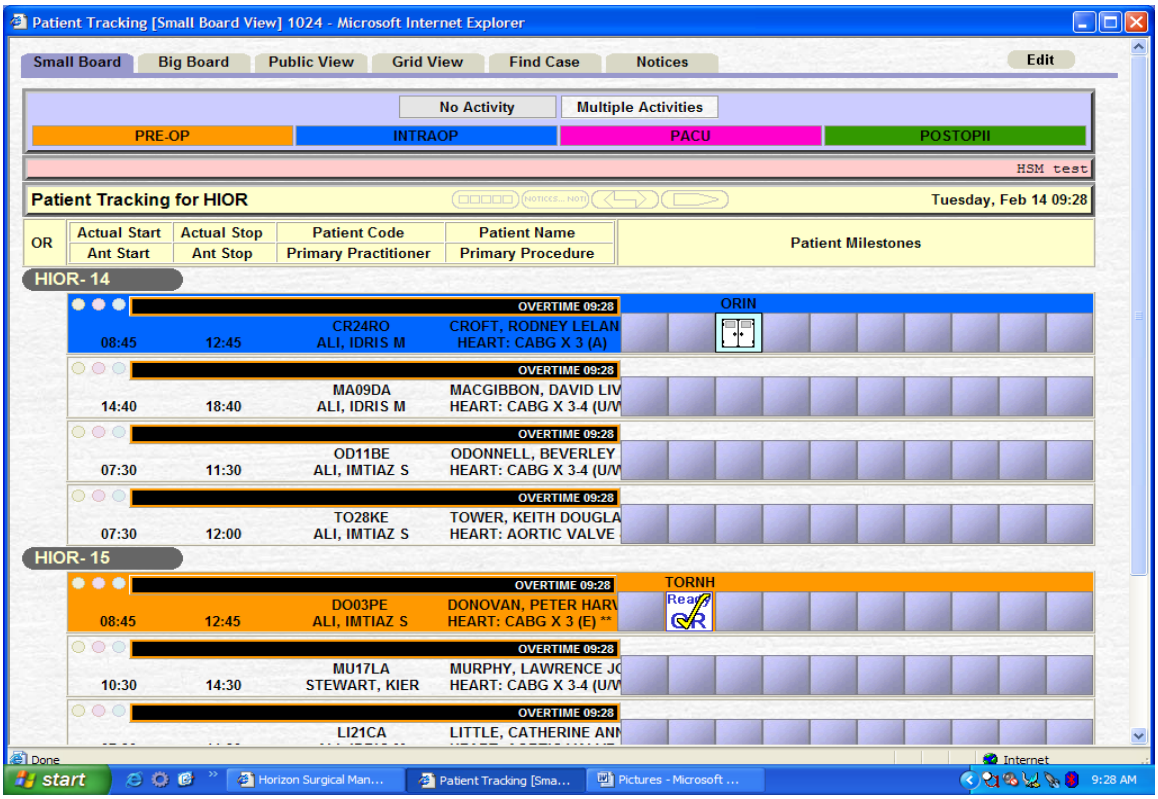

Figure 7: Small Board view.

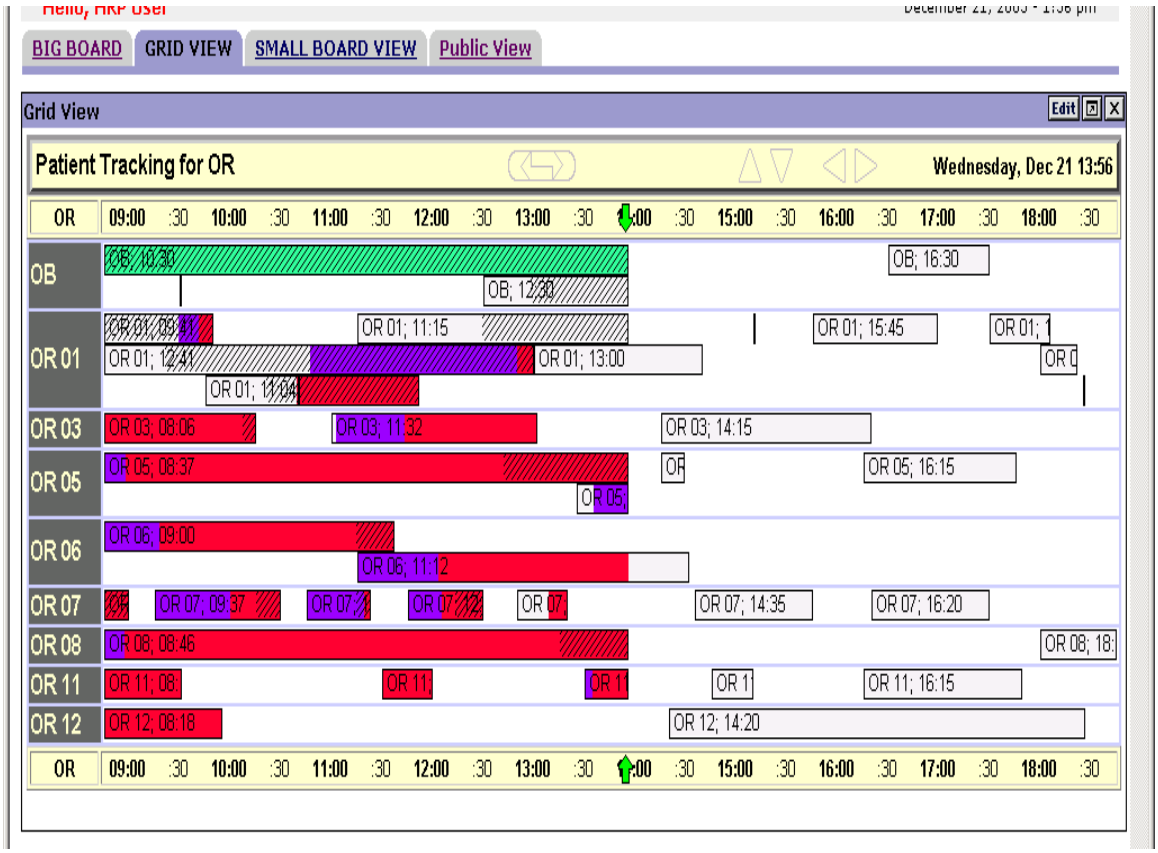

Figure 8: Grid view.

8. Working of the Patient Tracking Board

When the patient arrives at the registration desk on the day of surgery, the clerical staff enters the pertinent patient information in STAR system. The temporary Account number is changed to a permanent Account number and the patient is registered. The patient is then accompanied by the nurse to the PreOp room for assessment. When the nursing staff enters the "**PreOp in**" times (figure 9) in the Preoperative documentation screen, this sends information to the Tracking Board, which displays an icon next to the patient's code or name on the electronic grease board. [17] After the PreOp assessment is complete the patient is transported to the Holding area and icon changes to display "Patient in Hold" and for hospitals with no holding units it displays **"Patient ready for transfer to the OR**" (figure 9). When the surgical team completes the nursing assessment in the holding area and the patient is transferred to the OR room, the nurse enters the Patient-In OR Time and the icon changes to "**Patient in OR**" (figure 10). This indicates to the OR personnel that the patient is ready for the surgical procedure.

When the nursing staff is ready, they enter in the Intraoperative documentation screen which triggers the tracking board and displays "**Ready for Anaesthetist**" icon (figure 10). When the Anaesthetist starts anaesthesia the time is documented and the "**Ready for Surgeon**" icon (figure 11) is displayed. When the surgeon starts the surgical case, the "**Procedure Start**" icon (figure 12) is displayed. At the end of the surgical procedure, a "**Procedure Complete**" icon (figure 12) is displayed which notifies the PACU staff that a

patient will be arriving in their unit in 20 minutes. It also alerts the orderly staff member that the room needs cleaning for a new patient. The Anaesthetist and the circulating staff transport the patient to the PostOp Phase I and the "**PACU**" (figure 13) milestone is displayed. When the PACU nurse determines that the patient is clinically ready for discharge the "**Ready for discharge**" icon (figure 14) is displayed and when the patient is discharged the "**Actual Discharge**" icon (figure 14) is shown. The patient is then transferred to Post-Recovery. On arrival the nurse at Post-Recovery enters the "Phase II in" times and this triggers on the tracking board as the "**PostOp**" icon (figure 15) and this is displayed until the patient is discharged. Then the surgical case row is removed from the Patient Tracking Board.

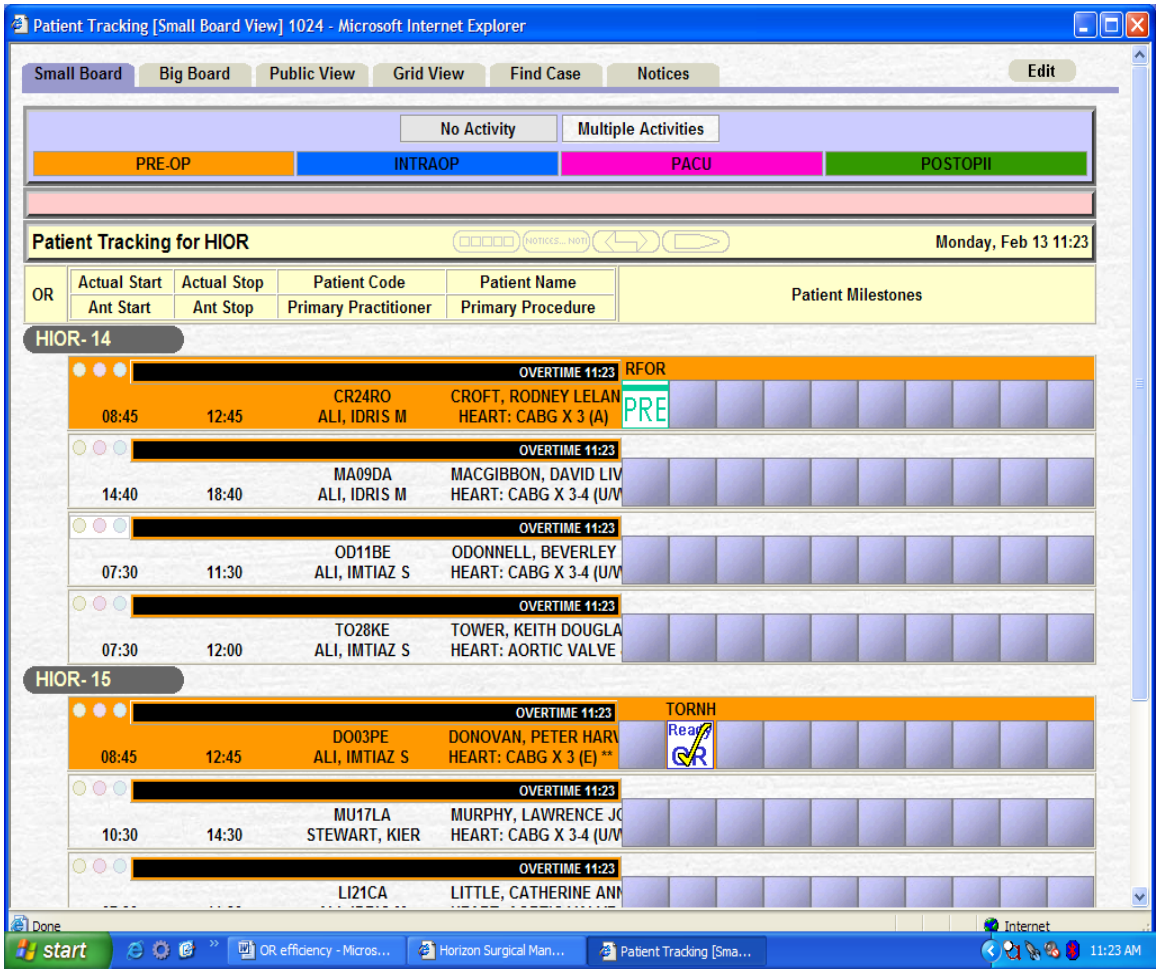

Figure 9: Orange color indicating "PreOp" location milestone
"RFOR" – Preop In – symbol milestone
"TORNH" – Patient ready to transfer to OR – symbol milestone

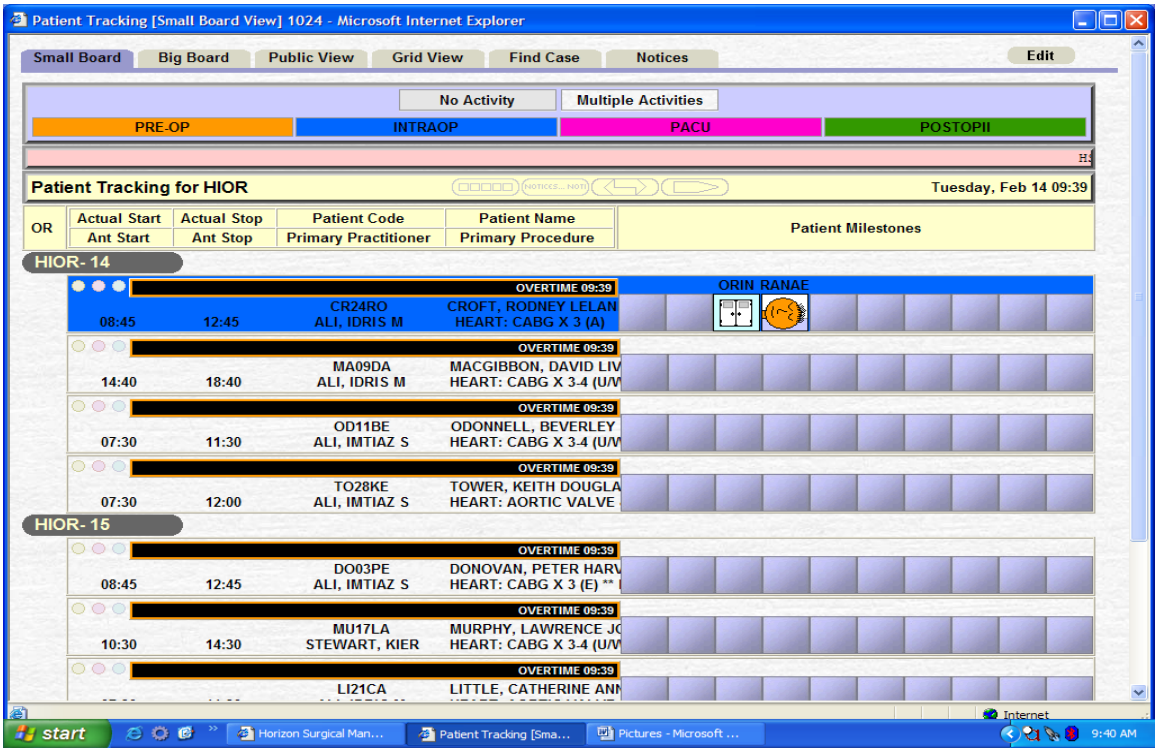

Figure 10: Blue color indicating “OR” location milestone
“ORIN” – Patient in OR – symbol milestone
“RANAE” – Ready for Anaesthetist – symbol milestone

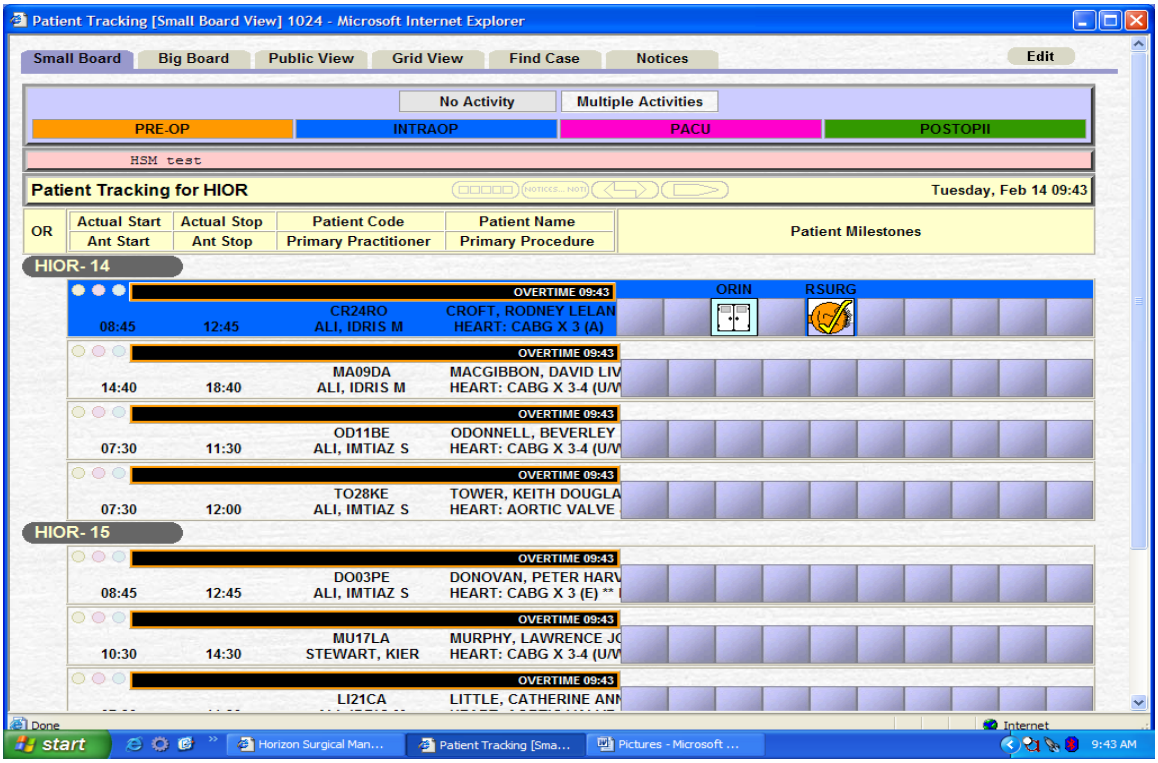

Figure 11: Blue color indicating “OR” location milestone
“RSURG” – Ready for surgeon – symbol milestone.

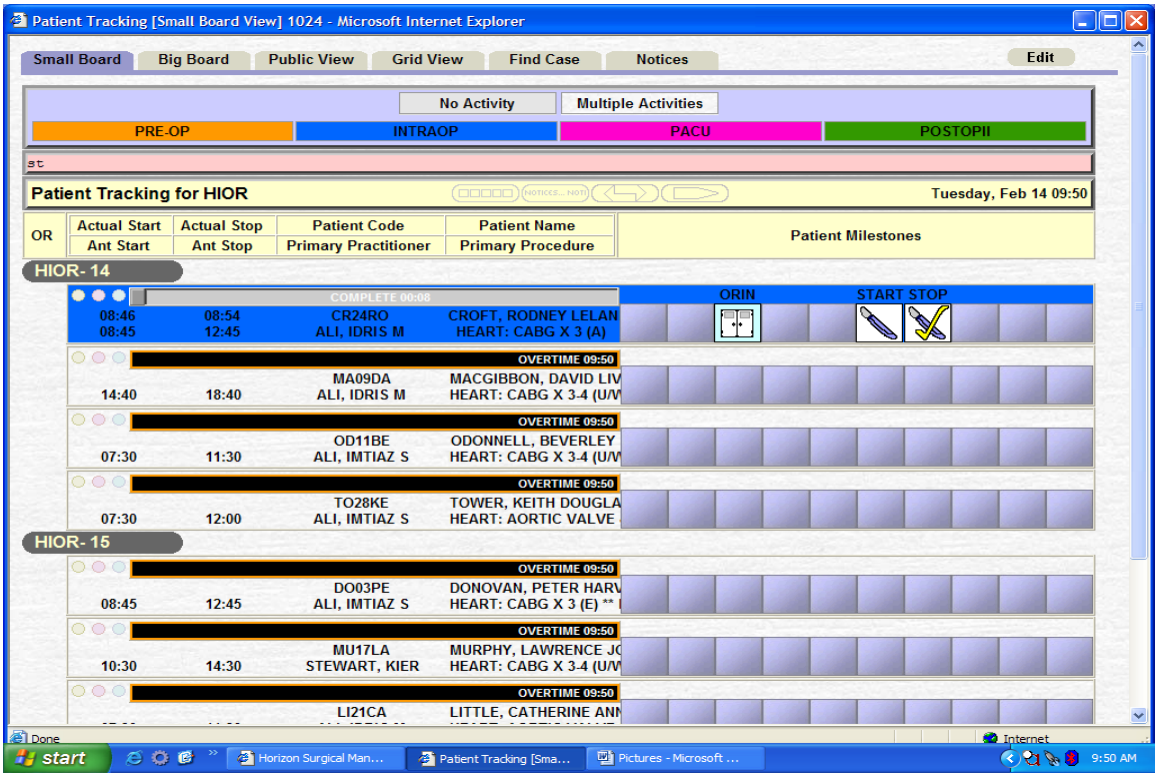

Figure 12: Blue color indicating “OR” location milestone
“START” – Procedure start – symbol milestone.
“STOP” – Procedure stop – symbol milestone

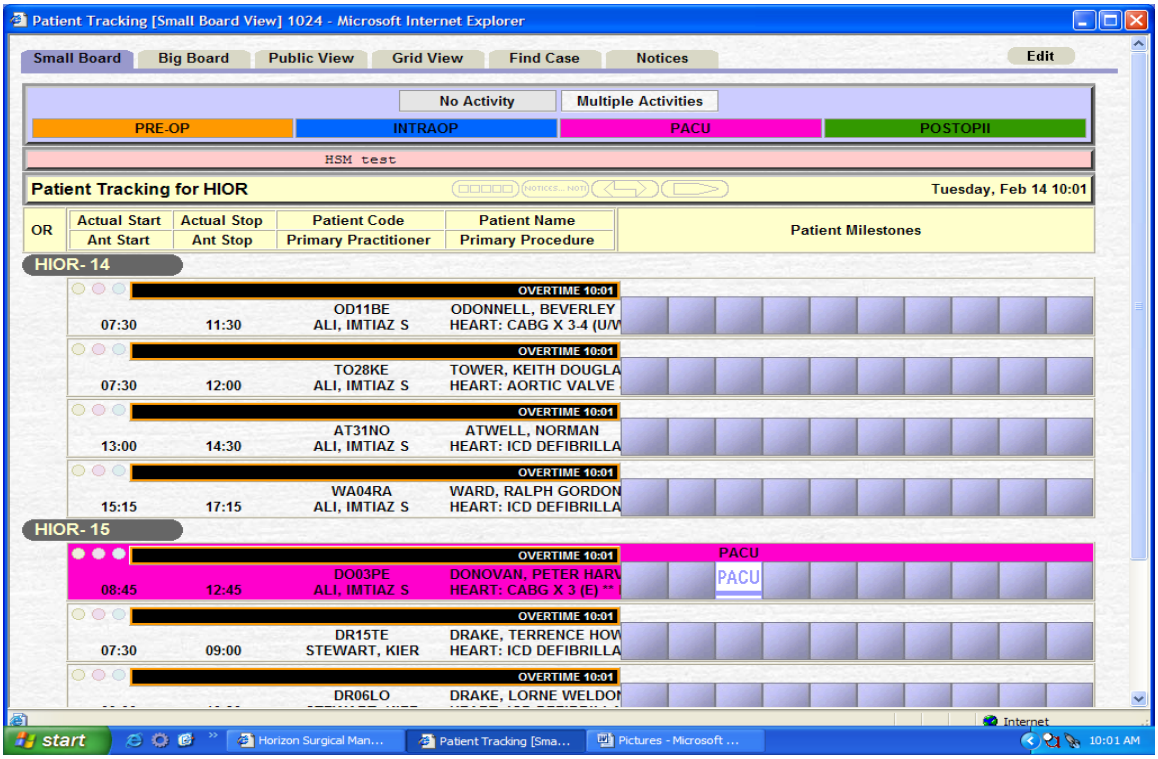

Figure 13: Pink color indicating “Post Anesthesia Care Unit” (PACU) location milestone
“PACU” – patient in PACU – symbol milestone

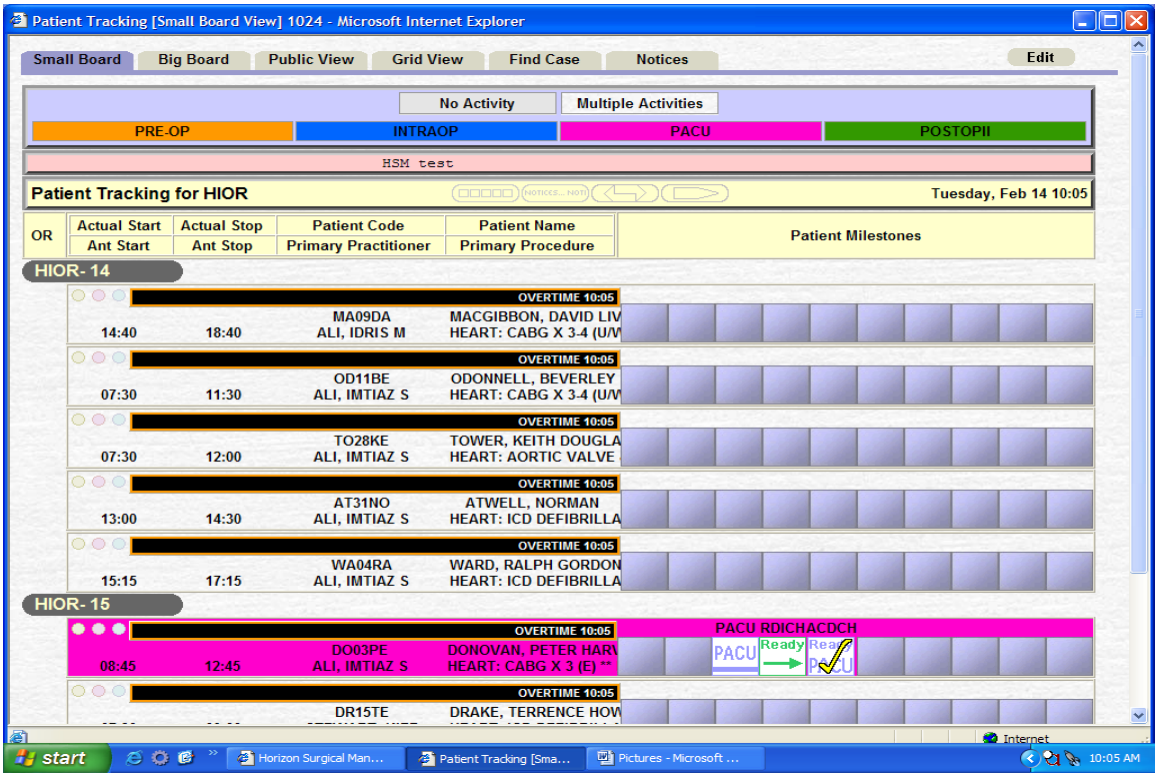

Figure 14: Pink color indicating “PACU” location milestone.
“RDCH” – Ready for discharge – symbol milestone
“ACDCH” – Actual discharge – symbol milestone

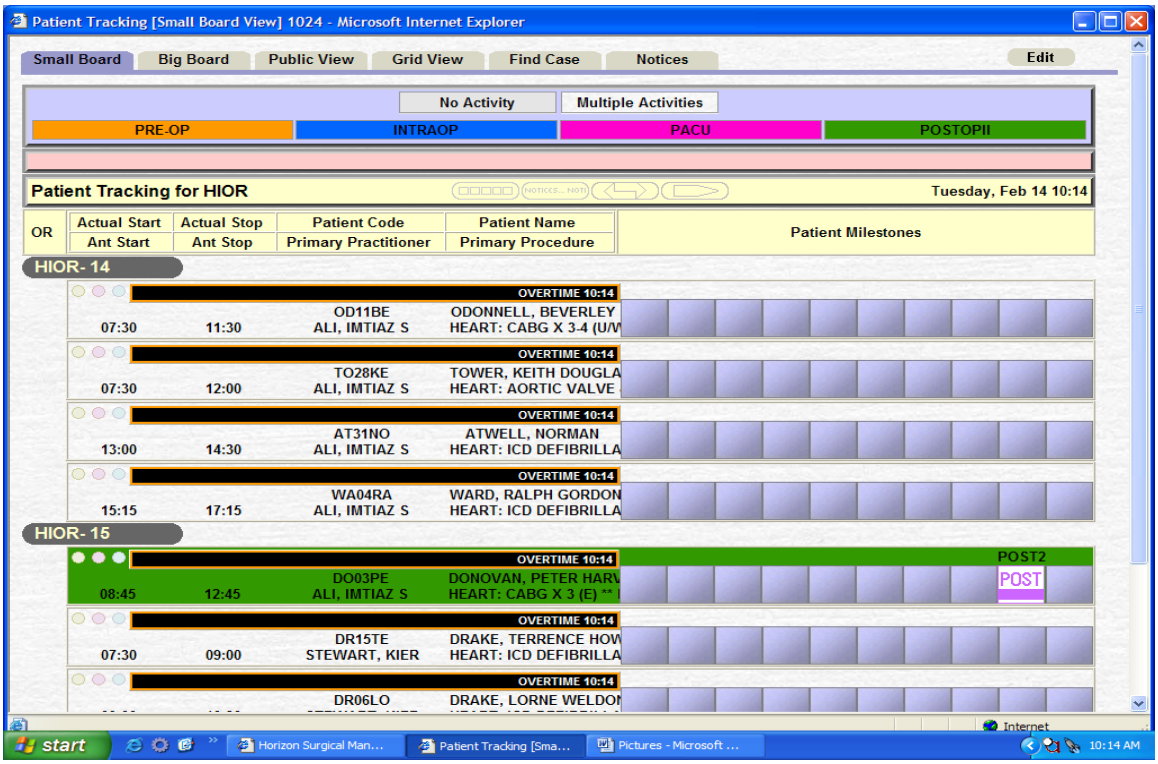

Figure 15: Green Color indicating “Postoperative phase II” location milestone.
“Postop2” – patient in post recovery- symbol milestone.

9. Conclusion

Information systems have the capability to improve perioperative performance, change patient flow process, and thus enhance patient care. [14] Its success greatly depends on the design, implementation and on achieving staff acceptance. [19]
The Patient tracking boards are more useful for the high-volume ORs (Victoria General-VG10, VG11A, Halifax Infirmary-HI and Dartmouth General Hospital-DGH resource units) where surgical times are unpredictable and where there is an increased need to streamline turnover times between cases. [18] It will indeed save case times, improve efficiency of the surgical processes, improve utilized times, shorten surgical wait times and improve patient care – common goals for all healthcare organizations. [5]

10. Recommendations

Real Time Documentation

- Charting in real-time and at the point of care is essential for the proper functioning of the Patient Tracking Board. Users are required to perform timely, accurate documentation in order for other peri-operative staff to rely on the information from the patient tracking board. This allows all clinicians to make timely decisions to streamline patient flow. [20]

Indicators

- Standard milestones should be used for all the Resource Units as it would avoid confusion for staff who work at different sites.
- Case turnovers are critical components to improve OR efficiency. New data fields need to be added to the existing clinical information screens to capture the OR cleanup time, OR setup time, Case delays, Add-on cases, Emergency cases and Cases that are cancelled. [8]

Patient Privacy

The clinical tracking boards should be placed in areas where the patient's personal health information is secured and where the public does not have access. [17] In order to maintain patient confidentiality only patient code should be used in the public view.

Design of OR rooms

The documentation station in each OR unit needs to be easily accessible and the system well designed, to enable staff to chart efficiently. Otherwise, a 5 minute delay/case would result in fewer cases being done and/or more waste of financial resources. [14]

System Interface

It is indeed essential that other information systems (labs, x-rays, anesthesia systems) in the organization must interface with HSM to ensure that the flow of information is maintained throughout the perioperative experience to facilitate efficiency and effectiveness. [9]

Staff buy-in

Staff buy-in is essential for the successful development, implementation and adoption of information systems in a highly specialized setting like the perioperative area. [17] In order for the staff to embrace this new system, it should be time saving, easy to use with minimal training and follow the workflow process. Incorporating staff ideas into the display of the Tracking Boards will enhance buy-in of the new system.

Testing

Testing of the tracking board should be done with the multidisciplinary team that includes the perioperative manager, clinical charge nurse, supervisors, super users and representatives from the information systems. This will enhance their understanding of the functional capability of system, system limitations, communicate pertinent milestone information that need to be displayed on the Tracking Boards and improve the patient tracking process. [21]

Training

Many staff members have different computer skills. There needs be a few super users who in turn would train other staff members. Training of all healthcare providers (especially patient attendants and other technical staff) is essential to track the location of the patients and help them determine when and where their services are required. [21]

Implementation

Once the perioperative documentation is implemented, all the charts need to be audited to ensure that charting is accurately completed and all the mandatory fields are timely documented. [21] Once its determined that charting is documented correctly the patient tracking board should be implemented phase by phase, starting with a small focused group, and then spread the implementation of the system throughout the department. The application requires periodic auditing. [22]The implementation of the tracking board will ultimately make the workflow more efficient and easier for providers, while at the same time improving the quality and safety of patient care.

Maintenance:

A data base coordinator is required to maintain the Patient Tracking System at the various sites. There will be occasional system ‘lock ups’ that would hinder the documentation process and the proper functioning of the Tracking Board so the presence of clinical/technical support staff 24/7 is essential. [23]

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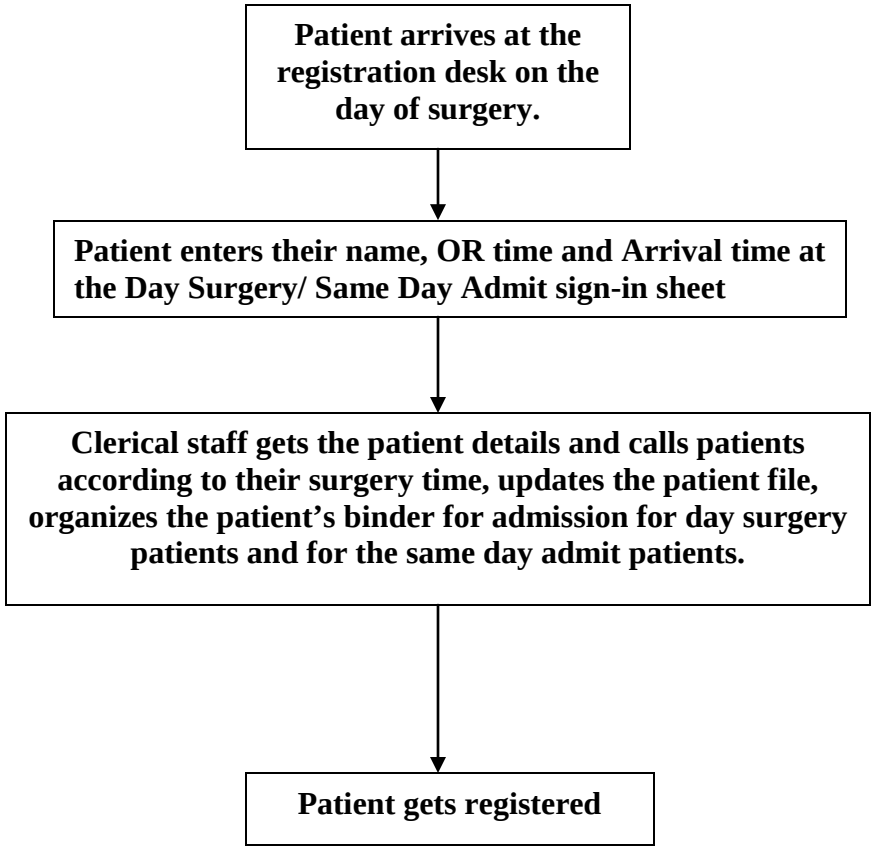
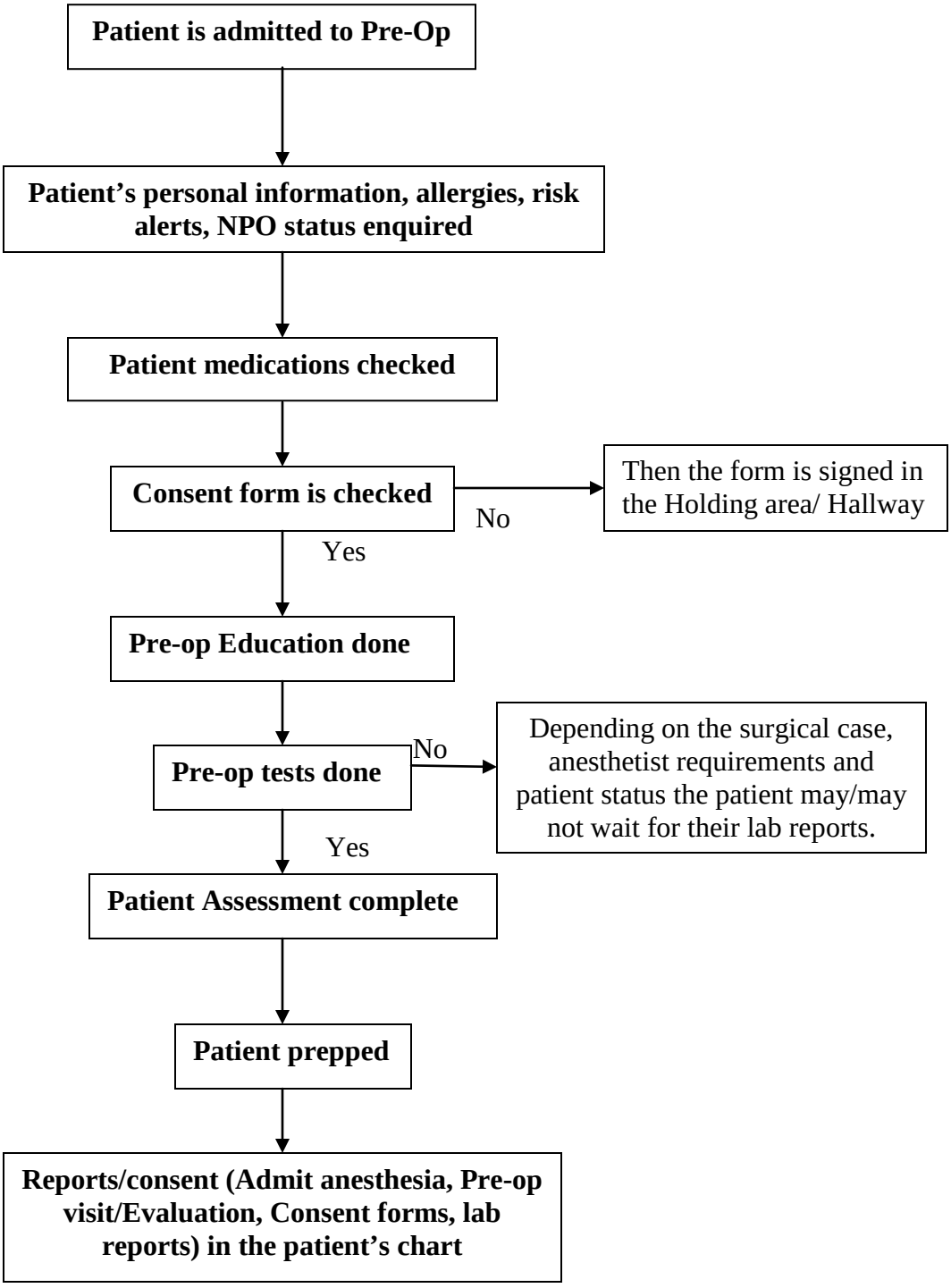
APPENDIX: A *Peri-Operative Flow Chart* [24]

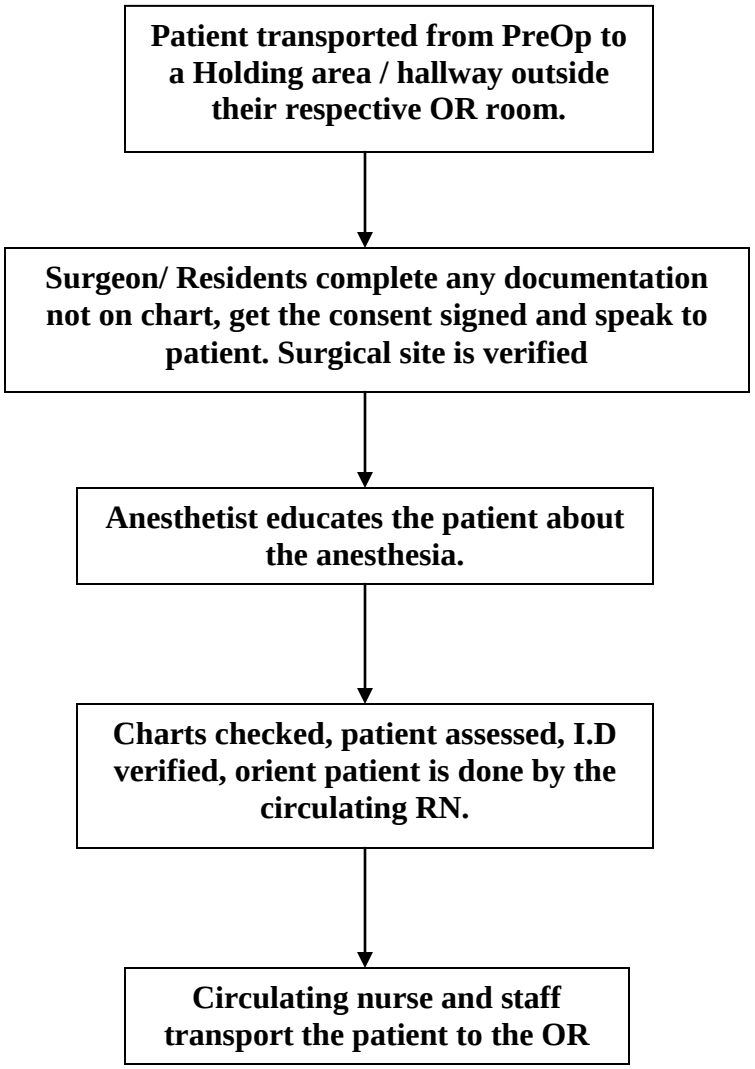
REGISTRATION



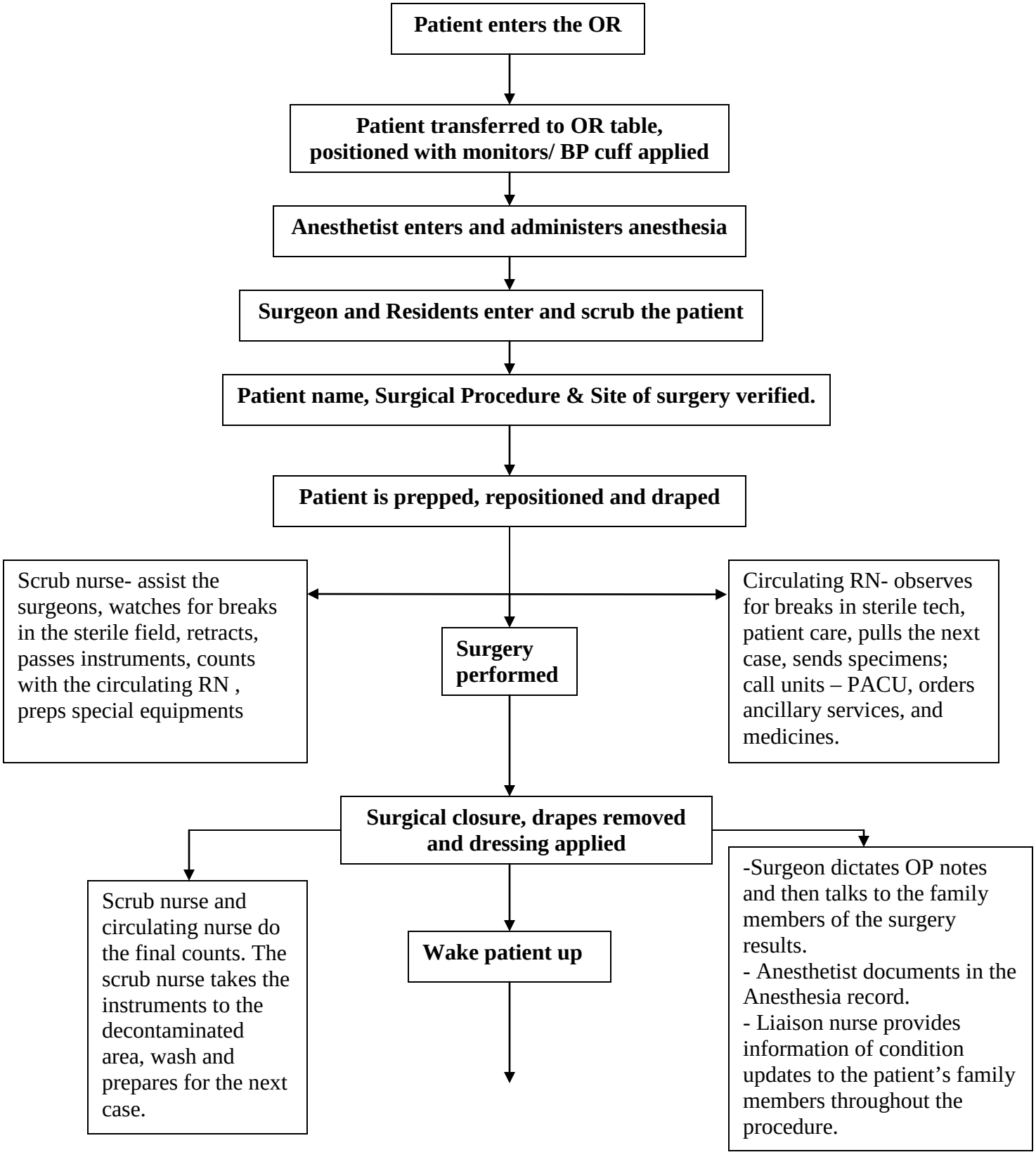
PRE-OP

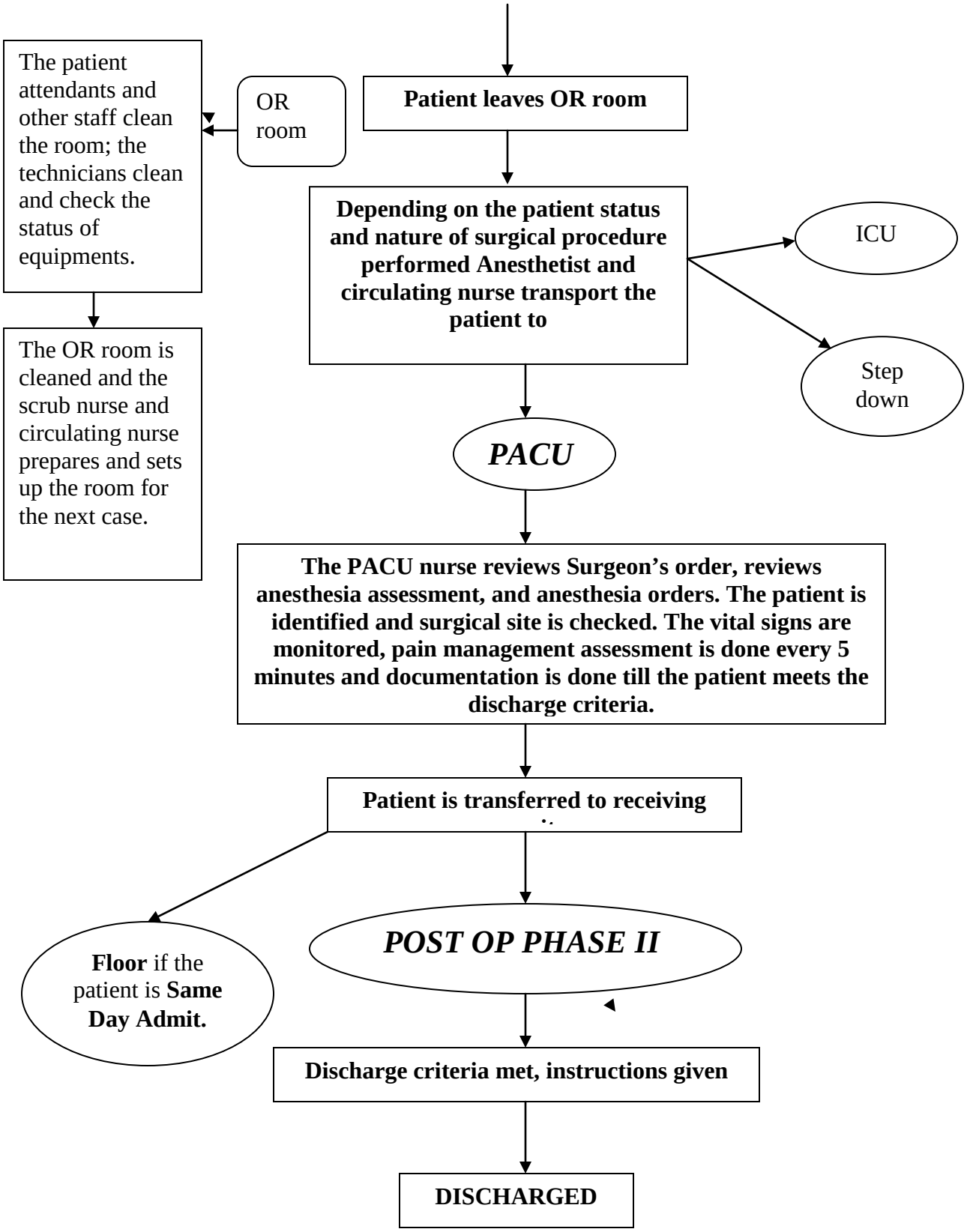

Patient is admitted to Pre-Op
Patient's personal information, allergies, risk alerts, NPO status enquired
Patient medications checked
Consent form is checked
No
Then the form is signed in the Holding area/ Hallway
Yes
Pre-op Education done
Pre-op tests done
No
Depending on the surgical case, anesthetist requirements and patient status the patient may/may not wait for their lab reports.
Yes
Patient Assessment complete
Patient prepped
Reports/consent (Admit anesthesia, Pre-op visit/Evaluation, Consent forms, lab reports) in the patient's chart

PATIENT ON HOLD



INTRA OP


Patient enters the OR
Patient transferred to OR table, positioned with monitors/ BP cuff applied
Anesthetist enters and administers anesthesia
Surgeon and Residents enter and scrub the patient
Patient name, Surgical Procedure & Site of surgery verified.
Patient is prepped, repositioned and draped
Scrub nurse- assist the surgeons, watches for breaks in the sterile field, retracts, passes instruments, counts with the circulating RN , preps special equipments
Surgery performed
Circulating RN- observes for breaks in sterile tech, patient care, pulls the next case, sends specimens; call units – PACU, orders ancillary services, and medicines.
Surgical closure, drapes removed and dressing applied
Scrub nurse and circulating nurse do the final counts. The scrub nurse takes the instruments to the decontaminated area, wash and prepares for the next case.
Wake patient up
-Surgeon dictates OP notes and then talks to the family members of the surgery results.
- Anesthetist documents in the Anesthesia record.
- Liaison nurse provides information of condition updates to the patient's family members throughout the procedure.


The patient attendants and other staff clean the room; the technicians clean and check the status of equipments.
OR room
Patient leaves OR room
Depending on the patient status and nature of surgical procedure performed Anesthetist and circulating nurse transport the patient to
ICU
Step down
The OR room is cleaned and the scrub nurse and circulating nurse prepares and sets up the room for the next case.
PACU
The PACU nurse reviews Surgeon's order, reviews anesthesia assessment, and anesthesia orders. The patient is identified and surgical site is checked. The vital signs are monitored, pain management assessment is done every 5 minutes and documentation is done till the patient meets the discharge criteria.
Patient is transferred to receiving
Floor if the patient is Same Day Admit.
POST OP PHASE II
Discharge criteria met, instructions given
DISCHARGED