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Intelligent Hospital™ OR Script 2015

Revised: Updated Feb 19, 2015 PHF

Name: Robert Grant
Age: 62 years
Condition: Mid-ternal chest pain radiating to his left jaw
Aortic Stenosis
Type II Diabetes, Hypertension, Hypercholesterolemia, Obesity

Introduction:
Welcome to the Intelligent Hospital Pavilion Advanced Perioperative Suite developed by the Intelligent Health Association. This advanced perioperative environment is supported through our partnerships with industry leaders in perioperative and healthcare solutions. Through our collaborative efforts, we share with you today a modern vision of an integrated OR environment that offers seamless connectivity and communications. Both quality of care and patient safety are enhanced utilizing advanced clinical applications and cutting edge medical devices, enabling unparalleled information access and real-time clinical staff awareness. The clinical scenario that follows is integrated with other Intelligent Hospital Pavilion departments, as you will find throughout your tour of our facility.

Patient Demographics (These will be updated as we develop the script *)
Robert Allen is a 62 year old male admitted through the ED who has undergone an emergency cardiac catheterization and was discovered to have aortic stenosis requiring valve replacement as well as a coronary bypass. Mr Allen a previous patient of the Intelligent Hospital has a documented history of type II Diabetes, hypertension, hypercholesterolemia and obesity.

Staff Identification:
As you can see, I was automatically identified as I entered the room through my real-time location system or RTLS, tag. (TBD (Actor 1 motions to the large screen when their picture appears) The OR unit combines a robust network and wireless infrastructure coupled with real time operational intelligence from multiple RTLS / RFID systems with integrations including several modalities of communication and visualization that provide rapid enterprise level interaction as observed on the large screen (TBD), or a handheld device (iPAD). (Actors point to large screen, hold up Tablet)
OR Platform Infrastructure:
Stryker
Within this advanced OR suite, we find the foundation of a modern OR infrastructure. This hybrid surgical environment has state-of-the-art Ultra-slide surgical tables and high intensity, advanced optic, LED surgical lighting systems *(Touch table and aim surgical lights onto surgical field)*. The integrated precision HD camera system offers a brilliant view of the surgical field via the boom mounted video routing and control platform *(Walk over to Skyvision system and route camera to display 4)*. By utilizing the intuitive touch interface, our Intelligent OR medical staff is able to display, share, and archive digital media and many other clinical information sources effortlessly. *(Touch the equipment boom)* The OR is capable of routing surgical video feeds and any visual display sources to other areas of the hospital for central planning and monitoring. The OR platform integrates with a C-Arm X-ray imaging system enabling dynamic imaging to be performed within the surgical field minimizing surgery time. These images are routed to the hospital PACS system and available anywhere in the institution for consultation.
Additionally this hybrid OR is designed to support multiple surgical modalities and incorporates minimally invasive surgical platform including an endoscopic devices, video camera, lights, insufflators, and scopes all mounted on one of the booms to support advanced laparoscopy equipment and procedures.

Temperature and Humidity Monitoring
The Intelligent Hospital OR suite is equipped with solutions for centralized temperature and humidity monitoring coupled with the RFID systems providing event driven alerts to aid in the management of regulation compliance and required reporting for the Joint Commission. *(Tech points out temperature and humidity modules)* These real-time environmental conditions within the OR suites are fed to the OR control area for automated limit monitoring which sends alarms or text messages to the communication badges of designated parties if room temp and/or humidity nears ‘breach’ levels, *(Actor holds up badge)* helping prevent patient care issues before they occur.

Integrated Management System
Extreme Networks
A versatile array of modular switches supporting everything from an enterprise/campus connectivity right up to cloud data centers. The system provides Terabit-class performance, high availability and redundancy, our simple, scalable and intelligent switching and routing products as required by the hospital. A integrated management system that provides wired/wireless visibility and control from the IT data center enabling the IT organization to optimize the efficiency of network operations.
Environmental Metrics
In addition the overall OR environment is continuously monitored for key environmental metrics, such as airborne particulates, differential room pressure, air quality, light and sound. Data is available for infection control and facilities staff to review via a browser based interface, and available anywhere in the hospital using a laptop, or tablet, and smartphone application. Alerts are generated anytime a potentially hazardous condition is detected, allowing for immediate remediation ensuring minimal impact on the surgical procedure and patient safety. (Actor points to the sensors, smartphone, and summary display)

Nurse Call
Ascom
In our clinical scenario using the workflow station, a notification has just been routed via the OR nurse call system, (Actor points to the Nursecall system) to the OR from the preop area (Presses ready for patient button and starts the timer) indicating that Mr. Allen is ready to transferred to the OR.

Wireless Communications
Ascom/Vocera
Alternatively, the Intelligent Hospital additionally deploys multiple wireless communications delivery modalities ranging from simple legacy pagers to an advanced communications badge. (Actor holds up the Vocera communications badge, or presses button while hanging from chest and pretends to talk, showing the hands free communication) The advanced pendant enables hands free staff to staff communications to any care provider enabling requests for assistance, messaging of status, requests for supplies, etc.

OR Information System
Upon notification of Mr. Allen’s readiness for surgery, the operating room staff uses the OR Information system TBD[HML1] as well as the electronic medical record (TBD[HML2]) routed to the screens within the OR to view and confirm perioperative data, other patient information such Cath Lab images (TBD). (Note: Allscripts and Cathlab Image on the Stryker boomed monitors)

Surgical Tray
Cardinal Health
In preparation, the surgical technician immediately proceeds to the central sterile instrument storage area and pulls an open heart surgical tray in anticipation of surgery. (Actor picks up tray in...
back of the OR brings to the surgical field and points out the RFID tags) The tray, prepared in central processing, is equipped with active RFID tags and surgical instruments integrated with passive RFID tags enabling institutional tracking and confirmation of the tray availability within the OR.

**RFID Personnel Tracking**

You will notice that our OR staff are also wearing RFID tags (*Point to and/or hold up your personnel RFID tag*). The Intelligent Hospital RFID asset and personnel tracking system enables improved surgical environment awareness as to staff location and status, critical to ensuring effective care delivery in a timely manner. *TBD*

**Wireless Messaging**

**Vocera**

Should any of the required personnel for the surgery not be present upon patient arrival, they are immediately notified via a range of communication options including digital paging, VoIP, or wireless messaging. All workflow data is automatically captured and metrics can be processed for later review and analysis to effectively achieve process improvement goals.

**Central Line Kit**

**Cardinal Health**

Now that the patient has arrived in the OR the surgery is ready to get underway. The anesthesiologist notes that the patient needs central venous access and has the nurse obtain the appropriate supplies including an IV pump and central line supplies. *<Sunquest for patient ID?>*

**RFID Tagged Equipment**

**Intelligent Insites**: RFID tagged equipment such as IV pumps are managed utilizing the hospitals RTLS system. (*Actor walks out of OR to get IV pump, Actor 1 will already be standing next to the Intelligent Insites dashboard*)

We can see that the IV pump has been identified as present in the OR on our equipment RTLS platform interface. (*Actor points to the Intelligent Insites Dashboard*) The ability to track items throughout the facility results in dramatic improvements in equipment utilization for our hospital. The OR staff is able to quickly prepare and deploy the vast number of items needed for surgery thanks to our implementation of a robust inventory and materials management RFID solution
Infusion Pump:

Hospira

The Intelligent Hospital has deployed an advanced infusion system operating wirelessly and with interoperability to the EMR system. This Infusion pump has onboard safety software providing a defense for the patient to guard against an incorrect dose or typo during infusion setup. Without these, a checks a missed decimal point or double key entry could change the intended order parameters with potential adverse, even deadly, results. The idea for this safety software is to set limits on medications so the caregiver will be notified or even stopped from entering an infusion parameter that was not reasonable for the drug, therapy, and patient weight.

These advanced infusion pumps are integrated with the EHR, which creates an integrated system connecting the infusion administration workflow to the pharmacy validated order. By adding the barcode scanning of the infusion pump, you create an association between the patient, the pump and the EHR. With this integrated system, the ordered infusion settings automatically populate on the pump screen, eliminating manual programming steps and decreasing opportunities for error. Running infusion status sent to the EHR allows for more timely, accurate and complete clinical documentation in addition to enabling infusion surveillance for nursing and pharmacy.

Drug Dispensing Cabinet

Omnicell

As anesthesia prepares the patient for surgery the perioperative antibiotics are administered. These are taken from the drug dispensing cabinet and using the embedded bar code reader the clinician scans the product GTIN (global trade item number). On administration the patient is also scanned establishing the association of the drug to the patient. This validation scanning is support by the OR information system and electronic medical record and confirms that the correct drug is dispensed and administered, providing clinical decision support with drug-drug, drug-allergy, and five rights checking.

Anesthesia Delivery System

(Walk over to the anesthesia machine and touch) The anesthesia team is supported by an advanced anesthesia delivery system, integrating the latest in physiologic and vital signs monitoring. This advanced system is interfaced with anesthesia specific analytics software to continuously analyze anesthesia related perioperative data. The Anesthesia Information Management System (AIMS) delivers the perioperative information anesthesia providers need – including data points from the physiological monitors facilitated by monitor data aggregation systems to avoid redundant
documentation. With unique workflow wizards and an easy-to-use touch screen application, the system facilitates pre-op and intra-op documentation to ensure provider focus remains on the patient. Utilizing the powerful interconnectivity features offered in this modern anesthesiology platform, we are able transmit data into the EHR achieving real time surgical care documentation and provide a summary of all on-going procedures within the Intelligent hospital OR suites as seen on the wall of knowledge.

**OR Pharmacy Control**

**Omnicell**
The OR also includes an anesthesia workstation providing instant access to medications ensuring tight yet convenient pharmacy control in the OR. This automated system securely stores all medications and supplies needed for a full day of cases while automatically tracking inventory. The system uses a color coded medication label printer to reduce medication errors and improve compliance with Joint Commission.

After the patient is anesthetized and the airway secured, the patient is prepped and draped for the surgery.

**Medical Device Connectivity & Integration:**

**Nuvon**
*(Note: Demonstration of physiologic value notifications displayed on iPad when thresholds are exceeded using measurements obtained from patient in OR.)*

All devices within the OR are integrated through the hospital’s medical device integration and connectivity solution, providing remote access to the vital signs of intra-operative patients. This serves to assist anesthesia when multiple cases are ongoing by providing notifications as to trends and changes in vital signs measurements that merit closer attention.

Increasingly used for surgical procedures pulse oximetry and capnography can help clinicians detect impending over-sedation, hypoventilation, and respiratory depression, thereby increasing patient safety and improve patient outcome.

*An intelligent OR View consolidates and summarizes specific patient data from electronic surgery documentation and a variety of disciplines – including anesthesia and procedural information such as medical surgical history, demographics, allergies, laboratory results, surgical status, and a time line of the procedure. *(Actor, point out different tabs on the OR view)* In addition, the intelligent OR View summarizes real time data, such as current OR staff, a time-out checklist for patient safety, and
physiological monitoring parameters. The information is routed to monitors throughout the surgical department, providing remote caregivers a clear view of patient and surgery status. Optimization of surgical scheduling, pre admission testing, nursing documentation, and charge capture enhances workflows and accuracy. This system also provides patient and surgical case tracking, providing visibility into specific case details and overall status of multiple OR procedures in progress – all accessible to the (OR control officer) in the War Room. Integration of the ORIS with the EHR will allow intraoperative information for flow from the perioperative area in the EHR. *(Not planned at the moment)*

Remote Collaboration Platform
Intouch Health

*(Walk over to the Intouch robot and touch)* The remote presence surgical collaboration platform enables unprecedented reach and expert consults between surgeons and specialists at distant locations. By merging of unique visualization and telecommunications technologies, barriers of time and distance are eliminated.

The pathologist is able to peer into the surgical field and visualize a pericardial mass identified intraoperatively. Pathology recommends biopsy of the mass.

Specimen evaluation requires a sample to be provided to the laboratory for STAT pathologic review. Using the pathology’s specimen collection system container ids are ready for specimen labeling without requiring staff to place orders. *(Actor moves towards the system to use the scanner)* Using a bar code based scanner, the patient’s wristband is confirmed and the patient’s labels are printed directly in the OR. *(Actor uses scanner to scan wrist band and print labels. Actor then pretends to stick label on the sample vials)*

This ensures that all the required drawn samples are verified, associated with the correct patient minimizing the chance of mislabeling errors; such as unidentified or missing specimens containers.

Pneumatic Tube System
Swisslog

This entire transaction was tracked within the pneumatic tube station’s software, providing complete chain of custody, which monitors all sends, receives delays or missing carriers. *(Actor moves to send the labeled specimens to the tube delivery system)*

{The nurse inserts the specimen into the pneumatic tube system carrier. The carrier is then inserted into the tube station [actor presses send]. The tube station reads the RFID chip imbedded in the carrier and tracks the specimen throughout the transport. The specimen, which is uniquely
identifiable to the patient and tracked from OR to Pathology, arrives at pathology. The clinician is alerted via mobile device that a specimen has arrived. She approaches the pneumatic tube station and swipes her hospital badge to release the carrier. The clinician removes the carrier from the station and opens it to access the specimen.

Pathology results are delivered on the OR view, enabling the surgeon and pathologist to discuss and review the slides and determine the next steps in treatment. (Zebra – Motorola, Sunquest)

Family Notification
Ascom
Earlier in the scenario, a timer was set on the work flow station that the procedure was started on to remind staff when to give the family an update. [Timer elapses and rings device, which actor should silence]. As per the protocol of the Intelligent Hospital, the nurse updates the family. This notification ensures compliance with family communication initiatives and results in improved satisfaction. The staff member can then send the status update to the family member through an RTLS Badge Tag assigned to the Patient’s Family. [At this point the actor will press a button on a tag they are carrying and points to the Family member receiving the message-verbiage]. Since this is a portable device, the family member can receive the status update while they move throughout the facility (TBD). This information can also be sent to the large screen in the waiting room, which automatically updates with the patient information to allow the family to see the progress. (TBD)

Usage Capture Station
Cardinal Health
During the valve replacement portion of the procedure, the nurse walks over and starts a case on the usage capture station (WaveMark XPOS). (Actor walks over to the Wavemark XPOS and starts new case). The ADT feed automatically populates the procedure and patient information.

The smart cabinet solution delivers the benefit of shared visibility, efficient inventory distribution, enhanced implant tracking, and improved regulatory compliance. Utilizing RFID tagged inventory and cabinets with embedded RFID readers, simply removing items from the cabinet enables advanced inventory management and supply control.

(The nurse walks over to the RFID coupled cabinet) Using the RIFD coupled cabinet, an artificial heart valve is retrieved from the SmartShelf and quickly waved past the usage capture station (XPOS). This system aids in tracking expired products and will immediately identify an expired
product in order to ensure it is not used. The staff is notified of the expired product status through the touch screen interface.

All products used during the procedure are “waved” using RFID or scanned using barcode for complete usage capture, and the information is sent via interfaces to hospital core clinical documentation systems, materials management, and charge capture systems – making all data available for subsequent analysis and optimization.

**Housekeeping Update**

**Ascom**

As the patient is transferred from the OR, housekeeping is made aware of a status update of the OR suite. The OR RTLS platform is able to automatically notify the housekeeping staff that a OR cleaning and is needed. <ASCOM Via Nurse call workflow station or v>

**Surgical Instrument Management**

**Cardinal Health**

Embedded RFID technology revolutionizes surgical instrument management by enabling sterile processing workflow optimization required for an efficient OR procedures. This Sterile Processing reception module ensures that all surgical instruments utilized in the OR have been returned to the Sterile Processing Department and provides alerting capabilities for any missing instruments. *(Tech pointing to the packing station displaying screen with set content partially packed)* The SPD packing station ensures 100% accuracy of surgical sets delivered to the OR staff and eliminates case delays due to missing or wrong item delivery. Note how the system intuitively guides the Sterile Processing tech on instruments yet to be packed as seen on the right hand column.

**Track Low Value Assets**

**DeRoyal**

During the course of the procedure general supplies are routinely required. RFID / Barcode coupled Kiosks are strategically mounted within the OR or available on movable stands. Required supplies are scanned and associated to the patient eliminating the manual recording process which links or documents supply utilization directly into electronic medical record, ERP & Financial systems. This information is available in real-time and documented into the case file as the procedure case is closed.

Once the case is closed the patient goes to recovery and is then admitted for post surgical care and follow-up. After discharge from the hospital he returns to his instrumented home.
Conclusion
The Intelligent Hospital Perioperative Team concludes this session with thanks to all of our dedicated vendor partners for their collaboration in delivering to you this state-of-the-art vision of the enhanced perioperative care delivery environment. Please follow this patient’s recovery in the Intelligent Medical Home. Thank you all for your time and attention and please visit the other Intelligent Hospital. Pickup the OR Tour Guide and visit the kiosks in the Pavilion to learn more about these technologies.

Thank you
Use Case Overview:
Company  Use case