Training issues in using the bar code readers surfaced quickly. Ongoing training occurred during go-live and continued as needed. Nurses learned how to get a ‘good read’ through reviewing internally developed training materials. Epic Tutors and IS analysts support BMA at the elbow for each installation for the first week.

Metrics and Reporting
Epic’s BMA compliance metrics have been useful in monitoring the use of the BMA system, resulting in efficient management of nursing activities at the bedside. Managers can review reports with parameters they select and remedies can be quickly identified and addressed. If a clinician is not using BMA for administrations documented on the patient MAR, in logging bar code reading workarounds at bedside, managers can assess the need for further training through the Epic Tutors on the units or in Clinical Training Resource Center.

The detailed reports generated by the Epic system identify all medication administration warnings and documented exceptions preventing errors. The system metrics provide Administration proof their BMA system is improving patient safety and quality. Avoiding patient medication administration errors is efficiency at its best.

BMA System Benefits
Profound benefits from implementing BMA system have been experienced at Legacy Health in the following areas:

- Reduction of medication administration errors.
- Increased patient safety and accurate reporting.
- Improved communication between departments.
- Improved process integration and information sharing.
- Reduction in overall cost of care.

- Valuable management-level decision-making tools.
- Patient medication record information availability.
- Increased efficiency at bedside.
- More caregiver-patient interaction at bedside.
- Bedside access to:
  - Procedures and protocols
  - Clinical journals and online knowledge bases
  - Order and medications profiles
  - Laboratory and imaging records
  - More caregiver-patient interaction at bedside.
  - Bar code readers used for bedside nursing are configurable and programmable for multiple uses such as pharmacy drug validation and NICU breast milk source-patient matching.

In Conclusion
Legacy Health attributes its BMA implementation success to top-level management support and dedicated project champions. Operational administrations at each hospital trained, practiced and promoted BMA and nursing sees it is well worth it. In fact, BMA is just one step. Improved patient safety is a driving force for progressive change and adoption of state-of-the-art technology. With a continued focus on integrating technology, Legacy Health will continue to be an outstanding provider of superior patient care.

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Improved patient safety is a driving force for progressive change and adoption of state-of-the-art technology.

Legacy Health System, a fully accredited six hospital health system in the Portland, Oregon area, has consistently been named to the “100 Most Wired” list by Hospitals & Health Networks magazine.

With more than 2,500 physicians, 1000 licensed beds and 9,000 employees, the Legacy Health System provides the perfect environment for establishing benchmarks and incorporating innovative technology into patient care scenarios.

With a focus on patient safety, physician acceptance and reducing medical errors, Hospital Administration identified Epic as their successor Electronic Health Record. A significant feature of any medication quality enhancement is a Bedside Medication Administration (BMA) and reporting system. A dedicated team was formed including representation from stakeholder departments: Information Services, Nursing and Pharmacy.

Two years after defining the scope of the BMA project all of the six Legacy Health System hospitals have implemented a BMA process and several additional projects have been defined and implemented to ensure patient safety and drug dispensing in Pharmacy, bedside Medication and

Vaccination Administration, logging of implants and blood products, Laboratory, and NICU Breast Milk tracking. The following is their BMA success story.

Choosing the Right BMA Solution
While the overall objective was clear, the project team worked through countless decisions to define Legacy’s BMA solution. The Information Services department was dedicated to the success of this project, giving it high priority, and led the team in defining the solution, ensuring that all participants and departments requirements were considered. The following decisions were significant:

- Configurable to work within the Epic EHR.
- A combination of both in-room workstations and workstation on wheels would be needed.
- A combination of both wired and wireless bar code readers would be utilized.
- BMA would be implemented in ED and inpatient services only.
- Nursing unit bar code readers are wireless and do not move between patients.
- Nurses responsible for bedside medications must be well trained and accept the new readers.
- Readers capable for 2D bar code recognition will replace existing readers limited to 1D only.

The Information Services department was dedicated to the success of this project, giving it high priority, and led the team in defining the solution, ensuring that all participants and departments requirements were considered.
If a CR2500 is being used, the Caregiver establishes
Note: With the CR2500, each scanning activity initiates
Caregiver identifies patient by scanning the 2D bar
Caregiver watches on-screen for warnings of ‘Patient
Caregiver logs into the health information system.
Caregiver scans medications at the bedside with either
Vendors were selected in part because of their willingness to modify their products to fit specific needs. Service and expertise validated vendor selection decisions made by the project team.

Legacy’s BMA Implementation Process -
Implementing BMA within Epic’s EHR:
• If a CR2500 is being used, the Caregiver establishes Bluetooth connection between bar code reader and workstation. If a tethered CR1200 is being used, a wired connection has already been established.
• Caregiver logs into the health information system.
• Caregiver identifies patient by scanning the 2D bar coded patient-identification wristband.
• Caregiver scans medications at the bedside with either manufacture or hospital generated bar code.
• Note: With the CR2500, each scanning activity initiates wireless information transfer. The bar code reader captures a bar code image, decodes the information and sends data to the bedside computer through the use of encrypted Bluetooth wireless technology. With the CR1200, the bar code reader captures the bar code image, decodes the information and sends data via a cable to the mobile device.
• The EHR is now ready for use at bedside with patient- and order-specific information viewable to the caregiver during medication administration.

Using the BMA System - Discovery -
Medication Bar Coding surveillance and labeling
The biggest discovery made during project preparation was the lack of bar codes on medications. During the Summer of 2010 more than 10 percent of medication inventory received at the hospital were not bar coded at the unit dose level. The team worked tirelessly to establish a new bar coding process for placing hospital-generated, bar code labels on unit dosed medications. One hundred percent of medications used in hospitals are scanned “at the door” into the pharmacy storerooms. Medication NDC bar codes must be validated in Epic prior to moving to the shelves. Surveillance and relabeling are key pharmacy quality initiatives.

User Training
Early in project discussions concerns were raised about how to effectively train clinical staff across the hospital system in both the Epic software system and the new bedside workflows. Information Services and permanent Epic Training staff conducted clinician training for bar code scanning at the bedside. The system’s Department of Education provided specific training for critical care units.

Attendance in training classes was required for all staff members who would use the Epic software system. Returning to the hospitals, nurses practiced in an online training environment and online proficiency testing recorded their progress. This approach helped ensure success once the system was in use.

Nurses practiced on bar codes that caused alerts and warnings for drugs not ordered for that patient. They learned to recognize normal processing from events requiring clinical judgment and documented BMA exceptions.

Timeline

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Epic Project Kick-off</td>
<td>November 2010</td>
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<tr>
<td>Bar Code Project Kick-off</td>
<td>April 2010</td>
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<tr>
<td>Bar Code Vendor Selection</td>
<td>May 2010</td>
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<tr>
<td>Bar Code Installation, Pharmacy Surveillance, Medication Validation and Relabeling</td>
<td>September 2010</td>
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<tr>
<td>Epic Training for all Users by Hospital</td>
<td>November 2010</td>
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<tr>
<td>BMA Installation 1st Hospital</td>
<td>April 2011</td>
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<td>BMA Installation 2nd Hospital</td>
<td>June 2011</td>
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<td>BMA Installation 3rd Hospital</td>
<td>August 2011</td>
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<td>BMA Installation 4th Hospital</td>
<td>October 2011</td>
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<tr>
<td>BMA Installation 5th Hospital</td>
<td>December 2011</td>
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<tr>
<td>BMA Installation 6th Hospital (New Children’s Hospital)</td>
<td>February 2012</td>
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