Bar Coding Systems: Implementing

What is Implementing Bar Coding Systems?
› Healthcare institutions are mandated to promote a culture of safety and to have policies and procedures in place that are intended to reduce adverse healthcare events and promote patient safety. Bar coding systems, which typically involve the patient wearing an identifying wrist band with a bar code that can be scanned electronically, reduce patient identification errors by providing a method for accurately identifying the patient prior to medication administration or performing any other procedure; accurate patient identification can help to reduce adverse healthcare events (e.g., medication errors) and promote patient safety
  • What: Implementing bar coding systems involves organizational changes in the healthcare facility with regard to workflow design (i.e., using scanners to identify patients rather than using traditional methods) and requires the acquisition of specialized equipment, including scanners to read bar codes, software to allow matching of wrist band bar codes with bar coded medication or other items, bar coded patient wrist bands, medications, and other items used
  • How: Implementing bar coding systems involves
    – the formation of an interdisciplinary steering committee to select a commercial bar coding system and plan the gradual phasing-in of the system
    – purchasing the necessary equipment (e.g., scanners, new computer systems, new bar coded patient wrist bands)
    – training of healthcare personnel on the use of the bar coding system
    – continued evaluation and support
  • Where: Implementing bar coding systems takes place in all patient care areas where patient identification is important (e.g., inpatient services, clinical laboratories, radiology departments)
  • Who: All healthcare personnel who are required to identify patients (e.g., nurses, pharmacists, laboratory technicians, physicians) will be involved in implementing bar coding systems and will need to develop competency

What is the Desired Outcome of Implementing Bar Coding Systems?
› The bar code system will be effectively implemented with a high rate of compliance and competency demonstrated by all healthcare personnel
› Implementing bar coding systems will result in fewer errors in patient identification

Why is Implementing Bar Coding Systems Important?
› Implementing bar coding systems is important to promote accurate patient identification, which will help to
  • prevent medication and other treatment errors (e.g., blood transfusion errors, laboratory errors)
    – Use of a bar code medication administration (BCMA) system—in which the right patient is matched with the right drug, at the right dose, using the right route, at the right time—has been shown to prevent medication errors
  • promote patient safety and a culture of safety in the healthcare organization
Facts and Figures

› Implementation of a computerized physician order entry (CPOE) system in combination with a bar code labeling system can significantly reduce ED laboratory specimen labeling errors (Hill et al., 2010)

› Implementation of a bar code tracking system to accurately identify and match patients, blood specimens, and blood components can significantly reduce blood component transfusion errors (Askeland et al., 2008)

› Implementation of a BCMA system can significantly decrease medication errors and result in an estimated cost savings of $1,100–5,400 USD per harmful medication error averted (Sakowski et al., 2013)

What You Need to Know Before Implementing Bar Coding Systems

› Bar coding systems can be utilized to
  • match the right patient with the right drug, at the right dose, using the right route, at the right time
  • match the right patient with the right blood component to be transfused
  • ensure that the right blood or other specimens are collected from the right patient
  • match the right newborn to the right mother following birth (e.g., a bar coded identification bracelet is placed on the newborn following birth, a wrist band with the identical bar code is placed on the mother, and the two are scanned each time the newborn is brought to the mother)
  • match the right newborn in a neonatal intensive care unit (NICU) with the right collection of expressed breast milk (e.g., a bar coded identification bracelet is placed on the newborn following birth, a label with the same bar code is placed on bags of the mother’s breast milk as they are brought to the NICU, and the two are scanned prior to feeding)
  • help identify patients and match the right patient with the right services when patients present for care (e.g., the patient is presented with a bar coded identification card that he or she presents to the clerk when registering for an appointment or other services)
  • supplement the manual sponge count during surgery to prevent retention of a sponge in the patient following the procedure (e.g., sponges tagged with a unique data matrix symbology tag can be scanned as they are added to and removed from the sterile field to verify they are all accounted for at the end of the procedure)
  • implement an instrument (i.e., surgical instruments, supplies, devices, equipment) management strategy to permit integrated web-based instrument ordering, facility-wide instrument management/tracking, and standardizing instrument-naming conventions (Goh et al., 2016)

› Prior to implementing a bar coding system, the following are required:
  • Organizational support at all levels of the organization
  • The formation of an interdisciplinary steering committee to guide and plan the implementation process
    – Members should include representatives from hospital administration, nursing services, pharmacy services, and clinical laboratory services (if the bar coding systems is to include laboratory specimen labeling)
    – The steering committee will
      - determine the goals for implementing a bar coding system
      - assess for readiness of implementing the bar coding system; issues to be addressed include the presence of organizational support, adequate funding, and an existing wireless network that is adequate to manage bar coding technology
      - determine the specific needs and desires regarding a bar coding system; issues to be addressed include the type of scanners to be used and the location of equipment on each unit (e.g., a permanent work station in each patient room, portable computers on wheels [COWs])
      - Consulting with other healthcare facilities that utilize a bar coding system can be useful in determining needs or desires
      - determine a time frame for the implementation process
      - It can take up to 3 months for the bar coding system to arrive after it is ordered
      - It is important to set and meet deadlines because otherwise the process can become stalled
      - The bar coding system should be piloted on a single hospital unit starting on day shift during the week when more support personnel will be available, and gradually phased in on other units
      - select a vendor
        - Vendors supplying bar coding systems can make modifications to their systems to meet the particular needs of the healthcare facility or a targeted patient population
        - plan training on the new system
          - Super users (i.e., personnel who are passionate about and eager to adopt a bar coding system) should be trained first by the vendor, and the super users should train other healthcare personnel on the use of the system
- Training should be thorough and geared to the level of comfort of the trainee’s previous experience with computers and computer systems; training should include
  - a didactic component, in which the use of the system and the benefits of the system with regard to improving patient safety are emphasized
  - an opportunity to use a mock-up of the bar coding system (e.g., simulate administering a medication using the system)
  - additional time for personnel who do not demonstrate competency
  - ongoing training as changes and enhancements are made to the system
  - reference charts placed on the unit for easy reference
  - provide ongoing evaluation and refinement of the bar coding system during and following implementation
  - provide ongoing support and education to staff during and following the implementation process
  - Support of nursing, pharmacy, and other services, as indicated
  - Meetings should be held to elicit concerns regarding the use of a bar coding system and to seek staff buy-in; refreshments or other incentives should be provided to encourage healthcare personnel to attend
  - Healthcare personnel should be invited to evaluate possible vendors and equipment
  - Having nurses simulate use of the equipment on the unit (e.g., handling scanners, rolling the COW into and around patient rooms) can provide valuable information on the feasibility of various systems or system designs

% Barriers to implementing a bar coding system include the following:
  - Resistance to change
    - Implementing a bar coding system requires change and acceptance of change at all levels of the organization, and change can be difficult
    - Nurses who are resistant to adopting the bar coding system or who lack competence using the system might use workarounds (i.e., methods for providing care while avoiding use of the bar coding system),
    - Workarounds include, but are not limited to, printing additional wrist bands, affixing patients’ identification bar codes to computer carts, carrying several patients’ pre-scanned medications on carts, or using patient labels that they keep with the patient’s medical record to scan rather than scanning the wrist band the patient is wearing
    - Nurses who are resistant to using a new bar coding system often become advocates for use of the system following a “near miss” episode in which a medication error was averted by alerts offered by the system
  - Poor communication
    - Healthcare personnel who are not allowed to have input into the selection and/or evaluation of the new system and those who are not informed regarding the planned changes in healthcare delivery are less likely to be supportive of a new bar coding system
  - Cost
    - It is estimated that the cost of implementing a bar coding system can average $40,000 USD per BCMA-enabled bed (Sakowski et al., 2013)
  - Technical difficulties or requirements
    - The pharmacy computer systems may need to be upgraded to be compatible with a new bar coding system; in addition, a medical relabeling system may need to be purchased to label medications lacking a bar coded label or medications prepared by the pharmacist (e.g., insulin drips)
    - Mislabeled bar codes on medications, wrist bands that are difficult to scan, or confusing computer screen displays can result in technology-related adverse healthcare events
    - As the system is implemented, unanticipated technological issues may arise that will need to be solved with the assistance of the vendor
  - Inadequate training
    - Inadequate training increase the risk of using the system improperly and/or relying on workarounds

% Equipment that will need to be purchased when implementing a bar coding system will likely include the following:
  - Bar coded patient wrist bands (adult size, infant/neonate size)
  - Hand-held or other scanning devices
  - Hardware and software to read and manage the bar coding system
  - A wireless computer network system that is sufficient to manage bar coding systems
  - Bar-coded labels to be attached to medications, laboratory specimen containers, or other supplies
How to Implement Bar Coding Systems

› Appoint or otherwise seek representatives from hospital administration, nursing services, pharmacy services, and other services, as indicated, to form an interdisciplinary steering committee, which will
  • determine the goals for implementing a bar coding system
  • assess the organization for readiness to adopt a bar coding system, including the presence of organizational support, adequate funding, and an existing wireless network adequate to manage bar coding technology
  • determine the specific needs and desires regarding a bar coding system, including the type of scanners to be used and the location of equipment on each unit
  • determine a time frame for the implementation process
    – Communicate with facility staff regarding the implementation of a bar coding system (e.g., through staff meetings, facility newsletters, and posters placed in highly visible areas)
  • research potential vendors and the bar coding systems they provide
  • request proposals from selected vendors
    – Perform a cost analysis to determine which vendors may best provide a cost-effective system meeting the facility’s needs
    – Seek vendor reviews from other healthcare facilities that utilize a bar coding system
  • invite selected vendors to the facility to provide a demonstration of their systems
    – Invite staff members to observe the demonstrations and provide feedback
  • review vendor proposals, demonstrations, and staff feedback
  • select a vendor and order the bar coding system
    – Collaborate with the vendor to make modifications to meet the particular needs of the facility or targeted patient population
  • have the vendor train super users, who then provide training to other healthcare personnel on the use of the system
    – Be sure that the training contains both a didactic component and the opportunity to simulate use of the system
  • pilot the bar coding system on one unit starting on a weekday day shift
    – Place simple reference sheets strategically throughout the unit
    – Solicit nursing and other feedback regarding use of the bar coding system
  • gradually phase in implementation of the bar coding system on other units
  • hold ongoing regular meetings to evaluate and troubleshoot the bar coding system, seeking help and modifications from the vendor as needed
  • provide ongoing education and support to healthcare personnel during and following implementation
    – Assess for and prevent workarounds (e.g., prevent printing of additional patient wrist bands, place a nonsense character in patient labels that prevents use with the medication scanner)
    – Issue written warnings or other disciplinary action for nurses who continue to attempt workarounds

Other Procedures that Can Be Necessary Before or After Implementing Bar Coding Systems

› Ongoing evaluation and feedback will be needed to be sure that the system is operating optimally
› Adjustments to the bar code system will need to occur as the system is used and problems or concerns arise
› Ongoing education of healthcare personnel will be needed as changes are made to the bar code system

What to Expect After Implementing Bar Coding Systems

› The bar code system will be effectively implemented with a high rate of compliance and competency demonstrated by all healthcare personnel
› Patient misidentification and medication and other adverse healthcare events will be reduced

Red Flags

› Bar coding systems can be “worked around” or bypassed by healthcare personnel, which can increase the risk for patient misidentification and adverse healthcare events
› Mislabeled bar codes on medications, wrist bands that are difficult to scan, and confusing computer screen displays can result in technology-related adverse healthcare events
What Do I Need to Tell the Patient/Patient’s Family?

- The patient and family should be reassured that the use of bar coding will increase patient safety and that there is no information gathered about the patient during the use of the bar coding system other than to match the patient with the correct medication or other treatment
- The patient’s bar coded wrist band must be scanned prior to any medication administration, including hanging a new bag of I.V. fluid, even if the patient is sleeping

References