



AHRQ's Health IT Portfolio. AHRQ's health information technology (health IT) initiative is part of the Nation's strategy to put information technology to work in health care. By developing secure and private electronic health records for most Americans, and making health information available electronically when and where it is needed, health IT can improve the quality of care, even as it makes health care more cost-effective. Since 2004, AHRQ has invested over \$260 million in contracts and grants to over 150 communities, hospitals, providers, and health care systems in 48 States to promote access to and encourage the adoption of health IT. These projects constitute a real-world laboratory for examining health IT at work.

Patient safety is a top priority for AHRQ, and Bar-coded medication administration (BCMA) holds promise for impacting the safety and efficiency of the medication administration process. This report focuses on findings from AHRQ health IT grantees that are implementing BCMA. AHRQ has funded grantees in 11 States (California, Georgia, Indiana, Michigan, Minnesota, Missouri, Ohio, Oregon, Utah, Vermont, and Wisconsin), including many in low-income and rural areas and areas with high percentages of patients enrolled in Medicare and Medicaid.

Medication errors pose a serious threat to patient safety. Each year in the United States, nearly 7,000 deaths are linked to medication errors. These errors can occur at any stage in the process of medication use (e.g., prescribing, dispensing, and administration). The administration phase of medication use occurs when a health care professional gives medication(s) to a patient. BCMA uses an IT system for medication administration management (electronic medication administration record) in conjunction with bar-coding equipment and software to avert medication administration errors. When health professionals administer medications to patients, the IT system electronically records medication administration details such as patient, medication, dose, and timing information. Nurses and other caregivers use bar-coding equipment and software to identify the patient and the medication and to verify that they are administering the right amount of the right drug to the right person at the right time.

BCMA can improve patient safety. Trends among AHRQ-funded BCMA projects suggest that patients whose providers use BCMA technology may benefit from improved safety for medication administration.

- Nurses and nurse managers who were involved in implementing AHRQ-funded BCMA efforts report that the technology improved hospital safety practices related to medication dispensing and administration. Improvements were typically noticed several months after BCMA implementation, once the nurses had learned the system and integrated it into their workflow. Hospitals that invested heavily in nurse training and workflow redesign saw safety improvements more quickly.
- Grantees also describe improved accountability and monitoring of the medication administration process. Many BCMA systems have reporting capabilities that permit analysis of when a medication was administered, who administered it, and whether medication information was scanned or manually entered into the system. Users indicate

Bar-Coded Medication Administration



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that this information helped them to better track medication administration and to more quickly report safety issues to hospital management. Better information, available more quickly, led to reductions in medication errors.

- Several AHRQ-funded projects report that implementing BCMA improved working relationships between nurses and pharmacists by facilitating better communication, collaboration, and teamwork. BCMA technology is often connected to the hospital's pharmacy information system. Thus, the strong involvement of pharmacists in the planning and implementation of BCMA systems is critical to their success.

Implementing BCMA is not easy. AHRQ-funded projects report technical and administrative challenges in implementing BCMA equipment and software—referred to as an electronic medication administration record (eMAR) system. If these challenges are not addressed, new opportunities for error in the medication administration process may be introduced.

- During the implementation process, some AHRQ grantees used workflow redesign tools like workflow and process diagrams to plan for and communicate about workflow changes. BCMA brings significant workflow changes for nurses in particular. Targeted change management strategies help to prepare for this adjustment and reduce the potential for nurses to adopt unsafe workarounds after BCMA implementation.
- AHRQ grantees found that it is critical for equipment to be easy to move and manipulate inside patient rooms. The size of mobile carts and pharmacy equipment can present human factors challenges to implementation of BCMA. Oversized medication carts, computers on wheels (“COWs”), and pharmacy equipment can obstruct the movement of people and equipment, especially in close quarters.
- Implementation of BCMA technologies often requires modifying hospital policies on medication administration and patient identification. There may be a need to modify additional policies regarding how and when scanners should and should not be used. For example, one AHRQ-funded grant implemented policies for allowing exceptions for bar coding mental health patients and during medical emergencies.
- Several AHRQ-funded projects reported that scanners they tested were unable to accurately interpret all of the bar codes used in their organizations. Before purchasing bar code scanners, hospitals should test for compatibility with the bar codes they will use on patients and medications.
- Several AHRQ-funded BCMA projects report that they had to internally repackage medications to properly affix bar code labels. Nurses and other caregivers using BCMA scanners must be able to scan bar codes on medication containers during medication administration. Thus, grantees found that they must re-package very small medications into larger packages that provide enough room to apply the bar code label. In-house repackaging of medications is often necessary to improve the usability of bar codes and to comply with the Food and Drug Administration (FDA) regulations. According to 21 CFR 201.25, certain human drug and biological product labels are required to include a bar code. Because this often includes medications that are packaged in very small containers, compliance with the FDA regulations can be challenging.

The AHRQ-funded portfolio of health IT projects is producing valuable, informative lessons for the Nation. The projects are making contributions to the use of health IT in solving the national challenge of improving patient safety. The lessons to date enhance understanding of various IT applications and the challenges involved when implementing them in a wide variety of clinical settings. Outcomes from these projects have the potential to change the U.S. health care system and offer valuable insight for others who look to use health IT applications in their own organizations.

For More Information:

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