

Where is RFID's ROI in Health Care?

The most strategic benefits for radio frequency identification in health care aren't necessarily found in applications with the most apparent return on investment.

Feb. 13, 2006—The U.S. health-care industry represents a large percentage of the overall U.S. economy and an area well known for being a late adopter of information technology. In fact, according to the U.S. Department of Health and Human Services (HHS), at the end of the 1990s, the health-care industry was investing only about \$1,000 per worker on IT, compared with about \$8,000 per worker for most other industries.

Yet, despite its late-adopter nature, the industry can benefit tremendously from IT innovation in order to improve patient safety and streamline business processes. The HHS estimates IT can reduce health-care costs up to 20 percent per year by saving time and reducing duplication and waste. IT innovation can come either in the form of established technologies deployed in new ways, or as emerging technologies applied to support new or existing processes.

The innovation that has traditionally occurred purely on the clinical side of health care is now starting to branch out into health-care IT (see The Importance of Industry Parallels). Within the broad context of IT innovation, RFID is just one area that shows promise for the future. According to BearingPoint's recent "RFID in Healthcare" survey of more than 300 health-care professionals, carried out in collaboration with the National Alliance for Health Information Technology (ITAA), we have found a wealth of application opportunity areas for RFID in organizations providing health care. Application areas include access control and security, asset tracking, laboratory order management, medical-equipment tracking, patient flow, patient safety (identification and medication administration), pharmaceutical order management, real-time location systems, supply chain, smart shelving, wireless commerce and worker identification. We have found that the top three applications, in terms of business benefit for today's provider organizations, are commonly mobile-asset tracking, patient-flow management and medication administration. Each of these application areas has its own unique business case, and we'll explore these here.

The business case for tracking mobile assets is related to the ability to find assets such as infusion pumps quickly, and to minimize time searching for these assets within an emergency department or other hospital unit. Real-time location systems are able to locate these assets within a few feet, or within a particular room. The time savings may be realized by both clinical engineering staff and nursing staff, and can often amount to a couple of days per week per person. Additionally, these faster search times can help improve overall asset utilization and, in certain circumstances, enable more streamlined inventories of equipment and lower rental costs. Tracking technologies can help to lower shrinkage when items get accidentally misplaced for extended periods of time, while also serving as a deterrent to deliberate theft. The return on investment can be quantified by looking at all of these factors and comparing them with the initial and ongoing costs involved in implementation. In this example, the business case is fairly straightforward to determine, and investment decisions typically ride upon the infrastructure costs of the network deployment.

The business case for better patient-flow management is related to the ability to streamline patient flow, and thus patient throughput, throughout the continuum of care. If an emergency department can process more

patients per year, it can help delay the need to expand the unit or build additional facilities. Improved patient flow can also have a positive effect on patient satisfaction and provider business processes and recordkeeping. The ability to capture procedure start and stop times and patient wait times can help automate previously manual measurement techniques. It can also be used for Six Sigma purposes and continuous improvement. An electronic record of patient flow greatly improves the time taken to perform chart audits and can feed into the patient electronic medical record. Patient status can be electronically communicated to family members in waiting rooms via displays, helping reduce call volumes and associated costs. Better flow management may also help to increase revenue by more accurately capturing services rendered, enabling full billing for those services and supplies.

Finally, diversions where patients are redirected to other hospitals can be reduced since optimizing patient flow provides more capacity in the system, allowing patients to be treated on the spot. In this example, the business case is more complex and the return on investment can be harder to estimate. Patient-flow management is a complex topic requiring strong knowledge of current health-care processes and a holistic approach to implementation that factors in change management and continuous improvement, along with the technical aspects of implementation.

The business case for RFID-enabled medication administration relates to the well-known "five rights" of medication administration: right patient, right medication, right dose, right time and right route. Like bar codes, RFID can help ensure these five rights are upheld and, hence, contribute toward reduced medical error rates. While only 7 percent of erroneously administered doses, on average, lead to "adverse drug events"—causes harm to the patient—these kinds of preventable events can lead to increased patient stays averaging over two extra days and costing around \$4,600 per event. Litigation from ADEs can be much more significant in terms of cost, and negative publicity is equally damaging. In this example, the business case is again harder to determine in terms of hard ROI numbers, but it is obviously an area of the most importance, since it directly relates to patient safety.

To execute on these three business cases, it is important to take a holistic approach and consider which initiatives are quick wins versus longer-term strategies. Tracking assets and improving patient flow can be implemented in parallel in order to leverage the same infrastructure—typically indoor positioning systems utilizing active RFID.

To measure success before a widespread rollout, providers can also target subsets of patients and assets. We have found that many providers are pursuing a phased approach from the emergency department to the operating room and beyond. This strategy helps focus deployments first where they have maximum benefit, and to expand later into other areas of value.

The business case for RFID-enabled medication administration, on the other hand, is more of a longer-term strategy because it requires more infrastructure to be in place, such as RFID-tagging at the item level, RFID-enabled patient wristbands for positive patient identification, and wireless devices and networks available to nursing staff throughout a facility. It also requires integration with existing clinical systems and software that supports RFID-enabled point of care.

These three application areas have strong business cases with the potential to improve patient safety and health-care service delivery significantly. While the return on investment is often readily apparent for quick wins such as mobile-asset tracking, the most strategic benefits appear to be found when RFID is applied to clinical transformation in terms of patient-flow management and medication administration. The return on investment is harder to quantify, yet the business benefits to patients and providers are immense.

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