Chapter 20
Operational Strategies Associated With RFID Applications in Healthcare Systems

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ABSTRACT

An effective information system is essential for a business or industry to be successful in today's highly competitive market. Perhaps the most compelling case for RFID-embedded technologies in the healthcare field has been increased efficiency in supply chain performance measurements, which generally consist of financial and non-financial indicators. Many research studies have assumed that these efficiency measures are transferrable in the medical services field. Such optimism is fuelled by the expectations that such supply chain measures will result in equally impressive results in the healthcare field. Although this transfer may be somewhat flawed and imperfectly applied, research has verified certain elements of operational optimism. There are still a number of technical, ethical, and legal issues or hurdles that surround RFID applications in the healthcare industry that must be successfully overcome. However, few can successfully argue against freeing hospital staff from the routine duties associated with traditional inventory so that they may be free to serve patients. With recent governmental regulations and the concern for increased access to universal medical care and its astronomical costs, these issues need to be addressed.

POTENTIAL BENEFITS USING RFID-RELATED TECHNOLOGIES

Supply Chain Management and Implementation Costs/Savings

Management at many businesses and, in the present case, hospitals are looking for ways to reduce their costs via effective supply chain management (SCM) principles and techniques. Supply related costs can run as high as 30% of total expenditure and many entities are moving toward vendor-managed inventory

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systems (VMI) (Bhakoo, Singh, & Sohal, 2012). In very basic terms, several key criteria which must be taken into account when choosing vendors (i.e. quality, price, agreement terms, delivery, and service). Healthcare service strategies and its associated supply chain systems in hospitals are different from for-profit businesses in many respects. For example, one the main drivers of automating prescriptions may be that many healthcare providers, who may have little to no experience in operations management and quality assurance techniques, may be prone to making substantial errors. While such human errors may have little consequences in the retail environment, they may lead to patient harm and litigation in the healthcare environment. To further complicate matters, the prescription industry is highly regulated and such mistakes due to human errors can be costly in both lives and financial resources. It takes great investments in time to bring any drug to market, and with so much money invested; pharmaceutical companies rely heavily on their marketing professionals, their contacts with the doctors and building long-term relationships with in their SCM systems. Supply chain activities can include but are not limited to evaluating inventory needs, placing orders, verifying deliveries, restocking shelves, counting inventory, identification and disposal of expired goods, and dealing with stock-outs. These activities may have no apparent value from a patient-care perspective and only serve to drive up operational costs, but are essential to an effectively management healthcare system.

In general, many hospitals operate on a different scheme than most businesses in that they never really can expect what their patient load will be, what their illness will entail, or what supplies might be needed for which surgeries, especially when it comes to emergency situations. Hospitals carry an extra amount of safety stock, since any problem resulting in a stock-out situation could be life-threatening, leading to catastrophic financial losses. Many innovations in healthcare supply chains and its management have been linked to applications of RFID-related technologies. Such innovations include self-replenishment systems, automated reordering, quality assurance improvements, and enhanced security of prescription medications. Passive RFID-enabled systems have the potential provide many applications within a single infrastructure at significantly less expense than active RFID-based technology. Passive systems are typically employed in very standardized supply chain functions as inventory and secure tracking capabilities that allow management and its customers to enhance security using same fixed readers for door-level access control/tags. These security measures can alert management when inventory are removed from devices typically through auto-notification techniques when tagged assets passes through designated areas.

Active RFID tags, which have an energy source and allow for read/write capabilities, have a number of important applications beyond inventory management in the healthcare industry. For example, perhaps the most advertised application for active tags are designed for providing additional level of security for hospital patients (i.e. neonatal, assisted living residents, and their staff personnel who needed more safety protocols in order to better manage high-value medical assets). Other applications include real-time location systems, assisted living monitoring, neonatal protection, staff duress call, resident wandering, wireless nurse calls, room and patient temperature monitoring, traditional and virtual asset tracking, guard protection, location-based tracking, emergency call systems, hand hygiene compliance, and general healthcare security applications (Smith, 2009).

There are a number of significant potential benefits using RFID-related technologies on the healthcare system, costs and infrastructure considerations. Much of the academic and practitioner-based research on the effects of automated technology and its developments in RFID-related systems have focused on improved supply chain efficiency in manufacturing and retail sectors (i.e. as the listing of related readings located at the back of this chapter has illustrated in terms of topics of research in RFID). RFID, security enhancements, are utilized in a number of areas today, including airline luggage tracking,