

## Rescuing the ED: A Real-Life Application of Patient and Asset Tracking





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As healthcare organizations across North America are faced with rising costs, staffing shortages and ever-growing regulatory mandates, nowhere are these challenges more apparent than in the Emergency Department (ED).

What follows is an inside look at how one healthcare organization deployed an enterprise mobility strategy using InfoLogix's HealthTrax patient and asset tracking system to transform its ED: pro-actively eliminating bottlenecks, improving patient throughput, and automating communication flow.

## Healthcare Organization Overview

Like many hospitals all over the country, a community healthcare facility in the Northeast found itself challenged by the increasing demands on its emergency department (ED). The hospital employs over 600 people and supports nearly 65,000 patients a year, with over 20,000 treated in the ED.

The ED facility currently supports eight beds, and was originally designed to handle 8,000 patients per year. The current ED patient volume – over two and a half times that intended – places a high demand on the department to provide quality, timely care. A planned expansion, currently under way, will soon double the size of the department's physical resources, but patient volume will continue to place increased demands on the ED's capabilities.

## Four Specific Objectives

Faced with this ongoing challenge, the hospital began to search for viable solutions to handle growth while providing a greater level of patient safety, care and satisfaction. The ED's Medical Director identified several targets for improvement:

- Better communication with patients and with other staff members;
- Better patient tracking and status reporting;
- Greater insight and measurement into how the ED is managing each patient and how it can improve its workflow;
- A nurse call system that meets the greater demands of the expanding ED facility.

## The CIO's Business Case

The hospital's CIO considered the ED's needs in light of the hospital's overall drivers, IT strategy and operational/financial constraints. The ED is considered the bread and butter operation of the hospital and, most importantly, the gateway to in-patient care. An approach needed to be found that addressed the ED Medical Director's needs and ultimately enable the existing and future, expanded ED facility – as well as staff resources – to be utilized more efficiently.

With this in mind, the CIO developed an IT plan that pointed to three new ED information resources:

1. A patient tracking system
2. An information/communication system
3. A nurse call system

The search for solutions began with the patient tracking system, as the existing manual white board process was viewed as a key source of operational inefficiency for the department. The search led to InfoLogix, a leading provider of enterprise mobility solutions for the healthcare industry – and to the InfoLogix HealthTrax system.

Review of InfoLogix's solution showed it offered an open system architecture that could provide integration with multiple HIS platforms, as well as with other hospital systems, including the future nurse call system. As HealthTrax is web-based, providing access to its services for other hospital departments would be easy and require minimal cost.

The hospital's administration had considered real-time location systems (RTLS) in the past, realizing they had proven effective in healthcare settings for mobile asset tracking, but the hospital's ED was too small to justify the initial infrastructure build-out based on this benefit alone. The ED patient tracking application presented an opportunity to amortize the cost by building on the ED infrastructure for other uses throughout the hospital.

Having found a potentially good fit solution for the ED, the CIO further considered the decision in light of several other hospital constraints and needs:

- The hospital's culture was typical of healthcare facilities in that they seek to avoid risk;
- The IT Department had only seven employees, so there was little luxury to take on solutions with unproven results that required a deeper resource commitment;
- The hospital had a good working relationship with InfoLogix, found their solutions and support very solid, and saw they were interested in working a pilot program with the hospital for the ED facility.

Equipped with a viable plan for the ED, the CIO and his team worked with InfoLogix to move the pilot process through the hospital's internal review and approval cycle.

## Elements of the HealthTrax Solution

HealthTrax from InfoLogix is based on a Real Time Locating System (RTLS), using active RFID tags, to monitor, track, manage, document and analyze patient movement and treatment “flow” through the emergency department and supporting facilities, such as x-ray, lab, and other departments across the facility. HealthTrax provides real-time updates of patient location to help staff identify operational bottlenecks, track patient care events and identify when treatment delays require escalated attention.

The HealthTrax solution replaces the manual white board process in the ED that was time-consuming for nurses to continually update, thus forcing them to spend less time for patient care and limiting their visibility into real time patient care status.

HealthTrax also incorporates automatic alerts in the form of color-highlighted patient status bars that graphically display on the ED patient tracking electronic display panel. When a patient’s wait time for a given treatment area exceeds a pre-determined length set by the department, an alert appears on the screen signaling a bottleneck that prompts for staff attention.

### The overall solution works as follows:

- 1 An RFID tag attached to patient’s wristband transmits a wireless signal – indicating the patient’s ID – at a regular interval;

- 2 The signal is received by a network wireless access point (reader) in the facility and is sent to a middleware server designed to determine patient location;
- 3 The location server uses a signal strength algorithm to determine location, and sends it to enterprise software for analysis and reporting;
- 4 The enterprise visibility software application uses the location data to display a linear tracking map that shows each patient’s location in the facility and creates alerts based on workflow thresholds.

The InfoLogix patient tracking system required a communications infrastructure to be in place to locate patients. This system utilizes a Wi-Fi network installed in the ED for connectivity between patient wristbands and system tracking middleware and reporting application.

### Other equipment utilized includes:

- Active tag bracelet attached to each patient;
- Wi-Fi Access Points to provide connectivity between tags and the HealthTrax system;
- HealthTrax location server to provide patient location data;
- HealthTrax enterprise visibility application that uses location data to display patient status information.



The patient tracking component includes monitoring functionality to visualize, search and filter patient location data, and notification functionality to automatically display a color-coded alert based on ED event specific rules such as excessive dwell time in the radiology department.

## Mapping Out an Enhanced Workflow

The introduction of the new patient tracking system into the ED required a rethinking of work processes and procedures for Admissions, initiating the new tracking methods, and for Nursing, shifting nurse work routine away from the manual tracking white board to the automatic status display.

The workflow for the new tracking process can be summarized as follows:

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- **Patient enters ED and is taken to a treatment room by a staff member.**
  - **Admissions is notified new patient arrival.**
  - **Admissions coordinator goes to patient's room with a mobile medical cart and begins registration process on cart's mobile system workstation.**
    - Name and other profile information are entered
  - **Coordinator returns to admissions desk, completes paperwork and prints out.**
    - Future enhancement: printer is to be added to mobile medical cart so paper work can be printed bedside, eliminating need to go back and forth between room and admissions desk
  - **Coordinator assigns tracking bracelet number to patient record, triggering patient to appear on tracking display screen.**
  - **Patient room number is entered in system or automatically updates in system when patient enters room wearing bracelet.**
  - **Coordinator places two bracelets on patient's wrist:**
    - RFID auto tracking tag
    - Name tag
  - **Admissions takes patient paperwork to emergency department ED, gets signature and gives to nurse or doctor.**
  - **Nurse assigns herself to patient in system.**
  - **Patient registration is complete – patient is now tracked automatically by system and status displayed on central ED display screen.**
  - **When patient is discharged, tag is removed from patient and placed in bin in ER. Tags are disinfected and taken to Admissions for reuse.**

When receiving their tag during the registration process, each patient is informed that this new tracking system helps tells nurses and doctors where they are at all times, so their needs are properly met.

The system is designed so anyone working in the ED can assign a tracking badge to a patient and tag assignment can be completed at any workstation. Moreover, the process takes just several seconds.

If the ER is full, the patient is taken to a Triage Desk that performs a patient “mini-registration.” In the future, the Triage area will not only perform the mini-registration, but also have the capability to assign a tracking bracelet.

## Solution Implementation

With only seven people in IT Department, the hospital would need considerable support from the chosen solution provider for a pilot project. InfoLogix worked closely with the hospital’s team to implement the system to meet the ED medical director’s targets. According to the CIO, InfoLogix:

- Assessed the hospital’s business challenge and created the solution;
- Presented the solution to the hospital;
- Secured sign-off from the CIO, ED medical director and other key decision-makers;
- Fully installed the solution and provided strong training to utilize the system effectively; and most importantly,
- Required little or no involvement from the hospital’s IT department.

## Direct Insight from the End-Users

How well was the goal of automating patient tracking and status monitoring to improve patient care and efficiency of staff utilization met? After an extended period of use, members of the ED department and other hospital staff members provided perspective on their experiences to date, including workflow enhancements, patient acceptance, and ease of use:

### ED Medical Director:

“Staff had already become dependent upon new system, even when we were still in pilot mode.”

### Patient Admission Coordinator:

“The system is designed so anyone in ED can assign a tracking badge to patient. Assigning a tag can be done at any workstation and takes just several seconds.”

“Patients are told this is a new tracking system that tells nurses and doctors where they are so there needs are properly met. Patients are OK with new process.”

### ED Nursing Supervisor:

“The ED electronic tracking display screen is now the centerpiece of our workflow.”

“Patients like the sense of security that comes from tracking system visibility.”

### CIO:

“HealthTrax can be put on almost any desktop, since it is a web browser-based solution. Other departments – like radiology, our lab – can check the tracking screen for patient location/status and respond in a timely manner.”

## Benefits Across Several Care Delivery Functions

Benefits for the ED patient tracking system were found to be consistent with the objectives documented during the initial assessment phase:

- ⦿ Better patient tracking and status reporting.

The ED Medical Director echoed the sentiments of his team, verifying that staff no longer had to spend time manually updating the movement and tracking of patients on the department's central white board. This reclaimed time is now used instead to take care of patients – achieving a primary goal to improve staff efficiency and increase “face time” with patients.

- ⦿ Reduced administrative burdens.

The ED nursing staff concurred. The new system is much less time consuming than the old manual process using the white board, since patients are constantly moving and their status changing. Each change required rewriting the updated patient information on the board. When the department got busy, it became difficult to keep the board current with accurate status. Now all changes to the electronic status screen, displayed on a 40" LCD monitor directly in front of the main ED desk, occur automatically as the patient is moved through the treatment process.

- ⦿ Greater insight and measurement into how the ED is managing each patient and how it can improve its workflow.

One feature the ED team found particularly useful was the “run time” function that tracks how long a patient is at any one location. The system has been configured with work process parameters that indicate if a patient has exceeded the maximum desired dwell time in a given treatment area; the system highlights that patient's displayed status line in a different color. By alerting staff to bottlenecks and providing a real-time visual alert, the feature prompts attention and helps accelerate patient care.

- ⦿ Better communication with patients and with other staff members.

The system also meets one of the ED Medical Director's most important targets – improved communications with patients and with other staff. Since the HealthTrax patient status screen can be run on almost any desktop in a web browser window, other departments can access the system to see a patient's status, and ascertain if any work they are performing is holding up treatment. The system also allows notes to be added to a patient's status line, enabling better communication – and resulting coordination – between departments.

## Ability to Adapt as the Hospital Evolves

Based on initial results from the HealthTrax solution, the advisory team reviewed the new workflow and procedures precipitated by the new tracking system for potential changes that will further enhance the hospital's benefits. Considerations include:

- ⦿ Number of display screens throughout department;
- ⦿ Type of data (patient, staff, department, etc.) displayed on screens;
- ⦿ Other areas of hospital the system can benefit;
- ⦿ Adding multiple views of status board;
- ⦿ Adding a graphical display map – versus the linear data display similar to the old white board – to better show patient location and status data;
- ⦿ Reporting log of face time with patients for process review, audit, documentation, and post treatment questions.

The Admissions Coordinator – who initiates the whole patient tracking process during patient registration – currently goes back and forth between the admissions desk and the patient's room to complete paper work and issue the two patient bracelets. After working through the pilot process, the Admissions Supervisor realized it would save time and effort to equip the mobile medical carts used in the ED with portable printers so the patient admission process could be completed at bedside without returning to the desk to print paperwork.

Having seen the benefits of the new system, the nursing staff is looking forward to a system enhancement that produces a report summarizing a patient's treatment history during his or her visit. This feature is expected to help nurses find gaps in the patient care process and also help fill in details needed for patient treatment documentation.

Now that the system has been shown to be effective with patient tracking, the nursing staff are proponents of expanding the use of tracking badges to nurses and doctors. Adding the care team members to the system, together with a slight modification to the information fields on the status display screen, can provide helpful status on the location of a patient's care team, further improving staff utilization and coordination. A graphical map view of the expanded tracking data is being considered to make locating easier and more intuitive.

Based on the success of the solution rollout, additional HealthTrax features under consideration by the hospital include reporting, multiple view screens, staff/physician tracking, and integration with other hospital systems, including the planned nurse call system and ED information system.

The hospital administration believes that with these applications of HealthTrax working in tandem will help lay the foundation for a full hospital infrastructure.

## Learn More:

- **HealthTrax asset tracking solution.** A powerful real-time location system to immediately identify the location of patients and mobile equipment assets.  
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## About InfoLogix, Inc.

InfoLogix is a leading technology provider of wireless and RFID based intelligence solutions that enable the mobile enterprise. InfoLogix uses the industry's most advanced technologies to increase the efficiency, accuracy and transparency of complex business and clinical processes for the healthcare industry and the commercial marketplace.

With 19 issued patents, InfoLogix provides mobile managed solutions, on-demand software applications, mobile infrastructure products and strategic consulting services to more than 2,000 clients in North America including Kraft Foods, Merck and Company, General Electric, News America Corporation, Mercedes Benz, Kaiser Permanente, Adventist Health, Universal Health Services and Stanford School of Medicine.

Founded in 2001 and headquartered in suburban Philadelphia, PA, InfoLogix has been named the sixth fastest growing new business in the United States for the last three years by *Entrepreneur Magazine*. For more information, visit [www.infologix.com](http://www.infologix.com).