Rhode Island Hospital ED Boosts Efficiency by Adopting Brown University Patient Flow Model

June 15, 2016 by Shari Welch, MD, FACEP

The Rhode Island **Hospital emergency department** in Providence was built 10 years ago and is one of the busiest teaching hospital emergency departments in the country. Treating more than 100,000 adult patients a year and admitting almost 30 percent of them, the department has such a high acuity that part of its 100-bed ED is dedicated to **critical care** patients. The Andrew F. Anderson Emergency Center (AEC) is the main teaching site for The Warren Alpert Medical School of Brown University and its many residency programs. It is one of the top-ranked **emergency medicine** residency programs, and its clinical metrics for **sepsis**, ST-segment elevation myocardial infarction, pneumonia, and stroke are among the best reported in the country. It is a center for **research** on medical teams, **injury** prevention and control, and **resuscitation** science.

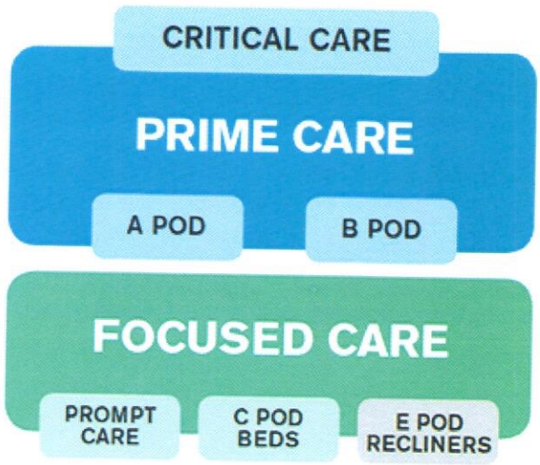
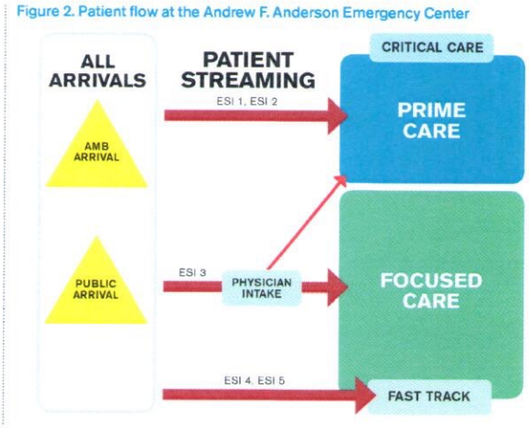


Figure 1. The AEC 2.0 model divided the ED into prime care for major medical cases and focused care for limited problems

All this aside, the **leadership** at Rhode Island Hospital—hospital president Peg Van Bree, DrPH, and Brian Zink, MD, chairman of the University Emergency Medicine Foundation—decided that they were not satisfied with the operational metrics for the department. Like most high-volume tertiary teaching hospitals, they struggled with operational metrics like door-to-physician time, length of stay (LOS), and left without being seen (LWBS) rates. After intensely studying their operational data, they learned that lower-acuity patients suffered most in terms of wait times and delays.

The leadership team—which includes David C. Portelli, MD, James E. Monti, MD, and Alexis Lawrence, MD, nursing leaders Susan Patterson, RN, and Lindsay McKeever, RN, and advanced practice provider (APP) leader Lisa Murphy, PA—decided that they needed real transformative change. The leadership team decided to stop all committee work on operations and to use the task force model for process improvement recommended by Brent James, MD, of Intermountain Healthcare. They participated in a retreat where they reengineered patient flow and workflow in their department. Armed with a charter and a tight project timeline, the team developed an ambitious change package, named AEC 2.0, involving four big innovations that would go live at once. Using the major care/minor care model that has proven successful in

Great Britain, they designated areas in their department as prime care for major medical cases and focused care for patients with limited problems and an expectation of discharge (see Figure 1).



(click for larger image) Figure 2. Patient flow at the Andrew F. Anderson Emergency Center

They then developed a patient-flow model that played to their strengths and their unique demographics. Rhode Island has unusually high emergency medical services utilization relative to the rest of the country. Forty percent of patients arrive at the AEC by ambulance. Imagine 120 ambulances arriving in your department each day! While the national norm is to bed ambulance patients upon arrival, this department did not have the capacity to immediately bed everyone who arrived by ambulance. Many ambulance patients, in fact, did not need a bed, and the leadership opted to save those beds for the sickest arriving patients. The AEC also has two other unique assets: strong nursing and a robust APP presence with a homegrown emergency medicine APP development program. The APPs have an average of nine years of experience and can function autonomously and efficiently.

	BASELINE May-Dec 15	RCT x 4	TO DATE
Volume	287	305	294
Admit Rate	28.15%	31.2%	29.1%
Door to Doc (Median)	52	26 min	22 min
Discharge LOS (Median)	297 min	225 min	228 min
Admit LOS (Median)	428 min	410 min	387 min
LWBS	4.63% (13)	1.64%	1.87%

(click for larger image) Table 1. Results of the AEC's patient-flow improvement efforts

The hospital is confident that its nurses know sick when they see it, and so all patients, whether they arrive ambulatory or by ambulance, receive a very rapid **nurse** assessment taking fewer than three minutes. During this assessment, a chief complaint is obtained, and an Emergency Severity Index (ESI) score is assigned. Vital signs, allergies, and a **pain** score are recorded. All ESI 1 and 2 patients go to the prime care area, which consists of mirror pods with 16 beds each and a 16-bed critical care area for highly unstable patients, and they are immediately seen by a physician. All patients of low acuity with an ESI of 4 or 5 are sent to a fast-track area, named prompt care, and are seen expeditiously by an APP (see Figure 2).

Half of the nearly 300 patients arriving at the AEC each day have an ESI 3 designation (intermediate acuity). Across the country, we have begun realizing that this is a tricky patient mix and will include some very ill patients with occult medical problems. These ESI 3 patients

are typically seen by a physician in triage in fewer than 20 minutes. This physician quickly begins the patient work-up and assigns the patient to an appropriate area within the department. If the physician determines the patient is sicker and needs an acute care bed, the patient can be sent to the prime care area, but most patients are sent for treatment in the lower-acuity focused care area and are treated in lounge chairs. The staff rapidly caught on to this new vertical flow model, which is being adopted and adapted to high-volume departments across the country.

The leadership team ran four tests of change (rapid cycle testing, or RCT) before going live with the model. Each test of change allowed the team to see the model at work under different conditions. The model was tested with volumes from 284 patients per day (PPD) to 340 PPD, with admission rates of 25 percent to 36 percent and fast-track volumes that varied by 50 percent. The model performed well, and the data were irrefutable.

Table 1 summarizes the remarkable results. The table shows the baseline, the RCT data, and the data-to-date numbers showing consistent improvement for two months. Door-to-doctor median, which began at 52 minutes, was reduced to 22 minutes, and LWBS rates, which were 4.6 percent, were reduced to 1.87 percent.

Their crowning event occurred on April 25, 2016, when the AEC recorded its busiest day ever: The department treated a whopping 364 patients and the door-to-doctor wait time was only 20 minutes.

Most high-volume tertiary and teaching hospitals believe that this type of performance is impossible, but the experience in Rhode Island suggests otherwise. The AEC has been quickly transformed in only 12 weeks from planning through implementation into one of the most operationally efficient teaching hospital EDs in the country. They are rocking in Rhode Island! The Brown University patient-flow model may become the standard for high-volume tertiary teaching emergency departments.

ACEP Now - http://www.acepnow.com/article/rhode-island-hospital-ed-boosts-efficiency-adopting-brown-university-patient-flow-model/