Building on Success

Academic emergency department leverages clinical automation to reduce overcrowding, streamline workflow and enhance revenue.

By Patricia Anderson, R.N.

In the chaos of a typical emergency department (ED), patients crowd waiting rooms, line hallways and are rushed in through the ambulance entrance. Many have limited access to healthcare, resulting in overcrowded EDs with patients who are sicker than ever and have fewer financial resources.

Within this challenging environment, Duke University Emergency Department in Durham, N.C., provides high quality emergency services for more than 65,000 patients a year. Some 200 staff members and clinicians, including 21 physicians, provide emergency department services for up to 80 patients at a time. Situated on the first floor of a 1980s building constructed to accommodate 20,000 annual ED patients, we now serve three times that amount.

Our Level I trauma center is a busy academic teaching center with 19 emergency medicine residents, eight physicians' assistants and 90 nurses. It is part of the Duke University Health System, which includes four acute-care hospitals, a physicians group, home health and a private diagnostic clinic that generate $1.4 billion in annual operating revenues. A 2004 *U.S. News & World Report* ranks Duke University Medical Center among the top six American hospitals.

Prior to 2002, handwritten grease boards, patient charts, discharge instructions and prescriptions were a fact of life at Duke. Clinicians scrambled to find the department "green book" of Duke policies and practices, locate patients when family members called and keep on top of the status of every patient. Some patients spent as long as 30 hours in ED before being admitted to the hospital or discharged. ED overcrowding was a serious concern and a patient safety risk. Five percent of all patients gave up and left without being seen (LWBS), a fact that troubled us from both a patient care perspective and from a revenue perspective.

Financial Woes

Lack of automation cost us money. Only 22 percent of ED services delivered and materials used were captured and coded for the charge journal in less than 10 days. In some cases, billing edits were months behind.

With our manual process, a billing sheet was attached to each patient chart. The charts and sheets were manually gathered and reviewed, and then each was assigned levels of service and charges by an internal revenue management organization before being sent for billing. The reconciliation process was all done manually to verify that each patient was being charged accurately and that each chart was accounted for. As a result, the ED—normally a revenue generator—financially was in the red.

We knew that we needed an EDIS to streamline our clinical workflow and improve the quality and efficiency of care. We presumed that improvements in these areas would overflow into the financial arena as well, and we were right.

Customization Key

Late in 2000, we formed an EDIS committee including representatives from our information systems department and clinical staff. Nancy Senter, an experienced Duke IS project manager, was overall lead, and I was clinical lead. After consulting the Gartner Group for vendor ratings, we sent five EDIS companies an RFP, narrowed the field to two firms and had them make presentations at Duke. Finally, we conducted site visits at the two organizations to see EDIS products in action.

In February 2001, we selected an EDIS from Somerset, N.J.-based Wells*oft* Corp. We wanted a company with considerable longevity, and they had a 16-year track record. Most important to us was their ability—and their willingness—to extensively customize their product to fit our internally built, proprietary backbone system.

> Initially our physicians were concerned that electronic charting would take time away from patient care. Instead, the reverse occurred and charting time declined from 20 minutes to five minutes a patient.

Phase 1

Duke implemented the EDIS in three phases. Phase 1 included automating patient tracking and bed tracking, triage documentation, prescriptions and discharge instructions. The Wells*oft* team and our EDIS committee spent almost four months analyz-

ing our ED workflow, customizing the software, developing interfaces, testing the system and training the staff.

We increased the number of ED workstations from 30 to 108, adding 33 new printers also. At the same time, we carved out a clinical evaluation unit from former lab space to add 14 patient observation rooms to the ED. This unit would accommodate cardiac patients and others who required a lengthy ED wait for test results such as EKGs or stress tests, pending possible inpatient admission. Well*soft* modified and customized the system's tracking and documentation templates to accommodate these longer-waiting patient cases.

For more information on Well*soft*'s EDIS systems, www.wellsoft.com

There were some mixed feelings when we went live in May 2002 and the grease board came down. After a few days, however, it was like turning on a light because all ED clinicians could instantly see all the beds available and could confidentially see the status of all patients at a glance. Well*soft* contracted to be on site for about six days of training and support, but we only needed them for three or four days since the learning curve took only nine days in total.

Phase 2

This phase, which took less than a year to complete, included automating nurse and physician documentation, tracking unresolved issues, and adding an interface to Duke's policies and practices manual to eliminate hunting for the "green book." Nursing documentation went live in January 2003 with physician documentation following in August.

We built an interface from our Welch Allyn patient monitoring system so that data captured would be available in the EDIS system. Now entire patient records are sent to a common data repository for easy access via a browser, also making them available to hospital personnel when ED patients are admitted directly.

We made a laudable start toward both process changes and systems changes we deemed necessary to launch a revenue enhancement project (phase 3). This project would be founded upon the efficiencies we gained from the software's clinical improvements and upon the increased volume of patient data we were capturing, which could translate into more accurate charge capture, appropriate coding and speedier billing.

During this phase, we developed a comprehensive drop-down list of charges that nurses could select as they clinically documented the patient visit. But, we didn't want to automate directly from capturing clinicals and charges to coding and billing; instead, we wanted to interject a step that would give us the opportunity for final review. A custom-designed billing report was created in the EDIS so the clinical administrator can review cases, reconcile and make necessary changes. Once the levels of care and appropriate charges were verified, the report can be sent to the revenue management group for billing.

Enhanced reporting capability has allowed us to address unresolved issues, such as the LWBS patients. Now we can attempt to resolve these via a resource nurse calling and following up directly with the patients.

Phase 3

In phase 3, we interfaced the EDIS with the organization's separate lab and radiology systems. Although EDIS-related lab and radiology orders must still be entered through Duke's HIS, the results from those tests now come directly back into the EDIS where their immediacy is needed.

During phase 3 we launched our revenue enhancement plan, based on the functions we built in phase 2. The automated clinical documentation and drop-down charge capture worked well, as did our ability to interject final review and reconciliation. But we wanted to be able to post charges at the time of patient discharge. For this purpose, another interface was built from the EDIS to the Siemens charge journal system; with the help of an error log, we could make sure the system posted all charges directly to the journal.

Reaping the Benefits

Today, registration takes 30 seconds instead of 20 minutes, with the issuing of an armband, and registration errors have fallen from 4 percent to less than 2 percent.

Length of stay has been significantly reduced, especially with our chest pain patients. In the past, a chest pain patient could spend up to 30 hours in ED before being sent offsite for a stress test to determine whether he would be admitted or discharged. Now chest pain patients only spend four hours in ED before being assigned to the clinical evaluation unit for 14 to 16 hours of onsite testing and observation. Patients who do not have to stay for observation are out of ED in an average of 4.2 hours, compared to 5.5 hours—a 25 percent cut. The LWBS rate was cut in half, from 5 percent to 2.5 percent.

The potential for medication errors and duplication of studies fell because the patient ED record is automatically sent to the clinical data repository, and clinicians have access to the history of care provided in ED. Results generated by the EDIS are enhancing our Six Sigma projects, particularly for admitted and cardiac patients.

Today, dictation occurs in less than 4 percent of all ED encounters, saving almost $700,000 a year in expenses and $300,000 a year in paper and special forms costs.

Initially, our physicians were concerned that electronic charting would take time away from patient care. Instead the reverse occurred, and charting time declined from 20 minutes to 5 minutes per patient. Before the EDIS, Duke built in 60 minutes at the end of each shift for physician turnover and actual time over shift averaged 70 minutes. Now, turnover time takes 20 minutes and time over shift averages five minutes.

One of the most dramatic bonuses of the EDIS implementation was the level of revenue enhancement. Using templates for physician documentation produced clear, legible and timely charts that enabled coders to capture all procedures performed and to bill at the appropriate, and often higher, levels. Prior to EDIS implementation, only 22 percent of charges were sent to the charge journal within 10 days. Today, 100 percent of charge entries occur within four days or less. Ultimately, the ED transformation provided a 300 percent increase in revenue since the 2002 go-live.

Finally, automating the financial process has allowed us to redeploy four FTE positions previously needed to manually add charges and make corrections for 65,000 ED patient encounters into much needed quality assurance positions.

For Duke University, the EDIS has been a resounding success. Duke's commitment to focus on and improve our processes and to choose a product that was flexible enough to meet our evolving needs turned out to be keys to our success.

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