Data Abstraction Unplugged: Taking Trauma Registry to the Point of Care with Wireless Technology

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Central to Geisinger Medical Center's success with concurrent abstraction is wireless technology that enables registrars to work at the point of care.

Registry abstraction can have trouble keeping up with technology. Often located away from IT-intensive clinical departments and operating on limited budgets, registry abstraction typically lags on the IT curve. Geisinger Medical Center in north central Pennsylvania solved that problem by pitching the clinical and business benefits of an upgraded registry program to other departments, enabling the program to acquire cutting-edge equipment—a wireless system for point-of-care data collection.

Adopting wireless technology helped Geisinger achieve its larger goal of concurrent data abstraction. The story illustrates how enabling abstraction at the point of care can improve efficiency and submission rates, maintain a high level of accuracy and data integrity, and increase quality of care through timely identification of issues.

Moving to Point-of-Care Data Collection

Geisinger's trauma registry has a long history, with more than 20,000 cases in the regional resource trauma center's database. The registry, developed in 1986 as part of trauma accreditation requirements within Pennsylvania, is the cornerstone of the Geisinger Level One Trauma Center, located in Danville, PA. Accessioning approximately 1,400 new cases every year, the registry serves as a resource for research, performance improvement, and resource utilization. The state governing agency relies heavily on the facility's data during its survey process.

In 2000 the Pennsylvania Trauma Systems Foundation (PTSF), the trauma accrediting body in Pennsylvania, designated concurrent registry abstraction as a best practice that improves patient outcomes. Geisinger's trauma administrator made concurrent abstraction a priority for the trauma registry. This seemed like a tremendous challenge, and registrars doubted the success of concurrent abstraction. They were concerned about inadequate staffing, maintaining data integrity in the face of late filing and incomplete charts, and increased abstraction time with repeated chart reviews.

At the time, Geisinger's current abstraction process began with paper abstracts that were subsequently computerized. Patient accession occurred after discharge, death, or transfer. The process achieved a 98 percent accuracy rate, with submission to the state database occurring in six weeks or longer. Echoing the registrars' concerns, an assessment of the process documented outdated computer equipment and marginal registry staffing.

To address some of these issues, the hospital increased staffing and updated desktop equipment. Geisinger's IT department proposed a more ambitious plan—wireless technology. The department proposed inpatient abstraction at bedside, with data entered directly into the database. The projected outcome was submission of data to the state four weeks after discharge, death, or transfer.

The plan called for registrars to be equipped with tablet PCs outfitted with wireless network PC cards. The tablets would connect to the center's local area network via access points located in the ceiling for transmission.

There was a strong case to make for concurrent abstraction and wireless technology. A literature review identified the trauma registry as the primary source of information for all trauma data. Accuracy and efficiency are key to the success of a trauma program, and both increase with concurrent abstraction. A positive impact on patient care was documented, identifying

meaningful and timely follow-up on educational issues (e.g., identification of educational needs during the inpatient stay versus after patient discharge). The increased efficiency gained with wireless technology allows direct submission of information to the database, forgoing a written copy.

Going Wireless

The facility's administration decided to proceed with wireless concurrent abstraction for the benefit and growth of the trauma program. However, implementing the wireless system required special funding. The purchase of the system, four wireless carts, and wiring the inpatient areas required $130,000. Other departments in the hospital were approached to elicit personal and financial interest. Wireless technology was new, and skepticism prevailed in some departments. In the final analysis, the IT department funded the initial survey identifying locations for the equipment throughout the hospital. The trauma program, with hospital administrative support, funded all of the equipment and hard-wiring through an endowment fund for the advancement of trauma care.

Based on the complexity of the program, the time and dedication required for implementation, and the existing need for additional registry staff, a new position was created—the trauma integration specialist. The specialist was crucial to the program's success, guiding development from inception through completion.

The facility chose the wireless equipment based on functionality and integration with existing computer equipment within the hospital. The facility also followed Institute of Electronic and Electrical Engineers standards for wireless transmissions in hospitals to prevent interference with existing hospital patient-monitoring and data-monitoring equipment. The project's contractor supplied all equipment, including access points, routers, fiber optic wiring, and wireless carts. The network was encrypted to prevent interception of data and to comply with privacy laws.

In June 2000 the wireless vendor conducted a formal survey to identify areas of the hospital to be wired based upon trauma patient location. Conference rooms and office space frequently used for meetings and accreditation reviews were also identified. By spring 2001 the facility had purchased the equipment, and installation began.

Once the wireless hardware was in place, the next step was assessing the system's functionality. Wireless signal quality was evaluated for each wired area to ensure adequate performance. Data entry was also evaluated to ensure complete capture, since abstracting directly into the database without a back-up written copy requires complete data capture. Battery life was evaluated to ensure the portability of the system. Finally, point-of-care abstraction was tested in multiple areas.

Adjusting to Point-of-Care Abstraction

As issues were discovered and addressed with assistance from the IT department, the trauma integration specialist trained the trauma registrars on point-of-care abstraction. The training included orientation to the wireless carts, patient identification, working in the inpatient setting, and patient caseload management. Each registrar received an individual orientation, completing the process in a maximum of three weeks.

Responsibilities for registrars were unchanged, with a defined number of cases to be closed and transmitted to PTSF each week. However, there emerged a need to incorporate newly admitted patients into the database and update their information daily. Previously, registrars knew the exact number of patients that were due each week, and they would schedule blocks of time for reporting, quality improvement, and miscellaneous duties. Concurrent abstraction made flexibility essential to registrar survival. Selection of concurrent cases were jointly made on a day-to-day basis determined by total patient admissions. Through trial and error, registrars discovered the best times for inpatient chart access. A typical day incorporated the following schedule:

8:15 a.m.–9 a.m.	Case finding and patient list update
9 a.m.–9:10 a.m.	Joint decision on concurrent cases for the day
9:15 a.m.–noon	Completion and closure of old cases
12:30 p.m.–3 p.m.	Concurrent abstraction and updates
3:30 p.m.–4:30 p.m.	Completion and closure of old cases and submissions to PTSF

Cooperation was key to making inpatient data collection successful. Although registrars had not performed case finding for many years, the transition went smoothly because the registrars were familiar with reporting guidelines for ambiguous cases. Adopting and troubleshooting the new technology posed the most challenging aspect of the project. The staff's diligence overcame occasional frustration.

The wireless concurrent process affected the clinical personnel's perception of the registry. Previously seated at work stations in remote offices, registrars did not come in contact with most of the trauma staff. With concurrent abstraction, the trauma registrars became more visible, interacted with clinical staff, and were valued for their role in improving patient care. Documentation was clarified while still fresh in practitioners' minds, which benefited the entire program. The wireless tablet PCs generated curiosity among clinicians, and many departments became aware of the trauma registry and the information it offers.

Registry staff responded positively to the change in venue, also. Initial doubts about working in the inpatient environment were erased as the registrars' professionalism won them acceptance in the units. The new system also enabled registrars to vary their days between desk work and data collection in the unit.

Hospital-wide changes put further support behind the move to concurrent abstraction. As more patient information became available online in the hospital's electronic health record system, hospital administration began to enforce a policy requiring timely completion of documentation (e.g., operating room dictation must be completed within 24 hours after the procedure, discharge summary dictation within two days after discharge, and a complete record within 30 days after discharge). Waiting for data would have been a major deterrent to the success of this program.

Troubleshooting

Technology issues included unacceptable signal quality—connection to the network was not consistently optimal. No information was dropped during the trials; however, data entry was sluggish. The tablet PCs had technical issues, also. Cursors froze, and the eight-hour batteries lasted fewer than eight hours. The wireless carts were not ergonomically designed. Finally, the abstraction software also had its bugs, and its ease of use wasn't optimal given the program's small display size.

A wireless issues sheet was implemented, and the IT department worked collaboratively with the trauma integration specialist and registrars to log and correct all problems. Additional access points were installed to provide a wider coverage area, and longer-life batteries were purchased. The hospital's facilities department addressed the ergonomic issues by altering the wireless carts for individual users. In March 2002, one year had passed since the first patient was abstracted concurrently. Sluggish data entry and software problems persisted, costing the registrars valuable time. The software vendor support company was notified, and in July of that year, a representative visited, worked with the database, and corrected most issues.

The Measure of Success and Lessons Learned

Outcome measures are an important part of any process. In 1999 only 23 percent of Geisinger's cases were submitted within six weeks after patient discharge, death, or transfer. The following year saw a significant rise to 87 percent, and in 2001 and 2002 the rate rose to 99 percent. This high level of compliance continued through 2003, maintaining a three-week death, discharge, and transfer submission rate. In comparison, the Pennsylvania trauma hospital submission rate for all trauma facilities averages 74 percent.

Accuracy has remained unchanged, with fewer than 1 percent of abstracts being returned from the central database for correction. Specific program outcomes include timeliness of data submission, timely performance improvement evaluation and follow-up, and increased trauma registrar job satisfaction.

What could have been done differently? Involving the software vendor support company earlier in the process would have decreased time spent troubleshooting. Batteries with longer life could have been purchased at the start. Totally paperless abstracting was desirable with the inpatient record; however, a written, one-page concurrent abstract was developed to document notes and provide an easy reference. This one-page abstract is optional and easily replaced with a tablet PC template function.

Overall, the registrars are satisfied with concurrent wireless abstraction and take pride in the improvements to the entire trauma program. Less time is spent chasing charts through the institution, and data is abstracted directly into the database. Some of the time saved through increased efficiency is spent in the inpatient record verifying accuracy of data; however, the submission rates demonstrate the benefit of wireless point-of-care abstraction. The process has continued to ensure data accuracy evaluated through peer review and state regulatory surveys. In addition, the trauma registrars have more time for other registry functions.

In the end, the implementation of wireless point-of-care abstraction has provided many benefits to Geisinger's entire trauma program and to the hospital overall. Concurrent data assists clinicians in trending patient care, identifying areas of needed improvement, and providing education in a timely manner. Increased efficiency, a high level of accuracy, and improved quality of care supports the trauma accreditation process. Many other Geisinger inpatient departments subsequently implemented point-of-care data collection through wireless technology.

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