

What's the Big Deal?

Chairside Charting With a Clinical Information System

By Stephen Guarnieri

In a perfect world, the only factor in a medical facility's purchase decision would be improved patient care in the form of better patient outcomes and better patient safety. In reality, the primary factors that often influence purchase decisions are increased revenue, decreased expenses or both.¹ Although clinical improvements or improved patient care are an important part of the decision process, these improvements are secondary and will remain so until financial incentives are aligned more with clinical quality measures, such as pay-for-performance.^{2,3}

Dialysis facilities face these realities when purchasing a clinical information system such as an electronic health record (EHR). Sometimes a seemingly minor detail can make a notable difference in aligning the facility's clinical and financial outcomes. One such detail, often underappreciated during the purchase decision process, is the implementation of electronic chairside (point-of-service) charting. Embedding electronic chairside charting into the clinical process can maximize the clinical and financial improvements from an EHR, and should be an important part of an EHR evaluation and implementation.

Improving Financial Outcomes

Health information technology (HIT) has the potential to save money.⁴ Health Informatics Inc. (HII) and other EHR companies have seen a 3 to 7 percent increase in revenue due to improved charge capture with chairside charting. Scott Singer, the operations manager for the Division of Medicine at Geisinger Medical Center's Dialysis unit in Danville, Penn., has not only seen impressive increases in revenue after installing HII's TIME system, but he has also seen impressive time savings in documenting the hemodialysis treatment. Singer notes savings of 15 minutes per treatment with chairside charting. With 12,300 treatments per year, the return on investment from the time savings alone is excellent (3,075 hours saved), and Singer was able to meet his business plan objectives for implementing an EHR.

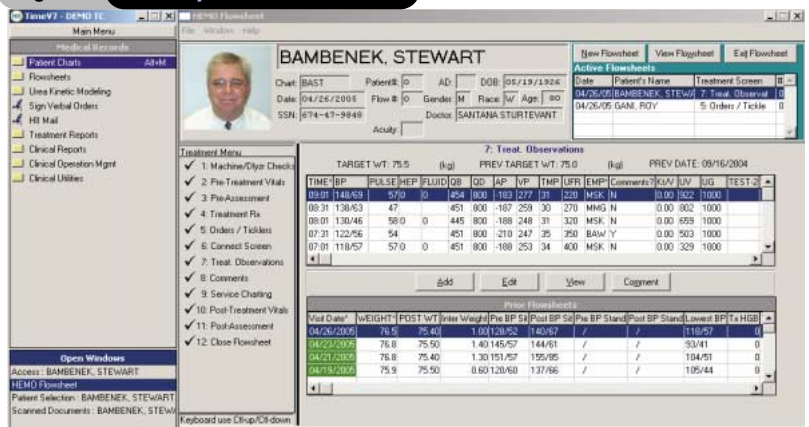
Part of Geisinger's time savings is associated with interface technology, namely the dialysis machine and lab

results interfaces. By interfacing the EHR with the dialysis machine, the treatment data from the dialysis machine and blood pressure cuffs automatically transfers to the EHR where the clinician verifies it. Similarly, Geisinger's lab result data automatically transfer to the EHR.

Additional time savings occur by having all relevant information to treat the patient easily accessible at the chairside when the clinician treats the patient. An EHR at the chairside provides time and cost savings from reduced/eliminated chart pulls. Further savings are accrued from reduced/eliminated dictation⁵ and savings from not having to print lab and other reports as often. At Geisinger Dialysis, an interface to Geisinger Medical Center's Epic System (hospital wide system) distributes the information from the dialysis EHR so that it is available when it is needed to all locations across the Geisinger health system, a health system recognized as a successful user of HIT in the U.S. Government Accountability Office's October 2003 report on HIT.⁶

In addition to cost savings, an EHR at the chairside can also contribute to residual gains in a couple of unexpected ways, specifically as a marketing tool to attract patients and

Figure 1 TIME System Flowsheet



clinicians to the facility. There is evidence that an ESRD patient can be more drawn to a dialysis facility with conveniently available computers.⁷ The sight of the chairside computer gives the patient confidence that his/her medical record will be available in real-time and that it is up-to-date. Likewise, dialysis facilities can attract more or better candidates with the presence of chairside computers. Singer mentioned that a locum tenens was impressed by the ability to quickly and fully document patient notes using the EHR. This locum tenens is sure to tell other clinicians of his experience which is great marketing for Geisinger.

Improving Clinical Outcomes

To implement an EHR effectively, the clinician must believe using the EHR is the quickest and easiest way to perform his/her job. The path of least resistance is the one most people usually choose. If a clinician must write notes or observations on a paper chart and then go to a computer workstation to enter this same information into an EHR, the quality of the data in the EHR will suffer and consequently the value of the information from the EHR will be reduced. Clinical data should only be entered once. There is an inverse correlation between the distance to the charting device and the quality of the data. The highest quality data occurs when charting in the EHR occurs directly at the chairside. When a clinician must write data on paper or remember data before walking over to a charting device, there are many opportunities for the “disconnect” syndrome⁸ to occur.

On the other hand, chairside electronic charting helps eliminate disconnects associated with documenting a hemodialysis treatment. If a clinician uses the EHR to verify the information from the automated dialysis machine interface and then in real-time checks the outlier values pulled from the automated lab interface, the EHR makes the clinician’s job easier. In order for an EHR to successfully improve clinical practice, the computer must be an integral part of the clinical workflow and deliver meaningful and timely information at the point of care.⁹ Dialysis facilities also reduce disconnects by staggering the times when a patient starts treatment. Technicians or nurses have focused time to setup one station at a time. Although chairside charting with an EHR can contribute to effective hand-offs of patients between personnel shifts, the EHR’s contributions is less since dialysis facilities routinely schedule staff to overlap shifts which obviates hand-off issues.

The EHR can be an assistant and a clinical tool for the clinician^{10,11,12} in the dialysis facility and can improve patient care.¹³ Since a patient receives life sustaining treatment usually three times a week for three hours or more, dialysis facilities have a unique opportunity to embed policies, procedures, and protocols in the EHR at the chairside (see Figure 1).

The EHR consistently pres-

ents what was ordered. Information on all ordered services is presented at the chairside. If a lab draw is necessary, the TIME system can prompt the clinician. If a med needs to be administered, all of the details are available. If the facility’s Epogen protocol says to titrate the dose, the clinician has the information delivered at the chairside.

Also, clinicians can take advantage of the chairside charting device to contribute to patient education. Patients can learn more about their clinical situation by showing graphical results of lab results and interventions taken to see how their disease is progressing or slowing. When patients are more involved in their own treatment, better compliance and outcomes are the result.

If an ordered service is not given, an EHR can require that the clinician is responsible for documenting the reason why. Sometimes the reason a medication is not given is clinically indicated; other times, the clinician simply made an error. Ever since the Institute of Medicine’s Committee on the Quality of Health Care report *To Err is Human: Building a Safer Health System* concluded that tens of thousands of Americans die each year from medical errors, health organizations have been more focused on medical errors—especially medication errors. Chairside charting of the dialysis treatment assists in the enforcement of a facility’s policies for machine checks, dialyzer verifications, pre- and post-vitals, pre- and post-assessments, and setup of the dialysis machine according to the dialysis orders. For units that reuse dialyzers, the clinician must verify that the appropriate dialyzer is chosen, verify sterilant status (both present and absent) and require two employees verify and sign the record. The system is order driven which in turn allows one step to review an order, validate that the order is being delivered, and document the action taken. A well designed and implemented EHR should help reduce the number of medical errors.

Medical errors have many costs including opportunity costs such as costs of repeated tests or counteracting an adverse event,¹⁴ legal costs, lost income and direct medical costs. Although some studies have attached a cost to medical errors such as Brigham and Women’s Hospital value of \$5,600 per error in 1997¹⁵ and another report from 2003 valued an error at an average of \$265,⁶ this article does not attempt to establish costs associated with an error. At Geisinger Dialysis, Scott Singer has positive preliminary results for reduction of medical errors using an EHR, and he plans on publishing the findings in the near future.

In addition to helping assist in error reduction, with a dialysis specific EHR, alerts for lab outliers can be appropriately set to match the unique ESRD population. An EHR for the general population will have lab alerts with little or no value to an ESRD population because the ESRD patient will trigger so many alerts that they risk being ignored. Most important-

ly, with proper alerts, the alert can be delivered in a timely manner to the clinician treating the patient at the chairside. Timely delivery of alerts of outlier lab tests have been shown to decrease time to therapy and time spent in a life-threatening condition.¹⁶ Also, many studies detail the positive effect alerts have on clinician behavior and patient care.¹⁷

Effective Implementation

Effective implementation of electronic chairside charting must balance space, cost and workflow con-

Figure 2 Chairside Device Table

Device	Form Factor	Functionality	Total Cost of Ownership	Ease of Use
Windows Thin Client (Winterm)	☆☆☆	☆☆☆	☆☆☆☆☆	☆☆☆☆☆
Desktop PC or “fat client”	☆	☆☆☆☆☆	☆☆☆	☆☆☆☆☆
Laptop or Notebook	☆☆☆	☆☆☆☆☆	☆☆	☆☆☆☆
PDA or “smart” phone	☆☆☆☆☆	☆	☆☆☆	☆☆
Tablet—Slate Model	☆☆☆☆	☆☆☆	☆☆	☆☆☆☆
Tablet PC or Convertible Notebook	☆☆☆	☆☆☆☆☆	☆	☆☆☆☆

source: Health Informatics Inc.

siderations. The decisions regarding the device or devices used and the method to place devices at the point of care are interrelated and must meet budget, functionality and available area constraints. In addition, corporate or hospital standards must be met for equipment. More critical to successful implementation, active support from management is required to ensure processes are followed for real-time documentation at the chairside in the EHR. Whichever device is chosen, ensure it is fast enough to perform electronic charting successfully without delays.

The entry device choice at the chairside should primarily focus on the needs of the clinicians who spend most of their time in direct patient care. Since dialysis facilities can be cramped with little available space for anything besides a chair and a dialysis machine, target the primary device that allows the most functionality. At HII, we recommend the Window Thin Client device (also known as Winterms, Windows terminals, or "smart" terminals) because these devices offer the best balance of space, cost and functionality (see P. 20). The form factor or size is excellent for the functionality achieved and the total cost of ownership is the lowest of all devices. With the rapid changes occurring in the computer hardware industry, recommendations for a chairside device could easily change in the next few years because the total cost of ownership for other devices could drop significantly as devices get less expensive, smaller, more robust, and faster.

The total cost of ownership is an important consideration. Besides direct costs, total cost of ownership includes costs for managing devices (including software and hardware upgrades) and replacement costs based on frequency of replacement. Compared to other devices, the Winterms are the easiest to manage because they can be managed from a server rather than requiring technicians to 'touch' each device. In addition, the software necessary on the Winterms is usually limited to the applications in use at the chairside such as the EHR. For Internet-connected devices such as desktop PC's, laptops, and tablets, another factor for manageability is for virus protection and spyware. Winterms are not susceptible to viruses or spyware. Because Winterms have little or no local storage, they are more secure from viruses, spyware, data theft and other similar security considerations.

In addition, replacement costs have higher significance in a dialysis facility than in a typical medical setting because of the various fluids in constant use—especially caustic fluids. Electronics and fluids do not mix well. Further, to achieve the small form factors used in PDA's and tablets, smaller, more delicate components are used. The dialysis setting is not optimal for gentle use.

"Rugged" notebooks are a class of notebooks which have been reinforced and sealed to be shock, water, and dirt resistant. These rugged notebooks are expensive (\$3,000 - \$15,000 each) and usually built with components that have less computing power to reduce heat issues in the

sealed chassis. Rugged notebooks are not currently recommended for point of care charting in a dialysis facility.

Ease of use is highest with thin clients or desktop PC's because of the full size keyboard and mouse and because of the fixed location. The fixed location saves time over any of the mobile devices which can be misplaced and require time to locate, and the mobile devices are more susceptible to theft and have battery requirements.

For point of care charting, Personal Digital Assistants (PDA's) have limited usefulness because of the limitations from a small screen and data entry issues. Voice recognition and handwriting recognition software hold the potential to make PDA's more effective for data entry; the recognition software is not robust enough for many since the user must train the software to recognize her voice or handwriting and the recognition errors must still be corrected. Although PDA's could be useful at the chairside for discrete functions such as assessment check lists or medication orders, they are not recommended for their overall lack of functionality for daily chairside charting in a dialysis facility by dialysis staff members. In the future, PDA's may have usefulness and provide efficiencies for highly mobile workers such as physicians.

Secondary Devices for the Chairside

For the successful use of an EHR, devices must be ubiquitous and one size does not fit all for a device choice.¹⁸ Secondary decisions should be made for devices that focus on the specific workflow requirements for physicians to use while rounding at the point of care. Doctors are not resistant to technology. Rather, doctors are resistant to technology that

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doesn't match their workflow and that they perceive reduces their time for patient care work.¹⁹ Tablets, including slates (no keyboard, just touch screen) and convertible notebooks (have attached keyboard), are popular with physicians because of the perceived usability and the portability to move from patient to patient. Another useful option is a laptop mounted on a cart which can be pushed to each patient. These secondary devices are also useful for dietitians or social workers for meetings with the patient.

If a physician perceives that any EHR device at the chairside slows his/her workflow, the EHR can still be valuable for creating the printed reports to display the information the physician needs for rounding. Develop a policy to print these reports before the physician arrives based on the shift schedule, and assign a person or resource (transcription service, etc.) to document the information written or dictated for capture in the EHR. While direct entry of the visit by the physician is the optimal use of the EHR, having the information captured in the EHR in an alternative manner allows other members of the care team to have access to a more complete record for the patient.

Device Placement Options

Many options exist for placing the device at the chairside for real-time documentation including simple countertop space, shelving, carts, and various methods of mounting to the wall, ceiling or countertop.

Consider using more than one placement options to match your facility's available space. Using grid paper, draw your facility layout and include impediments to placing a device such as televisions, nursing stations, or storage. Pay special attention to leaving easy access to the water pipes. Then, aim for a ratio of two dialysis chairs for one device. Higher ratios can be successfully utilized depending on staffing patterns, facility size, and budget. A 1:1 ratio is not necessary because of the workflow of dialysis facilities except in isolation rooms.

If possible, consider the clinician's position using the chairside device relative to the patient and viewing the dialysis machine screen. Lines of communication with the patient should be open. Not facing a patient while working in the EHR can cause anxiety in both the patient and the clinician. Furthermore, patients associate direct eye contact with increased satisfaction.²⁰ The ability to rearrange the placement of the monitor (as when mounted on an arm) allows the clinician to involve the patient more in his care.

Another consideration for devices at the chairside is the reliability, speed, and security of today's wireless networks. Mounting a wireless device to a cart with a battery pack can be a good solution particularly when space is at a premium. Wireless networks based on the IEEE 802.11 standard are well suited to a dialysis facility. Bluetooth networks have issues with distance (about 30 feet max), and infrared networks must maintain a direct line of sight between the device and the receiver which also results in issues with distance.

Conclusion

Electronic chairside charting can be an important part of an effective implementation of an EHR. In addition to the requisite financial improvements from improved charge capture and documentation time savings, an implementation with point of care charting in the EHR can improve patient care, patient safety and patient satisfaction. When deciding on devices, make two separate decisions: a decision for the primary devices to be used by the clinicians most involved in the direct care of the patients in the dialysis facility and another decision for secondary devices to be used to match the workflow of physicians during rounding and by dietitians and social workers. For the primary device, match your facility layout with the device that best balances cost, space and functionality requirements. With management support, endeavor to make the EHR ubiquitous in your unit with the many device placement options and possibly with wireless networks. As with most aspects of an EHR, one size does not fit all, and there are many paths to success. **RBT**

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