The Trauma Professional's Blog

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Electronic Health Record vs The Trauma Flow Sheet

There is a big push nationwide to move toward the use of electronic health record (EHR) systems in hospitals. There are a number of benefits from using such systems, including but not limited to:

- Comprehensive and permanent data collection
- Easy access, system-wide
- Reduction in human errors
- Increased throughput once the initial learning curve has been completed
- Multifaceted reporting capabilities

Many hospital or hospital system IT departments are insistent in moving all charting to the EMR, including the trauma flow sheet. For some, it is a revenue enhancement tool. For others, it is a result of the urge to make everything "paperless."

As a trauma center reviewer, I have had the privilege of visiting many hospitals and inspecting their trauma flow sheet charting tools. The bottom line is that I have not seen an electronic medical record system that can replace a handwritten trauma flow sheet. Yet. *And many have been revising and retooling their systems for over five years!*

A trauma team activation is a complex, fast-paced, finely orchestrated performance that does not lend itself well to being recorded electronically. There are two major problems:

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Trauma Calendar of Events

European Congress of Trauma & Emergency Surgery
Location: Amsterdam, Netherlands
Date: May 10-12, 2015

Pan Pacific Trauma Conference
Location: Seogwipo, South Korea
Date: June 4-6, 2015

- Accurate and timely data entry
- Intelligible reports

Problem 1. Input

There is so much information being transferred nearly simultaneously (vital signs, physical findings, procedures, fluid volumes given, laboratory and radiology orders, narratives, etc) that it is not possible to record it completely, accurately, and in a timely manner using **any** current computer data entry interface or medical record system.

This is primarily the result of the current state of data entry technology. There is a huge amount of information to be entered. The display area (computer monitor) is of limited size. So there must be multiple links or tabs (50+ in EPIC) that must be clicked to cause the appropriate area of the record to be displayed. And once the right window is displayed, the scribe must switch from mouse to the keyboard to enter data. And then back to the mouse to select the next input window.

This process is complex enough that some data frequently ends up being recorded by hand using other materials. I've seen pieces of paper, paper napkins, and pantlegs used. This data is then entered later into the EMR. And sometimes, it is not written down at all, and later entries are made in the EHR using only memory!

Another data entry issue occurs when the patient moves out of the ED. Sure, most hospitals have EHR terminals set up in radiology or the OR, and an ED nurse typically travels with trauma activation patients. But what about when they travel to other areas like interventional radiology (IR)? ED nurses do not typically stay in the IR suite with the patient, and IR personnel are generally not familiar with the trauma flow sheet or other trauma policies and practices.

Problem 2. Output

So now, let's switch from input to output. The reporting features of virtually all EHRs allow for an event listing sorted by time. Sometimes it is purely chronological, and sometimes it is separated into categories such as vital signs, fluids, etc. It is rarely graphical in nature, and typically spans multiple, multiple pages of text output. Charts that I have reviewed have output "reports" ranging from 8 to 30 pages. It is virtually impossible for a human being to read through this type of output and reconstruct the flow of a trauma resuscitation in their mind. In many PI review cases, the trauma program manager is reduced to transcribing the individual data items from the EMR report back onto a paper trauma flow sheet in order to better conceptualize the resuscitation. The very real danger is that key pieces of information may be overlooked because they are buried in so much "noise."

IT personnel may claim that the problem is an "end user failure." I defy any of them to come to a trauma resuscitation and rapidly and accurately transcribe all of the information presented, or try to critically review a PI case based on a printed EMR report.

Problem 3. Performance Improvement (PI)

Electronic health records were initially introduced to improve billing for physicians, and then hospitals. They have now grown in complexity and scope, and the US federal government has gone so far as to mandate their use in most healthcare organizations. In trauma care, the most important use is to review the trauma resuscitation for quality of care. It is critically important to be able to reconstruct significant events accurately, because human memory in such a fast-paced situation is flawed.

Unfortunately, the two factors listed above make the PI analysis process very difficult. If the inputs are flawed, how do we know when the chest was needled? And how much longer did it take to insert the chest tube? When did the massive transfusion protocol get activated exactly? When did the patient leave the room to go to CT scan? Try to find these on your own by sifting through the pages of your own trauma flow sheet report.

The combination of these two factors adds up to a lot of money in the form of wasted time. Someone has to do the PI analysis. And it certainly can be done. But the process now takes double or triple the time it used to when paper was the norm. If you are a busy trauma center, your trauma program manager or performance improvement coordinator suddenly lost a lot of time that they were previously able to dedicate to other functions.

Solutions

The majority of trauma centers across the US that have adopted an electronic trauma flow sheet continue to struggle with these issues. Here are the possible solutions:

1. Resist any move to adopt an electronic trauma flow sheet for now. It's not yet ready for prime time. Wait until the input and reporting technology has improved sufficiently.
2. If you've already made the move to the electronic trauma flow sheet, the cat is out of the bag. It's generally very difficult to go back to paper, although I have seen a few centers do so successfully. You will need to perform a very convincing financial study to show your hospital administrators how much the move is costing your program (especially in terms of time).
3. Throw a lot of money and resources at the problem. Some centers have addressed the data entry issue by having multiple scribes (two, and sometimes three to do the work that used to be done with one). Some have developed a cadre of superusers, typically nurses, who are the only ones allowed to be the scribe. This is an expensive way to address the problem, as at least one of the nurses must be on duty in the ED every shift, and must be able to immediately leave a patient they are already caring for to scribe for a trauma activation.

Bottom line: Trauma flow sheets (and other similar code sheets) cannot and should not be reduced to electronic data entry - yet. There is technology now available that may make the input process rapid and accurate. But it will take a federal mandate to the companies who sell the EHRs to adhere to a standard data interchange format to really help the process evolve. Once it's easy to talk to the various software systems, entrepreneurs will create slick input and display systems to make it better than paper. Unfortunately, trauma is such a niche market, there is not enough money in it for the EHR makers to spend much time on their own trying to make the improvements necessary for real usability.

If you have already had the misfortune of moving to an electronic trauma flow sheet, be prepared to suffer during your verification / designation site visits. Nearly every trauma center that uses one has enough oddities uncovered during the chart reviews that they nearly always receive a weakness. And a few find that their PI processes during trauma activations are so hampered that they actually receive a deficiency.

Real User Comments On The EHR Trauma Flow Sheet

So far, the only EHR that I've seen that can do a passable job, and the only two hospitals that I have seen that have not been assigned a weakness for it, is EPIC. Those two hospitals have a low patient volume, and have employed expensive superuser nurses to overcome its limitations. Over the years, I've received a number of comments about the EPIC Trauma Narrator. I'd like to share them with you:

- Bulky & cumbersome to access during a trauma team activation. Our build team promised us that this would be an efficient model of documentation, however, that has not been the case. It takes more steps to document than before and the output is in so many different places review of the chart is extremely difficult to do. You need to know exactly where to look for this information.
- While the rest of Epic has a feature that allows for the automatic integration of vital signs from cardiac and NIBP monitors, Epic does not allow this feature in the Trauma Narrator. All vitals need to be entered manually which can be time consuming. Knowing this up front, I think I would have advocated for not using the Trauma Narrator at all.
- Vital signs and GCS are not displayed within the same flowsheet in Epic. You can find VS in several places, however GCS are in one specific location and if you don't have the secret treasure map to find them, you will be searching the high seas of frustration for a long period of time.
- During our build, there were several requests that were not included in the build. I am told that the once Epic goes live, there is a lock-out of up to 12 months before any "optimization" occurs. My advice to you all who are going to Epic is to be adamant about what you want and ensure it is there before go-live. We are missing small things like "logroll time" and level of activation among other "simple" items.
- Massive transfusions are difficult to document as you need to address each blood component separately and there are several steps in the process for each component. Again, not a user-friendly system at this point for that.
- Our training was done concurrently with our build so our training was on a generic template/flowsheet within the Epic playground that did not mirror our live version. This was not at all what our production/end-user system looked like at all, so our employees had to be retrained on the job on how to document with the Trauma Narrator.
- Order sets are available within Epic, however not all staff use the trauma order sets. This creates confusion and the incorrect items being ordered. Again, bird-dogging is required to assure compliance.
- Once the patient is "arrived" within the Epic system (aka patient chart is noted as the patient actually being in the ED) you cannot go back and document on the EMS radio/report sheet. Staff need to be diligent to assure that documentation is completed before the patient arrives. We have had scenarios where there have been multiple trauma patients arriving and once the nurse begins the documentation of the trauma team, the ED Charge

nurse could not go back and enter the radio report in the proper section.

How Do You Dress Your Trauma Team?

Over the years, I've seen the trauma teams at quite a few hospitals in action. One thing I have noticed is that most just don't pay attention to what they wear. I'm talking about wearing personal protective equipment again. It's one of those things, like hand washing, that everyone knows that they are supposed to do.

There are two reasons to put all that stuff on:

1. To keep potentially contaminated body fluids from getting on you
2. To prevent you from contaminating your patient's open wounds

The minimum equipment that MUST be worn is a cap of some sort (to keep your hair from falling on the patient), mask and eye protection (mucus membrane protection), gown (protects your clothes), and gloves (obvious). Shoe protection is optional, in my opinion, unless you wear Christian Louboutin to work.

So you've been lax with your team. How do you get them to put everything on now? It's like getting your child to wear a bicycle helmet when they are fourteen.

- Create an expectation that everyone wear it and empower everyone to point it out. No exceptions. Physicians, this means you.
- Put all equipment just outside the trauma room door. The farther away it is, the less likely it is to be used.
- Assign an enforcer. Everyone entering the room must be dressed, or this person will speak up. Ideally, they should be a physician. If not, one of the docs must back this person up.
- Occasionally, a badly hurt patient gets rolled into the room with little advance notice. In this case the fully dressed people need to relieve those who are not as soon as they dress and walk into the room.

The top picture shows part of our trauma team assembling before a trauma activation. Everyone is dressed. They know that someone will call them on it if they aren't. Also, note the little pink sticker on the chest of physician at the head of the bed. We have a sticker for every role in the room (bottom picture). At the beginning of a resuscitation I scan the room to make sure everyone has one. It helps identify everyone and makes extraneous personnel stand out so they can be asked to leave the room.

Bottom line: Everyone has to wear their personal protective equipment on every trauma resuscitation. No exceptions.