

## Field Notes

# A Data Flow Sheet for Managing Unstable Patients in the Emergency Department

*Field Notes provides a forum for brief reports (approximately 1,000 words) on change concepts as applied to works in progress in quality improvement and patient safety. Readers are invited to send Field Notes proposals to Steven Berman at [sberman@jcaho.org](mailto:sberman@jcaho.org) (630/792-5453). James A. Espinosa, M.D., serves as Field Notes Editor.*



Visit <http://www.erflowsheet.com> to download and use the free data flow sheet.

*Dr. Harold Cross shares his Emergency Care Data Flow Sheet, which is “a one-page document that can portray the course of events during the ED stay clearly and succinctly to all providers.” The article is well worth reading. However, the data flow sheet’s deeper substrate and implications can only be appreciated by visiting the Web site. The organization (clearly and logically partitioned), practicality (easily accessible), and generosity (no fee) are a powerful reminder of the best-intentioned early visions of the Internet. The data flow sheet’s potential replicability to other applications in health care is significant. Yet Dr. Cross’ manner and spirit of Internet application is, in my opinion, just as profound an idea and change concept.*

— James A. Espinosa, M.D., Field Notes Editor

### Driving Forces

There are estimates of 100,000 wrongful deaths per year<sup>1,2</sup> in hospitals, including emergency departments (EDs). Distributed among 700,000 practicing physicians, these wrongful deaths would amount to about one patient death per physician every seven years. Therefore, an individual physician’s own experience may not be a helpful guide to the seriousness of the problem.

**Duration of Initiative:** 10 years

**Setting:** The Emergency Care Data Flow Sheet was developed by the author in 1995 at Bladen County Hospital in Elizabethtown, North Carolina. The data flow sheet was used on all emergency department (ED) patients seen at a community hospital in Beaufort, South Carolina, for two years (2003–2005), where total annual ED visits are approximately 15,000. Its use was terminated when another information-handling approach was introduced in an effort to augment physician documentation and the hospital’s remuneration. The author continues to use the data flow sheet for his ED patients.

**Whom This Should Concern:** Emergency physicians and nurses, chief executive officers, hospital trustees, and performance improvement and patient safety professionals.

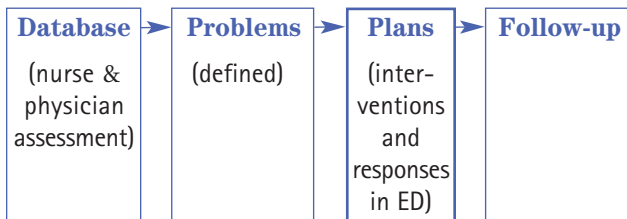
Trying to assess and improve the quality of care, given the way that medical information is usually handled, has been likened to a team of engineers trying to break the sound barrier by tinkering with a Model T Ford.<sup>3</sup> In the ED, “unstable patients”—as defined by abnormal vitals, specific symptoms (for example, pain level > 7), or interventions (for example, intravenous lines, analgesics, oxygen)—are seen in the context of many other patients. For each patient, 5 to 20 documents or papers can accrue in an hour or two (such as lab reports, electrocardiograms,

x-rays, computed tomography reports, ultrasound reports), which in turn present hundreds of values (such as blood pressure, pulse, temperature, and lab data). Therefore, it is easy to lose track of the data unfolding on an *unstable* patient who needs our expertise.

## Initiative Description

The Emergency Care Data Flow Sheet is a one-page document that can portray the course of events during the ED stay clearly and succinctly to all providers. For this information to be helpful in management, all interacting factors that are being monitored should be kept in *real time*. Absent or missing critical information can be easily spotted. The data flow sheet is designed for all care givers to record their findings, interventions, and observations. (Ideally, the data should be displayed on a wall liquid-crystal-display screen in the patient's room for all to see and respond to and should be electronically transferrable to the next provider.)

It may be helpful when considering care to classify it into four categories—as Weed<sup>4</sup> has done in constructing the Problem Oriented Medical Record:



The chance of serious error occurring in the process of care during the ED stay is greatest in “Plans.” This area is also the most difficult to describe and convey in the narrative because it involves many parameters, subjective and objective; interventions; nurse and physician observations; and data from labs, x-rays, and so on. The data flow sheet is designed to deal with this information.

## Assumptions

Care is provided to patients with the following assumptions:

- Minimal actions of care are expected on all patients.
- A system is in place to ensure that those actions are completed and acted on when abnormal.
- Quality of care is a high priority.

Unfortunately, none of these assumptions are consistently met. The format of the typical ED record can make confirmation of these assumptions tedious and time consuming.

*Quality* can be defined as doing correctly what was intended. The following are some examples:

- Were the predetermined minimal data obtained—for example, temperature, blood pressure, weight in all peds, and vital signs rechecked prior to discharge (procedural audit<sup>5</sup>)?
- Was appropriate and timely action taken on the result(s) (analytical audit<sup>5</sup>)?

The first component, procedural, can be done by a clerk. To be accurate, the second component, analytical, requires that the basic data (1) be present and (2) be recorded in real time. If these requirements are not met, judgments may be unsupported by evidence.

## What Has Changed?

When considering the interventions, both diagnostically and therapeutically, that have come on the scene in the past 50 years, it is apparent that it is almost impossible to keep track of all values for a given patient. Using a flow sheet to manage patients with diabetic ketoacidosis has been an accepted practice at least since the early 1950s. That was because there were a number of parameters that could interfere with recovery and there were appropriate corresponding interventions. For example, if a patient was found to have low potassium, immediate/appropriate correction is helpful in recovery. Yet, we now have numerous conditions where life-threatening aberrations (for example, major trauma cases; respiratory failure; congestive heart failure; renal failure; sepsis; adrenal insufficiency; patients immunocompromised because of human immunodeficiency virus, organ transplants, long-term steroids, and other immunosuppressant drugs) may occur and require prompt intervention for appropriate care and outcomes. A seemingly simple intervention of supplying extra oxygen to a patient with severe obstructive lung disease can result in carbon dioxide retention and death, unless he or she is appropriately monitored and managed with timely intervention as indicated by the data.

**Table 1. Time Needed to Perform the Procedural and Analytic Audits on Medical Records for 50 ED Patients**

Number of Pages/ Documents in the ED Record	Typical Record	Data Flow Sheet
<i>Procedural Audit</i>		
4-6	2-3 minutes	1-2 minutes
10-20	10-30 minutes	2-3 minutes
<i>Analytic Audit</i>		
4-6	5-10 minutes	2 minutes
10-20	30 minutes	2-3 minutes

## Barriers

Introducing the data flow sheet has usually met with resistance, reflecting reluctance to change customary procedures. Even when many nurses and physicians found it to be an efficient means of patient charting, others were able to subvert the effort.

## Metrics on Use of the Data Flow Sheet

During the first year (2003) of the data flow sheet's use at the the community hospital, the ED nurse manager randomly audited 20 records monthly for what were considered to be minimal parameters—for example, vital signs, pain assessment, time of triage, interventions, discharge vital signs, and weights in all pediatric patients (procedural or a clerical audit). He stated, "it took about 2-3 minutes per your flow sheet to review these items."

I then conducted two audits: (a) a procedural audit, to determine whether the minimal data were obtained, and (b) an analytic audit, to determine whether appropriate and timely action was taken on the result(s). The comparison of the conventional ED records and the records using the data flow sheet can be in found in Table 1 (above).

The mind's eye can process the whole picture (as on the data flow sheet) at a faster rate than reading narrative. Missing data, such as no entries on supplemental oxygen, the pain scale, or level of consciousness, are immediately evident. Interventions for aberrations and their timeliness can be quickly found.

## Results

Displaying data in the data flow sheet format reveals surprises, such as gaps in monitoring (for example, failure

to check or recheck pain level or fever, delays in respiratory support, antibiotics, and volume support). Providers at all levels ask more questions, and the process evokes interest and feedback. We live under the illusion that we function better than we do.<sup>6(pp. 119, 321, 340)</sup> Prompt and regular evaluation and correction will narrow this credibility gap, and fewer patients will "fall through the cracks."

The efficiencies inherent in the data flow sheet make it possible to quickly assess in a few minutes all of the records on a given

shift for deficiencies and thus provide opportunities to improve the quality of care provided.

When transferring patient information to the next provider, the receiving party can grasp the case in a couple of minutes rather than listening to a lengthy monologue.

## Key Learnings

- Rapid review and update of ongoing care: Patient responses (for example, pain level, peak flow rate, vital signs, urine output, Glasgow Coma Scale, results of lab tests, and radiologic findings) can be helpful in guiding further steps in care and avoiding misadventures.
- Transfer of information: A clear, concise picture of the patient's course is available for the next care giver—transport staff, change-of-shift staff, and physicians.
- Quality of care issues are easily and quickly spotted, often in time for correction—for example, timing of intravenous access, pain control, thrombolytics, antibiotic timing in sepsis and meningitis, hypotension, management of low or high potassium, and respiratory impairment.
- Complexity of care and amount of critical care time are easily assessed and with objectivity.
- Legibility is enhanced by use of printed headings.
- Warning! Implementation is due to fail unless there is consistent support from the top down, with regular audit and meaningful feedback. My experience in three organizations is that when administration waffles, use of the data flow sheet is haphazard, and that without corrective feedback it fails to serve its purposes.
- Care may look worse, not because it has changed, only because it is now visible. Used correctly, the data

flow sheet will tend to ward off malpractice. However, when this tool is used without feedback the process of care will be more exposed and may fail to show any indication of intent to improve.

■ Resist the temptation to remake the tool until you have used it for six months.

## What's Next?

*Leaders*—promoters of change, concerned performance improvement staff, chief executive officers, and trustees—should require the same level of thoroughness in the handling of medical data that is required of the clerical staff in securing the patient/family name(s) and necessary demographics. Peter Drucker put it this way: “Information is energy for mind work.”<sup>7(p. 27)</sup> Part of our task is to keep information in a format that is user friendly, so that the mind can quickly grasp the big picture to facilitate appropriate, timely intervention. My desire is to provide the safest, most efficient, timely care possible. The ED is a great place to do this!

## Contact Us

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Harold Cross, M.D., is an emergency department physician in Beaufort, South Carolina.

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