Improving Efficiency in Emergency Departments

a report by
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Emergency departments (EDs) throughout the country are plagued with long waits and overcrowding, which result in reduced patient satisfaction. The problem with overcrowding has resulted in many EDs repeatedly going on ambulance diversion. Schneider and others found that in one week 40% of EDs surveyed were boarding patients for 8.9 hours—many of whom were in hallways or doubled up in a room—and a further 31% were on ambulance diversion.[1] The problem with patient delays has resulted in a patient dying—ruled a homicide—while waiting to be seen in a Chicago area ED.[2]

In order to resolve the problem of ambulance diversion and ED overcrowding, hospitals must work on improving their efficiency in both the ED and inpatient units. According to standard LD.3.10, the Joint Commission on Hospital and Healthcare Organizations requires hospitals to develop and implement plans to identify and mitigate impediments to efficient patient flow throughout the hospital.[3]

There are no easy answers to resolving the issue of improving efficiency and reducing ED throughput. However, the best means of dealing with the problem is a well thought-out plan that encompasses planning and process, tracking systems and data, flow diagrams and benchmarks, techniques, overload and surge planning, and monitoring processes. Each of these factors will be discussed in detail, and a model to illustrate the application of an approach to the problem will be presented.

The first step in the throughput reduction process is to answer the following questions:

- Who needs to be involved?
- What is their level of authority?
- What committee structure is needed?
- Who needs to be in agreement?
- What is the role and buy-in of the line staff? and
- What process should be used?

Unless the process starts from the top down with buy-in from the chief executive officer and top-level management, it is destined for mediocrity or even failure. The top level of management needs to agree not only on what needs to be accomplished, but also on the process that is to be utilized. The process may take the form of process improvement or quality of care initiative. Whatever it is called, the team in charge must have the ability and authority to implement the changes being recommended. The team must establish good meeting ground-rules from the beginning, such as considering all options, avoiding blame, removing a silo mentality, and using a team approach. One of the first duties of the team is to determine which two or three issues are the most important to concentrate on first, as well as how to assess, measure, and monitor the success of these issues on an ongoing basis.

The committee structure or process used is not as important, as long as the changes are made in a timely fashion. It is essential that line personnel are involved in the process in order to ensure that the changes are 'do-able' and that the end-users will actually implement the recommended changes. It is also key to promote a list of quick fixes and not to get caught up in meeting mania. Realtime communication and promotion of all successes reinforces the work carried out by the group.

After determining which staff will be involved and which process will be utilized, good data must be obtained to determine where to place the group's efforts and to monitor success or failure of the changes. The following questions need to be answered:

- What data are needed?
- What type of tracking system is used?
- How can good data be obtained?
- What data analysis is needed? and
- How is the data analysis used?

The best data will be automated data points rather than receiver-dependent times. Having someone write down data points rarely provides accurate information. Therefore, an ED tracking system from patient presentation to discharge needs to be implemented. Once good data are obtained, the data analysis will need a strict focus. It is too easy to get caught up in looking at reams and reams of data. Choose key points to analyze and on which to focus efforts, such as door-to-doctor time, total average throughput time,

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or number of patients who walk out without treatment. Other data elements might include ED volume, ambulance volume, ambulance diversion times, patient source, ambulance waiting time, patient complexity, ED bed placement time, ED ancillary service turnaround time, nurse and physician workload, and hospital occupancy. Daily, weekly, or monthly reporting on the times or numbers must be communicated to hospital staff to celebrate the team's success.

The next step in the process is to establish agreeable time-frames for each point in the process, from ED triage to discharge. In order to accomplish this task, it is valuable to compose flow diagrams, establish benchmarks, agree on components of the throughput times, and monitor times. Each step in the process must be mapped out and include as much detail as possible. Time-frames for each step in the process must be determined from the data. Examples of time-frames and measures of productivity include:

- physician productivity: 2.0–2.5 patients/hour;
- nursing productivity: 1.7–2.1 patients/hour;
- registration clerk: 0.4–0.5 hours/patient;
- room-to-physician time: 15 minutes;
- total ED time: 180 minutes;
- total time for urgent patients: 150 minutes; and
- non-urgent patient total time: 60 minutes.[4]

The team must establish an efficient time period for each step in the process. The end-users must agree to what is reasonable based on the institution's current state of affairs. Once the steps in the process have been mapped out, the times have been determined, and all have agreed to efficient times for completion of each step, continual monitoring of the process is a must. If reasonable goals were set and implemented at the beginning, the monitoring will show success. If impediments are found, the goals may need to re-evaluated. If more opportunities for improvement are located, the agreed times can be reduced.

This process would not be complete without noting the importance of the hospital's efficiency in terms of ED throughput. Various studies have documented the close correlation between inpatient census and ED throughput. In a similar vein to the analysis and change put forward in the ED, hospital data must be collected, flow diagrams of the steps completed, inpatient standards established, and appropriate interventions determined. This improvement in hospital efficiency can be a continuation of the ED throughput project, sequential or concurrent to the ED process improvements.

The team can invent its own means of changing the process, review what other institutions have done, or examine the literature. The literature is sparse, with well-designed trials that have examined which processes work the best. In one of the most extensive studies on the rapid process redesign in a 48,000 academic ED, ED throughput reduced from 4 hours 21 minutes to 2 hours 55 minutes, and the number of left-without-treatments (LWOTs) were decreased by 92%. Multiple process changes were made, with a significant increase in staffing. The cost of making these changes increased staff costs by almost one million dollars annually.[5]

One model of improved efficiency can be found at Mount Sinai Hospital in Chicago. Mount Sinai Hospital is a 230-bed teaching hospital with a level 1 adult and pediatric trauma center seeing 48,000 ED visits annually. For many years the throughput of the ED had been noted to be long, and many reviews of the problem had occurred. Finally, an edict came from the top level of management and a consultant was hired to help the institution improve the ED's efficiency.

The process entailed a rapid design technique whereby all managers and representative line personnel were involved in improving throughput in the ED. During a six-week cycle, managers from each department reported on the means they had negotiated with the ED to improve service and efficiency in their area. All services—from housekeeping to pharmacy, from rehabilitation to cardiac catherization laboratory—were involved in the rapid process redesign. Each department presented plans to improve its own efficiency, then each week reported on its success in this process.

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This rapid process redesign resulted in the average patient throughput time being reduced by 32% and the number of walkouts reduced by 60% in six weeks. The keys to success included:

- buy-in from senior management and line personnel;
- celebrating successes;
- managers being responsible for determining the means and monitoring of their own processes; and
- good data analysis.

Although most of the improvements have been sustained, some backsliding has been seen since the project started. The process has now shifted to a rapid process redesign for the inpatient units.

Reducing throughput in the ED is an onerous process for most hospitals. A well-developed plan of action, dedicated management, and limited focus are the keys to success. The reduction of throughput must include process improvement for the inpatient units as well. ■

1. Schneider SM, Gallery ME, Schafermeyer R, Zwemer FL, Emergency Department Crowding: A point in time, *Ann Emerg Med*, 2003;42:167–72.
2. Sorrel AL, Woman's death in hospital emergency department ruled a homicide, *AMNews*, Oct 16, 2006.
3. Joint Commission, *2007 Comprehensive Accreditation Manual for Hospitals: The Official Handbook (CAMH)*, Oak Brook, IL: Joint Commission Publishing, 2007.
4. Karpiel MS, Benchmarking facilitates process improvement in the emergency department, *Healthc Financ Manage*, 200;54:54–9.
5. Spaite DW, Bartholomeaux F, Guisto J, et al., Rapid process redesign in a university-based emergency department: Decreasing waiting time intervals and improving patient satisfaction, *Ann Emerg Med*, 2002;39:168–77.