Surge: An Organizational Response to Emergency Department Overcrowding

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Abstract

• **Objective:** Emergency department (ED) overcrowding is a national crisis that has many root causes both internal and external to the ED. ED overcrowding can harm patients, impair the patient care experience, and lead to negative operational and financial performance. This article describes an initiative undertaken to respond to ED overcrowding through the development of a comprehensive organizational surge plan that took place at our institution from 2008 to 2009.

• **Methods:** The NEDOCS model was selected as an objective measure of ED overcrowding. A multidisciplinary leadership team worked together to create a comprehensive surge plan linked to the NEDOCS. This plan was scalable in terms of increased resource allocation to the ED based on the NEDOCS in order to alleviate crowded conditions. The surge plan was widely disseminated and made an organizational priority with the help of senior leadership.

• **Results:** There was a demonstrable improvement in ED operational metrics. Despite significant volume growth during this period, the ED was able to improve throughput times, decrease the number of patients that leave without being seen, and improve patient perception of their ED experience.

• **Conclusion:** Through a collaborative, multidisciplinary effort, the Ohio State University Medical Center was able to implement a scalable institution-wide surge protocol linked to the NEDOCS to address ED overcrowding.

Acute care hospitals across the country are concerned with the trend of rapidly increased demand for emergency services. Significant annual increases in patients seeking emergency care have left emergency departments (EDs) across the country overburdened. This strain on the system has shaken an already fragile health care safety net, leaving hospitals vulnerable to unmet patient demand, perceptions of lack of timely care, and liability. Patients increasingly wait for longer periods of time, walk out of EDs without treatment in higher numbers, and even find their ambulances diverted to another hospital because of the need to employ ambulance diversion to ensure patient safety. These concerns have received national attention and have been publicized in 2 recent high-profile reports [1,2].

As a result, the front door to the acute care hospital has been more difficult to access. While this may cause hospitals to lose potential lifelong health system patients, it also can have significant economic impact as many acute care hospitals generate a majority of their inpatient admissions through the ED and through EMS patients brought to the ED. Further, when patients do enter the system, their experiences are increasingly frustrated ones, leading to a negative impact on patient satisfaction scores and institution reputation. Numerous operational strategies have been proposed to provide temporary remedies to address these changes; however, few have addressed the root causes of overcrowding in the ED or have proposed system-wide solutions to address the problem.

This article describes an initiative undertaken to respond to ED overcrowding through the development of a comprehensive organizational surge plan that took place at our institution from 2008 to 2009. The surge plan was one aspect of a multifaceted process improvement initiative that also included redesign of patient flow processes internal and external to the ED and changes to physical facilities, including the opening of a clinical decision unit and expanded triage bed capacity. While first undertaken as a necessary intervention during frequent periods of high census, the stated goal was to avoid reliance on the surge plan as a routine response to ED overcrowding, favoring instead the implementation of sustainable improvements designed to minimize surge conditions.

Setting

The Ohio State University Medical Center is a provider of...
ED SURGE PROTOCOL

It was evident as we began to look at the root causes of ED overcrowding that the ED felt isolated from the rest of the institution as it attempted to deal with the continuous demands of patients for care and support. Although multiple clinical and ancillary services of the organization were responsible for providing service to the ED, too often the ED felt that there was less than adequate response and back-up. In discussions, many departments outside of the ED did not know when ED overcrowding existed and many were unaware of it as an institutional issue. As part of the development of the surge plan, we realized that a key element would be to increase organizational awareness and the commitment of resources to better match ED demand. To do so, less than acceptable process times, service levels, and throughput were documented and multidisciplinary leadership teams were constituted to address deficiencies.

Closely correlated to institutional awareness was a common understanding of what constituted overcrowded ED conditions. While the ED had internal standards for what it considered overcrowded, it was evident that these did not easily correlate with the rest of the institution. As a result, coming up with a common language and method to quantify and articulate the degree of overcrowding became an important component of the surge plan development. To accomplish this, we adopted the measurement and continuous reporting of the National Emergency Department Overcrowding Scale (NEDOCS) using a model and surge plan outlined for the Los Angeles County+USC Medical Center (CJ Celentano, personal communication).

The NEDOCS is a quantitative, prospectively validated index utilized to approximate the degree of ED overcrowding in large academic EDs [3-5]. Although ED staff can subjectively provide an assessment of how busy or overcrowded the ED feels, the NEDOCS allows for an objective, numeric system that allows the institution as a whole to “speak in the same language.” The NEDOCS formula utilizes a number of variables, including ED and hospital beds, wait times, and patient acuity, to yield a score between 0 and 200. The score falls along a color-coded scale ranging from “not busy” to “dangerously overcrowded,” as follows:

- 0–20 (green) = Not busy
- 21–60 (yellow-green) = Busy
- 61–100 (yellow) = Extremely busy but not overcrowded
- 101–140 (orange) = Overcrowded
- 141–180 (red) = Severely overcrowded
- 181–200 (black) = Dangerously overcrowded

Specific ED and organizational responses can be triggered by a given score, allowing for a proportional response and scalability.

In discussions with key stakeholders from across the institution, we consistently heard that having a visible reporting mechanism so that persons outside of the ED can be aware of the ED’s status would be critical for success. As such, in the early stages of development we involved the medical center’s information technology department to gain approval and buy-in to place the NEDOCS score on the internal home page of the entire health system. Our ED uses an electronic medical record (EMR) called ED PulseCheck (PICIS Co., Wakefield, MA). One of our faculty members created a real-time website that interfaces with the ED PulseCheck system to download information to calculate the NEDOCS score once every minute (Figure). All the variables that make up the NEDOCS score are displayed, as well as the number of patients in the waiting room. Information is provided about the number of patients seen in the ED and the number of admissions to the hospital for yesterday, today, and the last hour. Finally, a graph is displayed at the bottom of the website that shows the NEDOCS scores over the last 24 hours. Each point on the graph represents a 15-minute average score. This page is available to everyone within the medical center and on the medical center’s home page in the form of a color indicator that displays the NEDOCS score.

Implementation

With the NEDOCS as an objective basis for mobilizing the organization, surge plan development was undertaken in an offsite retreat setting. In addition to ED leadership, participants included leaders from the laboratory, radiology, patient placement, senior administration, nursing, environmental services, management engineering, information technology, and safety. The stated purpose was threefold: to promote awareness of ED overcrowding as an organizational issue, to provide education on the NEDOCS as an objective tool, and to develop specific departmental and service responses.

ED leadership conducted the educational component of the retreat, reviewing definitions and presenting actual ED scenarios which drive the NEDOCS scores. A cause-and-effect diagram showing “ED gridlock” as the effect to be
minimized was used to elicit group discussion of the causes from all perspectives. A list of potential specific actions by involved departments for each level of the NEDOCS was considered for inclusion or exclusion in the surge plan draft. This exercise led not only to specific surge plan actions but also illuminated the nursing, ancillary, and support department limitations in responding to the competing demands of the ED and the rest of the hospital.

The outcome of the retreat was a list of agreements to be included in the surge plan draft that was later crafted into a document, sent through administrative and medical staff approval processes, and recommended for implementation. The major elements of the plan included a description of the deployment actions within the ED, reprioritizing the pending workload in the radiology and laboratory, expediting bed cleaning and assignment processes, and creating a mechanism for on-call nurse staffing of additional inpatient beds. In addition to the administrative and medical staff venues for communication, IT representatives worked with internal marketing and communications staff to place the NEDOCS icon on the intranet home page. This created broad visibility and awareness of the ED’s status in real-time, further supporting the message that ED overcrowding is an organizational issue.

**Results/Outcomes**

In daily practice, the NEDOCS is continuously calculated and frequently monitored by the ED charge nurse, the ED shift assistant nurse manager, and the ED attending physician. As the NEDOCS increases or ED metrics begin to
trend in a negative direction, the ED begins to internally “ramp up” activities targeted to patient flow. When the ED reaches the red level or “severely overcrowded,” a number of specific interventions start to take place that include maximizing all treatment spaces, expediting patient transports to the floor or testing, expediting admissions, or calling in an on-call attending physician to work in our intake/triage area to see and evaluate patients from the waiting room. External to the department the bed placement/transfer center, environmental service, ancillary services, and transportation are alerted to the ED starting its “surge” via text page to key leadership in these areas; with the goal of optimizing patient flow. The nursing and medical directors of the department are also included in this page so that they can assist in mobilizing resources.

In most cases, the above interventions are sufficient to prevent further deterioration, improve conditions, and maintain unit safety. However, occasionally due to overwhelming demand or burden of critically ill patients, the NEDOCS will rise to the black or “dangerously overcrowded” level. With input from the directors, the black NEDOCS is a trigger to prompt consideration for ambulance diversion status and holding acceptance of ED-to-ED transfers if current ED resources are insufficient to adequately care for additional patients. In addition, inpatient units are asked to pick up patients in the ED, ancillary service staffing is increased and response provided to the ED (lab, respiratory therapy, and radiology), and additional “surge” inpatient unit beds can be opened up if necessary to add additional on-demand capacity to get ED patients out of the ED and into the inpatient setting more quickly.

To enhance awareness of the fully implemented ED surge, an overhead page is sent throughout the hospital as well as updated text pages to key leadership. This provides further assistance by inpatient units as well as informs members of the medical staff that they may be asked to provide assistance to seek alternative treatment sites for some ED patients within their area of expertise. If the ED remains in a critical state, and conditions further deteriorate, a full internal disaster response that activates the hospital’s incident command center can be considered (but has not been necessary to date). As such, the ED surge protocol is scalable, allowing the ED to handle normal operational conditions but allowing for a mechanism to scale up interventions based on conditions on the ground. It also allows for an institution-wide response that is benchmarked to ED conditions and institutions capacity as defined by the NEDOCS. Since the implementation of the organizational surge plan application, the ED has called for a “red” surge approximately 10 times a month. A “black” surge notification occurs 1 to 2 times per month.

The surge protocol helped to dramatically improve operational performance metrics coupled with other ED operational improvements and expanded ED capacity over the same time period. The percentage of patients that left without being seen went from a 7% average (pre-improvement) to a 2.8% average (postimprovement). Hours of ambulance diversion went from 794 hours in 2008 to 12 hours in 2009, the lowest among all EDs in Columbus. Door to provider, provider to disposition, and disposition to out of the ED times have improved significantly, reducing patient processing times and smoothing movement of patients through the department. The above operational improvements occurred during a period from 2008 to present, where our ED volume has increased from approximately 64,000 to 72,000 visits annually. Further, Press Ganey ED patient satisfaction scores have increased substantially over the same period, from 71% to 85.6%. The ED patient satisfaction scores have earned the ED 3 consecutive quarterly awards for service excellence and exceeding goals from the medical center. Staff and leadership satisfaction with the ED has also dramatically improved. This improved perception has led ED staff to feel valued in that the medical center has invested and supported ED operations.

Innovation

Our institution is not the first to successfully implement an institution-wide ED surge protocol or even to link ED overcrowding and responses to same to the NEDOCS. With this said, we feel our approach is innovative in how we leveraged this process of creating the surge protocol into larger ED operational improvement success through collaborative, multidisciplinary teamwork across all levels of our organization. The teams that worked on many aspects of the surge protocol identified numerous opportunities for ED process improvement. The larger ED surge retreat with senior leadership and key stakeholders helped solidify support for the ED and its needs across the organization. It also served to break down institutional silos and highlighted the importance of working together as one team and one medical center for the care of our mutual patients.

We believe that information technology’s involvement in the creation of the surge protocol is novel. We are unaware of other institutions that have the capability to continuously update the NEDOCS for the ED and link to a highly visible web-based home page. The creation of this program with interfaces to our ED EMR, the reporting and visual depiction of the NEDOCS and ED operational metrics, and the ability to see the real-time NEDOCS anywhere within the institution have not to our knowledge been previously reported.

Applicability

We feel that what we have described above is scalable, applicable, and feasible for others to duplicate. In essence, the
ED surge protocol we have developed was an exercise in institutional teamwork and a collaborative effort to break down institutional barriers that negatively impact ED operations and contribute to ED overcrowding. ED overcrowding is widely recognized as a national crisis, and other strategies to identify, characterize, and combat overcrowding have been widely reported [6–9]. Web-based scoring tools for the NEDOCS are readily available (e.g., www.nedocscalculator.com and http://hsunm.edu/emermed/nedocs_fin.shtml).

Practical Advice/Take Home Message

In an undertaking such as this, there are lessons to be learned about organizational culture, politics, and change management. There were several keys to our success that allowed us to tackle an institution-wide problem that has eluded many health system reform efforts across the country.

First and foremost was a commitment by senior leadership to provide the resources and the organizational inertia to break down cultural sticking points and roadblocks. Their resources, administrative support, and clout within the organization helped to make the problem of ED overcrowding visible to patient care areas and practitioners outside of the ED. Further, it helped to establish organizational ownership of ED overcrowding.

Second, we learned the value of making a problem visible. Many within our institution were unaware of the severe overcrowding conditions that existed in our ED. Bringing heightened awareness to the problem allowed for many creative volunteered solutions from leadership outside the ED. This helped to cement a sense of organizational ownership of the problem of ED overcrowding, shifting the emphasis from “an ED problem” to “a systems problem.”

Finally, the importance of effective communication was vital to our success. Multiple strategies had to be utilized to “get out the message.” This included email, mailings to members of the medical staff, a video blog by the health system’s CEO, and numerous in-person presentations about the surge plan and the NEDOCS at departmental meetings, medical staff leadership meetings, and organizational operations committees.

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References


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