Using Predictive Analytics to AVOID REACTIVE SURGE MANAGEMENT
Critical patients wait hours in the ER for a bed to become available in the ICU. ICU patients with days-old transfer orders wait for a telemetry bed. Other patients leave the emergency department without being seen, and ambulances divert to other hospitals.

Does this scenario sound familiar to your hospital or health system?
It’s no secret that high census days wreak healthcare havoc, triggering gridlock across a hospital.

Leaders scramble to respond: calling on nurses to work extra shifts, opening closed units, working frantically to find a few extra discharges and post-acute placements. It can take hours to coordinate the right response and negotiate who will do what.

Unanticipated volume surges are expensive too: they take key personnel away from patient care and important administrative work and incur unplanned extra staffing costs. And when ER patients walk out without being seen – or ambulances are diverted – potential revenue follows them through those sliding ER doors.

**Let’s take a look at some key patient surge triggers.**
Patient Surge Hotspot #1: The Emergency Department

Permanently curing capacity issues requires long-term, strategic improvements to match supply and demand for hospital beds. But short-term preparedness can help hospitals better cope with surges.

The ED is often the “canary in the coal mine.” When the hospital is full, admitted patients may “board” for hours, or even days, on stretchers in the ED waiting for beds. With a full waiting room, patients begin to walk out rather than wait to see a doctor. Ambulances divert to other hospitals, and the hospital loses potential revenue.

Worst of all: ED overcrowding is associated with worse clinical outcomes and higher mortality rates.¹

When is the right time to call for help?

ED doctors and nurses say they know overcrowding when they see it. But hospital leaders want clearly defined parameters backed by solid research that can tell them when an ED is merely busy or on the verge of an overcrowding crisis.

While each hospital is unique, researchers have developed an array of standardized scales for identifying surges across EDs of different types and sizes around the world. These include the free, publicly available NEDOCS Score for Emergency Department Overcrowding¹, which is geared primarily toward large, academic trauma centers; the CEDOC for community hospitals²; READI, which takes staffing levels into account; EDCS, which factors in hospital occupancy; EDWIN³; and SONET.

That’s a lot of acronyms. And they require a lot of manual effort on the part of your already busy team.⁴

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¹ www.mdcalc.com/nedocs-score-emergency-department-overcrowding
² ibid
³ providers.otddi.com/edwin/edwin_calc1.html
Whatever scale a particular ED chooses to use, and they may test several of them simultaneously, they should take frequent daily measurements, comparing the scores to what practitioners and patients are actually experiencing on the floor.

**But as useful as these scales are, they can only tell the hospital that the storm has hit – they don’t forecast the weather.**
Patient Surge Hotspot #2: Inpatients

Surges are an issue for the entire hospital – not just the ED. Inpatient capacity measures can also be used as triggers for surge responses and be a critical element in surge planning.

Traditional patient census measures include midnight and noon census, and typically count beds in such specialty areas as obstetrics, pediatrics, and epilepsy monitoring separately.

But more frequent assessment (hourly, for example) of non-specialty utilization, incoming admissions, and anticipated discharges can help accurately predict surges and trigger responses.
High bed utilization rates (above 85 or 90 percent, for example) often suggest the potential for overcrowding, but such gauges should be field-tested. What level of utilization actually leads to hospital logjams and the risk of compromised clinical care? What should the hospital measure in addition to non-specialty inpatient census? Is there a shortage of telemetry beds, for example, even when the general census is low? What kind of bottlenecks does that create and what can staff do to address them (i.e., prioritize those discharges?)

Hospitals shouldn’t wait until the ED is bursting at the seams to implement a surge plan when inpatient bed utilization rates are setting off warning bells.
Patient Surge Hotspot #3: Practitioners

A lack of available beds isn’t the only source of hospital bottlenecks and delays. The lack of staff and providers to care for newly admitted or transferred patients can also create major disruption.

Nurse staffing strongly correlates to bed capacity – when nursing units are not open and existing beds are unavailable for patients who need them, a shortage of available nurses to take care of those patients is often to blame.

Nurse staffing is typically ratio driven: the typical ICU, for example, may have one nurse for every two patients, while a monitored floor might have one nurse for every four beds. Some states regulate these ratios, and institutional policies as well as collective bargaining agreements may also mandate nurse to patient ratios.
Nurse-to-patient ratio requirements mean that an empty bed may not be an available bed. Efficient staffing models will take these ratios into account and help hospitals match the supply of nurse labor to patient demand.

In addition, they will help the hospital predict surges and staff up as appropriate so that nurses and other essential hospital staff members (techs, housekeeping and transport staff, etc.) are in place and prepared for patient surges.
On the physician side, most hospitals have coverage and call arrangements that usually prevent a doctor-triggered bottleneck from occurring. At teaching hospitals, however, regulations that limit the work hours and patient loads of residents can complicate scheduling and generate shortages or delays in assigning doctors and teams.
Siloing, when providers are assigned to highly specialized admitting teams (cardiology, neurosurgery, orthopedic surgery, for example), can also create provider shortages and delays, reducing effective capacity because some specialized teams may be fully utilized while others are not. More significantly, major delays occur when it requires a three- or four-way discussion to determine who will accept a new patient.

Incentives can also be an issue. At some academic hospitals, for example, providers may have few incentives to take on more new patients.
How can hospitals manage physician staffing issues in the face of patient surges?

Reducing silos can help: merging teams, allowing overflow between teams, and encouraging teams to be more flexible about which types of patients they accept. Even highly specialized academic hospitals should consider assembling robust hospitalist or general internist teams to help rapidly accommodate spikes in patient volume.

In addition, developing institutional policies for team assignments rather than making recurrent, case-by-case decisions is critical. Empowering emergency physicians and the admissions office to make “automatic,” single-step assignments will dramatically reduce delays.
Resolving the Patient Surge Predicament: The Role of Data

As the saying goes: a failure to plan is a plan to fail. Unanticipated patient surges cost hospitals money (lost admissions, lost transfers, canceled surgeries), risk their reputations, and can harm patients.

But overreacting or misreading the signs pose their own risks: triggering unnecessary surge actions or targeting the wrong areas also entails expense and can weaken the staff’s commitment to surge planning.
Surge plans are a tool for managing the crisis that a high census day creates. They standardize the triggers for action and create consensus. They improve reaction time and guide next steps. They create protocols so crucial steps don’t get missed and important people don’t get left out. And they can identify bottlenecks so that leaders know where to focus.

Over time, surge plans can be analyzed, refined, and improved. And with the right technology, hospitals can even predict surges, giving them precious extra time to plan.
The good news is that technology-based systems can now help hospitals perfect their surge plans by identifying early, accurate, specific, and targeted triggers for surge response activation – at every patient surge hotspot.

Think of these surge planning tools as today’s healthcare early warning system.

New technology-based surge planning tools analyze current hospital statistics in light of historical data to simulate events and actually predict patient surges, giving hospital leaders the early insights that they need to be prepared before the next perfect storm hits.

They do so by leveraging the wealth of data a hospital or health system has amassed (e.g., the data stored in electronic health records, and in bed management and other hospital systems) to accurately predict surge days in advance, allowing the hospital to maintain patient care quality, reduce unnecessary costs, and minimize the burdens on staff.
In the emergency department, the most obvious relevant data include how many patients are waiting to be seen, how many are currently being treated, and how many already admitted patients are waiting for a bed.

But other information can be critical. Is it flu season? Has a bad storm left the roads covered in ice? Is a major musical festival taking place down the street? All of these events can have a significant impact on emergency room traffic.

Advanced data systems can integrate the traditional ED statistics with other relevant information such as historical demand, weather patterns, seasonal fluctuation, and local events, and forecast ED demand days in advance to predict the number and type of patients (critical care, med-surg, etc.) and mix of acuities arriving hour-by-hour.
To address surge planning at the inpatient level, advanced data approaches combine forecasting with simulation modeling across the entire hospital or health system to predict well in advance when the hospital could experience things like a shortage of critical care beds. This advance warning gives the hospital time to prepare the appropriate, specific, targeted responses such a situation requires, rather than implementing a hospital-wide surge protocol.

And at the provider level, addressing the ways in which doctors, nurses, and other staff can trigger bottlenecks ensures healthcare professionals can focus on their ultimate goal – taking good care of their patients.
Advanced technology-based surge planning tools combine and integrate data from multiple sources and systems (e.g., electronic health records, physician order entry systems, bed management, and finance) via all admission avenues (the ED, direct admission, and scheduled surgeries). They run thousands of simulations with real data and capture variable metrics. They don’t just predict and pinpoint problems: they allow hospitals to test what-if solution scenarios and avoid putting staff through stressful and time-consuming trial and error processes.

These tools don’t just give hospitals a rear-view mirror look at where things went wrong: they deliver advanced tactical forecasting that can give hospitals three or more days’ warning of volume spikes, and strategic tools to make the right long-term decisions.

These surge planning tools also feature dashboards that break down walls between hospital departments, allowing everyone to see, understand, use, and update the same data and analysis in real time. This “radical transparency” generates trust and promotes engagement and consensus.
The Hospital IQ operations planning and management platform transforms data from your traditional IT systems into actionable surge planning information for your organization. The platform incorporates widely accepted operations management principles, such as variability methodology and queueing theory, in its state-of-the-art analytics engine. The combination of data, machine learning, artificial intelligence, and algorithms provide a powerful toolkit to drive decision-making for both short-term improvements and long-term strategic planning.

Hospital IQ’s deep data and analytics capabilities accurately forecast patient capacity issues before they occur, helping hospitals eliminate surge predicaments, improve revenues, maintain staff morale and, most importantly, stay focused on delivering the best possible care to patients.

To learn more, visit www.hospiq.com/census