



WHITEPAPER

Unlocking the Emergency Department

How Predictive Analytics and AI
Restore Patient Flow

The Crisis of ED Boarding

Every minute, an emergency department (ED) somewhere in the U.S. is forced to turn away an ambulance — not due to clinical limitations, but because of gridlocked hospital capacity. More than 90% of hospitals report boarding patients in the ED for extended periods, with stays stretching into days now alarmingly common. This growing crisis, known as ED boarding, impedes timely access to care, increases the risk of patient harm, exacerbates staff burnout, and imposes a heavy financial toll on hospitals.

Many hospitals now see ED boarding as the ‘new normal.’ The crisis has even entered popular culture — most notably in the Max series The Pitt, which portrays the daily challenges of an urban ED grappling with patient acuity, flow constraints, and prolonged boarding.

A recent study published in the *Annals of Emergency Medicine* found that prolonged ED boarding (exceeding 6 hours) was associated with increased inpatient mortality and length of stay, underscoring the clinical consequences of poor patient flow. The American College of Emergency Physicians (ACEP) has characterized ED boarding as a “public health emergency” due to its cascading effects on outcomes, safety, and throughput.

The financial impact is equally staggering. It’s estimated that ED boarding costs the U.S. health system \$12 billion annually. Additionally, ED boarding inhibits a health system’s ability to admit external transfers to their health system. This impact can be up to \$20,000 lost per declined transfer.

The root causes are multifactorial: rising demand from aging populations and deferred care, shrinking hospital capacity due to financial constraints, and chronic staffing shortages. Traditional approaches — such as constructing new beds or hiring more personnel — are no longer feasible solutions in 2025 and beyond. These capacity constraints demand a reimagined, tech-driven strategy to improve throughput and reduce friction across the inpatient ecosystem.



Orchestrating Flow Through Data and Intelligence

Improving ED throughput requires reengineering the hospital as a dynamic, interconnected system — where every unit, department, and care transition point functions as part of a coordinated whole. Similar to an air traffic control system, predictive analytics and artificial intelligence (AI) enable hospitals to manage patient flow with precision, anticipating demand and aligning resources in real time.

Achieving this orchestration requires more than awareness of current bottlenecks — it demands forward-looking intelligence. Hospitals must forecast what lies ahead, often days in advance. A hospital that fails to plan for tomorrow's discharges or predict a surge in ED arrivals is already behind. AI-enabled systems provide early warning signals: when discharges are trending too late in the day, when staffing won't align with forecasted admissions, or when specific units are at risk of gridlock.

Rather than reacting to crises as they occur, hospitals can use predictive insights to make proactive, system-level decisions. By embedding AI and automation into their operations, health systems unlock hidden capacity and create a more resilient, responsive care environment — one that supports timely patient movement and reduces the strain on frontline staff.



Three Ways Predictive Analytics and AI Unlocks the Emergency Department

1. Accelerating the Last Mile of Discharges

Delays in discharging patients from inpatient units directly limit ED throughput. The last mile of a hospital stay is often the most operationally complex, with clinical, logistical, and social barriers contributing to variability and delay. Discharge coordination is often fragmented, requiring multiple stakeholders — nurses, case managers, physicians, transport teams, and environmental services — to align on a timeline without the benefit of centralized, predictive tools.

AI and predictive analytics streamline this process by:

- Surfacing real-time discharge-ready patients using machine learning models that factor in historical trajectory, clinical milestones, and likelihood of barriers.
- Providing a morning discharge snapshot that flags patients likely to leave that day, allowing teams to prioritize rounding, medication reconciliation, and transportation.
- Highlighting trends such as late-day discharge peaks or unit-level variation, enabling leaders to create targeted interventions to smooth the discharge curve.

By accelerating discharge decision-making and task execution, hospitals can free up beds earlier in the day — unlocking inpatient capacity and accelerating ED-to-inpatient transitions.



↓ **50%** in discharge processing times

90% estimated discharge date compliance

↓ **1/2 Day** in average length of stay

[Read the case study](#)



2. Optimizing Patient Placement Across the Health System

Not every patient who arrives in the ED needs to be admitted to the main hospital campus. Yet, without visibility into alternative care settings, and without confidence in patient trajectory, default decisions often push patients into already overcrowded facilities.

Predictive analytics and AI enable smarter, more coordinated placement decisions by:

- Triaging patients to the right level of care based on predicted inpatient trajectory, clinical acuity, and site-specific capabilities.
- Offering automated recommendations for hospital-at-home programs, step-down units, or community hospitals when appropriate.
- Continuously monitoring capacity across all sites and surfacing opportunities to load-balance demand across the system in real time.

These tools help preserve the highest-acuity inpatient beds for the patients who need them most, reduce unnecessary transfers, and create more flexibility in responding to ED surges.



**SARASOTA
MEMORIAL**

HEALTH CARE SYSTEM

\$200M

in capital
costs avoided

95K

discharges through
lounge in 44 months

↑75

patients discharged
per day

[Watch the webinar](#)

3. Forecasting and Managing ED Demand in Real Time

Even with efficient inpatient throughput, the ED remains a complex and volatile care environment. Demand is inherently dynamic — shaped by time of day, day of week, flu season, and even regional events — and must be managed minute to minute.

AI-powered tools transform the way ED leaders manage capacity by:

- Generating short-term forecasts for ED arrivals, diagnostic delays, discharge barriers, and inpatient admissions by shift.
- Identifying downstream bottlenecks — such as full imaging queues or closed inpatient units — before they trigger backlogs.
- Delivering proactive alerts and suggested actions via communication platforms, allowing for quick response to evolving situations.

These capabilities empower clinical and operational leaders to proactively reroute staff, initiate surge protocols, or reallocate beds — helping to avoid bottlenecks before they happen and improving both patient throughput and provider experience.



**Baptist
Health**

↓ 525

patients boarded in
the ED per month

↓ 7%

in lost transfers

↑ 6%

in admissions

[Watch the webinar](#)

iQueue for Inpatient Flow: A Proven Solution

LeanTaaS' iQueue for Inpatient Flow exemplifies how AI and automation can reshape hospital operations. iQueue synthesizes real-time data from EHRs, predicts future demand, and orchestrates care across facilities and teams. The result: a more resilient inpatient flow that reduces pressure on the ED and improves the experience for patients and providers alike.



Proven Results

30 health systems

↑5% daily discharges

100 hospitals

↓25% transfer declines

30K inpatient beds

↓12hr inpatient stay

↑2% total patient admissions



The Future of Intelligent Inpatient Flow

Emergency department boarding is not merely an ED problem — it is a symptom of hospital-wide inefficiencies. Addressing it requires a system-level perspective, one that treats every node in the care journey as part of an interconnected whole.

Predictive analytics and AI unlock the potential to restore flow, reclaim capacity, and reduce the cost of care delays — without the need for new construction or excessive staffing. With proven solutions like iQueue for Inpatient Flow, health systems can act with precision, speed, and foresight to transform their operations and deliver better care.

[Request a Demo](#)

[Watch a Webinar](#)

[Read Success Stories](#)

[Learn about LeanTaaS](#)



