Qventus

Hardwiring Discharge Planning Best Practices to Decrease Length of Stay

By Peter Kriss, PhD, Jason Cohen, MD, Michael Mucha

Abstract: As Covid-19 amplifies existing operational challenges faced by health systems in the United States, effective length of stay management has become especially critical for reducing margin pressure and increasing effective capacity. Recent analysis has uncovered two key best practices for reducing length of stay and excess days: early discharge planning and proactive management of discharge barriers. Progressive health systems are hardwiring these data-driven best practices using "real-time operations" technologies, which combine advances in artificial intelligence and behavioral science, along with expertise in process improvement and change management. With new innovation, organizations can create effective capacity, generate significant financial value, and increase patient satisfaction — without adding additional staff.

Operational Excellence is the Key to Optimizing Length of Stay

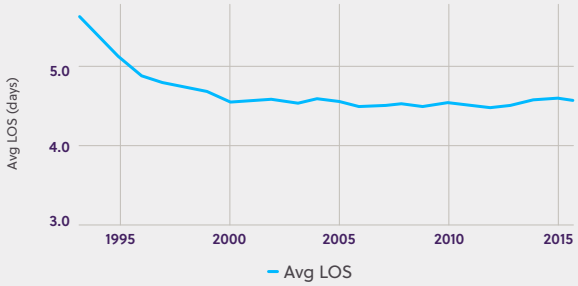
Despite world-class clinicians and cutting-edge technologies, U.S. health systems continue to be held back by poor operational systems and processes. In particular, length of stay inefficiencies create significant operational pain. With excess days comprising 22% of hospital days, patients are now staying a full day more on average than necessary.[1] This results in:

- Uncompensated labor and direct patient care costs
- Lost revenue from potential new patient volume
- ED boarding, OR holds, and other patient flow bottlenecks across the hospital
- Decreased patient satisfaction
- Increased hospital acquired infections, falls, and other complications

Although health systems have made significant investments in electronic health records (EHRs) and performance improvement initiatives, length of stay improvements have plateaued over the last two decades (Fig. 1). Meanwhile, health systems face greater margin pressure than ever, with the Congressional Budget Office projecting that 40-50% of hospitals could have negative margins by 2025.[2] As an aging population drives the shift in high-margin commercial payers to lower-margin Medicare plans, health systems are becoming increasingly focused on running Medicare breakeven operations. Furthermore, Covid-19 drove down surgical volumes, exacerbating preexisting stresses on hospital margins while straining capacity, which had already declined by 18% on a per capita basis between 2000 and 2017 as a result of health system consolidation and hospital closures.[3] As physicians and nurses report unprecedented levels of burnout, continued reliance on frontline care teams to drive further efficiencies is neither practical nor sustainable.

1 Data Primer: Avoidable Hospital Days. The Advisory Board, 2019
2 Projecting Hospitals' Profit Margins Under Several Illustrative Scenarios. Congressional Budget Office, 2016
3 The World Bank Open Data, Hospital beds (per 1,000 people) - United States

Figure 1:
Average Inpatient Length of Stay, U.S. Hospitals



Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project

New Analysis: Best Practices for Reducing Length of Stay & Excess Days

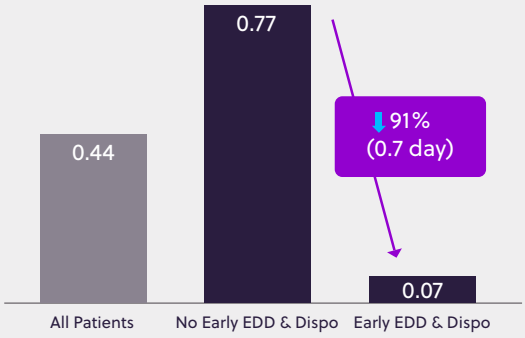
In the face of unprecedented financial pressures and operational challenges, health systems that implement best practices to reduce length of stay stand the best chance of surviving. Qventus conducted a multi-hospital retrospective analysis of 75,478 patient encounters across 11 U.S. hospitals of different sizes, clinical models, and levels of performance. The analysis identified two best practices that have a significant impact on length of stay: **early discharge planning** and **proactive management of discharge barriers.**

1. Early Discharge Planning

On average, patient encounters analyzed had 0.44 excess days (Fig. 2), with excess days defined as the difference between a patient's actual length of stay (LOS) and the geometric mean length of stay (GMLOS) for the corresponding DRG.[4] When care teams engaged in early discharge planning — identifying an estimated date of discharge (EDD) and expected discharge disposition by the second midnight of stay — patients had, on average, 91% (0.7 day) fewer excess days than patients who did not have an early discharge plan.

However, the next question was whether this pattern applied across clinical conditions. Additional analysis examining excess days by common DRGs (Fig. 3) revealed that the impact of early discharge planning persisted across a continuum of clinical complexities, from sepsis to joint replacements.

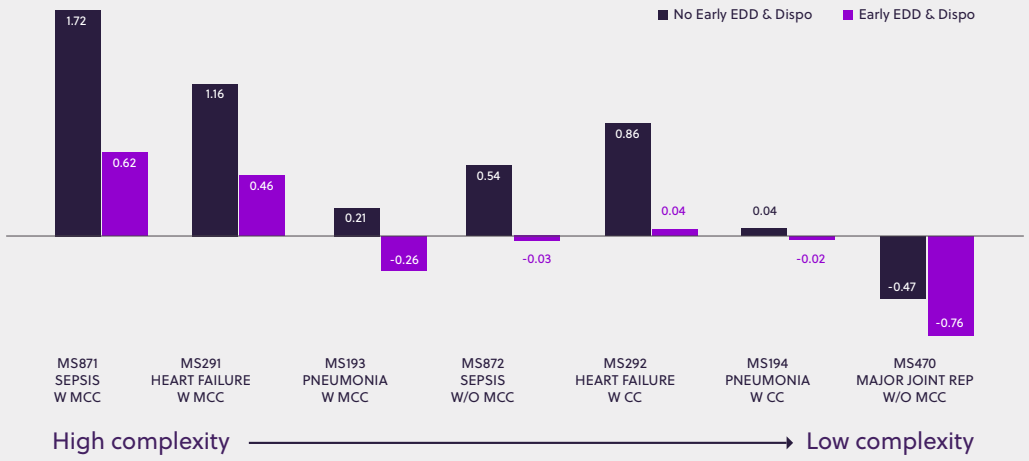
Figure 2:
Excess Day Impact of Identifying EDD & Disposition by Second Midnight of Stay
Units: Excess Days per Patient



Source: Qventus analysis, includes only patients with GMLOS between 3 and 7 days. The "No Early EDD & Dispo" cohort includes encounters where EDD and disposition were documented after the second midnight of stay, or not documented at all.

4 Only patients with GMLOS between 3 and 7 days were included in the analysis to reduce the impact of length of stay outliers

Figure 3:
Excess Day Impact of Identifying EDD &Disposition by Second Midnight of Stay Across Major DRGs
Units: Excess Days per Patient

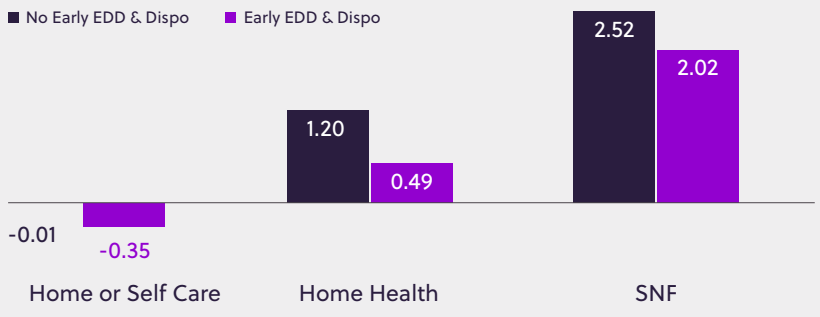


Source: Qventus analysis. The "No Early EDD & Dispo" cohort includes encounters where EDD and disposition were documented after the second midnight of stay, or not documented at all.

2. Proactive Barrier Management for Complex Discharges

While early discharge planning is important for all patients, this best practice alone is insufficient to achieve the excess day reductions that many health systems target as they seek to reach Medicare breakeven. As illustrated in an analysis of encounters with select dispositions (Fig. 4), patients who require post-acute care placement or services continue to drive high levels of excess days, even after accounting for gains achieved by early discharge planning. When EDD and disposition were identified before the second midnight of stay, patients requiring home health services or being discharged to SNF still experienced 0.49 and 2.02 excess days, respectively.

Figure 4:
Excess Day Impact of Identifying EDD & Disposition by Second Midnight of Stay Across Select Dispositions
Units: Excess Days per Patient



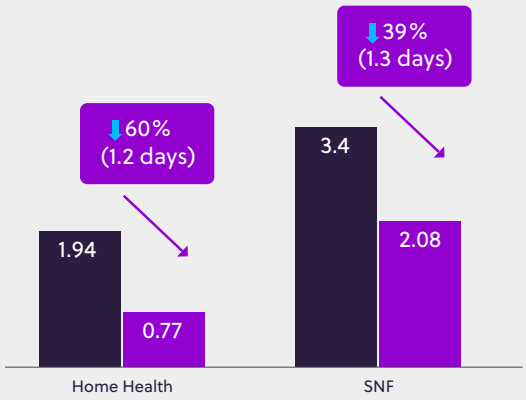
Source: Qventus analysis. The "No Early EDD & Dispo" cohort includes encounters where EDD and disposition were documented after the second midnight of stay, or not documented at all.

The elevated levels of excess days for patients discharging to SNF or requiring home health services are not surprising, as care teams need to manage many more process steps and potential bottlenecks. For example, managing discharge to SNF involves coordinating with the patient's family on facility choice, ensuring up-to-date documentation from therapy services, securing placement, obtaining prior authorization, and arranging transportation.

Therefore, for patients who discharge to a post-acute care setting or require home health services, the second best practice for reducing excess days is the identification of discharge barriers by the second midnight of stay. As shown in Fig. 5, among patients requiring home health services and having documented barriers, when early discharge planning and barrier identification were conducted, excess days decreased by 60% (1.2 days). For patients discharging to SNF, excess days decreased by 39% (1.3 days) when barriers to discharge were identified early. These findings demonstrate a significant opportunity for care teams to reduce length of stay.

Figure 5:
Excess Day Impact of Identifying Barriers by Second Midnight of Stay Across Select Dispositions Among Patients with Early Discharge Planning

Units: Excess Days per Patient



Source: Qventus analysis, includes encounters with documented barriers only.

What's Holding Us Back: Technology, Process, Accountability

The new analysis affirms the emphasis organizations have placed on early discharge planning. However, health systems have been held back from effectively implementing the best practices highlighted in the data for three major reasons:

Existing technologies do not support operational best practices. The EHR was designed for clinical documentation and billing, not for operations. Retrofitted for managing patient flow, EHRs lack the tools necessary to drive early discharge planning or barrier resolution with consistency. Discharge planning with typical EHR dashboards is manual and inefficient, relying on case managers to enter EDDs and update information for every patient each day. Discharge barriers are buried in the patient record and require multiple clicks to uncover, or need to be selected from long lists of checkboxes or open orders. As a result, documentation of barriers is inconsistent, and even when they are identified, resolving barriers often requires multiple time-consuming, back and forth calls across care teams and ancillary services, disrupting daily workflow.

Current care progression models are not focused on discharge. As care teams struggle to manage the hundreds of manual steps involved in a discharge — on top of their patient care responsibilities — adhering to best practice standards becomes an afterthought. Some organizations have attempted to address this by focusing on standardizing discharge tasks for the last 24 hours of the patient stay, but the complex orchestration required for effective care progression typically needs to be planned days in advance of discharge.

No useful tools or processes to ensure accountability and drive continuous improvement. Leadership teams are inundated with data yet lack a simple, standardized approach to manage accountability and sustain change. With limited visibility into overburdened processes, leaders can only intervene reactively after discharges have already been delayed. Retrospective analysis of performance at monthly leadership meetings often fails to translate to the real-time frontline action required to effectively resolve barriers and discharge patients.

As a result, hospitals are challenged by inconsistent operations that lack both resilience and repeatability.

Combining AI & Behavioral Science, Best Practice Processes, and Expertise to Hardwire Discharge Planning

In our current environment, it's no wonder that leading health systems are increasingly looking toward leveraging real time prediction and automation to achieve length of stay improvements. In fact, Gartner is recommending healthcare provider CIOs to frame their vision for the next generation of healthcare delivery using the concept of a "Real-Time Health System" — characterized by the use of AI and machine learning (ML) to analyze operational intelligence and optimize and orchestrate workflows.[5]

Real-Time Operations in particular is creating meaningful value as progressive health systems seek to hard-wire best practices for reducing length of stay. Health systems are combining innovations in AI and behavioral science, best practice processes for discharge planning, and expertise in process improvement and change management to drive reductions in excess days. This allows organizations to create effective capacity, generate significant financial value, and improve patient satisfaction — without adding additional staff.

New Technology Innovations in AI & Behavioral Science

Recent advancements in AI / ML, behavioral science, and data science are automating key discharge planning steps and orchestration with ancillary services to resolve discharge barriers. Together, these innovations allow health systems to proactively identify potential care progression bottlenecks, effectively orchestrate action among frontline teams and ancillaries to resolve barriers, and manage accountability across the organization, forming a closed-loop system for reducing excess days (Fig 6). More specifically, these advancements allow health systems to:

Figure 6:
Closed Loop Management System for Reducing Excess Days

5 Real-Time Health System Vision. Gartner, July 13, 2020

1. **Identify potential care progression bottlenecks early:** AI models and algorithms enable software systems to use data already captured in the EHR to predict EDDs and dispositions early in the patient stay more accurately and consistently than care teams alone. Such systems can auto-populate these predictions on discharge rounding boards, reducing the manual steps involved in preparing for multi-disciplinary rounds. The AI can then predict potential discharge barriers early in the patient's stay, giving sufficient lead time for teams to address them.

2. **Orchestrate action to proactively resolve discharge barriers:** Machine learning can help ancillary services prioritize orders to have the biggest impact on length of stay. As a result, barriers are resolved with fewer back and forths with the care team, reducing the "noise" from texts and calls that interrupt daily workflow. When urgent action is needed, real-time, automated "nudges" can be delivered to key stakeholders in their native workflows to drive collaboration.

3. **Manage accountability to reinforce discharge planning processes:** To help leaders effectively manage accountability, Real-Time Operations can leverage process analytics that incorporate behavioral science techniques to help leaders enforce standardized processes. For example, when rounding processes begin to slip, statistical engines can automatically escalate notifications around drops in engagement and highlight specific coaching opportunities for leaders to intervene in real time. These analytics can also automatically surface high-performing units so that managers can recognize their good work.

Best Practice Processes for Discharge Planning & Barrier Management

As illustrated in the previous analysis, early discharge planning is a best practice for reducing excess days, and for complex discharges, barrier management is especially crucial. Health systems are now using these best practices as the foundations for discharge-focused care progression models, using technology innovations to hardwire new operational processes and standard work.

Leveraging Expertise to Measure Outcomes & Drive Continuous Improvement

Using new software and expert services in process improvement and change management, health systems can analyze process metrics and length of stay outcomes to quantify the operational impact of key initiatives and identify opportunities for continuous improvement. Advanced statistical models can control for patient, hospital, and seasonal variables to evaluate the significance of changes in length of stay. With standardized barrier management processes in place, health systems can use data to easily identify common barriers and implement targeted workflow adjustments to decrease length of stay.

Driving Length of Stay Improvements Through Innovation: Paving the Path for Post-Pandemic Recovery

As organizations look toward driving operational excellence to thrive in the post-pandemic world, leveraging Real-Time Operations and hardwiring best practices is critical to reducing excess days and achieving financial sustainability. Health systems that embrace these innovations in AI and behavioral science can significantly improve margins and reduce the burden on frontline teams, setting the foundations for rapid post-pandemic recovery.

Real-Time Operations & Hardwiring Best Practices at M Health Fairview

M Health Fairview, an 11-hospital system in Minnesota, knew that it had to transform care delivery to achieve its vision of breakthrough care. Increases in operating costs had outpaced revenue growth, leading to a $100 million gap. The health system identified operational excellence as one of its key opportunities, and in particular, managing length of stay and excess days as a key imperative for the health system to reduce costs and create capacity.

One obstacle was that individual facilities had developed siloed processes and facility-specific EHR workarounds for their workflows, so discharge management was highly variable across units. With manual discharge planning processes, teams were chasing down orders on the day of discharge, while leaders used outdated or conflicting data to manage teams with limited effectiveness.

M Health Fairview partnered with Qventus, a real-time operations platform that applies AI and behavioral science to optimize patient flow. Together, the organizations worked to:

- **Standardize early discharge planning:** Teams use predicted EDDs and dispositions auto-generated by Qventus AI to start planning for discharge early in the patient stay. Leveraging the technology reduces manual work, decreases process variation, and improves their ability to predict capacity for new admits.
- **Proactively identify and resolve barriers with ancillaries:** Qventus uses machine learning to predict barriers to discharge, while therapy, imaging, and other ancillary teams use ML-driven priority queues to reduce discharge delays. This dramatically decreases the calls and texts needed to orchestrate resolution of barriers.
- **Drive real-time accountability and continuous improvement:** M Health Fairview uses Qventus to gain transparency into process fidelity and top barriers across units so that leadership teams can reinforce discharge planning processes and uncover targeted process improvement opportunities.

Since implementing Qventus, M Health Fairview has significantly improved its inpatient throughput, with a full day reduction in variance day rate and 38% increase in discharges before 11 am.

> **"Qventus really helps teams to think in a more forward fashion. That way, we're not stuck chasing down orders on the last day."**
>
> **Karyn Baum, MD, MSEd, MHA,** VP of System Clinical Operations & Professor of Medicine