The ROI of RTI

Hospitals are using real-time intelligence (RTI) to improve patient flow—for a healthier bottom line.
Table of contents

3 Increasing capacity—without expansion

3 Payback potential

4 Building a business case
   • Added effective capacity
   • Increased revenue
   • Reduction in hospital-acquired infection rate
   • Recouping the lost opportunity: Under-billing

6 The costs of doing nothing
   • Operational consequences
   • Lack of timely business intelligence
   • Negative side effects

7 Putting patient flow into practice
   • KPIs: Metrics of success
   • Mapping workflows
   • Going digital, end-to-end

9 Reducing initial—and ongoing—investment

9 Getting started
   • Building the business case
   • Flexible financing

10 Learn more
   • About HP
   • About Central Logic
   • About Intel
Rx: Efficiency

Hospitals are under extraordinary pressure to improve efficiency.

Expanding patient populations, staff shortages, and changing healthcare regulations are driving hospitals across the United States to make better use of their existing resources.

In a recent study, 31 percent of hospitals said they plan to implement or upgrade a patient flow solution to improve efficiency.¹

With real-time insight and visibility into patient and bed status, hospitals can significantly improve quality of care, resource utilization, and contribution margins.

Increasing capacity—without expansion

AHA Solutions and Hospitals in Pursuit of Excellence (HPOE) define patient flow as an enterprise-wide, circular process extending from pre-admission to post-discharge care that “ensures that all in the multidisciplinary patient team (nurses, physicians, therapists, etc.) have tools to assess real-time status and have the ability to make real-time updates.”²

As physical expansion becomes a less feasible option for most hospitals, many are investing in real-time patient flow solutions simply to make better use of the capacity they already have.

“Efficiency improvements are by far the most significant driver for provider organization investments in patient flow solutions,” says CapSite Research Director, Brendan FitzGerald. “More specifically, healthcare providers are focused on improving bed turnaround times and reducing patient wait times.”³

By matching patient needs to available physical resources in real-time, hospitals can improve the utilization of inpatient beds and limited resources in other areas, such as the emergency department (ED). Nationally, the ED accounts for nearly 70% of all hospital admissions and ED visits are growing at a rate of 1.9% per year—twice the rate of population growth.⁴ Today, nearly half of EDs report operating at or above capacity, and 9 out of 10 hospitals report holding or “boarding” admitted patients in the ED while they await inpatient beds.⁵

Payback potential

Even small improvements in bed turnover time increase effective bed capacity, delivering immediate payback. What’s more, most hospitals can easily calculate the impact of faster turnover and shorter average length-of-stay (LOS) on effective capacity—and assign a dollar value for each additional “bed” gained, in terms of additional revenue and/or capital expense cost-avoidance.

But the potential return on investment in the ability to capture, access, and share real-time information about patient and bed status across multi-disciplinary teams can go far beyond adding effective capacity.

¹ Source CapSite 2012 U.S. Patient Flow Study.
Simpler, more affordable, and “friendlier” digital and mobile technologies are making it practical for hospitals to provide staff with quick and easy anytime-anywhere access to real-time information that enables them to deliver better care and make better use of all hospital resources, including their own time.

At the highest level, the return on real-time intelligence stimulates both:

• Lower costs - through better utilization of all resources (transport, beds, equipment, facilities, professional staff, etc.)
• Increased revenue and reimbursement - by enabling more care with the same resources

A breakdown of potential "hard" and "soft" benefits includes:

• Added capacity without capital expense - through shorter average LOS, faster turnover of existing capacity, and less “bed hiding” from delayed updating of availability
• Better clinical outcomes - by improving timeliness of definitive care through faster, more accurate matching of patients with the right bed, in the right unit, with the right level of nursing care, diagnostics, specialists, and treatments
• Better patient experience / HCAHPS ratings – by reducing wait times and coordinating services, reflected in Hospital Consumer Assessment of Healthcare Providers Systems (HCAHPS) surveys
• Improved staff productivity - by cutting the time teams (Admissions, Transport, Emergency, Transfer, Nursing, Environmental Services (EVS)) spend entering, looking for, and sharing data and minimizing “work queueing”
• Shorter average LOS - through proactively managed right level of care and faster, more coordinated turnover (e.g., transfer, discharge, EVS) processes
• Decreased patient leakage – to other facilities due to poor visibility into availability
• Fewer readmissions – through better planned and coordinated discharge processes
• Reduced or fewer penalties - fewer non-reimbursed days and penalties for negative outcomes, such as Medicare/Medicaid reimbursement penalties for excessive readmission of patients in less than 30 days
• Reduced risk/liability – through better definition, coordination and oversight of standards and procedures, (e.g., MRSA control, negative airflow for TB)
• Improved productivity – as skilled nursing and other professional teams spend less time searching for, entering, updating and correcting information. Also, real-time visibility into available resources and worklists enable all types of staff to plan and do their work more efficiently.

Building a business case

Assume that a hospital that is able through proactive real-time patient flow intelligence (e.g., faster, informed decisions about patient placement from transfer, admission, and internal transport, to better discharge planning) to reduce its average LOS. According to a study conducted by The Health Care Advisory Board, an average 500-bed hospital that reduces LOS by 0.25 days is equivalent to adding 20 new beds to the facility [Table 1].

Added effective capacity

By looking at a possible reduction in LOS, the hospital could estimate the potential for additional effective beds gained per month without any capital investment in physical expansion.

Formula:

\[
\text{Hospital Size} \times \text{Occupancy Rate} = Y \\
\text{LOS}_{\text{Before}} - \text{LOS reduction} = \text{LOS}_{\text{After}} \\
(\text{LOS}_{\text{After}} \times Y) + \text{LOS}_{\text{Before}} = Z \\
Z - Y = \text{Effective Beds Gained}
\]

6 Source Maximizing Hospital Capacity. A report issued by the Health Care Board of The Advisory Board Company, 2002. Data assumes initial LOS (LOSbefore) of 5.2 days, 85 percent occupancy.
Table 1. “Effective” beds Gained per Month from LOS Reduction

<table>
<thead>
<tr>
<th>Hospital Size</th>
<th>200 Beds</th>
<th>300 Beds</th>
<th>400 Beds</th>
<th>500 Beds</th>
<th>600 Beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS Reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25 day</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>0.50 day</td>
<td>16</td>
<td>25</td>
<td>33</td>
<td>41</td>
<td>49</td>
</tr>
<tr>
<td>0.75 day</td>
<td>25</td>
<td>37</td>
<td>49</td>
<td>61</td>
<td>74</td>
</tr>
<tr>
<td>1.00 day</td>
<td>33</td>
<td>49</td>
<td>65</td>
<td>82</td>
<td>98</td>
</tr>
<tr>
<td>1.25 day</td>
<td>41</td>
<td>61</td>
<td>82</td>
<td>102</td>
<td>123</td>
</tr>
<tr>
<td>1.50 day</td>
<td>49</td>
<td>74</td>
<td>98</td>
<td>123</td>
<td>147</td>
</tr>
</tbody>
</table>

Increased revenue

The hospital could also use its LOS reduction to estimate the number of additional patients each bed could accommodate per month—and from that, the number of additional admissions per month. Multiplying by the hospital’s average net profit per patient, the hospital then could estimate the ROI per month through reduced LOS.

Formula A:

30 Days/Month + LOS_{After} = # Patients/Month per available Bed

# Patients/Month per Available Bed × # Effective Beds Gained = # Additional Admits/Month

# Additional Admits/Month × $ Avg. Net Profit/Patient = $ Additional Profit/Month

$ Additional Profit/Month = A

Reduction in hospital-acquired infection rate

The business case could also take into consideration the potential reduction in complications through better patient flow management (e.g., improved communication, coordination, and oversight of standards and procedures for patient placement and transfers). The ability to reduce hospital-acquired infection (HAI) rates by some percent, for example, can be multiplied by the number of patients and net profit per patient to come up with a potential savings in monthly revenues.

Formula B:

Hospital Size × # Patients/Month per Bed × Hospital’s Rate of HAI = # HAI cases/month

# HAI Cases/Month × % HAI Reduction = # Fewer HAI Cases/Month

# Fewer HAI Cases/Month × $Avg. Net Profit/Patient = $ Additional Profit/Month

$ Additional Profit/Month = B
Recouping the lost opportunity: Under-billing

A business case can also be built estimating the impact of improved patient flow management on patient flow errors, such as a miscategorization of inpatients as “observation status,” resulting in under-billing. To factor on a monthly basis, a hospital could multiply the average number of miscategorizations per month multiplied by the average loss of revenue due to under-billing.

Formula C:

$\text{ROI/Month} = C$

# Recaptured Inpatients × $\text{Delta between Inpatient and Observation Patient Net Revenue} = \$/\text{Day} \\
\$/\text{Day} × 30 \text{ Days/Month} = \$/\text{Month} \\
\text{SUM A:C} × 12 = \text{ROI/Month}$

Categories of potential savings from effective patient flow management can quickly add up as depicted in Table 2.

Table 2. Total Revenue Potential

<table>
<thead>
<tr>
<th></th>
<th>Monthly</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased bed capacity</td>
<td>$A$</td>
<td>$A \times 12$</td>
</tr>
<tr>
<td>Improved clinical outcomes</td>
<td>$B$</td>
<td>$B \times 12$</td>
</tr>
<tr>
<td>Decreased non-reimbursable days</td>
<td>$C$</td>
<td>$C \times 12$</td>
</tr>
<tr>
<td>Total</td>
<td>$\text{SUM A:C}$</td>
<td>$\text{SUM A:C} \times 12$</td>
</tr>
</tbody>
</table>

The costs of doing nothing

Investment in new real-time patient placement systems need to be weighed against the costs of continuing with the status quo. In a recent national survey of hospital professionals, 60.9 percent cited bad communication as the number one reason for poor patient flow, 29 percent lack of data visibility, and the remaining 10 percent, poor patient engagement. 7

Operational consequences

Many hospitals continue to rely on mostly manual patient flow processes, including handwritten updates on whiteboards, hand-carried paper notes, and phone calls and/or physical meetings, several times a day, in which flow coordinators and nurses from each floor share information and updates on patients, resource availability, and expected events.

Despite these considerable efforts, information is simply never up-to-date. What’s more, like a runner who misses the baton handoff in a relay, any unexpected change in the flow sequence—a postponed patient discharge, a surge in emergency admissions, a backup in telemetry, radiology or surgery—sets off a chain reaction of interdependent consequences, as staff struggle to correct and communicate information and re-align tasks and plans.

Some hospitals have attempted to augment manual patient flow processes with information from other applications. A common practice is to try to “piggyback” patient flow on the “Admission/Discharge/Transfer” (ADT) system. Although ADT can provide near real-time information regarding patient location, it does little to identify where vacancies or backlogs exist, and the interface is not user-friendly.

Lack of timely business intelligence

Such systems lack any predictive capability to help professional staff anticipate events or identify trends. Similarly, for hospital executives seeking to improve capacity management or patient flow, gaining access to relevant information has typically meant hiring an outside consultant or adding to the burden of already-busy professionals to collect and enter information into spreadsheets. Again, despite considerable effort, information remained fragmented and not timely enough to affect meaningful change in any kind of proactive manner. Instead, problems often only become visible during a crisis, such as a bed shortage or ER boarding.

Negative side effects

A 340-bed hospital that has three medical-surgical units, and treats nearly 16,000 inpatients per year estimated the lost revenue consequences of poor patient flow to be $3.1 million a year, due primarily to:

• Heightened occurrence of red hours
• Delayed admission
• Diverted patients
• Unsatisfied patients

Putting patient flow into practice

For all its benefits, successful implementation of enterprise-wide patient flow management requires careful analysis and planning.

Some health systems choose to start small and grow solutions over time. ICUs, surgery, and emergency departments are frequently selected to pilot patient flow systems to help manage their unpredictable, fluctuating demand over time. Limiting flow management to one department initially can help ease the implementation by allowing teams to focus, gain hands-on experience, and measure incremental results.

Before embarking on any patient flow management project, organizations should:

• Build the business case. What metrics will be tracked to gauge success? How do they translate to return on investment?
• Gain executive sponsorship. Who has the authority to review, approve, and drive progress across organizations?
• Involve key stakeholders. Get input from all users to define required features and capabilities and review and rationalize workflow.
• Engage IT to define infrastructure, integration, operational and support requirements. How will the patient flow system interact with ADT, electronic healthcare records (EHR) and other applications?
• Review organizational and skill requirements. Do reporting structures stand in the way of effective workflow? Which users will require what training?
• Develop and get sign-off on a detailed project implementation plan. What are the key tasks and milestones? Who will manage what aspects of the project? How will rollout be managed?
KPIs: Metrics of success

A key factor in building a business case and project definition is determining how to measure success. Hospitals should identify and measure key performance indicators (KPIs) that contribute to meeting their key objectives. As such, each hospital needs to determine its own KPIs, how they will be weighted, and what performance improvements are realistic. The quarterly benchmarks of care report, provided by The Centers for Medicare & Medicate Services (CMS) shows how similar-sized hospitals perform in areas such as LOS and ED metrics for specific clinical conditions, such as acute myocardial infarction, coronary artery disease, and stroke. A recent study by a large academic center offers an example of how KPIs translate into dollars. For example, they demonstrated how a 1-hour reduction in ED boarding time would contribute more than $9,000 of additional revenue by reducing ambulance diversion and the number of patients who left without being seen.

Mapping workflows

Visio-based workflows are an effective way to document, review, and rationalize complex, interdependent processes. They can be used to map out a hospital’s current system, identify ports of entry such as the ED, catheter lab, or some other portal, and connect all stops and steps in the care flow—including beds with different levels of care and transportation from point-to-point. They allow users to add or modify elements easily, as needs change.

Some patient flow solutions provide customizable predefined workflow templates as a starting point, along with the flexibility to adapt easily to team or hospital-defined requirements. Rules-based engines can also help guide staff through the development of workflows that match specific operations.

Going digital, end-to-end

Visio-based workflows are an effective way to document, review, and rationalize complex, interdependent processes.

The most critical aspect of patient flow transformation is the ability to provide everyone on the patient care team with real-time, “at-their-fingertips” information they need to make patient placement decisions.

New digital, touch-enabled, Web-enabled, and mobile technologies make an end-to-end digital system not only possible, but affordable and easy-to-use. Nurses stations that previously relied on manual entries on whiteboards can now be equipped with interactive digital wallboards that display patient information derived from the patient flow system. Bed and patient status can be securely updated by authorized members of the multi-disciplinary care team, using secure mobile devices anywhere in the hospital.

The result is better information about upstream demand with real-time information from admissions, ED, telemetry beds, surgery and ICU; better information at the point of patient care; and better information downstream for physical or occupational therapy, transport, and discharge.

An all-digital capacity management system with real-time visibility, automatic capture and analysis of data, and easy information access and sharing across the multi-disciplinary team from anywhere in the network is the foundation for critical functionality, including:

Real-time tracking of patients:
- At admission
- Through internal transfers
- At discharges

Real-time visibility into resource availability:
- Beds
- Diagnostic equipment
- Treatment facilities
- Snapshot views by multi-disciplinary team across units, floors, and the entire hospital system.

9 Source QualityNet Benchmarks of Care: https://www.qualitynet.org/dcs/ContentServer?c=Page&apagenum=QnetPublic%2FPage%2FQnetTier2&cid=1228768205297
Ease-of-Use:

• Automated workflows
• Automatically generated worklists
• Automatically generated reports
• At-a-glance dashboard views of performance metrics, with drill-down to details
• Real-time email alerts when hospital-defined parameters are exceeded
• Predictive intelligence tools
• Easy integration with ADT / EMR systems

Reducing initial—and ongoing—investment

Together, Intel, HP, and Central Logic help hospitals take advantage of the latest Web and touch-enabled technologies with customizable turnkey solutions and consulting, installation, configuration, training, and support services that reduce the time, cost, and complexity of implementing real-time patient flow management.

These solutions integrate:

• Central Logic suite of patient flow management software
  Intuitive, Web-enabled, software suite provides secure, real-time data visibility, communication, tracking, and updating of patient and bed status, predictive availability tools, and customizable templates and rules-based tools that make it easy to automate any workflow. The product portfolio extends from transport, admitting and transfer, bed and capacity management to patient placement discharge, and readmission avoidance.

• HP Digital Signage Displays, HP TouchSmart™ PCs, and HP ElitePad™ mobile devices
  Central Logic software on HP systems makes it easy for authorized personnel to quickly and securely access and update patient and bed information using interactive digital displays and a wide range of touch-enabled systems and mobile devices at every point of patient care.

• 3rd-generation Intel® Core™ vPro™ processor technology
  HP healthcare systems take advantage of advanced Intel processor technology innovations, which build security, self-maintenance, data encryption, and other functionality into the chipset and other system hardware, where they are less vulnerable to hackers, computer viruses, computer worms, and other threats.

Getting started

Building the business case

Central Logic consultants and authorized HP Healthcare Specialist partners bring extensive expertise and experience in digital patient flow solutions. We work with you and your staff to help assess current capacity, staffing, processes and workflows; identify opportunities; and build the business case for investing in real-time intelligence for better capacity management and patient flow.

Flexible financing

HP Financial Services can help you to begin to take advantage of end-to-end digital bed management in your hospital today—with minimal impact to cash flow. HP financing specialists take a lifecycle approach that helps you to consider not just initial purchase, but total cost-of-ownership to develop financing that makes sense for your organization.
Learn more

About HP
As a trusted supplier of information technology solutions to hospitals, clinics, and medical practices around the world, HP is uniquely equipped to support end-to-end patient flow solutions in major medical centers, community hospitals, and small care centers. The HP Healthcare Alliance program combines offerings from independent software vendors with hardware from HP to deliver integrated, tailored, and tested solutions that work.

Learn more about HP Healthcare solutions at:
hp.com/go/healthcare

About Central Logic
Central Logic is the healthcare industry’s leading provider of innovative patient flow software and consultative expertise. The company’s solutions have transformed patient transfer processes for some of the United States’ most respected medical systems and hospitals. Central Logic works collaboratively with physicians, administrators, and staff to design and deliver patient flow solutions that increase patient throughput, while conserving internal resources.

Learn about Central Logic patient flow solutions at:
centrallogic.com/solutions

About Intel
Where information and care meet: HP solutions powered by the Intel® vPro processor family deliver smart, long-lasting performance. Advanced and industry standard technologies from Intel help enable coordinated, customized care by contributing to the creation of an interoperable health IT infrastructure.

Learn about Intel and healthcare at:
intel.com/about/companyinfo/healthcare/index.htm