Improving Patient Flow in Healthcare

Introduction: Analyzing the Challenges of Patient Flow in Hospitals

Hospitals are challenged every day with managing patient flow through all departments and ensuring that each patient is seen in a timely manner to ensure that care is efficient, and the hospital can remain profitable. If the hospital has interruptions of care due to missing patients, staff, or equipment the resulting delays can create significant problems that can have a ripple effect across the entire schedule and the bottom line of healthcare facilities.

Over half of the 35 million inpatient hospital admissions in 2014 arose from the 137 million patients who visited emergency departments that year. In a 2012 publication, visits to emergency departments increased 60 percent faster than population growth over an 8-year period, and occupancy, or crowding, grew even more rapidly. In another study of 364 U.S. hospitals, emergent patients waited more than twice the recommended timeframe to be seen, with only the minority of hospitals consistently achieving recommended wait times for all ED patients, and fewer than half of hospitals consistently admitting their ED patients within 6 hours.

The idea of even incremental efficiency gains in this area have seemingly been maximized by the application of lean theory and value stream mapping, However, much of the data upon which these theories rely remains largely dependent upon the manually entered data by staff in anticipation of an event occurring or their estimate of a processing phase, This data, however, only reflects what was known at the point of data entry and does not always take into account excursions to imaging and procedures, the timing of specimen draws at the bedside and processing time in the lab. Additional key components that are left unaddressed include the readiness and location of frequently-used equipment, high-value assets/instruments, staff location and an accurate audit trail of workflow bottlenecks.

Department Specific Risks and Bottlenecks

ED Registration: Delays In Discharge & Regulatory Constraints

Wait-to-discharge inefficiencies from registration delays compromise patient throughput and satisfaction ratings. Further, EMTALA regulatory compliance restricts patient registration from occurring in certain patient presentations prior to the performance of the medical screening examination by an ED provider.

A 941-bed hospital performing an ED study noted 25% of all patients discharged from the ED were delayed by an average of 25 minutes to complete registration. Some of these delays can be reduced by shifting non-essential registration duties to non-ED staff, and by condensing questionnaire depth.

Further efficiencies could be gained, however, if registration staff could locate patients prior to walking unnecessarily to rooms that are absent of patients who are in imaging, undergoing a procedure, or using the restroom. Lastly, EMTALA regulatory best-practice is for registration staff to avoid delaying medical care for the patient. In these instances, registration staff can avoid this by knowing when the ED provider is physically present with the patient.

ED Admissions: Boarding & LOS Delays In The ED

Regulatory data by the Joint Commission has recommended hospitals set goals to limit ED boarding to 4 hours in the interest of patient safety and quality of care. While the achievement of this goal entails the participation of all stakeholders, the real-time onus of coordinating this objective befalls the house supervisor. Accurate knowledge of the whereabouts of staff and staff utilization, specialized bed placement needs, room optimization, specialized equipment, environmental cleaning, and physical location of discharged patients is key. Better access to this data can avoid needless interruptions to operational flow.

ED Elopements And Discharges

Patient elopement represents a patient health safety risk, revenue loss and medico-legal exposure to

the hospital, particularly if triage-based tests have been ordered. Further, elopements resulting in sentinel events are serious Joint Commission-reportable occurrences. Efforts to track the exact location of a patient in real-time can significantly reduce elopements by alerting nursing and security staff. Additionally, wandering patients that are roomed with treatment in progress, but cannot be found, cause patient flow delays, consume valuable nursing time, and can disrupt treatment and safety of other patients.

Locating personnel to assist with post-care management and complete the discharge process is a challenge for most facilities. One of ten discharged patient measurements in the HCAHPS survey covers patient satisfaction with the discharge process. The latest data indicates 12% of the 4,447 hospital participants received negative assessments from their patient respondents. This leaves an opportunity for any technology that could optimize patient flow to reduce discharge wait times.

Operating Room And IR/MRI: Utilization Inefficiencies

Patient flow and the integration of inpatient and outpatient scheduling for the operating room, and for high-value imaging centers, such as the interventional radiology and MRI suites, is a coordination challenge for all hospitals. Maximizing utilization via first-case readiness and patient availability is critical in ensuring the planned schedule is not disrupted. Various studies have attempted to derive what a single minute of OR time is worth. Most recently, $36/minute was used as an estimate in California which excludes surgeon and anesthesiology costs. Merely a few minutes of delay in first- case-starts is said to represent more than an hour delay for the day's last procedure. For example, a 75-minute delay per day for a six-day surgical week could represent a loss of approximately $840,000 annually per operating room.

Frequently, miscommunication about the location of the key staff and equipment is cited as the cause of these delays for the OR and IR/MRI suite. Having real-time location of the patient, perioperative and imaging staff, and status of instrument and machine readiness are all factors that can increase coordination of inpatient and outpatient cases thereby driving patient flow. For example, dispatching the pre-op or MRI staff to the ED to retrieve a patient who is physically in route to the floor wastes critical time.

Mitigating Infectious Disease Risks And Impacts To Patient Flow

Efficient tracking and deployment of capital assets such as portable UVC decontamination systems, and rapid utilization of environmental cleaning teams immediately upon patient discharge,

enhances patient flow and staff utilization. With real-time specific knowledge of the location of such supportive assets, a nurse anticipating patient discharge or admission could summon them rapidly thereby increasing room turnover.

Specimen Processing Risks And Delays

Lost or delayed surgical pathology specimens can result in significant risk to patients who might need to undergo an additional procedure in order to obtain the needed specimen. The risk to the facility is lost revenue and possible legal action. In the ED, repeating procedures to replace lost specimens, for instance drawing venous blood gases and repeating straight urinary catheterization, cause patient discomfort and increase infection risk. At any time, when additional specimens are required, patient satisfaction is impacted. Additional draws or procedures for time sensitive pathology specimens can delay discharges and delay care for subsequent patients who must wait for room availability.

ED providers treat high-acuity patients while they wait for pending lab results. Rapid processing of specimens in these cases narrows the differential diagnoses, thereby reducing the risk of significant adverse outcomes. Various specimens that are time or temperature-sensitive, such as lactate levels, must also be expeditiously processed.

Further, there are occasional disconnects between ED and the lab as to whether a specimen has been sent or received for processing. This is a result of misplaced or lost specimens where there is no method in which to track their actual location. An example is a laboratory that is in receipt of a specimen order but has not received a sample that has been documented as sent.

Comparing Technology Solutions: Key Considerations

Differentiating between RFID solutions includes the evaluation of cost, tag battery life, continuous versus intermittent location tracking, and contagion risk.

Active RFID

With active RFID, data collection is intermittent with tags pinging an average of every 15 minutes which may limit the benefit when rapid changes occur, which is common with ambulant patients where up to the minute information is required, such as in the ED setting.

Active RFID tags are intended for re-use among patients. This involves satisfying FDA, the CDC, WHO, ISID and other regulatory recommendations and mandates for sterilization to assure that contagions from one patient never expose a subsequent patient. Achieving this patient-safety mandate is problematic when examining the time and processing involved in attempting to achieve decontamination standards at each tag re-use event.

> Healthcare facilities have expended significant effort to find cost-effective disposable products and instruments that reduce the need for sterilization to increase patient safety while reducing costs associated with sterilization processing.

Passive RFID

Passive RFID patient bands and other RFID tags do not require batteries and instead rely upon energy transferred from readers using radio frequency. The average cost is 10 cents per tag. Communication is continuous which may be considered advantageous in the context of high acuity patient management such in the ED/OR. Finally, there is no requirement to satisfy contagion-risk regulatory mandates or to decontaminate the devices as passive RFID target labels are disposed of after each patient use.

The Benefits of Workflow Optimization for Efficiency, Safety and Regulatory Compliance

Opportunities to capture gains in operational and regulatory performance as well as patient safety and satisfaction exist by utilizing accurate real time versus estimated, staff-entered EMR data. Methods to achieve this include the augmentation of existing EMR visual interfaces by applying real-time tracking of the discussed examples above and to many other areas hospital-wide that ultimately contribute to effective and improved overall system performance.

A key component of a successful solution is the automating of the data for visibility. Mapping for location is helpful when clinical staff is actively in search of assets or patient location, however in busy clinical environments, the ability to receive predictive alerting based on outlier events can empower the staff with efficient proactive management of patient flow which can avoid challenges for staff with no time to consult a display. To the minute status updates allow rapid responses which enable more efficient care transitions.

The strength of automation and RFID patient flow optimization is the ability to synchronize and analyze

after determining what is working, what is not working and why, and to utilize the data to implement efficient process change. Over time, these data can strategically assist in the ability to predict how to plan for normal day to day operations and to compensate for random variability during surge events such as flu season or post-holiday illnesses by analyzing trends and planning with more accurate estimates for resources and equipment. Finally, the ability to present audit reports on the metrics for regulatory compliance such as shortened boarding time and the ability to positively impact quality of care and patient satisfaction is a critical piece of the puzzle to enhance and report on successful process improvement for all healthcare facilities.

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