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Introduction

Welcome

At Envision, we understand that clinical efficiency and effectiveness is critically important to our healthcare professionals and to our patients. This monograph will highlight ways in which to optimize a patient’s journey through the emergency department within the modern healthcare system. Hospitals and healthcare teams are being asked to elevate the level of the patient care experience, often while facing capacity constraints within Emergency Departments, which can lead to long wait times, diversion of patients to other hospitals, higher patient care-related expenses, and challenges to workforce morale and staffing. With an understanding of the relevant patient flow principles, and a working knowledge of the available ED Patient Flow strategies, a number of our challenges can turn into opportunities: decreasing throughput times, increasing patient satisfaction, improving patient safety and optimizing physician efficiency. Making Healthcare Work Better™ is a core strategy for EmCare: a strategy that can improve quality and efficiency, shorten length of stay, and increase clinical and operational effectiveness at our hospital sites.

We are confident that our approaches to optimizing patient flow and deploying best practice ED Patient Flow models will assist both our clients and our healthcare professionals in delivering quality care, providing financial savings and advancing the patient experience.

Purpose

This playbook will summarize relevant background literature on patient flow, describe the role of smooth patient flow in mitigating ED crowding, and highlight the use, deployment and benefits of an effective ED flow model. This document outlines strategy, tactics and proven best practices in launching and sustaining a successful E.D. patient flow operations model. Several examples of how the successful implementation of the appropriate ED Patient Flow strategies and models can positively impact a hospital’s operations are also detailed in this playbook. Individuals that may benefit from this document include hospital management, regional and site medical directors, physicians, EmCare Directors of Clinical Services, and EmCare divisional staff.
Overview

Defining Flow

In healthcare, flow is the movement of patients, information or equipment between departments, staff groups or organizations as part of a patient's care pathway.\(^1\) By improving patient flow, a hospital can optimize staffing levels to meet patient demand, decrease wait times and boost patient and clinician satisfaction.

Patient Flow encompasses certain features, which can be described as:

- Flow as efficiency and cycle times
- Flow as reduced variation, increased predictability and improved forecasting
- Flow as systems thinking
- Flow as empowered providers exceeding expectations
- Flow as demand capacity management

\(\text{Figure 1: Features of Patient Flow}\)^2

Importance of Flow

Healthcare practices of all sizes and shapes increasingly recognize that optimizing patient flow is crucial to improving efficiency for the practice, providing a positive experience for the patient and the health care team, all while growing revenue. Moving patients seamlessly from check-in to clinical practice areas to disposition allows healthcare providers to operate effectively and maximize time with patients. When people are treated in facilities and practices that minimize waiting and make the patient care journey (and its attendant transitions) transparent patients feel comfortable and confident.

\(\text{Figure 2: ED Patient Flow Diagram}\)

\(^1\)http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/patient_flow.html
The Science of Patient Flow

There are a number of critical strategic components to patient flow. Having a basic understanding of the key principles of the science of operations management can help one to fully leverage the patient flow models that are available, and to effectively deploy them in one’s healthcare facility. These critical components are discussed in this section.

The Science of ED Service Operations- Getting the Big Picture Right:

- **Systems thinking and appreciation** - A system is a network of components which work together to try to achieve common aims
- **A theory of knowledge** - One needs a theory of knowledge about one’s system and understanding of the ED, the hospital, and the relevant processes
- **Get clear about the key drivers of system performance**:
  - Demand-capacity management
  - Queuing
  - Variation
- **Define the high-leverage interventions**:
  - Theory of Constraints
- **Deploy a method or system for improvement**: Lean, Six Sigma, and TQM
- **Where waiting exists - apply The Psychology of Waiting Lines**

Demand - Capacity Management (DCM)

Demand capacity management is one of the key strategic concepts or drivers behind managing patient flow effectively. The aim is to predict demand using both historical data and recent trends in the demand for services, and then match service capacity to patient demand. This can be facilitated by creating daily and even hourly patient flow predictions and plans to service those predictions.

One should usually start with an assessment of demand-capacity management and seek to analyze demand (volume and complexity) by hour of the day (HOD), day of the week (DOW), and by season (if applicable). Mapping service and server capacity to demand and getting it right on average is a good place to start, and many Emergency Departments already approximate this based on historical arrival patterns and staffing plans that have been tweaked over the years. (Understand and remember that getting demand - capacity right on average is not the same thing as staffing to averages...). Matching capacity to demand can be accomplished with planning, modeling, foresight, and the appropriate deployment of resources.

A real-time demand capacity monitoring and early-warning system (say a real-time patient flow dashboard) can be incredibly useful and helpful when available. A dashboard can monitor the essential real-time metrics on departmental performance as well as provide the signals for when processes are in danger of moving out of the desired level of performance.

Advanced forecasting can play a significant role within the Emergency Department and the hospital. One can predict or model patient flow, acuity and arrivals with meaningful accuracy.
This provides a good estimate of who is coming, why they are coming, and what kind of resources they will need.

- **Pooling of resources vs carving them out to provide a faster, more effective and efficient service**: Hospitals traditionally segregate resources into centralized functional departments such as diagnostic departments, ambulatory care centers, and nursing wards. In recent years this organizational model has been challenged by the idea that higher quality of care and efficiency in service delivery can be achieved when services are organized around patient groups. Examples include specialized clinics for breast cancer patients and clinical pathways for diabetes patients.³

- **Load-leveling**: Load-leveling is a scheduling practice which uses volume estimates to determine the level of supply required to meet the demand of a production system at any given time. It ensures continuous flow of patients through operations without having to face long wait times. It is designed in a way where supply (i.e. providers, rooms, equipment, supplies, etc.) meets the demand in the right quantity, at the right time and at the right place. Hospitals can level out workloads to achieve the benefits of continuous flow. This leads to eliminating waste by leveling patient volume and mix & succeeds in leveling out the demands placed on their people, facilities, equipment and all other resources serving the system.⁴ In addition, by shaping demand, patient arrivals and their transition to exam rooms can be streamlined effectively.

### Queuing Systems and Queuing Theory

In an era of healthcare reform, improving quality and safety, and decreasing healthcare costs have become even more important goals than ever before. Scientific management of patient flow is at the center of our ability to achieve these goals. While on one hand we may be faced with stressed or overcrowded facilities, on the other hand, the industry’s financial environment seldom allows us to liberally add resources. One key challenge is our ability to match random patient demand to fixed or budgeted service capacity. Queuing theory is a methodology that addresses this very challenge. Queuing theory was first utilized in telecommunications and then was adopted by all major industries, including the airline industry, the internet and most service-delivery organizations. In the health care industry, however, the benefits of understanding and leveraging the insights from queuing theory have not been fully utilized until recently. When used correctly, the results are often dramatic: saving time, increasing revenue, and increasing staff and patient satisfaction.⁵

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³ [http://doc.utwente.nl/67543/1/memo1902.pdf](http://doc.utwente.nl/67543/1/memo1902.pdf)
Queuing theory can be leveraged when matching fixed resources to unscheduled demand, where demand is unscheduled but not unpredictable. Queuing theory helps us understand the underlying causes of waits and delays in a system and the optimal deployment of resources.

It is important to realize that we work in a queuing system whenever we are in a system or service line with unscheduled (but not necessarily unpredictable) demand. A “queuing system” is one where customers arrive at undetermined, but normally distributed, times. Classic examples include call centers, grocery lines, and emergency departments. Queuing Theory is the art and science of matching fixed resources to unscheduled demand or arrivals. Queuing Systems have distinct characteristics:

- Systems serving unscheduled (uncontrolled) arrivals behave in a characteristic fashion.
  - Note that unscheduled arrivals are not the same thing as unpredictable arrivals...
- When (patient) inflow and service times are random, their response to increasing utilization is non-linear. As utilization rises above 80-85%, waits and rejections increase exponentially. At high levels of utilization small changes in capacity or small decreases in key server utilization can lead to big improvements in flow through the system.

In a queuing system waiting times always skyrocket (logarithmically and not linearly...) as the number of arrivals per hour approaches system capacity (and higher levels of variation make this even more pronounced). When optimizing a queuing system, it is important to target utilization for the critical servers of around 80-85% (and not a utilization of 95-100%...which is what healthcare managers often aim for...). One can target a higher utilization of key servers as one drives more and more of the variation out of the system.

**Variability Management**

Variation arises from many interrelated factors, some within and some beyond the control of the health care system. Variability must be managed unless there is unlimited service capacity. Not all variation is inappropriate. Distinguishing among the types of variation to determine what is acceptable and what is not is critical to arriving at a reasonable set of recommendations for action. There are three major sources of variation (courtesy of Eugene Litvak, PhD, Boston University):

1. Clinical variability
2. Flow variability
3. Professional variability

There are two major types of variability: natural variation/variability and special cause variation/variability. Natural variation (example - natural differences in CHF patients, pain perception, and patient arrivals) must be managed or accommodated. Unnatural sources of variation should be eliminated whenever possible.

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6 Jensen, K. “Key Strategies for Improving Hospital Flow”. Best Practices.
7 Jensen, K and Grunau, R. “Variation and Flow Conversations, 2016”.

Examples of unnatural sources of variation would include the following:

- The only two cardiovascular surgeons operate only on Monday, Tuesday, and Wednesday rather than spreading surgeries out over the course of a five or seven day work week.
- Physicians or nursing schedules that won’t flex up for increased demand on heavy days (e.g. we don’t want to add any more weekend shifts...).
- Hospitals that, in the face of a 24/7 demand for services, operate on two levels-weekday schedules ...and then weekend schedules with limited capacity...

Variation has an even bigger impact at lower volumes. It is often easier to accommodate variation in high volume locations because the incremental volume surges as a percentage of the total volume are less. Additionally, high volume locations usually have a pool of resources that can surge temporarily. In low volume facilities or services, minor volume swings can have a major impact. And in low-volume facilities there are seldom robust resources to temporarily flex up, therefore making it more difficult to manage or control.  

Organizing practices and jobs around standard performance – with meaningful roles, job descriptions, SOPs, and best practices - can improve flow, reduce uncertainty, and offset some of the impact of variation.

Hospitals and health systems can take these action steps alone or in collaboration with others to reduce inappropriate variation within their organizations. The following steps help us understand and manage variation better:

1. Identify areas of focus
2. Set measurable goals
3. Acquire, understand and analyze data
4. Identify the required changes to implement
5. Identify best practices to achieve goals
6. Implement improvements

**Theory of Constraints**

Another useful (and necessary) perspective for flow is through the lens of the Theory of Constraints, a management model or system described by Israeli physicist Eliyahu Goldratt in the business novel *The Goal*. A system’s constraints limit its performance or progression toward its goal (throughput/flow).

Theory of Constraints (TOC) basic concepts:
- Constraints limit performance

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8 Jensen, K. and Grunau, R. “Variation and Flow Conversations, 2016”.
To improve performance, focus on improving (elevating) constraints or off-loading non-essential tasks from the constraint. Management of patient flow in a hospital is of major importance, for its impact both on the quality of care and on the associated costs. Waiting lines/queues form when capacity exceeds demand at various servers. When this happens bottlenecks begin to form. The prevention of the building up of bottlenecks is important. The Theory of Constraints (TOC) offers a way forward to solving problems in EDs by identifying and alleviating critical bottlenecks. The effective deployment of TOC assists one in identifying the true constraints to smooth patient flow and offers a methodology to attack those constraints.

TOC – The 5 Focusing Steps – Continuous Constraint Improvement

1. Identify the constraint(s) – weakest link(s)
   a. Can be rooms, process, staff, or policy (place, people, performance or policy)

2. Decide how to exploit the constraint – How to maximize its utilization and availability – How rooms, staff and beds are optimally utilized.

3. Subordinate and synchronize everything else to above decisions
   a. Align every other part of the system to support the constraints even if this reduces the efficiency of non-constraint resources
      i. Standard work
      ii. Support
      iii. Process Buffers

4. Elevate the performance of the constraint (If output is still inadequate, acquire more of this resource so that it is no longer a constraint) - Scribes/ CIMS are an effective tool that illustrates this.

5. If the constraint has been broken (fixed or optimized), go back to Step 1 and start the search for the next constraint.

The key principles behind TOC in healthcare are\textsuperscript{10}:

- Patient care is a network of queues and service transitions.
- An hour lost at a bottleneck is an hour lost for the whole system.
- Time saved at a non-bottleneck point is a mirage.
- Efforts spent improving a non-critical bottleneck will not improve the overall performance of the process or system

The Psychology of Waiting

Many businesses are rightly concerned with waits and delays and a customer’s or a patient’s frustration with waiting times. Organizations know that the modern consumer can react negatively if asked to queue for even a short time. Waiting is one of the top reasons why customers are annoyed or frustrated by an experience they have with a business. In an advertisement for Federal Express, the voiceover states that “waiting is frustrating, demoralizing, agonizing, aggravating, annoying, time consuming and incredibly

\textsuperscript{10} Jensen, K. “Key Strategies for Improving Hospital Flow”. Best Practices.
expensive.” Waiting generally results in negative perceptions of businesses by customers. Excessive delay is frequently the most important factor influencing satisfaction with services. Patients are customers of our healthcare services. Sometimes, it is unavoidable in a medical practice or an emergency department that patients will have to wait; there is an inherent amount of variation in the practice of medicine, and unexpected things come up that may not always be able to be controlled. And there are clear cut differences between a pure service business and the delivery of healthcare. And yet, it is certainly in a healthcare practice’s best interests to look into how wait times can be avoided, or at least diminished, to improve the patient experience. And if waiting cannot be completely avoided, there are ways to manage the waiting experience of patients. The principles behind the Psychology of Waiting Lines can provide us with useful insights and tactics. When looking at the psychology of waiting as it pertains to the healthcare setting, there are two laws of service worth noting as we begin:

1. If the service provided exceeds the customer’s expectations, the customer will be satisfied. The converse is also true: if service does not meet expectations, then the customer will likely be dissatisfied.
2. It is hard to play catch-up ball. If the service encounter begins with unmet expectations, it is hard to improve upon the patient’s journey later on.

This is important for any feature or service, and in fact, it has been demonstrated that patient satisfaction with emergency department care declines as the time spent waiting increases.

For the benefit of waiting patients and their families, good patient flow systems address and exploit the key principles of the psychology of waiting. In his paper, “The Psychology of Waiting Lines”, David Maister has identified eight of these principles:

1. Unoccupied time feels longer than occupied time
2. Pre-process waits feel longer than in-process waits
3. Anxiety makes waits seem longer
4. Uncertain waits are longer than known, finite waits
5. Unexplained waits are longer than explained waits
6. Unfair waits are longer than equitable waits
7. The more valuable the service, the longer the customer will wait
8. Solo waits feel longer than group waits

Donald Norman offers an updated perspective on Maister’s original insights, leveraging Norman’s experience with design and studying a person’s interactions with his or her environment. Norman, building upon Maister’s work, proposed eight design principles to keep in mind while designing processes and procedures for managing waits. These principles aim at designing the most effective approaches and experiences to managing waits and waiting lines for the people in it (Figure 7).

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There will always be some waits and delays, no matter how efficient and effective our processes and people are. Understanding and leveraging the psychology of waiting principles can help improve both the patient and the provider experience. In a practical sense this means paying attention to patient flow, movement, and transitions within the ED. A few suggestions for marrying the psychology of waiting principles with your patient flow efforts are listed below:

- Use scripts. These are pre-thought out ways of engaging the patient and if sincerely deployed can be a powerful way of setting expectations.
- Create and negotiate expectations.
- Engage the family so they can be an advocate for the ED.
- Use Rounding and Charge Nurses.
- Never forget the role of emotion.

**Effectively Managing Patient Flow: The Patient Flow Cascade**

**Patient Flow Operational Strategies, Options, and Opportunities**

Improving patient flow is a top priority for hospitals and healthcare systems. Over the past decade, a great deal of effort has been spent on defining the specific approaches aimed at improving patient flow, from the emergency department through to hospital discharge and transition to the community. A number of operational models have been designed to improve patient flow.

**Critical Patient Flow Concepts**

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Figure 4 provides an illustrative display of key patient flow concepts, including various patient access points in an Emergency Department of a hospital.
Hardwiring Emergency Department Patient Flow: Managing the Front, Middle and Back

Patient Visits and Flow
Flow is about the how, where, when and who of care provision. How services are accessed, where and when assessment and treatment is available, and who it is provided by, can have as significant an impact on the quality of care as the actual clinical care received. The concept of optimizing flow to improve care has received increasing traction within healthcare, especially in relation to reductions in patient waiting times for emergency and elective care. These ideas, often initially field-tested in other industries, have demonstrated proven results that healthcare organizations can benefit from applying flow and systems thinking to their organizations.

As the national policy agenda focuses more strongly on integration between primary care, acute services and community care needs, the necessity of understanding and improving how patients flow through systems is more important than ever. High profile cases of failures in the timeliness and quality of care also sound a warning as to the painful consequences of poor quality systems and processes.14

For effectively managing flow, it is critical to understand flow from all perspectives: Front End, Middle and Back End.

Figure 5: Lifecycle of a Patient Visit15

Rethinking the Patient Journey

Figure 6(a) & (b) illustrate the example of one ED in which flow was re-worked utilizing classic Lean concepts and ED flow best practices. The Emergency Department team started with a classic Emergency Department patient flow process: arrival to the greeter, registration, triage, arrival to room, contact with the physician, lab, imaging, re-evaluation and discharge – a respectable basic E.D. flow model seen in many E.Ds. When the process flow maps for this model are mapped out, however, they demonstrate a spaghetti diagram of forward and backward movement, involving a great deal of wasted motion, time, and effort. Although a classic way of processing patients, it is inefficient.

There is a better method - beginning with the Lean operational principles of continuous forward movement, moving steps closer together, and eliminating waste. The goal is to abolish backward movement and wasted time and effort whenever possible. Backward or retrograde flows consume time and effort, wastes staffing hours and constitute a potentially significant source of delays and re-work. The processes were redesigned (“leaned out”) with minimal backward flow and nearly continuous forward flow.
Before Flow Improvement Efforts

Figure 6(a): Before and After Flow movement in an ED

After Flow Improvement Efforts

Figure 6(b): Before and After Flow movement in an ED

Key Tactics for Getting Patient Flow Right at the Front End

Adopting an effective approach to redesigning front-end processes and breaking down each element of the care model from the perspective of the patient improves the overall flow of an Emergency Department. In many instances, clinical teams test various models of patient flow to arrive at the most efficient one. An understanding of the key tactics of getting patient flow right at the front end can greatly facilitate this process. An operations management and patient-centered approach to ED flow redesign results in an improved front-end process (and better metrics) for the delivery of emergency care. Listed below are key tactics involved in getting patient flow right at the front end.

<table>
<thead>
<tr>
<th>Focusing on the Front End of the ED:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measure patient demand by hour and design a system to handle it</td>
</tr>
<tr>
<td>• Commit to the right staffing mix—and the right staff</td>
</tr>
<tr>
<td>• Make sure your triage processes enhance flow, not form a bottleneck</td>
</tr>
<tr>
<td>– Triage is a process and not a place</td>
</tr>
<tr>
<td>• Use a simple and reliable system to segment patient flow</td>
</tr>
<tr>
<td>– Keep your vertical patients vertical and moving</td>
</tr>
<tr>
<td>– Not all patients need beds</td>
</tr>
<tr>
<td>• Match your service delivery options to your incoming patient streams</td>
</tr>
<tr>
<td>– Remove all work that does not add value</td>
</tr>
<tr>
<td>– Fast Track is a verb and not a noun</td>
</tr>
</tbody>
</table>

Figure 7: Focusing on the Front End of the ED

Front End Patient Flow Service Lines – Definitions and Descriptions

This section provides definitions and descriptions of key front end patient flow concepts which play critical roles in the smooth functioning and efficiency of an Emergency Department.

Fast Track: The role of the Fast Track is to segment and serve those patients that are uncomplicated or relatively easy to treat (ESI 5’s, 4’s and simple 3’s)

Super Track: A “Super” Fast Track located in or near triage for the purpose of promptly treating patients who require very low resource utilization (ESI 5’s + simple 4’s)

Vertical Flow – ESI Level 3 Fast-Tracking: Establishing a process (or set of processes), people, and a place (or places) to fast track your “vertical 3” patients.

Clinician in Triage/ RME/ or “Team Triage”: Front-loading a team of providers utilizing an “Intake Team” mentality for promptly assessing, treating and either placing or discharging ESI level 3 patients, and perhaps ESI 4’s and 5’s.
- Midlevel Provider in Triage
- MD in Triage
- Team Triage (Multi-disciplinary assessment and treatment team)

Best Practices in Driving Efficient Front, Middle and Back End Flow
Improving flow in the ED can enhance safe and quality patient care. Patients feel cared for in facilities and practices that minimize undue waiting, make progress transparent, and transitions seamless. The result is contented, well-treated patients and enhanced practice revenue.18

A classic medical maxim is “first the diagnosis, then the treatment plan”. It is recommended that flow problems be diagnosed prior to implementing the “fix” or treatment plan for the symptom of sub-optimal patient flow. This “diagnose, and then treat” approach helps identify issues with front-end flow, middle flow and back-end flow. It is also important to analyze the demand for patient care and service within the E.D. and then match care delivery services to that demand. This demand-capacity matching will ensure decreased wait times, smooth patient flow and enhanced physician and patient satisfaction.

Adopting a Split Flow Model
The Split-Flow model of care is an evidence-based best practice that hospitals nationwide are adopting with the goal of shortening the time before a patient is seen by a physician or healthcare provider, as well as the overall length of time spent in an Emergency Department. Long wait times during an Emergency Department visit are a major reason for low patient satisfaction scores and increase the potential of a patient leaving before receiving medical care.19

The Split-Flow model is operationally advantageous when considering the complementary goals of high-quality health care in the setting of high efficiency throughput. Over the past decade several effective approaches to improve ED efficiency and throughput have been developed and deployed. The fundamental theory of these models involves separating out (or sorting out) patients by acuity and channeling them through clinical environments matched to their resource needs and volume. These approaches may involve areas, personnel, and resources either internal or external to the ED. These models provide efficient and cost-appropriate services, thereby reserving and allocating the higher-cost services and teams for those high-

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19 http://www.stmaryhealthcare.org/splitflow
acuity patients who require the staff and resources capable of delivering high acuity and critical care services.\(^{20}\)

The caveat is that one should only segment or carve out a patient stream or service family if one has the volume or acuity to justify the segmentation of one’s resources. This question can be effectively answered by demand-capacity modeling.

![Matching Your Service Delivery to Your Incoming Patient Streams](image)

**Figure 10: Segmenting ED Incoming Patient Flow**

A selected overview of field-tested methods and models to optimize patient flow are highlighted below:

**Utilizing a Super-Track Model**

For Emergency Departments seeing medium to high volumes of patients, the concept of patient segmentation can be critical as a flow strategy. Patient segmentation groups patients requiring similar levels of care, resource requirements, and/or similar anticipated lengths of stay (LOS) into a designated geographic area with dedicated staff, space, supplies, and services. One of the examples of such patient segmentation is Super-Track, which now has a very compelling body of literature supporting it. Super-Track is usually dedicated to patients with ESI 4 and ESI 5 triage scores (and sometimes, at select locations, “Vertical 3s”). Once patients are found to meet the Super-Track criteria, they are quickly placed in the defined patient treatment space or care area, the patient care process is expedited, and the provider is alerted. (Healthcare Providers can always reroute a patient if they feel that other information indicates a higher level of care is required). Healthcare providers place additional orders and communicate with the main ED team throughout the process.\(^{21}\)

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20 http://www.annemergmed.com/article/S0196-0644(13)00968-2/fulltext
21 http://www.acepnow.com/article/supertrack-approach-patient-segmentation-aids-emergency-departments/?singlepage=1
Deploying Physicians and APPs in Triage
This refers to front-loading a team of healthcare providers utilizing an ‘intake team’ mentality for promptly assessing, treating and either placing or discharging ESI level 3 patients, and perhaps select ESI 4s and 5s.

Dedicating a physician to the intake process has a number of advantages. Placing a physician in triage decreases length of stay (LOS), decreases LWBS rates, and increases staff satisfaction. It is not uncommon for an Emergency Department Team to discover that approximately one third of their patients can be rapidly assessed and discharged using relatively few ED resources (ESI Level 5s, 4s, and “Vertical 3s”).

Deploying APPs in triage is an approach that has also gained momentum over the years. When a midlevel provider (i.e., nurse practitioner, physician assistant) is effectively placed and leveraged in triage, this too has resulted in reduced throughput times, reduced waits, and reduced rates of LWBS.

The challenges with this approach (placing a clinician in triage) is optimizing the best use of overall clinician and nursing resources and also defining when, where, and why this approach should be deployed.

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The Clinician in Triage model (CIT) can have a positive impact on a number of the patient satisfaction survey questions in the patient satisfaction survey. The areas which can be positively impacted by a clinician in triage model are listed here:

- Waiting time to treatment area
- Waiting time to see a doctor
- Doctor’s courtesy
- Doctor took time to listen
- Doctor informative about treatment
- Doctors concern for comfort
- Informed about delays
- How well pain was controlled
- Overall rating of ER care
- Likelihood of recommending

**Adopting a Team Triage Model**

Triage is the process of determining the priority and order of treatment of patients based on the severity of their conditions. This allocates patient treatment resources efficiently when healthcare providers are unable to immediately see and treat all patients at the time they

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present. Triage may result in determining the order and priority of emergency treatment, the order and priority of emergency transport, or the transport destination for the patient. Triage may also be used for patients arriving at the emergency department, or delivered via telephone or virtual medical advice systems, among others.  

ED patient flow begins at triage. Patient assessment must be rapid, accurate, and reliable in order to optimize flow and prevent bottlenecks. Triage, traditionally performed by a nurse, frequently includes completing a lengthy triage nursing assessment form. When deploying enhanced and more efficient front-end patient flow models, an all-inclusive approach to the triage assessment can be problematic. Many EDs have sped up the process by using bedside registration and a brief focused triage assessment and process. This approach will work as long as beds or patient treatment spaces are available. Another option to prevent a bottleneck at triage is to add triage personnel and resources to triage as soon as a pre-defined number of patients are pending triage, or if patients are waiting more than a defined time period to be triaged.  

Thom Mayer, MD, FACEP, and his team have described the “Team, Triage and Treatment,” or “T3” approach. Dr. Mayer found that over 30 percent of ED patients never need a separate and private ED room at all. Their illnesses or injuries are such that they may be evaluated and treated in a triage-like environment before they ever get into a regular room. The “team” part of T3 consists of an emergency physician, an emergency nurse, a scribe, a registrar, and a technician. The five member team works together to begin an ED patient’s evaluation and treatment at the point-of-contact in triage. This program was started with a Robert Wood Johnson foundation grant, and was deployed from 10:00 am to 8:00 pm. An interesting and unexpected outcome was that it improved patient flow and increased throughput for the entire 24 hour day, not just during the hours in which T3 was deployed. In EDs where this concentration of personnel and resources may not be justified on a regular basis, a version of this model can be used to help EDs manage peak flow or surge periods, or it can be deployed to address recurrent bottleneck situations.  

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26 https://en.wikipedia.org/wiki/Triage  
More about Team, Triage and Treatment (T-3)

Team
- Emergency Physician
- Emergency Nurse
- Scribe
- Tech-Sec
- Registrar

Philosophy
- Begin the evaluation and treatment at the point of contact
- Addresses capacity constraints moving upstream in the process in a dramatic fashion-forward deployment of resources
- Requires “catching the ball” in the back
- Requires not just bodies, but fundamental changes in resources, processes, and philosophy
- Registration is a key stakeholder and must be involved early

Hypotheses
- Patient satisfaction will improve
- Employee satisfaction will improve
- For T3 patients, turnaround times will decrease
- Patients leaving before treatment (LWBS) will decrease (79% - no room assignment)
- T3 will, at worst, be revenue-neutral
- Patient safety may improve
- The impact will disproportionately be on E/M 3-4 patients

Figure 9: More about Team, Triage and Treatment

Teams, Teamwork, and Team Based Care – Implementing a Zone or “Pod-Based” Model

Definition of a Team: Two or more people who achieve a mutual goal through interdependent actions-not a group that achieves its goal through independent, individual contributions. The essential elements of a team include a common purpose and shared goals, interdependent actions, communication, accountability, and a collective effort.

Those of us in emergency medicine have considerable experience with teams and team-based care. Teamwork is an essential element in the delivery of high-level emergency care. Teamwork

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29http://smhs.gwu.edu/urgentmatters/sites/urgentmatters/files/enewsletter_volume2_issue1_TeamTriage_Mayer.pdf
plays a critical role in emergency medicine, regardless of the form your patient flow model or delivery system takes.

Superb teamwork does not replace clinical skills - it augments and enhances them. Teamwork affects every aspect of ED operations: patient safety, patient flow, patient satisfaction, workforce satisfaction, and clinical processes.

To be the best ED you can be, you want to have your best team working at all times, and you want your ED staff to work as a high-performance team. Good teamwork and communication elevates a collection of skilled providers from a group of individuals organized around a common goal to a tight clinical care crew of talented individuals who function as a fluid, integrated and supportive team.

Some emergency departments, given the right patient volume and Emergency Department layout, can leverage teamwork principles and organize their care delivery around designated teams and spaces (some-times referred to as a “zone-bazed” or “pod-based” care model). One must be careful not to isolate or silo the teams.

Team-based care models have their origins in Crew Resource Management (CRM) and consist of a defined team of people with clearly defined (and circumscribed) roles caring for a defined group of patients in a defined area. This often starts with a model comprising four beds per nurse, two nurses per physician, and eight beds per physician with appropriate tech and/or scribe support for the team.

As LOS (length of stay) and acuity decrease, (say in a busy and and well-run fast track), the ratio might migrate toward three beds and six beds per physician or APP. Actual numbers will depend upon demand-capacity modeling and real-world testing and experience. Relevant variables include patient acuity, LOS, physical layout, sight-lines, the team’s clinical savviness, effective communication and aligned incentives.

When done well, designated patient care teams and team assignments can lead to decreased LOS, improved productivity, enhanced accountability, enhanced communication, better anticipation of care needs, and elevated levels of staff satisfaction.

In the appropriate clinical setting a “zone-based”, “pod-based” or “team-based” care model can be highly effective. Care must be taken not to let teams turn into isolated silos nor to overload one team at the expense of the other.

Additional Methods to Improve Flow
Clearly Defining Patient Destinations
Signage can be a key factor to improving flow. It may be as simple as lobby or parking lot signs directing patients to the correct floor or door. It may be signs within a practice clearly
distinguishing check-in from check-out, or segregating patients by type of service needed. This is part of visual management in healthcare.

**Examples of visual management tools in a health care facility:**

- Illustrating the activities of a process helps in shared clarity and in a better understanding of the process
- Placement and intermediate storage areas should be marked well e.g. hospital beds, wheelchairs, ultrasound scanner
- Designating common passageways and isolation passageways that cannot cross each other helps in appropriately regulating hospital traffic
- Organizing workspaces and assigning tools, machines and appliances to well-defined designated locations are good practices to follow
- Organizing documents and reports in visible spaces also sets a good example
- Differentiating job positions by uniform color helps in identification
- Reinforcing the safety of personnel and patients with signs, illustrations and notes are critical

*Figure 11: Examples of visual management tools in health care facility*

**Avoiding Bottlenecks**

A common bottleneck is at the traditional registration counter. Operational and architectural changes can improve this. Considering the strategic usage and spacing of exam rooms and knowing how many exam rooms a physician can typically handle at one time can help avoid bottlenecks. Knowing how many exam rooms are required to meet patient demand is also critical to help avoid bottlenecks.

**Planning for Logical Traffic Patterns with No Crossed Paths**

Very often a patient checks in, sits in a waiting room, and then must cross the path of new patients checking in on the way to an exam room. Planning instead for a traffic flow that moves patients sequentially through a visit without crossing paths or retracing steps can be helpful.

**Considering Internal Traffic Flow, Including within the Reception Area**

Providing touch-down stations where providers can write notes after a patient visit without going back to an office or nurses’ station can prove to be a vital step in this process. Also managing the movement of medical supplies can contribute to a smooth flow for patients and doctors.

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30 [http://www.leanhospitals.pl/en/project/visual-management/]
Parking is Part of Patient Flow
Parking is part of patient flow and can significantly affect both patient satisfaction and revenue. At times, due to limited parking space, patients cannot find parking spaces. As a result, patients can either become dissatisfied and leave, or avoid coming altogether. Others give up and become no-shows. Patient satisfaction, volume, and practice revenue can suffer. Thus, whenever considering a new facility or improvements to an existing facility, parking should be a critical factor taken into consideration.

Launching and Hardwiring Best in Class Patient Flow Strategies and Models
Smoothing the flow of patients in and out of hospitals and other health care settings can help to reduce overcrowding, prevent poor handoffs, and avoid delays. A number of hospitals and health systems are pursuing strategies to improve patient flow such as orchestrating the arrival and discharge of patients undergoing elective procedures and transferring the oversight of patients waiting to be admitted from emergency departments to other hospital units. It is crucial to manage the execution of improving flow by deploying effective project management and change management tactics and tools. A potential list of project management and change management strategies could include the following:

- **A Change Package**: A set of ideas and a performance improvement toolkit.
- **Data**: Key relevant performance improvement metrics. The data has to be reliable, transparent, and timely.
- **A true local champion** with a passion for change, the relevant knowledge and change management skills
  - Solutions can seldom just be imposed by management. There is a compelling need for local leadership - sometimes from the front and sometimes from the back - to drive the execution.
- **Aligned incentives**: Financial, promotions, incentives, perks, etc.
- **Competition**: Healthy, non-Darwinian competition that includes a transparency of data.
- **Every member of the team** needs to be aware of what the key metrics (KPIs) are, what they mean, and how to influence them.
- **Coaching/Guiding/Mentoring**: the challenge is determining how often, how much and by whom.
- **Problem identification**: Help with defining problems, prioritizing solutions, sequencing tests of change and hardwiring execution
- **Consequences for failing to act**

*Please refer to Appendix Section C to read more about Eight Steps for Successful Change Initiatives from the Advisory Board Company.*
Forming a Patient Flow Improvement Team
Numerous studies have shown the importance of creating multidisciplinary teams to plan quality improvement interventions. One of the benefits of a multidisciplinary team is that members will bring different perspectives and knowledge about problems, their underlying causes, and potential solutions.

It is recommended that a core team is formed. The core Emergency Department (ED) patient flow team should include a team leader (a day-to-day leader), senior hospital leader (e.g., the chief quality officer), individuals with subject matter expertise related to the strategy, emergency department (ED) physicians and nurses, ED support staff (e.g., clerks, registrars), a research/data analyst, a performance improvement expert and when needed, representatives from inpatient units. Registrars, unit coordinators, and technicians, as well as other ED support personnel play an important role in the problem identification, opportunity selection, and the successful adoption of strategies; there is a need to include these individuals in planning, problem-solving and implementation.31

<table>
<thead>
<tr>
<th>Putting Together the Right Core Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Create a <strong>Core Team</strong></td>
</tr>
<tr>
<td>▪ Designate <strong>Day-to-Day Leadership</strong></td>
</tr>
<tr>
<td>▪ Technical/Subject Matter Expertise</td>
</tr>
<tr>
<td>▪ Team Members</td>
</tr>
<tr>
<td>• Doctors and Nurses</td>
</tr>
<tr>
<td>• Key Stakeholders and Constituents</td>
</tr>
<tr>
<td>▪ Creating a larger <strong>Improvement Team</strong></td>
</tr>
<tr>
<td>▪ System Leadership and Executive Leadership</td>
</tr>
</tbody>
</table>

There may be one or more individuals on the team that fit into the core team, and one individual may fill more than one role, but each component should be represented in order to drive change in the organization. The core team should be comprised of individuals who:

- Have a working knowledge of the area selected,
- Can work together as a functioning team at an accelerated pace,
- Have time allocated by senior leadership to work on this project,
- Are motivated and excited about change and creating new designs, and
- Can make the work of the team visible to the departments/services that will need to be involved by sharing results, asking for input, and involving them in tests.

**Forming the Right Team**32: *Modeled after the Institute for Healthcare Improvement (IHI) Approach*

The core patient flow team should have representation from different dimensions:

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31 [http://www.ahrq.gov/research/findings/final-reports/ptflow/section2.html](http://www.ahrq.gov/research/findings/final-reports/ptflow/section2.html)

32 Jensen, K. *Execution: Project, People, and Change Management*, presentation 2017
Day-to-Day Leadership
Having a day-to-day leader is a critical component of the performance improvement project. It assures that changes are developed, tested and implemented. The day-to-day leader will be the key driver of the performance improvement efforts in any organization. It is important that this leader understands the various effects of making change(s) in the system. A person in this role needs to be able to work effectively with multiple disciplines and should be able to dedicate a healthy chunk of their professional time to this initiative.

An organization will often witness the emergence of a Performance Improvement (PI) High Impact Team (HIT) consisting of a nurse lead, physician lead and PI professional. The High Impact team is often the engine that drives the improvement effort day by day, week by week, and month by month.

Technical/ Subject Matter Expertise
A technical or subject matter expert is someone who knows the subject intimately and understands the processes of care. Additional methodological support may be provided by an expert on performance improvement methods who can help a team:
- Determine what to measure
- Assist in the design of simple, effective measurement tools
- Provide guidance on collection, interpretation, and the display of data
- Provide guidance on designing and running test of change (TOC)

Doctors and Nurses
It is critical to have at least one physician and one nurse champion on the ED team. It is always a good idea to look for a physician and a nurse who are opinion leaders in the organization. They should be individuals others go to for advice, and are not afraid to implement change. These champions should have good working relationships with colleagues and with the day-to-day leader. They should be interested in driving successful change within the system.

System Leadership
System leadership should include a senior level person to provide overall guidance to the team.
- A system leader is someone with enough clout in the organization to institute change, with the authority to allocate the time and resources necessary to achieve the team’s aim.
- It is important that this person have authority over all areas that are affected by the desired or suggested performance improvement changes.
- Examples of an appropriate system leader include a Vice President for Patient Services, CMO, VPMA, CNO or Division Lead.

Executive Leadership
The Senior Leadership in the organization should play three important roles:
• Sponsorship of the performance improvement team
• Creating the vision of the new system
• Fostering the cooperation needed throughout groups and stakeholders to achieve the organizational goals

Other Team Members
In addition to the core team, there are various others who can play a critical role in identifying, executing, and sustaining process changes in a meaningful way. Some of the people who are integrally involved in current ED processes include:
  • The Department Director(s) of the ED
  • Nursing Clinical Leaders on all shifts
  • Additional Nurses and Physicians
  • APPs
  • Ancillary Services (essential partners) such as the Radiology Director, laboratory services, etc.

Measuring ED Performance
Performance measurement is key step in the performance improvement project that tells a unit (service or production) how it is performing. Hospitals have collected financial data for years to give feedback to key stakeholders. They now have the added imperative of collecting quality data for an expanding number of internal and external stakeholders. The three major foci of measurement are:
  • Regulatory/Accreditation data
  • Mission critical data
  • Rapid Cycle Change data

Program Design and Implementation Strategy
Once a hospital has formed a patient flow improvement team and is collecting performance improvement data, the next step is to identify a strategy or series of strategies to identify best practices and opportunities for the patient flow improvement efforts. Selecting the right strategy is paramount for any successful intervention. Hospitals that devote sufficient time up front to careful strategy selection and problem identification often save time in the long run by avoiding the need to perform major adjustments midstream. Effort from all of the involved stakeholders needs to converge on identifying, testing and achieving the common goal. Helpful steps in designing the program and implementing the strategies are listed below:

Identify the Most Likely Causes of the Specific Problems that are Identified within the Areas of Focus
Members of the patient flow improvement team are often able to identify roadblocks to patient flow in the ED and the hospital. Is the absence of a robust triaging process and capacity

34 http://www.ahrq.gov/research/findings/final-reports/ptflow/section4.html
leading to delays in the front-end? Are patient treatment destinations clearly defined? Does the hospital need an enhancement to the fast track model by introducing the super track? Is the lab turnaround time contributing to long patient lengths of stay in the ED? Do patients typically wait for hours for a physician specialist consult? Performance improvement methodologies (e.g., Lean, Six Sigma) and related tools (e.g., process mapping, value stream mapping, root cause analysis, Pareto analysis...) can often be used to identify specific causes of blockages and opportunities for improvement.

**Be Sure to Validate the Suspected Causes with the Relevant Key Performance Metrics**

Team members are expected to utilize various assessment tools and techniques to validate the suspected causes with appropriate key performance indicators (KPIs). KPIs specify what is measured. Assessment techniques detail how and when it will be measured. This helps in identifying & finalizing the issues before attempting to fix the service delivery problems.

**Explore What Other Hospitals Have Done to Improve Patient Flow (Benchmarking)**

Numerous resources, including publications and online sources are available that describe actions taken by hospitals that have been successful in improving patient flow. These resources can help any team generate ideas for possible strategies.

**Consider the Available Resource Allocations**

A team needs to set realistic expectations for your strategy. How ambitious can the project be and still be successful? Resource allocation plays a critical role in the answers to this question.

**Choosing Your Strategy**

There are several approaches hospitals can use to select a strategy, ranging from one person selecting the strategy to a large staff-level performance improvement team brainstorming various strategies, testing them (e.g., through kaizen events [i.e., a continuous quality improvement process] or rapid cycle tests of change), and finally coming to a decision. In general, the selection process usually fits into one of two broad categories:

- Top-down strategy selection.
- Bottom-up strategy selection.
As healthcare continues to transform itself, EDs are transforming too. Smooth patient flow in the Emergency Department often sets tone for the rest of the patient experience. More than two-thirds of inpatients arrive via the ED. Hospitals and health systems that build strong support from administration, physicians, and ancillary staffs for efficient and patient-friendly EDs are likely to experience strong patient loyalty and a positive impact on the bottom line. Because hospitals are often silo-ed from department to department, it’s a challenge to identify the party or parties ultimately responsible for patient flow. Someone needs to “own” the process of monitoring patient flow, fixing issues that arise, and sustain the gains. Efforts to make more effective use of existing patient flow strategies and models to improve admissions, handoffs, and discharge processes can have significant benefits not only in terms of improved safety and more continuous care, but also in terms of increased efficiency and revenue.

**Getting Started**

**A Checklist for Launching a Patient Flow Program**

A patient flow improvement initiative consists of multiple phases, where each phase is designed to prepare a hospital team and establish the necessary conditions to execute the subsequent phase and optimize results at the end of the improvement initiative. A getting started checklist can be a helpful tool for such initiatives. The purpose of the checklist is to properly structure the approach to the project and assure that each of the major phases and activities are planned for and executed. A sample checklist is provided below which is designed to help healthcare providers track progress in their patient flow initiative and make significant and lasting improvements.

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35 [http://www.ahrq.gov/research/findings/final-reports/ptflow/section5.html](http://www.ahrq.gov/research/findings/final-reports/ptflow/section5.html)
Obtain Commitment From Senior Management to Launch the Patient Flow Improvement Program
Put Together the Right Team
- Secure a Champion for Launching the Patient Flow Team
- Create a Core Team
- Create a Larger Improvement Team
- Launch the Patient Flow Team
Create a Planning Group (Includes Core Team, Key Stakeholders, and Sponsors)
- Identify Team Roles/Responsibilities/Time and Resource Commitments
Establish the Patient Flow Program Goals, Infrastructure, Budget(s) and Timelines
- Evaluate the Current State
- Choose an Appropriate Patient Flow Model or Models (Potential Future State)
- Refine the Current Patient Flow Model and Implement as Needed
Identify the Method or the System for Improvement
- Adopt a Familiar and Reliable Model for Change/Improvement
- Develop Criteria for Site/Team Participation
- Select and Enroll Participating Site(s)/Teams
- Engage Site(s) and Establish Teams, Roles, Expectations, Timelines, and Deliverables
- Prototype/Test and Learn
Monitor Participating Site(s)
- Monitor and Measure Incoming Patient Flow and Acuity
- Evaluate Staffing Mix and Hours of deployment
- Align Demand and Capacity
- Manage Change
Prepare Analysis & Tracking Documents/Templates
- Data and Measurement Requirements Template
- Monthly Reports Template for Participating Teams
- Site SWOT Analysis Template
Track Appropriate and Relevant Metrics & Data
- Standardize Data Collection Mechanism
Invest in Staff Accountability and Training
Design Frequent Checkpoints/Meetings To Monitor Improvements
Hardwiring the Gains

Figure 13: A Sample Checklist for Launching a Patient Flow Program

37 http://www.ahrq.gov/research/findings/final-reports/ptflow/section6.html
A Checklist of Potential Patient Flow Strategies:

- Enhanced Triage
- Direct Bedding (“Pull ‘til Full”)
- Bedside Registration
- Advanced Triage Orders/Treatment Protocols
- Fast-Tracking Low-Acuity Patients:
  - Super-Track (ESI 5’s + simple 4’s)
  - Fast-Track (ESI 5’s, 4’s, and simple 3’s)
  - “A Fast Track on Steroids”
- ESI Level 3 “Fast Tracking”
- Clinician in Triage:
  - Midlevel Provider in Triage
  - MD in Triage
  - Team Triage (Multi-disciplinary assessment and treatment team)
- Team-Based Care Models
- Efficient Ancillary Services (“Essential Partners”…)
  - Lab and Imaging Services
- A Results-Waiting Area
- Efficiently Managing Admissions and Discharges
A Checklist of Potential Tactics & Action Items – An Assessment Tool

Provided below is a list or a checklist of High Leverage Emergency Department Tactics for Optimizing Operational Cycle Times, Improving Patient Safety and Increasing Workforce and Patient Satisfaction.

<table>
<thead>
<tr>
<th>High Leverage Emergency Department Tactics for Optimizing Operational Cycle Times, Improving Patient Safety and Increasing Workforce and Patient Satisfaction™</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>A. BEDSIDE REGISTRATION</strong></th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Development of protocols for bedside registration</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>2. Equipment needed for bedside registration (e.g. laptop computers, ports in rooms)</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>3. Consider simultaneous registration by a family member</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>4. Gather key information only</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>5. Cross-train others to do bedside reg.</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>6. Utilize strategies to make beds available (e.g. diagnostic waiting room)</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>7. Maximize use of bedside reg.</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>8. Other ideas</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>B. ENHANCED TRIAGE</strong></th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Protocols and flexibility for real time adjustment of capacity to demand</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>2. Protocols for appropriate intensity of triage (triage short form available)</td>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
</tbody>
</table>

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39 Developed by Kirk B Jensen, MD and the Envision Innovation Group
| 3. Standing order protocols for laboratory testing, imaging, and basic therapy | Y | N |
| 4. Team Triage where and when applicable | Y | N |
| 5. Physical changes to plant to allow for enhanced triage | Y | N |
| 6. Communication (e.g. walkie-talkies) between triage nurse and charge nurse | Y | N |
| 7. Other ideas | Y | N |

**C. FAST TRACK**

| 1. Allocation of space, staff, and supplies | Y | N |
| 2. Set of entry criteria | Y | N |
| 3. Protocols for patient care testing & treatment | Y | N |
| 4. Match FT hours to peak times in ED | Y | N |
| 5. Match Clinician (MD and/or APP) hours to patient demand | Y | N |
| 6. Match Nursing/tech Hours to patient demand | Y | N |
| 7. Match Beds/Treatment Spaces to patient demand | Y | N |
| 8. Results waiting area | Y | N |
| 9. Insure coordination with the main ED | Y | N |
| 10. Optimize FT patient volume | Y | N |
| 11. Other FT team generated ideas | Y | N |

**D. PATIENT SEGMENTATION/SPLIT-FLOW /FAST-TRACKING ESI LEVEL 3 PATIENTS MODELS**

| 1. Allocation of space, staff, and supplies | Y | N |
| 2. Set of entry/eligibility criteria | Y | N |
| 3. Protocols for patient care testing & treatment | Y | N |
| 4. Match hours to peak times in ED | Y | N |
| 5. Match Clinician (MD,APP and/or Scribe) hours to patient demand | Y | N |
| 6. Match Nursing/Tech Hours to patient demand | Y | N |
| 7. Match Beds/Treatment Spaces to patient demand | Y | N |
| 8. Results waiting area | Y | N |
9. Insure coordination with the main ED | Y | N
10. Optimize appropriate patient volume and acuity | Y | N
11. Other team generated ideas | Y | N

### E. ANCILLARY (ESSENTIAL PARTNERS)

<table>
<thead>
<tr>
<th>Ancillary: Imaging Services</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Guidelines for ordering of plain films and advanced studies</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2. X-rays ordered at triage—“enhanced triage”</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3. Efficient reading of images:</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>ED physician “Quick look” approach</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>Dedicated x-ray tech to ED</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>ED as a priority</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4. Contingency plans for real time delays</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5. Real time data collection on TAT</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6. 24/7 radiologist reading</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7. Other ideas</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

### Ancillary: Lab

<table>
<thead>
<tr>
<th>Ancillary: Lab</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Efficient accomplishment of testing:</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>Point of care testing (e.g. pregnancy tests, rapid strep test, cardiac markers)</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>Staff (e.g. phlebotomist) dedicated to ED</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><em>Priority given to ED (TAT guarantees)</em></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2. Real time data collection on TAT</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3. No oral contrast for abdominal CTs</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4. Other ideas</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

### Ancillary: Pharmacy

<table>
<thead>
<tr>
<th>Ancillary: Pharmacy</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pneumatic tube system or similar approach - ED given priority</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2. Satellite pharmacy with computerized control system</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3. Other ideas</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

### Ancillary: Respiratory Therapy

<table>
<thead>
<tr>
<th>Ancillary: Respiratory Therapy</th>
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<th>Notes, Observations, and Next Steps</th>
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</thead>
<tbody>
<tr>
<td>1. Respiratory therapy function folded into ED</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
2. Respiratory tech dedicated to ED  | Y | N
3. Demand management: develop protocols | Y | N
4. Other ideas | Y | N

**F. DISCHARGE**

<table>
<thead>
<tr>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pre-printed discharge instructions</td>
<td>Y</td>
</tr>
<tr>
<td>2. Discharge area</td>
<td>Y</td>
</tr>
<tr>
<td>3. Make “ready for disposition” visible</td>
<td>Y</td>
</tr>
<tr>
<td>4. Other ideas</td>
<td>Y</td>
</tr>
</tbody>
</table>

**G. ADMISSION**

<table>
<thead>
<tr>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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</thead>
<tbody>
<tr>
<td>1. Administrative buy-in to the importance of problem and interdepartmental collaboration</td>
<td>Y</td>
</tr>
<tr>
<td>2. Analysis and improvement of availability of inpatient beds (Bed Ahead):</td>
<td></td>
</tr>
<tr>
<td>Admission/discharge criteria on floor</td>
<td>Y</td>
</tr>
<tr>
<td>Earlier discharges (scheduling and orchestrating the discharge, discharge planning at admissions, earlier discharge rounds, e.g. discharge rounds before teaching rounds)</td>
<td>Y</td>
</tr>
<tr>
<td>Early notification of potential admissions from the ED</td>
<td>Y</td>
</tr>
<tr>
<td>ED admit needs modelled/predicted from DCM analysis</td>
<td>Y</td>
</tr>
<tr>
<td>Consider scheduling admissions from the ED</td>
<td>Y</td>
</tr>
<tr>
<td>Coordination with housekeeping</td>
<td>Y</td>
</tr>
<tr>
<td>Checks by bed control on actual inpatient bed availability</td>
<td>Y</td>
</tr>
<tr>
<td>A real-time bed monitoring system or dashboard</td>
<td>Y</td>
</tr>
<tr>
<td>Tracking and monitoring KPIs</td>
<td>Y</td>
</tr>
<tr>
<td>3. Recognize availability of inpatient beds:</td>
<td>Y</td>
</tr>
<tr>
<td>Bed control highly responsive to the ED</td>
<td>Y</td>
</tr>
<tr>
<td>Responsible party for bed control both on the inpatient and the emergency department side</td>
<td>Y</td>
</tr>
<tr>
<td>Bed hotline—“one call does it all-1-800-Admit”</td>
<td>Y</td>
</tr>
<tr>
<td></td>
<td>Execute the transfer:</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------</td>
</tr>
<tr>
<td>4</td>
<td>Place responsibility on receiving unit (pull system)</td>
</tr>
<tr>
<td></td>
<td>Adopt common documentation</td>
</tr>
<tr>
<td></td>
<td>Non-verbal reports to units (fax, tube)</td>
</tr>
<tr>
<td></td>
<td>Centralized dispatch for transport; dedicated transporter during peak times</td>
</tr>
<tr>
<td></td>
<td>Ancillary services (pharmacy, dietary, etc.) transfer automatically with patient or hand-off is standardized</td>
</tr>
<tr>
<td></td>
<td>The transfer process is measured and monitored</td>
</tr>
<tr>
<td>5</td>
<td>Ongoing feedback to floors and ED:</td>
</tr>
<tr>
<td></td>
<td>Monitor admission cycle times (real time tracking and plotted over time)</td>
</tr>
<tr>
<td></td>
<td>Monitor physician response times</td>
</tr>
<tr>
<td>6</td>
<td>Bridge orders for admits</td>
</tr>
<tr>
<td>7</td>
<td>Case managers in ED</td>
</tr>
<tr>
<td>8</td>
<td>No wait nursing reports for admits</td>
</tr>
<tr>
<td>9</td>
<td>Patient transporters</td>
</tr>
<tr>
<td>10</td>
<td>ED observation unit</td>
</tr>
<tr>
<td>11</td>
<td>Call for admissions early (don’t wait for all results if admission is obvious)</td>
</tr>
<tr>
<td>12</td>
<td>Other ideas</td>
</tr>
<tr>
<td>H. OTHER GENERIC HIGH-LEVERAGE CHANGES</td>
<td>Currently in Place</td>
</tr>
<tr>
<td>1</td>
<td>Strategies to improve patient flow:</td>
</tr>
<tr>
<td></td>
<td>Make patient status visible (boards, chart racks, electronic tracking systems)</td>
</tr>
<tr>
<td></td>
<td>Flag diagnostic test results</td>
</tr>
<tr>
<td></td>
<td>Expediter or “Flow Master” (role for charge nurse?)</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>2. Team-Based Care Models</td>
<td>☐ Y</td>
</tr>
<tr>
<td>3. Strategies to simplify data collection and charting (e.g. Multidisciplinary tool)</td>
<td>☐ Y</td>
</tr>
<tr>
<td>4. Strategies to extend physician’s time (e.g. use of a scribe, preformatted charting)</td>
<td>☐ Y</td>
</tr>
<tr>
<td>5. Scribes - Optimizing use, hours, training and utility</td>
<td>☐ Y</td>
</tr>
<tr>
<td>6. Strategies to reduce the number of handoffs of information</td>
<td>☐ Y</td>
</tr>
<tr>
<td>7. Move patients to results waiting</td>
<td>☐ Y</td>
</tr>
<tr>
<td>8. Visual triggers for tests completed, results returned</td>
<td>☐ Y</td>
</tr>
<tr>
<td>9. Visual triggers for critical abnormal results</td>
<td>☐ Y</td>
</tr>
<tr>
<td>10. Visual triggers or alerts for new orders placed</td>
<td>☐ Y</td>
</tr>
<tr>
<td>11. Unit based rounding</td>
<td>☐ Y</td>
</tr>
<tr>
<td>12. Surgical care smoothing</td>
<td>☐ Y</td>
</tr>
<tr>
<td>13. Tele-Medicine approaches and opportunities</td>
<td>☐ Y</td>
</tr>
<tr>
<td>14. Strategies to increase communication:</td>
<td>☐ Y</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicated phone, walkie-talkie, or communication system</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Dedicated communication nurse</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Board rounds</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Newsletter, e-mail, meetings, storyboards</td>
<td>☐ Y</td>
</tr>
<tr>
<td>15. Other ideas</td>
<td>☐ Y</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor door to doctor, doctor to data, data to decision, decision to discharge</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Measure and monitor throughput by area-fast track main ED, admissions</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Efficiency profiling</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Performance based pay or bonus plan for either physicians or nursing</td>
<td>☐ Y</td>
</tr>
<tr>
<td>Innovative or staggered scheduling</td>
<td>☐ Y</td>
</tr>
</tbody>
</table>
## I. DEMAND CAPACITY MANAGEMENT

<table>
<thead>
<tr>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Y ☐ N</td>
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</tr>
<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>☐ Y ☐ N</td>
<td></td>
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<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
</tbody>
</table>

### 1. Unit grading system
- Y
- N

### 2. Contingency plans
- Y
- N

### 3. Variable scheduling
- Y
- N

### 4. Queuing and capacity planning
- Y
- N

### 5. Staffing clinical providers to patient arrivals (predictive modeling)
- Y
- N

### 6. Strategies to match capacity to demand:
- Y
- N

#### Collect data on demand
- Y
- N

#### Adjust staffing for predictable demand
- Y
- N

#### Have contingency plans for unpredicted demand and/or surge capacity
- Y
- N

### 7. A reliable and effective approach and set of processes for dealing with Emergency Department boarding issues and challenges
- Y
- N

### 8. A reliable and effective approach and set of processes for dealing with Behavioral Health issues and challenges
- Y
- N

## J. THE ADMINISTRATIVE SYSTEM

<table>
<thead>
<tr>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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<tbody>
<tr>
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<tr>
<td>☐ Y ☐ N</td>
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<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
<tr>
<td>☐ Y ☐ N</td>
<td></td>
</tr>
</tbody>
</table>

### 1. Bed and flow management
- Y
- N

#### Patient flow coordinator/expediter
- Y
- N

#### Board huddles
- Y
- N

#### Bed Board
- Y
- N

#### Real time electronic bed status
- Y
- N

#### Real time communication system
- Y
- N

### 2. Demand/capacity measures and planning
- Y
- N

#### Time of day
- Y
- N

#### Day of the week
- Y
- N

#### Month/seasonality
- Y
- N

### 3. Early warning and response system
- Y
- N

#### Signals
- Y
- N

#### Actions based on signals
- Y
- N

#### A week ahead, a day ahead, the day of
- Y
- N
### K. WORKFORCE ISSUES

<table>
<thead>
<tr>
<th>Workforce Issues</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nursing staffing ratios</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>2. Physician staffing ratios</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>3. Communication</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>4. Teamwork/crew resource management</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>5. Workforce morale &amp; satisfaction</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>6. Physician scribes</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>7. Building adequate surge plan (predictive modeling)</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>8. Use better communication devices (mobile, text capable)</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>9. Cleaning turnaround times</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
</tbody>
</table>

### L. CLINICAL PATHWAYS/REALIABILITY/PATIENT SAFETY/CLINICAL BUNDLES

<table>
<thead>
<tr>
<th>Clinical Pathways/Realiability/Patient Safety/clinical Bundles</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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</thead>
<tbody>
<tr>
<td>1. Acute coronary syndromes</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>2. Stroke care</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>3. Pneumonia</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>4. Sepsis</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>5. Other high-Risk or High-Volume clinical conditions</td>
<td>☑ Y</td>
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### M. PATIENT SATISFACTION/ENGAGEMENT

<table>
<thead>
<tr>
<th>Patient Satisfaction/Engagement Survey</th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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</thead>
<tbody>
<tr>
<td>1. Patient satisfaction/engagement survey</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>2. Results tracked and trended</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>3. Targeted goals</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>4. Customer service training</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>What type?</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>How often?</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>Who participates?</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>5. Scripting</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>6. Managing the waits/ the psychology of waiting measures</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td>9. Patient follow-up calls</td>
<td>☑ Y</td>
<td>☑ N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y</td>
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<td>---</td>
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</tr>
<tr>
<td>7. Complaint management — <em>briefly outline your current process?</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Track physician metrics and coach to improve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Utilize hospitalists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Other ideas</td>
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<td></td>
</tr>
</tbody>
</table>

**N. PHYSICAL AND ENVIRONMENTAL**

<table>
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<tr>
<th></th>
<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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<tbody>
<tr>
<td>1. Physical space</td>
<td></td>
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</tr>
<tr>
<td>2. Layout and the ergonomics of patient flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Noise and other environmental stressors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Other</td>
<td></td>
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**O. CITIZENSHIP- THE ED AND THE COMMUNITY**

<table>
<thead>
<tr>
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<th>Currently in Place</th>
<th>Notes, Observations, and Next Steps</th>
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</thead>
<tbody>
<tr>
<td>1. Diversion management and the community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Nursing home relationships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Vaccination programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Public health clinics/relationships</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 14: High Leverage ED Tactics for Optimizing Operational Cycle Times, Improving Patient Safety and Increasing Workforce and Patient Satisfaction*
Appendices

Appendix A: The Benefits of Effectively Managing Flow

For Patients:
- Reduced patient wait times
- Decreased number of patients leaving without being seen (LWBS)
- Improved quality of patient care and safety
- Reduced medical errors
- Reduced patient complaints
- Improved patient satisfaction

For the Healthcare Team Members (Nurses, Doctors, APPs and Hospital Administrators):
- Improved staff satisfaction
- Increased physician, APP, and nursing productivity and effectiveness
- Reduced distractions for nurses and doctors and less pressured decision-making
- Reduced medical errors and improved clinical outcomes
- Improved staff morale and decreased staff turnover
- Increased hospital revenue with improved patient satisfaction

For Families/ People Accompanying the Patient:
- Doctors and nurses who are not overly burdened can be more attentive to questions concerns, and subtle patient care issues
- Reduction in crowding and waiting is associated with decreased stress and anxiety levels

---

Appendix B: Implications of Flow Problems

ED Crowding and the Need to Address It

EDs across the country are busy, and crowding is a frequent concern. 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. Because of crowding, approximately 500,000 ambulances are diverted each year away from the closest hospital. ED crowding has been the subject of countless news articles, lawsuits, and research studies.42

Hospital and ED leaders are responsible for overseeing hospital performance across a number of dimensions. There are multiple reasons for addressing ED patient flow, and crowding should be at the forefront of any organization’s improvement efforts.

What Crowding Implies…

“[Crowding] is a situation in which the identified need for emergency services outstrips available resources in the ED… [which] occurs in hospital EDs when there are more patients than staffed ED treatment beds and wait time exceed a reasonable period” (ACEP Crowding Resource Task Force, 2002).

“Crowding typically involves patients being monitored in non-treatment areas (e.g., hallways) awaiting ED treatment beds or inpatient beds. Crowding may also involve an inability to appropriately triage patients, with large numbers of patients in the ED waiting area of any triage assessment category” (Case et al., 2004)

ED Crowding Compromises Care Quality

EDs are often high-risk, high-stress environments. When capacity is exceeded, there are heightened opportunities for error. Safety, effectiveness, patient-centeredness, efficiency, timeliness, and equity may all be compromised when patients experience long waits to see a physician, patients are boarded in the ED, or ambulances are diverted away from the hospital closest to the patient.

Over the past decade, several studies have presented clear evidence that ED crowding contributes to poor quality care.444546

42 http://www.ahrq.gov/research/findings/final-reports/ptflow/section1.html
ED Crowding is Costly
ED crowding results in higher levels of left without being seen patients. These walk-outs represent significant lost revenue and adverse publicity for hospitals. The same is true of ambulance diversions.4748

Hospitals Report ED Crowding and Patient Flow Measures to CMS
Hospitals are required to report the following five ED crowding related measures (under the Hospital Inpatient Quality Reporting Program initiative) to The Centers for Medicare and Medicaid Services (CMS):

- Patient median time from ED arrival to ED departure for discharged patients (calendar year [CY] 2013).
- Door-to-diagnostic evaluation by a qualified medical professional (CY 2013).
- Patient left before being seen (CY 2013).
- Median time from ED arrival to ED departure for admitted patients (FY 2014).
- Median time from admit decision time to time of departure for admitted patients (FY 2014).

Hospitals are required to report these measures to CMS in order to receive the full Medicare payment update.4950

ED Crowding Compromises Community Trust
The ED plays a critical role within the community. There is a public expectation that EDs are capable of providing appropriate, timely care 24 hours a day, 7 days a week, and that they will have the capacity to protect and care for the public in the event of a disaster or public health emergency. When crowding leads to long wait times and a decreased ability to protect patient privacy and provide patient-centered care, the community's trust and confidence in the organization may be compromised.51

ED Crowding Can Be Mitigated by Improving Patient Flow

Over the past several years, significant effort has been devoted to investigating the sources of ED crowding and developing potential solutions. Based on this work, there is widespread agreement that improving the flow of patients in the ED and throughout the hospital holds promise for addressing ED crowding. A number of hospitals have implemented patient flow improvement strategies that have resulted in reductions in measures of ED crowding.\(^\text{52}\)


Figure 16: Addressing ED Crowding
Consequences of ED Crowding

Significant consensus exists regarding the consequences resulting from ED crowding. Patients in dire need of medical assistance, and even those whose circumstances are not quite that urgent, see a decrease in positive health outcomes when delays and unnecessary waits exist prior to treatment. As the ED patient population increases, and the number of physician, nursing, and other professional staff remains the same, providing the care their patients require becomes more difficult.  

Increased Wait Times

ED crowding leads to longer wait times for patients to see a physician. If the number of patients presenting to the ED for treatment increases, while space and resources for treatment remain constant, then this will create a bottleneck to patient flow and access to care.

Boarding

One of the most common complications associated with ED crowding is ED boarding. In other words, holding a patient who needs to be admitted in the ED until an inpatient bed becomes available is caused by crowding.

---

54 https://wakespace.lib.wfu.edu/bitstream/handle/10339/38562/Brassard_wfu_0248M_10429.pdf
55 Agrawal, S. Emergency Department Crowding: An Ethical Perspective. Academic Emergency Medicine. 2007. 14;8:750-751
56 Institute of Medicine, Committee on the Future of Emergency Care in the United States Heath System. Hospital-Based Emergency Care: At the Breaking Point. Washington, DC: National Academy Press; 2006
Ambulance Diversion
The increase in the number of patients presenting to the ED not only creates longer wait times, but also leads to ambulance diversion. Once a crowded ED reaches the point where it cannot receive new patients without compromising the safety of existing patients, as well as incoming patients, it may resort to sending patients to alternative health care sites.\(^{57}\)

Medical Errors
Medical errors not only compromise patient safety, but also negatively affect the reliability and quality of care the community can expect from the ED. Medical errors might occur as a result of a hurried pace to decrease wait times or of inadequate staff to deliver appropriate and well-monitored care.\(^{58}\)

Inequitable Care
One reason seeking care in the ED is appealing to many is that all patients are guaranteed access to quality medical evaluation and emergency care regardless of ability to pay or other considerations that may lead to health disparities in other medical settings. However, in times of crowding, equitable care is far more difficult to ensure than it would be otherwise. This is caused by the difficulty of the staff in accommodating the increased number of patients, which could potentially compromise the patient’s interpretation of the quality of care received\(^{59}\).

Long Stays in the ED

Length of stay (LOS) is considered a key measure of ED throughput, and from the perspective of the patient, it is perceived as a measure of healthcare service quality. Prolonged LOS can be caused by various internal and external factors. Some of those factors are illustrated in Figure 11. Long stays in ED are associated with poorer clinical outcomes.

Long waits in EDs are a common problem nationwide. Although the symptoms of the problem manifest in the ED, the causes are often external to the department. Emergency departments have responded to long waits with a variety of strategies, including improving their efficiency, and introducing triage physicians, for example. Numerous diagnostic and simulation studies

\(^{57}\) Institute of Medicine, Committee on the Future of Emergency Care in the United States Heath System. Hospital-Based Emergency Care: At the Breaking Point. Washington, DC: National Academy Press; 2006

\(^{58}\) Richardson, DB. Increase in Patient Mortality at 10 Days Associated with Emergency Department Overcrowding. The Medical Journal of Australia. 2006. 184;5:213-

have also been used to address the complexity of evaluating the impact of multiple interventions in improving ED performance.
Figure 18: Sample Cause and Effect Diagram for Long Stays in EDs[^60]

[^60]: https://www.researchgate.net/figure/51978080_fig1_Figure-1-Fishbone-diagram-showing-causal-factors-for-long-stays-in-hospital-emergency
Appendix C: Lean Methods and Techniques for Enhancing Flow

This section is derived from the Making Healthcare Work Better™ with Lean Workbook, authored by the EmCare Clinicians and Operational Experts. The references used in the original piece of work are preserved and noted in this playbook.

Lean is a set of operating philosophies and methods that help create maximum value for patients by reducing waste and waits. It aims to fundamentally change organization thinking and value, which ultimately leads to the transformation of organization behavior and culture over time. Based on the Toyota model, it focuses on how efficiently resources are being used and ask, 'what value is being added for the customer' in every process. The health care industry has demonstrated success in applying these principles.

Reducing waste and waits...

There are various ways that resources can be wasted, and here is a structured way to think about this issue. The acronym is a simple T-I-M-W-O-O-D. (The Japanese call waste “MUDA”.)

Transportation: Moving the product around unnecessarily is a waste of time, effort, and increases the likelihood that it will be damaged

Inventory: Any unused material is wasted capital. It is money just sitting around in the form of raw materials (0% complete), work-in-process (50% complete), or finished goods (100% complete).

Motion: Unnecessary motion or movement of the people, equipment, information or service involved in the process.

Waiting: Time that the patient, staff member, information or service is just “sitting there” – not being transported or processed. This is a large source of waste in physician offices.

Over-processing: Doing more to the patient or product than is necessary.

Over-production: Making more than is necessary, usually because the production batches are too large.

Defects: Imperfect production that requires re-work, or doing work again

“Lean principles applied thoroughly and throughout an entire organization can have a positive impact on cost, quality and timely delivery of service.”

~Institute Healthcare Improvement

Tough jobs are made easier with the right tools. And so is the case with lean as well. The following will provide you with an overview of a few of the useful lean tools that can be applied within the healthcare industry.

The goal of lean is to eliminate waste—the non-value-added components in any process. Unless a process has gone through lean multiple times, it contains some element of waste. When done correctly, lean can create major improvements in efficiency, cycle time, productivity, material costs, and scrap, leading to lower costs and improved competitiveness. The Lean Enterprise Institute (LEI), founded by James P. Womack and Daniel T. Jones in 1997, is considered a go-to

resource for lean wisdom, training, and seminars. According to Womack and Jones, there are five key lean principles: value, value stream, flow, pull, and perfection, illustrated in Figure 16.  

Value Stream Mapping
Value stream mapping (VSM) allows staff to observe the process first-hand, develop their own thoughts and provide feedback on why delays occur and how those delays can create frustration for patients and caregivers. VSM provides a snapshot of the system in order to identify areas of value and non-value.

Lean uses the value stream map to identify “current state” and “future state” and aid in implementing redesign. While it looks a bit like a flowchart, it differs from a flow chart in that it also identifies cycle times, the movement of information, and areas of inactivity.

Value streams give a high level look at the flow of services or people through the system and are commonly used to develop and standardize electronic workflows.

The Basic Steps for Value Stream Mapping
As value stream mapping is a complex skill, it works most effectively when employed by an expert trained in lean. However, the following basic steps can help you to better understand the steps in the process.

1. Define your project.

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62 https://www.asme.org/engineering-topics/articles/manufacturing-design/5-lean-principles-every-should-know
2. Define your symbols. (See examples below.)
3. Define the limitations and scope of your project.
4. Define your process steps and add them to your map.
5. Add the information flow affecting these process steps.
6. Add data to each process.
7. Create a timeline.
8. Interpret the map.
9. Create a VSM for the (ideal) future state.

**Spaghetti Diagrams**

Spaghetti diagrams depict the flow of work, material, people, supplies, charts, etc. creating a visualization of the workspace and existing process flow, while marking steps in the process and documenting the movement of people and work.

The spaghetti diagram is a powerful tool for showing waste, irrational flow, congestion and opportunities for error. It helps to determine the physical flow and distance that information and people have to travel to operationalize a process and often points out waste that was not evident before.

It can be a powerful tool for showing people inside or outside the process where there are major challenges or opportunities. It can be an important tool to use in presentations to upper level management to visually explain the need for improvement.

Creating an effective spaghetti diagram requires first understanding the “who, when and why” of the process being evaluated. It is best done by assembling a cross-functional group who are familiar with the process being diagramed. Use different color lines for different people.

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Kaizen and Kaizen Events\textsuperscript{66}

Kaizen supports continuous incremental improvement. In the Japanese language, kai means change and zen means good (or make good). Kaizen strives for continuous improvement or change for the good. A kaizen event is an activity that brings attention to a particular issue or set of issues to drive improvement and change.\textsuperscript{67}

Kaizen is intended to be continuous - a daily process. The last thing people in healthcare want or need is another program. When clinicians and staff understand that seeking improvement is part of the routine, it’s easier to adopt and hardwire the process. Just be sure your culture and leadership style empowers people to own the process of recognizing issues and suggesting improvements.\textsuperscript{68}

Kaizen is ineffective without a change in culture. It requires a team approach that continuously evaluates processes and makes them better. People closest to the process are best prepared to improve it, but major transformation also requires the commitment of leaders. The best kaizen leaders perform as coaches, not bosses.\textsuperscript{69}

Tips for hardwiring Kaizen culture include:

- Don’t worry about being perfect
- If something is wrong, fix it on the spot
- Ask “Why” 5 times to get to the root cause
- Say “No” to the status quo
- Look for wisdom from 10 people rather than one
- Never stop improving
- Respect others

Current State/Future State\textsuperscript{70}

Current State/Future State is used to evaluate current processes and identify more ideal processes. Current State/Future State is a foundational element of process improvement. Looking at a problematic situation as it is now, and then envisioning how it can be better and mapping the steps it will take to get there is the basic principle behind this analysis. The journey is recorded to evaluate progress and success.

Looking at the current state:

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\textsuperscript{66} Kaizen Definition & Principles In Brief. Thessaloniki 2006. Available at http://www.michailolidis.gr/pdf/KAIZEN08.pdf


\textsuperscript{68} Graban, M and Jacobson, G. (August 8, 2011) Putting the ‘Continuous’ Back into Health Care Improvement Available at http://www.qualitydigest.com/inside/health-care-column/putting-continuous-back-health-care-continuous-improvement.html#

\textsuperscript{69} Kaizen Institute. What is Kaizen? Available at https://www.kaizen.com/about-us/definition-of-kaizen.html

• Gaps?
• Patient focus?
• What can we improve?

Designing the future state so that:
• Every step the patient makes adds value to the experience.
• Every step staff makes improves clinical quality, service excellence, satisfaction and workforce retention.

**Fishbone Diagram**

The fishbone diagram is a root cause analysis tool. It is designed to capture multiple causes and then identify the most obvious causes. The angled outline structure looks much like the skeleton or bones of a fish. Each “bone” identifies a different category and its associated causes.

![Fishbone Diagram](image)

*Figure 21: Sample Fish bone diagram template*

**Rapid Redesign**

Achieving results is only the beginning. Sustaining great results and continuing to improve in the midst of constant changes in the rules, people and environment that impact patient care requires a flexible approach that supports continuous optimization. The rapid redesign concept

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for process improvement is used in many industries as it allows and sets the expectation for continuous and rapid change. The team should be able to quickly identify the steps that are unnecessary and be aware of workarounds, then rapidly redesign processes so results do not suffer.

Tabletop Simulations
Like other high reliability organizations, hospitals have experienced significant specialization of tasks and processes. Each area often operates in its own silo without regard for the total patient experience. The tabletop simulation condenses the big picture view of a typical day in the hospital into a model or micro-version that fits on a tabletop.

Tabletop simulations help participants evaluate patient wait times and the flow of a typical day in the hospital for patients who enter from various points of care, and can then be used to identify inefficiencies, assess existing resources, identify needed resources, clarify roles and responsibilities and validate and test plans.

One of the main objectives of the tabletop simulation is to give team members the ability to observe and identify inefficiencies in the current state of throughput in the department. It can allow them to visualize and identify areas of waste such as wait times, delays, bottlenecks and redundancies. Participants in a tabletop simulation are often better able to understand and formulate a realistic future state.

SIPOC Diagram
The Suppliers-Inputs-Process-Outputs-Controls diagram identifies key customers/stakeholders and defines the process at the macro level. The SIPOC diagram provides a starting point for conducting an efficiency analysis.

The five key elements of SIPOC are:
- Supplier – Who provides the input to your process
- Input – The product that a process does something to or with to deliver the required output
- Process – The activities you must perform to satisfy customer requirements and deliver the output
- Output – The product that results from the successful operation of a process
- Customer – Who receives the output of your process

Appendix D: Emergency Department Intake and Analysis Tool

<table>
<thead>
<tr>
<th>Hospital:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City/State:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

### HOSPITAL

- Improvement of performance in the ED is a strategic Initiative within the hospital  
  [ ] Y  [ ] N
- # Licensed Beds
- Average % Midnight Occupancy
- Average Hospital Daily Census: Past 3 Years
- Average Hospital Length of Stay (days)
- Hospital-Wide Electronic Patient Placement System  
  [ ] Y  [ ] N
- Hospital-Wide Bed Coordinator
  
  *If yes, who do they report to:*
- Hospital-Wide Patient Flow Improvement Team  
  [ ] Y  [ ] N

### EMERGENCY DEPARTMENT

**Operations & Patient Flow**

- Beds
  - # ED Beds Total
  - # Main Emergency Dept Beds
  - # Fast Track Beds
  - # Clinician in Triage – Beds or Bays
  - # Observation Beds
  - # Pediatric Beds
- Stat Lab Capability in Emergency Dept  
  [ ] Y  [ ] N
- Stat Lab currently used  
  [ ] Y  [ ] N
- Imaging Rooms in Emergency Dept  
  [ ] Y  [ ] N
- Electronic Bed Board in ED  
  [ ] Y  [ ] N
- # ED Patients per Year
- # ED Patients on a busy day
- # RN Staffing Hours per Patient
### # Patients per MD/Provider Hour

<table>
<thead>
<tr>
<th>EMERGENCY DEPARTMENT Operations &amp; Patient Flow (cont)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Triage</strong></td>
</tr>
<tr>
<td>Type of Triage System (5-level, 4-level, 3-level, ENA)</td>
</tr>
<tr>
<td>Maximum and Minimum # of nurses in triage</td>
</tr>
<tr>
<td>Do you use a physician or midlevel in triage?</td>
</tr>
<tr>
<td><strong>Fast Track/ Super Track</strong></td>
</tr>
<tr>
<td>Hours of Operation</td>
</tr>
<tr>
<td>Percent of total ED volume</td>
</tr>
<tr>
<td>Number of Fast Track beds/rooms</td>
</tr>
<tr>
<td>Beds per nurse</td>
</tr>
<tr>
<td>Beds per physician/midlevel</td>
</tr>
<tr>
<td><strong>Patient Flow Segmentation model</strong></td>
</tr>
<tr>
<td><strong>Physician in Triage</strong></td>
</tr>
<tr>
<td><strong>APP in Triage</strong></td>
</tr>
<tr>
<td><strong>Hours of Operation</strong></td>
</tr>
</tbody>
</table>

### Lengths of Stay and Cycle Times

*Note: Use the time in min. for the last year if available. If not, use what is available (e.g. last quarter’s data) or include an estimate. After each bulleted item in this section, indicate the time period used or if it is an estimate.*

<table>
<thead>
<tr>
<th>Average ED Length of Stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Track/ Super Track</td>
</tr>
<tr>
<td>Treat &amp; Release – Main ED</td>
</tr>
<tr>
<td>Admitted patients</td>
</tr>
<tr>
<td>Total Aggregate LOS</td>
</tr>
<tr>
<td>Identify any times (time of day/day/month) LOS is predictably longer than the average. (For example, Friday evenings)</td>
</tr>
</tbody>
</table>

| Average Door to MD time |

| Average time from decision to admit to leave the ED |

<table>
<thead>
<tr>
<th>Lab Turnaround Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
</tr>
<tr>
<td>Identify any times (time of day, day, month) that TAT is predictably longer than the average.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Imaging Turnaround Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
</tr>
<tr>
<td>Identify any times that TAT is predictably longer than the average.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CT Turnaround Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
</tr>
<tr>
<td>Identify any times that TAT is predictably longer than the average.</td>
</tr>
</tbody>
</table>
Disposition
(Use what is available: average of last year, last month’s data, or an estimate)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. % ED Patients Admitted</td>
<td></td>
</tr>
<tr>
<td>Avg. # Boarded Patients per Day</td>
<td></td>
</tr>
<tr>
<td>(A boarded patient waits more than 2 hrs in the ED after the decision is made to admit)</td>
<td></td>
</tr>
<tr>
<td>Avg. # Boarding Hours per Month</td>
<td></td>
</tr>
<tr>
<td>Avg. % Transfers per Month</td>
<td></td>
</tr>
<tr>
<td>Avg. % ED Walkaways per Month</td>
<td></td>
</tr>
<tr>
<td>(Walkaways are patients who left the ED before they should have)</td>
<td></td>
</tr>
</tbody>
</table>

Patient Satisfaction/ Engagement

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Method or Tool</td>
<td></td>
</tr>
<tr>
<td>Current Overall Score (last quarter)</td>
<td></td>
</tr>
<tr>
<td>Raw</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Best Practice Performance Improvement—the Advisory Board Way

Best Practice Performance Improvement
—the Advisory Board Way

Performance improvement seems simple at first: identify a problem, then take steps to solve it. But organizations often fail as their change initiatives struggle to gain traction. We’ve reviewed years of Advisory Board research to understand why improvement projects typically fail—and to identify the eight steps crucial to any successful change initiative. A summary of our findings is below.

1. **Aggressively Prioritize Opportunities**
   - To avoid overextending resources (pursue only the most valuable performance improvement projects)
   - Articulate clear criteria for choosing improvement initiatives

2. **Dedicated Leadership**
   - For every project, enlist support from an executive sponsor who can ensure the work gets adequate attention, clear direction, and resources
   - Give project leaders enough time to focus on the initiative, even if doing so requires reallocating or acquiring additional resources

3. **Coalition Building**
   - SYSTEMATICALLY assess how current processes fall short of best practice before creating new protocols
   - Conduct formal root cause analysis to determine what processes are driving the most variation

4. **Commit to Workplan and Goals**
   - Select measurable, realistic metrics to define success for the change initiative
   - Establish and adhere to— a formal workplan to guide project from start to finish

5. **Rocky Rollout**
   - While planning and preparation are the hardest parts of performance improvement, organizations can’t forget the implementation phase
   - Establish a change management plan that addresses potential resistance

6. **Smart Rollout**
   - Decide between simultaneous rollout to all stakeholders (a phylogenetic approach)
   - Phased rollout: select early stage sites strategically to generate early wins, validate concerns about change

7. **Insufficient Follow-Up**
   - Regularly assess progress, reevaluate timelines and milestones, and adjust as needed
   - The change initiative is only as strong as its accountability infrastructure

8. **Hold All Stakeholders Accountable**
   - Develop accountability measures for stakeholders from the executive suite to the front line—what you track is what you get

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Read the full briefing for detailed guidance on performance improvement:

advisory.com/steps-and-change

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Appendix F: AIDET® Patient Communication

**WHAT IS AIDET®?**
The acronym AIDET® stands for five communication behaviors: Acknowledge Introduce, Duration, Explanation, and Thank You.
As someone who works in healthcare, you constantly care for people who are feeling vulnerable, nervous, and even confused. AIDET is a communication framework for healthcare professionals to communicate with patients and each other in a way that decreases patient anxiety, increases patient compliance, and improves clinical outcomes.

**AIDET® WORKS IN ALL DEPARTMENTS AND DISCIPLINES**

Created by Studer Group as a foundational tactic for effective patient communication, AIDET is used by nurses, physicians, technicians, EVS, food service, administrators, and all staff involved in patient and family encounters at the bedside and across the continuum of care.

While keywords are important in AIDET, it is not a script. It's a simple, consistent way to incorporate fundamental patient communication elements into every patient or customer interaction. Below is an example of how to frame communication using this powerful tool:

<table>
<thead>
<tr>
<th></th>
<th>ACKNOWLEDGE:</th>
<th>INTRODUCE:</th>
<th>DURATION:</th>
<th>EXPLANATION:</th>
<th>THANK YOU:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Greet the patient by name. Make eye contact, smile, and acknowledge family or friends in the room.</td>
<td>Introduce yourself with your name, skill set, professional certification, and experience.</td>
<td>Give an accurate time expectation for tests, physician arrival, and identify next steps. When this is not possible, give a time in which you will update the patient on progress.</td>
<td>Explain step-by-step what to expect next, answer questions, and let the patient know how to contact you, such as a nurse call button.</td>
<td>Thank the patient and/or family. You might express gratitude to them for choosing your hospital or for their communication and cooperation. Thank family members for being there to support the patient.</td>
</tr>
</tbody>
</table>

[https://www.studergroup.com/aidet](https://www.studergroup.com/aidet)
HOW DOES USING AIDET® BENEFIT ME, MY PATIENTS, AND MY ORGANIZATION?
Using a consistent conversation framework helps physicians and staff anticipate the needs of patients and their families so that they can meet and exceed the level of care patients expect.
After more than 15 years in practice at hospitals, health systems, and medical practices, AIDET has proven to:

- Improve patient and customer perception of care or service
- Decrease anxiety (for staff and patients) and increase compliance resulting in better clinical outcomes
- Build patient and customer loyalty
- Ensure service providers deliver consistent measures of empathy, concern, and appreciation
Resources

There is a considerable amount of information available on the topic of Patient Flow. Listed below are a few books and articles which played an important role in developing this best practices playbook.

Books

**The Patient Flow Advantage** (Jensen & Mayer)
Fire Starter Publishing, 2015

**Hardwiring Flow-Systems and Processes for Seamless Patient Care** (Mayer & Jensen)
Fire Starter Publishing, 2009

**Leadership for Smooth Patient Flow** (Jensen, Mayer, Welch and Haraden)
Health Administration Press, 2006

**The Definitive Guide to Emergency Department Operational Improvement: Employing Lean Principles with Current ED Best Practices to Create the "No Wait" Department** (Crane & Noon)
Productivity Press, 2011

**Making Healthcare Work Better™ with Lean** (EmCare Clinical and Operational Leaders, Foreword: Kirk Jensen, MD, MBA, and FACEP)
Articles


https://www.researchgate.net/figure/237760614_fig1_Figure-1-ED-patient-flow-diagram-for-both-pediatric-and-surgical-patients


https://en.wikipedia.org/wiki/Triage


http://smhs.gwu.edu/urgentmatters/sites/urgentmatters/files/enewsletter_volume2_issue1_TeamTriage_Mayer.pdf

http://www.acepnow.com/article/supertrack-approach-patient-segmentation-aids-emergency-departments/?singlepage=1

http://www.stmaryhealthcare.org/splitflow

http://www.annemergmed.com/article/S0196-0644(13)00968-2/fulltext

http://www.leanhospitals.pl/en/project/visual-management/
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Grunau, R. “Variation and Flow Conversation Email, 2016”.


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http://www.ahrq.gov/research/findings/final-reports/ptflow/section1.html


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Institute of Medicine, Committee on the Future of Emergency Care in the United States Health System. Hospital-Based Emergency Care: At the Breaking Point. Washington, DC: National Academy Press; 2006


http://www.ahrq.gov/research/findings/final-reports/ptflow/section2.html


http://www.ahrq.gov/research/findings/final-reports/ptflow/section4.html

http://www.ahrq.gov/research/findings/final-reports/ptflow/section5.html


http://www.ahrq.gov/research/findings/final-reports/ptflow/section6.html