Session 37
The Patient Flow Advantage:
Hardwiring Hospitalwide Flow to
Drive Competitive Performance

Presented by:
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Kirk Jensen, MD
The Patient Flow Advantage

Hardwiring Hospitalwide Flow to Drive Competitive Performance

Disclosure of Relevant Financial Relationships

The following faculty of this continuing education activity has financial relationships with commercial interests to disclose:
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• EmCare – Salary – Employee
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  Chief Medical Officer, BestPractices
  National Executive Vice President, EmCare

Learning Objectives

• Tools to hardwire flow throughout and across hospital systems will be conveyed and discussed with a “flow toolkit” presented.
• Core strategies affecting flow such as queuing theory, eliminating bottlenecks, managing variation, and forecasting demand will be demonstrated.
• A Healthcare system that works for your patients, your healthcare team, and for you…
Agenda

• We work in an increasingly capacity-constrained environment requiring resourcefulness and expert change
• Flow improves safety, service and operating costs
• Flow allows us to serve more patients, serve them better and make our jobs easier
• The latter gives substantial competitive advantage in “talent arbitrage”
Peter Drucker’s Observations on Healthcare and Hospitals

• “The hospital is altogether the most complex human organization ever devised.”
• The only things that evolve by themselves in an organization are disorder, friction, and malperformance.

It Never Hurts to Have Friends in High Places...
TJC and Hospital-Wide Patient Flow

2005 - TJC and the Hospital-Wide Patient Flow Committee:
JCR Leadership Standard LD.3.10.10

• The leaders develop and implement plans to identify and mitigate impediments to efficient patient flow throughout the hospital.

• Effective for all accredited hospitals on January 1, 2005

2013 - The Joint Commission says “Boarding in the ED requires a hospital-wide solution.”*

*As reported in ACEP NEWS - January 14, 2013

• Performance standards put into effect Jan 1, 2013 require hospital leaders – namely the chief executive officer, medical staff and other senior hospital managers – to set specific goals to:
  – Improve patient flow
  – Ensure availability of patient beds
  – Maintain proper throughput in labs, ORs, inpatient units, telemetry, radiology and post-anesthesia care units

“We want to make sure that organizations are looking at patient flow hospital-wide, even if the manifestation of a flow problem seems to be in the emergency room.”
~ Lynne Bergero, The Joint Commission

Boarders, Emergency Department Crowding, and Hospital-Wide Flow

ED overcrowding correlates with the boarding of admitted patients more than any other metric

*ACEP Task Force Report on boarding

A major concern in ED patient flow is the number of admitted patients being held in the ED (boarders)

• The greater the percentage of ED beds occupied by boarders (admit-holds) the more likely flow will be impeded or obstructed
• Boarders occupy beds and consume resources that are staffed and allocated for incoming ED patients
• There is an extensive body of literature on the negative impact of boarders in the ED (Bernstein SL. Et. Al. The effect of emergency department crowding on clinically oriented outcomes. AcadEmergMed. 15(1):1-10,2009 Jan.)

There are a number of strategies that can help decrease ED boarding and accelerate movement into and through the hospital...
**HOSPITAL REPORTING OF ED MEASURES TO CMS**

1. Median time ED arrival to ED departure - for discharged patients (CY 2013)
2. Door-to-diagnostic (CY 2013)
3. Left without being seen (CY 2013)
4. Median time ED arrival to ED departure - for admitted patients (FY 2014)
5. Median time admit decision to ED departure - for admitted patients (FY 2014)

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**Lets Not Overlook Our Demographic Drivers - The Baby Boomers are Here...**

Demographic growth is driven by the elderly:
The 65 and older age cohort will experience a 28% growth in the next decade
- One baby-boomer turns 50 every 18 seconds and one baby-boomer turns 60 every 7 seconds (10,000 a day)
- This will continue for the next 18 years

This cohort will comprise 15% of the total population by 2016

A higher proportion of patients in this cohort, in comparison to other age groups, are triaged with an emergent condition

One-quarter of Medicare beneficiaries have five or more chronic conditions, sees an average of 13 physicians per year, and fills 50 prescriptions per year...
Abraham Maslow’s Hierarchy of Needs and Your Clinical Department

- **Physiological**: Food, Water, Warmth
- **Safety**: Security, Shelter
- **Belonging**: Friends, Family, Community
- **Self-Esteem**: Achievement, Mastery, Recognition
- **Self-Actualization**: Pursue talent, creativity, fulfillment

**Pyramid of Needs (After Abraham Maslow)**

**Best Practices**
- A “Best in Class” learning organization
- Patient flow, Patient satisfaction
- Workforce satisfaction
- Teams and Teamwork
- Effective leadership
- Fully Staffed? Right people, Right number, Right mix

“Every system is perfectly designed to get precisely the results it gets.”

Dr. Paul Batalden
The Fundamental Problem?

The way we’re working…

Isn’t working!

“But Dr. Mayer, I’m working so hard!”

Don’t work hard, work easy!

1st job of a leader
Hardwiring the Definition of Flow

*Flow* is defined as *adding value* and *decreasing waste* to processes, services or behaviors by *increasing benefits*, *decreasing burdens*, (or both) when applied to the movement of our patients through our service transitions and queues.
The Value-Added Equation

What are the benefits received?

What are the burdens endured?

Obvious?
Re-affirm them.

Non-obvious?
Inform them.

Necessary?
Explain them.

Unnecessary?
Eliminate them (Waste).

Becoming a "Flow Detective"

• A continuous Treasure Hunt to Add Value

• A continuous Bounty Hunt to Eliminate Waste (anything which doesn’t add value)
What if we knew how to solve Hospital-Wide patient flow problems and integrated this knowledge into our Portfolio of Solutions…

Flow and the 6 “Rights”

- Right resources for…
- Right patient in the…
- Right environment (bed) for the…
- Right reasons at the…
- Right time…
- Every time!
Connect the Gears
Shared Mental Models
Rule #1, Rule #2…Rule #3

2017 CONGRESS ON HEALTHCARE LEADERSHIP

Taxi, Take-Off, Flight, Landing
What’s at stake in improving flow?

- Improved financial return by increasing capacity
- Shortened time intervals by eliminating waste
- Identification and removal of bottlenecks
- Improved patient and clinician experience
- Increased safety by reducing non-value added variation
- Improved clinical outcomes and reliability
- Reduced costs by decreasing non-value-added steps
- Makes our jobs easier
### ER Patients Results

- **40,000 ED Visits x 1 Hr Reduction in LOS**: 40,000 Hours of ↑ED Capacity/Year
- **40,000 Hours of ↑ED Capacity/2 Hours per ED Visit**: 20,000 potential new visits/year
- **20,000 new ED visits x $150/visit in physician revenue ($150-200/visit??)**: $3,000,000 new revenue for the group
- **20,000 new ED visits @ $500/visit for the hospital**: $10,000,000 new revenue per year for the hospital
- **New hospital admissions at $3,000 - $7500 per admission**: 1 more admission per day (365) X $3,000-$7500/ patient admission =$1,095,000-2,737,500/year

*(AHRQ-only 6.2% of admissions through the ED are uninsured)*

### RAP&GO - Expediting Admissions and Increased Hospital Revenue

<table>
<thead>
<tr>
<th>Admitted Patients</th>
<th>Results</th>
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<tr>
<td>Freed Up ER Bed Time</td>
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<td>Average ER Patient LOS</td>
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<td>Additional New ER Patients Seen</td>
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<td>ER Admission Rate</td>
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<td>Average Hospital Revenue Per Admit</td>
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<td><strong>New Hospital Revenue</strong></td>
<td><strong>$5,475,000</strong></td>
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The Business Case for Flow
Continued…

If you assume an average $150 NCR MD income for every walkaway ($150-200 NCR??)

If you assume an average $500 in hospital income for every walkaway

For a 50,000 visit ED= $75,000 in new MD revenue (no increased overhead) for every 1% reduction in LWBS/LWBTs

A 1% reduction in walkaways = $250,000 in new outpatient hospital revenue

• In 2007, 1.9 million people – representing 2% of all ED visits – left the ED before being seen (LWBS), typically because of long waits.
• These walk-outs represent significant lost revenue for hospitals.
• A crowded ED limits the ability to accept referrals.

THE COST – IT ADDS UP

<table>
<thead>
<tr>
<th>1.9 million</th>
<th>$1,086</th>
<th>$9,000</th>
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<tr>
<td>In 2007, 1.9 million people – representing 2% of all ED visits – left the ED before being seen. These walk-outs represent significant lost revenue for hospitals.</td>
<td>A 2006 study found that each hour of ambulance diversion was associated with $1,086 in foregone hospital revenues.</td>
<td>A recent study showed that a 1-hour reduction in ED boarding time would result in over $9,000 of additional revenue by reducing ambulance diversion and patients who left without being seen.</td>
</tr>
</tbody>
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What are your biggest flow problems?

What are your biggest flow successes?
Holding Professionals Accountable

- This is sometimes difficult
- But it’s really not complicated…
- No one wants to be in the bottom third
- Data drives the train-Docs are scientists
- Make it transparent and simple
- Accentuate A Team Members and Behaviors
- Revisit the numbers frequently (every month)
- Have the courage and the culture to coach and mentor
- Anonymity affords the luxury of inertia
Accelerating Flow Into, Through, and Out of Your Hospital

The Lifecycle of a Patient Visit
Patient Flow and Patient Throughput
Pushing and Pulling our Patients Through

1. Door To Triage
2. Door To Doctor
3. Door To Bed

Front End

Middle

• Decision to Admit/discharge

Back End

• Discharge to home/admit

Push

Pull
Early Decision To Admit

• In most cases, an experienced emergency physician or nurse will know if a patient needs hospital admission within minutes of entering the patient’s room and performing a brief assessment.

• Delaying admission until every lab and diagnostic study is back is an unrealistic expectation on the part of the admitting team.

• Early consultation for admission is often resisted, despite the obvious improvement in patient flow.

Lean Admissions at ThedaCare

“Encircle Health”

• Anticipates and structures to meet all needs in one visit.

• Lab designed to get results to patient record within 15 minutes.

• Patients leave with one plan, all results.
The Inpatient Fast Track - Express Admitting Units (EAUs) And ED Holding Areas

- Busy EDs need to decompress before the number of boarders starts to grow.
- After evaluation, admitting service can select the most appropriate in-hospital bed.
Consider ICU “Fast-Tracking” – One Example

POLICY

• A Critical Care Alert can be called for patients meeting the following inclusion criteria:
  • Sepsis/Sepsis syndrome
  • Acute respiratory failure requiring mechanical ventilation
  • Resuscitation post-arrest
  • Unstable hemodynamics requiring vasopressor intervention
  • Intracranial hemorrhage with evolving neurological deficits or airway compromise

• Patients meeting inclusion criteria will have a Critical Care Alert called at the time they are recognized to meet inclusion criteria.
• A 30 minute response time (from notification to arrival in ED) is required from patient’s physician or the intensivist.
• Critical Care Unit will respond within 30 minutes of notification with both a bed assignment and a team for transporting the patient to Critical Care.
• All immediate diagnostic radiology needs should be completed prior to transport.
• The patient’s ED nurse will accompany the team to the Critical Care Unit to give bedside report.

Fast Track is a Verb and Not a Noun…

• Code Blue
• Code STEMI
• Code Stroke
• Code Sepsis
• Code Vascular
• Code…
No Delay
Nurse Reports…

Teams and Seams:
Partnering With Your Hospitalists
Or Specialists in Hospital Medicine?
Door-to-Discharge: A seamless network of patient care, handoffs, and transitions...

Contributions to Patient Flow By Specialty

*Significant flow and service efficiencies plus improved clinical outcomes can be achieved through the combined efforts of both services.*

**Emergency Medicine**
- Effective **triage**
- Professional, organized communication
- Lean thinking and patient-centered processes
- A continuous focus on improving flow and the patient experience

**Hospital Medicine**
- Patient rounding throughout the day
- Foresight and planning
- Observing and understanding a patient’s needs
- Arranging appropriate services and assistance
- Managing the patient experience and creating a positive care environment
Hospital Medicine Physicians -

Hospitalists as Quarterbacks

Hospital medicine physicians, or hospitalists, direct care for patients requiring hospital inpatient services.

The hospitalist can serve as quarterback of the patient care team, teaming up with multiple players:

- E.D. physicians and personnel
- Primary care physicians
- Specialists
- Nursing staff
- Case managers
- Laboratory staff
- Radiology personnel
- Patients
- Family members
- Program coordinators
- Home care agencies
- Long term acute care hospitals
- Rehab facilities
- Nursing homes

As many hospitals move to a model of 24-hour laboratory, radiology and other essential services, the advantages of 24-hour hospitalist services will likely become more dramatic.

Do Your…? If Not, Why Not?

Hospitalists care about…

ED boarders, LOS, patient satisfaction?

Emergency physicians care about …

Hospital bed turns, LOS, core measure compliance, finances, readmissions?

Radiologists care about …

Oral contrast in abdominal CTs, plain film TAT?
So Happy Together…

Ideal ED Doctor

- Now/later?
- Sick/not sick?
- Accurate drug list
- Proper bed/location ??
- Plays well with others
- Oriented to our culture
- Oriented to resources
- Mutual professional respect
  - Standard work
    - SBAR
    - Case discussions
- No batching
- Shared governance
- Has a diagnosis

Ideal Hospitalist

- Call back on time
- Just say yes!
- 1-800-ADMIT
- Healthy/Professional dialogue
- Good communication (Problem Child)
- The decision to admit ***
  - Bed ahead
- Allows bridge orders
- Can multi-task/serial admits/parallel process
- Aware of ED metrics

Teams and Teamwork:
It’s about your Processes, People…and Performance…
The Central Paradox?

- We can confidently assure our patients that they will be cared for by a team of experts…

- But can we assure them they will be taken care of by an expert team?

Handoffs- Multiple Potential Standardized Formats Are Available:

- The Five-P’s--Sentara
- I PASS the BATON- the Department of Defense’s Patient Safety Program
- SBAR + 2-Crew Resource Management
- HANDOFFS-TeamHealth
- Safer Sign Out
Key Questions:
• How many patients are coming?
• When are they coming?
• What are they going to need?
• Is our service capacity going to match patient demand?

And what are we/you going to do about it if it doesn’t?...

Matching Physician/APP Capacity to Demand: Patient Arrivals vs. Staffing

Demand vs. Capacity MajorCare

Demand vs. Revised Capacity MajorCare - Heavy Days

INITIAL

REVISED
Matching Nursing Capacity to Demand:
Arrivals vs. Staffing - Efficiency and Effectiveness

• Demand/Capacity analysis can be used to identify the best utilization of resources
  – Ensure appropriate coverage during the heaviest hours of the day
  – Allocate coverage appropriately between heavy and light days

• This is particularly useful in a resource-constrained system

Demand-Capacity Management:
Patient Arrivals (Demand) vs. Staffing (Capacity)
The Demand for Staffed Beds

- If all available beds are staffed during peak times (12p-12a), we have sufficient bed capacity.
- If one zone is closed during these peak times, we drop below required bed capacity and performance will falter.

Length of Stay Impact on HPPV*

*HPPV = Hours Per Patient Visit

- Because of the nature of nursing work, HPPV requirements vary based on Length of Stay.
- Reducing length of stay to 90 minutes or lower can decrease required staff by more than 20%.
Demand-Capacity Management: An Administrative System For Flow

A Bed Management Process

Real Time Demand/Capacity System

An Early Warning + Response System

Forecasting and Planning

Admissions

Transfers

Discharges

Real-Time Demand Capacity Management (RTDC): This Is Not Your Typical Hospital-Wide Bed Meeting

Hospitals benefit from an administrative system for flow that:

- **Predicts** at a unit level the **capacity** to accept admissions within a designated time period
- **Predicts** at a unit level the **demand** within a designated time period
- **Documents a plan** at a unit level if demand is predicted to be greater than capacity
- **Evaluates the success or failure** of predictions and plans
- **Uses failures and successes of predictions and plans to develop the key improvement projects to improve flow**
Be-A-Bed-Ahead Programs

Traditional:
- ED calls for an inpatient bed
- Bed board begins to “search” for a bed
- Multiple calls to multiple floors
  - “Bed hiding”
- Bed located
- Environmental services cleans the bed
- Bed in service
- Bed available

Be-A-Bed-Ahead:
- Beds identified as available only when clean, unoccupied, and staffed
- Bed board prospectively identifies beds by type (Med-Surg, ICU, Telemetry, etc)
- Bed board informs unit of “next up” status
- Charge nurse informs nurse of “next up” status
- Bed assigned when requested

Adapted from Chapter 38 - Disposition Decision to Departure: Finishing Strong, McGraw-Hill January 2014
Jody Crane, Robert W. Strauss, Suzanne Stone-Griffith, Thom Mayer

Don’t Overlook the Importance of Leadership, Rounding, and You… (MBWA)

Rounding on admitted patients
/Optimized rounding practice

- Look
- Listen
- Ask
- Coach
- Problem-solve
- Communicate
- Plan
Optimize Bed Capacity AND Utilization

Patients should be in a bed only if it is medically necessary and only as long as medically necessary...

TABLE TURNS - How many times a table in a restaurant is used to serve a new customer
Bed Turns—How Many Patients a Bed Can Serve per Unit of Time

The MVP of Your Hospital?
Admissions and Discharges

Problem: Mid-day bed crunch due to misalignment of admissions, discharges

Contributing Factor: Late rounding by PCPs, non-hospitalists

Patient Flow

Admissions
Discharges

6a 7a 8a 9a 10a 11a 12p 1p 2p 3p 4p 5p 6p 7p 12a

Peak Admission Period
Peak Discharge Period

Courtesy of The Advisory Board Company

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HEALTHCARE LEADERSHIP

“Everybody Out By 11…”

...discharge orders improved from 29.5% to 56%, but the mean length of stay was unchanged...

...although the timing of the discharge orders decreased by 78 minutes during the period, patients actually left the hospital only 12 minutes earlier—still around 4 p.m. ...

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HEALTHCARE LEADERSHIP
What Makes Hospital Census Variable?

• If ED cases are 50% of admissions …and…

• Elective-scheduled OR cases are 30% of admissions, …then…

• Which would you expect to be the largest source of census variability?

Courtesy Eugene Litvak, PhD
“The single most important factor contributing to ED diversion is the daily variability in the operating room (OR) elective surgical caseload.”

*According to Eugene Litvak, PhD, from Boston University School of Management and Harvard School of Public Health

- A 2002 Root Cause Analysis of Massachusetts EDs showed that there was a minimal relationship between diversion and patient arrivals (diversion did little diverting), and between diversion and ED volume.
- High ED volumes did not seem to contribute to Emergency Department Crowding Information.
- The authors found ED census did not affect diversion, and diversion had little impact on ED turn around times (TATs).
- They did find that ED boarders strongly correlated with diversion, as did scheduled admissions.
- Interestingly, they also found that the ED admissions were more predictable than the scheduled admissions.

The Answer Is …

The ED and elective-scheduled OR have approximately equal effects on census variability.

Why?
Because of another (hidden) type of variability …

**Artificial Variability**
- Non-random
- Non-predictable (driven by unknown individual priorities)
- Should not be managed, must be identified and eliminated

**Natural Variability**
- Clinical variability
- Professional variability
- Flow variability

Courtesy Eugene Litvak, PhD
Smoothing Surgical Flow...

- The operating room has a significant impact on the flow of patients through the hospital.
  - The peaks and valleys typically seen in the elective surgery schedule drive the corresponding patterns in the inpatient census.
  - During the peak days, usually early in the week, these electively scheduled patients fill the inpatient units so that when urgent or emergent patients come to the ED, these specialty beds are not available.
  - These fluctuations in the OR volume and resulting variability in the inpatient census also make it very difficult to have predictable scheduling for nurses and physicians.
  - Smoothing the flow of elective admissions and assuring that separate and adequate capacity is available for the demand for beds for urgent and emergent patients results in smoother patient flow patterns with smaller ranges between high and low volume and opens capacity in both the OR and the inpatient areas of the hospital.

Smoothing Surgical Flow Continued...

- The block schedule in the OR is typically based on utilization of the OR by surgeons or services and the preferences of the surgeons. Rarely is the schedule based on what happens in the inpatient units of the hospital. Smoothing the elective schedule incorporates the inpatient units into the OR scheduling process by adjusting the block schedule based not only on utilization but also on where the patient should go postoperatively.
- There must be give and take by both the hospital and the surgeons in order to make smoothing work. In some cases, surgeons must be willing to change the days of the week or hours that they work. In order to facilitate this, it is imperative that the data around patient placement, patient satisfaction, nursing overtime, and physician office issues be provided to surgeons being asked to change.
- Results from smoothing the flow of elective admissions and thereby reducing peaks and valleys are compelling. Reducing this fluctuation opens more functional capacity in the OR and in inpatient units.
- Further, with smoothing based on the destination unit of the patient, fewer patients are placed off-service, which leads to a reduction in length of stay. An additional benefit is that placing patients in the appropriate bed and unit improves not only patient satisfaction but also physician satisfaction as well.
Surgery - Fundamental Change Concepts

- Dedicate a room for unscheduled surgeries
- Develop and enforce scheduling procedures
- Place cases with unpredictable length in a separate room or at the end of the day
- Stagger surgery case start times
- Standardize room set-up and prepare commonly used drugs, equipment, supplies, etc. ahead of time
- Use historical data to establish surgical schedules (i.e. case length)
- Complete all pre-op work before start time
- Synchronize case start time to an agreed upon point in time (e.g. incision time)
- Designate “on-call” staff to help alleviate unexpected high demand situations
- Use an RN perioperative facilitator to streamline and manage the room transition process
- Use admission/discharge criteria to ensure appropriate post-op patient placement
- Use an OR room cleaning and turnaround strategy

The Importance of On-Time Starts in the OR...
Emergency Department Patient Flow: Creating Flow, Adding Value, Eliminating Waste

The Science of Service Operations: Hardwiring Your Tactics...

- Measure patient demand by hour and design a system to handle it
- Commit to the right staffing mix—and the right staff
- Make sure your triage processes enhance flow, not form a bottleneck
  - Triage is a process and not a place
- Use a simple and reliable system to segment patient flow
  - Keep your vertical patients vertical and moving
  - Not all patients need beds
- Match your service delivery options to your incoming patient streams
  - Remove all work that does not add value
  - Fast Track is a verb and not a noun
Hardwiring Emergency Department Patient Flow: Our Options and Opportunities

Elements of the “Patient Flow Cascade” include:
- 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 Tracks
- Clinician in Triage:
  - Midlevel Provider in Triage
  - MD in Triage
  - Team Triage (Multi-disciplinary assessment and treatment team)
- Efficient Ancillary Services (“Essential Partners”…)
  - Lab and Imaging Services
- A Results-Waiting Area
- Efficiently Managing Admissions and Discharges

Hardwiring Flow
Does Triage Add Value in your ED?

DOES TRIAGE...
1. Improve throughput?
2. Increase safety?
3. Improve satisfaction?
4. Improve quality?
5. Provide information?
6. Increase revenue?

If not…Why not…Change It…NOW!
We want to be fast at fast things and slow at slow things…and wise enough to know the difference…

Patient Segmentation, Streaming, and Flow…
“Vertical” vs. “Horizontal” Patients

**Vertical Patients**
- Ambulatory
- Arrive by Triage
- Well
- Younger
- Perceived urgency or convenience factor
- Value (Starbucks or McDonalds)
  - Speed
  - Convenience
  - Financial
  - Other non-medical factors

**Horizontal Patients**
- Stretcher bound
- Ambulance Arrival
- Sick
- Older
- Perceived serious or life-threatening Condition
- Value (Traditional Healthcare)
  - Speed
  - Safety
  - Preservation of Life/Limb

Get the patient to the right place, at the right time, with the right treatment…

- Patient Enters
- Patient Sorted
- Not Sick
  - Immediate bedding in back
  - Streamlined Care (ST/FT/TT/RW)
- Sick
  - Doctor to see now
Matching Your Service Delivery to Your Incoming Patient Streams

Ambulance Arrivals

Triage

Brief RN Assessment: ESI Evaluation / Evaluation of Acuity

High Acuity Pathway
ESI Levels 1 + 2

Moderate Acuity Pathway
Most ESI Level 3s

Low Acuity Pathway
ESI Levels 5, 4, + some 3s

Hardwiring Emergency Department Flow
Minimizing Door to Provider Time and Maintaining Forward Flow

Utilizing lean techniques, Best Practices operations models, and process flow redesign…

Before

After
Streamlined Front End ED Patient Flow

Patient Intake System
A Team Triage Model

A Team of providers that promptly assess, treat, and discharge primarily ESI level 3, 4, and 5 patients

Quick Triage
Quick Look
Quick Reg

Doc/MLP (1-2 Providers), RN/LPN (1-2), 1 Paramedic Scribes (1-2), 1PSR/HUC

Treatment Rooms

Modified from Jody Crane, MD, MBA and Mary Washington's “RATED-ER” design
Team Triage-Inova Fairfax Medical Campus

- 2004-RWJ Urgent Matters Grant
- 10 hours/day
- Doc, RN, Scribe, Tech
- 35% reduction in LOS
- 20% reduction for non-Team Triage pts
- Increased Pat Sat
- Increased Employee Satisfaction
- Top Decile Performance in:
  - Door-Bed, Bed-Doc
  - Discharged LOS
  - Door to Admit Decision
  - Reduced patient safety incidents
  - LWOTS < 0.5%

General Operational Strategies for Emergency Department Patient Flow by Volume Band:
A Representative Sample

20,000 and Below
- No triage, Immediate bedding, bedside registration for all
- No Segmentation – Clear signals to identify low acuity patients
- Results waiting

40,000
- Quick Look Triage to segment, Quick/Bedside Registration for all
- For ERs with low acuity/low admit: Super Track (9a-11p) with 1-2 MLP with committed resources for lab/rad
- For ERs with high acuity/high admit: Intake Team (9a-11p) with 1 doc, 1 MLP with committed resources for lab/rad
- Results waiting

60,000 and Above
- Quick Look Triage to segment, Quick/Bedside Registration for all
- Super Track (8a-1a), MD/MLP Intake Team (9a-11p)
- Results waiting
Benchmarking Tells Us Where We are and Where We Can Go…
The EDBA Annual Data Survey – (2014 Report)

The EDBA Annual Data Survey
The Cohort Summary (Page 1 of Spreadsheet)

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Your Critical or Key Servers:
*Doctors/APPs* *Nurses* *Beds*

2017 CONGRESS ON HEALTHCARE LEADERSHIP
Optimize ED Bed Capacity and Utilization...

 Patients should be in a bed only if it is medically necessary and only for as long as it is medically necessary...

- Optimizing or maximizing bed capacity and bed turns
  - Does bed capacity match patient demand?
  - Does the patient actually need a bed?
  - If a bed is needed, are patients in bed for the shortest amount of time that is medically necessary?
  - Are there boarded patients or outpatients in ED Beds?

Leverage Clinical Talent, Time, and Performance

- The clinical talent should be roving intellects engaged in value-added activities at all times
- The role of the clinical staff is to make diagnostic and treatment decisions and to manage the team and patient flow
- Anything else is non-value added activity...

- Optimize the MD/MLP/RN mix
- Scribes to leverage the MDs
- Patient flow coordinator
- Board huddles/rounds in the ED
- Team assignments/geographic zones
- The right clinical support mix
- Tailor the hours and staff to the facility and to patient flow
Teamwork and Crew Resource Management (CRM)
- Training
- Team structure and climate
- Planning and problem solving
- Communication within the team
- Managing the workload
  - Situational awareness
- Team improvement strategies

Teams and Teamwork: Working Together

The “Pod” Team-Based Model of ED Care

- Origins in Crew Resource Management
- A defined team of people with clearly defined (and circumscribed) role caring for a defined group of patients in a defined area
- What’s the right size and mix?
The Pod Model at Lakeland Regional Medical Center

- Annual ED Volume > 140,000
- CEO Commitment to Improvement
- Dedicated essential services
- Front-End Flow (Bed to Room < 5 min)
- Door to Discharge < 3 hours > 80th%tile
- LWOTS < 0.05%

Critical ED Patient Flow Concepts

- Front-Load Flow-The front door and your front end processes drive flow
- *Triage is a process, not a place*
- Get the patient and the doctor together as quickly and efficiently as possible
- Get the (right) patient to the (right) doctor/team as quickly and efficiently as possible
- *The more horizontal you are, the more you are a patient-the more vertical, the more you are a customer*
- Keep your vertical patients vertical and in motion
- *For horizontal patients, real estate matters; for vertical patients, speed matters*
Critical ED Patient Flow Concepts

- Be fast at fast things and slow at slow things
- The number one sign of the health of an ED, OR, PACU, ICU, or hospital floor is the relationship between the physicians and the nurses
- Making people unhappy and sending them a bill is not a healthy business model
- If your boarding burden is overwhelming, you are…!@!&%#!
- Open the Back Door of the ED and Optimize Hospital-Wide Flow

Advanced Flow Concepts
The Science of Service Operations

- **Systems thinking and appreciation** - A system is a network of components which work together to try to achieve common aims

- **A theory of knowledge** - You need a theory of knowledge about your system—an understanding of your ED, your hospital, and your 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, TQM…

- **Where waiting exists—applying The Psychology of Waiting Lines**

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Patient Flow is Predictable…

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Patient Flow is Predictable -
Classic ED Patient Flow Demand Curves

Emergency Department Admission Times: 1 Hour Increments

Scientific Management - Planning for Admissions

Forecasting Hospital Admissions from the ED by HOD
Patient Flow (Demand) is Predictable
and
Capacity (Staff, Space, Supplies, and Service...) is Manageable…*

*i.e. and is therefore a management responsibility…

Queuing and Queuing Systems
Queuing Theory-A Definition:
The art and science of matching fixed resources to unscheduled demand
Queuing Systems and Queuing Theory - Background

- A "queuing system" is one where customers arrive at undetermined, but normally distributed, times. Classic examples include call centers, grocery lines, and emergency departments.

- The behavior of these systems (e.g. # in the queue, waiting time) is well understood and can be described by two variables:
  - Mean arrivals per hour
  - Capacity per hour

- Queuing theory is the study of waiting lines, or queues – the science of waiting. Queuing theory helps us understand the underlying cause of waiting in a system. Understanding the basics of queuing theory will build your intuition of how staffing affects patient waiting time and will help you manage and match demand/capacity as well as the impact of the natural variation that occurs daily in your emergency department.

Queueing System

A queuing system combines the components of arrival time, service time, and the number of servers allowing one to model (predictive modeling or forecasting…) demand and capacity, as well as characterizing the impact of natural variation.

**Queueing Parameters:**
- Number of Servers ($n$)
- Average Arrival Rate ($\lambda$)
- Average Service Rate ($\mu$)

**Key servers in the emergency department:** beds, clinicians, and nurses

**Patient Velocity:** the rate at which patients are treated

**Graphic created by EmCare’s Innovation Group**
Queuing Systems Have Distinct Characteristics

- Systems serving unscheduled (uncontrolled) arrivals behave in a characteristic fashion.
- 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 can lead to big improvements...*
Queue Behavior as a Function of Utilization

Small changes in utilization can lead to big changes in service and throughput

Utilization as Percent

Average Time in Clinic

70 75 80 85 90 95 100

On the surface, it might seem that health care managers would seek 100% utilization of servers; however, increases in utilization are only achieved by increases in the length of the waiting line and the average waiting time. This is because as utilization approaches 100% waiting times increase in a highly non-linear fashion.

The Relationship between Waiting Time and Utilization

Notice how a slight increase in staff yields a much greater reduction in waiting time.

Average Minutes Waiting Time

5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% 80% 85% 90% 95%

Utilization

Variation and Variability

You must manage variability…
(Unless you have unlimited capacity)

Lessons from Variability and Operations Research

Sources of Variation:

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

Eugene Litvak, PhD, Boston University
Variability in a Queuing System
An Example:
The Performance of a Telephone Answering System

- A call lasts an average of two minutes.
- Calls are answered by one full time person...

**Question:** Can the system handle 30 calls an hour without putting people on hold?

Effect of Variation on Queues
Performance of a Telephone Answering System

- Note: -An avg call lasts 2 minutes.
  -Calls are answered by one person full time.

- Therefore, Avg. service rate = 30 calls/hr

(Utility = 97%)

(Utility = 83%)
Walk-in (Unscheduled) Urgent Care
Arrival Rate of 10/hour, Service Rate of 12/hour, and Server Utilization of 83.33%
As managers it is important to distinguish between the two different types of variation. Much variation is due to non-valued added activities and inefficient processes that can be controlled. However, there are other types of variation outside of our control that are often overlooked and not well understood. All variation should considered in decision making.

- **Artificial Controllable Variation** – non-random, non-predictable variation which, in many cases, is preventable. Unlike natural variation, it should not be managed. Rather, it should be identified and eliminated/reduced.
  - The human factor: Artificial variation is often affected by human actions, individual preference, and artificial “rules” created by humans

- **Natural Statistical Variation** – statistical variation inherent in any process. It cannot be eliminated or even reduced. Instead, it must be properly managed.

  - **Three Types of Natural Variability**
    1. **Patient Flow** (arrival time variation)
    2. **Clinical Presentations** (service time variation)
    3. **Professional Variability** (service time variation)

Although natural variation is outside our control, we can manage it using methods that evaluate the impact of natural variation on key performance metrics such as patient velocity, length of stay, and waiting time. One such powerful tool is queueing theory.


### Variation in Your Hospital

#### Emergency Department Variation

- Admission rates ranged from 15% to 29% despite equal work schedules.
- Length of stay for discharged patients varied by 25% between physicians.
- Abdominal CTs ranged from 0.9 to 3.9 per 100 patients treated per physician.
- Head CTs ranged from 4 to 12.43 per 100 patients treated per physician.
- PTTs ranged from 1 to 13 per 100 patients treated per physician.

#### In-Patient LOS Variation

- Congestive heart failure, severity 2 - range 2.6 to 5.6 days
- Simple pneumonia, severity 2 - range 2.5 to 7.7 days
- Exacerbation of COPD, severity 2 - range 2 to 6 days

Emergency Medicine and Acute Care Essays, Volume 29, Number 3, March 2005
Regional Healthcare Variation

- Beta blocker utilization in MI - 5% to 92%
- Mammograms age 65-69 - 21% to 77%
- Bypass rates- 3 per 1000 in Albuquerque versus 11 per 1000 in Redding, California
- Surgical treatment for back pain - 6-fold variation

Medical visits for Medicare patients in the last six months of life - 2 in Mason City, Iowa versus 35 in Miami, Florida

- Medicare hospital days in the last six months of life - 4.6 in Ogden versus 21.4 in Newark
- Percentage of Medicare patients having an ICU stay in the last six months of life - 14% in Sun City, Arizona versus 49% in Sun City, California
- Per capita Medicare spending in Miami is almost 2.5 times greater than in Minneapolis.


The Theory of Constraints

- By Eliyahu Goldratt
- A business novel
- Theory of Constraints:
  - Constraints limit performance
  - To improve performance, focus on improving constraints

- Goldratt: A system’s constraints limit its performance or progression toward its goal (throughput/flow)

- Two Types of Resources
  - Bottleneck - A resource that has the capacity equal to or less than the demand placed upon it
  - Non-bottleneck - A resource that has a capacity that is greater than the demand placed upon it
The rate determining step is the slowest step of a chemical reaction that determines the speed (rate) at which the overall reaction proceeds. The rate determining step can be compared to the neck of a funnel.

The Theory of Constraints in Healthcare

A simple system depicted as a chain.
The Theory of Constraints in Healthcare

Each of the links in the chain has a different capacity; **throughput is determined by the capacity of the weakest link.** The average capacity is 13; however, **system throughput is 8.**

Impact of cutting “excess” capacity. Constraint (physician) must do some work previously done by other links in the chain, **reducing throughput from 8 to 3.**
The Theory of Constraints in Healthcare

Top Panel: A simple system depicted as a chain.

Middle Panel: Each of the links in the chain has a different capacity; throughput is determined by the capacity of the weakest link. The average capacity is 13; system throughput is 8.

Lower Panel: Impact of cutting "excess" capacity. Constraint [physician] must do some work previously done by other links in the chain, reducing throughput from 8 to 3.


The Theory of Constraints (TOC)

The Theory of Constraints (TOC)

- Patient care is 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 is a mirage
- Efforts spent improving a non-critical bottleneck will not improve the overall performance of your process or system

In highly variable systems (i.e. the ED), the bottlenecks can appear to jump around...
Theory of Constraints - The 5 Focusing Steps - Continuous Constraint Improvement

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

2. **Decide how to exploit the constraint** – how to get as much out of it as possible - How rooms, staff, beds are utilized…

3. **Subordinate and synchronize everything else** to the above decisions
   - Align every other part of the system to support the constraints even if this reduces the efficiency of non-constraint resources
     - Standard work
     - Support
     - 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.)

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

Managing Waits and the Psychology of Waiting…
Putting the Psychology of Waiting to Work

Unoccupied time feels longer than occupied time
• TVs, magazines, health care material
• Company-friends and family
• ROS forms, kiosk, pre-work
• Frequent “touche”

Unexplained waits are longer than explained waits
• In-process preview and review
• Family and friends
• Patient and Leadership Rounding

Pre-process waits feel longer than in-process waits
• Immediate bedding
• No triage
• AT/AI (Advanced Treatment/Advanced Initiatives)
• Team Triage

Anxiety makes waits seem longer
• Making the Customer Service Dx and Rx
• Address the obvious-pre-thought out and sincerely deployed scripts
• Patient and Leadership Rounding

Solo waits feel longer than group waits
• Visitor Policy-The Deputy Sheriff takes a furlough
• Managing the family’s expectations
• It’s OK to leave for awhile
• On-stage/Offstage

Unfair waits are longer than equitable waits
• Announce Codes
• Fast Track Criteria known and transparent
The more valuable the service, the longer the customer will wait
• The Value Equation-Maximize benefits for the patient and significant others + Eliminate burdens for the patient and significant others

Uncertain waits are longer than known, finite waits
• Previews of what to expect
• Expectation Creation
• Green-Yellow-Red grading and information system
• Traumas, CPRs-Informed delays
• Patient and Leadership Rounding

The Science of Service Operations- A Recap

• Systems thinking and appreciation-A system is a network of components which work together to try to achieve common aims

• A theory of knowledge- You need a theory of knowledge about your system-an understanding of your ED, your hospital, and your 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, TQM…

• Where waiting exists- applying The Psychology of Waiting Lines
### Healthcare’s Top Ten List

- Acute Myocardial Infarction
- Appendicitis
- Meningitis
- Chest Pain (ACS and Non-ACS)
- Open Wounds
- Abdominal/pelvic pain
- Pneumonia
- Spinal Fracture
- Aortic Aneurysm
- Acute Testicular Torsion

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### Creating the Risk Free ED™

**Protect Your Patient**

**Protect Your Practice**

- **Best Practice #1**
  
  Ensure any patient with acute onset of testicular pain and clinical findings of torsion has:

- **Best Practice #2**
  
  Every patient with acute onset of testicular pain, but with equivocal findings of testicular torsion receives a color flow Doppler ultrasound

- **Best Practice #3**
  
  Ensure any patient with acute scrotal pain and negative imaging study receives:
  - Urologic consultation
  - Admission, placement in observation unit OR follow-up with urologist in AM
  - Careful discharge instructions

- **Best Practice #4**
  
  Ensure prospective, proactive discussion with both radiology and urology regarding the use of color flow Doppler ultrasound
Keys to Success

Key Principles

• Patient flow is a complex technical problem

• The Myth Of 100% Utilization

• Patient flow cannot be solved by just one discipline or one department within the hospital

  • The solutions require high levels of cooperation and integration
  
  • Effective diagnosis of problems and effective testing of changes using PDSA cycles are required
  
  • The solutions cannot just be installed
Focus on your opportunities, and not just your problems...
Questions to Ponder on Your Way Home…

• If you could do one, two, or three things to either improve your Department, Service, or Hospital what would they be…

• How can your ED, your Hospitalist Service, and even your OR, work better together…

• What are your next action steps…
George Washington Carver

How Far You Go In Life Depends Upon Your Being ...

Tender with the young, compassionate with the aged, sympathetic with the striving, and tolerant of the weak and strong. Because someday in your life you will have been all of these things.

Thank You!
Kirk B. Jensen, MD, MBA, FACEP

Dr. Jensen is Chief Innovation Officer for EmCare and serves as Chief Medical Officer for BestPractices, Inc.

In over 30 years in emergency medicine management and clinical care, Dr. Jensen has coached or consulted with over 300 hospitals nationwide, and developing innovative and creative solutions to enhance emergency medicine and hospital flow.

As a faculty member of the American College of Emergency Physician’s management academy and the Institute for Healthcare Improvement, and as a writer and presenter for HealthLeaders Media, Dr. Jensen shares expertise on patient safety, patient flow, operational strategies, error reduction, and change management.


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Dr. Thom Mayer is the Founder and CEO of BestPractices, National Executive Vice President of Envision Healthcare Services, and Medical Director of the NFL Players Association.

Dr. Mayer has spoken at national meetings for the American College of Healthcare Executives, American College of Emergency Physicians, Emergency Nurses Association and numerous healthcare systems on physician healthcare leadership and management, hardwiring flow, patient experience, patient safety, evidence-based practices, high-performing organizations and change management. His work on concussions in the NFL has changed the very nature of the care of patients with traumatic brain injury and was recognized by USA Today as one of “The 100 Most Important People in the NFL.”


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Resources, Data, Benchmarking and References

Flow Resources

2017 CONGRESS ON HEALTHCARE LEADERSHIP

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The Patient Flow Advantage: How Hardwiring Hospital-Wide Flow Drives Competitive Performance


Section 1 — Framing the Flow Mandate
Chapter 1: Why Flow Matters
Chapter 2: Defining Flow: Establishing the Foundations
Chapter 3: Strategies and Tools to Hardwire Hospital-Wide Flow
Chapter 4: Lessons from Other Industries

Section 2 — Advanced Flow Concepts
Chapter 5: Emergency Department Solutions to Flow: Fundamental Principles
Chapter 6: Advanced Emergency Department Solutions to Flow
Chapter 7: Hospital Systems to Improve Flow
Chapter 8: Hospital Medicine and Flow
Chapter 9: Real-Time Demand and Capacity Management

Section 3 — Frontiers of Flow
Chapter 10: Hardwiring Flow in Critical Care
Chapter 11: Smoothing Surgical Flow
Chapter 12: Acute Care Surgery and Flow
Chapter 13: Integrating Anesthesia Services into the Flow Equation
Chapter 14: The Role of Imaging Services in Expediting Flow
Chapter 15: The Future of Flow

Hardwiring Flow
Systems and Processes for Seamless Patient Care

Thom Mayer, MD, FACEP, FAAP
Kirk Jensen, MD, MBA, FACEP

• Why patient flow helps organizations maximize the “Three Es”: Efficiency, Effectiveness, and Execution
• How to implement a proven methodology for improving patient flow
• Why it’s important to engage physicians in the flow process (and how to do so)
• How to apply the principles of better patient flow to emergency departments, inpatient experiences, and surgical processes
Emergency Department Leadership and Management

Best Principles and Practice

Editors:

• Stephanie Kayden, Brigham and Women’s Hospital, Harvard Medical School, Boston
• Philip D. Anderson, Brigham and Women’s Hospital, Harvard Medical School, Boston
• Robert Freitas, Brigham and Women’s Hospital, Harvard Medical School, Boston
• Elke Platz, Brigham and Women’s Hospital, Harvard Medical School, Boston

Cambridge University Press: November 2014

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2. Identifying and resolving conflict in the workplace: Robert S. Suter and Jennifer M. Johnson

3. Leadership: an overview of three interrelated strategies of change: Donald Schon

4. Building the leadership team: Peter Cameron

5. Establishing the emergency department’s role within the hospital: Thomas F. Halamka

6. Strategies for clinical team building: the importance of teams in medicine: Matthew M. Rice

Part II: Management Principles

7. Quality assurance in the emergency department: Philip D. Anderson and Laurence McMillan

8. Emergency department policies and procedures: Robert W. Freitas

9. Establishing emergency department leadership and patient safety: Carrie Třebišovský and Jack Holman

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13. Project management: Liane A. Wells, Laura S. Wien, and Sebastian N. Walker


15. The leader’s toolbox: things they didn’t teach in nursing or medical school: Robert W. Freitas

16. Assessing your needs: Manuel Hernandez

17. Emergency department design: Michael F. Pietrzak and Janice Jensen

18. Informatics in the emergency department: Steven Hing, John D. Holmstrom, and Larry A. Nathanson

19. Fringe summer: Shariah Odeh and Ari Plotz


22. Observation units: Christopher W. Baugh and A. Stephen Webster

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24. Establishing a teaching environment in the emergency department: John J. Ross

25. Practice management models in emergency medicine: Robert S. Suter and Cheryl Schrader

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33. Planning for diversity: Tanicia Khan

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Relevant chapters on patient flow, patient safety, risk management, teamwork, culture change, and leadership development...
Leadership for Smooth Patient Flow:
Improved Outcomes, Improved Service, Improved Bottom Line

Kirk B. Jensen, MD, FACEP
Thom A. Mayer, MD, FACEP, FAAP
Shari J. Welch, MD, FACEP
Carol Haraden, PhD, FACEP

The heart of the book focuses on the practical information and leadership techniques you can use to foster change and remove the barriers to smooth patient flow.

You will learn how to:
- Break down departmental silos and build a multidisciplinary patient flow team
- Use metrics and benchmarking data to evaluate your organization and set goals
- Create and implement a reward system to initiate and sustain good patient flow behaviors
- Improve patient flow through the emergency department—the main point of entry into your organization

The book also explores what healthcare institutions can learn from other service organizations including Disney, Ritz-Carlton, and Starbucks. It discusses how to adapt their successful demand management and customer service techniques to the healthcare environment.

*This book marks a milestone in the ability to explain and explore flow as a central, improvable property of healthcare systems. The authors are masters of both theory and application, and they speak from real experiences bravely told.*

Donald M. Berwick, MD
President and CEO
Institute for Healthcare Improvement (from the foreword)
The Definitive Guide to Emergency Department Operational Improvement

Making Healthcare Work Better™ with Lean
Text and Workbook

Authored by:
EmCare Clinicians and Operational Experts

Foreword: Kirk Jensen

Sample Chapters:
- Applying Lean to Healthcare
- Lean Requires Transformation
- Lean System: Integrating Clinical Departments
- Lean Emergency Department
- Lean OR
- Lean in the Surgery Schedule
- Lean Inpatient
- Lean Transitions
- Lean Beyond the Hospital Stay
- Lean Radiology
- Lean Ancillary Services
- Lean Processes for Leaders

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Improving Patient Flow
In the Emergency Department

Kirk Jensen
Jody Crane

Real-Time Demand Capacity Management And Hospital-Wide Patient Flow

The Joint Commission Journal on Quality and Patient Safety: May 2011 Volume 37 Number 5
Improving Patient Flow Through a Better Discharge Process

Improving patient flow through a better discharge process.
Johnson M, Sensei L, Capasso V.

EmCare® Door-to-Discharge™
The Improvement Guide and Rapid-Cycle Testing

Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP.

*The Improvement Guide: A Practical Approach to Enhancing Organizational Performance (2nd edition).*

References

References


References

The Psychology of Waiting

Benchmarking Resources

Where to find data:

Your neighbors
• Call and/or visit
ACEP
• http://www.acep.org
Premier
• www.premier.com
VHA
• www.vha.com
ED Benchmarking Alliance
• www.edbenchmarking.org
UHC
• www.uhc.org

Be sure to compare hospitals with similar acuity and similar volume...