Emergency Department Directors Academy Phase I Spring 2020

*Engineering Patient Flow I: Theory, Metrics, and Application*

**DESCRIPTION**
Your ability to operate an efficient emergency department is paramount to your success and tenure. This becomes one of our greatest management challenges. The speaker will describe methodologies to identify barriers and bottlenecks that compromise efficient patient flow. A discussion of queuing theory, crowding, and essential metrics will help you develop strategies to improve workflow, build effective relationships with ancillary providers, and incorporate structural redesign into the already complicated picture. The manner in which informed participatory decisions can improve operational efficiency and throughput also will be discussed.

**OBJECTIVES**
- Describe queuing theory.
- Discuss issues of crowding.
- List common ED operation metrics.
- Describe the application of metrics to the ED.
- Identify ED technologies that can help improve patient flow.
- Engineering Patient Flow I: Theory, Metrics, and Application

2/3/2020, 2:00 PM - 3:30 PM

**FACULTY:** Kirk B. Jensen, MD, MBA, FACEP

**DISCLOSURE:** (+) No significant financial relationships to disclose
Emergency Department Directors Academy Phase I Spring 2020

Engineering Patient Flow II: Directing Change

DESCRIPTION
Once the director has analyzed the patient flow issue, the next step is to make improvements. The director must be able to implement specific changes to remove barriers and avoid the clogging points of his/her ED. Several specific case examples will be provided to demonstrate effective best practices that can be used to improve patient turnaround time and patient and

OBJECTIVES
• Describe improvement processes and concepts of "benchmarking" and "best practices".
• Describe implementation programs to reduce delays, improve patient throughput, and enhance patient and provider satisfaction, such as rapid triage and bedside registration; documentation methodologies, handwritten chart, templated systems, scribes, dictation, etc.; triage and nursing protocols; expedited laboratory and diagnostic imaging processes; streamlined admission process, and implementation of ED technologies that enhance patient flow.
• Discuss methods to create “buy-in” from administration.
• Engineering Patient Flow II: Directing Change

2/3/2020, 3:45 PM - 5:15 PM

FACULTY: Kirk B. Jensen, MD, MBA, FACEP

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Our Goals and Objectives:

• A Focus on Emergency Department patient flow and operations management
• Strategies and tactics to optimize your practice environment
• Highlights of selected innovative practices
• A clinical department and a hospital that works for your patients, your healthcare team, and for you…
We Work in Challenging Environments...

We...our patients and our team members...deserve Emergency Departments and health care systems that work...
The deck is often stacked against us...

We Know We Compete for “Scarce” Resources...
There are Multiple Opportunities for Bottlenecks and Discontinuous Flow

- Door To Triage
- Door To Doctor
- Door To Bed

- Data to Decision
- Decision to Dispo

- Discharge to Home
- Discharge to Admit

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

In 2016 - This cohort comprised 15% of the total population

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...
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
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)
Just Let Me Practice Quality Medicine...
Optimizing Patient Intake and Throughput...

The ED Is An Example Of A Production System.
Demand & Capacity Planning and Management

- **Demand** is the number of requests for a service, task, skill or machine.
- **Capacity** is the maximum level of value-added activity that a process can achieve under normal operating conditions over a period of time.

The Capacity of the ED is Largely a Function of its Processes, Staffing Levels, Physical Space and Equipment Capacity...
We want to be fast at fast things and slow at slow things…and wise enough to know the difference...

We Can’t Store Service Capacity…
Maximizing the Effectiveness of Our Critical Servers:
*Doctors/APPs  *Nurses  *Beds

Creating an Entire System That Works
A Framework for Improvement, Sequencing and Tempo

12- to 24-Month Initiative (Series of Projects)

- Matching Capacity to Demand
- Key elements for a front-end project
- What can the ED do?
- Patient Segmentation
- Admissions
- Throughput Bottlenecks
- Patient Satisfaction
  (add physical space, managing expectations)
- Optimization of Patient Flow (i.e. Lean Thinking)
Understanding Overall Demand & Leveraging Streaming of Our Incoming Patient Flows:

Patient Segmentation, Streaming and Patient Flow...

Patient Arrivals Can Be Broken Down By Stream, Or Segment...

Arrivals can be analyzed by:
- Acuity, or
- Presenting complaint (e.g. chest pain)
- Diagnoses (e.g. asthma),
- Resource needs,
- Healthcare resource grouping (product family),
- Or any other split (e.g. pediatrics), depending on need.
Capacity Planning:
Leveraging Streaming (or Patient Segmentation)

• In manufacturing terms, streams can be thought of as production ‘cells’: areas of a factory where similar processes are undertaken in a dedicated fashion.
• One should understand overall demand for each stream by HOD, DOW, and by season….

Segmenting Our Incoming Patient Flows and Matching Our Service Delivery Tracks & Capacity to Our Incoming Patient Streams – Segmentation, Streaming, & Split Flow…
Breaking Down Service or Patient Care Demand into Streams

- You need to decide how you are going to organize your ED in terms of incoming streams.

- In order to maintain optimal flow these areas should ideally run independently of each other.

- Streams should work separately, and they therefore need to be staffed separately.
Leverson the ED’s Points of Entry – Optimizing the Value and Impact of Triage and the Front End of our EDs

A Step-Wise Approach to Segmenting and “Fast-Tracking” our incoming patient streams:
1. Efficiently and Effectively Fast-Tracking our Low-Acuity Patients: ESI 5s and 4s
2. Mid-Acuity Management - ESI Level 3 Fast Tracking
3. A Plan and Process for our High-Acuity Patients

Patient Acuity: Higher acuity patients require additional staffing resources for evaluation, management, treatment and disposition...

Patient Length of Stay (LOS): Longer patient LOSs require more staffing time and attention...Although not necessarily more clinical staff...

Service Line Considerations:
- Make sure the low acuity service line (ESI 5s, 4s, and select 3s) is adequately resourced (space, staff, supplies) and busy at all times
- Staffing for your ESI 2s, 3s, and 4s - err on the side of staffing “fat” or “heavy” to handle variations in volume and acuity

Boarded Patients: If you are responsible for “boarded patients” (those awaiting admission to an inpatient unit but who are still located in the ED), then:
- Your staffing resources will be reallocated in order to monitor and treat these patients.
- Your bed capacity will be reallocated to monitor and treat these patients.
- Your ability to meet incoming patient demand is effectively reduced.
Hardwiring Emergency Department Patient Flow:
Process Redesign - We Have a Number of Field-Tested Options Available To Us…

ED Flow & Operations:
- 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:
  - APP Provider in Triage
  - MD in Triage
  - Team Triage (Multi-disciplinary assessment and treatment team)
- A Results-Waiting Area
- Efficiently Managing Admissions and Discharges

Front End Patient Flow Service Lines
Definitions and Descriptions

- **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 4s and 5s…
  - Midlevel Provider in Triage
  - MD in Triage
  - Team Triage (Multi-disciplinary assessment and treatment team)
Front-End Patient Flow: A Portfolio of Options

A Black Box Warning:
There is a Portfolio of Options available to you to be deployed as patient volume and demand either requires it or can justify it. The front-end flow tactics(s) are selectively and scientifically implemented at certain hours of the day and days of the week based upon your demand-capacity modeling of incoming patient flow.

- 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)
- Clinician in Triage:
  - Midlevel Provider in Triage
  - MD in Triage
  - Team Triage (Multi-disciplinary assessment and treatment team)

The Science of Service Operations:
Getting it Right at the Front End

- Measure patient demand (and acuity) by hour of the day and day of the week 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...
Patient Flow & Throughput – Key Tactical Leverage Points: A Summary

- **Demand-Capacity Analysis & Management:**
  - Planning for our critical servers – Docs (APPs), Nurses and Beds (Treatment Spaces) …
  - Getting it right on average…
  - Managing peak loads…

- **Leveraging our ED’s Points of Entry** - Optimizing the value and impact of Triage and the Front End of our EDs

- **Segmenting and “Fast-Tracking”** our incoming patient streams
  - Efficiently and Effectively Fast-Tracking our Low-Acuity Patients: ESI 5s and 4s
  - **Mid-Acuity Management** - ESI Level 3 Fast Tracking
  - A Plan and Process for our High-Acuity Patients

- **Making the most of Teams and Team-Based Care**
- **Addressing flow Into, Through, and Out of our Hospitals…**

Selected Illustrative Examples - Deploying Our Key Operational Management Tactics…
General Operational Strategies for Front-End Patient Flow by Volume Band: An Illustrative Example

20,000 ED Visits per Year and Below…

- No triage, Immediate bedding, bedside registration for all
- No Segmentation – Clear signals to identify low acuity patients
- A results waiting process and place…

- Peak arrivals are just over 3 pts/hr, FT arrivals 1.2-1.5 pts/hr, 10-20 beds
- Providers
  - Volume too low for 2 docs
  - FT volume too low for effective segmentation (Super Track)
  - MD/APP sharing the entire ED
  - 4 Main ED Nurses
- Operational approach
  - Immediate bedding, docs go from high to low acuity, PA from low to high
  - No triage
  - Results waiting area or space

SIZE MATTERS: The lower the yearly ED patient volume, the more one should think about the ED as one giant intake team…

Opportunities in Low-Volume EDs Include:

- Redesigning Patient Intake
- Repurposing triage as a rapid treatment unit (RTU) for your low-acuity service line
- Re-engineering patient flow for high-flow/low-flow times of the day
- Developing a night plan in conjunction with the hospitalist

For a helpful write-up of this approach applied to a low-volume ED see:

Patient Flow Improvements to Boost Efficiency in Small Emergency Departments
ACEP Now, June 19, 2017 by Shari Welch, MD, FACEP
General Operational Strategies for Front-End Patient Flow by Volume Band – 40k Per Year:

40,000 ED Visits per Year

- 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 APP with committed resources for lab/rad
- A results waiting process and place…

- Peak arrivals 6-7 pts/hr, FT arrivals 2.5-3 pts/hr, 20-40 beds
- Providers
  - 3-4 docs for traditional staffing
  - If low acuity/low admit ED - FT volume perfect to implement a Super Track
  - If 30,000-40,000 ED - Intake Team strategy may supersede Super Track due to more effective resource pooling
  - 8 Main ED nurses during peak times
- Operational approach
  - Quick Look Triage, Quick/Bedside Reg
  - Super Track (9a-11p) with Team-based care in the Main ED for low acuity/low admit ED
  - Intake Team (9a-11p) with 1 doc, 1 APP with committed resources for lab/rad high acuity/high admit ED
  - Immediate bedding
  - Results waiting

General Operational Strategies for Front-End Patient Flow by Volume Band:

80,000 Visits per Year:

- Peak arrivals just over 12-15 pts/hr, FT arrivals 5-7 pts/hr, 40-80 beds
- Providers
  - 7-8 providers for traditional staffing
  - 2 Super Tracks
  - 1-2 Intake teams with 2-4 providers (mix of MD/PA)
  - 12-16 Main ED nurses during peak times
- Operational approach
  - Quick Look Triage, Quick/Bedside Reg
  - 2 Super Track (7a-1a,9a-1a), 1-2 MD/App Intake Team (9a-11p,11a-2p,6p-9p)
  - Immediate bedding for Level 1 & 2 patients, Main ED Teams, Intake/Super Track for others
  - Results waiting
Triage is a process, not a place...
Triage Should Add Value

- Does it...
  - Improve Throughput?
  - Increase Safety?
  - Improve Quality?
  - Increase Satisfaction?
  - Increase Revenue?
  - Decrease Cost?

- If Not... Why Not... Change It... Now!

“Name, Rank, and Serial Number…”

- Name
- Limited chief complaint
- Vital signs
- Pain score
- “Sick or Not Sick”
Get the patient and the Doctor/APP together as quickly and as efficiently as possible…

Quick Bedside Registration and Direct Pullback…
**Nurse Initiated Order Sets:**

The use of evidence-based, standardized order sets has been shown to improve the timeliness of care and reduce medical errors...

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**Fast Track is a Verb and Not a Noun …**

- Code Blue
- Code STEMI
- Code Stroke
- Code Sepsis
- Code Vascular
- Code…
Optimize Bed Capacity and Bed 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

- 6 Hour ALOS=4 patients per bed per day
- 4 Hour ALOS=6 patients per bed per day
- A key rate limiting server
- A key component of care
- A key “member” of your team

...Park bench...or MVP?
Optimizing 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 the patient demand for beds?
  - 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?

Leveraging 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/APP/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
Teams and Teamwork: Working Together

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: It’s About Your People...

The A-Team:
- Hire right-Decide in haste or repent at leisure-it’s your call...
- Try to put your "A" Team on the floor at all times!
Making the Most of Teams and Teamwork…

- Scribes
- Effective use of APPs
- Clinical Care Teams, Teamwork Training and Coaching…
- Teams and Patient Assignments…
- Practicing at the Top of Our Licenses…

Innovative And Perhaps Disruptive Approaches To Flow and Operations…
NYU Langone Medhattan Urgent Care

We meet your immediate medical needs while accommodating your busy schedule.

NYU Langone Medhattan Urgent Care provides same-day doctor appointments and walk-in services for adults and children age five and older who have a serious or urgent medical need that is not a life-threatening emergency.

How about no triage at all....
Remote Clinician in Triage from a Command Center:

Command Center Tele-Triage Results:
- One physician serving entire acute care networks
- Remotely treating up to 25 patients per hour...

Staff Productivity Doubles vs. Traditional PIT

Our average wait time for a triage consult using an in person model is 12-14 minutes. With the remote triage provider it is 40 seconds.

- Dr. Ethan Booker, MedStar Director for ED QI

At Aurora Health Care Tele-triage reduced door-to-doctor times by 75%
Remote Triage from a Command Center:

One “Pod” – A single clinician managing up to 140,000 combined visits

Hosp A – 70,000 annual visits
Hosp B – 30,000 annual visits
FSED C – 20,000 visits
FSED D – 20,000 visits
Leveraging Command Center Medicine to Improve Flow

Remote Clinical Staff

Entry Points

Exit Points

Urgent Care Facilities
Emergency Departments
Hospitalists Inpatient Care

PHOTO: PAUL HASKINS

Command Center Medicine
Demand-Capacity Management & Operational Excellence
Carillion Clinic’s Command Center
Telemedicine may impact timeliness of care through several pathways:

- First and most obvious, telemedicine can provide a rapid response capability in remote and frontier hospitals with no in-house emergency physician. In these cases, therapy can be ordered by telemedicine providers even before local providers arrive in the hospital.
- Second, telemedicine may provide surge capacity in busy rural EDs when a provider is caring for other competing patients. While many rural facilities do not often have full waiting rooms, local events may quickly overwhelm available resources. For instance, motor vehicle crashes with multiple victims may stretch a provider in a typically low volume hospital to deliver simultaneous care to multiple critically injured patients.
- Telemedicine providers may be able to help risk stratify patients during times of high volume—conducting triage in parallel with the local emergency provider to help allocate limited resources. In many cases, telemedicine providers can be activated based on ambulance reports and can help to organize the care team and prepare equipment to improve the ability for a timely response on patient arrival.
- Provide the availability of scarce specialty and subspecialty services.
Peter Drucker – Select Observations on Hospitals and Leadership ...

"The hospital is altogether the most complex human organization ever devised."

"Only three things happen naturally in organizations: friction, confusion, and underperformance. Everything else requires leadership."

The Science of ED Operations Management as a Route to Operational Excellence...

- 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 for improvement: Lean, Six Sigma, TQM...
- Where waiting exists - applying The Psychology of Waiting Lines
Forecasting Demand
How many Friday nights does it take...
How many Monday mornings does it take...
How many flu seasons does it take...

Patient Flow is Predictable…
Patient Flow is Predictable - Classic ED Patient Flow Demand Curves

Patient Flow (Demand) is Predictable and Capacity (Staff, Space, Supplies, and Service…) is Manageable…*

*i.e. …is a management responsibility
Demand-Capacity and Scientific Management: Arrivals vs. Staffing

![Graph showing arrivals vs. staffing]

- **Hour of Day**
- **# of Arrivals**
- **Average Arrivals**
- **Under-Resourced**
- **Catching-Up**
- **Over-Resourced**

Demand-Capacity Modeling & Management: Patient Arrivals (Demand) vs. Staffing (Capacity)

![Graph showing patient arrivals vs. staffing]

- **Patient Arrivals**
- **Staffing**
- **Over Resourced**
- **Under Resourced**
- **Playing Catch Up**

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Demand-Capacity Management is of Paramount Importance...

Arrival Volume, Acuity and Variation as Key Drivers of Staffing...
Who's Coming, When Are They Coming, And What Are They Going To Need...

One needs to understand demand (volume and complexity) by hour of the day (HOD), day of the week (DOW), and by season (if applicable)...
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?...

Patient Arrivals:
• You should know the ED’s patient arrival volumes, acuity, and patterns.
  • Patient arrivals and acuity by hour of the day (HOD) and day of the week (DOW).
• Knowing the patient arrival curve(s) by HOD and DOW, one can schedule ED staffing to stay ahead of patient arrivals and acuity.
  • Identify “heavy” (greater than average) and “light” (less than average) days.
  • Although Sundays, Mondays, and the day following a holiday are generally heavier-volume days, you will want to compare average volumes and variation from the average for each day of the week.
• Review average daily visit volume for each of the most recent 24 months to determine seasonal fluctuations.
• Review annual arrivals over the past five years in order to understand trended historic growth and anticipate future growth.
• Benchmarking - Establish targets for how many patients per hour the practice can realistically or comfortably see.
• Perhaps consider stretch goals for PPH and LOS.
Demand-Capacity (DCM) Analysis – Key Questions in More Detail…

- With the appropriate use of Demand-Capacity Management (DCM) analytics and tools, the ED operations team is best equipped to answer the following questions*:
  - How many physicians, APPs, and scribes do I need to meet the demand of incoming patients?
  - How many nurses do I need to meet the demand of incoming patients?
  - How many beds do I need in my department to meet the demand of incoming and boarded patients?
  - Do I have the right staffing levels, staffing mixes, and staffing hours?
  - How do scribes & techs optimize physician, APP, and nursing productivity?
  - Is there an opportunity to operationalize a Fast Track/Low-Acuity Track or some other Front-End Patient Flow model?

*The suggestions should be based off arrivals, acuity, and productivity by hour of the day (HOD) and day of the week (DOW), and even by season of the year...as well as service times and targeted performance measures.

FINDINGS - The patient arrival and staffing (Demand-Capacity) graph above highlights the following mismatches:
Main – Understaffing - missing the patient arrival ramp-up (begins at 1000) and overstaffing twice later in the day (1400 and 2200)
Demand/Capacity Management: Volume Variation by Day of Week

- Volume varies significantly by day of week – 10%+ variation between heavy and light days
- Saturday, Sunday and Monday are heavier days

When matching capacity with demand, varying staffing by day of week is essential
Demand - Capacity Planning & Management

Analysis of emergency department demand and capacity is the critical first step towards effective workforce planning and process redesign.

If you want to have a particularly humbling moment, go out to your waiting room and practice your basic arithmetic skills…counting and multiplication…
Real-Time Monitoring of Patient Flow

Leveraging Real-Time Operational Dashboards…
You wouldn’t drive your car at high speeds and in the dark without one…
So why do we manage our EDs this way…
A customizable tracking board displays updated patient information, helping coordinate the flow of patients through the emergency department, allowing clinicians to track their patient documentation and helping improve communication by linking ED clinicians and patient records to a wider community.

- Provides information on the patient’s location within the ED, with colors representing the urgency of the patient being assigned by the facility.
- Enter patient information quickly and easily as part of quick evaluation.
- Helps determine status of patient.
- Shows the length of stay with a link to the patient timers.
- Indicates the order types placed in ED PulseCheck as well as status of these orders.
- Calls out high clinical importance items to highlight combinations of patient conditions the physician may not have noticed.
High census affects us all!

Surge Capacity is an organized process of specific criteria and concrete actions to maximize capacity and care.

Learn how to respond appropriately to high census and surge alert on The Point.
Queuing:

- A queue is due to the combination of the queue (demand sitting in the waiting room), patients undergoing assessment or treatment (patients in process), and patients waiting for beds (exit block).
- Patients in any of these groups constitute work in progress.
- By the time queues have built up they are hard to clear.
- Stopping queues building up, making processes more efficient and reducing exit block will all increase effective capacity.

Queuing and Queuing Systems

Queuing Theory - A Definition: The Science of Waiting - The art and science of matching fixed resources to unscheduled 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.
A queueing 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 \((\mu)\)

Queueing System

The key servers in the emergency department are beds, clinicians, and nurses

Patient Velocity – the rate at which patients are treated

In healthcare this population box represents all potential patients
Queuing Systems Have Distinct Characteristics

- In a queuing system, the waiting time for the key server skyrockets as the number of arrivals per hour approaches system/server capacity.
- At high levels of utilization small changes can lead to big improvements in service...
- A queue will persist until ongoing capacity is sufficient to deal with both ongoing demand and the backlog.
- When staffing for a queuing system, and accommodating for variation, it is critical to target a utilization of approximately 80% - 85%, on average.

The Relationship between Waiting Time and Utilization

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.

Notice how a slight increase in staff yields a much greater reduction in waiting time.
The Relationship between Waiting Time and Utilization

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...

As utilization approaches 100% waiting times for the server increase in a highly non-linear fashion.

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

The Science of Lines

What’s really happening at checkout

A shopper can use this formula, by John D.C. Little, to determine expected wait time: Average wait time = average number of people in line divided by their arrival rate.

6
Number of customers already in line

2
Customers entering line per minute

3:00
Average time you can expect to wait

Clock watching
Once a wait leaks longer than three minutes, the perceived wait time multiplies with each passing minute. Shoppers who actually waited five minutes told servers they felt they had waited twice as long.

Impulse buying
Marketers are copying grocery stores with items like key-stuffed animals and gift cards next to lines to distract from the wait.

Line jockeying
Short lines are usually short for a reason. Other shoppers may have concluded that a short line has an especially slow or chatty cashier.

Check It Out
A single-line leading to three cashiers is about three times faster than having one line for each cashier. At least one of the three lines could have a random event, such as a customer who would slow the line.

Small changes in server utilization or capacity can lead to big changes in service and throughput.

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Variation
You must plan for and manage variability…(Unless you have unlimited capacity)

Sources of Variation
- Demand
- Capacity
  - Clinical variability
  - Flow & Process variability
  - Professional variability
    - Staff – hours, mix, capabilities, speed..

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

Walk-in (Unscheduled) Urgent Care: Arrival Rate of 10/hour, Service Rate of 12/hour, and Server Utilization of 83.33%

Maximal server variation
No server variation
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.


The role that variation plays in congestion and delay in the emergency department is well known, but is typically ignored in day-to-day planning and scheduling.

The common practice of “staffing to averages” in the emergency department often leads to an overworked staff and inordinate waiting times for our patients.

Graph created by Envision’s Innovation Group
...the actual count of arrivals for any given hour or day can vary considerably. This is Patient arrival variation.

| Count | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|       | 1  |    | 1  |    | 1  | 1  |    | 1  |    | 1  | 1  | 2  |    | 1  | 1  | 1  | 1  |    | 1  | 1  | 1  | 1  | 1  | 1  |

Hour of Day (Mondays only)
The Impact of Variation in Our Processes: A Hypothetical…

• Imagine a relatively simple structure where patients arrive and wait to check in, then wait to be seen for diagnostic tests, and then wait for a consultation with the emergency physician. Your records tell you that a new patient arrives on average every 10 minutes, and spends 10 minutes each with intake, diagnostics, and the doctor, so you plan your workflow accordingly.

• Now, if everything runs perfectly and you get one patient arriving every 10 minutes and moving to the next stage of the process at an average pace, it all works out beautifully. By the end of an average day, with every patient exactly 10 minutes after each other, the simulation shows that none of the patients waits more than half an hour at any point, and everyone gets through the system in less than an hour.

• Now let's see what happens when you introduce just a small amount of variability to your averages. The Cardiff mathematicians modeled what happens when 90 percent of patients spend that average 10 minutes at each stage of the process, five percent of patients finish within five minutes, and five percent are still being served after 15 minutes.

• Patients' average time waiting in the system goes from 30 minutes to 119 minutes — half an hour to two hours — and only seven percent of patients are in the system less than an hour.

• "That shows the danger of planning services just incorporating average measures," said Paul Harper, PhD, a professor of operational research at the Cardiff University School of Mathematics, whose team is using data to forecast demand and build simulation models for emergency departments and emergency medical services in the United Kingdom.
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.

Rate Determining Step – Chemwiki chemwiki.ucdavis.edu
University of California, Davis Oct 10, 2015

The Rate Determining Step or the Rate-Limiting Step = The Narrowest Funnel in the Series

Khan Academy
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 Theory of Constraints (TOC)

- 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 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...

Optimizing a Bottleneck: TOC & The Five Focusing steps:

- **Identify** the system’s constraint(s)
  - What limits the productivity of the entire system?
  - Look for a long queue of work or long processing times.
- Decide how to **exploit** the system’s constraint(s)
  - Make decisions on how to modify or redesign the task/activity/process so that work can be performed more effectively.
- **Subordinate** everything else to the above decision
  - Make implementing step 2 one of your highest priorities.
- **Elevate** the system’s constraints
  - **Add capacity or off-load demand**
- **Warning** - If, in the previous step, a constraint has been broken, go back to step 1 but do not allow **inertia** to cause a new constraint.
  - Set-up a process of ongoing improvement. A new bottleneck will always be identified. Apply the above steps to this new bottleneck.
Managing Waits and the Psychology of Waiting…

The Psychology of Waiting

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 I will Wait.
8. Solo Waits Feel Longer Than Group Waits.

David Maister - The Psychology of Waiting
Unoccupied time feels longer than occupied time
- TVs, magazines, health care material
- Company-Friends and family
- ROS forms, kiosks, pre-work
- Frequent "touches"

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

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

Unexplained waits are longer than explained waits
- In-process preview and review
- Family and friends
- Address the obvious—pre-thought out and sincerely deployed scripts
- Patient and Leadership Rounding

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

Solo waits feel longer than group waits
- Your Visitor Policy-The Deputy Sheriff takes a furlough
The Science of ED Service Operations in a Nutshell:

- 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 For Improvement: Lean, Six Sigma, TQM…
- Where Waiting Exists - applying *The Psychology of Waiting Lines*

The Science of Service Operations - Getting it Right at the Front End:

- Measure **patient demand (and acuity)** by hour of the day and day of the week 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…*
Patient Flow & Throughput – Key Tactical Leverage Points: A Summary

- Demand-Capacity Analysis & Management:
  - Planning for our critical servers – Docs (APPs), Nurses and Beds (Treatment Spaces) …
  - Getting it right on average…
  - Managing peak loads…
  - Leveraging our ED’s Points of Entry - Optimizing the value and impact of Triage and the Front End of our EDs

- Segmenting and “Fast-Tracking” our incoming patient streams
  - Efficiently and Effectively Fast-Tracking our Low-Acuity Patients: ESI 5s and 4s
  - Mid-Acuity Management - ESI Level 3 Fast Tracking
  - A Plan and Process for our High-Acuity Patients
  - Making the most of Teams and Team-Based Care
  - Addressing flow Into, Through, and Out of our Hospitals…

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

Dr. Paul Batalden
Patient Flow And Clinical Operations:
Focusing On Our Opportunities...And Not Just Our Problems...

Success
Will
Ideas
Execution
You can do this...

Take a look at your ED…
-What will work for you…
-Get creative…
-Be persistent…
“Leveraging the Science, the Art and the Business of Emergency Medicine to Achieve Our Aims” –
A clinical department and a hospital that works for your patients, your healthcare team, and for you…

Thank You!
### There is a Compelling Business Case for Flow - A Case Study

<table>
<thead>
<tr>
<th>ER Patients</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>40,000 ED Visits x 1 Hr Reduction in LOS</td>
<td>40,000 Hours of ↑ ED Capacity/Year</td>
</tr>
<tr>
<td>40,000 Hours of ↑ ED Capacity/2 Hours per ED Visit</td>
<td>20,000 potential new visits/year</td>
</tr>
<tr>
<td>20,000 new ED visits x $100/visit in physician revenue (↑$150-200/visit??)</td>
<td>$2,000,000 new revenue for the group</td>
</tr>
<tr>
<td>20,000 new ED visits @ $400/visit for the hospital</td>
<td>$8,000,00 new revenue per year for the hospital</td>
</tr>
</tbody>
</table>

New hospital admissions at $3,000 - $7500 per admission

1 more admission per day (365) X $3,000-$7500/ patient admission = $1,095,00 - 2,737,500/year

*(AHRQ-only 6.2% of admissions through the ED are uninsured)*
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>
</tr>
</thead>
<tbody>
<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>
</table>


---

**The Hidden Cost of Implementing an EMR (One point of view...)**

- Hospital A treats 100 patients per day
- Staffed hours = five 8 hour physician shifts and one 10 hour shift per day
- Current throughput = 180 minutes on average
- Daily coverage cost = $7,500 (each physician salary + benefits of $150/hour)
- Calculation of increased time = 100 pts/day x 5 minutes/pt = 500 minutes or 8.33 hours of increased physician work per 24 hour period
- Additional EP cost to maintain patient throughput at current level: 8.33 hours x $150/hr = $1250/day or $456,000 annually

Courtesy Bryan Vineyard in EM News
4000 Clicks: A Productivity Analysis of Electronic Medical Records in a Community Hospital ED.


Abstract
OBJECTIVE:
We evaluate physician productivity using electronic medical records in a community hospital emergency department.

METHODS:
Physician time usage per hour was observed and tabulated in the categories of direct patient contact, data and order entry, interaction with colleagues, and review of test results and old records.

RESULTS:
The mean percentage of time spent on data entry was 43% (95% confidence interval, 39%-47%). The mean percentage of time spent in direct contact with patients was 28%. The pooled weighted average time allocations were 44% on data entry, 28% in direct patient care, 12% reviewing test results and records, 13% in discussion with colleagues, and 3% on other activities. Tabulation was made of the number of mouse clicks necessary for several common emergency department charting functions and for selected patient encounters. Total mouse clicks approach 4000 during a busy 10-hour shift.

CONCLUSION:
Emergency department physicians spend significantly more time entering data into electronic medical records than on any other activity, including direct patient care. Improved efficiency in data entry would allow emergency physicians to devote more time to patient care, thus increasing hospital revenue.

© 2013.

Average ED MD time allocations:
• 44% on data entry
• 28% in direct patient care
• 12% reviewing test results and records,
• 13% in discussion with colleagues,
• 3% on other activities.

Total mouse clicks approach 4000 during a busy 10-hour shift.

The True Cost of a Complaint:
• The cost to manage the complaint
• The impact of one unhappy customer (client) multiplied out over a year
• The lifetime value of a customer
The True Cost of a Patient Complaint

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician time for record review and follow-up with patient</td>
<td>1 hour</td>
<td>$200</td>
</tr>
<tr>
<td>Medical Director time for record review</td>
<td>60 minutes</td>
<td>$200</td>
</tr>
<tr>
<td>Secretary checking ED charge</td>
<td>15 minutes</td>
<td>$20</td>
</tr>
<tr>
<td>ED Manager time</td>
<td>30 minutes</td>
<td>$60</td>
</tr>
<tr>
<td>Administrative time to review (if needed)</td>
<td>30 minutes</td>
<td>$70</td>
</tr>
<tr>
<td>Patient Relations initial complaint, investigation, referral, f/u</td>
<td>2 hours</td>
<td>$80</td>
</tr>
<tr>
<td>Supplies</td>
<td></td>
<td>$20</td>
</tr>
<tr>
<td>Bill adjustments</td>
<td></td>
<td>$150</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
<td><strong>$800</strong></td>
</tr>
</tbody>
</table>

The Patient Complaint: Quick Facts

- Each disappointed patient who complains represents 6 others who are unhappy about a similar experience
  - Therefore each complaint represents 7 unhappy patients
- Each unhappy patient tells 8-10 other people about their unhappy experience
  - Therefore 63 people now know about these unhappy experiences
- ¼ of these 63 people (16) will act on what they hear and will choose not to do business with you
  - 16 patients x average revenue/patient x #visits/patient/lifetime = lost revenue per type of complaint
  - 16 patients x $500/patient x 5 lifetime visits = $40,000
- Just to handle the average complaint costs your institution at least $375.00 per complaint
  - (Or $19,500 per year)
- If 5% of inpatients opt not to return each year, the revenue at risk is $2,500,000 per year.
- 95% of customers will be satisfied, surprised and tell others if the problem is resolved on the spot
- 95% of dissatisfied customers never complain
- It is 6 times more expensive to attract a new patient than it is to keep an old one

Source: A Dissatisfied Customer? Do the Math by Patricia Weber www.epinc.com
Optimizing Staffing Patterns for Service and Safety

Traditional Staffing Model
= $270/Hr

Contemporary Staffing Model
= $280/Hr

Physician $125

Clerk $15

Nurse $40

Tech $15

Physician $125

Clerk $15

Scribe $15

Nurse $40

Tech $15

Nurse $40

Tech $15

Tech $15

Courtesy Rick Bukata, MD

REFERENCES & RESOURCES
Metric Driven Management: Everybody Wants Data-Benchmarking Resources

Where to find data:

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

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

2017 Cohort Summary – EDBA Initial Report

References:


Sentara Leigh Hospital, a 70,000+ visit Emergency Department in Norfolk, VA, developed and implemented a care delivery model based on lessons learned from a Kaiser Sacramento-based Emergency Department.

William D. Browder MD, FACEP, Ralph Rosignolo, Jr MBA BSN/RN CEN NE-BC, Jason Morgan MSN RN CEN, Melissa Escano BS, Mike Mana BS, Sentara Healthcare, Norfolk VA, Jamil Bhitar MD FACEP, Maurice Makham MD FACEP, UBQ Cooperation, Sacramento CA
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How Hardwiring Hospital-Wide Flow Drives Competitive Performance
Kirk Jensen/Thom Mayer  FireStarter Publishing, January 2015

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Chapter 2: Defining Flow: Establishing the Foundations
Chapter 3: Strategies and Tools to Hardwire Hospital-Wide Flow
Chapter 4: Lessons from Other Industries

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• 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

Publication planned for: November 2014 format: Hardback

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
Patient Flow: Reducing Delay in Healthcare Delivery, Second Edition:

1. Modeling Patient Flows Through the Healthcare System, RANDOLPH HALL, DAVID BELSON, PAVAN MURALI AND MAGED DESSOUKY
2. Hospital-wide System Patient Flow-ALEXANDER KOLKER
3. Hospitals And Clinical Facilities, Processes And Design For Patient Flow MICHAEL WILLIAMS
4. Emergency Department Crowding-KIRK JENSEN
5. Patient Outcomes Due to Emergency Department Delays: MEGHAN MCHUGH
6. Access to Surgery and Medical Consequences of delays BORIS SOBOLEV, ADRIAN LEVY AND LISA KURAMOTO
7. Breakthrough Demand-Capacity Management Strategies to Improve Hospital Flow, Safety, and Satisfaction-LINDA KOSNIK
8. Managing Patient Appointments in Primary Care- SERGEI SAVIN
9. Waiting Lists for Surgery- EMILIO CERDÁ, LAURA DE PABLOS, MARIA V. RODRÍGUEZ-URIJA
10. Triage and Prioritization for Non-Emergency Services- KATHERINE HARDING
11. Personnel Staffing and Scheduling- MICHAEL WARNER
13. Using Simulation to Improve Healthcare: Case Study-BORIS SOBOLEV
15. Forecasting Demand for Regional Healthcare-PETER CONGDON
16. Queueing Analysis in Healthcare- LINDA GREEN
17. Rapid Distribution of Medical Supplies - MAGED DESSOUKY, FERNANDO ORDOÑEZ, HONGZHONG JIA, AND ZHIHONG SHEN
18. Using a Diagnostic to Focus Hospital Flow Improvement Strategies ROGER RESAR
19. Improving Patient Satisfaction Through Improved Flow- KIRK JENSEN
20. Continuum of Care Program- MARK LINDSAY
21. A Logistics Approach for Hospital Process Improvement- JAN VISSERS
22. Managing a Patient Flow Improvement Project- DAVID BELSON

The Hospital Executive’s Guide to Emergency Department Management

Second edition  HcPro April 2014

Kirk B. Jensen, MD, FACEP
Daniel G. Kirkpatrick, MBA, FACHE

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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 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 met.”

Donald M. Berwick, MD  
President and CEO  
Institute for Healthcare Improvement (from the foreword)

ACHE + Institute for Healthcare Improvement

Managing Patient Flow in Hospitals:  
*Strategies and Solutions, Second Edition*
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

The Definitive Guide to Emergency Department Operational Improvement
2014 Michael A. Silverman, MD, FACEP
Chairman of EM at the Virginia Hospital Center
Emergency Medicine Associates
Columnist - *Emergency Physicians Monthly*

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**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).*

Leadership for Great Customer Service

Leadership for Great Customer Service: Satisfied Employees, Satisfied Patients
Second Edition 2014
(ACHE Management)
• Thom A. Mayer, MD
• Robert J Cates, MD