Institute for Healthcare Improvement

This presenter has nothing to disclose

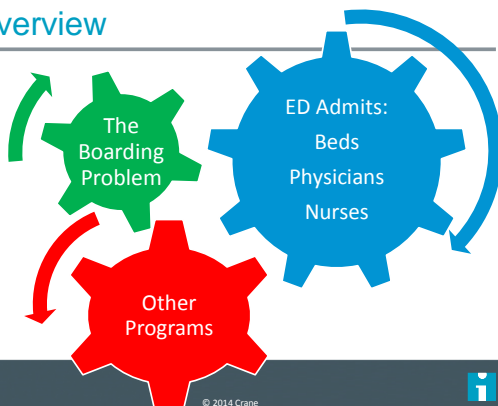# ED and Hospital-wide Flow Best Practices

Jody Crane, MD, MBA

March 13th, 2014 Denmark

Admitting/Inpatient

Arrival   **In-ED**   **Inpatient**

Wait   Wait   Wait   Wait   Wait

Sign in   Triage   Beds, Providers Ancillary   Admitting

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Overview

The Boarding Problem

ED Admits: Beds Physicians Nurses
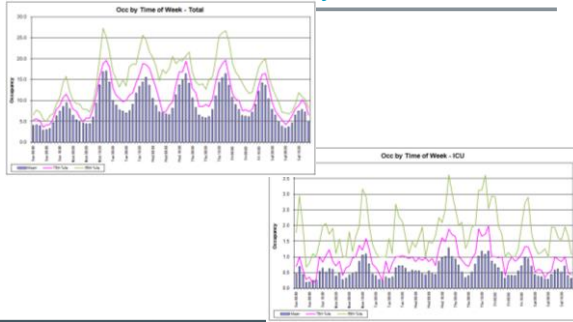
Other Programs
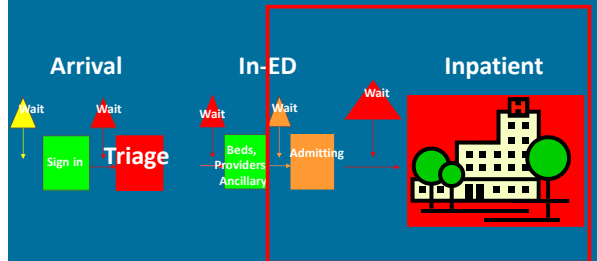
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The Boarding Problem

- Hospital Overcrowding and Boarding is the most serious problem we face as EDs
  - Patients tie up critical bed resources
  - More importantly, critical *nursing* resources
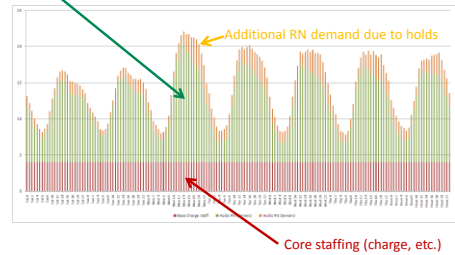
© 2014 Crane, Noon

Boarding Occupancy

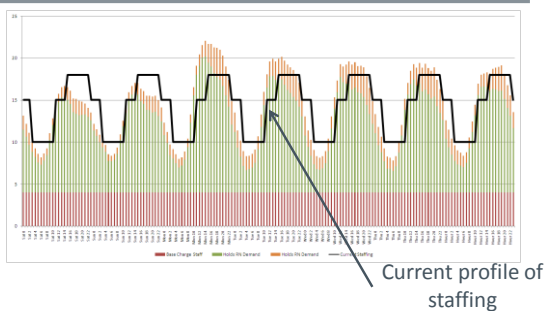## Staffing Analysis – RN Demand Layers and Current Staffing

Direct patient care, through the point of disposition

Additional RN demand due to holds

Core staffing (charge, etc.)

Staffing Analysis – RN Demand Layers and Current Staffing

Current profile of staffing

The Boarding Problem

- Hospital Overcrowding and Boarding is the most serious problem we face as EDs
  - Patients tie up critical bed resources
  - More importantly, critical *nursing* resources
- Quality, Satisfaction, and flow suffer as a result

Slide 1

The Effect of Hospital Occupancy on Emergency Department Length of Stay and Patient Disposition

Alan J. Forster MD, MSc[1,*], Ian Stiell MD, MSc[1,2,3,4], George Wells PhD[2,4], Alexander J. Lee BSc[4], Carl Van Walraven MD, MSc[1,4,5]

The ED length of stay appeared to increase extensively when hospital occupancy exceeded a threshold of 90%. Consultation and admission rates were not influenced by hospital occupancy.

Conclusions: Increased hospital occupancy is strongly associated with ED length of stay for admitted patients. Increasing hospital bed availability might reduce ED overcrowding.

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Slide 2

Display Settings: Abstract   Send to:

The effect of emergency department crowding on clinically oriented outcomes.

Bernstein SL, Aronsky D, Duseja R, Epstein S, Handel D, Hwang U, McCarthy M, John McConnell K, Pines JM, Rathlev N, Schafermeyer R, Zwemer F, Schull M, Asplin BR; Society for Academic Emergency Medicine, Emergency Department Crowding Task Force.

Author information

Abstract
BACKGROUND: An Institute of Medicine (IOM) report defines six domains of quality of care: safety, patient-centeredness, timeliness, efficiency, effectiveness, and equity. The effect of emergency department (ED) crowding on these domains of quality has not been comprehensively evaluated.

OBJECTIVES: The objective was to review the medical literature addressing the effects of ED crowding on clinically oriented outcomes (COOs).

METHODS: We reviewed the English-language literature for the years 1989-2007 for case series, cohort studies, and clinical trials addressing crowding's effects on COOs. Keywords searched included "ED crowding," "ED overcrowding," "mortality," "time to treatment," "patient satisfaction," "quality of care," and others.

RESULTS: A total of 369 articles were identified, of which 41 were kept for inclusion. Study quality was modest; most articles reflected observational work performed at a single institution. There were no randomized controlled trials. ED crowding is associated with an increased risk of in-hospital mortality, longer times to treatment for patients with pneumonia or acute pain, and a higher probability of leaving the ED against medical advice or without being seen. Crowding is not associated with delays in reperfusion for patients with ST-elevation myocardial infarction. Insufficient data were available to draw conclusions on crowding's effects on patient satisfaction and other quality endpoints.

CONCLUSIONS: A growing body of data suggests that ED crowding is associated both with objective clinical endpoints, such as mortality, as well as clinically important processes of care, such as time to treatment for patients with time-sensitive conditions such as pneumonia. At least two domains of quality of care, safety and timeliness, are compromised by ED crowding.

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Slide 3

Contents list for this issue

◄ PREVIOUS ARTICLE   NEXT ARTICLE ►

Research

The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments

Peter C Sprivulis, Julie-Ann Da Silva, Ian G Jacobs, George A Jelinek and Amanda R L Frazer

Download PDF

20-30% increased risk of mortality associated with longer ED LOS and prolonged physician times

Conclusions: Hospital and ED overcrowding is associated with increased mortality. The Overcrowding Hazard Scale may be used to assess the hazard associated with hospital and ED overcrowding. Reducing overcrowding may improve outcomes for patients requiring emergency hospital admission.

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Slide 4

ED and Hospital Crowding Compromises Quality

- Several studies have presented clear evidence that crowding contributes to poor quality care
- When capacity is exceeded errors are more likely to occur

Increase in patient mortality at 10 days associated with emergency department overcrowding

Drew B Richardson

Introduction — Methods — Results — Discussion — Conclusions — Acknowledgements — Competing interests — References — Author details

Abstract
Objective:

Impact of Delayed Transfer of Critically Ill Patients from the Emergency Department to the Intensive Care Unit

Chalfin, Donald B. MD, MS, FCCM; Trzeciak, Stephen MD, MPH; Likourezos, Antonios MA, MPH; Baumann, Brigitte M. MD, MSCE; Dellinger, R Phillip MD, FCCM
Crit Care Med. 2007;35(6):1477-1483.

Abstract and Introduction

Abstract

Objective: Numerous factors can cause delays in transfer to an intensive care unit for critically ill emergency department patients. The impact of delays is unknown. We aimed to determine the association between emergency department boarding (holding admitted patients in the emergency department pending intensive care unit transfer) and outcomes for critically ill patients.

Design: This was a cross-sectional analytical study using the Project IMPACT database (a multicenter U.S. database of intensive care unit patients). Patients admitted from the emergency department to the intensive care unit (2000-2003) were included and divided into two groups: emergency department boarding (≥6 hrs [delayed]) vs. emergency department boarding <6 hrs (nondelayed). Demographics, intensive care unit procedures, length of stay, and mortality were analyzed. Groups were compared using chi-square, Mann-Whitney, and unpaired Student's t-tests.

Setting: Emergency department and intensive care unit.

Patients: Patients admitted from the emergency department to the intensive care unit (2000-2003).

Interventions: None.

Measurements and Main Results: Main outcomes were intensive care unit and hospital survival and intensive care unit and hospital length of stay. During the study period, 50,322 patients were admitted. Both groups (delayed, n = 1,036; nondelayed, n = 49,286) were similar in age, gender, and do-not-resuscitate status, along with Acute Physiology and Chronic Health Evaluation II score in the subgroup for which it was recorded. Among hospital survivors, the median hospital length of stay was 7.0 (delayed) vs. 6.0 days (nondelayed) (p = .001). Intensive care unit mortality was 10.7% (delayed) vs. 8.4% (nondelayed) (p < .01). In-hospital mortality was 17.4% (delayed) vs. 12.9% (nondelayed) (p < .001). In the stepwise logistic model, delayed admission, advancing age, higher Acute Physiology and Chronic Health Evaluation II score, male gender, and diagnostic categories of trauma, intracerebral hemorrhage, and neurologic disease were associated with lower hospital survival (odds ratio for delayed admission, 0.709; 95% confidence interval, 0.561-0.895).

Conclusions: Critically ill emergency department patients with a ≥6-hr delay in intensive care unit transfer had increased hospital length of stay and higher intensive care unit and hospital mortality. This suggests the need to identify factors associated with delayed transfer as well as specific determinants of adverse outcomes.
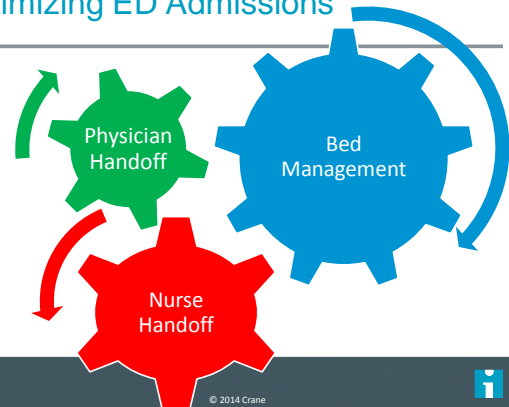
© 2014 Crane

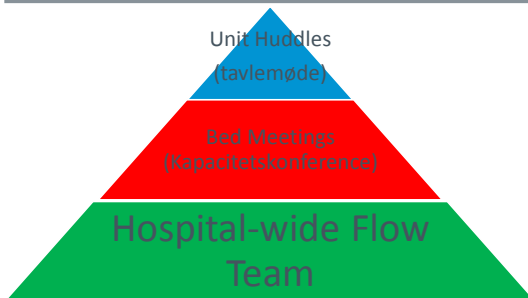## The ED is the Window into the Hospital

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Optimizing ED Admissions

Physician Handoff

Bed Management

Nurse Handoff

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Real Time Demand/Capacity Management

Unit Huddles (tavlemøde)

Bed Meetings (Kapacitetskonference)
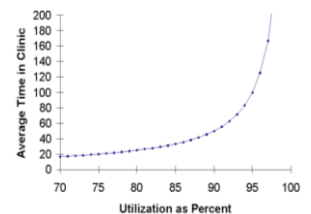
Hospital-wide Flow Team

© 2014 Crane

Inpatient Bed Management

- High inpatient utilization results in queuing and longer LOS, translating into misplaced patients and ED boarders
- This requires 2 countermeasures:
  - Aggressive bed management
  - Improving processes to reduce LOS

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Admissions and Discharges
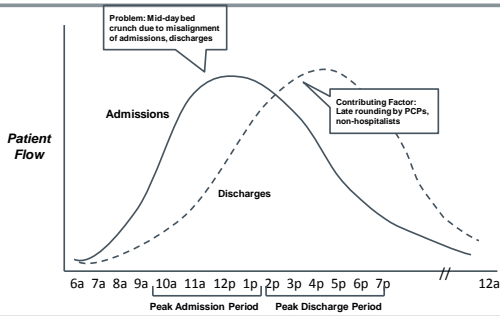
Figure compliments of Kirk Jensen

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Understanding Demand…
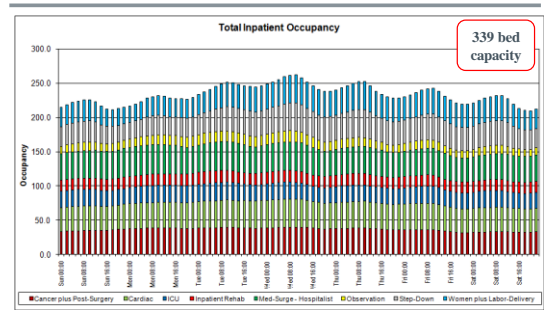
© 2014 Crane

Occupancy by Day of Week and Hour of Day

Cardiac Unit:
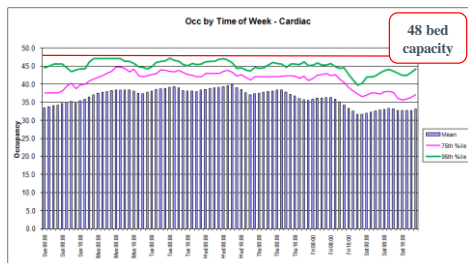
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Occupancy by Day of Week and Hour of Day

Women plus Labor-Delivery:

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5

Real-time Demand Capacity Management

- Provides a framework **connecting senior administration all the way to front line nurses**
  - Anticipate discharges to **understand available capacity**
  - **Predict demand** of admissions from all sources
  - Provides **countermeasures** for demand/capacity mismatches
  - Provides for **specific tasks with time targets**
  - **Escalation Plan**
- Allows for **evaluation of plan and targeting of strategic initiatives**

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Unit Huddles

- Unit level meeting with Charge Nurse, Case Management, and Front Line Nurses
- Classify each patient based on discharge targets and gaps – goal is to establish demand needed by 2pm
- Create today's to do list – task oriented for front line nurses to meet the anticipated 2pm demand
- Determine who can be discharged today and what needs to be done for tomorrow's discharges

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Huddle Guidelines

PATIENT ADMITTED IN LAST 12HRS	→	Diagnosis and Social Situation
PATIENT ON "R" SHEET TO LEAVE TODAY	→	What we need to do, can they go by 2pm?
PATIENT POTENTIAL DC TOMORROW	→	Why not today? What needs to be done? Secure transportation
PATIENT NOT IDENTIFIED FOR DC IN NEXT 48HRS	→	RN – What are we doing? CM – Determine needs
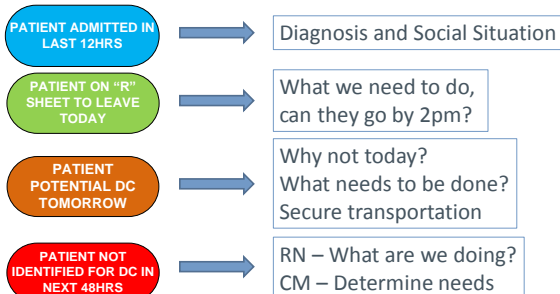
©Deb Kaczynski, IHI, 2014

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Huddle Output – "R Sheet"

Pt Name		Rm #		DC Need	"R" Name		Action to be taken		Time	2pm d/c Y/N
S. Jones	in	302	needs	O2 eval for home O2	Staff RN	will	Call RT to expedite	by	10AM	N
C. Brooks	in	312	needs	w/ c van for home transport	SW	will	Enter transport request into ECIN	by	9AM	Y
MLong	in	316	needs	Results of AM H&H test	Staff RN	will	Call attending with results & get dc order	by	10AM	Y
T. Top	in	328	needs	PFTs	CM	will	Ensure pt on schedule today	by	9AM	N
	in		needs			will		by		
	in		needs			will		by		
	in		needs			will		by		

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Bed Meeting - Key Participants

Departments
- ED
- Transport
- PACU
- Cardiology
- Cath Lab
- EVS
- Radiology

People
- Nursing Supervisor
- Case Management
- Nursing Leadership
- Hospitalists

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Bed Meeting - Objectives
- Understand needs of individual nursing units
- Create a global picture of the hospital at that time
- Create system-level countermeasures for demand/capacity constraints
- Draft communication of today's demand/capacity picture

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Predicting Demand
- Outputs from all Units
- Color-coded to alert of Unit or Hospital status

Mary Washington Hospital — 1300 Census Report — January 11, 2007

Predicting Demand
- Outputs from all Units
- Color-coded to alert of Unit or Hospital status
- ED Rolling average of 4 previous same days (Mondays)
- Direct admits
- Surgical schedule
- Generates a global picture

Total Anticipated D/C:	27
Total Anticipated Admits:	58
Sitters (1:1):	10
Average ED Admits:	45
Direct Admissions (include IR):	0
OR Cases to Place:	9
Caths:	2
Infusions:	2
Chemos:	1
NICU Census:	10
L & D Admits:	0
ED Patients to Place:	0
Nuclear Stress Tests:	0
Nursing Home Discharges:	0
Physical Beds Available:	57
Staffed Beds Available:	57
Anticipated Physical Bed Surplus/Deficit:	26
Anticipated Staffed Bed Surplus/Deficit:	26

Capacity Management Alert Box

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Bed Meeting - Objectives

- Understand needs of individual nursing units
- Create a global picture of the hospital at that time
- Create system-level countermeasures for demand/capacity constraints
- Draft communication of today's demand/capacity picture
- Decide on and implement alert status

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Capacity Management Plan 2012
Strategy Implementation Tool – Stafford Hospital v.3

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Capacity Management Plan 2012
Strategy Implementation Tool – Stafford Hospital v.3

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Bed Meeting – Key Outputs

Output Level	Example Actions
Unit Level	Call in physician to discharge, provide phone discharge, or cancel non-critical tests
	Nurse to triage patients on telemetry to free up monitors
System Level	Decide which patients will overflow on which units
	Implement "code" activities such as open PACU for boarders
	Prioritize physician rounding based on unit needs

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Escalation

- Senior Leadership (COO, CNO, CMO) should be engaged if implementation is failing at a system level
- Examples
  - Doctors are not responding to pages or are refusing to come in (I am in clinic)
  - Discharged patients are not leaving in a timely manner
  - There are delays in bed turnover that are not being solved at the Unit Manager level
  - Resistance to patient movement during crisis times because, "we are too busy"

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Hospital-wide Patient Flow

- Every major director
- Dashboard metrics
- Design Capacity Management Plan

Dansk Øjeblik

HOLGER MØLLER HANSEN, 1951
Invented the fiberskopet (endoscope)

Real Time Demand Capacity Management
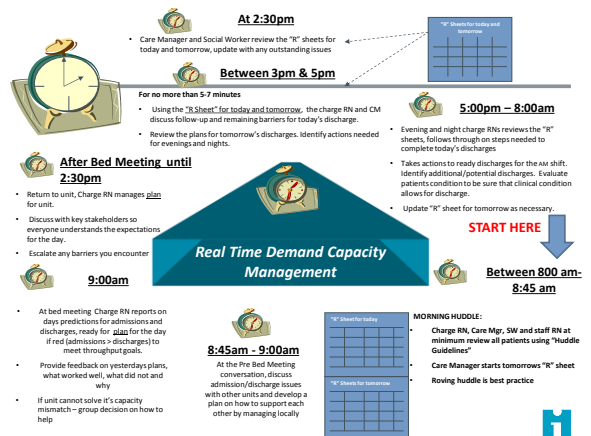
If you Don't Have an Inpatient Problem, Look at Your Process

Current "Decision to Admit to Bed Assignment"	140	minutes
Benchmark "Decision to Admit to Bed Assignment"	30	minutes
Current "Bed Assignment to Leave Department"	143	minutes
Benchmark "Bed Assignment to Leave Department"	30	minutes

- Long decision to bed assignment times
- Long bed assignment to departure times
- Similar whether "crowding" or high census is present or not

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Real Scenario

- Began working with an ED in October, 2010 associated with architecture work
- Began improvement efforts just as Winter Census was peaking (Jan/Feb 2011)
- Boarding was a major problem
- In June/July, frequently heard, "We don't have boarding," in fact, every day, inpatient beds were closed due to "low census."
- What was the reality?

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What's the Answer?

	Sun	Mon	Tues	Wed	Thur	Fri	Sat	Weekly	% Change from Peak
Apr-Jun 2010	181.88	260.31	326.45	305.32	295.69	304.42	171.20	1,845.27	-27%
Jul-Sep 2010	164.33	257.73	308.88	300.05	271.09	242.01	165.83	1,709.92	-32%
Oct-Dec 2010	196.19	303.79	357.20	320.34	312.61	301.33	218.38	2,009.83	-21%
Jan-Mar 2011	194.25	319.57	414.63	482.65	469.23	418.98	233.60	2,532.90	0%

In other words 78% of boarding was process-related, or system-induced
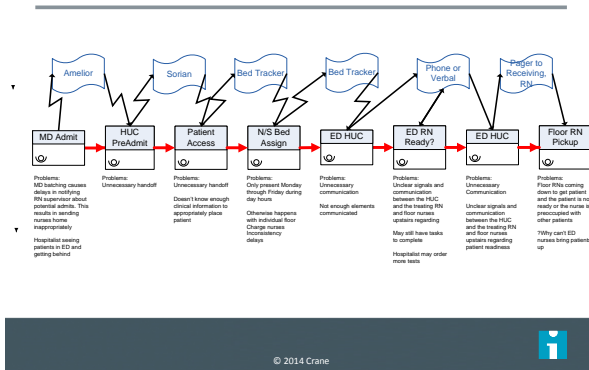
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How do we fix this?

- Floor unable to take patient
- MD delay
- Bed not ready
- RN busy with another patient
- Inappropriate assignment
- Change in patient status
- Ancillary care provider delay
- Patient requesting delay
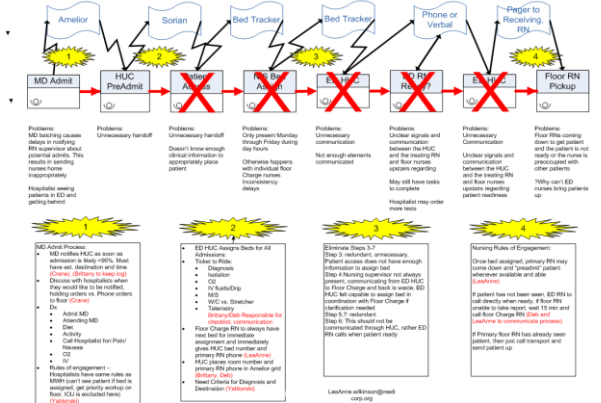- Patient not assigned to a nurse
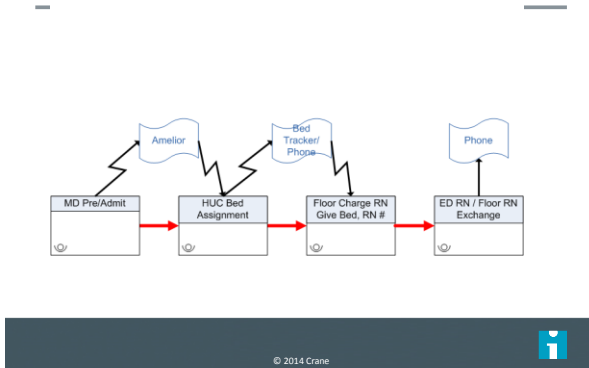- No one to transport patient

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Stafford Admitting Process Current State

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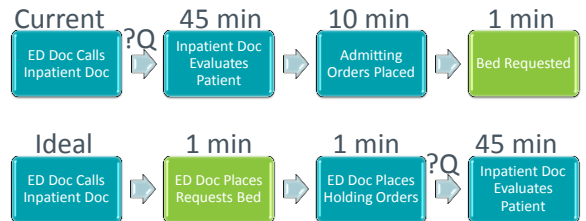
Stafford Admitting Process Changes Planned

Stafford Admitting Process Desired Future State

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The Physician Handoff

● The clock starts when the ED physician knows what to do with the patient

Current	45 min	10 min	1 min
ED Doc Calls Inpatient Doc	Inpatient Doc Evaluates Patient	Admitting Orders Placed	Bed Requested

Ideal	1 min	1 min	45 min
ED Doc Calls Inpatient Doc	ED Doc Places Requests Bed	ED Doc Places Holding Orders	Inpatient Doc Evaluates Patient

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Early Decision To Admit

- System to admit patients as soon as need for admission known
- Must have reasonable understanding of:
  - Diagnosis
  - Destination
- Coordination with admitting physicians:
  - What types of patients are ok for quick admit and which are not
  - What labs are required for specific destinations (ICU, tele, floor)
  - System to review cases where there is disagreement

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The Physician Handoff - Requires

- ED Physician Engagement
  - A little more work
  - Bridging orders endorsed by ACEP and AAEM in position statements
- Collaboration between ED Docs and Inpatient Docs
  - Must see the patient in a timely manner
  - Must understand patient status may change
- Outcomes measures

✓ **The American Academy of Emergency Medicine** states that "The Academy believes that it is acceptable for emergency physicians to write Holding Orders, which define any necessary treatment and assessment parameters required in the interval until completion of admission orders."

✓ In their April 2010 policy revision, the **American College of Emergency Physicians** (ACEP) stated; "...in the interest of patient care and safety, an emergency physician may be compelled to write transition orders. These transition orders may include essential treatment and assessment parameters required before preparation of suitable admission orders." (ACEP Policy "Writing Admission and Transition Orders" April 2010)

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Does your patient have a ticket to ride?

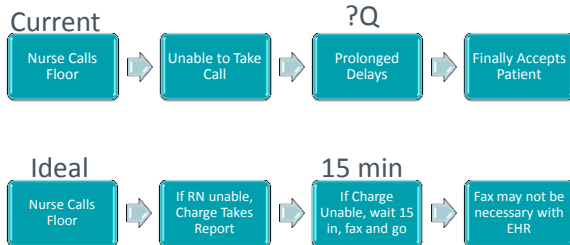Figure compliments of Kirk Jensen

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Early Admit
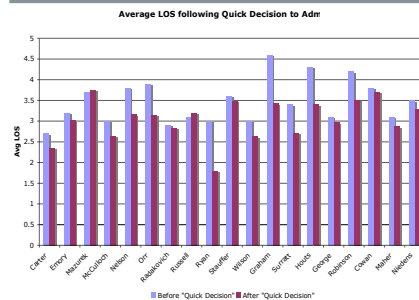
Reduced ED LOS by 20 minutes on all admissions!

Gary Carter, MD, PEMBA 2008

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Nursing Handoff – Best Practice

Current

Nurse Calls Floor	→	Unable to Take Call

?Q

Prolonged Delays	→	Finally Accepts Patient

Ideal

Nurse Calls Floor	→	If RN unable, Charge Takes Report

15 min

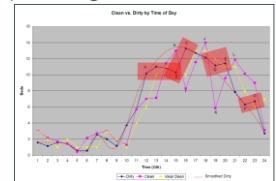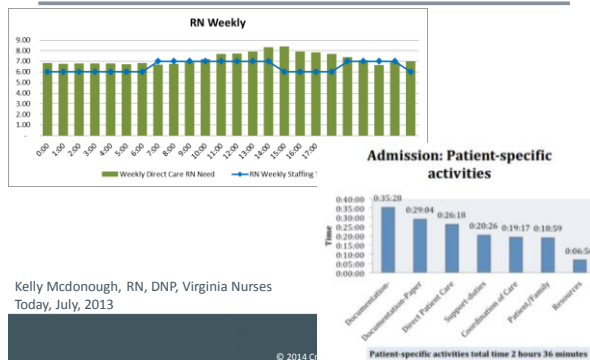| If Charge Unable, wait 15 in, fax and go	→	Fax may not be necessary with EHR

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The Nursing Handoff

- Incentives are misaligned on both inpatient and ED sides
- Reward for doing efficient work is more work
- Worse for inpatient nurses (discharge workload and admit workload)
- Shift change and breaks
- Calling report
- "No Fly Zones"

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Nurse Workload

RN Weekly

Kelly Mcdonough, RN, DNP, Virginia Nurses Today, July, 2013

Admission: Patient-specific activities
0:35:28, 0:29:04, 0:26:18, 0:20:26, 0:19:17, 0:18:59, 0:06:56
Patient-specific activities total time 2 hours 36 minutes

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Nurse Report Best Practice

- ED Nurse attempts to call report
- If Floor Nurse is unable to receive report, Charge Nurse should take report
- If Charge Nurse is unable to take report, then the ED Nurse waits 15 minutes for floor nurse to call.
- If there is no call, the ED nurse faxes report and the patient is transported to the floor

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Approaches

- Programs
  - Full Capacity Protocol (Hallway Boarding)
  - OR Smoothing
  - Observation Units
  - Bed Ahead Process
  - Project RED (Re-engineering Discharge)
- Improve flow in areas specifically affecting the ED → ICU / Telemetry

---

Hallway Boarding

- Peter Viccellio's "Full Capacity Protocol"
- How do we fix it?
  - Diversion is not the answer…
    - Patient safety
    - Revenue
  - Turning pts away after MSE – no…
- Evenly distribute patients upstairs and sharing the boarding burden
  - Improves inpatient and ED throughput , safety
  - Costs nothing, revenue improves
  - Improves satisfaction, improves bed turnover

Parents Prefer Inpatient Hallways to the Emergency Department For Children Who Are "Boarded" While Waiting for a Bed

---

The variation associated with surgical admissions (Litvak)

Root Cause Analysis of Emergency Department Crowding and Ambulance Diversion in Massachusetts, Boston University, 2002: ED diversions study under Department of Public Health grant
http://www.state.ma.us/dph/dhcq/pdfs/Final_Report_Exec_Summary.pdf
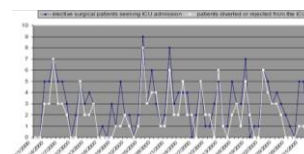
When the scheduled demand is significant, there was much stronger correlation between scheduled admissions and diversions than between ED demand and diversions
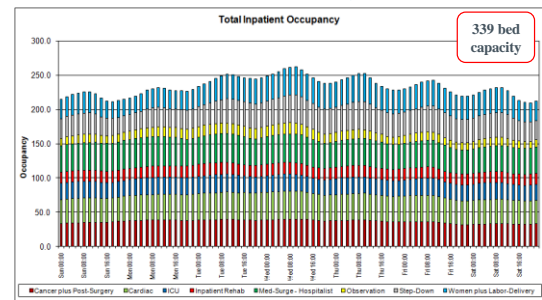
The Impact

- ED Admissions and Elective OR patients have an equal impact on hospital crowding

- OR System-induced variation – non-random, unpredictable, must be identified and eliminated

- ED natural variability is related to clinical factors, professional factors, and flow variation

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Occupancy by Day of Week and Hour of Day

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OR Smoothing

- Adjusting the OR schedule and block scheduling practices based on inpatient demand to smooth admissions over the course of the week
- Very difficult to execute
- Very helpful if successful
- Requires innovative thinking (increased weekend resources) and willing participants (enlightened) physicians

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Pull Systems (Bed Ahead)

- Beds identified as available only when clean, unoccupied, and staffed
- Each Unit identifies the next available bed (Med-Surg, ICU, Telemetry, etc)
- Bed Czar or Nursing Supervisor informs Unit to get next admission
- Charge nurse informs nurse to get next admission
- Bed available upon request without delay

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Admitting and ED Holding Units

- Allow for decompression of crowded EDs
  - Stable ED patients are immediately moved with transition orders to await admission or to wait for bed placement
  - Allows for ongoing decision-making and more efficiency for admitting physicians
  - Decreases resistance from floor nurses for taking patients because the work has already been done
- Can be just another bottleneck if not careful
- Why not just make these additional inpatient beds and avoid the extra transfer?

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Streamlining Processes - ICU

- Based on established criteria, patients are identified in the ED and immediately taken to the ICU to be cared for by the Intensivist, goal 30 minutes
- Examples:
  - Sepsis
  - Acute Respiratory Failure
  - Status-post Cardiac Arrest
  - Hemodynamic Instability
  - Intracranial Hemorrhage
- ICU should be able to provide similar level of care

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Observation Units and CDUs

- Markedly shorten the inpatient length of stay
  - Standardized pathways
  - Reduced consultation
  - Evidence-based practice
- Are good from the patient's perspective
  - There are better, more efficient ways to do things
  - Which essentially means same outcome, less waste from the patients perspective
- Involve standardizing clinical and non-clinical practices

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11 AM Discharges
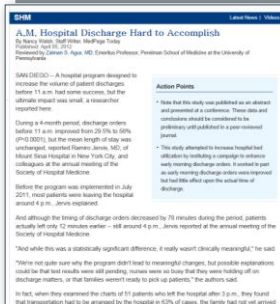
- Hard to do
- Questionable impact
- Current thinking – discharge them when they are ready

Figure compliments of Kirk Jensen

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Improving Patient Flow Through a Better Discharge Process

- Giving patients an **expected length of stay** before admission
- **Set target discharge dates** on admission
- **Promote communication** to keep an overview of the patient's progress towards a satisfactory discharge.
- Senior **nursing staff were empowered to discharge patients** based on pre-established pathways
- Patients who were **waiting for transport** were transferred to the discharge lounge before 10:00 AM
- Encouraging **Saturday and Sunday discharges**

Reduced the average LOS for 80 percent of patients from 13 days to 4 days!

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Project Red (Re-engineered Discharge)

- Explicit delineation of roles and responsibilities
- Patient education must occur throughout the hospitalization
- Information must flow easily between the PCP and the hospital team
- Information should be captured throughout the hospital stay
- Every discharge must have a written, comprehensive discharge plan addressing: medications, therapies, lifestyle modifications, follow-up care, patient education, and instructions about what to do if the condition worsens.
- This discharge plan should be completed before the patient leaves the hospital.

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Project Red (Discharge Plan)

- Patients at high risk of rehospitalization should be contacted by the hospital team after discharge.
- All information about the admission must be organized and delivered to the PCP within 24 hours.
- Waiting until the discharge order is written before beginning the discharge process is likely to increase the risk of errors.
- Efficient and safe hospital discharge is significantly more difficult to achieve if the case management staff works only the 7 a.m.–3 p.m. shift.
- All patients should have access to their discharge information in their language and at their educational level.
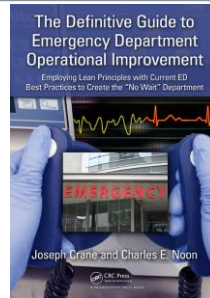

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Summary

- Mastering Hospital-wide flow requires an understanding of your bed utilization and process capability

- In order to achieve flow, your organization must optimize bed management, and patient handoffs between nurses and between physicians

- There are other programs to fix certain situations and everyday tools to employ to optimize flow

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Managing Patient Flow in Hospitals

Strategies and Solutions

Second Edition

Edited by **Eugene Litvak**, Ph.D.
Foreword by **Susan Dentzer**

Chapter **8**

Improving Hospitalwide Patient Flow at Northwest Community Hospital
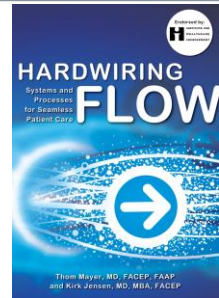
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Hardwiring Flow
Systems and Processes for Seamless Patient Care

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

HARDWIRING FLOW

Systems and Processes for Seamless Patient Care

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

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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.

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President and CEO
Institute for Healthcare Improvement (from the foreword)

ACHE + Institute for Healthcare Improvement

LEADERSHIP FOR smooth patient flow

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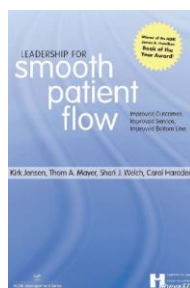
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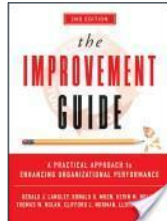© 2014 Crane

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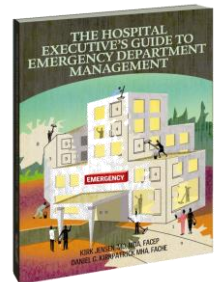
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