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Accelerating Performance Improvement

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Webinar Series 2013

The presentation will begin shortly.

Best Care at Lower Cost

The Path to Continuously Learning Health Care in America

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation / Improving health

Why now?

- Quality: *persistent shortfalls*
- Costs: *unsustainable levels, waste*
- Complexity: *exponentially increasing*

Committee Members

Mark D. Smith (*Chair*)
President and CEO, California HealthCare Foundation

James P. Bagian
Professor of Engineering Practice, University of Michigan

Anthony Bryk
President, Carnegie Foundation for the Advancement of Teaching

Gail H. Cassell
Former Vice President, Eli Lilly and Company

James B. Conway
Institute for Healthcare Improvement

Helen B. Darling
President, National Business Group on Health

T. Bruce Ferguson
Professor and Inaugural Chairman, Department of Cardiovascular Sciences, East Carolina University

Ginger L. Graham
President and CEO, Two Trees Consulting

George C. Halvorson
Chairman and CEO, Kaiser Permanente

Brent James
Chief Quality Officer, Intermountain Healthcare, Inc.

Craig Jones
Director, Vermont Blueprint for Health

Gary Kaplan
Chairman and CEO, Virginia Mason Health System

Arthur A. Levin
Director, Center for Medical Consumers

Eugene Litvak
President & CEO, Institute for Healthcare Optimization.

David O. Meltzer
Professor of Medicine & Economics, U. Chicago

Mary D. Naylor
Director, Center for Transitions and Health, University of Pennsylvania School of Nursing

Rita F. Redberg
Professor of Medicine, UCSF

Paul C. Tang
Chief Innovation and Technology Officer , Palo Alto Medical Foundation

Quality

- **Patient harm –** Studies have found that between one-fifth and one-third of hospital patients are harmed during their stay; much of that harm is preventable.

- **Evidence not applied to care–** Americans receive only about half of the preventive, acute, and chronic care recommended by current research and guidelines.

- **Variations in outcomes–** If all states could provide care of the quality provided in the highest-performing states, there would have been 75,000 fewer deaths across the country in 2005.

Costs

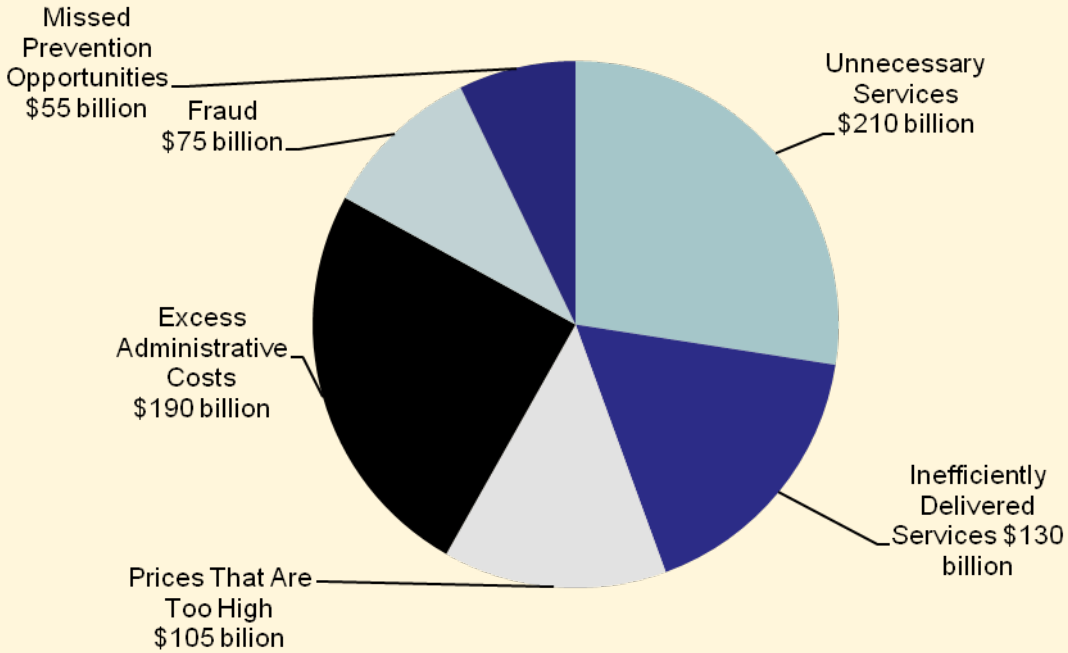
- **Absolute expenditures –** $2.6 trillion (2009), 18% GDP
- **Overwhelming wage gains–** 76% increase health costs in past 10 years, overwhelming the 30% gain in personal income
- **Compared to the economy –** For 31 of the last 40 years, health care has grown faster than the economy.
- **If prices of other products had grown as fast as health care since WWII–**
  - A dozen eggs: $55
  - Gallon of milk: $48
  - Dozen oranges: $134

Opportunity Costs

- Waste could pay the entire Department of Defense budget in 2009 and have $100 billion left.
- Waste could pay salaries of all first response personnel for 12 years
- Waste could pay the entire nation's infrastructure costs for 1.5 years—roads, railroads, water, telecom, airlines…
- Waste could pay the health insurance premiums (employee and employer contributions) for 150 workers
- Waste could pay the tuition and fees for every 18-24 year old to get 2 years of college.

Waste

Wasted expenditures – $750 billion (2009)



The Vision

Characteristics of a Learning Health Care System

- **Science and informatics**
  - Real-time access to knowledge
  - Digital capture of the care experience
- **Patient-clinician partnerships**
  - Engaged, empowered patients
- **Incentives**
  - Incentives aligned for value
  - Full transparency
- **Culture**
  - Leadership-instilled culture of learning
  - Supportive system competencies

Recommendations

- **Community links**
  Promote community-clinical partnerships and services aimed at managing and improving health at the community level.
  - Public payers should incorporate population health improvement in payment and contracting policies.

- **Care continuity**
  Improve coordination and communication within and across organizations.
  - Research funding agencies should support the development of measures for monitoring the effectiveness of care transitions.
  - Public payers should support effective care transitions through payment and contracting policies.

- **Optimized operations**
  Continuously improve health care operations to reduce waste, streamline care delivery, and focus on activities that improve patient health.

Managing Variability in Hospital Patient Flow: A Necessary Foundation for Quality, Safety Improvement and Cost Reduction

Eugene Litvak, Ph.D.

Institute for Healthcare Optimization (IHO)

March 5, 2013

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www.ihoptimize.org

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Major health care delivery problems:

- Patient Safety
- Nurse understaffing/overloading
- ED diversions/access to care
- High cost

Addressing variability is necessary, although not sufficient, to satisfactorily resolve these problems.

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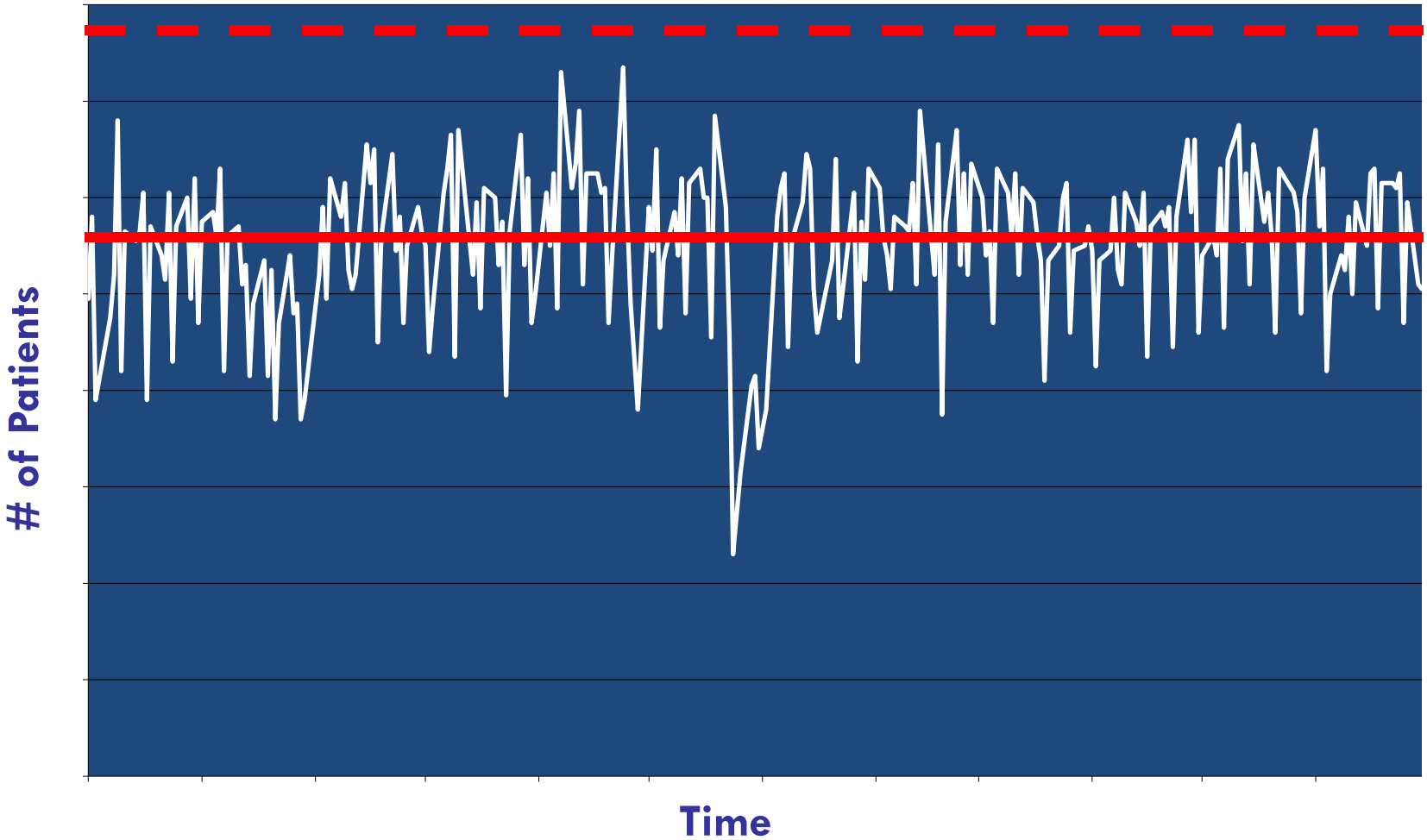
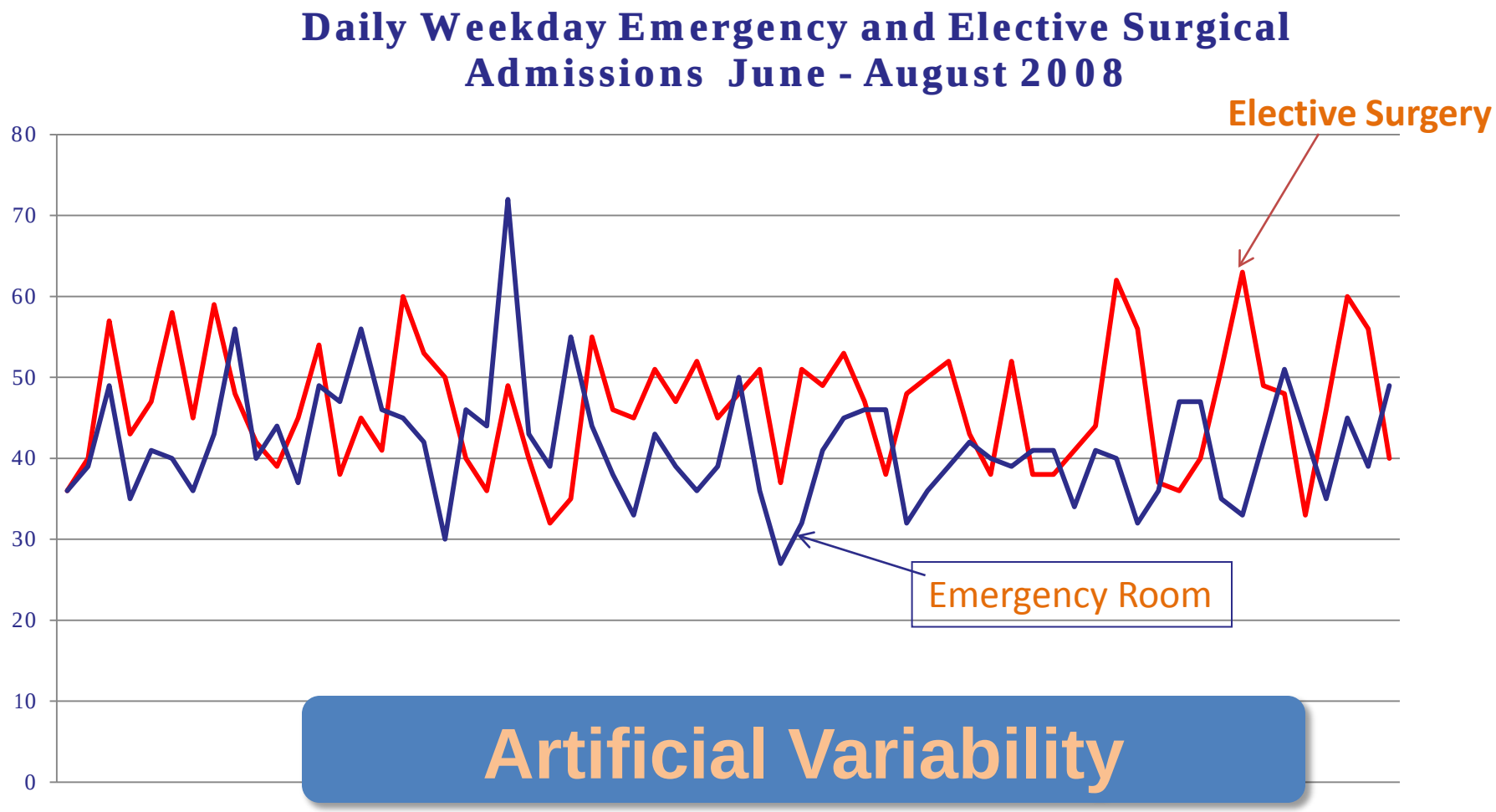
How did we staff, and how do we staff



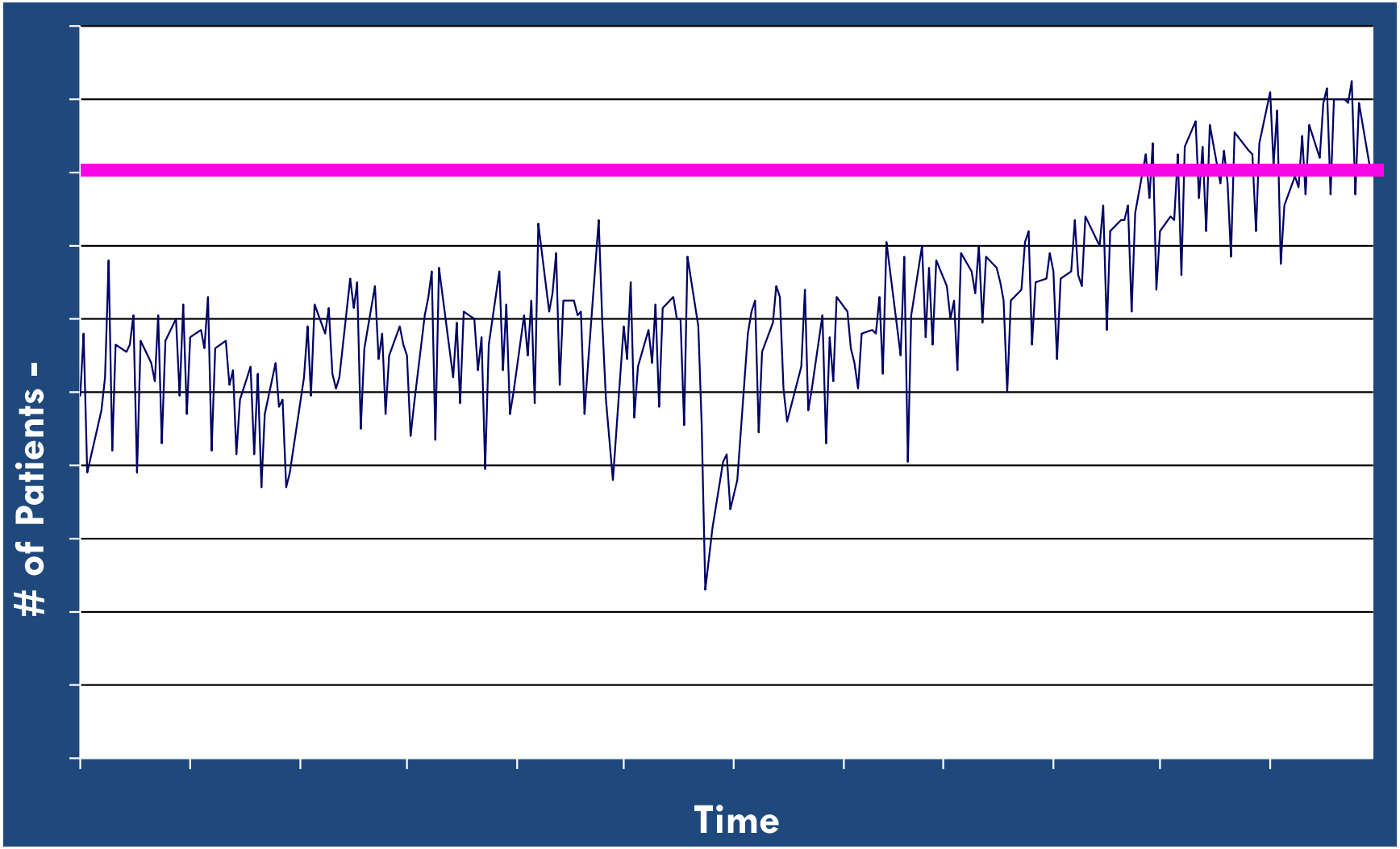
A key root cause of hospital bottlenecks and inefficiency



Slide provided by Sandeep Green Vaswani, Institute for Healthcare Optimization

Why managing variability today is more important than before?

Does the healthcare system need more capacity?



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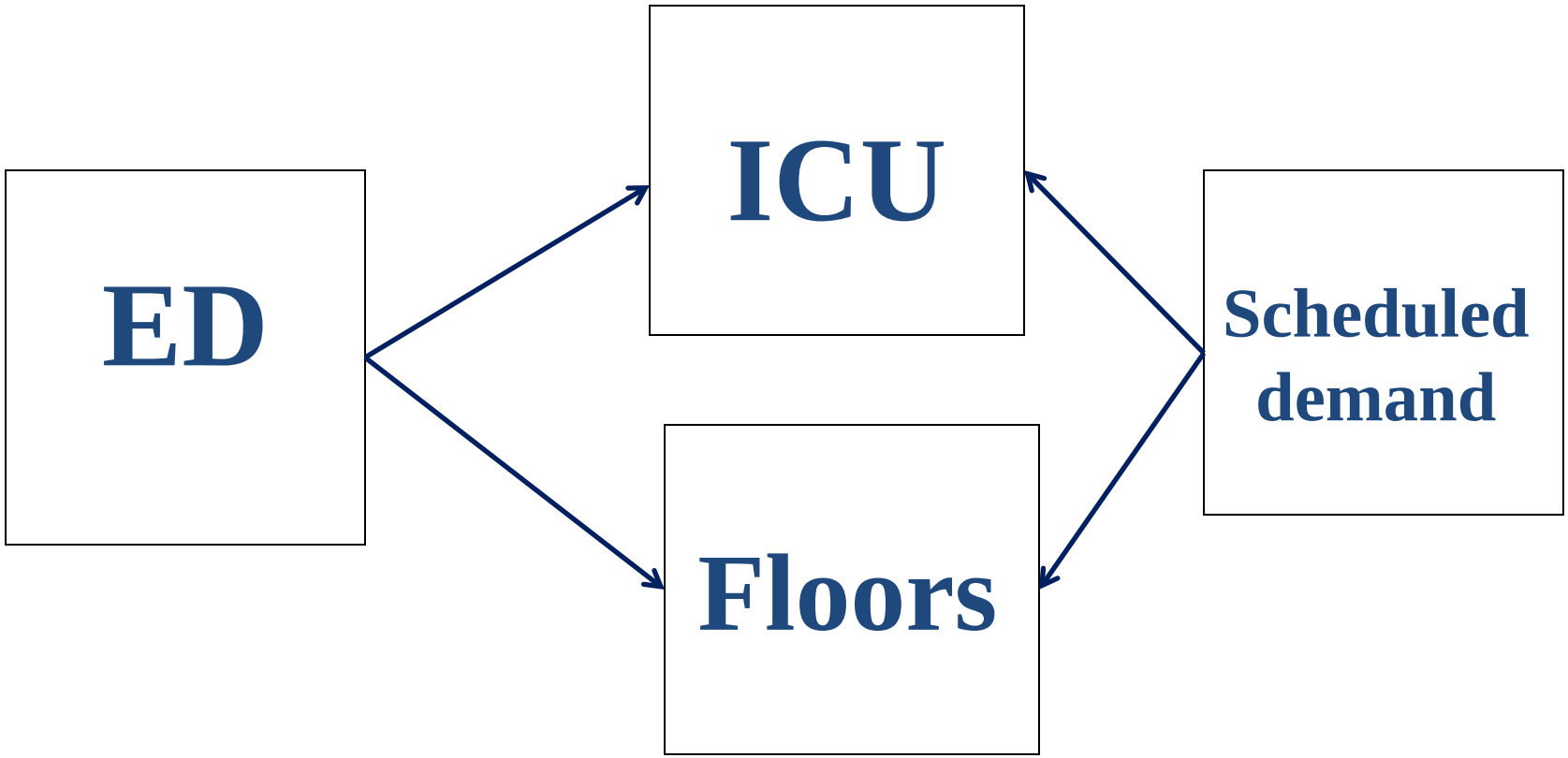
At what cost?

- Typical cost of new capacity
  - Inpatient beds - $1M in capital and $250K-800K annual operating expense
  - Operating rooms - $2 – 7 Million, $250K+ annual operating expense
  - Major imaging (CT, MRI, PET/CT, etc.) – approx. $1M+
  - Cardiac Catheterization Lab – approx. $2M
- Nursing and other provider shortages?

Variability and access to care



Patient Mortality and Patient Flow

Nurse Staffing and Inpatient Hospital Mortality,
Needleman J., Buerhaus P., et al.

N Engl J Med 2011; 364:1037-1045, March 17, 2011

- *"There was a significant association between increased mortality and increased exposure to unit shifts during which staffing by RNs was 8 hours or more below the target level "*
- *"The association between increased mortality and high patient turnover was also significant "*

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What is easier: to talk to your colleagues or to your lawyers?!

http://www.nhmedmallawyer.com/blog/post/show/hospital-staffing-and-its-effect-on-quality-care

http://www.healthleadersmedia.com/content/LED-269595/PDH-Understaffing-a-Possible-Factor-in-Deaths-at-CRMC##

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Adoption of National Quality Forum Safe Practices by Magnet Hospitals

Jayawardhana, Jayani PhD; Welton, John M. PhD, RN; Lindrooth, Richard PhD

Journal of Nursing Administration: September 2011 - Volume 41 - Issue 9, pp 350-356

Maintaining higher affordable nurse staffing levels is only possible by managing variability in patient flow

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Variability and health care-associated infection

Jeannie P. Cimiotti DNS,RN, Linda H. Aiken PhD, Douglas M. Sloane PhD, Evan S. Wu, BS

American Journal of Infection Control: August 2012- Volume 40, pp 486-490

"There was a significant association between patient-to-nurse ratio and urinary tract infection (0.86; P ¼ .02) and surgical site infection (0.93; P ¼ .04). In a multivariate model controlling for patient severity and nurse and hospital characteristics, only nurse burnout remained significantly associated with urinary tract infection (0.82; P ¼.03) and surgical site infection (1.56; P <.01) infection. Hospitals in which burnout was reduced by 30% had a total of 6,239 fewer infections, for an annual cost saving of up to $68 million."

Physician Workload & Quality of Care

Impact of Attending Physician Workload on Patient Care: A Survey of Hospitalists

Michtalik H, Yeh HS, Peter J. Pronovost, MD, Ph.D.

JAMA Intern Med. 2013, Published online January 28, 2013

"Forty percent of hospitalists reported unsafe workloads at least monthly. Nearly one-quarter of hospitalists reported that excess workload adversely impacted patient outcomes by preventing full discussion of treatment options and worsening patient satisfaction. Twenty-two percent of physicians reported ordering potentially unnecessary tests, procedures, or consults because of not having adequate time to evaluate patients in person. Given the large number of patients cared for by hospitalists, the frequency with which workload exceeds safe levels, and the perceived impact of workload on patient outcomes, hospital administrators, researchers, and policymakers should focus attention on attending physician workload".

Variability and Readmissions I

Does variability affect readmission rate?

"The main outcome variable is unplanned patient readmission to the neurosciences critical care unit within 72 hrs of discharge to a lower level of care. The odds of one or more discharges becoming an unplanned readmission within 72 hrs were nearly two and a half times higher on days when ≥9 patients were admitted to the neurosciences critical care unit …" *)

"The odds of readmission were nearly five times higher on days when ≥10 patients were admitted …" *)

*) Baker, David R. DrPH, MBA; Pronovost, Peter J. MD, PhD; Morlock, Laura L. PhD, *et al.* Patient flow variability and unplanned readmissions to an intensive care unit.
Critical Care Medicine: November 2009 - Volume 37 - Issue 11 - pp 2882-2887

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Variability and Readmissions II

Hospital Nursing and 30-Day Readmissions Among Medicare Patients With Heart Failure, Acute Myocardial Infarction, and Pneumonia

McHugh, Matthew D. PhD, JD, MPH, RN; Ma, Chenjuan PhD, RN

Medical Care: January 2013 - Volume 51 - Issue 1 - p 52–59

"Each additional patient per nurse in the average nurse's workload was associated with a 7% higher odds of readmission for heart failure [odds ratio (OR)=1.07; confidence interval CI, 1.05–1.09], 6% for pneumonia patients (OR=1.06; CI, 1.03–1.09), and 9% for myocardial infarction patients (OR=1.09; CI, 1.05–1.13)".

- **Quality and Safety Corner at www.ihoptimize.org**
- The Institute for Healthcare Optimization's approach to managing variability in healthcare delivery addresses some of the most intractable quality and safety issues such as readmissions, mortality, infections, ED boarding and others. Learn more »

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Why do this project?

- Bumped or delayed elective surgery cases
- Delays in securing OR access for urgent and emergent cases (transplantations)
- Overburdened nurses, medical errors, high overtime, excessive nurse vacancies
- Lack of timely access to nursing units
- Prevent ED overcrowding and boarding
- Improve patient, provider and staff satisfaction

"By smoothing the inherent peaks and valleys in patient flow, and eliminating the artificial variabilities that unnecessarily impair patient flow, hospitals can improve patient safety and quality while simultaneously reducing hospital waste and cost." Institute of Medicine, June 2006

JCAHO's Patient Flow Leadership Standard - "LD.3.15 The leaders develop and implement plans to identify and mitigate impediments to efficient patient flow throughout the hospital."

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Project Overview

Phase I
Separation of OR Flows

Goals

- To assess the extent of artificial patient volume variability and patient flow bottlenecks in key areas of the hospital, and their ripple effects on quality and cost of care
- To separate flows of scheduled (elective) patients from that of unscheduled (emergent/urgent) and work-in patients through the OR

Expected Benefits

- Increase in surgical capacity / volume (***Note: there will be absolutely no decrease in any individual surgeon's volume as a result of this project***)
- Decrease in patient wait times for emergent and urgent surgeries
- Decrease in OR overtime
- Increase in staff and patient satisfaction

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Expected Results

Phase I
Separation of Scheduled v. Unscheduled OR Flow

Expected Benefits

- Increase in surgical capacity / volume (*Note: there will be no decrease in any individual surgeon's volume as a result of this project*)
- Decrease in patient wait times for emergent and urgent surgeries
- Decrease in OR overtime
- Increase in staff and patient satisfaction

Phases II and IIb
OR and Cath Lab Smoothing

Expected Benefits

- Further increases in capacity / throughput
- Enhanced patient placement in preferred beds
- Decrease in nursing stress
- Decrease in mortality and medical errors related to delays and patient misplacement
- Increase in transplantations volume
- Prevention of ED overcrowding

Phase III
Determination of Bed and Staffing needs

Expected Benefits

- Further decreases in patient wait times where they exist
- Further enhancement of patient placement
- Decrease in staffing expense
- Enhanced utilization of existing resources
- Accurate determination of capacity growth need (Additional Med/Surg bed requires ≈ $1 million in capital cost + over $.25 million annual operational cost)

Case Study: Boston Medical Center

- Surgical throughput up 10%
- Bumped surgeries down 99.5%
- Reduced nurse stress; 1/2 hour reduction (6%) in nurse hours per patient day in one unit ($ 130.000 annual saving)
- ED waiting time down 33%
- 2.8 hour wait in one of state's busiest EDs vs. 4 to 5+ hours for most of the academic hospitals in Boston

Source: John Chessare, MD, then Chief Medical Officer at Boston Medical Center

Case Study – Cincinnati Children's Survey

- "We have not had anywhere near the patient complaints or physician complaints. Physician and Family satisfaction has skyrocketed…" - *Orthopedic Surgeon, Division Director*
- "The family satisfaction with their experience is better than it used to be." – *ENT Surgeon, Attending*
- "As a general observation, nursing staff 'on call' are not staying as late due to add-ons remaining at change of shift." - *OR Nurse*
- "…We get our case done early, and patients don't have to wait NPO until the evenings to have their surgery. This has made call much less stressful for my surgeons and myself…" - *Orthopedic Surgeon, Division Director*

State-wide collaborative to improve patient safety and quality of care while reducing its cost

Partnership for Patients - New Jersey

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PARTNERSHIP FOR PATIENTS
HealthCare.gov

NJHA
NEW JERSEY HOSPITAL ASSOCIATION

News

On January 30, **NJHA** in collaboration with The **Institute for Healthcare Optimization** kicked off Partnership for Patients-NJ, part of a national initiative from the U.S. Department of Health and Human Services to improve the quality, safety and affordability of healthcare, **Learn more»**

U.S. Senator **Robert Menendez** (Senate Finance Committee) at the Partnership for Patients New Jersey kick-off on January 30, 2012

Patient Flow/Throughput

The New Jersey Hospital Association has provided IHO Variability Methodology™ to NJ hospitals to help them improve patient safety and flow/throughput . Some of these resources and the list of the NJ Patient Flow Collaborative Members have been publicly disseminated, **Learn more»**

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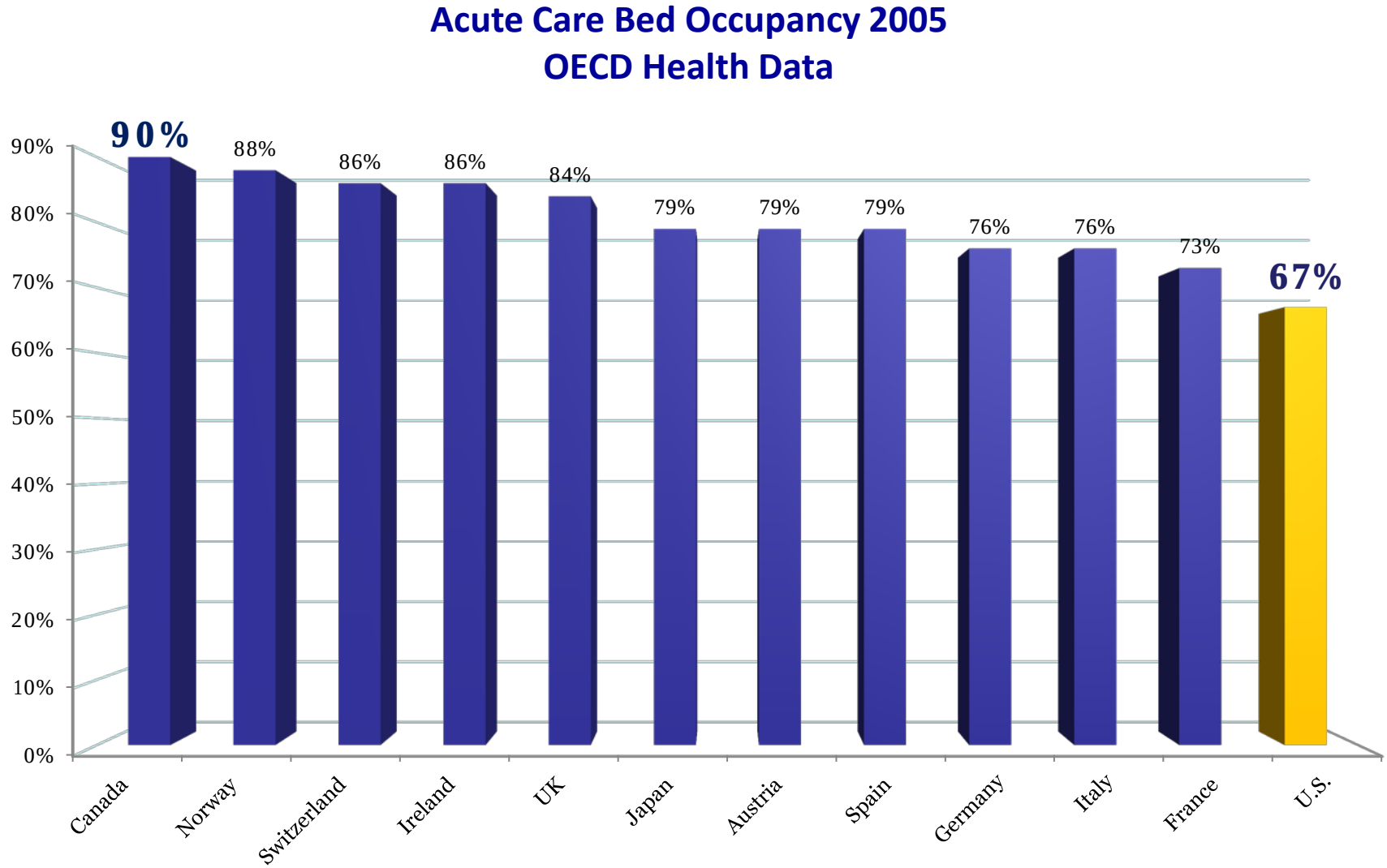
Three alternatives:

1. Provide the resources (e.g., staffing) sufficient to meet current patient peaks in demand - historical scenario (***a dream about the old good times***)
2. Staff below the peaks and tolerate ED diversions, nursing overloading and medical errors - current scenario (***pretend that we did not discuss these issues as it is much easier to create a new patient centeredness committee than to make tough changes required to achieve patient safety***)
3. ***Smooth artificial variability and provide the resources to meet patient (vs. provider) driven peaks in demand. Variability methodology can quantify and justify such additional resources***

OECD Acute Care Bed Occupancy



Slide provided by Sandeep Green Vaswani, Institute for Healthcare Optimization

We are 1/3 empty and overcrowded!!!

"Engineering applications likely represent the single largest group of discrete service innovation opportunities to improve the affordability of US hospital care. Pioneers such as Cincinnati Children's Hospital increased their patient flow by approximately 15% without proportionately adding staff or physical plant.5 National diffusion could reduce total US per capita spending by an estimated 4% to 5% if hospitals pass savings through to consumers and health benefit plan funders" *

*) Milstein A., Shortell S. Innovations in Care Delivery to Slow Growth of US Health Spending., *JAMA*, October 10, 2012—Vol 308, No. 14

The financial ROI from IHO projects at the individual hospitals varies **from $17,000/bed to over $300,000/bed annually** depending on the hospital size and patient flow structure (e.g., proportion of surgical patients). It is accompanied by significant improvements in quality of care

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IHO Variability Methodology® Endorsements

- **American Nursing Association**: IHO Variability Methodology has been endorsed by the ANA Board as one of the key measures to improve patient safety

- **Joint Commission Resources:** The Institute for Healthcare Optimization's approach to managing variability in healthcare delivery is the central theme of Joint Commission Resources' second edition of the book: *Managing Patient Flow in Hospitals: Strategies and Solutions*.

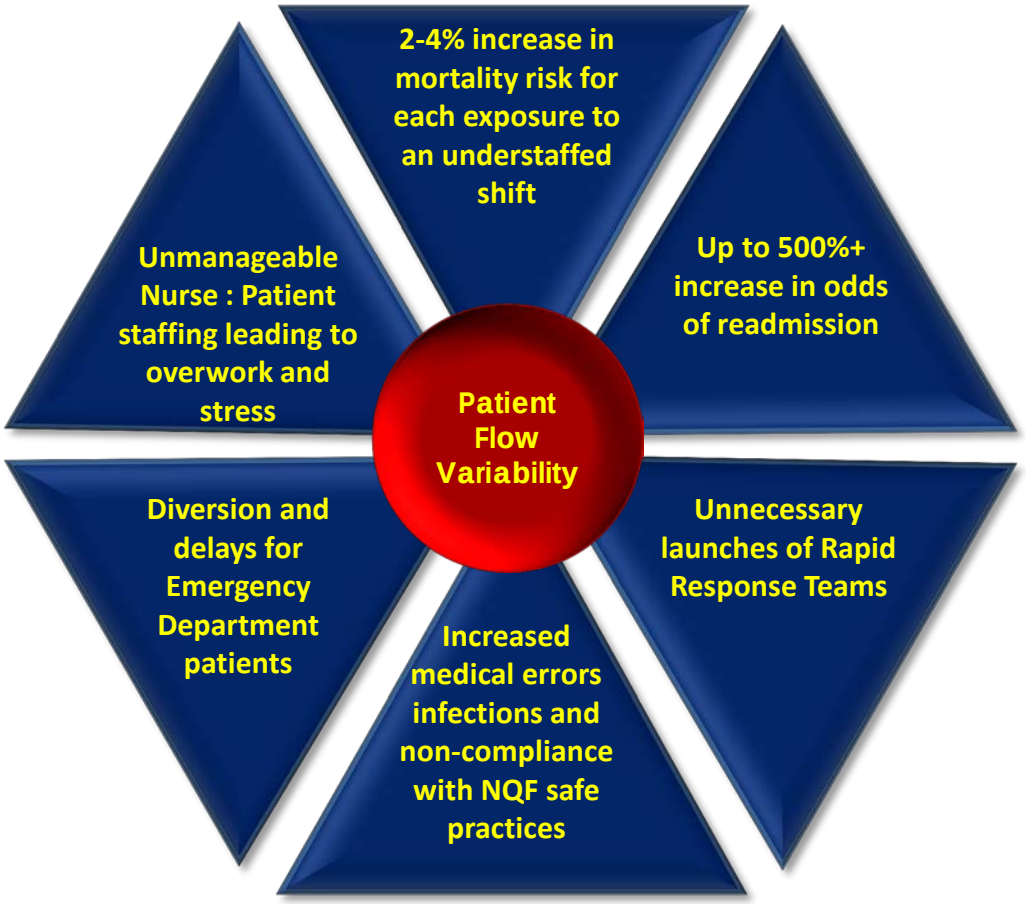
- **Government Accountability Office:** The Government Accountability Office recognizes variability in elective admissions as one of the key drivers of ED overcrowding .

- **American College of Emergency Physicians:** ACEP has recommended Variability Methodology as a key measure to reduce ED overcrowding

- **The Leapfrog Group** made reducing artificial variability in patient flow one of their Leaps for all US hospitals

- **American Organization of Nurse Executives**

Effects of Flow Variability on Quality of Care and Patient Safety



http://www.ihoptimize.org/what-we-do-methodology-quality-and-safety.htm

Slide provided by Sandeep Green Vaswani (Institute for Healthcare Optimization)

IOM: CEO Checklist, 2012

Resource Utilization

"Optimized use of personnel, physical space, and other resources Providing high-value care requires the efficient use of finite resources, yet much of health care today is suboptimal on both counts. Operations-management tools can help improve returns on fixed capital investments. Variability in the flow of patients into a hospital unit results in overcrowding, worse health outcomes due to fluctuations in staffing levels, increased staff stress, lower patient and staff satisfaction, reduced access to care, and higher costs. Strategies such as Queuing Theory and Variability Methodology can be used to eliminate sources of artificial variability, improving occupancy without increasing staffing or capacity or reducing lengths of stay. Furthermore, systematic process improvement efforts such as Lean can be used to make more efficient use of personnel and other resources. Structured analysis of daily work can eliminate inefficiencies, increase value-added time spent with patients, reduce staff stress, and optimize the use of supplies and other resources."

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The Recent Quote

"…rely on systems engineering and operations research to smooth the flow of patients through the health care system. Backups in emergency rooms, periodic crowding in hospitals, and the lack of specialty postoperative beds are often symptoms of uneven scheduling of admissions, suboptimal scheduling of operating rooms, and inadequate discharge planning. Hospitals that apply systems engineering to scheduling and resource use can save many millions of dollars individually and billions in the aggregate, reduce overcrowding, and improve staff satisfaction and performance. Organizations such as the Institute for Healthcare Optimization are showing the way.[23] " *)

[23)] Litvak E, ed. Managing patient flow in hospitals: strategies and solutions. 2nd ed. Oakbrook Terrace, IL: Joint Commission Resources, 2009.

***) President of IOM Dr. Harvey V. Fineberg. A Successful and Sustainable Health System - How to Get There from Here, N Engl J Med 2012; 366:1020-1027, March 15, 2012**

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6 Things Every Hospital Executive Needs to Know

1. Scientific operations management and systems re-engineering methods that have helped other industries have been effectively applied to simultaneously improve quality, efficiency and customer satisfaction
2. The ROI from the implementation of operations management and variability management approaches enable hospitals to survive and thrive even under Medicare margins
3. Adoption of scientific operations management is the only sustainable way to improve hospital efficiency – ignoring systems re-engineering can significantly diminish any benefit from process improvement efforts

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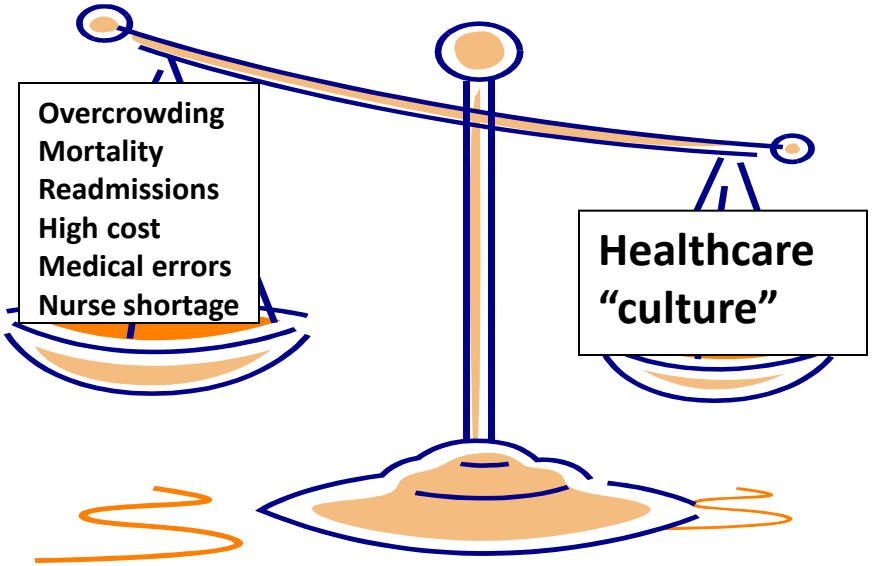
6 Things Every Hospital Executive Needs to Know (continued)

4. A significant portion of the problems of overcrowding, ED diversions, waiting times and patient flow, are self-imposed rather than patient-driven
5. Efficient capacity utilization and planning cannot be achieved without better understanding and effectively managing your operations
6. Artificial variability in patient flow is a key driver of readmissions, unmanageable nurse-to-patient staffing levels, ED and other internal delays, patient rejection and diversion, misuse of rapid response teams, and other important healthcare problems

Mortality, Readmissions, Medical Errors, High Cost

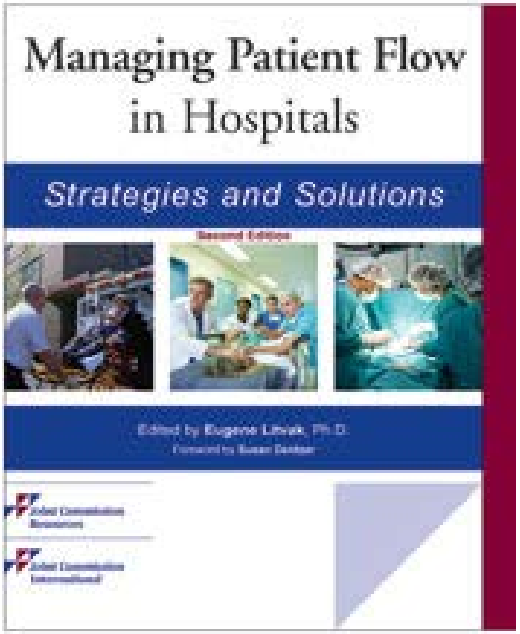
vs.

Health Care "Culture": Which Will Prevail?



YOU decide!

Resources



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

2009. 166 pages. ISBN: 978-1-59940-372-4

http://www.jointcommissioninternational.org/Books-and-E-books/Managing-Patient-Flow-in-Hospitals-Strategies-and-Solutions-Second-Edition/1497

Patient Safety and Quality of Care:
http://www.ihoptimize.org/what-we-do-methodology-quality-and-safety.htm
http://www.ihoptimize.org/knowledge-center-publications.htm

News & Events

Additional Resources

- www.ihoptimize.org

Upcoming Events

- **IHO Symposium: How to Succeed at Achieving Hospital Efficiency (July, 2013)**

  A 2.5 day professional symposium

Tackling Capacity Management

James M. Anderson

American Hospital Association Webinar
March 5, 2013

Tackling Capacity Management

Cincinnati Children's

Why We Did It

- Inadequate capacity
- Very difficult and expensive to build
- Clearly dysfunctional flow
  - Patients, nurses, anesthesiologists, surgeons waiting
  - Operating rooms underutilized
  - Beds not available
  - Resources not available when and where needed
- Commitment to our vision: leadership
  - Best outcomes, experience, value
- Lessons from manufacturing; go visit

Tackling Capacity Management

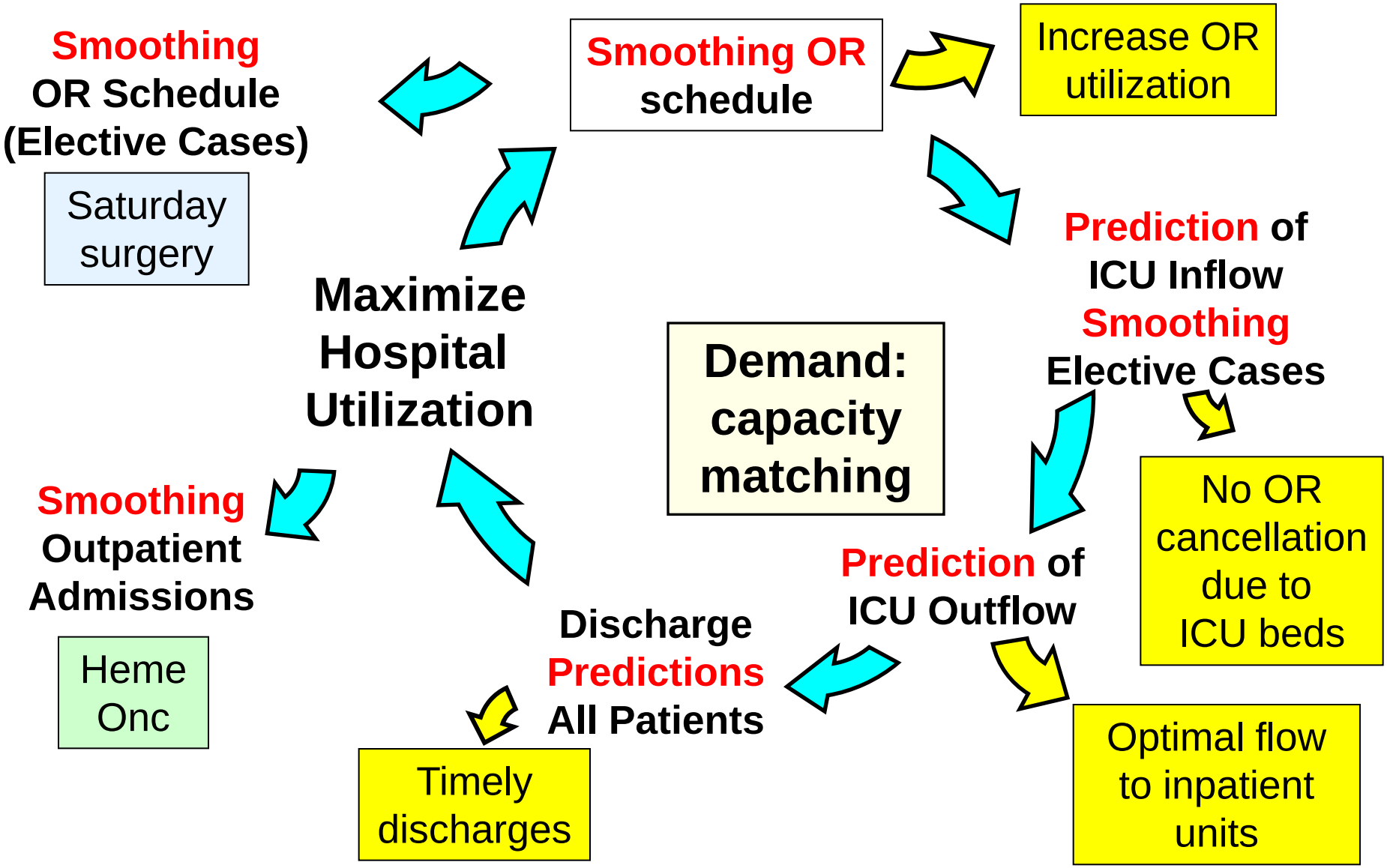
Cincinnati Children's

Why We Did It

Once the facts were clear, we couldn’t fail to address capacity management and regard ourselves as a well-managed institution.

Hospital-Wide Flow

Prediction and Decreasing Variability



Culture Changes: Ownership of Work

- Surgical scheduling
  - Changes in block management, call schedules
  - Prioritization of cases by urgency
- Optimization of capacity use
  - Prediction of D/C and transfer
  - Rounding and work flow
- Capacity prediction
  - Design unit level by simulation bed prediction
- Capacity management
  - Prediction of bed needs, “reservations”

OR Urgent Case Management

Cincinnati Children's

OPERATING ROOM FLOW IMPROVEMENT
SEPARATING SCHEDULED AND UNSCHEDULED CASES TO IMPROVE ACCESS, SAFETY, AND EFFICIENCY

INITIAL MODEL

TWO CASE SCHEDULING TYPES

SCHEDULED CASES
85-90 % all Cases

EMERGENCIES
10-15 % of all Cases

DAILY SCHEDULE

95 % of all OR time allocated to Doctor Specific Blocks

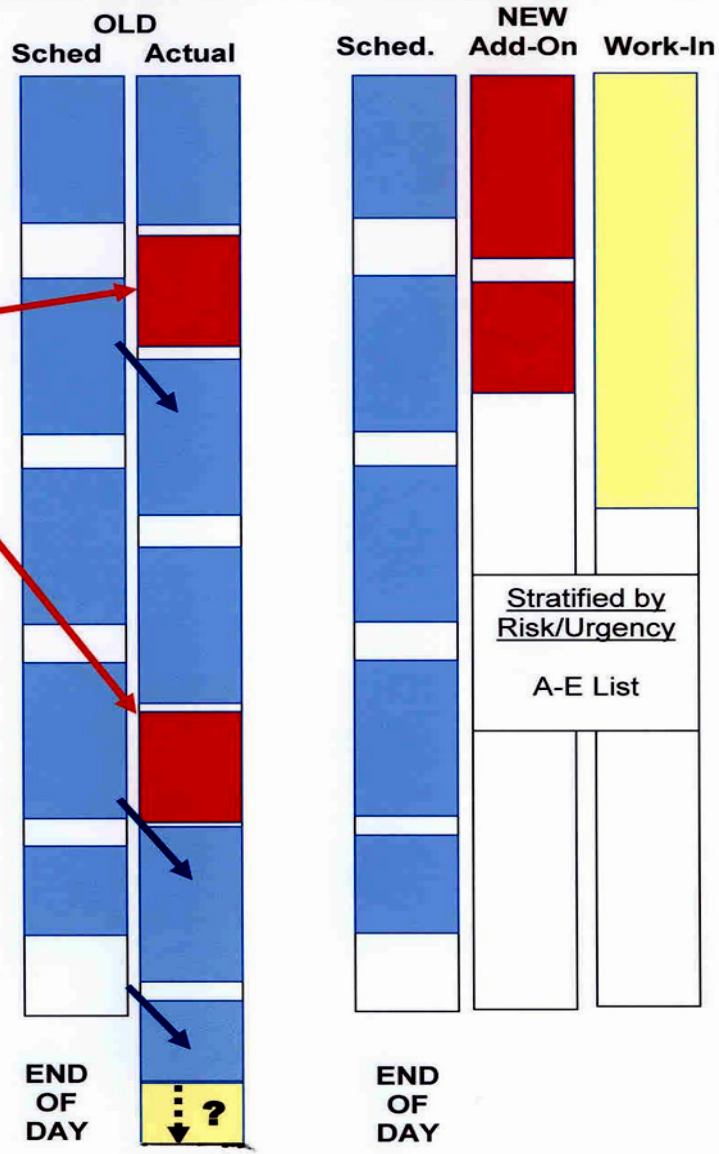
Emergencies done at end of the day, or forced into slots between scheduled cases.

RESULT

Long Add-On List at the conclusion of the day

Long Waiting Times for parents and children with urgent needs

Often doing complex cases in evening or at night when resources were limited



PRESENT MODEL

TWO CASE SCHEDULING TYPES

SCHEDULED CASES
85-90 % all Cases

UNSCHEDULED
10-15 % of all Cases
Divided into two subgroups
Add-On – 0-24 hours
Work-In – 1-7 days

DAILY SCHEDULE

90 % of all OR time allocated to Doctor Specific Blocks

2 Add-On Rooms for Urgent and Emergent cases / day

1 Work-In Room for cases needing access in < 7 days

RESULT

Decreased time to access OR in urgent and emergent cases

Add-On's done during prime operating hours, maximum resources

More predictable end of day

Cincinnati Children's

Production Capacity, FY 2005

- Maximum inpatient capacity: 425 beds ("theoretical capacity")
- Barriers resulted in daily "practical capacity" reached at ~ 325 patients
  - System failures: cancel surgery, deny admission
- Practical operational capacity was 76% of theoretical maximum capacity

Cincinnati Children's

Production Capacity, FY 2010

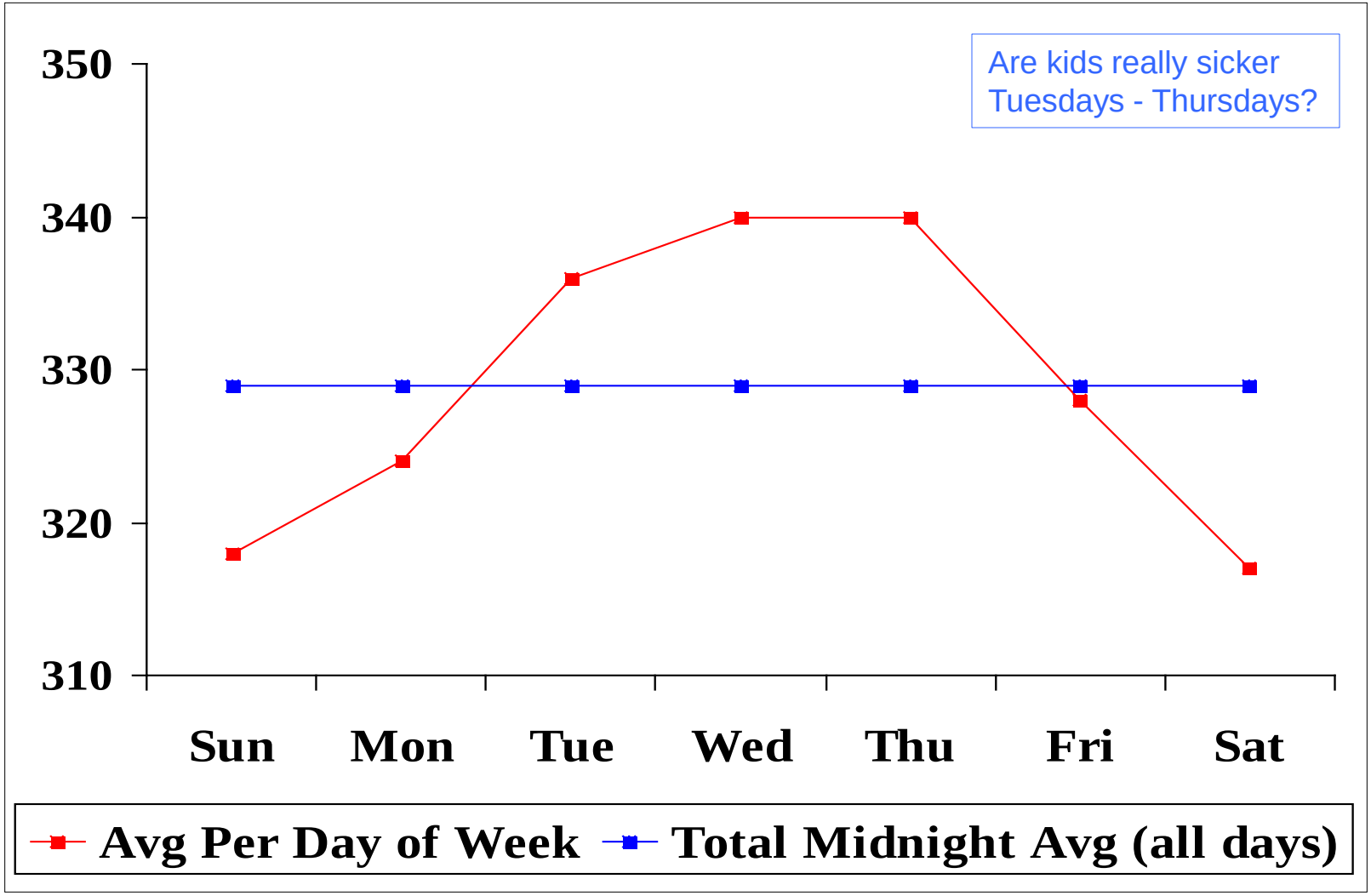
- Inpatient capacity: 510 beds ("theoretical capacity")
- Four years of work on:
  - Smoothing scheduling
  - Discharge planning
  - Patient flow
  - Physical layout in key bottleneck areas
  - Re-examining patient cohorting for greater utilization
- Expanded "practical capacity" to a daily peak of 450 inpatients (88% of theoretical capacity)

Room for Improvement

Cincinnati Children's

Average Midnight Census

July 1 – October 27, 2010



What Has It Meant?

Cincinnati Children's

- Potential for **65** more inpatients/day within current bed capacity; previously unsustainable
- **$315,000/day** in potential additional net billing revenue from existing assets and staff ($115 million/year)
- FY 2010: Utilized about **30%** of the total additional untapped capacity (about $33 million)
- Avoided construction of about 75 additional beds ($100+ million) that would have been required to meet today's volume in our FY 2005 workflow system
- Still have a long way to go to grow into our capacity