

4 June, 2024



Managing Variability in Patient Flow Is a Key to Patient Safety Reducing ED Boarding, Nursing Shortage and Hospital Expenses

I SEMINÁRIO EM EFICIÊNCIA HOSPITALAR
Revelando Oportunidades de Melhorias na Prestação de Serviços de Saúde

Eugene Litvak, Ph.D.

About IHO

- The Institute for Healthcare Optimization (IHO) is an independent **not-for-profit** 501(c)(3) research, education and service organization focused on bringing the science and practice of operations management to healthcare delivery.
- The Institute grew out of the work of Boston University's Program for the Management of Variability in Health Care Delivery (MVP) where we originally developed our approach for managing flow variability.
- Our approach has been successfully applied by many healthcare organizations to simultaneously reduce cost and improve quality of care, contradicting the notion that improving quality and cost of health care has to involve trade-offs.

Brazilian Health Care: Achievements and Challenges

Achievements:

- Creation of the Sistema Único de Saúde (SUS), a universal healthcare system that has been instrumental in improving access to healthcare services for many people, particularly those living in poverty.
- Reduction of infant mortality rates, decreasing from 53 deaths per 1,000 live births in 1990 to 12 (!) deaths per 1,000 live births in 2019
- Critically important work on Patient Flow by Welfane Cordeiro and others.

Challenges:

- Ensuring that patients receive **timely** high-quality care at low cost.
- Addressing unequal access to healthcare services and resources, particularly in rural areas and regions with a high poverty rate.

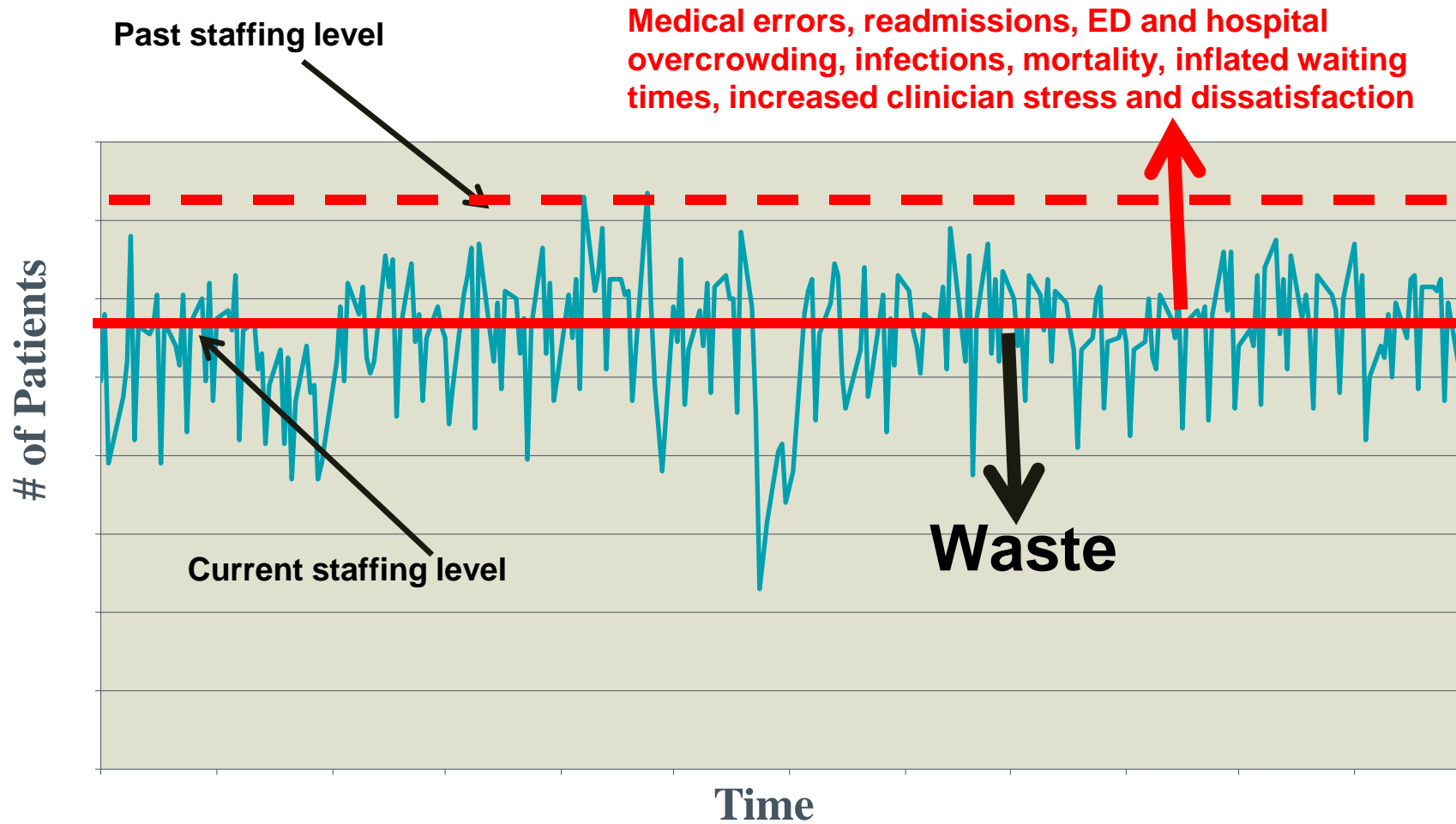
Quality of patient care and quality of provider work environment

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Quality care cannot be provided if providers' working conditions are not satisfactory

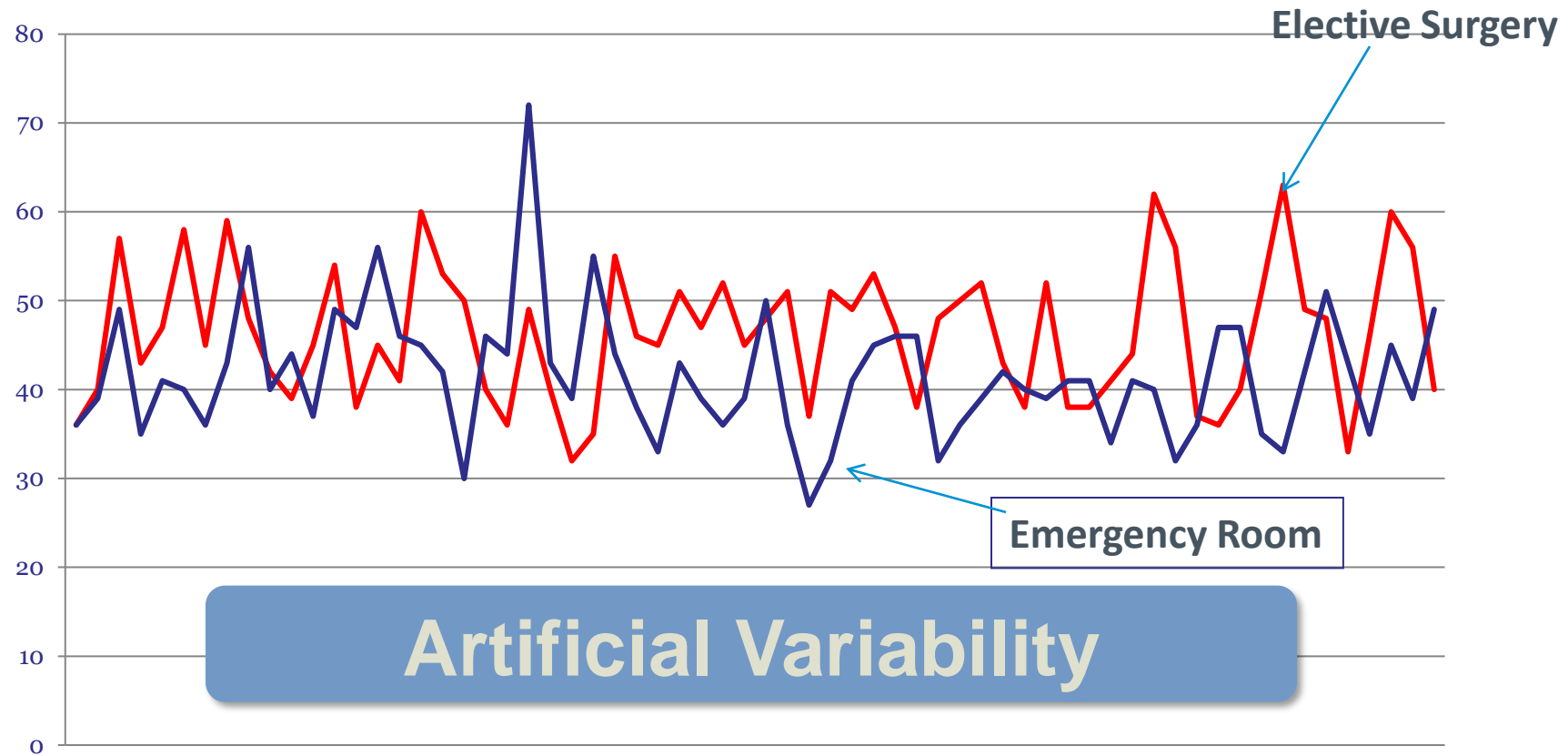
How did we staff, and how do we staff

Eugene Litvak

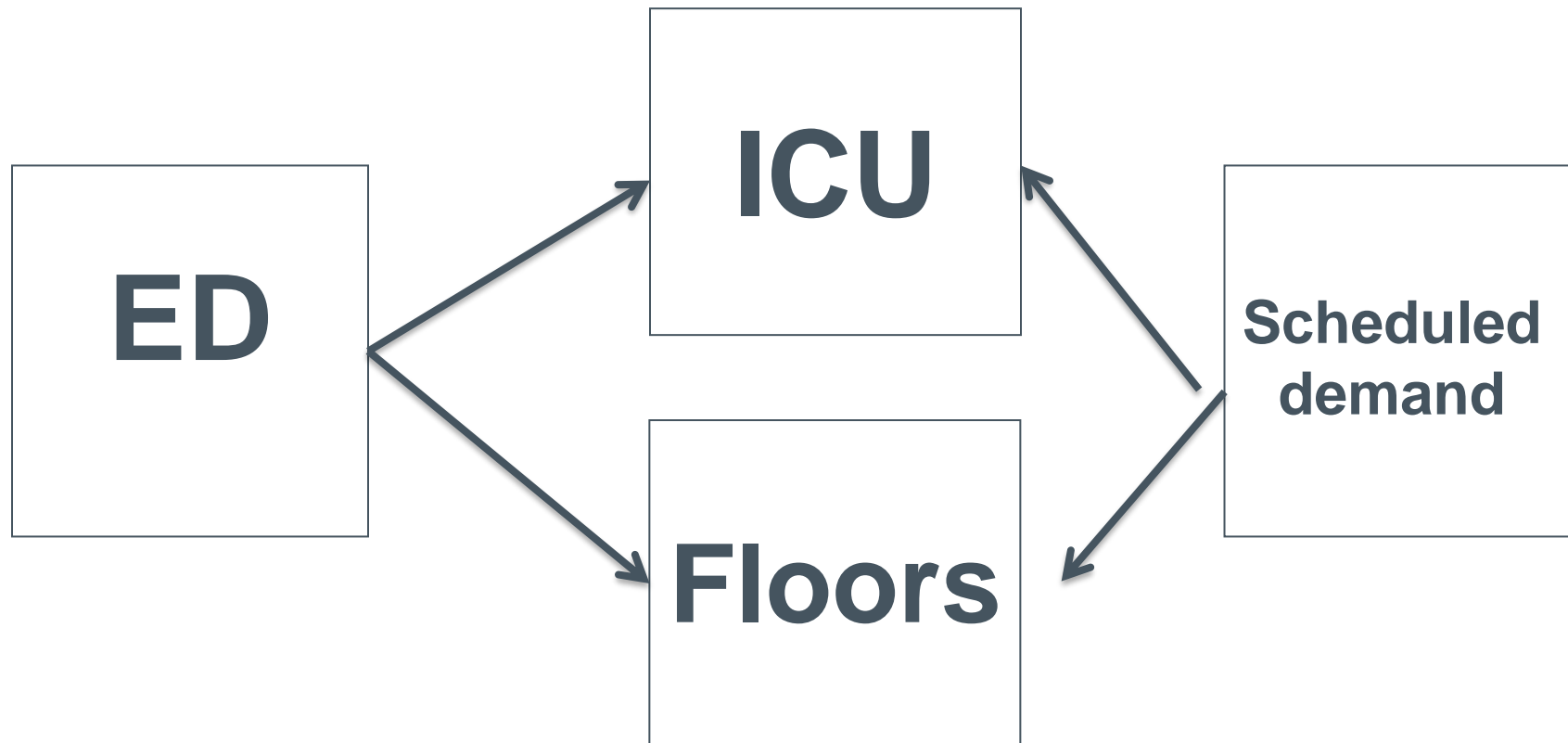


A key root cause of hospital bottlenecks and inefficiency

Daily Weekday Emergency and Elective Surgical Admissions June - August 2008

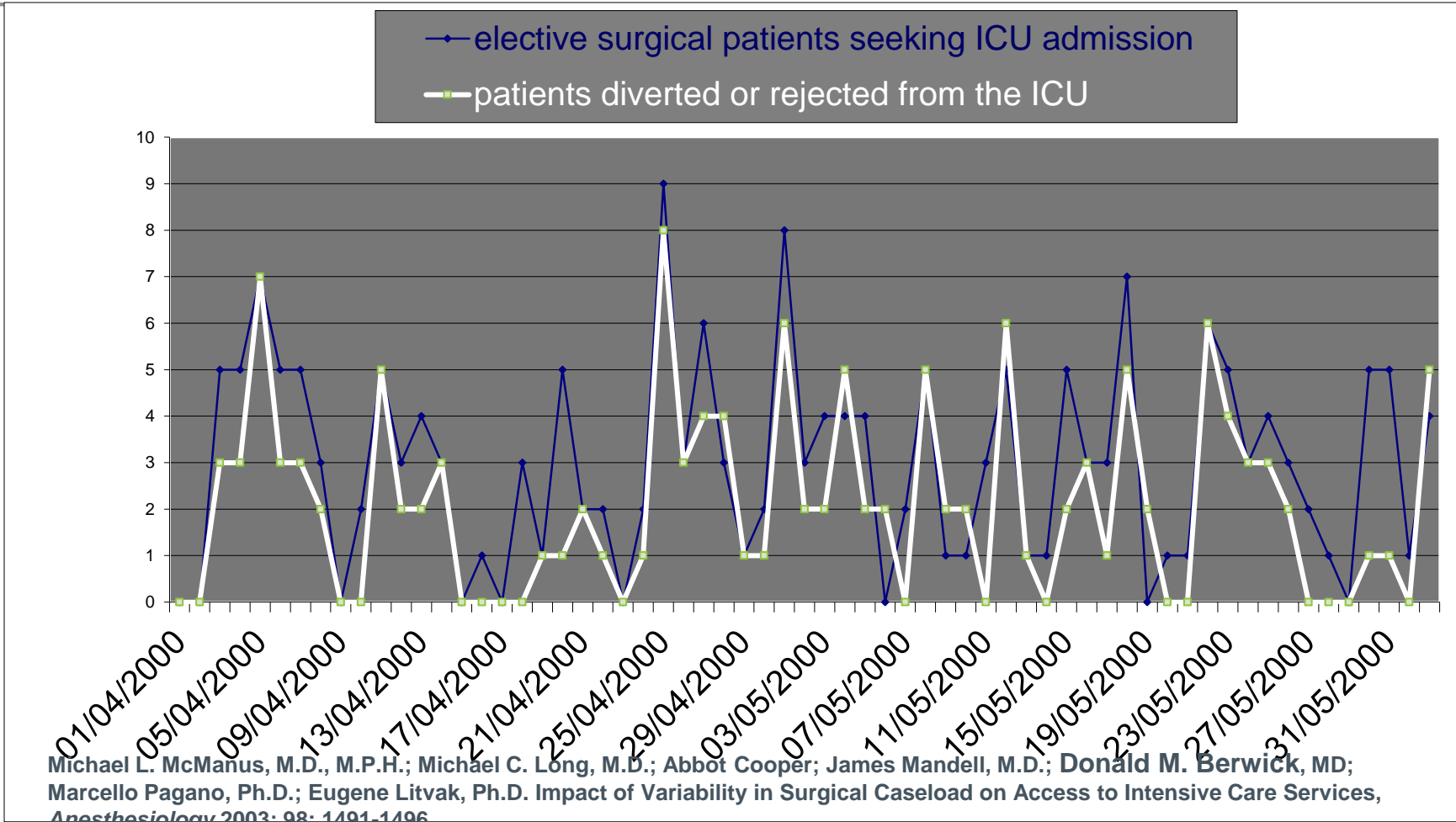


Variability and access to care

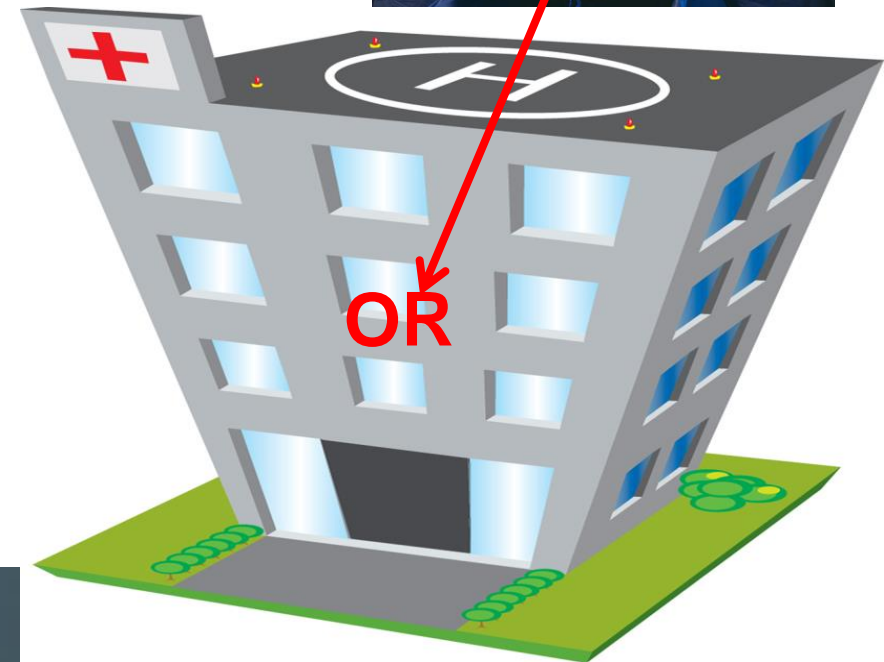


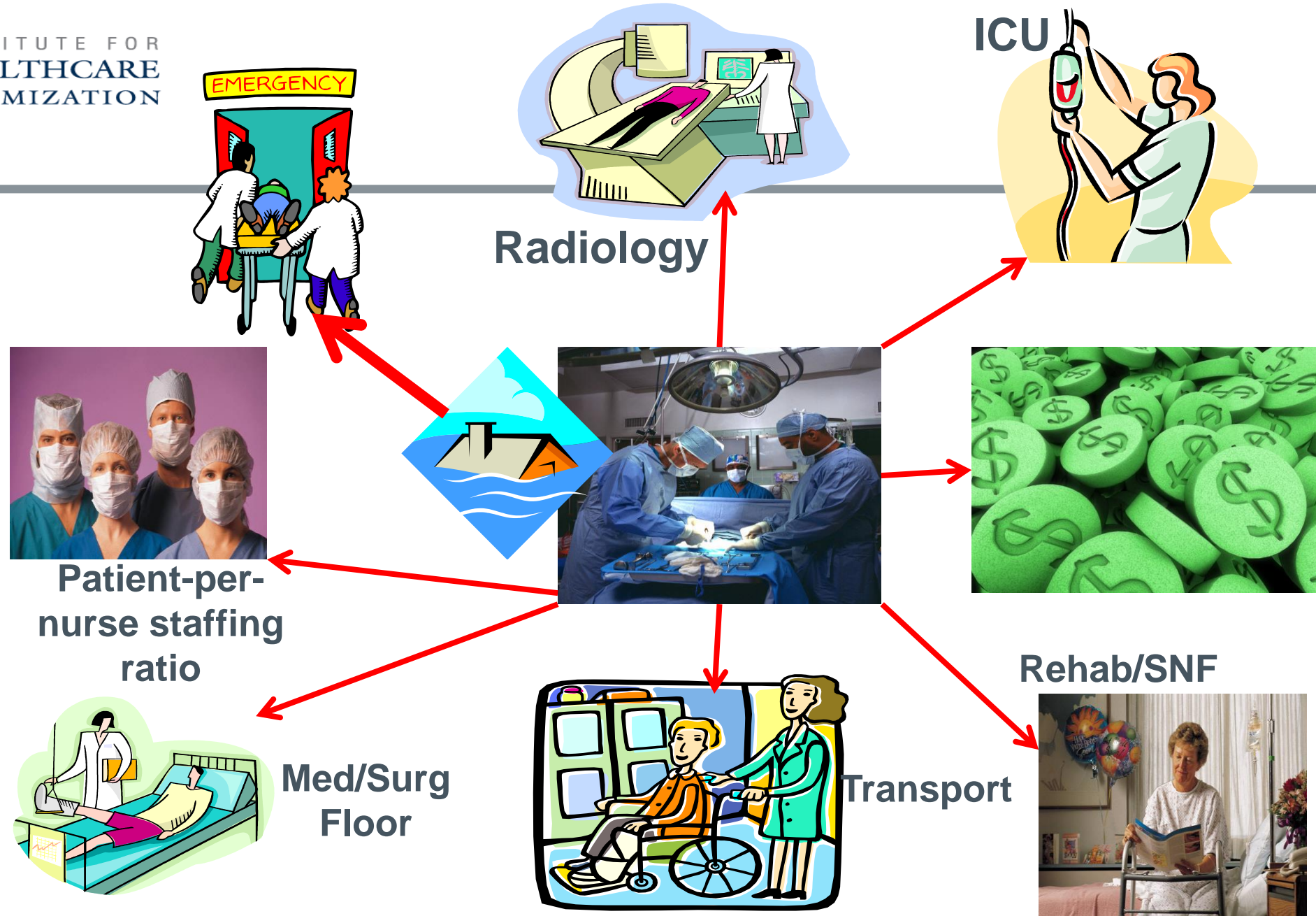
Emergency Department Crowding: The Canary in the Health Care System, NEJM Catalyst, Sept. 2021, <https://catalyst.nejm.org/doi/full/10.1056/CAT.21.0217>

Elective Surgical Requests vs. Total Refusals



Why Operating Room is a starting point?





Three choices that hospitals had:

- 1- Adding more beds, nurses, physicians (frequently unaffordable or not feasible)
- 2- Limiting the number of patients to accommodate by increasing waiting times and/or refusing new patients.
- 3- Smoothing patient flow.

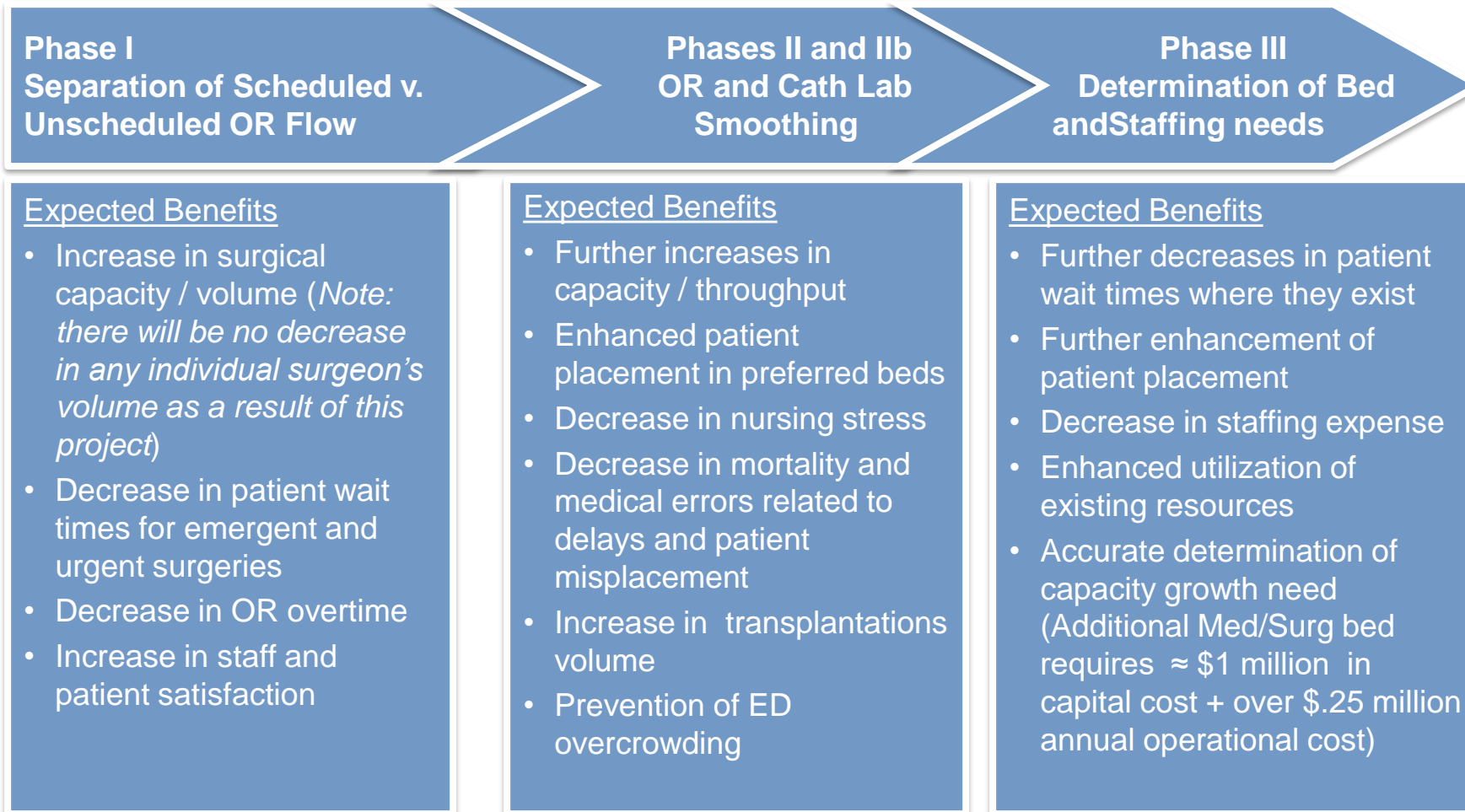
Why do this project?

- Bumped or delayed elective surgery cases
- Delays in securing OR access for urgent and emergent cases (transplantations)
- Overburdened nurses, medical errors, high overtime
- Lack of timely access to hospital wards
- **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.”

Expected Results



University Health Network (Toronto)

#1 hospital in Canada, #3 worldwide

[How Hospitals Can Save Lives and Themselves Lessons on Patient Flow From the COVID-19 Pandemic](#). Litvak, Eugene PhD; Keshavjee, Shaf MD, MSc, FRCSC, FACS; Gewertz, Bruce L. MD; Fineberg, Harvey V. MD, PhD (*Annals of Surgery*, July 2021.)

*“Implementing all these steps at UHN allowed the hospital to do more emergent and urgent surgeries as this project created the opportunity for UHN to perform **over 3000 additional elective surgeries**. There was also an improvement on an already high compliance with wait time for urgent/emergent surgeries by an **additional 13% to 20% for UHN hospitals**. Reducing wait times has been demonstrated to significantly reduce patient mortality and length of stay. These steps also allowed UHN Surgery to restart less-urgent scheduled surgeries sooner than other hospitals in Ontario by appropriately and optimally utilizing their scarce resources such as nurses and hospital beds and without limiting necessary access*

University Health Network (Toronto) #1 hospital in Canada, #3 worldwide

Dr. Shaf Keshavjii – Chief of Surgery (September 2021):

“It is the silver bullet in that we’re doing more than we’ve ever done with less, more efficiently. We’ve created capacity to do more. So we are working at 105, 110 per cent. I can tell you our backlog has gone from 4300 down to 3200. We’ve cleared about 1,000 cases”.

Case Study: Boston Medical Center (main safety net MA hospital)



- Surgical throughput up 10%
- Bumped surgeries down **99.5%**
- 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
- Phase II: Reduced nurse stress; **1/2 hour** reduction (**6%**) in nurse hours per patient day in one unit (**\$ 130.000** annual saving)

http://archive.boston.com/news/local/articles/2004/07/08/emergency_room_recovery/?__goto=loginpage

Case Study: Mayo Clinic (FI)



CHANGES IN OPERATIONAL PERFORMANCE OF OPERATING ROOMS

	Pre- Re-Design	Post-Re-Design	% Change
Surgical Cases (count)	11,874	12,367	4%
Surgical Minutes	1,757,008	1,844,479	5%
Prime Time OR Utilization	61%	64%	5%
Number of Overtime FTE's (average)	7.4	5.4	-27%
Staff Turnover Rate	20.3%	11.5%	-43%
Daily Elective Room Changes (Average/Mon)	80	25	-69%
Daily Elective Room Changes (%)	8%	2%	-70%
Cost/Case (added 15 OR Staff FTEs)	\$1,062	\$1,070	0%
Cost/Minute of Surgery (added 15 OR Staff FTEs)	\$7.18	\$7.26	1%
Staff Turnover Cost (millions)	\$2.47	\$1.40	-43%
Overtime Cost Savings		\$111,488	
Total OR Net Revenue (fee increase adjusted)	\$93,929,569	\$98,686,693	5%
Net Operating Income	\$15,877,986	\$21,957,708	38%
Operating margin	17%	22%	28%

Source: C. Daniel Smith, et al. *Re-Engineering the Operating Room Using Variability Management to Improve Healthcare Value*. Journal of the American College of Surgeons, Volume 216, Issue 4 , Pages 559-568, April 2013

Case Study: Cincinnati Children's

- Phase I. Weekend waiting time (for urgent / emergent surgeries) down **34%** despite **37%** volume increase, Weekday waiting time down **28%** despite **24%** volume increase (results for the first three months after implementation)
- Initially an equivalent of **1 OR** capacity freed up
- OR overtime down by **57%** (approx. **\$559K** saved annually)
- Substantially improved provider satisfaction
- Phase II. Surgery volume has sustained **7%** growth per year for at least two years
- Phases II – III. Inpatient occupancy increased from **76%** to **91%** resulting in **\$137 million/year** plus **75 new beds** avoided capital cost (over **\$100 million**)

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*
- <https://store.jcrinc.com/managing-patient-flow-in-hospitals-strategies-and-solutions-second-edition/>

Case Study: The Ottawa Hospital



- ❖ Improved access for patients needing emergency surgery within 24 hours from 60% to 90%
- ❖ **Reduced mortality rate by 23% for patients requiring urgent surgery from 3.9% to 3%, resulting in 40 lives saved annually**
- ❖ Achieved efficiency gain equivalent to \$9million by decreasing length of stay and better use of beds
- ❖ Reduced surgery cancellations due to bed shortages from more than 600 per year to zero
- ❖ Reduced Neurosurgery inpatient census from 46 to 33, resulting in a savings of 13 beds

Source: Jack Kitts, President and CEO: [Re-engineering surgical patient flow saves lives](#), *Canadian Healthcare Technology*, December 19, 2013

Newark Beth Israel Medical Center (NJ) the main safety net in NJ

▣ Barnabas Health (Telemetry Unit)

- **Eliminated 26 telemetry beds, resulting in a savings of over \$10 million per annum while reducing cost of care and improving quality of care**
- **Decreased ALOS of telemetry patients by one full day leading to fewer hospital-acquired infections**
- **ED wait time for telemetry bed decreased from 15 hours average (30 hours max) to three hours or less for 90 percent patients.**

"The results have been remarkable. The average wait time for admission to a telemetry bed has been reduced, along with other savings." - Robert Lahita, MD, Chairman of Medicine

Source: <http://www.barnabashealth.org/Press-Center/Newark-Beth-Israel-Medical-Center-News/2014/Newark-Beth-Israel-Medical-Center-Sets-New-Natio.aspx>

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

Partnership for Patients - New Jersey



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»](#)

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»](#)



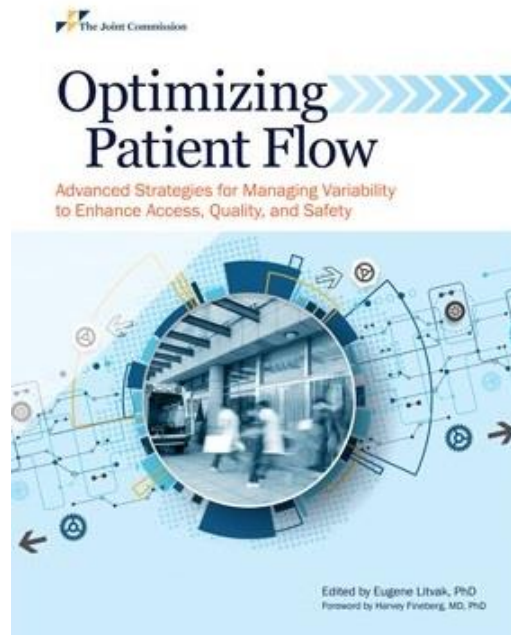
U.S. Senator **Robert Menendez** (Senate Finance Committee) at the Partnership for Patients New Jersey kick-off on January 30, 2012

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

- *11,800 to 17,300 additional patients that could be treated without adding inpatient beds or operating rooms*
- *Roughly 20,000 additional patients that could be accommodated in hospital emergency departments*
- *21 percent to 85 percent decrease in wait times for emergency department patients to be admitted to a hospital bed*
- Reductions in the length of hospital stays ranging from 3 percent to 47 percent for certain groups of patients

More on <http://www.ihooptimize.org/who-we-work-with-iho-impact-multi.htm>

Resources



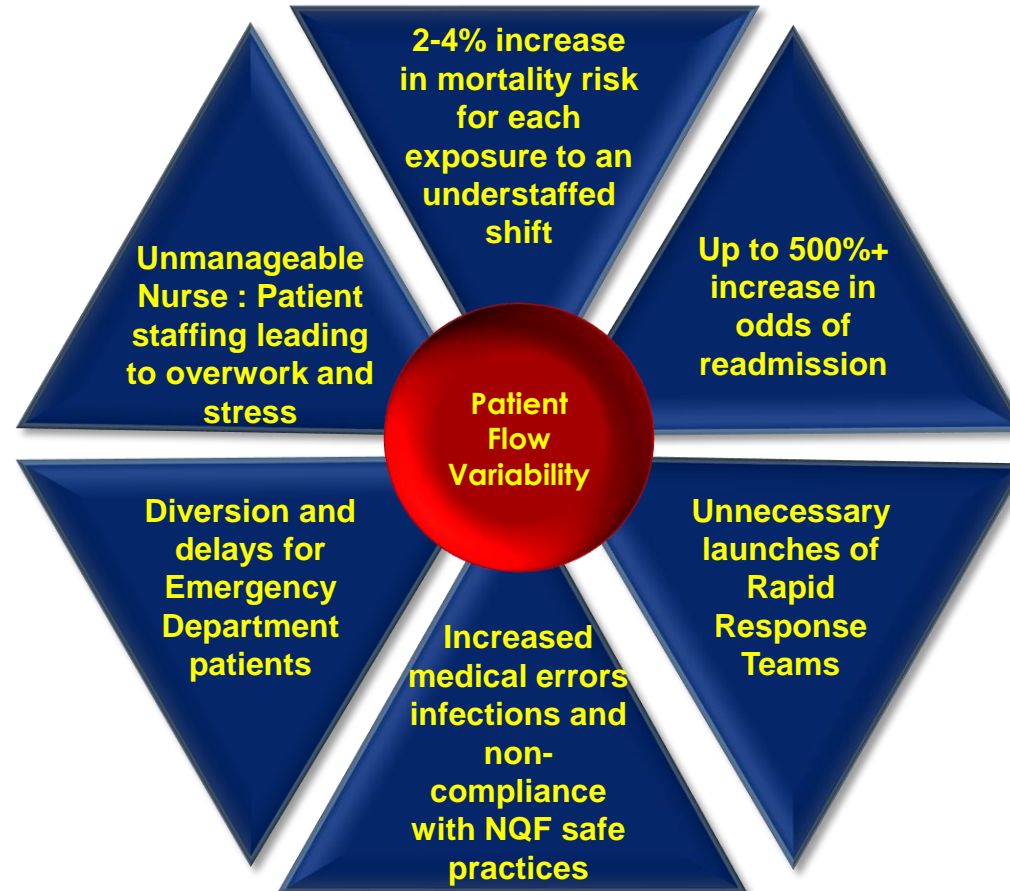
Optimizing Patient Flow: Advanced Strategies for Managing Variability to Enhance Access, Quality and Safety

<https://www.jcrinc.com/optimizing-patient-flow-advanced-strategies-for-managing-variability-to-enhance-access-quality-and-safety/>

Sample pages, Prologue:

https://www.jcrinc.com/assets/1/14/EBMPF18_sample_pages.pdf

Effects of Flow Variability on Quality of Care and Patient Safety



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

What is here for me?

Patients:

- Reduced waiting time
- Improved access to care
- Reduced mortality and medical errors

Nurses:

- Reduced overtime
- Reduced workload

What is here for me (continued)?

Physicians:

- Reduced waste of time
- Increased patient throughput
- Reduced overtime
- Improve quality of care

Hospital:

- Better utilization of resources
- Reduced hours of ED overcrowding
- Staff and patient satisfaction
- More staffing resources
- Reduced mortality and medical errors
- Reduced length of stay
- Increased hospital throughput and revenue

New Orleans, LA Outpatient clinics for underserved population

- Improved capacity by 35% thereby improving access to care for patients
- Increased number of patients treated by 25% by proper allocation of resources and scheduling practice
- Reduced patient waiting time
- Timely access to same day and next day service
<https://www.youtube.com/watch?v=AcVDJaRswDU>
- Improved team performance, provider and patient satisfaction
- Increased operational efficiency and quality of care

<http://www.theneworleansadvocate.com/community/crescentcity/11387066-171/st-thomas-fills-health-care>

<http://www.ihoptimize.org/who-we-work-with-iho-impact-clinics.htm>

New book by *John Wiley & Sons*

