

IHO's Variability Methodology®: How to Maximize Efficiency and Patient Flow During and Post-Pandemic

The COVID-19 pandemic has created two significant challenges for hospitals:

1. At the outset of this pandemic, many hospitals suspended elective surgeries. However, there is a continuing need to perform emergent and urgent surgeries including some cancer surgeries and transplants. The answers to how many, what type of surgeries, and for which patients depend both on the level of urgency and hospital non-COVID capacity. Hospitals should balance these two factors and continue to conduct as many urgent surgeries as possible amid the pandemic.
2. The suspension of elective surgeries has forced hospitals to forfeit a major revenue stream, leaving many operational questions. When is the right time to bring some elective surgeries back? Which operations should be prioritized? How could the backlogs of patients waiting for elective surgery be treated most expeditiously? Hospitals should be prepared to answer all these questions.

The [Institute for Healthcare Optimization \(IHO\)](#) has developed Variability Methodology® that answers the above questions and more. Some questions need to be answered now, some later, and others when the epidemic is curbed. This methodology has been practically implemented and successfully adopted by a wide range of hospitals in the US (e.g., teaching, community, pediatric) and internationally (e.g., Canada and the UK). IHO's methodology has been the basis for Joint Commission Resources' books on patient flow optimization: [Managing 'Patient Flow in Hospitals'](#) and ['Optimizing Patient Flow'](#).

IHO's Variability Methodology® focuses on reducing variability in operations, and the use of advanced operations management and data analysis methods to achieve dramatic improvements in quality, access, and cost of care. Specific applications to hospitals follow:

Reengineering the Operating Rooms

As a result of the influx of COVID19 patients, hospitals are having to quickly quantify urgent surgery needs. IHO provides step-by-step methodology guidance to classify surgical cases, collect data, engage surgical staff, update scheduling and queuing procedures, modify OR allocations and block schedules, and measure OR performance. Clinical details are developed by hospital staff to which IHO tailors its recommendations. As elective surgeries ramp back up, competition between elective and unscheduled flow again is at risk of becoming the root cause of delayed surgery, cancellations, overtime, staff dissatisfaction and prolonged length of stay. The implementation of Variability Methodology® will help hospitals avoid this common pitfall while ensuring that the needs of both urgent and elective patients are met.

Smoothing Surgical Flow

Bed limitations will be even more acutely felt by hospitals post-COVID when restarting elective surgery. Artificial variability in scheduled admissions is a key reason behind bed pressures, which often result in elective case cancellations and placement on patients in suboptimal units. Both of these can lead to grave harm to patients while overburdening already stretched nursing staff. IHO guides hospitals by investigating surgical schedules, bed allocations and then develops bespoke scheduling recommendations to achieve a smooth flow of elective patients through surgical units. Schedule smoothing recommendations are based on each hospital's unique challenges, constraints, and goals. IHO provides guidance towards smaller and greater levels of optimization that can be achieved by smoothing surgical flow.

Reengineering Medical Flow and Right-sizing Inpatient Units

This recent influx of medical patients requires hospitals to manage both surgical and medical inpatient flow as efficiently as possible. A significant opportunity to enhance patient flow into, as well as out of, the hospital is to remove artificial variability in admission, discharge, and transfer (ADT) processes, and then to right-size acute and critical care units. IHO's methodology has been implemented in many hospitals increasing access to care while reducing wait times and cost. IHO provides detailed guidance to develop optimal ADT criteria, implement rigorous procedures to ensure compliance with criteria, collect data to allow for better visibility and measure of flow and bottlenecks, and ultimately to achieve a clinically optimal length of stay and to reduce ED boarding.

Capacity Planning

Timely placement of patients in the appropriate levels of care and specialty units is crucial to the achievement of optimal quality and safety of care. When bed capacity is organized correctly, it not only enhances patient care, it also improves clinical providers' workload and satisfaction. IHO uses IHO Variability Methodology® as well as Queuing Theory, Discrete Event Simulation and other tools to accurately design and right-size various types of inpatient units to optimize patient placement and reduce access times.

Capacity Building

Driven by its mission, IHO's approach includes building capacity and capability at partnering hospitals to ensure the sustainability of improvements and wide adoption of optimization techniques. We have demonstrated success in helping hospitals to achieve this goal.

University Health Networks partnership with IHO

"Being engaged in the IHO project meant that the Surgery Leadership team was well-positioned to manage the COVID-19 pandemic and has several strategies to optimally engage around ramping back up in terms of activity levels when appropriate."

Elizabeth A. Ryan, Esq, President & CEO, New Jersey Hospital Association

"16 of our hospital CEOs have joined with the IHO in an added initiative to improve patient throughput. That effort shows promise in decreasing mortality risks, reducing length of stay, and decreasing emergency department boarding time. One of our CEOs said it best, when he said "consultants go away, but by working with the IHO, we now understand how to replicate this work throughout our organization."

Selected Outcomes

- **Partnership for Patients Initiative in New Jersey** – combined savings/margin improvement by \$30M while reducing ED overcrowding, shortened wait times, and improved access
- **The Ottawa Hospital** – reported saving 40 lives, saved \$9M and eliminated surgical cancellations
- **Cincinnati Children's Hospital** – avoided capital cost of \$100M by canceling a budgeted new patient tower, and increased its margin by \$115M annually
- **Mayo Clinic, Jacksonville, Florida** – OR annual net revenue increased by \$5M and annual staff turnover cost reduced by \$1.07M
- **The Johns Hopkins Hospital, Baltimore, Maryland** – increased surgical volume by \$4M annually while decreasing over overtime and waiting time
- **Boston Medical Center** – surgical throughput increased by 10% (\$3.3M)
- **Palmetto Richland Memorial Hospital, Columbia, South Carolina** – opportunity to further increase surgery volume with \$8m projected annual margin increase with \$2 million achieved in the first year

Many more examples can be found [here](#) »