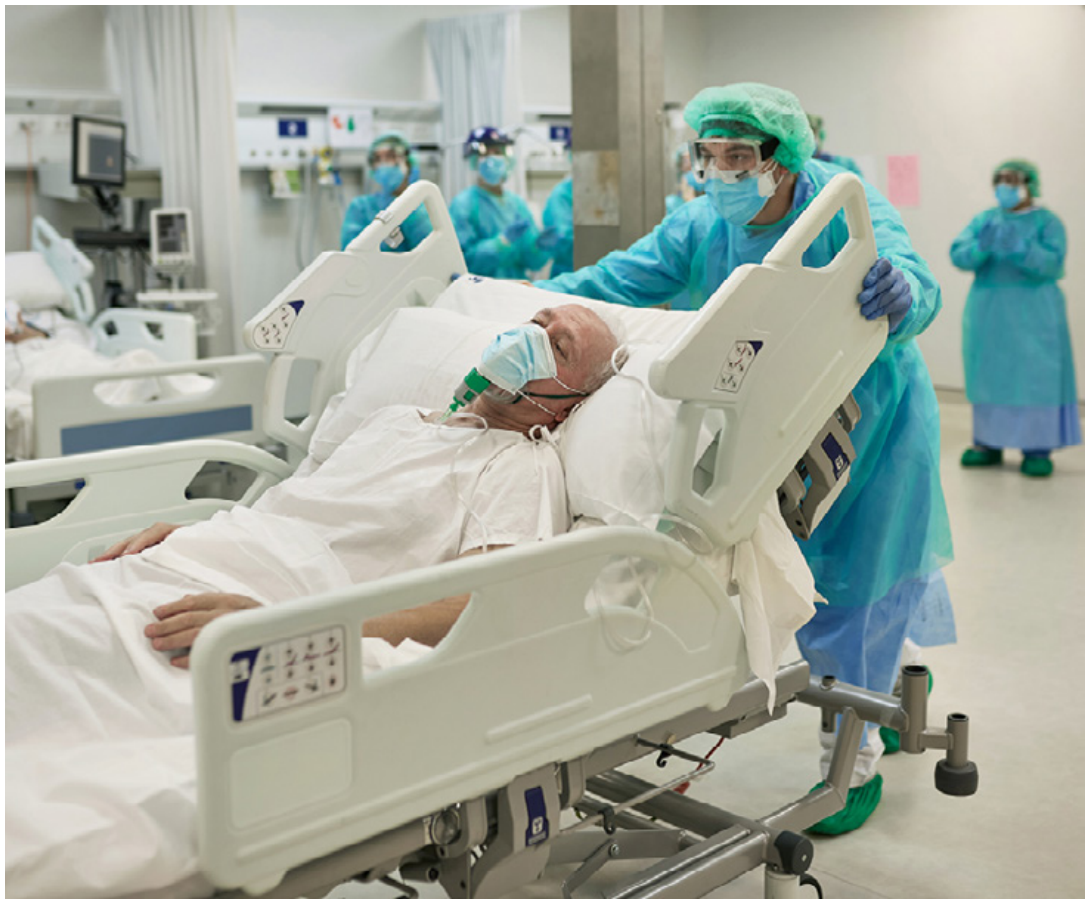
Meeting COVID-19 head-on with data-driven insights

Toronto-area hospital leans on analytics to improve care

by Michelle Cloutier

8-minute read

When people walk through the door of the emergency department (ED) at North York General Hospital (NYGH), they just want to be treated quickly and efficiently.



And although they may wonder how long their wait time will be before seeing a physician or receiving an X-ray or other diagnostic procedure, they're probably not thinking about the hospital's performance metrics for providing care or how it measures up to Ontario healthcare provision standards. But, thankfully, Business Intelligence Specialist Sri Vijay Bharat Peddi and the Business Intelligence (BI) team at NYGH are doing just that.

As a community hospital, NYGH receives the majority of its funding from the Ontario Ministry of Health and Long-Term Care. To secure the funds it requires to serve the diverse communities in the North Toronto area, the hospital must demonstrate that it is providing healthcare services that meet and exceed the province's standards. In Ontario, one of the key components for the funding model is a measurement of Quality-Based Procedures (QBPs), where hospitals are reimbursed based on the types and quantities of patients

they treat. QBPs rely on evidence-informed rates that are associated with the quality of care delivered.

For many years, NYGH successfully used IBM® Cognos® Analytics software to measure and report its QBPs, developing and delivering reports for individual metrics such as cost per case, length of stay, patient age and so on. However, the hospital needed a way to dynamically visualize the relationships between variables on the fly, instead of creating a new report for each relationship analysis.

In 2017, the hospital engaged IBM to begin transforming its analytics infrastructure to provide a more powerful and flexible way to monitor QBP performance. Since then, NYGH has continued its journey of using data-driven insights to improve the quality of care throughout the hospital. At the

New funding resulting from ED efficiency improvements

CAD 3

million annually

Time to launch COVID-19 dashboard

2

weeks

heart of this effort, Sri Vijay quietly but effectively helps guide the hospital's data-driven care provision. "I enable people to make data insights part of their day-to-day routine" he says, "and give them the confidence to make decisions based on it."

When the COVID-19 pandemic arrived on the hospital's doorstep in 2020, Sri Vijay realized that the BI team needed to create a dynamic, real-time dashboard to track active cases and measure the impact of the pandemic on its service provision. "First, we needed to track how many patients, who they were and where they were coming from," he says. "We weren't even sure yet what all the metrics were, but because community transmission has a high impact on the hospital, we needed to be able to measure them in near real time."

> "Thanks to the infrastructure we already had in place, we were able to launch our COVID-19 portal in less than two weeks."

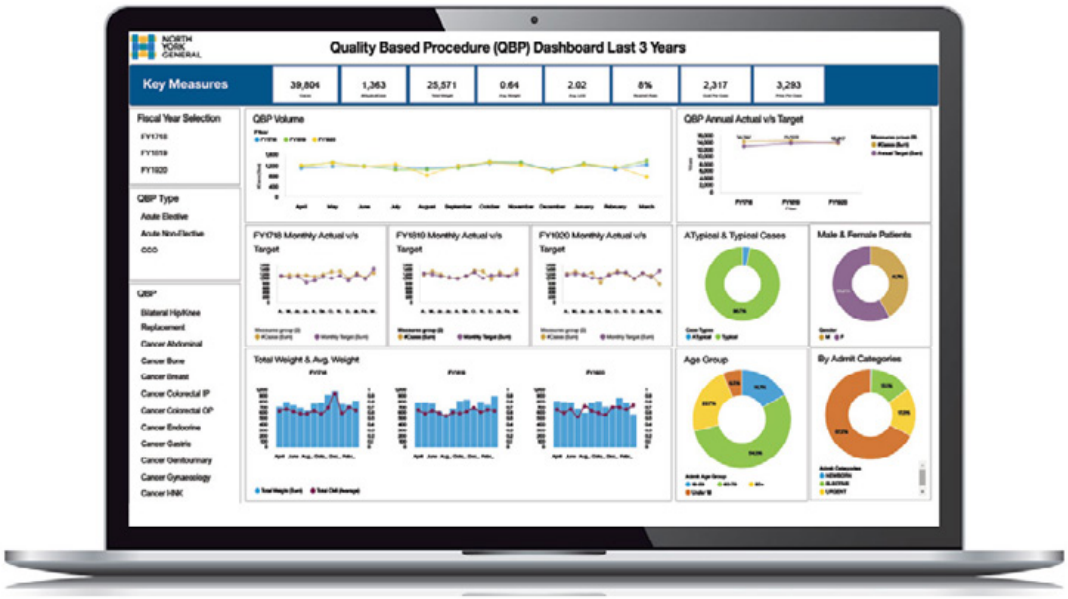
Sri Vijay Bharat Peddi, Business Intelligence Specialist, Analytics and Decision Support, North York General Hospital

Cognitive insights improve hospital responsiveness

The hospital's cognitive journey with IBM began in 2017 with the implementation of a data warehouse platform, the IBM PureData® System for Analytics, powered by Netezza® technology. NYGH then deployed the AI-powered IBM DataStage® solution to deliver data to the data server from more than 15 source systems throughout the hospital in real time. These include internal clinical and non-clinical source systems from Cerner Corporation, RL Solutions and TeleTracking Technologies, Inc., as well as external sources, including datasets from the City of Toronto and Ontario Health and open source geo-spatial datasets. NYGH also implemented and

continues to use IBM SPSS® Modeler for predictive analytics.

Finally, NYGH upgraded to the AI-powered Cognos Analytics software, which it uses to develop real-time reports and dashboards covering multiple service provision metrics. The hospital first applied these AI insights to more than 20 QBPs, creating a dashboard that replaced at least 100 different static reports. A single dashboard provides insights into all the QBPs while allowing users to drill down to permissioned details and insights, including to the patient level.



Sri Vijay credits the interactive, rich visualizations and the user-focused design of the Cognos Analytics software for rapid uptake by hospital staff. "It allows us to gain more real-time insights," he says. "And it also allows users to go in and, in a self-serve way, slice and dice the data the way they need to. A physician or nurse manager can look at a graph, see at a glance if something isn't right." Users can also filter data and harness powerful patient-level drill-through reports to gain deep insights into performance and outcomes.

The BI team then turned its attention specifically to the ED. According to Sri Vijay, "Metrics like patient wait times and length of stay are critical to the performance of the emergency department and inpatient units, but from an operational perspective, there might be dozens of factors that drive those metrics." The hospital examined specific backlogs where patients waited longer for care. In one case, it discovered that ED readmissions where

diagnostic imaging was the reason for the return visits were having cascading impacts on the overall ED patient flow. By ensuring the availability of imaging resources at various times during patient's first visit, the hospital was able to mitigate some of the ED return visits, which in turn improved overall patient wait times.

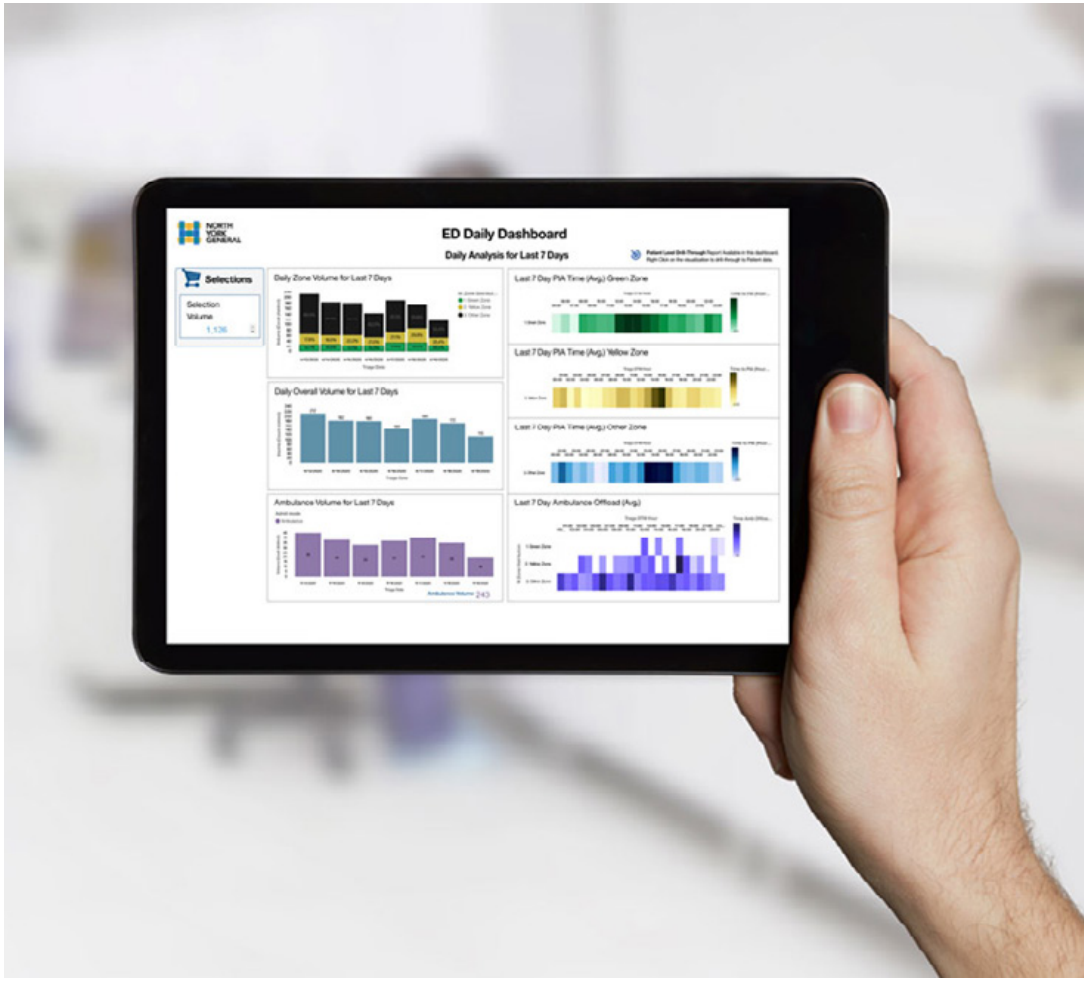
NYGH also uses the Cognos Analytics solution to analyze population health determinants for the local area from which they draw most of their patients. "We use the mapping features in the Cognos solution to identify hotspots of disease prevalence and demographics," says Sri Vijay. "We want to know if there are any gaps in services so we can serve our community better."

Most recently, in 2020, the COVID-19 pandemic strained the hospital's capacity to deal with an influx of patients. NYGH applied the Cognos

> "As a member of the Incident Management Team, the information on the COVID-19 dashboard gave me real-time access to critical information such as ICU and acute care COVID-19 admissions, number of ventilated patients and the number of tests completed at the COVID-19 Assessment Center."

Sandy Marangos, Clinical Director of Mental Health Program, North York General Hospital

Analytics solution in a phased approach to analyze the impact of the virus on various resources, including testing capacity and ED, inpatient and ICU beds. In addition to creating real-time reports, the hospital used its SPSS Modeler software to predict future resource impacts based on forecast models.

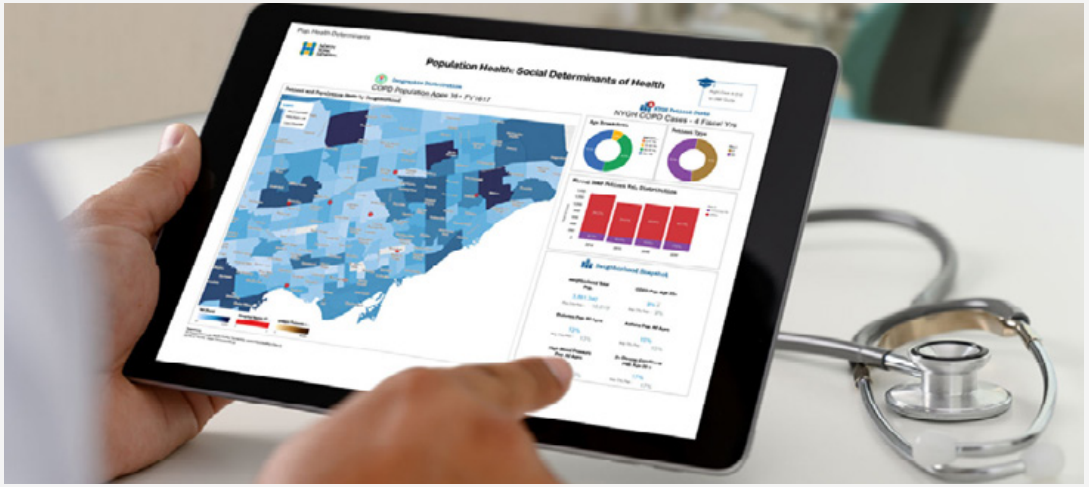


"As a member of the Incident Management Team, the information on the COVID-19 dashboard gave me real-time access to critical information such as ICU and acute care COVID-19 admissions, number of ventilated patients and the number of tests completed at the COVID-19 Assessment Center," says Sandy Marangos, Clinical Director of Mental Health Program at NYGH.

Ultimately, NYGH built a service recovery dashboard to monitor the many different metrics and forecasts concerning COVID-19. "This was a challenge in terms of ensuring that our core services were ramped up," says Sri Vijay. "For example, making sure that all our surgeries are up to the mark while making sure that the impact of COVID-19 patients doesn't overwhelm the system."

Improving today's services, preparing for the future

Several years ago, NYGH embarked on its strategy to implement data-driven healthcare with the help of IBM advanced analytical tools. Today, the hospital not only measures but improves performance by using Cognos Analytics software to quantify and evaluate key performance measures across the facility.



When it began tracking its ED performance using Cognos Analytics dashboards, the hospital discovered service bottlenecks. By tackling these issues head-on with a new staffing strategy, NYGH improved service efficiency and improved KPIs radically, which resulted in an additional CAD 3 million in government funding annually. Widely admired across the greater Toronto area, the ED dashboard solution is now used to benefit other hospital organizations.

The hospital continues to improve QBPs by understanding care pathways and associated costs and funding, and by finding ways to improve service delivery at lower costs. By analyzing the data in its population health dashboard,

the hospital has embarked on the creation of collaborative community health teams to address demographic healthcare issues in its surrounding area. The goal is to improve disease prevention and primary and preventive care before its patient population requires hospitalization.

When it came time to respond proactively to the COVID-19 pandemic, NYGH naturally turned to its preferred analytical tools. “Thanks to the infrastructure we already had in place, we were able to launch our COVID-19 portal in less than two weeks,” says Sri Vijay. “And that’s been a big win for us.”

The real-time dashboard lets the hospital track trends in hospital and ICU admissions and various resources throughout the hospital to allow it to respond quickly to new upticks in community transmission. “It’s our command center dashboard that the

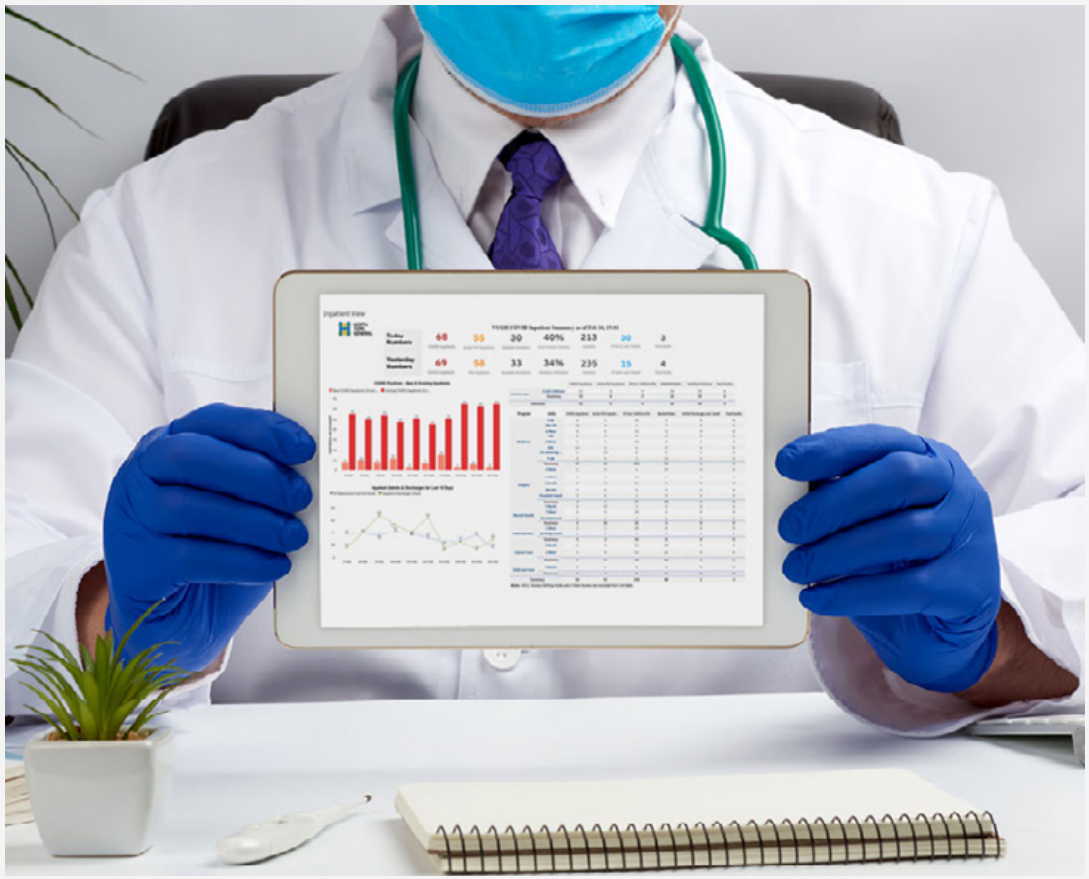
> “I have used the COVID-19 dashboard daily to identify the total number of patients in the organization and their impact on capacity within the Medicine Program and within the critical care unit. It provides just-in-time data on patient volume, capacity and acuity.”

Wendy Cheung, Director, Medical Program, North York General Hospital

entire hospital staff can see at a glance," says Sri Vijay. "About 5,000 staff have access to the dashboard to see the current metrics and stay informed."

At the onset of the pandemic, many surgeries and procedures were cancelled to accommodate the possible influx of COVID-19 patients. As time progresses, the hospital is using its analytical tools, including IBM SPSS Modeler, in a service recovery initiative to avoid surgery backlogs even as it plans for possible surges in COVID-19 capacity.

"I have used the COVID-19 dashboard daily to identify the total number of patients in the organization and their impact on capacity within the Medicine Program and within the critical care unit," says Wendy Cheung, Director, Medical Program, North York General Hospital. "It provides just-in-time data on patient volume, capacity and acuity.



This dashboard provides insights to compare our internal capacity and acuity with other organizations and within the Central Local Health Integration Network (CLHIN) for Ontario."

"As we continually build new use cases for the Cognos Analytics tools," concludes Sri Vijay, "we can just keep providing more economic value to the hospital in terms of helping people get better care and even saving lives."

About North York General Hospital

As one of Canada's leading community academic hospitals, North York General Hospital (NYGH) provides an exceptional care experience for its patients and their families. Since 1968, NYGH has proudly served a diverse community of approximately 400,000 people in North Toronto and beyond. Its more than 5,000 staff, physicians and volunteers offer a range of acute care, ambulatory and long-term care services.

Solution components

- IBM® Cognos® Analytics
- IBM DataStage®
- IBM PureData® System for Analytics
- IBM SPSS® Modeler

Produced in the United States of America, March 2021.

85037985USEN-00