

Best Achievement in Data Analytics enabling Operational Excellence – **Clinical Operations Dashboards**

1.0 SYNOPOSIS

1.1 Background

University Health Network (UHN) is an international source for research, patient care and education and consists of four hospitals, five research institutes, and a post-secondary institution. With a budget of over \$2 billion, UHN makes a difference in the lives of patients and their families every day.

1.2 Challenge

UHN has an aging and complex patient population. With increasing volumes and longer wait times, UHN is challenged to deliver world-class care with limited resources. With hundreds of electronic systems, there is **too much data** and **not enough insight** and **data-driven action**. Prior to the Clinical Operations Dashboard project, our executives were unable to see key performance metrics on a real-time basis (see Figure 1 Past and Present for Clinical Operations Dashboards). Our dashboards help identify congested areas leading to opportunities to improve capacity to support patient flow.

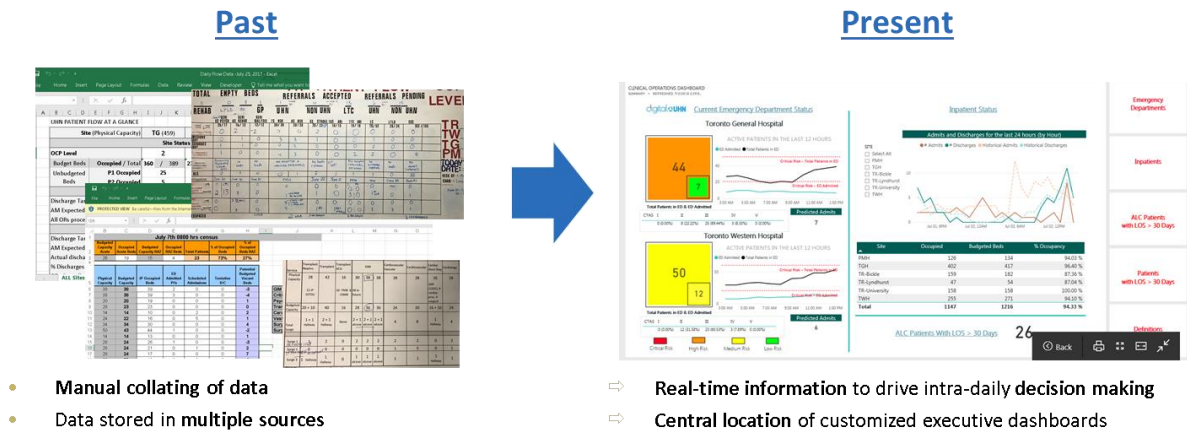


Figure 1: Past and Present for Clinical Operations Dashboards

1.3 Outcome

This project enables the following:

- **Translate complicated data into simple to understand insights:** many of our clinicians are not “fluent in data”. We use data visualization to remove the noise and processing and allow them to focus on key insights
- **Increase views by 1300%:** previously, census information is provided manually twice a day, we have seen our Executive Vice President (EVP) access the census dashboard 28 times in 1 day
- **Shift from reactive to proactive:** there are times when our EVP sees an emerging “critical” status on our dashboard, it will prompt him to immediately go down to the Emergency department

2.0 STRATEGIC OBJECTIVES AND SCOPE

2.1 UHN Organizational Strategy

One of UHN’s strategic objectives is focusing on **Operational Excellence**: finding safer, simpler and smarter ways of providing exceptional care. As a values-based organization, UHN believes in an integrated approach to putting the needs of our patients first. The Clinical Operations Dashboards **play a fundamental role, utilizing data analytics**, in driving efforts to **improve patient flow** across our organization and providing efficient, sustainable, and patient-centered care.

2.2 Project Objectives

The key objectives of this project include the following:

- **Improve Patient Flow:** utilize data analytics to drive executive decisions to support patient flow
- **Improve Data Literacy Across Organization:** make complicated and hard to find data more visible and understandable and improve how people use and interpret data
- **Identify Bottlenecks and Pain Points:** present data in a way that is understandable and allow the team to identify busy clinical areas to support patient flow
- **Improve Communication:** provide real-time data analytics and bring together teams that have been independently engaged in managing patient flow
- **Shift From Reactive to Proactive Behavior:** instead of providing reports after the fact, provide data on a real-time basis that allows our team to proactively change the situation in the moment

2.3 Project Scope

The focus on the Clinical Operations Dashboard is to develop an **operational** (monitoring performance real-time / intra-daily) versus **tactical** (monitoring performance over a period such as weekly) dashboard. The purpose is to develop an executive dashboard that gives visibility and insight of what is going on at an executive level every day. The focus is on real-time and meaningful data that will help start conversations that will aid in improving patient flow. The scope includes focusing on the following:

- **Data electronically available and reliable:** in order to keep the stakeholders engaged and to keep the project momentum going, we only consider data that is currently electronically captured and reliable. This will allow our team to quickly develop the dashboards and show progress and allow the users to use the dashboards as soon as possible
- **Data captured on a real time basis:** focus on data that is already electronically captured real-time in order to be able to drive potential action to improve patient flow
- **Data that impacts patient flow:** for version 1.0, the focus is on data analytics for Emergency Department and Inpatient areas. For version 2.0, the scope is extended to include Outpatient, Referrals, and Surgical. We are also using simulation models to conduct predictive analytics to support bed management and patient flow. We have a targeted scope and we only include a few key data elements per area to ensure we are only capturing the key essential information
- **Data that will drive behavior change:** focus on data that the executive team would want to see at 7am that will help determine what conversations and decisions they need to make that day and again at 5pm to ensure the day was a success. We concentrated on data that is relevant and tailored to our executive team to ensure they will use it

3.0 IMPLEMENTATION PROCESS AND TIMELINE

3.1 Implementation Approach

The following are the key guiding principles to our approach:

- **Focused Scope:** we start with a narrow scope. Once our executive sponsor was engaged and using the dashboard daily and we demonstrated success, we then expanded our scope
- **Agile Development:** instead of following the lengthy waterfall systems development life cycle approach, where value diminishes during development, we applied an agile approach, focusing on the key vital indicators and quickly moved to refine and demonstrate value
- **Build with Strategic Purpose:** the dashboards created are customized based on the individual needs of our executive audience with a defined outcome in mind versus taking the traditional approach of building generic dashboards that are so generalized that they are of limited value to an individual

Please refer to Figure 2: High Level Implementation Timeline.

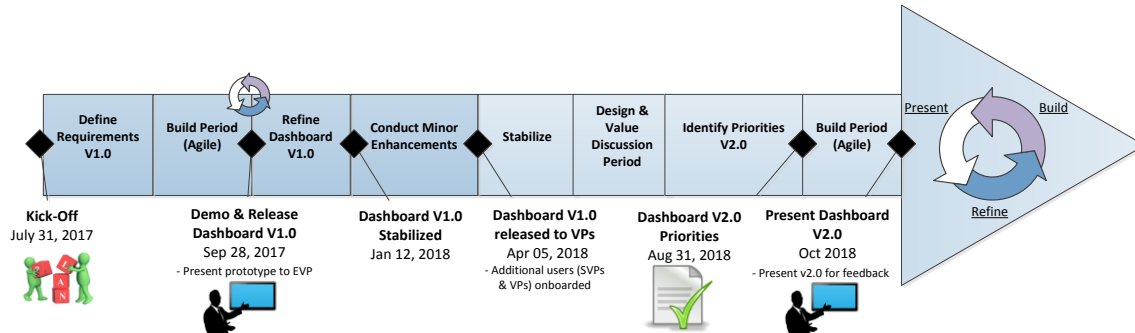


Figure 2: High Level Implementation Timeline

3.2 Leadership Engagement

The executive sponsor is our **EVP, Clinical Support and Performance, Mike Nader**. The design is led by Mike and his executive team, representing each of the six hospital sites including labs, imaging, and pharmacy.

Open Challenge / Collaboration Model: Our EVP has greatly contributed to the design of the dashboards. The dashboards have been tailored to the unique needs of his portfolio. Mike gave feedback directly and continuously as he uses the dashboard. This has been an innovative and collaborative model. Our team has established clear goals and a trusting environment where we felt comfortable challenging each other throughout the design and development phases.

4.0 SIZE OF PROJECT CHALLENGE

4.1 Size of Project

The size of our challenge include looking at patient flow for the following:

- **Outpatient:** over **1 million clinic visits** per year
- **2 Emergency Departments** with over **120,000 emergency visits** annually
- **Site and Unit Bed Capacity:** **6 hospital sites**, over **1200 beds**, over **430,000 inpatient days**
- **Surgical:** over **30,000 day surgical cases** per year

4.2 Innovative Tools / Approach

- **Quickly develop a “minimal viable product”:** in order to keep our sponsor engaged, we had to shift our technical team from a traditional, long drawn out development approach to an agile approach
- **Iterative improvement / refinement:** our executive sponsor continued to provide us with real-time feedback as he uses the dashboard daily and we continue to refine the dashboard based on his feedback. It was a paradigm shift for our team, as we had to change their mindset that the dashboards are meant to be fluid; if it is not telling the right story, then we need to change it quickly. By making the changes on the feedback quickly, we were able to keep our stakeholders engaged
- **Focus on data analytics that will drive outcome and action:** quite often stakeholders requested to include additional data metrics to the dashboard. However, we consistently asked them, by having that data, what action will it drive and how will this impact patient flow?
- **Monitor usage to ensure value:** for the first time, we monitored if people were using the dashboards to ensure we are providing value. We have seen our EVP click the dashboards 28 times in 1 day. In comparison, there are many manual reports that are delivered to our end users which we hear back that people are not reviewing
- **Feedback boards to document feedback:** to ensure we keep our stakeholders engaged, we delivered large, visual boards that we ask them to post on the office walls to document their feedback (please see Figure 3: Large Feedback Boards).

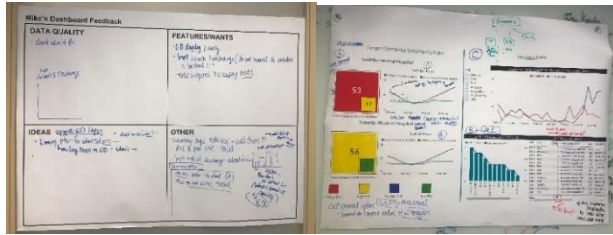


Figure 3: Large Feedback Boards

5.0 ORGANIZATIONAL IMPACT OF PROJECT

5.1 Organizational Learnings and Value

- **Provide a holistic picture on real-time patient flow across the organization:** given there are hundreds of systems at UHN and that we have too much data and not enough insight, this is the first time we were able to provide real-time data analysis to our executives to demonstrate how our various sites are doing in terms of managing patient flow
- **Improve communication:** provide real-time data analytics and bring together teams that have been independently engaged in managing patient flow
- **Shift from reactive to proactive behavior:** instead of providing reports after the fact, providing the data in a real-time basis allows our team to proactively change the situation in real-time. We hear feedback from our EVP that often he will see that the emergency department status is “red” in critical state, and it will prompt him to go down to the Emergency department and offer support
- **Highlights gaps in data quality and data anomalies:** the dashboard introduced data quality issues to how some data is currently captured and, or interpreted. The dashboard surfaced some existing practice issues and gave the organization an opportunity to correct them

6.0 Business Results

6.1 Business Results

- **Increase views by at least 1300% for unit census information:** previously, unit census information was only provided manually twice a day (8am and 3pm) – we have seen our EVP clicked the dashboard 28 times in 1 day to better understand unit census data
- **Increase at least 78% in speed of delivering a product of value to the business:** traditionally it would take approximately 9 months before demonstrating a non-working prototype to the business. For this project, from the moment we defined the requirements with the business, we delivered the prototype and a live model for the customer to use within 2 months

6.2 Customer Benefits

At our organization, we provide thousands of reports each year that are hardly used. A dashboard is a reporting tool and unless people using it, the tool is ineffective. We have been able to demonstrate that our tool is effective, as we have seen our EVP click our dashboards over hundreds of times per month.

This project provided a platform to enable the following:

- Providing opportunities to see **real-time data analytics** and **respond quicker** to key events that **may impact patient flow**
- Introducing new opportunities for **“rounding to influence”** that helps bridge the potential information gap between our executive audience and front line staff and allow us to start crucial coaching conversations across our teams
- Improving understanding of busy times can **aid in predicting staff workload** and timing of scheduled visits and potential improvement to staff satisfaction