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Population Health and Data Reporting Strategies in the Era of COVID-19

Insights from Massachusetts Healthcare Leaders

PREPARED WITH:

MHA MASSACHUSETTS Health & Hospital ASSOCIATION

WHITE PAPER

Introduction

In the wake of COVID-19, hospital reporting tactics underwent a massive transformation as health systems raced to move from retrospective to real-time reporting of key metrics such as bed availability, PPE burn rate, and inventory of nasal swabs, reagents, ventilators, and medications.

These insights were critical to public health administrators working to coordinate a statewide response to the pandemic. As case counts surge it is critical that hospital and public health leaders consider additional reporting strategies that will better prepare the healthcare system.

This white paper will examine insights from healthcare leaders, including:

- Steps taken to identify and close health data reporting gaps during the first phase of the pandemic
- Remaining data deficits faced by hospital executives
- Strategies for creating more granular visibility into end-to-end patient flow, including identification of new key metrics from ambulatory, acute, and post-acute care settings
- Opportunities for, and sources of, predictive analytics available to support more efficient inventory management and care coordination

This paper has been developed in collaboration with the Massachusetts Health & Hospital Association (MHA) and includes insights from a webinar MHA conducted and Dimensional Insight sponsored with the following Massachusetts healthcare leaders:

- ***Elizabeth H. Johnson***, MD, MS, FACP, Chief Medical Officer, Beth Israel Lahey Health Primary Care
- ***Peter F Dunn***, MD, Vice President, Procedural Services, Healthcare System Engineering, Capacity Management, Massachusetts General Hospital
- ***Kyan Safavi***, MD, MBA, instructor, Harvard Medical School; David F. Torchiana Fellow in Healthcare Policy and Management; faculty member of the Department of Anesthesia, Critical Care and Pain Medicine at Massachusetts General Hospital.
- ***Anu Puri***, Executive Director, Chief Data Officer, Massachusetts Health & Hospital Association
- ***Thomas Scornavacca***, DO, Chief Medical Officer, Population Health, Medical Director, Employee Health Plan, UMass Memorial Health Care - Office of Clinical Integration

Getting a handle on state-level data

Early in February 2020 when it became clear that the United States was going to be hit by the COVID-19 pandemic, the Commonwealth of Massachusetts wanted to assess its hospital data so it could, at a state level, understand the level of resource constraints and strains it would face in terms of ICU beds, medical/surgical beds, ventilators, personal protective equipment (PPE), and supplies. While the state didn't know it yet, these projections would be critical as Massachusetts was severely affected by COVID-19 in March and April.

The Massachusetts Health & Hospital Association (MHA) wanted to make high-level predictions in these areas to support its hospital members, so the organization looked at some of the early data coming out from China and Italy on bed use rates, ventilator use rates, and more. MHA then coupled that data with hospital census data and the state's Center for Health Information and Analysis (CHIA) data on beds to make some initial projections.

While the projections were concerning, also troubling to MHA was that the bed data and occupancy data it was using was two years old, and it was reported in a confusing and inconsistent way.

Anu Puri, chief data officer at MHA, says, "What became very clear to us is that we really needed to have more current data on bed availability and occupancy and we needed it to be accurate, complete, consistent, and clear in order to be able to do meaningful projections and capacity planning, and to provide data back to our hospitals so they could track that."

MHA was able to partner with the Massachusetts state government to leverage an existing system – the Web Emergency Operations Center (WebEOC). This online FEMA tool for resource management and information sharing enabled the state to ask questions on the required data from acute care hospitals and turn that data around daily.

The reporting requirements soon expanded to include federal requirements that involved more than 60 metrics to be reported daily. While the state had to continually refine its definitions and expand on the items reported, today the acute care data set and reports are stabilized. The association has 100% compliance for all of the state's hospitals, including acute care, post-acute care, and psychiatric institutions. The data set includes information on:

- Admissions
- Bed occupancy
- COVID bed occupancy
- COVID share of ED use
- Staffing shortages
- PPE
- Supplies

Despite the progress made in gathering the required data, there are still gaps or areas with room for improvement. These areas include:

- **Post-acute care transitions:** This area was quickly recognized as a bottleneck. As a result, the state has now instituted twice-weekly reporting on the supply of post-acute beds as well as the demand from acute care hospitals.
- **Psychiatric data:** The state has a ballooning ED boarding crisis in behavioral health as a result of the pandemic. MHA is working to have a more complete picture of that sector in terms of capacity and occupancy.
- **Assisted living:** MHA and the state need more data on this part of the care continuum to help have a more rounded picture.

In addition, MHA is looking at how the second surge of COVID-19 in the fall of 2020 differs from the first surge in the spring. One of the lessons from the first surge was that decision-makers generally agreed that a wholesale shutdown of elective services is not desirable from both a patient outcome perspective and a financial sustainability perspective.

Puri says, "We are trying to make sure we understand the data, track the data, report out meaningful and correct data, and at the same time, set up mechanisms for sharing this data for localized decision-making within regions so we can balance patients and avoid overwhelming the healthcare system."

A health system view of the data that matters

While Massachusetts faced challenges in aggregating and reporting data at the state level, hospitals and health systems were also assessing the data they had on hand to try and make projections and understand how COVID-19 would affect their organizations.

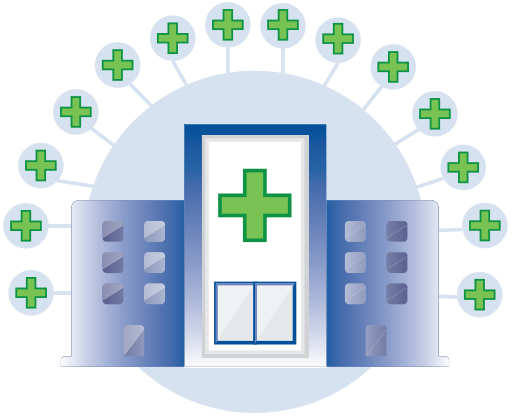
At Massachusetts General Hospital (MGH), a 1,000-plus bed hospital in Boston, the organization has a healthcare system engineering department, which started more than a decade ago as a collaboration with the MIT Sloan School of Management. The department employs operations research techniques and mathematics to model opportunities for improvement.

In 2019, MGH finished modeling a future state of the allocation of all the beds in the institution and was working to balance out resources it needed for different patients. At the time, the organization hadn't realized that it would have to apply its learnings from that experience to COVID-19.

Early on, the questions at MGH centered on whether the hospital would be as affected as hospitals in Italy and New York City. MGH took the data it had on hand for those two areas to create models to understand what the effect might be based upon different sensitivities of impact. Some of the specific questions were:

- Would the hospital have enough ICU beds?
- Would it have enough ventilators?
- Did it have enough supplies such as PPE?
- Did it have enough staff both in numbers and specialization for the ICU, general care, emergency department, and other areas?

MGH built models not just for its hospital, but for all of the 14 hospitals across the Mass General Brigham system. It also worked with other hospitals in Boston to compare its outputs with theirs to try and understand the future direction for a week or two.



As a result, the organization was able to predict the state of its hospital system about a week out and could provide recommendations to the senior leadership and incident command team. That allowed MGH to consider what floors of general care it would want to convert over to an ICU and gave staff time to plan its team to function in an area of the hospital that is not typically used as an ICU. It also allowed the hospital to balance out the resources of physicians and nurses so it had an appropriate complement of ICU experience mixed in with others who were willing to work in the new environment.

DATA THAT MGH EXAMINED

Epidemiologic models	Examined mild, moderate, and severe peak occupancy scenarios. Resulted in management operational leaders coming together to talk about how the system could meet the needs of a worst-case scenario.
Benchmarking trajectory as a system	Examined data on hospital occupancy in the Italian national health system early in the crisis. Models ultimately evolved to a point where MGH had enough COVID patients in its hospitals that it could understand key data points such as: • ICU utilization rate • Length of stay • Sequence of general care/ICU utilization
Other important data	MGH also examines data including: • Geographic hot spots in the Boston area • Accelerations in hospitalizations • Infection rates in post-acute care facilities and skilled nursing facilities (SNFs) • More sophisticated data on COVID patients, including those admitted for other reasons

Moving forward, MGH is working to better understand data related to positivity rates in surrounding communities and what that means for care within the hospital. So far, the hospital has seen a disconnect between the rate of positivity testing and hospitalizations. However, because Boston is a city rich with colleges and universities, which are testing en masse, and seeing younger patients test positive who generally don't require hospitalization, the numbers could be obscuring other data that would be useful.

Using data to inform post-acute care

Once patients have recovered in acute care settings and are ready to be discharged, they often move to post-acute settings. The goal for transitional and longitudinal care is to continue the recovery process and help prevent readmissions.

UMass Memorial Health Care had, like other hospitals, sought to strengthen its relationship with post-acute facilities before the pandemic hit. That meant that when COVID patients came to the hospital and were ready for discharge, care providers could work with the post-acute facilities at a deeper level to improve care.

Using sepsis as an example, it's not uncommon for people to start having signs of it when they are in a skilled nursing facility (SNF) after they have been discharged from the hospital. However, SNFs are traditionally not set up to recognize the early symptoms. Another example would be getting supplies; SNFs did not have leverage in obtaining PPE, and it was hard to determine who to talk to in order to get the supplies they needed.

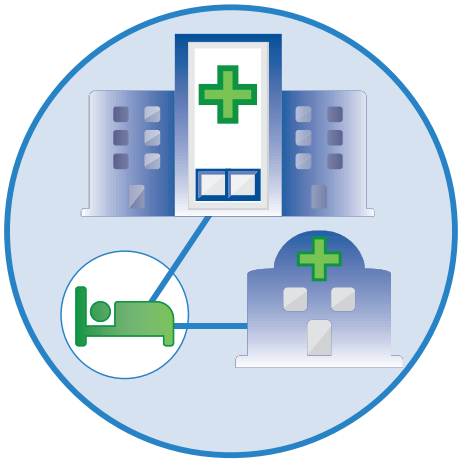
For UMass Memorial, addressing these and other issues involves cross-collaboratives to work on topics where experts share workflows and best practices. Step one was to have the right conversations and exchange of information. Step two, once COVID-19 hit, was to set up SNFs as discharge destinations for COVID-positive patients once they were ready to leave the hospital. They could not just send them back to nursing homes and put others at risk. UMass Memorial was able to move hundreds of patients from its acute tertiary care center during the patient recovery phase to these SNFs.

Once the initial COVID-19 surge in Massachusetts waned over the summer, executives at the hospital turned their focus towards advance care planning and trying to understand some of the issues the organization faced in delivering palliative care and advance care planning during the pandemic.

According to Thomas Scornavacca, MD, chief medical officer, population health, at UMass Memorial, "Most of our focus during the summer was on advance care planning and building technology using our data to share with those nursing facilities, developing a workflow, and setting some pilot projects where we could deliver remote telehealth consultation for palliative care."

That meant having the right equipment available to do telehealth consultations with a palliative care provider in the nursing home, since the nursing homes did not want providers walking through the front door and potentially bringing COVID-19 into their institutions. Figuring out and deploying the right technology to support this has been a priority for the health system.

Another priority has been leveraging data MHA provides and combining that with its own data to provide information back to the post-acute providers who don't have the same level of insight. UMass is trying to bring its data analytics, claims data, and population data together to provide post-acute providers with information on what's working and what are the important trends to focus on. The result of this collaboration is an expanded network of SNFs, long-term care, rehabilitation services, and the health system that can better identify opportunities for improvement specifically related to COVID or other chronic conditions.



Using data at the physician level to improve care

A final area in which Massachusetts healthcare leaders have been looking to better understand their data during the COVID-19 pandemic has been at the physician level by striving to provide better services to patients.

Beth Israel Lahey Health (BILH) Primary Care recognized at the outset of the pandemic that there were gaps in advance care planning with its patients. In early 2020, the health system was inundated with critically ill patients, and the BILH team didn't have advance directives on file for many of them. Therefore, providers didn't fully understand the wishes of patients.

As a result, the organization put together a multi-disciplinary task force to focus on questions such as:

- How do we communicate to patients?
- How do we let them know we want to focus on this area?
- How do we operationalize this?
- How do we leverage our EHRs and document advance care plans appropriately?

The health system used its data to identify patients who did not have advance care planning. It then had to think through issues of how to reach them, since in March and April, providers had transitioned to a full-time telehealth model of care. These patients were at home and worried about the pandemic, so the BILH team took this as an opportunity to reach out to them around this topic and to also see how they were doing.

BILH used some of its predictive analytics to identify its high-risk, high-needs patients. The organization decided to begin outreach with this list. The system also trained its providers on how to do advance care planning by telehealth, and then measured the results, such as patient engagement, during the process.

What BILH found was that patients were happy to have the discussions on advance care planning through telehealth and to have their families with them in their living room while they had these conversations. As a result, the organization is working to further refine and investigate other areas where its predictive analytics can make an impact.

Lessons learned

As organizations reflect on their data challenges and successes from earlier in 2020, three lessons emerge for healthcare leaders:

1. Collect data in a systematic manner: In a dire situation such as the COVID-19 pandemic, it's critical that organizations have a complete and accurate view of their data. This means having clear and consistent definitions of data so organizations can be confident that they are viewing the same information in the same way. It also means identifying data gaps and continually working to eliminate them.
2. Identify the right data to make an impact: It's important to not just collect data for data collection's sake. Especially in a pandemic, it's important to focus on the data elements that will truly make a difference. MHA is focused on providing reports on ICU and medical surgical bed capacity to hospital executives. It's critical to identify the data that's meaningful and provide that in concise reports to the right leaders, while omitting anything that will just be noise.
3. Collaboration is key: As we've seen through the examples we've examined, collaboration is important to gain better insights. Sharing information between the state, hospitals, post-acute facilities, and the rest of the care continuum has been critical in being able to better understand COVID-19 and how healthcare organizations can make better decisions to positively affect patient care.

Learn more

To view the full webinar with Massachusetts healthcare leaders that examined this topic, please visit https://www.dimins.com/webinars/population-health-data-reporting-strategies/.

You can also visit https://www.healthcare.dimins.com to learn more about Dimensional Insight, which provides an enterprise analytics platform that healthcare organizations can leverage to make better decisions to positively impact patient care.

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Dimensional Insight® is a leading provider of analytics, data management, and performance management solutions, offering a complete portfolio of capabilities ranging from data integration and modeling to sophisticated reporting, analytics, and dashboards. The company is a seven-time Best in KLAS winner in healthcare business intelligence and analytics, most recently ranking #1 in 2020. Founded in 1989, Dimensional Insight has thousands of customer organizations worldwide. Dimensional Insight consistently ranks as a top performing analytics organization by customers and industry analysts in its core market segments including healthcare, manufacturing, and beverage alcohol. For more information, please visit https://www.dimins.com.

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