Information Technology to Improve COVID-19

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ABSTRACT

Our health system recently transitioned to a unified enterprisewide electronic medical record across all of our hospitals. This accelerated our ability to implement a series of technological solutions to the crisis. The technology bridged divides between different hospital systems across New York City to encourage the sharing of data and improve patient care. By rapidly expanding its use of information technology, NYC Health + Hospitals was able to respond to the COVID-19 surge and is now better positioned to work in a more integrated fashion in the future.

Keywords

COVID-19; Health; Information technology

INTRODUCTION

New York City's coronavirus disease 2019 (COVID-19) pandemic, New York City Health + Hospitals, the nation's largest municipal health care system, found itself forced to rely on information technology to expedite and expand its volume of work in caring for large numbers of socioeconomically marginalized New Yorkers, who were disproportionately affected by COVID-19 [1].1 Just two years before COVID-19, NYC Health +Hospitals system serving more than 1.1 million patients annually through eleven acute care hospitals, a long-term care facility, a certified home care agency, and more than seventy ambulatory clinics had operated on multiple different medical record, scheduling, financial, and data storage platforms, impeding maximal coordination, efficiency, and rapid-cycle learning. On March 1, 2020, the same day New York City reported its first case of COVID-19, the system turned on its unified electronic medical record (EMR) at its last remaining inpatient facility. The ways in which NYC Health+Hospitals used its newly inaugurated EMR to direct and facilitate pandemic response were indispensable in supporting tens of thousands of New Yorkers over the peak period of crisis, from March to May 2020 [2].

INFORMATICS

NYC Health+Hospitals, using the principles of information science to acquire and analyze heath data has been essential. Dashboards reflecting ED patient volume, ICU and medical floor availability, and staffing were rapidly created by Information Technology and our Office of Population Health as the urgency of the COVID-19 crisis overwhelmed institutional inertia. These dashboards automatically dragged data from the integrated EMR and other data resources to present a unified single source of information. Matched capacity to bed demand across the entire enterprise, rather than at the individual hospital level [3]. Transferred patients daily out of our hardest-hit hospitals to our other facilities. When the patients arrived at a new facility, their labs, radiology, notes, and vitals from the previous facility were all accessible. There was no need to sift through paper records. These measures helped with "level-loading" patients and staff members more equally throughout the system, alleviating patient surges and provider shortages at the most affected facilities.

A shared EMR knowledgeable by clinically active leadership made this work possible. The dashboards were not modified to meet clinical needs, they were built in collaboration between data scientists and clinicians who also served within operations. In the crisis, enterprise definitions of what constituted ICU space-medical floor space capable of caring for critically ill patients with COVID-19 were agreed upon and historical local definitions set aside. The dashboard's contents were reviewed daily on a morning call that included the facility chief medical officers, chief executive officers, and system leadership. This allowed for data-driven decision making and the rapid correction of inaccuracies.

Facilities converted post-anesthesia care units and operating room space into new ICUs, and medical floor space was adjusted to allow them to accept ICU-level patients. Rehab space and pediatric floors were turned into adult medical floor units [4]. The EMR was updated so that intensivists seeing an ICU patient in a post-anesthesia care unit or an adult hospitalist caring for a patient on a former pediatric unit would see the layout to which they were familiar and not require retraining. This added capacity was reflected in the enterprisewide dashboards. The integrated EMR system enhanced our ability to standardize, share, and use information much more quickly than we could

have under a system of paper records or an electronic system that was not fully standardized, allowing us to respond in real time to rapidly shifting demands. An ICU patient summary tailored to patients with COVID-19 allowed our intensivist to view and trend over time all of the important clinical variables, such as vital signs, recent lab tests, ventilator settings, and medications, on a single screen, and an infectious disease–focused summary followed all suspected and long-established COVID-19 cases within an entire hospital.

CONCLUSION

NYC Health + Hospitals to use its information technology effectively improved patient care delivery and laid the groundwork for a more optimized system response during a time of crisis. Speed in decision making was essential and required entrenched communication with front-line staff complicated in direct patient care. A number of barriers had to be overcome, but data were used effectively to address population and individual patient needs. Together, these innovations not only helped NYC Health+Hospitals weather one of the greatest health crises in its history but also positioned it structurally to be able to use enterprise information technology in new and ground-breaking ways in the period after the pandemic.

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