

How technology can help alleviate the COVID-19 crisis



Orion Health Whitepaper
Dr. Chris Hobson
Chief Medical Officer, Orion Health
032020



A global pandemic on health systems

The rapid emergence of COVID-19 and its far-reaching effects have been a startling wake-up call for patients and healthcare providers across the globe. Amidst travel bans, political disputes and economic crises, countries are confronted with questions around how to maintain a sustainable healthcare system.

These concerns are well founded. It is clear from events that have unfolded in China, Italy, Iran and other countries that health systems need to prepare for a massively increased load – especially on their hospitals. Demand for essential items such as intensive care unit (ICU) beds, respirators, ventilators and personal protective equipment is expected to greatly exceed supply.

With minimal knowledge on the biology of the disease, interventions need to be agile to meet a rapidly evolving threat. Now is the time for healthcare officials to turn their attention to digital health to support the sustainability of healthcare systems during a pandemic relies on technology.

This white paper outlines key technologies health systems should consider in combating this pandemic. Together these technologies form a complete package for health systems to use in managing an unprecedented threat to their sustainability and their ability to minimize loss of life.

Patient self-assessment to reduce the load on the health system

The first major step is to screen large volumes of patients, many of whom are anxious members of the “worried well” and will not require further treatment. Nevertheless, finding and enrolling those patients who will need additional medical attention is critical. A self-assessment website that considers all relevant factors of an individual and provides evidence-based recommendations to them is therefore desirable.

Self-assessment has many advantages in this current environment. It automates early steps in the disease process and follows the maxim of “letting patients help.” Self-assessments need to be in the context of each patient, especially their age, contact with Covid-19, and the presence of a chronic disease or significant comorbidities.

Based on the information entered by the patient, it should be possible to determine the likelihood of that patient contracting Covid-19, the severity of their clinical situation, and the likelihood of hospitalization now or in the near future.

The website should also help reassure the “worried well” that they are fine, thus reducing overload on the health system – including any public-facing services or call centre help lines.

Using advanced electronic health records, a clinician can then access a combined view of all the traditional clinical data as well as the new data types, perform analytics on that data, and act on those insights. The ability to predict and identify those patients most at risk, limits the strain on the health system, while ensuring correct patients are treated in the right place, at the right time.

Reducing hospital patient load with remote monitoring

Once a person has taken the SARS-CoV-2 RT-PCR test, it is important that the result

is available within the clinical record, ideally within a Health Information Exchange (HIE). This will ensure that every clinician in contact with the patient knows about the test result. Patients will need notification of their test result, either via secure messaging or via their patient portal.

Next, we turn to the most critical aspect of the entire process - managing and reducing the total patient load on hospitals. To alleviate pressure within hospitals, it is critical that patients who can safely be managed at home are discharged early. There are several categories of patients where this applies. Most obviously are COVID – 19 patients in recovery and those with other conditions that can be managed at home, such as chronic diseases (chronic obstructive pulmonary disease and congestive heart failure) and patients currently in hospital waiting for alternative levels of care.

For hospitals these are an extra set of tools to manage non-emergent patients in a way that reduces the risk to employees and other patients. To do this, a key enabling technology will allow clinicians to monitor regular patients at home via a remote monitoring solution.

For successful remote monitoring at home, the technology must offer clear, two-way trigger points. Patients can call for help or transfer to hospital, meanwhile alerts need to be sent to providers when patients deteriorate at home. The data is fed into hospitals, ensuring care can be allocated without overloading individual clinicians or departments.

Progress in remote patient monitoring will see critical data lead to a deeper understanding of the resources available in hospitals. A study in the Lancet identified multi-system organ failure, sepsis and delayed hospital transfers were significant hurdles for healthcare providers in Wuhan, China. In the case of a pandemic such as COVID-19, the death toll increases rapidly when ICUs are overwhelmed.

Reducing the burden on clinicians with population-level dashboards and collaborative worklists

Overall, healthcare providers will need to monitor their patient population, sorted by their level of risk, with the use of population-level dashboards. These dashboards should feed into worklists to enable healthcare providers to allocate work to the care team, reducing the load on individual clinicians.

Worklists can be made available to healthcare providers both in the community and in the hospital. An ideal format for a worklist is a shared or collaborative worklist, which facilitates active collaboration on the same lists of patients by health care teams.

Understanding current, and predicting future load on health systems with analytics

High-quality analytics are key in understanding both current and predicted workloads on healthcare providers. Analytics can provide critical information on the number of patients requiring hospital admission, ICU beds, and ventilators. This is crucial in avoiding deaths due to overwhelmed ICU admissions. Over time and as data becomes available, we want to be able to track recovery of patients and use these data sets to inform future algorithms via machine learning.

Integrating care with coordination tools

Today, there is still much that is unknown about the disease. For instance, if the virus latches onto the angiotensin-converting enzyme (ACE) in the lungs, there is a possibility that ACE inhibitors and angiotensin receptor blockers (ARB) may increase the patient's risk for severe outcomes, including death.

At the same time, ACE and ARB medications are important to patients to manage their hypertension, cardiovascular disease and a range of other medical problems. These patients should not stop their medication without proper assessment and balance of risks and benefits. This will be easier for clinicians once we know for sure whether ACE and ARB medications do in fact contribute to poor outcomes.

Integration with other clinical data, such as information in an HIE, is valuable for managing patients given the importance of comorbidities. Individual case management tools are also important, especially for complex patients where Covid-19 is just one of their multiple medical and social problems. Case management and care coordination tools will add significant value in helping such patients by allowing clinicians to see a more complete view of the patient record.

The challenge in developing technology during an emerging pandemic

One of the greatest challenges in developing technology during a pandemic crisis is the rapid emergence of new requirements, as the disease impacts an increasing number of patients. The technology implemented must be easy to learn, configure and adapt.

Technology should enable us to capture data and help us better understand the disease -- as currently there is a real shortage of reliable information. The lack of reliable best practices and scientifically validated information on the disease, confident decision-making is difficult.

Conclusion

A multi-pronged technology approach during a pandemic

The COVID-19 pandemic is an opportunity to demonstrate to health care officials and decision-makers that technology can facilitate sustainable healthcare systems. It can support the care of individual patients across the community, while also managing the needs and resources of the wider population. There is plenty more to come from machine learning-based predictive tools as healthcare providers leverage more data and experience from the disease.

With technology, healthcare providers can facilitate the care of individual patients in a community and derive population-level measures, fundamental to understanding the state of healthcare needs and its corresponding resources. Incorporating machine learning will give greater future insights, with more data being collected during the outbreak on COVID-19.

Taking advantage of solutions such as the use of a self-assessment tool, remote patient monitoring, collaborative worklists, population-level dashboards and integration with care coordination tools will significantly alleviate the burden on health systems during this rapidly evolving crisis.

A multi-pronged approach that uses technology to address the key issues health systems face, will ease their burden during this pandemic. As the number of confirmed COVID-19 cases grow globally, it will be critical to take action now to make an impact during this pandemic and ensure health system can deal with the increased load.

