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Cover Story

Pandemic Prevention Strategies
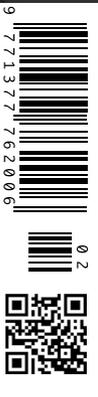
Leveraging Data and Digital Technology for Pandemic Prevention

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The COVID-19 pandemic has changed the way healthcare works. HealthManagement.org spoke to Sourabh Pagaria to discuss the future of data and digital technologies as strategic assets for pandemic prevention in future.

✓ Key Points

- There is a need to adopt technological solutions to help extend reach of clinical staff and improve patient experience.

- Artifical Intelligence (AI) and Machine Learning (ML) powered solutions will play an increasing role in improving clinical outcomes as well as operational workflows in healthcare organisations.

- Healthcare organisations would need to transform themselves into digital enterprises to thrive in the post COVID-19 era.

- Long-term partnerships within and beyond healthcare ecosystems can help healthcare organisations meet these challenges.

In light of the challenges healthcare systems across the globe have faced during the COVID-19 pandemic, what do you expect in healthcare over the next few years?

The COVID-19 pandemic has challenged healthcare systems all over the world placing an unprecedented stress on them. It has also accelerated the adoption of digital technologies. Significant changes in the healthcare landscape are already conspicuous and over the coming years, we will see further tectonic shifts that can be clustered as follows:

Digital Health will become mainstream: Use of digital solutions will continue to grow even after the immediate threat of COVID-19 is over, as patients, providers, and payers alike discover the benefits of virtual forward triage and eICUs, remote care, home monitoring, and digital communications channel. There will also be increased acceptance of AI as a clinical decision support tool to enable fast triaging and reduce unwarranted variations in care. Hospitals would need to build infrastructure to leverage operational data to efficiently manage patient flow and caregiver workflow. Perpetual shortage of medical staff and increased risk of infections will also force adoption of technology solutions to help extend the reach of clinical staff using technologies like eICUs, teleradiology and telemedicine

Increased consumerism will drive focus on patient experience: Increased adoption of digital technologies like telehealth and self-monitoring devices like wearables will challenge the traditional physician-patient relationship in many ways. Hospitals and health systems will need to focus on patient experience management, and engage them through digital channels across various stages of care continuum. They would also need to build services that can cater to different price and service level expectations among different consumer/patient groups for e.g. Millennial and Generation Z population segments are seemingly willing to pay membership or subscription fees that support convenience and on-demand use.

Expansion of outpatient care and decentralised testing: The risk of getting infection at a hospital which is also managing infectious populations will deter some patients from seeking care in that setting. Hence, adding ambulatory sites to delivery networks will make it more feasible for health systems to offer a safe and convenient "infection free" environment to both patients and care providers.

What are the top factors that you see as necessary for healthcare organisations and businesses going forward?

Managing change while delivering: Healthcare organisations and businesses have a huge transformation challenge ahead of them. To excel in this era of fast adoption of digital technologies, increased focus on patient experience and need for transformation of care delivery (from centralised to decentralised and remote as well as from episodic to continuous care) would mean building completely new skills, processes and investing in new technologies. They have to do all this while current business and actual services would also need to continue uninterrupted during the change. Finding the right balance between very fast transformation and progressive fade out of actual service will be the key for success. This is a huge change management effort which will require buy-in, focus and commitment from all levels of the health system leadership.

enterprises.

It is clear that these challenges are too big for healthcare institutions to face alone. In my view, well thought through long-term partnership within and beyond healthcare ecosystems can help manage this challenge.

Compared to other industries, the healthcare industry has not been able to completely leverage data and digital technologies. Why do you think that is?

Digital transformation of healthcare is inevitable but certainly not easy as digitalising healthcare requires profound changes in the way healthcare systems operate. There are many factors which have impeded the penetration of digital technologies and proper leveraging of power of data in healthcare:

Fragmentation of patient data: More often than not, even within healthcare systems, the patient data are dispersed

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Balancing competing financial priorities: Additionally, budget constraints have to be managed to continue supporting traditional flows and technology investments while financing a very fast transformation that needs investments in new technology and talent. Healthcare systems would need to explore new financial models with various stakeholders including payers and technology partners to align the risk-return profile of these investments.

Increasing attractiveness for non medical talent: The Industry has been sort of endogamic due to the very special training needs and professional requirements of healthcare, but now, specially in technological and specialised functions, companies will have to integrate people from outside of the industry like information technology, cybersecurity, data science, lean management etc.

Building a learning culture: True, sustainable digital transformation goes beyond adopting new tools and technologies. It requires a culture change and reorientation around more data-driven care models. Simply digitalising current processes and procedures won't be enough; healthcare providers, med tech companies, government agencies, payers and patient advocates will have to work together to sustainably deliver seamless digitally enabled care across a wide variety of care settings. Realigning organisations around data-driven, digitally enabled processes and care models is paramount to the long-term success of healthcare

in various silos which have low interoperability – labs, radiology, outpatient practices, physician offices and pharmacies. With increasing use of wearables and self monitoring devices by patients this problem has only compounded. This problem gets even more severe if patient goes to a healthcare provider outside a network during his care cycle.

Lack of high quality operational and clinical data: Even in the institutions where proper data infrastructure was put in place to bring data together at one place the challenge of ensuring that meaningful data is captured with proper identifiers like time stamps, machine readable physician notes has remained. In most cases, this has required redefining workflows and data capture responsibility within care teams to make it work.

Resistance in using digital communication channels in both patients and physicians: Healthcare delivery was always characterised by deep face to face interactions between caregivers (doctors, nurses) and patients. This was considered necessary to have empathy in these interactions especially with older patient population. COVID-19, however, has challenged both providers and patients to explore digital channels for the same. Using digital channels generates high quality data about the patient journey and disease progression which was not available earlier.

Lack of expertise: As said before, healthcare institutions have not been the first choice of talent that has driven

digitalisation revolution in other industries due to the endo-gamic nature of technology developments and lack of career paths for such talents. However, many leading institutions have realised this and have been bringing in cross industry talents into highly visible management positions like Chief Data Officer, Chief Digitalisation Officer who, in turn, are then catalysing this transformation.

Do you think partnerships and alliances with technology companies could help healthcare organisations better leverage data and digital technologies?
Because of the scope and complexity of digital transformation in healthcare, partnerships between healthcare provider organisations and industry are vital to success. Medtech partners with broad and integrated healthcare portfolios hold particular advantages for healthcare enterprises that are ready to embrace digital transformation. Such partnership can help provider organisations leverage technology to upgrade their organisations both in the near term, to better cope with the urgency of the pandemic, and in the long

relevant especially during times of pandemic with high patient load. There will always be a role for in-person care, but the benefits of telemedicine and remote monitoring point to sustained growth in their utilisation in the coming years.

What role do you think Artificial Intelligence and machine learning can play to improve quality of care?
AI-powered solutions are becoming more and more common in everyday clinical practices as they relieve physicians of routine tasks, enable more precise diagnoses, and give medical staff more time for supporting patients and families. Most of the Artificial Intelligence we see in use today is actually application of Machine Learning (ML) algorithm on specific problems. For clinical applications like using AI to automatically detect nodules in lungs using data from CT scans, the algorithms were trained on large clinical data sets which were created over a broad sample population and broad time scale. This important work is a prerequi-

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term, by investing in strategic digitalisation efforts. Such partnerships need to look beyond immediate financial benefits to one party and take an approach of co-creation, joint innovation and co-leveraging of mutual competencies and assets in order to deliver meaningful improvements in clinical and financial outcomes from such efforts.

COVID-19 has also revealed the role telemedicine can play in healthcare. Apart from fulfilling social distancing goals, what other benefits can telemedicine provide?
COVID-19 has indeed changed the face of medicine and telehealth has become the norm virtually overnight at many institutions due to restrictions on face to face appointments; one of our customers reported an increase in the share of telehealth visits from <1% of total visits to 70% of total visits, reaching more than 1000 video visits per day in just 4 weeks.[1] Overall, there is substantial evidence that home-based telemedicine reduces care costs in a number of chronic conditions including congestive heart failure and diabetes.[2] When done well, telemedicine can also deliver patient satisfaction that is at least equivalent to in-person care.[3] Telemedicine when coupled with AI can also enable fast triaging and quickly identifying critical cases requiring urgent medical attention. This use case becomes very

site for using AI in a clinical setting and when done right can enhance productivity of clinical staff manyfold while also improving quality of care. We are also seeing applications of ML in improving operational workflow in hospitals by leveraging operational data for e.g. with one of our customers we worked on applying ML in predicting patient inflow into ER departments depending on external conditions like time of the year, weather conditions etc. This can enable hospital managers to better plan staff levels and capacity which means more patients can receive better care thereby improving quality of care.

How can healthcare systems realise the full potential of Big Data?
We have recently released a comprehensive paper on "Digitalizing Healthcare" where we have articulated the key steps healthcare organisations can take to become Digital Enterprises.[4] In summary this means:
Managing data as a strategic asset by creating infrastructure and processes to integrate data from multiple sources like imaging, laboratory, physician offices, payers, wearables and genetics on secure and easily accessible data platform. Managing issues related to cybersecurity and data privacy would need to be an integral part of this effort.
Empowering data-driven decisions making by deploying

How to build a digital enterprise

| Manage data as a strategic asset | Empower data-driven decisions | Connect care teams and patients | Build a learning health system |
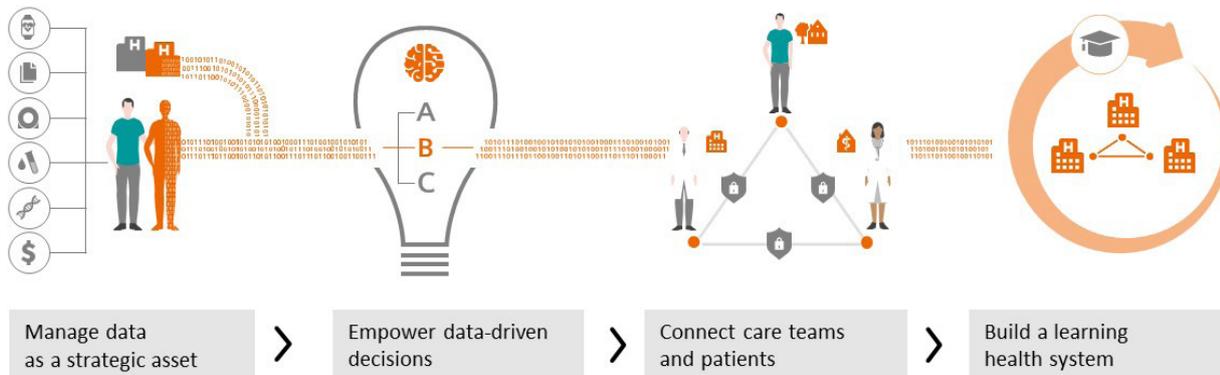
decision support tools for clinical use cases (fast triaging in ED, automated reading of body scans, therapy decision support tools etc.), operational (staff capacity management, patient load balancing across various locations) and consumer use cases (health informatics apps and dashboard for self recording of health data).

Connecting care teams and patients using digital platforms to deliver an integrated care experience. Apart from investing in telehealth and remote monitoring platform, building interoperability between hospital and physician offices, integrating data from wearables and other self monitoring platforms should also be part of this effort.

Building a learning health system which builds commitment within the organisation to both digital transformation and a culture of continuous improvement and knowledge/best practice exchange among the physicians. An important aspect of this effort would be to create leadership buy-in with joint targets, aligned incentives, and a commitment to transformation. Building the right organisational structures, including a dedicated team to support evaluation and learning activities throughout the organisation

What steps should healthcare systems take to ensure they are better prepared next time for a pandemic like COVID-19?

A new pandemic is unfortunately inevitable but health systems can be better prepared for the next event. The COVID-19 experience has highlighted the need for precise, coordinated and data-driven response. Three areas which would need focus are:

Applying testing, tracing and technology: This would include decentralised and random community testing, contact tracing and surveillance enabled by digital tools and using AI-driven telehealth platforms and chatbots for fast triaging and identification of high-risk patients at home to avoid hospitals becoming epicentre of infection.

Building community health information infrastructure: Local and national health authorities should also invest in building digital community health information infrastructure. These Artificial intelligence (AI)-driven community health monitoring centres would become enormous treasure troves of information. Using AI and machine learning, the spread of contagious diseases could be predicted and monitored. Such centres would, of course, need help in the form of hospital admissions data from all private and public facilities so they can take timely and effective actions to contain the transmission.

Ensuring preparedness of hospitals to manage community outbreaks: Preparedness is the key to mitigating a disaster. There are two aspects to consider when it comes to being prepared for a healthcare emergency:

1. Conducting disaster management drills at community level to test coordination between multiple hospitals in a community
2. Ensuring flexibility of infrastructure and staff such that temporary infrastructure like isolation wards, beds and even ICUs can quickly be set up in the wake of a community outbreak. ■

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