THE NEW NORMAL

THE IMAGING LANDSCAPE IN LATE-STAGE PANDEMIC DAYS
The novel coronavirus (COVID-19) pandemic has upended most of society the world over, particularly revealing fault lines in health care, economics, access to valuable social services and disaster preparedness in the United States.

While the global scientific community worked as one to solve a huge, new problem in real-time, their efforts and discoveries were also frequently undermined by an equally virulent “infodemic,” as political operatives of no lesser station than the American president sought to manipulate what was known about the virus for their own ends. (In October, researchers at Cornell University analyzing 38 million English-language articles about the pandemic found that President Donald Trump was the single largest driver of COVID-19 misinformation.)

With the promise of antiviral vaccines from pharmaceutical giants Pfizer and Moderna expected to hit cold-chain storage facilities as 2021 unfolds, the country has its first glimpse at being able to stem the tide of the virus. But the havoc it will have wreaked with the national health care infrastructure will not soon be undone. Like COVID-19 itself, the effects of the pandemic are likely to linger for months and years after it is under control. The losses that will have been sustained as a result may never be recovered.

Mike Klein, CEO of the Nashua, New Hampshire-based radiation therapy and cancer detection device-maker iCAD Inc., believes that the world of breast imaging is “clearly at an inflection point” that the pandemic has accelerated at “a double-time rate.” That point, as Klein sees it, is the departure from an age-based to a risk-adaptive screening model, triggered by the gap in care brought about by months of inactivity that many hospitals and imaging centers endured in the spring and early summer of 2020.

Roughly 40 million American women undergo breast cancer screening annually, making breast imaging “the canary in the coal mine” of broader imaging trends, Klein said. That breaks down to somewhere around 3.3 million women per month, or 10 million per quarter; from late March to late June 2020, they were unable to undergo routine mammograms when health care facilities were closed to all but essential procedures across much of the country.

“Fundamentally, 90 days was taken out of the cycle,” Klein said. “We now have to screen 40 million women in 25 percent less time.”

In addition to the lost opportunities of booking those patients, capacity limits and sanitization measures have reduced the number of patients seen in a given day by as much as half. Organizations may seek to offset the impact of those depleted revenues by extending hours and working weekends, but as Klein sees it, “We’re still lagging by 25 percent, and we also have missed 25 percent.”

“The net effect is we have a pipeline capacity of 20 million women and 40 million women who need to be screened,” he said. “This is not going to be changed until perhaps into the summer or well into the fall.”

Klein sees an opportunity to regain that lost ground by making broader changes. His solution: bringing patients in for imaging studies based on their unique biological profiles rather than on a calendar basis. By leveraging artificial intelligence (AI), the iCAD ProFound AI Risk clinical decision support tool can help physicians inform patients about their individual cancer risk months before studies present visually identifiable abnormalities.

“A woman may show up today with no indication of cancer, but with AI, we pull apart images, pixel by pixel, and look at asymmetries, architectural distortions and anomalies.”

Mike Klein, CEO of iCAD Inc.
the algorithms,” Klein said.

“This becomes a prioritization and scheduling tool for who to see now, but also who to follow up with on a more consistent basis,” he said.

Under traditional screening paradigms, patients are classified as being of either average or high risk, along a 90-10 split, respectively.

“It’s ‘I’ll see you in a year,’ or ‘I’ll see you in two weeks for supplemental imaging,’” Klein said. “But with this information, you now make decisions based on where the patient is. If risk is high, the patient moves to a different regimen of personalized care. Suddenly, everything changes: you screen more frequently, and you screen on supplemental technology, while you see lower-risk cases less frequently.”

Individualized risk stratification supports clinicians pursuing additional advanced imaging studies for those patients who need them while also allowing for earlier interventions in the treatment of a disease the survival rate of which improves dramatically the earlier it’s diagnosed. Klein believes the early detection information yielded by AI-enhanced imaging algorithms will lead to physicians treating breast cancer in a similar fashion as they treat heart disease: with pharmaceutical interventions and more frequent monitoring.

The deferral of breast cancer screenings because of pandemic-related shutdowns has also dragged down detection rates, Klein said. Prior to the pandemic, the bulk of cancers found through screening were detected at Stage One, the minority in later stages of development. Since the shortfall of that missing second quarter of cases, clinicians are diagnosing more later-stage cancers through the same screening opportunities. That demonstrable difference in early detection also has an impact on imaging professionals, as they will be seeing fewer patients who will likely be farther along in the development of their diseases, Klein said.

“The stress of not knowing, of being able to say it’s 95 percent curable versus 75 percent, for example; the psychological impact of having to tell patients, ‘I could have done something six-to-nine months ago but we’re not there,’ is really challenging,” he said.

“This phase between radiology and patients becomes far more intimate now,” Klein said. “You can be part of a care management program with that woman instead of a bearer of bad news. We’re going to be in for a really tough time, and even though the patient workload will be at a more moderate pace, the qualitative dimension of the news that has to be given will be better than it is now.”

Staffing challenges have been another dimension of the pandemic, as health care workers of every stripe battle the anxiety of possibly contracting the virus in the normal course of their duties, change up their protocols to cohort sick patients, and face extra precautions to keep their families safe as well. Klein believes that pandemic fatigue coupled with treating patients in more advanced stages of their illnesses may even affect hiring decisions going forward.

“You’re going to need people that are going to be able to interact more with patients,” he said. “This high-throughput, assembly-line nature of health care is going to give way to more quality time, more telehealth, more triaging of who needs to be seen and not seen.”

If the earliest days of the pandemic presented issues of coping with the shutdown in non-emergency operations, the challenge of late-stage pandemic health care involves adapting to greater hospital utilization, as record numbers of Americans check into intensive and critical care units with complaints related to COVID-19 symptoms.

To Kevin Goodwin, CEO and founder of the Redmond, Washington-based portable ultrasound manufacturer EchoNous Inc., that means finding ways for doctors and imaging specialists to work faster, offer telehealth options and hold on until a vaccine is widely available.

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Kevin Goodwin, CEO of EchoNous Inc.
ing a big lift because of the size of the unit and the value of ultrasound,” Goodwin said. “You can look at the lung and see how things are changing in real-time. It’s lower-cost, better for patients and you get more information.”

Goodwin believes EchoNous can fill a specific niche in COVID-19 diagnoses with its portable ultrasound device, which offers specific advantages over stationary ultrasound units as well as X-ray technology. Since ultrasound imaging is performed in real-time, technicians can see the impact of the virus in terms of observable change, identify scarring and develop cardiopulmonary information without the use of ionizing radiation.

Like Klein, Goodwin believes the value of the imaging modality can also be enhanced with the application of AI and machine-learning processes to imaging studies, the better to unpack more information from the results of the scans via object classification tools. He also believes the uptick in usage will lead to more technicians pursuing ultrasound training, particularly as at-home care increases and practitioners and caregivers visit patients where they live.

“I think the whole health care model has a pronounced shift towards telehealth and telecare: keep revenue going by seeing patients remotely, because in-person is just not as easy,” Goodwin said. “You have a combination of people who are afraid, unwilling, or unable to come in, and how many people can be in the room at one time?”

“Expectations for ultrasound are positive; the economics will loosen up if we have legitimate vaccines,” Goodwin said. “It’s just a matter of scaling it and pointing it where it’s needed.”

“Hospitals lost a lot of money on an operating basis [in the early days of the pandemic],” he said. “This time around, people are able to better manage it.”

As a technology vendor, Goodwin also believes that the imaging trade show sector is on a slower path to recovery amid the pandemic. He didn’t enjoy the virtual substitutes that sprang up to replace and supplement those in-person events canceled due to the risks of in-person gathering, and wondered whether the convention business itself could be more deeply at risk until the virus is brought under heel.

“We’ve been through several of them; the platforms are not ready, and they don’t give the vendor quality access,” he said. “I don’t know if trade shows come back the way that they did. It’s been a bad year for them.”

Pediatric critical care specialist Arup Roy-Burman, MD, founder and CEO of Elemeno Health of Oakland, California, believes virtual connections have greater value in a socially distanced future. With pandemic-related protocols changing on the fly, and especially when depleted staff may not have a full roster of colleagues on hand to consult, technologies that replace face-to-face interactions allow valuable information to be shared in a chaotic time without compromising safety.

“We’ve had pressures on staff like we have not seen in generations,” Roy-Burman said. “Staff need to be able to do more, learn more, handle personal protective equipment (PPE), and practices and workflows that are constantly changing. How do I keep myself safe, and how do I keep my team members safe when we no longer get everybody together for training?”

The very real likelihood of missing employees during the pandemic, whether for reasons of illness, workforce reductions, scheduling irregularities, or capacity limitations doesn’t mean that those staffers on the clock must lose access to their collective wisdom, however. Elemeno Health offers a technological solution to what Roy-Burman describes as “the knowledge-practice gap,” i.e., the shortfall between institutional knowledge and bedside manner: on-demand videos comprising the accumulated learning of the organization’s “best and brightest.” He calls it “bite-sized micro-learning at the point of care.”

“In a setting where we’re limiting the number of people, it’s harder to find somebody to ask, and in so many situations, you’ll get a different answer depending upon who you ask,” Roy-Burman said. “If I’m a frontline staffer, I need a multiplier to access the information I need when I need it, in a format that is nice, short, and easy to digest. With that virtual coaching, I can do more.”

“We’re now recognizing that our frontline staff are under tremendous duress, and we need to look at technologies that will support them, equip them and enable them to be their better selves,” he said.

Along the same lines, Roy-Burman believes U.S. health care will enjoy “a greater de-siloing” as institutions begin to collaborate more in a communal sense, a trend that follows the same path of consolidation most institutions are currently walking.

“Twenty years ago, there was this intense idea of everything we do in our hospital is proprietary,” he said. “For American health care to thrive in this economic climate, we’re going to have to help one another.” •