

The Evolution of Virtual Critical Care and Remote Monitoring in a Post-Pandemic Era

How Health Care Leaders Impacted
the Bottom Line and Created a
New Standard of Data-Driven Care





Medical Informatics Corp. (MIC) and Intel, in partnership with World Congress, recently convened a panel featuring world-renowned institutions to talk about the evolution of virtual critical care and remote monitoring as we move into a post-pandemic environment. The pandemic highlighted opportunities for greater efficiencies in health care and drove the evolution and acceleration of both in-patient and out-patient virtual care.

Leaders from Houston Methodist, Johns Hopkins Health System, and Texas Children's Hospitals joined MIC's Co-Founder and CEO Dr. Emma Fauss to share ways they leveraged technology, including MIC's FDA-cleared Sickbay platform, to help manage the many challenges during and after the pandemic.

The panelists also identified lessons learned and best practices for remote monitoring, virtual ICUs, and virtual rounding from both the clinical and technical perspective, described plans for expanding technologies across service lines, and modifying policies and procedures to ensure long-term sustainability of programs. The panel also included a perspective from CMS to give insight into changes in telehealth policy as a result of the Public Health Emergency and recommendations for how health systems can work with the agency to make many of the flexibilities allowed over the past year permanent.

Panelists



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Co-Founder and CEO
**Medical Informatics
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DAVID W. LI, MBA
Director, Clinical
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**Johns Hopkins Health
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KEN LETKEMAN
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Texas Children's Hospital

Making the Business Case to Implement a Virtual ICU

Houston Methodist went live with its Virtual ICU in January 2020, **Ken Letkeman, Chief Information Officer**, told the audience. Initially with 24 beds, the plan was for a small implementation with a gradual rollout throughout the year. It rapidly accelerated because of Covid, and today has 351 beds and mobile carts available to be monitored in the virtual care operation center.

Pre-pandemic, Letkeman admitted, making the business case was a “bit more of a difficult sell” that started with exploring opportunities for remote physiological monitoring and expanded to include some of the deterioration models and other kinds of systems ancillary to physiological monitoring, to which they could then make the case to implement the Sickbay technology across the entire system.

“The size and scale of any virtual intensive care investment requires quite a bit of scrutiny. We had to expand on some of our thinking about what other products are in this domain that we could include in our analysis in the business case,” Letkeman explained. “We expanded it to include things like deterioration algorithms and models that we had purchased for a single use, or for one particular set of users. When we did that, and as we understood the capability of the integrations that we were going to implement, the business case started to make itself.”

Now, the business case seems more obvious, as the usefulness during the pandemic was immeasurable. Making an investment in a remote physiological monitoring solution that exposes alarms, waveforms, and more allowed the organization to remote them to their virtual intensivists, as well as build the alarms and deterioration models on top of it.

“I would describe it as a rigorous process, as with many of our investments, but one that we’re really happy that we made, and one that has proven to realize the benefits that we were expecting.”

Since its implementation, Houston Methodist has continued to expand its capabilities, partnering with MIC to build more than 20 algorithms on top of Sickbay to alert its clinicians to conditions that they prescribe. Letkeman is excited about the opportunities to continue to grow those models, particularly as they become more mature and advanced.

“You can go back and test models based upon data you’ve persisted from subset cohorts of patients over time,” he said. “That’s the really cool stuff.” The organization continues to expand those efforts, both clinically and in its Center for Outcomes Research.



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- Ken Letkeman,
Houston Methodist



5 Considerations for Successful Implementation

What is the thought process that should be followed for a successful implementation? David Li shared these tips that he and his department consider.

- 1** Make sure the solution is going to solve the clinical and operational problems that are being posed to you.

Think through these questions:

 - Do we already have tools in house that will serve this need?
 - If we're looking to bring in another tool, is it compatible with those tools?
 - Is this tool something that we can integrate and implement in a successful way?
- 2** Does the ease of implementation meet all of your standards in terms of cybersecurity?
- 3** What support do we need?

 - Can we install it in a safe and successful way?
 - Is it sustainable after the initial install?
- 4** Is this a siloed deployment of technology? Look at these solutions on an enterprise-wide basis and only allow differences across hospitals when the variation is either clinically or operationally justified.
- 5**

Addressing the Challenges of Device Integration and Driving to an Enterprise-Wide Solution

Johns Hopkins Medicine has had a virtual ICU since the mid-90s, but through a combination of challenges – funding, financial, resource, and political – they were never able to implement an organizational, enterprise-wide solution, **David W. Li, Director, Clinical Information Systems, Johns Hopkins Health System** shared. Instead, over time, they've implemented a number of different tools that provide virtual care, including a remote patient safety observation system and virtual legality visits using its main EMR (Epic).

“Pre-pandemic, a lot of our emphasis on technology and care focused on enterprise-wide deployments of medical device integration,” he said, noting that deployment of integration on those kinds of product lines take a lot of money and a lot of time.

In 2018, Johns Hopkins Health System initially deployed Sickbay in one unit, the neurocritical care unit in the hospital. At the time of the pandemic, Li described, it rapidly deployed to more than 140 beds in very quick succession.

“By doing a lot of pre-planning, we were able to bring online monitor and ventilator integration in a very compressed timeframe to give our providers the ability to access that physiologic data, retain data, and assess a patient's condition, not only within the hospital, but also from home using a secure cyber security, cyber connection over VPN,” Li said. “And so that was really transformational for us in terms of providing care.”

Virtual Rounding - From Keeping Staff Safe during Covid to Enabling Increased Collaboration and Knowledge Sharing

At the height of the pandemic, when traditional rounding at the bedside could not occur due to social distancing and Covid protocols, Texas Children's Hospital shifted to a virtual rounding practice. "We could share the Sickbay real-time, high-fidelity data as if you were looking at the monitors in the room over a web-based interface," explained **Dr. Barbara-Jo Achuff, attending physician in the 54-plus bed cardiac ICU at Texas Children's Hospital**, an institution rated #1 in the US for cardiology and congenital heart surgery.

Virtual rounding allowed everyone to collaborate and share, to review patient cases and develop care plans, and even actively add more specialists to review the data remotely.

"All of our decisions are very data-driven decisions, but the patient can still stay at the center," she said. "As you're speaking and presenting a patient, the Sickbay data is across the screen in real time allowing us not to have a single pause or gap in our care. That was essential, that clinical distancing, rather than social distancing, allowed us to care for those very highly critically ill children and adults, not change any quality of care, and keep our staff safe because they needed to continue to work. As our census grew and grew, we needed to continue that."

The technology also allowed, complete historical review of data, along with the ability to keep the patient in real time with real-time data review. "We used to have 10 to 12 providers who were rounding on that patient at the bedside but then with virtual rounding it grew to 20 and then 40, and now we can have patient conferences with up to 112 to 120 patient providers and specialists, all reviewing the data at once in real time. And that's an incredible addition to our practice that has allowed a lot more collaboration and knowledge sharing."

Medicare Telehealth Benefits and CMS' Reflection on Tele ICU

When the Public Health Emergency (PHE) was declared, CMS "did 20 years' worth of policymaking in about two months, because that's roughly how old the Medicare telehealth benefit is," **Emily Yoder, analyst in the Division of Practitioner Services in the CMS Center for Medicare** said. Congress gave the Secretary the ability to waive statutory restrictions. She described the thinking of the agency at the start of the pandemic: "We need to get our payment regulations out of the way to allow clinicians the most flexibility possible in terms of keeping beneficiaries home and keeping themselves safe." Two sets of waivers emerged: the ability to waive the geographic and site of service restrictions; and the ability to waive the list of practitioners that can furnish, so that any practitioner – regardless if they can bill Medicare – could bill for telehealth during the PHE. About 300 additional services were added to the telehealth list for the PHE.

As she reflected on the conversation during the panel discussion, Yoder said, "It's a great privilege, and a bit of a burden that I have, when I do these sorts of panels. I get to hear all about these really wonderful, really innovative models of care delivery. And then I have to ask the question, 'How do we code for this?' 'How do we pay for it?'"



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- Dr. Barbara-Jo Achuff,
Texas Children's Hospital



Surrounding tele ICU specifically, she explained that CMS doesn't have CPT codes that describe the full range of service that the panel articulated. She said she suspects it's being reported through a combination of remote monitoring codes, and through telehealth services such as critical care, critical care console, inpatient services, and ventilation management when done using telehealth. But she assured the panel and audience, "CMS is really, really interested in this model of care."

Last year, CMS did a comment solicitation on tele ICU. She said the agency is looking for stakeholders to submit recommendations on how to code and how to pay for this service, but explained the overarching challenge with payments like this in a FFS Medicare environment.

"It has to be boiled down to: here's this specific service that's furnished to a specific beneficiary in a specific way. That's all in the code," Yoder said. "That becomes really challenging as you're thinking about longitudinal care or things like care management, or where you're delivering care to beneficiaries simultaneously."



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- Emily Yoder, CMS



A Vision for What's Next: Future Opportunities and Recommendations

The panel closed with reflections on key learnings, opportunities, and advice for their peers. At Houston Methodist, Letkeman said they're looking at new technologies across all of their delivery channels. He cited centralized telemetry across all of the hospitals as an example, as well as virtual ambulatory and outpatient expansion.

"I think Covid actually has done a lot of good for practice. In a way, that sounds so crazy to say that, but it really has accelerated a lot of things," Texas Children's Achuff added. "I think we would have gotten there. But, we've gotten there much faster in the use of technology."

Hopkins' Li agreed, "The pandemic was really great in organizing around one set of priorities. And it's really hard, post-pandemic, to figure out where your priorities are going to be." But he offered some advice. "First thing: Focus. You're figuring out what your high value projects are, and product value opportunities are. Second: Make sure you've got the right technology to engage the user base to solve those problems." Then, make sure you have the right people in the right places to make these visions a reality. "You've got to have the right team, the right technology, in the right priorities to succeed."

Letkeman shared similar advice. "It's a journey," he said, noting it's one that requires many different stakeholders. "The opportunity really is now because of the impact of the pandemic, frankly. So, if you were thinking about it, and you have the available stakeholders, my advice would be to come together and get after it."

Said Achuff, "It's really true that you make the investment for the big thing, because the next pandemic is going to come, the next crisis is going to come, and you want to have the tools already available to you."

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About Medical Informatics Corp.



Medical Informatics Corp. (MIC) is empowering a new standard of healthcare by accessing, synthesizing, and delivering patient-specific data to clinicians to save and improve lives. Through the company's FDA-cleared Sickbay™ virtual care and analytics platform, MIC provides a singular, interconnected architecture that helps hospitals solve clinical needs to reduce costs, increase revenue, and improve operational efficiencies. MIC's flexible, software-based solution enables rapid scaling of vendor-neutral remote patient monitoring across any inpatient setting and the ability to accelerate the development and deployment of patient-centered AI at scale. Fueled by innovative engineers, mathematicians, clinicians, researchers, and entrepreneurs whose work with clinicians at the bedside led to groundbreaking discoveries, MIC is based in Houston, Texas, and works alongside hospitals and healthcare systems across the country to create a new standard of care driven by unprecedented access to patient data. More information is available at michealthcare.com.