# Best Practices in Clinical Decision Support
## Four industry leaders weigh in on how CDS is evolving for the future

John Halamka, MD, President of the Mayo Clinic Platform, doesn't think about the future of clinical decision support (CDS) in terms of decades – but quarters. "Innovation is moving incredibly fast," he said. "It's going to require a next generation of collaboration between payers, providers and the industry."

Halamka shared his experience at Mayo Clinic in a recent panel moderated by Atif Chaughtai, Senior Healthcare Market Leader, Red Hat. Gloria Romeo, Senior Vice President, Product and Development for HM Health Solutions, and Shane McNamee, MD, CMIO, Perspecta, and CMIO, BPM+ Health, rounded out the group. The panel described how technologies such as artificial intelligence (AI) and machine learning (ML) are fundamentally changing CDS in the near future, enabling new opportunities for payer-provider collaboration, and the challenges that must be overcome to be successful.

### Behind Mayo's 'AI factory'

Mayo Clinic began its journey to CDS innovation by first recognizing the benefit of curating large amounts of data from its past. Dr. Halamka knew that in order to be successful with AI and ML, Mayo would need quality data – and a lot of it.

The organization set about digitizing their entire corpus (roughly 150 years) of information and de-identifying it through a variety of next-generation algorithms. In April 2020, Mayo moved its data into a secure container encrypted at rest in a hybrid cloud environment. This laid the groundwork for their new CDS "AI Factory," which they launched in September.

As part of this initiative, Dr. Halamka described, "Any stakeholder who Mayo appropriately authorizes can use the de-identified data in a secure fashion with TensorFlow, R, Python, C# and various mechanisms to develop new knowledge and algorithms."

Now Mayo Clinic is working with third-party vendors to make this warehouse of algorithms available to providers and patients in their workflows. "That means if a clinician is in their EHR, they don't need to leave it to get the benefit of running an AI algorithm against a piece of data," said Dr. Halamka. He hopes that because of these collaborations, Mayo providers will soon be able to treat higher acuity patients outside the hospital setting.

### New era of collaboration

The evolution of CDS also reflects changes in financial models. In a fee-for-service environment, CDS was seen as "something static within the physician's lane, a set of tools they were supposed to use during a patient encounter to point the patient in the right way," said Dr. McNamee. But, as healthcare transitions to a value-based care paradigm, healthcare organizations are shifting CDS from sickness to wellness and creating new opportunities for payer-provider collaboration.

"Patients have their data scattered among many different healthcare organizations and payers. The next era of care will have to be care without boundaries if we want to better understand the health of patients and populations," said Dr. McNamee.

It's no surprise then that payers are seeing CDS as a valuable resource. In Chaughtai's experience, payers are increasingly using AI/ML to augment the complex pre-authorization process with real-time rules, shortening the time from pre-authorization request to response.

But Romeo said it goes beyond that. "With the right CDS tools, payers can look at a claim and go further than 'is this authorization justified?' They can look at the member's previous data and determine if they are at risk for a major incident or a chronic condition," she said. For example, they could check on their member's medication adherence – are they refilling their scripts on schedule? "From there, payers can steer the patient to an integrated care team tailored to their needs."

There are other payer scenarios, added Chaughtai: "One example is using historical claims data in identifying a member that is high risk for sepsis. When that member is admitted to the hospital for any reason, the member profile can immediately inform the hospital of the risk."

It's also allowing payers to curate health programs for their members and not just offer blanket wellness options, but better-utilized management options. "Ultimately, we are using CDS to streamline that experience between payer and provider to make it easier for both our members and their clinicians," said Romeo.

## Drivers for change

The transition to virtual care has been the main driver behind Mayo's accelerated focus on CDS. Dr. Halamka believes that this "new normal" requires novel tools to ensure patients receive proper treatments in a timely fashion. "In an era of COVID and beyond, the use of AI algorithms to deliver care is increasingly important when patients are reluctant to travel and concerned about infection," said Dr. Halamka.

For Dr. McNamee, the main driver for CDS is automation. He believes the influx of authorized data from personal devices – patient's phones, wearables and home devices – will support new automation protocols and standards in healthcare. "If we consider the four top-level quality metrics within healthcare

– outcomes, cost, safety, experience – these are the same things that automation has delivered to other industries, like manufacturing and banking," he said.

## The interoperability challenge

Even with strong drivers in place, challenges remain. According to a 2018 HIMSS survey, 60% of hospitals and health systems reported dissatisfaction with their current CDS tools. The primary reasons for this were a lack of integration in workflows – often the result of proprietary software – and the absence of feedback processes within their systems.

According to Chaughtai, a feedback loop is a high priority for most organizations when it comes to CDS because to deliver key insights, organizations need a way to give feedback to their algorithms. "They are looking for a mechanism to ensure that their system is working, that it is improving care and lowering costs," he said.

Has much changed in 2020? Webinar participants reported in a live-poll during the panel discussion that these two barriers continued to interrupt their CDS journey, in addition to the cost of implementation.

Chaughtai advised that open source is the best way to advance CDS because it addresses the key barriers of integration, feedback and cost. Because the source code is accessible, a CDS system can be designed to integrate naturally within an organization's workflow. With the upcoming 2021 CMS mandate for data interoperability, Chaughtai believes it will only become easier to share medical data between providers and payers and enable patients to go to third-party applications with their data to help manage their health options.

"Imagine a variety of third parties providing cloud-hosted decision support with the algorithm or the function that you need and that is available to connect to your EHR or app using a standard like FHIR CDS hooks," said Dr. Halamka. "So, therefore, the cost is just a subscription to the service and the integration is simply a pointer to whatever cloud service you want to consume using a standard that is widely available in the EHR or other products."

"That's the future: plug and play," responded Dr. McNamee.

## Best practices in an evolving CDS landscape

To that end, the panel recommended these best practices to continue along the path toward CDS innovation:

1. *Focus on data hygiene*. "The future of CDS has to start with the data of the past that is heavily curated and kept secure, that we can then develop with next-generation algorithms," said Dr. Halamka. In order for AI/ML to integrate with provider and payer workflows, "we will need curated, standardized and enhanced data," added Dr. McNamee.

2. *Be agnostic*. "Open source is critical in developing new algorithms, new care plans, new visualizations and new knowledge," said Dr. Halamka. Organizations should have the agility to take modular components and add and subtract them in their architecture without heavy lifting. "Staying agnostic to vendors and clouds certainly makes that happen," agreed Romeo.

3. *Context is key*. "The purpose of CDS is to meaningfully improve decision-making, not intrude on the process," said Chaughtai. AI/ML algorithms can give situational awareness

of patients to help advise on optimal care in their future – but that doesn't mean that all algorithms are free from bias. "Any automation we do must be augmented with the human touch and, ultimately, human interpretation," he said.

"This isn't science fiction," Dr. Halamka concluded. "The industry is coming together to work on open-source CDS cloud-hosted facilities, which will connect to EHRs and other workflows. There are already good exemplars of these, but we will see it more and more in the next couple of quarters."

The future of CDS is not decades away. With open-source standards and community collaborations – it's happening right now.

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**Atif Chaughtai** | Senior Healthcare Market Leader | Red Hat

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