How managing COVID-19 "crystalized" operations for data & telehealth at UCSD
Making the Rounds

Brian Clay, MD, on how managing COVID-19 "crystalized" operations for data and telehealth at UCSD

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In this episode of Making the Rounds, Brian Clay, MD, internal physician and a chief medical information officer at the University of California San Diego shares his experience with clinical informatics including interoperability, open notes for patients, data literacy and more. This episode is part of the health IT series by the MSS Committee on Health Information Technology, hosted by Shivani Bhatnagar, a medical student at the Texas College of Osteopathic Medicine.

Speakers

- **Brian Clay, MD**, internal physician and chief medical information officer, University of California San Diego

Host

- **Shivani Bhatnagar**, medical student, Texas College of Osteopathic Medicine

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Transcript


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Bhatnagar: Hello and welcome to Making the Rounds, a podcast by the American Medical Association. Today's episode is part of our health IT series from the AMA Medical Student Section Committee on Health Information Technology. My name is Shivani Bhatnagar. I'm a medical student at the Texas College of Osteopathic Medicine. I'll be your host for today. Today, we are joined by Dr. Brian Clay, who is an internal physician at UC San Diego. He's also the chief medical information officer at UCSD. Hello and welcome, Dr. Clay.

Dr. Clay: Hi, glad to be on. Thank you, Shivani.

Bhatnagar: To get us started, can you explain to our listeners a little bit about how you're involved within health IT?

Dr. Clay: Certainly. As you said, I currently serve as the chief medical information officer at UC San Diego Health. A note of clarification, we actually have three chief medical information officers here at UCSD. About five years ago, the size and scope of the organization became such that one was not enough. I've been in my current role for about 10 years but as a hospital medicine physician, I now largely focus on the inpatient space as well as some areas having to do with interoperability. I also am the chief medical information officer liaison to the other University of California Health campuses.

I've been in the role 10 years. It has been a rollercoaster of technological advances over that time. When I first started, the role of the CMIO was largely about implementation of the electronic health record, whether it's in the clinic, in the hospital or what have you. Then about getting people to adopt those workflows and making those workflows optimal and efficient. Then later on, it became about, well, we're putting all the data into the electronic medical record, how can we use that data to learn? How do I get the data back out to drive insights about our patients, to find out where we can deliver care better and so on.

What we're working on now in health IT is kind of the next phase. That is how do we bring all this data to the patient? How do we use our technology for better patient engagement? How do we make the patient experience better, both in the clinic and the general outpatient space, as well as in the hospital? Then, of course, over the last two years, the COVID-19 pandemic has influenced all of that work in some interesting ways.

Bhatnagar: What are some things that you found?

Dr. Clay: One of the things that is true for anybody who works in clinical informatics is that there's always opportunities to make things better, there's always new technologies you can evaluate. Your bandwidth to do that kind of work is never going to be enough to tackle everything. A big part of what we do is to make governance decisions about what's most important to do now and what we can do a little bit later on.
Well, COVID crystallized that for all of us. It immediately became everyone’s number one priority. Almost two years ago now, in March of 2020, as we moved from normal operations to in the throes of a global pandemic within the space of about six weeks, we had to rapidly mobilize both our operational and our technological side at UCSD to do a number of things to address the needs of the pandemic.

We couldn’t all be in the same room anymore. We had to stand up an enormous telehealth infrastructure. We went from a baseline of doing approximately 10 or 20 video visits a week for outpatients to doing 1,000 a day. That ramp up took place over five calendar days. We had some of the infrastructure structure and we had some of the playbook but we’d never done it at scale, but we were able to ramp that up, educate everybody in rapid fashion. We went from very little telehealth to essentially 85%, 90% telehealth in our ambulatory space in just a few weeks.

We did it very successfully. It was meant to meet the needs of the moment, but things went well and we were able to continue caring for patients using that technology.

**Bhatnagar:** Awesome. Five days is such a short span to accomplish something like that. Do you anticipate that these changes will last moving forward, even once the pandemic slows down or if it isn’t as big of an impact as it is anymore?

**Dr. Clay:** I think we’ve done quite a few things in response to COVID that are going to have a lasting effect and will persist even beyond the bounds of COVID-19. Telehealth is one. Even though we are still within the pandemic, we do a lot more in-person care than during those first weeks two years ago, but we have a residual footprint of telehealth that’s still substantial. It’s not 10 and 20 visits a week. It’s about 20% of our ambulatory care is done via video visit. That’s something where we have found, depending on the specialty, that there’s more or less applicability of that technology. Having it available as a tool has been very good. Everyone is kind of finding the right balance between having patients come to get care in person versus doing it through a video visit. That’s one.

One other thing that we were called upon to do in the first few months in the pandemic, along the lines of what I mentioned before, is get data out of the system. People were hungry, starving for information. How many COVID patients do we have? What is the rate of our positive tests? How long are COVID patients staying in the hospital? All kinds of information that the organization needed to help manage resources and just be ready every day to deliver care to our patients. We stood up a number of reports, dashboards, other analytics, tools to get people at all levels of the organization the information they need.

We at UCSD use an application called Tableau as our business intelligence application, basically the thing we do to create data visualizations. We stood up something called a “COVID-19 Daily Readiness Dashboard,” which showed things like our current status on personal protective equipment, whether green, yellow or red. How many cases we were doing in the OR, how many people got admitted yesterday with COVID, how many free ICU beds were available? How many COVID patients were on
the ventilator, how many were on ECMO, so that we had kind of a daily snapshot of where we were and the trends from recent days.

That is something that a lot of organizational leadership had access to but we actually created a PDF of it and emailed it to everybody in the health system. It ended up going out to about 10,000 people every day. To illustrate how hungry people were for information, we still get email responses now a year and a half later asking about tweaks, adjustments, other things people would like to see. People tell us that they are avid consumers of this information. Just being able to get the data out of the system and deliver it to the people helping care for our patients has been incredibly important.

All of that is to say, that is another thing that's going to persist. We have used COVID-19 as a springboard to really build out an incredibly robust data visualization platform. That is something now everybody wants more of. Everybody wants to see their performance in their clinic, in their academic division or even at a personal level. We have used Tableau and other tools to continue to build out these kind of data structures so that people can have that information.

Bhatnagar: Are there any challenges that come up when you're trying to accomplish something like this? For example, in prior interviews, we've talked to people who are concerned about perhaps data privacy issues when it comes to patient's protected health information and things like that that people now have access to, through all the data collection and EMRs and things. What is your experience with that?

Dr. Clay: There's certainly a risk that comes with the concept of big data. Now that most health care organizations of any size have had electronic medical records in place for quite some time, everyone has aggregated these really large databases of patient information. That's a good thing because we can use those for research, for quality improvement and to get insights on our patient care, but it comes with risk if you try and extract it out of there. It's incumbent upon all of us to treat that data with care and to make sure we put the appropriate safeguards around it. This hasn't necessarily been a challenge but it's something that we have had to be sure that we mindfully address. We have had a number of efforts at UCSD over the last few years, even predating COVID-19, to stand up infrastructure and processes around safeguarding patient data.

We've done a lot of work in the cybersecurity space in the last couple of years to kind of harden our systems against external intrusion or database attacks or things like that. We've embarked upon a robust educational effort to all of our workforce about the importance of keeping your username and password secure and not giving into email phishing attacks and things like that because that's how people tend to get into your systems from the outside. But also put governance structures around requests from our researchers, our operations folks and our folks that work in quality improvement who want to access these big data sets to make sure that we deliver it in a way that minimizes the risk of that data going far afield. We kind of keep it within the bounds of the technical infrastructure but still in such a way that people can use it to do whatever project they're working on.
That's been something we've had to do. Again, not so much of a challenge but just an obligation, I would say, to help minimize the risk of a patient data privacy breach. All that is happening in the setting of a requirement that we all comply with related to a law called the 21st Century Cures Act, which was passed by Congress in 2016 and generated a regulatory rule from the Office of the National Coordinator in April of 2020, which the timing was coincidental, but happened at the start of the pandemic. This essentially said patients have a right to all of their health care information in an electronic format.

Now there were more details than that, of course, but it led health care organizations to move to make test results and clinical notes available to patients essentially in real time within the patient portals and other methods that patient had to access their medical data. That's been a challenge, not because of the technical approach to getting it done but because that's an enormous culture change, right? Understandably so.

Back when we used paper records, the only way a patient could access their medical data was to actually make a trip to medical records and submit a request for a copy of their medical record. Then in the EHR data or EHR era, I should say, patients got patient portals, where they could access certain subsets of their data from the electronic medical record but it was just that. It was a limited subset. All of a sudden, patients are going to get access to their information much more broadly and in real time, including things like clinical notes where providers may describe something in a way a patient doesn't like or a CT scan result that shows an unexpected tumor that neither the ordering physician nor the patient expected. The patient is seeing that in real time and then having to deal with it.

I am very much an advocate of data transparency and patients, I think, should have all this information but we are all learning how to support our clinicians and our patients in what it means for patients to be able to see the data immediately. That's something we've never done. We've all made the conversion relatively quickly in the last year and a half. I think we're still learning how to manage that change with everybody involved. That's definitely been a challenge.

**Bhatnagar:** Changes like this tend to have very positive connotations and seem to be a step forward within the medical sphere, but then there are issues such as digital issues with digital literacy or perhaps access to technology that can allow patients to see their health information in real time like you're talking about. What are some solutions that you think might help bridge that gap moving forward?

**Dr. Clay:** The digital literacy issue is a big one. Historically, I would say most health care organizations, including our own, have been mindful about content that we create in the arena of patient instructions to try and be written at an appropriate grade level, not too complex, not too much jargon because that was what was patient-facing. But over the last year and a half, most things have become patient-facing, including clinical notes that we all write as doctors, which we tend to write with other doctors in mind as the consumers of that data and not so much the patients.
Much of what people have seen as we've gone to what is called open notes, where patients can see all their clinical notes, is that a lot of questions come up about verbiage or jargon or what do you exactly mean by that? Now I am hearing plenty of anecdotes from our physicians that patients are contacting their physician, not urgently, but just, "Hey, I saw this in my note and this really helped me remember what I was supposed to do after I saw you last before I see you again in three months," or occasionally, we are getting patients call back and say, "Oh, you said this was in my left elbow. It's actually in my right elbow." That's great. A patient can call up and we can quickly correct the record. That's important.

But back to the digital literacy issue, that is something where I think the answer's still unknown. What I think is going to happen is that the next phase of the open notes project is really collaborative authorship of the clinical documentation. Here's what I mean by that. Historically, it was the physician who wrote the note. Today, in 2022, notes are often authored by multiple members of a clinical team. Perhaps the patient comes into the clinic, the medical assistant or the LVN in the clinic takes a brief history, confirms the medication list, gets the chief complaint and that information is recorded the medical record and can be imported into the note for the day. Then the physician comes and interviews the patient, does a physical exam, creates an assessment and plan and documents the rest of that. Many of our notes today are sourced from multiple areas but they're not yet sourced from the patient.

There's some interesting work being done in a number of organizations where what people are doing now is sending prompts or questionnaires to patients in advance of the clinic visit asking them about say their top concern or their top couple of concerns and asking for some details and using that as the starting point for the history of present illness in the clinical note. In essence, the patient is actually authoring part of the note. Some organizations are exploring workflows where the note is actually authored together, at least in part, during the clinic visit, where you might imagine both the doctor and the patient are both looking at the same computer screen and confirming that they agree on the information. This is, I think, one of the ways that we can address the fact that physicians are always going to use language that is kind of above and beyond what the median patient may understand.

There's a lot of complex terminology. Some of it needs to be in the note because the patient isn't the only consumer of the note. It's also a medical document and so on but people are starting to realize that the patient is also a consumer of the note and to write with that in mind. I think we will see evolution of style probably over a five to 10-year range about how people write their notes. Even for things like how radiologists dictate their reports for things like CT scans and MRIs and other imaging studies, knowing now that the patients are going to have access to that and are going to be inquiring about the terminology that they see.

Bhatnagar: That'd be a really interesting shift in the patient-physician relationship moving forward. That'd be exciting to see. Just to pivot a little bit, UCSD is one of the leaders in health IT research.
How has your experience been or what has it been like to be one of the leaders in a group like this?

**Dr. Clay:** It's been a great experience. I have to give credit to our chief information officer for the last five years, Dr. Chris Longhurst, who came to us from Stanford Children's where he had the CMIO role there. He was a big proponent of making sure that in addition to doing good work in applied clinical informatics, that you generate scholarship from it. Not everything needs to be a grant-funded project or a randomized-controlled trial. A lot of what we do in clinical informatics is implementation science. It is very worthwhile writing up and publishing how you accomplish something, the pro and cons, the challenges and the wins, because you can teach other organizations who are looking to do a similar thing, how you went about it and how successful that was.

This can be applicable to even relatively small-scale projects that you implement over say a two to three-month timeframe. There's still some lessons to be learned and some measurements to be made that can then generate some scholarship and some publications. This is helpful not only for the organization but for the physicians and the faculty members who participate in that work because it helps them in terms of advancement and promotion, round out their CV and things like that. It's also a great opportunity for all of the learners around here, residents, fellows, medical students across multiple disciplines. We've had quite a few residents and fellows partner with us on projects and get publication opportunities based on the scholarship that derived from that.

**Bhatnagar:** For any of our listeners who are interested in learning more about what it's like to be a CMIO, what are some training or qualifications that are required to be in this position?

**Dr. Clay:** That's a really interesting question. When I started 10 years ago, the field was very new. The CMIO who inhabited the position before me had only held that title for about a year. As far back as say 15 years ago, to get into clinical informatics, you just had to be willing. EHRs were new. They needed physicians to help lead projects. People that had interest in the space could basically just volunteer and step into a role.

The field has certainly matured since then. There is now an ACGME-accredited clinical informatics fellowship. That is a two-year fellowship. We run one here at UCSD. It's a fellowship that can take a resident from any specialty, after they finish, then they can do two years in applied clinical informatics. There is a board exam and a board certification for that.

What we're seeing now is that people are availing themselves either of a clinical informatics fellowship or they are doing other types of training that really are essential for what we do in clinical informatics, aside from the technology. What I mean by that are things like lean training, green belt, black belt-type certifications, process improvement and quality improvement training. A big part of what we do is not the technology itself, but how you get it done and how you get a project implemented.
I didn’t go through a formal fellowship for clinical informatics because there ... and there is still something called a practice pathway to be able to sit for the boards. If you've worked in clinical informatics for more than a few years at more than 30% time, then you're eligible to sit for the boards. I became board-certified back in 2016. But recognizing early on that I had an interest in this, I took something called the AMIA, the American Medical Informatics Association, the AMIA 10x10 course, which is an online course sponsored by multiple organizations. I took one that was sponsored by Oregon Health Sciences University, OHSU, way back in the day. It's all online. It spans 10 weeks. It covers kind of the basics of clinical informatics. That was a great kind of starting point.

For anybody who's interested in this space, I highly recommend checking out a 10x10 course. It's relatively a light lift. It doesn't take much time but it's a great introduction to the topic. It will definitely tell you whether you want to learn more.

**Bhatnagar:** Thank you for sharing that. Reflecting back 10 years ago when you first got started, what is something that drew you to the field?

**Dr. Clay:** I’m a San Diego native. I was an undergraduate and a medical student here at UCSD, but after spending all that time in San Diego, you want to see some other neck of the woods. I did internal medicine residency elsewhere. I was at Vanderbilt University in Nashville, Tennessee. Vanderbilt was one of the organizations that was really at the forefront of bioinformatics. They had a division of bioinformatics, a homegrown electronic medical record system. When I started there as a resident in 2000, they were already doing computerized provider order entry, CPOE.

Over my three-year residency there, I watched them evolve their technology and their electronic medical record in areas like clinical decision supports and order sets. Really, I was able to see how you could use the technology to guide people to make the right decision. I found that fascinating. When I was done with residency in 2003 and I came back to San Diego and joined UCSD as faculty in hospital medicine, we were just starting our journey to implement an enterprise electronic medical record. I said, "I want to get in on that," because I think there’s incredible opportunities as we move off of paper notes and paper orders to make processes highly reliable, to implement standard workflows, to give ordering physicians the information they need at the point of care to make good decisions.

That ended up being correct. There's a ton of opportunities to do that with the right software and technology in place. There’s still a lot of work to do. It's very similar to internal medicine in that regard. One of the reasons I became an internist is because you can never master the field. It's so big, right? There's always something else to learn and something else interesting to know about. I think that information technology is much the same way. That there's always a new area to kind of dig into and see if it can help you improve of the care of patients.

**Bhatnagar:** Now looking forward within the next 10, 15 years as my generation of medical students start entering the workforce, what are some changes that we should anticipate within HIT?
Dr. Clay: Oh, I'm being asked to prognosticate. It's very easy to see kind of the continuation of the current state only more so. We'll have electronic medical records but they'll become more efficient and easier to use. Maybe there are mobile app versions of them today. Those will become more robust. But I do wonder if a sea change is out there, maybe 10 down the road. I think a big part of what drives that is actually external to the IT space. Specifically, I mean, how we all get reimbursed as physicians.

Even now, a good chunk of how physicians get paid is dependent upon their clinical documentation for that patient, for that visit and drives a lot of how we write notes and how much information we include and things related to that. If we were to radically change the funding model for physicians and for hospitals, that might drive an enormous amount of change in how we set up systems for people to write orders and write notes. That's one area.

But even if that doesn't come to pass, I think one of the things that I'd be willing to put a little bit of money on in the next 10 years is that technology that's already being evaluated and piloted today, in terms of voice recognition software and ambient computing, will become mature enough to essentially mimic the Alexa that's in your house. My apologies to everyone who's listening to this whose device just turned on.

But you might imagine that there's a computer editing in the exam room and you're interviewing your patient and you're examining your patient, and maybe you're talking out loud a little bit like you did during a structured clinical exam in medical school. The computer is ingesting all of that information. It's parsing what goes in the note. It's parsing what goes into patient instructions. It's parsing what are orders and teeing all of that information up so that you, the physician, then wander over to the computer, review all that material, make sure it's accurate and sign it off. The whole chunk of time that we spend doing clinical documentation and order entry could potentially be outsourced to technology.

I think this is actually going to happen. I don't think it's going to happen next year. I don't think it'll happen in five years. I think that it'll happen within the scope of my career and I have a ways to go. It will definitely be something, I think, that today's medical students will see during their career.

Bhatnagar: Awesome. I'll look forward to that. All right. As we wrap up, do you have any channels or social media handles where people can connect with you and follow your work?

Dr. Clay: Certainly, you can find me on Twitter at @BrianClayMD, B-R-I-A-N-C-L-A-Y-M-D.

Bhatnagar: Awesome. Well, everyone, that's all for today. Thank you for listening. Thank you for your time today, Dr. Clay. This has been Making the Rounds, a podcast by the American Medical Association. You can subscribe to Making the Rounds and other great AMA podcasts wherever you listen to yours or you can visit ama-assn.org/podcasts. Thank you for listening.
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