Speaker 1:	00:01	Quality improvement in the time of COVID-19 is brought to you by the American Heart Association with support from Novartis Pharmaceuticals, as physicians, scientists, and researchers worldwide struggle to understand the COVID-19 pandemic. The American Heart Association has developed its COVID-19 CBD registry powered by get with the guidelines to aggregate data and aid research on the disease, treatment protocols and risk factors tied to adverse cardiovascular outcomes. For more information, visit us at heart.org/covidregistry.
Sandeep Das:	00:32	Hello and welcome to the American Heart Association Podcast on quality improvement in the time of COVID-19. My name is Sandeep DAS, and I'm a cardiologist on faculty at the University of Texas Southwestern Medical Center in Dallas. In addition to clinical work, I spend a lot of my time thinking about systems approaches to improving quality of care. Today, we're going to talk about another aspect of quality improvement in the time of COVID-19. The American Heart Association has built its extensive portfolio of quality improvement programs on the premise that patient outcomes improve when medical professionals follow the most up-to-date evidence-based treatment guidelines. One major challenge in the COVID era has been maintaining consistency and treating to our established standards of care in the context of the pandemic. At the same time, a second major challenge has been developing new standards for COVID specific care quickly and effectively. Together in this series, we're examining some of those challenges more closely and hearing from experts in how quality improvement programs are systematically adapting and responding to the crisis. Today I have the pleasure of hosting one of those experts, Dr. Ty Gluckman, medical director of the Center for Cardiovascular Analytics at Providence St. Joseph, a major health system in the Pacific Northwest. Today we'll talk about some of the cardiovascular issues related to COVID-19. But first I'll let Dr. Gluckman tell you a little bit about himself. Ty?
Ty Gluckman:	01:53	Sandeep, it's a real pleasure to be with you today. I'm a clinical cardiologist and have been in practice for about 15 years. And about a couple of years ago, I took over and helped to launch a center that's really around accelerating health services, research, leveraging our health systems data, to be able to understand gaps in care and be able to drive quality improvement initiatives, to help close gaps in care. And as you and your center, myself at my center, and everybody probably listening, we're trying to figure out how to make improvements

in terms of care delivery related to COVID-19 and the pandemic that we're all living through.

Sandeep Das: 02:32 Well, fantastic. So let's get right into it. Early on in the pandemic. In the opening months, there were a lot of concerns raised in anecdotes about devastating cardiovascular complications in patients with COVID-19, ranging from acute heart failure to sudden death. Can you summarize what your current thinking is now that we're nine months in?

Ty Gluckman: 02:53 Sure. And I think that's a phenomenal question. And I would point to sort of two divergent issues. One is the impact of COVID on noncommunicable diseases and the other has been the direct impact of COVID. So taking the second one first, we recognize that there are really three potential manifestations of COVID-19 on the heart or the cardiovascular system, one being acute myocardial injury, that may be a direct effect or an indirect effect that which can result ultimately in heart failure that comes about through myocarditis or an inflammatory condition that affects the heart that can result in pump dysfunction. And then lastly, the susceptibility to arrhythmias.

Now there are a range of other related topics, including a prethrombotic state that we'll probably touch on. The second that I would say is, is that we recognize that early into the pandemic, perhaps accelerated by some missteps in communication or misunderstanding by patients was that as we had deferred a lot of our elective and non-urgent procedures, patients may have misunderstood and thought that perhaps hospitals were not safe places to receive care. And as a result of that, we saw marked reductions in numbers of people coming in with acute heart attacks and heart failure. And while there were some prevailing theories about biologically plausible reasons why people may be having fewer heart attacks, reduced air pollution, et cetera. I think the prevailing theory is that most people felt that patients were scared. They didn't know if hospitals were safe places to receive care and thus indirectly we've seen consequences as a result.

Sandeep Das: 04:30 Well, excellent summary there. In terms of patients who may be nervous about coming in and the indirect consequences that you talked about and deferring care, what's your thought on patient to patient? Once you're in the hospital, what is the risk of patient to patient transmission of COVID-19 or of the novel coronavirus?

Ty Gluckman: 04:50 Yeah, I think what we need to reassure, I think this is true ubiquitously across the United States today and was very early on that hospitals are safe places to receive care. Hospitals have gone to great lengths to isolate on different wards, different parts of the hospital. Patients who are infected with SARS-CoV-2 and thus the risk of transmission from patient to patient is very low. To that end, individuals who are not concerned about their potential risk of actually having COVID-19 right now, but rather experiencing acute onset of chest pain, shortness of breath, or for that matter, other signs or symptoms of stroke or acute cardiac disease, those individuals should be contacting emergency medical services, contacting 911 and seeking immediate medical attention. And as you know\ well, and as many people listening know well, that time is of key importance for conditions like acute stroke and acute heart attacks.

And we've recognized in some of the research that's been published thus far, that potential delays to receiving timely care for time-sensitive conditions can have a significant impact, not only in terms of the acute care that they may be receiving in the emergency department, but the consequences, heightened risk of mortality, et cetera. And I'll just add also that we've seen and connecting these dots has been a challenge. But in areas where we've seen fewer patients presenting with acute heart attacks, we've seen now cases of a rise in sudden cardiac death or people having life-threatening arrhythmias, all of which point to albeit in an anecdotal way, but a good, strongly supported case that people not getting attention in a timely fashion can have serious untoward consequences.

Sandeep Das: 06:34 And what are you guys doing at Providence to segregate people with potential COVID from people who are unlikely to have COVID who are presenting with their heart attack or stroke.

Ty Gluckman: 06:43 Yeah, so much like everybody, we are restricting the number of visitors to the hospital. We are obviously going through all of the appropriate testing when people present initially, whether those individuals have clear overt symptoms or not overall. We're obviously taking great lengths for those individuals coming in with less urgent presentations to screen those individuals. And for those procedures where there may be an heightened risk for aerosolization we're preemptively testing those individuals as well. And then for those individuals that ultimately test positive, we're isolating those individuals, so as to not expose other individuals in the hospital who may be there for completely unrelated, non-COVID-19 related reasons from potentially getting the virus. We're also obviously taking all

of the appropriate precautions with use of PPE as a protective measure, not only for the patients themselves and patient to patient transmission, but obviously our frontline healthcare workers to mitigate their risk of getting infected as well.

Sandeep Das: 07:46 Yeah, excellent. We're doing the same in Dallas. We have dedicated entrances, dedicated elevators, all that other kind of stuff. So once you're being investigated for potential COVID, you're segregated from the other population until you're definitively ruled out, which I suspect is what probably most hospitals are doing. Some variant of that. You mentioned also in terms of direct myocardial injury, is that the classic conventional MI like platelet mediated coronary thrombus, or is it some direct viral involvement of the heart muscle?

Ty Gluckman: 08:20 So it's a phenomenal question. And what's been recognized early on including reports that came out of China and the United States early on is that markers of myocardial injury, most commonly troponin, whether the standard sensitivity or high sensitivity, there's been a notable increase in the numbers of individuals that have elevated troponin levels. And in fact, for COVID-19 related respiratory illness and non-COVID-19, there are reports out there that as many as 40% of individuals may have elevated troponin levels. We know prognostically that those individuals that have elevated troponin levels fair worse. A challenge that we have is many of these same individuals have many of the same risk factors that may increase their risk for a worst prognosis as well.

I think the general prevailing theory is there is no question that individuals may come in with COVID-19 related illness and happen to have plaque rupture or a type one myocardial infarction. But the lion's share of individuals that come in with an elevated troponin level, either have a demand supply mismatch, a so-called type two myocardial infarction, or may in fact have myocardial injury without a true rise and fall of troponin levels, and may have just direct myocardial injury. Sorting those issues out really become the challenge for the frontline clinical teams in trying to piece together the story and thus the underlying or prevailing pathophysiological mechanisms that underlie that elevated troponin level.

Sandeep Das: 09:52 Thanks. Great answer. Anecdotally that's exactly what we're seeing as well in Dallas. Now you talked about not seeing a ton of acute coronary syndromes, secondary to the virus. But you did earlier mentioned pro thrombotic complications. So are

these arterial complications, thrombus, venous thrombosis or both?

Ty Gluckman: 10:13 Yeah, it's a phenomenal question. And it's been well-recognized that individuals who come in with COVID-19 have a pro-inflammatory state that can actually rev up their thrombotic system for lack of a better word. And we have seen cases. We, the broader cardiovascular community, have seen cases of both arterial and venous thrombotic events. So in the case of the venous side, it's DVT, deep venous thrombosis. We've seen pulmonary emboli and we've seen other venous thromboembolic events. On the arterial side we've seen cases of stroke and we've seen other thrombotic complications that occur on the arterial circulation as well. The really challenging question that one asks is if in fact you're seeing these cases, what can be done to mitigate the risks related to this? And the party aligned today, which is a little bit frustrating or challenging because you'd like to be able to do more is, if patients come in who have indications, pre-existing indications for antiplatelet or anticoagulant therapy, the easy question is, or the easy answer is have them continue that therapy going forward.

We know that for all of us well predating the pandemic that individuals that are hospitalized with acute illness are at increased risk for venous thromboembolic events. And as a result, precautions need to be taken to mitigate that risk with VTE prophylaxis. What we've seen in the literature now is questions being asked of, is there a benefit to full intensity anticoagulation as opposed to VTE prophylaxis out there? We've seen reports that in sickest patient population, particularly those in the ICU and those being mechanically ventilated, that there is some in non-randomized studies suggestion that those individuals benefit from full therapeutic anticoagulation. But as of today, the NIH treatment guidelines related to COVID-19 feel that there's still insufficient data to guide a push towards full therapeutic anticoagulation. Rather the recommendations those individuals be enrolled in a clinical trial to figure out, in fact, what's beneficial.

And the last question that gets asked a lot is if these individuals enter the hospital at increased thrombotic risk, does that thrombotic risk extend when they leave the hospital? And you're well aware of the fact that there have been some studies looking at extended duration, thromboprophylaxis out to perhaps a duration as much as 35 to 42 days. As a matter of routine, current COVID-19 treatment guidelines do not recommend routine extended duration thromboprophylaxis.

But couched in the data that's come out thus far with the direct acting or [inaudible 00:12:55] coagulence, There may be a benefit in selected circumstances at the discretion of a clinician's judgment about extending the duration of thromboprophylaxis beyond the period of the hospitalization overall. But as a matter of routine, not recommended.

Sandeep Das: 13:10 Yeah, that's a great answer. we've struggled with the same question about whether people should be anticoagulated. And I really think that making decisions in this space based on observational data is fraught with peril, right? I mean, there's obvious reasons why people get anticoagulated by physician decision, discretion that may not translate well. I mean those may be what's driving the outcomes and I would love to see some randomized trial data in that space as well. So I'm going to put you on the spot here with a tough question. Everything you described has also been reported in ARDS more broadly. So do you think there's anything or is there a lot that's unique about COVID-19 or is this just another instance of severe respiratory failure?

Ty Gluckman: 14:03 Yeah, I think we've seen this certainly that there are cases of direct myocardial injury. There may be created an inflammatory prethrombotic state by other severe acute viral illnesses. I'm not convinced that there is something unique about COVID per se, that separates and differentiates it from a lot of other acute severe viral infections. The challenge that we have for this is A, we have no approved vaccine and therefore we may be seeing more severe manifestations. That even in the case of influenza, where we have a vaccine, we may be attenuating the severity of that illness overall. And B we've never been exposed to this, so we're learning on the fly. But I'm going to put my money down on, I may regret those words and eat those words in the months and years to come to say, right now, I'm not so certain that it's something unique about COVID as much as it is something that's unique that we have a paucity of data on. And we just have not had designed therapies that can essentially address this specific viral infection.

Sandeep Das: 15:12 Yeah. More or less that's exactly where my thinking is on this. So, I'm going to applaud that statement. One of the things, so you mentioned people have indications for anticoagulation. They continue their antiplatelet therapy. What about ACE inhibitors or angiotensin receptor blockers, or even ARNI? Is that issue solved? Is that resolved? Is there no open question there anymore? I know early on we were talking about whether

we should be holding ACE because of the portal, the virus entry involves the ACE receptor. What are your thoughts on that?

Ty Gluckman: 15:43 Yeah, so the spike protein on the SARS-CoV-2 virus binds to the ACE two receptor. We know that there is previous data suggesting that at least from a biologic plausibility standpoint, that ACE inhibitors ARB and ARNI's by the nature of it having an angiotensin receptor blocker included, might upregulate ACE too and therefore facilitate a either greater infection, greater viral burden, and therefore consequence of disease. I would say A, in spite of that plausible argument, the data thus far would point against all of that thus far. Number one, I would say that we don't have a big leg to stand on to say that there's overwhelming evidence to suggest beat on an ACE or an ARB causes harm. A lot of the speculation early on was hypertension was recognized as a risk factor for more severe manifestations of COVID-19. Hypertension is very prevalen.t as we age, there's more people with hypertension. And was that just a confounder that wasn't directly the cause for why that was observed?

And in fact, we really have lacked a lot of data to point to those on ACEs and ARBs is have more severe manifestations of the disease. As you know well, the European Society of Cardiology and the American College of Cardiology, the American Heart Association amongst others have come out and said, "Please do not stop your ACE or ARB in part because we have a lot of great data in the heart failure with reduced ejection fraction population highlighting that if you withdraw those agents, you can actually create a lot of harm." Lastly, I would point to the fact that the European society of cardiology, there was a randomized trial that actually sought to answer this question specifically, and the Brace Corona Trial that was run out of Brazil, randomized people to a temporary cessation or continuation, and showed that a temporary cessation did not improve outcomes overall in this regard.

So I think there will be more data that is forthcoming, but it's as you had said beforehand, it's nice to see randomized data that helps to at least refute or affirm what we were thinking. And in this case, I think the prevailing and now strongly prevailing data coming out of the Brace Corona Trial provides a validation at the statements issued by our professional societies holds true. Do not withdraw an ACE or an ARB in this regard. It will be interesting to know in the future, because there are some ongoing investigations to say, if you didn't have an indication for an ACE or an ARB might giving an ACE or an ARB to people who

otherwise don't have an indication provide value. I think we'll learn more in the future in this regard.

Sandeep Das: 18:34 Great. Yeah, that's one thing that was ... I really liked was the consistent messaging from all the relevant specialty societies to continue [inaudible 00:18:45] that came out early and clearly and consistently, which is a refreshing change in the time of mixed messages. What do you think is the impact of the mixed public health messaging on your ability to care for patients up in the Pacific Northwest?

Ty Gluckman: 19:04 Yeah, I mean I think none of this has been intended and it's always ... You can play Monday morning quarterback, we all can in this. I think, and this is one of the things that worries me today, so many people listening may be in the midst of either a second wave or a third wave, depending upon where they were of the pandemic in the United States. And one of the challenges that we had early on was the concept of how we flatten the curve, so as to not overwhelm our hospital's ability to have adequate ventilators, ICU beds available. We are now, I'm talking to many of my colleagues in the Midwest in the United States where in Minnesota, Wisconsin, and Illinois, they're being challenged to accommodate capacity and we may not have seen the worst yet.

So in that respect, how do we with many hospitals beginning to talk about delaying or deferring elective non-urgent procedures, while that may be well-intended to facilitate maximizing bed capacity, ICU capacity, ventilator capacity, how do we communicate to our patients that hospitals are still safe places to receive care? To our fellow clinicians, to make sure that they communicate to patients in the ambulatory setting, these are safe places to receive care. So that's my biggest worry. You will hear individuals say, "Stop medical distancing, yes to social distancing." And how do we make sure that patients feel that wherever they need to receive care, it's a safe place.

So that's my biggest worry of all is that we don't have a redo that is a less desirable redo in sending mixed messages to our patients. So I think we've fortunately the American Heart Association and other professional societies weigh in very clearly into, or beyond that early phase, to say, "Hospitals are safe places to receive care." And it really is about public messaging to our patients, a public service announcement to make sure they understand very clearly do not avoid receiving care under any circumstances.

Sandeep Das: 21:11 Yeah, that's a great point. And earlier on when you talked about indirect harm from COVID being patients seeking to defer care, and I think you make an eloquent point here that an equally important indirect harm is hospital systems that are overburdened by providing COVID care, may just not have the bandwidth to provide all the other care. If you have a hemorrhagic stroke somewhere and you can't find an ICU because the ICUs are full of COVID, then it's just as bad for you as it is for the patients with COVID. I think it's pretty well recognized that existing cardiovascular disease does increase your risk of worse outcomes if you were to get COVID. Are there any precautions that you're recommending to your patients that have preexisting cardiovascular disease?

Ty Gluckman: 21:58 Yeah. I think they're all the usual precautions that all of us should be taking. We recognize that there are now a slew of risk factors that portend a higher risk of having more severe manifestations of the disease. To be clear and I think consistent, I don't believe that there's any data suggesting a older individual, and individual that has diabetes that has chronic atherosclerotic cardiovascular disease is per se, more susceptible to developing SARS-CoV-2 infection. Rather the clinical consequences of that infection could be that much greater overall. So to that and frequent hand washing, social distancing, universal masking, and universal masking from friends, family, those individuals who hopefully they're minimizing contact with, but in those in whom they have to have regular contact with. Again, the masking is as important for you as an individual, as it is to avoid transmission of the virus if you are infected and don't even recognize it. You're asymptomatic or minimally symptomatic or pre-symptomatic overall. I think those are all of the precautions that should be taken.

If you're a patient that has chronic cardiovascular disease and one thing that we haven't touched on is the worry that I have months and years down the road is if people are delaying their chronic interaction with their care providers, their care teams for chronic illness, where are we going to be months and years down the road? So regular touch points. We're fortunate to have virtual care as an option. So interact with your care teams, interact with your clinicians, to be able to make sure you're getting your medications refilled regularly. You're up-to-date on all of your preventative care. You're addressing small, medium and large concerns that you have. And if that can be done virtually, great. So be it. But taking all of the regular precautions that anyone else should as well. If you can leverage other

individuals in the household to be able to do your grocery shopping, to be able to facilitate delivery of your necessities, all the better overall.

So I think those are the precautions that we should be taking. I will say a little bit of a worrier in me is many of us are used to issuing prescriptions, making sure that patients are not left with shortages of their prescription, for the gaps in their care and making sure they're getting 90 day supplies of as many medications as they can is of key importance. So for us as clinicians, to make sure that patients have available and reaching out proactively if possible, if there are needs that need to be met to our most at risk patients is of key importance overall.

Sandeep Das: 24:42 Excellent. So is there any role for routine heart screening in patients who have COVID? Let's say you have COVID, you don't get admitted to the hospital, but you get diagnosed. Should these patients seek cardiology evaluation?

Ty Gluckman: 24:57 Yeah. So for those individuals that have established atherosclerotic cardiovascular disease, other forms of cardiac disease, heart failure or risk factors, but they don't yet have a established cardiovascular disease. And then separately the whole group of people to say, "I got COVID. To my best knowledge I recovered from COVID-19. Do I need to do to see a cardiologist?" I think the answer in short is no. So meeting and connecting back with their primary care clinician, their care team is of key importance. If individuals remain asymptomatic to my best knowledge, there's not additional testing that is recommended as a matter of routine. I think the challenge that we all face, and maybe a topic of discussion for us is, we begun to see reports come out in the literature for those individuals that were seemingly healthy, who have recovered from COVID-19, who may be minimally symptomatic or asymptomatic.

We've now seen reports. And this is where the science is still not as mature as we would like, who have had testing done. And the most notable of this has been cardiac MRIs, whether done in Germany, whether done in Ohio, whether done most recently in China. We're beginning to see that we can identify sub-clinical evidence of ongoing inflammation, fibrosis, and potentially even subclinical, a reduction in heart function in particular involving the right ventricle. Markers or indices that may reflect mild carditis. And it's engendered for probably you and myself alike, a lot of questions that have come out to say, "I got COVID. As far as I know, I'm healthy and I've recovered."

And if it hasn't come from patients, it's probably coming from family members and maybe a topic of a virtual discussion over the Thanksgiving holiday is what should I be doing about this? And I think our best knowledge right now is if you're asymptomatic, the answer is probably nothing. If you are symptomatic, you should be seeking medical attention from your primary care team. And if there are questions that are lingering about cardiovascular involvement, a good history and physical, an electrocardiogram, and if needed from an imaging perspective, an echocardiogram. But routine advanced cardiac imaging in otherwise healthy individuals who have contracted COVID-19 who are asymptomatic or mild or minimally symptomatic, doesn't as of right now, bear fruit in terms of at least the available evidence as of today.

Sandeep Das: 27:42 Excellent answer. And a tough question. And you're right we are seeing a lot of these patients in clinic. For patients who were incidentally found to have, let's say abnormal imaging on MRI without a clear focal pathology during these diffuse nonspecific abnormalities, or who have incidentally elevated troponin, what are you doing about return to exercise or return to activities in those patients?

Ty Gluckman: 28:08 Yeah, there's been a lot that's been written about this recently, including in the last month. And I think the general guidance has been to point to prior pre-participation screening or evaluation for those individuals that have been published before. And so you're a good history and physical, an electrocardiogram.,And if necessary from an imaging perspective, an echocardiogram is, or are your best friend in that regard. So I think routine more advanced testing, particularly in the asymptomatic or mild or minimally symptomatic is not recommended as a matter of routine. For those individuals that have concerning symptoms or signs more moderate or severe manifestations, that's altogether a different question and a regular routine evaluation dictated by those symptoms and signs is warranted overall.

Now I think you and I are in a challenging mix when we throw in elite athletes, professional athletes who may undergo these types of evaluation, the elite or more competitive athletes versus those individuals who may be want to retune to return back to less competitive sports. But I would point all the individuals listening to our pre-participation guidelines that have been written and some consensus statements that have been written more so by experts in the field who have put together their best judgment. And you will see those types of algorithms being circulated just in the last few months. And I

think they've been thoughtfully done in trying to take into consideration symptoms and signs and again, history and physical and electrocardiogram. And if appropriate, an echocardiogram is your first bent towards imaging.

Also just add, we don't know what the cardiac manifestations in an unselected population of influenza looks like at scale. So you and I both would see people every year who have influenza who have seemingly recovered, may have some lingering symptoms, where it fits in terms of their types of testing. So I think a lot will be learned over time in terms of what are the near term and longterm consequences. It may just be that acute viral illnesses that require hospitalization and in the most severe forms, ICU stays, intubation, mechanical ventilation whether those individuals represent a group that as we discussed earlier, independent of the acute viral pathogen may create a lot of acute harm that may or may not, we don't know, create problems down the road for these individuals.

Sandeep Das: 30:55 That's a great answer to a really tough question. Some people have now probably are six or eight months out from their COVID infection. Are you seeing any delayed cardiac manifestations like longterm delayed?

Ty Gluckman: 31:10 Yeah, and the short answer is I honestly don't know. I mean, we're seeing people coming in with new cardiac complaints and the challenging issue for both you, myself and everyone else is, are these true, true, and related or true, true and unrelated overall? I think coming back to what we had led in with at the very beginning, we know that there are direct myocardial injury processes that can be at play. And certainly in the setting of people who have a visceral dilatory distributive shock, they can have type two MIs. And that dominates that group. We know that there are people who can have myocarditis and we recognize that it's the acute viral infection. But then it's the hyper or exaggerated immune response that can underlie, not just COVID-19 related myocarditis, but for that matter, all forms of viral myocarditis. And then there's the arrhythmia potential and I think the arrhythmia potential is tightly tied to the other two. When you have acute myocardial injury or myocarditis inflammation, perhaps left ventricular or right ventricular or biventricular dysfunction, there's an accelerator risk of myocarditis independent of the therapies like hydroxychloroquine or chloroquine that we were using early on.

So in the short answer, I guess this is a long answer to your question is it's a challenge right now, but I have not yet seen

people who have fully recovered in being able to delineate clear cardiovascular complications that I can attribute back to COVID overall. We know, however, and the term that's being used are long haulers or people who are experiencing persistent symptoms that clearly didn't exist prior to the pandemic or prior to their infection. And now they're left with in spite of seemingly recovery from their infection, ongoing persistent symptoms that may be as seemingly mild as fatigue, but can have a dramatic impact on one's wellbeing and functional status-

Sandeep Das: 33:14 Absolutely.

Ty Gluckman: 33:14 ... to more prominent symptoms and what that is attributable to. So I think I, at least personally, have a lot to learn in the coming months, and I dare say perhaps years to figure out how much of this may be affecting the cardiovascular system overall.

Sandeep Das: 33:31 Well, thanks. This has been a really interesting discussion, honestly. I'm wondering if you have some parting thoughts you want to share with our listeners? What are your key take homes for the audience from this discussion today?

Ty Gluckman: 33:42 Yeah. I would say a couple of things. For everybody listening, I think our science has dramatically expanded with clinical trials that have been done and the novel therapies that we now have available on the acute care, in the ambulatory setting, and certainly the advancement in developing vaccines have all come about because of people's willingness as patients to be enrolled in and clinicians willingness to enroll their patients in clinical trials. In spite of the fact that we all thought this would be behind us, there's a lot more still to learn. So I warmly encourage all listeners to enroll patients in active clinical trials in the ambulatory in the hospital settings, because it's how we will learn more.

Number two, a part of me fears the non-COVID, but still very important related indirect effects of the pandemic that as we enter a second wave and hospitals potentially begin to restrict the types of procedures they're doing, that we don't send mixed messages to our patients and run the risk of again, questions being asked about where are all the heart failure, stroke and heart attack patients in the hospital, because patients are staying at home and hunkering down in the midst of fear I presume about coming to hospitals. Hospitals are safe places overall.

		And then I would say, lastly is continue your quizzical nature. We don't have all this figured out. And I continue to learn what used to be hour by hour or maybe day by day in new advances, is turning a little bit into a week by week and month by month. But I would continue to stay on top of the literature, continue to keep asking questions, and hopefully the science will catch up as quickly as we'd like it to, and being able to answer and afford answers to all these questions. Those are I guess my biggest takeaways.
Sandeep Das:	35:30	Awesome. So thanks again, Ty, for a great discussion. I really enjoyed it and I learned a lot. Thank you.
Ty Gluckman:	35:35	My pleasure, please stay safe.
Sandeep Das:	35:38	You too.
Speaker 1:	35:39	Quality improvement in the time of COVID-19 is brought to you by the American Heart Association with support from Novartis Pharmaceuticals. The views expressed in this podcast do not necessarily reflect the official policy or position of the American Heart Association. For transcripts of this podcast and more information on the associations COVID-19 CBD registry powered by get with the guidelines, visit us at heart.org/covidregistry.