

Jacqueline Tomei:

Good day and welcome to the National Heart Failure In the Time of COVID-19 webcast, today brought to you by the American Heart Association with support by Novartis. My name is Jacqueline Tomei. I am a quality programs manager for the quality and health IT team at National Center, currently overseeing the Get With The Guidelines 360 Heart Failure Initiative in metropolitan Chicago. Joining me today from the American Heart Association to co-facilitate the presentation are Robin Kaiser, quality programs manager in St. Louis, Missouri and Lynn Serdyski, quality programs manager in Milwaukee, Wisconsin.

Jacqueline Tomei:

We have approximately 500 healthcare professionals registered for the call, and I'd like to express our sincere appreciation to each of you for taking the time to support this presentation today. This time together will allow us to discuss and share the current state of challenges, observations, and early successes of the heart failure patient population and health care providers during the COVID pandemic. As a reminder, all lines will be muted for the duration of the webinar. This call will be recorded and be made available within 24 to 48 hours. Please feel free to type your questions in the chat or question box to all participants. The questions will be answered in the chat and we will do our best to address them verbally as time allows at the conclusion of the moderated Q&A period. Or if they are not addressed, HAQSI team members will reach out. Thank you for, again, taking the time to submit your challenges, lessons learned, best practices and panelists questions in the registration survey. Your questions have been incorporated into the content for today's presentation and will be used to help develop further content for you in the future.

Jacqueline Tomei:

Before we begin, I am required to mention that the opinions expressed during this webinar are those of the speakers and do not necessarily reflect the opinions, recommendations, or guidance of the American Heart Association. For more information about the American Heart Association, please visit [heart.org](http://heart.org).

Jacqueline Tomei:

Without further ado, I would like to introduce our expert panel. With us today, we have Dr. Clyde Yancy, vice Dean of Diversity Inclusion and Chief Of Cardiology at Northwestern University and Associate Director of Bloom Cardiovascular Institute for Northwestern Medicine. Dr. Mitchell Saltzberg, Medical Director Of Comprehensive Heart Failure and the transplant program at Medical College of Wisconsin. And dr. Chahoud, Director Of Cardiology Services at SSM Health Saint Joseph Hospital, Lake St. Louis. Before we begin the moderated Q&A, we would like to offer each panelists a few minutes for an opening statement. So Dr. Yancy to start us off.

Clyde W. Yancy:

Thank you, Jacqueline. Let me begin by not only saying good afternoon to all of the persons who have attended, nearly 400 now, but also let me begin by saying thank you. I don't think there's a healthcare provider anywhere that hasn't been touched or directly engaged or within the indirect support services that are necessary to respond to COVID-19. What we have seen over the last nearly three months has been nothing short of heroic. It has been the call to duty and it has been the reaffirmation of why so many of us opted for careers in healthcare.

Clyde W. Yancy:

We made this decision. We elected this path to provide healthcare because we wanted to help people. We wanted to make a difference. There's so many quiet heroes that have really taken upon their own initiative, looked at the fear involved and worked through that fear in order to execute the principles of health care and the principles of the practice of medicine. I've seen it firsthand in my own group. I've seen it indirectly in my peer group, nationally and internationally. And so I don't think it would be appropriate without saying thank you to the health care workers. That's particularly important because the headlines this morning in the medical news now tell us that over 60,000 healthcare workers who faced fear and stepped up to help others are infected with this condition. And so this is not a problem that affects them. This is a problem that affects us. And we should all keep this in mind.

Clyde W. Yancy:

Let me also tell you that there's a reason why the American heart association is the convener for this webinar. Early on, the leadership beginning with the CEO and the president, stood firm and said, "We will rise to the occasion. We will help even though we have been fiscally challenged in an environment where all of our traditional fundraising activities have been hampered." Nevertheless, the American Heart Association redirected funds to stand up at least 10 novel research initiatives from which we will learn more about this condition.

Clyde W. Yancy:

Moreover, we've used the leverage of Get With The Guidelines. And led by some stellar clinician sciences at the University of Texas Southwestern Medical Center in Dallas, now have a COVID-19 specific cardiovascular disease registry akin to the Get With The Guidelines the now has well over 100,000 entries. You can only imagine when we see the first analytics, how much more we will learn. That's what the American Heart Association has done to be responsive to this crisis. We're doing it again today by convening this panel for our constituency, particularly here in the Midwest, to really make ourselves available, to answer your questions.

Clyde W. Yancy:

I'm delighted that Georges and Mitch are with me. Our intention is to address questions in really three big domains. We will share those domains, but there may be areas about which one or the other of us has a unique perspective.

Clyde W. Yancy:

The first will be, what do we know about the intersection of cardiovascular disease and COVID-19? Some incredibly important information there, particularly as it pertains to heart failure and the drugs we use to treat heart failure. The second is how do we as practitioners engage with the patients who present, and particularly as we go forward, how do we reengage with our usual patients who will soon be back in our offices and our hospitals and our practices and our communities and our environments? That soonness may be as recent or may happen as soon as next week.

Clyde W. Yancy:

And then the pain points that we've experienced in this COVID-19 crisis. The number of deaths nationwide, we should crest over 100,000 in just three months. This is the most vicious, quickest killer of Americans in the history of the United States. We should hit the peak today over 100,000. But in addition to that, we've learned how inequitable this burden is. And once again, those at greatest risk are

those that have been disenfranchised, disadvantaged and are in the underrepresented populations, who we'll talk about the social determinants of health and those that are at risk.

Clyde W. Yancy:

We'll talk about cardiovascular disease and how it intersects, amplifies COVID-19 and particularly the drugs we use and specific comments about heart failure. And hopefully we'll have some additional time and some comments about how do we engage with patients? The mechanics. How do we actually execute care in a world where we're conscious about our safety, our patients are conscious about their safety? We want to do the best we can to help everyone and above all else, do no harm.

Clyde W. Yancy:

So let me again thank you for being here. We're just a few people shy of 400. And if there's more than one person listening to this at any one station, we may be as many as 500 that are engaged. Thank you for your attendance. Wanted to let you know that we intend to make this interactive after these opening comments. We will begin to vet your questions and that will drive our content. We're not going to trouble you with PowerPoints, but we instead will answer your questions. Let me now switch to Georges and allow Georges to give you an introduction.

Georges Chahoud:

Thank you, Clyde, and thank you Mitch as well as our AHA staff. This is a great opportunity and a great privilege to be able to participate in this webinar, along with Clyde and Mitch talking about the impact of COVID-19 pandemic and our heart failure patients. It's quite interesting that we are about three months through it, and we're still learning as we go. This is an pandemic like no other. It's a once in a lifetime experience. All the efforts of our healthcare providers about are in the front lines are always appreciated.

Georges Chahoud:

As we talk about this, I would like to highlight a couple of the facts, and this is unfortunate status in reality what we've known so far, that even during this current pandemic, more people will still dying from cardiovascular disease and COVID-19. And unfortunately our patient with cardiovascular disease, especially heart failure patients, are more likely to die from COVID-19. The case fatality rate is quite high, close about 10%. Unfortunately, we've seen a trend then the hospital admissions of patients with acute coronary syndrome, as well as [inaudible 00:10:41] has reduced drastically. We're seeing up to about 20 to 40% reduction in the number of [inaudible 00:10:49] in our ERs. And a lot of these patients have not been showing up or they started showing up a bit late with cardiogenic shock presentations, which because the point that we will probably start seeing more patients with new onset heart failure with reduced [inaudible 00:11:09] fraction as we go along with this journey. And the whole idea initially that came about that you don't have to come to the hospital to try to avoid contracting COVID-19 does not apply to all patients with acute coronary syndrome or acute decompensated heart failure.

Georges Chahoud:

First, I'll try to just highlight two points in relation to heart failure, particularly in COVID-19 to say that we'll probably, we likely are dealing with two groups of patients. The first ones are the ones that have an underlying preexisting heart failure, and that is precipitated by the acute illness if they contract COVID-19. But at the same time, as we will go over in some of these questions, COVID-19 itself can cause some type of cardiomyopathy. The mechanism of it is still not clearly defined. Could be related to myocarditis,

direct myocardia injury, profound systemic inflammation and possibly microvascular dysfunction and endothelial dysfunction. And this is probably accounting for about 30% of the [inaudible 00:12:18], which is going to be presenting a challenge in how we manage those patients.

Georges Chahoud:

But at the same time, in my opinion, the biggest challenge that we have been facing over the past two months is the fact that patients are afraid of coming to seek medical attention because of fear of contacting COVID-19. That's been amplified by the message that they should practice social distancing and stay at home, which is causing patients to delay evaluation for more advanced congestive symptoms or low output symptoms. And they end up suffering from worse outcome. We've been able to adopt early on the technology with the telehealth and virtual visits to try to help this patient population that is being at risk. And I'm sure that we'll be answering a lot of questions related to that as we go along with this presentation.

Georges Chahoud:

And as Clyde mentioned, it's not my intention to go over any slides. We just wanted to give a quick 30,000 feet overview of some of the facts, what we know, and the challenges that we are all facing. And try to answer some of these questions as they come along. I'm going to open for Mitch to go ahead and give his keynotes as well before we start answering the questions that are available. Thank you.

Clyde W. Yancy:

Thanks, Georges. Mitch?

Mitchell T. Saltzberg:

Thank you, Clyde. And I want to add the tremendous respect and gratitude for my colleagues around the country, coworkers, and all the ancillary support, people that go into caring for this incredible disease. Of course, we've never witnessed anything like this. I think the data that Clyde has highlighted clearly speaks to the overwhelming systems of care that we've had and not only take advantage of, but redesign. And I'm sure each of you who's on this call today has seen a tremendous transformation of healthcare. I think it's a reminder, to complement my co-panelists comments, that heart failure didn't go away during the pandemic. And I think one of the things that I hope we have some time to talk about today is the ongoing need to provide care for this chronic patient population and still address their needs at a time when we're seeing patients effectively try to avoid healthcare systems during a time of great uncertainty.

Mitchell T. Saltzberg:

I think there's much more that we don't know today than what we do know. And as we see the science evolve regarding the cardiovascular complications of the coronavirus disease, I think we're learning more every day that will help us take care of this population, not knowing for sure what the chronic implications are, but anticipating that we will see not only the direct effects of infection from this disease, but the indirect effects from people who have abstained or deferred care and the longterm consequences of that.

Mitchell T. Saltzberg:

I'm grateful for the American Heart Association to take on this initiative. I think building the databases that are being built today will help address very pivotal questions. And I would also encourage

everybody to continue to support efforts like Get With The Guidelines, especially at a time where we've seen tremendous financial pressures brought down on organizations as they have to make critical choices where they continue to invest. But heart failure is still with us. We know these patients are there and they need our services, care and insights more than ever.

Mitchell T. Saltzberg:

So I look forward to very productive dialogue today. I'm grateful for the opportunity to participate with my esteemed colleagues. And I hope to be able to address any concerns that the audience has as we move forward today.

Clyde W. Yancy:

Thank you, Mitch. I think you were the secret sauce that got us over the 400 crest. So we've got quite an audience. Let me remind the audience that the chat box is open and we will be reviewing questions that you submit in the chat box as content for our speakers to address. I'm going to start the discussion and turn to Mitch and really have Mitch kind of frame for us our concerns about heart failure in this pandemic. What have we seen? What are the issues of myocarditis? What are the concerns about residual heart failure when this is all over? And what about the drugs that people are taking for heart failure, ACE inhibitors and ARBs? What are the concerns? What do we know now?

Mitchell T. Saltzberg:

Thank you, Clyde. I think we've been of course following our data very carefully. And I think our data likely supports other trends. We've seen 75% to 80% reductions in heart failure hospitalizations. This doesn't speak to the fact that there's any less disease, just that patients are not getting the care that they typically would have. I think we know from an evolving literature that patients who are presenting with acute coronavirus infections can have a fairly robust presentation of heart failure. It's been estimated up to about 23% of patients can present with acute heart failure in the setting of acute COVID infection and cardiomyopathy may occur in about a third of those patients. So that's on top of the underlying population where we already know as has been well documented that heart flare patients have a significantly higher risk of an adverse outcome. In our data, we've seen roughly a 10% absolute difference in mortality between a coronavirus patient-

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Mitchell T. Saltzberg:

And absolute difference in mortality between coronavirus patients with and without heart failure. And we've seen hazard ratios for mortality increase significantly compared to our baseline data, highlighting the fact that these patients portend to tremendous risk, not only from direct heart failure, but also from the acute onset of dysrhythmias, which also have been found to be increased and present in about 17 to 20% of hospitalized patients. And almost half of the patients hospitalized in the ICU will have [de-novo 00:00:18:32] onset of ventricular dysrhythmias. This disease is going to increase the population of patients that we have in our heart failure midst. And we have to be prepared to manage these patients. There's some early signals, although these are not strong, that perhaps ACE inhibitor therapy, but not angiotensin receptor blocker therapy may confer a modest benefit for coronavirus patients. By no means a treatment strategy, but more of an observational database that's being put forth.

Mitchell T. Saltzberg:

And, as we've seen recently with some publications, the drugs that are being used and have been suggested, particularly the combination of hydroxychloroquine or chloroquine with, or without a macrolide antibiotic, now, is being called into great question with the recent publication of a retrospective analysis, and a review of nearly 100,000 patients that suggest that these patients are, in fact, at higher risk for mortality when these drugs are being utilized. And, again, heart failure confers an independent, very strong adverse risk profile to these populations of patients.

Mitchell T. Saltzberg:

I think from a treatment standpoint, we have been in a position to be testing in real-time many approaches and without a definitive treatment at this time, I think, many of us continue to struggle with what the ideal strategy is. But I think we're learning a tremendous amount. We have, certainly, continued therapy with our heart failure patients and, as we transitioned to virtual visits from face-to-face visits, and now heading back in the other direction, I encourage our patients to continue their routine therapies. We've not made any drastic changes as yet pending further data.

Mitchell T. Saltzberg:

So, I think at the moment, my concerns related to Clyde's initial questions have to do with the high prevalence of suspected myocarditis, that Dr. Chahoud had mentioned earlier. And I think we're only beginning to realize the full impact of this disease related to new onset cardiomyopathy and exacerbation of underlying heart failure. Both of which would be somewhat expected based on reviews of prior pandemics. But, generally, with other coronavirus subspecies that we've seen where the risk of myocarditis, both acute and even late, has been well-documented.

Clyde W. Yancy:

Mitch, that was superb, that really was a beautiful summation over just a few minutes about where we are with this. And I'll get back to a couple of themes there, particularly with regard to the ACE inhibitor story, but a great segue to go back to Georges, because Georges did mention originally about myocarditis and cardiomyopathy.

Clyde W. Yancy:

Georges, tell us what we know specifically about the coronavirus becoming the COVID-19 disease and that disease, in turn, impacting the myocardium. What do we know about this myocardial disease in a setting of COVID-19?

Georges Chahoud:

Great. Thanks Clyde. I mean, this is a very important question because as we learn more about it, it looks like there are several mechanisms for the injury that happens to the myocardium in patients with COVID-19. There is a lot of speculation that there is direct damage by the virus to the myocardium because, as we know so far, that the virus basically by and through the S14 to the ACE2 receptor, especially in the lungs. But also we know for a fact that those ACE2 receptors are available in the myocardium, as well as in the vasculature including the endothelial cells. And that way the virus is speculated to cause direct myocardial damage.

Georges Chahoud:

But also, at the same time, there has been a lot of reported cases of a cytokine release storm that happens in the late stages of the disease process with COVID-19, which causes the release of several

inflammatory markers, whether it's IL-6, IL-2 cytokines, which has been postulated to be one of the reasons for significant myocardial damage, which has led to significant decline in the myocardial function. And those are the patients that, on top of their ARDS, are developing acute hemodynamic compromise going into cardiogenic shock, along with a vasodilatory shock that they experience along with that.

Georges Chahoud:

But, on top of this, we've seen several patients, even in their early disease phase, being labeled as having myocardial injury by virtue of having elevated troponin levels. And whether this is related to type 2 MI from hypoxia induced myocardial injury or potentially increased demand [inaudible 00:23:27] supply during this acute illness, which could lead to the leak of those enzymes. And we have, currently, quite a bit of data that points out that the mere fact of positive troponins, above the 99 percentile for the lab, carries a significant prognostic indicator. And even patients without an underlying cardiovascular disease who have a positive troponin has a mortality, which is close to about 37, 38%.

Georges Chahoud:

And if you add the group of patients that have an underlying cardiovascular disease, as well as a positive troponin during their admission for COVID-19 their mortality rate over a two month period of time was up to about 70% compared to those patients that had negative troponins at the beginning. And we've seen that this rise of the troponin could be just a marker of a worse outcome. And some of these patients are the ones that we'll have to pay close attention to. And, again, the unfortunate patients are the ones that have an underlying cardiovascular disease, end up contracting COVID-19, and have a direct evidence of myocardial hit or myocardial injury by elevated troponin levels, as well as NT-proBNP. Those are the ones that we've seen a very high mortality rate of over 70%. And those are the ones that succumb to COVID-19, unfortunately.

Georges Chahoud:

But I would like to draw our attention to the group of patients that are "stable" with COVID-19 but, at the same time, had a positive troponin elevation during their admission, because part of the things that we've seen in order to avoid contact with our healthcare professionals, as well as our sonographers, a lot of times, if the patient is hemodynamically stable we've been shying away from doing any imaging studies, including echocardiogram. So, we really don't know the magnitude of LV dysfunction in these patients with positive troponins.

Georges Chahoud:

And I would like to suggest, basically, that we follow those patients very closely after they're discharged, even if they had an uncomplicated course and they were cured completely because we still believe that we're going to be facing a larger group of patients that have contracted COVID-19, and had a myocardial injury during that process that will end up developing some degree of cardiomyopathy on the long run. We don't know yet if this is going to be reversible or not, but at the least that we need to do is to have them follow with an imaging modality, at least after this 28 days of infectivity, to see what's that underlying LV function looks like and make sure that they get started on the guideline directed medical therapy early on, if there are any signs of a decline in their LV function.

Clyde W. Yancy:

So let's take a pause. A lot of information just in the first few minutes. And Georges, while you kind of regroup a little bit, let me go back to Mitch. Mitch, in the very beginning, we started with these incredible anxieties about the exposure to an ARB, or an ACE inhibitor that might up regulate ACE2 and result in greater entry of the coronavirus into the cell, particularly pulmonary endothelial cells. And there was great concern expressed by many, especially patients, about remaining on their ACE inhibitors or ARBs.

Clyde W. Yancy:

And if everyone was listening to you as carefully as I was, you exercised a full pivot and said, now, we're not having the conversation that there's a risk attributable to these drugs. We're having the conversation that there may be some observational data that suggest maybe a lesser severity of disease. And part of this is validated in the paper to which you referred, Mitch, that was published last Friday in the [inaudible 00:27:47] Journal of Medicine lead author was Mandeep [Meh-ra 00:00:27:48]. 161 countries, 9,000 patients an incredible tour de force meta analysis. And even though it showed, we think, definitively a signal of harm from hydroxychloroquine or chloroquine with or without the [macrolide 00:10:07], there was also a point estimate decidedly in favor of lesser risk of death on the ACE inhibitor, totally confounded, not cause and effect, but it was very interesting to hear you take that pivot. So, how about this? For the 400 people that are listening in, what's the definitive word about the use of ACE inhibitors and ARBs in the setting of coronavirus exposure and COVID-19 infection?

Mitchell T. Saltzberg:

Clyde, I'd love to say I have definitive information, I think that would make me way smarter than all the other folks out there. But I think, as we look at this data, and I found it very interesting as we begin to look at what risk factors do exist, that both portend higher and lower risk of inpatient mortality for these unfortunate patients. And, as you mentioned, the signal is there. And, again, it's just the signal and requires further study that the ACE inhibitors and, for whatever reason, not the angiotensin receptor blocker class was associated with a reduced in-hospital mortality risk. That data does come from the paper you referred to. Again, nearly 100,000 patients from around the world that were divided into groups according to the treatments that were offered. And roughly 15,000 of those were in different treatment groups, and 81,000 served as a propensity matched control group.

Mitchell T. Saltzberg:

And, as the data is evolving, we're seeing really substantial signals about mortality risk increase for these previously commonly prescribed, but really understudied therapies with hydroxychloroquine, chloroquine, and a macrolide antibiotic. We have not, in our practice, systematically transitioned patients off an ACE or an ARB. We've maintained their guideline directed medical therapy on the belief that we've got an awful lot of data that supports those medicines still confer a survival advantage for our chronic heart failure patients. And not having definitive enough data to make, I think, any systematic recommendations to suggest that these medicines be abandoned in a time of crisis.

Clyde W. Yancy:

If anything, it's the other way around, right? Be aware that the abrupt cessation of guideline directed evidence-based therapies, particularly for heart failure, may result in short order with a decomposition episode in a setting where we're already seeing fewer patients present to the hospital. So, I think you are spot on, correct. We need to encourage patients definitively, if I can use that word, to stay on their



evidence-based therapies. There's just no reason to follow any other guidance. I think you would agree with that.

Mitchell T. Saltzberg:

I would agree. And I think that the reality is, as we're seeing these patients present, most of these are very acutely ill patients who had upwards of eight days of disease beforehand. And one of the questions that we just haven't had data to answer yet is what happens to the patients that convert from a relatively tolerable course of disease, lasting one to two weeks, to those who are destined for really adverse outcomes? And do we know enough in the absence of adequate testing to know the population the true denominator here to really begin to study what the impact background ACE inhibitor or angiotensin blocker, or even neprilysin inhibitor therapy might have on the likelihood of progression of the disease?

Mitchell T. Saltzberg:

That, to me, is a very critical question that I think we're sort of edging around as we move through this discussion as to, is there either a protective or harmful effect in the pre-critically symptomatic window for these patients that I just don't think we have enough information for. And I would agree, we do not abruptly withdraw these medications. Certainly, in the critically ill patients who are destined for, say, extracorporeal membrane oxygenation support due to complete hemodynamic instability, that is a different subset of the population that we might talk about today. But the routine heart failure patient, of which there are many, that are infected with this disease that come in are continuing their therapy as long as it makes hemodynamic sense to do so.

Clyde W. Yancy:

Thanks, Mitch. I think you are absolutely spot on. And you're right, the denominator in [Meh-ra's 00:32:25] paper was over 100,000 patients, and there were about 86,000 in the control arm. So, even though it was an observational analysis, there's a lot of power in those numbers.

Clyde W. Yancy:

So ...

Jacqueline Tomei:

Dr. Yancy?

Clyde W. Yancy:

Yes?

Jacqueline Tomei:

Do you mind if I cut in with one of the questions that came in from one of our audience, that's directly related to what you're talking about?

Clyde W. Yancy:

Yes.?

Jacqueline Tomei:

So, do you suspect that we're going to continue to see a worsening in EF for these heart failure patients that have recovered and in your experience with, how do we keep those patients on that guideline directed medical therapy? Or do you think that those patients are going to see an alteration in that, on what is guideline directed medical therapy in the future, as we understand this disease more?

Clyde W. Yancy:

So, I'll start the response and then ask Georges to offer a response as well. My greater concern is this, for the patients that have been seriously ill, and are recovering from COVID-19, invariably, there has been some myocardial depressant activity noted. In some cases, drank myocardial edema. Rarely there's been a syndrome that looks like myocarditis. Interestingly, in terms of biopsy proven myocarditis, there's very little evidence that we've seen there. We have seen noninvasive imaging consistent with myocardial edema. We have seen MRI imaging that is suggestive of my myocardial involvement. But most of what we see is interstitial inflammation.

Clyde W. Yancy:

Nevertheless, I am of the heart failure ilk for long enough to really respect the fact that once there's been myocardial injury, over time, that injury can become more manifest. Perhaps it will be attenuated with early introduction of evidence-based therapies, ACE inhibitors in particular. But I think we should be prepared. It is quite likely that there will be post-COVID-19 heart failure episodes in those that were hospitalized. I agree with Dr. Saltzberg, particularly in our ICUs. Unfortunately, the exit event is myocardial, where the patients have this moment of calm, and then just abject hemodynamic failure. That is, then, complicated by incessant arrhythmias.

Clyde W. Yancy:

And so, for anyone who's been able to overcome that, that is to say, support with extracorporeal membrane oxygenation, able to come off ECMO, able to come off additional other mechanical circulatory devices, and is now better, I think we should be prepared that patient has an at-risk substrate.

Clyde W. Yancy:

In the meantime, we really should be as strident as we've ever been about adherence evidence-based therapies. They're inexpensive, or generic for any patient that has any amount of LV dysfunction. And this is a guideline driven statement, the ACE inhibitors indicated. And so, we should be very thoughtful about this. Georges?

Georges Chahoud:

Yeah, I agree with you definitely, Clyde. I mean, this is a very important point. The issue of the decline in the LV function, in my opinion, I do agree with you that there is definitely going to be more patients that will show up at our doorsteps with further decline in that LV function. And any type or any degree of myocardial injury that happens related to, as we said earlier, direct virus injury, or ...

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Georges Chahoud:

As we said earlier, direct virus injury or related to an increased demand-supply mismatch, that will eventually lead to further decline and there will be ejection fraction. In what we've seen so far, the idea

of fulminant myocarditis, there has not been anything to support that. There has not been any documented cases of acute myocarditis induced by COVID-19. It's probably just an inflammatory process that happens, could be related to the cytokine release storm, but as you mentioned, the myocardial edema and interstitial edema that happens in the myocardium, with some MRI data, has been showing that, and there is a currently, as you know, the Heart Failure Society of America is seeking endomyocardial tissue samples with a study that is conducted down at Vanderbilt, looking at the exact pathophysiology and what are the changes that are happening in the myocardium in those patients with COVID-19.

Georges Chahoud:

But going back to the statement regarding the guideline directed medical therapy, and we cannot emphasize that enough, we still see it over and over again, that these patients, when they come into the hospital with known LV dysfunction, their guideline directed medical therapy was put on hold when they show, in the hospital, even though they have no significant hemodynamic compromise, in my mind, there is no reason to stop those lifesaving therapies. There is enough evidence to suggest that stopping, or even reusing those medications, has been implicated in a worse outcome, increased mortality, and to some extent, reverse remodeling, and we cannot afford that in our patients that are being admitted with COVID-19, with the concern that there may be further myocardial damage and injury related to the virus, to deprive them from this guideline directed medical therapy.

Georges Chahoud:

And on the other hand, starting those guideline directed medical therapy in the stable patients, even if they are COVID-19 positive, if we have anything to suggest an underlying myocardial injury, LV dysfunction, starting them on the guideline directed medical therapy before leaving the hospital is very important to try to avoid any further decline in their LV function. But I agree with you, we definitely are going to be seeing a large number of patients and an increase in the flux of heart failure with reduced ejection fraction. We always say, in the community, we've been dealing with more heart failure with preserved EF, but I think we're going to start seeing more and more increase in the number of patients with reduced ejection fraction as they start showing up in the next month or two.

Clyde W. Yancy:

Guys, we've got about four questions here, and I want you to answer the four questions in a way that someone who's taking care of patients will have a take home kernel, a nugget, something they can use. Mitch, I'm coming back to you, for the patient with symptomatic heart failure, reluctant to come to the hospital, what are the tips? What are the strategies that you can offer for caring for those patients out of the hospital setting, until such time emerges where the patient is comfortable with coming to hospital? Two or three really crisp steps.

Mitchell T. Saltzberg:

Yeah, Clyde, I think the challenge we've found, step one is to engage the patient. I think as we've seen this transformation healthcare delivery, we have transformed our clinics in a way that allows patients to feel connected to us, even if they're reluctant to come in. Whether that is a telephone encounter, which has more favorable reimbursement than it did initially, which helps, a video encounter for systems that were either nimble enough to try to pivot to video encounters, or have implemented systems to do so, or in cases where you have true concern, creating a safe environment for that patient to actually come in for a face to face visit and addressing all of their concerns regarding the risk of infection coming to a

health care facility. I think that's been one of the things we learned very, very quickly as we can, that we just cannot abandon the care of these very sick patients who need our help.

Mitchell T. Saltzberg:

That's certainly lesson number one. Two is, we need to continue to work at a systems level to ensure that the infrastructure that previously supported these patients, including community resources that were very, very acutely affected and historically produce, I think, real risks of people decompensating, these are the social support structures. I think Clyde has sort of talked about the disadvantaged patient population that we often are forced to deal with and take care of, these patients are at the greatest risk because, of course, the resources that many of them rely on for basic necessities have fallen apart. We've continued to engage with our community support systems. Paramedicine programs that have been able to step up to the plate and provide care when necessary have been really pivotal for us to try to see these patients through.

Mitchell T. Saltzberg:

I think, finally, is working with our team, to remind our team that we do have a mission. We are here to take care of patients. This is what we are... Made our career choices and have not backed away from that. We've been continuing to provide, whether it's advanced therapies, transplants and LVADs, these patients still have urgent needs and we can't ignore those, but also the chronic heart therapy patients. It's a matter of engaging our staff, as well, to remind them how important our mission really is. As we've seen, numbers of heart failure patients decline in the acute hospital setting, we still know that they are there and need our support. I think those are the three pivots, is to engage work with the community and work with your staff to ensure that they all know that this is mission critical work and it's central to the outcomes of the patients that we take care of.

Clyde W. Yancy:

All that in number four there, Mitch, that was a great several thoughts that you shared with us. Engaging with the patient, depending on the paramedical help that's in most communities, being particularly attuned to those with least resources, the least amount of resources, and then really respecting our mission and finding a way. Along the lines of finding a way, number four, that I would add to that, is that we have engaged with the patients directly to find out what's the nearest facility? Is that a facility that is currently feeling the crush of COVID-19 patients? If not, most emergency departments have found a way to self isolate those suspected, versus those not, and still to provide acute care.

Clyde W. Yancy:

I've had a number of patients present to area emergency departments, I've been on the phone with emergency room physicians and we've cared for those patients. And yes, I've had several patients come in to the hospital, on our inpatient services, that we've gone out of our usual protocol to protect them and make certain that the environment is safe. And so if a patient really needs to come in, I would advise the person who raised this question to not allow that fear to resort to a less than ideal care practice. Georges, do you have anything to add to this question?

Georges Chahoud:

Yes, thanks Clyde. The one that point I would mention as well, and this is something that we've started in our system, which is exactly what you've been talking about, is creating a safe environment for the patients to be able to come in, especially for acute management. What we've established in our system

is kind of a rapid infusion center, or Lasix infusion, for those patients, because the majority are basically showing up with acute volume overload.

Georges Chahoud:

If they're not able to manage with titrating their oral diuretics, we have established a protocol where the patient can be directed, either to be seen physically in the office, or just basically cutting the chase short and sending them, either to the infusion center in a side that has not been overwhelmed with COVID-19, or even we had established a protocol through the ED as an ED observation unit, where the patients can come in, get high dose diuretics for a short period of time, they will be monitored, looking at their vitals, making sure that their electrolytes are corrected and making sure that they're not orthostatic, and then they can be discharged from the ED directly, without having to be admitted to the hospital.

Georges Chahoud:

That way, we're able, at least, to manage those patients in a timely manner, get them taken care of and trying to reduce their admission to the hospital, because the flip to that coin, and we're seeing a larger number of patients that have waited long enough, and I have, at least, in my unit here, at least about three patients with about 40 to 50 pounds of weight gain, coming in with acute decompensated heart failure requiring high dose IV diuretics, along with inotropes to try to diurese them. But the bulk of these patients, as Mitch mentioned earlier, we need to make sure that we send a message that we are still taking care of these patients.

Georges Chahoud:

We want them to reach out. By virtual visit, we can at least assess their need and then direct it from there, to the resources that we have available and the protocols that we have established, to try to care for them in a timely manner, to try to reduce their admission to the hospital. But if they get to the point, like these patients that you mentioned, yes, our system, and as well as a lot of systems across the nation, have made it as safe as possible for the patient to be admitted to non COVID units where they are protected, but at the same time, they're being cared for.

Clyde W. Yancy:

Let me go back to Mitch, thank you, Georges. Mitch, this, I think, is right in your sweet spot, so I'm expecting a home run. I got to use a baseball analogy. I miss baseball so much. What are the selection criteria for ECMO use when you're dealing with a critically ill COVID-19 patient?

Mitchell T. Saltzberg:

Yeah, in our center, we convened, pretty early on, a multidisciplinary group of individuals, everyone from the critical care to cardiac surgery, advanced heart failure, general cardiology, interventional, et cetera, to try to hammer down which population was most likely to benefit. What we learned early on is patients already presenting to the critical care environment who, ultimately, need mechanical ventilation had, especially in older population, had an extraordinary mortality that was difficult to justify the use of these very expensive and scarce resources. Despite the size of our hospital, we can only support about 10 ECMO patients, at any one time, with the resources that we have. We were forced to make some very critical decisions.

Mitchell T. Saltzberg:

Currently, we do have an age limit, which is 55 in our center, and ECMO support is limited to those patients who largely have single system disease. Most of these patients, we know, have severe pulmonary disease, but typically our best outcomes, and we've had about a 37% survival rate, have been in those patients who have, primarily, the hemodynamic instability that is well seen in this population, or in an isolated group of patients who have a need for V-V ECMO to support pulmonary function, and we've learned to do this much earlier. The select cases we've done for cardiovascular compromise, their mortality is extremely high. But in our center, what we've found is when there's multi-system involvement, we just are not seeing the survival for these critically ill patients. We have gone to V-V or V-A ECMO in those cases, particularly where there's pulmonary disease as the predominant factor, or primarily a cardiac manifestation, respectively. Those have been the populations where we've had, I think, data that is leading a bit in the national outcomes.

Mitchell T. Saltzberg:

I think, from our standpoint, having a 37% survival, while dismal by a lot of standards, in this particular disease, seems to be a bright spot, given the approaches. We continue to evolve our decision making week to week. Some of that's just based on our experience and where the resources of the hospital are, but the age criteria has held pretty fairly firm. As someone who's roughly in that sweet spot of age, I'd say it's a very difficult decision to make, as to what age you just consider the care of these patients less than ideal and can't justify the resources.

Clyde W. Yancy:

This is the most sobering aspect of any of these conversations. Several weeks ago, we saw the aggregate data from New York, demonstrating that in those patients who receive mechanical ventilatory support, and particularly if there were older patients, the mortality rate was 90%. Those numbers are halting and they really force you to sit back and consider next steps in whom, for what indication, with what expectations? This has been a really, really challenging component of all of this. Georges, let me go back to you. We have some questions still, about hydroxychloroquine use. What's your advice?

Georges Chahoud:

We have changed our approach, over the past two months, quite drastically. Currently in our system, hydroxychloroquine has been pulled as a preferred therapy. It's not being used, at all, in any patient that shows up with COVID-19 for treatment, and for the same reason, for prevention, which we've had some unfortunate comments that were made, that maybe it will help to prevent exposure, whether to healthcare providers or their families, or for the general population. But currently, basically, we pulled it off completely. We have not been using any doses of hydroxychloroquine for at least about four, if not more, weeks. Initially, we started raising the concern, as a cardiovascular service line, with the higher risk of arrhythmias, and we've seen it firsthand, I've seen several patients, even on hydroxychloroquine alone, without macrolide antibiotic, going into [inaudible 00:14:54].

Georges Chahoud:

Luckily, several of them, it was short lived. Some of them had other risk factors, where there were electrolyte imbalances during this stage. We've raised the concern, early on, that these patients will need to be monitored closely if we decide to utilize that therapy and try to use only one agent without adding the macrolide, and then we basically pulled away completely with all the data that is coming out showing a higher mortality in those patients, higher risk of arrhythmias, without any significant benefits. The short answer is no hydroxychloroquine.

Clyde W. Yancy:

But that is the issue that you just highlighted. Many, many patients, let's be candid, take Plaquinel. that's the proprietary name, for appropriate indications, and do well with that and it relieves their symptoms. But in the patient who is ill from COVID-19 and has flux in the acid-base status, flux in the electrolytes, the exposure to hydroxychloroquine consistently prolongs the QT interval. Many publications now have validated this, and increases the risk for arrhythmias.

Clyde W. Yancy:

I'll go back to the paper that Mitch and I have been citing, the [MIRA 00:52:04] paper from the NEJM just a week ago, one table demonstrated the mortality risk associated with hydroxychloroquine and chloroquine, but the next table highlighted the ventricular arrhythmia risk. There is harm. There is a concern, particularly in those that have this condition. Mitch, I want to respect our time and keep going, because there's another important question that's come up here, and this is a tough one. How do you get your heart failure patients to come back? Do you need to advocate? Do you need to get on the phone? Do we need to have patient level webinars like this? How do you get your heart failure patients to come back? You have to be concerned, like I am, that they are home struggling.

Mitchell T. Saltzberg:

Yeah-

Jacqueline Tomei:

Just within that same vein, would you also be willing to answer one of the questions that came through the chat, is where are the patients? Are you seeing reduced numbers, like many of our other hospitals and colleagues?

Clyde W. Yancy:

Well, they haven't taken vacations. I'm sure they're home. How do we get them to come?

Mitchell T. Saltzberg:

Yeah, and I'll answer both questions, because I have data, internally, that I pulled specifically for this webinar, because I was asking the same questions, which is where are the patients? What has happened to them? In our center, we typically have about 80 admissions at the main campus, and then roughly about the same number at two other campuses. Many of those patients do come through the emergency department, and we've seen, effectively, almost nobody for the months of March and April. We don't have the May data just yet, but we saw numbers that go from 40, down to two or three people a month, coming in through the emergency department with heart failure.

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Mitchell T. Saltzberg:

Pretty down to two or three people a month coming in through the emergency department with heart failure. That's a real problem. So the way we engage and we began, we took our entire clinic schedule, we initially converted because we weren't set up for video visits to just telephone calls. The way we structured this, we developed multiple tiers initially of patients who just needed to be seen regardless of the pandemic, we created safety nets for them to get in the hospital. These are more advanced

populations. People with recent transplants, a recent mechanical, circulatory support devices, those patients, we just felt like we had to see these folks.

Mitchell T. Saltzberg:

For the chronic heart failure patients, we instructed our team. Everyone got a phone call. It was coming up in our schedules and patients were through a detailed questioning. You had any concern about, we brought them in for visits. As we've evolved and now we're into more of a recovery scenario trying to engage people in the community, I find that most of my phone calls are more to reassure the patient. One, your concerns about when speaking to the patient, you're concerned about being next to patients, other patients who might have the disease. We've separated the waiting room tremendously. People can not get close. Everybody's now wearing a mask in our organization. Patients can not walk in without one. That's a big step. We weren't initially there, but we have to get there. We have to be able to protect people.

Mitchell T. Saltzberg:

We are reminding people that they still have a chronic illness. A lot of this Clyde, I think really comes down to our intimate knowledge of these patients, our relationship with these patients and their trust of us. When we say we really do need to see you. You need care, you need your testing. We need to continue risk stratification. We need to optimize your meds. Now this disease didn't stop. I think it's one of the biggest concerns that I have every day is, I suspect to see a tremendous rebound and at least in our region, as people are following the news in Wisconsin. We've had a lot of politicking regarding how to end this, the isolation that people and social distancing that people are performing. We're seeing the numbers that we just continue to grow. We're not seeing a slowing down. I really think a lot of these heart failure patients are just sitting on the sidelines and we need to engage them.

Mitchell T. Saltzberg:

So a lot of it is reassurance and creating safety systems for them to come into the hospital. There's nothing magical about it. We have a care coordination team as well that got pulled. These are the nurses making those critical phone calls in between visits and their resources were diverted. We've had to re-engage with them as well to remind them that we need to go back to that population. Our patients-

Clyde W. Yancy:

And to be clear, the same thing happened with us. Our heart failure nurses became bedside, step down unit nurses over 36 hour period.

Mitchell T. Saltzberg:

Absolutely.

Clyde W. Yancy:

And that changed everything. There's one more sobering aspect to this, Mitch. You may have seen these data, George, may have seen these data as well, but public health experts, epidemiologists have done a very sobering exercise. They've taken same month of 2019 and compared that to 2020. Same exposure to influenza, the only thing different is exposure to COVID-19. They've looked at the number of deaths, they've adjusted for the number of deaths that are known to be attributable to COVID-19. There's still an excess. The sobering piece of this is that we have patients that may have died away from the hospital



at home. We don't know whether or not they had COVID-19. The number of deaths that we're seeing is inaccessible what we usually see.

Clyde W. Yancy:

It is quite likely that these are either undiagnosed COVID-19 or indirectly related to the crisis exactly because of fear of presenting to a hospital and experiencing events out of the hospital. There are some data being brought forward now looking at out of hospital cardiac arrest, those numbers as well are increased, you mentioned George. A theme that's consistent with the notion that it's not just people staying at home; it's people staying at home and having symptoms and having events and so that is very disquieting.

Clyde W. Yancy:

We have about eight minutes left and I think there's a practical question here that I'd like for us to address. George, I'll start with you. A lot of the people on the call, my word, we still have well over 350 that are still with us, so thank you for that. But a lot of people on the call wants to know, okay, let's just peel the onion back. How do we protect ourselves this afternoon, tomorrow, Monday morning? We will be in clinical care environments. How do we protect ourselves? George why don't you start. Telling me what's happening in your space? Mitch, tell us what's happening in your space. And then I'll talk about what's happening in our space. George, you go first.

Georges Chahoud:

Thanks, Clyde. This is a very, very interesting because this is a way at least to make sure that we have a safe environment for our patient, but also for our healthcare professionals. We've had a concern early on that a lot of patients were in their asymptomatic phase and they were basically spreading the disease and COVID-19 was in the early phases of it. There was a big concern that without social isolation, social distancing, and the appropriate measures, that we'll have a significant flux of patients where we've had done in [inaudible 00:59:58] particularly, which is the same thing that St. Louis has done in 1918 during the Spanish flu. Which is early on adapting all the measures to reduce exposure, increased social distancing and isolation, which was very important because we did not see as a significant peak of cases of COVID-19, but going forward, the answer to your question is we will have to make sure that we are protecting our healthcare force and at the same time, protecting our patients, because we need them to be seeking medical attention and provide the care that we can provide to them.

Georges Chahoud:

So in general terms, what we've done in our system, and this is basically across the whole hospital system is number one, there has been a lot of changes in how our clinics have been structured to basically promote the social distancing. All patients coming across has to be masked, they will all be screened on the way in. After they will have this screen questionnaire as well when they get called by the office staff before they come in. To prevent crowding in the room, sometimes what we've done is for the front desk personnel, calling the patients to only come in when it's their time to be seen in the office. Same thing with testing to reduce the crowded waiting rooms and trying to reduce potential exposure, not just by increasing social distancing and wearing mask, but at the same time, reducing the crowding of those waiting rooms that we've seen before with multiple providers in the office, as well as patients coming for testing.

Georges Chahoud:

So that way, at least we can reduce potentially the exposure. The concern is going to come, not only now, because we don't know if this is going to be seasonal or not, we hope not, but it's going to be a major concern coming fall if there is a re spike again in COVID-19 during the flu season, and that's going to be the big concern is are we going to be hit again at that point in time? Is there going to be any concern going forward and do we need to do anything else different? So I would be interested to hear both your perspective and Mitch's perspective as well.

Clyde W. Yancy:

Thank you George. Mitch.

Mitchell T. Saltzberg:

Well, I think we've taken, I think comparable steps, and I think we're working very closely with health departments and following the CDC guidance and also having to develop some workflows that are specific to the geography and the footprint that we have to manage. Our clinic structure, for example, we have a clean room where we do video visits. Each provider now has given two rooms, and that helps us where I can sit in one room and do my video visits and go to another room that's thoroughly cleaned in between face to face encounters. That gives us a little bit of flexibility to have a room that we can feel comfortable in as a healthcare provider and also ensure that our patients are having a clean environment to receive their care.

Mitchell T. Saltzberg:

Workflows, patients are being brought into waiting rooms that have far fewer places to sit. And so the messaging is very clear regarding the timing of their visits, similar to what George I think has highlighted. Everyone instead of wearing a mask, we've refined the questions that are asked when people come in, it's one thing to ask, "Are you symptomatic?" I find that that's a useful question if someone happens to be walking in one of the non ED entrances, but I think it's also more important to ask a quick question about someone's exposure risk.

Mitchell T. Saltzberg:

I have now I don't have the personal experience where people have gotten all the way up to my clinic. I was the first one that asked him if they've been exposed and they tell me they're living with people with the disease and thankfully everyone is wearing a personal protective equipment, but I think it highlights the fact that we're going to continue to have to refine the questions that we ask to protect the staff and the patients alike. This is a complex issue though and I think we're all aware of the fact that while we want to provide care and bring people in, we do have to do it in the safest possible way. Right now that's following the guidelines. We remind everybody, as I say, before they leave, wash your hands and don't touch your face. I think those elements are critical to the extent that we can encourage social distancing in and outside the hospital, I think that's our best strategy right now.

Clyde W. Yancy:

Yeah. I think both of you have really emphasized the overarching themes. The only thing I'll add is that we have instituted a policy where everyone who walks in a hospital basically is on an assembly line. The first thing you do is get hand sanitizer, you pick up a mask and then you have a laser check of your temperature and an ID badge screen or you're given a badge if you're there as a patient pursuing a procedure.

Clyde W. Yancy:

As we start to open up our clinics next week, we have decongested the seating areas in our waiting room by about 60%. We're using a text messaging system to let people know precisely when they're ready to be seen and as providers, we will be forced to function on the minute, by the minute to eliminate congestion. We don't know where this will evolve. This may be necessary for the next three to six months, or this may be the new way of doing things, but everyone will have to be creative to think this through and understand what really are the best practices. We've got just a few minutes left. I couldn't be more grateful to the two of you for working with me on this webinar and to the many people and care providers, nonetheless, who have stayed with us throughout the hour. Let's do this, each person provide one take home point. George, you go first.

Georges Chahoud:

So the only thing I would mention is I think we are living in a new norm and we're all in it together. We're having to shift how we practice medicine nowadays. I think that's going to impact our heart failure patients in particular. I think to me, the point that I would see going forward is that we're going to be utilizing more and more our virtual visits. It's going to be part of our routine, how well for some of these patients with heart failure which emphasizes the point that we have very robust system nowadays, we've been doing it for about two months. Nobody imagined before that we're going to be using telemedicine to start dealing with patients with heart failure, because we always like having the hands on the patient. But I think this has proven to be a viable option. Patients have liked it so much. They feel comfortable with it. I think it's probably going to carry forward. It's not going to go away. So I think telemedicine is here to stay as a supplement to our current workflow for patients, especially our heart failure patients.

Clyde W. Yancy:

So totally agree. Telemedicine is a great take home point. Any of us who haven't refined our approach to telemedicine, we need to get busy because that really will be a modus operandi going forward. We will find patients that will prefer a telemedicine visit for lots of reasons that avoids paying parking in downtown Chicago, for example. There'll be more use of telemedicine. Mitch, what's your one take home point?

Mitchell T. Saltzberg:

What I would encourage people to be flexible and to continue to advocate for this population. I think ultimately we remain committed and those of us on this call to the care of this complex patient population, they are there. They need our help. Even if the care environment is shifting and adjusting, I think we need to be the ones advocating for these patients in an ever changing environment until whenever a new normal is established, and I just want to thank everybody for the work that they do to provide care for this patient population to improve the lives of our patients with heart failure. So good luck everybody.

Clyde W. Yancy:

So in addition to George, reminding us to embrace tele-medicine, Mitch is really taking the ethos of being positioned to the next level and reminding us to remain advocates for our patients and do whatever's necessary.

Clyde W. Yancy:

I'm going to close with the theme that we opened with and I did not develop deliberately during our conversation because I wanted to close with this. Don't let the clearly evident disparities become a factor in your local environment. Recognize that there are people, patients that we know well, we see them. They work in our hospitals. They serve our meals. They clean our operating rooms. They staff our cath labs. They're at a unique risk. The tragic stories that we've heard they come from these inner city communities, these at risk communities. Let's not let our local environment replicate those stories. Let's realize that now is a time to reach out, now is a time to be compassionate, now is the time to understand, now is the time to virtually embrace and help those patients that we've known all along needed just a little bit more of a boost, not a gift, just a boost to get them into a more equitable place.

Clyde W. Yancy:

This disease kills and it has disproportionately killed so many people that are at risk just for life and living. In that regard, it's become one of the cruelest experiences that I've seen in my 62 years of living and we shouldn't let that be the case any longer.

Clyde W. Yancy:

I want to thank everyone, particularly the HEA staff for setting this up. I want to thank all of those who stayed with us through the duration of our commentary. I hope you learned something. I hope you took things away with you. I hope that you are thinking of the American Heart Association kindly. If you recognize that what we do is all based on volunteer effort and you're able to volunteer, that's terrific. If you're able to maintain your heart failure registries and keep them up to speed, that's wonderful. But if you're just able to extend the mission of the Heart Association and help us look for a future with happier, healthier lives, free of heart disease and stroke, that would be ideal. Thanks very much for your time today. Hope you-

Jacqueline Tomei:

Thank you so much to our panelists. We are at time, so we aren't going to go over our resources at this time, but we will send them out with our slides and our recording, but thank you so much to Dr. George Chaudé, Dr. Mitchell Saltzberg and Dr. Clyde Yancy, our moderator, and our host today. I thank you to Novartis for its support of this webinar. If you have any questions, please visit [heart.org/quality](http://heart.org/quality) or contact your local quality and systems improvement director. Thank you all for your dedication, courage, and support during this trying time. So with that, I adjourn this webinar and please feel free to contact us with any questions.

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