Dr. Ron Yee (00:00):
Thank you for joining us today for our National COVID-19 Webinar. I'm Ron Yee, the Chief Medical Officer for the National Association of Community Health Centers. We'd like to present a special CDC focus webinar today. Now that we're about four to five months into our COVID-19 response, we'd like to take a look at the state of the epidemic, and have a more in depth Q&A time through a panel of seasoned health center physicians who've gathered questions from the health center field. We'll also have a chance to hear about a joint project in which the CDC and NACHC are partnering to address COVID-19 and the health center response.

Dr. Ron Yee (00:37):
For those joining via internet, there'll be content slides for our CDC speaker as he presents today. The recording transcript, PDF slides and resources will be posted on the NACHC website after the call. If you’re having any technical problems, please click on the box on the left bottom corner. Request support if you’re having any difficulties, someone will get with you right away.

Dr. Ron Yee (01:01):
Let's meet our speakers for today. First up, we'll have Dr. Catharine. She leads the Rare Disorders and Health Outcomes team in the National Center on Birth Defects and Developmental Disabilities at the CDC. She's currently leading a team focused specifically on federally qualified health centers to support our work and our part in CDC's COVID-19 response. Our team has really enjoyed working directly with Dr. Riley on our CDC NACHC COVID-19 response initiatives, which she will share about shortly.

Dr. Ron Yee (01:35):
Following her, Dr. John Brooks, who normally serves as the Chief Medical Officer to the CDC's division of HIV AIDS prevention, where he coordinates the division's activities related to the new National Ending the HIV Epidemic Initiative. He's an infectious disease specialist and is presently serving as the Chief Medical Officer of the CDC's COVID-19 response team. Dr. Brooks has led teams during CDC emergency responses to anthrax, SARS, Ebola and Zika, and we look forward to hearing from Dr. Brooks, as our primary speaker today is informing us on the state of the COVID-19 epidemic.

Dr. Ron Yee (02:13):
Following that, we'll have our Q&A time and our health center physician panel to prepare key clinical and operational questions for the health center frontlines. This includes Dr. Faith Polkey who serves as the Chief Clinical Officer at Beaufort Jasper Hampton Comprehensive Health Services in Beaufort, South Carolina. Dr. Polkey is a Board Certified pediatrician and preventive medicine physician and serves as the Regional Director of the Medical Education and Assistant Professor at ATSU University School of Osteopathic Medicine in Arizona.

Dr. Ron Yee (02:46):
Their South Carolina campus is based at the Beaufort Jasper Hampton Comprehensive Health Services site. Faith also serves as the co-chair of NACHC’s Health Professions Education and Health Centers Task Force. Also, on The panel is Dr. Rina Ramirez, who is the Chief Medical Officer at Zufall Community Health Center, Dover, New Jersey, and a Board Certified internal medicine physician. Zufall Community Health Center was designated as a Million Hearts hypertension control champion by the Centers for Health Promotion and Evidenced-Based Practice.
Disease Control, and a distinguished honor that few organizations have achieved reaching 80% control rate for their entire patient panel with hypertension.

Dr. Ron Yee (03:26):
Dr. Ramirez has consistently demonstrated leadership being cited as an outstanding executive leader by HRSA. Has been recognized for significant contributions to women's health care by the New Jersey Primary Care Association. She is also an active member of NACHC’s Clinical Practice Committee and has served on many HRSA sponsored expert panels and has presented at several national regional and local medical meetings on clinical improvement activities.

Dr. Ron Yee (03:53):
Finally, to round in our physician panel with Dr. Grace Wang is a Board Certified family physician with an MPH serving in international community health services, a federally qualified health center in Seattle, Washington. Dr. Wang has been heavily involved in expert panels, learning collaborators and recently narrative medicine and caring for the compassionate care team. She contributed significantly to the recent Arizona State University digital magazine edition focusing on moral distress, and moral injury, which has become more and more important as we respond to this COVID-19 epidemic.

Dr. Ron Yee (04:28):
Grace served as the NACHC vice speaker of the house and is part of the executive committee for NACHC and serves on multiple committees. Dr. Wong will serve as our moderator for our webinar today, and I will turn it over to you, Dr. Wang. Grace?

Dr. Grace Wang (04:45):
Thank you, Dr. Yee, and good afternoon from the Pacific Northwest. Let's start our webinar today to hear from Dr. Catharine Riley from CDC.

Dr. Catharine Riley (05:00):
Thank you so much, Dr. Wang. Good afternoon, and thank you to Dr. Yee and the National Association of Community Health Centers for hosting this important webinar series, and working with CDC to put together today’s webinar, providing an opportunity to share information regarding COVID-19 response activities. We are excited to announce that CDC is collaborating with NACHC to connect public health response efforts with community health centers across the United States, in order to enhance COVID-19 response activities for at risk populations, including populations at an increased risk for COVID-19.

Dr. Catharine Riley (05:33):
We will be working with NACHC to provide technical assistance and disseminate information. We hope to this effort we can share CDC guidance, resources, tools and training opportunities with community health centers, health center controlled networks and primary care associations across the US.

Dr. Catharine Riley (05:48):
As a start, we put together a resource guide for community health centers, which is available for download with this webinar. We will also be working with NACHC to describe the health burden and health disparities and overall impact of COVID-19 on the population served by community health centers. CDC has had an opportunity to hear from primary care associations and community health
centers across the US. I wanted to take this opportunity to say thank you to all those who took time to
talk with us and share your experiences addressing COVID-19 at the local level. Your input and feedback
has been so valuable in moving our work forward.

Dr. Catharine Riley (06:23):
We want to continue hearing from the field, and we'll be working with NACHC to create opportunities to
hear from you all in the coming month. I wanted to take this opportunity to thank the community health
centers, the HCCN, and primary care associations for all you do everyday to serve the populations who
are often most at risk. I will end there, so we can get to the main event, Dr. John Brooks, Chief Medical
Officer for CDC's COVID-19 response, will be presenting on the state of the pandemic. With that, Dr.
Wang, I will turn it back over to you. Thank you.

Dr. Grace Wang (06:58):
Thanks, Dr. Riley, and we start Look forward to hearing more about this very exciting and important
partnership with FQHCs and the CDC. Dr. Brooks, please tell us about the state of the epidemic.

Dr. John Brooks (07:12):
Well, good afternoon, everybody, and thank you so much for the opportunity to speak to you all. I really
appreciate the opportunity from NACHC. If you want to move ahead to thank you to the first slide.
That's the title slide. We're going to talk about the state of the pandemic here in the United States and
abroad. Next slide, please.

Dr. John Brooks (07:27):
I have no relevant financial affiliations to disclose. Next slide, please. I'd like to start with a brief review
of basic coronavirus virology, which is the type of virus that causes COVID-19. Next slide. Some of you
may know that coronaviruses are a single stranded RNA virus and they're on the large end of viruses,
both in terms of their size and also in terms of the size of their genomes. The coronavirus genome
encodes four major structural proteins, including the spike protein, and that's shown in this picture on
the left in gray.

Dr. John Brooks (08:03):
The spike protein is the part of the virus that binds to cells and facilitates viral fusion with the cell and
thereby cell entry. These spike proteins former crown like halo that's the characteristic feature of
coronaviruses. Next slide, please. This is a picture of the star of our show. The image is an electron
micrograph of an actual coronavirus, albeit, not SARS-CoV-2, but this stand in is a good example that
nicely shows off the characteristic crown like halo. Next slide, please.

Dr. John Brooks (08:34):
Coronaviruses are nidovirals, and infect a wide variety of mammals and birds. The term nido, comes
from the Latin word, nitus, for next, and refers to a hallmark of all nidovirus transcription, whereby all
coronaviruses synthesize three prime code terminate nested sets of mRNA. You don't have to remember
that. There's not going to be a test, but some people like to know that.

Dr. John Brooks (09:03):
Coronavirus are divided into four general; alpha, beta, gamma and delta. The alpha and the beta coronaviruses infect mostly mammals and include the coronaviruses that cause human disease, which I'll cover in the next slide. They've been isolated from many lands mammals, as well as those that fly like a bat and those that swim like beluga whales. The gammas and deltas, affects mostly birds and have been isolated from birds across the entire size spectrum; sparrows to ostriches.

Dr. John Brooks (09:32):
Coronaviruses can cause a variety of lethal disease in mammals and birds, and for this reason have been well studied due to their impact on the agricultural sector, where they call fatal disease in the form of respiratory and interridge illness. Next slide, please. Up to seven coronaviruses rather known to cause human disease and we call them HCoVs for short, four generally cause mild disease, mostly upper respiratory illness, or like the common cold.

Dr. John Brooks (10:04):
However, three of these pathogens, all beta coronaviruses can cause lethal human disease. These include SARS-CoV-1, the cause of the 2003 SARS outbreak, MERS-CoV, which is first recognized in 2012, and that continues to cause sporadic clusters of Middle East Respiratory Syndrome, and now SARS-CoV-2. I just want to get us all on the same page and be sure everyone understands that when we use the term COVID-19, this is to describe the illness that's caused by the virus, SARS-CoV-2. It's named SARS-CoV-2 because it's genetically more like SARS-CoV-1 than MERS-CoV. Next slide, please.

Dr. John Brooks (10:45):
Let me now share with you what we know about the transmission of COVID-19. Next slide. COVID-19 appears to have been first recognized as a human illness in late 2019. We don't know exactly when, how or where this virus arose. We believe that likely represents a cross species transmission from an animal reservoir, very likely bats, and that transmission to humans may have involved another animal, an intermediary animal host.

Dr. John Brooks (11:16):
Most of the early COVID-19 cases but not all, were linked to a market in the city of Wuhan, in Hubei province, China. As you can see, I hope on the bar graph to the left, even among the earliest cases diagnosed before January 1st, 2020, over 30% reported no contact or other link with that market. But then during January, cases rapidly spread to more and more people who had no known exposure to this market that's shown in green.

Dr. John Brooks (11:42):
These transmissions presumably occurred through person to person contact, both inside and then ultimately outside the market and amplifying the outbreak. Next slide, please. By mid-January, COVID-19, had been confirmed in almost every province of mainland China, with the greatest number of cases in Hubei province, the darkest pink area in this map in the center, within the province's capital and most populous city, Wuhan. Next slide.

Dr. John Brooks (12:11):
This figure from early in the epidemic shows the daily number of new cases reported from China, showing green, and from all other countries outside of China shown in yellow from January 19th to
March 5th, covering roughly six week period it took for China to control the emerging pandemic locally. Early in the pandemic, spread of COVID-19 was limited mostly to China, with two large increases in mid-January related to the change in the Chinese case definition.

Dr. John Brooks (12:37):
But if you look over here to the right, by February 25th, the daily number of new cases outside China exceeded those within China, and a few days later, by March 4th, the number of daily deaths from COVID occurring outside China exceeded the number within China. Next slide, please.

Dr. John Brooks (12:56):
As the initial outbreak in China resolved, COVID-19 was spreading rapidly worldwide. You can see from the insets blue bubble graph at the top left of this slide that COVID-19 has been reported basically everywhere, except for a few island nations in Antarctica. New diagnoses are continuing to accelerate, with the largest expansion right now occurring in the Americas. Note, that last Saturday, July 18th, the number of new infections diagnosed worldwide in one day of 260,000 is more than double, the 150,000 diagnoses made during the entire first six week period of the pandemic, when it was mostly limited to China. Which now, by the way, in this graph, is a very modest appearing blip on the left side of the figure.

Dr. John Brooks (13:40):
As of July 22nd, the US accounts for the world's greatest number of total cases at 25%, and deaths at 23%. Followed by Brazil that accounts for 14% of the world's total cases and 13% of the world's total deaths, followed by that are India and Russia. Next slide, please.

Dr. John Brooks (14:00):
Despite the close genetic relatedness of SARS-CoV-2 to its cousins; SARS-CoV-1 and MERS-CoV, this new virus differs from both of its relatives in two important ways. First, the incubation periods are all about the same, but persons with COVID-19 from SARS-CoV-2 can be infectious to others and transmit the virus before they develop symptoms.

Dr. John Brooks (14:22):
We now know that infectiousness peaks in the first few days and then during the few days following symptom onset. Second, a substantial fraction of infected persons estimated to be perhaps 15% to 45% never develop illness and remain asymptomatic. We know these persons can also transmit the infection, although how infectious they are, and how infectious they may be to others, is still being worked out. Next slide, please.

Dr. John Brooks (14:51):
This table shows what we presently know about which body fluids carry and can transmit the virus, showing whether viral RNA has been detected in the first column, whether actual live virus has been isolated in culture in the second column, and whether the body fluid has been epidemiologically documented as a mode of transmission in the rightmost column.
It's very clear that SARS-CoV-2 causes a respiratory illness transmitted through exposure to respiratory particles. Although viral RNA can be readily detected in stool, efforts to isolate virus from stool by culture has been remarkably unsuccessful, with only a few reports suggesting possible isolation of live virus and that many reports of failed attempts.

Dr. John Brooks (15:32):

As stools mode of transmission is yet to be epidemiologically confirmed. Urine and blood have not been shown to contain infectious virus, and curiously, detection of RNA has been confirmed in semen, but only in men during the peak of their illness, and after recovery RNA appears to no longer be present, and neither isolation of live virus nor sexual transmission of SARS-CoV-2 through semen have been reported. Next slide.

Dr. John Brooks (16:03):

People often ask how far can SARS-CoV-2 travel in the air? I'd like to take a moment or two to walk you all through that discussion. The evidence is very clear that infection is transmitted like other respiratory viruses, predominantly through respiratory droplets and other particles to which people are exposed in close proximity to a source patient. Small aerosol sized particles comprise a large fraction of what comes out of our mouths when we speak, although when we shout and sing, the particles can get larger.

Dr. John Brooks (16:34):

I mention this because under highly controlled, experimental conditions, virus have been demonstrated to survive for hours in small aerosol sized particles. Under special circumstances, that have concentrated large amount of respiratory particles in the air over an extended period, in a poorly ventilated space, transmission through exposure to the air might have occurred. Some examples include, and you may have read about these, an aerobics workout with an infected person teaching an hour long class in a small studio. Or an infected man who playing squash for 50 minutes with other people in a small, tightly sealed court, or an infected passenger on a long bus trip which didn't have isolation. Or perhaps most famously in this country, a choir practice that took place in a closed room without good ventilation.

Dr. John Brooks (17:19):

These case reports show us that it's possible potentially that infection was transmitted through the air, although I'll just note that it's still hard to absolutely rule out possible exposure to fomites on shared surfaces and shared objects. However, I do want to say that at this time, there is no compelling epidemiologic evidence that airborne transmission outside of the six foot respiratory droplets zone is efficiently spreading the virus.

Dr. John Brooks (17:47):

We have not seen examples of transmission across large spaces, such as restaurants or theaters, or infections in people whose only exposure with passing through the same place or an infected person lingered momentarily but was no longer present, like elevators, or transmission through handling air systems and offices or cruise ships. I just want to be clear that this doesn't mean CDC is not concerned about this possibility. In fact, in response to the possibility, CDC strongly recommends increasing ventilation and air movement to minimize this risk, which happens to also be good for reducing potential exposure to all respiratory particles. Thanks, next slide, please.
After that long talk, let me move on and now describe how we as human beings respond clinically to infection with SARS-CoV-2, and I'd like to do this by emphasizing four main points. Next slide, please.

First, viral burden declines steadily after illness onset. As shown in these two figures, with the X-axis showing viral load and the... Sorry, the Y-axis, excuse me, showing the viral load and the X-axis showing the time since ailment's onset.

**Dr. John Brooks (18:57):**
The amount of viral RNA measured in clinical samples is greatest at the onset of illness and declined steadily thereafter. Next slide, please. In this slide with two figures, I want you to first look at the upper figure, which demonstrates that as viral load is declining after illness onset, the ability to recover live virus from human samples by culture becomes more difficult. After eight to 10 days, you can no longer recover a live replication competent virus from respiratory tract specimens in otherwise healthy persons with mild to moderate illness.

**Dr. John Brooks (19:34):**
A recent study suggests that a severely ill person who may spend weeks in the hospital may shed live virus up to 20 days in some circumstances. Then looking at the bottom figure, I want to note that within days after illness, patients begin to develop a serological antibody response to the infection and this includes IgM, IgG and IgA, and that IgG response includes neutralizing antibodies that can block viral infection of cells.

**Dr. John Brooks (20:05):**
Although our immune systems are clearly responding to and controlling the infection, we don't know at this time how well this immune response protects us from the infection, and if it does, for how long? Not all persons develop antibodies after infection, and emerging data indicate that levels may start to decline after a few weeks. Next slide.

**Dr. John Brooks (20:29):**
Fourth and lastly, it's now been widely observed that viral RNA can be detected by PCR and remain positive for weeks, long after persons have recovered from illness and actively believe they are no longer infectious to others. Shown here is an illustrative decay curve from a paper by Xiao et. al that illustrates the classic sigma shaped theme with this sort of phenomenon.

**Dr. John Brooks (20:52):**
To date, but I expect this record will be broken eventually, the longest persistent positive we've seen is out to 12 weeks at 83 days. This phenomenon that I will note was not observed with SARS and MERS has created a really substantial problem for patients for whom isolation is discontinued or transmission precautions are removed based on a test based strategy using PCR testing. Clinicians are increasingly managing people who can't leave the hospital, can't get back to work or can't get back to their activities in their new normal way of life because they're stuck in what I call persistent PCR purgatory.

**Dr. John Brooks (21:33):**
We also don't know yet if anyone can be reinfected. I mentioned that earlier. I'll just say, that from an epi perspective, despite over 14 million diagnoses now worldwide, no case of reinfection has been unambiguously demonstrated. We hope that if it occurs, it would be rare, but even rare infection could
meaningfully sustain the epidemic if the circumstances were right. If reinfection were to occur, based on
the extremely limited experience we have with one of the endemic human coronaviruses called OC43,
that's in the same family of betacoronaviruses with SARS-CoV-2. The earliest we might see risk for the
infection to start to grow again, would be around 90 days, which notably is around the same time when
at least for now, we've observed the longest shedding of persistent residual RNA. Next slide, please.

Dr. John Brooks (22:28):
We have recently updated our recommendations for discontinuing isolation and precautions, as a result
of what I just showed you. Now, we recommend that for most persons, they can discontinue 10 days
after symptom onset, or for those who don't develop illness, 10 days after their first positive test. As
long as they also have resolution of their fever for at least 24 hours and have improved in other
symptoms. I showed you the data that some people may be shedding virus out to 20 days if they're
really sick. We caution that for a limited number of persons with severe illness, they may want to
consider extending up to 20 days.

Dr. John Brooks (23:08):
We really urge that you make that decision in consultation with infection control experts. We also have
changed our position on the role of PCR testing to discontinue isolation precautions. I think we still
recommend you consider it for severely immunocompromised persons, because ample experience from
other infections has taught us that people who have really severe immunocompromised may continue
to shed live bacteria or virus longer than other people. But we don't know this yet for SARS-CoV-2.
That's why we suggest consulting infectious diseases experts.

Dr. John Brooks (23:41):
But for everybody else, we no longer recommend using a test based strategy unless for some reason,
you want to get the person out of isolation before 10 days. Next slide. What about using PCR after
you've discontinued isolation precautions, when the person has recovered? We no longer recommend
that within the three month period after the date of symptom onset, for the initial COVID-19 infection,
that you retest them. As I pointed out, that can be a bucket of trouble that you keep getting these
positive tests and you don't know what to do with them.

Dr. John Brooks (24:15):
We also no longer recommend quarantine, if a previously infected person is the close contact of a case
after they've recovered from their infection, within that 90 day window. Now, some people will develop
symptoms after their primary infection after recovery. This has been observed. When they've been
examined, they haven't had evidence of live virus by culture and there's no evidence that they've
epidemiologically transmitted to others. But given that we don't know much about the infection yet,
caution may be warranted.

Dr. John Brooks (24:55):
If the person is symptomatic, we might consider retesting for SARS-CoV-2 with the PCR RNA test, but we
need to rule out alternative ideologies, that will be important starting this fall when we have co-
circulating influenza. You may want to consider isolating that person, especially if the symptoms have
occurred within less than 14 days of the context, 14 days of the incubation period for this illness. That
maybe raise your suspicion a little bit that isn't more likely to be real. But regardless, in this case, we
recommend consultation because these are situations that probably need some external help to decide what to do. Next slide, please.

Dr. John Brooks (25:35):
What about serology? Well, data that will inform serologic testing guidance are rapidly evolving, but serologic or other correlates of immunity have not yet been established. The utility of serologic testing to establish the absence or presence of infection or reinfection, as well as immunity remains undefined. Serologic testing should not be used to establish presence or absence of infection or reinfection or have immunity at the present time. Next slide, please.

Dr. John Brooks (26:06):
All right, let's move on and discuss what we know about the clinical epidemiology of COVID-19. If you go to the next slide, I just want to, with this figure, give you a sense of the relative frequency of the major signs and symptoms observed with COVID-19. I'm showing you here, these early data from three reports of hospitalized patients in China. More than 80% of patients develop fever during illness over have developed cough, and about a quarter, 25%, myalgia or arthralgia, and a small fraction develop headache or diarrhea.

Dr. John Brooks (26:36):
Most people present with the sub acute or acute onset of cough and fever. Although the fever may not be measurable at presentation and a person be described simply feeling feverish, many do go on to later develop fever. But it's notable that in one study, 44% of patients presented without fever, but then all of them went on to develop fever later.

Dr. John Brooks (26:58):
I also want to highlight that there are some reports of persons presenting with isolated GI illness, specifically diarrhea that had preceded the development of cough and fever by a day or two. Next slide, please. Let's talk about case fatality. Adults, especially adults over age 60 experience significantly more severe COVID-19 illness are more likely to die as reflected by these case fatality rates, or CFRs in the figure below. These are data from China, but we could make this curve from data from just about anywhere.

Dr. John Brooks (27:28):
I just want to caution you a little bit about fixating too much on precise values, as a number of factors can affect the CFR. The two I want to highlight are these. First, the number of people tested and diagnosed with infection, in outbreaks, the most evidently ill people with a higher risk of death tend to be tested first. As more people with less severe disease are diagnosed, the increasing number of diagnosed cases will include more survivors, build out your denominator and therefore lower the CFR.

Dr. John Brooks (27:55):
Second, the number of deaths, how many people die depends on how quickly illness is recognized and how well it is being managed. Deaths will be higher where sufficient life sustaining supportive care is lacking. Our current best estimate is that with COVID-19, the CFR appears to be five to 15 times more than that of the seasonal flu. Next slide, please.
Dr. John Brooks (28:19):
Showed here are data from China to illustrate the spectrum of illness severity in adults on the left and in children on the right, and this is among those with symptomatic disease. Despite the important concerns I've raised about case fatality rates, most COVID-19 illnesses are and we expect they're going to continue to be mild and most patients will recover spontaneously with supportive care, especially children and middle aged adults.

Dr. John Brooks (28:41):
In fact, the illness is considerably less severe in children. Less than 5% of children develop severe or critical illness, and among those with critical illness, a much smaller fraction will die. Next slide, please. Unfortunately, at this time, no particular set of signs or symptoms of other clinical findings can reliably discriminate COVID-19 from other respiratory viral infections like influenza. One interesting aspect of COVID-19 is the relatively high frequency with which infected persons report anosmia and dysgeusia or any change in smell or taste, which can sometimes be their only symptom of illness.

Dr. John Brooks (29:18):
As noted earlier, most people recover spontaneously with supportive care and for those that don't, the typical complications also seen with other viral respiratory infections, including pneumonia, respiratory failure, multi system organ failure and death. Next slide, please. Some people are at a higher risk for more severe illness and death from COVID-19. In addition to advancing age, the conditions listed here also increase a person's risk for severe illness, and that's regardless of age. Together, advancing age and these conditions that are often more prevalent in older persons can substantially increase the risk of COVID-19 for the elderly. But we need to also pay attention to the fact that these factors are important risk factors for younger persons as well. Next slide, please.

Dr. John Brooks (30:06):
With regard to pregnancy, recent data suggests pregnant women may have some increased risk for severe illness, including hospitalization, admission to the ICU, and the need for mechanical ventilation. I will say that SARS-CoV-2 RNA has been detected, but very, very rarely in amniotic fluid, placental tissue, umbilical cord blood and breast milk. Reassuringly, the risk of perinatal transmission appears to be low. It may be possible, but among the many pregnant persons who have given birth during this pandemic, there has been to date, only one well documented case that might be a likely transmission. Next slide, please.

Dr. John Brooks (30:45):
I'm sure everyone in this audience knows that long standing systemic health and social inequities have put some members of racial and ethnic minority groups at increased risk of getting COVID-19, or experience severe illness regardless of age. Non-Hispanic, American Indian or Alaskan Natives have a rate of approximately five times that of non-Hispanic white person's, non-Hispanic blacks have a rate approximately five times that of non-Hispanic persons, and Hispanic or Latino persons have a rate of approximately four times that of non-Hispanic white persons. Next slide, please.

Dr. John Brooks (31:20):
I reviewed earlier the typical course of infection, but I really want to highlight here some of the very unique and troubling complications of COVID-19 that differentiate it from any viral respiratory infection
in which I am familiar. These are a selection of some of the most concerning ones, but not a comprehensive list. First, we know the virus can infect endothelial cells of the cells that line our blood vessels and multiple organs that can cause diffuse inflammation of those blood vessels or vasculitis. This can lead to inflammatory cell death. That injuries in the blood vessels can then result in tissue injury to those tissues served by the effect of blood vessels.

Dr. John Brooks (31:56):
Second, persons with COVID-19 appear to experience increased risk of blood clots or hypercoagulability. Clots have been observed in vessels of all sizes, including both artery, but mostly veins. These clots can form locally within the vessel, but they can also form elsewhere and travels through the bloodstream and then become lodged in other organs cutting off their blood flow. Of particular concern are pulmonary emboli.

Dr. John Brooks (32:18):
We initially thought that most people succumb to lung failure from damage to the alveoli in the lung, but autopsy series have found that in addition to this kind of injury, pulmonary emboli were almost universally present in the lungs of deceased. Not only this, but these clots have formed despite aggressive anticoagulation during the course of their treatment, but they weren't recognized during clinical care, so that in retrospect, they're only diagnosed after death. In retrospect, people think they probably contributed significantly to death.

Dr. John Brooks (32:51):
We're also seeing that the virus can induce different forms of hyper immune reaction and excess inflammation both during and after infection. One consequence of this hyperinflation is myocarditis. This condition can be so bad, that it can mimic a heart attack or characteristic EKG changes of an ST segment elevation myocardial infarction. But when they do a cardiac cath and look at the blood vessels, no blockages are present. In some cases, the heart muscle tissue permanently damage with scarring and permanently decreased contractility. Lastly, is a condition called multi organ inflammatory syndrome in children. This illness appears to happen about four weeks after infection, can cause cardiovascular collapse, even in children whose infection was asymptomatic.

Dr. John Brooks (33:33):
Thankfully, it's not common, and if recognized early can be managed, but there have been a few deaths. Although less common, a very similar syndrome has also been observed recently in a handful of middle aged adults. Next slide. What is going on that leads to this hyper immune response to SARS-CoV-2 infection? This figure illustrates our current understanding of the complexity of the immune response to SARS-CoV-2, it depicts the multiple intercellular signaling pathways in that response currently known to be stimulated by infection.

Dr. John Brooks (34:03):
What I really want you to note in this figure are the multiple arrows stemming from the virus particles in the upper left, and all of the many different intracellular pathways inside of immune cells that those virus particles stimulate and then contribute to what ends up part of the cytokine storm shown in the red box at the bottom.

Dr. John Brooks (34:24):
Note the large number of signaling proteins in that red box that go out and act on tissues throughout the body. Clearly, this is not a simple process, and one that is subject to intense investigation and we, as people are looking for drug products, shown here in blue, that might be able to moderate the immune overdrive characterized by SARS-CoV-2. Next slide, please. Okay, let's get to the end of this and talk a little bit about prevention.

Dr. John Brooks (34:51):
Let me start by talking about contact tracing. Contact tracing is one of our most powerful and critical tools for stopping the spread of COVID-19. Contact tracing stop the spread of COVID-19 with three key steps. First, quickly identify anyone with the infection and their contact. Two, ask these persons to isolate if infected, or self-quarantine if not. Lastly, work with public health staff to help these persons who are isolated or quarantined to monitor themselves for illness.

Dr. John Brooks (35:20):
I'd like to direct you to the PDF on the right. I've put the web address in an arrow, which I think is a document we've come up with that you may find very helpful when talking to patients about contact tracing and what it means for them. You can print this out as a one pager with a front and back. Next slide, please. Although we don't have highly effective medical means to combat COVID, like a vaccine or drug prophylaxis, there are things all of us can do to reduce our risk of infection and the risk of spreading it to others. These are often called non-pharmaceutical interventions or NPIs. We can't help but give it an acronym. I'd like to quickly touch on a few of the most important of these towards the end here. On top of the list of social distancing. Social distancing can be applied in all levels of society; at home, school, work, and at large gatherings by using virtual meeting technology like we are today. Next slide.

Dr. John Brooks (36:12):
Individuals can also undertake other personal actions to protect themselves and to protect others from COVID. To the extent that it's under your control, avoid close contact with people who are sick. Avoid touching your face and wash your hands often with soap and water for at least 20 seconds, and hand sanitizing gel is okay when soap and water aren't available, but it needs to have greater than 60% alcohol. I'll just note that studies have clearly shown washing with soap and water for 20 seconds is superior.

Dr. John Brooks (36:40):
When soap and water are available, please use them. Next slide please. CDC also strongly recommends the use of cloth or fabric based coverings or any kind of masking to slow the spread of COVID-19. A cloth based covering may not protect the wearer perfectly, but it can definitely help keep the wearer from spreading the virus to others. Especially when an infected person is infectious, but may not know they have COVID-19 because they haven't got symptoms yet.

Dr. John Brooks (37:05):
Recall that we estimate presently that as many as a third of infected persons will never develop symptoms of the infection and know their infectious. Like herd immunity with vaccines, the more individuals that cover their faces with masks and cloth face coverings in public places where they can be close together, the more the entire community is protected. Each additional person who wears a mask or a face covering increases the individual protection for each of us. Next slide, please.
Dr. John Brooks (37:34):
I'll just note CDC also recommends regular disinfection of surfaces, especially high touch surfaces, doorknobs, sink faucets, light switches, phones, computers, and the like. Next slide please. Finally, I want to remind everyone that ventilation can help rapidly clear the air of germs like SARS-CoV-2. For mechanical air handling systems increase the total airflow supplied to occupied spaces and boost the rate of air exchange. Increase the air system intake of outside air if possible, and also consider adding filters with a high MERV or M-E-R-V rating. The highest that system can handle or HEPA filters if the system can handle that.

Dr. John Brooks (38:15):
Lastly, just try to increase that natural ventilation then, that you can. To crack a window, open a door, if that's possible and safe. When conditions allow, bring in outdoor air to dilute the indoor air and just keep it moving along.

Dr. John Brooks (38:30):
Last slide. Just in closing, I'm often asked what I think is going to happen, and I don't know what's going to happen, although current trends are frankly very disarming. But I do know this about SARS-CoV-2, this is a novel virus that no living human being has been exposed to before. It continues to spread rapidly worldwide, causing unique and serious set of clinical and epidemiologic problems that I don't think anyone ever expected. Simply put, this is an entirely new disease, and it's a very bad one. We urgently need a vaccine, or some form of effective preventive therapy as well to improved medical therapy. Thanks all for listening.

Dr. Grace Wang (39:07):
Thank you, Dr. Brooks for that incredibly comprehensive presentation. Now, we have a set of questions that are compiled from our CHP colleagues, and we'll start with Dr. Polkey.

Dr. Faith Polkey (39:25):
Thank you, Dr. Brooks. Excellent presentation. All of our health centers had issues as far as staff returning to work from possibly being affected with COVID. Some of us were using the symptom based criteria, some of us using the test based criteria. Given your update today and update from the CDC, just review a bit about the symptom based criteria being used instead of the testing base and why that's important, so that we can take that back to our health centers, and our leaders at our health centers to possibly change some of the policies.

Dr. John Brooks (40:05):
Yeah, happy to elaborate on that a little bit. The reason we feel confident about the symptom based strategy is that there's increasing evidence that people don't produce live virus after 10 days. In studies that have followed patients who've been released from isolation, but they develop a positive PCR afterwards, they've looked carefully at these folks, and there's a very large study from Korea that folks can look up on the Korean CDC website, where they show that people who had left isolation were outside that 10 day window or re-positive again, there were no infections transmitted from them to other people, and they isolated all of their contacts for 14 days.
Cultures from those people did not yield infectious virus, and that was a group of people who were out to 81 days. We feel pretty good that what we’re seeing in these positive tests after recovery is a test that is not giving you good information if the person's got infection anymore. In fact, and this is the point I want to make, can be harmful.

Dr. John Brooks (41:14):
This positive test, if you rely on it, it's not giving you useful information, it's not telling you that infection is present any longer, but it's leading you to exclude people from work, from encountering others interacting and doing things that you should be able to do. That's the reason we're really pushing people towards the symptom based strategy and limiting the use of the PCR test to initial diagnosis.

Dr. Grace Wang (41:39):
Thanks, Dr. Brooks. This Grace Wang and I'm going to ask you the next question. Thank you for showing us the epidemiologic data that shows that the COVID-19 pandemic has had a disproportionate impact in communities of color. This is of particular interest to health centers, as many of us are located in and or serve communities of color. My question is, what are your thoughts and recommendations on health center strategies to address this disproportionate burden of disease in our community?

Dr. John Brooks (42:22):
Thanks, Dr. Wang, that's a nice question. Because I think sometimes, those of us who've been in this business for a long time feel there's not much we can do. That these are problems that are beyond our control. But I don't believe that. I just want to share a few things that folks at the level of a community health center can do.

Dr. John Brooks (42:37):
First is, you provide primary care for people on the front lines and you can be a testing site to get people tested and help coordinate contact tracing. It's administered project predominantly through the public health system. Making sure you know who the public health authority is in your region coordinating with them to facilitate contact racing, very important. Second, I just want to note that in all community health centers, if I'm not mistaken, more than 50% of the members are from the community. I really would encourage folks to consider leveraging the influence and the access of their board members to increase community mitigation strategies, alert people to the availability of testing, educate the community about what contact tracing is and what it entails, and facilitate coordination of other social services like food, housing, and other options for isolation for the people, a substantial fraction of people who may not have a place where they can go there.

Dr. John Brooks (43:35):
Obviously, I think we know this from doing healthcare for a long time, increasing language access is critical. To the extent that you can hire translators, that can be very helpful. We also were making many of our materials available in Spanish and other languages. Then lastly, partner with faith based organizations, local systems and other civic organizations like the Lions Club and NAACP.

Dr. Grace Wang (44:02):
Thanks Dr. Brooks, and thank you so much for giving a shout out to our boards, which as you pointed out are majority people who actually use our services. Before we move on to Dr. Ramirez's question, I
just want to let the audience know that we acknowledge that we started a bit late. So, we will make up for some of that time at the end and run a little bit over and I hope people's schedule can accommodate that. Dr. Ramirez, the next question, please.

Dr. Rina Ramirez (44:28):
Thank you, Dr. Wang. Dr. Brooks, you had a wonderful slide on the signs and symptoms of COVID-19. It is important to note that they're remarkably similar to flu. Once flu season begins, do you have any advice for us on how to prioritize influenza testing or treatment or handling patients with COVID-19 and or influenza?

Dr. John Brooks (44:53):
Yeah, I first of all, I'm worried about this. I think if there is a year in your life that you should get a flu vaccine, this is absolutely the one. I don't know what's going to happen, if and when flu, we presume is going to come back. But here you're going to be faced with patients who have influenza like illness. You should know the symptoms of COVID are in that category of viral illness. What do you have to do? Well, first, I think it's important to know if the person has influenza.

Dr. John Brooks (45:24):
We definitely recommend testing people for flu, who present with the symptoms that would prompt that kind of testing. If it's a person who warrants early antiviral therapy for flu, they're one of those people at risk who really need to get the Tamiflu right away, I would administer it. I don't think Tamiflu is known to have any harmful effects with regard to a person in the event they had COVID-19. Unfortunately, it also doesn't seem to have any benefit. I don't think you'll be doing any harm there.

Dr. John Brooks (45:50):
We're hoping that they'll soon be a PCR test that can test for all three viruses simultaneously. By three, I mean COVID or in this case SARS-CoV-2, which causes COVID, influenza A and influenza B, so you can get that information in one test at the same time. I think that'll be very helpful to triaging folks in the right direction.

Dr. John Brooks (46:14):
Until you know the result of the flu test, positive or negative, and the COVID, test, positive or negative, the person presenting with those symptoms should be physically isolated or kept apart to the extent that it's possible, pending that workup.

Dr. Grace Wang (46:36):
Thank you, Dr. Brooks. Dr. Polkey, your next question, please.

Dr. Faith Polkey (46:41):
A lot of our health centers have access to rapid antigen testing at our sites. While we know PCR testing is a gold standard, many are wondering, is it a reasonable approach to start with antigen testing, and then maybe send a PCR test if the patient's symptomatic or maybe tests negative for the antigen. Where is the role of antigen testing?

Dr. John Brooks (47:05):
We're actually working on that now as well. It's a new technology for this infection that's used in many other infections, including HIV for some time. We're trying to better understand how it works. I'll say that those places that are using rapid antigen tests that had been approved by FDA under what's called the Emergency Use Authorization or EUA, temporarily approved in it's emergency. Anybody who tests positive on that test that counts the decays and gets reported to the CDC.

Dr. John Brooks (47:34):

First, I would say, choose the test that works best for you, what you have available, we're all struggling with supplies and stuff. I don't think we know yet if there's a way to... An algorithm that we can create to use one test first and then another in the second... Either take the antigen test or pick the PCR test and start with that. I believe... But I haven't actually seen the antigen kit, but I know something about it, I believe you have to collect the same kind of samples. You may not be able to spare someone the MP slob, but the little brain tickle, but it works, and we'd recommend using that if you don't have the PCR available.

Dr. Grace Wang (48:16):

Thanks, Dr. Brooks. This is Grace Wang, again, I'm going to ask the next question, and this will actually draw upon what you did previous to your current role. This has to do with the impact of the COVID-19 pandemic on people living with HIV and AIDS. Could you speak a little bit about what our current state of knowledge is in terms of morbidity and mortality?

Dr. John Brooks (48:46):

Yeah, thanks. As you might imagine, I follow that literature very closely. I think it's mostly good news. There have been a number of reports now in developed countries, the United States and Europe that show that in general, people with HIV do the same as any other person presumably without HIV or known to not have HIV. They do just as poorly, and just as well. There's no obvious difference.

Dr. John Brooks (49:16):

I will say that the number of persons with HIV who have profound immunosuppression is smaller in this country, but it's still very much a problem for the United States, and there just hasn't been enough data yet for us to say reliably that they are not at any different risk. But certainly for persons who have well controlled disease and a solid fee for cell count, I think they can expect to do the same as anyone else. For persons who have really severe immunosuppression due to the HIV infection, we recommend that they take especially good precautions to try and reduce their risk of being exposed to the virus just in case.

Dr. John Brooks (50:01):

One thing I'll just add, sorry. One thing I'll add, some folks may have heard that a lot of the drugs used to treat HIV have been explored for treating COVID. Right now, we don't have any evidence that those drugs are helpful and we do not recommend that people who are on a stable treatment regimens if they're HIV, fiddle around with changing that regimen to make it include some of these drugs that might be helpful.

Dr. Grace Wang (50:29):

Thanks, Dr. Books, that's really helpful. Dr. Ramirez, the next question, please.
Dr. Rina Ramirez (50:34):
Yes. Hi, thank you for that last statement, because I'm sure that's on a lot of people's minds in terms of am I on the right medication? That was great. I have a burning question, what is the likelihood that an effective vaccine will be available and what do you think the timeline will be? If a vaccine is created, do you think it will have to be given annually like the flu vaccine or will it have to be given in the two or three dose series?

Dr. John Brooks (51:00):
That's a great question. I think that I struggle a lot with that myself. I really wish I knew the answer. Operation Warp Speed as they're calling it, is plowing ahead, working very fast, very hard to get some good candidates out there and tested in phase three trials. But until those are done, with regard to your question about number of doses, the series and maybe how to time it with other vaccines, we're not going to know that, yet, until they've done that work.

Dr. John Brooks (51:32):
The likelihood of an effective vaccine, I don't really have an answer, but I can say that the primary front of everyone's mind is to make sure that we don't work too fast that we don't pay attention to safety. That's going to be a very important control on this whole enterprise where people are moving ahead very fast. There are lots of controls to try and ensure that what eventually comes out and would be put into someone, is not only efficacious, but safe.

Dr. John Brooks (52:05):
Also, if folks are interested to follow what's going on with the development of the vaccine, I just want to say the New York Times as a terrific interactive figure. I think you can Google New York Times Corona Vaccine Tracker, and you can bring it up and follow up for yourself, how the progress is going. They do a beautiful job.

Dr. Grace Wang (52:27):
Thanks, Dr. Brooks. Dr. Polkey, the next question, please.

Dr. Faith Polkey (52:33):
Okay, you mentioned antibody testing in some of your slides and what it can and can't be used for. I know a lot of health centers are vetting or looking at possibly rapid antibody testing in their offices. Some were doing that just to see hesitations and expose. Perhaps they have patients that have COVID related symptoms related to heart disease or blood clots, that kind of thing? What is the role for antibody testing?

Dr. John Brooks (53:04):
Yeah, I think you've hit on its potential goal, which is a one time look see, to see if you might have some correlative evidence that the person in front of you may have been exposed. But right now, our understanding of what that test means in terms of a person's immunity to reinfection, or what this test means in terms of how long ago somebody might have been exposed, that has all yet to be defined, we just don't know yet.
I want to re-emphasize something I said, which is, there are a goodly fraction of persons, if I'm not mistaken, it may be up to the in the 10% to 20% range, who despite severe illness, or a very solid exposure to the virus and a substantial illness, don't develop detectable antibodies. It's a little bit like Hepatitis B, I think. That's just crossed my mind that those of us in healthcare know that you may get vaccinated every time you change jobs because you never test positive.

Dr. John Brooks (54:10):
We don't know what.... Again, cautious about the possibility that you do a serology test, and there are no antibodies and you might interpret that if the person would have been exposed. Right now, it's maybe helpful to get a glimpse of what's going on, but I don't think it's something you can make a lot of clinical decisions on at the present time.

Dr. Grace Wang (54:30):
Thanks for that caution, Dr. Brooks. This is Grace Wang, again. The question I'd like to ask you relates back to something you mentioned in your response to the question about people living with HIV and AIDS and you mentioned some medications that are being tested. I'm wondering if you could talk a little bit more about what we know at this time about treatments for COVID-19?

Dr. John Brooks (55:04):
Yeah, happy to. First of all, if folks want to look up what we know about the treatment, they can always go to the NIH's COVID-19 panel for the treatment... Sorry NIH panel for the treatment of COVID-19. I think if you type in like NIH COVID-19 treatment panel, it'll bring you to that document and that's updated regularly. There's always what's new page at the front, so you can see what new information is in there. First, we do notice that there are a number of agents, which seem to work and that can be recommended. They include remdesivir, an antiviral and dexamethasone, a steroid. How they should be used has been recently updated, and I'll just refer people to the guidelines to check on that to see if they have a patient who is with COVID, whether this might be the right thing for them.

Dr. John Brooks (55:59):
There are a lot of medications under investigation. If you have a person with COVID, either who you want to treat, or you have a person who is worried and want to potentially look at ways of preventing getting COVID with medications, go to clinicaltrials.gov, clinicaltrials.gov, type in COVID-19 in the search window, and you can see the hundreds and hundreds of clinical trials that are being done and tell you where they're occurring, what they're looking at, whether it's for treatment or for prevention, and then what the criteria are for enrollment.

Dr. John Brooks (56:36):
I will say there are a number of treatments that are out of favor right now, which we only recommended to be used in the context of a clinical trial. Those include hydroxychloroquine and chloroquine, which you may have heard a lot about. Right now, we don't recommend they be prescribed outside of a clinical trial. Likewise, those two drugs combined with azithromycin, which has been done in the past. Then lopinavir ritonavir, that's one of the HIV drugs I alluded to before, with the commercial name Kaletra. The combination of two HIV drugs in a single tablet hasn't been a home run yet, but people are still studying it. The guidelines recommend also like hydroxy and chloroquine, to be used only in the context of a clinical trial.
Dr. Grace Wang (57:30):
Great, thanks for that comprehensive answer, and thank you so much for your excellent presentation and responses to the questions that we've asked. I'll be turning it back to Dr. Yee.

Dr. Ron Yee (57:47):
Thanks, Dr. Wang, and thank you, Dr. Brooks for some great, really in depth answers and questions. I think those are the things percolating around in our minds out in the health center field. That is so helpful. Thank you for that great presentation. Technical enough, but also practical enough. Again, I want to thank everybody for the few extra minutes, and for joining us today. I want to especially thank the CDC doctors, Catharine Riley and John Brooks, really for their expertise and leadership at this really critical time in American healthcare history.

Dr. Ron Yee (58:19):
A special thank you to the great insights, questions and service from our health center frontline, doctors Faith Polkey and Rina Ramirez, and Grace Wang, who also served as our moderator. Great job, Grace. The recording transcript and slides and supporting documents will be posted on the NACHC website. You can also click on that resource button in the bottom left hand corner if you want to download anything to continue on with your work.

Dr. Ron Yee (58:46):
Any unanswered questions will be submitted that came through the chat box will be added to the FAQs, if not already answered. We'll be back in two weeks on Thursday, August 6th at 1:00 PM Eastern Time. The next Reimagine Webinar will provide instructions about submitting your CARES funding activities budget and managing your cash flow. We'll have accounting and legal experts that will offer insight into the reporting and grants management requirements for the FY2020 CARES supplemental funding guidance and respond to questions from the field.

Dr. Ron Yee (59:18):
Again, thank you all for joining us. Please stay safe and healthy and just know that we are with you in our health center, COVID-19 emergency response. Thank you very much for everyone, and please take care.