

Good afternoon. I'm Commander Ibad Khan, and I'm representing the Clinician Outreach and Communication Activity, COCA, with the emergency risk communication branch of the Centers for Disease Control and Prevention. I'd like to welcome you to today's COCA call. Outbreak of 2019, Novel Coronavirus Interim Guidance for Clinicians. You may participate in today's presentation via webinar, or you may download the slides if you are unable to access the webinar.

The PowerPoint slides and the webinar link can be found on our COCA webpage at [emergency.cdc.gov/coca](https://emergency.cdc.gov/coca). Again, that web address is [emergency.cdc.gov/coca](https://emergency.cdc.gov/coca). Continuing education is not provided for this COCA call. Please note, there are only a few introductory slides for this presentation. The subject matter covered during this webinar will not have an accompanying slide deck. After the presentation, there will be a Q and A session.

You may submit questions at any time during the presentation through the Zoom webinar system by clicking the Q and A button at the bottom of your screen and then typing your question. Please do not ask a question using the chat button. Questions regarding the webinar should be entered using only the Q and A button. For those who may have media questions, please contact CDC Media Relations at 404-639-3286 or send an email to [media@cdc.gov](mailto:media@cdc.gov).

If you are a patient, please refer your questions to your healthcare provider. Our first presenter today is Dr. Joseph Bresee, an Associate Deputy Incident Manager for CDC's 2019 Novel Coronavirus Response. Dr. Bresee will provide opening remarks, and he will be followed by Dr. Aron Hall, CDC's Epidemiology Task Force Deputy Lead, Dr. Will Weldon, Laboratory Task Force Lead, Dr. Ryan Fagan, Healthcare Infection Control Team Lead, and finally, Dr. Tim Uyeki, Clinical Team Lead. Dr. Bresee, please proceed.

And thanks very much, and thanks everybody for joining. Before we hear from the four senior experts about four very critical parts of the response, I want to make two framing statements. One is that CDC continues to lean forward into this outbreak and this response, and as such, we're really focused on containment, reduction of a further spread, prevention of further spread very early in the outbreak. And so what you'll hear is a group of recommendations, guidances, approaches that reflect that very forward-leaning posture focused on early containment of cases. The second shaping comment is that because the approach we're taking right now and the recommendations from us and local health departments reflect what we know right now, the evidence we have, the science that we know.

But it's changing very, very quickly, and so, the guidance you'll hear today and from CDC on its website and in the other four, will change over time, necessarily. So, pay attention. Be patient with us, but pay attention to what we say, because it may change from day to day at this early stage in the outbreak. But I'll turn you over to the experts, and I'll let Dr. Hall take it over from here.

Okay. Thank you, Dr. Bresee, for that introduction. So, I'm going to provide a brief update on the epidemiologic situation and just to re-emphasize, this is a rapidly changing situation. We continue to monitor it closely, and we will continue to keep partners apprised as information changes.

As of today, there have been approximately 10,000 cases of this Novel Coronavirus that have been reported worldwide, most of those cases occurring in mainland China. Those include approximately 200 deaths, and there have now been about 20 countries that have reported exported cases, including the United States. Here in the United States, we have six confirmed cases including one case that was a close contact of an original case representing the first human-to-human transmission in the United States. For context, the virus that's causing these illnesses is a Novel Coronavirus. There are four common Coronaviruses that circulate and cause typical symptoms of the common cold in addition to two more severe Coronaviruses that cause SARS and MERS.

This 2019 Novel Coronavirus is in the beta Coronavirus family, related to SARS and to a lesser extent MERS. We're receiving additional information about the epidemiologic features of this virus as they are developed, but some of the early information that has come out of mainland China has provided some important insights into how the virus is spread and how we might contain it. Based on those early reports, we've seen an incubation period reported of approximately five days, ranging from, all the way from two to 14, but the 95th percentile goes all the way up to about 12 days. We've also seen report of serial intervals about seven to eight days and a basic reproductive number of about two, indicating that there are two additional cases resulting from each confirmed case. As many may have seen, based on this emerging information, the World Health Organization announced on January 30th that this is now a public health emergency of international concern.

So, with that information as background, I wanted to focus the remainder of my time on the changes that we are going to be making to how we identify and investigate patients under investigation for this Novel Coronavirus. As folks may have seen, we have posted online our PUI or Patients Under Investigation definitions, and these have recently been updated today, and there will be forthcoming guidance to help clarify. But I wanted to highlight a few key points. So, we continue to focus on people with fever or symptoms of lower respiratory illness, specifically cough or shortness of breath. If we see either of those symptoms in somebody who is a close contact with a laboratory confirmed Novel Coronavirus case within the last 14 days, that meets the PUI definition, and they should be referred for testing.

Additionally, we have expanded the geographic range, representing epidemiologic risk for travelers to include all of Hubei province, the province in which Wuhan city is located. Any patients that present with fever or signs of lower respiratory illness and recent travel within the last 14 days to Hubei province likewise should be referred for Novel Coronavirus testing. And then there's one key addition to the PUI definition I'd like to call your attention to. Given the emerging information about further spread of this virus outside of Hubei province in mainland China, we have added a PUI definition for

fever and signs of lower respiratory illness in a traveler returning from mainland China within the last 14 days. Only these individuals that require hospitalization should be referred for Novel Coronavirus testing.

So, to simplify the approach moving forward, I wanted to emphasize the key questions that we'd like to enlist the assistance of clinicians with when assessing patient histories. First, it's important to ask if a patient has traveled to mainland China within the last 14 days. Or, if the patient has had contact with a person diagnosed with or suspected to have or under evaluation for 2019 Novel Coronavirus illness. That's the epidemiologic criteria, and then lastly the clinical criteria, assess whether the patient has fever or again symptoms of lower respiratory infection such as cough or shortness of breath. As soon as these patients present, and as my subsequent colleagues will emphasize, it's important that these patients be isolated.

They should be given a facemask and isolated even before the initial clinical assessment to avoid further spread in the healthcare setting. Once a patient is identified that meets these criteria, we are recommending that contact with the health department ensues so that they can be referred for appropriate specimen submission to CDC for testing. At this time, all diagnostic testing for Novel Coronavirus is taking place at the CDC and is coming through referral from our state and local health departments. So, clinicians should be referring these case to their respective state and local health departments to request that testing. With that, I will pass it over to my colleague, Dr.

Will Weldon, who can provide an update from the laboratory task force.

Thank you, Dr. Hall. So, once a PUI has been identified, CDC is recommending that three specimen types are collected to increase the likelihood of detecting infection with the Novel Coronavirus. A lower respiratory and an upper respiratory and a serum specimen. If possible, additional specimens should be collected, such as stool or urine, and should be collected and stored initially until a decision is made by CDC whether additional specimen sources should be tested.

This collection should be conducted as soon as possible. Maintain proper infection control when collecting these specimens, and store the samples according to your institution's protocol. For specimens being submitted to CDC for testing, please store the specimens from two to eight degrees Celsius and ship it overnight to CDC on an ice pack. Each specimen should be labeled with the patient's ID number, a unique specimen ID, the specimen type, and the date the sample was collected. Along with each submission, a CDC 50.

34 form should be completed. In the upper left-hand corner, the test requested should be the respiratory virus molecular detection, noninfluenza test, and should be brought to the attention of Steven Lindstrom for the 2019 Novel Coronavirus PUI. Currently, the CDC lab is working hard to make sure that the kit for detection of the Novel Coronavirus is prepared and of the highest quality. This kit will be distributed through international

reagent resource to qualified labs for testing at public health labs. So, I will turn it over to Dr. Ryan Fagan.

Hello, and thank you. So, first, let me acknowledge that this is a situation of concern for all of us, and we're dealing with a lot of questions and a great number of unknowns about illness severity, transmission, and shedding duration. One thing I hope to convey with these introductory marks is that much of what we're recommending involves established infection control strategies consistent with standard precautions that all facilities should implement to prevent the spread of any respiratory virus including 2019 Novel Coronavirus. In addition to standard precautions, CDC is recommending contact and airborne precautions including eye protection for the management of patients under investigation or with confirmed 2019-nCoV. These recommendations constitute, as we've already been discussing, an aggressive and cautious approach to control practices.

These are aimed at protecting both patients and healthcare personnel in U. S. Healthcare facilities. Our guidelines are designed to contain the spread of nCoV within healthcare facilities to healthcare personnel and other patients who may be exposed to a patient with suspected or confirmed nCoV. These recommendations are informed in part by experience with healthcare-associated transmission of other Coronaviruses, specifically SARS and MERS, but I think it's important to point out that it's too soon to conclude the degree to which 2019-nCoV transmission will resemble either of these viruses in healthcare settings.

As we learn more about nCoV and as the needs of the response within U. S. healthcare facilities change, we will refine and update this early and aggressive approach. As the response of all, we are always looking to ensure that our recommendations align with what is known about transmission and the needs of the U. S.

healthcare facilities. In fact, we're already proposing some clarifications around the initial management of patients in healthcare settings that do not have airborne infection isolation rooms. Because we expect guidance to change as we accumulate experience and more information, please check the provided CDC link for the infection control guidance on the page that has been provided here to make sure that you're working with the most current information. We are also in the process of actively supporting local health department investigations and seeking input from our health system and federal partner organization as this outbreak evolves. So, I will direct you to follow the link at the bottom of the page for the full guidance, but I did want to highlight, I think, some of the things that all of you should be aware of from the guidance that we currently have online for infection prevention control recommendations in U.

S. healthcare settings. And I think although many of the same principles would apply, it's also important to point out that this guidance is not specifically intended for nonhealthcare settings such as schools or to persons outside of healthcare settings. I think the first highlight I would like to make is that infection control begins upon arrival to

the facility and potential even before arrival to a healthcare facility in terms of initial triage practices. As Dr.

Hall pointed out, putting face masks on people with respiratory, signs and symptoms of respiratory illness is a standard precaution and something that we should all be prepared to do including for seasonal influenza and other respiratory viruses. Now, in terms of implementing the PUI definitions and isolation recommendations, some of you might be familiar with what we've referred to as an identify, isolate, inform framework. I would draw attention to the fact that again we're asking some initial closure and clinical critical questions to identify possible infections. Isolation in either an airborne infection isolation room or if you do not have one, a private room with a closed door, and then immediate notification to your infection control team and your local public health jurisdiction. One of the areas of clarification that we're just going to expand upon a little bit is that the lack of an airborne infection isolation room does not preclude from taking the other precautions in our guidance.

So, again, source control by putting masks on symptomatic patients, putting them in a private examination room and keeping the door closed and the mask on the patient if they're in a non-AIIR, and wearing the recommended PPE and taking other precautions still applies regardless of having an AIIR, such as in an outpatient setting. The other sections, which I will not go into detail in this guidance and not to take away from questions, we do have expanded explanation about the personal protective equipment recommendations as part of this guidance. We address policies for visitor access and movement within the facility, the implementation of engineering controls, how to monitor and manage exposed healthcare personnel. I will share that that is an ongoing aspect of the current investigations in the field, and we are taking a risk-based approach to that, where we evaluate on a case-by-case basis the actual exposures that the healthcare personnel had in helping local jurisdictions and facilities make decisions about work exclusions and the degree to which active monitoring or self-monitoring can be permissible. We also highlight the importance of training and educating healthcare personnel, for instance, in not just the PPE to have, but in a safe use and doffing or taking off to avoid self-contamination.

I think another highlight to draw attention to is that environmental infection control, so the combination of practices needed to clean medical equipment and clean patient care spaces. Those are essentially in accordance with standard precautions, and we have language in the guidance about the use of disinfectants in those spaces. I would also point out that the management of laundry, food service utensils, and medical waste should also be performed in accordance with routine procedures for your facilities. We can't be more specific in routine procedures concerning waste management, because we acknowledge that waste haulers and local jurisdictions often have regulations that supersede ours, but from our standpoint, this is per routine procedures as regulated medical waste. And lastly, but still very important, as we talked about with triage, establish and reporting within healthcare facilities and the public health authority.

So, having numbers handy at points of triage and isolation to know who to call for infection control and public health support. With that, I will turn it over to Dr. Tim Uyeki, who is leading the clinical team for the CDC response.

Thanks, Dr. Fagan. Like my colleagues at CDC have mentioned, we're really still in the early periods of understanding this virus infection, and similarly, our understanding of the clinical features/clinical aspects of 2019 Novel Coronavirus infection is limited. There are limited published data available, and we're really learning together every day. But it appears that there's a wide clinical spectrum of illness, and that includes asymptomatic infection that has been reported.

In those who are symptomatic, the initial clinical course consists of mild nonspecific respiratory signs and symptoms that overlap with those caused by many respiratory pathogens during the winter in the U. S. For example, in a hospitalized case series from China, frequently reported signs and symptoms at illness onset were most commonly fever and cough, and just a note that not all patients have fever at onset. And then then less frequent symptoms reported at onset are myalgia or fatigue. Some patients have reported a sore throat early in the clinical course, and less commonly early in the clinical course, there's been sputum production, headache, hemoptysis, and a very small proportion of patients have had diarrhea.

The fever course with patients with this virus infection is not fully understood. Fever, as I mentioned, is not always present at illness onset, may be intermittent, and may be prolonged. The data that have been reported from China are in hospitalized patients diagnosed with pneumonia. In those patients, the median time from illness onset to hospital admission was seven days, and more than one-half of those hospitalized patients with pneumonia reported dyspnea. Complications that have been reported in hospitalized pneumonia patients include the acute respiratory distress syndrome or ARDS in about 17 to 29 percent of these hospitalized pneumonia patients.

A secondary infection has also been reported in the hospital in up to 10 percent. About a quarter to a third of hospitalized patients with pneumonia have required intensive care for respiratory support. That includes invasive mechanical ventilation, and a small proportion have actually gone on to receive ECMO. There are other clinical complications that have been reported in a smaller proportion of patients, and those include acute cardiac injury and acute kidney injury. And in the two case series of hospitalized pneumonia patients available from China, the case fatality proportion has been about 11 to 15 percent, but please understand that this estimate is only hospitalized pneumonia patients and is likely biased upward because it did not include mildly ill patients who are not hospitalized.

The most common laboratory abnormalities among hospitalized patients with pneumonia on admission include leukopenia, leukocytosis, and lymphopenia, and I would say that it has a really wide range of laboratory findings at admission, by lymphopenia is more common, reported in more than half of patients at admission. Of note, there's also elevation of hepatic transaminases, AST, ALT elevation in about a

third of patients at admission. I just wanted to mention that there are two widely available molecular viral respiratory panels that are used in the U. S. , and there are many others that are available.

Those commercially available molecular viral respiratory panels that detect currently the four known human Coronaviruses. There are two alpha and two beta Coronaviruses. Those assays do not detect this new Novel Coronavirus. So, there's no cross-detection, cross reaction. So, radiographic findings in patients with pneumonia most frequently include bilateral involvement but unilateral abnormalities have also been described, and typically the most common abnormalities on chest CT include ground glass opacities and multiple areas of consolidation.

At this time, we really don't know all of the risk factors for severe illness to be able to predict those who will progress to more severe disease, but some early signals include patients on the older end of the age spectrum and those with chronic medical conditions seem to be at higher risk for severe outcomes. And about one-third to one-half of reported patients with pneumonia have had underlying medical comorbidities including diabetes and cardiovascular disease. And so, we can hypothesize that possible risk factors for progressing to severe illness might include but not limited to older-age underlying chronic conditions such as chronic lung disease, cancer, heart failure cerebrovascular disease, renal disease, liver disease, diabetes, immunocompromising conditions, and we can also hypothesize that pregnancy might be a risk factor for severe disease although no cases in pregnant women to our knowledge have been reported to date. One of the important points to make is that a number of reports suggest the potential for clinical deterioration during the second week of illness. I will say of the handful of case patients in the U.

S. to date, the clinical course has really been mild to moderate with progression to pneumonia in the second week of illness in some patients. And this has been associated with clinical findings on auscultation, suggesting focal pneumonia, hypoxia, and radiographic evidence of pneumonia. None of the U. S.

patients has been severely ill to date. And just to say in the hospitalized case series from China, this is fairly consistent that among patients with pneumonia and confirmed 2019 Novel Coronavirus infection, just over half of patients developed dyspnea, a median of eight days after illness onset with a wide confidence interval from five to 13 days. And so, what are the implications of that? Well, if a patient has clinically mild illness and does not require hospitalization for medical supportive care, they should be monitored very closely for potential deterioration that could occur in the second week of illness. In terms of detection of this virus, what we can say is that 2019 Novel Coronavirus RNA has been detected from the upper and lower respiratory tract in clinical specimens, and the virus was isolated in China from a bronchoalveolar lavage fluid specimen. We don't know at this time, we don't have good understanding of the duration of viral shedding, but it could be several weeks or longer, which has been observed with other beta Coronaviruses such as Middle East Respiratory Syndrome Coronavirus and SARS-associated Coronavirus.

What I can say is that viral RNA has been detected in blood in China in severely ill patients, and viral RNA has been detected in a fecal specimen on day seven of illness in one U. S. patient. And that's reported in a case report that was just published in the New England Journal of Medicine and is available online. But I want to make it clear that detection of viral RNA does not necessarily indicated the detection of infectious viable virus.

You can only ascertain that through virus occults or in isolation of the virus. So, the clinical significance of extrapulmonary detection of viral RNA is really unknown at this time, and there are efforts being done in the U. S. and worldwide to better understand the duration of viral replication, detection of viral RNA, and infectious virus in clinical specimens, both respiratory and extrapulmonary specimens over time. So, now, focusing on clinical management, in addition to what Dr.

Fagan has said, it's very, very important to recognize, identify, and isolate a patient with suspected Novel Coronavirus infection. But I'll just cover patients who are confirmed with this infection. So, they should be, as Dr. Fagan mentioned, cared for in an airborne infection isolation room and following standard contact and airborne precautions with eye protection. Now, clinical management really is supportive care of any complications and advanced organ support of complications, if indicated.

At this time, there is no specific treatment for Novel Coronavirus infection. There's no approved or demonstrated antiviral treatment that is effective or efficacious for this virus infection at this time. So, really, it's supportive care. It includes management of community-acquired pneumonia based upon clinical assessment and following clinical guidelines that are already available for management of CAP. And for example, one reference is the American Thoracic Society, Infectious Diseases Society of America, adult community-acquired pneumonia guidelines.

And another important point to highlight is that at this time corticosteroids should be avoided for treatment of this virus infection including for respiratory failure and ARDS. Corticosteroids really should only be given if they're indicated for some other reason than for treatment of this virus infection. For example, exacerbation of chronic obstructive pulmonary disease or if the patient is critically ill and deteriorates and is diagnosed with refractory septic shock, then corticosteroids, in this case, hydrocortisone, should be administered per surviving sepsis campaign guidelines. And the reason for the avoidance of corticosteroids for treatment of this virus infection is because what we know from other virus infections, for example, Middle East Respiratory Syndrome Coronavirus pandemic and season influenza virus infections is that corticosteroids can actually prolong viral replication in the respiratory tract, and this can be associated with prolonged and more severe clinical disease. So, at this time, I'd like to turn it back to Commander Kahn.

Thank you.



Presenters, thank you so much for providing our audience with CDC's interim guidance on this rapidly changing outbreak. We appreciate your time and value your clinical insights on this matter. We will now go into our Q and A session. Audience, please remember you may submit questions through the webinar system by clicking the Q and A button at the bottom of your screen and then typing your question. Again, please do not ask a question using the chat button.

**Our first question is regarding PUI definitions. Which classification of patient should the clinicians be worried most about possible Novel Coronavirus infection?**

Yeah, thanks for the question. So, we have three different definitions for PUIs that are now on our website, and you can refer to that for the details. But I think to answer the question most directly, the patients of the greatest concern are those that have had contact with a known confirmed case of 2019 Novel Coronavirus, and for those individuals, we have a somewhat lower threshold for PUI definition in terms of clinical symptoms. Those individuals with contact with a known case require the presence of fever or lower respiratory symptoms in order to qualify as a PUI. The other categories that include travel history to specific parts of China or throughout mainland China require both presence of fever and signs of lower respiratory illness.

It's of course important to note that any of these individuals could be potentially infected, and so proper followup and testing should be pursued. But I think the clinical criteria gives a sense of which individuals we are establishing a lower threshold for detection.

**Thank you. Our next question is regarding contacts. Can you please differentiate and elaborate on close contacts versus direct contacts and the implications of each?**

Yeah, sure. So, I can take that again. So, for contact investigations, we're taking an approach that assesses the risk and tries to put people into different categories based on the presumed risk that they may have had for exposure. So, at the highest level of potential risk are certainly healthcare workers that have had unprotected exposure to a confirmed case, but perhaps in a relatively similar high category would be household members or intimate partners of confirmed cases, which likewise would have had consistent and prolonged and varied intensive contact with a confirmed case. More lower-risk categories would include people that have had contact within six feet of a confirmed case for at least 10 minutes in the community or healthcare workers that may have had some PPE but perhaps not full adherence to the recommended PPE.

And then we have a category of individuals for whom there is low or no risk that's recognized, and those would be people that have had really less than 10 minutes or greater than six feet exposure from a confirmed case. So, we're taking this risk stratification approach to identifying those contacts and then those correspond with different recommendations for active monitoring, passive monitoring, and followup.

**Thank you. We've had multiple questions regarding treatment or potential treatments for Novel Coronavirus. Can you please address if there are any pipeline antiviral treatments that may be utilized for Coronavirus, and if not, can you please explain a little bit more about the supportive care that may help in severe case situations?**

So, I answered the second question. This is Tim Uyeki, I'll answer the second question first, and there's really nothing magical about the supportive care. It's the same as management for any other patient with viral pneumonia and exacerbation of underlying medical conditions. In terms of, you know, for example, such as management of seasonal influenza, severe seasonal influenza, with the addition of different infection prevention control precautions. In terms of treatments, as I mentioned, there's no specific treatment that's been proven for this disease.

We don't even know at the moment, we don't have any even in vitro data about neutralizing activity for this virus against drugs that might be available or in development. There are antiviral drugs that have been used for other infectious diseases that are under investigation for potential use of treating patients with this virus infection, but at this time there's no recommendation that can be made. In the case report that's just been published, the first U. S. patient did receive an investigational therapeutic.

And I just wanted to mention that in China there have been one clinical trial that's been implemented of some investigational therapeutics, and other clinical trials are planned. When one uses investigational therapeutics for compassionate use that's uncontrolled, it's basically impossible to make conclusions about the clinical benefit of that treatment. So, what we really do need is randomized controlled clinical trials. So, unfortunately at this time in the absence of even in vitro data, we can't really make any comments about what drugs appear to be beneficial at this time. Over.

**Thank you. We've received multiple questions about the role state health departments have to play in this emerging threat. Could you please address the screening of PUI contacts that state departments could undertake?**

Yeah. Thanks again for the question. So, of course the initial screening of patients as they present for care will be performed by the clinicians, but if they have suspicion of the patients meeting the definitions laid out, the recommendation is that they reach out to their health department to refer the case for further evaluation and testing. At this time, we want to ensure that all patients that are submitted for testing for Novel Coronavirus go through the appropriate public health channels so that those specimens can be tracked appropriately and notifications go out in an appropriate manner. So, state and local health departments play a critical role as the interface between the healthcare providers and CDC to provide appropriate diagnostic testing as well as providing assistance in further evaluation of patients if there's ambiguity in terms of patients meeting the PUI definition.

Those consultations take place between CDC staff involved in the response and the state and local health departments with jurisdiction over the patients.

And this is Ryan Fagan with the Infection Control Team. I could, I will just add a comment for awareness that all of you might not be familiar with that all state health departments have healthcare-associated infection prevention programs supported by CDC, so in addition to the epidemiology and laboratory support, we have people who specialize in talking through some of the issues related to healthcare infection control, so please keep them in mind, and they should be early in this notification process about suspected PUIs.

**Thank you for your answers, and thank you for mentioning the state health departments and the laboratory side of it, because we have received multiple questions asking about how to submit samples. Could you please address that or direct our audience to a resource that can help them determine how to submit samples for Coronavirus testing.**

This is Will Welton. So, for clinicians that have a suspected PUI and have reached out to their state and local health departments, the emergency operations center at CDC can assist local and state health departments with collection, storage, and shipping of specimens to CDC. The EOC will also assist with this activity during after hours or on weekends and holidays.

**Thank you for that. We have quite a few questions regarding the use of PPE and face masks. Can you please explain to our audience how effective you expect N95 face masks to be in preventing the Coronavirus?**

I'm going to broaden the answer to that a little bit beyond a simple N95 respirator question. So, remember that PPE is part of an overall framework of infection controls, and we want to start in the conversation with face masks about putting them on patients with symptoms of respiratory illness to contain the secretions that might be coming from their coughs or runny noses, etc. So, that's a really important use of a face mask for source control. In our recommendations for whereby healthcare personnel, we're specifically recommending the use of respirators. And so, some respirators like N95s are filtering face piece respirators, so they cover the nose and mouth.

There's a variety of options that provide that and additional higher levels of protection, but we think all of those, including N95, are effective at filtering out Coronaviruses. I think actually what I want to draw attention to here is that we still believe that the primary routes of exposure for Coronavirus are likely to be close proximity to a patient and droplet contamination or direct contact. So, the respirators, we think, are important for the concern about inhalational risk, but we also want to, again, this is part of an ensemble where you're protecting your eyes, which also have vulnerable mucous membranes, and paying attention to the use of gloves and gowns to avoid inadvertent contamination elsewhere on your body. So, I think that some discussion of respirators is important, and we're available to talk through specific models and how they fit with

specific regimens, but I want to make sure we're looking at these things in the context of the overall precautions framework that we're recommending.

**Thank you. We also have a question regarding risk factors. In your study of the data of all these cases, have you noticed that there are any particular risk factors that make patients more likely to acquire Coronavirus infection?**

Yeah. Thanks for the question. This is obviously an area of active investigation, and we're continuing to monitor the literature closely as well as in contact with colleagues internationally that, you know, have been investigating a much larger number of cases. Initially, when the outbreak began, there was an indication that many of the cases had an association with a seafood and live animal market in Wuhan province. However, as the weeks ensued, fewer and fewer of the cases reported that exposure.

So, increasingly, the reports out of China do not indicate specific exposure to a particular market or animal markets in general. So, this information coupled with some of the other available information suggest that the virus is spreading person to person in China. In terms of specific risk factors for infection, we don't really have clear indication yet of any specific groups that might be at higher risk of infection. However, the supposition that perhaps the typical vulnerable populations maybe more commonly effected, including young children, the elderly, and immunocompromised individuals or people with other comorbidities certainly seems reasonable and is consistent with what we've seen from other beta Coronaviruses. But we're continuing to look closely as new cases get reported and try to assess them for specific risk factors.

This is Ryan from the Infection Control Team. I'd actually like to add a brief point to the answer about PPE, if the moderators could add that to my response, that in addition to covering the eyes and mucous membranes of the face from direct droplet spread, part of the reason for this is to avoid accidental self-contamination from touching of gloved or ungloved to your eyes and face should be gloved in a healthcare patient care setting, and so having eye protection and face coverage is important for that reason as well.

**Thank you. That actually leads to some questions we received from alternate sites. Does the agency have infection control guidance for EMS workers or home healthcare workers or even transportation workers that may be at risk of exposure?**

This is Ryan again from the Healthcare Infection Control Team. The short answer is yes, that the recommendations that we're providing for healthcare setting apply to prehospital transport and EMS workers. I will say that at specific implementation steps will vary to that unique setting. We're in the process of developing some specific implementation tools based on the guidance we've produced, but the principles that we're talking about apply. That includes the use of contact precautions, wearing of a respirator and covering of the eyes for EMS workers who are riding in the patient compartment with a person, a patient under investigation for Coronavirus.

**Thank you. Another question we're receiving from a lot of our audience are what can you say about asymptomatic transmission based on the data you have received?**

Yeah. Thanks for that question, and that's certainly a question that's very high on our list as well, to gather as much information as possible in order to properly address. We have likewise seen some of the reports that have been released in bot media as well as in the science literature suggesting that this is possible. However, at this time CDC does not have direct evidence in our hands demonstrating that asymptomatic individuals are transmitting this virus. As we would expect with Coronaviruses, as with many infections, there is a wide spectrum of illness that can result from infection ranging all the way from asymptomatic or mild disease to very severe disease.

So, we certainly are not surprised to find that with this Novel Coronavirus. However, the infection risk that these individuals position for further spread of the virus remains an active area of investigation and is in part what we hope to answer with our ongoing contact investigations as cases are reported in the United States. And this is certainly where our clinicians and healthcare providers can be of great assistance in early identification of these cases, referring them for testing, so that these investigations can ensue and gather that information.

**Thank you for that. We have received a question form our clinical lab audience members. Are there any special precautions that you would recommend for the use of either pneumatic tubes or transporting specimens for PUIs?**

So, I would, this is Will Weldon. I would suggest that you should refer to the institution biosafety guidelines for transporting specimens that are being submitted for testing for infectious disease.

And this is Ryan Fagan from the Infection Control Team. It's a guidance that's actually currently on our website under clinical lab guidance, and maybe that's a link we could add to the dissemination list. It does direct the use of VSL2 for routine lab specimen [inaudible] processing now directly to look at the guidance for the list. There's a list of the type of labs. And there's a cost to not try to culture this virus in your hospital lab.

That would be a VSL3 activity. But perhaps we can provide a link to that for further detail.

**Thank you. We have some questions regarding Coronavirus and influenza. Does a positive test result for influenza mean that infection with Coronavirus is unlikely if other PUI criteria are met?**

Yeah, this is Aron. Let me try to address that initially, and then perhaps others may add to it. So, certainly it's always possible that people can have multiple infections simultaneously, but we do include in our PUI definition some consideration for alternate pathogen diagnoses. And so, that should factor into some of the decision making, but I

want folks to of course adhere to the specific definitions as they are listed out, because there is the possibility of during this time of year in particular when we have high incidents of influenza and other common respiratory viruses that there's the potential for multiple coinfection.

**Thank you very much. Our next question is a common one that we have seen come up from our audience. When do you expect patients to be most contagious as well as how long do you expect individuals with a Coronavirus infection to remain infectious to others?**

This is Tim. So, this is a very good question, and we don't have great data right now to be able to answer that. But it appears that detection of viral RNA can be prolonged in both the upper and lower respiratory tract. Again, detection of viral RNA does not necessarily mean detection of infectious virus, but certainly it may suggest that. And so, this highlights the need to adhere to infection prevention control recommendations very closely.

It's possible that similar to SARS and MERS patients that those who have more severe disease may actually have prolonged viral replication in the respiratory tract, particularly lower respiratory tract, but I think we're still in the very early days of really learning about the duration, both the levels and the duration of viral shedding, both in the respiratory tract and potentially outside the respiratory tract. So, it's a little hard to answer that question at this time.

Yeah. I would just add, again, that that is one of the key questions that we are trying to answer with these early case investigations and contact investigations. Through serial sample collection and active monitoring of cases, we hope to gather the information to ascertain how long people shed the virus and through the contact investigations glean some insights into their potential infection risk to others throughout that time period. So, those are definitely at the top of our list of questions that we're trying to answer with these early investigations.

What we can say is that in patients, particularly those who have been detected outside of China, that some of these patients have been actually positive in the upper respiratory tract, up to day 12 and 14. So, suggests prolonged at least detection of viral RNA. We've seen some really differing, a lot of variability. Some patients have results that suggest not very high levels of virus in the upper respiratory tract. We've also had some patients that have had results that suggest very high levels.

So, for example, the case report published today, a patient was positive in the upper respiratory tract and nasopharyngeal and throat swabs at days four, seven, and 11, and even positive in the nasopharyngeal in a swab at day 11. But, on day 4 and 7, the results suggest very high levels of virus in the nasopharynx. So, I think it's very, very hard to know. We have very limited data on a small number of patients in the U. S.

, and I think we look forward to learning a lot more from our colleagues overseas as well. So, much more to be learned.

**Thank you. We have some more questions regarding PUI criteria, and the questions revolve generally around travel. So, I'll try to combine them into one question. It goes something like this. Is travel anywhere in China considered a risk factor for Coronavirus testing and is travel to countries outside of China that have had reported cases considered a risk factor for Coronavirus testing?**

Yeah, so thanks again for the question or for the composite question. This is obviously one of the evolving areas of this outbreak and response, and we continue to monitor closely what's being reported from around the world so that we can adjust our PUI definition accordingly. And that's of course what's precipitating the change today that I highlighted with my opening remarks. So, we still see the majority of cases that have been reported in China as occurring in Wuhan City and Hubei province, and so that remains the focus of our person under investigation for people with fever and signs of lower respiratory illness. However, recognizing that there is transmission that has been reported outside of Hubei province in China, that is the exact reason why we have broadened our PUI definition to include patients that may have traveled to areas outside of Hubei within China that have fever and lower respiratory illness that require hospitalization.

So, recognizing kind of the volume of individuals that may have had recent travel to anywhere in China, the decision was made to focus primarily on those with severe disease, those that require hospitalization as having potentially the highest likelihood of being positive as well as those that would pose the greatest potential threat for transmission to others. We'll continue to monitor the epidemiology closely and adjust our PUI definition accordingly, but at this time, only travel to China is considered an epidemiologic risk of exposure.

Thank you for that.

If I could--.

Yes, please.

I have one further clarification. I guess the one caveat would be if somebody traveled to a country outside of China where they had contact with a confirmed case of Novel Coronavirus, potentially such as one of those countries reporting these exported cases, they would still meet the PUI definition under the first criterion of having had contact with a confirmed Novel Coronavirus case.

**Thank you for that distinction. We have one more question about personal protective equipment. If a faculty is used to utilizing reusable gowns as opposed to disposable gowns and laundering them, do you have any specific guidance for them?**

In U. S. healthcare settings, we're recommending the use of disposable gowns, and I think we'd have to know more about the specific scenario and product to comment further on that.

**Thank you. Another question we have regarding infections with Coronavirus, can you please elaborate and list the clinical manifestations of Coronavirus infection again?**

So, there are four known human Coronaviruses, two alpha and two beta Coronaviruses, and just to clarify again, these are distinct from other beta Coronaviruses that have caused severe disease. So, that includes MERS and SARS Coronaviruses and this 2019 Novel Coronavirus. So, for the four human Coronaviruses that are community transmitted, these are typically viruses that infect the upper respiratory tract and cause very mild, typically cold-like signs and symptoms. However, with, there are certain patients that for any vile respiratory infection can have more severe disease, and those are typically people who are severely immunocompromised or immunosuppressed. But, typically the human Coronaviruses that circulate worldwide among people cause very mild illness.

Now, that's different than with Middle East Respiratory Syndrome Coronavirus and SARS-associated Coronavirus and this 2019 Novel Coronavirus. We also realize that there is a wide clinical spectrum with all of these viruses, but certainly, it's quite clear that these three beta Coronaviruses can cause severe pneumonia and worse complications. So, the case fatality proportion with SARS worldwide in 2003 was about nine to 10 percent. For Middle East Respiratory Syndrome, again many patients are hospitalized with more severe disease, so the case fatality proportion is somewhere biased upward, but it's approaching 35 to 40 percent. With this virus infection, it's really too early to know, but there are reports out of China about 10 to 15 percent.

So, I think we can expect wide clinical spectrum and severe disease but really trying to learn a lot more as we go.

**Thank you for that. Our next question asks are there standardized criteria or benchmarks for discharging a patient?**

This is Ryan from the Healthcare Infection Control Team. The decision to discharge should be made on medical criteria.

Thank you very much.

Yeah, maybe--.

Go ahead.

I think maybe related to that though and perhaps what the question was about is distinguishing between, you know, ultimate disposition or discontinuation of infection



control precautions and discharge. And so, one of the resources we have on our website is considerations for home isolation. So, I wouldn't equate discharge from the hospital as just continuing of isolation. I think what we would recommend right now for patients who are either confirmed cases, who are getting better, and from a medical standpoint okay to discharge or for PUIs who have been evaluated in outpatient settings and, for example, awaiting lab results, that on a case-by-case basis, you have discussions with your local health department and us if necessary to help determine if it's appropriate to manage that person in a home isolation environment. In addition to medical criteria, that would involve social criteria as well.

And just to reiterate, because we have seen this question a lot, can you definitely address if patients that are still waiting test results can be released from isolation whether it's in a facility or at home?

Yeah, again, pointing back to the fact that overall this approach is one where we want to be very cautious and try to contain this virus. Again, it's not a specific set of criteria. It's a discussion on a case-by-case basis right now about the management of the patient, either in a healthcare setting or home, and it wouldn't be, those are two different decisions than discontinuation of precautions. If they are a PUI, under clinical and EPI criteria or a confirmed case, and we think that they might still be infectious, we're going to continue to recommend infection control precautions, whether they're in a healthcare setting or they're being managed at home. I think the discussion are when it's appropriate to go from a healthcare setting to a home isolation setting.

But be clear on the terminology. It's not a discharge decision. That's a medical criteria and decision. The discontinuation precautions is more based on what we think about risk of transmission and criteria for accommodation on that specifically.

**Thank you for that. And as we reach the top of the hour, we have time for one last question. This question revolves around clinicians and other healthcare workers. Is there any guidance available for healthcare workers that may have recently returned from affected countries?**

Yeah. So, I would refer back to the revised PUI definition, which does include healthcare workers who may have had contact with a confirmed Novel Coronavirus patient, and if they have signs of fever or lower respiratory illness, they would be considered a PUI. There aren't distinct criteria for healthcare workers who don't have any known contact with a Novel Coronavirus patient or travel, of course, to the affected areas. However, obviously we want to consider all of the kind of considerations for further healthcare transmission and have a relatively low threshold for detection. So, this factors into the various risk stratifications that were just alluded to a moment ago in terms of maintaining isolation, maintaining monitoring, potentially furlough from work, and so forth.

But those recommendations are specifically for people that meet the PUI criteria and obviously for confirmed cases.

Thank you for that. On behalf of COCA, I would like to thank everyone for joining us today with a special thank you to our presenters. The recording of this call will be posted within the next few days to the COCA website and available on demand at [emergency.cdc.gov/coca](https://emergency.cdc.gov/coca).

Again, that web address is [emergency.cdc.gov/coca](https://emergency.cdc.gov/coca). To receive information on upcoming COCA calls or other COCA products and services, join the COCA mailing list by visiting the COCA webpage at [emergency.cdc.gov/coca](https://emergency.cdc.gov/coca) and click on the join the COCA mailing list link. To stay connected to the latest news from COCA, be sure to like and follow us on patient at [Facebook.com/cdcclinicianoutreachandcommunicationactivity](https://Facebook.com/cdcclinicianoutreachandcommunicationactivity). Again, thank you for joining us for today's call, and have a great day.