ALISON BULLOCK: Thank you, everybody, for joining. My name is Alison Bullock. I am a senior global product manager for our infection prevention franchise with Boston Scientific. I just wanted to take a moment and thank you all, thank you all for being here. Thank you all for doing what you're doing every day. Being on the front lines, this is a really scary, tumultuous time. And we are here to help in whatever way that we can. And the best way that we can do that right now is sit together in this little webcast, which is the only way that we could gather and meet up with 1,000 of our closest friends to learn a little bit more about how we can maintain endoscopy staff safety during this COVID-19 pandemic. So we'll get started.

Just a few disclosures so far is that in order to receive CNE credits at the end, you need to be listening for the entire duration of the program, including the resulting Q&A. a survey will be sent to you via the email that you registered for. And so at the end of the survey, which will be sent tomorrow, early tomorrow morning, once the survey is complete, you'll get that, the CNE credit.

And if you have any questions that you wanted to ask at all, there is a Q&A feature. And the panelists and myself will kind of review. So there is a dedicated session at the end, where we can go through the different Q&As that's been, the questions that were asked, and try to address as many as possible.

So with that, I would love to introduce you to our speakers this evening. So Betty McGinty is our RN, CGRN, CER. She is our clinical fellow of education services at Boston Scientific. She is a registered nurse by trade, with more than three decades of experience in a clinical setting. Most of that is in gastroenterology. And specifically, she spends her recent years devoted to IP, with a focus on endoscope reprocessing and high level disinfection.

Maren David is our principal infection prevention specialist at Boston Scientific. She's worked in the field of microbiology for over 15 years, with experience in basic research, product development, and clinical research, on topics ranging from biofilm prevention to skin anti-sepsis and device reprocessing. So with that, I will hand it over to our two speakers this evening. And again, any questions, please feel free to ask it in the function. All of your lines are muted, and the hand raising function will also not work. But if there's any kind of questions, just feel free to answer it in that Q&A portion on the bottom of your screen. Maren, over to you.

MAREN DAVID: All right. Thank you so much, Alison, for that introduction. And thank you so much for inviting me to speak tonight to this amazing group of people about a very important topic. I am so glad to be sharing the virtual stage with my favorite GI Nurse, Betty McGinty. So I hope that you all learn a lot. And we are very lucky to be hearing from our special guest, Dr. Ding in China, who will be speaking about his experience after and Betty and I complete the CNE presentation and before the Q&A session.

So quickly, just going to go over some of our learning objectives for this presentation. So first, learners will be able to name two transmission routes for the virus in the GI suite. Second, learners will be able to identify two methods for preventing spread of the virus within the GI environment. And then finally, learners will be able to discuss the importance of adherence to endoscope reprocessing guidelines during this global pandemic.

ALISON BULLOCK: That's over to me. Sorry.

MAREN DAVID: No, it's OK.

[LAUGHS]

I think we're all getting used to Zoom, everybody. So the first thing that I want to talk about is, I want to do a little bit of Microbiology 101 with you all. And the reason for that is primarily because I think our focus in endoscopy has been on bacteria over the last five to seven years. This is primarily because of the MDRO outbreaks that have occurred over the last few years. But there are some really important differences between bacteria and viruses that I think are important for all of us to understand.

So firstly, I'd like to point out that bacteria are living organisms that can reproduce independently. Viruses, on the other hand, are non-living, or abiotic. And they undergo host dependent replication. So they are unable to replicate on their own. So that's a really important distinction.

And it's important for endoscopy, because when we think about contamination of the endoscopes after reprocessing, and when we think about proliferation of microbes, in those endoscopes during storage, we're really concerned about proliferation of bacteria in those scopes when moisture and nutrients are present. But with viruses, because they can only replicate in the presence of a host cell, we're not as concerned about the numbers of viruses, or the viral load, increasing during that storage time.

So in terms of size, bacteria are quite a bit larger than viruses-- so generally, on the order of one to two orders of magnitude larger than viruses. And just talked a little bit about reproduction. But if we go into some more detail. What you see here is that with bacteria, bacteria reproduce using binary fission. So what that means is that anytime an individual bacterium reproduces, it makes an identical copy of itself. And this is referred to as exponential growth.

When we talk about virus replication, what happens here is, a virus will bind to a receptor on the host cell. In the case of enveloped viruses, the envelope or the lipid bi-layer on the virus will fuse with the membrane on the host's cell. And then the contents of the virus-- so the genetic material-- will then enter the host cell. And the virus essentially hijacks the host's cell and uses it to replicate. And typically, for every host cell, multiple copies of a virus can be made.

The last topic I want to cover here is to talk to you a little bit about susceptibility of viruses and bacteria to various challenges that they would encounter in the endoscopy unit. So this includes environmental challenges from desiccation to heat, and then also chemical challenges, such as disinfection and antisepsis. So there is really a hierarchy when it comes to resistance and susceptibility of these different organisms to these challenges. And at the top of that hierarchy, what we have are bacterial spores. So those are generally going to be most resistant to environmental challenges, as well as chemical challenges. Lower on the hierarchy than bacterial spores are vegetative bacteria and non-enveloped viruses. And then at the bottom, we have enveloped viruses. So generally speaking, enveloped viruses are going to be most susceptible to desiccation or drying, very susceptible to increases in temperature, and also very susceptible to disinfectants and alcohol.

So Alison, if you want to move to the next slide, we will talk more specifically about SARS CoV, which is the virus that causes COVID-19. So this is Severe Acute Respiratory Syndrome Coronavirus 2. This is a member of a family of pathogenic viruses, coronaviruses, that can cause respiratory and gastrointestinal distress in both humans and animals. One thing that's really important to note about this virus is that even though we are in this incredibly challenging and unfortunate situation, this is an envelope virus, which is a good thing for us. Because what that means is that we are better able to control it in the environment and on our skin, and is more susceptible to defecation, heat, disinfection and alcohol than their non enveloped counterparts.

We know that this virus binds to the Angiotensin-converting enzyme 2, or ACE 2 receptor, which can be found in cells of the esophagus and lung, the ilium, colon and bile duct, as well as the heart, the kidney, and the bladder, among other cell types and others tissues in the body. So there are a number of locations in the body that can be impacted by this virus.

In Terms of routes of transmission, what everyone does agree on is that this is definitely transmitted via droplet transmission. And so droplets are generally produced by sneezing and coughing. And they will generally not travel farther than six feet from the source. And so those droplets are greater than 5 or 10 micrometer is in diameter. And so because of their size and their weight, they cannot travel very far.

In terms of airborne transmission, there is a little bit of controversy around this topic right now. The World Health Organization recently released a scientific brief stating that there is a lack of evidence to support airborne transmission of SARS CoV-2. However, CDC states that both droplet and airborne transmission precautions, as well as contact transmission precautions, need to be followed by health care workers.

So we've talked about droplet and airborne transmission. The last one we're going to cover here is contact transmission. So this could include either direct or indirect transmission. So direct transmission is exactly what it sounds like. So there's direct contact between an infected individual and a susceptible individual. An indirect transmission occurs when a surface becomes contaminated from an infected individual, and then a susceptible individual comes into contact with that surface.

So with contact transmission, survival of the virus in the environment has a direct impact on that route of transmission. So we don't have a lot of data on survival of this virus in the environment. There are a couple studies that have been done. What we do know, based on these data, is that the virus, under laboratory conditions-- so these are well-defined, controlled laboratory conditions-- the virus survives on stainless steel and plastic surfaces for up to three days, and survives for at least three hours when aerosolized.

The last topic, but one that's important, that I want to make sure that I touch on is that there is some recent evidence that suggests a fecal oral route of transmission for this virus. So there have been a number of studies done where high RNA loads, high viral RNA loads, have been isolated from the feces of infected patients. There is only one study done in which one patient had an active and infective isolated from feces. So we have yet to see a large number of studies where active virus has been isolated from disease. But based on some of the data that are available today, and some of the symptoms that these patients experience, it suggests that there is the potential for the fecal oral transmission of the virus.

So Alison, if you want to move on to the next slide, we're going to talk a little bit about epidemiology. So one important topic to cover is incubation period. So this is probably a term that you've been hearing in the media, or in your workplace, over the last couple of months. So incubation period is the time between exposure to the virus and onset of symptoms. So what we know, based on the data that have come out of China so far, is that the estimates on incubation period range between a median of 4.8 to 6.4 days. We have seen some data suggesting that it could be nine days. And there are some analysis that suggest that it could be as high as 14 days, or perhaps even longer.

There is also evidence that supports transmission of the virus prior to answer of symptoms. And it's thought today that this could perhaps be contributing significantly to transmission and spread of COVID-19.

The second topic we're going to cover here is the reproduction number or transmissibility of the virus. So what this is the average number of secondary infections expected from an index case. One thing that's really important to note about the reproduction number is that this is a value that can change, depending on the region. So the reproduction number in China may be different in New York City, for example.

Part of this is because the reproduction number is a function of both human behavior and innate characteristics of the virus. So things like contact rate, population density, and population mobility can have a significant impact on that value. I've provided a few examples of reproduction numbers for viruses that you all are probably familiar with. So if you look at the bottom left hand side of your screen, you can see the are not values for measles, for example, which is highly transmissible, and has a reproduction number ranging between 12 and 18.

Just under that, we have smallpox, which is a non-enveloped virus that has been shown to persist for months on surfaces in the environment, and has a reproduction number ranging between 3.5 and 6. And then in the middle there, we have SARS CoV-2, which we're estimating right now to be somewhere between about 2 and 1/2 and 3. And then at the bottom, we have the seasonal flu, which is estimated to be just a bit higher than 1.

OK, Alison, if you want to move to the next slide-- so we're going to talk very briefly about the symptoms that patients with COVID-19 are experiencing. So on the left hand side, here we have some early reported symptoms in some of the patients who became ill early on during the outbreak. And what we see up at the top here is that many of those patients were experiencing fever, fatigue, and dry cough. We often hear hear, here in the US, that, fever, dry cough, and sore throat are things that we need to be keeping an eye out for. But what we also see here is that there are some GI symptoms as well. So we see diarrhea, nausea, vomiting, and abdominal pain.

So what we're seeing more recently-- and on the right hand side here, what we're going to talk about is the study that came out of China just last week, or maybe even the week before that. But what these investigators reported when they did cross-sectional a retrospective evaluation of 204 case reports, was that almost half of those patients presented with GI symptoms as the chief complaint. And so we see a large proportion of those patients experiencing lack of appetite, diarrhea, vomiting, and abdominal pain.

One of the other preliminary findings of this group was that patients without digestive symptoms appeared to be more likely to get well and be released from the hospital than those with GI symptoms. So again, these are preliminary data. It is unclear what this means. And we will continue to keep an eye out for more data coming out of China.

Alison, if you want to move on-- this next slide is just an early look at US data from the CDC. We don't have a lot of data right now. One thing I want to point out about this slide is that these data are a couple of weeks old now. So the data were released on March 16th. At that time, we had less than 5,000 cases, confirmed cases, of COVID-19 in the United States. We are just a few weeks beyond that date, and we now have over 200,000 cases. So there is certainly the potential that this information has changed.

Another important point is that for much of the data, we've got gaps. So some of the data on age and outcomes is missing, which CDC so states is, likely results in underestimates. I think one really important point here is that, consistent with data from China, we're seeing that fatality is highest in those of advanced age. And something else that I think is very important to note here is that 20% of known hospitalizations are occurring among those aged 20 to 44. So while that group is not seeing necessarily a very high case fatality rate, they are becoming ill enough that they require hospitalization.

And with that, that wraps up my portion of the talk. I'm going to pass it along now to Betty McGinty, who's going to talk to you about how all of this impacts practices in the endoscopy suite.

BETTY MCGINTY: Thanks, Maren. I really appreciate your setting up the stage for talking about endoscopy nursing staff considerations in this arena. And it really brings up the point that probably our best friends, speaking of endoscopy staff, best friends should be there infection preventionists. So thank you so much.

So I'm going to talk about some different topics that do involve safety. And these involve precautions, PPE, hand hygiene, transporting when it's necessary to transport the patients to and from the GI endoscopy arena, as well as any particular post procedure practices, recovery room, turnover-- and then I'm going to end with a discussion about endoscope reprocessing.

Alison? So when we look at precautions, the CDC is very helpful in providing guidance regarding the type of precautions in the GI arena and in all arenas that should be exercised. So the precautions recommended by the CDC, like I say, in general, are standard precautions which are recognized as those to be following in GI procedures. These assume that all patients and body fluids are potentially infectious. It also includes hand hygiene and personal protective equipment.

Now add to the standard precautions as a base, those that are transmission based. And so you've heard of the different routes of transmission that Maren has discussed. So added to the standard precautions would be the recommendation to direct these toward these methods, including contact droplet and airborne precautions.

Next? So when we look at the room, the endoscopy room, for doing endoscopy procedures, number one, when we're working with this population of patients, we want to make sure that we choose a negative pressure room. Obviously, the reason for the negative pressure is to contain the contaminants within that procedure room. Keeping the door closed is very important to keep that negative pressure. And you will recall that negative pressure is a recommendation requirement for our reprocessing room, for the same reason. And also procedures that you would be doing such as bronchoscopy, where there's a potential for tuberculosis, would require the negative pressure room. It would be a consideration to perhaps identify one room, that during this time, that could be that particular room was being used consistently for this patient population. Also, if you happen to have an isolation room with an antirum, that would be a best practice. Most endoscopy suites do not have one. But if there is one, that would be the best way to keep all of the clean materials on-- in the antirum side, and setup from there into the isolation area.

Other considerations could include identifying one anesthesia machine that would be used consistently with these patients, as well as identifying staff that have been well-trained in the use of the correct PPE, and that are comfortable-- in the identification of staff, remembering, the least number of staff to staff in the room would be most advantageous.

So seeing that, having the anticipated extra supplies either in the room [INAUDIBLE] realizing that those supplies would be considered contaminated afterwards, or having them in the clean ante area, or even having a runner to be outside the room for additional items and equipment as needed. Another consideration is to use this procedure room for not only the procedure, but also for the prep and the recovery.

On the next slide, I'd like to show you a diagram. I found an article published in the Canadian Journal of Anesthesiology, which is a recently published article. And it was entitled What do You Do When a COVID-19 Patient Needs an Operation? And so the authors of this article provided this suggested layout of how the staff could be used, and how things could be arranged for these procedures. Even though this is an operating room setting, I think there's a lot of interesting considerations that could be transferable over to the endoscopy room.

Next? So distancing-- we're hearing about distancing all the time. When we think about distancing within the endoscopy suite, that in itself could be a challenge. Because I know that there are various sizes of endoscopy rooms. And oftentimes, they can be quite tiny. So, however, we still need to be conscious of the intent of keeping the six foot distance in mind. And what it may mean in the endoscopy room is for only those that need to be as close for the assistive role, and others that can be further away in the room-- that mindset should be there, just always a consciousness of doing that.

There was an early case report from last month that was published in the Annals of Internal Medicine. And this kind of accentuates and lets us know that the distancing is helpful. In this case, 41 health care workers that had been exposed to aerosol generating procedures for at least 10 minutes, they were 6 and 1/2 feet apart from the patient who had severe pneumonia, that at the time had not been diagnosed, but later was diagnosed with the COVID-19. None of these in this particular study contracted the disease. So that does help to reinforce that.

I'll also speak to another recent source, Repici et al, of a March publication that reminds everyone of the study from Johnston et al after the SARS outbreak of 2003, seeing that the droplets from the infected patients could reach persons that were located six feet or more from the source. And also this study brought out the point that there was risk to the endoscopist's face, or to also the assistive person at the face level, to potentially infectious biologic samples during endoscopy. So these are things to keep in mind when we're talking about distancing within the endoscopy room.

Next? So talking about PPE, the SGA standards requiring, regarding PPE for general GI setting are as you see on this slide here. And they must be selected based on the potential for exposure during a particular task performed in the GI setting. So these include gloves, impervious gowns, masks. I highlight the respirators, because we'll talk a little bit more about that, goggles, eye shields to protect the eyes. And we point out that the eyeglasses don't substitute for goggles and eyes shield, face shields to protect the face, the mouth, nose, and eyes, and head and shoe covers may be a necessity. These are, once again, in the GI setting in various arenas.

So next, I'd like to capitalize on the respirators. If you'll back up one-- OK. There you go. So, thanks Allison. That's fine. The next one's fine.

So we the main respirators that we talk about-- next slide, please-- would be the N95 respirator. And everyone has used this. Everyone is aware of the shortage that exists all over the news, and all of the different options that are out there. But just to provide some education on the N95 respirators-- they're tight fitting. They're tight fitting for a purpose, and they're not really comfortable. Because they need to be very tightly fit on the face. The reason is that this protects the person wearing it from tiny, very small particles that float in the air.

And if you look at the 95 on the N95, this refers to the blocking of the 0.3 micron particles. So it's 95% of those would be blocked. There are more-- there are some that are out there that are 99. So they would be a N99s. And I even heard of one today, that there is a 100.

Next, another alternative in the respirator round would be a PAPR, and this is the powered air purifying respirator, which uses the battery operated blower to force the air through a filter, and to actually produce HEPA filtered air.

Next, the CDC provides guidelines for us for donning and doffing our PPE, and the order for doing this. I want to let you know that if you have perhaps attended other presentations-- and I will tell you there's variations for these. There's variations and different procedural areas and [INAUDIBLE] arenas, and different countries. And this is the PPE order that is given by the CDC. And I refer you to their website to get their posters, that will show you not only this order, but also the various steps that go along with making sure that these are dawned and doffed correctly.

The point I want you to remember is, the importance is that you want to make sure you're not contaminating and terminating when you're putting on and removing the pieces of PPE. And that's the most important thing.

When we're dealing with patients that have a respiratory illness, we will generally don the PPE prior to going in the room to get the respiratory protection. And then we'll keep the respirator on when doffing or removing, until out of the clinical space.

Next, the CDC also gives us recommendations to keep our hands away from our face, limit the surfaces that we're touching, changing our gloves when they're torn or heavily contaminated, and performing hand hygiene between the steps, if the hands become contaminated, and always, always after removing all the PPE.

Next, hand hygiene-- wash your hands. This cannot be overemphasized. And it's not just running a little water and soap on the hands. It's actually mechanically scrubbing the hands. The mechanical action helps to remove soil that may contain pathogens. The minimum is 20 seconds. If you don't have soap and water readily available, use a hand sanitizer that has a minimum of 60% alcohol.

Remember that not all hands are created equal in size. So it's important to get enough hand sanitizer on your hands to cover them, and rub them together until they're dry. There's not a particular required amount of time. But when they're dry, that would be the signal that has been sufficient. Avoid touching your eyes, your nose, your mouth and your unwashed hands. This is very difficult to do. I never realized until this recent situation, how many times I want to reach up and touch my face, or scratch my face, or whatnot. So it's become a real exercise. And I hope that it will stick with everyone for more time to come, too.

Once again, remember hand hygiene for infection prevention for any disease process, is important part. And it's a major part of our response to the COVID-19.

Next, I wanted to bring up the fact that I've mentioned earlier how best practice would be to do your procedures within the patient's room. But if not possible, you may have to transport the patient to the endoscopy suite, and then back to the room. And the CDC does offer guidelines for this. Generally speaking, we don't have see or expect to see an infection prevention PPE in the hallway. But the CDC does provide the guidance to let us know how best-- we have our transporter protected, the one who's getting the patient ready for transport, the patient transporter him or herself, as well as the receiving personnel. It's very important that communication be initiated prior to sending the patient to the endoscopy unit, so that there is full no knowledge and preparedness on the receiving side. And that goes the same way for returning the patient.

The part that I highlighted here, where there was a recommendation that the transporter should wear a face mask without additional PPE for the transport. But the CDC does say, unless there is anticipated need for medical assistance during the transport, so this has to be evaluated on a case by case basis.

Next, so after the procedure's been performed, once again, if the patient can be recovered within the procedure room, that would be a best case scenario, whether that be the patient's room or the procedure room in endoscopy. Some units may have an isolation room in their PACU area with a door, and with the required negative pressure. And that would be, actually, an absolute best practice, if that occurred. It may not be the situation that one finds.

There may have to be an opportunity to locate an area that's spatially separated from other recovering patients. And that would be something to work with the infection preventionists at your facility, as well as engineers that can help with some partitions to get these patients isolated. And these patients would have a face mask, just a surgical face mask, to contain their secretions.

As far as how long a time to wait between doing procedures that have had these procedures performed, you want to allow sufficient time. And the literature says between 30 minutes and an hour. Once again, you're going to need to allow time to disinfect the room, first to clean it. And that's an important point. If you have dirty surfaces, they need to be cleaned with a detergent or soap and water. And then they will need to be disinfected following that.

Another point to remember is not to shake linen, so as not to aerosolize any virus that could be on the linen. As far as disinfecting the surfaces, [INAUDIBLE] can use bleach solutions, alcohol solutions with a minimum of 70%, or the EPA registered disinfectant solutions. Maren told you that this virus is sensitive to these disinfectants. And so therefore, we can rest assured that practicing the disinfection is successful with our attempts. But we want to always follow the IFU for the chemical, ensuring the appropriate contact or wet time.

Next, Maren did talk to some of the COVID-19 surface life. There have been a couple of studies that I've seen recently, too, that talked about the fact that the Coronavirus viruses could persist on surfaces for up to nine days-- however, that they were inactivated in their laboratory by the surface disinfection procedures, with the 62% to 71% ethanol, a 1/2% hydrogen peroxide, or 0.1% sodium chloride within one minute's time. Once again, these are laboratory studies that are done. Also, the SARS CoV-2 can remain viable in the air for up to three hours, on copper for up to four hours, on cardboard for up to 24 hours, and on plastic and stainless steel for up to three days.

The thing to keep in mind, once again, is to use the disinfectants post procedure.

Next, so what about endoscope reprocessing? The question may be asked, is there anything that should be done differently for this patient population? So I answered the question by saying no, and then I say yes. And what I mean by no is, no, there is no difference in the standards for reprocessing. I say yes because the yes is the heightened awareness to-- that it's very important, extremely important, not to skip or miss any of the steps in the process. We'll talk a little bit about that, as far as water safety, the efficacy of our high level disinfectants, and then I'll end by bringing up some of our challenges.

So first of all, it has been recognized-- and it's still a matter of truth-- that reprocessing has a narrow margin of safety. Michelle Alpha made this statement back in 2006, and spoke to the point that any slight deviation from recommended reprocessing protocol can lead to the survival of microorganisms and an increased risk of infection. So this is a true statement, and it continues to be a true statement.

SGNA does have a recommendation in the standards for six-- I mean nine steps of reprocessing. And these are portrayed to you on steps, because they are stepwise. They are intended to be followed sequentially. Within these steps are some sub-steps. And add to that instructions for use from the manufacturers. And there have been some determinations that there can be at least 138 steps. But just a reminder that it is important to follow all of the steps for reprocessing.

Next, then I want to remind you that reprocessing an endoscope takes place not only in one setting. It begins in the procedure room, and it ends with a storage of the endoscope. The procedure room is where the pre-cleaning begins. And this begins immediately after the endoscope is removed from the patient, before there is time for any bio burden to dry on the endoscope, or there to be any microorganisms to find a place to inhabit.

And then proceeds along the way to the reprocessing room, to the dirty side, where manual cleaning, following the leak testing takes place, and the preparation of the scope, with visualization, and then moving to the clean side for the high level disinfection, followed by the rinsing and the drying, and then the storage room. So all of these are important areas and components for the cleaning process for reprocessing.

Next, I want to make a highlight on pre-cleaning, point of care cleaning, pre-cleaning. And this is performed in the procedure room. It's really important on this-- remember, we talked about the possibility of the fecal oral route of transmission. And also if there was a bronchoscopy, there could be the existence of some of the material on the bronchoscope. So it's really important to this begin immediately. We want to prevent biofilm attachment and formation, no soil drawing on the scope, and to prevent any delayed reprocessing. So this is important.

And then following the pre-cleaning, there is the careful preparation of the endoscope for transfer to the reprocessing room, so that it's protected, that it's covered, and it's identified as biohazard, and taken to the reprocessing room.

And then when you move into the cleaning room, you want to make sure, doing this most important step, that everyone agrees is most important, in the process of removing the soil, want to make sure that the appropriate PPE is worn by those staff who are reprocessing the endoscopes. You want to make sure that all of the cleaning takes place under the water, so there is no aerosolization.

And then following the cleaning, there is the disinfection of the counters, the sinks, whatever area in the reprocessing room that could have come in contact with this contaminated endoscope. So this needs to be sure to be taking place also.

We talk about water quality and water safety. And we hear about different types of bacteria and contaminants that can be in our water supply. The CDC has found that there is no COVID-19 virus in drinking water, which is potable water, which is the utility water used an endoscope cleaning. So you can rest assured that the water is of sufficient quality to be used. And as far as the efficacy of the high level disinfectants, the FDA approved high level disinfectants. And I've given an example here of one. That you'll be able to find this with others that you find in, for those that you use, that they are coming out with their statements that they are efficacious in killing these coronaviruses. Once again, Maren has helped us to understand that these enveloped RNA strand viruses are susceptible.

Next, finally, I just want to bring up some challenges. And you may be experiencing these. I am so grateful for everyone who works in the GI arena, and so grateful for those who reprocess endoscopes and protect our patients from infections. So a shout out to you.

But some of the human factors-- on a good day, we know we have a lot of human factors involved in reprocessing. But let's say, going beyond that, to being in our challenging times, what additional human factors do we have? There may be staffing shortages. Maybe there's an illness of the reprocessing staff. Maybe there is an illness of their family member. Maybe then that will leave less experienced staff in the arena. Staff may be reallocated to other areas, because procedures have been often canceled or deferred. And perhaps then, some other staff may be floated in. So we look at competency issues.

Staff can easily be burned out at this time. They're anxious. You're anxious. Worried about jobs. Worried about getting sick. Working additional shifts, and just being tired. When we're tired, sometimes we're not as attentive to detail. And so we could sometimes miss steps.

Sometimes, there is pressure to turn around the equipment a little more quickly. Maybe there have been dedicated scopes that have been used. And so there's pressure to turn it around. Once again, sometimes the steps can be omitted. Sometimes, using an instrument so much, there could be damage from the usual wear and tear. Or there could be some malfunction in our AER, and this could go overlooked.

Then looking on the supply side, attention to pre-cleaning kits and cleaning brushes-- is there an adequate supply of these? What about the chemicals for the detergents enzymatics used for cleaning, and the disinfectants? AER filters, the air and water filters, need to be changed regularly, as per their IFU. And when there are supply issues and a shortage of the supplies, there could be the temptation to ration them, or to create workarounds to compensate. There could also be a temptation, at this time, to reuse single use items, such as cleaning brushes, such as scope valves and buttons, scopes themselves, and forceps.

These are all challenging times for all of us. And we can get through them by working together, supporting each other. One way we can support each other is by learning from those who have been presented with similar challenges and have come through them successfully.

Now I'm going to turn it back over to Allison.

ALISON BULLOCK: Thank you. Thank you very much, Betty. And thank you, Maren, for your informative talk. So this essentially concludes the CNE portion of the program.