FDA Webinar Series - Respirators for Health Care Personnel Use during COVID-19 Pandemic

Moderator: Irene Aihie
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Coordinator: Welcome and thank you all for standing by at this time all participants will be in a listen-only mode until the question and answer portion at the end of today's presentation. At that time if you would like to ask a question, you may press star one on your phone.

As a reminder, if you have not logged into WebEx please do so you can view today's presentation. Today's conference is being recorded. If you have any objections, you may disconnect at this time. I would now like to turn the call over to Irene Aihie Thank you, you may begin.

Irene Aihie: Thank you. Hello, and welcome to today's FDA webinar. I'm Irene Aihie of the CDRH Office of Communications and Education. Welcome to the third CDRH webinar in our webinar series on the topic of decontaminating respirators for health care personnel during the COVID-19-time damage.

Today we would be joined by experts from FDA Center for Devices and Radiological Health and colleagues on the Occupational Safety and Health Administration and the Centers for Disease Control. During this webinar, FDA

will speak in detail about decontamination systems for respirators, including specific methods for decontamination, evidence of potential effectiveness, and best practices and common challenges in emergency use authorization request submission.

Following the presentation, we will open the line for your questions related to the information provided during the presentations. Colleagues from both CDC and OSHA will join us to assist with the Q&A. Now I give you Dr. Binita Ashar from FDA Center for Devices and Radiological Health.

Dr. Binita Ashar: Thank you very much, Irene. Hello, everyone, and welcome to today's third session in our bi-weekly webinar series on personal protective equipment. My name is Binita Ashar, and I'll be moderating today's webinar where we're continuing our discussion on respirators for use by healthcare personnel during the COVID-19 pandemic response.

In the first webinar launching this series, FDA, CDC/NIOSH, and OSHA provided a broad overview of respirators used in health care that would serve as the foundation upon which we would then devote subsequent sessions for a deeper dive.

The respirators we've been focusing on are the N95 respirators, which are disposable facepiece filtering facepiece respirators that cover a user's airways or nose and mouth and offer protection from particulate material and an N95 filtration efficiency level.

In our second session two weeks ago, we discussed the various EUA emergency use authorizations that have been issued for the respirators and illustrated the ongoing issues related to addressing the supply-related concerns with the necessity for ensuring that respirators for our healthcare workforce are

indeed providing adequate respiratory protection.

In today's third session of our webinar series, our topic is decontaminating respirators for healthcare personnel use during the COVID-19 pandemic. Decontamination systems are devices intended to decontaminate certain medical devices, such as compatible respirators so that they can be reused by healthcare personnel.

A decontaminated respirator should only be used when there are insufficient supplies of newly approved cleared or authorized respirators. Today, the FDA has authorized nine decontamination systems for high-level tier-one decontamination. Each of these systems is unique and their assessment complex.

To discuss the various considerations, best practices and common challenges in emergency use authorizations for decontamination systems for respirators for healthcare personnel use, we have with us today, Captain Elizabeth Claverie-Williams, Assistant Director for the reprocessing and personal protection team. Dr. Clarence Murray III, team leader, sterility devices team, and Dr. John Weeks Scientific reviewer. Captain Claverie and Dr. Murray are from FDA’s Center for Devices and Radiological Health, Office of product evaluation and quality. and Dr. Weeks is from FDA’s Center for Devices and Radiological Health Office of Science and Engineering Laboratory.

Captain Claverie will begin the presentation and hand it over to Dr. Weeks and Dr. Murray. When they conclude they will hand the session back to me and we will open the line for questions. With that, I'd like to ask Dr. - Captain Claverie to begin today's presentation.

Capt. Elizabeth Claverie-Williams: Good afternoon everyone, and welcome to this presentation

on decontaminating respirators the healthcare personnel use during COVID-19 pandemics. Next slide, please. During the COVID-19 pandemic, the reuse of N95 respirators has become a critical strategy to mitigate shortages against devices.

We want to ensure that our health care personnel have access to respirators that effectively filter particulates and have been adequately decontaminated to prevent the undue risk of exposure, and that the benefits of using these devices outweighs the risks.

Once we begin receiving EUA requests for respirator decontamination, we worked to provide guidance to ensure there are clear, consistent recommendations to facilitate the development of this novel approach for respirator reuse.

This guidance was developed to communicate a recommended framework to our stakeholders who are developing microbicidal processes intended to make respirators safe for subsequent uses. Let us now discuss the methods for decontamination and bioburden reduction of N95 respirators.

We understand that there are many different microbicidal processes, such as vaporized hydrogen peroxide, and steam beingexplored for this purpose.. Different microbicidal processes may have different utility depending on the modalities, use environment, context of use, and the intended outcome of the process. Despite this variability, the guidance presents a set of considerations that are generally applicable to most decontamination and bioburden reduction processes.

We have intentionally differentiated between what we consider “disinfection” and “bioburden reduction” in order to clearly communicate different degrees of

potential microbicidal effectiveness. The initial evidence of potential effectiveness comes from the demonstration of the microbial inactivation.

Later in our presentation, my colleagues will provide more details about our tiered approach for these systems and how we have differentiated between respirator decontamination and bioburden reduction. At a high level, all pre-EUA requests for respirator decontamination or bioburden reduction systems must provide some evidence of potential effectiveness at achieving a controlled, repeatable microbicidal endpoint.

Depending onthe intended microbicidal endpoint and the target Tier, this evidence may include microbicidal effectiveness testing performed by the sponsor directly, or it may include valid scientific evidence from other sources, such as scientific literature.

Finally, we will discuss observations, common challenges, and recommendations for the emergency use authorization. During this webinar, we will provide recommendations for stakeholders considering submitting an EUA request for a decontamination or bioburden reduction system for respirators or surgical masks.

We will also provide some observations regarding common challenges we are seeing for theseEUA submissions. These recommendations and observations were used to write the aforementioned guidance document, which we will now discuss in more detail.

As a respectful reminder, decontaminated respirators should only be used when there is an insufficient supply of new approved cleared or authorized respirators. Next slide, please.

FDA recently issued this Immediately in Effect Guidance. Recommendations for sponsors requesting EUAs for decontamination and bioburden reduction systems, for surgical masks and respirators during the Coronavirus disease (COVID-19) public health emergency.

Our guidance gives recommendations for submissions of an evidence-based approach to decontamination and bioburden reduction systems. This guidance document outlines our evidence-based approach for reviewing the decontamination bioburden reduction EUA request.

It outlines recommendations for how a sponsor of an EUA, may use valid scientific evidence to demonstrate the safety and potential effectiveness of their proposed system, as well as how to address known and potential benefits and risks related to the emergency use of their system.

Now, I will discuss an overview of the Tiers.. Excuse me. Section 4B of this guidance document provides an overview of our Tiered approach for decontamination and bioburden reduction systems. We will go into more detail later, butat a high level, we are considering three Tiers of microbicidal processes for use with respirators and surgical masksunder an EUA. Tier one has the most stringent criteria of the three tiers and includes decontamination of surgical masks and respirators for single or multi-user reuse. Tier two includes decontamination of surgical masks and respirators for single user reuse only.

And Tier three is for bioburden reduction of these devices for single-user reuse only, and only as a supplement to existing CDC reuse recommendations. Each tier addresses a different microbicidal endpoint as we will discuss shortly.

Finally, I will discuss the recommended content of pre-EUA submissions and

EUA requests. The guidance also provides recommendations for the content of pre-EUA submissions, and EUA requests aligned with our evidence- based approach for assessing the safety, possible effectiveness, and benefit-risk analysis of these systems. In addition to the demonstration of microbial effectiveness, you will need to provide evidence that cycle conditions do not affect the respirator.

In other words, please include evidence to ensure that the decontamination or bioburden reduction system is not damaging the respirator or surgical mask in a way that reduces the device's performance to an acceptable level. For example, after the maximum number of decontamination or bioburden reduction cycles, a respirator should be able to maintain its function as demonstrated by the fit, filtration and breathability of the device.

The microbicidal process should be compatible with the materials of the respirators, including the strap, and should not degrade the device. For example, we are aware that respirators containing cellulose are not materially compatible with microbicidal processes that use hydrogen peroxide.

We ask that EUA sponsors identify any respirator or mask materials known to be incompatible with your proposed process. We also ask that all EUA sponsors clearly specify the maximum number of process cycles that can be applied to a respirator or mask using their proposed system. It is our expectation that the maximum number of cycles is supported by valid scientific evidence that demonstrates the maintenance of the PPE performance characteristics after the maximum number of cycles.

EUA sponsors should provide a clear mechanism for tracking the number of cycles that have been applied to each piece of PPE. Finally, we considered the residuals, labeling, and mitigations to reduce risk. When reviewing these EUA

requests, we also evaluate the safety of the PPE user and any personnel that may be operating the microbicidal process.

We encourage sponsors to include mitigation measures like engineering controls, process controls, and labeling to reduce the risk of cross-contamination between respirators, or between people and contaminated respirators. We encourage regular monitoring of disinfection or bioburden reduction personnel for signs of COVID-19 or other respiratory infections.

And lastly, for the disinfection of bioburden reduction methods that are intended for single-use reuse, we expect sponsors to do everything reasonably possible to reduce contact between pieces of contaminated PPEs and to reduce respirator contact with anyone other than the specific user. Single-user reuse systems should also include a mechanism for ensuring that each piece of PPE is returned to its original owner.

All of the recommended content for the pre-EUA submissions and EUA requests is focused on ensuring that the FDA review personnel have the scientific evidence and risk mitigation information needed in order to perform a complete review of the EUA. Now, my colleague, Dr. Jon Weeks, will go into more detail regarding how we developed our evidence-based approach to reviewing these submissions. Jon.

Dr. Jon Weeks: Thank you, Captain Claverie. Good afternoon. I'm Dr. Jon Weeks and I will be discussing information on evidence-based approaches and our tiered approach for decontamination and bioburden reduction and specific modalities we have received submissions regarding the decontamination or bioburden reduction of N95 respirators and surgical masks. Next slide, please.

From sterilization and disinfection, we have a general understanding of the

resistance of microorganisms to various commonly used chemicals like vaporize hydrogen peroxide and ozone as well as heat. It is generally observed that spores and Mycobacterium are the most resistant sitting various modalities.

Non-envelope viruses and vegetative bacteria exhibit intermediate resistance, and enveloped viruses, such as SARS-CoV-2, commonly known as Coronavirus are more susceptible.

Based on this hierarchy we've established a tiered approach discussed on the next slide. For modalities that do not follow this hierarchy of resistance, we recommend contacting FDA at the address on the screen to discuss appropriate organisms to use for validation testing. Next slide, please.

The tiers were designed to create a margin of safety and provide confidence that microorganisms, including SARS-CoV-2, would be inactivated. We, therefore, recommend that demonstration of activation of only enveloped viruses or SARS-CoV-2 alone does not provide a sufficient margin of safety for decontamination, or bioburden reduction systems.

Our recommended for non-enveloped viruses, vegetative bacteria, mycobacteria, and spores allow for confidence that SARS-CoV-2 and possibly other pathogenic microorganisms are inactivated.

While SARS-CoV-2 is utmost importance, healthcare personnel are commonly exposed to other opportunistic pathogens, which may cause additional infections in the wave of COVID-19. Additionally, demonstration of the only inactivation that SARS-CoV-2 may not provide a sufficient margin of safety as we do not have clear information on the infectious dose or know what level of exposure to the pathogen is safe for reuse.

Demonstration of inactivation of more resistant microorganisms provides a margin of safety to help prevent the spread of SARS-CoV-2 and possibly other pathogenic microorganisms. For modalities that do not follow the classical hierarchy of resistance, we recommend that microorganisms that are resistant to the chemical agent or radiation are used for the testing to build in a margin of safety.

For all systems, we may ask for a justification for organisms to be used for validation to demonstrate that those selected are appropriate for the testing performed. We understand that the ability to get time in a microbiology testing laboratory or the supplies for testing are limited in the current situation. To ensure that the testing will address our concerns, we recommend discussing it with us before conducting your testing.

We welcome interactions and are willing to review protocols to ensure that the testing will contain adequate conditions to address the microbial effectiveness. The table on the screen provides information on the three tiers, including the intended use of the respirator, and the microbiological acceptance criteria.

Note that for tier one, which is for single or multiple users, Sponsors should provide evidence to demonstrate inactivation of greater than or equal to six logs of the most resistant spores, or Mycobacterium species. For tier two, which is only for single users, sponsors to demonstrate the ability to inactivate greater than or equal to six logs of three non-enveloped viruses or two gram-positive and two Gram-negative vegetative bacteria.

For tier three, which is only for single users, and only for supplementing existing CDC recommendations for reuse. Sponsors should provide evidence to demonstrate inactivation of greater than or equal to three logs, a non-enveloped virus or two gram-positive and two gram-negative vegetative bacteria or

provide other evidence that demonstrates the specified critical parameters, which is a similar level of inactivation of microorganisms.

Ideally, we recommend the use of new FDA cleared or authorized and NIOSH approved respirators, but we understand that this is not always possible. In situations where a new respirator cannot be used, we recommend that decontaminated respirator be used. The best option would be a Tier 1 decontaminated respirator at these decontamination methods has demonstrated the greatest reduction of some of the most resisting microorganism to modality.

We understand that not all facilities have access to tier one decontamination systems and recognize there is a need for additional alternatives. Tier two decontamination systems will have demonstrated the ability to inactivate moderately resistant organism, and we feel render the respirator state for a single user.

To further reduce the risk for tier two and tier three, we will recommend explicit labeling and precautions to prevent cross-contamination of the respirators. While tier three will not have demonstrated the same level of microbial inactivation, i.e. six logs versus three log reduction, we believe that when these systems are used in conjunction with existing CDC recommendations for reuse, it will be safe for a single user.

An example of the existing CDC recommendations for reuse would include placing respirators into a paper bag or other breathable bag for five days between users of the respirator, please refer to the CDC plus page for additional recommendations. Next slide, please.

Sponsors have submitted pre-emergency use authorization factors claiming the respirators can be decontaminated or bioburden reduced by many modalities.

These are the included vaporized hydrogen peroxide, moist and dry heat, low-temperature steam, ethylene oxide, vaporized peracetic acid, chlorine dioxide, UVC irradiation, supercritical carbon dioxide, bleach wipes and ozone. We have or are in the process of reviewing the data presented reports these claims.

For many of these modalities, the classical hierarchy of resistance of microorganisms applies. However, there are some modalities that these do not apply to. As noted in the guidance for these modalities, we recommend that sponsors contact FDA to discuss what organisms and testing to be conducted to demonstrate the device will meet one of the three tiers of decontamination or bioburden reduction.

Based on our review EUA and pre-EUA submissions for decontamination and bioburden reduction systems, we've observed some common pitfalls and have some recommendations. Please remember to include details on how the validation testing was conducted and differences in conditions between various sites or reported literature, if you are leveraging published data. We've particularly observed that issue or challenge in the VHP submissions.

For parasitic acid, ozone, chlorine dioxide, supercritical carbon dioxide, and any modality that is likely to have residuals, please include a risk assessment indicating how the residual are acceptable as well as the risk assessment demonstrating the person conducting the decontamination did not risk of exposure to the chemical sterilant.

For UVC irradiation, please demonstrate the shadowing and penetration into the internal fibers of the respirator do not pose a risk that the decontamination system will be unable to provide adequate microbial inactivation.

Please also remember to adequately demonstrate that the respirators are not damaged by the decontamination cycle. I will now turn it over to Dr. Clarence Murray to discuss evidence of potential effectiveness.

Dr. Clarence Murray III: Thank you Dr. Weeks for your description of the various types of specific methods for decontaminating and bioburden reduction of N95 respirators. Good afternoon. My name is Dr. Clarence Murray III and I would like to thank you all again for attending this webinar.

At this time, I would like to focus our attention on the second bullet point which is entitled Evidence of potential effectiveness. In this bullet, I would like to identify and briefly describe and discuss each of the critical pieces of evidence that is needed to determine the effectiveness of a method used to decontaminate or to reduce the bioburden.

In addition, I will discuss the evidence needed to demonstrate that the N95 respirator has been decontaminated. Now, I am going to walk you through the sections of the pre-EUA submission and highlight a few points to consider. In the section focus on the proposed intended use, in the discussion of the request, there should be a clear discussion of the specific modality and where the decontamination or bioburden reduction system will be used to decontaminate or reduce bioburden on the N95 respirators.

In your section described in the description of the technology. This section should describe the mode of action of the technology, in addition, describe any unique features of the technology and the chemistry and the physics of the decontamination or bioburden reduction system. Finally, this section should describe the most resistant organisms to the system.

In the section labeled description of the process control, including the critical

cycle parameter, this section should describe the baseline control of the process parameter and critical parameter which includes time, temperature, pressure, humidity, dose, and concentration.

In addictions, this section should also describe the process parameters and the critical parameters used to decontaminate or reduce the bioburden on N95 respirators.

In the section focused on validation of decontamination or bioburden reduction, (Tiered Approach) The guidance document entitled Recommendations for a sponsor requesting EUA for decontamination and bioburden reduction system, for surgical masks and respirator during the Coronavirus disease COVID-19 public health emergency provide guidance on microbiological testing for tier one, tier two and tier three approach.

Also, the validation evidence should provide a description of the N95 respirators' load and configuration in the system. And clarify whether the N95 respirator is being inoculated with the challenge organism or process challenge devices is being constructed with their biological indicator in N95 respirator.

Finally, this section should include validation evidence describing how the system's critical parameters will be monitored by the health care personnel.

In the section focus on material and respirator compatibility, this section should include either testing evidence or literature evidence that demonstrates the material used in the construction of the N95 respirator is compatible with a specific method.

In the section focused on process residues. This section should address whether the residues that are produced through the decontaminating or bioburden

reducing modalities are at safe level. Also the occupational resources from the process should be evaluated so that the risk of the process residues is assessed and toxicologically understood.

In the section focused on the number of decontamination slash bioburden cycles that specific N95 respirator can withstand and still demonstrate: this section should describe the filtration efficiency performance using 42 CFR Part 84 and or the NIOSH modified testing methodology.

For breathability, the section should be based on 42 CFR Part 84.180. For fit testing, you should look at OSHA's regulations 29 CFR 19.134. Appendix A. And also there should be an evaluation of the strap integrity for the claimed number of decontamination cycles.

The section focused on the chain of custody and safeguards to prevent inadvertent exposure. This section should clearly describe the methodology used to ensure that there is no cross-contamination in the decontaminating or the bioburden reduction system.

In addition, you should describe how cross-contamination with the N95 respirators are mitigated among the healthcare personnel, health care facilities, and decontamination facilities.

In the section that is focused on labeling, this section should focus on the information that need to be shared through fact sheet, instruction to healthcare personnel, instruction to healthcare facilities, and the decontamination facilities. For examples of labeling for authorized EUAs, you can review our website for EUAs that have been authorized.

We also want to remind you that the technical data, is just one part of the

evidence that is needed in the request. And now let's discuss the additional evidence that is needed in your pre-EUA.

The first additional evidence, is the regulatory status and history. The section describes the decontamination or bioburden reduction system regulatory history. This can include the system's history with the FDA and other foreign countries and the clear slash approved intended use.

We understand that some devices are being reconfigured and providing a 510(k) number will suffice this concern. And for novel systems, we recommend that you provide as much information as possible. The second additional evidence that I will mention is the unmet public health need question.

This section provides a discussion focused on the public health need of decontamination for the bioburden reduction system and the unmet need or needs the potential emergency you use authorizations would address. This discussion also should identify any approved alternative decontamination, or bioburden system and those systems availability and adequacy for the proposed use.

The next additional evidence I would like to discuss is the risk and benefit assessment. This section discusses the risks and benefits associated with the decontamination or bioburden system that includes a discussion of the risks and benefits of decontaminating or bioburden reduction of N95 respirators.

And finally, the last piece of evidence that I would like to discuss is the estimation of the number of decontamination or bioburden reduction system. The projection regarding the quantity of the decontamination or bioburden reduction system that will be available on hand and the surge capability of the manufacturing site to be provided.

In closing the evidence of potential effectiveness is a combination of addressing the unmet public health need question and understanding the landscape of the medical device shortage in combination with the validation data, microbiological data, control of the process and its critical parameters. respirator functions, understanding the risk of process residue, occupational exposure, the risks and benefits in the decontamination or bioburden reduction, potential of cross-contamination, labeling, chain of custody and safeguards to prevent inadvertent exposure and human factors to determine the effectiveness of the evidence in a pre-EUA request submission. Now I will turn the presentation to Dr. Weeks to talk about the common challenges and observations and recommendations.

Dr. Jon Weeks: Thank you, Dr. Murray. I would like to finish off the presentation with some challenges and recommendations to address these challenges. This information is the principal for all sponsors of the decontamination and bioburden reduction system. One common challenge is understanding the microbiology of your decontamination or bioburden reduction system.

Understanding the hierarchy of resistance and micro microbiology is important so the testing is performed using the correct organisms to the modality and here being demonstrated. To be used to establish the appropriate margin of safety for the cheer being demonstrated.

Another common challenge is the demonstration that testing is performed using worst-case conditions. Worst-case conditions can be thought of through multiple avenues, including worse case locations on the respirator, shorter or longer exposure times, higher or lower concentrations, soils used during the testing, and load configuration during the validation testing.

For this, we recommend sponsors provide a description or the protocol used for validation and demonstrate that you can decontaminate respirators. This should include information on how respirators are inoculated, soils used for suspension of the microorganisms, and a description of how the chamber was filled to create a worst-case validation of the microbial inactivation.

While we understand that visibly soiled respirators will be excluded from decontamination or bioburden reduction, by wearing a respirator they will be exposed to many soils, such as sebum, saliva, mucus, and possibly SPF lotions that will likely transfer to the respirator through use.

All of these items should be considered like conducting your validation testing, and when providing this information to the FDA for review. I would like to reiterate that we understand that the ability to get time in microbiology testing laboratories and supplies for testing are limited in the current situation.

To ensure that the testing will address our concerns, we recommend discussing with us before conducting your testing. We welcome interactions and are willing to review protocols to ensure that the protection will contain adequate conditions to address the microbial effects.

Validation testing is designed to test the limits of the decontamination cycle. The worst-case conditions used in the validation testing will be used to design the critical process parameters required for production conditions or the critical process parameters required to achieve the intended level of microbial inactivation.

If the validation testing is conducted in a small-scale chamber, we will need information on how the process has been scaled to a production size and how has determined that the critical process parameters are equivalent.

Monitoring of the cycle can be another challenge we have experienced when working with sponsors. Monitoring can be achieved through biological indicators, chemical indicators or integrators, temperature probes, relative humidity monitors, and UV dosimeters to name a few. We recommend that you provide a mechanism for the cycle to be monitored, and ideally recorded so that there is a clear indication for the person performing the decontamination cycle to know the cycle have been successfully conducted. Providing a clear description of the mechanisms in place to achieve this is also important for FDA to understand that the sponsor has a clear understanding of the process.

For sponsors that are leveraging data from other sources, we commonly experienced the sponsors will not provide a correlation between the critical process parameters used in the referenced information to the critical process parameters of their system. This is important whether the leverage data is used for demonstrating microbial inactivation or functionality of the respirators. We recommend that when leveraging data you should provide a comparison between the critical process parameters and a justification as to how these parameters will not affect what is being leveraged.

For example, if you are leveraging data regarding microbial activation, we recommend that you demonstrate your system will provide the same conditions described. Additionally, if you're leveraging data for filtration efficiency, or other aspects, demonstrating the correlation between the parameters in the study and the critical process parameters will be important to confirm the conditions are equivalent and will not cause additional damage to the respirator. This concludes our presentation and I will now turn the presentation back over to Dr. Binita Ashar.

Dr. Binita Ashar: Thank you, Dr. Weeks. Thank you, Capt. Claverie and Dr. Murray for your

excellent presentations. I want to emphasize that we are committed to helping our frontline health care personnel by ensuring that they have access to adequate supplies of safe respirators for use.

While we recommend that health care personnel use FDA approved, cleared, or authorized respirators when possible, there remains an important role for respirators that have undergone decontamination or bioburden reductions.

At this point, we have concluded the formal presentation portion of the webinar. I'd like to now open it up for a moderated question and answer session. We have several subject matter experts from across FDA, CDC, and OSHA. We're standing by to help address your questions. Operator may we have our first question, please.

Coordinator: Thank you. We would now like to open the lines for questions. If anyone does have a question. Please unmute your phone hit star one and record your name clearly when prompted.

Again, to ask a question for today's presentation. Please hit star one and record your name when prompted one moment to see if they have questions. And for those that raise their hand in WebEx, if you could hit star one so I could introduce you for questions. Our first question is from (Amanda Jones), your line is open.

(Amanda Jones): Hi I'm just wondering what the information based on for the tier system. You said that you had information, but I don't think it was clear on what the information is based on the tiered system.

Dr. Binita Ashar: Thank you, Miss Jones. Dr. Weeks or Dr. Murray, would you be able to address that question, please?

Dr. John Weeks: So this is the information that we base this on is the resistance of the - hierarchy of resistance of microorganisms to various modalities, and chemical steroids. So - I believe that with this presentation, we had the hierarchy of resistance of microorganisms, and based on that information we determine that. what's your one, this would be a demonstration that you've been activated the most resistant organisms to the modality, and that would provide the highest - the highest margin of testing that this would be safe for you.

And then for tier two and tier three, we wanted to demonstrate an intermediate level of resistance so that was looking at something that would be enabled to inactivate either non-enveloped viruses or vegetative bacteria and the various blog reductions, we felt would provide a significant level of reduction.

(Amanda Jones): So can I just ask one more question. So it's the basic theoretical assumption that there are no test data that supports real-world evidence, say in actual situations what the burden would be on the masks.

Dr. John Weeks: There is not - at this point that we are aware of a study that has determined to be actual bioburden on a respirator. But these have demonstrated a high degree of moderately or very resisting organisms. So we feel that this should be able to activate a high number of non-enveloped viruses, as well as for tier-one should help to inactivate other opportunistic pathogens that may be present.

(Amanda Jones): Thank you.

Coordinator: Thank you. Our next question is from (Darren Green). Your line is open.

(Darren Green): I've got a question (unintelligible) literature indicates that by some local alcohol fertilizers electrostatic charge found on non-local propylene fibers using in N95

which reduces the efficiency from around 95 to 70%.

(Unintelligible) Most of them are marked with sharpies to indicate both user ownership and the current cycles. We're curious about what your thoughts are on the impact of sharpies filtration effect on the N95. One of the major components within a sharpie looking at it (unintelligible). Seems to be (unintelligible) alcohol. Thank you.

Dr. Binita Ashar: Hello, thank you for that question. (Mr. Green). This is Binita Ashar I think our team has considered that issue It's a challenge. First of all, we want everyone to always use a new respirator first and so these decontaminated respirators are really when there is a shortage situation.

Then concerning the sharpies, there has to be some way to mark the number of rounds of decontamination. And so I think this team has discussed several options and so perhaps I'll turn it to Dr. Murray, to talk about some of the considerations that we have struggled with.

Dr. Clarence Murray III: So thank you, Dr. Ashar. I believe (Mr. Green) - Thank you for the question. I think what it is - an issue that we should think about when you think about the isopropyl alcohol issue is the amount. So the total volume that would be needed to adjust the filtration property.

And so in the use of a permanent marker, what we try to do is limit the interaction of the permanent marker or move to other places on the respirator to use as a way to monitor the number of decontamination cycles that a respirator could go through.

So your point is well taken, and that is going to cover the mitigation strategies that we try to use to make sure that we could want still to count of the number of

decontamination cycles to make sure that in the situation when someone has to use a decontaminated respirators, that there is a viable way to mark the number of times the respirator has been exposed to decontaminating or bioburden reduction or modality.

Dr. Binita Ashar: And this is Binita Ashar if I can add, you know, if you mark the respirator itself, you'll encounter the problems that you've mentioned, if you put a tag on a respirator you encounter the problem of the tags being damaged during the decontamination cycle leaving all the tags on the floor. If you put it on the strap you encounter problems with Sharpie interfering with the elastic nature of the strap.

So, it is a challenge and which we completely acknowledge and recognize, however, it is important to keep track of the number of decontamination cycles and the ability to get the respirator back to the original user if that what is intended. Thank you for the question.

Coordinator: Thank you next, we have (David Dark), your line is open.

(David Dark): Thank you very much I appreciate the opportunity you did not specifically mention heat as a modality in detail although you did mention generally at the beginning of the presentation either wet heat or dry heat has used effectively excluded in modality or what are the comments would you have to make additions as decontamination.

Dr. Binita Ashar: Perhaps. Captain Clarverie, would you be able to address this question.

Capt. Elizabeth Claverie-Williams: Hi, my apologies for asking could you please repeat the question?

(David Dark): Certainly, although heat as a decontamination modality was mentioned generally with the - being part of the presentation it was not specifically called out the way some of the other modalities were either wet heat or dry heat. Can you comment specifically on heat as a decontamination modality? Is it acceptable? There are no residuals. So, are there any specific concerns the FDA has about using heat as a decontamination modality?

Capt. Elizabeth Claverie-Williams: Thank you very much. That's a very good question. And let me start very general in very general terms and answer when I did my portion of the presentation, I only mentioned as you said, I mentioned vaporize hydroxide and steam among others.

We have authorized modalities as well as moist heat and vaporized hydrogen peroxide. We've authorized a combination of vaporized hydrogen peroxide and ozone. We are examining many modalities, including dry heat and we are not opposed to dry heat at all.

It's just that we're still in our review process as relates to dry heat. I'm going to ask my colleague, Dr. Murray, if he has anything in addition to add to what I've just said in response to the question and Thank you, sir, for the questions.

Dr. Clarence Murray III: Thank you Capt. Claverie, I think you summed it up, I think the point of the few pages wasn't to necessarily highlight or to put a spotlight on anything or to leave any modalities out. What we would say that everything is under - it has an opportunity to be under review If the pre-EUA or EUA were submitted to the agency.

(David Dark): Great. Thank you very much. Understand that thank you.

Coordinator: Thank you. Next, we have (Samir Bamberg) your line is open. Hi, this. Can you

unmute your phone?

(Samir Bamberg): Can you hear me now?

Coordinator: Yes, we can hear.

(Samir Bamberg): Okay. A two-part question. The first deal with the residuals in the respirators, given the expertise of CDRHs labs as your group considered putting in place a standard protocol for measuring the residuals over time in the respirators. That's part one.

And the second part. Here in Boston, there appears the hydrogen peroxide was interacting with the materials getting off. Now odors. Therefore, the residuals are affecting the re-users and how you are (unintelligible)?

Dr. Binita Ashar: Thank you for the question. Yes, residuals are an important consideration and a concern to us. To address the question of how we're looking at residuals and potential options moving forward. Dr. Weeks are you able to comment?

Dr. John Weeks: Yes, I can start, and then I'll also pass that over to Dr. Murray. So, we are concerned about residuals and we do think that the residuals should be tested and assessed. We have seen that this has been conducted through various methods.

This has been done through extraction as well as the use of monitors. And this point in time, I don't know that the agency is working towards developing a standardized method. Dr. Murray might be able to provide some more information about it.

Dr. Clarence Murray III: So thank you, Dr. Weeks So, to address the question of residual, we,

as an agency work very closely with the international standards organizations. And so in there we are, members, of the working group that deals with the ISO 10993-12 where we look at methodologies and sample preparation things like that.

And so, with that, we have many of our colleagues in the center that work on that and so, and then also in that you have many different sponsors who will be part of that and so, what we try to do is make sure people are using the latest and greatest techniques that are out there and ...

(Samir Bamberg): Could you be specific (unintelligible) the first 109993 are on biocompatibility. So could you be specific as to the protocols you're using?

Dr. Clarence Murray III: So here is what I would say we need the sponsors to tell us how they are performing their exhaustive extraction in some cases, or what types of systems one would use to evaluate the number of residues that would be coming off of modalities that will have process residue.

You know, the case of hydrogen peroxide is always interesting, because there's been a lot of discussion about the biocompatibility and cytotoxicity endpoint results.

And so like I said, before we made it to be the sponsors' responsibilities and make sure they have exhausted extraction so that they could mitigate in the process residues and then we asked them about exposure information they have over time. Let's talk about it.

Dr. Binita Ashar: And if I can add. This is Binita Ashar. These are significant concerns you are on your separate because of the risk of residuals being inhaled and being on having toxicity associated with that.

And so we were in partnership with our CDC, NAIC and OSHA colleagues when the question of residuals arises, and so as Dr. Murray was saying it is, you know, modality-specific. The testing provided is the testing that we're given and we're assessing that, but it is with a significant amount of scrutiny. I don't know if our OSHA colleague (Andy Levinson) has anything more to add?

(Andy Levinson): No, we don't. We review also on a case by case basis as the data comes in. You know, we of course have accepted FDA methods. OSHA is open to considering other methods that employers outside of healthcare settings and employers provide. But again, it is case by case, what's the objective data that the employer has provided?

(Samir Bamberg): Right. And then the subsection (unintelligible) carbon dioxide mentioned that was used during anthrax, h1n1 (unintelligible). It's been cleared both by the EPA and the FDA. But we have yet to see anything coming from your group with respect to the state of carbon dioxide.

Dr. Binita Ashar: Thank you for that observation. I think as Dr. Murray mentioned, we're open to evaluating all methods of decontamination and so we're not able to talk about the status of a particular application or the status of a particular modality even beyond the authorizations that have already been issued.

(Samir Bamberg): Thank you.

Coordinator: Thank you. And our last question comes from Dr. (Peter Crannis). Your line is open.

Dr. (Peter Crannis): Thank you for taking my call. So I'm in Maryland and (unintelligible) benefits from various decontamination systems. And I think FDA does support

some research by I think it was ARA in Florida a couple of years ago they looked at, I think hydrogen peroxide and also UVC radiation and sort of stress the idea about, you know, costs of the systems as well as whether or not there were points of service, whether they involve, you know, logistics risks and moving, you know, contaminated mass from outside of the units or their use.

And just as a general question now we're sort of faced in our hospital we're using a one size fits all masks. They're not - these are given to staff that was never properly set it or they're given, say, say regular masking, they'll say they've been fitted for a small mask.

And then they're not performing feel test. So my question is, would it logically I'm kind of thinking I'd rather have a fitted mask that I knew fit my face and go through tier two or tier three contamination system UDC or something else - whatever, than be given an unfitted, unfield-tested mask. Does that make sense?

Binita Ashar: Yes. I think it does. I mean we all struggle with what's better; using a new mask, using one that's been decontaminated or using one that's new but doesn't fit well. You know, I'm going to ask my NIOSH colleague, Jeff Peterson, to see if he has any initial thoughts, particularly around fit testing.

Jeff Peterson: This is Jeff Peterson. So, you know, the requirement for individual fit testing follows OSHA though, you know, I'll give my perspective and then point to Andy if he has anything. But, you know, certainly, I think to maintain the approval of a NIOSH approved device, one of the requirements is that are identified (unintelligible) limitations of use is the label indicates that they must be moved in accordance with, you know, the appropriate regulations and that certainly does point to the OSHA regulations.

So, you know, you can't assume that a respirator is going to be effective and do a proper selection unless you understand the hazards and understand the amount of reduction that's needed. And the only way going forward on an individual level, to insure that that level of protection is going to be maintained is by doing an individual fit test.

So the importance of the fit test is crucial no matter what (unintelligible) and what a decontaminated or a new device or whatever. So, you know, there are indications that one size fits all, one size fits most shouldn't be taken as a (unintelligible) about doing fit testing. So (Andy), do you have anything to add?

Andy Levinson: Yes, Jeff. Thanks. So I think Jeff is spot on. The fit testing is vitally important because without the fit testing you don't know whether or not it's going to fit you and you don't know if it will provide the expected level of protection.

We are aware there are some shortages and limitations in fit test supplies and OSHA and NIOSH have actually put out guidance on how to make your own fit test solutions, which is completely acceptable within the OSHA standards.

I think at a minimum there is certainly no reason why the users couldn't figure out or couldn't be trained how to do a user field check to figure out if they have at least have the grossest levels of leakage and the ones that are absolutely, you know, the worst failures.

Now in terms of the overall selection and decision process, what OSHA is going to do when we come into a workplace, is we're going to look at the whole process that the employer used and to what extent they tried to comply with the standard to the extent possible.

So before we even get into the decontamination and reuse of respirators, we

would be looking at number one, is the employer trying to comply with the standard by buying adequate amounts of filtering facepiece respirators if that's their preferred method? We have heard stories about employers who were not even trying to provide new respirators at each usage and are going immediately to decontamination. And we need to face cost of that as a significant concern.

I would say also there are respirators that are designed to be decontaminated and reused, so we would look at whether or not the employer has considered an elastomeric generic respirators or PAPRs, powered and purifying respirators.

And then I think after you've exhausted all of those other things, when you're falling back to a decision about where you're making - whether you're going for different tiers of decontamination, I think that becomes a judgment call based on the site-specific facts and what the employer has tried to do and what options they have available to them.

So it gets into a little bit more detail, but I think the important overall piece is employers must try to comply with the standard to the maximum extent that they can, before we would allow any decontamination reuse, extended use or crisis standards that are potentially allowable under the OSHA standards.

Binita Ashar: Great. Thank you so much, Andy. And before I turn it back over to Irene, as this now ends the question and answer session of this program, I really wanted to thank all of our subject matter experts for their participation and all of you for your excellent questions. And moreover, for all of the work that you're doing to address this COVID-19 public health emergency. Thank you. Irene?

Irene Aihie: Thank you. This is Irene Aihie. We appreciate your participation and thoughtful questions. Today's presentation and transcript will be made on the CDRH Learn Web page at www.FDA.gov/training/CDRHLearn by Wednesday, July 15th. If

you have additional questions about today's presentation, please use the contact information provided at the end of the slide presentation. As always, we appreciate your feedback.

Following the conclusion of today's webinar, please complete a short, 13-question survey about your FDA CDRH webinar experience. The survey can be found at www.FDA.gov/CDRHWebinar immediately following the conclusion of today's live webinar. Again, thank you for participating and this concludes today's webinar.

Coordinator: Thank you for participating in today's conference. You may now disconnect.

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