Q&A April 1, Webinar: N95 USE, Disinfection and REUSE

By: Michael Diamond

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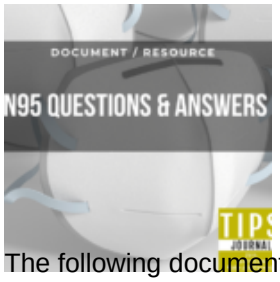

The following document represents some of the Questions and Answers from the TIPS Master Class Webinar held on April 1, 2020.

You can watch the full presentation here: N95 RESPIRATOR USE, DISINFECTION AND RE-USE: WHAT THE LITERATURE SAYS

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The following Q&A was answered by the TIPS Team

Please contact our team if you have further questions or suggestions: info@IC.tips

Questions

Would the manufacturer's instructions for use or the manufacturer's technical department contain information about length of time for re-use or extended use?

Start by checking the manufacturer's instructions for use to find information about length of time for re-use or extended use. If you don't find the information there contact the manufacturer's technical department.

Will the slide presentation or webinar be available later for review?

Yes, all Master Classes are archived on the TIPS website https://infectioncontrol.tips/ and on the TIPS Master Series website: https://masterseries.events/

Are there any commercial solutions for disinfecting N95 masks?

Please contact info@IC.tips for specific recommendations.

Can N95 and surgical masks be disinfected by spraying or soaking in water with a concentration of 0.05%

cholorine?

One report (Viscusi, Dennis J., et al. "Evaluation of five decontamination methods for filtering facepiece respirators." Annals of occupational hygiene 53.8 (2009): 815-827.) notes that a 30 minute soak in 0.6% hypochlorite solution followed by air drying did not significantly affect the N95 filtration performance, but did leave a bleach smell. The authors recommended against this method due to the risk of chemical irritation for the wearer. Use of lower concentrations like 0.05% did not come up in our review.

Does UV disinfection degrade the mask?

All studies suggest that the mask performance is not affected by UV at any levels that would be used for disinfection. Long term effects of UV disinfection are not yet available.

Any studies representing surround dosing of UV?

Some studies have looked at one direction for UV irradiation, and others have looked at irradiating both sides. Both approaches seem to be effective IF the dose is correct.

How should one calculate the strength of the UV light based on distance?

Calculating UV irradiance is not a simple task because of the 3-D nature of the situations. UV manufacturers may be able to provide rough estimates, but validation with a UV radiometer or other dose measurement method is recommended for any set-up.

What are filter layers composed of? Same material in layers?

Literature suggests that many/most filters are comprised of 2 or more layers of a polypropylene fiter material. Details about the composition are not published, as far as I've seen.

I saw one article on using Chlorine dioxide gas as being successful for disinfecting masks. Has anyone one tried sraying with solutions of Chlorine Dioxide or Peracetic Acid

I didn't see any literature on those two disinfectants with respect to N95s. Chlorine dioxide usually requires generation on-site and can be an air quality issue where it is used.

Who would be the person to make the decision of if the mask is clean and able to be recleaned?

This was answered live. I would follow the policy and procedure for your facility, but it makes sense that the wearer make the decision of if the mask is clean and able to be recleaned.

Are you aware of ionized hydrogen peroxide?

Yes, but there was no published literature on N95 applications.

Are there any companies/hospitals/facilities that will reprocess used N95s from other hospitals?

I am not aware of any companies/hospitals/facilities that will reprocess used N95s from other hospitals.

UV causes photooxidative degradation of polymer chain, creating free radicals thus changing the molecular weight. (I.E. oxidation of polymers this plague the Ortho implant industry with breakdown of heavy wieght high density polymers in the early 90's. This was just caused by room air. How is possible to that there isn't

damge to a polymer chain?

This is correct in a theoretical sense. One paper notes polypropylene fiber breakage, but this is after 168+ hours of irradiation (a dose in the order of 500,000 mJ/cm2), and whether a few fiber breaks affects filtration is uncertain. But this dose is also 500 times what a disinfection dose would be. One study with 200,000 mJ/cm2 dose on an N95 mask found no effect on filtration performance.

Are you aware of any issues surrounding vaporized H2O2 leaving a residue of H2O2 on the mask (that would then make it unfit to breathe)?

One report (Viscusi, Dennis J., et al. "Evaluation of five decontamination methods for filtering facepiece respirators." Annals of occupational hygiene 53.8 (2009): 815-827.) suggested that H2O2 residues were not of concern because they will decompose back to water.

Do medical technologist who working in Blood Bank need to wear N95 mask?

Medical technologist working in Blood Bank should follow their policy and procedures for processing infectious materials. N95 protect from aerosolized pathogens so if there is a chance of aerosolization of the specimen a N95 may be indicated but I would not think this is common.

How about sterrad vs UV?

Per the CDC: Viscusi et al. found that 9 FFR models (three particulate N95, three surgical N95 FFRs and three P100) exposed to one cycle of VHP treatment using the STERRAD 100S H2O2 Gas Plasma Sterilizer (Advanced Sterilization Products, Irvine, CA) had filter aerosol penetration and filter airflow resistance levels similar to untreated models; however, Bergman et al. found that three cycles of VHP treatment using the STERRAD 100S H2O2 Gas Plasma Sterilizer negatively affected filtration performance.

Do you do any type of culturing before and after doing any of these disinfection processes, in other words- how do you verify it worked?

Bacterial culturing before and after disinfection would be recommended for validation and QA/QC purposes, for any set-up.

After the mask was disinfected with the uv , were they sent to a lab to check for growth of the virus?

All published studies that addressed disinfection efficiency carried out culture assays.

Would there be an advantage to using multiple techniques simultaneously - either to reduce the amount of time required to disinfect, or to reduce the impact to the mask (Ex. UV + heat)?

A "multi-barrier approach" could be useful. One possible suggestion is to store masks for some time (to allow natural decay of virus activity), followed by a disinfection method.

Is steam an option?

Not at autoclave conditions, as it will destroy the filter efficacy. "Steam" at less than 75C (i.e. warm moist heat) has been successfully tested.

Can you steam sterilzation pre and post vav sterilizer 250 degrees delicate cycle 20 minutes with 10 minute dry time?

According to one paper, autoclaving ruined the filtration efficiency.

Does using UV lights at both of the sides of the room assuring the masks are getting coverage on both sides OK?

Yes, the intention in that design is to provide coverage on both sides, rather than relying on light penetration from one side. According to literature, both approaches can work if designed and operated properly.

I'm a physical therapist in an outpatient setting seeing one patient per hour for now for 3 days a week, how many uses of an N95 mask can I get before disposing it?

- Follow manufacturer's user instructions for maximum number of donnings, inspection procedures, and conducting seal check.
- Ideally limit number of re-uses to no more than five uses per device
- Hand hygiene before and after touching or adjusting respirator
- Wear clean gloves when donning used N95 respirator and performing user seal check
- Inspection of device for physical damage
- Are straps stretched so much they no longer provide enough tension for respirator to seal to face?
- Is nosepiece or other fit enhancements broken?

What differences are there between an n95 used for construction and one used in hospitals? Is a disinfected n95 better than a new industrial n95?

Recently, some N95 masks that are primarily intended for use in industrial settings, such as construction, were temporarily approved for medical use by the F.D.A.

Did you see anything in the literature about UV-C LEDs or was it all low-pressure mercury?

Nothing about UV-LEDs with respect to N95s. The LEDs are a relatively newer development, so not a lot has been done with them yet.

While they are considered the last resort, what materials are most effeective to use in making home made masks?

Vanderbilt University Medical Center in Nashville, have also suggested using tightly woven fabrics for do-it-yourself facial coverings. Kaiser Permanente has also published instructions on DIY masks, also calling for two layers of cotton fabrics. if the fabric allows for a substantial amount of light to shine through, it's probably going to allow tiny viral particles through, as well.

What are cleaning procedures for the mask?

Start by checking the manufacturer's instructions for use to find information about decontamination. If you don't find the information there contact the manufacturer's technical department . Be mindful of any chemicals used to deconatminate as you may be inhaling trace chemical left on the mask.

Would you please comment on UV boxes that are currently being advertised for UV disinfection of personal devices (cell phones, pads, tablets, etc.). Would these units be appropriate for N95 masks?

Technical details about UV wavelength, irradiance, and light distribution are not readily available so it's impossible to draw any conclusions. However, these are designed and marketed for hard surface disinfection, and N95 disinfection requires much higher doses to ensure adequate penetration into the filter depths. For this reason, I would have serious

concerns with relying on them without further testing and validation.

How long does the COVID virus live on N95 masks?

The problem is knowing how long it will take a virus to dry out and become noninfectious. Eventually, the virus deteriorates and becomes inactive. The speed at which that happens depends on whether the virus is in the air or on a surface. One facility suggests the virus dies in 3 days,so they wear mask for 1 day, place in a paper bag at end of day, and re-use mask again in 3 days. Paer rather than plastic bags are used to allow the mask to dry.

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