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A Laboratory Risk Assessment During the Coronavirus (COVID-19) Pandemic.
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Guest: Dr. Nichols is a professor of pathology, microbiology and immunology, and is the medical director of clinical chemistry and point-of-care testing at Vanderbilt University School of Medicine in Nashville, Tennessee.

Randye Kaye: Hello and welcome to this edition of JALM Talk, from *The Journal of Applied Laboratory Medicine*, a publication of the American Association for Clinical Chemistry. I'm your host, Randye Kaye.

The novel coronavirus known as SARS-CoV-2, the cause of COVID-19, has caused a global pandemic and has placed a great burden on healthcare. While many citizens are working from home, clinical laboratorians are essential healthcare workers who must continue their critical services to support patient care. As COVID-19 cases continue to climb, clinical laboratorians may wonder how at risk they are to virus exposure while at work.

An Opinion published in *The Journal of Applied Laboratory Medicine* summarizes key recommendations for working with clinical laboratory specimens amongst the COVID-19 pandemic. This article will appear in the September 2020 issue and is available online now. The first author of the article is Dr. James H. Nichols. Dr. Nichols is a professor of pathology, microbiology and immunology, and is the medical director of clinical chemistry and point-of-care testing at Vanderbilt University School of Medicine in Nashville, Tennessee. Dr. Nichols is our guest for this podcast. Welcome Dr. Nichols.

So first, these are daunting times for clinical laboratory staff who cannot work from home. How can lab staff minimize occupational exposure to the SARS-CoV-2 virus to protect themselves and their loved ones.

Jim Nichols: I think it's a concern for everybody who's working in the hospital situation. Now, nobody really wants to become infected with this virus. But I think that the best way that we can help protect ourselves, protect our families because we have to go to them after work, is to become knowledgeable about what we know about the virus. That information is changing on a daily basis. So, you know, keep abreast of the CDC information that's coming out and keep knowledgeable about what we know about the virus and how it's transmitted. What we do know is that it's transmitted like the flu. So, it's primarily respiratory

transmission, person-to-person just like the flu virus. We have to be concerned about residual virus on surfaces, cleaning surfaces, making sure that as we're in the laboratory working with patient samples, we use gloves, we protect ourselves with the standard BSL-2 type of protective equipment. That's typically a lab coat, covered shoes, gloves when we're handling specimens, and a face shield or glasses. We want to take a little bit of extra care in terms of cleaning surfaces more frequently, be more diligent about not touching bare skin, so not touching bare hands with gloves and watching what surfaces we touch. So, separating dirty phones, dirty computer keyboards that we may touch with gloved hands from those that are clean and we can touch with bare skin.

Randye Kaye:

Okay. Thank you. That's excellent advice for everybody but obviously, specifically for lab technicians who may be working directly with the virus. I know my husband is on a community response team and he taught me how to remove gloves. So, we had that advantage. Now, the CDC does recommend that clinical laboratories perform a site-specific and activity-specific risk assessment. What does that risk assessment entail and how should laboratories perform one?

Jim Nichols:

Sure. So, the definition with what they're talking about is looking for hazards in the laboratory which may pose a risk of exposure to the staff member and protecting staff who may come down with the virus from each other and transmitting it from one staff member to the next. So, site-specific really means looking at your hospital, your individual workflows, your operations. And specifically, if you are deploying the testing in different areas or you have the laboratory testing being conducted in different areas of the hospital, looking at site-specific, what is the workflow, following the specimen from collection of the patient all the way through how it gets to the laboratory, how it's handled and processed in the lab, analyzed by the instrumentation, and then what happens to that specimen afterwards and how it's disposed of.

So, looking at both site-specific as well as activities because certain activities, we know that this virus is transmitted by respiratory droplets and by aerosols. So, we want to minimize procedures which generate aerosols in the laboratory.

This would be vortexing tubes without a cap on them, uncapping tubes can cause splatter of fluids, centrifugation. So, putting a cap on the rotor holders because if a tube breaks during centrifugation, it can generate aerosols within that centrifuge that when you then open the centrifuge, that staff member would be exposed to them. So, just following that specimen through the laboratory and trying to minimize

the procedures and contact with the sample and procedures that actually generate aerosols. So, adding additional barriers such plexiglass that may not normally be used in the laboratory, but taking a little bit more due diligence that when we uncap samples, we uncap them behind a plexiglass barrier to prevent splatter onto our clothing or onto the gloves and to minimize aerosols.

And if we're going to be doing procedures that generate aerosols, we do those in a biosafety cabinet. Particularly, with some of the more higher risk samples, from patients that we know have tested positive.

Randye Kaye: Okay. That all makes a great deal of sense and while all human specimens should be treated with precautions obviously, are there specific sample types or procedures that could place the lab staff at an increased risk?

Jim Nichols: Yes. Obviously, with this particular virus, respiratory samples. So, swabs from the nasal cavity or from the throat region, these are going to be the highest risk samples because they're going to take the swab or nasopharyngeal swabs, place them in viral transport media and now you have virus within a media, a liquid, that when it arrives in the laboratory, as you uncap that sample, that's going to be higher risk than a serum or plasma sample or even urine and other body fluids which although there may be virus in there, it's not nearly at concentration that it is in the respiratory fluids.

So, I think we need to take extra precautions when we're handling respiratory specimens particularly for this SARS-CoV-2 virus which causes the disease COVID-19. So, if we know or we suspect patients and we're sending respiratory specimens for testing, we don't want use a pneumatic tube system, because pneumatic tubes, like our bank teller tubes, actually transport specimens in a tube and has high pressure air to send that carrier to the laboratory. If you have leakage of the sample during transport, it's not only going to leak in that carrier, possibly outside the carrier, but the high pressure air goes somewhere when it's released and that tube arrives, so the staff member who opens the tube is going to basically be exposed to aerosols.

The air that pushed that tube in to the laboratory is going to be dissipating aerosols. So, these are higher risks and I think those types of site-specific and activity-specific risk assessments should be made. And maybe for this virus, think about your institution and maybe hand-carrying those higher risk samples. As we deal with plasma, serum, standard urine samples in the laboratory, blood samples, these tend to be lower risk and our standard precautions of

gloves, a gown, a face shield or an eye gear, that protective equipment seems sufficient to protect us.

Randye Kaye: Okay. Thank you, wow, so many things in the laboratory. Now, outside of the laboratory, is point-of-care testing particularly hazardous during this pandemic?

Jim Nichols: Yes. Point-of-care testing is laboratory testing conducted outside of the central laboratory. And we now have tests that can be conducted on devices closer to the patient. So, in satellite laboratories, maybe in these tents where they have drive-through settings and they're collecting specimens for testing, these types of settings outside of the central laboratory are a particular risk because they're using the respiratory samples that have higher risk than the blood samples and they're testing them on site. So, we don't tend to have biological safety cabinets in those locations. So, we have to provide and think about a risk assessment, think about how we're handling that specimen, the gloves that are coming into contact with it, how they uncap that specimen, where they make it splash. So, let's add more barriers between the specimen and the staff member who's conducting the testing, such as face shields, additional plexiglass barriers, and conducting the testing away from patient beds, in an area that's known to be contaminated or potentially contaminated, and holding that specimens and laboratory testing to a confined region of these tents or areas that may be outside the lab.

Randye Kaye: Okay, excellent, excellent advice. Now, let's talk about the laboratory directors and the managers, what recommendations do you have for them to best protect their staff on the job, besides what you've already mentioned?

Jim Nichols: Sure. I think the best way we can protect our employees and protect ourselves is to basically keep informed. Go to the CDC website, keep in contact with your local government, your departments of public health in your state, keep up-to-date with that information that's coming out and make sure that you communicate that information, and the latest that we know about the transmission and how to protect ourselves to our lab staff, so that they can protect themselves as well.

Randye Kaye: Wonderful, well, thank you so much for this important and timely interview and stay safe and healthy and sane.

Jim Nichols: You as well, and thank you.

Randye Kaye: That was Dr. James Nichols from Vanderbilt University School of Medicine, describing his JALM article "A Laboratory Risk Assessment During the Coronavirus (COVID-19) Pandemic. Thanks for tuning in to this episode of JALM

Talk. See you next time, and don't forget to submit something for us to talk about.