2024 NATIONAL HEALTHY SCHOOLS DAY CONFERENCE REPORT
APRIL 10, 2024

Air Just Air

CLEAN AIR IN SCHOOLS

HEALTHY SCHOOLS NETWORK

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Preface

By Susan Goekler, PhD, Healthy Schools Network Board President and Claire Barnett, MBA, Executive Director

This year's National Healthy Schools Day—the 22nd!—continues a tradition that began with a tiny event in 2002 and became an annual national event with over 60 partnering NGOs and agencies. This year, its featured event, the AIR JUST AIR national conference, illuminated two key elements of managing the indoor health of schools, consistent with our call for schools to have written infection prevention and control policies: cleaner indoor air and cleaning and disinfecting with safer and less polluting products.

The critical importance of indoor air quality was elevated during the COVID pandemic and continues today. The lack of funding from any level to address indoor air quality in schools became apparent when the airborne virus closed schools nationwide and resulted in deaths and too many missed school days. As attention turned to schools' indoor air quality, additional concerns quickly arose about the effects of polluted indoor air on children and on school personnel.

Early in the pandemic, Healthy Schools Network co-developed a policy call for all schools to have written infection prevention and control plans focused on clean indoor air, clean water, and clean facilities, parallel to existing "all-hazard" emergency management plans in schools. Such policies could reduce the spread of colds, reduce the frequency of asthma events in schools, and help facilities stay open longer or reopen safely sooner after disasters like hurricanes, tornadoes, extreme heat events, and wildfires.

At this year's conference presenters from the BlueGreen Alliance and US EPA provided valuable information about the unprecedented level of federal funds currently available to help schools improve facilities. Keynoter Lynn Goldman, MD, dean of the George Washington University's school of public health, described how schools can jeopardize occupant health and stressed the need for federal and state funding to address the health of facilities. Panelists considered the use of sensing devices to measure indoor air in schools and setting indoor air standards for schools, and the source reduction of indoor pollutants through using safer cleaning and disinfecting products.

Participants also commented that employing all the energy retrofit measures available to schools is insufficient if schools do not design, maintain, and operate their facilities to be resilient in the face of emerging infectious agents and to extreme weather events. The result of inaction will be more school closures with renewed damage to students' physical health, mental health, and learning, and to working families.

We are profoundly grateful to our sponsors: the American Federation of Teachers, the National Education Association, the George Washington University's Milken Institute School of Public Health's Climate and Health Initiative, Project Green Tree, and the Learning Disabilities Association of America and its Healthy Children Project, as well as HealthyIndoors e-magazine for live-streaming the event. We also welcome our 317 registrants from 18 nations, 39 states, and seven Tribal Nations, of whom 106 were involved with schools (superintendents, parents, personnel), plus representatives of 89 public agencies, 98 NGOs, and 24 for-profits.

Healthy Schools Network looks forward to continuing our series of webinars and conferences on how to better ensure children's physical health, mental health, and safety in times of extreme weather events. Let's work together to ensure that every child and school occupant has an environmentally safe and healthy school to protect their health and to support their academic achievement.

OPENING REMARKS

Federal Funding for Schools

David Boundy

David Boundy has led numerous campaigns for working families, a cleaner environment, and safer communities. In 2022, Boundy signed on to help AFT be a force for climate solutions, and environmental justice. *See Appendix I for full bio.*

We have an imperative: transform schools to be healthier and cleaner for our kids.

Unprecedented heat in the changing climate poses a triple-threat crisis for children. It affects their physical and mental health and impacts learning. Boundy is concerned that the administration of President Joe Biden is focused simply on getting off fossil fuels, when it should also be addressing the heat impacts of climate change now. As we head into spring and summer, schools across the country will be shutting down due to high classroom temperatures. Those temperatures could hit 90 degrees, even reaching into the 100s, as happened in some classrooms last year. In Philadelphia, for instance, there were over 90 heat-related school closures in June and September. This affects children's physical and mental health and contributes to learning losses. And it proportionally impacts low-income students and students in schools in disadvantaged communities.

After personnel costs, addressing heat-related climate impacts could be the second-highest expense for school districts. Buildings are one of the leading sources of greenhouse emissions and one of the largest, if not the largest, consumers of energy in the public sector. Remarkably, there are real resources to deal with some of these problems at scale in the President's Inflation Reduction Act. There's plenty of money to act on the problem, Boundy says. We just need to figure out how all the pieces work together.

> We have an imperative: transform schools to be healthier and cleaner for our kids.

Harley Stokes, MA

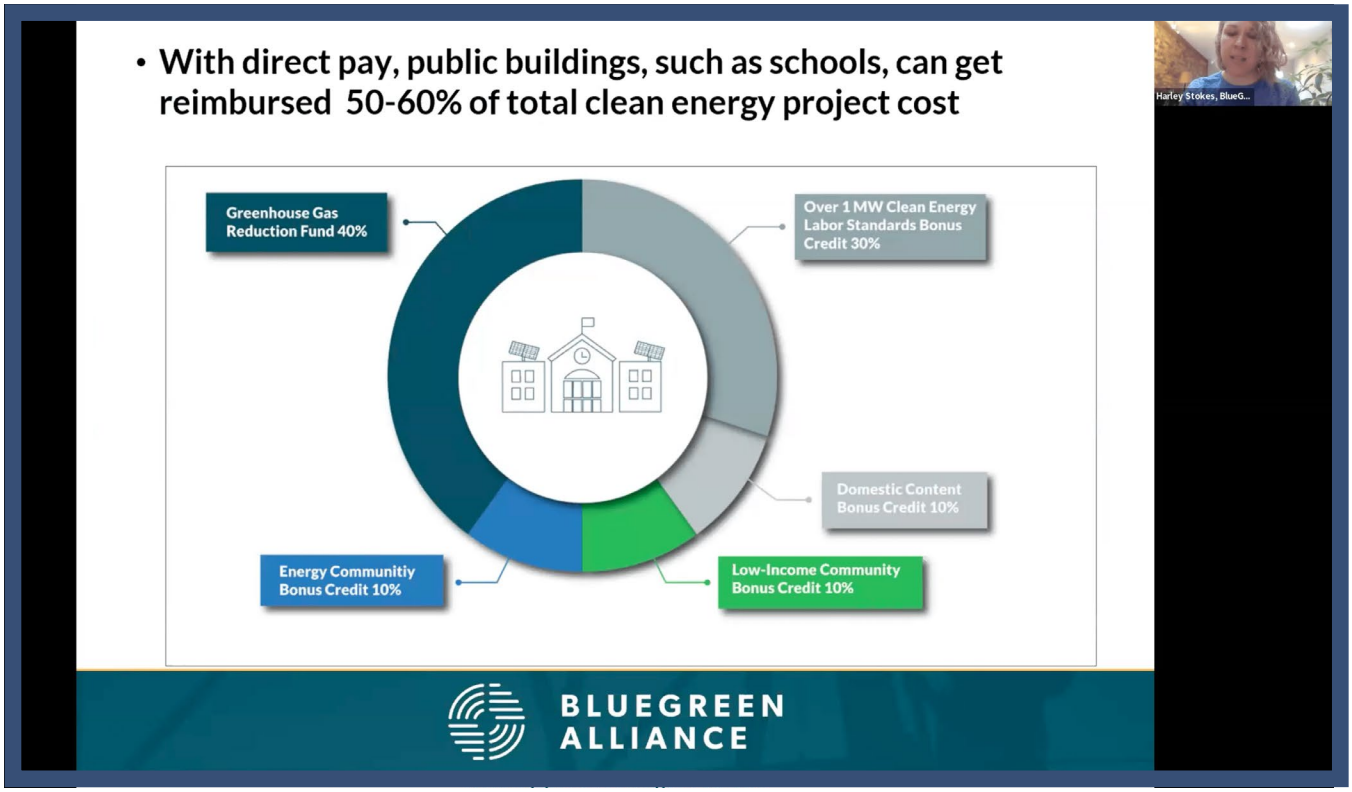
As Senior Policy Advisor, Harley Stokes leads policy development, advocacy, and network engagement for green buildings, health initiatives, and equity at the BlueGreen Alliance. She previously worked on global food security and climate change and led the Livable Streets Coalition. She has an undergraduate degree from Vassar College and a Masters from George Washington University. *See Appendix I for full bio.*

You don't have to choose between a good job and a clean environment. You can, and must, have both.

The BlueGreen Alliance maintains a comprehensive list of funding sources—federal and technical—that could provide assistance to schools and related institutions. These include federal funding resources such as ESSER, ARPA, Department of Energy Renew America's Schools Prize, and clean energy tax credits. Technical assistance information such as EPA Community Change Grants and the Efficient and Healthy Schools Program are also identified.

You don't have to choose between a good job and a clean environment. You can, and must, have both.

For more on federal funding available for school energy efficiency and clean energy upgrades check out BGA's school fact sheets included in Appendix II.



PANEL ONE

Indoor Air Metrics: What Gets Measured Gets Done, But Does it Help?

A note on format: We are presenting our speakers' contributions in different ways—summaries, condensed transcripts, slides, and more—to reflect their individual approaches to core issues.

Richard Corsi, PhD, PE

Richard Corsi is Dean of the College of Engineering at the University of California, Davis. Corsi and his team have researched indoor source dynamics in indoor homogeneous and heterogeneous chemistry, as well as innovative and accessible control technologies for reducing exposure to indoor air pollutants. At the University of Texas at Austin, he was an endowed research chair and a member of the Academy of Distinguished Teachers; he also served as director of the NSF and GERP program on indoor environmental sciences and engineering. *See Appendix I for full bio.*

With respect to removing sources, there's a famous quote by Max von Pettenkofer: If there's a pile of manure in a space, do not try to remove the odor by ventilation. Remove the pile of manure.

The goal is to improve the health of those in schools by reducing the inhalation dose of any air pollutants that exist in the classrooms and other buildings. The focus is on particulate matter, but this applies to gas pollutants as well.

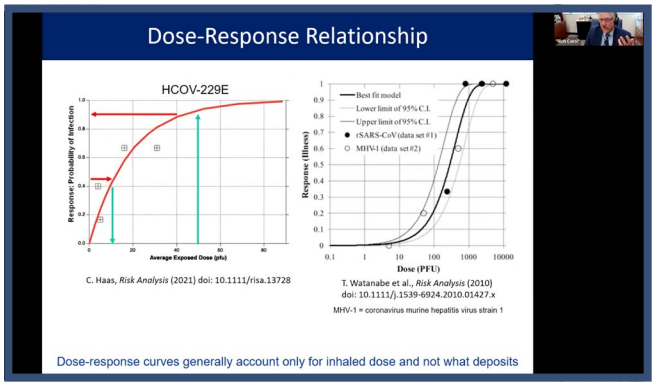
Dose is the product of four terms multiplied by one another. The first term is the amount of stuff per liter of air in a classroom or other school location. That is multiplied by the respiratory minute volume, which is the amount of air that we breathe in per minute. For a resting adult, that's about 6 liters per minute. The amount of stuff per volume of air multiplied by the respiratory minute volume then gets multiplied by the amount of time students, teachers, or staff are in polluted environments. Finally, the product of the first three terms is multiplied by the fraction of pollutants that are actually deposited in our respiratory system. The one thing that can be controlled in the air is the amount of pollutant per liter. And that's a function of how much is being emitted in the classroom, or brought into the building

> "If there's a pile of manure in a space, do not try to remove the odor by ventilation. Remove the pile of manure."
>
> — MAX VON PETTENKOFER

from outdoors, from sources such as wildfires, as well as the mechanisms that remove the pollutant from indoor air, e.g., filtration.

Ventilation is important, but it should be reduced during wildfire seasons or if there are significant industrial or transportation sources near a school. Increased ventilation is beneficial when dealing with sources inside the classroom like influenza or COVID. The type, nature, and effectiveness of filtration are important, as is personal protective equipment. Masks and respirators can be effective at reducing the inhalation dose of indoor particulate matter, especially in wildfire season or in COVID outbreaks.

Once we have the dose, we can link the dose to what's called a dose-response relationship, as shown in the illustration of a common cold and a coronavirus.



The horizontal axis is the average exposed dose in this case as the inhaled number of viable viruses. Once we know how much we've inhaled, we can predict what the probability of illness is for individuals in the classroom. This one happens to be for a common cold virus. Just a couple of other coronaviruses here have dose-response curves with a slightly different shape. The point is that the greater the dose, the greater the probability of infection; the same is true of other air pollutants: dose makes a difference.

The 3 Rs for assuring healthy indoor air quality: remove sources, reduce sources, and remediate indoor air. As a nation, we've failed at the first two.

The first thing to do when dealing with indoor air quality problems is to identify the sources and, if possible, remove the sources. Stay home when you are ill. The only way we can reduce sources of infectious agencies is if everybody masks. That's the only chance that somebody who's infected is also masked. And an infector who is properly masked dramatically reduces their emissions of infectious agents. And I would submit that as a nation we've absolutely failed at those two things.

The 3 Rs for assuring healthy indoor air quality: remove sources, reduce sources, and remediate indoor air. As a nation, we've failed at the first two.

And so we're left with remediating indoor air. And the way we remediate our air is to try to reduce that concentration in the inhalation dose equation. For an individual, that means masking. Reduce the amount of pollutants in your breathing zone—that is, wear a mask. Ventilate if the source is an indoor source. Effectively filter for infectious agents. Use upper-room UV, which can also be incredibly effective.

Focus on portable air cleaners. Portable HEPA filtered air cleaners are high-efficiency, particulate air cleaners. They're proven and readily available technology. They can be a great ventilation supplement, especially when we have significant outdoor sources that preclude ventilation, like during wildfire season or in schools near major industries or busy freeways, transportation-related air pollutants, traps, or even allergen season.

The key parameter for any portable air cleaner is a Clean Air Delivery Rate (CADR), that is, the multiplication of fraction of particles that are removed when they move through a filter and the air flow rate through the air cleaner.

Imagine there are 100 particles moving through a filter and 70 of the 100 particles are removed. The single-pass removal fraction in that case is 0.7 (or 70%). We want to multiply that by the volume of air that the air cleaner moves and that's usually in CFM, cubic feet per minute. For example, if the single pass removal fraction is 0.7 and the volume of air that passes through the air cleaner is 1,000 CFM, then the CADR will equal 700 CFM.

Since we failed at removing sources and reducing sources, the only other way we can reduce sources of infectious agents is if everybody masks. We are betting that somebody who is infected is also masked. An infector who is properly masked dramatically reduces their emissions of infectious agents. And betting that someone who is not infected is also masked so what they inhale is filtered through their own mask.

Mansel Nelson, MS

Mansel Nelson is with the Institute for Tribal Environmental Professionals, whose mission is to educate, conduct research, do partnerships, and provide technical assistance for tribes. The Institute was founded a little over 30 years ago by Virgil Masayesva, who was inspired by his Hopi elders, and now serves 574 federally recognized tribes. The Institute started with a cooperative agreement with the Environmental Protection Agency. *See Appendix I for full bio.*

With advances in consciousness and current policy, more organizations are working with or in disadvantaged communities. Those working with or aspiring to work with tribes might be interested in some thoughtful feedback. Understand and remember that tribes are sovereign governments. Relationships are very important.

> We sometimes get focused on all the electronic stuff and we forget about the fact that humans are also great sensors.

Don't neglect human sensors. **I've been watching the development of sensors over the last 26 years. I still feel that our human senses are vital and important for looking at school buildings close up. . . . Our nose is very sensitive, but our sense of smell attenuates quickly. So we need to pay attention to our initial observations. They may lead to further investigations. Of course, in addition to the nose and our eyesight, we also need to listen to people.**

Working in a building conducting an assessment, in many cases, teachers feel like they are being listened to for the first time. They may not always know what they are feeling, observing, and smelling. But they have a lot of information to share because they are the ones that are in that building all the time.

Of course, budget is always going to be a consideration. So we want to think about that, but I try to maximize the use of the funds that I have available to get the devices that I think will

best serve my purpose. I use a wide range of devices, including what I now call research grade to distinguish from low-cost devices. The research grade ones I will not put in the hands of students. The low-cost ones, I often do.

Carbon dioxide measurements can help us assess and track how much ventilation is taking place, in effect seeing that unseen factor that can be so mysterious at times. As I go into classrooms and schools, I've often seen their HEPA filters or their [Corsi boxes] turned off. Many times they tell me it's too noisy or they just turn them off because they think it's using too much electricity. So that gives me an opportunity to take a measurement. And then turn it on and demonstrate to them how these filters are benefiting their classroom.

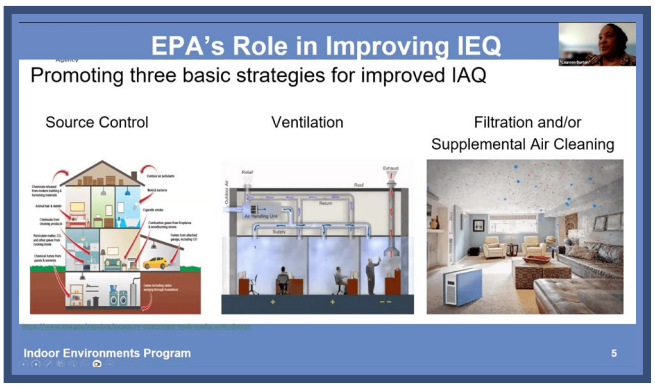
Laureen Burton, MPH

Laureen Burton has been a scientist in the U.S. Environmental Protection Agency's (EPA) Indoor Environments Division (IED) for over 25 years, with primary areas of interest including pollutant and source control, IAQ impacts of products, combustion and combustion by-products, health effects, low-level chemical exposures and mixtures, IAQ in large commercial buildings, citizen/participatory research, and technical communications. She is the technical liaison to several of IED's programs including EJ and Tribal programs and the co-lead of the Division's Indoor Metrics, Indices and ORIA's Diversity Equity Inclusion and Accessibility (DEIA) Advisory Council. She has a Masters of Public Health from the University of Michigan's School of Public Health and a Bachelor of Science from Virginia State University. *See Appendix I for full bio.*

Our mission is protecting the public's health from indoor environmental concerns where they live, learn, work and play. The authority that we've been given is to help coordinate IT research and activities and provide and disseminate guidance to help with indoor air quality issues. We tie our work to the principle of trying to reduce effluent exposures.

First, just touching again on how complex indoor air quality is, there are many factors that come into play that will determine what your indoor air quality is and what you're dealing with. Fixing one thing doesn't necessarily mean you fix everything that could be impacting your indoor air. And that's one of the things I want to caution.

Often people say that they are putting in a low-cost monitor and they're monitoring indoor air quality. What they are monitoring are the pollutants that the monitor is designed to collect or to measure. There could be many other issues and sometimes you can measure something and you think, okay, I just need to fix that. But there are other factors you may have to fix as well.



We promote the three basic strategies of improving indoor air quality, source control being the one that is most effective. If we can remove or reduce the sources, that is the primary focus.

Another aspect of it is ventilation—using ventilation to help reduce the exposures that you have. And then supplementing with filtration and supplemental air cleaners.

Because there are no national standards to measure against, we haven't really talked about using measurement as a tool. We've gone more into the concept of describing tools that can help, that complement the traditional best practices, not replace the traditional best practices, but complement them and help people understand when it's time to take certain actions.

We have several programs in our office that do this work. One of them is our schools program. I invite you to go to www.EPA.Gov/Schools to learn more and to get involved in using our school buildings and grounds guidance documents and checklists.

We promote the three basic strategies of improving indoor air quality, source control being the one that is most effective. If we can remove or reduce the sources, that is the primary focus.

KEYNOTE ADDRESS

The Importance of a Healthy Schools Effort

Lynn R. Goldman MD, MS, MPH

Lynn Goldman, a pediatrician and epidemiologist, is the Michael and Laurie Milken Dean and professor of environmental and occupational health at the George Washington University. Before she was in academia, she was the Assistant Administrator for Toxic Substances at the US Environmental Protection Agency, where she directed the Office of Chemical Safety and Pollution Prevention, and the chief of the Division of Environmental and Occupational Disease Control at the California Department of Public Health. She is a member of the National Academy of Medicine and has received numerous awards for her work. *See Appendix I for full bio.*

If you think about it, the reason why there needs to be an organized effort around healthy schools is that our schools are actually not healthy. That is true for a number of reasons. And I think it's important to understand how we got where we are today.

The reason why there needs to be an organized effort around healthy schools is that our schools are actually not healthy.

Children are vulnerable—not only because, compared to adults, they breathe more air but also because they are continuing to grow and develop. During their school times, children are learning, and that learning is building on what they learned the day before, and the day before, and the day before that. And so, if children are not in an optimal environment for learning, that is going to have an impact over a lifetime. They are going to miss things.

The other issue in school environments is density. The more people who are in an indoor environment, the more demand there is for clean air in that space.

And, unfortunately, over time—there is a historical problem that's very serious—in how schools were cited or located.

My first epidemiology study took place when I was a resident in pediatrics. It was an environmental health study of the children living in Niagara Falls, New York, who were going to a school that was located right on top of an industrial waste disposal site called Love Canal.

Although that's an extreme situation—it is unusual for a school to be on a toxic waste site, because of the way that schools are financed, communities have often sited schools on land that was free or nearly free. I think that land had been sold to the school district for only a dollar. Frankly, that wasn't a bargain.

Finances have too often trumped issues such as health and safety for kids. So, we see schools next to industrial sites and in heavy traffic areas that are heavily polluted. And redlining exacerbated that problem in that communities that are poorer had schools sited in even more polluted areas.

Finances have too often trumped issues such as health and safety for kids.

There is also the issue of how the schools were constructed. When I was a child, I was fortunate to be in one of those old-fashioned Victorian school buildings that had windows that opened and closed, built at a time before there even were HVAC systems. But we had fresh air.

Unfortunately, for a long time, there was a tendency to construct very tight school buildings that contained and retained the pollutants. The building materials often included very toxic substances: lead in the paint, lead in the drinking water fountains, PCBs in window caulking, and asbestos insulation. Some of these have been dealt with by law, and others are yet to be cleaned up.

There's been a lot of criticism of the Asbestos in Schools Act (known as AHERA), because asbestos removal is costly. However, much was accomplished to get the asbestos out of children's schools. You don't want kids starting out life with a risk for lung cancer. However, other schools still have persistent contaminants like PCBs and lead. We're still working on getting them out of the schools.

There is also the issue of what we've allowed to be done in the schools and how many have been maintained. In the past, as an epidemiologist, I learned of many cases where the application of organophosphates and other pesticides used in schools had exposed children. There are residues of pesticides in many schools. Many of the cleaning products used have not been safe. Even some of the arts and crafts products that have been used in schools are not safe and can contaminate the air that children breathe. Certainly, other contaminants might be present in a shop classroom, in a cosmetology classroom, or in the chemistry lab where proper safety precautions are not in place. Pollutants can enter school buildings by design. One environmental health investigation I was involved in early in my career found that children were exposed to carbon monoxide and diesel exhaust from the very heating system that was heating that building with dirty fuel and an air intake that was too close to the exhaust system.

I investigated one problem where there was mercury in the chemistry lab that was not kept under lock and key and contaminated the entire school building.

COVID-19 finally brought home the fact that school buildings have not been constructed with state-of-the-art air filters and HVAC systems. It was the first time in my life that school nurses and school administrators were calling me about their concerns about air filtration.

It comes down to, and I'm going to put it starkly, two things:

One is that there's been an injustice; we have been unfair to the next generation when we have not given them the best start in life by adequately investing in healthy school environments.

Second is that we have unjustly structured communities with historical racial and economic discrimination where the schools are even worse. And so this issue invokes both a racial and economic injustice and intergenerational injustice. We can do better, and the path forward largely needs to engage law and policy.

Until a couple of decades ago, none of the laws, none of the policies made sure that children were protected. Moreover, the Clean Air Act still doesn't do anything to directly address exposures indoors. It needs to be amended to include indoor air.

I am, nonetheless, hopeful. We are seeing engagement by communities across the country in making schools safer. Concerns around climate change and air pollution are incentivizing communities to switch from polluting diesel school buses to alternative fuels electric vehicles that do not expose children to air pollution. Around the country, many school districts are saving money by taking advantage of programs to help schools install solar energy. Schools have been adopting safer methods of pest control and cleaning. And many have been upgrading their HVAC systems. In short, communities are coming together to make schools healthier.

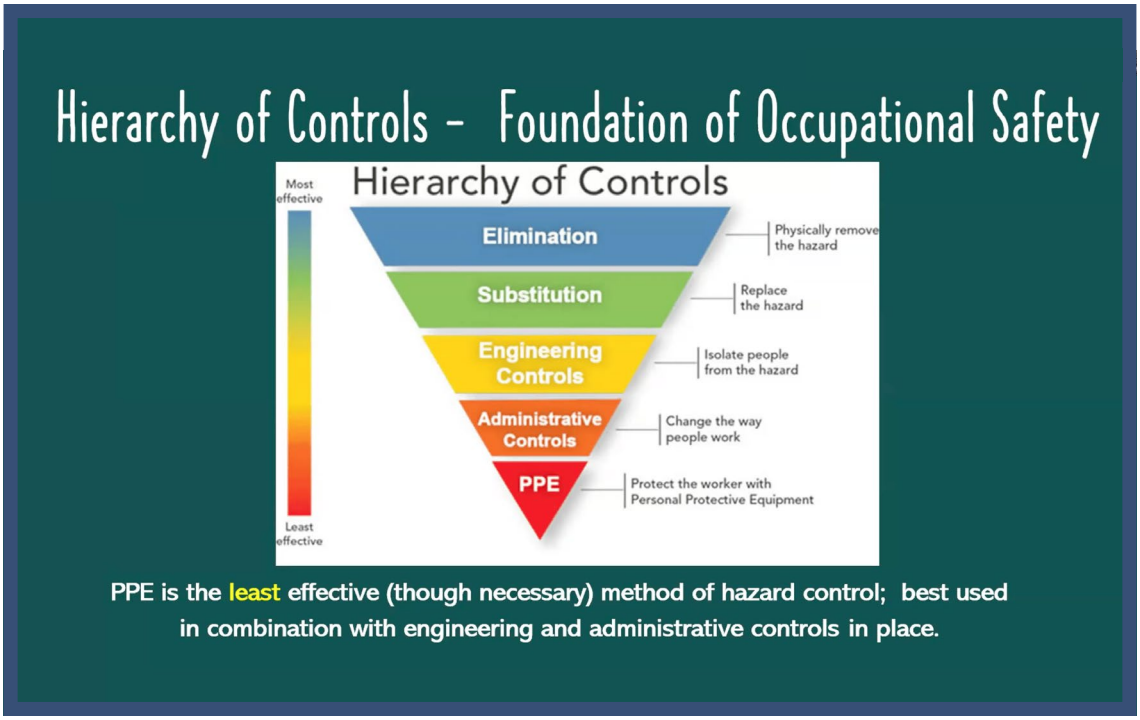
PANEL TWO

Cleaning & Disinfecting: Lessons From COVID

A note on format: We are presenting our speakers' contributions in different ways—summaries, condensed transcripts, slides, and more—to reflect their individual approaches to core issues.

Ellie Barbarash, MS, CPEA

Ellie Barbarash serves as Senior Health and Safety Advocate for AFSCME, a union of 1.4 million public and private sector members, including K-12 and higher education. Her safety portfolio includes regulatory safety policy analysis and compliance, risk management program auditing, industrial hygiene, and safety curricula development and instruction. She has a Master of Science degree in occupational and environmental safety and is board certified as CPEA, a professional environmental auditor of risk management programs. *See Appendix I for full bio.*



Barbarash began, I want to talk about applying basic occupational safety principles to control IAQ and workplace exposures and focus on the hierarchy of controls before looking at airborne contaminants themselves. This means we examine not just replacing hazardous cleaning agents with safer ones, but also explore strengthening engineering controls like building ventilation and filtration and strengthening school administrative controls like better product procurement, staff education, reliable and effective cleaning schedules, and adequate staffing levels.

> An injustice to workers in education translates to an injustice to students.

Applying occupational safety science to school IAQ requires an effective analysis of where the IAQ problem is coming from. That activity is (and should be) the responsibility of the employer and/or building owner. Educated and empowered workers can help identify exposure problems causing poor indoor air quality, such as faulty equipment, mold, dust, water infiltration, etc. However, identifying and responding to hazards and providing a safer workplace is the legal responsibility of the district and educational authorities. This responsibility exists for employers around the nation and includes education.

Education employers need to determine the source of hazards plaguing employees, as well as their students. Is everyone getting sick at the same time? Is there asbestos exposure in old, damaged school buildings? Lead paint? Mold? Insects? MRSA (Methicillin-resistent Staphylococcus Aureus) in a locker room or hepatitis A in the water? Whatever it is, it's the employer's responsibility to listen to their workers, assess the problem, and develop and implement a plan to protect building occupants from exposures, including addressing what creates IAQ issues. There needs to be a formal written plan with assigned responsibility, and it must include training staff on hazards and safest work procedures. And there needs to be enough staff and resources available to deal with problems identified.

> You have to include workers in safety decisions; only in that way will you ensure safer indoor air quality at schools.

The Occupational Safety and Health Administration (OSHA) gives workers and management a model of how to deal with hazards. OSHA requires that management establish safe working procedures. Not everyone is covered by OSHA but that does not shift this responsibility. This requires that employers understand and implement a hierarchy of controls.

But I really want to stress that you need worker involvement and feedback to succeed. Workers apply chemical cleaning agents, maintain the HVAC system, change the filters, do the cleanup. They're the ones creating the environment that children and teachers are functioning in. If you don't include workers to identify ongoing safety issues, and train and empower them to apply best safety practices in maintaining the environment that education happens inside of, you will not succeed.

Richard Shaughnessy, PhD

Richard J. Shaughnessy, Ph.D., has served as Director of the University of Tulsa's Indoor Air Program (TU IAP) in the Chemical Engineering Department since 1987. His studies have focused on particulate research, air cleaner evaluation, indoor chemistry, school studies, asthma, housing, research, and resolution. He's currently furthering research setting associations between indoor air quality parameters and classrooms and student health performance and is working toward defining the basis for clean air in schools, which applies to performance and health of students. *See Appendix I for full bio.*

Shaughnessy began by noting, Our research is focused on schools. Why schools? Because they are a Petri dish for contamination. There's no way around it. And we have a captive audience and one that's so important to our future. So, when looking at a surface, you might see a little action, but within that surface you may have hundreds of thousands of organisms. That is really what we need to focus on when we're concerned about transmission of disease.

There are methods out there. You may have heard of fluorescent markers, where you're trying to determine whether an attempt has been made to clean a surface. A lot of our work is focused on one indicator, adenosine triphosphate. I'm not going to go into too much detail on what ATP is other than the fact that it's present in cells both alive and burnt and dead. Testing is very rapid to do. It's simple. It's inexpensive. And it's a marker of cleaning effectiveness related to bio burden on surfaces.

> Why focus on schools? Because they are a Petri dish for contamination. And we have a captive audience that's so important to our future.

Now there are many caveats related to that. And we've done a lot of work on this. It is simple, it's rapid, it's inexpensive, and there are many monitors out there. That's good and bad because each one of these monitors has different scales and readouts related to them. So you have to put that in perspective in terms of trying to determine what's your starting point, what's your endpoint, and what's acceptable.

Contact transmission (touch) is important to consider. With the University of Colorado and others, we looked at 55 schools with health data on some 35,000 students that we're still analyzing. We have found a statistically significant association between cleaning and absence of various illnesses, including intestinal. That's very important and it's difficult to get these kinds of data when you're working in schools.

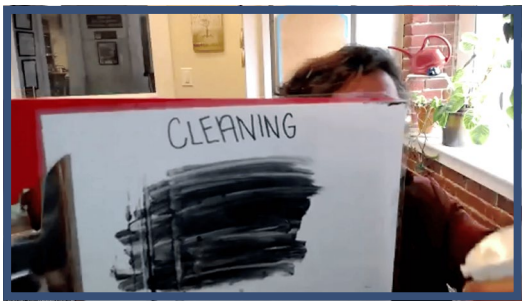
Alicia M. McCarthy, MS

Alicia McCarthy is a laboratory specialist at the Toxic Use Reduction Institute located at UMass Lowell, with a Master of Science degree in molecular and cellular biotechnology and occupational health and industrial hygiene. She researches and provides assistance with adopting safer chemical and equipment alternatives for cleaning, sanitizing, and disinfection that is uniquely tailored to the specific applications and needs of the users. Additionally, she serves as an adjunct professor at the University of Massachusetts, Lowell, sharing her expertise in green chemistry, sustainability, and public health with undergraduate students. *See Appendix I for full bio.*

What does cleaning do? What do sanitizing and disinfecting do, and why do we clean dirty surfaces before we layer on sanitizers and disinfectants? Why is pre-cleaning a surface before disinfecting really important for the COVID-19 virus? And note, COVID is continuing to mutate and there are new surges in many states. Let's pay attention!

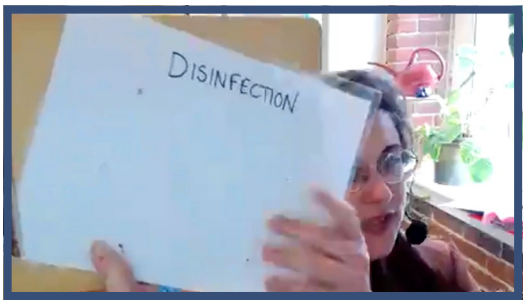
This slide demonstrates "mechanical removal" of dirt and micro-organisms. At the end of the day, the purpose of a cleaner is really to remove those types of soils and prepare the surface before you use a sanitizer or a disinfectant.

When we're talking about sanitizing, we're referring to products that are regulated by the EPA and their job is removing most microorganisms, like on food preparation surfaces.



Disinfectants kill or deactivate bacteria or viruses (read product label for the exact target organism). They're also regulated by the EPA. And like sanitizers, they also have those "contact" or "dwell" times when the wet product sits on the surface. Always read the product label and always follow directions exactly.

For example, COVID is a layered virus: it has a fatty (lipid) layer surrounding it. So to kill it, you first need to remove its oily surface envelope with soap or detergent. This is also why it is effective to wash your hands.



In summary:

- **Pick the product that will do the job:** Clean, or Sanitize, or Disinfect—they are NOT all the same.
- **Read the product label.**
- **Follow the instructions.**

Alicia Culver

Alicia Culver is the Executive Director of the Responsible Purchasing Network, an international network dedicated to promoting sustainable purchasing and best-practice policies for government agencies, public institutions, and businesses. She has over three decades of experience in the sustainable procurement field and in 2013 was a lead author on a groundbreaking report on safer products and practices for disinfecting and sanitizing surfaces that was published by the City of San Francisco. During the pandemic, she focused on researching and promoting effective disinfecting products that, unlike chlorine bleach and quats, are not linked to asthma. *See Appendix I for full bio.*

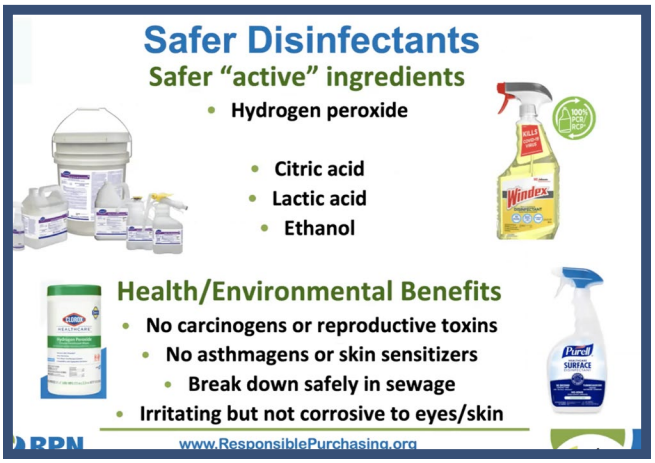
Culver began: I've been working on this issue for a long time. At least a decade on disinfectants and green cleaning for another decade prior to that. For a long time, policies were adopted around green cleaning and everybody just said, "Oh, we just can't talk about disinfectants."

Disinfectants are pesticides. San Francisco took it on as a challenge and hired me as well as the Pesticide Research Institute, since disinfectants are pesticides, to determine how can we figure out if a disinfectant is safer since none of these products have certifications. And so, we set out to do that. The first thing that we did was to look at some of the conventional disinfectants. These were used a lot during COVID, mostly because there were existing supply chains and people were familiar with them. And there's the impression that things like sodium hypochlorite—chlorine bleach—are effective. **It actually turns out that chlorine bleach is not that effective.** Especially when compared to some of the other safer disinfectants on the market. So first I want to talk about the conventional disinfectants and then I'm going to talk about why the safer disinfectants are better.

> Our experience going into schools and childcare centers and office buildings is that [bleach] is not used correctly. There's a spray and wipe situation mostly going on, which means it's basically aggravating the germs rather than killing them.

The main problem with chlorine bleach is that it causes occupational asthma. Numerous studies have documented this. This means that in the workplace as you're using it, you can get asthma when you didn't have it before.

The warnings on chlorine bleach say it's corrosive, causes skin burns and eye damage, can be a splash hazard, and also can produce toxic gases when it's mixed with other chemicals. That means pre-cleaning is required, or bleach does not work at all. And when it is used, it needs to be rinsed off. And



our experience going into schools and childcare centers and office buildings is that it's not used correctly. There's a spray-and-wipe situation going on, which means it's basically aggravating the germs rather than killing them.

I want to focus mostly on how to find safer and effective active ingredients. The activated ingredient is the portion of the chemical that kills things. That is the pesticide. The primary, most effective active ingredient is hydrogen peroxide, not necessarily the chemical in the brown bottle but in cleaning and disinfectant products that have hydrogen peroxide and have been formulated and proven to kill bacteria, viruses, and fungi.

Other active ingredients out there that are effective are citric acid, lactic acid, and ethanol. These are safer. They're not linked to asthma. They're not carcinogens or reproductive toxins. And they break down in the environment and don't build up in sewage sludge. They may be irritating but they're not corrosive to the skin and eyes, which means they won't cause permanent damage.

CLOSING REMARKS

US EPA Sources of Funds for Schools

Mark Rupp, BS, JD

Mark Rupp serves as the Assistant Deputy Administrator at the U.S. Environmental Protection Agency. Previously he was the Adaptation Program Director at Georgetown Climate Center, leading a team in support of resilience, equity, and community-based solutions at the local, state, and federal levels and led State-Federal Policy and Affairs for the Ecosystems Program at the Environmental Defense Fund. Prior to EDF, he served in several positions in state and federal government. *See Appendix I for full bio.*

EPA Announcement

Mark Rupp announced that EPA is opening its new National Environmental Museum and Educational Center. The Center will focus on educating young people—and people of all ages—about the many reasons EPA is here and the Agency's role in protecting human health in the environment. For people coming to Washington, D.C., especially school groups, tours can be arranged through contact information on the Museum's website at www.EPA.Gov/Museum.

Rupp began by saying that he wanted to underscore what a historic amount of investment Congress has made. At the request of President Biden and Administrator Regan, we have **unbelievable amounts of money flowing through EPA with both the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA)**. These resources are helping and will continue to help secure healthy learning environments that are necessary to increase academic performance, decrease negative health effects, and improve attendance for students and teachers and school staff. And so much more!

All of you have tracked EPA's indoor air quality efforts for a very long time. So you know all about the following:

- **IRA and that it provided $50 million to EPA for grants** and technical assistance to improve indoor air quality and reduce greenhouse gas emissions at schools. EPA anticipates announcing 4 to 6 awardees in June that will be provided $5 to $8 million

each to fund 5 years of school indoor air quality and greenhouse gas reduction activities, particularly in low-income, disadvantaged, and tribal schools.

- We also have our **community change grants program**. This program will bring approximately **$2 billion in IRA funding to benefit disadvantaged communities through projects that reduce pollution, increase community resilience**, and build community capacity to address environmental and climate justice challenges. These place-based investments will be focused on community-driven initiatives.
- There are half a million **school buses in this country that move 26 million children each day** and produce over 5 million tons of annual greenhouse gas emissions. These buses create the unhealthiest air that a child will breathe all day because 95% of them run on diesel fuel. Diesel air pollution is linked to asthma and other conditions that harm students' health and cause them to miss school, particularly those students in communities of color. Phasing out diesel school buses will ensure cleaner air for students, bus drivers, and school staff working near the bus loading areas as well as the communities through which these buses drive every day. Electrifying the buses will create immediate improvements in air quality and in children's health. **And, fortunately, EPA is managing a clean school bus program. This program received $5 billion through the Bipartisan Infrastructure Law. To date, we have awarded almost $2 billion to fund approximately 5,000 school bus replacements.** And the program will announce additional grants and rebate opportunities through 2026.

> There is no better way to approach such a challenge than with friends and partners. And Healthy Schools Network brings all of us together and keeps us focused on what's most important, our nation's young people.

We know that there is no safe blood lead level for children. Lead exposure can lead to impaired growth, reduced attention span, hyperactivity, and learning disabilities. Beginning in 2019, EPA received funding from Congress to establish a grant program to test for lead in drinking water in schools and childcare facilities. The Bipartisan Infrastructure Law expanded the program, to allow funding for remediation after testing is done. For the current fiscal year:

- **EPA announced $58 million in funding for testing and remediation through a noncompetitive voluntary schools and childcare lead testing and reduction program.** The funding can be used to replace faucets or internal plumbing that contains lead, replace led service lines, install point-of-use devices and water filters, and more. I encourage you to reach out to your state programs and to share this opportunity with nearby districts.

New $20B EPA Program Announced

EPA recently announced $20 billion in grants to finance organizations for projects that lower energy costs and catalyze economic revitalization to communities through the Greenhouse Gas Reduction Fund (GGRF). This money is divided between two programs: the National Clean Investment Fund and the Clean Communities Investment Accelerator. The GGRF has three goals: reduce climate and air pollution; deliver benefits to communities, especially low-income and disadvantaged communities; and mobilize financing and private capital.

Want to find out more?

To help keep track of all these opportunities and many others that are coming up, EPA's healthy school environments webpage gathers information with a focus on steps you can take at every level, which you can access through their website:

EPA.GOV/SCHOOLS

APPENDIX ONE

Speaker Bios

KEYNOTE

Lynn R. Goldman MD, MS, MPH

Michael and Lori Milken Dean and Professor of Environmental and Occupational Health at the Milken Institute School of Public Health at the George Washington University

Former Assistant Administrator for Toxic Substances at the US Environmental Protection Agency

Lynn R. Goldman, a pediatrician and an epidemiologist, is the Michael and Lori Milken Dean and Professor of Environmental and Occupational Health at the Milken Institute School of Public Health at the George Washington University. She is a renowned expert in pediatric environmental health and chemicals policy. Dr. Goldman has contributed academic scholarship that has helped shape this field of study. She also has translated research to policy by writing policy analyses and congressional testimony in service of successful efforts by Congress to enact reforms to federal pesticide law (the 1996 Food Quality Protection Act) and federal chemicals law (the 2016 Lautenberg Chemical Safety Act for the 21st Century).

Previously, Dr. Goldman was Professor of Environmental Health Sciences at the Bloomberg School of Public Health, Johns Hopkins University (1999–2010); Assistant Administrator for Toxic Substances at the U.S. Environmental Protection Agency, where she directed the Office of Chemical Safety and Prevention (1993–1998); and Chief of the Division of Environmental and Occupational Disease Control (as well as other positions) at the California Department of Public Health.

Dr. Goldman is a member of the National Academy of Medicine (NAM) and received the NAM Walsh McDermott Award for service to the academy. She is a recipient of the Heinz Award for Global Environmental Change and the American Public Health Association Environment Section's Homer M. Calver Award. She has received alumna awards from Hopkins (Woodrow Wilson Award for Excellence in Government and Society of Scholars); UC San Francisco (150th Anniversary Alumni Excellence Award); and the UC Berkeley School of Public Health (Alumna of the Year and its Influential Alumni Award). Dr. Goldman serves on the Environmental Defense Fund Board of Trustees; is immediate past chair of the Association of Schools and Programs of Public Health, and previously served on the NIH National Advisory Environmental Health Sciences Council and the Advisory Committee to the Director of the US Centers for Disease Control and Prevention.

Dr. Goldman earned her BS and MS from UC Berkeley, an MD from UC San Francisco; an MPH from Johns Hopkins University; and completed her pediatric residency training at the UCSF Benioff Children's Hospital in Oakland.

OPENING REMARKS

David Boundy

Office of the President, American Federation of Teachers

Designee to BlueGreen Alliance Foundation Board

David Boundy has led numerous campaigns for working families, a cleaner environment, and safer communities. In 2022, Boundy signed on to help AFT be a force for climate solutions and environmental justice.

Harley Stokes, MA

Senior Policy Advisor, BlueGreen Alliance

As Policy Advisor, Harley leads policy development, advocacy, and network engagement for green buildings, health initiatives, and equity at the BlueGreen Alliance. Before joining BGA, Harley worked for several years on global food security and climate change through policy, advocacy, and technical implementation. She continued working at the nexus of health and environment, at the local level, leading the Livable Streets Coalition, a local environmental health and mobility equity initiative by a Maryland state delegate.

Harley received a Bachelor of Arts in Africana and Hispanic studies from Vassar College and a dual Masters degree in International Affairs and Global Health from the George Washington University.

CLOSING REMARKS

Mark Rupp, BS, JD

Assistant Deputy Administrator, U.S. Environmental Protection Agency

Adjunct Professor of Law, Georgetown University Law Center

Mark Rupp serves as the Assistant Deputy Administrator at the U.S. Environmental Protection Agency. Before joining EPA, Mark was the Adaptation Program Director at Georgetown Climate Center, leading a team in support of resilience, equity, and community-based solutions at the local, state, and federal levels. Mark came to GCC from the Environmental Defense Fund, where he led State-Federal Policy and Affairs for the Ecosystems Program. Prior to EDF, Mark served in several positions in state and federal government, to include: Deputy Associate Administrator for Intergovernmental Relations at EPA; Director, Washington, DC Office to former Governor Chris Gregoire (WA); Health and Human Services Policy Advisor to Governor Gregoire in Olympia, Washington; Legislative Counsel to U.S. Senator Maria Cantwell (WA) in Washington, DC; and staff positions in the Washington State House of Representatives. He has a BS from Western Washington University and a JD from Golden Gate University.

Kyle Belokopitsky, Esq

Executive Director, NYS PTA

Moderator—Panel 1

Kyle McCauley Belokopitsky, Esq., is a tireless community volunteer, a mom, attorney, and child advocate, serving as Executive Director of the NYS Parent Teacher Association. She has committed her life to supporting children and families, and is extremely proud of her work in family engagement, supporting students with disabilities, and diversity and inclusion. Kyle was named to the City and State "2021 Education Power 100," honored as a "Hometown Hero" by NYS Senator Daphne Jordan, honored as a 2021 NYS Senate Woman of Distinction, was awarded the prestigious NYS PTA Distinguished Service Award, and named to Politics NY's "2022 Power Players in Education."

Under her 8-year tenure with NYS PTA, National PTA has awarded NYS PTA: the Outstanding State PTA Advocacy Award twice, the Jan Harp Domene Diversity and Inclusion Award, a Silver Membership Growth Medal, a Silver Local Unit Connection Membership Award, the Hispanic and Latino Outreach Award, the Family Engagement Innovation Award, and most recently, a Family Engagement Grant.

Kyle specializes in education policy after years of working in both the NYS Senate and Assembly. She previously represented NYS United Teachers, the NYS Council of School Superintendents, and the NYS Catholic Conference. She is admitted to practice law in New York and Federal Courts and has taught collegiate and graduate level courses at Hudson Valley Community College, Schenectady County Community College and The College of St Rose. Kyle lives by her favorite Dr. Seuss quote: "Unless someone like you cares a whole awful lot, nothing is going to get better. It's not."

She is active in both the PTA and Special Education PTA at Wynantskill UFSD, and now as a parent volunteer with the La Salle Institute, as her son transitioned to high school. She is the Immediate Past President of Twin Town Little League, and currently serves on the Board of Directors, and is Past President of the Junior League of Troy, currently serving as Treasurer. Kyle serves as Vice Chair of the NYS Educational Conference Board, past Knight in the Benevolent and Protective Order of Elks and was the fundraising chair for the East Greenbush Miracle League for Disabled Children. She is a past firefighter and EMT at Defreestville and Menands Fire Departments, who proudly served on the NYS Urban Technical Search and Rescue Team who deployed to Ground Zero on 9/11. Suffering from multiple 9/11 illnesses herself, she now dedicates her time to supporting other 9/11 responders in their health journey.

Richard Corsi, PhD

Dean, College of Engineering, University of California, Davis

Dr. Richard Corsi is Dean of the College of Engineering at the University of California, Davis. Dr. Corsi's team has researched indoor source dynamics, indoor homogeneous and heterogeneous chemistry, and innovative and accessible control technologies for reducing exposure to indoor air

pollutants. At the University of Texas at Austin he was an endowed research chair and member of the Academy of Distinguished Teachers, and served as Director of an NSF IGERT program on Indoor Environmental Science and Engineering that spawned many successful scholars of indoor air science.

In response to COVID-19, Dr. Corsi developed a predictive tool for assessing practical interventions for lowering inhalation dose of respiratory aerosols, later developed the concept of an open-source and effective DIY air cleaner used worldwide, and founded a non-profit foundation to help the underserved achieve cleaner indoor air. He recently chaired a National Academies committee report on Health Risks of Indoor Exposure to Fine Particulate Matter and Practical Mitigation Solutions. He is a past President of the ISIAQ Academy of Fellows and Indoor Air 2011 in Austin.

Dr. Corsi was named a Distinguished Alumnus by Cal Poly Humboldt (2006) and Distinguished Engineering Alumnus by the College of Engineering at UC Davis (2016).

Mansel Nelson, MS

Program Manager, Institute for Tribal Environmental Professionals, Northern Arizona University

Mansel Nelson's formal education includes a BS in Chemistry and graduate studies in Chemical Engineering. For twenty-six (26) years Mansel has served with the Institute for Tribal Environmental Professionals (ITEP) located at Northern Arizona University. Prior to working with ITEP, he served in the US Army Chemical Corps and taught community-based high school chemistry on the Navajo Nation. As a Program Manager, he prepares Native American students for careers applying science and engineering to environmental issues impacting tribal communities. He also conducts training for Tribal Environmental Staff on maintaining Healthy Tribal Homes and Healthy Tribal Schools, with an emphasis on protecting children's health. During the pandemic he has been seeking approaches for creating COVID Ready schools through application of air quality principles and a variety of air quality sensors. Protecting the health of children is protecting our legacy. Mansel has six grandchildren including four that are members of the Navajo Nation.

Laureen Burton, MPH

Senior Scientist, US Environmental Protection Agency, Office of Air and Radiation, Office of Radiation and Indoor Air, Indoor Environments Division

Laureen Burton has been a scientist (chemist/toxicologist) in the U.S. Environmental Protection Agency's (EPA) Indoor Environments Division (IED) for over 25 years. She has a Masters of Public Health from the University of Michigan's School of Public Health in Environmental and Occupational Health with a focus in Toxicology and a Bachelor of Science from Virginia State University in Chemistry and Mathematics. Her primary areas of interest within IED include pollutant and source control; IAQ impacts of products; combustion and combustion by-products (i.e., carbon monoxide and nitrogen dioxide); health effects (i.e., reproductive and children health issues); low level chemical exposures and mixtures, IAQ in large commercial buildings; citizen/participatory research especially in marginalized communities and populations; and Technical Communications.

Currently she serves as the technical liaison to several of IED's programs including EJ and Tribal programs and is the co-lead of the Division's Indoor Metrics, Indices and Sensors Technology (IMIST) program. She is also co-lead of ORIA's Diversity Equity Inclusion and Accessibility (DEIA) Advisory Council and works collaboratively with several other Agency programs on IAQ associated issues. Prior to coming to EPA, she worked as a Reproductive Toxicologist for the US Consumer Products Safety Commission and has also worked in academia and industry.

Frank Leavitt

Moderator—Panel 2

Director of Facilities Operations & Warehouse, Portland Public Schools

Frank Leavitt is the Director of Facilities Operations & Warehouse for Portland Public Schools in Portland, Oregon. Frank began in Facilities with PPS in December of 2006. He currently leads a team of nearly 400 employees across 100 properties. Frank utilizes his degree in Communication and years of experience leading Facilities teams to provide excellent service to the 47,000 students and 8,000 employees of PPS. Frank is a graduate of Portland State University with a B.A. in Communication.

Ellie Barbarash, MS, CPEA

Senior Health and Safety Advocate, AFSME-International Union

Ellie Barbarash, MS, CPEA, serves as a Senior Health and Safety Advocate for AFSCME, the American Federation of State, County and Municipal Employees, representing 1.4 million union members working across the country in education, healthcare, public safety, emergency response services, municipal infrastructure support, childcare, and more. Ellie has supported unions, local government, and utilities as an occupational safety compliance specialist, industrial hygienist, adult educator, and risk management program auditor for more than three decades. She has an MS degree in Occupational Safety and is board-certified as a Professional Environmental Auditor with a specialty in occupational health.

Richard Shaughnessy, PhD

Director of Research and Manager of the Indoor Air Program, University of Tulsa

Richard J. Shaughnessy, Ph.D., has served as Director of the University of Tulsa's Indoor Air Quality Research Program (TUIAP) in the Chemical Engineering Department since 1987. His studies have focused on particulate research, air cleaner evaluation, indoor chemistry, school studies, asthma/housing research, resolution and remediation of bioaerosol-related problems, and, recently, addressing COVID present day and sustainable practices in the future. He is currently furthering research studying associations between IAQ parameters in classrooms and student health/performance and is actively working toward defining a basis for "clean" in schools which applies to performance and health of students. Through 2009–2012, he served as President of The International Society of Indoor Air Quality and Climate (ISIAQ), and continues to work with the Society to translate science into practice.

Alicia McCarthy, MS

Laboratory Specialist, Toxic Use Reduction Institute, University of Massachusetts at Lowell

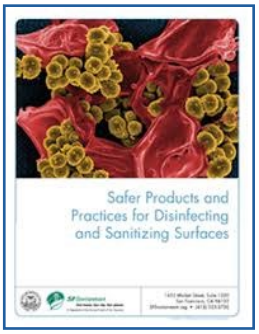
Alicia McCarthy is a Laboratory Specialist at the Toxics Use Reduction Institute (TURI), located at the University of Massachusetts Lowell, where she researches and provides assistance with adopting safer chemical and equipment alternatives for cleaning, sanitizing, and disinfection that is uniquely tailored to the specific applications and needs of the users. Collaborating with businesses and the community, Alicia works to further technical and strategic goals that promote toxics use reduction in Massachusetts that can be applied nationally. Additionally, she serves as an Adjunct Professor at the University of Massachusetts Lowell, sharing her expertise in green chemistry, sustainability, and public health with undergraduate students. With Master of Science degrees in Molecular and Cellular Biotechnology and Occupational Health and Industrial Hygiene, Alicia is passionate about toxics use reduction and microbiology, and dedicated to identifying and implementing sustainable approaches that protect both human health and the environment.

Alicia Culver

Executive Director, Responsible Purchasing Network

Alicia Culver is the Executive Director of the Responsible Purchasing Network, an international network dedicated to advancing sustainable purchasing policies and practices among government agencies, public institutions, and businesses. RPN uses “the power of the purse” to help government agencies and school districts, meet their climate protection, zero waste, toxics reduction, and other sustainability goals.

Alicia has over three decades of experience in the sustainable procurement field. Throughout her career, green cleaning has been a cornerstone of her work. In 2013, she was the lead author on a groundbreaking report on *Safer Products and Practices for Disinfecting and Sanitizing Surfaces* that was published by the City of San Francisco. During the pandemic, she focused on researching and promoting the availability of highly effective disinfecting products that, unlike chlorine bleach and “quats,” are not linked to asthma. This included writing an article for the Association of School Business Officials titled “Green Cleaning Can Help Schools Safely Open”.



Alicia and the RPN team have helped many states, local governments and school districts to identify, pilot test, and purchase high-performance green cleaners and asthma-safe disinfectants for their facilities. A highlight of her work has been assisting in the development of a model multi-state contract for Environmentally Preferable Cleaning Products for the Commonwealth of Massachusetts, New York, and several other Northeastern states.

APPENDIX TWO

Resources Contributed by Speakers

Opening Remarks: Blue Green Alliance

- BGA's School Fact Sheet
- BGA's Direct Pay Explainer

Panel One: Indoor Air Metrics: What Gets Measured Gets Done, But Does it Help?

- Corsi-Rosenthal Air Filter Boxes, with Lesson Plans
- Indoor Air Quality in Tribal Schools
- US EPA IAQ Tools for Schools Resources
  - Framework for Effective School IAQ Management
  - IAQ Tools for Schools Action Kit
  - IAQ Tools for Schools Preventive Maintenance Guidance Documents
  - IAQ Tools for Schools Video Resources

Panel Two: Cleaning & Disinfecting: Lessons From COVID

- AFSCME-International Union
  - NIOSH Hierarchy of Controls
  - Worker Right to Know About Workplace Hazards
- UMass Toxics Use Reduction Institute: Cleaner Solutions Database
- Responsible Purchasing Network: Safer Disinfectants
- Association of School Business Officials – International:
  Green Cleaning Can Help Schools Open Safely, School Business Affairs Magazine

Closing Remarks US EPA

- National Environmental Museum and Education Center
- EPA funding availability
  - Multiple sources of funding for schools/childcare
  - Clean School Bus
  - Lead in School Drinking Water
  - Greenhouse Gas Reduction Fund

APPENDIX THREE

Time-Stamped Video of Conference

There is one link below that includes three separate sections of the conference. At the end of Part One (Opening Remarks and Panel 1), the video automatically starts Part Two (Keynote by Lynn Goldman); at the end of Part Two, the video automatically starts on Part Three (Panel 2 and Closing Remarks).

Example: If you wish to view, say, the keynote, fast-forward the cursor to the end of Part One and the video will automatically restart at the keynote. If you wish to view only the panel on cleaning or EPA's closing remarks, fast-forward the cursor to the end of the keynote, and the video will restart at Panel Two.

WATCH CONFERENCE VIDEO

Passcode: 8CJ.k&pG

List of Timestamps:

VIDEO PART ONE

- **00.00.03**—Conference Welcome
- **00.07.09**—Opening Remarks: Federal Funding for Schools
- **00.26.50**—Panel One: Indoor Air Metrics: What Gets Measured Gets Done, But Does it Help?

VIDEO PART TWO

- **00.00.27**—Keynote Address: The Importance of a Healthy Schools Effort
- **00.22.00**—Panel Two: Cleaning and Disinfecting: Lessons From COVID

VIDEO PART THREE

- **00.00.26**—Closing Remarks: US EPA Sources of Funds for Schools

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