

**Federal Interagency Committee on Indoor Air Quality (CIAQ) Meeting Minutes
March 3, 2021**

Moderator: Laureen Burton, U.S. Environmental Protection Agency

Meeting Overview

- Welcome, Introductions and Announcements
- Federal CIAQ Member Agency Updates (Pages 2–25)
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 - U.S. Department of Housing and Urban Development (HUD)..... 6
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- Indoor Air Quality (IAQ) Area of Interest Presentation



Development, calibration and validation of a simple tool for guiding mold inspection and remediation in U.S. homes

Richard Shaughnessy, Ph.D., Director, University of Tulsa Indoor Air Quality Research Program



Jordan Peccia, Ph.D., the Thomas E. Golden Jr. Professor of Environmental Engineering, Yale University

- Post-Meeting Updates and Announcements
 - The next CIAQ meeting is scheduled for June 2021.

U.S. Department of Energy (DOE)

Agency Point of Contact: Chris Early, 202-586-0514, chris.early@ee.doe.gov

1.1 National Virtual Biotechnology Laboratory

The DOE Office of Science, Biological and Environmental Research Program has \$3.3 million in funding for 11 DOE National Laboratories to investigate viral fate and transport in the built environment—including air, surface and water systems.

The National Virtual Biotechnology Laboratory is taking advantage of DOE user facilities—including light and neutron sources, nanoscale science centers, sequencing and bio-characterization facilities, and high-performance computer facilities—to address key challenges in response to the COVID-19 threat. A major focus is on aerosol transmission. Their web page is <https://science.osti.gov/nvbl/NVBL-Projects>.

The following three tasks were conducted:

- Task 1: Improving Understanding of Drivers of Airborne Transport and Fate Impacting SARS-CoV-2 Transmission in the Built Environment
- Task 2: Understanding the Role of Surface Chemistry and Material Science for Viral Transmission and Spreading
- Task 3: Transport and Emergence of SARS-CoV-2 from Environmental Reservoirs That Contributes to Human Transmission of COVID-19

The DOE coordinated physical measurements and computer modeling to study airborne transmission and efficacy of ventilation, filtration, mask wearing and physical barriers across a range of important environments—school bus, classroom, multi-room building, outdoor dining and outdoors in general. For school buses, for example, the DOE used computational fluid dynamics models to simulate alternative ventilation configurations. Pathogen concentrations and exposure risks are minimized when through-flow conditions exist with at least two sets of windows or openings. The DOE is working with Albuquerque and other public school transportation directors to implement and test strategies that minimize exposure risk while maintaining thermal comfort.

DOE teams will use a combination of simulations and experiments to study the transport of droplets and aerosols within and between rooms. “A key question is: What is the risk of a building occupant’s inhaling an infectious virus while in a room or building with one or more infected persons?” These results will be published very soon.

The DOE designed new classes of antiviral materials with low potential toxicity to humans that can adsorb SARS-CoV-2 virus and deactivate the pathogen.

www.epa.gov/indoor-air-quality-iaq/federal-interagency-committee-indoor-air-quality

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1.2 Building Technologies Office's Better Buildings Solution Center, "Building Operations During COVID-19"

DOE's Building Technologies Office has developed a resource center in the Better Buildings Solution Center (BBSC), titled "Building Operations During COVID-19" (<https://betterbuildingssolutioncenter.energy.gov/covid19>) to provide information to building operators about COVID-19 mitigation and the associated energy implications. This site includes fact sheets developed by the national laboratories for the hospitality, office, retail and grocery sectors. The DOE also has hosted three webinars:

- The Energy Impacts of COVID-19 on HVAC Mitigation Strategies, February 22, 2021 (recording to be posted on BBSC)
- Minimizing Infectious Disease Spread in Buildings: How HVAC Guidance Has Evolved, January 25, 2021
- Learning from Building Operations During COVID-19, December 7, 2020

The Building Technologies Office conducted an analysis of the impact of ASHRAE COVID-19 mitigation recommendations on the energy consumption of the national commercial building stock using the ComStock tool and is studying fluid dynamics analysis of ventilation systems inside grocery stores and between zones in commercial office buildings. The Office will release the results when they are available. Summary results from the ComStock analysis are in the sector fact sheets published in BBSC.

The DOE is starting research about the development of ventilation-efficiency system packages for utility incentive programs and a state of ventilation review. The DOE will make the information available on the Beyond Widgets web project page at <https://buildings.lbl.gov/cbs/getting-beyond-widgets-enabling-utility-incentive>.

As directed in the Energy Act of 2020, the DOE is the lead agency for coordinating and disseminating information on existing federal programs and assistance that may be used to help initiate, develop and finance energy efficiency, renewable energy and energy-retrofitting projects for schools. This coordination includes promoting the maintenance of health, environmental quality and safety in schools, including the ambient air quality. The DOE currently is gathering data and invites other agencies to provide information about related programs and assistance. DOE will report the implementation of this coordination on June 25, 2021.

The Building Technologies Office is organizing and running a session at the Building Performance Association 2021 National Home Performance Conference April 12–16 (virtually) concerning "Implementing Health Into Residential Energy Efficiency: Money, Measures & Impact" with the American Council for an Energy-Efficient Economy (ACEEE).

1.3 The U.S. Department of Energy's Weatherization Assistance Program

The U.S. Department of Energy's Weatherization Assistance Program

"Building Assessment of Radon Reduction Interventions With Energy Retrofits Expansion (The BEX Study): Final Report." September 2020; Posted in January 2021. DOE's Oak Ridge National Laboratory (ORNL) and EPA. A study was performed to assess whether current precautionary measures used by the

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Weatherization Assistance Program (WAP) are effective for preventing radon increases following weatherization. This work followed previous studies, including the ORNL Indoor Air Quality (IAQ) Study that showed a statistically significant increase in radon levels in homes following weatherization. The study results show that current practices have produced substantial benefit compared to previous practices and that there are no statistically significant changes in indoor radon levels on the lowest living levels with these practices. These results demonstrate a substantial improvement compared with the WAP IAQ study, which showed a 22 percent increase in control-adjusted arithmetic means that was statistically significant. The results do suggest that, on average, radon levels in basements have a greater potential to increase following weatherization than do radon levels on first floors. For the 122 homes in which a one-year follow-up test was conducted, the lowest living levels experienced an average 10 percent reduction in radon levels compared with the levels measured post-weatherization, which was statistically significant. The mechanisms for these improvements are not clear, but when combined with the results comparing pre- and post-weatherization radon levels, this analysis suggests that a long-term radon level reduction of 5 to 10 percent was evident. The study showed that radon levels in basements have a greater potential to increase following weatherization than on first floors and that WAP may consider recommending or requiring ventilation in basements. <https://weatherization.ornl.gov/wp-content/uploads/2021/01/ORNL-TM-2020-1769.pdf>

Pacific Northwest National Laboratory

“Progress and Challenges. Residential Ventilation Systems.” March 2020. The *ASHRAE Journal*. Mike Lubliner, Washington State University; Iain Walker, Lawrence Berkeley National Laboratory (LBNL); Cheryn Metzger, Pacific Northwest National Laboratory (PNNL); Chrissi Antonopoulos, PNNL; Eric Martin, Florida Solar Energy Center. This column provides a summary of the state of the art in residential ventilation based on two recent field research studies focused on measuring indoor air in mechanically ventilated homes. The results of these studies are being used to help address future changes to both ASHRAE Standard 62.2 and industry practice to improve residential ventilation and IAQ.

Lawrence Berkeley National Laboratory New Reports and Journal Articles

LBNL published a multidisciplinary 10-year strategic plan research for SARS-CoV-2 research at <https://covid.lbl.gov/Berkeley-Lab-COVID-19-Research>.

“Indoor Air Quality in New and Renovated Low-Income Apartments With Mechanical Ventilation and Natural Gas Cooking in California.” 2020. *Indoor Air*. <https://onlinelibrary.wiley.com/doi/10.1111/ina.12764>

“Effective Kitchen Ventilation for Healthy Zero Net Energy Homes With Natural Gas.” 2021. The field study found operational deficiencies with mechanical ventilation systems in a substantial fraction of low-income apartments. Simulation analysis found that performance standards need to be updated to ensure that kitchen exhaust ventilation adequately protects for substantial cooking in new California residences. <https://indoor.lbl.gov/publications/effective-kitchen-ventilation-healthy>

“Factors Impacting Range Hood Use in California Houses and Low-Income Apartments.” 2020. *International Journal of Environmental Research and Public Health* Vol. 17. <https://indoor.lbl.gov/publications/factors-impacting-range-hood-use>

“Association of Residential Energy Efficiency Retrofits with Indoor Environmental Quality, Comfort, and Health: A Review of Empirical Data.” 2020. *Building and Environment*. Most studies evaluated retrofits of homes with low-income occupants. Indoor radon and formaldehyde concentrations tended to increase after retrofits that did not add whole-house mechanical ventilation. Study-average indoor concentrations of nitrogen dioxide and volatile organic compounds other than formaldehyde increased and decreased with approximately equal frequency. Average indoor temperatures during winter typically increased after retrofits, usually by less than 1.5°C. Dampness and mold, usually based on occupants’ reports, almost always decreased after retrofits. Subjectively reported thermal comfort, thermal discomfort, non-asthma respiratory symptoms, general health and mental health nearly always improved after retrofits. For asthma symptoms, the evidence of improvement slightly outweighed the evidence of worsening. Evidence was insufficient to determine whether changes in thermal comfort and health outcomes varied depending on the type of energy efficiency retrofit.

<https://indoor.lbl.gov/publications/association-residential-energy>

“Does Vaping Affect Indoor Air Quality?” September 2020. *Indoor Air*.

<https://indoor.lbl.gov/publications/does-vaping-affect-indoor-air-quality>

“Improving Ventilation and Indoor Environmental Quality in California K–12 Schools.” July 2020. This project developed and demonstrated approaches to synergistically improve ventilation and indoor environmental quality during replacements of packaged heating, ventilation and air conditioning (HVAC) systems in California schools. The research team characterized HVAC systems, carbon dioxide concentration and indoor thermal conditions in 104 classrooms that had replaced packaged HVAC systems serving a single classroom (single-zone) between 2013 and 2016. Inspections of 104 classrooms with HVAC equipment installed between 2013 and 2016 showed that only 15 percent of classrooms’ estimated median daily ventilation rates met the 7.1 liters per second per person Title 24 code requirement, and 9 percent had carbon dioxide levels above 2,000 parts per million for significant portions of the school day, which implies a ventilation rate of less than half of that required. Where under-ventilation occurred, it tended to affect several observed classrooms within a given school and not as an isolated case. Periodic testing of ventilation systems and continuous real-time carbon dioxide monitoring could help to detect ventilation problems. Field testing and modeling of HVAC technologies determined that variable speed motors for indoor blowers, two-speed compressors, economizers, demand-control ventilation technology and air filters with a minimum efficiency reporting value of 13 constitute an HVAC package suitable for all of California’s climates. The combination of technologies can save between 28 and 57 percent of HVAC electricity use, depending on climate. Filters with a minimum efficiency reporting value of 13 can reduce indoor particulate matter exposures by 40 percent or more compared with filters with a value of 8. <https://indoor.lbl.gov/publications/improving-ventilation-and-indoor>

“Post-occupancy Evaluation of Indoor Environmental Quality in Ten Nonresidential Buildings in Chongqing, China.” November 2020. *Journal of Building Engineering*. This report studied many factors, such as carbon dioxide and formaldehyde in the air. Sound was the factor with the lowest satisfaction level among the four principal environmental factors. Overall, this study demonstrates the value of post-occupancy evaluation on identifying deficiencies in the indoor environment and provides a reference for assessment of indoor environmental quality in nonresidential buildings.

<https://indoor.lbl.gov/publications/post-occupancy-evaluation-indoor>

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“Smart Ventilation for Advanced California Homes.” 2020. <https://indoor.lbl.gov/publications/smart-ventilation-advanced-california>

“Wildfire Smoke Adjustment Factors for Low-Cost and Professional PM_{2.5} Monitors with Optical Sensors.” June 2020. <https://indoor.lbl.gov/publications/wildfire-smoke-adjustment-factors-low>

Centers for Disease Control and Prevention (CDC)

National Center for Environmental Health (NCEH)

Division of Environmental Health Science and Practice
Asthma and Community Health Branch

Recent publication: S. A. Damon and G. L. Chew. 2020. “Mold Cleanup Practices Vary by Sociodemographic and Allergy Factors.” *Journal of Environmental Health* Vol. 83, 18–21.

National Institute for Occupational Safety and Health (NIOSH)

Respiratory Health Division
Field Studies Branch

- The 3-D Printer Project: NIOSH currently is evaluating particle and gas-phase emissions from three-dimensional printers using recycled polymers and comparing results with virgin or unmodified polymers.
- Recent publication (open access and hyperlink is provided): J.-H. Park, A. R. Lemons, J. Roseman, B. J. Green, and J. M. Cox-Ganser. 2021. “Bacterial Community Assemblages in Classroom Floor Dust of 50 Public Schools in a Large City: Characterization Using 16S rRNA Sequences and Associations With Environmental Factors.” *Microbiome* Vol. 9, 15.
<https://link.springer.com/article/10.1186/s40168-020-00954-2#change-history> ([correction to the article](#))

U.S. Department of Housing and Urban Development (HUD)

Technical Studies Grant Awards

On October 26, 2020, HUD announced the award of approximately \$9.4 million to 13 universities and public health organizations to improve our understanding of the longer-term impact of housing interventions targeting lead and other residential hazards and improve methods to identify and control residential health hazards, such as pests, injury hazards and asthma triggers. Under the Lead Technical Studies Grant Program, approximately \$3.8 million was awarded to six institutions, and approximately \$5.6 million was awarded under the Healthy Homes Technical Studies Grant Program to seven institutions (see abstracts below).

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1. Healthy Homes Technical Studies Grant Awards

1.1 Sonora Environmental Research Institute, Inc. (SERI): Researchers will study the effectiveness and longevity of healthy homes interventions and education for reducing unintentional injuries and fires resulting from housing-related hazards and determine the barriers and incentives affecting future use of these cost-effective strategies. The study builds on a previously awarded Healthy Homes Production grant, which targeted a population of 2,985 low-income households and provided home assessment utilizing the SERI Healthy Homes Rating System app, installation of smoke alarms, and an educational packet discussing methods to make residents' homes healthier, with some receiving physical interventions for unintentional injuries and fires.

Principal Investigator: Ann Marie Wolf, annmarie@seriaz.org

HUD Contact: Brenda M. Reyes, brenda.m.reyes@hud.gov

1.2 University of Kentucky Research Foundation: Researchers will evaluate resident perception of cockroach management in affordable housing and develop and evaluate an accessible, resident-centered cockroach management protocol. Researchers will develop a protocol to reduce cockroach populations in affordable housing communities by reshaping how cockroach management is implemented and sustained and by centering control efforts on residents by placing them in a position to be champions for their own health.

Principal Investigator: Zachary DeVries, Ph.D., zde234@uky.edu

HUD Contact: J. Kofi Berko, Jr., j.kofi.berko@hud.gov

1.3 The Administrators of the Tulane Educational Fund: The researchers will examine exposure to air pollution (black carbon, PM_{2.5} and NO₂) in the homes of low-income adults, 60 years of age and older (eligible participants include residents of HUD subsidized housing) in Greater New Orleans. The primary goal of the study is to assess the impact of indoor exposure to black carbon and cardiopulmonary health, with a focus on the potential effects on blood pressure and heart rate. Air pollutants chosen are those known to be combustion byproducts and thought to be predictors of adverse cardiovascular and respiratory outcomes.

Principal Investigator: Felicia Rabito, Ph.D., rabito@tulane.edu

HUD Contact: Brenda M. Reyes, brenda.m.reyes@hud.gov

1.4 Johns Hopkins University Center for Injury Research and Policy: The grantee will be partnering with the Green and Healthy Homes Initiative to demonstrate and address the gap between what is known to work for preventing child home injuries and the uptake of those prevention approaches by high-risk families. The study team will use the CHASE Tool, developed by Johns Hopkins University, to assess child injury risks in low-income foster family homes in the Baltimore area before and after implementation of evidence-based modifications and to document the time and cost burden of conducting the assessments on a large scale and the residents' willingness to accept the modifications.

Principal Investigator: Wendy Shields, Ph.D., wshield1@jhu.edu

HUD Contact: J. Kofi Berko, Jr., j.kofi.berko@hud.gov

1.5 Silent Spring Institute, Inc.: The grantee will partner with the City of Rochester (a HUD lead hazard control [LHC] program grantee) and evaluate the effectiveness of integrating resident engagement in homes participating in lead and healthy homes rehabilitation programs to sustainably improve housing conditions and to evaluate the combined influence of housing rehabilitation and resident engagement on exposures to semivolatile organic compounds (SVOCs), lead and allergens. Researcher will evaluate the impact of the LHC program on levels of SVOCs, which often are found in house dust, and compare the impact on residential behaviors and measured lead, allergen and SVOC dust levels in homes also taking part in an enhanced version of the New York's Healthy Neighborhood Program (a low-intensity healthy homes education and referral program).

Principal Investigator: Robin Dodson, Sc.D., dodson@silentspring.org

HUD Contact: J. Kofi Berko, Jr., j.kofi.berko@hud.gov

1.6 Rutgers, The State University of New Jersey: Researchers will evaluate the cost-effectiveness of integrated house mouse management programs by comparing the cost and effectiveness of three different mouse treatment programs in multifamily apartment buildings and the effect of integrated house mouse control programs on mouse allergen reduction in homes. They also will profile house mouse ectoparasites and their potential role as disease vectors by investigating the species and infestation rates of ectoparasites on house mice found in multifamily buildings.

Principal Investigator: Changlu Wang, Ph.D., changluw@rutgers.edu

HUD Contact: J. Kofi Berko, Jr., j.kofi.berko@hud.gov

1.7 The Ohio State University: The researchers will develop and validate a rapid, point-of-care, smartphone-based test of house dust for semiquantitative detection of inhalant allergens, which commonly cause asthma symptoms. The researchers also will demonstrate the usability of the app for improved real-time hazard assessment in homes of asthmatic children. They will work with their community partner, the Asthma Express program, at Nationwide Children's Hospital Homecare. This program has direct access to the community and provides follow-up education and instruction through in-home nurse visits to families of pediatric patients who suffer from severe asthma attacks.

Principal Investigator: Karen Dannemiller, Ph.D., dannemiller.70@osu.edu

HUD Contact: J. Kofi Berko, Jr., j.kofi.berko@hud.gov

2. Selected Lead Technical Studies Grant Awards

2.1 University of Nevada, Las Vegas: Researchers will study the extent of hazards associated with the lead content of commercially available ceramic tile. They will purchase a variety of ceramic tiles and determine the lead content using X-ray fluorescence (XRF) and measure the dust lead levels on the tile and the lead content of dust generated during demolition. Their findings could inform policies and practices concerning the extent of lead dust hazards originating from tile, lead utilized in the manufacturing of tile and glazes, and guidance regarding the handling, installation and demolition of tile during home renovations. Guidance regarding testing tile could be incorporated into combined lead inspection/risk assessment procedures and educational information provided to residents and homeowners.

*Principal Investigator: Shawn Gerstenberger, Ph.D., shawn.gerstenberger@unlv.edu
HUD Contact: Eugene A. Pinzer, eugene.a.pinzer@hud.gov*

2.2 Indiana University: Researchers will use existing databases to define a “lead exposome” —combining all the potential contributors to lead exposure in one place. Compiling data linking a child’s total lead exposome to previously collected blood lead data could lead to a precision approach to healthy housing and lead hazard control, decrease reliance on children’s blood lead levels (BLL) to identify at-risk homes and focus spending on where it will have the greatest effect. Data to be linked include blood lead surveillance data for 59,483 children, house age, tax value, proximity to selected lead sources, water source, predicted soil lead levels, neighborhood-scale demographics, lead hazard control activities, and household-level demographic and occupational information. Machine-learning algorithms then will be used to predict the following: (1) expected children’s blood lead at each household; (2) the probability that blood lead will exceed 5, 2 or 1 µg/dL; (3) the relative contributions of different lead exposure sources; and (4) the potential effectiveness of alternative interventions.

*Principal Investigator: Jacqueline MacDonald Gibson, Ph.D., jacmqibs@iu.edu
HUD Contact: Eugene A. Pinzer, eugene.a.pinzer@hud.gov*

2.3 The University of Notre Dame: Researchers will validate and scale-up a household lead screening kit to detect environmental lead hazards in two Indiana counties. The study’s goal is to prove the efficacy and cost-effectiveness of the screening kit and allow health departments to target lead risk assessments to homes that are most likely to contain the worst environmental lead hazards. The study will (1) validate the lead screening kit in 320 households; (2) test the scalability of the lead screening kit by distributing the kit to 1,000 households; and (3) understand how the kit helps households identify lead hazards. The kit is predicted to increase the capacity of local health departments to serve households with children who have an elevated BLL and whose homes have not received a lead risk assessment.

*Principal Investigator: Heidi Beidinger-Burnett, Ph.D., hbeiding@nd.edu
HUD Contact: Eugene A. Pinzer, eugene.a.pinzer@hud.gov*

2.4 University of Missouri, Kansas City (UMKC): The research team will study how different interventions have made housing lead safe and if this leads to fewer lead-poisoned children among those who later move into remediated homes. An existing lead-testing database will be used to evaluate the efficacy and long-term outcomes of lead hazard control interventions on children who are in residence at the time of the intervention and those who began residence post-lead hazard clearance. UMKC also will develop a Housing-Based Lead Risk Index to cost-effectively target homes with higher interior lead dust levels. The Index will be tested to see whether and how it facilitates an efficient target testing approach, using such easily obtained information as age of housing and condition of exterior housing components. The agenda is to develop a primary prevention approach based on exterior housing observations, as well as neighborhood-level social determinants of health.

*Principal Investigator: Stephen D. Simon, Ph.D., simons@umkc.edu
HUD Contact: Eugene A. Pinzer, eugene.a.pinzer@hud.gov*

3. Healthy Homes and Weatherization Program Coordination Grants

In Fiscal Year (FY) 2020, HUD's Office of Lead Hazard Control and Healthy Homes (OLHCHH) will publish a new Notice of Funding Availability (NOFA) announcing \$5 million in funding to promote the coordination between local HUD-funded Lead Hazard Control/Healthy Homes program grantees and the Department of Energy-funded Weatherization Assistance Program. The funds will be awarded in up to five communities with both programs to determine whether coordination between the two programs can result in cost savings and better outcomes for households receiving the combined services. Applications were due on December 9, 2020.

HUD Contact: Brenda Reyes, brenda.m.reyes@hud.gov

4. American Healthy Homes Survey II (AHHS II)—Update

The AHHS II survey field work ended July 2019 with a total of 703 housing units participating. Data and samples were collected by XRF for lead-based paint and dust wipes for lead-based paint hazards. Final lead findings are expected in the first quarter of 2021. HUD teamed with EPA for collection of drinking water samples for analyses for lead and other metals, the collection of dust samples for mold analysis by polymerase chain reaction, and collection of wipe samples for pesticide analyses. HUD also collected air samples collected for formaldehyde. A manuscript on the mold analyses has been submitted for publication by EPA (Dr. Steve Vesper is lead author).

HUD Contact: Michelle Miller, michelle.m.miller@hud.gov

5. Radon

(a) The President's Budget for FY 2021 requested that \$5 million of the OLHCHH's funds go to a radon testing and mitigation resident safety demonstration program in public housing. (b) HUD's Office of Multifamily Housing currently has radon testing or mitigation requirements for some of its mortgage insurance or financing programs that exempt properties located in Zone 3 of EPA's radon risk map, requiring testing of 25 percent of ground-floor housing units. The Office is proposing to remove the Zone 3 exemption and increase the testing requirement to 100 percent of ground-floor units. The proposal is currently under review at the Office of Management and Budget.

HUD Contact: Peter Ashley, peter.j.ashley@hud.gov

6. Carbon Monoxide

The President's Budget for FY 2021 requested that \$35 million for OLHCHH funds go to a carbon monoxide alarms installation demonstration in public housing and multifamily assisted housing.

HUD Contact: Warren Friedman, warren.friedman@hud.gov.

U.S. Environmental Protection Agency (EPA), Indoor Environments Division (IED)

COVID-19 Update

In coordination with the CDC, EPA has developed guidance addressing risks, exposures and protection from indoor airborne transmission of COVID-19. This information can be found at <https://www.epa.gov/coronavirus/indoor-air-and-coronavirus-covid-19>.

FAQs specific to IAQ issues are available at <https://www.epa.gov/coronavirus/frequent-questions-about-indoor-air-and-coronavirus-covid-19>.

EPA's indoor air COVID-19 guidance and FAQs include links to additional resources, including relevant CDC guidance, for managing IAQ to help provide protection against airborne transmission of COVID-19 in homes, schools, offices and other commercial buildings.

For multilingual web content on COVID-19 and indoor air quality (as well as other indoor air environmental health issues), visit <https://www.epa.gov/lep>. EPA is continuing to add multilingual content and is updating this FAQ list, so please consider checking it routinely.

For the latest information on EPA's overall COVID-19 guidance and response, visit <https://www.epa.gov/coronavirus>.

Science

EPA-Sponsored Consensus Study Emerging Science on Indoor Chemistry NASEM Announces Public Workshop Hosted by NASEM on April 5, 2021

The EPA-sponsored consensus study *Emerging Science on Indoor Chemistry by the National Academies of Sciences, Engineering, and Medicine (NASEM)* is convening a team of scientific experts to examine the state of the science regarding chemicals in indoor air, with a focus on under-reported chemical science discoveries and how these findings shine light on the link between chemical exposure, indoor air quality and human health. Study sponsors include EPA, the CDC, the National Institute of Environmental Health Sciences and the Alfred P. Sloan Foundation.

NASEM has announced a virtual public workshop to be held on April 5, 2021, from 9:30 a.m. to 5:00 p.m. EDT to launch the study. The workshop will feature invited presentations from leading experts on topics that include emerging science on indoor chemistry, monitoring and exposure, crosscutting issues, and data gaps and research needs to support information gathering for the consensus study.

Register to attend the public workshop at <https://www.eventbrite.com/e/emerging-science-on-indoor-chemistry-and-implications-a-workshop-tickets-142536377141>. More information can be found on the study website.

www.epa.gov/indoor-air-quality-iaq/federal-interagency-committee-indoor-air-quality

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EPA-Sponsored Public Workshop Series on Indoor Exposure to Fine Particulate Matter and Practical Mitigation Approaches to be Hosted by NASEM on April 14, 20 and 28, 2021

EPA is sponsoring a three-webinar workshop series called *Indoor Exposure to Fine Particulate Matter and Practical Mitigation Approaches*, hosted by the NASEM. The workshop will be held across three sessions on April 14, 21 and 28, 2021. The workshop follows on the 2016 NASEM Workshop and Report, *Health Risks of Indoor Exposure to Particulate Matter*, and will address the state of the science on exposure to fine particulate matter (PM_{2.5}) indoors, its health impacts, and engineering approaches and interventions to reduce exposure risks, including practical mitigation solutions in residential settings. The workshop will feature invited presentations and panel discussions with top experts in the field.

- *April 14 Topic:* Sources of indoor PM_{2.5}
- *April 21 Topic:* Health effects, metrics and assessment of indoor exposure to PM_{2.5}
- *April 28 Topic:* Mitigation of indoor exposure to PM_{2.5}

Program details and registration will be posted at <https://www.nationalacademies.org/our-work/indoor-exposure-to-fine-particulate-matter-and-practical-mitigation-approaches---a-workshop>.

Recently Announced: Cleaner Indoor Air During Wildfires Challenge Competition

EPA and other federal, state, local and tribal partners recently launched the Cleaner Indoor Air During Wildfires Challenge Competition. The goal of the challenge is to encourage the development of low-cost air cleaning technologies that reduce particulate air pollutants in homes during wildfires or other high-pollution episodes. Challenge winners whose ideas are chosen will receive prizes of up to \$10,000.

The following organizations are partnering with EPA on this challenge competition:

- U.S. Department of State
- CDC's National Center for Environmental Health and National Institute for Occupational Safety and Health
- National Institute of Standards and Technology
- Hoopa Valley Tribe
- California Air Resources Board
- Oregon Health Authority
- Missoula City-County Health Department
- Puget Sound Clean Air Agency
- Lane Regional Air Protection Agency

The challenge is now open, and proposals will be accepted through May 17, 2021.

Please visit the challenge [website](#) to learn more about the challenge and how to apply.

EPA Staff Participated in Development of Recently Released ASHRAE Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events

On February 12, 2021, ASHRAE released a [new guidance document](#) called “Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events.” The document provides recommended HVAC and building measures to minimize occupant exposures and health impacts from smoke during wildfire and prescribed burn smoke events, with an emphasis on commercial, school, and multi-unit residential and similar buildings. The document also includes considerations for reducing transmission of SARS-CoV-2 in these situations. EPA staff contributed to the development of the guidance through the ASHRAE Guideline Project Committee (GPC) 44P Committee.

Upcoming EPA Indoor Air Quality Science Webinar, Understanding the Health Effects From Radon: Fundamentals and New Insights (March 16, 2021, from 10:00 a.m. to 12:00 p.m. EDT)

Radon, a naturally occurring radioactive gas that can be found across the United States, is the second leading cause of lung cancer after smoking. This webinar will describe approaches for estimating the health risk of radon, summarize findings of epidemiologic studies of radon and share findings of a recent report published by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), which evaluated lung cancer from exposure to radon.

- **Radon: Leading Environmental Cause of Cancer Mortality in the United States?**
Presented by: Bill Field, Ph.D., Department of Occupational and Environmental Health, The University of Iowa
This presentation will provide a summary of the findings of the various cohort and case-control epidemiologic radon studies and their reported risk estimates, including some of the obstacles to reconstructing past radon exposure. In addition, a brief overview of studies suggesting adverse health effects from protracted radon decay product exposure other than lung cancer will be presented.
- **UNSCEAR 2019 Report: Lung Cancer Risk from Exposure to Radon**
Presented by: Brian J. Smith, Ph.D., Department of Biostatistics, The University of Iowa
This presentation will provide a summary of the findings of a recent report published by UNSCEAR, which evaluated lung cancer from exposure to radon. This presentation will provide a brief overview of the report’s findings, including recent developments in risk estimates of lung cancer and radon exposure, radon dosimetry, and dose conversion factors applied for radon dose assessment.

For more information and to register for this webinar, please visit this [registration link](#).

Household Energy (Cooking, Heating and Lighting in the Developing World)

Promotion of ISO Standards

The household energy community has completed and issued important standards in the past 2 years through the International Organization for Standardization (ISO) process. In 2018, ISO published the international standard for laboratory testing of cookstoves. The new standard includes protocols to test and report the emissions, efficiency, safety and durability of cookstoves in a lab setting. The laboratory

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test standard replaces an ISO International Workshop Agreement from 2012, which was led and organized by EPA through the Partnership for Clean Indoor Air. The new standard serves as the basis for national policies and programs on cookstoves, while also incentivizing manufacturers and developers to improve stove quality and performance. An accompanying ISO technical report that benchmarks performance to voluntary performance targets or tiers and provides guidance on how to understand and interpret laboratory test results also was approved and published.

In 2019, a second ISO household energy standard, “Guidance on Field Testing Methods for Cookstoves,” was finalized. These voluntary documents provide a framework for organizations, countries and regions to adapt and implement cookstove protocols, metrics and targets based on their priorities over the coming months and years. ISO standards are reviewed and updated regularly, so these standards can be updated based on future research and on the progress in the cookstove and fuel market.

EPA is working with the Clean Cooking Alliance, the ISO and the World Health Organization (WHO) to organize and facilitate regional workshops to promote the adoption or the adaptation by countries of the recently finalized ISO harmonized laboratory standards for clean cookstoves and clean cooking practices. The first workshop was held in Nepal for 10 Asian countries in December 2018. The second workshop was held in Uganda for 11 Anglophone African countries in July 2019. Although in-person regional workshops in West Africa and Latin America were postponed in 2020, organizers have developed a six-session virtual workshop series (conducted in English and French) to begin engaging with stakeholders in West Africa for Francophone African countries now. The sessions are designed for policymakers and for stove-testing experts at household energy laboratories to provide technical assistance and guidance on laboratory testing methods contained in the new ISO standard.

Launch of the Advancing Sustainable Household Energy Solutions Initiative at Colorado State University

EPA cooperative agreement recipient Colorado State University, in collaboration with Berkeley Air Monitoring Group, began a new household energy solutions and air quality initiative. Through the Advancing Sustainable Household Energy Solutions (ASHES) initiative, Colorado State is building a consortium of household energy community members that includes researchers, academics, practitioners, private industry and community partners working together to define the way forward and advance sustainable household energy solutions for public health and environmental sustainability. This work includes a webinar series that focuses on the support of the WHO and its role in the development and implementation of stove performance standards or targets and how that effort fits into its broader portfolio of tools and support for household energy, an overview of the voluntary performance targets and the tools WHO has provided to derive region-specific performance targets (focusing on the emissions), and a brief summary of Uganda’s progress in adopting the ISO standards and its future plans or possibilities for deriving stove performance targets.

Radon

National Radon Action Plan

IED continues to support the growing national network of federal agencies, private-sector entities, nongovernmental organizations and states to prevent lung cancer deaths through the National Radon Action Plan (NRAP). Along with other NRAP founding members, the American Lung Association has brought in supporting organizations (those who have signed a declaration of support) and emerging

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potential partners (organizations identified to help drive progress) to increase the mitigation of existing homes and the construction of new homes with radon-reducing features. The NRAP expands the efforts under the Federal Radon Action Plan to focus on actions that go beyond federal governmental actions alone.

The NRAP presents a long-range strategy for eliminating avoidable radon-induced lung cancer in the United States. The Plan's near-term goals are to reduce radon risk in 5 million homes and to save 3,200 lives. Although these goals offer bold and important milestones, the NRAP's ultimate goal is to eliminate avoidable radon-induced lung cancer in the United States by incorporating radon testing, radon mitigation and radon-resistant construction into the systems that govern purchasing, financing, constructing and renovating homes and other buildings. Progress for NRAP strategies can be tracked at <http://www.radonleaders.org/resources/nationalradonactionplan>.

Some highlights include the following:

- Throughout much of 2020, NRAP partners have been focused on developing and finalizing the NRAP Accomplishments report. This report is an important milestone, showing work completed by the diverse stakeholder group up to this point.
- The NRAP Leadership Council met on December 9, 2020, and January 27, 2021. NRAP partners are focused on aligning around a bold goal for the next 5 years of national radon action; measuring progress; and determining high-impact strategies for saving lives from radon in the near term. NRAP partners continue to move forward on developing the next version of the NRAP. Several themes have come up in discussions about the next version of the NRAP, including the following:
 - Changing building codes to ensure homes are built radon resistant and to require post-installation testing
 - Leveraging available sources of funding and recognizing opportunities to seek additional funding
 - Ensuring equity and value addressing disparities in radon risk reduction

State Indoor Radon Grants

The FY 2021 Consolidated Appropriations Act was passed in December 2020. State Indoor Radon Grant (SIRG) funding was appropriated at \$7.795 million for FY 2021, slightly more than \$7.789 million from FY 2020. EPA Regions are beginning to negotiate 2021 radon grants with states and tribes. EPA is working to finalize the 2020 Annual SIRG Activities Report. This report highlights the important work states, territories and tribes are undertaking across the country to advance risk reduction. (A link to the report will be available on EPA's [SIRG Resources web page](#).)

EPA's SIRG Resources web page includes general SIRG information, a link to the grants.gov applications, guidance from the Agency regarding work planning and funds utilization in the face of challenges due to the COVID-19 pandemic, and other useful information. (Visit the web page at <https://www.epa.gov/radon/state-indoor-radon-grants-resources>.)

CRCPD Mini-Grants and Spring Webinar Series

The Conference of Radiation Control Program Directors (CRCPD), under its cooperative agreement with EPA's Indoor Environments Division, issued 11 mini-grants to state, tribal and local partner organizations for innovative projects that will address radon risk reduction. These projects are aimed at expanding radon risk reduction (including low-income mitigation assistance), activities that advance technical understanding of radon risks, and outreach projects that will result in a significant increase in visibility, knowledge, awareness and action. Upon project completion, award recipients must develop a summary report, including the lessons learned and project results. Please see the announcement in the Fall 2020 CRCPD Newsbrief for more information. (Link provided [here](#).)

CRCPD and The American Association of Radon Scientists and Technologists (AARST), in partnership with EPA's Indoor Environments Division, are hosting a series of radon webinars to be presented over the next 6 months. Announcements about the webinar series will be shared through several networks (including CRCPD, AARST and EPA), and additional details about upcoming webinars and registration information will be posted on <http://www.radonleaders.org>.

Standards of Practice

EPA, AARST and CRCPD collaborated to host two webinars in April 2020, focused on radon testing and mitigation standards.

EPA issued updated guidance recommending that states and other recipients of SIRG reference the most current voluntary consensus-based standards when implementing their radon programs (dated April 2020). The updated guidance includes the latest new construction standards, but otherwise remains consistent with the previous version (dated August 2019) and is available on the [SIRG Resources web page](#).

Building Codes

EPA continues to collaborate with industry and states to actively engage in efforts to promote adoption of radon-resistant new construction practices through international, national, state and local building codes. These efforts are mandated by the Indoor Radon Abatement Act and are also a key component of the NRAP.

EPA is working with key radon stakeholders to draft code changes or introduce new code requirements in several different areas within the broad spectrum of the International Code Council (ICC) portfolio that include the following:

- International Building Code
 - Educational Occupancies Requirement (schools and daycares)
 - Multifamily Buildings Requirement (R-2: apartment houses, congregate living facilities, etc.)
 - A non-mandatory provision for radon control in the body of the code
 - New Appendix—available for adoption by local and state jurisdictions

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- Property Maintenance Code
 - Testing and mitigation requirement

The proposals for the various changes/additions to the ICC codes were due at the end of January 2021.

Radon Credentialing

Professionals who provide radon testing and mitigation services play a key role in public health protection efforts. Although credentialing systems exist for radon professionals and roughly 6,300 individuals are credentialed today in the United States through state licensure or private credentialing bodies, these systems lack a standard benchmark for quality. As part of EPA's role to support state programs and to promote the availability of the best possible radon services to consumers, EPA sought public feedback in 2017 on a proposed non-regulatory approach for developing a framework that would help align existing credentialing systems for radon service providers and promote access to a qualified workforce. The Agency plans to post an updated proposal online that reflects stakeholder feedback and hold an information session as soon as possible. For more information about EPA's proposal, visit <http://www.epa.gov/radon>.

Asthma

National Environmental Leadership Award in Asthma Management

The National Environmental Leadership Award in Asthma Management is presented annually to community-based programs that exemplify innovative asthma programs working to improve the lives of people with asthma, especially those disproportionately impacted. Award winners serve as models and technical resources for other programs across the country. The application for the 2021 awards process is now closed. EPA and an interagency review panel currently are reviewing applications and will announce the winners during Asthma Awareness Month (May). More information about the work of the previous award winners can be found at <https://www.epa.gov/asthma/national-environmental-leadership-award-asthma-management#2020>.

Community of Practice and Federal Asthma Disparities Work Group

EPA is continuing to work at the national, state and local levels to find breakthrough solutions for environmental management asthma interventions. As part of this effort, a Community of Practice was formed. The Community of Practice is focused on collecting and spreading emergent and innovative practices to deliver and finance environmental asthma interventions, including addressing the home environment during the coronavirus pandemic when home visits are challenging.

In addition to this effort, EPA is serving in a leadership capacity on the Federal Asthma Disparities Workgroup to accelerate federal action on key areas critical to sustainable financing for in-home interventions. The federal workgroup has identified sustainable financing of in-home interventions as one of its top three priorities, with EPA and HUD taking the lead.

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AsthmaCommunityNetwork.org

An important component of EPA's asthma program is equipping stakeholders with ongoing technical knowledge and capacity building. This is accomplished through [AsthmaCommunityNetwork.org](https://www.asthmacommunitynetwork.org), an online resource that facilitates peer-to-peer engagement and action learning events. Currently, almost 4,700 members are registered. EPA hosts technical webinars throughout the year, and they are archived on this website. In addition, AsthmaCommunityNetwork.org features more than 600 asthma educational materials in the Resource Bank and offers mentoring opportunities for registered members. You also can find more information on our asthma award winners and sustainable financing. If you are not a member, join today!

AsthmaCommunityNetwork.org now features more schools-based content. Creating healthy indoor school environments is important to ensure that school-aged children, especially those with asthma, have healthy learning environments. To promote such environments, the Network has expanded to provide additional focus on addressing the school sector.

Comprehensive IAQ Interventions in Homes

Indoor airPLUS: New Homes

In April 2020, in response to the COVID-19 pandemic, EPA's Indoor airPLUS (IAP) and ENERGY STAR Certified Homes Programs announced [temporary allowances for remote visual verification](#) of checklist items. Both programs continue to require on-site diagnostic testing for all labeled homes, which is permitted to be completed at a later date if scheduling has been impacted. The Indoor airPLUS Program has seen increased traffic on the IAP website in the last few months, likely due to heightened awareness of IAQ issues as a result of the pandemic. EPA also released an updated version of the IAP mobile app for both iOS and Android, which includes the current IAP Construction Specifications and tools for in-field verification.

Following a trend of growing public interest in indoor air quality, IED's Indoor airPLUS Program saw impressive growth of IAP-labeled homes in 2020. In the past year, EPA recorded a 17 percent increase in IAP homes (4,671 to 5,472) verified by home energy raters, and new homebuilder partnerships have doubled since April 2020 in comparison with the previous 6 months. With the recent commitment of Meritage Homes to build 100 percent of its homes with the Indoor airPLUS label, EPA expects to surpass 30,000 total IAP homes in early 2021 and anticipates the trend of increased partnerships and labeled homes to continue in the coming year.

Indoor airPLUS: Version 2 Construction Specifications

In December 2020, EPA's Indoor airPLUS Program released new proposed requirements for Version 2 of the Construction Specifications for newly built homes. These specifications will be the first significant set of changes to "raise the bar" for IAQ protections and additional measures to improve overall home performance and occupant comfort since the program was launched in 2008. Some of the areas proposed for advancement include requirements for balanced dwelling-unit ventilation, improved performance in HVAC design and filtration, lower envelope air leakage allowances, additional humidity control and local exhaust requirements, expanded requirements for radon-resistant construction, and additional categories for low-emitting materials.

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The underlying strategies for risk-reduction in Version 2 are still the same—focusing largely on *prescriptive* measures to address source control, ventilation and filtration. However, EPA recognizes that the future of IAQ and healthier homes will begin to focus more on *performance-based* approaches that include IAQ sensors, monitors and connected systems. As these technologies advance, we feel that they will benefit both occupant *awareness* through the measurement and display of contaminants and occupant *control* of their indoor environment with more responsive and automated systems that improve ventilation and filtration upon demand. Indoor airPLUS Version 2 begins to address some of these emerging areas of home performance, either through new requirements or as advisories that may become new specifications in the future.

The first public comment period ends March 17, and we want to strongly encourage interested parties to comment on the newly proposed requirements to help improve both the rigor and the market uptake of the program. The draft documents and a tool to provide public comment can be found by visiting the Indoor airPLUS homepage or the Version 2 landing page: <https://www.epa.gov/indoorairplus/indoor-airplus-version-2>. The Indoor airPLUS team also has presented at various conferences and virtual meetings to introduce these specifications. The recording from the recent ENERGY STAR Partner Meeting can be found at <https://register.gotowebinar.com/register/3923301987895872523>.

Indoor airPLUS: Existing Homes

As part of IAP Version 2, the Indoor airPLUS program is considering developing a labeling opportunity for existing homes—Indoor airPLUS Existing Homes (IAP-X). An EPA IAQ label for existing homes would provide new opportunities for home performance contractors and healthy home evaluators to partner with EPA to improve IAQ in the vast segment of existing homes throughout the country.

Energy Saving Plus Health Indoor Air Quality Guidelines for Single-Family and Multifamily Housing

EPA is updating its Energy Saving Plus Health Indoor Air Quality Guidelines for single-family (2011) and multifamily (2016) housing to address IAQ concerns and technology advancements during energy upgrades. These voluntary guidelines provide best practices for improving IAQ in conjunction with energy upgrade work. The updates include references to building codes, industry standards and URLs; best practices and technical guidance; recent developments in pollutant control (e.g., particulate matter, radon, moisture); and general formatting for improved usability by industry stakeholders. The guidance not only will help users improve their IAQ but also will provide an opportunity to market improvements in existing homes. EPA plans to release the documents and the checklist generators in the summer of 2021.

Comprehensive IAQ Interventions in Schools

Indoor Air Quality, Healthy Green Cleaning and Preventive Maintenance in Schools

EPA continues to support Healthy Indoor Environments in Schools during the COVID-19 pandemic. On November 19, 2020, IED hosted a Healthy Indoor Environments in Schools Webinar titled “Indoor Air Quality in K–12. Schools: Addressing the Concept of Layered Risk Amidst COVID-19.” Experts from the International Society of Indoor Air Quality and Climate (ISIAQ) and the American Industrial Hygiene Association (AIHA) discussed strategies for navigating the pandemic and reducing health risks and

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explored the scientific basis for guidance issued by government, health and public health organizations. A recording of the webinar is available at <https://www.epa.gov/iaq-schools/healthy-indoor-environments-schools-plans-practices-and-principles-maintaining-healthy>.

On February 25, 2021, IED hosted a Healthy Indoor Environments in Schools Webinar titled “Ventilation and Virus Mitigation in Schools: Creating a Game Plan to Reduce COVID-19 Risk and Make Lasting Improvements to IAQ.” The featured speakers were from the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE), National Energy Management Institute and District of Columbia Public Schools System Department of General Services. This webinar was designed to teach participants how to create a game plan for mitigating risk of exposure to SARS-CoV-2 in the near term and prioritizing the top five IAQ improvements to ensure healthy air in schools in the long term. Webinar participants acquired the skills to assess their current air-handling capabilities (e.g., effectiveness of filtration, ability to bring in fresh air, energy efficiency) and create a plan to improve air quality using a free online risk assessment. On-demand viewing will be coming soon at <https://www.epa.gov/iaq-schools/healthy-indoor-environments-schools-plans-practices-and-principles-maintaining-healthy>.

IED hosted the School Health and Indoor Environments Leadership Development (SHIELD) Network meeting on February 18. Meeting invitees included nongovernmental organizations, school district representatives with established IAQ management programs, industry leaders, government agencies (federal and state level), and community-based asthma coalitions focused on schools and/or healthy indoor environments. Representatives from the CDC, the U.S. Department of Education and the National Institute of Standards and Technology who have been particularly active collaborators on school IAQ attended the meeting. IED led discussions on accelerating progress on indoor environmental health in schools through the green and healthy schools movement featuring members of the ASHRAE, ISIAQ, and several prominent researchers and model school districts. Participants shared and highlighted the unique and impressive set of assets and resources they bring and how they align with the Network’s collective assets.

EPA has partnered with Chemical Insights, an Institute of Underwriters Laboratories, and launched a four-part learning module series to create awareness about the potential health risks associated with 3-D printer emissions, including for students and staff in a school environment where 3-D printers have been introduced. This series of learning modules, hosted on AsthmaCommunityNetwork.org, walks through why IAQ matters, research on the impact that operating 3-D printers has on IAQ, and how to best mitigate the unintended consequences associated with this exciting, innovative technology.

EPA continues promoting a suite of resources titled “Indoor Air Quality Tools for Schools: Preventive Maintenance Guidance Documents” to help school personnel take a holistic, proactive approach to IAQ issues. The guidance leads school personnel through the steps to develop and implement an IAQ preventive maintenance plan and offers a framework to make the case using a value proposition for an IAQ preventive maintenance plan and gain buy-in from the school community. The resources are available online at <https://www.epa.gov/iaq-schools/indoor-air-quality-tools-schools-preventive-maintenance-guidance-documents>.

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Expanding the Reach for School IAQ Training

EPA promotes IAQ guidance, tools and training to gain wider adoption of effective IAQ policies and practices in school districts across the country. EPA continues to actively deliver technical assistance to the schools community through two professional training webinar series: the 10-part IAQ Master Class Professional Training Webinar Series and the subsequent series, IAQ Knowledge-to-Action Professional Training Webinar Series. Since the launch in 2015, more than 3,000 participants have generated nearly 6,000 views of the trainings. All webinars are available on demand. Register to view the webinars at <https://www.epa.gov/iaq-schools/indoor-air-quality-master-class-professional-training-webinar-series>. EPA is eager to drive even more action in school districts through spreading the IAQ Master Class Professional Training Webinar Series across more networks and platforms. Please contact us at iaqschools@epa.gov if your organization would like to use your existing training platforms and vehicles to host or link to EPA's IAQ Master Class Professional Training Webinar Series.

Consider Subscribing to Email Alerts on IAQ Topics

EPA offers a free subscription service for information on more than 20 indoor air topics—opt in at <https://public.govdelivery.com/accounts/usepaiaq/subscriber/new> to receive email updates on IAQ. More than 145,000 subscribers regularly receive announcements of upcoming trainings, webinars and events, as well as practical tips and information resources to improve IAQ. Subscribers can choose among 20 topics, such as mold, air cleaners, radon, environmental asthma and air quality in schools. Many topics also are presented in Spanish. Subscriptions can be canceled easily at any time.

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