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Reopening: Guidance for Laboratories

Guidance Document

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Overview

Laboratory workplaces and operations have been affected by the COVID-19 pandemic, from limited to complete workplace closures. Following individual state and local guidance, many workplaces are now fully reopening. The purpose of this document is to provide clear and actionable guidance for the safe reopening of laboratory facilities, including measures to slow the spread of COVID-19 and maintain a healthy workplace while resuming or continuing operations.

Laboratory operations for the purposes of this guidance document consist of traditional research, governmental, and commercial chemical and biological laboratories as well as support operations (e.g., chemical storage, equipment rooms, cold rooms, photography studios, office areas), analytical and quality laboratories, medical and assay laboratories, animal procedure and surgery spaces, conservation laboratories and studios, and museum collection research and study laboratories. Occupations working in and supporting these laboratory operations include researchers, staff, students, interns, postdoctoral researchers and fellows, engineering facilities and custodial staff, visitors, contractors, conservators, museum staff, and vendors.

Overall, it is advised that employers take a controlled and phased (stepwise) approach to reopening, one that allows employers to prioritize health and safety while taking progressive steps to restore regular operations. New laboratory protocols may need to be developed and implemented to reduce the risk of transmitting COVID-19 by person-to-person spread through aerosolized respiratory droplets and surface transmission, but in the meantime, it will be important to continually reevaluate the efficacy of protocols and adjust accordingly.

As laboratory administrators begin their reopening process, they should address these fundamental questions:

- How can we protect the health and safety of employees, academic affiliates (students, postdocs, fellows, interns), visiting researchers, vendors, and contractors?
- How do we best protect high-risk populations?
- What steps need to be taken regarding increased cleaning and disinfection and improved ventilation controls?
- What employee training and communication is needed to keep everyone informed of the preventive steps being implemented?

This document addresses guidance for laboratory facilities that have not been previously evaluated in other AIHA's Back to Work Safely Guidance documents. Please refer to AIHA Guidance documents on General Office Settings (including guidance on restrooms), Institutions of Higher Education, Schools (K-12), Restaurants (for guidance on shared dining/kitchen areas), Museums and Collecting Institutions, and Libraries to address areas other than the direct laboratory environment.

Please refer to the Resources section for links to AIHA Guidance documents concerning other areas of employment. Consider consulting an industrial hygiene or occupational safety expert if additional advice is needed. AIHA has a consulting list of qualified professionals.

What Actions Should Laboratory Facilities Take to Protect Personnel?

Employers should continually monitor international, federal, state, and local guidelines for updates and changes in recommendations, cleaning and disinfecting strategies, and other best management practices. The international authority is the World Health Organization. On the federal level, it is the Centers for Disease Control and Prevention and OSHA in the United States, or the Canadian Centre for Occupa-

tional Health and Safety. Employers also should seek guidance from regional, national, and international leaders relative to health policy and best practices.

In addition, employers should consider forming a team that includes leadership, health and safety professionals, facilities engineering, custodial, and laboratory personnel, to monitor, assess, and implement new strategies as necessary. Lastly, employers should consider the following methods for reducing the risk of COVID-19 transmission: physical distancing strategies, enhanced cleaning practices, engineering and administrative controls, wellness, training, and risk communication.

Due to the wide variety of laboratory facilities (e.g., geographic location, size, physical layout, structure), employers may not be able to implement all of the following recommendations. They therefore are encouraged to work with state and local health officials to consider and implement these recommendations and make the necessary adjustments to meet the specific needs of both the facility and the local community.

Personnel and Facility Readiness

- Review and update laboratory sick leave policies and compensation. Policies should encourage and allow employees to stay home if sick, or if they need to care for dependents who are sick. Make sure policies do not inadvertently encourage employees to come to work when they are not feeling well.
- Establish a clear chain of command for return to work: to whom to report unsafe conditions if supervisors are not on-site, who the designated on-site safety officer is, and whether that person is expected to be on-site daily. See the Contact Tracing and Space Use Monitoring section for details on access control.
- Before returning to work, communicate with employees about the COVID-19 health and safety plans that are in place, what employees should expect upon return, and online training materials as applicable. This can be accomplished using the facility's webpage, web meetings, Q&A sessions, or internal email systems.
- Designate someone to be responsible for responding to employees' COVID-19 concerns. In a laboratory, the most appropriate person might be the lab supervisor or manager or the principal Investigator. Employees should know who this person is and how to contact this person at all times.
- Consult OSHA's Guidance on Preparing Workplaces for COVID-19 to assess which work activities and employees have very high, high, medium, and low risk-exposure levels. This will help determine how to phase in employees' return to work and resumption of activities.
- In the first phase of reopening, allow telework-capable and high-risk employees (per CDC guidance: persons over 65 years of age or with certain underlying medical conditions) to work from home, with only essential employees on-site.
- Offer alternative work hours for employees challenged by infrastructure not in place yet (day care and school closures, eldercare needs, limited public transit).
- Encourage teleworking whenever possible. If possible, arrange for administrative staff to work from home.
- Stagger on-site work schedules so that employees do not overlap in the same direct area. Determine which procedures can be performed remotely, including laboratory meetings, study design, data analysis, and writing.
- Consider discontinuing or limiting nonessential visitors or outside volunteers.

- Review laboratory-assigned duties and consider reassignment, cross-training, or coordination to reduce the density of on-site employees.
- Identify tasks that should not be performed alone, such as working with highly hazardous materials in the lab. Ensure that other individuals are located nearby and trained to help in an emergency. If working alone is necessary, a check-in process should be established. This can be executed manually or by implementing automated device or app-based systems.
- Stock cleaners, disinfectants, hand sanitizers, face coverings, and any necessary personal protective equipment (PPE).
- Install building signage indicating distance requirements, bathroom and elevator capacity and use requirements, traffic flow, pause points, face-covering expectations, food and beverage processes, and hand-cleaning.
- Confirm that outside contractors, visiting researchers, and staff from adjoining shared space labs understand your established COVID-19 protocols or that they have established their own compatible COVID-19 protocols. Consider adding an addendum to their contract stipulating vendor-required COVID-19 protocols.
- If spaces have been unoccupied, perform a walk-through and initial readiness assessment of all laboratories, storage areas, and office spaces. Look for lost or missing items, damage due to mold or pests, or other items that require immediate attention.
- Prior to reopening, perform ventilation surveys to determine whether exhaust hoods and trunks are operating within recommended ranges. Also consider water safety (e.g., *Legionella*) if the water has been stagnant for a significant period of time.
- Confirm that lab space air exchange rates and HVAC filtering capabilities meet recommendations of the American Society of Heating, Refrigerating and Air-Conditioning Engineers for building operations (see the section Ventilation and Other Building System Utilities).
- Review and submit any applicable permit renewals. These will vary by jurisdiction.
- Ensure that equipment and instruments are properly calibrated and maintained.
- Review emergency and disaster plans for compliance with COVID protocols.

Laboratory Staff Wellness

- Instruct employees, vendors and visitors to stay home if they are sick, display COVID symptoms, have a temperature of 100.4°F (38.0°C) or above, have tested positive, or are awaiting results from a COVID-19 test; or if someone within their household is sick or has tested positive.
- Employers should educate employees, including lab workers, to recognize the symptoms of COVID-19 and provide instructions on what to do if they develop symptoms. At a minimum, any worker should immediately notify their supervisor, their employer occupational health clinic (if applicable), their healthcare provider, and their local health department, which will provide guidance actions to take.
- Instruct employees on steps to help prevent the spread of COVID-19 if an employee is sick.
- Instruct sick employees to stay home and not return to work until the criteria to discontinue home isolation are met, in consultation with healthcare providers and state and local health departments.
- Establish routine, daily wellness health checks on arrival or online before arriving on-site (such as temperature screening and symptom screening of all staff and visitors). Conduct screenings safely, respectfully, and with measures in place to ensure confidentiality, as well as in accordance with any applicable privacy laws or regulations.

  - Perform a temperature check to ensure that anyone with a fever is not admitted to the facility.
  - Perform a visual inspection for other signs of illness (e.g., flushed cheeks, rapid or difficulty breathing without recent physical activity, fatigue, cough).
  - Additional screening information and guidance can be found on the CDC website and provided in CDC's General Business FAQs for screening individuals.
- If employees receive any testing, results and testing methodology should be reported to the employer. Then, all regulations and policies should be followed in relation to occupational medical records, including healthcare decisions based on test results.
- Remind employees that people may be able to spread COVID-19 even if they do not show symptoms. Consider all close interactions (within 6 feet for a total of 15 minutes or more) with any person as a potential source of exposure and avoid such interactions if possible.
- Provide all who enter and exit the facility with adequate time and access to soap, clean water, and either single-use paper towels for handwashing or a hand sanitizer with at least 60% alcohol (often listed on the label as ethanol, ethyl alcohol, isopropanol, or 2-propanol). Ensure proper labeling and accessible safety data sheets (SDSs). Shared spaces should be equipped with a hand-sanitizing station at each entrance to each room or building. (Check that the hand sanitizer is safe to use and not methanol based.)
- Provide signage on washing hands with soap and water for at least 20 seconds. Post signs and reminders at entrances and in strategic places with instruction on hand hygiene, respiratory hygiene, and cough etiquette. This should include signs for non-English speakers, as needed.
- Instruct employees to avoid touching things unnecessarily throughout the lab areas.
- For shared items, create a procedure for cleaning shared equipment after use, and remind staff not to touch their mouths, noses, or eyes during use of shared equipment.
- Ensure employees are assigned individual PPE such as lab coats and safety glasses.
- Follow the Personal Protective Equipment and Face Coverings section of this document, since these practices may vary for activities in the laboratory.

Training and Communication

- **Employers** should notify laboratory, maintenance, and custodial personnel as well as contractors and vendors of new policies and changes prior to reopening and upon resuming operations.
- Consider scheduling training for supervisors and team leaders before returning to the venue, possibly off-site or virtual, as a train-the-trainer opportunity and deploy those leaders once employees return to the venue. Explore the National Institute of Environmental Health Sciences Worker Training Program for COVID-19 Virtual Safety Training Initiative. Detailed instructor notes are included.
- **All employees** should be trained on new or modified schedules, how they can stay up to date on new scheduling requirements, and how they can request schedule changes if a need arises.
- Communications to employees about what is being done to mitigate the spread of COVID-19 should include safety measures such as physical symptoms of COVID-19, disinfection routines, social distancing policies, and protocols for when an employee has a confirmed case.
- Written communication can include social media and websites, posted information on indoor or outdoor bulletin boards, and online dashboards of up-to-date infections and testing statistics.

- **All employees** should receive, at minimum, awareness training on chemical hazards, safety procedures, proper donning and doffing of PPE, use and limitations of required PPE, face-covering usage, and personal hygiene, in accordance with OSHA requirements, particularly its Hazard Communication standard. Employees must have access to SDSs for all cleaning products and chemicals in use. For employees who will use disinfectants and cleaners, training should also include proper use, PPE, disposal, and all precautionary measures.
- Educate employees on cleaning of common high-touch surfaces (e.g., doorknobs, faucet handles, light switches) and unique venue-specific high-touch surfaces (e.g., interactive touch screens, vending machines, shared equipment). Train employees to wipe down and disinfect surfaces after every work interaction and between timed-entry public visitations, and train them on the importance of contact time for disinfectants.
- Plan for respiratory protection training, medical surveillance, and fit-testing for respiratory protection per OSHA Standard 29CFR 1910.134 to be initiated before employees return on-site to perform any work with a high risk of exposure to the COVID-19 virus. Explore distribution of medical surveillance forms electronically and facilitate access to e-learning.

Note: Employer human resource policies, HIPAA guidelines, and other pertinent laws should be followed at all times.

Personal Protective Equipment and Face Coverings

Please note this section is focused on face coverings and PPE as it relates to the COVID-19 pandemic and does not address PPE requirements for hazards associated with laboratory activities. For example, processing SARS-CoV-2 samples may require NIOSH-approved respirators and other OSHA-required measures.

- Cloth or disposable face coverings should be worn unless you are the only person in the space or in a private office. Face coverings are not a substitute for physical distancing, engineering controls, cleaning, proper hygiene, or staying home while sick. Nor are face coverings considered PPE. However, they are recommended by the CDC to limit spread of COVID-19 as a public health hazard.
  - Exception: Face masks or coverings made of natural fibers (e.g., cotton) or fire-resistant material should be worn during laboratory activities involving flammable materials, pyrophoric compounds, or open flames.
- Disposable face coverings, rather than cloth face coverings, are recommended for wear during laboratory work that involves working with (but not being overexposed to) hazardous chemicals or biological or radiological materials. Therefore, they can be disposed of after these tasks are completed. If contamination with hazardous materials may have occurred, face coverings should be disposed of immediately per your facility disposal requirements.
- N95 filtering facepiece respirators or higher levels of respiratory protection (e.g., full-face elastomeric air purifying respirators) may be assigned due to occupational hazards in the laboratory. Employers should follow OSHA Respiratory Protection requirements. See the Training and Communication section.
- Gloves are not a substitute for rigorous handwashing protocols and are not recommended as a standard public health measure to limit the spread of COVID-19.
- Any reusable cloth materials (e.g., lab coats, face coverings, aprons, uniforms, cotton gloves) should be laundered either on-site or via a commercial service prior to subsequent use. Laundering and drying should be performed at the highest temperature setting allowable for the fabric. If reus-

able cloth materials are laundered on-site, training should be provided that addresses cleaning protocols and safe handling.

- Ensure that all commercial laundry providers are aware of the potential for SARS-CoV-2 viral exposure if the lab is handling, testing, or analyzing SARS-CoV-2 samples.
- PPE should not be shared. Clean and disinfect PPE between uses (e.g., safety glasses, goggles, face shields).
- Personnel should be assured that they can let their supervisor know if they have concerns about the PPE being provided.

If Lab Operations Include the Handling and Processing of SARS-CoV-2 Samples:

- Separate this area(s) from other areas of the lab. Use signage to alert others in the lab that this area is high risk and should be avoided if possible.
- Follow recognized, sound biosafety practices to prevent or minimize the transmission of infectious agents (in this case, SARS-CoV-2). Laboratories should already be using standard precautions and should be following standard laboratory practices. These practices should continue when working with SARS-CoV-2 samples and specimens. This includes clinical and microbiological laboratories performing routine diagnostic, analytical, or other research-related tests on serum, blood, sputum (respiratory), and other specimens. The CDC and OSHA suggest using a combination of standard precautions, contact precautions, airborne precautions, and eye protection.
- For more detailed information, see OSHA's guidance document COVID-19 Control and Prevention for Laboratory Workers and Employers.

Physical Distancing, Including Shared Spaces and Equipment

Shared spaces and equipment may include cold rooms, equipment rooms, common rooms, office areas, and laboratory stations or worktables, as well as specific equipment such as centrifuges, microscopes, cameras, analytical equipment, and specialized tools.

- Arrange workstations to accommodate physical distancing of at least 6 feet considering the flow of foot traffic. If physical distancing is not possible (e.g., in the case of front-desk personnel or screeners), partitions should be considered. Consider the use of camera technologies to remotely monitor entrances.
- Use floor markings to promote physical distancing. Consider establishing one-way foot traffic.
- Encourage physical distancing by asking personnel and contractors and vendors to stay at least 6 feet apart from each other, and to wear face coverings in any shared spaces. Discourage employees from lingering or socializing in shared spaces and eating or drinking together. Stagger breaks to make it easier to physically separate.
- Limit the number of laboratory occupants to allow for physical distancing. Opportunities to enable remote work should be continually evaluated. Consider staggering laboratory schedules and shifts to reduce the number of laboratory occupants. Create schedules for shared equipment. Maintain compliance with local or employer-specific guidance where applicable (e.g., maintaining no fewer than two personnel in the laboratory at a time during certain analytical procedures or use of certain chemicals).
- Regulate the use of shared spaces and equipment with clear signage (including maximum occupancy) and physical distancing measures in accordance with public health rules and guidelines.

- Post equipment cleaning and disinfection protocols for shared spaces and equipment.

Contact Tracing and Space Use Monitoring

- Systems to deliver information on the use of space can contribute to contact tracing and help an employer monitor the effect of policies regarding the numbers and distribution of occupants. A wide range of technical approaches to handling space use information can be employed. Some options include:
  - A manual sign-in sheet or attendance log is a simple tool that can be implemented.
  - The access control system or building automation system may offer digital options with varying capabilities. Traditional occupancy sensors indicate if there are any people in a space, but not which individuals and not always how many.
  - Today's occupancy or presence sensors detect users with much higher spatial resolution, making it feasible to count the people in a room and record their distribution. The technology depends on many sensors, typically attached to each light fixture, and connected by a wireless network.
  - In facilities where users carry unique, electronic ID badges, systems can record each individual's location throughout the day. It may be necessary to consult the facilities staff on the technical capabilities of existing systems.
- Implications for the culture of the organization are significant. In some cases, software is available to turn the sensor data into information about potential exposure. The occupational safety team needs to consider that culture when selecting the tools and technology to gather and process information on movements of workers.

Disinfection, Cleaning and Sanitization

What Is the Difference?

- **Cleaning removes germs**, dirt, and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.
- **Disinfecting kills germs** on surfaces or objects by means of chemicals. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.
- **Sanitizing lowers the number of germs** on surfaces or objects to a safe level, as judged by public health standards or requirements. This process **works by either cleaning or disinfecting** surfaces or objects to lower the risk of spreading infection.

Enhanced Cleaning and Disinfection

- Existing laboratory standard operating procedures for cleaning and disinfection, particularly those related to quality assurance, should be reviewed and updated as appropriate with COVID-19 specific methods and materials. For example, certain lab plans already address cleaning or disinfection of surfaces between cases (forensic labs). Conservation and art spaces may require specific sequencing: surfaces cleaned with soapy water and cloth, clean water used to rinse residues, dry clean towel wipe, and a 70% isopropanol cloth wipe, 1 to 5 minutes dwell time, and finally air dry. Follow your workplace guidelines for cleaning and disinfection.
- Use only disinfectants approved by the EPA for COVID-19 disinfection. Visit the EPA website and search for List N: Disinfectants for approved disinfectants. When using an approved disinfectant, ensure that the contact time stated by the manufacturer is met for proper disinfection. Failure to meet manufacturer contact time may not fully disinfect the desired surface.
- Select appropriate disinfectants both for the expected occupant load and activities in each space and for the effect of the disinfectant on laboratory

activities (e.g., chemical interference with laboratory analysis), equipment, and surfaces. Disinfectants in the laboratory may differ from those identified for use in the office areas.

  - Disinfectants should be compatible with equipment (e.g., cameras, microscopes) and processes. For example, bleach can damage metal in biosafety cabinets, so alcohol is recommended.
  - When choosing disinfectants, take into account possible residues the disinfectant may leave. For example, use only alcohol-based solutions in all areas where art might be placed, or on handles or equipment that might be touched directly before art (carts, art cabinet handles).
  - Fogging, misting, or electrostatic spraying is not generally recommended for disinfection in laboratory environments, assuming that traditional disinfecting methods suffice. If these approaches seem to be needed for surfaces that cannot be disinfected using traditional methods, use them only if the product label specifically includes disinfection directions for this type of application.
- Ensure that laboratories are adequately and continuously stocked with disinfectant supplies, hand sanitizer, soap, and paper towels. Encourage frequent handwashing. Hand sanitizer should only be used if handwashing sinks are not readily available. Provide readily available cleaning supplies for employees to utilize before and after they use common spaces and contact surfaces.
- Do not mix different EPA-registered chemicals. The combination could be toxic by inhalation.
  - Review product labels and safety data sheets (SDSs), and follow manufacturer specifications for cleaning and surface-contact duration.
  - Ensure that appropriate PPE is used when mixing, applying, and disposing of disinfectants. Refer to the SDS for guidance.
- Ensure that waste disinfectants and waste created from the use of disinfectants is disposed of per local, state, and federal waste regulations.
- Identify high-touch surfaces within the laboratory, and develop strategies to minimize contact with commonly touched surfaces, to include handwashing or use of hand sanitizer before and after touching high-touch surfaces. Examples include microscope oculars, control panels, sample containers, equipment handles, and shared computers. Identify commonly touched surfaces in the facility, including shared office and lab spaces. Examples include doorknobs, faucet handles, and light switches.
- Shared equipment, including fume hoods, biosafety cabinets, freezers, and instruments, should be disinfected before and after each use.
- Establish a cleaning and disinfection routine for employees to clean high-touch and commonly touched surfaces before and after use using EPA N-Listed disinfectants. Common areas are to be cleaned or disinfected more frequently. Use disposable towels to wipe surfaces, if possible. All items should be allowed to dry thoroughly following cleaning. See the cleaner's product-specific instructions to determine the necessary contact and drying time.
  - Seating, doors, restrooms, common areas, and so on should be disinfected at the end of each day.
  - Benchtop liners (diaper paper) cannot be cleaned or disinfected. Therefore, these liners must be replaced daily or not used at all, so that the benchtop can be adequately disinfected.
  - Consider using a checklist or audit system to track when and how cleaning is conducted.
- Books and other paper-based materials are not considered a high risk for transmission, and cleaning or disinfection with cleaning solution is not recommended. If preferred, these types of materials

can be isolated for several days between uses. Plastic coverings on books can be disinfected between uses with a cleaning solution.

- Disinfectants should be stored according to manufacturer guidelines. Use caution when storing flammable disinfectants; ensure that maximum storage quantities are not exceeded. Cleaners containing bleach should not be used where collections and sensitive materials might be placed.

Ventilation and Other Building System Utilities

Heating, ventilating and air conditioning (HVAC) and other building systems, such as cooling towers, chiller loops and deionized water systems, are important aspects to consider when reopening a laboratory facility. However, if these systems have been mothballed during a prolonged shutdown, their subsequent function and use can impact worker health and effect controls for chemicals, materials, other objects, and research.

Ideally, the HVAC system should have been adjusted to account for inactivity prior to closing the facility. This dormancy may lead to harmful and uncomfortable indoor air quality issues directly related to the HVAC system.

Mold can grow on moist building surfaces (and on the surface of contents), due either to leaks or condensation on surfaces such as windows, roofs, or pipes. In addition, if *Legionella* has propagated in stagnant water and plumbing, it could become aerosolized and spread throughout the workplace via the ventilation system — possibly causing potentially fatal Legionnaires' disease. It is important that HVAC, other building mechanical systems, and the building itself be thoroughly inspected for any damage or issues caused by the vacancy.

Prior to employees reoccupying the workplace, employers and managers should consult facility management or HVAC and building systems professionals to ensure that these systems are operating correctly. Refer to AIHA's Recovering from COVID-19 Building Closures and ASHRAE's COVID-19 (Coronavirus) Response Resources updates for more information.

Ventilation

Ventilation clearly can affect the likelihood of transmitting disease between people in a building. It can directly contribute to transmission, or it can reduce the risk. The objective is to ventilate in a way compatible with the way the systems should be operated to reduce the chance of transmission. It is a simple goal but a complex physical problem. Nevertheless, the safety professional must assess the risk of infection in the various working scenarios and judge the need to mitigate it. That means taking account of each of these factors:

- Concentration of the contaminant over time due to low air movement, in contrast to effective removal
- Migration of contaminant within a room, driven by air motion
  - Spatial layout and airflow rates of supply and exhaust devices (includes general exhaust grills and exposure control devices, such as fume hoods)
  - Action of equipment that draws air in and returns it to the room (includes ductless hoods, biological safety cabinets, snorkels and downdraft tables, chilled beams, and fan coil units)
- Migration of contaminant between rooms or spaces
  - Relative pressurization of adjacent spaces (usually a small flow)
  - Transfer of makeup air between spaces (possibly a significant flow)
  - Recirculation of air between spaces by air-handling equipment

Considered together, the complexity of these issues is more than we can conclusively analyze. This makes specific guidance difficult, especially when compounded by the fact that source of contamination is an unidentified person at an unknown location. Nevertheless, the safety professional needs to assess the risk of infection in the various working scenarios and judge the need to mitigate it. That means being aware of each condition.

ASHRAE offers substantial guidance on ventilation with respect to transmission of illness, with information that applies both to buildings in general and to specific kinds of facilities. Readers are advised to use the guidance resources provided by ASHRAE and ventilation guidance specific to laboratories. In addition, consult OSHA's COVID-19 Guidance for Ventilation in the Workplace.

In addition, ASHRAE offers general building HVAC information that addresses standard practice in laboratories — for example, high outside air ventilation rates, a high level of filtration, and lack of recirculation of air from occupied spaces. Other suggestions that apply to general spaces could cause problems in a lab. For example, a room air cleaner with its own fan might disrupt air currents at exposure control devices or could introduce excess heat or noise affecting occupant comfort.

The ASHRAE documents emphasize that a team considering any adjustments to the HVAC system should consider the effects on the activities performed in the impacted spaces, in this case, laboratories. One idea worthy of attention is the recommendation to maintain relative humidity between 40% and 60%. The consequences, positive and negative, of maintaining humidity in this range can be very significant. Consider modifications carefully, with input from HVAC experts and experts who know the circumstances and characteristics of the buildings in question.

Although changes to the lab ventilation system may not be advisable, recommissioning or reassessment of the current operation is warranted. ASHRAE provides lists of system features to check.

Other Building Systems

As discussed previously, other building systems should be evaluated when reopening laboratories. Ensure that water systems, such as potable systems, cooling tower and chiller loops, and laboratory deionized or reverse-osmosis water systems, are in readiness condition for occupancy. Some measures include:

- Flushing water systems to remove stagnant water that could support microbial growth such as Legionella bacteria
- Confirming water quality parameters such as water temperature, pH, and pressure are correct
- Working with the water treatment service provider to ensure that system components are in good working order and that chemical levels are within defined ranges for cooling towers, closed water systems, and so on

If you do not know how to address these measures, ask a water systems professional. For more information, see the American Water Works Association's COVID-19 Resource Topic, EPA's Information on Maintaining or Restoring Water Quality in Buildings with Low or No Use, Louisville Water Company's Flushing Lines Video/Fact Sheet and AIHA's Recognition, Evaluation and Control of *Legionella* in Building Water Systems.

What Can Employees Do to Protect Themselves and Minimize the Transmission of COVID-19?

- Evaluate your health constantly and consistently. If you are sick, stay home. If you have an elevated temperature, stay home. If someone at home is sick or you came into contact with someone who

became sick, stay home and monitor your health. If you have another medical illness or are at high risk, stay home as much as possible. **Note: HIPAA guidelines and other privacy laws should be followed at all times.**

- Wear a face covering when in public and during the workday and maintain physical distancing.
- Wash your hands when you arrive at work, throughout the day after various activities (e.g., before and after preparing food, after handling garbage, after using the bathroom), after touching your face covering, when you leave work, and when you arrive home.
- Let your employer know if you have concerns about the PPE that may be provided to you. Make sure that you are properly instructed on how to use it.
- Do not remove your face covering to sneeze or cough. Distance yourself, and cover your nose and mouth, over your face covering. Immediately wash hands with soap and water for at least 20 seconds or use hand sanitizer. Replace your face covering as soon as feasible if it has been soiled. Clean face coverings should be kept separate from ones that are contaminated. If coughing or sneezing persists, report to your supervisor and then leave for home immediately.
- Adhere to whatever guidelines are set up for disinfecting your personal workspace and shared equipment and tools.

What Can Visitors and Clients Do to Protect Themselves and Minimize the Transmission of COVID-19?

- Adhere to instructions regarding restricted access and movement throughout the laboratory and associated spaces.
- Evaluate your own and your family's health constantly. If you or anyone in your household is sick, stay home. If any of you have an elevated temperature, stay home. If you came into contact with someone (during their infectious period) who became sick, stay home. Others who should consider staying home are those with certain medical conditions whom the CDC has determined are at increased risk of severe illness from the virus that causes COVID-19.
- Before you visit, check to see whether the laboratory requires you to wear a face covering or if there are other special requirements for entry such as temperature checks.
- Make sure you will be able to comply with the laboratory's physical distancing requirements and any restrictions to certain spaces and equipment.
- Wash your hands throughout the day and after touching your face or face covering.
- Inform the laboratory management if, after visiting, you or a family member has been either diagnosed with or in contact with someone diagnosed with COVID-19.

Resources

AIHA Free Public Resources

- AIHA Effective and Safe Practices, Guidance for Custodians, Cleaning and Maintenance Staff
- AIHA Employers Guide to COVID-19 Cleaning and Disinfection in Non-Healthcare Workplaces
- AIHA Reducing the Risk of COVID-19 Using Engineering Controls
- AIHA Personal Protective Equipment for SARS-CoV-2
- AIHA Back to Work Safely Reopening Guidelines for various settings

Other Resources

- ACGIH White Paper on Ventilation for Industrial Settings during the COVID-19 Pandemic

- American College Health Association (ACHA). Considerations for reopening Institutions of Higher Education in the COVID-19 Era
- American Society of Heating, Refrigeration and Air-Conditioning Experts COVID-19 (Coronavirus) Response Resources
- Campus Safety, Health, and Environmental Management Association (CSHEMA). Checklist for restarting laboratories on college and university campuses
- Canadian Centre for Occupational Health and Safety
- Centers for Disease Control and Prevention Coronavirus Resources
  - CDC Considerations for Institutions of Higher Education
  - CDC General Business Frequently Asked Questions
  - CDC Cleaning and Disinfection for Community Facilities
  - CDC Cleaning and Disinfecting Your Facility Everyday Steps, Steps When Someone is Sick, and Considerations for Employers
  - CDC Sequence for Donning Personal Protective Equipment
- EPA List N Disinfectants for Coronavirus
- National Institute of Environmental Health Sciences Worker Training Program for Covid-19 Virtual Safety Training Initiative
- OSHA COVID-19 Resources
- OSHA COVID-19 Control and Prevention for Laboratory Workers and Employers

AIHA®

AIHA is the association for occupational health and safety science professionals who are committed to preserving and ensuring health and safety in the workplace and community. Founded in 1939, we support our members with our expertise, network, comprehensive education programs, and other products and services that help them maintain the highest professional standards. More than half of AIHA's nearly 8,500 members are Certified Industrial Hygienists, and many hold other professional designations. AIHA serves as a resource for those employed in the industrial, consulting, academic, and government sectors. For information visit: www.aiha.org.

About Occupational Health and Safety Professionals

Occupational health and safety (OHS) professionals (also known as industrial hygienists) practice the science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness. Through a continuous improvement cycle of planning, doing, checking, and acting, OHS professionals make sure workplaces are healthy and safe.

Get additional resources at AIHA's Coronavirus Outbreak Resource Center.

Find a qualified industrial hygiene and OEHS professionals near you in our Consultants Listing.

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These guidance documents were primarily developed for those smaller business that don't have readily available occupational health and safety resources, and designed to help business owners, employers, employees and consumers implement science-backed procedures for limiting the spread of the coronavirus. They are subject to any local, state, or federal directives, laws, or orders about operating a business and should only be used if they do not conflict with any such orders. These documents are subject to revision and shall be updated accordingly.

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