

background information to review prior to completing

Purdue COVID-19 Research Space Standard Operating Procedures (SOP)

On May 1, 2020, Governor Holcomb announced a five-stage plan for Indiana to come back from COVID-19 over two months. As our large and complex research enterprise returns to operation over this same period, our researchers should expect laboratories to function differently than before COVID-19. This is likely to continue until a vaccine is widely available.

To put this return to operation process in context, Purdue has over 1200 funded principal investigators (PIs) working on over 4500 sponsored programs in more than 105 buildings on the West Lafayette campus and 92 agriculture centers and field states across the state. We estimate that over 85% of these programs have an experimental component that requires access to laboratories or capabilities in one or more building or location.

In April, we established a Research Task Team to work in concert with the President's Safe Campus Task Force to translate report recommendations into research operation-specific decisions and actions. As we progress through our phased return to research operations, we want to thank you for your ongoing support, cooperation, and patience during this difficult time. Similar to Indiana's plan, the increase in research capacity and the duration of the process will depend on our ability to maintain safe operations across campus. Therefore, it is essential that everyone in the Purdue research community contributes to our success in minimizing virus transmission and the consequences of transmission.

Here, we share information and guidance on COVID-19 safety criteria and mitigation measures for research spaces. PIs and laboratory directors should review this information in advance of preparing a COVID-19 Research Space SOP template, and researchers and supporting personnel before signing a completed SOP.

PURDUE RESEARCH RETURN TO OPERATIONS

Our research is conducted a wide variety of environments and spaces from agricultural field sites to engine test cells and almost everything in between. As members of the Purdue research community return to campus operation over the next two months, we must take the steps necessary to stay well and protect others, particularly the most vulnerable. The majority of our researchers are graduate students and post-doctoral scholars under the age of 30. As a population, they are at lower risk for severe illness or serious complications from COVID-19 than the remainder of our research community. Information on increased risk factors, including age and serious underlying medical conditions, can be found at this [link](#).

There are still many gaps in scientific understanding about the transmission dynamics of SARS-CoV-2. But initial published data suggest that transmission of SARS-CoV-2 occurs primarily through prolonged, close contact. In studies that have monitored people with a known exposure to a confirmed case, household members, those who report frequent contact, and people who have traveled together or shared a meal are found to be at highest risk of infection. Other studies that attempt to reconstruct transmission chains among confirmed cases have also found that prolonged close contact is the source of most new infections. These findings suggest that settings where close contact is minimal will be lower risk than settings with prolonged close contact. Any place where people come together or have contact with shared surfaces presents a transmission opportunity.

The purpose of this document is to provide context for new behaviors and practices to prevent the spread of SARS-CoV-2 which causes COVID-19, with a particular focus on research spaces and laboratories. It is important to note that the safety criteria and mitigation measures, including social distancing measurements, for research spaces may be different from academic spaces. They may also change with time. Check the Purdue COVID-19 Research Web Site for regular updates at this [link](#).

WHAT THIS MEANS FOR PURDUE RESEARCH

At this time, all Purdue employees who must return to campus to support the research enterprise will be accountable for implementing baseline COVID-19 mitigation measures to minimize virus transmission from silent carriers to others in the community. These measures include:

- Wear nonmedical cloth face coverings (including disposable level 1 surgical face coverings) in any setting with two or more people;
- Pay attention to personal hygiene, including frequent hand washing with soap and water, not touching your face, etc.;
- Clean and sanitize surfaces frequently, using the correct cleaning products and procedures;
- Maintain a minimum 6 ft. separation to the nearest person in shared laboratory and office spaces and in public research settings with prolonged contact;
- Incorporate engineering controls such as physical barriers and/or wear enhanced PPE when maintaining a 6 ft. separation to the nearest person is not possible in shared laboratory and office spaces;
- Maximize separation between adjacent people if it is not possible to maintain a 6 ft. separation at all times when traveling through outdoor and indoor public research settings;
- Support and enable employees to remain at home if they are sick or have been in close contact with a confirmed COVID-19 carrier.

Some work functions and positions may not be amendable to one or more of the COVID-19 mitigation measures for research. For example, servicing research instruments or supporting infrastructure often requires prolonged contact of two or more people. In this case, modified mitigation measures such as additional PPE will be required, e.g., N-95 masks, face shields, protective garments to minimize virus transmission. In addition, high risk individuals may require additional accommodations, including as modified mitigation measures, to further reduce the likelihood that they become infected.

JOHNS HOPKINS REPORT

Please review the Johns Hopkins report entitled “Public Health Principles for a Phased Reopening During COVID-19: Guidance for Governors” for additional information on risk profiles and mitigation measures. The complete report can be downloaded at this [link](#). For quick reference, the portions of the report that are most beneficial to developing a COVID-19 Research Space SOP and implementation strategy are reproduced here.

THE IMPORTANCE OF RISK ASSESSMENT

Risk assessments should be integrated into the decisions around reopening. Risk assessments are formalized processes to evaluate risks and hazards. Assessing the risks of easing social distancing measures and restarting parts of the economy requires a measurement of the likelihood of increased transmission and the

consequences of that transmission. Likelihood in this case means the probability that reopening a business, school, or other organization where people congregate will cause significantly increased transmission. Consequence is the impact that increased transmission could have on individuals or communities if a business, school, or other organization reopens or eases social distancing measures.

In addition, there are mitigation measures that can decrease both the likelihood and consequences of transmission. Although enumeration of those mitigation measures for every type of business is beyond the scope of this report, we briefly describe principles of risk reduction through the hierarchy of controls later in this section. Where possible, we have also linked to a selection of existing guidance throughout the document.

The risks of increased transmission of COVID-19 are balanced against risks to the health and well-being of the public, society, and the economy from measures taken to reduce the spread of the disease. The likelihood and consequence of harms across a range of factors, including but not limited to increased disease transmission, other health impacts, threats to livelihoods, and consequences to regional economies, should be considered together.

Likelihood: There are still many gaps in scientific understanding about the transmission dynamics of SARS-CoV-2. But initial published data suggest that transmission of SARS-CoV-2 occurs primarily through prolonged, close contact. In studies that have monitored people with a known exposure to a confirmed case, household members, those who report frequent contact, and people who have traveled together or shared a meal are found to be at highest risk of infection. Other studies that attempt to reconstruct transmission chains among confirmed cases have also found that prolonged close contact is the source of most new infections. Some special settings have also been identified. Superspreading events have been linked to religious services, choir practice, and large family gatherings, among others. Congregate settings like cruise ships, institutions of incarceration, and long-term care facilities have also been the source of large outbreaks. These findings suggest that settings where close contact is minimal will be lower risk than settings with prolonged close contact.

However, it is important to note that low risk does not mean no risk. Any place where people come together or have contact with shared surfaces could in theory be a transmission opportunity. Exact quantification of the risks of various activities is not possible, so we present here qualitative assessments using expert elicitation and published data as of the date of this report.

Consequences: The primary consequence is the risk of increased transmission of SARS-CoV-2, which could precipitate community spread. Businesses or activities that bring people together in densely populated spaces, those that have employees or customers that travel further and disperse more widely, and those that either employ or have a large number of customers with COVID-19 risk factors, like underlying medical conditions, may create greater personal and societal consequences if they ignite a chain of transmission by reopening.

Mitigation: Mitigation measures are those actions to reduce the negative impacts of situations carrying increased risk through minimizing the severity or scope of impact. The Centers for Disease Control and Prevention has published extensive guidance on implementation of mitigation measures across multiple levels of society, including individuals, schools, workplaces, faith-based organizations, and congregate living spaces.

Even if a business or organization is deemed to be high risk because of likelihood or consequences of increased transmission, it is possible to reduce that risk with targeted mitigation steps. However, it should be noted that

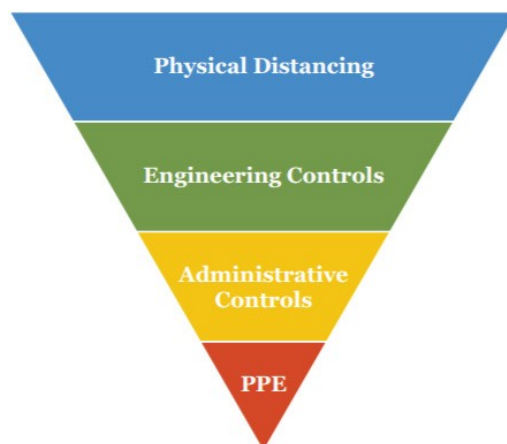
no mitigation step will reduce the risk completely, and even with multiple mitigation steps in place, some businesses or organizations may be at too high a risk to open until the pandemic is over.

Hierarchy of controls is a concept used by the National Institute for Occupational Safety and Health (NIOSH) as a framework for identifying controls for potentially harmful workplace hazards. These principles are useful for assessing the effectiveness of controls for COVID-19 and for understanding the range of impacts those measures can have on decreasing the likelihood of transmission. The NIOSH hierarchy of controls structure is adapted below for COVID-19 purposes.

COVID-19 MODIFIED HIERARCHY OF CONTROLS

Using the modified hierarchy of controls, COVID-19 mitigation measures can look like:

- Physical Distancing — wherever possible having people work or access the business from home; this should include restructuring responsibilities to minimize the numbers of workers that need to be physically present.
- Engineering controls — creating physical barriers between people
- Administrative controls — redistributing responsibilities to reduce contact between individuals, using technology to facilitate communication
- PPE — having people wear nonmedical cloth face coverings (including disposable surgical face coverings)



Regardless of business specific considerations, there are measures that can be taken to mitigate the risk of infection to protect individuals:

- Use of nonmedical cloth face coverings;
- Reconfiguring space to enable people to be located apart;
- Incorporating engineering controls such as physical barriers where possible;
- Supporting and enabling employees to remain at home if they are unwell or have been in close contact with someone who is sick

PURDUE COVID-19 RESEARCH SPACE GUIDANCE AND MITIGATION MEASURES

Research spaces at Purdue (except those that are actively researching strains of SARS-CoV-2) are currently considered medium exposure risk, as per the by Occupational Safety and Health Administration (OSHA) found at this [link](#). Note that all of the previous standards laid out in the Purdue Chemical Hygiene Plan (CHP) for appropriate laboratory practices and PPE remain in place, including implementing in-person or remote buddy systems as necessary.

The PIs and/or laboratory director should establish visual cues (e.g., laboratory door postings, floor markings, other signage) outside each lab and/or common area to remind researchers and support personnel to practice COVID-19 related safety and mitigation measures, including social distancing, self-monitoring, and proper

personal hygiene, etc. It is the responsibility of the PI, director, and all research personnel working in a particular research space to ensure and enforce all COVID-19 safety and mitigation measures as defined in the approved COVID-19 Research Space SOP.

On-site research activities may only be conducted when appropriate COVID-19 related PPE and supplies as well as are available to the research space for health/medical personnel uses. Researchers and supporting personnel requiring clinical-grade PPE will only be allowed to return to campus if sufficient supplies are available on a continuous basis and if there are no current shortages in the Indiana healthcare workforce.

Cloth Face Coverings: Proper use of cloth face coverings is required in all shared spaces on campus except when individuals are wearing more highly protective face coverings (e.g., N95 or half-face respirator). Purdue is providing disposable Level 1 surgical face coverings for use in campus buildings and field sites. Personnel may also use their own cloth face coverings provided they are washed on a daily basis using recommended procedures. Personnel are responsible for carrying out recommended washing procedures on cloth facemasks.

Social Distancing and Engineering Controls: Research spaces should develop methods and/or equipment to ensure that a minimum of 6 feet separation is maintained in all workspaces. For example, if sufficient space cannot be created at a lab bench to achieve 6-foot separation between researchers, screens or dividers should be placed between work areas. All facility modifications must be coordinated through physical facilities.

Cleaning and Disinfection of Surfaces: Research personnel that use the space are responsible for regular cleaning and disinfection of all surfaces during and following use. Due to the sensitivity of experiments to cleaning products and the diversity of shared research spaces and equipment at Purdue, cleaning and disinfection methods and products must be customized for the particular research space and experiments. CDC guidelines for cleaning hard and soft surfaces can be found [here](#). A list of potential products can be found at this [link](#). We are also creating a series of cleaning and disinfecting guidelines for common high-touch surfaces and shared use equipment (e.g., optical microscopes).

Table 1 outlines some COVID-19 safety and mitigation measures you can begin to consider.

Table 1: COVID-19 Safety and Mitigation Measures	
Category	Examples
Physical Distancing <i>Work and communicate remotely whenever possible.</i>	<ol style="list-style-type: none"> 1. Conduct research remotely whenever possible. This includes computational work, data analysis, literature reviews, writing, etc. 2. Use technology to engage in remote communication with group members, collaborators, and sponsors. 3. Limit trips to essential research-related travel to field sites, sponsor visits, program reviews, national user facilities, collaborator facilities, etc.
Social Distancing <i>Achieving 6 foot separation between researchers</i>	<ol style="list-style-type: none"> 1. Install floor markings to identify 6-foot separation when waiting to use shared equipment, using fume hoods or biological safety cabinets, disposing of waste materials, etc. These measures apply to public areas as well, such as break areas and meeting rooms.

	<ol style="list-style-type: none"> 2. Remove chairs or label chairs to prevent use so as to provide separation between researchers when at a workstation, bench, conference table, etc. 3. If researchers are working on back-to-back benches (back facing each other), their physical distancing could be less than the required 6 feet. In such cases, closing down alternate workspaces on each bench to create a staggered workspace across all the lab benches in a zig zag pattern is recommended. 4. Avoid performing non-lab work activities such as computer or paper work in the lab if there are ongoing lab activities nearby. 5. Researchers should use alternate fume hoods if available. If necessary, develop a schedule for fume hood use.
<p>Contact Time</p> <p><i>Minimize contact time of researchers during experiments</i></p>	<ol style="list-style-type: none"> 1. Implement a staggered work shift to minimize contact time and avoid peak hours for travel. (e.g. Team A and Team B to work on alternate days or half-day shifts). 2. Implement a reservation system with a specific downtime/blocked period for the use of common equipment to prevent physical encounter of the two persons, such as a 10 min interval before the next person can use the equipment. This also applies for activities or equipment that are unable to be physically separated for operational reasons. 3. Safely ramp up activities based on priority.
<p>Exposure Reduction</p> <p><i>Minimize cross-contamination</i></p>	<ol style="list-style-type: none"> 1. Determine the maximum occupancy allowed for each research space including shared areas. 2. Assign work areas such as desk or bench to individual staff or student. Each researcher should only use their assigned workarea. 3. Ensure regular disinfection of areas where gloves are not used, such as door handles, light switches, common equipment, and workstations before and after use. 4. Ensure that there is a known and documented process for sanitizing shared equipment in research spaces. This includes instruments, lab benches, conference tables, etc. 5. Researchers should also wash hands before and after laboratory work. Place hand sanitizer at strategic locations. 6. Change of work processes by assigning specific tasks to the same person to restrict people movement across laboratories. 7. Do not come to campus if you are sick. Seek medical attention if needed.

	<p>8. Restrict visitors to essential personnel including contractors and vendors.</p>
<p>Engineering Controls <i>Minimize exposure</i></p>	<p>1. If sufficient space cannot be created between adjacent workbenches, desks, fume hoods, screens or dividers should be placed between work areas.</p>