

## 4.0 GUIDANCE ON FACILITIES MANAGEMENT OF VENTILATION AND PLUMBING SYSTEMS

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The following guidance is provided for use by camp facilities management and operators in preparation for occupying their buildings or sites during the ongoing COVID-19 pandemic. Although many camps are based on the premise of personal enrichment for campers through immersion and enjoyment of the outdoors, special steps must be taken at this time to ensure that it is done thoughtfully and safely.

The guidance presented here goes beyond simple preparations of a cabin or recreational hall for occupancy and is based upon guidance issued by the American Society of Heating, Ventilating, and Air Conditioning Engineers (ASHRAE) and the U.S. Centers for Disease Control and Prevention (CDC). It includes information on operating building systems and steps that can be taken to check and confirm effective operation of camp facilities. The recommendations provided below are based on ASHRAE's "Post-Epidemic Conditions" advisory guidance<sup>20</sup> and the CDC guidance<sup>21,22</sup> for reopening buildings after prolonged shutdown or reduced operation.

Although much of the camp experience is based on housing that utilize basic ventilation and plumbing schemes, the manner in which the buildings are opened, prepared, and accepted for occupancy is critical in providing a safe experience for the campers, counselors, and other staff. Because many of the facilities rely on natural ventilation to meet the needs of its occupants, the need for ensuring maximum effectiveness is more challenging than ever. This is especially true in light of the need to minimize the possibility for airborne infection to occur and spread in the camp environment. Maintenance of a safe camp environment will require adherence to basic principles of air movement and ventilation, a commitment to maintenance, and sometimes, creativity. Also, as camps continue to expand their offerings, there are other facilities at camps that may utilize more advance mechanical systems to provide both localized (room level) and building-wide ventilation and thermal comfort and they are addressed here as well.

The following guidance is broken into a timeline that addresses when each activity should be undertaken in order to have a successful camp opening and camp session. Of course, it cannot be emphasized enough that every camp is different, and this is a guide, not a rigid playbook. Also, no matter how successful an opening may be, it is the ongoing commitment to maintenance and ongoing verification of performance goals that will determine the overall success of the program.

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<sup>20</sup> American Society of Heating, Ventilating, and Air Conditioning Engineers. *ASHRAE Epidemic Task Force, Building Readiness, Updated May 5, 2020*. <https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf>

<sup>21</sup> U.S. Centers for Disease Control and Prevention. *Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation*. <https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>

<sup>22</sup> U.S. Centers for Disease Control and Prevention. *Interim Guidance for Businesses and Employers Responding to Coronavirus Disease 2019 (COVID-19), May 2020*. <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-business-response.html>

## GENERAL RECOMMENDATIONS

- Assemble a **Building Readiness Team** that includes key individuals and companies who play a role in the setup and operation of all the camp building systems. The types of service providers that may be required include, but are not limited to, the following:
  - **Camp Owner and/or Operator** to specify the goals and objectives to be supported by the physical environment and to provide guidance as to how the buildings are typically operated.
  - **Maintenance Manager and Support Staff** to review current system condition and operation and to ensure it is ready for opening.
  - **Mechanical Contractor** may be used to supplement the in-house staff to implement repairs to the building mechanical systems that may be identified through the implementation of this guidance.
  - **Building Controls Contractor** to provide specialized support with modification or repair to the mechanical systems controls.

### One Month Before Opening

- Perform an inventory of mechanical systems in all camp buildings (supply fans, exhaust fans, ceiling fans, etc.) and verify their operational status.
- Ensure windows and doors are operational and insect screens and animal guards are in place.
- Perform an inventory of heating, ventilating, and cooling (HVAC) systems and document the types and MERV (minimum efficiency reporting value) rating of particulate air filters installed in the systems. This inventory in combination with HVAC performance data can be used for assessing the potential of upgrading the systems to higher efficiency filtration systems, if desired.
- Verify sensor calibration for demand-based ventilation instrumentation, airflow measurement instrumentation, and temperature control instrumentation.
- If the on-site facility manager does not have the appropriate skill set, engage a mechanical service company to inspect and assess the operational capabilities of all mechanical systems including supply and exhaust fans, refrigeration equipment, water heaters, boilers, pumps etc.

### Two Weeks Before Opening

- Check controls and operation of hot water boilers, steam generators, and heat exchangers to ensure that set points are consistent with those required during normal operation. Confer with the local authorities about requirements for start-up of domestic water systems.
- Check the fuel source for boilers and hot water generators to make sure it is on and available. Confirm that the flues and make-up air paths are open prior to engaging these devices.
- Review programming of central HVAC systems to provide flushing two hours before and two hours after occupancies. This includes operating the exhaust fans as well as opening the outside air dampers.

- Inspect HVAC system components to verify proper function. Inspection should include the following elements:
  - Fan belt(s) are appropriately tensioned to ensure full airflow is provided to space(s).
  - Outdoor air and other damper linkages are fully connected and operational.
  - Heating and cooling coil valves and valve actuators are connected and operational.
- Confirm occupancy schedules for HVAC systems and review timer set points and programmed operating schedules in the building automation system (BAS). Modify the occupancy schedule as needed to fit the current occupancy schedules for the building.
- If HVAC system control setbacks were previously implemented as part of a building shutdown protocol, check to ensure that these setbacks were returned to normal.
- After confirming timers are functional and BAS occupancy schedules are set right and overrides have been put back to normal, operate the HVAC systems in Occupied mode for at least 24 hours. During this period, trend temperature control and ventilation parameters in those areas serviced by central HVAC systems. If trending through the BAS is not possible, work with the ventilation contractor to install monitoring equipment or measure to verify proper temperature and ventilation control. These measurements should confirm that space temperature and relative humidity levels are being controlled to the acceptable setpoints.

### One Week Before Opening

- Check domestic hot water heaters for proper operation and setpoint. Confirm that the water heater is set to at least 120°F. For domestic hot water systems equipped with mixing valves, higher primary water temperatures (>130°F) can further reduce the risk of *Legionella* growth; however, mixing valves must be tested to prevent scalding temperatures.
- Check all drain pans in air handling units and floor drains. Fill with water to ensure that drain traps are wet and do not allow for the passage of sewer gas.
- For facilities with hot tubs and spas, confirm that the chemical treatment has been maintained during the shutdown to avoid conditions that could lead to an outbreak of Legionnaires' disease.<sup>23</sup>

### Day Before Opening

- In buildings with operable windows, if the outside air temperature and humidity are moderate, (temperature range between 65°F and 78°F and relative humidity between 20% and 75%), open all windows for four hours minimum. Utilize internal fans, i.e., ceiling-mounted fans or strategically (and safely to avoid tripping hazards) place floor fans to promote air circulation. Operate all exhaust fans during this pre-occupancy period as well.

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<sup>23</sup> U.S. Centers for Disease Control and Prevention. *Extended Hot Tub/Spa Closures*.  
<https://www.cdc.gov/healthywater/swimming/aquatics-professionals/extended-hot-tub-closures.html>

- Prior to re-occupying a building with an HVAC system such as the administrative building or Health Center, perform a “flush out” by opening outside air intake dampers to the maximum allowable position and operate in this manner for at least four hours before reoccupation. Note that the maximum allowable outdoor air damper position will depend on outdoor air temperature and humidity conditions. When operating in the flush out mode, acceptable indoor temperature and humidity conditions should be maintained. Upon completion of the flush out, damper positions can be adjusted back to achieve normal design outdoor air levels.
- Consider installing portable high efficiency particulate air (HEPA) filter air cleaners in administrative offices, the health center, and indoor spaces that are provided with mechanical ventilation. These air cleaners should be operated continuously (24/7 operation).
- Implement a flushing plan to flush hot and cold water systems through all points of use (e.g., showers, sink faucets). The purpose of building flushing is to replace all water inside building piping with fresh water.

### Day of Opening

- In buildings with operable windows, if the outside air temperature and humidity are moderate, (temperature range between 65°F and 78°F and relative humidity between 20% and 75%), open all windows for three hours minimum before the reoccupation.
- Utilize internal fans, i.e., ceiling mounted fans or strategically (and safely to avoid tripping hazards) place supplementary floor fans to promote air circulation. Operate all exhaust fans during this reoccupancy period as well.

### During Ongoing Camp Operations

- Keep HVAC systems, internal fans, and operable windows functioning and operational to maintain good air circulation within the camp buildings throughout the season.
- Try to maximize general ventilation by utilizing window and door openings. If windows must remain shut due to weather, insects, or safety conditions, maintain continuous operation of exhaust fans. Consider use of supplementary floor fans, if overall ventilation and thermal comfort must be improved, especially if there is limited window and door opening opportunities.
- Once HVAC systems are placed in normal operation, consider implementing an outdoor air ventilation flushing mode two hours before scheduled occupancy and again two hours after occupancy. This includes operating the exhaust fans as well as opening the outside air dampers. Ideally, this flushing mode can be implemented through timers or the BAS.
- During occupied periods, optimize outdoor air ventilation by operating HVAC systems at increased outdoor air rates (i.e., increase the percentage of outdoor air). The percentage of outdoor air delivered will be limited to cooling capacity of the HVAC systems and its ability to provide an appropriate discharge air temperature while also controlling for humidity.

- During unoccupied mode (i.e., when it is expected that the occupants will not be present for at least four consecutive hours), the HVAC systems should continue to operate continuously and at minimum outside air mode.

## HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS – GENERAL GUIDANCE

- Inspect HVAC system components to verify proper function. Inspection should include the following elements:
  - Fan belt(s) are appropriately tensioned to ensure full airflow is provided to space(s).
  - Outdoor air and other damper linkages are fully connected and operational.
  - Heating and cooling coil valves and valve actuators are connected and operational.
- When servicing air handling equipment such as changing filters or accessing interior areas, consider workers' use of personal protective equipment (PPE). This would typically involve use of safety glasses or face shields and gloves.
- It is not necessary to clean ductwork for COVID-19 control, however, if internal duct cleaning is being considered for other reasons, you should consult additional industry guidance before implementing.

## HVAC SYSTEM FILTRATION

- For HVAC filtration, consider increasing the level of filtration in the air handling systems to a MERV-13 or greater. An assessment of the current filtration coupled with air handling unit performance information can be used to determine whether the existing fan systems can overcome the additional pressure drop of the new filters while still maintaining appropriate air flow.
- Inspect HVAC system air filters and replace with new filters if deemed necessary. Inspect air filter installation and ensure filters are properly fitted and have little to no bypass around filter banks.
- If the use of MERV-13 or greater filtration is not possible, portable HEPA units can be used in high-traffic areas to provide continuous recirculation. These units can also be utilized in higher occupancy indoor spaces such as dining areas and the health clinic, as warranted.

## HEATING AND COOLING SYSTEMS

- For facilities with cooling towers, confirm that the chemical treatment has been provided and maintained to avoid conditions that could lead to an outbreak of Legionnaires' disease.
- Check controls of water chillers and cooling towers to ensure that setpoints are consistent with those required during normal operation.

- Check the status of chilled water systems and cooling towers to ensure they are operated at appropriate water levels and are provided sufficient make-up water. Check pump operation and that water is flowing.
- For HVAC systems with direct expansion cooling coils, check the refrigerant pressures to make sure the system is adequately charged.
- Check controls and operation of hot water boilers, steam generators, and heat exchangers to ensure that setpoints are consistent with those required during normal operation and in accord with local health department requirements. Ensure proper carbon monoxide detectors are functioning in areas where combustion appliances/equipment are located and in accord with local municipal requirements.
- Check the fuel source for boilers and hot water generators to make sure it is on and available. Confirm that the flues and make-up air paths are open prior to engaging these devices.

## 4.1 GUIDANCE ON RESIDENTIAL CAMPS

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Cabins provide living and sleeping spaces for campers and staff. Since sleeping density tends to be high in some camp settings (i.e., bunk beds), it is important to implement controls associated with sleeping arrangements that may help reduce the risk of transmission of COVID-19.

### HOUSING

#### Policy

- Keep the same staff members assigned to a cabin throughout the program; do not rotate staff between cabins.
- Maintain the roster of cabin-members throughout the program; do not rotate campers between cabins. See the [Using Cohorts at Camp](#) section for guidance on organizing campers and staff members.
- Limit cabin access to only individuals who reside in that cabin; avoid having visitors and parents entering the cabin at drop off and pickup periods in the residential spaces.
- All cabin residents should use hand sanitizer containing at least 60% alcohol or wash their hands with soap and water, for at least 20 seconds, upon entry to their cabin.
- Avoid sharing common items (cups, bedding, etc.) as well as the sharing of individuals' items with cabin mates.
- Cabins should be cleaned routinely. Refer to the [Cleaning and Disinfection](#) section of this guide.
- Personal belongings should be limited to essential items plus a limited number of non-essential items.
- Campers should keep personal belongings organized and separate from other campers' belongings.
- **Best practice:** campers should be provided a personal storage space (i.e., cubby, footlocker, etc.) for their personal belongings.

#### Configuration

- Station dispensers of alcohol-based hand sanitizer containing at least 60% alcohol at the entrance or have campers wash their hands with soap and water immediately upon entry.
- Post relevant posters and signage from the Centers for Disease Control and Prevention ([CDC](#)), World Health Organization ([WHO](#)), and/or other health agencies in cabins in trafficked areas to encourage behaviors which mitigate the spread of disease:
  - [COVID-19 information](#)
  - [Handwashing](#)
  - [Cough etiquette](#)
  - [Symptoms associated with COVID-19](#)
  - [Stop the spread of germs](#)
  - [Physical distancing](#)

## BATHROOM

- Avoid sharing common bathroom supplies (towels, soap, toothpaste, etc.). Instruct campers to bring their own bathroom supplies and a container for toiletries to be stored in for the duration of camp (for example, a bathroom tote or a 1-quart clear plastic bag labeled with their name).
- Campers should keep personal items in their bag or tote and store their bag or tote in a designated area.
- Keep soap, toilet paper, and paper towels in the bathroom stocked at all times.
- Create a staggered bathing schedule and limit the number of people using the facilities at one time.
- Place a trash can (with a foot-actuated lid or no lid) near the exit of the restrooms to make it easier to discard items.
- Post the [Handwashing](#) sign from the CDC in the bathroom to remind campers and staff when and how to properly wash hands.

## SLEEPING

- If possible, create at least six feet of space between beds. If utilizing head-to-toe orientation (see below) four feet of space between beds is acceptable.
- If possible, minimize the number of people sleeping in a space by converting common spaces to sleeping areas.
- Position sleepers head-to-toe or toe-to-toe to maximize distance between heads/faces:
  - For bunk beds, position the head of the camper in the top bunk opposite the position of the camper in the bottom bunk.
  - For side-by-side beds, position the head of the camper in one bed opposite the position of the camper in the adjacent bunk.
  - For end-to-end beds, position the toes of each camper close to the other camper's toes.
- **Best practice:** Create physical barriers between sleepers, especially if a distance of six feet cannot be created, using curtains, sheets, barriers, etc.
- Use bedding (e.g., sheets, pillows, blankets, sleeping bags) that can be washed and dried in a mechanical air dryer. Keep each camper's bedding separate.
- Place a label with each camper's name on their bed.
- Bedding that touches a child's skin should be cleaned weekly or before use by another child. See the [Laundry](#) instructions within the [Cleaning and Disinfection](#) section.
- Best practice: Store extra bedding in individually-labeled bins, cubbies, or bags.



## VENTILATION

- Increase ventilation:
  - Naturally by keeping windows open if weather permits, or
  - Mechanically, by running heating, ventilating, and air-conditioning (HVAC) systems, cabin and bathroom exhaust fans, and pedestal fans, etc.
  - During occupied periods for sleeping areas with mechanical ventilation, optimize outdoor air ventilation by operating HVAC systems at increased outdoor air rates (i.e., increase the percentage of outdoor air). The percentage of outdoor air delivered will be limited to cooling capacity of the HVAC system and its ability to provide an appropriate discharge air temperature while also controlling for humidity. Consider the use of portable HEPA air cleaners in the Health Center or residential bunks with persons in isolation.

## REFERENCES AND RESOURCES

U.S. Centers for Disease Control and Prevention. *Open Child Care Programs*.  
<https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-childcare.html>

U.S. Centers for Disease Control and Prevention. *H1N1 Flu*.  
<https://www.cdc.gov/h1n1flu/camp.htm>

NYC Health. *COVID-19: Guidance for Congregate Settings*.  
<https://www1.nyc.gov/assets/doh/downloads/pdf/imm/guidance-for-congregate-settings-covid19.pdf>

Multnomah County. *COVID-19 Guidance for Shelter Settings*. <https://multco.us/novel-coronavirus-covid-19/covid-19-guidance-shelter-settings>

American Society of Heating, Ventilating, and Air Conditioning Engineers. ASHRAE Epidemic Task Force, Building Readiness, Updated May 5, 2020.  
<https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf>

## 4.2 GUIDANCE ON AQUATIC FACILITIES OPERATIONS

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The novel coronavirus SARS-CoV2 is not waterborne. There is no current evidence that COVID-19 can be spread to people through the water in a pool, hot tubs, spas, or water play areas. Proper operation and maintenance of pools and related facilities will likely inactivate the virus in the water. The Centers for Disease Control and Prevention (CDC) states “there is no evidence showing anyone has gotten COVID-19 through drinking water, recreational water, or wastewater. The risk of COVID-19 transmission through water is expected to be low.” However, it is important to follow safe physical distancing and proper hygiene practices at lake and pond recreational areas.

All aquatic recreational areas should consider the following:

- Prepare and place relevant posters and signage incorporating guidance from the CDC, World Health Organization (WHO), and/or other accredited health-based organizations, in appropriate places where intended audiences can be reached. Examples include:
  - [COVID-19 information](#)
  - [Handwashing](#)
  - [Cough etiquette](#)
  - [Symptoms associated with COVID-19](#)
  - [Practices to stop the spread of the virus](#)
  - [Physical distancing](#)
- Ensure campers and staff practice proper hand hygiene prior to entering and leaving the facilities or waterfront:
  - Instruct campers to wash hands with soap and water for 20 seconds before and after activities, or
  - Provide alcohol-based hand sanitizer containing at least 60% alcohol before and after activities.
- Maintain adequate staff to ensure camper safety. Efforts to maintain physical distancing should not impact existing camp safety protocols (e.g., first aid, CPR, one-on-one interaction.)
  - **Good Practice:** Participate in activities by small groups. Provide physical cues spaced 6 feet apart for campers in locker rooms and change areas and while waiting to enter waterfront area or pool facilities.
  - **Best Practice:** In addition to following physical distancing of groups and activity, incorporate guidance found in the [Activities](#) and [Using Cohorts at Camp](#) sections of this guide.

- Maintain routine cleaning and disinfecting of frequently touched surfaces daily throughout facilities (e.g., lifeguard stands, railings, etc.) with U.S. Environmental Protection Agency (EPA) List N disinfectants.<sup>24</sup> Cleaning and disinfecting procedures should follow those outlined in the [Cleaning and Disinfection](#) section of this guide.
- Clean and disinfect all shared items and equipment (e.g., kickboards, life-saving devices, pool noodles, etc.). Refer to the [Cleaning and Disinfection](#) section of this guide for instructions on cleaning and disinfecting porous and non-porous objects. In addition, be sure to follow applicable manufacturer recommendations.
  - Good practice: If feasible, shared equipment should be limited to items that can be effectively cleaned.
  - Better practice: Limit the amount of shared supplies and equipment for aquatic activities and life-saving measures by providing each participant their own (e.g., kick boards, foam tubes) for the duration of camp, if feasible.
- Follow state and local guidelines for aquatic facilities operation. Consult health swimming guidelines for your state.<sup>25</sup>

## POOLS

As noted by the CDC, proper operation, maintenance, and disinfection of swimming pools will likely inactivate the virus that causes COVID-19. Swimming pools and play areas should be properly cleaned and disinfected, following the procedures outlined in the [Cleaning and Disinfection](#) section of this guide, in addition to the following practices:

- Maintain proper disinfectant levels (1–10 parts per million [ppm] free chlorine or 3–8 ppm bromine) and pH (7.2–8).
- Treat pool with biocidal shock treatment on a daily to weekly basis.
- Follow local regulations pertaining to operation and maintenance of pools.
- Refer to CDC [Model Aquatic Health Code](#) for more recommendations to prevent illness and injuries at public pools.

## LAKES AND PONDS

There is no current evidence that COVID-19 can be spread to people through the water in a pool or waterfront. For natural waterfronts, it is best to follow proper physical distancing and good hygiene practices as outlined above and in the [Activities](#) and [Cleaning and Disinfection](#) sections of this guide.

- **Best practice:** Keep up with CDC, WHO, and health-based organizations information regarding COVID-19 in relation to waterfront activities and requirements.

<sup>24</sup> U.S. Environmental Protection Agency. *List N: Disinfectants for Use Against SARS-CoV-2*. <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>

<sup>25</sup> U.S. Centers for Disease Control and Prevention. *State-based Healthy Swimming Information*. <https://www.cdc.gov/healthywater/swimming/states.html>

## CHANGING AREAS AND SHOWERS

Many aquatic facilities require showering prior to entering the pool or waterfront. In addition to proper cleaning and disinfecting of shower facilities, it is important to note that during prolonged shutdown or following a significant decrease in use, stagnant water can lead to conditions that increase the risk for *Legionella growth*. To minimize the risk following a prolonged shut-down:

- Follow proper physical distancing and good hygiene practices as outlined above and in the [Activities](#) and [Cleaning and Disinfection](#) sections of this guide.
- Implement a flushing plan to flush hot and cold water systems through all points of use (e.g., showers, sink faucets). The purpose of building flushing is to replace all water inside building piping with fresh water. Regular flushing should be considered during initial phases of lower occupancy.

## PERSONAL FLOTATION DEVICES

- If personal flotation devices including life jackets will be shared among campers or stored in a common location, follow the practices below for proper cleaning after each use.
  - Good practice: Limit the amount of shared supplies and equipment per activity. Hand wash life jackets in hot soapy water. Allow to air dry and spray lifejackets with alcohol-based disinfectant spray.
  - Better practice: Hand wash life jackets in hot soapy water. Use a dryer to ensure complete drying with a temperature setpoint not to exceed 140 °F. Spray lifejackets with alcohol-based disinfectant spray before use.
  - **Best practice:** Designate certain equipment (e.g., lifejackets) to individuals for the duration of camp, to decrease the quantity of shared items.
  - **Best practice:** Personal flotation devices should be cleaned and disinfected after each use, following the guidance in the [Cleaning and Disinfection](#) and [Activities](#) sections of this guide. Do not use bleach products on ropes or lifejackets.
- Safety protocols should follow standard operating procedures with the adjustments outlined in the [Safety](#) section of this guide.

## SWIMMING

- Campers should follow physical distancing per groups/cohorts and perform proper hand hygiene prior to entry and when leaving pools or other outdoor aquatic facilities (e.g., lakes, ponds).
- During swimming activities, the following practices are recommended:
  - **Best practice:** For free swim, continue safe swim practices, such as the swimming buddy system where each camper is assigned a “buddy” to stay with at all times. Try to ensure that assigned buddies are in the same cohort. Swimmers must participate in swim drills to maintain safety.

- **Best practice:** For laps, maintain 8-foot lane width in swimming pools and maintain spacing between individuals swimming by creating a rotation.
- **Best practice:** For counselors, maintain the same instructors with each group of campers each day. Refer to the guidelines in the [Using Cohorts at Camp](#) section of this guide.
- Safety protocols should follow standard operating procedures with the adjustments outlined in the [Safety](#) section of this guide.

## REFERENCES AND RESOURCES

ASHRAE. *Epidemic Task Force: Building Readiness*. American Society of Heating, Refrigeration, and Air-Conditioning Engineers. <https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-building-readiness.pdf>. Updated May 5, 2020.

U.S. Centers for Disease Control and Prevention. *Considerations for Aquatic Venues*. <https://www.cdc.gov/coronavirus/2019-ncov/community/parks-rec/aquatic-venues.html>

The Swim Guide. *COVID-19 and Recreational Water Quality*. <https://www.theswimguide.org/2020/03/30/covid-19-and-recreational-water-quality/>

U.S. Centers for Disease Control and Prevention. *Healthy Swimming, Aquatic Professionals*. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/index.html>

U.S. Centers for Disease Control and Prevention. *Healthy Swimming, Operating Public Pools*. <https://www.cdc.gov/healthywater/swimming/aquatics-professionals/operating-public-swimming-pools.html>