Disinfection of Hot Tubs Contaminated with *Legionella*

Hot tubs that are not properly operated and maintained can provide an ideal environment for spreading *Legionella*, the bacteria that causes Legionnaires' disease and Pontiac fever. The phrase "hot tubs" in this document includes hot tubs, whirlpool spas, and hydrotherapy spas.

This photograph shows Legionella sp. colonies grown in culture and illuminated using ultraviolet light.

Outbreaks of Legionnaires' disease and Pontiac fever have been linked to hot tubs contaminated with Legionella. Failing to regularly scrub hot tub surfaces to remove biofilm, the slime layer that protects *Legionella* from disinfectants, and failing to maintain adequate disinfectant levels promotes *Legionella* growth. Hot tub users can be infected with *Legionella* when they breathe in tiny water droplets that contain *Legionella*.

CDC has not made any recommendations regarding routine laboratory testing for *Legionella*, because proper hot tub maintenance and operation should prevent the growth of *Legionella*. However, **if cases of Legionnaires' disease or Pontiac fever are linked to a hot tub, it is important to take samples for laboratory testing and then disinfect the hot tub to prevent others from being infected.**

While no scientific studies have been conducted to determine the best way to disinfect a hot tub contaminated with *Legionella*, **CDC recommends these best practices** based on the scientific information that is currently available:

1. **Close the hot tub to bathers immediately**, and shut down the hydrotherapy jets and circulation pumps, but do not drain the water.
2. **Contact your state or local public health agency** for information about laboratory testing for *Legionella*. If the health department determines that laboratory testing is needed, water and biofilm samples should be taken from the tub, hydrotherapy jets, drain, and filters/filter media to test for *Legionella* by culture before taking the steps below. Sampling and laboratory testing are complicated and should always be done in collaboration with your state or local public health agency and a laboratory with *Legionella* testing expertise. A list of CDC-certified *Legionella*-testing laboratories can be found at https://wwwn.cdc.gov/elite/Public/MemberList.aspx.
3. Proceed as directed below **after samples have been taken**; it is not necessary to wait for laboratory test results. However, the hot tub should not be re-opened to bathers until all test results are negative for *Legionella*.
4. **Drain** all water from the hot tub. Dispose of the water to waste or as directed by the local regulatory authority.
5. **Scrub** VIGOROUSLY all hot tub surfaces, skimming devices, and circulation components with free chlorine at a minimum concentration of 5 parts per million (ppm) to remove any biofilm or slime. After scrubbing, rinse the tub with clean water and flush to waste.

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6. **Replace** filters (for cartridge or diatomaceous earth filters) or filter media (for sand filters). Bag these and dispose as normal solid waste.
7. **Inspect** the hot tub thoroughly for any broken or poorly functioning components such as valves, sensors, tubing, or disinfectant feeders. Make any needed repairs.
8. **Refill** the hot tub with clean water.
9. **Hyperchlorinate** using 20 ppm free chlorine.
   a.) Keep the hydrotherapy jets off and let the hyperchlorinated water circulate for 1 hour in all of the components of the hot tub including the compensation/surge tank, filter housing, and piping.
   b.) Turn on the hydrotherapy jets to circulate the hyperchlorinated water for 9 additional hours. Ensure that 20 ppm of free chlorine is maintained in the system for the **entire 10 hours**.
10. **Flush** the entire system to remove the hyperchlorinated water from all equipment prior to repeat sampling.
11. **Take repeat samples** for culture-based laboratory testing to confirm that *Legionella* has been eliminated. Water and biofilm samples should be taken from the tub, hydrotherapy jets, drain, filters/filter media, and any part of the hot tub that originally tested positive for *Legionella*.
12. Keep the hot tub closed to bathers until this repeat testing has confirmed the elimination of *Legionella*. If laboratory testing is positive for *Legionella*, repeat steps 4–11 until all testing is negative for *Legionella*. **When all tests are negative, the hot tub can be re-opened to bathers**.
13. Ensure that halogen (chlorine or bromine) and pH levels meet local and state standards before re-opening the hot tub to bathers. **Maintain water quality** according to local and state standards. Continued *Legionella* testing may be considered on a case–by–case basis to ensure complete elimination of *Legionella*.
14. If the hot tub is associated with an outbreak, the following **continued laboratory testing schedule** may be considered: conduct culture-based testing every 2 weeks for 3 months, then every month for 3 months to ensure complete elimination of *Legionella*. If at any time during this laboratory testing schedule *Legionella* is found, disinfect again and start the testing schedule over. For hot tubs that continue to grow *Legionella*, consider hiring a consultant with expertise in *Legionella* elimination.

This image is of a typical pool/spa water chemistry test kit for measuring chlorine, bromine, and pH.

Note: There are no data to suggest that personal protective equipment is required for disinfecting a hot tub, but N95 respirator masks may be worn during the disinfection process. Respirators must be used in accordance with a comprehensive respiratory protection program, which includes fit testing, training, and medical clearance (see OSHA standard 29 CFR 1910.134). For more information about N95 respirators, visit the National Institute for Occupational Safety and Health (NIOSH) website.

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