

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.

[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.**



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

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](#).

References:

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