Disinfection of Hot Tubs that Contain *Legionella*

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

Hot tubs* that contain *Legionella* bacteria can cause outbreaks of disease. *Legionella* can cause Legionnaires’ disease, a serious type of lung infection, and a milder infection called Pontiac fever. It is critical to collect water samples then disinfect hot tubs linked to cases of Legionnaires’ disease or Pontiac fever.

**CDC-recommended best practices**

No scientific studies have determined the best way to disinfect a hot tub that contains *Legionella*. **CDC recommends following these steps** based on currently available scientific information:

1. **Close the hot tub immediately.**
   - Shut down the hydrotherapy jets and circulation pumps, but **do not** drain the water.

2. **Contact your state or local public health agency.**
   - The health department will determine if you need to conduct laboratory testing.

3. **Collect water samples if directed by the health department.**
   - If so, always collaborate with your state or local public health agency and a laboratory with *Legionella* testing expertise. View a [CDC list of laboratories that test for Legionella](https://www.cdc.gov/legionella).
   - Have samples taken from the tub, hydrotherapy jets, drain, and filters or filter media before proceeding to step 4. Find [additional information and tools from CDC on water sampling](https://www.cdc.gov/legionella).
   - You do not have to wait for laboratory results before disinfecting the hot tub. However, do not re-open the hot tub for use 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. **Vigorously scrub all hot tub surfaces, skimming devices, and circulation components.**
   - Use water with free chlorine at a minimum concentration of 5 parts per million (ppm) to remove any biofilm (slime). After scrubbing, rinse the tub with clean water and flush to waste.

6. **Replace filters (for cartridge or diatomaceous earth filters) or filter media (for sand filters).**
   - Bag these and dispose as normal solid waste.

7. **Make any needed repairs.**
   - Inspect the hot tub thoroughly for any broken or poorly functioning components such as valves, sensors, tubing, or disinfectant feeders.

8. **Refill and hyperchlorinate using 20 ppm free chlorine.**
   - 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.
   - Turn on the hydrotherapy jets to circulate the hyperchlorinated water for 9 additional hours. Maintain 20 ppm of free chlorine in the system for the **entire 10 hours**.

---

*National Center for Immunization and Respiratory Diseases*
*Division of Bacterial Diseases*
9. **Flush the entire system.**
   - This removes the hyperchlorinated water from all equipment.

10. **Take new samples to confirm the elimination of Legionella.**
    - At least 24 hours after the device has been restored to normal operating conditions, have samples taken from:
      - Tub
      - Hydrotherapy jets
      - Drain
      - Filters or filter media
      - Any part of the hot tub that originally tested positive for Legionella

11. **Keep the hot tub closed until testing confirms the elimination of Legionella.**
    - If laboratory testing is positive for Legionella, repeat steps 4 through 10 until all testing is negative.
    - If laboratory testing is negative for Legionella, proceed to step 12.

12. **Ensure water quality prior to reopening the hot tub for use.**
    - Ensure that halogen (chlorine or bromine) and pH levels meet local and state standards.

13. **Maintain water quality according to local and state standards.**
    - See “Prevention through regular operation and maintenance” section below for additional information.
    - Continued Legionella testing may be considered on a case-by-case basis.
    - 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.
      - If testing finds Legionella at any time during this 6-month period, disinfect again and start the testing schedule over.
      - For hot tubs that continue to grow Legionella, consider hiring a consultant with expertise in Legionella remediation.

**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 Occupational Safety and Health Administration standard 29 CFR 1910.134). Visit the National Institute for Occupational Safety and Health N95 respirator web page.

**Prevention through regular operation and maintenance**

Proper operation and maintenance of hot tubs can help prevent the growth of Legionella and protect people’s health. View CDC’s Model Aquatic Health Code for guidance on making water activities healthier and safer. Water management programs take a preventive approach by reducing the risk of Legionella growing and spreading in building water systems. See CDC’s toolkit on how to develop a Legionella water management program.

**References:**

2. ASHRAE. Minimizing the risk of legionellosis associated with building water systems. Atlanta, GA: ASHRAE; 2000.

* The phrase “hot tubs” in this document includes hot tubs, whirlpool spas, and hydrotherapy spas.