Pseudomonas and Whirlpools – 'Hot Tub Rash'

***Pseudomonas aeruginosa (P. aeruginosa)* is a common type of bacteria that can cause skin rashes and ear infections. The bacteria is commonly found in untreated water, soil, and poorly maintained whirlpools. This uncomfortable condition, often called 'hot tub rash,' typically appears within a few days of exposure.**

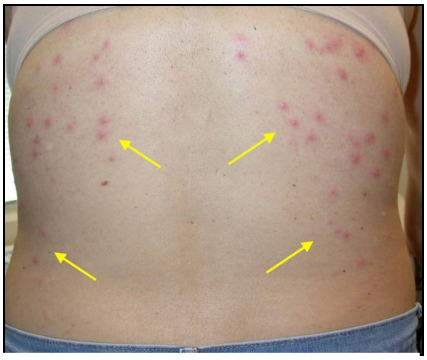
Whirlpool water conditions create an ideal environment for *P. aeruginosa* growth. High bather loads and turbulent waters (i.e., use of jets) make it harder to maintain sufficient disinfection, allowing bacteria to multiply. Additionally, *P. aeruginosa* forms a protective biofilm on surfaces, making elimination more challenging.

P. aeruginosa thrives at 37°C, making whirlpools an ideal environment. The bacteria can also survive from 4°C to 42°C, posing a risk to all improperly maintained pools.

Signs and Symptoms

- Itchy, red, and bumpy rash (often worse in areas covered by a swimsuit).
- Pus-filled blisters around hair follicles.
- Ear infections (e.g., 'Swimmer's Ear').

P. aeruginosa ('Hot Tub Rash') can affect people of all ages. Mild rashes may resolve on their own, but persistent symptoms require medical attention. Contact a healthcare provider.



Source: National Library of Medicine

Prevention

Swimmers:

- Do not go swimming if you are ill or have an infection.
- Wear proper swim attire when swimming.
- Take a cleansing shower with warm water and soap before and after swimming.
- Launder your swim attire with detergent after each use.

Public Pool Operators:

- Ensure swimmers take a cleansing shower using warm water and soap before entering the pool(s).
- Frequent monitoring and adjusting of pH and disinfectant levels (chlorine or bromine) is essential. Adequate levels for whirlpools are:
  - Free chlorine at a minimum of 3 milligrams per litre (mg/L), or
  - Bromine at a minimum of 4 mg/L, and
  - pH maintained between 7.2 - 7.8.
- Test the water's disinfectant and pH levels at a minimum before opening the pool and every three hours thereafter.
- Regularly submit pool water samples to the provincial lab for *Pseudomonas* analysis.
- Regularly clean and disinfect surfaces around the facility, including pool walls (scum line), washrooms, floors, handrails, and benches.

- Regularly superchlorinate the pool (e.g., weekly, or sooner such as after heavy bather loads), to ensure proper disinfection and prevention of bacteria and algae growth.
- Whether you have a chlorine or bromine pool, use a high concentration of chlorine to superchlorinate. A non-chlorine shock is a good oxidizer, but it won't kill bacteria like *P. aeruginosa*.
- Regularly drain and clean small-volume whirlpools, such as hotel whirlpools, using a scrub brush. Disinfect them with high-level chlorine to remove biofilms.
- Follow the manufacturer's recommendations for maintaining pool filters, including backwashing, cleaning, and replacing. Clean filters and filter media help prevent *P. aeruginosa* growth.

Responding to a Positive *Pseudomonas* Water Sample Result

Recommended procedures for public pool operators following a positive *P. aeruginosa* sample result:

- Close the pool.
- For pool sand filters, backwash the filter according to the manufacturer's instructions. Filter media replacement is recommended when the media has reached the end of its effective usage cycle or shows signs of deterioration.
- For cartridge filters, rinse and disinfect the filter(s) according to the manufacturer's guidelines. For effective disinfection, a high-level chlorine solution is recommended (ratio of 1:10 chlorine to water). Replacing cartridge filters is recommended once they have exceeded their designated usage cycle or if visible damage is observed.
- Superchlorinate:
  - Raise the free chlorine level to 20 – 50 mg/L.
  - Maintain the pH level between 7.2 – 7.8.
  - Activate the jets to circulate the water for a minimum duration of six hours. Ideally, keep the jets running continuously overnight or longer (e.g., 24 hours).
- Drain the whirlpool:
  - Scrub the walls, floors, and jet housings with a cleaning and/or acid solution (DO NOT mix chemical products).
  - Rinse with fresh water.
  - Wipe walls, floors, and jet housings with a high-level disinfectant solution (e.g., ratio of 1:10 chlorine to water). Allow sufficient contact time (i.e., ensure surfaces remain wet with the disinfectant solution).
- Refill the pool and adjust the water chemistry to regular operating parameters.
- Submit a water sample to the lab for analysis to ensure the *P. aeruginosa* has been destroyed.
- Await confirmation from the Public Health Inspector regarding whether the pool can be reopened.

For more information

- For further guidance, contact your local Public Health Inspection office.
- For information on sampling instructions, requisition forms, and sampling containers, contact the accredited Roy Romanow Provincial Laboratory.