

STRATEGIES TO REDUCE ENVIRONMENTAL EXPOSURE TO NTM

Patient Instructions

We do not have evidence that instituting these measures will result in reduction in disease, but there is microbiologic evidence that these may decrease NTM numbers.

Hot Water Heaters

- Raise hot water heater temperatures to 120°F. Water heaters with Temps >110°F (43°C) did not harbor NTM and those <110°F did grow NTM.
- Consider draining your hot water heater every 6 months. Hot water heaters contain concentrations of NTM as high as 103 cfu/mL water. The highest numbers are in the sediment that collects at the bottom.
- Consider installing tankless water heater or switching to gas water heater, which attain more uniform temps (they heat from the bottom) and grow less organisms.

Filters

- The wrong filter can be harmful. If filters are not changed frequently, the filter can become a source of NTM, as they can attach and grow on the organic compounds collected on the filters.
- Most filters do NOT prevent the passage of NTM. Require pore size of 0.2 microns
- Although effective in removing chlorine, metals, and organic compounds that can impart bad tastes to water, granular-activated charcoal or carbon (GAC) filters do not filter out NTM as their pore size is too big
- GAC filters promote the growth of NTM without preventing their passage. NTM grow well in these filters; they attach and grow on the carbon-bound organics and metals as they are resistant to the disinfectant.

Showers

- Replace showerhead with one that produces streams of water through larger holes and not a fine mist. Metal showerheads are better than plastic (less likely to harbor biofilm).
- Remove and clean showerheads once a month. Manually clean the inner surfaces and the pipe to which the showerhead attaches to try to remove as much of the biofilm as possible.

- Disinfect showerhead by placing in a pot of boiling water or placing in undiluted household bleach for 30 min, then rinse +/- place in dishwasher.
- Allow shower to run for a few minutes (2-3 minutes) before entering.
- Ventilate shower as much as possible using a bathroom fan or open window.
- Minimize time spent in shower, and do not face the shower stream for longer than necessary. Try not to intentionally inhale shower mist.
- If you enjoy taking baths, they are probably safer.

Sink Faucets

- Remove mesh aerators (NTM can form biofilm on large surface area of the aerators)
- Clean inner surfaces of sink faucets regularly with a brush and chlorine bleach.

Flushing of Taps

- Water stagnation in pipes that are infrequently used can increase NTM in “first catch” samples; this is especially important after long periods of non-use, such as after returning from vacation.
- For taps used infrequently: Flush x 5 minutes before use.
- For taps used on a daily basis, Flush x 200mL for first use in the morning.

Humidifiers

- AVOID use of any type of humidifier. Do not use room humidifiers or humidifiers attached to heating/cooling systems.
- NTM have been found in all types of humidifiers, from which they become aerosolized and easily inhaled into the lungs.
- If a humidifier must be used for a CPAP/BIPAP machine, or if a Neti pot must be used, use only sterile water or previously boiled water (distilled water can contain NTM).

Gardening

- Avoid dusts from peat or potting soil, which contains high numbers of NTM (1 million per gram). Moisten potting soil when working with it to decrease dust generation.
- If activities must be performed that will involve aerosolization of water or soil (i.e. gardening), wear an N95 respirator mask (0.1 to 0.3 micron).

Recreation

- Avoid use of hot tubs and steam rooms
- Consider avoiding use of indoor pools

Drinking Water/Reflux Prevention

- NTM can survive acid pH of stomach; it is unknown whether patients are acquiring NTM via aspiration of tap water into lungs.
- NTM content of bottled water is unknown.
- Consider boiling drinking water x 10 minutes to sterilize (212OF, 100OC).
- Avoid lying flat immediately after drinking large amounts of water.
- Silent reflux of gastric and duodenal enzymes during sleep may cause damage to the airways which can potentially predispose to the acquisition of NTM from the environment.
- Avoid food or drinks that trigger heartburn.
- Consider sleeping at 30-degree angle to minimize reflux and potential silent aspiration in lungs during sleep; use foam wedge to elevate your body from waist up at least 30 degrees

Mucus Clearance

Please discuss these standard of care measures with your treating physician. To Consider:

- Albuterol nebulizers
- Hypertonic saline nebulizers
- Flutter/PEP device use twice daily
- Chest percussion – manual or with vest twice daily
- Guaifenisin 1-2 times daily
- Aerobic exercise