**Reducing Exposure to Nontuberculous Mycobacteria (NTM) Joseph O. Falkinham, III 8 November 2021**

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**Problem Response Support for Response or Remaining Questions**

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Municipal Piped Water in US has NTM 1. NTM in Throughout Plumbing doi: [10.1128/AEM.67.3.1225-1231.2001](https://dx.doi.org/10.1128/AEM.67.3.1225-1231.2001)

2. NTM Resistant to Chlorine and Other Disinfectants doi: [10.1128/aem.66.4.1702-1705.2000](https://dx.doi.org/10.1128/aem.66.4.1702-1705.2000)

3. NTM Rapidly Adhere to Surface and Form Biofilms doi: 10.1099/jmm.0.000822

 [doi.org/10.1111/jam.12272](https://doi.org/10.1111/jam.12272)

NTM Sources in Residences 1. Water Heaters = Source of NTM Growth Alternative = “Tankless”, but untested

2. Showerhead Aerosols = Source of NTM DOI: [10.2166/wh.2008.032](https://doi.org/10.2166/wh.2008.032)

 3. Tap and Basin Drain Aerosols = Source of NTM Likely, but Untested

 4. Refrigerator Water and Ice Machine NTM Survive in Ice

5. Flushing Toilets Likely, but Untested

6. Drinking Water (If Gastric Reflux) doi: 10.1378/chest.06-1906

NTM in Water 1. Raise Water Heater Temperature to 130° F = Low NTM DOI: 10.3201/eid1703.101510

 2. Flush Unused Taps, Showers, Toilets In preparation

3. Filtration (0.2 micrometer pore size) = NTM Can’t Pass Pre-Filter to Collect Particulates 1-5 micrometers

 4. Boiling = Kill Microorganisms doi: 10.1016/j.jhin.2011.12.018

 5. Spring Water = Low NTM Limited Survey

 6. Well Water = Low NTM DOI: 10.3201/eid1703.101510

 7. “Sterile” and “Purified” Water have NTM = Avoid Limited Survey

 8. Ultraviolet Irradiation = Kill NTM if Irradiated Efficacy of Commercial Instruments Unknown

 9. Disinfection = Kill NTM Implementation and Maintenance Difficult

NTM and OPPPs in Aerosols 1. Showerhead Filter = NTM Can’t Pass Pore Diameter Less than 0.2 micrometers

 2. Clean and Disinfect Showerhead Weekly Detergent with 100 % and Submerge in Bleach 30 min

 3. Shower Mists in Bath DOI: [10.2166/wh.2008.032](https://doi.org/10.2166/wh.2008.032)

 <https://doi.org/10.1128/JCM.00899-13>

 Exhaust Fan or Window

 Showerhead with Large Holes (Drops, not Mist)

 4. Only Evaporative Humidifiers; Avoid Ultrasonic Humidifiers Generate NTM Aerosols doi: 10.1099/jmm.0.000822

 6. Avoid Spas or Hot Tubs = Generate NTM Aerosols DOI: 10.3201/eid0706.010623

Disinfecting Equipment 1. Vinegar as Disinfectant (pH 2.55) NTM Acid-Tolerant:

 doi: 10.1111/j.1574-6968.2000.tb08871.x.

Strain, Dose, Growth DOI: [10.1128/mBio.00013-14](http://dx.doi.org/10.1128/mBio.00013-14)

Nebulizers 1. Water and Breathing = Contamination Clean with Detergent and Disinfect

 Disinfect with Chemicals, Steam, Heat But Untested

 Alcohol Can’t Penetrate NTM Wax Surface

Peroxide Inactivated by NTM Surface Enzymes

Filtration 1. Filters Do Not All Have the Same Pore Diameter Pore Size Must Be Less than 0.2 micrometers

2. Granular Active Carbon (GAC) Filters Support NTM Growth doi: [10.1136/jcp.52.8.629a](https://dx.doi.org/10.1136/jcp.52.8.629a)

Never Use GAC-Filtered Water Unless Post-0.2 µm Filter

Gardening 1. Garden Soil = NTM doi: 10.1128/AEM.00930-06

Garden with N95 Mask and Wet Soil = No Dust

 2. Potting Soil (purchased) = Lots of NTM doi: 10.1128/AEM.00930-06

Garden with N95 Mask and Wet Potting Soil = No Dust

Residence Location 1. NTM are Estuarine doi: 10.1164/arrd.1980.122.1.89.

 Avoid Coastal Swamps and Estuaries

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