Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care

MODULE 9 — Dental Unit Water Quality

Modules in the Slide Series

1. Introduction
2. Hand Hygiene
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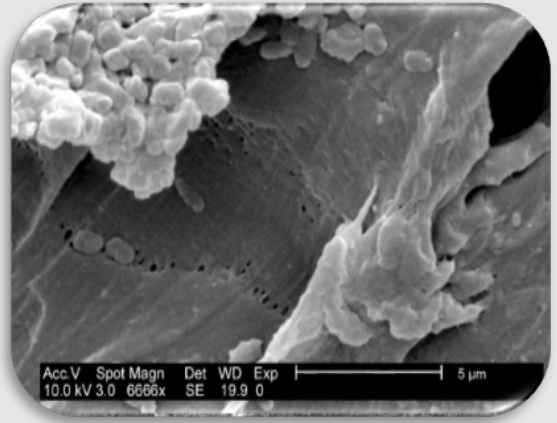
5. Sharps Safety
6. Safe Injection Practices
7. Sterilization and Disinfection of Patient-Care Items and Devices
8. Environmental Infection Prevention and Control
9. **Dental Unit Water Quality (this module)**
10. Program Evaluation

Dental Unit Waterlines

- Narrow-bore plastic tubing that carries water to:
  - High-speed handpiece.
  - Air or water syringe.
  - Ultrasonic scaler.
- Factors that promote bacterial growth and development of biofilm:
  - System design.
  - Flow rates.
  - Materials.

Dental Unit Waterlines and Biofilm

- Microbial biofilms form in narrow-bore tubing of dental units.
- Biofilms serve as a microbial reservoir.
- Primary source of microorganisms is municipal water supply.



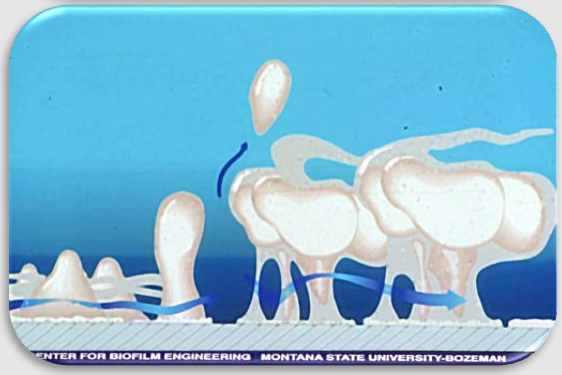


Photo credit (bottom): Center for Biofilm Engineering, MSU-Bozeman

Microorganisms of Concern

- *Legionella* species:
  - Transmission occurs primarily through inhalation of infectious aerosols.
  - Pontiac Fever, Legionnaires' disease.
- *Pseudomonas* species:
  - Bacterial infection that usually occurs in a hospital setting or in people with weakened immune systems.
  - Most common type infecting humans is *Pseudomonas aeruginosa*.
  - Can be mild or severe
- Nontuberculous *Mycobacteria*:
  - Can cause infection on skin and in soft tissue and organs.
  - Associated with outbreaks in health care and dental settings.

Dental Unit Water Quality

- Using water of uncertain quality is inconsistent with infection prevention principles.
- Colony counts in water from untreated systems can exceed 1 million CFU/mL (CFU = colony forming unit).
- Untreated dental units cannot reliably produce water that meets drinking water standards.
- Removal or inactivation of dental waterline biofilms requires use of chemical germicides.

Recent Disease Transmission Associated with Dental Unit Waterlines

- 2011 transmission of *Legionella*, Italy[1]:
  - 82-year-old woman.
- 2015 transmission of *Mycobacterium abscessus*, Georgia[2]:
  - 23 cases—all children.
  - All received pulpotomy procedures.
- 2016 transmission of *Mycobacterium abscessus*, California[3]:
  - Infections reported in children who had pulpotomy procedures.
  - As of May 2, 2017, 68 potential cases have been reported.

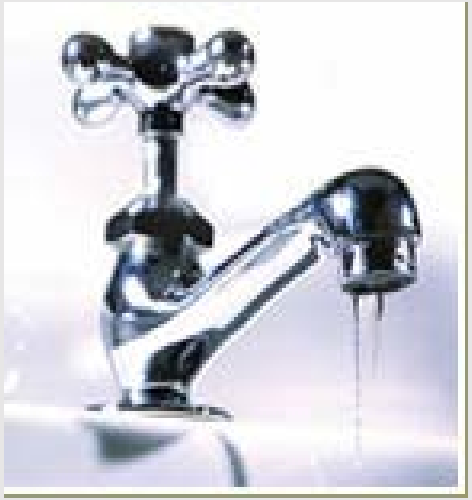
[1]Ricci ML, et al. *Lancet*. 2012;379(9816):684; [2]Lindsay, H, et al. Pediatric Dental Clinic Associated-Outbreak of *Mycobacterium abscessus* Infections. Oral Abstract Session, IDWeek 2016; [3]www.ochealthinfo.com/phs/about/dcepi/epi/dip/prevention/disease_listing_a_z/myco

CDC Recommendations for Dental Unit Water Quality

- Use water that meets US Environmental Protection Agency (EPA) regulatory standards for drinking water (i.e., <500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water.
- Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the recommended quality of dental water.
- Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product.

CDC Recommendations for Dental Unit Water Quality (Continued)

- Discharge water and air for a minimum of 20–30 seconds after each patient, from any device connected to the dental water system that enters the patient's mouth (e.g., handpieces, ultrasonic scalers, air or water syringes).
- Consult with the dental unit manufacturer on the need for periodic maintenance of antiretraction mechanisms.



Improving Dental Unit Water Quality

- Available Technology
  - Independent reservoirs.
  - Chemical treatment.
  - Filtration.
  - Combinations of technologies.
  - Sterile water delivery systems.
- DHCP should always consult with the dental unit manufacturer for appropriate methods to maintain the recommended dental unit water quality.

Monitoring Options

- Water-testing laboratory.
- In-office testing with self-contained kits.
- Follow recommendations provided by the manufacturer of the dental unit and the waterline treatment product for monitoring water quality.

Oral Surgical Procedures

- Involve the incision, excision, or reflection of tissue that exposes the normally sterile areas of the oral cavity.
- Examples:
  - Biopsy.
  - Periodontal surgery.
  - Apical surgery.
  - Implant surgery.
  - Surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of the mucoperiosteal flap, removal of bone or section of tooth, and suturing if needed).
- **Use sterile irrigating solutions.**

Sterile Irrigating Solutions

- Use sterile saline or sterile water as a coolant/irrigator when performing surgical procedures.
- Use devices designed for the delivery of sterile irrigating fluids.

Dental Unit Water Quality Resources

- CDC. *Guidelines for Infection Control in Dental Health-Care Settings—2003*
- CDC. Dental Unit Water Quality website
- CDC. *Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care*
- Montana State University Center for Biofilm Engineering website
- Organization for Safety, Asepsis and Prevention. Safe Water, Safe Dentistry, Safe Kids webinar
- Peralta G, Tobin-D'Angelo M, Parham A, et.al. *Mycobacterium abscessus* infections among patients of a pediatric dentistry practice—Georgia, 2015. *MMWR Morb Mortal Wkly Rep*. 2016;65:355–356

End of Module 9

For more information, contact Centers for Disease Control and Prevention (CDC).
1-800-CDC-INFO (232-4636)
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC.