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
3. Personal Protective Equipment
4. Respiratory Hygiene/Cough Etiquette
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.

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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
End of Module 9

For more information, contact Centers for Disease Control and Prevention (CDC).
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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.