

# In Practice

**FREE CE for members!**

**IN THIS ISSUE**

*Infection Control in Practice* focuses on the basics of infection prevention and control while maintaining a safe work environment, limiting the spread of contamination, and promoting compliance with COVID-19 prevention guidelines in dental facilities. This will help the Infection Control Coordinator (ICC) communicate the importance of **the safest dental visit™**

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## TEAM HUDDLE: Aerosol Management: Part 1 Engineering Control Options To Reduce Risk Of Airborne Diseases

As we continue to learn from the COVID-19 pandemic, indoor air safety emerges as a key factor in dental safety programs. This issue is part one of a two-part series on Aerosol Management emphasizing engineering controls to reduce the risk of airborne disease transmission. Part one considers indoor air safety with a focus on structural air handling equipment. Part two will address add-on equipment and other options for indoor air safety.

### LEARNING OBJECTIVES

After reading this publication, the reader should be able to:

1. Describe how to assess risk for airborne diseases in dental environments.
2. Identify factors that reduce the risk of airborne diseases in dental environments.
3. Understand the importance of managing indoor air quality using air ventilation and filtration equipment to reduce exposure to Aerosol Transmissible Diseases.

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# TEAM HUDDLE: Aerosol Management: Part 1 Engineering Control Options To Reduce Risk Of Airborne Disease Transmission

## Where Do We Go From Here?

COVID-19 is a contact, droplet, and airborne disease that changed respiratory safety protocols in dentistry by requiring the practice of both Standard and Transmission-Based Precautions.<sup>1</sup>

Standard Precautions provide acceptable safety levels against transmission of bloodborne, droplet, and contact diseases but do not effectively address airborne disease transmission. When practicing Standard Precautions, symptom screening is used to identify and exclude known or suspected cases of Aerosol Transmissible Diseases.

## Why Is This Important?

Because asymptomatic carriers are known to transmit COVID-19 as well as other airborne infectious diseases, dental settings must be prepared with a respiratory protection program that goes beyond Standard Precautions.

The Centers for Disease Control and Prevention (CDC) and the Occupational Safety and Health Administration (OSHA) recommend a layered approach to manage airborne risks: a respiratory protection program focusing on Personal Protective Equipment (PPE), including respirators, within the context of other mitigation strategies.

Indoor air quality is one of the most important mitigation strategies, as research links poor indoor air conditions to unhealthy exposures to air contaminants and to increased transmission of airborne diseases including COVID-19.<sup>1,2</sup>



# Workplace Scenario: The Situation

Dylan began his dental hygiene career during the COVID-19 pandemic. He learned at the university about respiratory protection and knew his school had upgraded the air filtration systems to reduce exposure to COVID-19 and other airborne pathogens. Dylan now works at his aunt's small dental office in a strip mall (Office A) and another dental office in a medical building (Office B). Both office locations are general dental practices.

The first thing Dylan noticed in Office A was the garlic smell from the restaurant next door and the receptionist's scented candles, even while using the only available N95 respirator that did not fit Dylan's face well. Windows were closed to manage outside odors and temperature; the office felt stuffy, even with the ceiling vents set on "max."

The equipment was vintage 1990s with weak suction. Everyone was doing their best within the accepted limits of the "good old office," so discussion of this issue was discouraged among staff and patients.

Office B was more like the university: newer Heating Ventilation and Air Conditioning (HVAC) system, better suction, and the office considered aerosol management important. Before his first workday, Dylan was fit-tested for a respirator and trained on office safety practices.

He saw the HVAC engineer evaluate the ceiling equipment to maximize the ventilation and filtration and learned that the HVAC equipment could accommodate up to "MERV 6" filters (see glossary on pages 5 and 8), a typical level of air filtration in non-healthcare buildings. This level of filtration



was below the medical standards, according to the engineer.

The dentist in Office B wanted better air filtration, so he was considering adding separate High-Energy Particulate Air (HEPA) filter units and external suction units and was trying to figure out how many they needed and the best locations.

They calculated air changes per hour (ACH), but no one could find guidelines for recommended ACHs in a dental office. Finally, they settled on a 6 – 12 ACH range based on medical standards.

Dylan was chosen to help the ICC integrate aerosol protection into the overall safety program because of his recent university experience. At Office B, every morning huddle included a discussion of safety concerns and practices.

With the winter flu season and increasing numbers of local COVID cases, the odors and stuffiness of Office A made Dylan feel more than uncomfortable: he felt unsafe.

He didn't want to bring illness home to his wife and new baby. It was time to discuss it with his aunt, but where should he start?

# Workplace Scenario: How To Proceed

## The Approach

At Office A, Dylan decided to speak with his aunt privately. He started by focusing on his desire to avoid respiratory diseases to protect his baby and showed her some research on healthcare aerosol disease risks and recommendations.

They discussed the discomfort and risk associated with the air “feeling stuffy and stagnant”, and why it was significant that the masks didn’t filter out the aroma of garlic.

Dylan suggested ordering the same N95 respirator he used at Office B and offered to create a respiratory protection plan, including N95 respirator fit-testing and options for improving ventilation and air treatment.

To his surprise, his aunt welcomed the help. Dylan began his search by joining OSAP, where he found insightful resources and links to useful information.

## Action Steps: What To Do?

Dylan researched aerosol management recommendations from the CDC and he also looked up standards from OSHA and then called the local OSHA field office for advice.

He was told to find a mechanical engineer to evaluate the office’s HVAC system. From this HVAC evaluation, he would learn how to maximize its air management capacity and consider modifications, such as improving air intake and exhaust and adding filters that are compatible with the equipment.

To address any deficiencies, OSHA suggested considering stand-alone air purifiers and reminded him of the employer’s responsibility to implement a respiratory protection program. Also, the dental dealer’s equipment specialist suggested upgrading the high-volume suction system and looking at external suction units.

Since specific dental air quality rules were not found, the operational targets for the equipment were determined by using healthcare (medical) air safety standards as guidelines.

## Problem-Solving Strategies

Dylan recognized conditions that might indicate risk for airborne disease transmission and addressed them. His goal was to find solutions that would mitigate airborne disease transmission risks.

The built-in HVAC system would be his first focus; he recognized that the building’s air handling system required attention and found experts to analyze and upgrade it as much as possible.

Beyond the limits of the HVAC system, Dylan identified other equipment and protocols to create a safer setting. The engineering controls he addressed are a key part of the whole respiratory safety program.

Dylan found that OSHA and CDC dental indoor air quality (IAQ) recommendations fall under general healthcare standards based on medical settings and vary according to how spaces are used. He gathered references to apply healthcare indoor safety standards to a dental office. Dylan was able to assess the risk of airborne infection, identify the factors that increase those risks, suggest solutions to reduce the risks and find healthcare standards to follow.

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**In This Issue:** Dylan leads his aunt’s office to address the air mechanical HVAC system as a first step in a comprehensive respiratory protection program. This is a logical first step because built-in equipment can establish predictable air management processes to effectively remove air contaminants.

In part two of this series on Aerosol Management, Dylan will address additional engineering controls to make up for any deficiencies in the structural HVAC system and to provide greater control over office air quality.

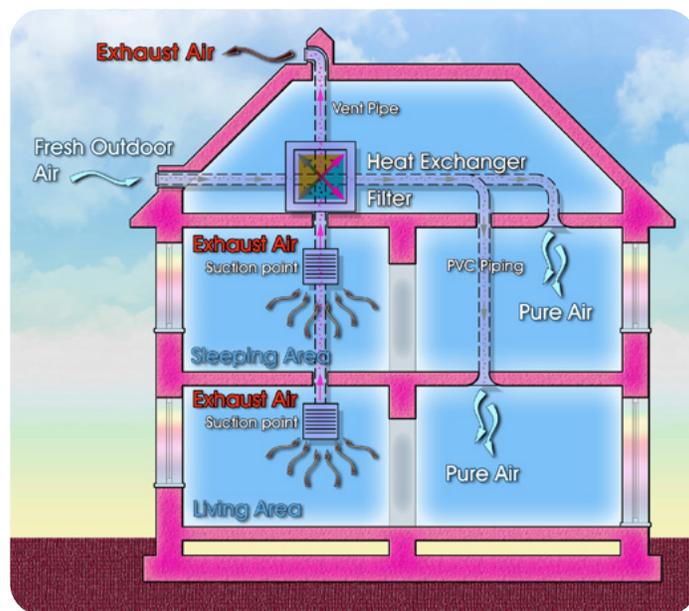
# Finding Solutions To Indoor Airborne Risks

Dental offices may be built in structures that do not provide optimal indoor air safety. Within the context of a full safety program, and along with a complete respiratory protection program, the following considerations are important to improve air safety in a dental environment.<sup>2,4,7,8</sup>

## Building Design and Engineering Considerations

1. HVAC system design, capacity, and function
2. Ventilation: Air changes per hour
3. Intake of outside air
4. Air filtration levels and function
5. Air exhaust
6. Temperature and humidity

## MECHANICAL VENTILATION SYSTEM



Mechanical Extraction Ventilation (MEV) for indoor air quality - concept image with architectural cross section and diagram of operation. © Francesco Scatena | Dreamstime.com

## Glossary of Terms for This Issue

### ACH:

Air Changes per Hour is a calculation of how many times per hour the entire volume of air in a given space is replaced with supply (outside) and/or recirculated air. ACH is calculated by measuring room air volume and the capacity of equipment that drives airflow, air mixing, dilution, and filtration.

### ATD:

Aerosol Transmissible Disease is a disease that is effectively transmissible via the airborne route.

### HEPA Filter:

High-Efficiency Particulate Air filter that removes at least 99.97% of 0.3 micron particles at rated flow, typically reported in cubic feet per minute (cfm). HEPA filters are comparable to MERV 17.

### HVAC:

Heating, Ventilation, and Air Conditioning.

### IAQ:

Indoor air quality

### MERV:

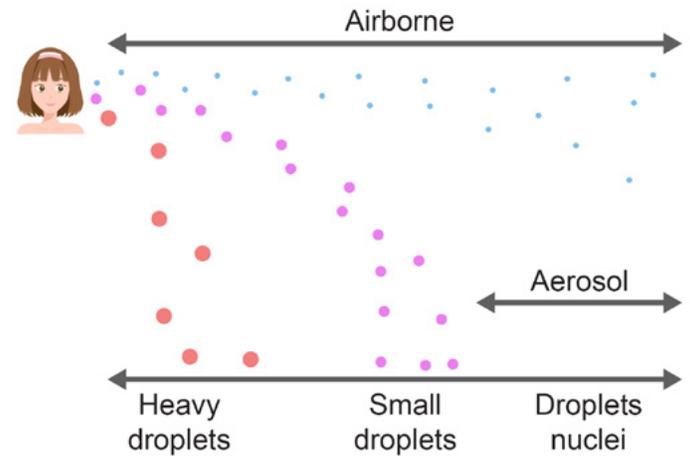
The Minimum Efficiency Rating Value is a measure of the filter efficiency determined by the percentage (%) removal of various particle sizes. (See page 8 for further details).

# Understanding Aerosol Transmissible Disease Risk

## Characteristics of Airborne Diseases

Exposure to respiratory diseases occurs in the following three principal ways.<sup>1,2,3,4</sup>

1. Inhalation of very fine respiratory droplets and aerosol particles
2. Depositing of respiratory droplets and particles on exposed oral, nasal, or ocular mucous membranes by direct splashes and sprays
3. Touching mucous membranes with contaminated hands.



The principal mode by which people are infected with airborne pathogens, including SARS-CoV-2, is through exposure to respiratory fluids carrying infectious microorganisms.

People release respiratory fluids in the form of droplets across a spectrum of sizes. These droplets carry viruses and bacteria and transmit infection. The largest droplets settle out of the air within seconds to minutes. The smallest droplets and aerosol particles can remain viable and suspended in the air for minutes to hours.<sup>1,3,4</sup>

## Factors that **Increase** aerosol transmissible disease risk

**Exposure to known or suspected infectious people:** Screen for ATDs and exclude symptomatic patients and workers.<sup>1,2,3</sup>

**Asymptomatic transmission:** If an ATD, such as COVID-19, can be transmitted by asymptomatic people, symptom screening is less effective. Dental safety precautions should address unrecognized infectious people.<sup>1,2,3</sup>

**Community Disease Activity:** Risk increases as the number of cases, hospitalizations, and deaths rise. Local levels of COVID activity are used to determine when to follow transmission-based precautions, such as during local infection surges and seasonal infection activity.<sup>1,3,5</sup>

**Proximity to the source:** The risk of exposure and transmission is greatest within three to six feet of an infectious source where droplets, very fine droplets, and particles are concentrated, but the transmission of infections at distances greater than six feet from an infectious source has occurred.<sup>1,3,4</sup>

**Enclosed spaces with inadequate ventilation** or air filtration may trap exhaled respiratory fluids, especially very fine droplets or aerosol particles, which can build up in the air space near and distant from the source.<sup>2,3,4</sup>

**Increased exhalation** or projection of respiratory fluids including performing aerosolizing

procedures (high-speed handpieces, sonic and ultrasonic scalers, air-water syringes, air polishers, lasers) or if the infectious person is engaged in physical exertion or active vocalization, coughing or sneezing.<sup>3,4</sup>

**Prolonged exposure** to the above conditions, typically 15 cumulative minutes or more: close exposure to patients' open mouths and noses (respiratory secretions, saliva) without effective PPE.<sup>3,4</sup>

**High personal susceptibility to infection** or likelihood of transmitting to others at risk. This may justify the strictest application of safety protocols, e.g., when making a choice, selecting an N95 vs level 3 surgical mask.<sup>3,5</sup>

# Understanding Aerosol Transmissible Disease Risk (cont'd)

## Factors to **Decrease** the risk of aerosol transmissible diseases in dental settings

Airborne infection risks must be included in a comprehensive infection control and prevention program. The CDC recommends a layered approach using multiple methods, including air ventilation, to control exposure to hazards and to manage ATDs.<sup>1,3,6</sup>

The concept of the “Hierarchy of Controls” arranges safety strategies according to their effectiveness, based on the likelihood of human errors or non-compliance.

The following approaches are arranged from most effective controls (top of the pyramid) to least effective controls (bottom of the pyramid). This issue focuses on engineering controls, including building air handling systems with the understanding that a successful aerosol management program includes all of the layers of the pyramid.<sup>3,6</sup>

### HIERARCHY OF HAZARD CONTROLS

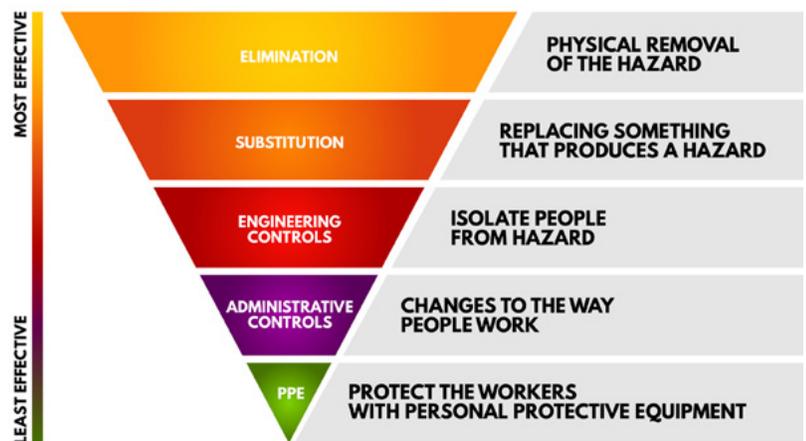


Image adapted from [cdc.gov/niosh/topics/hierarchy/images/NIOSH\\_HOC\\_Main\\_508\\_photocredit.jpg](https://www.cdc.gov/niosh/topics/hierarchy/images/NIOSH_HOC_Main_508_photocredit.jpg)

#### **Elimination: Avoid exposure to the hazard**

Screen for symptoms of ATDs and exclude (dismiss) known infectious patients and workers but recognize that ATDs may be transmitted by asymptomatic people. Set safety standards that protect against unidentified infectious people.

#### **Substitution: Avoid or reduce exposure by substituting a safer practice or item**

#### **Engineering Controls: Designed to physically improve safety**

Control indoor air quality and safety with ventilation, filtration, and air-cleaning equipment. Optimize (adjust, upgrade or improve) HVAC and suction equipment to reduce pathogen concentrations in the air.

#### **Administrative Controls: Policies and protocol**

Safety recommendations have changed since the early COVID-19 crisis, reflecting changes in infection risk, availability of prevention, management, treatment options, and information. Update the written program with a respiratory protection program with standard operating procedures (SOPs), checklists, monitoring, and maintenance. Provide ongoing training, and updates. Address safety issues daily with open communication and meetings, creating a culture of safety.

#### **PPE: Personal Protective Equipment**

Establish and enforce a respiratory protection program including fit-tested respirators. Purchase a fit tester or arrange the use of a nearby hospital fit-testing program.

# Strategies: For Air Quality Management Using Engineering Controls

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), the CDC and OSHA healthcare standards are different from non-healthcare recommendations; healthcare settings require additional ventilation, filtration, and other engineering controls to ensure the safest indoor air quality.

Throughout COVID-19, ASHRAE has recommended optimizing a building's HVAC system to the highest filtration class possible within the limits of the equipment.

If the HVAC units cannot accommodate the resistance of filters with appropriate Minimum Efficiency Reporting Value ratings (MERV 13 or above), ASHRAE recommends upgrading HVAC systems and/or achieving equivalent airflow by adding separate filters and air cleaners.

High-Efficiency Particulate Air filters are recommended for high occupancy, low ventilation, and high-risk medical spaces. Maintain humidity between 40% and 60% for comfort and biological safety. Consult a licensed mechanical engineer specializing in heating, ventilation, and air conditioning when considering changes to HVAC systems and equipment.<sup>1,2,7</sup>



## Air Filtration Considerations

In the absence of specific dental IAQ standards, ASHRAE medical standards may be used as a guide to determine appropriate air quality strategies in dental settings.

ASHRAE healthcare air quality guidelines set filter requirements for various spaces, based on how the room (or space) will be used. Based on room use, the following filter levels are recommended: See Table 1, page 9.



## What is MERV?

**The Minimum Efficiency Rating Value** is a measure of the filter efficiency determined by the percentage (%) removal of various particle sizes.

**MERV values range from 1-16:** higher values are more efficient. OSHA recommends MERV 13 or higher for infection control.

**MERV 8** filters are not rated for 0.3 – 1.0 micron particles and remove only 20% of 1.0 – 3.0 particles.

**MERV 13** filters capture at least 50% of 0.3 – 1.0 micron-sized particles and at least 85% of 1 – 3 micron-sized particles.

MERV 13 and higher most effectively filter out human-generated particles trapped in wet and dry respiratory droplets.

**MERV 14** filters capture at least 75% of 0.3 – 1.0 micron-sized particles and at least 90% of 1 – 3 micron-sized particles.

**MERV 15 & 16** filters exceed the above levels.<sup>7</sup>

# Strategies: For Air Quality Management Using Engineering Controls (cont'd)

**Table 1:** ASHRAE filtration recommendations reflect the use of the space and anticipated MERV rating needed to provide safe air<sup>7</sup>

Level	Space Category	Filter Efficiency Recommendations <sup>a,b</sup>
Level I	<ul style="list-style-type: none"> <li>› Primarily exhausted space (e.g., restrooms, janitor's rooms)</li> <li>› Any human-occupied space</li> <li>› Any room, inpatient or outpatient, where a patient stays less than 6 hours including waiting rooms</li> <li>› Laboratories</li> <li>› Resident rooms in assisted living or hospice</li> <li>› Storage of packaged sterile material, clean linen, or pharmaceuticals<sup>c</sup></li> <li>› Treatment rooms, endoscopy procedure room</li> <li>› Dirty side of decontamination processing</li> </ul>	MERV 8 (equivalent to ASHRAE 62.1 or Standard 62.2)
Level II	<ul style="list-style-type: none"> <li>› Inpatient spaces, including medical-surgical, airborne isolation<sup>d</sup></li> <li>› Special exam room for suspect airborne cases, emergency department exam rooms<sup>e</sup></li> <li>› Resident room in a skilled nursing area</li> <li>› Workroom for packing of sterile materials</li> <li>› CT or MRI procedure room, interventional radiology (including biopsy operatory, or bronchoscopy room)</li> <li>› ER procedure or trauma room</li> </ul>	MERV 14 <sup>f,9</sup>
Level III	<ul style="list-style-type: none"> <li>› Operating room<sup>h</sup>, MERV16<sup>f</sup></li> </ul>	HEPA
Level IV	<ul style="list-style-type: none"> <li>› Operating room designated for orthopedic, transplants, neurosurgery, or dedicated burn unit procedures</li> <li>› Protective environments, including burn units</li> </ul>	HEPA

- Notes:
- a. Where listed, MERV rating is assumed to be non-degrading.
  - b. Transfer air due to differences in pressure between spaces may be unfiltered.
  - c. Pharmacy compounding spaces are not covered in this table. Follow <USP>795, <USP>797, or <USP> 800 as applicable.
  - d. Does not include recirculated air. Air recirculated in an Airborne Isolation Room requires HEPA filters.
  - e. Air from spaces where suspected airborne cases may be treated or examined should be filtered at level II prior to re-circulation to other spaces. If exhausted, supply air filtration may be level I.
  - f. Minimum MERV rating of the highest efficiency filter in the air stream.
  - g. Filter efficiency if supply air is used; Not intended to exclude natural ventilation if otherwise allowed.
  - h. An optional risk assessment, with the user group may indicate a need to increase from Level III to Level IV.

# Strategies: For Air Quality Management Using Engineering Controls (cont'd)

## Air Ventilation Guidelines

The CDC provides a guideline for ventilation requirements in medical facilities. The unit of measure is Air Changes per Hour. ACH is a calculation of how many times per hour the entire volume of air in a given space is replaced with supply (outside) and/or recirculated air. In the absence of dental-specific rules or guidelines, medical ventilation guidelines may be used.<sup>8</sup>



**Table 2:** Total ACH and what part of that must be from outside.

The following Table is adapted from CDC Guidelines for Environmental Infection Control in Health-Care Facilities (2003), specifically Table B.2. Ventilation requirements for areas affecting patient care in hospitals and outpatient facilities.<sup>8</sup>

Location	Outside Air Changes/Hour	Total ACH
Critical intensive care room	2	6
Procedure room	3	15
Patient room	2	6
Airborne infection isolation room	2	12
Bronchoscopy	2	12
Treatment room	—	6
Toilet room	—	10
Patient corridor	—	2
X-ray diagnostic & treatment	—	6
Examination room	—	6
Sterilizer equipment room	—	10

# Strategies: To Improve Indoor Air Quality

The following table shows key factors and goals to consider when improving indoor air quality and safety.

**Table 3:** Air Quality Considerations

Building Design and Engineering Considerations	
Consideration (What?)	Goal (Why?)
HVAC design & capacity, including the motor, ducts, filters, and openings	Maximize built-in equipment effectiveness as appropriate for each space (room).
Air intake requirements: The volume of air. The time needed to change/replace room air, and location of intake ports.	Increase outside air, meet outside ACH goals.
Air exhaust requirements	Match exhaust to intake volume. Optimize exhaust volume, locate exhaust correctly and maximize exhaust hours of operation.
Meet or exceed the minimum total ACH for each room. This is the combined outdoor and recirculated (indoor) air that is replaced per hour.	Optimize airflow to occupants by balancing intake (outside) air and recirculated (inside) air to meet total ACH goals.
Meet or exceed minimum outdoor air changes	Ensure adequate supply of (outside) air.
Outside air filtration	Ensure outside air intake improves IAQ (may need to filter outside pollutants).
Recirculated air filtration	Meet total ACH goals by filtering recirculated air. Recirculating air increases HVAC efficiency & decreases costs, but filtration is important.
Ducting size, design, condition	Control indoor airflow volume, distribution, and quality. Ensure the quality & function of ducts.
Particulate matter filters: MERV ratings, locations, fit, maintenance	Maximize air filtration: use the highest MERV rating compatible with the HVAC motor, optimize filter location & fit (balance filtration with efficiency).
Directional airflow	Control clean-to-less-clean air movement, away from occupants.
Heating, cooling, humidity, energy recovery	Create comfortable temperature & humidity, and maximize building efficiency. Reduce costs by reusing heated or cooled air. This limits outdoor air. Filtration offsets that risk.
Shared or separate air use & filtration	Isolate spaces or share air between spaces considering space use and air safety needs.
System monitoring & maintenance	Ensure ventilation systems operate properly, providing acceptable IAQ for each space.
Data in Table 3 reflects combined information from CDC, OSHA, ASHRAE, and National Institute for Occupational Safety and Health (NIOSH). <sup>1,2,4,7,8,9</sup> For an expanded table which includes methods and resources to implement air quality improvement goals, <a href="#">click here</a>	

# Strategies: What Indicators Are Available To Monitor Air Quality?

Ongoing maintenance and monitoring are necessary to insure indoor air safety. Equipment should be inspected periodically, and filters must be inspected and changed regularly.

Air quality can be monitored by testing for specific contaminants that are easier to detect and measure than airborne pathogens. Examples of these include various-sized particulates, Carbon Dioxide (CO<sub>2</sub>) and Volatile Organic Compounds (VOCs). (See Table 4 below) Professional environmental engineers can provide this service or air monitors can be purchased. High amounts of these particulates can indicate poor air quality and/or safety concerns.<sup>10</sup>

**Table 4:** Examples of air pollutants that can be monitored to indicate the effectiveness of your air quality control <sup>4,7,8,10</sup>

Air Pollutants	Safe Limits
Particulate Matter (PM <sub>2.5</sub> ): fine dust particles suspended in the air with a diameter of 2.5 micrometers or less.	Limit: 0 – 12 ug/m <sup>3</sup>
Particulate Matter (PM <sub>10</sub> ): coarse dust particles that meet or exceed a diameter of 10 micrometers.	Limit: 0 – 54 ug/ m <sup>3</sup>
Volatile Organic Compounds: chemical compounds that can evaporate under normal indoor conditions. Sources include solvents, liquid fuels, furniture, carpets, and other fabrics.	Limit: 0 – 15 ppm
CO <sub>2</sub> : Highly populated rooms can increase CO <sub>2</sub> levels.	Limit: at or below 800 ppm
Formaldehyde: a VOC, probable carcinogen. Sources are building materials, upholstery, cigarettes, some pesticides, and preservatives.	Limit: 0 – 0.2 ppm
Carbon Monoxide (CO)	25 ppm limit for an 8-hour workday
Nitrogen Dioxide (NO <sub>2</sub> )	100 ppb 1-hour standard
Radon	No safe exposure levels
Methylene chloride	250 ppm odor threshold
Polycyclic Aromatic Hydrocarbons (PAHs)	Less than 10 ppm

## TEAM HUDDLE DISCUSSION GUIDE

1. Do you feel that your office has adequate ventilation?
2. Does your current building's HVAC equipment function properly?
3. Is your practice screening patients and workers for aerosol-transmitted diseases?
4. Do you have suggestions to improve your office air quality and safety?



## Links to Resources

1. Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic. Updated Sept. 23, 2022 [cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html](https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html) Accessed Dec. 2022
2. OSHA Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID-19 in the Workplace. June 10, 2021 [osha.gov/coronavirus/safework](https://www.osha.gov/coronavirus/safework) Accessed Dec. 2022
3. Scientific Brief: SARS-CoV-2 Transmission. May 7, 2021 [cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html](https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html) Accessed Dec. 2022
4. ASHRAE Positions on Infectious Aerosols. Oct. 13, 2022. [ashrae.org/file%20library/about/position%20documents/pd\\_infectious-aerosols-2022\\_edited-january-2023.pdf](https://www.ashrae.org/file%20library/about/position%20documents/pd_infectious-aerosols-2022_edited-january-2023.pdf) Accessed Jan. 2023
5. CDC COVID Data Tracker. [covid.cdc.gov/covid-data-tracker/#datatracker-home](https://covid.cdc.gov/covid-data-tracker/#datatracker-home) Accessed Dec. 2022
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# In Case You Missed This!

## Outbreaks of Nontuberculous *Mycobacteria* Infections Highlight Importance of Maintaining and Monitoring Dental Waterlines\*

*Dental providers should recognize the risk to patients and workers if dental waterlines are not treated and monitored, and be familiar with CDC's recommendations on how to properly maintain and monitor their dental equipment to ensure that dental treatment water is safe for patient care.*

### Outbreaks

In 2015 and 2016 multiple outbreaks of nontuberculous *Mycobacteria* (NTM) infections occurred in children who received pulpotomies in pediatric dental clinics where the dental treatment water contained high levels of bacteria. The outbreaks in California and Georgia involved young children, with ages ranging from 4 to 8 years. Many of the children developed severe infections with clinical diagnoses such as cervical lymphadenitis and mandibular or maxillary osteomyelitis and required hospitalization, treatments such as intravenous antibiotics, and surgical procedures. Complications from their infections included permanent tooth loss, hearing loss, facial nerve palsy, and incision fibrosis.

In 2022 a new cluster of NTM infections was reported and is being investigated. Initial reports indicate that dental waterline testing showed microbial counts much higher than recommended levels for potable water with levels exceeding 500 colony-forming units (CFU)/mL of heterotrophic water bacteria.



\*Highlights of CDC Health Alert Network (HAN) Health Advisory Oct 31, 2022 <https://emergency.cdc.gov/han/2022/han00478.asp#print>

### What Providers Must Do To Prevent This

Dental providers must disinfect, maintain and routinely monitor dental waterlines by following dental equipment manufacturers' directions.

Water and air should be discharged 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, and air/water syringes).

Oral surgical procedures should only be performed using sterile solutions as a coolant or irrigant and use appropriate delivery devices such as sterile syringes, sterile tubing that bypass dental unit waterlines, or sterile single-use devices.

Dental providers must maintain and monitor dental unit water and provide staff training based on the manufacturer's instructions for the products and devices used.

Waterline treatment and monitoring records should be kept following state and federal requirements and suspected infections must be reported to public health authorities.

For non-surgical pulpal therapy and endodontic procedures, the American Academy of Pediatric Dentistry, American Association of Endodontists, and OSAP recommend using only sterile irrigants delivered with sterile or single-use delivery devices.

### **NEW Continuing Education Webinar!**

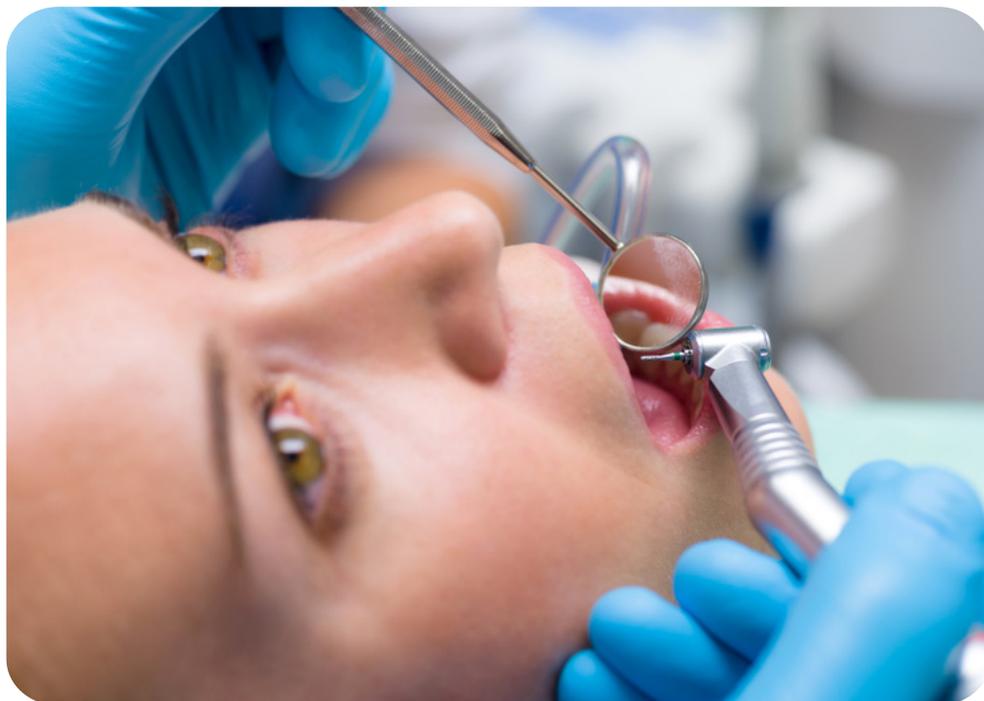
Managing Dental Unit Water Quality, jointly hosted by ADA and OSAP, with speaker Dr. Shannon Mills.

February 16, 2023 at 12:00pm Central time.

**Register for the webinar [HERE](#)**

# What's Wrong With This Picture?

Can you identify what safe work practices are missing in this picture of a dental procedure that is about to begin?



**Answer:** Although a saliva ejector is in place, use of high-volume evacuation (HVE) should be at the ready to control aerosols that will be created by use of the high speed handpiece. The dental patient has not been given protective eyewear during a procedure that is about to generate splatter and aerosol spray.

# Take the Silent Video Challenge!

**The Scenario:** Improving Indoor Air Quality

Air filters in HVAC systems are part of environmental controls to improve indoor air quality. **What is the best air filter MERV rating to choose for a dental office?**

[youtu.be/n2DnQC8Ka8g](https://youtu.be/n2DnQC8Ka8g)

Challenge your knowledge and compare to the lesson below.



**The Lesson:** When installing air filters in HVAC systems in the dental office setting, choose the highest possible MERV level that the HVAC equipment can accommodate. If the HVAC units cannot accommodate the resistance of filters with appropriate ratings, MERV 13 or above, the ASHRAE, recommends upgrading HVAC systems and/or achieving equivalent airflow by adding separate filters and air cleaners.

# Thanks

to our sponsors

OSAP thanks the following companies that help to underwrite each issue of this special series of *Infection Control in Practice: Team Huddle™* in 2023.

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## KEY TAKEAWAYS

1. Enclosed spaces with inadequate ventilation or filtration increase airborne infection risk.
2. Monitoring and managing indoor air quality (IAQ) is an important strategy to use in a layered approach to manage and reduce the risk of exposure to airborne infections in dental settings.
3. Engineering controls including built-in HVAC equipment are an excellent starting point to lower or eliminate airborne risks.
4. Healthcare indoor safety standards provide guidance to manage dental air spaces.



## Educational Spotlight

### JUST RELEASED...NOW SHOWING!

This impactful 5-minute digital video uses actual dental healthcare personnel (DHCP) to demonstrate the cross-contamination DHCP would see if saliva were red.

Produced without a voice track, only visual cues are used to highlight common dental infection control flaws and show the need for procedure-specific dental infection control to reduce the risk of exposure.

It is an ideal training tool, regardless of one's native language. **Register to view for FREE!**  
[osap.org/if-saliva-were-red](https://osap.org/if-saliva-were-red)

**It also includes: *How to Tell the Story: A Facilitator's Guide***, with talking points, answers to common questions, a checklist of the elements of a comprehensive dental personnel training program, and a list of resources.

**Claim 1 CE credit for FREE! Click here to register**, and complete an online assessment.



## GET YOUR CE CREDIT ONLINE

Follow the instructions below to receive 1 hour of CE credit FREE to OSAP members. OSAP is an ADA CERP Recognized Provider.\*

**Step 1:** Go to [osap.mclms.net/en/package/11408/view](https://osap.mclms.net/en/package/11408/view) to register or purchase the course.

**Step 2:** Log in to your OSAP member account or create a new user account.

**Step 3:** Complete the registration form. OSAP members FREE! Non-members \$20.

**Step 4:** Complete the online course. You must pass with 7 out of 10 correct answers. When completed, you will receive an email with your CE certificate. The CE certificate will also be available in your new OSAP Infection Prevention & Safety CE Center account under MY ACCOUNT > MY CERTIFICATES.

### QUESTIONS TO ONLINE QUIZ: Select the most correct answer

1. What type of safety precautions should be practiced during and following the COVID-19 pandemic?
  - a. Universal Precautions
  - b. Standard Precautions
  - c. Standard and Transmission-based Precautions
  - d. Strictly Transmission-based Precautions
2. Identify the true statement regarding the layered approach to respiratory safety:
  - a. If N95 respirators are worn, no other precautions are needed.
  - b. Every office must have two layers of protection: MERV 8 and MERV 10 filters.
  - c. A full respiratory safety program requires many layers of protection to reduce risk.
  - d. If one layer of protection is excellent, the others are not necessary.
3. How are healthcare IAQ standards different from non-healthcare standards?
  - a. Healthcare standards require additional ventilation, air filtration, and other engineering controls.
  - b. Healthcare standards are the same as non-healthcare standards.
  - c. Ventilation and air filtration standards are lower for healthcare than for non-healthcare facilities.
  - d. Healthcare HVAC equipment must sterilize all air.
4. What is the best air filter rating to choose for a dental office?
  - a. MERV 6
  - b. MERV 18
  - c. Highest possible MERV level that the HVAC equipment can accommodate
  - d. Lowest possible MERV level that the HVAC equipment can accommodate
5. What factor is used to establish the filtration rating for different healthcare rooms?
  - a. Location of the rooms
  - b. Size of the rooms
  - c. All rooms require the same filtration rating
  - d. How the room will be used
6. Identify the INCORRECT statement about Air Changes per Hour.
  - a. Air is naturally changed every hour as occupants breathe.
  - b. ACH is a calculation of how many times per hour the entire volume of air is replaced.
  - c. ACH may be achieved by the intake of outside air.
  - d. ACH may be achieved by air filtration and intake of outside air.
7. Identify the situation that poses the LOWEST RISK for aerosol disease transmission.
  - a. Working in enclosed spaces with inadequate ventilation or air filtration
  - b. Working within 1 foot away from others without PPE
  - c. Community disease activity is very high, HVAC system is not working
  - d. Community disease activity is very low, HVAC system with MERV 13 filters is working well
8. Identify the one FALSE statement about air exhaust requirements:
  - a. Air exhaust must be balanced with air intake
  - b. Air exhaust ports should correlate to how the room will be used
  - c. Air exhaust ports must be located near the floor
  - d. Running exhaust systems continuously, or at least for extended hours beyond work hours increases air safety
9. Identify a recognized and practical method of monitoring IAQ in a dental office:
  - a. Measuring levels of airborne particulates and contaminants
  - b. Monitoring radiology equipment
  - c. Daily testing for bacteria on all surfaces
  - d. Daily testing for viruses on all surfaces
10. Identify the room in a hospital that required the highest number of Air Changes per Hour:
  - a. Procedure room
  - b. Exam room
  - c. Sterilizer equipment room
  - d. Toilet room

## FROM THE Editor's Desk

### Is It the Flu? - Differential Rapid Test Kits

Under emergency use authorization (EUA) the Food and Drug Administration (FDA) has authorized the first non-prescription consumer nasal swab test that can identify and differentiate influenza A and B (the flu), respiratory syncytial virus (RSV), along with SARS-CoV-2. **Read more here.**

With the triple threat of influenza, respiratory syncytial virus infection, and COVID-19, even with vaccinations, masks, and infection control precautions, infection is a possibility. At the earliest sign of respiratory infection, consider

a rapid differential test for influenza, COVID-19, and respiratory syncytial virus.

There is no drug treatment for RSV, but there are specific treatments for influenza and COVID-19. Early diagnosis is critical because the drugs are only effective if given early.

### Get Vaccinated and Boosted

To find COVID-19 vaccine locations near you. Go to: **Vaccines.gov**, or text your zip code to 438829 or call 1-800-232-0233

[Find COVID-19 Vaccines Near Me](#)

## Greetings from the Editor



Dear Readers,

As incoming Editor-in-Chief, I am honored to take the reins from our beloved and highly respected Dr. Chris Miller to continue bringing curated relevant content to this peer-reviewed publication. Our goal is to address timely and realistic clinical issues and link them to vital scientific principles, relevant guidelines and requirements, as we support OSAP's mission to ensure every dental visit is a safe visit. The familiar format of Infection Control in Practice will continue and we will work to interest and challenge you. Welcome to 2023 ICIP!

## OSAP-DALE Foundation Dental Infection Prevention and Control Certificate™

A comprehensive online educational program for anyone who wants to learn more about dental infection prevention and control. Earning the certificate demonstrates an in-depth understanding of CDC guidelines and OSHA standards related to standard precautions.

### STEPS

- 1 Complete the OSAP-DALE Foundation online CDEA® module **Understanding CDC's Summary of Infection Prevention Practices in Dental Settings** (\$30)
- 2 Complete the **OSAP-DALE Foundation Dental Infection Prevention and Control eHandbook™** (\$195)

**Bundle Price \$215\***

[Get the Bundle!](#)

\*Discounts are available for the purchase of multiple courses and groups of learners.



Those who successfully complete the program receive a certificate of completion and a digital badge that can be shared on social media, emailed to friends or colleagues, or downloaded.

[dentalinfectioncontrol.org/education](https://dentalinfectioncontrol.org/education)

Interested in further education and earning certification in dental infection control? **Set yourself apart.** See page 19 for a quick look at opportunities.



# SET YOURSELF APART

## Education



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*Developed by OSAP and the DALE Foundation*

## Certification



### Dental Industry Specialist in Infection Prevention and Control® (DISIPC®)

Intended for those who play important roles in dental infection prevention and control, such as practice managers, sales representatives, customer service personnel, and service technicians who do not provide clinical care. Earning DISIPC demonstrates knowledge related to infection control guidelines and standards.

*Developed by OSAP and DANB*



### Certified in Dental Infection Prevention and Control® (CDIPC®)

Intended for the dental team, educators, consultants, and others with a clinical background. Earning CDIPC certification demonstrates an advanced level of infection control guidelines and standards knowledge and the analytical and critical-thinking skills to apply them in various scenarios.

*Developed by OSAP and DANB*



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