June 24, 2020



NC Department of Health and Human Services

DHHS COVID-19 Guidance for Dental Professionals: HVAC Overview & Updated Respiratory Guidance

RCC (Relay Conference Captioning) Participants can access real-time captioning for this webinar here: https://www.captionedtext.co m/client/event.aspx?EventID =4476597&CustomerID=324 Jessica Scott, DHSc, RDH Oral Health Coordinator, NC Oral Health Section David Goldstein, PE HVAC Engineer Darlene Baker, RDH Lead Policy Analyst, NC Division of Health Benefits

Logistics for today's COVID-19 Forum

Question during the live webinar



Technical assistance

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Announcement

Date: June 8, 2020

From: U.S. Department of Health and Human Services (HHS), through the Health Resources and Services Administration (HRSA)

To: Eligible providers that participate in state Medicaid and Children's Health Insurance Program (CHIP) programs

Information: Additional distributions from the Provider Relief Fund

CARES Act Provider Relief Fund

 Eligible providers will receive at least 2% of reported annual gross revenue from patient care.

• Providers can apply by July 20, 2020, to receive payments.

Qualifications - Provider Relief Fund

 Providers have directly billed Medicaid for health care related services during the period of January 2018 to May 31, 2020.

• Providers continue to provide patient care after January 31, 2020.

 Providers did not receive a payment from either distribution of the <u>CARES Act</u> <u>Provider Relief General Allocation</u>.

Special Bulletin – Provider Relief Fund

SPECIAL BULLETIN COVID-19 #101: Medicaid Providers May Be Eligible for Federal Funding

https://medicaid.ncdhhs.gov/blog/2020/06/19/ special-bulletin-covid-19-101-medicaidproviders-may-be-eligible-federal-funding

HHS Webcast - Provider Relief Fund

The webcast will provide information about the application process for providers.

Thursday, June 25, 2020 at 2:00 p.m.

To pre-register for the webcast, visit: https://www.hhs.gov/coronavirus/cares-actprovider-relief-fund

CDC & FDA Updates

Coronavirus (COVID-19) Update: FDA Reissues Emergency Use Authorizations Revising Which Types of Respirators Can Be Decontaminated for Reuse

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For Immediate Release: June 07, 2020

In response to public health and safety concerns about the appropriateness of decontaminating certain respirators, the agency is reissuing certain emergency use authorizations (EUAs) to specify which respirators are appropriate for decontamination. Based on the FDA's increased understanding of the performance and design of these respirators, the FDA has decided that certain respirators should not be decontaminated for reuse by health care personnel. For example, the FDA has learned from the Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH) testing that authorized respirators manufactured in China may vary in their design and performance. As such, the FDA has determined that the available information does not support the decontamination of these respirators and has accordingly revised the relevant EUAs. In addition, the FDA is also revising relevant EUAs to no longer authorize decontamination or reuse of respirators that have exhalation valves.

CDC Updates

Operatory Cleaning & Disinfection

- If a patient is not suspected or confirmed COVID = no wait time to clean/disinfect
- If a patient is suspected or confirmed COVID = wait time determined by rate of air change per hour

Table B.1. Air changes/hour (ACH) and time required for airbornecontaminant removal by efficiency *

ACH § ¶	Time (mins.) required for removal 99% efficiency	Time (mins.) required for removal 99.9% efficiency
2	138	207
4	69	104
6+	46	69
8	35	52
10+	28	41
12+	23	35
15+	18	28
20	14	21
50	6	8

https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html#tableb1 https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html

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CDC Updates

Engineering Controls

 Clarification: CDC does not provide guidance on the decontamination of the building heating, ventilation, and HVAC systems

"To date, CDC has not identified confirmatory evidence to demonstrate that viable virus is contaminating these systems."

https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html#EngineeringControls

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HVAC for Dental Offices

Mitigating the Spread of Aerosols

By David J. Goldstein, PE DaGoldsteinNY@gmail.com



Anatomy of an HVAC System



Anatomy of an HVAC System



Key Concepts

- Air Changes
- Air Filtration
- Air Distribution
- Room Pressurization



Air Changes

- An air change is when the complete air volume in a room is replaced by new conditioned air
- Air Changes are measured in air changes per hour (ACH)
- Air supply to a room is measured in cubic feet per minute (CFM)
- Example:
 - A room is 10' W x 10' L x 10' height
 - Room volume = 1,000 cubic feet
 - 100 CFM of air is supplied to the room
 - 100 CFM x 60 min/hr = 6,000 cubic feet per hour
 - 6,000 / 1,000 = 6 ACH
- The inverse of ACH is the time to replace all the air in the room
- 1 / 6 ACH = 0.17 hours (10 mins) to replace all the room air



Air Change Requirements

- Codes don't specify minimum ACH requirements for dental patient rooms
- ACH requirements for hospital rooms as follows (per ASHRAE Standard 170)

STANDARD

ANSI/ASHRAE/ASHE Standard 170-2017 (Supersedes ANSI/ASHRAE/ASHE Standard 170-2013) Includes ANSI/ASHRAE/ASHE addenda listed in Appendix C

Ventilation of Health Care Facilities





Airborne Infection Isolation: 12 ACH



Operating Room: 15-20 ACH



Additional Considerations

- The supply air must be clean:
 Fresh outside air or adequately filtered
- The HVAC unit must be running continuously
- The HVAC supply air volume must be constant
- Ensure proper temperature control is maintained



Key Concepts

- Air Changes
- Air Filtration
- Air Distribution
- Room Pressurization



Aerosol Particle Sizes

- Coronavirus particle diameter = appx. 0.125 micron (μm)
- Typical droplets exhaled will be in the 100 μm range
- Evaporation causes the droplets to shrink and become aerosols (< 10 μm)
- The exact particle size that needs to be removed to effectively prevent the spread of SARS-CoV-2 is not known
- What we can say is that the more effective the filter is at removing particle sizes < 10 μ m, the better the chances are for preventing the spread of SARS-CoV-2





Filter Performance Ratings

- Filters are typical rated by a MERV value (minimum efficiency reporting value)
- The controlled contaminant size for each MERV rating is as follows:

MERV Rating	Typical Controlled Contaminant size ($\mu m)$	
1-4	> 10	
5 – 8	3 – 10	
9 – 12	1-3	
13 – 16	0.3 - 1	
17 – 20 (HEPA)	< 0.3	

- HEPA: High Efficiency Particulate Air
 - Removes 99.97% of particles at 0.3 microns

Filter MERV Requirements

- Codes don't specify minimum MERV requirements for dental patient rooms
- MERV requirements for recirculated air in hospital rooms as follows (per ASHRAE Standard 170)

STANDARD

ANSI/ASHRAE/ASHE Standard 170-2017 (Supersedes ANSI/ASHRAE/ASHE Standard 170-2013) Includes ANSI/ASHRAE/ASHE addenda listed in Appendix C

Ventilation of Health Care Facilities

Patient Room: MERV 14



Airborne Infection Isolation: HEPA



Operating Room: MERV 14*



*Operating rooms are often provided with HEPA filters

Additional Considerations

- Replacing a filter with a higher MERV rating will affect HVAC system operation
- Higher MERV filters require more frequent replacement
- Lower MERV pre-filters can be included to extend the life of the higher MERV filter
- The filter must be installed with a tight seal such that air cannot bypass around it



Key Concepts

- Air Changes
- Air Filtration
- Air Distribution
- Room Pressurization



Air Distribution Strategies

- Supply & Return Grille Placement
- Avoid Stagnant Zones
- Move aerosols away from occupants



Avoiding Stagnant Zones



Avoiding Stagnant Zones



Avoiding Stagnant Zones











Air Distribution

- There are many different arrangements possible
- There is no numerical measurement of good air distribution
- Use judgement and common sense







Key Concepts

- Air Changes
- Air Filtration
- Air Distribution
- Room Pressurization



Room Pressurization

- What is room pressurization?
- Why do we pressurize rooms?
- How do we pressurize rooms?



Positive Pressurization

- Air leaks out of the room
- Used to protect occupants inside the room from contaminants coming in



Positive Pressurization

• Provide more supply than return



Negative Pressurization

- Air leaks into the room
- Used to protect occupants outside of the room from contaminants leaking out



Negative Pressurization

• Provide more return than supply



Hospital Pressurization Requirements

- Codes don't specify pressurization requirements for dental patient rooms
- Pressurization requirements in hospital rooms as follows (per ASHRAE Standard 170)





Airborne Infection Isolation: Negative



Operating Room: Positive



Monitoring & Control

- Airborne Isolation rooms require at least 0.01"w.c. negative pressurization
- Airborne Isolation rooms require continuous pressure monitoring with local display



Key Concepts - Summary

- Air Changes
- Air Filtration
- Air Distribution
- Room Pressurization

Typical Hospital Room HVAC Requirements (for comparison)					
	Patient Room	Airborne Infection Isolation Room	Operating Room		
Air Changes per Hour (ACH)	6	12	15-20		
Air Filtration (MERV rating)	14	HEPA	14 minimum HEPA typical		
Air Distribution	Return above head of bed	Supply at ceiling Return close to floor	Supply at ceiling Return close to floor		
Room Pressurization	No Requirement	Negative	Positive*		

* Negative ORs are provided where needed for airborne infection isolation

Portable HEPA Filters

- What are they?
- How effective are they?
- How best to use them?
- When are they appropriate?



Portable HEPA Filters











Portable VS. Central Filtration



VS.





Installation – Non-Ducted



Installation – Supply Duct



Installation – Return Duct



Installation – Exhaust Duct



Evaluation

- Air Changes: YES
 - Get CFM from manufacturer to determine # of air changes based on room size
- Filtration: YES
 - HEPA filter will effectively remove coronavirus aerosols
- Air Distribution: NO
 - Can be improved by adding flexible ductwork
- Room Pressurization: YES/NO
 - Can be used for negative pressurization when ducted directly to outdoors
 - · May over-pressurize the room if airflow is not selected carefully









Application

- Pros: Quick, inexpensive, easy
- Cons:
 - Not as effective as a filter integrated into a properly designed HVAC system
 - Noisy
 - Easily blocked
 - Easily turned off
 - Takes up space in patient room
- In general, portable filters are best used for temporary purposes, or
- To supplement additional measures taken in the central HVAC system









Next Steps

- Evaluate the performance of your existing HVAC system
- Evaluate your options for upgrades, including cost, schedule, and operational impacts
- Implement the options that make sense for you
- Perform regular maintenance as required to ensure performance doesn't deteriorate over time



Questions?

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