



Date: Sep 10, 2021

From: Mechanical Engineer, Division of Engineering Services

Through: Director, Division of Engineering Services

Subject: Open Dental Operatories and Air exchanges

To: Dr. Timothy Lozon
Director, Division of Oral Health

This memo is to share my personal insight and opinions as a (HVAC)mechanical engineer.

BACKGROUND

As the COVID-19 pandemic continues to rage on and the development of new COVID variants of concern make headlines, the below inquires have been made by dental clinics throughout IHS:

1. Should dental exam rooms be “open bay”
2. What are appropriate air changes per hour (ACH) for enclosed dental operatories
3. What are appropriate ACH for open bay dental operatories

DISCUSSION

Dental Ventilation is specified in the IHS Technical Handbook, ‘VOLUME III – HEALTH CARE FACILITIES DESIGN AND CONSTRUCTION, PART 21 – DESIGN CRITERIA AND STANDARDS, Chapter 21.4 Mechanical Guidelines, Ventilation – Dental: 21.4.5

Prior to the COVID -19 environment, the IHS Dental Ventilation criteria provided ventilation in which there were no known concerns regarding the adequacy of the ventilation.

If the IHS dental staff is concerned about performing dental procedures with potential exposure to COVID-19, then the following comments are provided.

Due to the longevity of the COVID-19 pandemic (most of 2020 and into 2021, and the consideration that COVID-19 may become endemic, it appears that it is impractical to defer

routine dental procedures such as prophylactic dental cleaning, treatment of dental caries, fixed prosthodontics, etc.

Open dental operatories.

It is acknowledged that the architectural layout of open dental operatories, in IHS health care facilities, is because it provides some procedural advantages to the dentist. The main benefits are that it is considered advantageous to accommodate a dentist to more easily treat multiple patients and that there can be a sharing of certain equipment such as a dental x-ray unit.

From a Mechanical/ Ventilation Engineer’s perspective, the open dental operatory has an inherent weakness in containing airborne infectious diseases such as COVID-19 that may be released in a space. Walls and negative room pressurization are the proven engineering techniques to contain airborne infectious agents within a health care facility room.

EXCERPT FROM: Chapter 21.4 Mechanical Guidelines, Ventilation – Dental: 21.4.5

Area Designation	Air movement relationship to adjacent area ^{1, 2}	Minimum air changes of outdoor air per hour ³	Minimum total air changes per hour ⁴	All air exhausted directly to outdoors ⁵	Relative humidity ⁶	Design temperature ⁷ (degrees F/C)
Enclosed Dental Operatory (w/nitrous oxide) ^{8,9, 10, 11}	In	3	12	Yes	30-60%	75 (24)
Open Dental Operatory (w/nitrous oxide) ¹²	---	---	---	---	---	---
Open Dental Operatory (w/o nitrous oxide)	---	2	6	---	30-60%	75 (24)

ACH for enclosed Dental Operatory.

Chapter 21.4 Mechanical Guidelines, Ventilation – Dental: 21.4.5 requires 3 ACH “outdoor air” and 12 ACH “Total air”. This meets and slightly exceeds the requirements in ASHRAE Standard 170 – 2021 for an airborne infection Isolation room.

CONCLUSION and RECOMMENDATION:

If the IHS dental staff is concerned about performing dental procedures with potential exposure to COVID-19 or future airborne infectious agents, my recommendation is that enclosed dental operatories should be designed and constructed as an airborne infection isolation room with the

additional ACH specified in the IHS Technical HB and the placement of a low wall register when nitrous oxide will be administered.

The suitability of “Open dental Operatories” in IHS Healthcare Facilities, is a determination for the Office of Clinical and Preventive Services, Division of Oral Health. This determination should incorporate available dental infection control and ventilation guidelines, and in consultation with the following:

1. Office of Quality, Infection Prevention and Control Coordinator
2. Office of Environmental Health and Engineering, Institutional Environmental Health Program

Please advise me of comments and questions. (email Paul.Ninomura@ihs.gov. Phone 206-615-2095)

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REFERENCES:

ASHRAE Standard 170- 2021: Ventilation of Health Care Facilities

e- cc:

Cheryl Sixkiller, Office of Clinical and Preventive Services
Charles Woodlee, Institutional Environmental Health Program
Matthew Ellis, Office of Quality
Andy Wilson, IHS Chief Dental Officer
James Ludington, OEHE Director
Steven Raynor, DFPC Director
Paul Gagliano, DES Acting Deputy Director for the PM Branch
James Aberle, DES Acting Deputy Director for the AE Branch
