

## TC9.6 HealthCare Facilities

Annual Meeting, Virtual “Phoenix, AZ”

June 9, 2021

### MEETING MINUTES

---

Meeting Minutes reported by Ken Mead, TC 9.6 Secretary

- 1) **TC called to order at 12:00 pm by Chair Traci Hanegan (TH) (supporting slides – App A)**
  - a) Overview of initial slides, instructions by TH, agenda, zoom tips, code of ethics, scope
  - b) Instructions and link for Jetform attendance log were provided
  - c) Roll call by Ken Mead (KM) - members present confirmed: 12 of 15 quorum voting members present – quorum reached
  - d) Jetform Attendance Summary Report – **App B**
  - e) Corresponding members present 34, including 13 noted as PCM
  - f) Guests present - 15
  - g) YEA members – 8
  - h) All Handouts, Agenda, Meeting Minutes (Draft and Final) Attendance summary, & subcommittee reports will be posted to the TC website: <http://tc96.ashraetcs.org>
- 2) **Membership Chair Report– Ron Westbrook**
  - a) Traci introduction of Ron W “doing excellent job”
  - b) Update slide from Traci (209 overall, 15 VM, 103 CM, 91 PCM, 47 yea members)
  - c) TC Officer Changes for coming Year: TH rolls off, NL, KM and DE all roll into new positions 07/01
  - d) Subcommittee chairs (see slide) – no changes to subcommittee chairs
  - e) VM off/on (Traci H., Eric G, Pavel L: all roll off; Rolling on as VM are Nick L, Ehsan M, Larry W.
  - f) Welcome to our nine new PCMs. PCMs who are active participants over next 2 years will roll on as CMs
  - g) Reminder to bring ASHRAE profiles up to date
- 3) **Chair’s Report – Nick Lemire**
  - a) No slides – breakfast happened last week
  - b) Vegas in Jan planned to be face-to-face, sem/forums due Mon Jul 12, dates not expected to change
  - c) Pushing harder for Hightower award nominations – Recognized outstanding technical leadership and contributions, forms due Sep 1. See honors and awards portion of ashrae website for details and instructions
  - d) PDC – seeking new ideas for ALI courses
  - e) ASHRAE cert committee seeking ideas for new professional certifications
  - f) Tech content for phoenix June 26-30 – can still register or get company packages
  - g) Workshops: IAQ 2020 Sep 13-15 Athens Greece, 2021 ASHRAE Building Performance Analyses Conf will be online Nov 10-12, ASHRAE Winter Meeting/AHR Expo Jan31-Feb 2, 2022, Ventilation 2022 (International Ind vent Conference) June 22-24, 2022 in Toronto Canada
- 4) **Minutes of Previous Meeting– Ken Mead**
  - a) Meeting Minutes from Kansas City were distributed online to voting members prior to the meeting. Motion to approve the minutes by Eric Granzow. Seconded by Jeremy Fauber. Motion passed 12-0-0 CV.
- 5) **Sub-committee Reports**
  - a) Energy – David Eldridge (DE) (See minutes attached, **App C**). Approx. 25 on zoom call, discussed several decarbonization initiatives (CA Energy Commission, WA State Clean Buildings Act, Local Law 97 – NYC0, 189.3 (sub looking for case studies), Towards zero guidebook partnership with REHVA.
  - b) Programs – DE for Mark Tome (Joint meeting with Energy, **App C**). (1) IEQ interest – track for Vegas, will follow up on IEQ ideas, (2) protecting buildings from contaminant sources originating both within and outside facility (e.g. wild fires),

(3) Discussion about IEQ assessment tools which may be available and helpful to ASHRAE members, (4) Pandemic Energy Use

- i) Kishor K – proposed program on infectious aerosol flow paths in Dental Treatment Rooms
- c) Research – David Thomsen (See minutes attached, **App D**). 35-40 observed attendees on call.
  - i) Main discussions: Bathrooms, poss. RTAR on Hosp. Energy & Filter Pressure Drop, Big Data – OR Air Changes.
  - ii) Existing: Four ongoing sponsored or co-sponsored research projects, 2 WS at RAC, 7 ongoing sponsored dev projects, 1 potential co-sponsorship development publication
- d) Infectious Diseases – Ken Mead (See minutes attached, **App E**). 49 people attended zoom call, Presentations by:
  - i) TH – ETF – Healthcare Team: Guidance & new developments, CORE Recommendations, New Dental Guidance
  - ii) Steve Martin (SM) – ETF Filtration & Disinfection Team: Core Rec., Aerosol Transmission statement, MERV 13 Equivalent, need for in situ test protocols, especially for emerging technologies
  - iii) Walt Vernon – New Infectious Aerosol Position Doc Committee: Cmte formation quicker than normal, seeking less prescriptive approach, closer alignment with WHO guidance, new advisory committee role-see Walt if interested, “Provide advice to policymakers”, seeking to get draft completed by end of calendar year
  - iv) Lewis Johnson (Lee Health) – Case Study on COVID response use of Ventilated Headboards (over 300 deployed) initially developed by CDC/NIOSH
  - v) Steve Welty - A brief discussion on recent research regarding airborne transmission of infectious disease, toilet plume, recent manuscripts claiming extensively long range outdoor transmission
- e) Handbook – Pavel Likhonin (See minutes attached **App F**). 28 people approx. on call
  - i) Pavel showed Gantt Chart Timeline, going over task lists, discussed section/group leader approach, have to turn everything in by May 10 2022, aiming to complete to TC by end of 2021. Authoring portal issues re-discussed. Misc update focal points discussed.

**6) Webmaster – George Augustini (see slide 13, app A)**

- a) Believed to be updated, request for relative references, still need to determine how we want to use basecamp (TH – will prob keep to VMs and ex-com only), George to continue to try and push from basecamp to webpage important stuff as well as info from S170.
- b) Website address is <http://tc096.ashraetcs.org>

**7) ALI – Pavel/Don Burroughs**

- a) Next (will be 6-hr course ) Dec 7-8, returning to standard class as opposed to covid version. In July doing a private version for an engineering firm in CA, prev. did private class to engineering firm in Nova Scotia in Sep 2020. Have been doing covid-focused infection mitigation versions over past 18 mos

**8) Liaison Reports**

- a) Std. 170 (J. Fauber) – S170 met this week, 2 presenters (1) cfd modeling on airborne spread and (2) indep. Research on ionization devices, both lab and field study. Completed advisory pub reviews on addendums re: natural vent. Minimal comments so must not be much concern. Another more direct addenda being developed. Addenda c is currently out for public review through Jul 4th FGI still seeking comments on their Emergency Conditions Guideline (due 06/30). Next meeting Jul 14<sup>th</sup>. Meet monthly, Oct meeting may be hybrid, 2021 S170 doc is completely published.
- b) Std. 189.3 (Walt V) – Meeting next week, addenda is out for public comment now
- c) Std 188 (Kevin Scarlett) – nothing to present but scheduled to meet twice in next 2 weeks
- d) Std. 90.1 – no update
- e) Std. 55 (Poots) – Met yesterday, still pursuing a prescriptive path to use std in more friendly manner. More to come.
- f) Std. 62 – no update
- g) MTG Ventilation Air Changes Rates (Lautz) –research proj. is nearing completion, headed to PMS/MTG at end of Aug to vote on approval. Additional conversation in MTG – seminar – there is a need for actual validation of monitoring and validation of ACH and impact on IAQ.
- h) Ventilation for Infection Control (VFIC) MTG update – [TH for Rick Hermans] work is ongoing, another meeting next week. Just getting started.
- i) Environmental Health Committee – no update

**9) Presentation (Paul Jensen using UVC for AI prevention and control)**

- a) Slides to be provided - George will post to TC webpage/Documents/Meeting Presentation Materials

- b) TB vs coronavirus – TB requires droplet nuclei whereas SARS-2 can be spread via any of the droplet sizes. Control between the two is the same.
- c) Used an example scenario to describe the design process and the performance expectations and considerations
- d) Described results from field applications, went over conclusions, safer than upper room, more CADR
- e) Find answer regarding first/operating costs.

{comment from Paul: The Russian study tested the exhaust from high-risk areas and that air was exhausted outside. We also evaluated the Korf unit in a recirculating configuration. The summary table was the normalized for equivalent UVC254 dose. Correct about temperature . . . Most effective location is upstream of the cooling coils.

**10) Presentation Patient Room UVGI Analyses (Jovan Pantelic and Aviv Dorit)**

- a) Slides to be provided - George will post to TC webpage/Documents/Meeting Presentation Materials higher resonance time for upper room vs in-duct
- b) no good evaluation technique – proposed using ray tracing tools both for efficacy within irradiated zone and for safety in occupied zone.

**11) New Business**

- a) Dan K: Proposed Scope Revision: Motion to approve: Dan, 2<sup>nd</sup>: Pavel – allowed subsequent discussion
  - i) Discussion: Proposal to add air quality and infection control to scope. Dan shared list of “Elements for a High Performing Health Care HVAC System” (**App G**) and suggested possible incorporation into new scope/mission statement.
  - ii) TH – we should list in priority?, Mike M had asked where inf control came in (ans. = perf.), “Safety” was intended to be more life safety, ....Vigorous discussion ensued – more work required, DK/JF moved/2<sup>nd</sup> to table for now with intent for more work at next meeting (vote unanimous). Send email to DK if interested in working on this prior to next meeting. Thanks to DK for proposing/simplifying.
- b) If eventually decide to do this – will vote on it and send to TAC

**12) Imaging Equipment Heat Gain RP 1816 (Walt Vernon) update – starting to resurrect as covid is letting up and opening facilities back up. Got some data as result of different proj. but hospital reentry is hoped for soon.**

**13) Traci update re: Healthcare Team of ETF.** (see slides) – probably another round of updates soon. New 1-page guidance docs pointed out. Updated version of healthcare guidance in April to better align with core recommendations and to align with ASHRAE/USACE ACS guidebook, mentioned equivalent OA calculator that’s in the building readiness guide – comments to Wade Conlan if have comments, re-highlighted article regarding discussing transmission and terminology, ton of ?s re: dental and thus new dental guidance out 21 April.

**14) Vice Chair Comments – Nicolas Lemire (NL) moved to end the meeting**

- a) Multiple “Thank You”s to Traci and others who have been engaged in TC 9.6 leadership and committee work. Always looking for involvement of new members, we need you, we’re doing important stuff and need help
- b) Been a challenging virtual year. Looking forward to resuming face-to-face. Special thanks to all volunteers
- c) Special thanks to Traci, solid commitment and work over past 15 years +/- especially over last 6 years, want to recognize all the time effort for TC 9.6.
- d) Traci: Thank you, enjoyed her time with TC 9.6, the work is important as demonstrated by past year of pandemic. Received emails at all hours of day from multiple contributors at all hours of day. Thank you & encourage you to stay involved. Work that you do is important. Example: Email response from questioner: Thank you for the info and discussion – “You keep me alive”.

**15) Meeting adjourned at 2:07pm**



# TC 9.6 Healthcare Facilities

Main Meeting

Wednesday, June 9, 2021

Noon - 2p.m. (EST)

# Zoom Tips

- Open “Participants” on Zoom
- If your full name is not displayed, please highlight your name, select “More” and use rename to add our full name.
- Make sure you are on “Mute” unless you are talking or getting ready to talk.
- Keep your webcam off to minimize band width requirements.

In all your interactions at these meetings,  
please remember...

## Code of Ethics

*“As members of ASHRAE or participants in ASHRAE activities, we pledge to act with honesty, fairness, courtesy, competence, integrity and respect for others in our conduct. We will avoid conflicts of interest and behavior that is discriminatory and/or harassing.”*





# Attendance Sheet

- Please go to <https://form.jotform.com/211576210115140> and fill out the form so we have a record of your attendance at today's meeting.



# Agenda

Item	Description	Person	Time (min)
1	Introductions, agenda, conference call and attendance documentation instructions	Hanegan	5
2	<u>Roll</u> call, quorum check.	Mead	2
3	Minutes	Mead	2
4	Membership Chair Report, Roster Changes, Welcome PCM's	Westbrook	5
5	Chair's Report TAC Breakfast Meeting	Lemire	3
6	Energy Subcommittee Report	Eldridge	4
7	Programs Subcommittee Report	Tome	3
8	Handbook Subcommittee Report	<u>Likhonin</u>	3
9	Research Subcommittee Report	Thomsen	6
10	Infectious Diseases Subcommittee Report	Mead	6
11	Webmaster Report	<u>Augustini</u>	3
12	Committee Scope Revision	Koenigshofer	5

13	Section Head Comments	Cochran	3
14	TB/Ventilation/UV Discussion	Jensen	15
15	ALI	Koenigshofer <u>Likhonin</u>	3
16	Patient Room UVGI analysis	Jovan Pantelic and Dorit Aviv	15
17	MTG Ventilation for Infection Control Update	<u>Hermans</u>	2
18	MTG Ventilation Rates (ACH or cfm/sf) Update	Lautz	2
19	Liaison Reports -Std. 170 -Std. 189.3 -Std. 188 -Std 90.1 -Std 55 -Std 62 -Environmental Health	Fauber Vernon Scarlett Boldt Poots / Mora Darwich Taylor	3 2 2 2 2 2 2
20	RP-1816 (Imaging equipment heat gain) status update.	Vernon/Bunsen	1
21	Other New Business –Ongoing Epidemic Task Force work for TC9.6 (Hanegan)	Hanegan	12
22	Vice Chair's Comments	Lemire	3
23	Closing Remarks	Hanegan	2



## TC9.6 Scope (at least for today)

TC 9.6 is concerned with the application of ventilating, air-conditioning, refrigeration, life safety, and energy conservation systems to healthcare (hospital, outpatient, long-term care) facilities.

# Membership Report – Ron Westbrook

- 209 overall members
  - 15 Voting members
- 103 Corresponding members
- 91 Provisional Corresponding Members
  - 47 YEA members

# Roster Changes

## 2021-2022 Society year

### Officers

- TC Chair: Nick Lemire
- Vice Chair: Ken Mead
- Secretary: David Eldridge

# Roster Changes

## 2021-2022 Society year

### Subcommittee chairs

- Handbook (Applications, Chap. 8): Pavel Likhonin
  - Research: David Thomsen
  - Standards: Jeremy Fauber
  - Programs: Mark Tome
  - Membership: Ron Westbrook
- Healthcare Energy subcommittee: David Eldridge
- Infectious Diseases subcommittee: Ken Mead
  - Webmaster: George Augustini
  - ALI Coordinator: Dan Koenigshofer
- TC associated MTG (MTG-ACR, Air exchange rates): Roger Lautz

# Roster Changes

## 2021-2022 Society year

- Voting members, terms expiring:
  - Traci Hanegan
  - Eric Granzow
  - Pavel Likhonin
- Newest Voting members (4-year term):
  - Nick Lemire
  - Ehsan Mousavi
  - Laurence Wilson

# Newest Provisional Corresponding Members

- Michael Collins YEA
- Jessica Fitzpatrick YEA
- Robert Heinlein
- Dr. Yeong Jin King
- Dr. Issa Ramaji
- Prof. Vishu Reddi
- Rachel Romero YEA
- Terry Sharp
- Atul Amar Kumar Swamy YEA



# Join TC9.6

[Home](#)[Membership](#)[Meetings](#)[Documents](#)[Functions](#)[More](#)

## Member Roster

Current as of 6/19/2020

[Join TC 9.6](#)

If you want to become a provisional corresponding member of this TC, click on the "Join TC" button above. You will be automatically added to the roster and will receive all TC communications.

Committee members can download a copy of the complete roster in any of three formats by logging in to their ASHRAE member account, clicking on my account and selecting Committees.

A provisional corresponding member is a two year appointment. Once you demonstrate your engagement by participating in one or more of our subcommittees your membership will be changed to corresponding member. Once a corresponding member, based on your level of interest, participation, and engagement you can be considered for becoming a voting member of TC 9.6.



CELEBRATING  
**125**  
YEARS

# Website – <https://tc0906.ashraetcs.org/>



## Healthcare Facilities

ASHRAE Technical Committee 9.6

[Home](#)[Membership](#)[Meetings](#)[Documents](#)[Functions](#)[More](#)

### Agenda

TC 9.6 Draft AGENDA 2021 Chicago Virtual rev1

### Upcoming TC Meetings

Location: Virtual Conference - Zoom meeting hyperlinks are below.  
ASHRAE virtual Meeting Guidance  
(All meeting are listed in Eastern Time)

#### Tuesday, 06/08/2021

2:30 PM - 4:00 PM [Infectious Diseases Subcommittee](#)

4:30 PM - 6:30 PM [Research and Handbook](#)

#### Wednesday, 06/09/2021

10:00 AM - 11:30 AM [Energy & Program Subcommittees](#)

12:00 PM - 2:00 PM [Main Meeting](#)

#### Friday, 06/11/2021

11:00 AM - 12:00 PM [PMS meeting](#) (Project Monitoring Subcommittee Members Only Please)

### Committee Chair

Traci Hanegan [TC0906@ashrae.net](mailto:TC0906@ashrae.net)

### Committee Scope

TC 9.6 is concerned with the application of ventilating, air-conditioning, refrigeration, life safety, and energy conservation systems to healthcare (hospital, outpatient, long-term care) facilities.

[More >](#)

### Upcoming Society Conferences

ASHRAE Virtual Annual Conference  
June 28-30, 2021



# Epidemic Task Force (ETF) - Update

- EHC Cognizant to Epidemic Task Force (ETF) per ASHRAE ExCom
- Primary role is for the ETF to communicate with those involved in the built environment:
  - Review all technical questions/requests for technical guidance submitted
  - Coordinating activities of ASHRAE's internal resources
  - Partnering with and monitoring the activities of external organizations, including the more than 60 members of the [ASHRAE Associate Society Alliance \(AASA\)](#) of organizations related to the HVAC&R industry around the world
  - Reviewing, organizing, consolidating and publishing clear and concise summaries with citations of the most relevant information available to the built environment

# Epidemic Task Force (ETF) - Update

- Published several 1-page summaries
- Core Recommendations
- Updated Guidance for many building types, building readiness section.
- COVID-19 resources/guidance page [ashrae.org/covid19](https://www.ashrae.org/covid19).
- Answers to over 1217 questions to web site ([COVID-19@ashrae.org](mailto:COVID-19@ashrae.org) )
- Collaboration with other organizations (ASHE, WHO, CIBSE, REHVA, etc.)



# Epidemic Task Force (ETF) - Update

## Focus Areas as of January 2021

- Healthcare (including long-term care)
- Residential
- Commercial / retail
- Schools
- Transportation
- Building Readiness
- Laboratories
- Resource inventory
- Science/Literature review
- Filtration and disinfection
- Science Applications
- Industrial
- Communications
- Grassroots/Government Activities
- Advocacy / developing economies
- External partnerships

# ETF – New Guidance since Chicago Virtual Meeting



## Core Recommendations for Reducing Airborne Infectious Aerosol Exposure

LEARN MORE



One Page Guidance Documents – Laboratory, Small  
Temporary Dining Structures, In-Room Air Cleaners



## Questions Answered Frequently Asked Questions and Glossary of Terms





## ASHRAE EPIDEMIC TASK FORCE

HEALTHCARE | Updated 4-8-21



### BACKGROUND/CONTEXT

- [Modes of Transmission](#)
- [ASHRAE Statements on Airborne Transmission and Core Recommendations](#)
- CDC recommends Airborne Infection Isolation rooms for [aerosol generating procedures \(AGPs\)](#)
- [Secondary Infection Susceptibility](#)
- Committing Airborne Infection Isolation rooms for use as inpatient rooms limits future flexibility. Work with clinical staff to establish use requirements.
- [Cohorting – Cautions and current methods](#)
- [See ASHRAE COVID-19](#)
- ASHRAE members have provided input on [Disaster Planning and Emergency Management for Healthcare Facilities](#). Partner on your local professional engineering partners for input and guidance during this time.

### GOALS

- Do No Harm
- Protect Healthcare Workers, Family, and Visitors
- Protect Other Patients
- Empower people to make and carry out the best decision they can.
- Work as a team – weigh competing concerns, define key areas, share the plan.
  - Consider the type of HVAC system, the configuration, clinical needs, facility infrastructure capacity, and limited resources available.

### LIFE SAFETY

- Confirm that power-consuming equipment is connected to the appropriate branch of the essential power system.
- Maintain Egress
- Consider defend-in-place plans and smoke compartments
- Increased facility oxygen use elevates risk of a fire spreading more rapidly
- [First responder protection](#).
- Develop Interim Life Safety Measures as applicable

### SUGGESTED APPROACHES

- [Passive Isolation](#)
- [Strategically utilize All Rooms](#)
- [Airflow from Clean to Less Clean](#)
- [Increase Filtration Level if possible](#)
- [Guidance on Recirculation and Increased Outside Air](#)
- [Maintain relative humidity at 40-60%](#)
- [Evaluate continued operation of recovery wheels](#)
- [Improve/Consider room airflow direction/patterns](#)
- [Utilize portable ante rooms/vestibules with HEPA filtration](#)
- Utilize UV light ([see Facilities/Maintenance – Disinfection](#))
- Areas for non-COVID patients should still be treated with care because someone could be unknowingly infected.

### SPECIFIC “HOW-TO” AND UNIQUE AREAS

- [Layered approach for normal and small surge operations](#)
- [Source Control Options](#) for patient beds
- [Operating on COVID-19 positive patient](#)
- [Variable Air Volume Adjustments & Modification to economizer or reduced recirc.](#)
- [Cautions on Recirculating Room Units](#) (Fan coils, induction units, etc.)
- [2-person patient rooms](#) – creating or managing existing
- [Use Operating rooms for inpatient rooms/temp ICU](#)
- [Emergency Department](#)
- [Warning on Older ICU units](#)
- Transmission through the air in toilet rooms
- Provide areas for safely doffing PPE, such as shoe cover removal followed by “tacky mats” for personnel exiting an area.
- [Gastrointestinal Endoscopy](#)

### SURGE AREAS

- [Initial Considerations](#)
- [Alternate Care Site Design Concepts](#)
- [Single patient room considerations vs. 2-patient rooms](#)
- [General Parameters for ACH, Temp, Filtration, and RH](#)

### FACILITIES/MAINTENANCE

- [PPE basics](#)
- [Filter changing](#)
- [Room turnover](#)
- Verify performance of critical HVAC systems – airborne infection isolation rooms, Emergency Departments, etc.
- Disinfection: [Normal UV, VHP, Hypochlorous Acid](#)
- See [ASHRAE COVID-19 Filtration and Disinfection section for greater detail](#).
- Considering the possibility of being short-staffed in the future, run-test and re-fuel emergency generator system.
- Coordinate any planned rescheduling or postponement of Inspection, Testing, Maintenance (ITM) with local or state AHJ. Submit waivers as required.
- Check to be sure COVID-19 area AHU return air isn't being used to condition mechanical rooms.
- [Waterborne Pathogen Prevention](#)

### MEDICAL GAS/VACUUM SYSTEMS

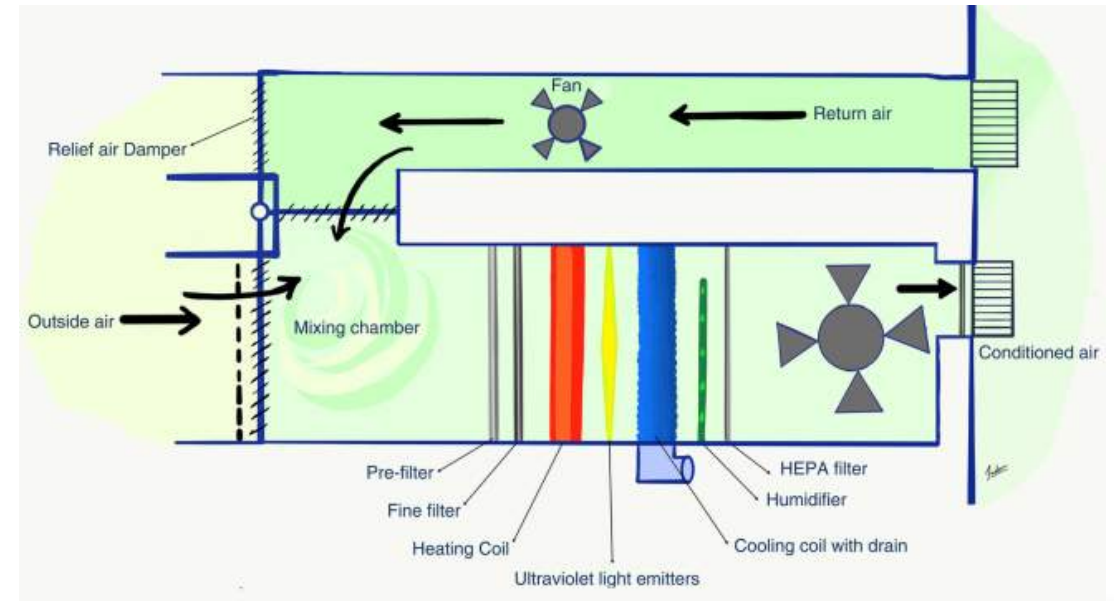
- Demand for gasses in [ICU rooms](#)
- Demand for gasses in [med-surg rooms and OR's](#)
- [Accommodating increased demand \(flow\) in fixed piping systems](#)
- [Impact of demand/consumption on existing gas systems](#)
- Consider providing [supplementary gas sources](#)

### OTHER

- Reduce # of rooms utilized off a single HVAC system to free up AHU capacity to achieve performance goals. 25 beds with desired airflow/temps better than 30 beds with airflow/temp deficiencies.
- Document the Action Plan and Alternations in Place Obtain AHJ approval for long-term alternations.
- [Healthcare Team Members](#)
- [Acknowledgements & Disclaimer](#)

# ASHRAE Equivalent Outdoor Air Calculator

- Incorporates combination of:
  1. The actual outdoor air
  2. The impact of filtration or air cleaning technologies on recirculated air
  3. The impact of air cleaning technologies in the space



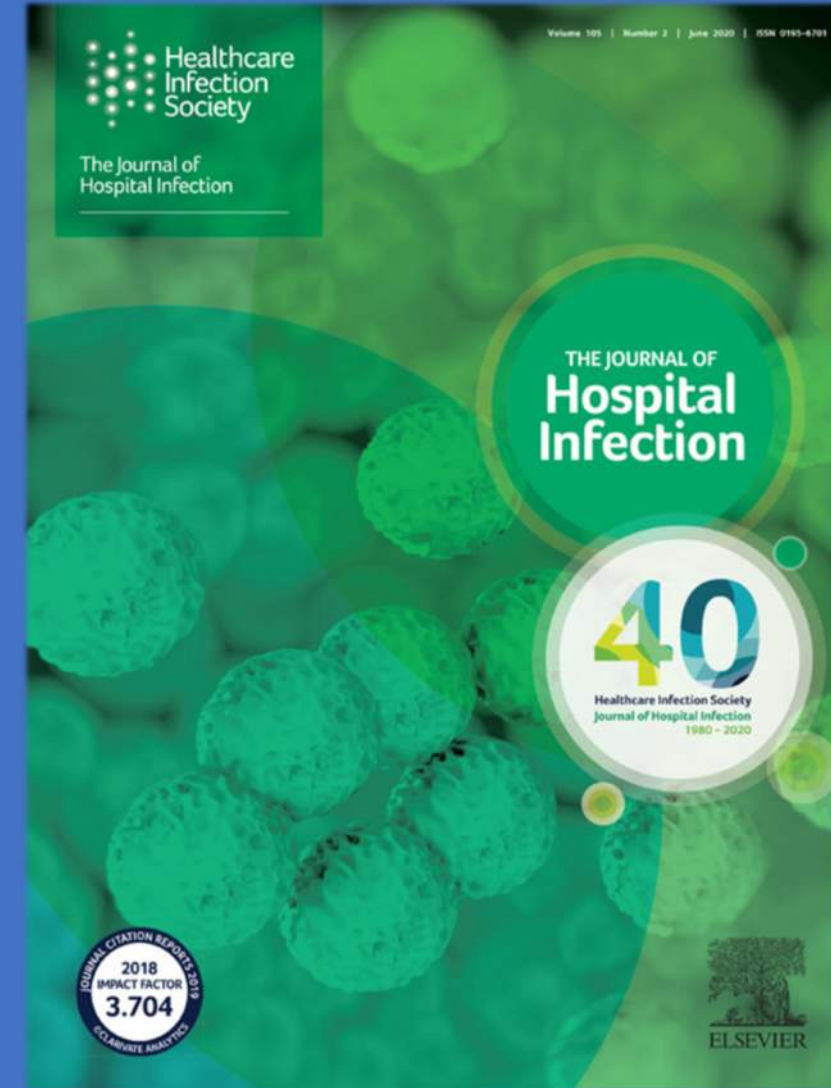


REVIEW ARTICLE | [ARTICLES IN PRESS](#)

## Dismantling myths on the airborne transmission of severe acute respiratory syndrome coronavirus (SARS-CoV-2)

[Julian W. Tang](#) • [William P. Bahnfleth](#) • [Philomena M. Bluyssen](#) • ... [Raymond Tellier](#) • [Pawel Wargocki](#) • [Stephanie J. Dancer](#)   • [Show all authors](#)

Published: January 12, 2021 • DOI: <https://doi.org/10.1016/j.jhin.2020.12.022>



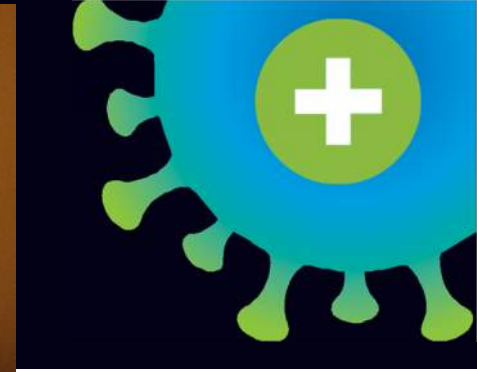


Half of all Epidemic Task Force  
Inquiries through the COVID-19  
website assigned to the  
Healthcare Team were Dental  
related.



## ASHRAE Epidemic Task Force

### Dental Facilities | 4-21-2021



#### Introduction/Background

- Dental professionals have been impacted by COVID-19 and face unique challenges in a wide variety of clinical environments. [See this exposure graphic for Dentists](#)
- Given the prominent role of airborne infective aerosols in transmitting COVID-19, the dental community needs to work with professionals in the heating ventilation and air conditioning (HVAC) industry for guidance on achieving safer and healthier indoor air quality (IAQ) spaces.
- [Modes of Transmission](#)
- [ASHRAE Statements on Airborne Transmission and Core Recommendations](#)

#### Aims & Objectives

- To provide the Dental Profession with Evidence Based scientific and technological information related to HVAC, indoor air quality (IAQ), Water Quality, and other environmental concerns to promote a safe and healthy dental setting.
- To encourage the establishment, acceptance, and understanding of appropriate engineering principles by the Dental Profession to promote safer dental working environment in clinical and laboratory settings.
- To promote proper dental office design with the objective of helping to minimize the effect of infectious challenges such as airborne COVID-19 and waterborne Legionella.
- Do No Harm
- Protect Dental Workers and Patients
- Empower people to make and carry out the best decision they can.
- Consider the type of HVAC system, the configuration, clinical needs, facility infrastructure capacity, and limited resources available.

#### General Recommendations

- [Patient Placement Strategies](#)

#### General Best Practice HVAC Recommendations for Dental Practitioners

- [Primary Source Management to Limit Contamination at the Source – The Mouth of the Patient](#)
- [Source Control Considerations](#)
- [Are your Main Dental Office HVAC Filters Adequate? Choosing Appropriate Dental Office HVAC Filtration Levels In Room or Portable Air Cleaners.](#)
- [Achieving proper hourly room air changes as best possible.](#)
- [Establishing Proper Room Airflow Directions](#)
- [Consider Maintaining 40-60%RH.](#)
- [Employing Disinfection and UV technologies](#)
- [Split System Air Conditioners and Natural Ventilation](#)
- [Surgery on Active COVID-19 Patients](#)
- [Working from a Mobile Dental Van](#)

#### Maintaining and Servicing of Air and Water Systems in the Dental Environment

- [HVAC System Maintenance and Filter Removal & Replacement](#)
- See [ASHRAE COVID-19 Filtration and Disinfection section for greater detail.](#)
- [Waterborne Pathogen Prevention](#)
- [Transmission through air in toilet rooms](#)
- [Building Readiness](#)

#### OTHER

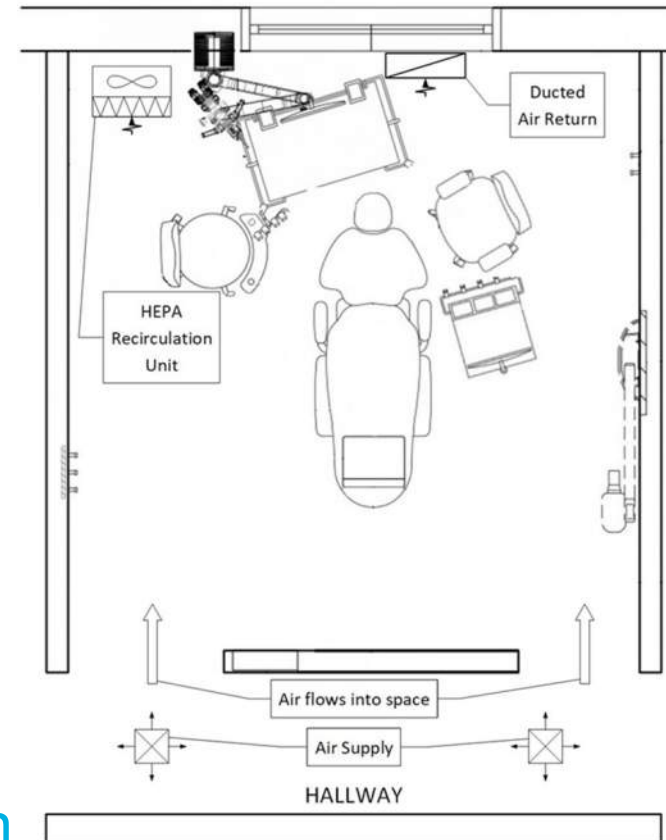
- [Healthcare Team Members](#)
- [Disclaimer](#)





# Patient Placement Strategies

- Well-ventilated individual operatories are preferred
- If floor plan is open:
  - Confirm at least 6 feet of space between patient chairs
  - Place physical barriers between patient chairs (floor to ceiling preferred if fire code compliant)
  - Orient operatories parallel to the direction of airflow if possible
- Patient orientation:
  - Patients should be oriented with their head away from pedestrian corridors, towards the rear wall when using vestibule-type office layouts, and near the return air vents



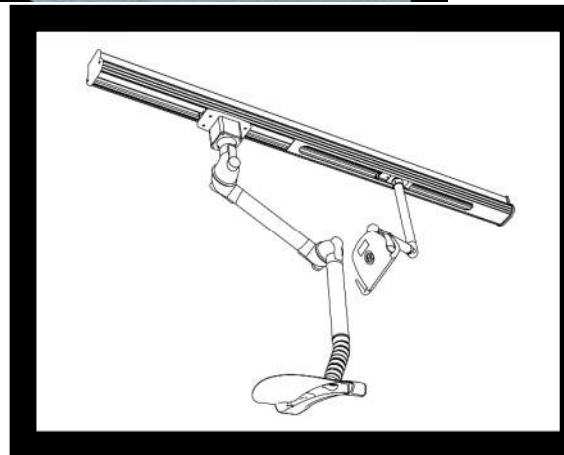
Graphic by CDC/NIOSH





# Source Control Considerations

- Capture is very dependent on the proximity of the capture device to the source
- Consider ability to maintain adequate lighting
- Consider sound levels of capture devices when operational



# Healthcare Team Members

Below are the members of the Healthcare Team of the Epidemic Task Force



Traci Hanegan (Chair)	Coffman Engineers, Inc.
Robert Block	Dr. Robert M. Block, DDS
Mike Cummiskey	Virginia Dept. of Health/Dental Division
Tim Earhart	McDonough Bolyard Peck
David Eldridge	Grumman/Butkus Associates
Jeremy Fauber	Heapy
Jonathan Flannery	ASHE
Melvin Glass	EMC Engineers
Eric Granzow	Specialized Engineering Solutions
Rick Hermans	Retired
Jerry Ivey	Willis-Knighton Health System
Roger Lautz	Affiliated Engineers Inc.
Mike Meteyer	Erdman
Frank Mills	Frank Mills Consulting
Zaccary Poots	Toro-Aire Inc
Michael Sheerin	TLC Engineering Solutions
Wayne Stoppelmoor	Schneider Electric
Paul Supan	American Dental Association Volunteer
Steven Welty	Green Clean Air
Laurence Wilson	WSP

**Thank you also to Dr. David Ahearn and to Alberto Garcia for sharing information used in this Dental Guidance.**



# Vice Chair Comments





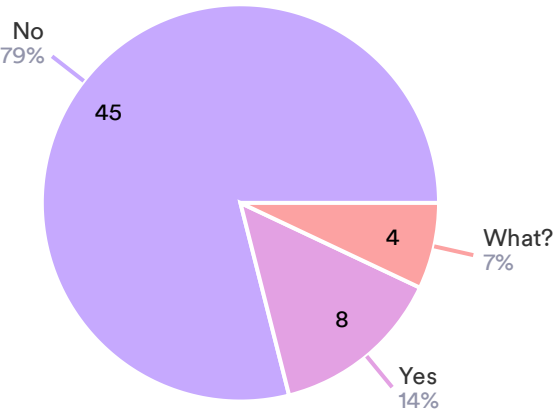
# 2021 "Phoenix" Virtual Annual Meeting ASHRAE TC 9.6 Attendance and Survey

Traci Hanegan, Chair during 2021 Annual Meeting - [traci.hanegan@coffman.com](mailto:traci.hanegan@coffman.com)

David Eldridge, JotForm Manager - [deldridge@grummanbutkus.com](mailto:deldridge@grummanbutkus.com)

## YEA member?

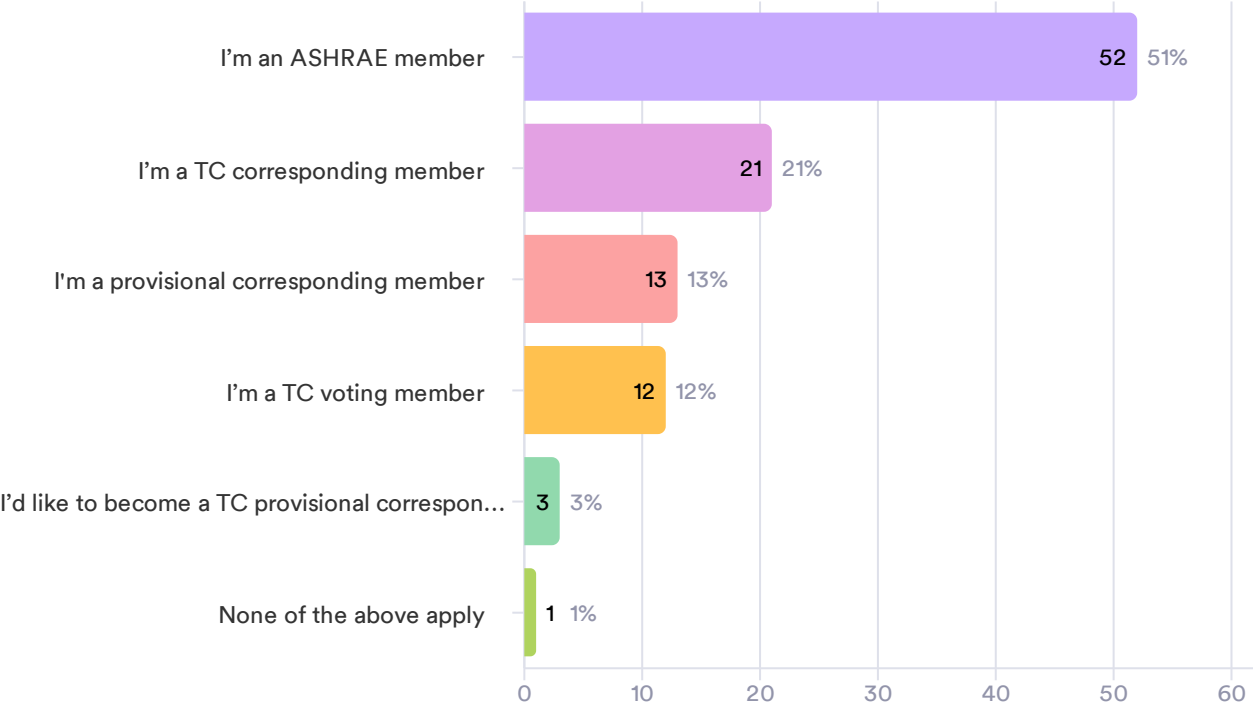
57 Responses- 2 Empty



● No ● Yes ● What?

## ASHRAE and/or TC membership status

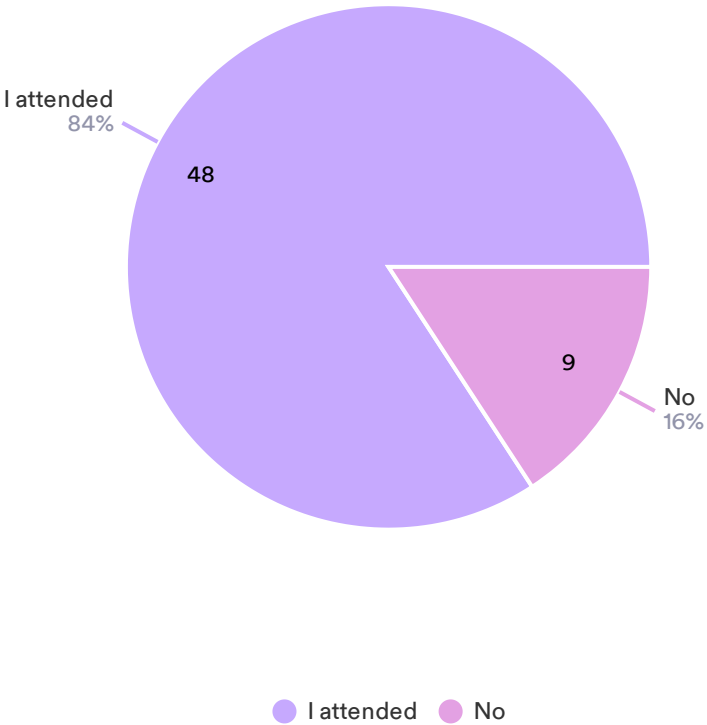
102 Responses- 1 Empty



● I'm an ASHRAE member ● I'm a TC corresponding member ● I'm a provisional corresponding member  
● I'm a TC voting member ● I'd like to become a TC provisional corresponding member ● None of the above apply

Did you attend the main TC meeting?

57 Responses- 2 Empty



Affiliation / Company (Showing Responses with Multiple Entries)

58 Responses- 1 Empty

Data	Responses
WSP	5
American Ultraviolet	3
CDC/NIOSH	3
Specialized Engineering Solutions	2
Affiliated Engineers, Inc.	2
Other entries	43



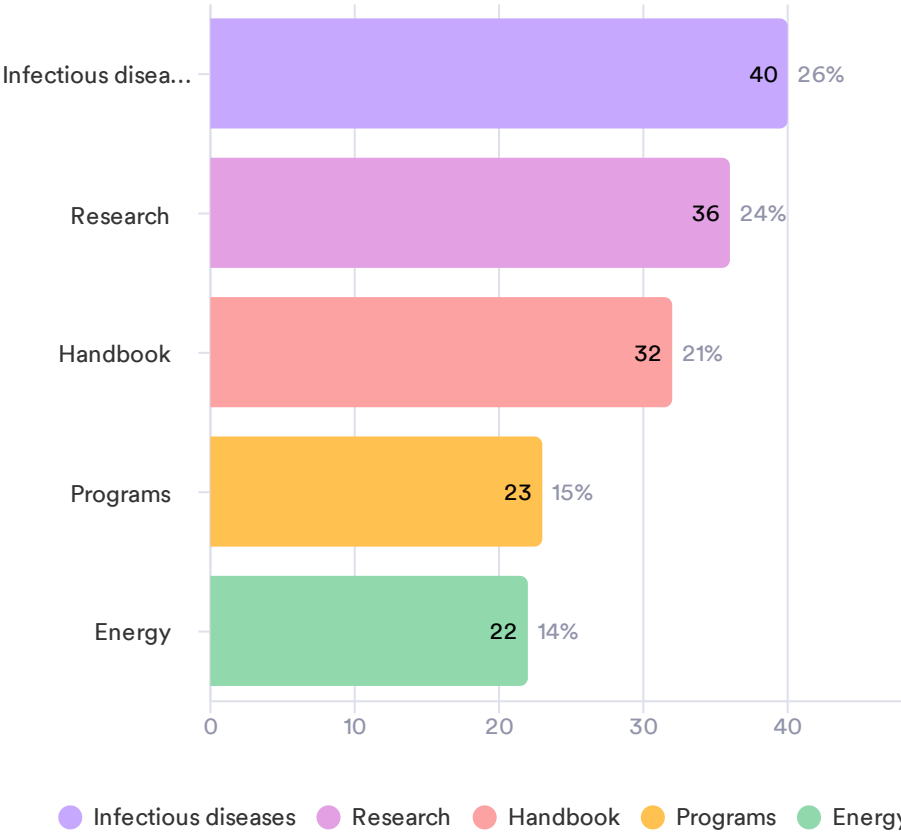
Suggestions if any for further improvement:

4 Responses- 55 Empty

Data	Responses
More notice before the meetings, more frequent meetings (e.g., monthly)	1
We need to think more about how to connect our work with that of ASHRAE's decarbonization agenda.	1
N/A	1
First time to ID sub-committee meeting.	1

Which subcommittee(s) are you attending?

153 Responses- 9 Empty



**Energy Subcommittee**  
**Agenda / Minutes**  
**Tuesday, January 26, 2021**  
**12 p.m. - 1 p.m. EST**

AGENDA / MINUTES

1. Roll Call / Introductions
2. No previous meeting due to pandemic
3. Towards Zero Guide
4. Energy end-use breakdown
5. Program ideas from energy subcommittee:
  - a. Pandemic energy use, I have some case studies, would others join?
    - a. David Thomsen: sees similar effect at Providence
    - b. Tracy: NYSERDA provided a study of this based on ETF measures such as outside air, UV lights, etc. ETF reviewing papers now. Could be public by February/March. Some hospitals were included.
    - c. Walt: NFPA study for electrical loads, metered ~8 hospitals in six states looking at branch circuits. Interesting correlation between patients and energy use / power. Started in March. NFPA wants one year of data.
  - b. MBCx / FDD been kicking this one down the road but also interested to participate. Maybe send a questionnaire to find out what questions people have.
  - c. ACS HVAC Guidebook – may not be needed if vaccines roll out
6. New business:
  - a. Walt: how are states doing with complying to the most recent versions of ASHRAE 90.1 as they roll out. How are hospitals complying, what can be done to improve adoption of the newer versions?
    - i. Terry Sharp: Standard 100 energy targets being updated from 2003 to 2012 shows median value has increased 3% from 2003 to 2012 (PRELIMINARY!) in terms of kBtu/sf/year.
    - ii. David Thomsen at Providence: built one new hospital during this period, not many new whole greenfield sites there, much more renovation/addition. Notes that many new buildings are MOB and outpatient, care center, etc. (DSE commentary)
    - iii. Walt: healthcare systems that operate in CA, OR, WA and the north division cost less and use less energy when built.
    - iv. David Thomsen: 2012 hospital is 115 kBtu/sf/year but that's a rare new replacement hospital.

## TC9.6 Research Subcommittee Report

- Subcommittee met June 8, 130pm PT
- 35-40 attendees
- Discussions
  - Bathroom ventilation
  - Potential RTAR – Hospital Energy and Filter Pressure Drop
  - Big Data OR air changes
- Action Items
  - Schedule restroom ventilation discussion – possible RTAR(s)
  - Finalize direction on filtration/energy RTAR
  - Schedule Big Data OR discussion(s)

# Summary

- Four ongoing sponsored or co-sponsored research projects
- Two work statements submitted to RAC – awaiting results
- Seven ongoing sponsored development projects
- One potential co-sponsorship development publication

# Sponsored and Co-Sponsored Research

- TC9.6 Sponsor - RP-1816: Reporting the Energy Use and Heat Gain from Imaging Equipment
  - Oscar: Underway again, getting access to locations again, PMS meeting this Friday
- TC9.6 Co-sponsor - 1833 RP: Literature Review for Evidence of the Basis for Specified Air Change Rates (ACR) for Cleanrooms, Laboratories, and Healthcare Facilities with medium to high ACR.
  - Roger/Kishor: Working on final draft, aim for end of August delivery
- TC9.6 Co-sponsor - RP-1760: Update of clothing database for existing and new Western clothing ensembles, including effects of posture, body and air movement
  - Mike: Underway again, labs are open and working on testing (and doing more than initially asked for). This work was an extra service – the original data has been published; final draft likely this fall
- TC9.6 Co-sponsor - RP-1780: Test method to evaluate cross-contamination of gaseous contaminant within total energy recovery wheels.
  - Brendon: Underway again, March 2022 target completion

# Sponsored Research Development

- 1889 WS: Graywater use in Healthcare Facilities; determining risk and appropriate design responses
  - Eric/Erica/Tyler: Submitted to RAC!
- 1864 WS: Investigating the applicability of Standard 62.1's Ventilation Rate Procedure for Healthcare Rooms
  - Paul/Ken/Kathleen/Alejandro/Arun/Abdel: Submitted to RAC!

# Sponsored Research Development

- XXXX RTAR: Anteroom ventilation rate, temperature range, pressure relationship, and boundary conditions
  - Kishor/Ken/Tom/Arun: Looking for volunteer(s) to help discussion/development of RTAR
- XXXX RTAR: Ventilation Mixing/Dilution – air flow patterns and air change rates
  - Kishor/Ken/Tom: Looking for volunteer(s) to help discussion/development of RTAR
- XXXX RTAR: Big Data Operating Room Air Change Analysis
  - Juli/Tom/Sean/Gina/Ehsan/Roger/Fred/Kishor: Action item to get team together for further discussion
- XXXX RTAR: Efficiency of filtration with respect to the extra cost and energy burdens
  - Ardas/Kathleen/Ramon/Geoff: Good discussion; action item to finalize decision
- XXXX RTAR: Recirculation efficiency in reducing energy consumption when compared with the potential of infection transmission costs
  - Ardas/Kathleen/Ramon/Geoff: Starting following decision on filtration
- XXXX RTAR: Understanding the appropriate application of humidity and temperature control strategies across climate zones on infectious aerosol transmission
  - Alejandro/Duncan/Traci/Brendon: Continuing discussion to potentially narrow scope
- XXXX RTAR: Bathroom ventilation design
  - Steve/Ken/Rick/Travis/Kishor/Linda/Stephanie: Action item to get team together for further discussion

# Co-Sponsored Research Development

- TC9.6 Co-sponsor - 1873 WS: UVGI Design Applications for Large Volume Spaces
  - Ken: RAC approved, with comments. Once those are addressed will be in queue for bidding. Funding might be challenge
- TC9.6 Co-sponsor - 1854 WS: Database of Ultraviolet Inactivation Rate Constants (k-values) for Microorganisms Critical to System Design
  - Ken: RAC approved, awaiting funding
- TC9.6 Co-sponsor - PTAR: Publication - Guidelines for State Codes on Secondary Water Treatment Systems for Buildings
  - Eric: More to come; meeting June 22 with more info



Thanks

## TC 9.6 Infectious Disease Subcommittee



**Minutes 08 Jun 2021, 2:30:00 PM– 4:00:00 PM EDT**

1. Meeting started at 2:30 by Ken Mead, Subcommittee Chair
2. **ATTENDANCE:**
  - a. 40 Attendees documented using jotform link
  - b. 49 attendees observed during meeting
3. **Abbreviated Introduction exercise:** TC Chair/Vice-Chair/Secretary/Incoming Secretary/TC 9.6 subcommittee chairs
4. **Presentation:** Traci Hanegan, PE, FASHRAE (Coffman Engineers): Brief Overview of ASHRAE/ETF/Healthcare Team Guidance & related issues
  - a. Quick overview showing updated ETF Guidance page
  - b. Introduced ETF Core Recommendations
  - c. Dismantling Myths Paper
  - d. Dental Questions: Roughly 50% of questions coming in to ETF Healthcare Committee were related to dental exposures. In response, updated Dental Guidance was issued on 04/21/21
5. **Presentation:** CAPT Steve Martin, PhD, PE (CDC/NIOSH): An Overview of ASHRAE/ETF/Filtration & Disinfection Team Guidance & related issues.
  - a. Public ASHRAE statement on COVID and Airborne Exposures and Disease Transmission
  - b. Input to CORE recommendations
  - c. Discussion of combining air cleaning options in order to achieve “MERV 13 Equivalent”. Method still shaky – will require refinement. Potential weakness associated with non-filtration interventions.
  - d. Good discussion: need for in situ commissioning test, “Standard Method of Test”
  - e. Overview of topic of Emerging Technologies and how to evaluate them
6. **Presentation:** Walt Vernon, PE, LEED AP, EDAC, FASHE (Mazzetti): Overview of Vision, Goals, Development Activities for the update to the April 2020 ASHRAE Infectious Aerosols Position Document.
  - a. New committee formed more quickly than normal cycle due to concerns (within EHC?) that the existing Infectious Aerosol PD was too prescriptive and that previous helpful info from Airborne Infectious Diseases PD had been removed.
  - b. New PD will seek to align with World Health Organization (WHO)

- c. Committee limitations on size so will also rely upon an advisory committee to assist PD committee. If interested in joining advisory committee, contact Walt Vernon at walterv@mazzetti.com.
  - d. PD committee is trying to grapple with evidence of varying quality
  - e. Overarching PD Role: Provide advice to policymakers
7. **Presentation:** Lewis Johnson, MS, CIH, CIC, FAPIC (Lee Health): *Utilizing Headboard Ventilators for Airborne Infection Isolation.*
- a. Lee Health 1800-2000 beds over 5 hospitals
  - b. Deployed over 300 Ventilated Headboards (VH), Cost ~ \$2K/ea parts/labor/install w/o blower. Rented most of the HEPA fans from a flood response company.
  - c. Placement And orientation were important to avoid crossflow issues across face of VH
  - d. Op instructions were important, Size/noise were a challenge, approx. 30-min setup
  - e. Alternate configurations:
    - i. Treadmill test
    - ii. COVID-19 testing sites
  - f. Found commercially available version but was not tall enough for Lee's needs
  - g. Intend to deploy/redeploy based on disease incidence and need
8. **Presentation:** Steve Welty, CIE, CAFS, LEED, AP (Green Clean Air): A brief discussion on recent research regarding airborne transmission of infectious disease (reference: <https://www.frontiersin.org/articles/10.3389/fbuil.2021.666923/full>).
- a. Focus of discussion on toilet plume and concerns that "open windows" guidance may facilitate long-range building -to-building infectious aerosol travel and disease transmission
9. **Wrap up, Open Mic & Prepare for Research Subcommittee**
10. **Meeting adjourned at 4:00 PM**



## TC 9.6 Handbook Subcommittee Meeting (2023 Applications – Health Care Facilities)

**Tuesday June 8, 2021**

**4:30 pm - 6:30 pm. Started ~6:00 pm, ended 6:30 pm**

Item	Description	Person	Time
1	Welcome	P. Likhonin	2
2	Introductions and Sign-in Link:	All	3
3	Schedule for 2023 Applications	P. Likhonin	2
4	ASHRAE Authoring Portal – Chapter Location	P. Likhonin	1
5	Task List	All	15
6	Discussions/New Business	All	5
7	Adjourn/Next Meeting	P. Likhonin	2

### **Intro:**

- Video feeds off
- Update names on zoom (First Name Last Name)
- Mute unless you're speaking
  - Sign in via link: <https://form.jotform.com/211576210115140>
  - Select Handbook

### **Schedule:**



## ASHRAE TC9.6 HANDBOOK SUBCOMMITTEE MEETING AGENDA

### 2023 HVAC Applications

		2019			2020			2021			2022			2023		
		Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct
Review	Current HB received (June 1)															
	TC selects HB subcom and chair															
Revise	Review current HB for changes															
	Decide extent of and outline revisions															
Approve	Seek and appoint reviser(s)															
	Revise chapter(s)															
Edit & Produce	Send revised chapter to TC for review															
	TC approves chapter															
	Send chapter to HBC liaison															
	HQ sends chpt. proof to TC contact															
	HB sent to printer (April 1)															
	HB mailed (May 15)															

HBC = Society Handbook Committee

HB = Handbook volume

HQ = ASHRAE Headquarters editorial staff

TC-9.6 Votes on Chapter  
Winter Conference 2022

5/10/2022 Final Revisions to  
Handbook/Society

- Any issues, please contact Heather Kennedy @ [hkennedy@ashrae.org](mailto:hkennedy@ashrae.org)
- Go over the ASHRAE Authoring Portal
  - <https://authoring.ashrae.org>
- Ongoing re-organization of sections.

### Task List:

- Google Docs Spreadsheet:
  - <https://docs.google.com/spreadsheets/d/1Et1NnoG5lVHqnYmEBz6oLAKiy8xeJo0x/edit#gid=247477692>
- Workgroup meeting via MS Teams Monthly.
  - Monthly 1 hr work sessions:
    - Split up by Group leaders:
      - Section 1.2 (Sustainability and Energy Concepts) – Travis English
      - Section 2.1 and 1.1 (CORP-3 updates) – George (get Josephine's contact to George)
        - Air Sterilization Technologies – Josephine Lau.
      - Section 1.3 (Continuity of Service and Energy Concepts)-- Ron Westbrook.
      - Water Backup– Eric Granzow



- Biocontainment – Dylan Neu
- Pharmacy – Erik Phelps
- Section 1.4 Guidelines on Emergency Conditions – Pavel L.
- Comfort – Mike M.
- CEC PER 17 016 – Austin Barolin
- Natural Ventilation – Alejandra Menchaca/ Travis/Jeremy
  - 170 abstract/paper (Travis)
- Pressurization updates – Don B.
- Section 3.1 - Duncan
- Dental Care Facilities – Paul Ninomura

**Discussions/New Business:**

- Need to focus on completing the chapter by winter meeting.

**Remaining Meeting Schedule and Links**

Zoom links for the subcommittee and main meetings are listed below:

**TC 9.6 Energy and Program, 6/9/2021, 10:00:00 AM– 11:30:00 AM EDT (Zoom)**

Link:

<https://ashraeorg.zoom.us/j/92731475483?pwd=YWdXTWRUeGlYK2FCaVZlZVpIRExMQT09>

Details: Meeting ID: 927 3147 5483 Passcode: 800670 Find your local number:  
<https://ashrae-org.zoom.us/j/92731475483?pwd=YWdXTWRUeGlYK2FCaVZlZVpIRExMQT09>

**TC 9.6 Healthcare Facilities Main Meeting, 6/9/2021, 12:00:00 PM– 2:00:00 PM EDT (Zoom)**

Link:

<https://ashraeorg.zoom.us/j/93693059690?pwd=WndOOTRiTE9SNGdTV29CT0lnZEFiUT09>

Details: Meeting ID: 936 9305 9690 Passcode: 783206 Find your local number:  
<https://ashrae-org.zoom.us/j/93693059690?pwd=WndOOTRiTE9SNGdTV29CT0lnZEFiUT09>





## ASHRAE TC9.6 HANDBOOK SUBCOMMITTEE MEETING AGENDA

### Zoom Meeting Minutes:

Introductions: ~28 participants on zoom, TBD for actual sign-in.

1. Schedule (Major Milestones):
  - a. Select Working Group to lead revisions identified by Feb 1, 2021
  - b. Revise Chapter by Mid-January, 2022
  - c. Send Chapter to TC to review by Winter Conference 2022.
  - d. TC to vote by April 10, 2022
  - e. Send Chapter to HBC Liaison by May 10, 2022
2. ASHRAE Authoring Portal access issues – multiple folks couldn't sign in. Send email to Heather Kennedy, copy Pavel. Pavel to start a list of folks with access issues.
3. Went over current task list and updated the group on progress for each task.
4. Reviewed Task leads and assignments.
5. We need to split out operations section and continuity of service. Tom Parker is heading up operations, Ron W. heading up emergency preparedness.

Applications Handbook 2023 - Health Care Facilities						
Issue #	Title	Description	Discussion	Person Assigned	Comments	Latest Update
1	Outline Problems	Section 1 is organized poorly. Section needs to be renumbered.		Pavel, Dan K. Amit Bhansali		
2	Energy Section	Read through Rheva-Net Zero	Section 1.2 - Sustainability and Energy Concepts  graphic around diversity of sources and continuity of service. typical EUI discussion? EUI of US vs EU? add graphics from ASHRAE/RHVA guidebook? end use graphic? ** make the graphics small (for one column) and black and white friendly	ENERGY CONSERVATION SUB-GROUP (Travis)  Travis, Heather Burpee, Walt Vernon, Benjamin Leutze, David Eldridge, Dan K., Duncan Curd.		TO DO: have a subgroup meeting between now and next handbook meeting.
3	CO-RP-3 Research Update Section 2.1	Lots of findings to be updated. Update the following paragraphs	updates to 1.1 "air conditioning and prevention of disease"  updates to the reference list "temperature and humidity", "outdoor air intakes", and "exhaust air outlets"	SECTION 2.1/CORP-3 (George lead)  Duncan Curd, Roger Loutz, Fred Betz PhD, Ehsan, Travis, George Augustini, Kapil Mehrotra		Next action: Get George to lead. Roger to commit to an update of section 2.1 holistically. George to set a meeting for February.
4	Bedmaking Chart		Differentiation between "steady-state" and "episodic" contamination events. Examples of "episodic": a. Bedmaking b. Waiting room cough (see Pantel & Tham 2012) c. VOC data from Feb 2020, CEC PER 17 016 on VOCs	Travis, Ken Mead, Dan K. Erica Stewart		
5	Section 1.3 creation of content	Creation	Emergency Power, resiliency, seismic design criteria,  Emergency preparedness	SECTION 1.3 (Ron Westbrook lead)  Ron W, Travis, Kurt Montero, Pavel, Tom Parker, Heather Platt		Next action: Waiting for draft approval at SSPC 170. Content will be taken from operations manual and inserted here. Continuity of Service Part of Operations or separate? We will split back out. Tom - Heading up Operations. Ron heading up continuity of service.
6	Operations	Creation		Tom - Heading up Operations.		CSA282 Standard
7	Domestic Water Backup Req	Edit to match FGI, 170 and expand for resiliency section	FGI 2018 2.1-8.4.2.3 S170 6.1.2.1 Add references -CDC Emergency Water Supply Planning Guide for Hospitals and Health Care Facilities -ASPE handbook -UPC	WATER BACKUP (Eric lead)  Eric Granzow		Next action: Eric to generate text. Coordinate with FGI. Redundancy.
8	Biocontainment Section	Edit to match latest updates	Fixed Figures.	Dylan Neu - Lead, Pavel, Ken to read through		Next action: Ken and Dylan to review and advise any edits. Dylan leading.
9	Pharmacy Section	Update to include latest USP797 and 800		PHARMACY  Erik Phelps - Lead, Ken Mead, Alejandro. Pavel, Dylan Neu, Benjamin Leutze	Aaron Johnson - leading SSPC 170 workgroup/section for pharmacy	Next Action: Erick leading. Amit to relay anything from the 170 working group to Erick that needs to get published into the handbook.
10	Pandemics	New heading in 1 - (1.4) Applies to all HC Facilities, not just hospitals	could be incorporated into the sections Temporary conversions 1. ventilated headboard diagram. Corp of engineers efforts - David Eld. S  Add this to 2.3, after "All rooms" and "biocontainment", add "Temporary containment areas" Review all section of "FGI Guidelines on Emergency Conditions" Then figure out how to incorporate into the handbook. use that area to talk about lessons learned from pandemic	New Section 1.4 (Pavel lead) Call the section "Guidelines on Emergency Conditions"  Ken Mead, Pavel, Dan K. Steve Friedman. and David E. Duncan C., Gina Semerad, Dylan Neu, Amit B	ETF to review this section: Traci Hanagan (healthcare team on epidemic taskforce)	Format will take shape after review of FGI paper. - Pandemic workforce (ASHRAE). Steve F. - Liason with FGI. Pavel to draft email to steve about adding section to handbook.



## ASHRAE TC9.6 HANDBOOK SUBCOMMITTEE MEETING AGENDA

11	Comfort	Focus will be on thermal comfort and will also include sound and lighting.	Will include results and topics from recent papers and publications on the subject.	Mike M. - Lead, Duncan C.		Mike will get with Duncan. Light and sound mentioned here. bigger focus on thermal. Travis, has resource for light and sound. Mike to get outline.
12	CEC PER 17 016	Update on contaminants/air changes	Section 2.1 "Indoor air quality" include the ach vs CO2 and ach vs particles graphics	SECTION 2.1/CEC Austin Barolin, Duncan C. <b>Juli C. Johnson</b>		Duncan to reach out to Austin Barolin to volunteer to lead.
13	Natural ventilation	Update from SSPC-170 position paper	Summarize the conclusions from 2017 "SSPC-170 Natural Ventilation Task Group Position Paper on Natural Ventilation" (2017) Also can see ASHRAE/RHVA guidebook	<b>NATURAL Ventilation (Lead: Alejandra Menchaca)</b> Paul N., Travis, Frank Mills, Duncan C. Alejandro		Next action: Alejandra to propose text. Continue meeting
14	Update "sustainability"		any updates for 189.3? Water, materials, etc?	<b>Benjamin Leutze - Lead.</b> Tim Earhart, Duncan C., Pavel		Next action: Benjamin to send workgroup invite, once 189.3 votes on changes. (once we have final draft from 189.3)
15	Air sterilization technologies	Review and update	References to 2.9 - HC applications Filter information needs to be updates. Filter removal rates. HEPA's, etc. UV application guideline "Basic Upper-Room Ultraviolet Germicidal Irradiation Guidelines for Healthcare Settings" Ionization update. Study in progress at med-ctr (Ban leutze)	SECTION 2.1/TREATMENT <b>Dan K - Lead:</b> Pavel, Dylan Neu, Roger L. Josephine Lau, Linda Lee, Amit Bhansali, Erica Stewart		Next action: Dan K - come up with outline and present to workgroup. Univ Wisconsin Hospital. Put in for odor control for diesel. was effective. Any BiPolar ionization experience with 3rd party backup. Will be research topic for TC-9.6. does it do any harm.
16	Pressurization updates Example Calcs		can we add a section with example and calculation procedure on rooms with cascaded positive and negative pressure? *Positive, negative and neutral pressures. can we add a section with example and calculation procedure on rooms with cascaded positive and negative pressure? *Positive, negative and neutral pressures	<b>Don B.</b> Arun Cherian help		Next Action: Don to get up with Arun. updates from class
17	Section 3.1		diagnostic and treatment clinics	<b>Duncan Curd,</b> Mike M		Next action: review section and assign help. Pavel to ask for more volunteers.
18	Section 3.2	Dental Care Facilities	Dental Care Facilities	<b>Paul Ninomura - Lead,</b> Travis help,		Next action: Paul to review. needs some help. Paul to edit with suggestions. Paul to make updates to section and share with Travis.

6. Meeting Adjourned at 11:30

Chat from Zoom:

From David Thomsen to Everyone: 11:03 AM

<https://form.jotform.com/210187687959171>

From Travis English - 714-469-9553 to Everyone: 11:08 AM

i'm on another call... i'll be back for real in about 10 minutes  
sorry, man!

From Viken Koukounian to Everyone: 11:09 AM

I'm not sure if I missed it, but is there someone we can contact to become involved on a section found in the Google Doc/join the monthly meetings?

From Josephine Lau to Me: (Direct Message) 11:10 AM

Hi Pavel,

II can help with the Air Sterilization Tech

I done research on UVC and ozone

From Tom Parker to Everyone: 11:10 AM



## ASHRAE TC9.6 HANDBOOK SUBCOMMITTEE MEETING AGENDA

Have we merged the operations workgroup with the 1.3 workgroup?

From Brendon Burley | BKM to Me: (Direct Message) 11:10 AM

I really don't want to lead, no time, but I can contribute to air sterilization.

From dkoenigshofer to Everyone: 11:13 AM

FYI -Don B. is Don Burroughs in our office. Great engineer!

lots of info; sounds like a Manual. How many pages will chapter be?

From Viken Koukounian to Me: (Direct Message) 11:15 AM

Hi Pavel, if you have an email, I can reach out to you (when you're done talking). I'm specifically interested in Comfort, but specifically relating to acoustics. That seems to be under Mike Meteyer's lead.

From Me to Viken Koukounian: (Direct Message) 11:18 AM

plikhonin@dewberry.com

From Stephanie to Everyone: 11:23 AM

authoring portal access has been improved. now can use multiple types of web browsers.

From duncan curd to Me: (Direct Message) 11:24 AM

HI Pavel, I have got access to the portal but cant download certain files....

From dkoenigshofer to Everyone: 11:24 AM

please add me to list of failures on author portal

# TC 9.6 Proposed Scope Change

Technical Committee 9.6 strives to provide information and guidance regarding the design and operation of high-performing HVAC Systems in Healthcare Facilities. We believe the key elements, **in order of priority**, of a successful healthcare HVAC system are:

1. Performance. Providing a healthy and comfortable environment for patients, staff, and visitors.
2. Reliability
3. Safety
4. Low maintenance
5. Flexibility for change
  - Our goal is to achieve all the above elements while minimizing energy use.