

TC9.6 HealthCare Facilities

Annual Meeting, Kansas City, MO

June 23, 2019

MEETING MINUTES

Meeting Minutes reported by Nicolas Lemire, TC 9.6 Secretary

1) TC called to order at 5:00 pm by Chair

- a) Introductions were made by attendees.
- b) Agenda and Sign-in sheets distributed, instructions explained by RW.
- c) Roll call - members present confirmed: 12 of 14 quorum voting members present – quorum reached
- d) Also present are 7 excom non-voting members.
- e) Corresponding members present 19, including 5 noted as PCM
- f) Guests present - 19
- g) YEA members – 7
- h) All Handouts, Agenda, Meeting Minutes (Draft and Final) Sign-in sheets (Appendix A), & subcommittee reports will be posted to the TC website: <http://tc96.ashraetcs.org>

2) Chair's Report – Ron Westbrook (RW)

- a) Chair Westbrook thanks outgoing members and welcome all new voting members.
- b) RW give the audience a briefing following section meeting attended in the morning.
- c) Update on upcoming changes in TC organization by Section 9 Head Vance Payne. Note his email is vance.payne@nist.gov.
- d) ID subcommittee has invited TC2.1 to attend their meeting and collaborate on common issues.

3) Minutes of Previous Meeting– Nicolas Lemire

- a) Meeting Minutes from Atlanta were distributed online to voting members prior to the meeting. Motion to approve the minutes by Erica Stewart. Seconded by Pavel Likhonin. Motion passed 12-0-0 CV.

4) Vice Chair Comments – Traci Hanegan (TH)

- a) TH thanks outgoing Chair Westbrook for a great chairmanship for the past 2 years and also for a great involvement of many years on TC 9.6.

5) Membership Chair Report– Ron Westbrook

- a) No report. Membership changes covered earlier.

6) Sub-committee Reports

- a) Energy – David Eldridge (See minutes attached, Appendix B). 30 people showed-up. RW recognize Frank mills for his contribution. Many discussions like economizer and other energy wise ideas.
- b) Water Subcommittee – Eric Granzow (No meeting this time in KC). Working on RTAR on reuse of grey water in healthcare. Question raise in 189.3 meeting and it was decided that more research was required on the matter. Eric Granzow move that we accept the RTAR, seconded by Erica Stewart; vote results 11-0-1 CV; motion passes.
- c) Programs – Mark Tome (See minutes attached, Appendix F). Decent turn out (about 20 people). Went over the tracks for upcoming 2020 Winter Meeting in Orlando; dates for submission are shown on the screen. Mark mentioned that if people want to submit anything, they should contact him and he will help. Tracks and dates for Austin 2020 Annual Meeting were also showed on the screen.
- d) Handbook – Pavel Likhonin (See minutes attached, Appendix C). 2019 application hbk is out. Starting now for the 2023 application chapter. 24 people signed in for the new revision cycle. All revision must be identified by July 2020. Deadline is Feb 1 2022.
- e) Research – David Thomsen (See minutes attached, Appendix D). 31 people signed in. Review current research projects. RP-03 is very close to be approved. Travis English gave a presentation. Discussions on non-potable water RTAR just

approved by full committee in the water subcommittee section. RP-1816 have been tabled for the moment. Some issues need to be resolve first and then an email ballot to voting member will be conducted.

- f) Infectious Diseases – Traci Hanegan (See minutes attached, Appendix E). 54 people attending including 9 YEA members. Ken Mead gave a nice update on what is happening in the world on ID. Traci gave an update on FGI best practices section that you can contribute to (white papers and case studies). There were good comments on the white paper on Humidity Control Events in Perioperative Spaces published earlier. Dr. Taylor gave a presentation in the ID subcommittee on more research supporting the importance of indoor air hydration above 40% RH.

7) Webmaster – George Augustini

- a) Website is up-to-date. Schedule on review process of Handbook is posted. We are now ready and active on basecamp.
- b) Website address is <http://tc096.ashraetcs.org>

8) ALI – Dan Koenigshofer

- a) Dan gives a webinar twice a year and a 3 hour class twice a year at Annual and Winter meeting.

9) Environmental Health –Erica Stewart

- a) Several position documents are being revised at the moment. Main sections were reviewed as of now. 3 people for TC9.6 are involved in the committee (Kishor Khankari, Erica Stewart, and Dr. Stephanie Taylor). Position papers currently recommended to be reaffirmed include those on Environmental Tobacco Smoke, Combustion of Solid Fuels and Indoor Air Quality in Primarily Developing Countries, and Indoor Carbon Dioxide. EHC is also co-sponsoring a SSPC 62.1 seminar related to the Indoor Air Quality Procedure and co-sponsoring an SSPC 62.1 workshop related to Controlling Excess Humidity to achieve IAQ.

10) Liaison Reports

- a) Std. 170 (Faubert) – Addendum e out for public review. FGI guidelines out for public review. Addenda out for review later this summer.
- b) Std. 189.3 (Sheerin) – In process of incorporating latest version of 90.1 Review period is 1 month.
- c) Std. 188 (Stewart) – Working on Guideline 12 answering comments.
- d) Std. 90.1 () – No report.
- e) Std. 55 (Poots) – No report.
- f) Std. 62 (Abdel Darwich) – No report. Erica talked about debate on dew point vs relative humidity. Kishor Kankhari is trying to find the impact of volume on dilution.
- g) MTG Ventilation Air Changes Rates (Lautz) – 1833-TRP, “Literature Review for Evidence of the Basis for Specified Air Change Rates (ACR) for Cleanrooms, Laboratories, laboratory animal facilities, and health care facilities with medium to high ACR”, Approved by RAC. Contractor has been selected.
- h) TC 7.9 (Lautz) – No report.

11) Presentation

- a) Dr Stephanie Taylor gave a small presentation during the ID subcommittee report on more research supporting the importance of indoor air hydration above 40% RH.
- b) IUVA also gave a small presentation (see new business section).
- c) Presentation on Event Based Modeling of Indoor Airflow Patterns was delivered by Dr. Mousavi.

12) New Business

- a) The Healthcare design manual was translated into Spanish.
- b) STD 170 is proposing to write an Operation Guideline. The main purpose is to help facility folks on the operation side. Ron Westbrook will help on that matter by Chairing the committee working on this. The guideline would be a stand-alone document. Motion to approve the creation of “Operation Guidelines” chaired by Ron Westbrook: moved by Erich Granzow and seconded by Erica Stewart for TC approval. Voting results 11-0-1 CV.
- c) Guests from TC 2.9 were asked to come in front to present. IUVA (International UV Association) presented the history behind their existence. They would like to develop an industry standard test method for consumer to be able to compare various technology.

13) Meeting adjourned at 7:03pm

APPENDIX A

Sign-in Roster – Full Committee

TC 9.6 HEALTHCARE FACILITIES

ROSTER INSTRUCTIONS KANSAS CITY 2019

Sign-in Sheet, please follow instructions :

- Look for your name. Please initial as you are present and make any change if required
- The names are organized in alphabetical order, but there are 4 sections in the roster in the following order :
 1. TC Leadership
 2. TC Voting Members
 3. TC Provisional Corresponding Members
 4. TC Corresponding Members
- If you are a YEA Member, please add Y beside your name
- Attending for the first time? Want to be part of our TC? Your name does not show on the roster? You want to be added to the list? Please follow the link to register. You will need your member number : www.ashrae.org/joinatc
- Guests can sign in on last pages

ASHRAE Roster
Health Care Facilities-T-TAC-TC09.06
As of Any Date

Chair
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Term on Committee: 07/01/2004 to 06/30/2019
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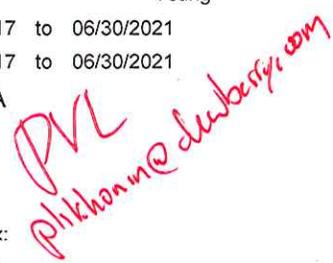
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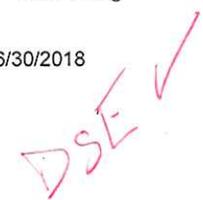
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ASHRAE Roster

Health Care Facilities-T-TAC-TC09.06

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Health Care Facilities-T-TAC-TC09.06

As of Any Date

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Term in Position: 06/08/2018 to 06/08/2020

Term on Committee: 06/08/2018 to 06/08/2020

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ASHRAE Roster
Health Care Facilities-T-TAC-TC09.06

As of Any Date

Provisional Corresponding Member

8236582 184 Non-voting

Term in Position: 11/06/2018 to 11/06/2020

Term on Committee: 11/06/2018 to 11/06/2020

Mr Abdallah Osama YEA

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Provisional Corresponding Member

8176184 163 Non-voting

Term in Position: 03/22/2018 to 03/22/2020

Term on Committee: 03/22/2018 to 03/22/2020

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Provisional Corresponding Member

8278396 066 Non-voting

Term in Position: 01/03/2019 to 01/03/2021

Term on Committee: 01/03/2019 to 01/03/2021

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Provisional Corresponding Member

8155841 503 Non-voting

Term in Position: 02/28/2017 to 02/28/2019

Term on Committee: 02/28/2017 to 02/28/2019

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8246931 190 Non-voting

Term in Position: 08/09/2018 to 08/09/2020

Term on Committee: 08/09/2018 to 08/09/2020

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Term in Position: 07/24/2017 to 07/24/2019

Term on Committee: 07/24/2017 to 07/24/2019

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8352141 081 Non-voting

Term in Position: 03/06/2018 to 03/06/2020

Term on Committee: 03/06/2018 to 03/06/2020

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Provisional Corresponding Member

8237506 175 Non-voting

Term in Position: 03/12/2017 to 03/12/2019

Term on Committee: 03/12/2017 to 03/12/2019

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ASHRAE Roster

Health Care Facilities-T-TAC-TC09.06

As of Any Date

Provisional Corresponding Member

5176651 999 Non-voting

Term in Position: 01/29/2017 to 01/29/2019

Term on Committee: 01/29/2017 to 01/29/2019

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8200737 084 Non-voting

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Term on Committee: 02/06/2018 to 02/06/2020

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Term on Committee: 02/05/2017 to 02/05/2019

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2028393 064 Non-voting

Term in Position: 06/02/2017 to 06/02/2019

Term on Committee: 06/02/2017 to 06/02/2019

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Provisional Corresponding Member

8254555 075 Non-voting

Term in Position: 06/26/2018 to 06/26/2020

Term on Committee: 06/26/2018 to 06/26/2020

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Term in Position: 09/20/2018 to 09/20/2020

Term on Committee: 09/20/2018 to 09/20/2020

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5122944 094 Non-voting

Term in Position: 06/26/2017 to 06/26/2019

Term on Committee: 06/26/2017 to 06/26/2019

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Term in Position: 07/10/2017 to 07/10/2019

Term on Committee: 07/10/2017 to 07/10/2019

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ASHRAE Roster
Health Care Facilities-T-TAC-TC09.06

As of Any Date

Provisional Corresponding Member
 8258959 503 Non-voting

Term in Position: 07/14/2017 to 07/14/2019

Term on Committee: 07/14/2017 to 07/14/2019

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 8249920 999 Non-voting

Term in Position: 10/17/2017 to 10/17/2019

Term on Committee: 10/17/2017 to 10/17/2019

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Term in Position: 09/10/2018 to 09/10/2020

Term on Committee: 09/10/2018 to 09/10/2020

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Term in Position: 06/20/2018 to 06/20/2020

Term on Committee: 06/20/2018 to 06/20/2020

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Term in Position: 10/10/2017 to 10/10/2019

Term on Committee: 10/10/2017 to 10/10/2019

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 8207047 169 Non-voting

Term in Position: 01/13/2018 to 01/13/2020

Term on Committee: 01/13/2018 to 01/13/2020

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 8313846 143 Non-voting

Term in Position: 07/17/2018 to 07/17/2020

Term on Committee: 07/17/2018 to 07/17/2020

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Term on Committee: 01/28/2015 to 06/30/2017

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As of Any Date

Corresponding Member
 8073963 022 Non-voting
 Term in Position: 12/08/2017 to
 Term on Committee: 12/07/2015 to 12/07/2017
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Corresponding Member
 8101736 084 Non-voting
 Term in Position: 07/01/2014 to
 Term on Committee: to
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 Term on Committee: 05/19/2016 to 05/19/2018
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 Term on Committee: 07/01/2005 to 06/30/2011
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 Term on Committee: 09/21/2015 to 06/30/2016
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 67244 067 Non-voting
 Term in Position: 07/01/2009 to
 Term on Committee: to
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 8031277 081 Non-voting
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 Term on Committee: 06/18/2009 to 06/30/2013
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 Term in Position: 01/25/2018 to
 Term on Committee: 01/24/2016 to 01/24/2018
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Health Care Facilities-T-TAC-TC09.06

As of Any Date

Corresponding Member
 7989433 026 Non-voting
 Term in Position: 07/01/2015 to
 Term on Committee: 08/22/2012 to 06/30/2015
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Corresponding Member
 8027884 025 Non-voting
 Term in Position: 07/01/2016 to
 Term on Committee: 04/06/2015 to 06/30/2016
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CORRESPONDING MEMBER
 2012619 007 Non-voting
 Term in Position: 07/01/2004 to
 Term on Committee: to
Mr J Patrick Carpenter,
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Corresponding Member
 119184 028 Non-voting
 Term in Position: 07/01/2008 to
 Term on Committee: to
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Corresponding Member
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 Term in Position: 02/20/2018 to
 Term on Committee: 02/19/2016 to 02/19/2018
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 Term on Committee: to
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Corresponding Member
 152968 106 Non-voting
 Term in Position: 07/01/2018 to
 Term on Committee: 07/01/2004 to 06/30/2018
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 157764 064 Non-voting
 Term in Position: 07/01/2015 to
 Term on Committee: 08/12/2014 to 06/30/2015
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Health Care Facilities-T-TAC-TC09.06

As of Any Date

Corresponding Member
5216063 160 Non-voting

Term in Position: 07/01/2014 to
Term on Committee: 05/21/2013 to 06/30/2014

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Term on Committee: 05/29/2014 to 06/30/2015

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Health Care Facilities-T-TAC-TC09.06

As of Any Date

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8192264 052 Non-voting

Term in Position: 07/01/2014 to

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Term in Position: 07/01/2014 to

Term on Committee: 09/17/2013 to 06/30/2014

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Term in Position: 07/01/2011 to

Term on Committee: to

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ASHRAE Roster

Health Care Facilities-T-TAC-TC09.06

As of Any Date

Corresponding Member

5225838 045 Non-voting

Term in Position: 07/01/2015 to

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Term on Committee: 07/01/2004 to 06/30/2017

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Term in Position: 07/01/2018 to

Term on Committee: 07/01/2004 to 06/30/2018

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Term in Position: 07/01/2017 to

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Term on Committee: 07/01/2006 to 06/30/2014

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Term in Position: 06/27/2018 to

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8054857 045 Non-voting

Term in Position: 07/01/2017 to

Term on Committee: 06/26/2016 to 06/26/2018

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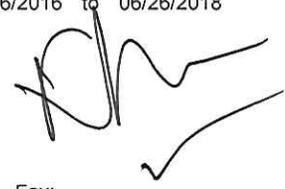
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Health Care Facilities-T-TAC-TC09.06

As of Any Date

Corresponding Member
7961395 Non-voting

Term in Position: 06/03/2018 to
Term on Committee: 06/02/2016 to 06/02/2018

Ms Debbie Kiely

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Health Care Facilities-T-TAC-TC09.06

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APPENDIX B

TC 9.6 Energy Subcommittee

ASHRAE Kansas City TC 9.6 Energy Subcommittee

Sunday, June 23, 2019 2:56 PM

TC 9.6 Energy Subcommittee Minutes, Sunday June 24 - 3 p.m. KCCC Room 2215A

David Eldridge Chair

REHVA guidebook

- Seminar 2 this morning
- 2 of 3 reviews in from TC members
- REHVA reviews submitted this morning
- Finalize and incorporate
- Potentially for sale in Orlando

- Recognize speakers in attendance

Economizers – airside vs water

- California (MS)
- Texas (AB)
- Pacific NW (DT)
- Omaha (EG)
- Brandon Damas – let's check the 90.1 methodology, would a building type be excluded if shown to be different behavior.
- Forward to LVW

End-use calculations / breakdowns – reheat being the biggest one

- Legacy Salmon Creek
- Two NREL facilities – get Ron's summary for end-use breakdown – was a care center facility at SUNY Upstate, lots of internal gains

Frank wants to emphasize the clinical equipment efficiency. Other non-healthcare sectors we have these examples. Dan and Pavel may have some data and work on article, could use more data. DT has some examples where clinical requires water-cooled. Danette @

Cleveland Clinic. Water quality. Rust inhibitors may not be allowed.

May migrate to virtual subcommittee role...TBD depending on our current mission.

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ASHRAE TC 9.6 KANSAS CITY 2019		TIME	EVENT DATE	LOCATION
ASHRAE TC 9.6 KANSAS CITY 2019		TIME	EVENT DATE	LOCATION
Energy Subcommittee		3 p.m. - 3:45 p.m.	Sunday, June 24	KCCC Room 2215A

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13				
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15				
ASHRAE TC 9.6 KANSAS CITY 2019		TIME	EVENT DATE	LOCATION
ASHRAE TC 9.6 KANSAS CITY 2019		TIME	EVENT DATE	LOCATION
Energy Subcommittee		3 p.m. - 3:45 p.m.	Sunday, June 24	KCCC Room 2215A

APPENDIX C

TC 9.6 Handbook Subcommittee



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

Sunday June 23, 2019

2:30 - 3:00 – KCC, 2215A

Item	Description	Person	Time
1	Welcome	P. Likhonin	2
2	Self introductions and Sign In Sheet	All	5
3	Schedule for 2023 Applications	P. Likhonin	5
4	ASHRAE Authoring Portal	P. Likhonin	5
5	Roster Generation	All	5
6	Discussions/New Business	All	5
7	Adjourn/Next Meeting	P. Likhonin	3

Process and Schedule:

- Review of current handbook is due on July 1, 2020 for identifying changes to be made.
- Basefile of 2019 available on the ASRAE Portal, in about 1 month.
 - **WE ARE USING THE NEW ASHRAE AUTHORIZING PORTAL – authoring.ashrae.org**
 - **Only available in IE, doesn't work on any other explorer....**

Assignments:

Meeting Minutes:

Introductions: 24 people signed in.



ASHRAE TC9.6 HANDBOOK SUBCOMMITTEE MEETING AGENDA

1. Schedule (Major Milestones):
 - a. Identify Revisions to be done by July 1, 2020
 - b. Select Working Group to lead revisions identified by Feb 1, 2021
 - c. Revise Chapter by Feb 1, 2022
 - d. Send Chapter to TC to review and Vote by June 13, 2022
 - e. TC to vote by June 26, 2022
 - f. Send Chapter to HBC Liaison by July 31, 2022
2. Went over handbook chapter review form and requested feedback for areas to edit.
 - a. Amit B., George A., Robert C. and Eric G. Volunteered.
3. ASHRAE Authoring Portal access and discussion of workflow.
4. Meeting Adjourned at 2:56pm.

SIGN-IN SHEET

TC-9.6 Subcommittee Meeting

Totals signed in = 24

DATE: 6/22/2019

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SIGN-IN SHEET

TC-9.6 Subcommittee Meeting

DATE: 6/22/2019

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APPENDIX D

TC 9.6 Research Subcommittee

TC 9.6 Research Subcommittee Report
Meeting Report: June 23, 2019 – Kansas City

1. Agenda

- a. Welcome and Introductions.
 - i. David Thomsen; david.thomsen@providence.org
- b. Sign-in sheet
- c. Flow chart of ASHRAE research provided in appendix
- d. FYI – Presentation at TC9.6 meeting by Ehsan Mousavi for NSF grant to study a new air/contamination modeling approach.
- e. Summary of TC9.6 research efforts (see below)
- f. Presentation by Travis English of KP research funded by CEC
- g. Discuss proposed “tracks” for TC9.6 research
- h. Open discussion for new research

2. Funded Research:

- a. CO-RP 3: Literature Review of ASHE/ASHRAE Standard 170.
 - i. PI: Roger Lautz, Ehsan Mousavi, Fred Betz
 - ii. Research Objective: Conduct a review of S170 to determine whether the requirements are supported by engineering and/or scientific evidence.
 - iii. Ready to be published.
- b. RP-1760: Update of clothing database for existing and new Western clothing ensembles, including effects of posture, body and air movement
 - i. Lead TC2.1: Dennis Loveday, Ron Westbrook
 - ii. TC9.6 Contacts/PMS: Mike Meteyer
 - iii. Research Objective:
 - iv. TC2.1 agreed to amend contract to included defined set of healthcare attire. Ron working with Mike to provide attire for: OR patient, within sterile OR, outside sterile OR, sterile processing decon, sterile processing distribution, isolation room; working on laboratories.
 - v. Mike was hoping to complete change order submission but it might be too late
 - vi. Mike attending PMS team meeting in KC

3. Tentative Research Project

- a. 1780 TRP: Test method to evaluate cross-contamination of gaseous contaminant within total energy recovery wheels.
 - i. Lead TC 9.10 Laboratory Ventilation,
 - ii. TC 9.6 Lead/PMS: Brenden Burley
 - iii. Research Objective:
 - iv. Bid(s) received and scored but not able to award yet.
- b. 1837 TRP: The effects of ventilation in sleeping environments
 - i. Lead TC2.1: David Wyon, P Wargocki, C Sekhar
 - ii. Research Objective:
 - iii. Out to bid
 - iv. FYI only per Ron
- c. 1816 TRP: Reporting the Energy Use and Heat Gain from Imaging Equipment

- i. Lead TC9.6: Oscar Cobb PMS Chair
 - ii. TC4.1 and TC4.7 Co-sponsored
 - iii. Research Objective: This research will determine heat gain and energy use for large, often multi-component, imaging systems in the field. Results will be used to update and expand current data in multiple ASHRAE publications. It will also provide energy use metrics for energy modeling and medical equipment comparisons in HVAC designs.
 - iv. Bids received and PES team reviewing/meeting shortly
 - d. 1833 TRP: Literature Review for Evidence of the Basis for Specified Air Change Rates (ACR) for Cleanrooms, Laboratories, and Healthcare Facilities with medium to high ACR.
 - i. Lead Air Change Rate (ACR) MTG: Kishor Khankari
 - ii. TC9.6 Contacts/PMS: Erick Phelps, Ken Mead, Mike Meteyer
 - iii. Research Objective: Evaluate ASHRAE ACR Guidance and determine if it is research-based and whether the ACR approach is the most appropriate design/control approach for the design space. Similar to CO-RP 3 and with obvious overlap yet it applies to spaces beyond healthcare and may include evaluations of the appropriateness of ACR as a design/control aspect not included in CO-RP 3.
 - iv. PES reviewed proposals prior to KC
 - v. Sent to RAC
- 4. Work Statement
 - a. 1864 WS: Investigating the applicability of Standard 62.1's Ventilation Rate Procedure for Healthcare Rooms
 - i. TC9.6 Lead: Paul Ninomura
 - ii. Co-Sponsor: SSPC 170
 - iii. Research Objective: ASHRAE Standards 62.1 and 170 seek to provide safe and acceptable indoor environments yet they employ very different approaches. This research investigates if/where the design flexibility in Standard 62.1's Ventilation Rate Procedure could be an appropriate and energy-conserving alternative to Standard 170's prescriptive air-change-per-hour approach to outdoor air ventilation requirements.
 - iv. Ken authored RTAR with Paul assisting, Paul is guiding the RTAR for SSPC170.
 - v. RAC liaison approved RTAR; comments received will be addressed in WS
 - vi. Rick is drafting WS. Anticipated complete in 2-3 months, per Paul.
 - b. 1873 WS: UVGI Design Applications for Large Volume Spaces:
 - i. Lead TC 2.9: Steve Martin
 - ii. TC9.6 Lead: Ken Mead
 - iii. Research Objective: Current system design guidance is based on room volume. High-ceiling rooms are thus penalized causing potential over-design and inflated first and operating costs. Objective is to conduct research to ID if floor area design approach would be equally effective at airborne pathogen deactivation
 - iv. Approved RTAR with comments in Atlanta
 - v. Addressing comments with Liaison
 - vi. Goal of Aug 15 for WS submission
- 5. Submitted RTAR
 - a. 1854 RTAR: Database of Ultraviolet Inactivation Rate Constants (k-values) for Microorganisms Critical to System Design

- i. Lead TC 2.9: Steve Martin
 - ii. TC9.6 Lead: Ken Mead
 - iii. Research Objective: Literature review and development of a comprehensive and standardized database of UV rate constants (susceptibility to UV) of various micro-organisms in air and surfaces in the built environment.
 - iv. Submitted to RAC shortly after Atlanta
 - v. RAC to review at KC
- 6. In Progress RTARs
 - a. Non-potable Water
 - i. Lead 189.3: Walt Vernon, Shannon Bunsen,
 - ii. TC9.6 Lead: Eric Granzow
 - iii. Research Objective: Determine if any negative impacts to patient safety may exist from use of non-potable water.
 - iv. Draft RTAR completed
 - v. Hope to endorse for TC vote
 - vi. Approved 10-0-1.
 - vii. Additional TC's may co-sponsor
 - viii. ASPE contact will be included
- 7. KP South Bay IAQ Study – Travis English presentation
- 8. Propose three areas of focus, with big picture (healthcare of 2050) in mind –
 - a. Code/Standard changes - ventilation?
 - b. Handbook/Manual design changes - operations impact, data?
 - c. New technology?
- 9. Potential Research (pre-RTAR)
 - a. Emergency chiller operations for healthcare environments
 - i. TC9.6 Lead: Bob Cox
 - ii. Research Objective: Sizing and criteria for chiller operation during normal power outages
 - iii. Several members indicated their interest in the topic and were instructed to give their contact information to Bob Cox previously.
 - iv. Ron, Walt, Larry, Ken, Amit
 - v. Potential forum?
 - b. OR air distribution and ACH
 - i. TC9.6 Lead: Erick Phelps
 - ii. Research Objective: Optimize OR distribution and ACH
 - iii. Houston discussion:
 - 1. Discussed recent ASHRAE Journal manuscript by Kishor Khankari regarding OR design. Modeling results appeared consistent with other reports of OR recirculation air entering into the sterile zone.
 - 2. Significant discussion ensued regarding this potential research topic
 - 3. Unofficial vote indicated near unanimous agreement that this should be investigated further as a future research topic.
 - 4. Suggestion to await official release of CO-RP3 report for their comments on this topic.

iv. Atlanta discussion:

1. Originally conceived as a study into air curtains it has evolved into a general OR distribution question. CO-RP3 should be published shortly which will help inform.
2. SSPC170 was going to initiate a work group with FGI and AORN. Erick will participate and lead any research requests

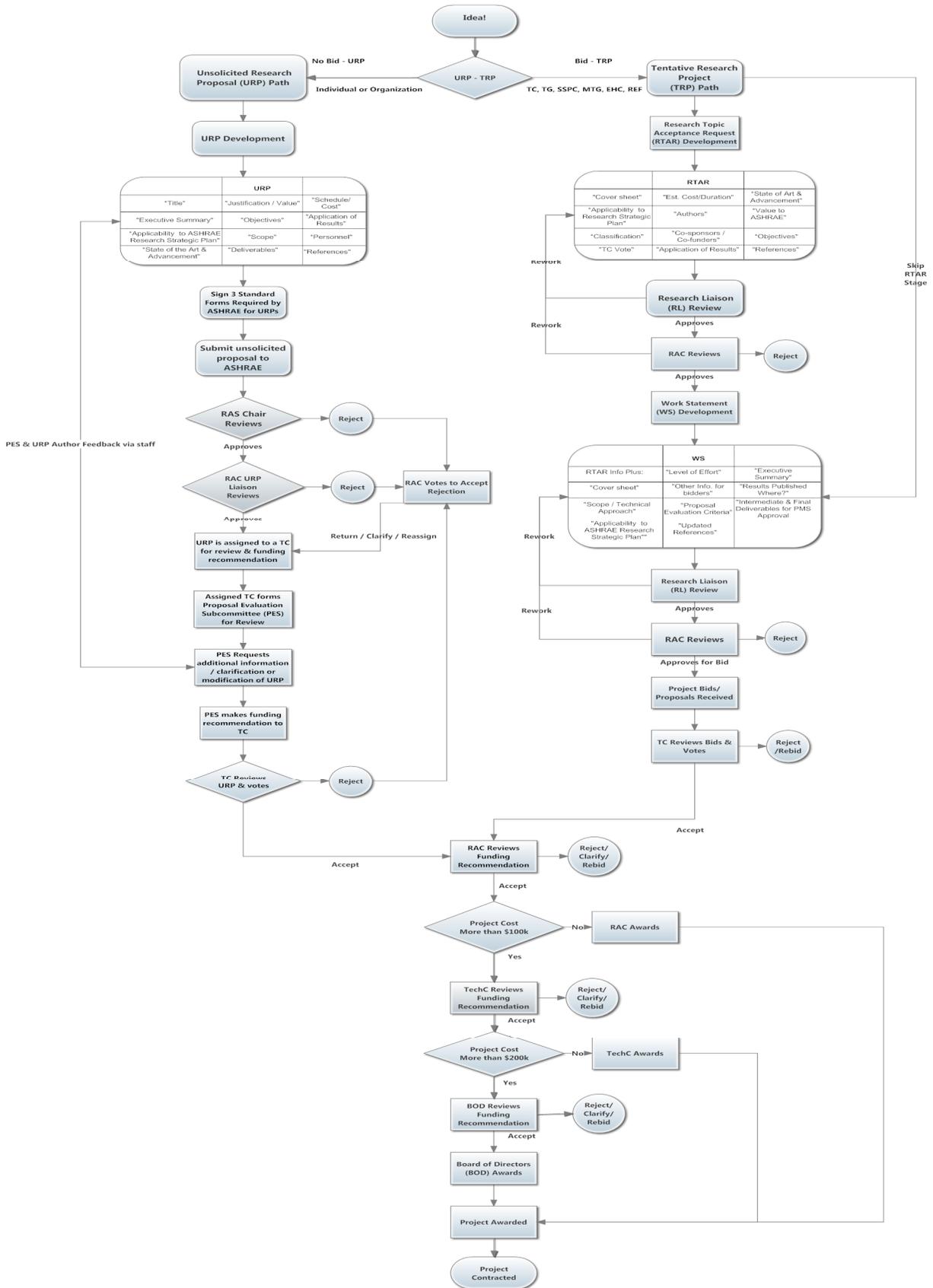
v. Kansas City discussion:

1. Coordinate with Kishor's efforts
2. Involve Kevin Scarlett's work, Dan, Larry, Ken, Walt and Travis volunteered to participate

10. Previous Discussions in need of TC9.6 Lead

- a. Effectiveness of 188?
- b. Relative Humidity?
- c. Standard 100 researching alternate to EUI?
- d. Discussed potential for MS Thesis-level investigation of RH vs wetted contact time for hospital disinfectants
 - i. Walt Vernon mentioned his involvement with Health Care Institute (HCI) and International Federation of Healthcare Engineers (IFHE). [Walt serves on HCI board and Sees opportunity for HCI/IFHE/ASHRAE research collaborations.]

Appendix



**ASHRAE TC9.6 Research Sub-committee Attendance List
Kansas City, June 23 2019**

Name	e-mail	Affiliation	Present	YEA
Anderson, Tyler	Tyler.anderson@chemaqua.com	Chem-Aqua	✓	✓
Augustini, George	gagustini@ssr.inc.com	SSR	✓	✓
Barbosa, Bruno	Bruno.perazzo@fiocruz.br	Fiocruz		
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Bhansali, Amit	Amit.bhansali@wsp.com	WSP	✓	
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Likhonin, Pavel	plikhonin@dewberry.com	Dewberry Engineers	✓	
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BRIAN TANNER	btanner@dewberry.com	ASHRAE	✓	
Heather Burpee	burpeeh@uw.edu	Univ. of Washington	✓	
Maya Salabashewa	mayai.salabashewa@kp.org	Kaiser	✓	
Ehsan Mousavi	mousavi@clemson.edu	Clemson University	✓	
Paul Ninomura	Paul.Ninomura@ihs.gov	Indian Health Service	✓	
Paul Kondrat	pkondrat@cannondesign.com	Cannon Design	✓	

APPENDIX E

TC 9.6 Infectious Diseases Subcommittee

**TC 9.6 Infectious Diseases Subcommittee
Meeting Minutes
Kansas City Annual Meeting
Sunday, June 23, 2019, 11am-12:30pm**

- Traci Hanegan, Chair. Ken Mead, Vice-Chair. The meeting was attended by 54 professionals including 9 YEA. **Note that Ken Mead will take over as the subcommittee chair beginning July 1, 2019.
- An update was provided on the Environmental Health Committee's work.
- Ken Mead provided an update on recent "Infectious Diseases Headlines" related to infectious diseases (see end of these minutes for detailed information on topics reviewed). The committee discussed the challenge of tracing contacts from measles exposure and determining how far to go. There is still concern about MERS cases because there are still a number of outbreaks in health care facilities, despite precautions being in place. The committee also had its usual discussion on toilets. Some members have noted that architects on some projects are resistant to trying low wall exhausts. Infection control personnel should be pulled into the discussion to evaluate the benefits. It was noted that U of Oregon's Biology in the Built Environment Lab may have capacity and interest in further study on low wall exhaust near toilets. Farhad noted that for 10-15 microns and smaller in drier air, that ceiling exhaust was shown to be more effective at contaminant capture. Rick Peters offered to send the toilet smoke videos to Traci Hanegan to share with those interested in his project. Farhad submitted a request to FGI to have ante rooms required on ALL rooms in some cases, but the committee rejected his proposal.
- Dr. Stephanie Taylor presented recent research and news related to indoor air RH% and its relationship to infection control. Of most recent interest is a study titled, "Low Ambient Humidity Impairs Barrier Function and Innate Resistance Against Influenza Infection", Kudo, et al., PNAS 2019.
- Traci Hanegan provided an update from the ASHE PDC Conference that was held in March 2019. FGI has a "Beyond Fundamentals" section on their website with information that is relevant to health care facility designers. They would like to include the recent Humidity whitepaper. Traci discussed the potential for reclassifying humidifiers as infection control equipment with the Joint Commission and will follow up with them.
- Traci Hanegan solicited feedback on the recently published whitepaper, "Humidity Control Events in Perioperative Spaces". This is now available for free download. The committee discussed the desire to update the name to "Humidity Excursions in Perioperative Spaces" to better match language used by AJHs. Kevin Scarlett from Washington DOH discussed the background behind the suggested name change. Additional suggested edits are welcome and will be included in a proposed revision for TC9.6 to vote on in the coming year.
- The subcommittee continued discussion from the past meeting about Urgent Care Facilities and the growing risks of infection at these locations as more sick individuals make use of them in lieu of the hospital emergency room. TC9.6 may set up a group to look at this issue further and make recommendations to address it.

Meeting adjourned.

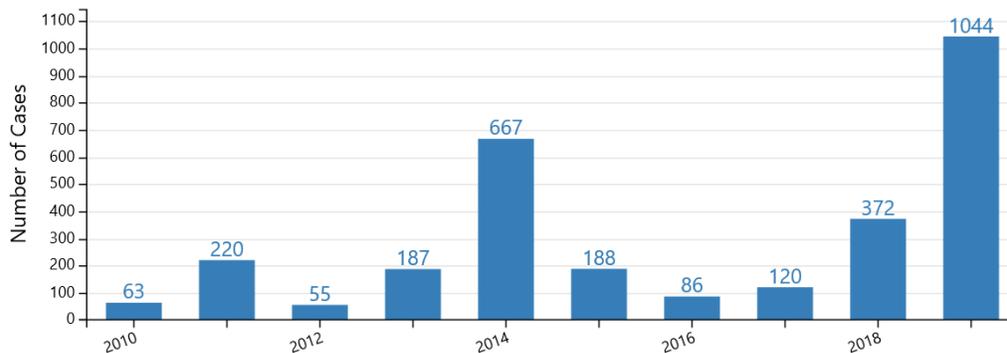
Infectious Disease Headlines – June 2019

1. Measles, Measles, Measles... (www.cdc.gov)

From January 1 to June 13, 2019, **1,044** individual cases of measles have been confirmed in 28 states. This is an increase of 22 cases from the previous week. This is the greatest number of cases reported in the U.S. since 1992 and since measles was declared eliminated in 2000.

Number of Measles Cases Reported by Year

2010-2019** (as of June 13, 2019)



- Measles outbreaks (defined as 3 or more cases) are currently ongoing in 2019 in the following jurisdictions:

- New York State, Rockland County
- New York City
- California, Butte County
- Pennsylvania
- Washington

These outbreaks are linked to travelers who brought measles back from other countries such as Israel, Ukraine, and the Philippines, where large measles outbreaks are occurring.

- 1 January 2018 thru 1 Mar 2019, 47 of the 53 countries in the European Region have together reported over 100,000 measles cases and over 90 measles-related deaths. Worst is Ukraine, where eleven people have died and more than 30,000 have been infected in 2019 alone.

- Measles highly contagious if not vaccinated. Disease complications can be serious to include death.

- airborne – reportedly viable up to 2 hrs – significant implications for medical facilities who do not timely isolate.

2. Ebola

- As Ebola Cases Rise, so Do Worries of a Cross-Border Epidemic (The New Humanitarian) The second-largest Ebola outbreak ever continues to spread, and health officials now say it's likely to reach the populous city of Goma. Once there, the risk of it spreading beyond the Democratic Republic of Congo to Rwanda, South Sudan, or Uganda increases.

- CDC Recently (12 Jun) activated their emergency operation center in support of response

- Started Aug 2018, now 2nd largest Ebola outbreak, primarily DRC, response hampered by civil war

- As of June 19, 2019:

Total cases: 2204*

Deaths: 1479

- Confirmed cases: 2110

- Confirmed: 1385

- Probable cases: 94

- Probable: 94

* Approx 6% of these are healthcare workers

3. Mumps: From January 1 to May 24, 2019, 42 states* and the District of Columbia in the U.S. reported mumps infections in 1,002** people to CDC. (PA & TX have largest # of cases, CA and IN also higher case count)

4. MERS (see http://applications.emro.who.int/docs/EMROPub_2019_MERA_apr_EN_23513.pdf)

As of 1 May 2019:

- Total cases: 2428 laboratory-confirmed cases of Middle East respiratory syndrome (MERS)
- 838 associated deaths (case–fatality rate: 34.5%)
- majority reported from Saudi Arabia (2037 cases/760 deaths, 37.3%).
- During the month of April, a total of 29 laboratory-confirmed cases of MERS were reported globally. All the 29 cases were reported from Saudi Arabia with 11 associated deaths.
- Saudi Arabia reported a new outbreak in April, in Al-Khafji city and one of its hospitals with 13 reported cases and 6 associated deaths. The cases are linked to two clusters: the first cluster has 10 cases (and 3 deaths) including 5 health care workers that contracted the infection in the hospital (with 1 death), three hospital acquired cases (with 2 deaths) and one household contact.

5. Influenza ([https://www.journalofinfection.com/article/S0163-4453\(19\)30152-5/fulltext](https://www.journalofinfection.com/article/S0163-4453(19)30152-5/fulltext))

Journal of Infection: “A hospital cluster combined with a family cluster of avian influenza H7N9 infection in Anhui Province, China “

- Reports a hospital cluster combined with family cluster of H7N9 infection. A poultry farm was the initially infectious source of the H7N9 virus infection. Airborne transmission may have caused the hospital cluster.
- 2017 Outbreak of H7N9 in China put world on pandemic alert. Luckily, that never fully materialized but documented human-to-human transmission and suspect airborne transmission for this case is worth noting.

6. TB:(June 4, 2019) Source: Washington University School of Medicine

About 1.5 million people died of tuberculosis (TB) in 2017, making it the most lethal infectious disease worldwide. A growing rise in drug-resistant TB is a major obstacle to successfully treating the illness. Now, researchers have found a compound that prevents and even reverses resistance to isoniazid (in the lab), the most widely used antibiotic for treating tuberculosis.

7. PLOS Computational Biology: (<https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1006496>)

“Close proximity interactions support transmission of ESBL-K. pneumoniae but not ESBL-E. coli in healthcare settings.”

- An observational study conducted in a French hospital showed that human contact was responsible for 90 percent of the spread of one species (ESBL K. pneumonia) of antibiotic-resistant bacteria to new patients, but less than 60 percent of the spread of a different species (ESBL E. Coli).
- distributed wearable sensors (RFID tags) to hundreds of patients and health care workers in a French hospital. Sensors allowed the researchers to track patterns of human contact between patients over an eight-week period.
- Meanwhile, they systematically screened patients for ESBL-producing Escherichia coli and Klebsiella pneumonia.
- The scientists found that 90 percent of the spread of ESBL K. pneumonia to new patients could be explained by direct or indirect contact with patients who had the same bacteria within the previous eight weeks; this figure was less than 60 percent for ESBL E. Coli.

8. Contagion Live Outbreak Monitor: <https://www.contagionlive.com/outbreak-monitor>

9. For Research discussion: <https://afludiarly.blogspot.com/2018/02/toilet-bowl-sunday.html>

10. Comment from Erica Stewart: APIC had a lot of sessions dealing with biofilms, both wet and dry and I suspect that this will become an area of interest for ASHRAE in terms of intermittent high humidity conditions in the HVAC system during set-back conditions.

APPENDIX F

TC 9.6 Program Subcommittee



TC 9.6 Healthcare Facilities – Programs Subcommittee

Sunday 6/23/2019, 3:45 pm, KCCC, 2215A

Introductions

Healthcare Related Programs/Courses at Orlando Meeting

ALI courses

- Designing and Operating High-Performing Health Care HVAC Systems
Monday, June 24, KCCC

Programs

- Seminar 2: Net-Zero Hospital Guidebook (ASHRAE/RHEVA)
Sunday, June 23, 8:00-9:00
- Seminar 15 Indoor RH: Evaluating Dry Air and Measures of Health
Sunday, June 23, 1:30 – 3:00, 2103C, KCCC
- Seminar 34: Microbial Risks in the Built Environment: “Legionella” Commissioning and Supplemental Disinfection of Building Water Systems
Monday, June 24, 11:00-12:00, 2104B, KCCC
- Session 14: Improved Ventilation for Healthcare Facilities & Disease Transmission
Tuesday, June 25, 8:00-9:30 2203, KCCC

Orlando, FL 2020 Winter Meeting, February 1 – 5

The 2020 ASHRAE Winter Conference technical program is comprised of eight tracks, selected to represent areas of focus common among ASHRAE membership. The track focus areas include HVAC&R fundamentals and applications, systems and equipment, refrigeration and refrigerants, and other specific topics including novel approaches to HVAC&R systems and buildings for contemporary concerns and analytical techniques to economically automate buildings.

1. **HVAC&R Fundamentals & Applications, Track Chair:** Maggie Moninski maggie.moninski@gmail.com
2. **Systems and Equipment, Track Chair:** Rick Hermans herma015@umn.edu
3. **Refrigeration and Refrigerants, Track Chair:** Stephen Idem sidem@ntech.edu
4. **Cutting Edge Approaches, Track Chair:** Marianna Vallejo marianna.vallejo@jacobs.com
5. **High Efficiency Design and Operation, Track Chair:** Ryan MacGillivray ryan.macgillivray@dwel.com
6. **Big Data and Smart Controls, Track Chair:** Leticia De Oliveira Neves leneves@gmail.com

7. Ventilation, IAQ and Air Distribution Systems, Track Chair: Robert Cox bob.cox@jacobs.com

8. Standards, Guidelines and Codes, Track Chair: Lee Riback lee.riback@gmail.com

Dates:

Mar 18, 2019 -- Conf. Paper Abstracts, Technical Papers & Paper Session Requests Due

Apr 22, 2019 -- Conference Paper Abstract Accept/Reject Notifications

Jun 07, 2019 -- Website Opens for Seminar, Workshop, Forum, Debate, & Panel Prop.

Jul 08, 2019 -- Final Conf. Papers Due - Sub for Review; Request for Conf. Paper Sess Due

Jul 26, 2019 -- Conference Paper Accept/Revise/Reject Notifications

Aug 09, 2019 -- Revised Conference Papers/Final Technical Papers Due

Aug 26, 2019 -- Conference and Technical Paper Final Accept/Reject Notifications

Oct 04, 2019 -- Seminar, Workshop, Forum, Debate, & Panel Accept/Reject Notifications

Austin, TX 2020 Annual (Summer) Meeting

The deadline for submitting a conference paper abstract and or technical paper is August 12, 2019. Decisions on conference paper abstracts will be sent by August 30. Conference Papers for accepted abstracts will be due January 13, 2020.

Tracks and Track Chairs

Track 1: Fundamentals and Applications

Rupesh Iyengar, Rupesh_iyengar@yahoo.com

Track 2: HVAC&R Systems and Equipment

Ashu Gupta, ashu.energy@gmail.com

Track 3: Research Summit

Kristen Cetin, kcetin@iastate.edu

Track 4: Professional Development

Devin Abellon, devin.abellon@yahoo.com

Track 5: Grid-Interactive Efficient Built Environment

Vikrant C Aute, vikrant@umd.edu

Track 6: Multifamily and Residential Buildings

Sonya Pouncy, sonyapouncy@gmail.com

Track 7: Resilient Buildings and Communities

Christine Reinders-Caron, christinereinders@gmail.com

Track 8: Zero Energy Buildings and Communities: Opportunities and Challenges

Raul Simonetti, raul.simonetti@carel.com

Discussion on Potential Program Topics

- Case Study AEDG/REVA/Targeting 100, approaches to low energy in healthcare
- Forum – Chiller Triage
- Forum – Looking ahead, what do we need in the next five years for building that will be around in 50 years
- ASHE Future Trends in Healthcare
- Addendum 'E' 170
- New UK Healthcare Code vs ASHRAE/US vs Canadian
- Desiccant vs DX vs Chilled Water
- Bob Cox, CEC member to advocate for Healthcare track at future meetings

Reviewers needed for conference papers. Interested persons should contact programs chair: mark.tome@mail.ashrae.org

Adjourn 4:15



TC 9.6 Healthcare Facilities Programs Subcommittee Attendance

Name	Email	Affiliation
Larry Wilson	Lawrence.wilson@wsp.com	WSP
Ken Monroe	kmonroe@dls.net	MC Enterip
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George Augustini	gaugustini@ssr-inc.com	SSR
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