

SAFETY AND EFFICACY OF UVC TO FIGHT COVID-19

GILBERT W. BEEBE WEBINAR SERIES

SEPTEMBER, 16, 2020 from 1:00 - 3:15 PM (ET)



Gilbert W. Beebe
W E B I N A R

There is much we don't know about the transmission of SARS-CoV-2, the virus that causes COVID-19. Ultraviolet light at a particular "short" wavelength (known as UVC) has been used for decades to disinfect unoccupied medical and other facilities and reduce the spread of airborne infectious diseases such as tuberculosis. Not surprisingly, UVC has now gained attention as a promising control measure to reduce transmission of SARS-CoV-2, the virus that causes COVID-19. The [Nuclear and Radiation Studies Board](#) of the National Academies invites you to explore current knowledge and possible solutions to safely and effectively use UVC in occupied medical facilities and public locations to reduce airborne transmission of SARS-CoV-2. [Click here](#) to register.

For comments and questions about the [Gilbert W. Beebe Webinar Series](#), or suggestions for future topics, please contact Ourania (Rania) Kosti at okosti@nas.edu.

FULL AGENDA

- 1:00 **Call 2nd Webinar to Order and Welcome**
Sally Amundson, Columbia University
- 1:05 **2.1 History of Germicidal UVC as a Means of Disinfecting Air and Surfaces**
Edward Nardell, Harvard Medical School, Brigham & Women's Hospital, Division of Global Health Equity
- 1:25 **Q&A and Discussion**
- 1:35 **2.2 Spread of SARS-CoV-2 and a Potential Role of UVC for Air and Surface Disinfection**
David Sliney, Illuminating Engineering Society
- 1:50 **Q&A and Discussion**
- 2:00 **2.3 Safety of Far UVC Germicidal Light in the Fight Against COVID-19**
David Brenner, Columbia University
- 2:20 **Q&A and Discussion**
- 2:30 **2.4 Panel Discussion on UVC Lamp Technologies and Current Applications**
Upper room—Richard Vincent, Mount Sinai Health System
In-duct—Dean Saputa, UV Resources
Whole room and other—Paul Jensen, CDC (retired)
- 3:00 **Q&A and Discussion**
- 3:15 **Adjourn 2nd Webinar**
Save the Date for 3rd Webinar
Margaret Karagas, Geisel School of Medicine at Dartmouth

SPEAKER BIOS

Dr. Sally Amundson (*moderator*) is an associate professor of radiation oncology in the Center for Radiological Research at the Columbia University Irving Medical Center in New York, where she is co-director of the Center for High-Throughput Minimally-Invasive Radiation Biodosimetry. Her research uses functional genomics approaches to study low dose radiation and bystander effects, unique effects of space radiation, and the development of gene expression approaches for radiation biodosimetry. Dr. Amundson is a current member of the Nuclear and Radiation Studies Board (NRSB) of the National Academies. She holds a BA in biology from Hamline University in St. Paul, MN, and a doctorate in radiation biology and cancer biology from the Harvard School of Public Health in Boston, MA.

Dr. David Brenner (*presenter*) is the Director of the Columbia University Center for Radiological Research, which is the oldest and largest radiation biology center in the US. He is also P.I. of the Center for High-Throughput Minimally-Invasive Radiation Biodosimetry, a multi-institute consortium to develop high-throughput biodosimetry technology to rapidly test individual radiation exposure after a radiological incident. He is also Director of the Columbia Radiological Research Accelerator Facility (RARAF), which is a national facility dedicated to probing the mechanisms of radiation induced cancer. Dr. Brenner's research focuses on mechanistic models for the effects of ionizing radiation on living systems. Over the past few years Dr. Brenner and colleagues have developed a promising technique to prevent the airborne transmission of viruses like influenza virus, which they expect to be effective for coronavirus too.

Dr. Paul Jensen (*panelist*) worked at the Centers for Disease Control and Prevention (CDC) for over 30 years until his retirement in June 2020. At CDC he served as the Lead for Airborne Infection Prevention & Control and Laboratory Biosafety, both domestically and internationally, and was assigned to the Global TB Branch, Division of Global HIV/AIDS & TB (DGHT), Center for Global Health.

Dr. Margaret R. Karagas (*moderator*) is the James W. Squires Professor and founding chair of the Department of Epidemiology at the Geisel School of Medicine at Dartmouth College. Her research encompasses interdisciplinary studies to illuminate the pathogenesis of human disease over the life course. Among her current investigations are population-based studies of the temporal trends in keratinocyte cancers incidence in the United States, bladder cancer etiology and prognosis in northern New England, and impacts of environmental factors on the health of pregnant women and their offspring. She has published extensively on the sources and risks associated with UV exposure and collaborative investigations of the genetic determinants of UV-susceptibility to keratinocyte cancers. Dr. Karagas has served on a number of National Academies' committees including the Committee on the Analysis of Cancer Risks in Populations near Nuclear Facilities - Phase I and the Committee on Use of Emerging Science for Environmental Health Decisions. Dr. Karagas received her PhD in epidemiology from the University of Washington.

Dr. Edward Nardell (*presenter*) is professor in the Departments of Environmental Health and Immunology and Infectious Diseases at Harvard T.H. Chan School of Public Health. His research interest in airborne infection and its control began with an outbreak of drug resistant TB in a large homeless shelter in Boston in 1983 when he was the TB Control Officer with the City Health Dept. In an effort to stop transmission Nardell contacted Richard L. Riley, pioneer researcher of TB transmission and UV air disinfection, beginning an 18 year collaboration during his retirement. Nardell received a B.S. from King's College, Wilkes-Barre, PA and an M.D. from Hahnemann University (now Drexel), Philadelphia, PA.

Mr. Dean Saputa (*panelist*) is the vice president and co-founder of UV Resources. He has served the HVAC community for more than three decades, helping to educate and train facility managers, specifying engineers and industry professionals with an emphasis on air and surface treatment and cleaning technologies. Mr. Saputa is an active member on several ASHRAE Technical Committees including serving as a past Chair of TC-2.9 (*Ultraviolet Air and Surface Treatment*); Chair of SPC-185 (*Method of Testing Ultraviolet Lamps*), and Founding member and secretary of GPC-37, *Guidelines for the Application of Upper-Air Ultraviolet Germicidal Devices to Control the Transmission of Airborne Pathogens*. He is a contributing author of the 2019 ASHRAE Application Handbook, chapter 62: "Ultraviolet Air and Surface Treatment," as well as ASHRAE's position document: "Filtration and Air Cleaning" that was reaffirmed in 2018.

Dr. David H. Sliney (*presenter*) serves as chair of the Illuminating Engineering Society's Photobiology Committee. He worked for the US Army Public Health Center until retiring in 2007. His research interests focus on UV effects upon the eye, optical hazards from intense light sources and lasers, laser-tissue interactions and laser applications in medicine and surgery. He served as member, advisor and chairman of numerous committees active in the establishment of safety standards for protection against non-ionizing radiation (ANSI, ISO, ACGIH, IEC, WHO, NCRP, and ICNIRP). Dr. Sliney holds a Ph.D. in biophysics and medical physics from the Institute of Ophthalmology of the University College (London, UK), an M.S. in physics and radiological health from Emory University (Atlanta, GA, USA) and a B.S. in physics from Virginia Polytechnic Institute (Blacksburg, VA, USA).

Mr. Richard Vincent (*panelist*) is the Environmental Health Research Manager at Mount Sinai School of Medicine. He applies germicidal ultraviolet (GUV) cleansing technology and tools to control the transmission of tuberculosis in high-risk settings. He was the project manager and UV lighting specialist for the Tuberculosis Ultraviolet Shelter Study (TUSS), (1997-2004). TUSS—a multidisciplinary, multicenter epidemiological field trial of ultraviolet air cleansing effectiveness formed by St. Vincent's Hospital and the Harvard School of Public Health (HSPH) advanced UVGI application for airborne disease control in homeless shelters. At the Icahn School of Medicine, Mount Sinai, he is working on reducing the rate of hospital-acquired infections (HAIs), by benchmarking the efficacy of various technologies including: mobile, whole-room UVC devices for decontamination of surfaces from pathogens such as MRSA, and C. Difficile. Since 2008 he has been on faculty at the Harvard Course: Building Design and Engineering to Prevent Airborne Infection – An International Approach. He has taught a shortened course in Pretoria, South Africa and Mumbai and New Delhi, India. He has provided technical assistance on GUV projects in India, Myanmar and Pakistan. Since 2016, Mr. Vincent serves as the Coordinator for the StopTB Partnership working Group: End TB Transmission Initiative (ETTI). He provided expert input on GUV for the WHO Guidelines on tuberculosis infection prevention and control, 2019 update. Mr. Vincent is the chair of the ASHRAE GCP 37 developing guidelines for the application of upper-room ultraviolet germicidal irradiation systems (UVGI/GUV). He chairs the CIE TC 6-52 to test upper room GUV fixtures.

BACKGROUND MATERIALS

2.1 History of Germicidal UVC as a Means of Disinfecting Air and Surfaces

Nardell and Nathavitharana, 2020, JAMA, Airborne Spread of SARS-CoV-2 and a Potential Role for Air Disinfection,
<https://jamanetwork.com/journals/jama/fullarticle/2766821>

Mphaphlele et al., 2015, American Journal of Respiratory and Critical Care Medicine, Institutional Tuberculosis Transmission Controlled Trial of Upper Room Ultraviolet Air Disinfection: A Basis for New Dosing Guidelines,
<https://www.atsjournals.org/doi/pdf/10.1164/rccm.201501-0060OC>

2.2 Spread of SARS-CoV-2 and a Potential Role of UVC for Air and Surface Disinfection

Sliney, 2013, Photochemistry and Photobiology, Balancing the Risk of Eye Irritation from UV-C with Infection from Bioaerosols,
<https://onlinelibrary.wiley.com/doi/pdf/10.1111/php.12093>

IES Committee Report, 2020, Germicidal Ultraviolet (GUV) – Frequently Asked Questions, <https://www.ies.org/standards/committee-reports/ies-committee-report-cr-2-20-faqs/>

2.3 Safety of Far UVC Germicidal Light in the Fight Against COVID-19

Buonanno, M., Welch, D., Shuryak, I. et al. Far-UVC light (222 nm) efficiently and safely inactivates airborne human coronaviruses. Sci Rep 10, 10285 (2020).
<https://doi.org/10.1038/s41598-020-67211-2>

Fukui T, Niikura T, Oda T, Kumabe Y, Ohashi H, Sasaki M, et al. (2020) Exploratory clinical trial on the safety and bactericidal effect of 222-nm ultraviolet C irradiation in healthy humans. PLoS ONE 15(8): e0235948.
<https://doi.org/10.1371/journal.pone.0235948>

2.4 Panel Discussion on UVC Lamp Technologies and Current Applications

HPAC Engineering, June 2020, Limiting Disease Spread With Germicidal UV
<https://secure.viewer.zmags.com/publication/7a1fe2ad#/7a1fe2ad/20>