

Next Breath & WFF 2021

From Water to Air; Scientific Pathways towards a Clearer, Cleaner Future.

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Talk Title — Cool but Dangerous: How climate change is increasing the risk of airborne infections

"Much of the world depends on natural ventilation, that is, open windows, for airborne infection control. But windows are being closed because of increasing heat, humidity, and air pollution around the world, especially in countries with both climate change and sufficient resources in the population to install air conditioning. The result is an immediate sharp increase in the risk of airborne infections such as Covid-19, influenza, and tuberculosis. Although immunization and effective disease control are part of the solution, replacing outdoor air ventilation with efficient air disinfection is another important intervention that is not currently being done"

2) "As temperature, humidity, and air pollution rapidly rise in cities around the world, an immediate response among those who can afford it is to install air conditioning - often the ductless type that brings in no outside air. The result is an immediate steep rise in the risk of airborne infections, given an infectious source. Replacing lost natural ventilation with highly effective, evidence-based air disinfection strategies, such as upper room germicidal UV, is a necessary, immediate, and relatively economical response that is available now"

Ed Nardell

Dr. Nardell is a professor in the Departments of Medicine and of Global Health and Social Medicine at Harvard Medical School and a professor in the Departments of Immunology and Infectious Diseases and of Environmental Health at the Harvard School of Public Health. He is an associate in medicine in the Department of Medicine at Brigham and Women's Hospital (BWH), in both the Division of Global Health Equity and the Pulmonary Division. His research interests involve the control of tuberculosis under resource-limited conditions, with a focus on the pathogenesis of drug-resistant tuberculosis, its airborne transmission, and transmission control in institutions. He is recently tested interventions to prevent transmission of multidrug-resistant tuberculosis (MDR-TB) in a unique experimental facility in South Africa, in which large numbers of sentinel guinea pigs served to sample the air from a six-bed MDR-TB ward, part of an MDR-TB referral center. An early observation of this research led to new investigation on TB pathogenesis, specifically the possibility of transient TB infection in guinea pigs as well as humans. Another important finding is that effective treatment rapidly (within days) stops TB transmission, even due to MDR-TB. Further planned research will determine which drugs are responsible for this dramatic effect. Ongoing experiments are also studying the impact of inhaled TB drugs on TB transmission. Another long-standing research avenue is the application of germicidal irradiation to reduce airborne transmission. Dr. Nardell also is developing more efficient, less expensive UVGI fixtures for resource-limited settings. In addition, he has worked on developing and validating a computer-assisted design software package to facilitate planning of UV installations in buildings. He has also begun testing a novel, environmentally safe chemical vapor that may be effective in reducing airborne transmission.

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