



Questions and Answers Associated with the H1N1 Presentation

The following 11 participant questions/comments were answered by the presenter, Steven Welty.

Q1: This washing hands issue is contrary to CDC claims - who is 'peer reviewing' this? [Laraine Koehler] [koehler.laraine@epa.gov] [Q: 3:06 PM]

Welty's Answer: The protocol of hand-washing to reduce influenza transmission has never been studied. The most cited published study outside a hospital setting concerning hand washing and respiratory disease transmission was done by Margret K. Ryan, et. al in 2001 (Am J Prev Med 21(2) p. 79-83). They looked at a Military training population and a hand washing intervention in streptococcal pharyngitis transmission. While getting the soldiers to increase their hand washing reduced overall visits to the base medical offices, it did nothing to reduce hospital admissions of more severe flu like pneumonia conditions. They say: "Hand washing may be more effective against less-virulent rhinoviruses, for example, explaining our observed reduction in total illness without a quantifiable reduction in hospitalization or severe illness". This suggests that viral "colds" caused by rhinoviruses may be reduced with hand washing as they do not present with the more severe symptoms of high fever, chills, etc of influenza A virus infections. This is consistent with my slide #10 which states that influenza is not a rhinovirus and that rhinovirus transmission via contaminated hands and thus fomites may be impacted by improved hand hygiene.

Kilic & Gray (TAF Prev Rev Bull 2007 6(4) p. 285-90) state: "no data demonstrates that hand washing deters the spread of influenza". They add: "Recommendations for "respiratory hygiene/cough etiquette" such as covering one's mouth when coughing and avoiding spitting have been made more on the basis of plausibility than based on evidence from controlled studies". Eric Toner also questions hand washing in his article in Biosecurity and Bioterrorism, Biodefense, Strategy, Practice and Science v4 (1) 2006) saying: "there is no evidence to support the notion the frequent routine hand-washing during an epidemic will provide additional protection against transmission of the virus."

Q2: FYI: At upcoming ASHRAE conference we are proposing a symposium abstract: Modeling, measuring, and mitigating infectious disease airborne transmission #2 Seminar Abstract: Infectious Disease and the significance of indoor air as a vehicle for pathogen." I requested studies to be done as a literary search revealed insufficient efficacy studies done to correlate MRSA exposure to the high incidence of patient infection and possible relationship to airborne vectors and cross contamination. I needed information for article I was writing for a medical publication. [Marlene Linders] [mlinders@phildersgroup.net] [Q: 3:12 PM]

Welty's Answer: Marlene-There are a number of studies done on airborne staphylococcus transmission. The best one is: "Significance of Airborne Transmission of Methicillin-Resistant Staphylococcus aureus in an Otolaryngology-Head and Neck Surgery Unit" by Teruo Shiomori, MD, PhD; Hiroshi Miyamoto, MD, PhD; Kazumi Makishima, MD, PhD. Arch *Otolaryngol Head Neck Surg*.2001; 127:p.644-648

Q3: Need to discuss "contact time" and distance from UV source [Hal Levin] [hal.levin@buildingecology.com] [Q: 3:36 PM]

Welty's Answer: Good point Hal. A URV rating does just that when it calculates the % of airborne germs that are sterilized by Ultraviolet Germicidal (UVGI) Irradiation Light using dose and contact time. See your MERV & URV question below for the Kowalski reference.

Q4: PCO is "theoretically" effective but with out evidence from research in the field or epi studies. [Hal Levin] [hal.levin@buildingecology.com] [Q: 3:38 PM]

Welty's Answer: Photo-catalytic Oxidation (PCO) has been studied for many years and has a wealth of published articles. It has been successfully applied in the air disinfection fields and is widely used in Asia. It has been shown to sterilize viruses: Appl Environ Microbiol, Jan. 1994, p. 344-347, Appl Environ Microbiol, Jan 2005, p. 270-275 and J Gen Virol (2006) 87, p. 3125-30

Q5: Escombe - Peru hospital TB study -- also had negative air ionization which would affect particle concentrations in air. [Hal Levin] [hal.levin@buildingecology.com] [Q: 3:44 PM]

Welty's Answer: The Escombe - Peru hospital TB study tested negative air ionization separately from UV light and



never simultaneously. The scientists made sure that neither the UV experiment affected the ionization experiment and vice versa.

Q6: and children are more vulnerable- breathe more air per pound of body wt than adults. [Claire Barnett] [cbarnett@healthyschools.org] [Q: 3:45 PM]

Welty's Answer: Great point Claire. Several airborne viral transmissions were done with measles which has many characteristics of influenza. Measles is a round virus like flu and has the hemagglutinin receptors just like flu virus. There have been studies of airborne measles transmission in schools done by William Wells and Richard Riley in the 1940's and 50's until there was a measles vaccine created in the 1960's which halted wintertime measles epidemics in schools. Wells study "Air Disinfection in Day Schools" ([Am J Public Health Nations Health](#), 1943 Dec; 33(12):1436-43) is available for free at Pub Med.

Q7: How did you combine MERV and UVR for a single value? [Hal Levin] [hal.levin@buildingecology.com] [Q: 3:49 PM]

Welty's Answer: Wladyslaw Kowalski, William Bahnfleth and Amy Musser wrote the peer reviewed article in June 2003 called "Modeling Immune Building Systems for Bioterrorism Defense" in the Journal of Architectural Engineering. In it they combine the URV and MERV ratings to form a combined URV and MERV rating or a total %capture/ kill//sterilization ratio. See the article for a complete description of this.

Q8: However, if the humidity levels were so low, there would not be such a mold problem. I spent 30 years in teaching. Kids transmit sickness to a larger degree because they are in "each other's faces" and share pencils, toys, educational materials. They sneeze on materials that are shared. They cough on materials that are shared. They share lunches and swap food. Kids need buildings with windows that open. and in the case of HVAC, need the fresh air "ratios" increased and not "re-circulated" to save energy. Thanks, Ginny Tomasini Lane [Ginny Tomasini Lane] [gtomlane@comcast.net] [Q: 3:50 PM]

Welty's Answer: Indoor humidity levels exceeding 65% are what may contribute to indoor condensation and thus mold growth. The winter indoor humidity levels of 35% or less (I had schools tested at 15% rh) which favor airborne virus droplet nuclei transmission do not contribute to surface condensation and mold growth. I agree that large droplet transmission from people coughing and sneezing within 3-6 feet can contribute to human to human airborne contagion & infection. I am not convinced that influenza can be *significantly* transmitted from intermediates (fomites) like door handles, pencils, toys, etc. to be an important factor in contagion. I am more convinced that rhinoviruses which cause the common cold can be transmitted through fomites. Remember that viruses only survive on hands for 5 minutes (Carolyn B. Bridges, Clin Infect Dis 2003;37 p 1094-1101.) See also my response above to Larainne Koehler.

Q9: Is this ventilation information going to be reflected in the soon to be released ASHRAE/EPA IAQ design guide? [Nancy Bernard] [nancy.bernard@doh.wa.gov] [Q: 4:03 PM]

Welty's Answer: No. It has not been submitted as the ASHRAE guide is already in progress. Airborne viral infection is not a building sanitation issue like mold or bacteria which grow in the HVAC systems. It is a human condition and thus lies in the murky waters of IAQ purgatory.

Q10: Heads up to "more humidity" and "positive air pressure" in cold climate designs – both of these can have unintended consequences in some buildings. [Robert Bean] [info@healthyheating.com] [Q: 4:04 PM]

Welty's Answer: Good point. Depending on the quantity and humidity of both indoor & outdoor air it can be advisable to have a neutral building which can go slightly negative in the wintertime so you don't push indoor humidity into walls and create condensation and thus possible mold growth issues.

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