

Are windows salutogenic?

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In October, after two years of peer review, an important [new study](#) linking sunlight to the reduction in bacteria found in household dust was published. Yet another proof-point supporting the need for windows to create buildings, which are healthy for human occupancy and for the inclusion as a health requirement in building regulations.

The study showed that sunlight filtered through today's high-performance coated glass results in about 50% less bacteria present in household dust, compared to that present when dust is left under non-illuminated (dark) conditions. It also shows that this filtered daylight is as effective as ultra-violet (UV) light, which is a known sterilizer, at reducing bacteria counts. Also, the bacteria that survived less well in the daylit rooms were associated with a type that cause human respiratory infections.

The study was completed by a multi-disciplinary team from the University of Oregon's Biology and The Built Environment Center, Energy Studies in Buildings Laboratory and Mathematics Department, in collaboration with the Department of Biostatistics from the Harvard T.H. Chan School of Public Health. Given that dust – and the bacteria that comes along with it – contributes to the quality of indoor air, this data underscores the role that fenestration plays in the creation of healthy indoor air quality. According to Kevin Van Der Wymeleberg, co-director of the University of Oregon's Biology and Built Environment Center, in [an interview with National Public Radio](#). "Until now, daylighting has been about visual comfort or broad health. But now, we can say daylighting influences air quality."

This new data supports the [empirical conclusion at which Florence Nightingale](#) arrived in the 1850s when she prescribed direct sunlight for her hospital patients, believing that it had a purifying effect. In fact, by the end of the 19th century, sunlight was referred to "[nature's disinfectant](#)" in the Journal of the American Medical Association and important in the treatment of tuberculosis. In stark contrast, the germicidal properties of sunlight are rarely considered today when buildings are planned, according to [Richard Hobday](#), an authority on the health of the built environment, in his article "[The best disinfectant is Sunlight.](#)"

The use of high-performance fenestration to deliver the needed sterilizing sunlight can also improve indoor air quality yet further. Generally, bacteria have a low survival rate in the dryness of dust, and fairs better in higher humidity conditions. Condensation on windows can create a breeding ground for bacteria and mold, which can then be entrained into a building's air causing health issues for occupants. High-performing fenestration (with large thermal breaks, warm-edge spacer, low-e coated insulating glass) can significantly reduce the build-up of condensation – by keeping room-side surface temperatures higher than the room's dew point.

On a related topic, I learned a very useful new word this week: "[Salutogenesis](#)" – meaning the "origins of health" – which was coined by medical sociologist Aaron Antonovsky. It is the opposite of "pathogenesis" – which is the "origins or causes of disease." Salutogenesis is being used in a very effective way by architectural firm [Farrow Partners Inc.](#) to help us [think differently about building design](#). Farrow partners are asking how we can "cause health" (salutogenesis) in our buildings. They assert that there is no such thing as a neutral space – it either causes health or erodes health, and they advocate for the use of creation of health (salutogenesis) to judge building performance.

Based on the evidence so far, high-performance fenestration appears to be at the nexus of all aspects of indoor environmental quality and a key driver for healthy buildings: Fenestration facilitates the delivery of the needed daylight and views for health and well-being, and if done well, glazing systems can also facilitate the delivery of thermal, visual and acoustical comfort. And now, we have a stronger link to the improvement of indoor air quality. Does this mean that we can call high-performance windows salutogenic? I think we can.