

IAQ: A PHYSICIAN'S VIEW

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Is There A Doctor In The House?

It's time to stop marginalizing research on IAQ and occupant health.

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 While travelling in Europe to the Indoor Air 2016 conference in Belgium, I had the opportunity to discuss a largely unspoken shift in the management of IAQ with a like-minded colleague, Dr. Walter Hugentobler from the University of Zurich, Switzerland. Also a physician, he is very concerned about the impact of IAQ on occupant health. Despite the fact that most of us spend the vast majority of our time indoors, I have found few physicians focusing on this crucial relationship.

Nowadays, building codes are written to preserve building materials and control energy consumption. Thus, “healthy buildings” are defined by metrics on the structure and equipment with alarmingly few clauses addressing everyday IAQ and occupant health. In fact, in this century, little new data on our physiological response to indoor air parameters has been collected. We need to ask why this is so, but more importantly, we need to change this knowledge deficit.

Historically, advances in housing technology have far exceeded medical progress in promoting the health of mankind. These advances include the provision of clean drinking water, improved sanitation facilities, safe disposal of waste water, windows for daylight, heating and ventilation systems. Yet, today's indoor building conditions are one of the most significant factors causing disease. In building code literature, occupant health has been demoted to much the less compelling subject of occupant comfort. This change in vocabulary is indicative of an unspoken and harmful shift of priorities in the building industry. Few people seem to realize this fact.

In the last several decades, doctors have largely abandoned the field of occupant health and indoor air management. This was not always the case. At some point, environmental hygiene and preventive medicine was downgraded in medical school

curricula and replaced by pharmacology classes, clinical rotations in subspecialties, and other treatment interventions which stimulate the “business of medicine.” Like any neglected area, the lack of attention and research on environmental hygiene has had serious consequences on our health!

As doctors turned away, architects and engineers were forced to design buildings and manage HVAC systems without the benefit of data from medical research. Understandably, they focused on their areas of expertise — the maintenance of building materials and controlled energy use. (Being a physician, I would not want to be in charge of designing a variable refrigerant flow, dual-return heat capturing system!!).

Physicians have not always neglected their patients who use buildings as dwellings and workplaces. For example, in the 1980s, Professors Diebschlag and Grandjean, both physicians and engineers at the Institute of Hygiene and Occupational Physiology, along with the Canadian ASHRAE engineers Scofield, Sterling and Arundel, shaped research on IAQ and clinical outcomes. Their work, based on clinical studies on humidity and health, gave rise to the well-known Scofield-Sterling diagram that defines, “The optimal relative humidity range for minimizing adverse health effects”, namely viral and bacterial respiratory infections, allergies, fungal growth and mite exposure in building users. Their focus was on health and not on merely comfort!

With no new scientific evidence to support a change, these excellent studies on indoor climate and occupant health outcomes were buried when the correlations were relabeled as comfort issues. Subsequently, studies on indoor climate after 1985 focus on occupant comfort (thermal comfort and dryness of eyes, nose and skin) and performance while substantial adverse health effects specified in the diagram above were completely neglected.

The enormous health costs resulting from our current way of designing, constructing, and operating buildings pose a major societal challenge. To protect people’s health by incorporating physiological data into building codes will require a serious paradigm shift. The current language of IAQ adequate for “comfort” must return to IAQ to maximize the “health” of building occupants.

To make this shift, architects, engineers and facility management must partner with physicians to optimize IAQ for the benefit of our most basic asset, our health. Air quality is defined by the quantity of water and air pollutants, therefore, measurement of aerosols and the impact of humidity on air pollutants are mandatory for adequate assessments.

Important steps to accomplish this desired change:

- Re-introduce the successful cooperation between building engineers and physicians (preventive, environmental and occupational) for the determination of occupant orientated building codes
- include aerosol technology know-how in the training of HVAC engineers
- correlate IAQ data to privacy-protected occupant health information such as infections, allergies, pulmonary and circulatory disease, sick days, medication needs, doctor's visits and hospitalizations
- educate engineers about the basics of maintaining health of the respiratory system
- educate primary care physicians about basics in building technology and patient symptoms associated with poor IAQ.

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