

The UK is putting IAQ and health on the agenda again



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This article presents an overview of current UK developments in the field of indoor air quality and health, in particular the outcomes of the AHRC funded HEMAC (Health Effects of Modern Airtight Construction) Network and the UK Indoor Environments Group 2017 Conference (26th April 2017, held in Glasgow, Scotland).

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It is apparent that there is an increasing awareness of the potential health effects of indoor air pollution in the UK. Links between health and outdoor air pollution have been understood by the medical community, and this was well publicised last year following the launch of a report on *Every breath we take: the lifelong impact of air pollution*, by the Royal College of Physicians (RCP) and the Royal College of Paediatrics and Child Health (RCPCH). Importantly, the report also identified the risks of indoor air quality and acknowledged that some aspects are not fully understood and more evidence is needed. As a result, RCPCH and RCP have joined with the Building Research Establishment (BRE) and the Adaption and Resilience in the Context of Change (ARCC) network to establish a new *working party* to tackle indoor air quality in homes. This shift coincides with the recent announcement of the development of *indoor air quality*

guidelines by the National Institute for Health and Care Excellence (NICE) in collaboration with Public Health England (PHE).

At the same time, initiatives from indoor and built environment communities are raising the agenda of IAQ and health in UK homes. A recent review entitled *Each Home Counts* published in December 2016 on consumer advice, protection, standards and enforcement of energy efficiency and renewable energy, calls for measures to tackle problems with inadequate ventilation, poor quality installations and moisture problems in buildings. A workshop report launched by the UK Indoor Environments Group on *Healthy Indoor Environments: Challenges and Opportunities for Policy Makers*, calls for collaborative action across UK government departments to develop an effective, coordinated strategy to improve indoor environmental quality in

buildings. A campaign launched by the BEAMA group on *My Health, My Home* aims to raise awareness among the general public of the dangers of poor indoor air quality in the home environment and there is also an All Party Parliamentary Group (APPG) set up last year called *Healthy Homes and Buildings*.

There have been increasing reports in the media raising awareness of the dangers of poor indoor air quality in airtight homes, including BBC coverage of a report funded by the Scottish Government on *Occupier Influence on Indoor Air Quality in Dwellings*. A recent report published by *Which?* (the largest consumer body in the UK) reveals potential exposure to high levels of pollutants in the home, following everyday activities.

Two recent events hosted by the Mackintosh Environmental Architecture Research Unit (MEARU) at the Mackintosh School of Architecture, Glasgow School of Art, aimed to accelerate and strengthen this expansion of the IAQ and health agenda within the UK. The first was a sandpit event, organised by

the Health Effects of Modern Airtight Construction (HEMAC) network (25th April, 2017), followed by the 14th annual UKIEG Conference (26th April, 2017). These events marked the bringing together of researchers and practitioners from across the UK and beyond, to deliberate ways of addressing the challenge of improving the quality of the UK indoor built environment.

HEMAC Network

The HEMAC network (*Health Effects of Modern Airtight Construction*) was established to bring together researchers and practitioners from the fields of indoor air quality (IAQ), health and the built environment to develop shared research agendas and identify ways of addressing these. The network has a particular focus on challenges concerning IAQ in new-build and/or retrofitted airtight dwellings. The HEMAC network is made up of a steering committee of researchers and practitioners from medicine, indoor air science, microbiology, engineering, architecture and ventilation; including participants from the UK, Ireland, the Netherlands, Denmark, Belgium and China.



Participants attending sandpit session on: The Changing Nature of Pollutant Exposure in the Home Environment.



Participants attending sandpit session on: Ventilation Noise Levels and Occupant Perception in Airtight Homes.



Attendees at UKIEG 2017 Conference. (photo credits: Vivian Carvalho)



Lunch and poster viewing at UKIEG 2017.

The network was funded by the Arts and Humanities Research Council (AHRC) and has supported a series of events, including a symposium (21st September 2016), a workshop event (30th November 2016) and most recently a sandpit, held at the Glasgow School of Art in Scotland (25th April 2017). The symposium provided a platform for members to present recent findings, and put forward ideas regarding gaps in the knowledge and possible research questions; which were deliberated during a discussion session at the end of the day. This was followed by an online survey, which collated opinions of symposium participants concerning key problems and challenges in the field.

This information, together with the outcomes of the symposium, was used to develop a series of workshop sessions to discuss the state of knowledge in the field and stimulate ideas for multidisciplinary projects, to address the challenges of designing healthy, energy efficient homes. Some sessions explored the need for practical guidance for design and construction professionals on ventilation and source control and the challenges of ensuring effective ventilation in airtight homes. Others addressed specific gaps in knowledge, such as the role of dwelling ventilation and IAQ on the health of susceptible groups, or the influence of housing ventilation on the indoor microbiome. Nine workshop sessions were held throughout the day, which culminated with a sequence of presentation pitches from the workshop chairs on proposed multidisciplinary projects, to an audience of invited participants.

The purpose of the sandpit event was to take these ideas further and develop them as funding proposals for collaborative projects between academia and industry. Six proposals were developed in total. Some of these were focused specifically on addressing the evidence gap between IAQ and health, whilst others proposed mapping studies of chemical emissions in the home. Several proposals addressed specific concerns regarding ventilation performance standards, in particular the need for improved ventilation noise characterisation and ventilation control metrics. The event concluded with a networking dinner.

UK Indoor Environments Group

The UK Indoor Environments Group (UKIEG) is a multidisciplinary network committed to the development, synthesis, dissemination and application of evidence concerned with UK policy and practice on the indoor built environment. Set up in 2003 to co-ordinate UK activity relating to the improvement of indoor environments for people, the group organises annual conferences to provide a platform for members to discuss areas of common interest. The UKIEG Committee also organises and promotes expert workshops and reports.

This year's UKIEG conference was supported by the HEMAC network and MEARU, at the Glasgow School of Art in Scotland. The theme of UKIEG 2017 was *Indoor Environments and Health in Buildings*. The conference kicked off with a keynote presentation

by Prof Jan Sundell, who presented evidence on the relationship between ventilation and health in homes, including interesting new findings from China on risk factors for asthma and allergies. The conference included 10 oral and 10 quick-fire / poster presentations, on topics including indoor air quality, occupant control, comfort and perception, ventilation performance and green infrastructure.



Visitors at industry stand at UKIEG 2017.
(photo credits: Vivian Carvalho)

Several challenges regarding ventilation performance were highlighted, with presentations dealing with the relationship between ventilation noise (and associated occupant behaviour) and overheating in homes, issues regarding passive ventilation provision in retrofitted Irish homes, and the influence of design decisions on the performance of MVHR systems in practice. Challenges of setting appropriate ventilation standards in homes were discussed, following a presentation on the introduction of a new Belgium workplace ventilation requirement, which stipulates an ambitious carbon dioxide concentration threshold limit of 800 ppm. Evidence was also provided on the importance of control (whether available, implemented or perceived) on the stimulus-response relationship between indoor environmental parameters and occupant comfort, productivity and health. The conference concluded with a presentation by Allergy UK, which provided details of a number of initiatives to help improve knowledge and awareness of allergic diseases among health care professionals and reduce allergens in the indoor environment, through endorsement schemes with product manufacturers.

Remarks

The two events held side-by-side provided a meeting point for UK researchers and practitioners to share ideas and insights on how to improve the quality of the indoor environment for people. The HEMAC sandpit brought together a diverse group of people to facilitate the development of cross-disciplinary collaborations, whilst the UKIEG conference provided a platform for researchers to present new findings and promote knowledge exchange. It is hoped that the outcomes of the HEMAC sandpit might lead to some large-scale multi-disciplinary UK projects or initiatives to improve IAQ and ventilation provision in contemporary dwellings. ■

References

Every breath we take: the lifelong impact of air pollution, available at www.rcplondon.ac.uk

For information on the working party Better Homes, Better Air, Better Health, see www.arcc-network.org.uk/wp-content/pdfs/IAQ-action-group-report-Apr2017.pdf

For details on the NICE IAQ guidelines, see www.nice.org.uk

Each Home Counts: Review of Consumer Advice, Protection, Standards and Enforcement for Energy Efficiency and Renewable Energy, available at www.gov.uk

Healthy Indoor Environments: Challenges and Opportunities for Policy Makers, available at www.ukieg.org (news section)

For more details on the My Health, My Home Campaign, see www.myhealthmyhome.com

For details of the APPG Healthy Homes and Buildings, see: www.healthyhomesbuildings.org.uk

Investigation of Occupier Influence on indoor Air Quality in Dwellings, available at www.gov.scot

Which? report Revealed: the hidden air pollution in your home, see: <http://www.which.co.uk/news/2017/03/revealed-the-hidden-air-pollution-in-your-home/>

For more information on the HEMAC network and related events, see: www.hemacnetwork.com