factors, typically to odorous chemicals, but also to non-perceivable factors considered potentially harmful to health, e.g. electrical devices. Reactions due to intolerance range from unpleasant sensations or annoyance to disabling symptoms, which may lead to serious restrictions in daily life. Reactions often initiate exposure assessments in work, home or public environment and may lead to excessive actions to eliminate minor exposures.

In 1996, the WHO classified all medically unexplained conditions attributed to different environmental exposures under the term idiopathic environmental intolerance (IEI), regardless of the factor in question (IPCS 1996). The factors may include e.g. chemicals, moulds. The term is most commonly used for multiple chemical sensitivity (MCS), but also non-specific building-related symptoms (or sick building syndrome), hypersensitivity to electromagnetic fields (EMFs) are regarded as its subtypes. Although the various types of environmental intolerance (EI) share common core characteristics, there is no generally agreed definition of the condition.

The prevalence estimates are based on self-reporting. In adults, the prevalence estimates of EI attributed to chemicals vary from 9% to 52%, to EMFs from 1.5% to 21%, and to sounds from 8% to 39% (Karvala, *et al* 2017, submitted).

Environmental intolerance manifests as different degrees of annoyance, which shows a continuum with increasing symptoms, behavioural changes and disability.

IPCS/WHO (1996). Conclusions and recommendations of a workshop on Multiple Chemical Sensitivities (MCS). International Program on Chemical Safety/World Health Organisation. *Regul Toxicol Pharmacol* 24:188–189.

Keywords: Idiopathic environmental intolerance, reactions to environment, multiple chemical sensitivity, sick building syndrome, sensitivity to electromagnetic fields

1716b LOW LEVEL CHEMICAL EXPOSURES – WHY DO SOME INDIVIDUALS DEVELOP HEALTH SYMPTOMS WHEREAS OTHERS DO NOT?

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People are on a daily basis exposed to a variety of odorous and pungent substances. For a person with severe chemical intolerance (CI) or building-related intolerance (BRI) such exposure can result in substantial suffering and reduced quality of life. Symptoms are reported in relation to low-level chemical exposures and there is currently no established dose-response relationship between exposure to certain compounds and reports of symptoms. Most of the volatile organic compounds (VOCs) identified in indoor air are non-reactive and chemicals that might be more important for symptom reports require specific sampling and analytical methods and are therefore probably not included in the measurements. The overall aim was to investigate the role of individual factors in the development of health symptoms due to exposure to low levels of VOCs.

Data from a cross-sectional field study investigating individuals diagnosed with BRI will be presented as well as data collected from controlled exposures in an exposure chamber. By

combining data on individual factors with data from new, more sensitive methods for measurement of organic compounds we are able to study indoor air health problems in a new light. There is a large individual variation in the response to exposures to certain reactive compounds. Exposure-related factors such as type of compound and duration of exposure are of importance. One example is the reactive compound acrolein that induced sensory irritation in a time-dependent manner at a concentration below previously reported detection levels and at half the Swedish occupational threshold limit. Factors related to the individual such as CI, stress or inflammation are also of importance for reports of sensory irritation due to low level chemical exposures. Further, negative affect and information about the exposure also mediate annoyance and symptoms. In order to understand sensory irritation from low-level exposure to VOCs we have to take both individual- and environmental factors into account.

1716c IS ENVIRONMENTAL INTOLERANCE RELATED TO CHEMICAL OR ODOUR HYPERSENSITIVITY? A SUMMARY OF EPIDEMIOLOGICAL AND EXPERIMENTAL EVIDENCE

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Multiple chemical sensitivities (MCS) nowadays more often called idiopathic environmental intolerance (IEI) is characterised by the recurrent occurrences of multiple symptoms involving in multiple organ systems. With respect to the aetiology of IEI toxic-, immune-, and psychogenic theories have been proposed but the exact physiological mechanisms underlying this syndrome are far from being conclusive. The complex health complaints are triggered by environmental chemicals in very low doses and the upper respiratory tract and the nervous system are two of the most prominent organs of these health complaints. Due to the fact that these 'trigger concentrations' are usually tolerated by most persons, genetic (e.g. slower detoxification) and acquired hypersensitivities (odour sensitivity) are thought to be characteristic features of IEI patients. In questionnaires assessing sub-clinical levels of chemical intolerance items addressing odour sensitivity are often used. Our experimental research showed that such scores predict a more unidimensional hedonic evaluation (e.g. malodors) of chemicals. Moreover, differentiation between odours was reduced. In line with other researchers we also showed that such self-descriptions are not associated with better olfactory acuity assessed with standardised psychophysical methods. When combining our own experimental findings with epidemiological studies on IEI we came to the conclusion that chemical or odour hypersensitivity is not an increased sensitivity of chemosensory pathways, but it appears to be a uniform and affective style of responding to low-level exposures to volatile chemicals. Such an undifferentiated response might also explain the fact the chemical triggers of IEI symptoms span from natural fragrances, to perfumes, to industrial chemicals like solvents.