Reference: Peris R, Diallo N, Psaradellis E, Trifunovsk A, Vangala K, Wagner H (2025) Resilienz: Internationale Konferenz über Multiple Chemikalien-Sensitivität (MCS). German magazine umwelt · medizin · gesellschaft 38 | 2-2025:30–35 (translated version)

Resilience: International conference on Multiple Chemical Sensitivity (MCS)

In early May, the Environmental Health Association of Canada (EHAC-ASEC) and the Environmental Health Association of Quebec (ASEQ-EHAQ) co-hosted a two-day online conference.[1] Day one focused on the scientific legitimacy of Multiple Chemical Sensitivity (MCS), with research findings on biological mechanisms, symptoms, and causes. Day two addressed the global prevalence, social impacts, and legal challenges of MCS from a disability rights perspective, and presented original research by both organizations. Highlights included the presentation of emerging research projects. International representatives shared the complex realities faced by those with MCS through a video compilation. The complete interview from Germany (separate video) also includes an urgent appeal to clinical environmental medicine professionals.[2] The Zoom conference drew approximately 900 attendees, including government officials, health professionals, researchers, advocates, and people with lived experience. Below is a brief overview. Complete video modules of the conference are available.[1]

The MCS story: The science and resistance to change[1,11]

Speaker:
John Molot, MD. Environmental Medicine. Adjunct Professor, Faculty of Medicine, University of Ottawa, Canada

In the prologue, the biological mechanisms of MCS were reviewed by Dr. Molot, followed by the chronological story of MCS discoveries since its first mention in scientific literature. This presentation also included a review of the persistent published pushback and its resulting detrimental effects.

Dr. Molot provided a summary of the facts for his publication, "Multiple Chemical Sensitivity: It`s time to catch up to the science".[3] Citing 676 sources to write this paper, Dr. Molot provides a detailed overview of a condition that is often misunderstood, and misdiagnosed. MCS is a complex condition, whose etiology and pathophysiology may include:

- genetic implications
- gene-environment interactions
- chronic exposures to complex chemical mixtures
- oxidative stress
- systemic inflammation
- receptor sensitization
- changes in cell function
- involvement of multiple organ systems
- co-morbidity

Even low-dose exposures to ubiquitous pollutants are sensed by human receptor systems and can induce oxidative stress (inflammation and cell damage), which is strongly linked with many common chronic diseases. MCS is the possible result of a cycle of repeated exposure, and resulting inflammation. MCS is a severe chronic disease characterized by the occurrence of symptoms even in the case of low-dose exposures.

Dr. Molot criticizes the exclusion of biological mechanisms for MCS in pre- or postgraduate education. Many doctors and researchers, therefore, lack or ignore a fundamental understanding of these mechanisms. Many wrongfully assume or argue that MCS is psychological. Patients are complaining as a result:

- A lack of medical support
- A decreased access to health care
- The ongoing stigmatization from healthcare providers

Poor detoxification and receptor sensitization

In his presentation, Dr. Molot also introduced the concept of nutritional deficiency and inadequate detoxification capacity, a disposition in which specific genotype variants have an increased risk of developing MCS upon exposure. If an individual's body cannot remove foreign chemicals efficiently, they will persist within organ systems, and have toxic effects. Weak detoxification is associated with an increased risk of developing environmental non-communicable diseases and increased oxidative stress in the body, which is observed in MCS.

He also drew attention to TRPV1 and TRPA1 sensitization. The Transient Receptor Potential (TRP) family of channels are chemoreceptors which are responsible for detecting foreign chemicals in the body, and induce an appropriate immune response. The TRPV1 and TRPA1 variants have been shown to be associated with increased sensitization. According to animal studies, sensitization can develop in the low-dose range (below toxic thresholds) upon exposure to solvents and pesticides, with sensitivity eventually developing to other chemicals as well. This sensitization of TRP receptors can be associated with MCS. The prevalence of TRP receptors throughout the body, and their potential to be activated by various chemicals, suggests that their investigation provides immense scientific value.

Regarding TRPV1, 19 capsaicin challenge studies show increased receptor sensitivity in MCS patients. They developed unexplained breathing difficulties, and in 14 of these studies, these patients experienced headaches, nausea and/or fatigue. This multi-system symptomatic profile corresponds to the signs of MCS.

In two single-blind studies with acrolein provocation tests, TRPA1 sensitization was also detected in MCS patients.

Support for the receptor-sensitization hypothesis of MCS includes:

- 21 receptor challenge studies, which suggest chemo-sensitive receptors are sensitized in MCS patients.
- 9 brain scan studies have shown that chemosensitive receptors in the central nervous system of people with MCS react differently compared to controls.

Rejecting attitudes towards new findings

In this regard, Dr. Molot referred to the so-called Semmelweis reflex[4]. This effect is a natural human tendency to reject or disregard new information which opposes the established norm, despite the well-grounded state of the newfound information. In extreme cases, it leads to the scientific establishment vehemently opposing research results that contradict its standards or convictions without further examination and defaming the researchers. In 2021, a study investigated the issue of fabricated doubt, whereby manipulated information is spread to protect certain interests, even if this may have harmful effects on the environment and health.[5] Previous research has examined individual cases, but this study identified 28 common tactics to make them easier to identify.

Unfortunately, MCS is still often seen as an exclusively psychological disorder. This leads to the stigmatization and exclusion of this patient group. Dr. Molot reveals that numerous studies - which report MCS as an anxiety disorder, panic disorder, somatoform disorder or depression - never considered the fact that MCS symptoms can be explained by biological processes.

There are always three stages in the development process:

Stage 1: Ridicule

Stage 2: Vehement Opposition

Stage 3: Becoming Self-Evident

In terms of the acceptance of MCS, we are currently at the second stage. And the question arises: how can we join forces to reach the third stage?

Planned special issue in the International Journal of Environmental Research and Public Health:[1,12]
„Understanding MCS: Interdisciplinary Insights into science, policy and practical experience"

Until 31.05.2026 can be submitted for inclusion in the special issue:

- Scientific contributions that deal with MCS from different disciplinary perspectives, including biomedicine, law, social sciences, environmental medicine and disability research.
- Original research articles, systematic reviews and critical commentaries that advance our understanding of the prevalence of MCS, the pathophysiological mechanisms, diagnostic challenges and environmental factors.
- Contributions dealing with legal and policy aspects, including human rights, accessibility and the duty of care for people with MCS, as well as qualitative research based on lived experience.

Purpose:

To enhance both the scientific legitimacy and the human experience of MCS and to encourage a more critical and compassionate rethinking of the way MCS is understood and treated in today's society. By fostering dialogue between researchers, clinicians, legal scholars, policy makers, advocates, and those directly affected by MCS, this special issue will

- close existing knowledge gaps,
- challenge persistent stigmatization,
- promote evidence-based responses that advance equity and inclusion.

Further details including information on manuscript submission, can be found here:[12]
https://www.mdpi.com/journal/ijerph/special_issues/F3U0WXKPFS

Involvement of brain function and networks after exposure to extrinsic stimuli [1,13]

Speaker:
Kenichi Azuma. PhD, Professor in the Department of Allergy and Preventive Medicine at Kindai University, Japan.

Dr. Azuma presented his paper titled "Chemical intolerance: involvement of brain function and networks after exposure to extrinsic stimuli perceived as hazardous",[6] that underlines a possible underlying mechanism of MCS. The presentation explores the neurological processing of low levels of odours in patients with MCS which were examined using functional brain imaging techniques.

As an introduction, Dr. Azuma further emphasized that MCS is a developed chronic disorder characterized by non-specific symptoms that are experienced after exposure to common odorants. The study group found that significant activations in the prefrontal cortex occur in MCS patients compared to the control group during olfactory stimulation with various odorants. Therefore, the scientists focused on the involvement of brain functions and networks after exposure to extrinsic stimuli as a possible underlying mechanism in MCS.

Exposure episodes in the onset of MCS:

- The initiation of MCS often occurs when individuals are first sensitized by a high-dose initial exposure or by repeated exposures to small doses of chemicals.
- With repeated exposures, those affected become increasingly sensitized.
- The intolerances often worsen, and the patients react to several additional chemicals.

Patients at the MCS outpatient clinic in Kyoto refer to the following initial exposures that triggered the first symptoms:

- Organic solvents
- Use of pesticides or incense in the workplace
- Odours from pesticides or exhaust from nearby diesel machines
- Fragrance from a neighbour, evaporated pesticide used indoors
- Chemical exposure after renovation of a house or moving into a newly built home
- Repeated exposure to solvents emitted from a neighbouring industrial plant or paint store
- Tobacco smoke emitted in neighborhood

Evidence of altered neurological processing

In their study, researchers carried out provocation tests with various substances and used brain imaging techniques to monitor the effects on brain functions and networks. Dr. Azuma indicated that there is consistent evidence that altered neurological processing of sensory information contributes to MCS. However, further neurophysiological research - exploring the processing of extrinsic stimuli and the perception of sensations by the limbic system and the associated cortices in the onset of MCS - is required to solidify this association further.

Figure 1 suggests increased activation in the prefrontal cortex (PFC) during olfactory stimulation above the odour threshold in patients with MCS:[1, 7, 13]

- Participants were exposed to an odorant for 10 seconds: γ-undecalactone [fruits, heavy, sweet] (D) and skatole [vegetable chips, fecal] (E). Each in concentrations of 1(odor recognition threshold) and 4 (normally perceived odor level). The non-odor control (placebo) is marked as NO.
- Imaging data were collected during (A) and immediately after exposure.
- The results indicate instantaneous responses of odour-processing neuronal circuits, and an enhanced and sustained activation in individuals with MCS.

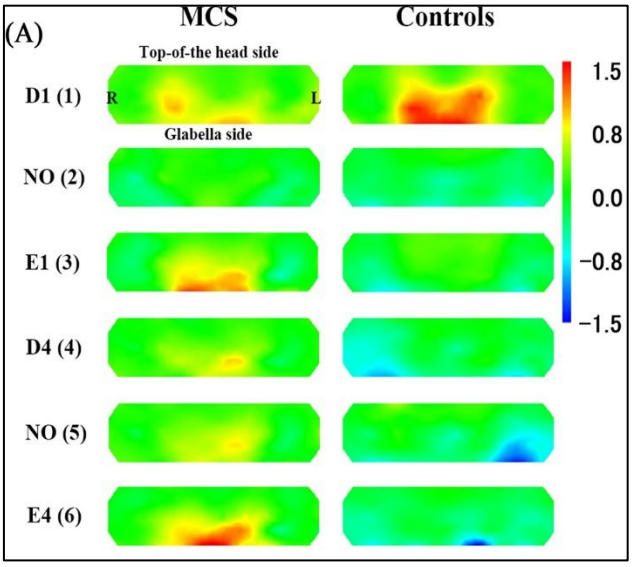

Fig. 1: Azuma et al. 2016 - Topographical maps of average z-scores for oxygenated hemoglobin (oxyHb) levels between patients with MCS (n = 10) and controls (n = 6)[7, 13]

Accessibility and MCS: Effects of a fragrance-free policy on indoor air quality [1, 14]

Speaker:
Dino Zuppa, PhD, CEO, Accessibility Standards Canada

Accessibility Standards Canada (ASC) is developing standards on accessibility for MCS. Their work provided interesting insights into Canada's commitment in this regard. For example, a study was carried out by ASEQ-EHAQ, funded in part by ASC:

- To investigate the qualitative barriers for people with MCS and other chronic conditions that are impacted by air quality
- To investigate the quantitative effectiveness of fragrance-free policies.
- People with the lived experience of MCS were key in the research design.
- The premises being studied comprised 34 office spaces, half of which had a fragrance-free policy

A number of interesting articles have already been published in this magazine on the health effects of indoor air pollution caused by volatile organic compounds (VOCs). This Canadian project is now using indoor air measurements to deliver impressive results that can be achieved through fragrance-free policies in the workplace alone (Fig. 2).

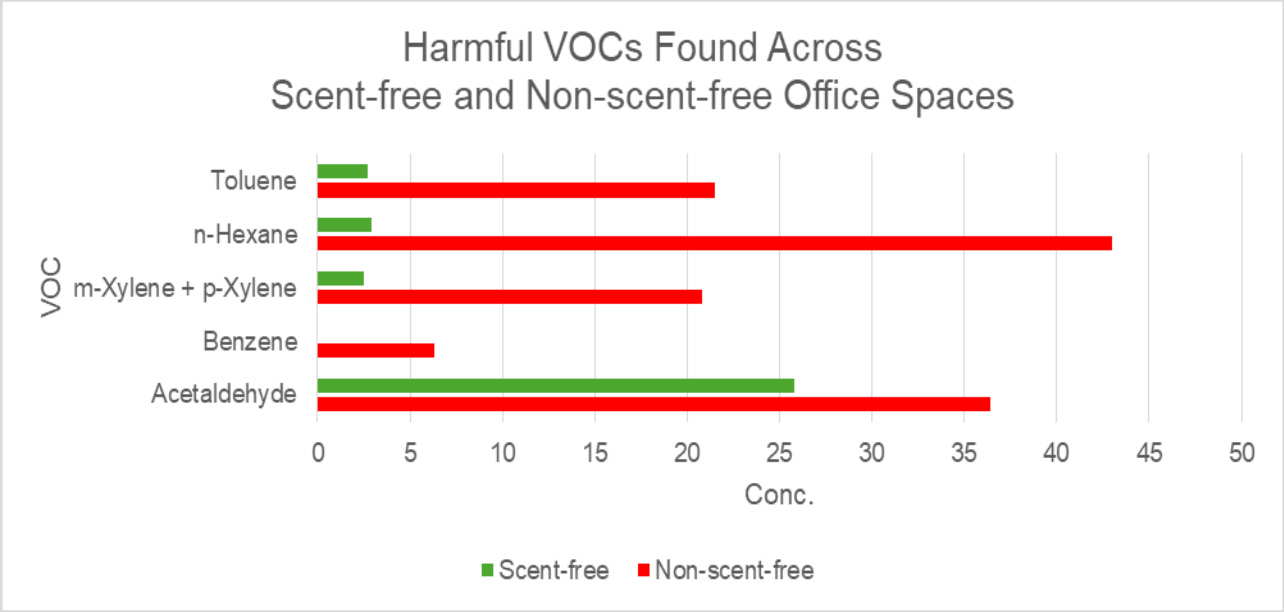

Fig. 2: Accessibility Standards Canada "Effect of fragrance-free regulations in rooms"[1, 14]
The green bars represent the measured values in fragrance-free offices, while the red bars indicate the VOC concentrations in offices without such policies.

Significantly better indoor air quality by avoiding fragrances

The comparison showed that significantly fewer VOCs were measurable in areas with fragrance-free policies than offices without policies. As part of the investigations, it was also determined that ethanol was the highest indoor air pollutant. This liquid is especially found in perfumes, cleaning agents and disinfectants. It is also used as a solvent for paint.[8] In all cases studied, the average total concentration of VOCs was around 70% lower in workplaces with a fragrance-free policy. Achieving similar reductions through ventilation alone would require significantly higher air exchange rates, resulting in increased energy consumption.

Further results (Fig. 2):

- Benzene was eliminated entirely by fragrance-free regulations.
- Other chemicals were reduced by over 80% as a result.
- Any space that was frequently cleaned had poorer air quality

Fragrance-free policies also support people with other medical conditions such as migraines, chronic fatigue syndrome, and asthma. Research demonstrates the importance of a well-designed and well-implemented scent-free policy, which is effectively communicated and enforced.

Barriers for the implementation of fragrance-free policies

A challenge to standardizing fragrance-free policies is overcoming attitudinal and systemic barriers:

(a) Attitudinal barriers:

- Misunderstanding of MCS:
  Which is often mistaken for a simple dislike of smell/fragrance rather than an exposure to the chemicals producing the smell or scent.
- Limited view of fragrances:
  Overlooking the presence of fragrance in everyday products such as lotions, air fresheners and detergents.
- The effect of nose blindness:
  A habituation effect leading to an underestimation of the strength of a scent.
- Stigmatization of people with MCS:
  Due to a lack of understanding of the nature of the invisible disability.

(b) Systemic barriers:

- The absence of a fragrance-free environment.
- Lack of policy enforcement, leading to non-compliance and exposure risks.
- Lack of adequate accommodation in workplaces, schools, services, and health settings, leading to social exclusion.
- Lack of transparency in product label and ingredients: Which are often undisclosed and hidden under the umbrella term “fragrance”, “perfume”, or “parfum”.
- Misleading labelling and greenwashing in “natural” or “Eco-friendly” products, leading to harm from exposures.

Targeted education and knowledge transfer should be the starting point. In Canada, efforts will continue to support the integration of people with MCS in various areas through targeted projects and regulations.

Announcement: New Canadian study
“Genetic predisposition to MCS” [1, 15]

Hypotheses:

- There is a genetic predisposition to MCS
- This includes both a Mendelian component and a polygenic component

Planning:

- Evaluation of inventory data
- Recruitment of approx. 300 additional MCS patients from the patient population of Canadian specialty clinics
- Formation of a control group (excluding a number of chronic diseases, which are also frequently MCS comorbidities)

Study lead:

- Audrey V. Grant, PhD, Assistant Professor at the Department of Anesthesia, and expert in Genetic Epidemiology at McGill University
- In collaboration with ASEQ-EHAQ

Another qualitative study examined how systemic barriers and persistent misconceptions impact individuals living with MCS in Canada.[9] Based on focus groups conducted across the country, the research highlighted how stigma, lack of awareness among healthcare providers, institutional resistance, and policy inaction limit access to healthcare, safe housing, employment, and social inclusion for people with MCS. The findings underscore the need for cross-sectoral responses, such as stronger fragrance-free policies, expanded public education, and formal recognition of MCS in accessibility legislation. These insights have already begun shaping national housing standards to include MCS-specific accessibility considerations.

It is important that the medical professionals are informed about the current study situation, acknowledge MCS, and provide appropriate accommodations such as fragrance-free, least-toxic, lowest-emission product use environments. Clinical environmental medicine and environmental diseases such as MCS should be more strongly integrated into the medical curriculum in order to finally improve the environmental medical care situation.

Further conference and video content at a glance[1]

- **Gut microbiome analysis and Genetic analysis in MCS**
  K.Watai, MD, PhD, Prof. Department of Preventive Medicine at Kindai University, Japan
- **Home diagnostic and treatment options for MCS patients**
  O. Tapparo, MD, Prof, doctor of medical dentistry, with a focus on immunotoxicology and regenerative therapies
- **Dissecting the Genetic Architecture of MCS**
  A.V. Grant, PhD, Assistant Prof. Dep. of Anesthesia, and expert in Genetic Epidemiology at McGill University

- **Mast cell activation in MCS**
  H. Theoharides, MD, PhD, Neuro-Immune Medicine-Clearwater, Nova Southeastern University
- **Pollution & Chemical Exposure: Shared Exposure Events**
  S. Masri, PhD, Associate Specialist of Air Pollution Exposure Assessment & Epidemiology, University of California, Irvine
- **The Complexities of Environmental Medicine**
  J.Armstrong, MD, Founder and Medical Director at the Ottawa Environmental Health Clinic
- **Panel Discussion: Advancing our Understanding of MCS**
  Topics: Research, Diagnosis, Treatment, Environmental Policies
- **Understanding MCS: A Global Perspective**
  EHAC-ASEC; ASEQ-EHAQ (CAN), SOS MCS (FRA), CONFESQ (ESP), MCS-Aware (UK), AMICA (ITA), MCS Rosenheim (GER), Kato Yasuko (JPN), Janice Foster (SCO), AESSRA (AUS), Civil Society & Disability Community (CAN)
- **Prevalence of MCS**
  R. Peris, President & CEO, the Environmental Health Associations of Canada and Québec
- **Unmasking Misconceptions: Exploring Policy, Institutional, and Social Barriers Faced by Individuals with MCS**
  S. Yousufzai, Master of Public Health and E. Psaradellis, Researcher at ASEQ-EHAQ
- **Research Project: Accessible Indoor Air in the Built Environment - Identifying barriers to an accessible indoor air**
  N. Diallo, A. Trifunovski, Researchers at ASEQ-EHAQ
- **Raising Awareness and Reducing Exposure: Educating for Safer Environments**
  C. Barakat, PhD, Associate Professor in the Faculty of Health Sciences at Ontario Tech University
- **The invisibility of MCS and the barriers and bias observed in society, health care, research, policy, and litigation**
  J. Molot, MD, Environmental Medicine. Adjunct Professor, Faculty of Medicine, University of Ottawa
- **Understanding Ableism within Policy and Law**
  R. Lattanzio LLB, Executive Director, ARCH Disability Law Centre
- **Inclusive employment for workers with Multiple Chemical Sensitivity: Best practices and insights from employment services for workers with disabilities**
  M. Pagliaro, Researcher, Canadian Council on Rehabilitation and Work (CCRW)
- **The Time to Act is Now!**
  PC Berube, Lawyer LLB, Former president of Accessibility Standards Canada

The fact that there is also an urgent need for action in Germany has already been pointed out by the Robert Koch Institute in the Bundesgesundheitsblatt 2-2020.[10]

This information can only provide a few highlights However, the full content oft he conference is available here as videos for interested parties: https://aseq-ehaq.ca/en/resiliencemcsconference/ in the section “Videos & Summaries”.[1]

The interview with statements on the situation of MCS sufferers in Germany and the appeal to doctors in clinical environmental medicine (from min. 17:12) is available on YouTube[2]: https://www.youtube.com/watch?v=Hd5BSSbxVJ4

All media allow subtitles and automatic German translations to be activated. By the way, there are already follow-up events planned by ASEQ-EHAQ/ASEC-EHAC.

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