



ERS Congress 2024: highlights from the Epidemiology and Environment Assembly

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The #ERSCongress 2024 sessions showcased by Assembly 6 (Epidemiology and Environment) underline the urgent need to address environmental and occupational exposures, improve smoking cessation tools, and advance epidemiological methodologies <https://bit.ly/4fUzhPi>

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The 2024 European Respiratory Society (ERS) Congress in Vienna, Austria, brought together researchers and clinicians from across the globe to share novel findings and innovative strategies in respiratory health. Assembly 6, dedicated to Epidemiology and Environment, highlighted pivotal research exploring the intersection of environmental exposures, respiratory health, and innovative approaches to address pressing challenges. This editorial encapsulates key take-home messages from diverse sessions, providing an overview of the advancements that will shape future strategies in respiratory epidemiology and environmental factors for respiratory health.

In the hot-topic session “Overcoming the challenges of increasing urbanisation for respiratory health”, the complex interplay between urbanisation and respiratory health was explored. Vivi Schlünssen (Aarhus, Denmark) highlighted the links between urbanisation, lifestyle changes and the prevalence of asthma, emphasising how these factors collectively shape respiratory health outcomes [1]. Notably, male puberty was proposed as a novel and critical window of opportunity for improving the respiratory health of future generations [2–4]. Alessandro Marcon (Verona, Italy) addressed the impact of climate change and urban greenness on health, underscoring the importance of designing healthier urban spaces [5]. He highlighted that restoring tree cover can effectively reduce temperature, air pollution and airborne pathogens, while being a cost-efficient intervention [6, 7]. Climate change also exacerbates pollen-related health challenges, but advancements in pollen forecasting technologies offer promising solutions for both research and everyday disease management purposes [8]. Randi Jacobsen Bertelsen (Bergen, Norway) delved into the influence of the environment on the human microbiome and resistome, demonstrating how changes affect health. Urban environments, compared to rural settings, lead to a distinct indoor microbiome, with implications for respiratory health [9]. Moreover, meteorological factors were identified as key drivers in shaping microbiomes and allergen dynamics [10, 11]. Finally, shifting the focus to low- and middle-income countries, Om Kurmi (Coventry, UK) presented the disproportionate burden of chronic respiratory diseases (CRDs) in these regions. He emphasised their significant morbidity, mortality and socioeconomic impact. To address the disparities, he advocated for universal health coverage, equitable resource allocation, better routines for interprofessional collaboration, and active community engagement, as pivotal steps towards achieving health equity.



During the oral presentation session “Lifetime impact of environmental and occupational exposures on respiratory health”, 10 studies explored the intricate relationships between environmental and occupational exposures and respiratory health outcomes. Four studies focused on air pollution, highlighting its detrimental effects, including an increased risk of asthma in both adults and children, the progression of asthma to COPD, and a higher frequency of pneumonia-related hospitalisations. BRIGHT *et al.* [12] investigated the unintended consequences of infection prevention practices in daycare settings. Their study revealed that the extensive use of disinfectants and cleaning products is associated with increased child wheeze and a higher need for inhaled corticosteroids. MØLLER KYNDE *et al.* [13] and WAN *et al.* [14] used advanced methodologies, including exposome-wide association studies and machine learning, to explore COPD and lung function determinants. BASHIR *et al.* [15] found educational attainment, rather than occupation, more strongly associated with adult asthma phenotypes. Additional studies highlighted the absence of significant links between occupational particulate exposure and lung diffusion capacity [16] and the role of occupational exposures in idiopathic pulmonary fibrosis research [17].

The poster session “Lung function and lung function-associated respiratory health outcomes” featured presentations addressing occupational and environmental risk factors affecting lung health. A national study by LELOUP *et al.* [18] revealed high mental health challenges among French pulmonologists, with 53% reporting anxiety, 22% burnout, 17% depression and 7% suicidal thoughts. Sleep debt affected 65%, with 46% experiencing disturbed sleep, and anxiolytic (19%) and hypnotic (10.3%) use was notable. Women were disproportionately affected, highlighting the need for targeted mental health support. At the same time, environmental challenges, such as the climate crisis and air pollution, are driving global allergy increases [19]. TUVSHINTUR *et al.* [20] reported a 17.6% asthma prevalence and 5.1% diagnosed asthma in 548 adults from rural Mongolia, with asthma rates doubling over two decades in the Western provinces. These findings emphasise the need for urgent interventions in underserved areas.

The impact of smoking on lung function was also addressed in this session. GONNELLI *et al.* [21] explored the prognostic role of smoking and body mass index in interstitial lung diseases, finding that both current smokers and ex-smokers had poorer outcomes compared to non-smokers (mutually adjusted hazard ratios 1.23 and 1.24, respectively). Rounding off the session, RÖNMARK *et al.* [22] presented a longitudinal study of allergic sensitisation and lung function in 1495 Swedish schoolchildren. Their findings revealed that maternal smoking during pregnancy was significantly associated with lower lung function in children, reinforcing the importance of early preventive measures.

The oral session “Updates from population-based and clinical cohort studies including children with respiratory problems” highlighted the increasing respiratory burden caused by the climate crisis. This includes a rise in dust storms in the eastern Mediterranean, exacerbating conditions such as asthma in children [23, 24]. Pinelopi Anagnostopoulou (Nicosia, Cyprus) presented findings from the Cyprus MEDEA cohort, which analysed data from 3773 children born in Nicosia and Limassol. The study demonstrated that prenatal exposure to particulate matter with aerodynamic diameter $<2.5\ \mu\text{m}$ and $<10\ \mu\text{m}$ ($\text{PM}_{2.5}$ and PM_{10}) increased the odds of wheezing by 3% (95% CI 2–4%) and asthma by 4% (95% CI 2–6%) [25]. Boys exhibited slightly higher odds of asthma (OR 1.04, 95% CI 0.98–1.11), and temperature was shown to positively interact with PM exposure (p -value <0.05). These findings underscore the critical need for strategies to reduce PM exposure.

The poster session “Challenges and perspectives of tobacco cessation in special groups of populations” featured engaging presentations, with notable work by FREELEY *et al.* [26], who proposed a refined pack-year history (PYHx) calculation, accounting for variations in smoking intensity. In 105 ever-smoking patients, detailed PYHx (PYHxdetailed) showed a stronger correlation with forced expiratory volume in 1 s per cent predicted (-0.43% per PYHxdetailed, $p<0.001$, $R^2=0.118$) compared to the traditional (PYHxtrad) calculation (-0.19% per PYHxtrad, $p=0.043$, $R^2=0.043$). This approach may improve estimates of tobacco exposure and its harm, warranting further investigation.

At the poster session “Environmental and occupational determinants of respiratory health outcomes”, EJAZ *et al.* [27] used Global Burden of Disease study 2019 data to quantify the burden of CRDs in Pakistan for the first time. In 2019, 6 085 677 individuals had CRDs, which is a 40% increase since 1990. Prevalence was highest in the Sindh region (4704 cases per 100 000), with CRDs ranked as the seventh leading cause of death. Smoking and household air pollution were the main risk factors for men and women, respectively, highlighting the need for tobacco control and improved environmental legislation. A study covering 10 provinces in Türkiye found that the presence of mould was associated with an increased risk of early childhood asthma, COPD, allergic rhinitis and pneumonia, reinforcing the importance of indoor air quality [28].

At the poster session “Challenges and perspectives of tobacco cessation in special groups of populations”, a study investigating the inflammatory effects of cigarette smoking and moist snuff usage in young adults revealed key differences in their impact on systemic inflammation [29]. Daily cigarette smoking was significantly associated with elevated levels of systemic inflammation-related plasma proteins, whereas moist snuff usage showed no such association. Another innovative study explored the potential of using ChatGPT as a tool for smoking cessation interventions [30]. Artificial intelligence (AI)-generated responses were rated higher than human expert responses in terms of completeness, structure and accessibility. These findings suggest that ChatGPT could serve as a valuable resource for delivering smoking cessation advice. However, the study also noted limitations in the quality and accuracy of some AI-generated responses, underscoring the need for further refinement before widespread implementation.

The symposium “Smoking in patients with obstructive airway diseases: a challenge beyond COPD” featured five presentations, one of which included a patient perspective. The sessions collectively explored the multifaceted impact of smoking on asthma and COPD. Guy Brusselle (Ghent, Belgium) presented evidence that smoking exacerbates asthma outcomes by increasing symptom severity, accelerating lung function decline, and inducing structural airway changes. Later, Marco Idzko (Vienna, Austria) demonstrated that smoking impairs the efficacy of inhaled corticosteroids by disrupting glucocorticoid receptor signalling. Despite these challenges, he emphasised that biological treatments remain effective for managing severe asthma and COPD, even in smokers.

The following symposium “Lung function abnormalities, chronic obstructive lung disease and multimorbidity” delved into the complex relationships between respiratory diseases and comorbidities. In one of four presentations, Shyamali Dharmage (Carlton, Australia) examined asthma trajectories, highlighting that early-onset asthma is strongly linked to mental health disorders, while late-onset asthma and restrictive spirometry patterns are associated with physical comorbidities. She further emphasised that asthma–allergy combinations exert a greater impact on comorbidities than asthma alone, offering valuable insights for optimising the management of these conditions.

The ERS Congress 2024 sessions showcased by Assembly 6 underline the urgent need to address environmental and occupational exposures, improve smoking cessation tools, and advance epidemiological methodologies. The findings provide actionable insights to inform clinical practice and public health policies, ensuring better outcomes in respiratory health for diverse populations.

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