



**EUROPEAN CONFERENCE**

# **Conference Proceedings**



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## **PM<sub>10</sub> AND PM<sub>2.5</sub> AS AN ENVIRONMENTAL HEALTH THREAT**

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Recent studies have revealed a growing influence of environmental factors, particularly air pollution, on public health. According to experts from the World Health Organization (WHO), air pollution ranks among the most critical determinants of health [1,2]. Specifically, exposure to fine particle outdoor air pollution is the second largest risk factor for premature death globally behind only high blood pressure, and the single largest environmental risk factor for premature death globally. Exposure to PM<sub>2.5</sub> reduced average global life expectancy by approximately one year and eight months in 2021[3].

The deadliest illnesses linked to PM<sub>2.5</sub> air pollution are stroke, heart disease, lung disease, lower respiratory diseases (such as pneumonia), and cancer. Additionally, elevated levels of fine particulate matter are linked to other health issues, such as diabetes, impaired cognitive development in children, and mental health disorders [3].

Given the significant health risks associated with air pollution, we initiated research to assess levels of PM<sub>10</sub> and PM<sub>2.5</sub> in Zaporizhzhia. Our findings indicate that these pollutants are consistently present in the atmosphere; however, their distribution is uneven.

The highest concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> were observed in areas with major industrial facilities and heavy traffic, specifically in the Voznesenovskiy, Zavodskiy, and Shevchenkovskiy districts. In these regions, pollutant levels exceeded WHO recommendations by a factor of 4.5 to 10 [4].

As a result, residents in these areas face elevated health risks. To evaluate the non-carcinogenic effects of particulate matter (PM) exposure, a hazard quotients (HQ) was employed. The highest values are for acute influx (HQ = 2.6) for the population of Zavodskiy district, and for chronic influx (HQ = 5.4) for the population of Voznesenivskiy district.

These risks are particularly concerning for children, as there is a strong correlation between air pollutant concentrations and respiratory illnesses among this population. For children under six, a direct association has been found between PM<sub>10</sub> levels and the incidence of bronchial asthma ( $r = 0.7$ ). In children aged 7 to 14, similar correlations exist: PM<sub>10</sub> concentrations are strongly linked to chronic bronchitis ( $r = 0.8$ ) and tonsil and adenoid diseases ( $r = 0.7$ ). Moderate associations were also observed for chronic rhinitis, nasopharyngitis and pharyngitis ( $r = 0.4-0.6$ ), as well as for chronic laryngitis and laryngotracheitis ( $r = 0.3-0.4$ ) and allergic rhinitis ( $r = 0.3-0.4$ ) among all age groups of the pediatric population.

Thus, PM10 and PM2.5 pose a significant ecological threat to public health, particularly in regions where elevated levels are consistently recorded. This situation underscores the urgent need for a comprehensive analysis of these pollutants to accurately evaluate their impact and to devise effective strategies for preventing future adverse health effects.

#### **References:**

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