# Health Risk Analysis Due to Exposure to $PM_{2.5}$, Secondary Organic Aerosols, and E-Cigarettes: A Literature Review of Respiratory and Cardiovascular Impacts

Putri Aulia Haumahu[1*], Dwintha Lestari[2], Titian Daru Asmara Tugon[3], Ijang Faisal [4], Iis Dewi Fitriani[5], Yuti Yuniarti[6]

[1]*Pharmacy study program*
[2]*Pharmacy study program*
[3]*Pharmacy study program*
[4]*Communication Science Study Program*
[5]*Management Study program*
[6]*Communication Science Study Program*
*University of Muhammadiyah Bandung, 752 Soekarno Hatta Street, Cipadung Kidul, Panyileukan, Bandung, West Java, 40614*

## Abstract

This research highlights growing concerns about how air pollution can affect our health, particularly from fine particulate matter (PM2.5), secondary organic compounds (SOA), and e-cigarette use. These three factors have the potential to cause acute respiratory infections (ARI) and heart and blood vessel problems. The review examined mortality data from relevant agencies, animal studies showing changes in the immune system and inflammation, and surveys of occupational exposure levels to measure pollutant levels and biological health markers. The results show a strong link between PM2.5 and SOA and a higher risk of death and inflammation throughout the body. Exposure to e-cigarette vapor has also been shown to negatively impact the lungs and increase the risk of respiratory diseases. Therefore, preventative measures, stricter health regulations, and further research are needed to understand the long-term impacts of these three types of exposure.

***Keywords:***Air pollution; PM2.5; Secondary organic aerosol; Electronic cigarettes; ISPA; Cardiovascular.