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Commentary

# Everyday Chemicals Contribute To the Death Toll from Air Pollution

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## INTRODUCTION

Around 7 million people die each year as a result of air pollution and 91 percent of the world's population is exposed to air that exceeds the World Health Organization's pollution standards (WHO). Air pollution is mostly caused by fine particulate particles. This can occur either directly or indirectly as a result of other contaminants reacting with molecules in the atmosphere [1].

### Fine particulate matter

According to the World Health Organization, around 7 million people die each year as a result of air pollution. According to the organisation, nearly 90% of the world's population breaths air that exceeds WHO air pollution safety limits. Fine particulate matter is a primary source of pollution, according to researchers, with fatalities from fine particulate matter increasing from 3.5 million per year in 1990 to 4.2 million per year in 2015.

Fine particle matter can be caused directly or indirectly, according to the Environmental Protection Agency. Fires and construction sites are two direct sources of fine particulate pollution. Chemicals such as nitrogen oxides and sulphur dioxide, which are emitted from the combustion of fossil fuels and react with other chemicals in the atmosphere to form fine particulate matter, are examples of indirect sources [2,3].

### Anthropogenic secondary organic aerosols (ASOAs)

ASOAs are a type of chemical that can aid in the creation of small particulate matter. These chemicals, which can be found in inks, cleaning solutions, adhesives, and paints, are a primary source of volatile organic compounds, which add to fine particulate matter, according to previous study.

"These human activities include things like driving cars (tailpipe emissions), cooking (charcoal emissions), heating (charcoal or wood), and volatile chemical goods like paint, glue, inks, cleansers, asphalt, and so on. Benzene, toluene, and xylenes are examples of these organic compounds."

Particulate matter is divided into two categories: primary and secondary. Consider the black smoke that comes out of a diesel truck or the smoke that comes from a campfire or forest fire as examples of primary particulate matter. Secondary particulate matter is particulate matter formed by emissions that have gone through chemistry in the atmosphere – think of sulphur dioxide spewed by coal-fired power stations, which causes acid rain. Secondary particle matter can be more difficult to regulate due to this chemistry, as you must understand both the emissions and the chemistry that leads to the particulate matter that is being observed and that might cause health effects. The secondary organic aerosol is one of the most difficult to manage, as thousands of organic gases are believed to be present in the atmosphere as a result of diverse emissions [4].

Once these emissions reach the atmosphere, they may undergo rapid chemistry, which (a) allows them to become particulate matter but (b) makes tracing that molecule back to an emission source more difficult. Because of the mix of emissions and chemistry, researchers have been working hard to understand secondary organic aerosol formation and how it may affect human health.

**20 years of data:** The data was then analysed using air quality models that also included satellite information. They were able to determine the contribution of ASOAs to fine particulate matter, as well as the mortality caused by fine particulate matter, as a result of this.

**Strong correlation:** While air pollution rules have become more stringent over time, ASOAs have remained relatively unregulated. Previous studies indicated that the influence was minor, thus there was no need to restrict the chemicals that are most essential in the production of ASOAs. Our research reveals a significant impact, and recognising this is the first step toward regulation. Then there's the need for greater research into the precise items and chemicals that are the most essential, as well as the development of policies to address these sources [5].

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