Menopause and the environment:
Air pollution

The World Health Organization (WHO) defines air pollution as 'contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere'. Air pollution is associated with 7 million premature deaths annually.

Air pollution, particularly particulate matter, is associated with increased cardiovascular risk across the menopausal transition.

Air pollution may contribute to ovarian ageing, potentially influencing timing of menopause.

Sources of pollution

Outdoors

- Vehicle emissions
- By-products of manufacturing and power generation (e.g. coal-fueled power plants)
- Wildfires
- Volcanic eruptions
- Sand and dust storms

Indoors

- Solid fuels and kerosene for cooking and heating

Types of air pollution

Air is polluted by particles and gasses:

- **Particulate matter** includes sulfates, nitrates, carbon and mineral dusts
- **Gasses** include ozone, carbon dioxide, carbon monoxide, nitrogen oxides and sulfur oxides

Effects on health and menopause

Population studies have found that air pollution is associated with:

- Increased mortality
- Respiratory disease (asthma, emphysema, chronic bronchitis)
- Heart disease and stroke
- Diabetes
- Cancer (of the breast or lung, and also leukemia and lymphoma)
- Dementia
- **Early menopause**
- Osteoporosis

Measures to reduce air pollution

- 'Green' and 'blue' spaces for healthier cities and cleaner air
- **Awareness** of health impacts
- Decentralized renewable **energy solutions** for health-care facilities
- Tools to **assess air quality**

Further information

Celik et al. (2025). Ubiquitous monitoring of the environment and menopause https://doi.org/10.1016/j.maturitas.2025.108729

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