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Introduction of Air Pollution

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Photo Credit: Conserve Energy Future

unicef | for every child

DONATE

Press release

Indonesia: 10 million children at risk from air pollution due to wild forest fires

24 September 2019

JAKARTA, 23 September 2019 – Wild forest and peatland fires across Kalimantan and Sumatra in Indonesia are putting nearly 10 million children at risk from air pollution, UNICEF said today.

Small children are especially vulnerable to air pollution because they breathe more rapidly, and their physical defenses and immunities are not fully developed. It is estimated that 2.4million children under five live in the areas most affected by the haze and wild fires, which have been burning in Indonesia since July 2019.

The Jakarta Post

ACADEMIA > OPINION

Jakarta's enemy is air pollution

Tata Mustasya and Bondan Andriyanu

-

Jakarta / Sat, June 29, 2019 / 09:16 am

Hardly visible: Smog blankets Jakarta's skyscrapers in this file photo. Air pollution in the city is among the worst in the world. (The Jakarta Post/Wendra Ajistyatama)

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Cases of Air Pollution

Definition of **Air**

Air is a mixture of gases

Composition of Air

- 78% nitrogen
- 21% oxygen
- 1% water vapor, carbon dioxide, argon, and various other components

NASA (n.d). *Air Properties Definitions*. Available at https://www.grc.nasa.gov/www/k-12/airplane/airprop.html

Definition of **Air**: Decree of The Minister of Health Number 1407/ Menkes/ SK/ XI/ 2002

Udara ambien adalah udara bebas di permukaan bumi pada lapisan troposfir yang berada di dalam wilayah yurisdiksi Republik Indonesia yang dibutuhkan dan mempengaruhi kesehatan manusia, makhluk hidup dan unsur lingkungan hidup lainnya.

Ambient air is **free air** on the surface of the earth in the troposphere that is within the jurisdiction of the Republic of Indonesia which is **needed and affects the health of humans, living things and other environmental elements**.

Definition of **Air Pollution**: Decree of The Minister of Health Number 1407/ Menkes/ SK/ XI/ 2002

Pencemaran udara adalah masuknya atau dimasukkannya zat, energi, dan atau komponen lain ke dalam udara oleh kegiatan manusia, sehingga mutu udara turun sampai ke tingkat tertentu yang menyebabkan atau mempengaruhi kesehatan manusia.

Key Point:

- The entry or insertion of substances, energy and other components so that the air quality drops thus either cause or influence human health

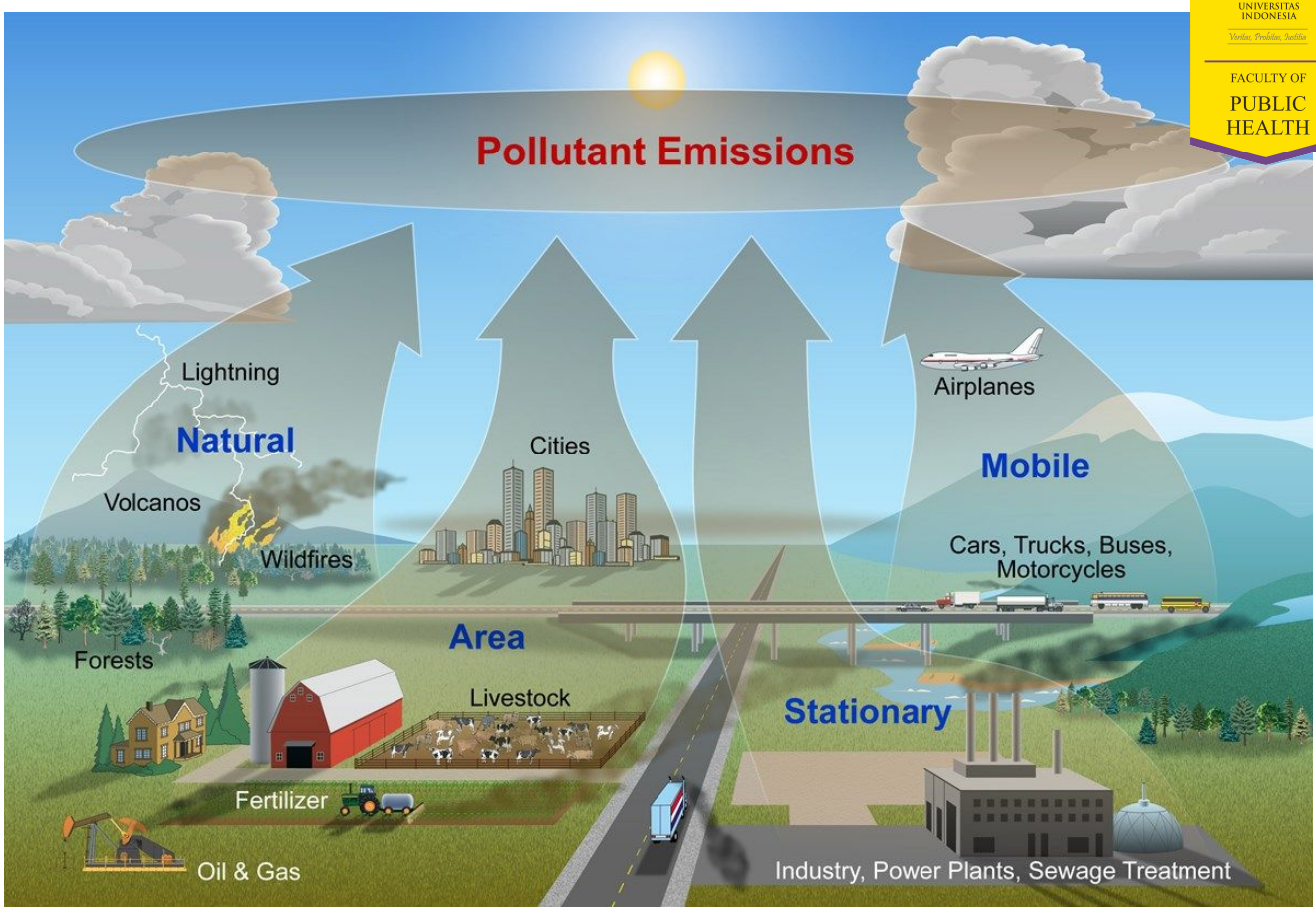
Sources of Air Pollution

Mobile Sources

Stationary Sources

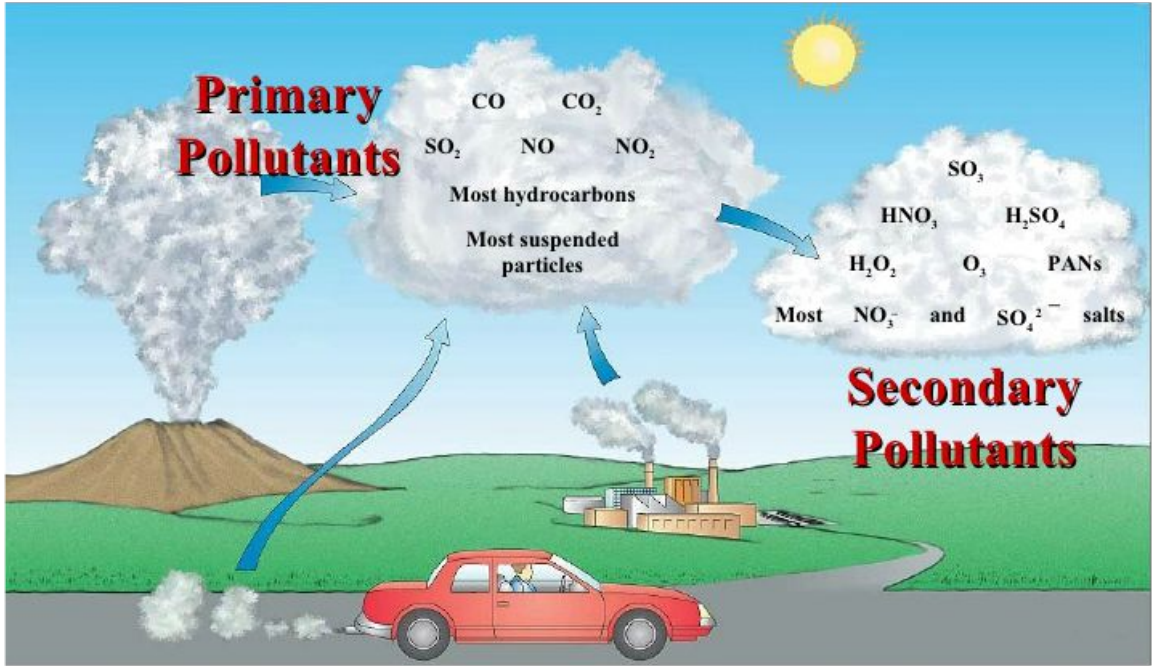
Area Sources

Natural Sources



National Park Service (2017). *Where Does Air Pollution Come From?*. Available at https://www.nps.gov/subjects/air/sources.htm

Types of Pollutants



Primary Pollutant

Secondary Pollutant

Photo Credit: https://vivieandbriehateairpollution.weebly.com/primary-pollutants-vs-secondary-pollutants.html

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Outdoor Air Pollution

Outdoor air pollution originates from natural and anthropogenic sources. While natural sources contribute substantially to local air pollution in arid regions more prone to forest fires and dust storms, the contribution from human activities far exceeds natural sources

WHO (n.d). *Ambient air pollution: Pollutants*. Available at: https://www.who.int/airpollution/ambient/pollutants/en/

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Sources of Outdoor Air Pollution

- Fuel combustion from motor vehicles
- Heat and power generation
- Industrial facilities

- Municipal and agricultural waste sites and waste incineration/ burning
- Residential cooking, heating, and lighting with polluting fuels
- Natural processes

Thompson, A. (2014). For Air Pollution, Trash Is a Burning Problem. Available: https://www.climatecentral.org/news/where-trash-is-a-burning-problem-17973
NIH (2017). Combatting epigenetic effects from outdoor air pollution. Available at: https://www.nih.gov/news-events/nih-research-matters/combatting-epigenetic-effects-outdoor-air-pollution
WHO (n.d). *Ambient air pollution: Pollutants.* Available at: https://www.who.int/airpollution/ambient/pollutants/en/

Impacts of Ambient Air Pollution

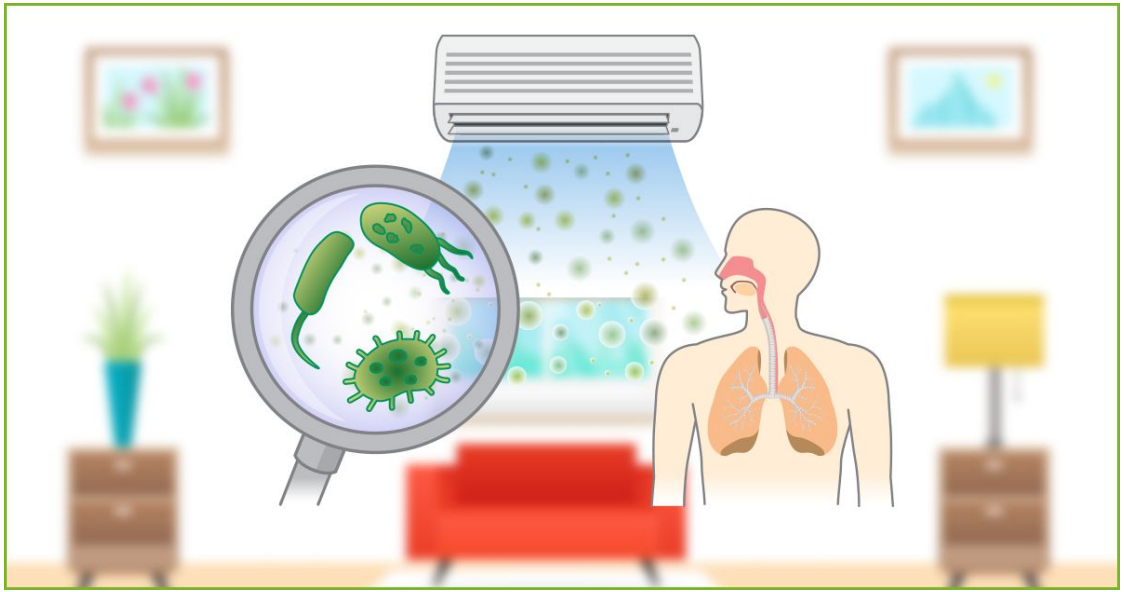
An estimated 4.2 million premature deaths globally are linked to ambient air pollution

Worldwide ambient air pollution accounts for

- 29% of all deaths and disease from lung cancer
- 17% of all deaths and disease from acute lower respiratory infection
- 24% of all deaths from stroke
- 25% of all deaths and disease from ischaemic heart disease
- 43% of all deaths and disease from chronic obstructive pulmonary disease

WHO (n.d). *Ambient Air Pollution: Health Impacts*. Available at https://www.who.int/airpollution/ambient/health-impacts/en/

Indoor Air Pollution



Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants

EPA (n.d). *Introduction to Indoor Air Quality*. Available at: https://www.epa.gov/indoor-air-quality-iaq/introduction-indoor-air-quality#:~:text=Indoor%20Air%20Quality%20(IAQ)%20refers,risk%20of%20indoor%20health%20concerns.

OMNI Hospitals (n.d). *What are the causes and effects of Indoor Air Pollution?*. Available at: https://omnihospitals.in/what-are-the-causes-and-effects-of-indoor-air-pollution/

Main Indoor Air Pollution Sources

- Tobacco products
- Fuels used for heating and cooking
- Confined and poorly ventilated spaces

- Overcrowded homes and insufficient living space
- Customs, habits, traditions
- Building materials and furnishings
- Products for household cleaning and maintenance

Impacts of Household Air Pollution

3.8 million people a year die prematurely from illness attributable to the household air pollution caused by the inefficient use of solid fuels and kerosene for cooking.

Among these 3.8 million deaths:

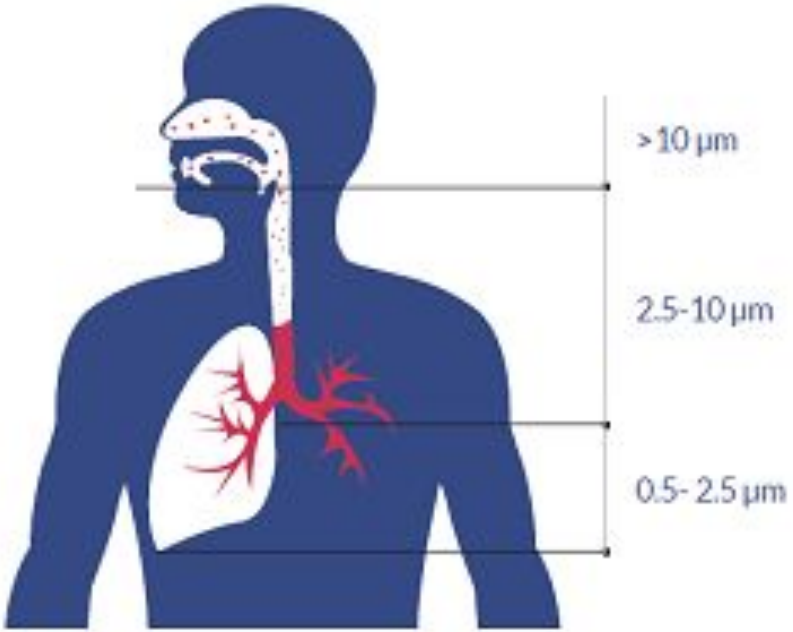
- 27% are due to pneumonia
- 18% from stroke
- 27% from ischaemic heart disease
- 20% from chronic obstructive pulmonary disease (COPD)
- 8% from lung cancer.

WHO (2018). *Household Air Pollution and Health*. Available at https://www.who.int/en/news-room/fact-sheets/detail/household-air-pollution-and-health

Effects of Air Pollution

Particulate Matter

- Coarse particles (2.5–10 micrometres) deposited in the upper respiratory tract and large airways
- Fine particles (< 2.5 micrometres) may reach terminal bronchioles and alveoli



WHO (2008). *Outdoor Air Pollution*. [ppt] WHO Training Package for the Health Sector World Health Organization. Available at https://www.who.int/ceh/capacity/Outdoor_air_pollution.pdf
WHO (n.d). *Common Pollutants from Household Heating, Cooking and Lighting*. Available at https://www.who.int/airpollution/household/pollutants/combustion/en/

Effects of Air Pollution

Sulphur Dioxide

- Exposure to SO2 affects the respiratory system and the function of the lungs, and causes irritation of the eyes

Carbon Monoxide

- A colourless and odourless gas, which at high levels can be harmful to humans

Lead

- **Children**: behaviour and learning problems, lower IQ
- **Pregnant women**: reduced growth of the fetus and premature birth.
- **Adults**: higher risk of cardiovascular effects, increased blood pressure

WHO (n.d). *Ambient Air Pollution: Pollutants*. Availabe at https://www.who.int/airpollution/ambient/pollutants/en/
WHO (n.d). *Household Air Pollutants from Non-Combustion Sources*. Available at https://www.who.int/airpollution/household/pollutants/noncombustion/en/

Building Related Illness

Symptoms of diagnosable illness are identified and can be attributed directly to airborne building contaminants.

Sick Building Syndrome

Situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified

Effects of Air Pollution

U.S EPA (1991). *Factsheet: Sick Building Syndrome*. Available at https://www.epa.gov/sites/production/files/2014-08/documents/sick_building_factsheet.pdf