

# AIR POLLUTION AND HEALTH: RESEARCH FINDINGS IN JAKARTA

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**Low- and middle-income** countries face the largest burden. 90% of all air pollution deaths were in these countries:



India and China each had more than 2 million deaths attributable to air pollution in 2023.

Bangladesh, Pakistan, and Nigeria each saw more than 200,000 deaths.

Indonesia, Myanmar, and Egypt each saw more than 100,000 deaths.

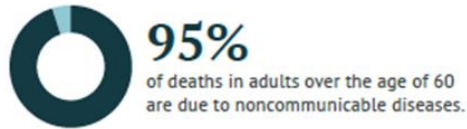
**Noncommunicable diseases** accounted for **6.8 million deaths**.



**Air pollution** continues to be the second leading risk factor for early death, surpassed only by high blood pressure.



In 2023, **dementia** attributable to air pollution resulted in **626,000 deaths** and **11.6 million** healthy years of life lost.



# Annual Global deaths caused by air pollution (State of Global Air, 2025)

## WHO has named air pollution as the world's largest environmental health risk.

Source: WHO 2019, The ten threats to global health

# Air pollution & health research in Jakarta

Osong Public Health Res Perspect 2019;10(2):51-55



Osong Public Health and Research Perspectives  
Journal homepage: <http://www.kodohrp.org>

Original Article  
Effect of Exposure to 2.5  $\mu\text{m}$  Indoor Particulate Matter on Adult Lung Function in Jakarta

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## Exposure to PM<sub>2.5</sub> and Lung Function Impairments on the Public Transportation Drivers in Jakarta 2019 56% adult male impaired lung function

Tia Prabawati Suhengsi<sup>a</sup>, Budi Haryanto<sup>a\*</sup>  
Submitted to **Akademi Sains Malaysia Journal** (Q2)

## 38.5% Lung Function Impairment among Housewives in Pulo Gadung Industrial Area

ASM Sc. J., 13, Special Issue 5, 2020 for APRU2018, 24-29

### Air Pollution and School Children Respiratory Diseases in Indonesia: A Cohort Study

Haryanto, B.<sup>1,2\*</sup> and Djafri, D.<sup>3</sup>

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## No-different Incidence Rate of Acute Respiratory Infections (5-12%) between level of exposures at 28 elementary schools in Jakarta



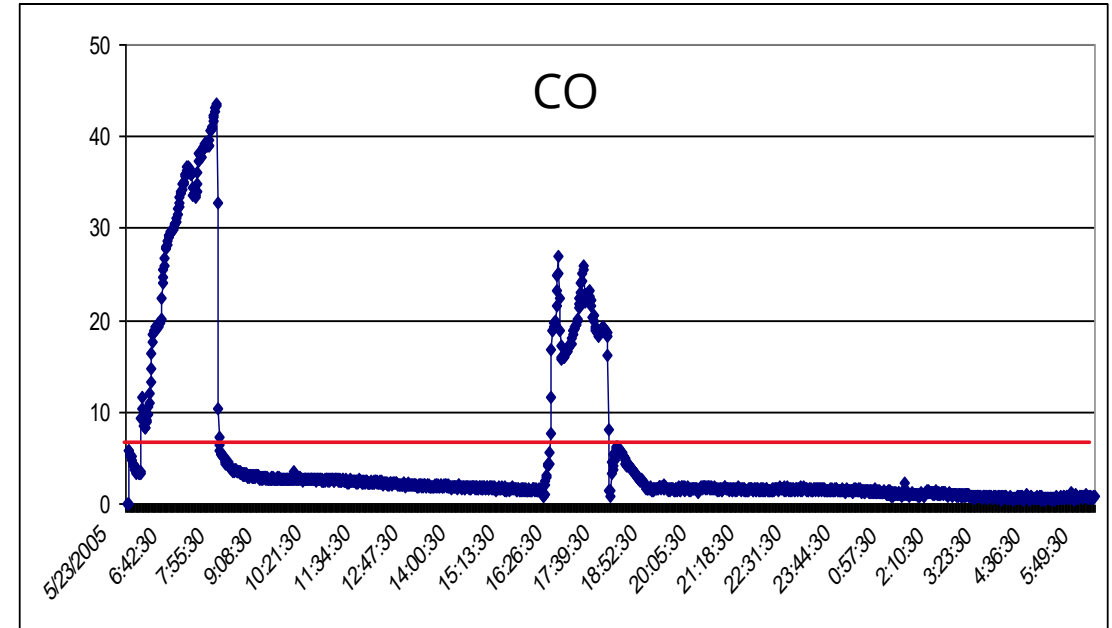
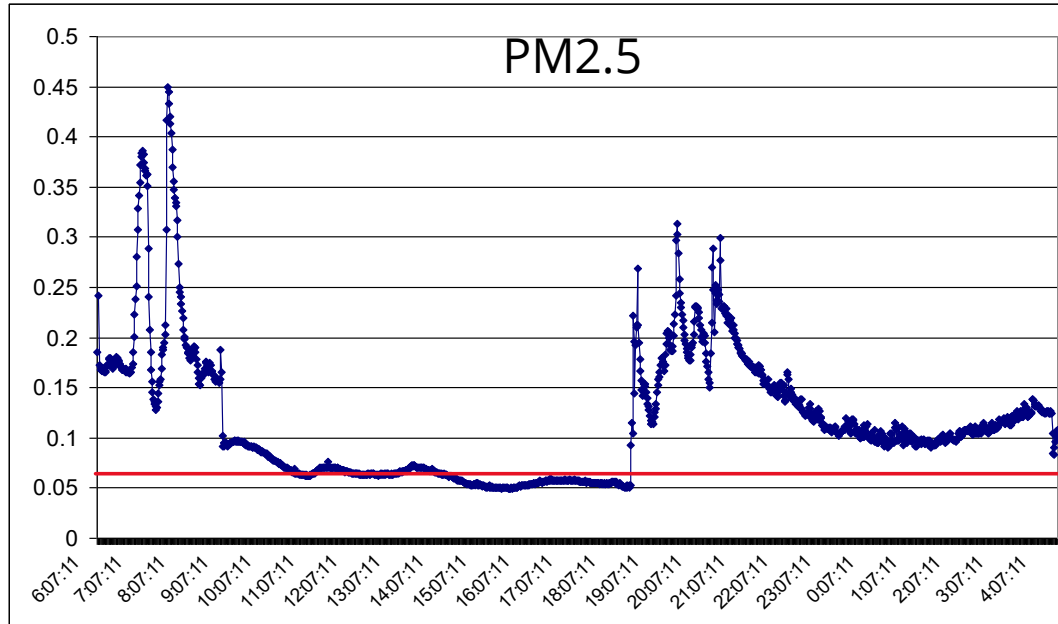
Reviews on Environmental Health | [Ahead of Print](#)

## Effect of particulate matter 2.5 exposure to urinary malondialdehyde levels of public transport drivers in Jakarta

Damai Arum Pratiwi and Budi Haryanto 

DOI: <https://doi.org/10.1515/reveh-2020-0017> | Published online: 08 Jul 2020

# 24 hours exposure of PM2.5 and CO among commuters with Air-Conditioned car for transportation in Greater Jakarta 2004



Science of the Total Environment 443 (2013) 965–972

Contents lists available at SciVerse ScienceDirect

Science of the Total Environment

journal homepage: [www.elsevier.com/locate/scitotenv](http://www.elsevier.com/locate/scitotenv)

Exposure to carbon monoxide, fine particle mass, and ultrafine particle number in Jakarta, Indonesia: Effect of commute mode

Adam F. Both<sup>a</sup>, Dane Westerdahl<sup>b</sup>, Scott Fruin<sup>c</sup>, Budi Haryanto<sup>d</sup>, Julian D. Marshall<sup>a,\*</sup>

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## Diseases-related to Air Pollution & Cost of Illness (IDR) in Jakarta (UI-KLHK-UNEP 2010)

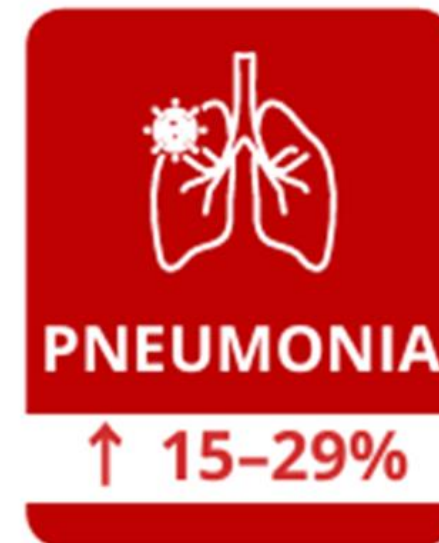
- 1,210,581 people suffered by asthmatic bronchiale (12.6%)
- 153,724 people with bronchopneumonia ( 1.6%)
- 2,449,986 with ARI (25.5%)
- 336,273 people with pneumonia ( 3.5%)
- 153,724 people with COPD ( 1.6%)
- 1,246,130 people with coronary artery diseases (13.0%)

57.8% of the Jakarta population had already suffered by various air pollution-related diseases in 2010

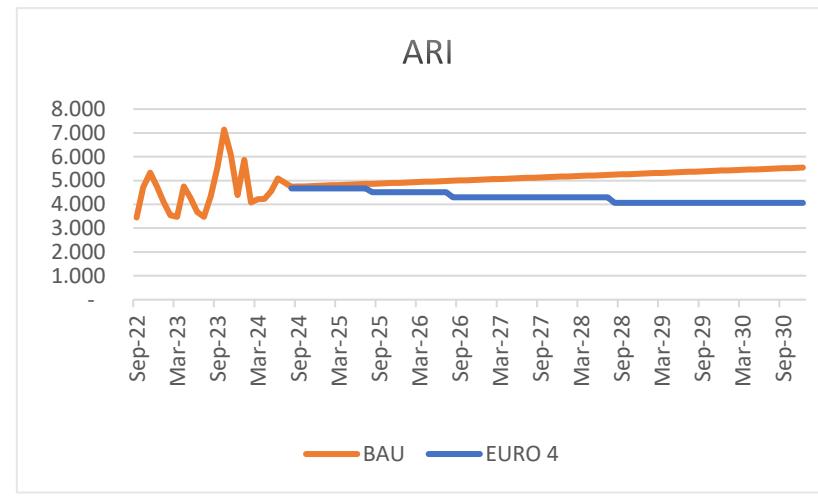
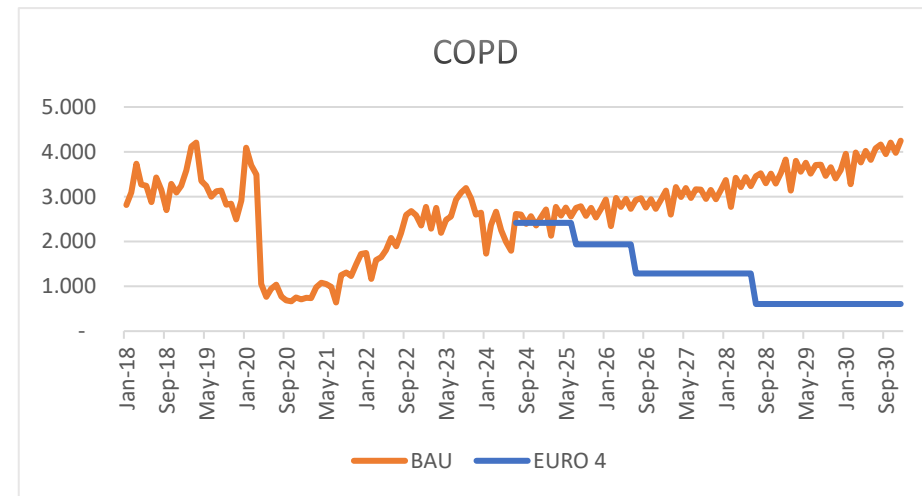
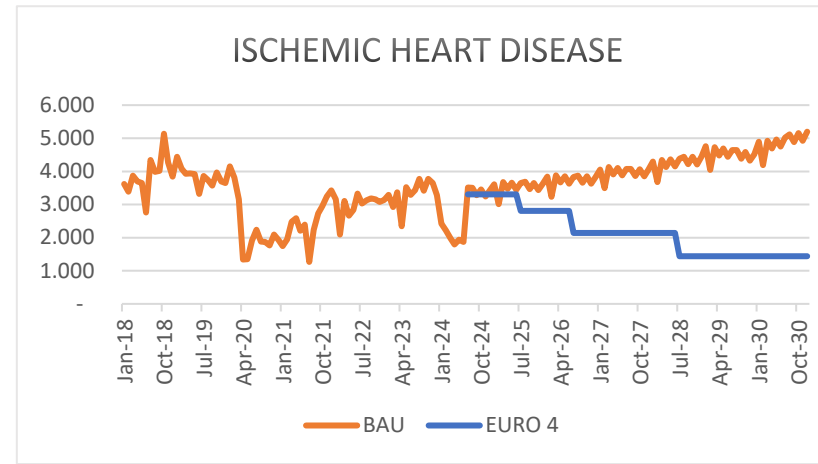
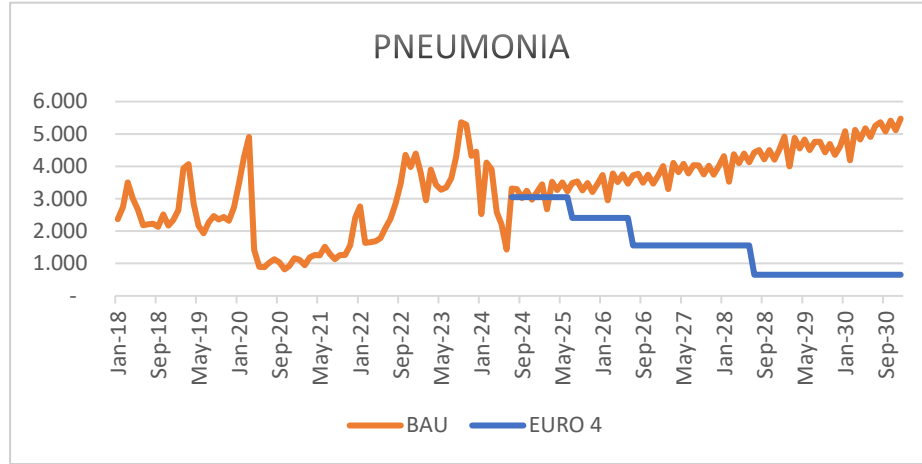
Health Impacts	Incidence Per 100,000	Cost per patient		Estimated cost in Jakarta	
		Minimum	Maximum	Minimum	Maximum
Asthmatic bronchiale	12,600.0	173,972	4,418,618	210,607,225,915	5,349,095,712,874
Bronchopneumonia	1,600.0	91,500	3,650,813	14,065,837,500	561,221,228,425
ARI	25,500.0	92,142	4,774,843	225,746,580,987	11,698,296,998,123
Pneumonia	3,500.0	109,738	5,455,359	36,901,876,543	1,834,489,937,007
COPD	1,600.0	164,161	5,276,800	25,235,582,747	811,176,080,000
Coronary artery diseases	12,970.0	148,763	14,647,900	185,378,033,307	18,253,187,244,690
<b>Total</b>				<b>697,935,136,999</b>	<b>38,507,467,201,119</b>

# The Risk of Diseases Exposed by PM<sub>2.5</sub> in Jakarta 2018-2023

- Every increasing of concentration of 15 ug/m<sup>3</sup> PM<sub>2.5</sub> associated with the raise of 20% cases of pneumonia.
- Every increasing of concentration of 15 ug/m<sup>3</sup> PM<sub>2.5</sub> associated with the raise of 27% cases of COPD (Chronic Obstructive Pulmonary Disease).
- Every increasing of concentration of 15 ug/m<sup>3</sup> PM<sub>2.5</sub> associated with the raise of 37% cases of Ischemic Heart Disease.



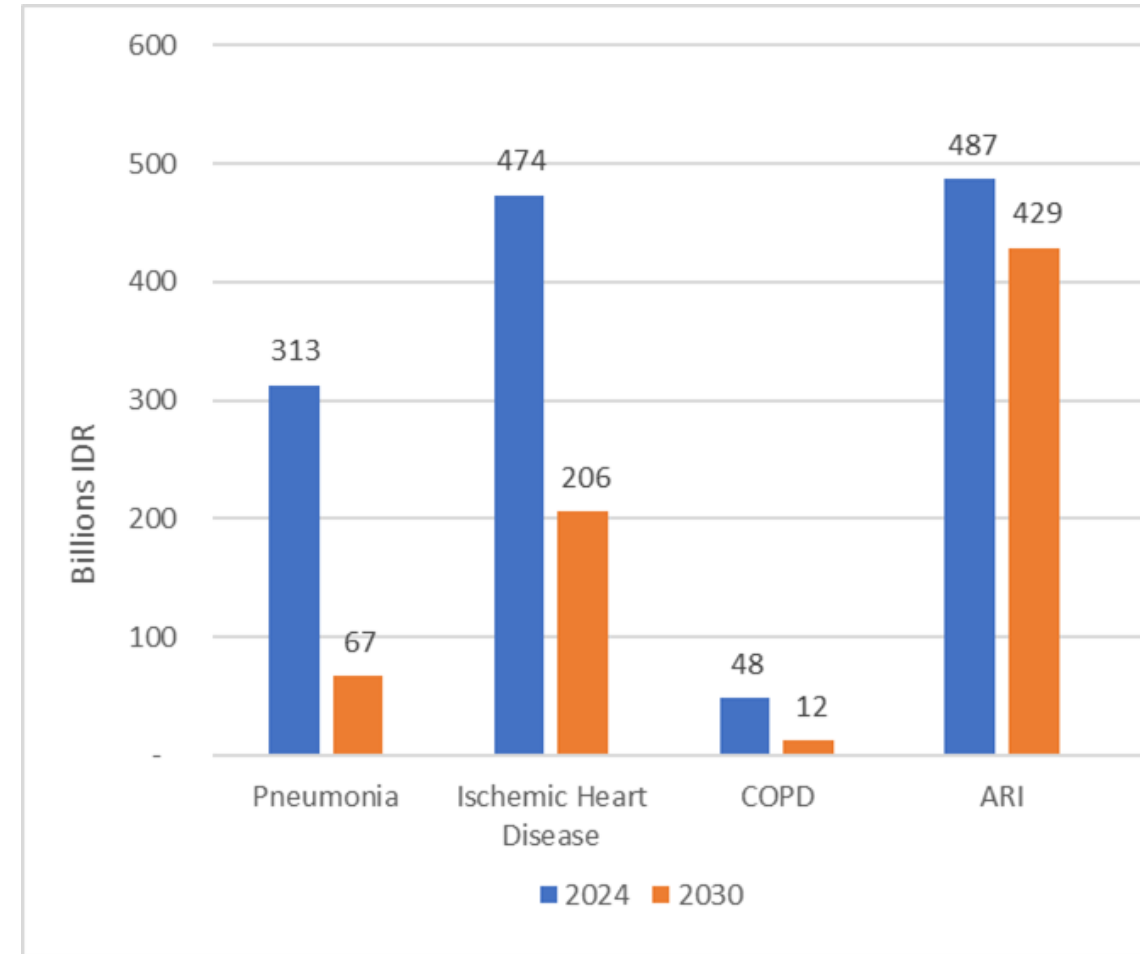
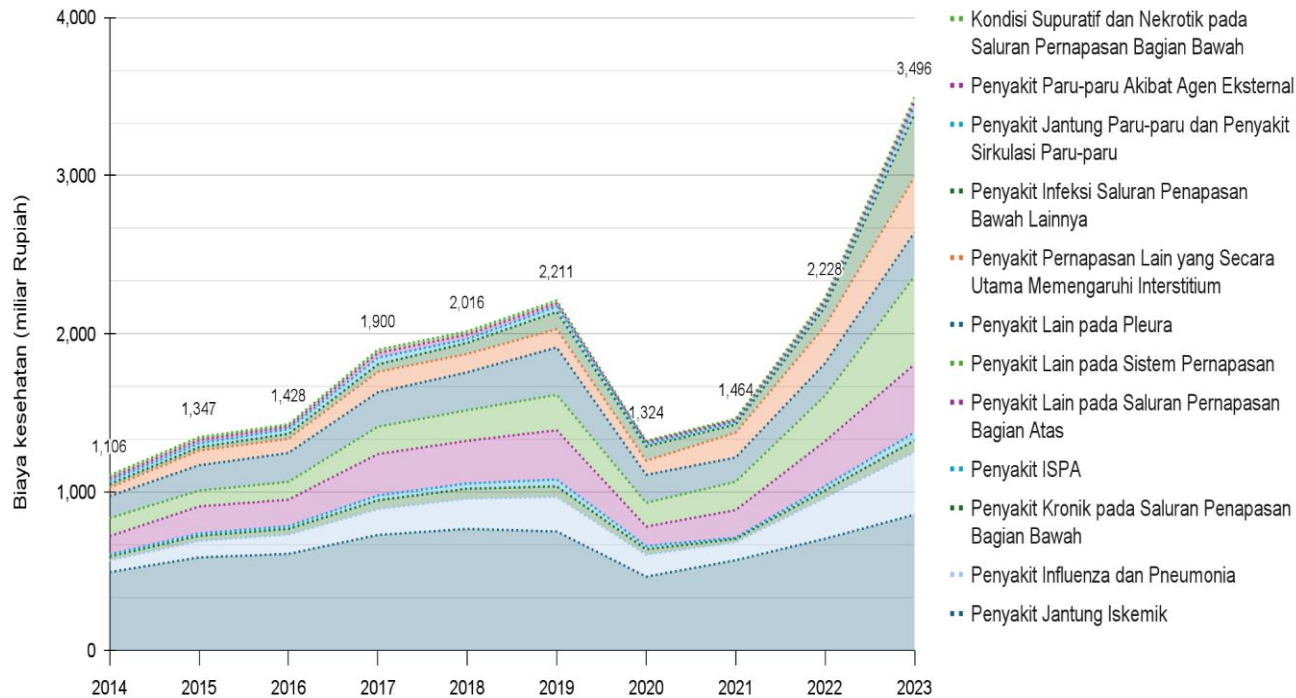
# Effects scenario EURO4 shifting 2024-2028 to the Incidence of Pneumonia, Ischemic Heart Disease, COPD & ARI in Jakarta



Reduction in diseases cases in 2030 under the EURO 4 scenario:

- Pneumonia 86%
- Ischemic Heart Disease 69%
- COPD 84%
- ARI 23%

# Total claim of BPJS Kesehatan for 12 diseases related to air pollution in 2023 (IDR 3.5 trillion) & the amount reduction 4 diseases in 2030 under the EURO4 scenario



# CONCLUSION

- Air pollution is a major cause of diseases (about 58%) among Jakarta population
- Air pollutants are highly existed and estimated sharply increased in the future
- Air pollutants will be putting more population in severe risk of serious health effects
- Air pollution related diseases is preventable and manageable → willingness, commitment, focus, and serious actions of all stakeholders



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# THANK YOU



<https://airpollutionhealth-rcccu.id/>

