

## Air Pollution

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### Introduction

92% of the world currently lives in areas with air pollution levels above safe limits (1)– air pollution transcends all social, economic, political and geographical boundaries (2). It is a global health emergency that needs urgent action.

Ambient (outdoor) air pollution is most commonly produced from vehicle fuel combustion, industry, biomass combustion for household energy needs, and burning of fossil fuels for electricity production (3). As cities grow and become increasingly globalised and industrialised, pollution levels increase, often at the cost of the inhabitants' health.

Household air pollution, produced from cooking with solid fuels such as wood or coal in poorly-ventilated homes, can also have significant consequences for health, and contributes to ambient air pollution (4). 41% of the world's population is reliant on solid fuels (5) and is exposed to the toxic pollutants for numerous hours a day: most live in low-middle income countries (5) and have limited access to safe energy because of poverty and inequality.

Air pollution influences the health of populations throughout the life course, in all nations across the world. Annually it accounts for 9 million global premature deaths (16% of total global mortality), and 269 million disability-adjusted life years (6): it has now overtaken unsafe water and sanitation as one of the major risk factors for the global burden of disease (7).

### Ambient air pollution & health

Pollutants causing the most concern are fine particulate matter (PM<sub>2.5</sub>), ground-level ozone, nitrogen dioxide and sulphur dioxide (3). Exposure to fine particulate matter and nitrogen dioxide is associated with both an increased prevalence and incidence of coronary artery disease (8), stroke (8), chronic obstructive pulmonary disease (9,10) and lung cancer (9). Peaks of exposure lead to exacerbations of underlying cardiovascular and respiratory disease (8,9,11). Particulate matter is classified as a carcinogen that causes lung cancer (9). Ambient air pollution is contributing to the growing burden of non-communicable diseases in low-middle income countries.

In children, it worsens asthma (12). Furthermore, exposure to ambient air pollution during pregnancy been linked to high blood pressure (13), an increased risk of low birthweight, preterm birth and small-for-gestational age (11).

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Respiratory and cardiovascular disease from ambient air pollution caused over 3 million global premature deaths in 2012 (1). High levels of exposure are associated with peaks in both short and long term mortality (3,11)

The large range of diseases affected by ambient air pollution limits the quality of life of hundreds of thousands of people across the world, as they live with the increased burden of chronic non-communicable diseases. The number of years lived with disability is vast, and particularly impacts on those in low-middle income countries (see figure 1). 88% of premature deaths from ambient air pollution occur in low-middle income countries (1). While ambient pollution is a problem in all major cities, it is likely the poorest are most likely to be exposed to higher pollutant levels, and have limited capacity to access healthcare or reduce their exposure (2)(14).

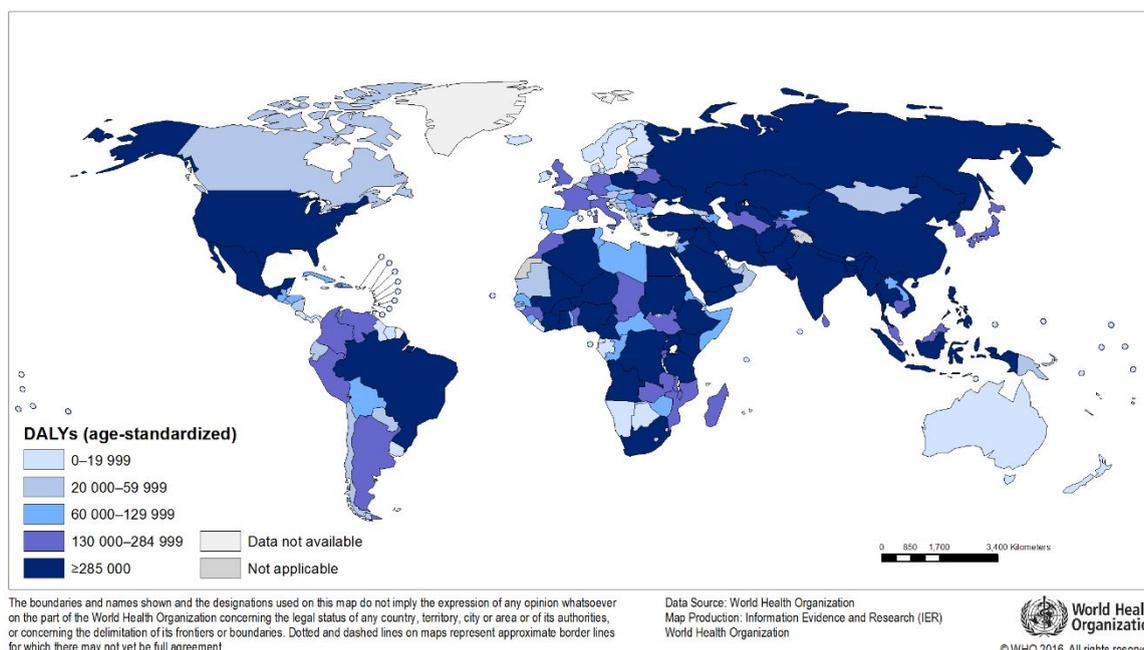


Figure 1: DALYs attributable to ambient air pollution in 2012 (age standardized) (1)

## Household air pollution & health

Given that nearly half of the global population is reliant on unsafe, unclean fuel for cooking, it is unsurprising that 4.3 million premature deaths were caused by household air pollution in 2012 (15).

Women often bear a disproportionate of the burden of the health impacts of household air pollution, as they spend a large amount of time cooking and therefore exposed to pollutants. During pregnancy, exposure increases the risk of stillbirth (16), neonatal mortality (17) and low birthweight (16)(18). It is also associated with increased risk of hypertension (19,20), birth defects (21,22) and prematurity (16), though further research is needed into these areas.

Children often spend a significant time exposed to the pollution, as they remain with their mothers during cooking. This doubles the risk of pneumonia (18) and leads to high under-5 mortality rates (17).

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Spending a lifetime cooking in polluted homes increases the risk of ischaemic heart disease (23), and chronic lung disease such as chronic obstructive pulmonary disease (24). Household air pollution has been linked to lung cancer (24–26), as well as numerous other oral and respiratory tract cancers (27).

There is a lack of evidence as to which particular pollutants from household air pollution cause adverse health outcomes: therefore the disease burden from household air pollution is likely hugely underestimated.

Solutions to provide access to safe, clean energy for households that reduce pollution enough to improve health have been slow to emerge. However, clean cookstoves that use alternative fuels or burn fuel more efficiently hold great potential to not only meet sustainable development goal number 7 (safe and affordable energy for all (28)) but empower women, tackle climate change, improve health, strengthen economies and reduce ambient air pollution (29).

## Conclusion

The majority of the global population is exposed to harmful levels of air pollution, both outdoors and within the home, leaving them vulnerable to the harmful health effects throughout their life course. However, it is likely that its impact on health is far greater amongst the poorest populations who have limited capacity to reduce their exposure (30,14). Air pollution is largely neglected in the global health field, underfunded, under-researched and left out of global health curricula. It requires urgent, multi-sectoral action to mitigate its effects and protect global health.

However, tackling air pollution offers a vast opportunity to improve global health through multiple ways (31):

1. Preventing ill health directly caused or exacerbated by air pollution
2. Mitigation also tend to reduce greenhouse gas emissions, and reduces the impact of pollutants on ecosystems, therefore preventing temperature rises and climate change. Preventing climate change is the greatest opportunity of the 21<sup>st</sup> century to improve public health (32).
3. Individual lifestyle changes to reduce air pollution hold their own potential to improve physical and mental health. For example, cycling instead of driving to work improves mental and physical health while reducing emissions of nitrogen dioxide.

## Call to Action

For Students for Global Health to play their part in mitigating air pollution and the harmful health effects, it pledges to take the following actions:

### *Members*

- Consider the individual impact that their lifestyle choices may contribute to air pollution, such as reducing car journeys and switching to electric vehicles, and take measures to reduce this by taking part in the World Health Organization's

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BreatheLife

Campaign

2030:

<http://breathelife2030.org/act-now/general-public/> or the UK Healthy Air Campaign <https://www.healthyair.org.uk/get-involved/>

- Support local efforts to reduce air pollution, such as local council's air pollution policies and university air pollution reduction measures

## *Branches*

- Educate and advocate around the impact of air pollution on health and the benefits of mitigation, to raise awareness amongst university students and amongst branch members, considering collaborating with Healthy Planet UK branches to do this
- Support and advocate for university policy to tackle air pollution on campuses, such as creating and conserving green spaces or improving cycle routes
- Campaign for greater inclusion of planetary health and air pollution into university degree curriculums, particularly in medicine and the health sciences

## *National*

- Encourage sustainable choices for national and regional events which reduce the impact of air pollution, such as shared transport and online meetings
- Collaborate with Healthy Planet UK in advocating for the link between air pollution & health, and the benefits of combating air pollution
- Advocate for air pollution & health at an international level through IFMSA
- Join organisations such as Friends of the Earth, Client Earth, Medact and the Royal College of Physicians in the Healthy Air campaign, to push for the UK government to legislate the right to clean air for everyone in the UK and take up their legal responsibility to tackle air pollution  
<https://www.healthyair.org.uk/clean-air-act-21st-century/>

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