OUR RIGHT TO HEALTH, OUR RIGHT TO CLEAN AIR

Improving air quality to address NCDs

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NCD Alliance

10 YEARS 2009-2019

Forum of International Respiratory Societies
United for Lung Health

Introduction

Noncommunicable diseases (NCDs) are now widely recognised as a major challenge to health and sustainable human development in the 21st century. NCDs, including cardiovascular disease, chronic respiratory conditions, cancer, diabetes, and mental and neurological disorders, are the leading cause of death and disability worldwide, responsible for 71% of global mortality[1]. This figure is projected to rise in future years, exacting a heavy and growing toll on the health and economic security of all countries. Increasingly, it is low and middle-income countries (LMICs) and the poorest and most vulnerable populations that are hardest hit by these largely preventable diseases.

NCDs are driven by similar risk factors, including use of tobacco and alcohol, unhealthy diets, and physical inactivity, and air pollution. The World Health Organization (WHO) estimates that air pollution claims 7 million deaths every year worldwide[2]. Of these deaths, about 80% are from NCDs, making the number of NCD deaths due to air pollution comparable to mortality from tobacco use[3]. There is some overlap in the deaths attributable to ambient and outdoor air pollution, with approximately 4.2 million deaths from exposure to ambient (outdoor) pollution, and 3.8 million from household (indoor) pollution[4]. Together, 24% of deaths from stroke, 25% of deaths from ischaemic heart disease, 28% from lung cancer, and 43% from chronic obstructive respiratory disease are attributable to ambient and household air pollution, and evidence on additional NCDs is emerging[2].

In 2016, over 90% of the world's population lived in places where the air is unsafe to breathe, according to the WHO's air quality guidelines[5].

With the world's population (and hence number of people reliant on industrial processes and transport) growing rapidly, and over half of all people now living in urban areas (where air quality is poorest), there is an urgent need to implement policies to combat air pollution. Raising awareness of the health implications of air pollution and amplifying the growing body of evidence is crucial in order to mobilise political action and ensure that no-one is left behind. The right to breathe clean air is an integral part of the right to health.

[1] Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. World Health Organization, 2018 (online)
[2] Burden of disease from the joint effects of household and ambient air pollution for 2016. World Health Organization, 2018 (online)
[3] Noncommunicable Diseases Country Profiles 2018. World Health Organization, 2018 (online)
[4] Ambient (outdoor) air quality and health. World Health Organization Fact sheet, 2018 (online)
[5] Household air pollution and health. World Health Organization Fact sheet, 2018 (online)

Key Messages

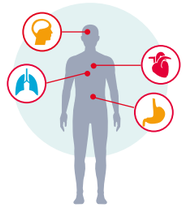
The harm caused by air pollution is more dependent on one's postal code than one's genetic code.

EVERYONE HAS THE RIGHT TO BREATHE CLEAN AIR.

While many forms of air pollution are invisible, HEALTH IMPACTS are all too tangible.

Particulate matter 1/30th the size of a grain of sand can penetrate deep into the lungs and other organs and cause harm.

Air pollution has an impact on most organs in the human body, leading to **INCREASED RISK OF DEVELOPING A VARIETY OF NCDs.**



REDUCING AIR POLLUTION can have almost immediate benefits for health, with quick gains possible within a single political term.

Actions to improve air quality often have co-benefit implications for other **SUSTAINABLE DEVELOPMENT PRIORITIES.**

Policymakers, NGOs and health professionals all have crucial roles in accelerating the response to air pollution and can **TAKE SPECIFIC ACTION.**

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All People and All Ages
Ensuring No-one is Left Behind

Certain populations are especially vulnerable to the impacts of air pollution, and must be placed at the centre of the response to ensure no-one is left behind.

Exposure to air pollution during pregnancy is associated with adverse outcomes that extend throughout life.

The impact of exposure to air pollution during pregnancy and childhood can be 'devastating' according to the WHO, with links to impaired cognitive and motor development, childhood obesity, respiratory conditions, and certain cancers[6]. Air pollution is associated with increased risk of infant mortality, and of developing NCDs in later life. Older people are also at particular risk, especially those already living with one or more NCDs. A life-course approach which seeks to protect people of all ages is necessary in order to address the impact of air pollution on health.

As with most illnesses, there is a hereditary component to the biological response to air pollution exposure, but for ill-health related to air pollution, the postal code is more important than the genetic code: socioeconomic inequalities which vary with geography have a far greater bearing on the exposure of individuals to air pollution and the health impacts they experience. People living in Africa, Asia and the Middle East on average breathe higher levels of pollutants than those in other parts of the world, and, therefore, sustain a greater health burden[7]. Within regions, people with low social and economic status are often forced to take jobs with high occupational air pollution exposure. They are also more likely to live in areas with higher densities of traffic or local sources of air pollution, such as factories or waste processing plants. People living in economically poor areas are less likely to have access to safe cooking technologies and fuels and more likely to be exposed to high levels of indoor air pollution. Women and children are especially at risk because they spend more time indoors near smoky fires used for cooking. Addressing air pollution and reducing the risk of NCDs enables these cycles of poverty and ill health to be interrupted, thus reducing health inequalities and promoting sustainable human and economic development.

[6] Air pollution and child health: prescribing clean air. World Health Organization, 2018 (online)

[7] Schraufnagel D, et al. Air Pollution and Noncommunicable Diseases, A Review by the Forum of International Respiratory Societies' Environmental Committee, Part 1: The Damaging Effects of Air Pollution. CHEST. 2019; 155(2):409-416 (online)

What is Air Pollution?

An air pollutant is, by definition, any substance present in the air that may harm the health of humans, ecosystems, or the planet.

Air pollutants are divided in **two categories: gaseous pollutants and particulate matter.**

Gaseous pollutants include sulphur oxides, nitrogen oxides, carbon monoxide, and ground-level ozone. The damage to human tissue by gases depends on their water solubility, concentration and ability to oxidise tissue[7].

The second form of air pollution is **particulate matter** (PM), which often contain toxic metals and hydrocarbons. The particles are classified by their size: PM_{10} are particles that are 10 µm (0.01 mm) in diameter or less; $PM_{2.5}$, or 'fine particles', are 2.5 µm or smaller, and $PM_{0.1}$ or 'ultrafine particles' are 0.1 µm or smaller. Airborne large particles may be seen as dust or haze, whereas small particles are invisible. The finer particles, $PM_{2.5}$ and $PM_{0.1}$, penetrate deep into the lungs, and $PM_{0.1}$ quickly pass into the bloodstream. Once in the lungs, the body tries to defend itself and eliminate the particles by triggering an inflammatory reaction that involves the whole body. This generalised inflammation affects many organs, often leading to permanent damage. The second feature that makes air pollution so deadly is that the fine and ultrafine particles enter the bloodstream and reach all organs in the body. These particles are linked to most of the death and disability from air pollution.

The susceptibility of the individual exposed to air pollution determines the extent of the health impacts – in addition to children being at particular risk since their development is ongoing, immune and inflammatory responses also vary from person to person: the greater the extent of the inflammation, the worse health outcomes are likely to ensue.

Sources of PM include combustion engines (especially diesel), solid fuel (especially coal), and in-home smoky fires for warmth or cooking. Other industrial activities (such as mining, smelting and waste incineration), agricultural activity (such as the use of nitrogen fertilisers), as well as naturally occurring events (such as sand-storms and volcanoes) can contribute to air pollution.

The air pollutants discussed in this policy brief are limited to those that directly impact human health; other emissions, such as carbon dioxide and methane, contribute to climate change, which presents an additional grave threat to human and planetary health. Reducing air pollution can have an almost immediate impact on health – an increase in average birth weight was observed when China enacted strict air pollution guidelines at the time of the 2008 Olympic and Paralympic Games in Beijing[8]. Improving air quality prevents NCDs and their devastating consequences and offers a great opportunity for better health.

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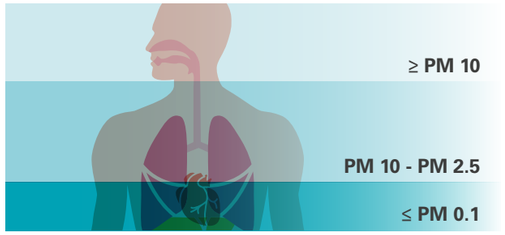
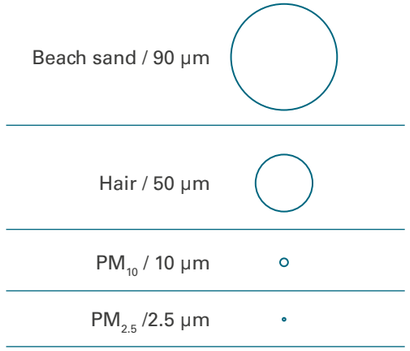
[8] Rich DQ, et al. Differences in Birth Weight Associated with the 2008 Beijing Olympics Air Pollution Reduction: Results from a Natural Experiment. Environ Health Perspect. 2015; 123(9):880-887 (online)

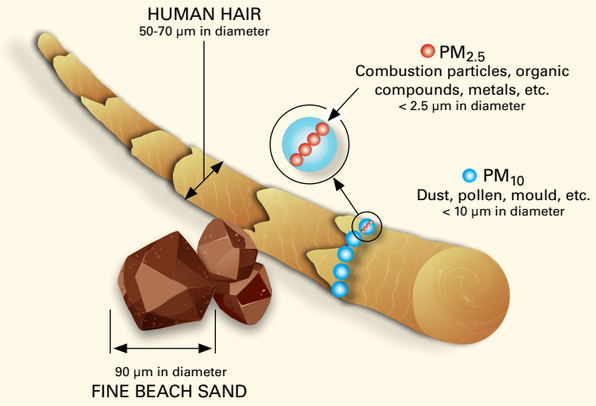
EFFECTS OF AIR POLLUTION ON THE HUMAN BODY



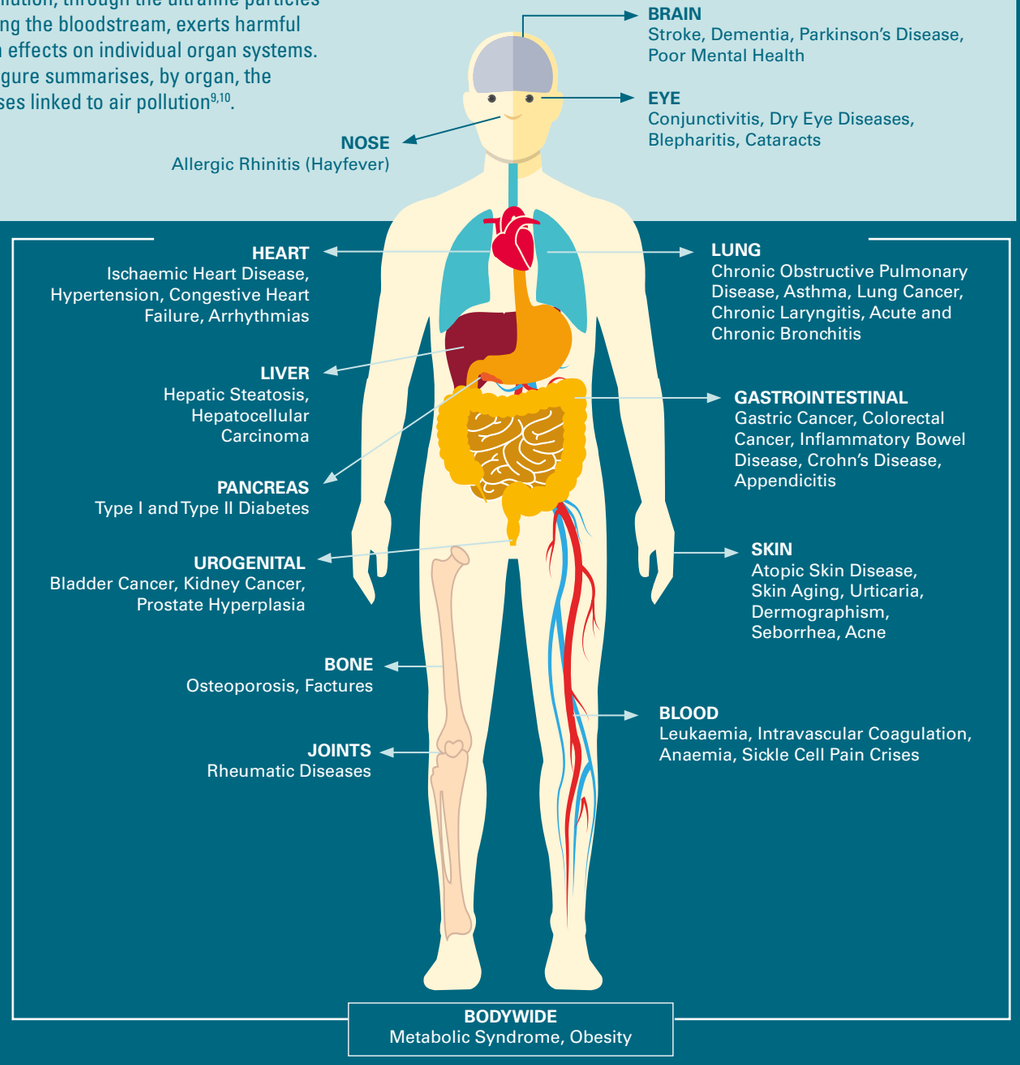
Particles with a diameter greater than 10 µm penetrate as deep as the upper airway but not further. Particles with a diameter between 2.5-10µm can go as deep as the lungs, while those with a diameter of 0.1µm or less can pass into our bloodstream.



To fully appreciate how small particulate matter is, this scaled graphic is a side-by-side comparison of its size to beach sand and a human hair.



Air pollution, through the ultrafine particles entering the bloodstream, exerts harmful health effects on individual organ systems. This figure summarises, by organ, the diseases linked to air pollution[9,10].



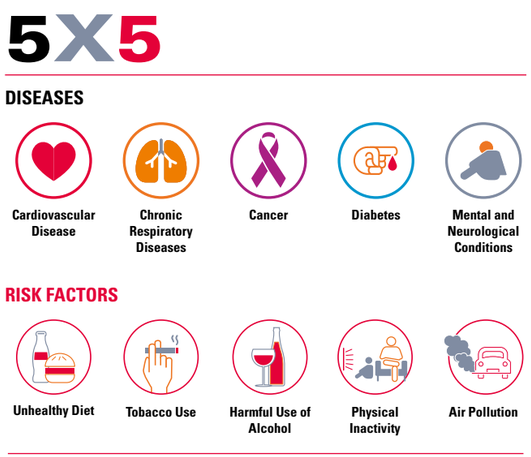
[9] Schraufnagel D, et al. Air Pollution and Noncommunicable Diseases, A Review by the Forum of International Respiratory Societies' Environmental Committee, Part 2: Air Pollution and Organ Systems. CHEST. 2019; 155(2):417-426 (online)

[10] Shin J, et al. Long-term exposure to ambient air pollutants and mental health status: A nationwide population-based cross-sectional study. PLoS One. 2018; 13(4):e0195607 (online)

Policy Links
NCD Risk Factors and Sustainable Development

Policy context: expansion of the NCD response to '5x5'

At the 2018 UN High Level Meeting on NCDs, Heads of State and Government signed a political declaration agreeing to extend the previous policy approach to NCDs[11], which sought to tackle four major risk factors: tobacco use, alcohol use, unhealthy diet and insufficient physical activity, as drivers of four main groups of NCDs: cardiovascular disease, cancers, chronic respiratory disease and diabetes. This so-called '4x4' approach is now extended to include mental health as a major NCD grouping and air pollution as a globally important risk factor – termed the '5x5' approach. The WHO has been asked to present recommendations by 2020 to Member States on cost-effective measures to reduce premature deaths caused by air pollution.



[11] A/RES/73/2 United Nations Political Declaration on NCDs, 2018. (online)

[12] Hidden Price Tags: How Ending Fossil Fuel Subsidies Would Benefit Our Health. Health and Environment Alliance, 2017 (online)

Learning from the response to other NCD risk factors

Similar strategies can be employed to address strategies for air pollution as for other NCD risk factors:

Fiscal policies

Just as taxation plays a key role in reducing consumption of other unhealthy commodities such as tobacco, alcohol, and sugar sweetened beverages, it is also an important tool to reduce the consumption of fossil fuels. A 'carbon tax' can be imposed on energy producers, companies, or at the level of individual consumption, though care is needed to guarantee that people with low income are not left without access to energy. Subsidy reform is also an important tool - G20 governments paid out 444 billion USD in subsidies to fossil fuel companies in 2014, while the use of fossil fuels resulted in estimated health costs of at least six times this amount: 2.76 trillion USD[12].

Promote healthy alternatives

Measures must reduce consumption of unhealthy commodities and promote healthier alternatives. Comparable to the need to increase availability and affordability of fruits and vegetables over unhealthy foods, the wider health community must advocate for increased access to energy from renewable sources over fossil fuels. Individuals must be presented with sustainable options that reduce the need for energy from combustible sources.

Combat industry interference

The replication of tobacco industry tactics by the alcohol and unhealthy food industries is now well understood. These same tactics are used by the fossil fuel industry, including extolling the 'benefits' of industry self-regulation, that workers and economies will suffer if regulated, asserting the importance of a seat for industry at the policy making table, and 'greenwashing' industries most at fault by promoting negligible efforts, such as minor investment in alternative energy sources. Lessons learned by the NCD community in tobacco control and combatting the tactics of other unhealthy commodity industries can also be employed to regulate the fossil fuel and other polluting industries.

Action on air quality brings benefits across the SDGs

Ensuring consideration of health in discussion fora relating to the SDGs beyond goal 3 helps to ensure that the immediate and personal impacts of air pollution are relevant for policymakers across sectors, and can be a valuable lever for decisive action.

SDG 7

Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 7 includes targets to substantially increase the share of renewable energy in the global energy mix and to enhance international cooperation to facilitate access to clean energy research and technology, both of which offer valuable health benefits. This is applicable both in and outside the home – for cooking, heating and lighting as well as transport and industry.

SDG 11

Make cities and human settlements inclusive, safe, resilient and sustainable

Targets under goal 11 span sustainable transport, and improving urban air quality. However target 11.2 on sustainable transport omits any mention of walking and cycling, both of which are important health measures since they reduce emissions, increase physical activity and improve mental wellbeing.

SDG 12

Ensure sustainable consumption and production patterns

Alongside targets to better manage natural resources and chemicals, SDG 12 also includes a dedicated target to 'rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions'.

SDG 13

Make urgent action to combat climate change and its impacts

While goal 13 is focussed on climate change, climate change and air pollution go hand-in-hand. They have similar causes, the burning of fossil fuels and waste, and each contributes to the worsening of the other. SDG13 also includes targets to 'improve education, awareness-raising and human and institutional capacity on climate change mitigation' and other interventions, and to 'implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilising jointly $100 billion annually by 2020 from all sources to address the needs of developing countries', including mitigation.

With the UN High-Level Meeting on UHC taking place on 23rd September 2019, the same day a the Climate Summit at UN Headquarters in New York, there is particular window to promote opportunities to protect human and planetary health through co-benefit action, advancing progress towards multiple SDGs. Without action to address air pollution, the burden of NCDs will continue to rise, placing increasing strain on health systems, and thwarting the achievement of UHC. **Action to reduce air pollution also serves to mitigate climate change, protecting the planet for future generations.**

Calls to Action

The greatest threat to our planet, and indeed to people's health, is the belief that someone else will save them.

Decisive action is needed from all sectors of society, with policymakers, NGOs and health professionals all having a particular role to play.

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Policymakers

1

Ensure that all policy decisions serve to protect and improve health

A 'health in all policies' approach requires decision-makers to assess and consider health impacts of decisions in other policy areas. The potential impacts of policies implemented in the energy, agriculture, transport and industry sectors at national and local level should be evaluated as part of an impact assessment, taking into account health costs across society due to resulting pollution, costs for the health system and productivity losses to the economy and any negative impacts avoided or mitigated.

2

End health harmful subsidies

Rapidly phase out subsidies for fossil fuels and polluting industries and introduce penalties for polluters and taxes on pollution.

3

Invest in health

Redirect investment to health-promoting, accessible alternatives including clean transport, renewable energy and to provide universal health coverage.

4

Provide safe housing conditions

Improve housing and ensure access to clean energy sources for indoor cooking, heating and lighting.

5

Regulate potentially health-harmful industries

Adopt and strictly enforce emissions standards for all pollutants in all relevant sectors, including industry, energy, transport, waste and agriculture.

NGOs and Communities

1

Raise awareness at local and regional levels

This will build demand for change, and mobilise a coordinated movement.

2

Amplify the voices of those affected and at risk and enabling people living with and affected by NCDs

Providing platforms for people living with NCDs and other health conditions due to air pollution to share their stories demonstrates the cost of the burden in real terms.

3

Build links with environmental counterparts

Coordinating health and environmental concerns strengthens the rationale for action on both issues and accelerates progress.

4

Develop evidence based advocacy priorities

Organisations and communities can develop and disseminate advocacy priorities rooted in robust evidence to be shared with policymakers at global, regional, and national level.

Health Professionals[4,9]

1

Know the health effects of air pollution

Health professionals should learn how air pollution affects their patients, especially the most vulnerable (young children, pregnant women, the elderly and infirm, those with lung or heart disease), and how to advise them.

2

Educate patients on the health risks of air pollution and advise them how to best protect and manage their health

Health professionals can point their patients to more information and the latest evidence and help them decide how to reduce their exposure to air pollution and its impacts. Health professionals are uniquely placed to be able to advise their patients and take a leading role in improving the health of the community.

3

Advocate for clean air

Engage with civil society campaign groups working on policy and advocacy, and also approach policymakers directly. As trusted members of society, health professionals are a powerful voice at the policy level.

4

Build capacity of other health professionals to engage

Key messages can be spread to specialists as well as primary-care health professionals. Educating students and physicians-in-training is a key to long term advocacy for clean air.

Conclusion

Air pollution is the foremost environmental risk factor for NCDs[13]. Its effects are often invisible but widespread and powerful. It preys on the vulnerable. Because of our interconnections, every organ in the body and every body in the world can be harmed. The situation is severe. The challenge is great, but the 'cure' is straight-forward. The global challenge must be met by national, regional, local, and personal responses. Air pollution reduction is a tool for improved health, not least through prevention of non-communicable diseases. Collective action from many sectors is needed to assure that everyone can breathe clean air.

THE RIGHT TO BREATHE CLEAN AIR IS AN INTEGRAL PART OF THE RIGHT TO HEALTH.

[13] Preventing noncommunicable diseases (NCDs) by reducing environmental risk factors. World Health Organization, 2017 (online)

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