Air pollution exposure and noncommunicable diseases

Key messages

» Air pollution is the second leading cause of noncommunicable diseases (NCDs), which are on the rise worldwide.

» In many countries, NCDs can only be significantly reduced by improving air quality.

» Making air pollution reduction mainstream in policies to combat NCDs reaps multiple benefits for the environment, economy and health.
Introduction

Noncommunicable diseases (NCDs) – such as stroke, cancer and heart disease – are the leading cause of death in the world. Many factors contribute to NCDs, including tobacco and alcohol use, physical inactivity, high blood pressure and obesity. After tobacco smoking, air pollution exposure is the second biggest cause of NCDs globally.

Together, ambient and household air pollution (HAP) were responsible for 7 million premature deaths in 2016. Of these, more than 5 million deaths were due to NCDs. In 2016, 16% of all NCD deaths between the ages of 30 and 69 years could be attributed to air pollution.

Deaths (000s) attributable to the joint effects of HAP and AAP in 2016, by disease

NCDs are on the rise, especially in low- and middle-income countries (LMICs). The share of the total global burden of disease due to NCDs is increasing, even as the proportion of deaths from infectious diseases is declining due to progress in prevention such as improving access to safe water and sanitation.

Of the many factors driving this rising trend in NCDs, air pollution is among the most important. For over 3 billion people who rely on polluting fuels for cooking, heating and lighting, (most of them living in LMICs) the resulting smoke is a major risk factor for many NCDs. HAP is responsible for 25% of all premature deaths from chronic obstructive pulmonary disease (COPD) in adults in LMICs, and is the single largest cause of COPD in women globally.

Most of these deaths are preventable. By reducing exposure to air pollution, millions of the lives now cut short by stroke, heart disease and cancer, can be saved.

A heavy burden of noncommunicable disease

Much of the burden of disease from NCDs can be traced to the fact that over 90% of people worldwide breathe air with pollution levels above WHO air quality guidelines.

Ambient air pollution (PM2.5) was responsible for an estimated 4.2 million premature deaths in 2016. Of these deaths, the vast majority were due to NCDs.

Globally, ambient air pollution is the cause of 29% of all deaths and disease from lung cancer; 24% of all deaths from stroke; 25% of all deaths and disease from ischaemic heart disease; and 43% of all deaths and disease from COPD.
NCDs are linked to poverty. A lack of access to clean household energy is a major source of NCD risk. In 2016, HAP from cooking killed 3.8 million people. Of those deaths, 27% were due to ischaemic heart disease, 20% from COPD, 18% from stroke, and 8% from lung cancer. For non-smokers, HAP exposure is the most important risk factor for COPD and lung cancer. For women in LMICs, HAP is the single leading cause of stroke, COPD, lung cancer and heart disease.

According to a 2013 assessment by the WHO’s International Agency for Research on Cancer (IARC), ambient air pollution is carcinogenic to humans. Because it can penetrate deep into the lungs and enter the bloodstream, fine particulate matter (PM2.5) poses a particularly potent threat. There is clear evidence that exposure to PM2.5 is associated with elevated risk of cardiovascular diseases such as IHD and stroke.

Challenges and gaps

The bulk of the NCD disease burden is due to long-term exposure to air pollutants. Short-term pollution events often garner attention from the public and policymakers, but stopgap solutions won’t stem the crisis. A patient and transformative effort to clean up both ambient and household air is needed to significantly reducing the NCD burden of disease.

The critical role of air pollution in driving NCDs has received relatively little attention in the public health sector in recent years. Disease control strategies have largely neglected to emphasize air pollution interventions as a solution to reduce NCDs, partly because doing so requires coordinated efforts from actors beyond the health sector.

The mix of pollutants in ambient air is largely dictated by choices made by leaders in industry and government, at the local, national and regional levels. Reducing the NCD disease burden by tackling emissions at their source will therefore require the involvement of key actors in a wide range of sectors.

Priorities and opportunities

For most countries and cities around the world, the fight against NCDs will only succeed if they prioritize reducing air pollution. The sectors that are the main sources of air pollution – including energy, transportation, industry, land use and waste management – must all be part of the solution to combat the NCD surge.

Cost-effective, proven, interventions are readily available

These include:
- improved waste management practices;
- expanding access to clean household energy solutions for cooking, heating and lighting;
- switching to soot-free electric buses and other urban transport systems;
- promoting and mandating cleaner heavy-duty diesel vehicles and low-emissions fuels; and
- investing in renewable, combustion-free electricity generation (e.g. wind and solar).
Instituting health-based performance and safety standards for household fuels and technologies, upgrading building energy codes and reforming fossil fuel subsidies are also key policy levers for reducing air pollution exposures.

**Such measures have crosscutting benefits for health.** For example, increasing access to walking and cycling networks can both reduce air pollution and give people more opportunities for physical activity, the lack of which is another major risk factor for NCDs.

**Addressing air pollution also generates benefits for preventing multiple diseases.** For example, improving a family’s access to clean cooking lowers their risk of pneumonia and burns, even as it reduces their chances of suffering from chronic respiratory and cardiovascular diseases.

**The way forward**

**Tackling air pollution is one of the most effective strategies for fighting the global NCD epidemic, which is a driver of poverty and a major obstacle to sustainable economic development.** Countries and cities are already committing to this fight, as part of the BreatheLife campaign led by WHO and the Climate and Clean Air Coalition (CCAC). BreatheLife provides a platform for cities and countries to share best practices and showcase progress toward meeting WHO air quality targets by 2030.