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HEALTH  
ENVIRONMENT  
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TURKEY

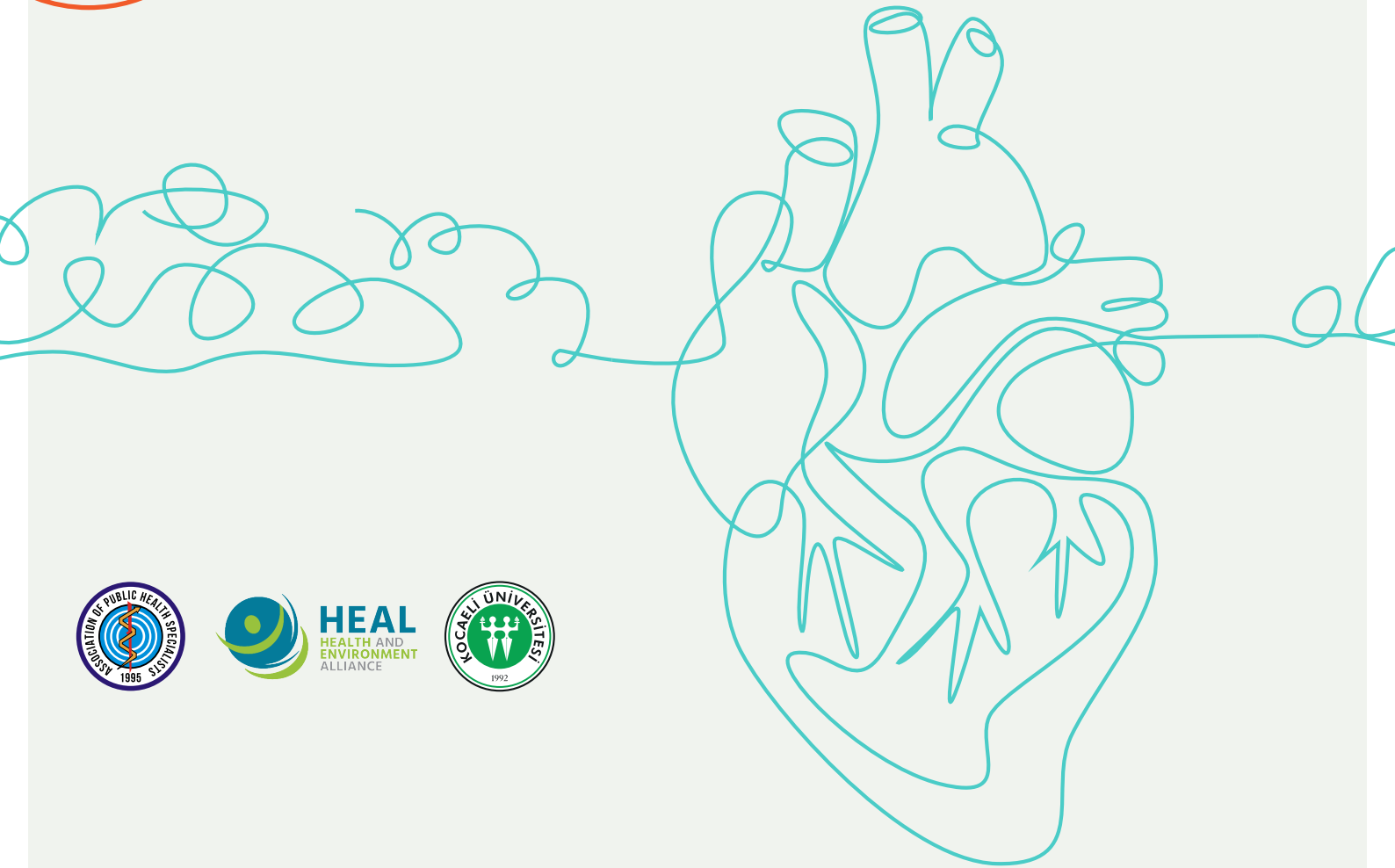


BRIEFING:

# Health Impacts of Air Pollution



**HEAL**  
HEALTH AND  
ENVIRONMENT  
ALLIANCE



# 1- Why is Air Pollution a Public Health Concern?

Air pollution has negative impacts on human life and wellbeing and it is **the third leading risk factor for death from non-communicable diseases**<sup>1</sup> after high blood pressure and tobacco use. Emissions from human activities such as heating, traffic, electricity generation, industry, mining, construction, industrial agriculture and forest fires constitute the main causes of pollution. Air pollution can be prevented by taking decisive measures.<sup>2</sup>

Air pollution causes **8 million premature** deaths every year and affects **92 percent of world population**.<sup>3</sup> The burden of disease caused by air pollution is very high and requires urgent action. It is important to note that with the right measures air pollution is a **preventable cause of death and disease**.

According to a study published in 2020, **7,9 percent** of all deaths (**31.476 deaths**) in 2019 and **12,13 percent** of all deaths in 2018 (**45.398 deaths**) in Turkey could have been avoided, if air pollution had been reduced to the World Health Organization (WHO) guideline values.<sup>4</sup> According to the same study, air pollution was responsible for **6 to 7 times** more deaths than traffic accidents in 2017-2019. Since this study was published before the WHO Air Quality Guideline (AQG) update of 2021 and therefore used higher limits than the revised WHO guidelines, it is safe to assume that air pollution will cause even more health problems.

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1 Ritchie H, R.M. Causes of Death. 2018 [cited 2022 16 Jan]; Accessed at: <https://ourworldindata.org/causes-of-death#risk-factors-for-death>

2 Right to Clean Air Platform, Dark Report, 2020: Air pollution and Health Impacts, 2020. Accessed at <https://www.temizhavahakki.com/wp-content/uploads/2020/09/Dark-Report-2020Vfinal.pdf>

Air pollution can be caused by natural phenomena such as desert dust and volcanic eruptions as well as by human activities. This report focuses on anthropogenic air pollution.

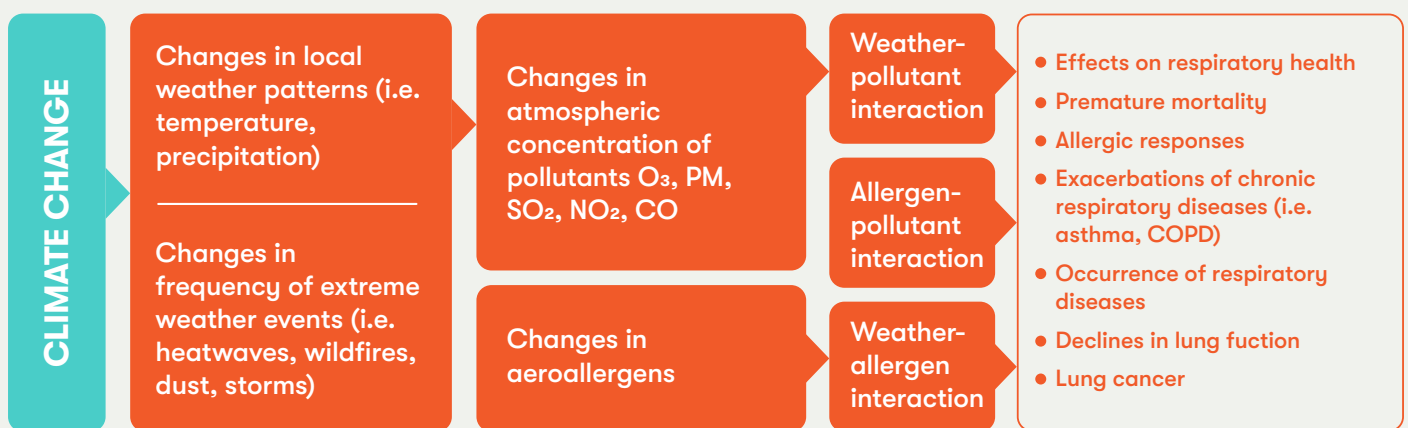
3 WHO. Air Pollution 2016 [cited 2021 16 Jan]; Accessed at: [https://www.who.int/health-topics/air-pollution#tab=tab\\_1](https://www.who.int/health-topics/air-pollution#tab=tab_1). United Nations Environment Programme accessed at: <https://www.cleanairblueskies.org/#>

4 Right to Clean Air Platform, Dark Report, 2020: Air pollution and Health Impacts, 2020. Accessed at <https://www.temizhavahakki.com/wp-content/uploads/2020/09/Dark-Report-2020Vfinal.pdf>

## What is the Link Between Air Pollution and Climate Change?

As well as driving climate change, burning fossil fuels is also a major source of air pollution. Reducing fossil fuel use can improve air quality. According to a recent study, fossil fuel combustion caused 8.7 million deaths in 2018.<sup>5</sup>

Climate change is causing average temperatures to rise, which in turn will trigger other air pollutant emissions such as ground-level ozone.<sup>6</sup> With climate change, extreme weather events such as heat waves are becoming permanent and this increases the duration of air pollution peak episodes.



**Figure 1. Climate change: its influence on extreme weather events, air pollution and aeroallergens, and effects on respiratory health. PM: particulate matter; COPD: chronic obstructive pulmonary disease.<sup>7</sup>**

Moreover, with climate change, the pollen season is getting longer and pollen intensity and diversity are increasing, directly impacting air quality. **Studies indicate that, due to climate change, the air concentrations of allergenic ragweed pollen could quadruple in Europe by 2050**, increasing the number of those affected from 33 million to 77 million.<sup>8</sup>

5 K. Vohra et al., Global mortality from outdoor fine particle pollution generated by fossil fuel combustion, *Environmental Research*, Volume 195, 2021, Accessed at: <https://doi.org/10.1016/j.envres.2021.110754>

6 University of Delaware. (23 July 2019). Ozone threat from climate change: Increasing global temperatures will impact air quality. ScienceDaily. ScienceDaily, Accessed at: [www.sciencedaily.com/releases/2019/07/190723121906.htm](http://www.sciencedaily.com/releases/2019/07/190723121906.htm)

7 M. De Sario, K. Katsouyanni, P. Michelozzi. *European Respiratory Journal*. Climate change, extreme weather events, air pollution and respiratory health in Europe. 2013, Accessed at: <https://erj.ersjournals.com/content/42/3/826>

8 HEAL, 2021, EU's Clean Air for Health Transition 2021-2030 HEAL 10 demands, Accessed at: [https://www.env-health.org/wp-content/uploads/2021/09/HEAL\\_10-demands\\_air-quality\\_September21.pdf](https://www.env-health.org/wp-content/uploads/2021/09/HEAL_10-demands_air-quality_September21.pdf)

Improving air quality will enhance climate change mitigation efforts, and reducing emissions will improve air quality. By attaining the 2021 WHO AQG recommendations, countries can protect public health as well as mitigate global climate change impacts.<sup>9</sup>

## **Main Pollutants**

Air pollution is the pollution of the air we breathe indoors and outdoors by any chemical, physical or biological factor that potentially threatens human and ecosystem health. The main air pollutants that have negative health impacts are particulate matter (PM<sub>10</sub>) and fine particulate matter (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>) and carbon monoxide (CO).

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<sup>9</sup> WHO, 2021, accessed at: <https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution>

## 2- Why is Air Pollution a Health Problem?

### Health Impacts of Air Pollution

Exposure to air pollution leads to millions of premature deaths and substantial loss of healthy life years each year.<sup>10</sup> Air pollution is recognized as the greatest environmental threat to human health because the burden of disease attributable to air pollution is on a par with other major global health risks such as unhealthy diet and tobacco use.<sup>11</sup>

Pollutant compounds in the atmosphere cause a wide variety of health impacts. These impacts vary according to the type of pollutant and duration of the exposure. Moreover, the impacts vary according to a number of susceptibility factors such as age, nutritional status, health status and genetic predisposition.<sup>12</sup> **Almost all organs and systems are affected by air pollution.**<sup>13</sup> The cardiovascular and respiratory systems are particularly affected by air pollution.<sup>14</sup>

Scientific research indicates that exposure to air pollution increases long and short term cardiovascular disease death rates by increasing the incidence of heart attack, stroke and heart failure.<sup>15</sup>

Although the risk of cardiovascular disease increases with the level and duration of exposure, studies have concluded that there are no safe threshold values.<sup>16</sup> Long-term exposure to particulate matter and nitrogen oxides at low levels can age blood vessels prematurely and lead to a faster buildup of calcium in the coronary artery.<sup>17</sup> This calcium buildup can restrict blood flow to the heart and other major blood vessels, increasing the likelihood of cardiovascular events such as heart attack and stroke.

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10 Cohen, A.J., et al., Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *Lancet*, 2017. 389(10082): p. 1907-1918.

11 WHO, WHO global air quality guidelines. Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. 2021, World Health Organization Geneva.

12 Kampa, M. and E. Castanas, Human health effects of air pollution. *Environ Pollut*, 2008. 151(2): p. 362-7.

13 Ghanim, A.A.J., Analyzing the severity of coronavirus infections in relation to air pollution: evidence-based study from Saudi Arabia. *Environ Sci Pollut Res Int*, 2021.

14 Kunzli, N. and I.B. Tager, Air pollution: from lung to heart. *Swiss Med Wkly*, 2005. 135(47-48): p. 697-702.

15 Bourdrel, T., Bind, M. A., Béjot, Y., Morel, O., & Argacha, J. F., Cardiovascular effects of air pollution. . *Archives of cardiovascular diseases*, 2017. 110(11): p. 634-642.

16 Al-Kindi, S.G., et al., Environmental determinants of cardiovascular disease: lessons learned from air pollution. *Nat Rev Cardiol*, 2020. 17(10): p. 656-672.

17 Kaufman, J.D., et al., Association between air pollution and coronary artery calcification within six metropolitan areas in the USA (the Multi-Ethnic Study of Atherosclerosis and Air Pollution): a longitudinal cohort study. *Lancet*, 2016. 388(10045): p. 696-704.

All air pollutants affect the airways.<sup>18</sup> Studies have reported increased respiratory symptoms, decreased respiratory function, and increased airway inflammation related to acute exposure to fine particles, particularly in children and those diagnosed with asthma.<sup>19</sup> Exposure to particulate matter is causing an increase in respiratory symptoms, including COPD and respiratory infections, and an increase in emergency room visits and hospital admissions. Prolonged exposure to low concentrations of pollutants produce similar effects on the respiratory system. Long-term exposure to particulate matter and nitrogen oxides at low levels has negative effects on the development of lung functions in children, and decreased lung function may lead to lung failure in the future.<sup>20</sup> Chronic exposure to air pollution, even at low levels, increases the frequency and severity of respiratory symptoms, especially in individuals with asthma and COPD.<sup>21</sup>

A recent review found that chronic exposure to air pollution can affect every organ in the body, complicating and worsening existing health conditions.<sup>22</sup> WHO provides evidence of the links between exposure to air pollution and Type 2 diabetes, obesity, systemic inflammation, Alzheimer's disease and dementia.<sup>23</sup> **Pollution affects the immune system.**

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18 Kampa, M. and E. Castanas, Human health effects of air pollution. *Environ Pollut*, 2008. 151(2): p. 362-7.

19 EPA, U.S. Particle Pollution and Respiratory Effects. 2021 [cited 2021 12 Jan ]; Accessed at: <https://www.epa.gov/particle-pollution-and-your-patients-health/health-effects-pm-patients-lung-disease>.

20 Gauderman, W.J., et al., Association between air pollution and lung function growth in Southern California children - Results from a second cohort. *American Journal of Respiratory and Critical Care Medicine*, 2002. 166(1): p. 76-84.

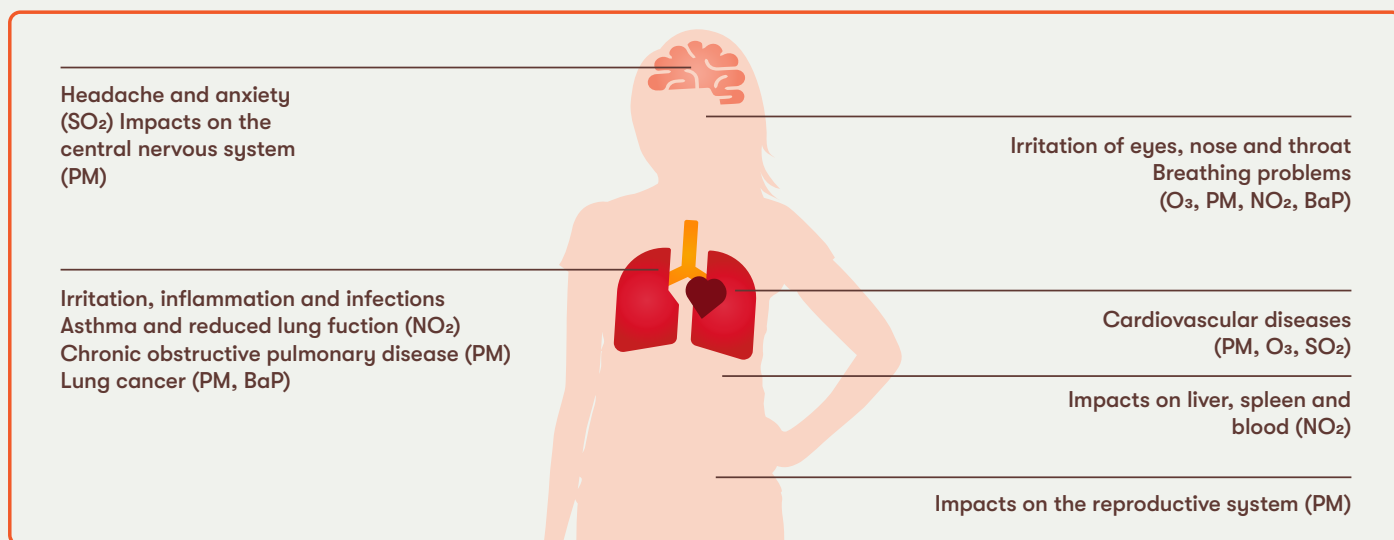
21 EPA, U.S. Particle Pollution and Respiratory Effects. 2021 [cited 2021 12 Jan ]; Accessed at: <https://www.epa.gov/particle-pollution-and-your-patients-health/health-effects-pm-patients-lung-disease>.

22 Schraufnagel, D.E., 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): p. 417-426.

23 WHO, WHO Expert Consultation: Available evidence for the future update of the WHO Global Air Quality Guidelines. 2016, World Health Organisation: Bonn, Germany.

By causing allergic sensitivity, air pollution leads to both the development and the exacerbation of allergic diseases.<sup>24</sup>

"Outdoor air pollution", which was categorized as "Group 1 Carcinogenic to Humans" by the International Agency for Research on Cancer in 2013, has been recognized as a carcinogen for lungs and has been reported to increase the risk of bladder cancer.<sup>25</sup>



**Figure 2. Health Impacts of Air Pollution<sup>26</sup>**

## Burden of Disease and Burden of Death Attributed to Air Pollution

According to the WHO, air pollution causes a total of 8 million premature deaths a year; ambient (outdoor) pollution from industrial activities, traffic and heating accounts for 4.2 million deaths while 3.8 million deaths are attributable to indoor air pollution caused by fuels used for residential heating and cooking.<sup>27</sup>

According to the Global Burden of Disease Study for 2019, air pollution is the third most important risk factor for deaths across all age groups and both sexes worldwide (Figure 3). The study calculated the global burden of 87 risk factors from 204 countries and regions and concluded that 2.92 million female deaths (11,3 percent of total female deaths) and 3.75 million male deaths (12,2 percent of total male deaths) were caused by air pollution.<sup>28</sup>

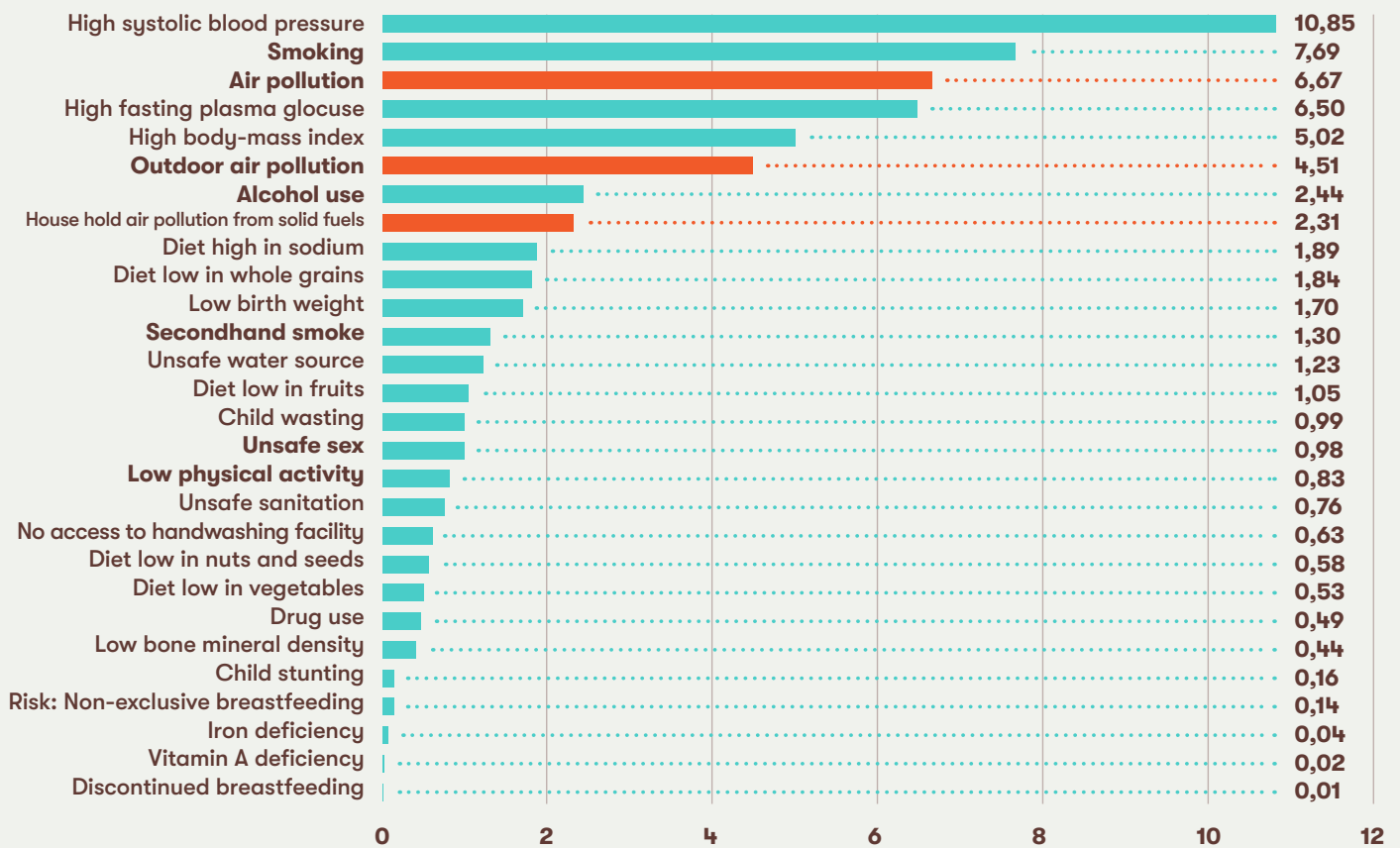
<sup>24</sup> Schraufnagel, D.E., et al., Air Pollution and Noncommunicable Diseases: A Review by the Forum of International Respiratory Societies' Environmental Committee, Part 2: Air Pollution and Organ Systems. *Chest*, 2019. 155(2): p. 417-426.

<sup>25</sup> IARC, Air Pollution and Cancer: IARC Scientific Publication No. 161, A.C.a.J.S. Kurt Straif, Editor. 2013, International Agency for Research on Cancer.

<sup>26</sup> EEA. Air pollution: how it affects our health. 2021 [cited 2021 16 Jan]; Accessed at: <https://www.eea.europa.eu/themes/air/health-impacts-of-air-pollution>

<sup>27</sup> WHO. Air Pollution 2016 [cited 2021 16 Jan]; Accessed at: [https://www.who.int/health-topics/air-pollution#tab=tab\\_1](https://www.who.int/health-topics/air-pollution#tab=tab_1)

<sup>28</sup> Collaborators, G.B.D.R.F., Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*, 2020. 396(10258): p. 1223-1249.



**Table 1. Number of Deaths by Risk Factors, World, 2019<sup>29</sup>**

Total annual number of deaths by risk factor, measured across all age groups and both sexes

The Right to Clean Air Platform’s Air Pollution and Health Effects report published in 2020 indicates that air pollution in Turkey was responsible for almost 6-7 times more deaths than traffic accidents in 2017-2019.<sup>30</sup> According to the same report, **7,9 percent** of all deaths (**31.476 deaths**) in 2019 and **12,13 percent** of all deaths in 2018 (**45.398 deaths**) could have been avoided if air pollution in Turkey had been reduced to the WHO AQG recommendations.

<sup>29</sup> Ritchie H, R.M. Causes of Death. 2018 [cited 2022 16 Jan]; Accessed at: <https://ourworldindata.org/causes-of-death#risk-factors-for-death>

<sup>30</sup> RCAP, Air Pollution and Health Impacts. 2020, Right to Clean Air Platform, İstanbul.



## Who is Most Affected by Air Pollution?

Exposure to airborne pollutants threatens the health of people of all ages around the world, in both urban and rural areas, but is an even greater threat for the most vulnerable groups.<sup>31</sup> The health risk from air pollution varies according to age, place of residence, basic health and sociodemographic characteristics.

Populations most at risk of health problems related to air pollution are:<sup>32</sup>



**Infants  
and  
children**

**Adults over  
65**



**People with  
chronic  
illnesses**

**People living  
in poverty**



**People working in  
occupations where  
there is high exposure  
to contaminated air**



31 World Health Organization. Air pollution and child health: prescribing clean air: summary. No. WHO/CED/PHE/18.01. World Health Organization, 2018

32 Who is at risk from air pollution? [Internet]. Accessed at: <https://www.pca.state.mn.us/air/who-risk-air-pollution#:~:text=The>

**Infants and children** are the most vulnerable group when it comes to the harmful health effects of air pollution. During fetal development and in the earliest years, they are more affected by airborne pollutants as their lungs, organs and brains are still maturing. Also, children breathe primarily through the mouth, meaning that particles are not filtered by the nose and can directly enter the lower airways. Children breathe faster than adults, taking in more air and with it more pollutants. Furthermore, they live closer to the ground and are more exposed to some pollutants that settle on the ground. Newborns and infants spend most of their time indoors with their mothers, where they are more susceptible to indoor air pollution. Older children, on the other hand, may spend a lot of time outside, doing physical activity and playing in potentially polluted air. Children are also vulnerable as they depend entirely on adults for protection and coping with the effects of polluted air. Breathing, ingestion or exposure to airborne pollutants in the womb causes death, lifelong illnesses and other health problems in children.<sup>33</sup> Exposure to air pollution during pregnancy can lead to stillbirth, premature birth, intrauterine growth retardation and low birth weight, and may cause neurodevelopmental problems and decrease in lung functions in the later stages of life.

Exposure to heavy metals such as methyl mercury and lead in the womb may affect the IQ levels of the child. Studies with pediatric patients have demonstrated that gene-specific DNA methylation is a probable mediator of the association between exposure to air pollution and asthma attacks.<sup>34</sup>

According to 2016 data, 93 percent of children worldwide were exposed to PM<sub>2.5</sub> pollution at levels exceeding the annual average WHO AQG. According to the WHO, in 2016, 9 percent of the total number of deaths attributable to the joint effects of household and ambient air pollution worldwide were children, with 543.000 deaths in children under 5 years and 52.000 deaths in children aged 5–15 years.

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33 World Health Organization. Air pollution and child health: prescribing clean air: summary. No. WHO/CED/PHE/18.01. World Health Organization, 2018. What are the effects of air pollution on children's health and development? [Internet]. Accessed at: <https://www.euro.who.int/en/data-and-evidence/evidence-informed-policy-making/publications/hen-summaries-of-network-members-reports/what-are-the-effects-of-air-pollution-on-childrens-health-and-development>

34 World Health Organization. Air pollution and child health: prescribing clean air: summary. No. WHO/CED/PHE/18.01. World Health Organization, 2018. What are the effects of air pollution on children's health and development? [Internet]. Accessed at: <https://www.euro.who.int/en/data-and-evidence/evidence-informed-policy-making/publications/hen-summaries-of-network-members-reports/what-are-the-effects-of-air-pollution-on-childrens-health-and-development> Ferrari L, Carugno M, Bollati V. Particulate matter exposure shapes DNA methylation through the lifespan. *ClinEpigenetics*. 2019 Aug 30;11(1):129. doi: 10.1186/s13148-019-0726-x.

Andrea L. Moreno-Ríos, Lesly P. Tejeda-Benítez, Ciro F. Bustillo-Lecompte. Sources, characteristics, toxicity, and control of ultrafine particles: An overview. *GeoscienceFrontiers*, <https://doi.org/10.1016/j.gsf.2021.101147>.

Moreover, household air pollution and ambient air pollution together are responsible for more than 50 percent of acute lower respiratory tract infection in children under 5 years in low and middle income countries.<sup>35</sup>

According to a study conducted by Funda Gacal and Çiğdem Çağlayan, in 2018, 19 million children (0-14 years old, 23 percent of the population) in Turkey were exposed to an average PM<sub>10</sub> concentration of 49 µg/m<sup>3</sup>. Our study showed that if the PM<sub>10</sub> concentrations in each city had been reduced to the WHO AQG limits, 8.959 hospital admissions (respiratory, cerebrovascular, and cardiovascular combined), 17,8 percent of acute deaths and 11,9 percent of infant deaths that occurred in 2018 could have been avoided.<sup>36</sup> According to another HEAL study on the cumulative health impacts and costs of thirty Turkish coal power plants between 1965 and 2020, air pollution from coal caused 117.661 preterm births and 1.247.344 cases of pediatric acute bronchitis. The same study determined that children suffered from asthma and bronchitis symptoms for 11.163.625 days.<sup>37</sup>

Other groups most severely affected by air pollution include the elderly and people with chronic diseases such as heart or lung conditions. Old age is associated with several factors -such as the biological effects of past exposures and weakened immune responses- that may contribute to a reduced physiological capacity to cope with air pollution.

Moreover, the elderly are more vulnerable, largely because they have a higher frequency of underlying conditions, particularly cardiovascular and respiratory diseases.<sup>38</sup>

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35 World Health Organization. Air pollution and child health: prescribing clean air: summary. No. WHO/CED/PHE/18.01. World Health Organization, 2018

36 Gacal F & Çağlayan Ç. (2020). Benefits of Reducing PM10 Pollution to WHO Standards for Children Health in Turkey. Abstract for the 10th International Conference on Children's Health and Environment.

37 HEAL. (2022). Chronic coal pollution Turkey: Cumulative health effects. HEAL. Accessed at: <https://www.env-health.org/wp-content/uploads/2022/01/Table-da-ta-CC-turkey.pdf>

38 Makri, Anna, and Nikolaos I. Stilianakis. "Vulnerability to air pollution health effects." *International journal of hygiene and environmental health* 211.3-4 (2008): 326-336

# 3- The importance of the WHO Global Air Quality Guideline

## How to use the WHO Global Air Quality Guidelines

The Air Quality Guidelines (AQGs) are strong evidence-based guidelines to protect public health. The AQG recommendations are not legally binding recommendations. However, the AQGs can be used as an evidence-based reference tool by decision makers to set legally binding standards and targets for air quality management at international, national and local levels.

They can also be used by academics and relevant authorities (national and local) working in the air quality field for planning and impact assessments, and can encourage them to do further research and monitoring. They can also be used by non-governmental and academic organizations as an advocacy tool to protect public health from the impacts of air pollution.<sup>39</sup>

Based on extensive scientific evidence, the WHO AQGs set the air quality levels necessary to protect public health worldwide. The guidelines also serve as a reference for assessing whether and how much a community's exposure to air pollution exceeds the levels at which it can cause health problems. Published following a transparent and evidence-based review process of extremely high methodological quality, **the guidelines are the gold standard for evidence-based air quality with a focus on human health and based on the latest science.**<sup>40</sup>

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<sup>39</sup> WHO, WHO Global Air Quality Guidelines, 2021, Accessed at: <https://www.who.int/news-room/questions-and-answers/item/who-global-air-quality-guidelines>

<sup>40</sup> HEAL, Health and air quality standards in the European Union, 2021. Accessed at: [https://www.env-health.org/wp-content/uploads/2021/09/Air-Quality-QA\\_Short\\_EN.pdf](https://www.env-health.org/wp-content/uploads/2021/09/Air-Quality-QA_Short_EN.pdf)

## Achieving the Recommended Levels in the Guidelines will Deliver Significant Health Benefits Globally

WHO performed a rapid scenario analysis to assess the health gains attributable to improved annual ambient particulate matter concentrations if air quality guideline levels were attained. It concluded that **if the annual air quality guideline level for PM<sub>2.5</sub> were attained, approximately 80 percent of deaths attributed to PM<sub>2.5</sub> exposure in the world could be avoided.**<sup>41</sup>

The following table, which features the WHO AQGs 2005 values, the updated WHO AQGs values updated in September 2021 and the current pollutant limits in Turkey, indicates that Turkey needs to rapidly set new limits. **Air pollution has very serious health impacts and adverse health effects can be observed at very low concentration levels.**

Pollutant	2005 AQG (µg/m <sup>3</sup> )	2021 AQG (µg/m <sup>3</sup> )	Current limit in Turkey (µg/m <sup>3</sup> )
PM <sub>10</sub> (Annual value)	20 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>
PM <sub>2.5</sub> (Annual value)	10 µg/m <sup>3</sup>	5 µg/m <sup>3</sup>	-
NO <sub>2</sub> (Annual value)	40 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>
SO <sub>2</sub> (Daily value)	20 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>	20 µg/m <sup>3</sup>
O <sub>3</sub> (Peak season value)	-	60 µg/m <sup>3</sup>	120 µg/m <sup>3</sup>
CO (Daily value)	-	4 µg/m <sup>3</sup>	10 µg/m <sup>3</sup>

**Table 2. 2005 and 2021 WHO Air Quality Guidelines Recommendations and Current Pollutant Limits in Turkey<sup>42</sup>**

<sup>41</sup> WHO, WHO Global Air Quality Guidelines, 2021. Accessed at: <https://www.who.int/news-room/questions-and-answers/item/who-global-air-quality-guidelines>

<sup>42</sup> WHO, What are the WHO Air Quality Guidelines? 2021. Accessed at: <https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines>

## 4- The Air Quality Assessment and Management Regulation in Turkey

The Turkish Air Quality Assessment and Management Regulation entered into force in April 2008. The goals of the regulation are to define and establish air quality target values in order to prevent or reduce the adverse effects of air pollution on the ecosystem and human health, to evaluate air quality based on defined methods and criteria, to maintain the current air quality status where it is already good or to improve it, to collect sufficient information and to inform the public through warning thresholds.<sup>43</sup>

An important shortcoming worth mentioning is that there are no regulations regarding  $PM_{2.5}$  limit values in Turkey and  $PM_{2.5}$  is not widely measured.<sup>44</sup> In 2021, the Ambient Air Quality Management Regulation Draft, which was prepared by the Ministry of Environment, Urbanization and Climate Change in the context of the harmonization process with the European Union Acquis, was made available for consultation. The Draft included reduction scenarios specific to  $PM_{2.5}$  (National Exposure Reduction Target), however the exposure reduction target was set at  $18 \mu\text{g}/\text{m}^3$  by 2034.

In 1979, Turkey ratified the United Nations Convention on Long-Range Transboundary Air Pollution (CLRTAP). According to the convention, measures against air pollution with cross-border effects are discussed at intergovernmental platforms to prevent unilateral steps and to provide mutual health and environmental benefits. Furthermore, Turkey has enacted regulations on the "Control of Industrial Air Pollution", the "Control of Air Pollution Resulting from Heating" and "Exhaust Gas Emission Control".

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<sup>43</sup> Air Quality Assessment and Management Regulation, 2008, accessed at: <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=12188&MevzuatTur=7&MevzuatTertip=5>

<sup>44</sup> RCAP, Dark Report 2021: Air Pollution and Health Impacts, 2021 p.64, accessed at: <https://www.temizhavahakki.com/wp-content/uploads/2020/09/Dark-Report-2020Vfinal.pdf>

## How is Air Quality Monitored in Turkey?

In Turkey, air quality is monitored in real time through the Ministry of Environment, Urbanization and Climate Change ground-level stations and data is available to the public.<sup>45</sup> However, measurement results from official monitoring stations can also be misleading, for example, **if the station is not located in one of the city's most polluted spots, the pollution level may appear low.** Moreover, not all pollutants – e.g. **PM<sub>2.5</sub>** – are monitored for lack of equipment. The ministry plans to establish eight “Clean Air Centers” in Istanbul, Samsun, Erzurum, İzmir, Adana, Konya, Ankara and Diyarbakır cities and to reach a target of 330 stations.<sup>46</sup>

## Do National Legislations Take the WHO AQGs into Account?

The design process of the current EU air quality directive took into account the 2005 WHO AQGs (however, the EU PM limit is more than double what the WHO recommends). Revisions to set current EU Air Quality Standards closer to WHO recommendations are ongoing. Turkey, on the other hand, has targeted the European Union limits for air quality limit values, but has planned to reach these target values gradually.<sup>47</sup>

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<sup>45</sup> Ministry of Environment, Urbanization and Climate Change, Air quality monitoring website <https://www.havaizleme.gov.tr/>

<sup>46</sup> Ministry of Environment, Urbanization and Climate Change, Air Quality Monitoring System, accessed at: <https://sim.csb.gov.tr/Home/HKI?baslik=HAVZA%20%C4%BOZLEME%20S%C4%B0STEM%C4%B0>

<sup>47</sup> Istanbul Metropolitan Municipality, Air Quality Assessment and Management Regulation, accessed at: <https://havakalitesi.ibb.gov.tr/Icerik/mevzuat>

## 5- The Role of Health Professionals



Air pollution is one of the biggest obstacles in maintaining health and preventing diseases. Tackling air pollution and the health problems it causes is of vital importance and should be one of the primary responsibilities of every health professional. All health professionals can help to achieve clean air for health, through personal efforts and engagement in health organizations.

At the General Assembly held in October 2020, the World Medical Association (WMA) underlined that "health professionals have a duty to care, respect and protect human life, as well as the right to live for future generations and all forms of the natural living world."<sup>48</sup>

One of the specific steps that can be taken rapidly is updating the curriculum in medical faculties and adding courses that focus on environmental health, thereby preparing health systems for the health impacts of climate change. Moreover, it is important to call upon decision makers to adopt and encourage the implementation of air quality and climate change policies that align with WHO AQG values.

Another important point is to adopt stricter regulations regarding environmental protection and assessment, permit, monitoring and control procedures to limit the health impacts caused by the emissions of new industrial facilities.

**Health professionals should advocate for leaving a habitable planet for future generations and address the intrinsic links between health, environment and climate at every platform.**

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<sup>48</sup> WMA, WMA Resolution on Protecting the Future Generation's right to Live in a Healthy Environment, 2020, accessed at: <https://www.wma.net/policies-post/wma-resolution-on-protecting-the-future-generations-right-to-live-in-a-healthy-environment/>



## 6- Recommendations for Decision-Makers



### 1. Include the WHO Air Quality Guidelines in National Action Plan

Although the WHO AQGs do not make legally binding recommendations on achieving clean air, they can be considered a milestone. To attain the WHO AQG recommended concentrations, Turkey needs to define a time plan, to target zero emissions as well as zero pollution and prioritize measures that benefit health, clean air and climate.

### 2. Monitor Pollution

Monitoring air pollution throughout the country is an important measure to protect public health. Aligning national limits with the WHO AQGs, particularly for  $PM_{2.5}$ , increasing the number of  $PM_{2.5}$  stations, providing easy access to data and enhancing the internet interface are important action points.

### 3. Allow Access to Health Data

Sharing health data on air pollution with the public and the health sector will play a key role in determining which air pollution measures need to be prioritized. Allowing access to disease data to calculate the number of premature deaths, causes of death and health effects attributed to air pollution will foster academic studies and lay the groundwork for efficient action.

#### **4. End Subsidies Provided to Fossil Fuels and Other Pollutants**

Rapidly ending all new investments and subsidies provided to the dominant source of climate change, namely fossil fuels, and a fair and rapid transition to renewable energy models will play an important role in reducing pollution. Supporting policies, including energy policies, that advocate and focus on public health will be important for the health of the entire society.

#### **5. Apply the Health Impact Assessment (HIA) Method**

Completing the necessary processes to include the HIA method in the development and permit processes of industrial investments will constitute an important gain for public health as well as for the overall well-being of the environment.

#### **6. Involve Health Professionals in Decision-Making Processes**

The active participation of health professionals, particularly in investment decisions that will impact public health as well as in efforts and policies to reduce pollution is crucial in protecting and improving public health.

## About the Project

This briefing has been published as part of the CISIP project.

The Environment, Climate and Health Cooperation Project (ÇİSİP in Turkish) was launched by the Health and Environment Alliance (HEAL), HASUDER (Association of Public Health Professionals - Turkey) and Kocaeli University Department of Public Health in April 2020. Funded by the European Union, CISIP's aim is to bring together all environmental health actors in Turkey and to support health professionals in the fields of environmental and climate policies.

The Environment, Climate and Health Cooperation Project will continue until April 2023 and aims to:

- Establish a collaborative platform on the environment and climate change for all health professionals.
- Organize online trainings, provide mobile training seminars and courses for medical students on the environment and climate change with a public health perspective.
- Create a dialogue between health professionals in Turkey, professional organizations, non-governmental organizations and think tanks in Europe.
- Produce environmental, climate change and health content, briefs and training materials directed to health professionals.



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