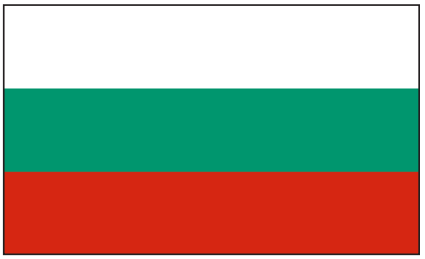
AIR POLLUTION AND HEALTH IN BULGARIA



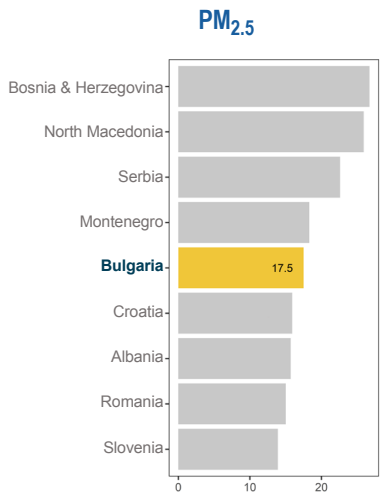
Air pollution continues to be a leading health concern in Bulgaria and the rest of Southeast Europe,[1] where countries experience $PM_{2.5}$ exposures well above the World Health Organization (WHO) annual guideline value of 5 µg/m³.

Exposure to Air Pollution

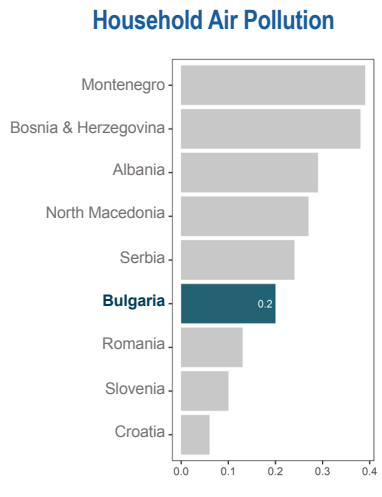
Air pollution is a complex mixture of particles and gases, whose sources and composition vary in time and space.

- **100%** of the population in Bulgaria lives in areas that do not meet the **WHO guideline for $PM_{2.5}$** (5 µg/m³). However, all of Bulgaria's population lives in areas **below** the least stringent WHO **Interim Target 1** (35 µg/m³) for $PM_{2.5}$, and only 6.09% live above the current annual EU air quality limit value (25 µg/m³).
- **99%** of the population in Bulgaria lives in areas that do not meet the **WHO guideline for ozone** (60 µg/m³), but just 1% live in areas above the least stringent interim target for ozone (100 µg/m³).
- The annual average $PM_{2.5}$ exposure in Bulgaria in 2019 was **19.4 µg/m³**.
- ***Good News***: $PM_{2.5}$ annual average exposure **decreased** for Bulgaria by 3.40 µg/m³ (14.9%) since 2010, down from 22.8 µg/m³.

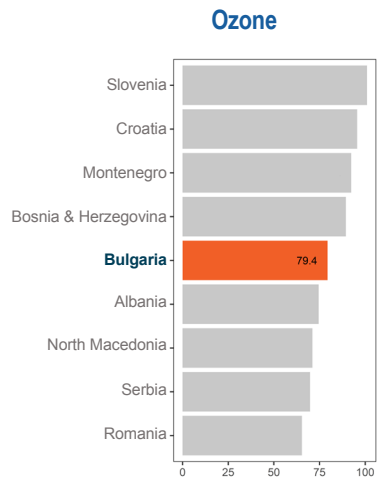
Countries in Southeast Europe with the Highest $PM_{2.5}$, Household Air Pollution, and Ozone Exposures in 2019



Population-weighted annual average $PM_{2.5}$ exposures (µg/m³)



Percentage of population relying on solid fuels for cooking



Population-weighted average seasonal 8-hour maximum ozone exposure (µg/m³)

How Have Pollutant Exposures Changed Between 2010 and 2019?

$PM_{2.5}$ (presented as population-weighted annual average concentration)
- **Lower** in 2019 (19.4 µg/m³) than in 2010 (22.8 µg/m³)
- **Higher** than EU-28 average (11.4 µg/m³)

Household Air Pollution (% of population relying on solid fuels for cooking)
- **Lower** in 2019 (20.0%) than in 2010 (22.2%)

Ozone (presented as population-weighted seasonal average concentration)
- **Lower** in 2019 (79.4 µg/m³) than in 2010 (87.6 µg/m³)
- **Lower** than EU-28 average (83.5 µg/m³)

[1] Southeast Europe refers to Albania, Bulgaria, Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, Romania, Serbia, and Slovenia.

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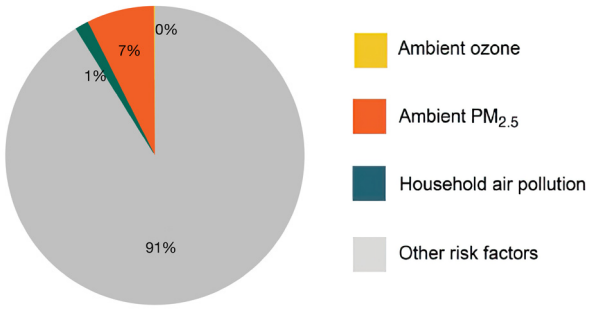
Impacts of Air Quality on Health

Long-term exposures to air pollution contribute to increased risk of illness and death from chronic noncommunicable diseases, such as ischemic heart disease, lung cancer, chronic obstructive pulmonary disease (COPD), stroke, and type 2 diabetes as well as lower respiratory infections (e.g., pneumonia), especially in children under 5 years of age. Exposure to $PM_{2.5}$ also puts mothers at risk of delivering babies too early and smaller than normal, and these babies are more susceptible to dying from a range of diseases or are considered to be at increased risk for diseases later in life. There is also emerging evidence on the role of air pollution in cognitive disorders, including dementia. MORE.

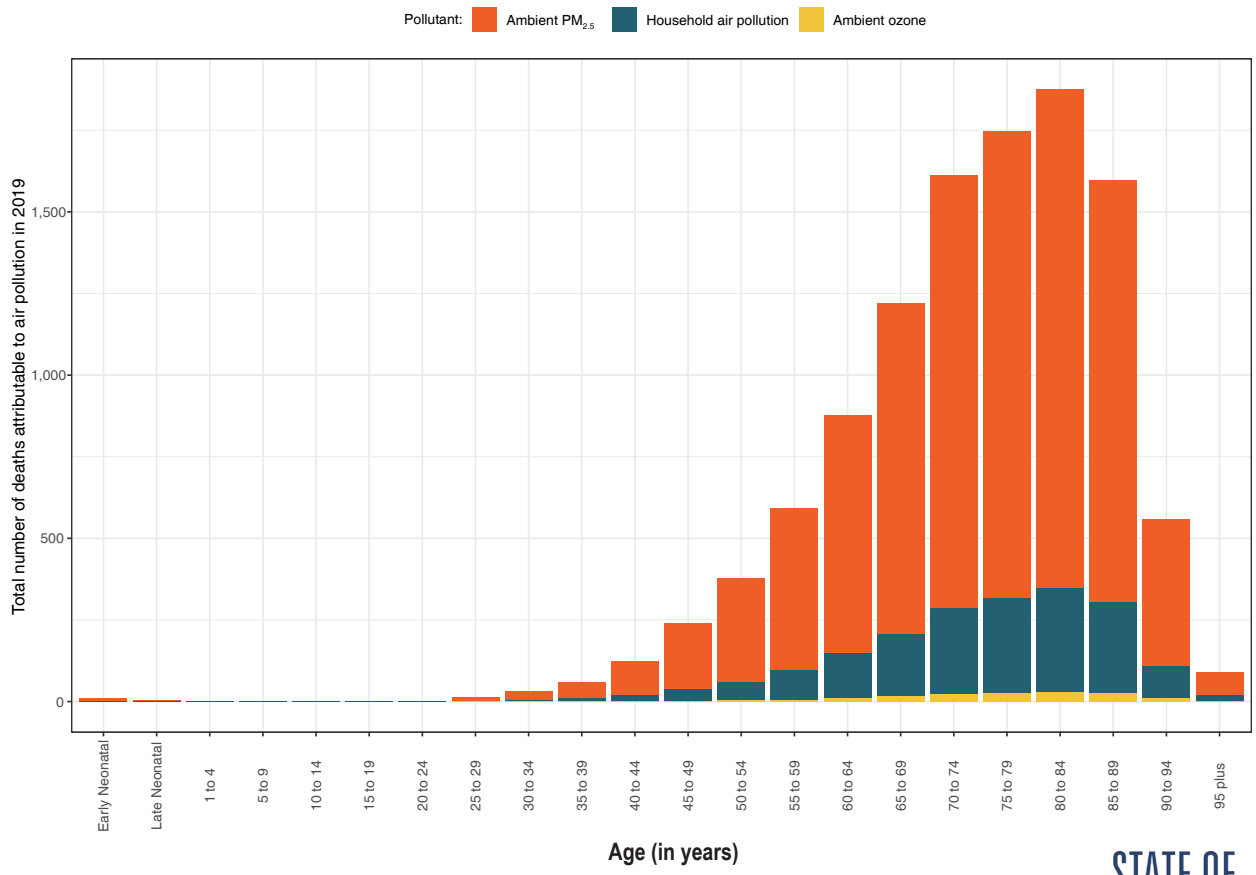
- Air pollution was the **seventh highest** risk factor for ill health in Bulgaria in 2019.
- **9%** of total **deaths** in Bulgaria (11,000 deaths) were linked to air pollution in 2019. Outdoor $PM_{2.5}$ accounted for the **largest fraction** of air pollution–related deaths (9,000 deaths or 7.3% of total deaths).
- The $PM_{2.5}$-linked death rate exceeded the global rate of 53.5 deaths/100,000 people at 131 deaths/100,000 people.
- On average, nearly **20% of all COPD-related deaths** were attributed to air pollution.

Percentage of Total Deaths Including Those Linked to Individual Pollutants (Ozone, $PM_{2.5}$, and Household Air Pollution) in Bulgaria in 2019



How Does Air Pollution Affect the Young and the Old?

- Across Bulgaria and the rest of Southeast Europe, the peak in pollution-related deaths occurs in the **older age group** (ages 70 or older). **82%** are related to exposure to ambient **$PM_{2.5}$ exposure**.
- Exposure to air pollution accounted for **6% of infant deaths**.



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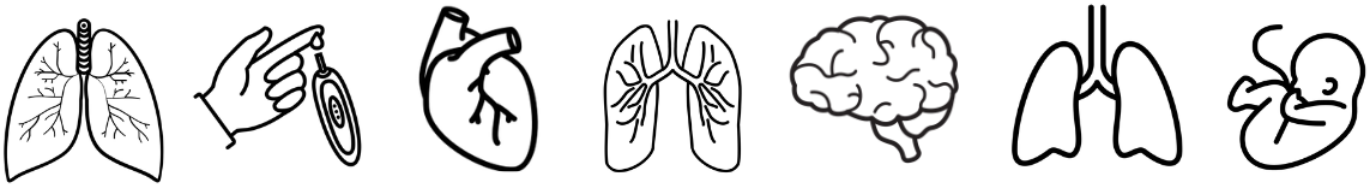
Percentage of Deaths (by Cause) Linked to Air Pollution in Bulgaria in 2019



20% of COPD deaths

18% of diabetes deaths

14% of ischemic heart disease deaths

16% of lung cancer deaths

15% of ischemic stroke deaths

12% of lower respiratory infection deaths

6% of neonatal deaths

Key Sources of $PM_{2.5}$ in Bulgaria

$PM_{2.5}$ is generated from both natural and anthropogenic (or man-made) sources. Common natural sources include wind-blown dust, sea spray, and wildfires, while anthropogenic sources include fossil fuel and biofuel combustion, industrial processes, agriculture, and waste management. To identify priority actions and most cost-effective solutions, it is critical to understand the major sources, especially anthropogenic sources, of air pollution.

- Key sources of $PM_{2.5}$ in Bulgaria include residential combustion, energy production, windblown dust, agriculture, anthropogenic dust, and industry. Important fuel contributors to $PM_{2.5}$ exposures in the region include **coal**, **liquid fuel** and **natural gas**, and **solid biofuels**.
- Use of **fossil fuels** (i.e., coal, oil, and natural gas) is linked to **30.4%** of the total disease burden related to $PM_{2.5}$ in Bulgaria.
- As individual sources, **residential** sources contributed the most (17.6%) to $PM_{2.5}$-attributable deaths in 2019, followed by **energy production** (17%), **windblown dust** (14%), and **agriculture** (13%), and **anthropogenic dust** (8%).

Top Five Sources of Outdoor $PM_{2.5}$ and Associated Disease Burden in Bulgaria in 2019

	Residential	Energy	Windblown dust	Agriculture	Anthropogenic dust
Contribution to total outdoor $PM_{2.5}$	17.6%	17%	14%	13%	8%
Number of $PM_{2.5}$ linked deaths	1,645	1,589	1,309	1,187	748

FOR MORE INFORMATION:

For more information about air pollution and health in Southeast Europe, read the full report.

Explore available evidence on air pollution and health in Southeast Europe here.

To explore and download data, please visit www.stateofglobalair.org.

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Contact us *SEE@healtheffects.org*

The State of Global Air website is a collaboration between the Health Effects Institute and the Institute for Health Metrics and Evaluation, with expert input from The University of British Columbia.

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