AIR POLLUTION AND HEALTH IN SOUTHEAST EUROPE
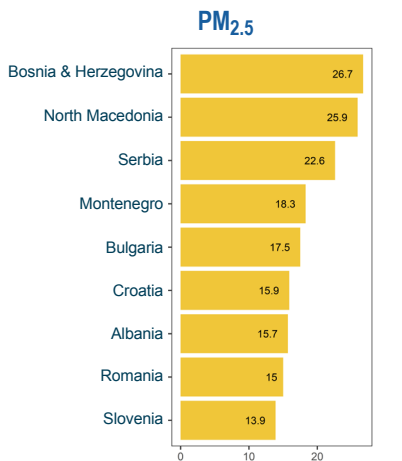

Air pollution continues to be a leading health concern in Southeast Europe, where countries experience $PM_{2.5}$ exposures well above the World Health Organization (WHO) annual guideline value of 5 µg/m³.
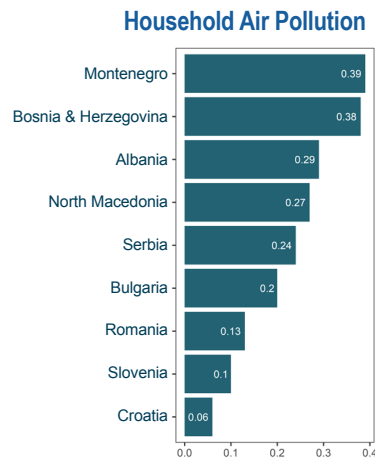
Exposure to Air Pollution

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

- Up to **71%** of the population in this region lives in areas that do not meet the current EU air quality limit value (annual mean of 25 µg/m³). However, all the countries in the region meet the least stringent WHO Interim Target 1 (35 µg/m³) for $PM_{2.5}$.

- **Highest annual average** $PM_{2.5}$ exposure in 2019 was observed for **North Macedonia** (30.3 µg/m³), while **Romania** had the **lowest exposure** (15.7 µg/m³).

- *Good News*: $PM_{2.5}$ annual average exposures have **decreased** for every country in the region over the last decade, with the largest decrease in **Serbia**, where levels of $PM_{2.5}$ in 2019 were 19.1% lower compared to 2010.
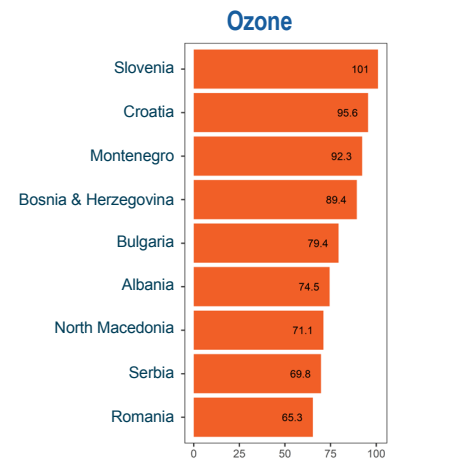
Countries in Southeast Europe with the Highest $PM_{2.5}$, Household Air Pollution, and Ozone Exposures in 2019

$PM_{2.5}$

Country	Value
Bosnia & Herzegovina	26.7
North Macedonia	25.9
Serbia	22.6
Montenegro	18.3
Bulgaria	17.5
Croatia	15.9
Albania	15.7
Romania	15
Slovenia	13.9

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

Household Air Pollution

Country	Value
Montenegro	0.39
Bosnia & Herzegovina	0.38
Albania	0.29
North Macedonia	0.27
Serbia	0.24
Bulgaria	0.2
Romania	0.13
Slovenia	0.1
Croatia	0.06

Percentage of population relying on solid fuels for cooking

Ozone

Country	Value
Slovenia	101
Croatia	95.6
Montenegro	92.3
Bosnia & Herzegovina	89.4
Bulgaria	79.4
Albania	74.5
North Macedonia	71.1
Serbia	69.8
Romania	65.3

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 (19.1 µg/m³) than in 2010 (25.5 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 (23.0%) than in 2010 (27.7%)

Ozone (presented as population-weighted seasonal average concentration)
- **Lower** in 2019 (82.0 µg/m³) than in 2010 (87.9 µg/m³)
- **Lower** than EU-28 average (83.5 µg/m³)

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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 ranked among the top 10 risk factors for ill health in every country in Southeast Europe.
- **11.8%** of total **deaths** in Southeast Europe (56,300 deaths) were linked to air pollution in 2019. Outdoor $PM_{2.5}$ accounted for the **most** air pollution–related deaths (46,600, or 9.7% of total).
- **Romania** had the **highest** number of air pollution–attributable deaths (17,100) in the region while **Montenegro** had the **lowest** (700).
- The $PM_{2.5}$-linked death rates exceed the global rate of 53.5 deaths/100,000 population in eight out of nine countries — Slovenia is the only exception.
- On average, nearly **23% of all COPD-related deaths** were attributed to air pollution. The largest impacts were seen in Bosnia and Herzegovina (30%), North Macedonia, and Montenegro (each 26%), while the lowest such burden was estimated for Romania (14%).

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

- Ambient ozone
- Ambient $PM_{2.5}$
- Household air pollution
- Other risk factors

4% 7% 1% 88%
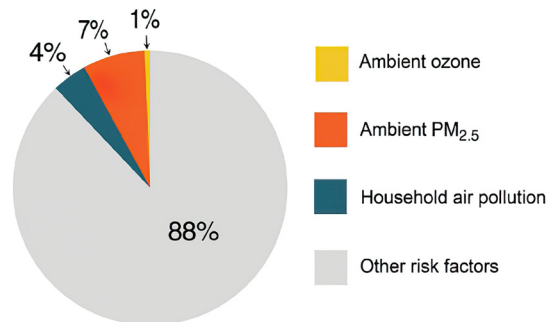
How Does Air Pollution Affect the Young and the Old?

- Across Southeast Europe, the largest number of deaths occur in people aged 70 or older.
- Exposure to air pollution accounted for **7.7% of infant deaths**, with most deaths attributed to ambient $PM_{2.5}$.
- The percentage of **infant deaths** linked to air pollution in 2019 was **largest** in Bosnia and Herzegovina (11%) and North Macedonia (10%).

Percentage of Deaths (by Cause) Linked to Air Pollution in 2019
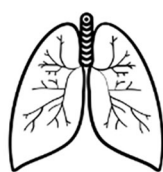
22.7% of COPD deaths	**18.7%** of diabetes deaths	**14.8%** of ischemic heart disease deaths	**17.0%** of lung cancer deaths	**15.8%** of ischemic stroke deaths	**13.5%** of lower respiratory infection deaths	**7.7%** of neonatal deaths

## Key Sources of $PM_{2.5}$ in Southeast Europe

$PM_{2.5}$ 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 the most cost-effective solutions, it is critical to understand the major sources, especially anthropogenic sources, of air pollution.

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- Important fuel contributors to PM$_{2.5}$ exposures in the region include **coal**, **liquid fuel** and **natural gas**, and **solid biofuels**.
- As individual sources, **residential** sources contributed the most (20%) to PM$_{2.5}$ attributable deaths in 2019, followed by **energy production** (18%), **windblown dust** (13%), **agriculture** (13%), and **transport** (7%).

Percentage of PM$_{2.5}$ from Five Major Sources in Nine Southeast European Countries in 2019
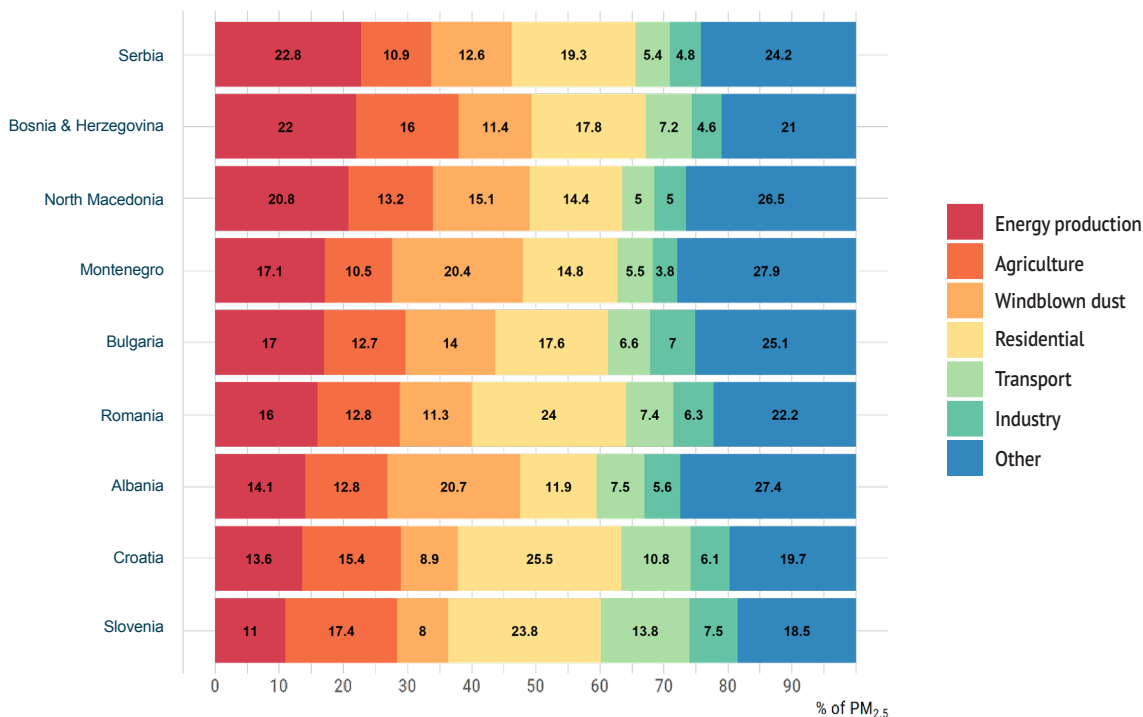
Data source: McDuffie E, Martin R, Yin H, Brauer M. 2021. Global Burden of Disease from Major Air Pollution Sources (GBD MAPS): A Global Approach. Research Report 210. Boston, MA:Health Effects Institute.

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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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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