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/m$^3$.

**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/m$^3$). However, all the countries in the region meet the least stringent WHO Interim Target 1 (35 μg/m$^3$) for PM$_{2.5}$.
- **Highest annual average PM$_{2.5}$ exposure** in 2019 was observed for North Macedonia (30.3 μg/m$^3$), while Romania had the **lowest exposure** (15.7 μg/m$^3$).
- **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$_{2.5}$ (presented as population-weighted annual average concentration)**
- Lower in 2019 (19.1 μg/m$^3$) than in 2010 (25.5 μg/m$^3$)
- Higher than EU-28 average (11.4 μg/m$^3$)

**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/m$^3$) than in 2010 (87.9 μg/m$^3$)
- Lower than EU-28 average (83.5 μg/m$^3$)

How Have Pollutant Exposures Changed Between 2010 and 2019?
**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%).

**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.

*Continued next page*
- 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

<table>
<thead>
<tr>
<th>Country</th>
<th>Energy production</th>
<th>Agriculture</th>
<th>Windblown dust</th>
<th>Residential</th>
<th>Transport</th>
<th>Industry</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serbia</td>
<td>22.8</td>
<td>10.9</td>
<td>12.6</td>
<td>19.3</td>
<td>5.4</td>
<td>4.8</td>
<td>24.2</td>
</tr>
<tr>
<td>Bosnia &amp; Herzegovina</td>
<td>22</td>
<td>16</td>
<td>11.4</td>
<td>17.8</td>
<td>7.2</td>
<td>4.6</td>
<td>21</td>
</tr>
<tr>
<td>North Macedonia</td>
<td>20.8</td>
<td>13.2</td>
<td>15.1</td>
<td>14.4</td>
<td>5</td>
<td>5</td>
<td>26.5</td>
</tr>
<tr>
<td>Montenegro</td>
<td>17.1</td>
<td>10.5</td>
<td>20.4</td>
<td>14.8</td>
<td>5.5</td>
<td>3.3</td>
<td>27.9</td>
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<tr>
<td>Bulgaria</td>
<td>17</td>
<td>12.7</td>
<td>14</td>
<td>17.6</td>
<td>6.6</td>
<td>7</td>
<td>25.1</td>
</tr>
<tr>
<td>Romania</td>
<td>16</td>
<td>12.8</td>
<td>11.3</td>
<td>24</td>
<td>7.4</td>
<td>6.3</td>
<td>22.2</td>
</tr>
<tr>
<td>Albania</td>
<td>14.1</td>
<td>12.8</td>
<td>20.7</td>
<td>11.9</td>
<td>7.5</td>
<td>5.6</td>
<td>27.4</td>
</tr>
<tr>
<td>Croatia</td>
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<td>15.4</td>
<td>8.9</td>
<td>25.5</td>
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</tr>
<tr>
<td>Slovenia</td>
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<td>23.8</td>
<td>13.8</td>
<td>7.5</td>
<td>18.5</td>
</tr>
</tbody>
</table>


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.