Air Quality and Health in Southeastern Europe to Inform Policy Action

Brussels Meeting on Air Pollution and Health: Taking stock of the proposed revision to the Ambient Air Quality Directive

Brussels | May 24, 2023

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Key messages

There are huge disparities in exposure to air pollution and associated health impacts across Europe.

(Local) evidence on health effects of air pollution in Southeast Europe is limited but growing.

Need for further mobilization as well as targeted, bold action on clean air at regional, national, and local levels.
Air pollution’s contribution to disease is not borne equally across Europe.

More than 95% of the population in the region in areas where the PM$_{2.5}$ exposures exceed the WHO guideline for healthy air (5 $\mu$g/m$^3$);

$\sim$70% live in areas that don’t meet the current EU Limit Value (25 $\mu$g/m$^3$)
Sofia has the highest average PM$_{2.5}$ exposure among capital cities in the EU.

Based on data for 2019.
Stark differences in health impacts linked to air pollution across the EU

Death rates are highest in cities in Central and Eastern Europe.

https://www.stateofglobalair.org/resources/health-in-cities
What does evidence from the region tell us?

Increases in respiratory, cardiovascular, gastrointestinal, and neurological disease-related outpatient and hospital emergency services in Bulgaria (Simidchiev et al 2020), more patients were admitted for stroke on days when ozone levels are higher (Knezovic et al 2018)

Positive associations between type 2 diabetes and PM$_{2.5}$ and polycyclic aromatic hydrocarbons (PAHs) (Dzhambov and Dimitrova 2016)

correlation between acute COPD aggravations and average PM$_{10}$ in the previous six days (Krachunov et al 2017)

association between higher PM$_{10}$ and COPD exacerbation and longer hospitalizations (Doneva et al 2019)

increased ambient concentrations of polycyclic aromatic hydrocarbons increased risk of lifetime lung cancer, especially during heating season (Radonic et al 2017)

For a list of research studies on air pollution and health in Southeast Europe, visit https://www.healtheffects.org/global/spatial-bibliography
Процент от смъртните случаи (по причина), свързани със замърсяването на въздуха в България през 2019 г

<table>
<thead>
<tr>
<th></th>
<th>COPD</th>
<th>Diabetes</th>
<th>Ischemic heart disease</th>
<th>Lung cancer</th>
<th>Stroke</th>
<th>Lower respiratory infections</th>
<th>Infant deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20% от смъртните случаи от ХОББ</td>
<td>18% от смъртните случаи от диабет</td>
<td>14% от смъртните случаи от ишемична болест на сърцето</td>
<td>16% от смъртните случаи от рак на белия дроб</td>
<td>15% от смъртните случаи от ишемичен инсулт</td>
<td>12% от смъртните случаи от инфекция на долните дихателни пътища</td>
<td>6% от смъртните случаи при новородени</td>
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</table>
Various efforts are underway to improve air quality

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Community monitoring, engagement efforts

Low emissions zone in Sofia

Engaging medical experts, health policymakers

https://maps.sensor.community/#7/43.268/24.478
https://air4health.eu/en/lekari/
Expanding public engagement on air quality and health

Community monitoring of nitrogen dioxide - various cities in the EU

Targeted campaigns on air quality during the ‘pollution’ or ‘heating’ season - Western Balkans

Nudging for clean air action – Skopje, North Macedonia
**Sectoral interventions**: [Upcoming] Low emissions Zone in Sofia, Bulgaria

**Sectoral interventions**: Cleaning up the heating sources

### Fuel contribution to outdoor PM$_{2.5}$

<table>
<thead>
<tr>
<th>Region</th>
<th>Coal</th>
<th>Liquid Fuel &amp; Natural Gas</th>
<th>Biofuel</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southeast Europe</td>
<td>18.6</td>
<td>13</td>
<td>21.2</td>
<td>47.2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>18.5</td>
<td>11.9</td>
<td>18.1</td>
<td>51.5</td>
</tr>
</tbody>
</table>

How are these estimates produced?

- Satellite data
- Chemical Transport Models
- Ground monitoring data

Minimum risk exposure level

Concentration-response relationship

Burden of Disease Linked to Air Pollution

Baseline disease rates

Epidemiology studies on health effects of air pollution

https://www.stateofglobalair.org/
Producing the air quality estimates; gaps in data

Satellite data
Chemical Transport Models
Ground monitoring data

Minimal risk exposure level

Limited ground monitoring data from Africa >> higher uncertainties in exposure estimates

Source: 2022 Open Air Quality Data: The Global Landscape, OpenAQ

https://www.stateofglobalair.org/
Estimating health impacts; gaps

Concentration-response relationship

**Baseline disease rates**

**Burden of Disease Linked to Air Pollution**

Limited studies on health effects of air pollution in high-pollution environments, no studies from Africa in the integrated concentration-response functions

Limited availability of baseline disease rates

Epidemiology studies on health effects of air pollution

https://www.stateofglobalair.org/
Since 1990, air pollution emissions have declined.

Sectors with the largest contributions to emissions in 2017 were residential (37%), on-road transportation (19%), and energy (15%).

“Transport is absolutely dominant source of PM$_{10}$ pollution in the central city area (Sofia) and along the roads with heavy traffic during both cold and warm season” (Dimitrova and Velizarova 2021)