Outdoor Plus Indoor Air Pollution From Fossil Fuels, Biofuels, Bioenergy, and Biomass Burning is the Second Leading Cause of Death Worldwide, and a 100 Percent WWS World Will Eliminate Most of These Deaths

In
100% Clean, Renewable Energy and Storage for Everything
Textbook in Preparation

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7.7.2. Avoided Health Costs From Air Pollution
Transitioning homes, towns, cities, states, provinces, and countries to WWS immediately reduces air pollution health problems. Fewer health problems result in cost savings due to lower hospitalization rates, fewer emergency room visits, fewer lost work days, fewer lost school days, lower insurance rates, lower taxes, lower workman’s compensation rates, and less loss of companionship, among other impacts.

Air pollution causes premature mortality in several ways. It contributes to death from heart disease, stroke, chronic obstruction pulmonary disease (COPD), lower respiratory tract infection, lung cancer, and asthma. Common types of COPD are chronic bronchitis and emphysema. Common types of lower respiratory tract infections are the flu, bronchitis, and pneumonia.

In 2016, 56.9 million people died from all causes worldwide (WHO, 2017a). Table 7.13 shows that air pollution caused between 24 and 45 percent of the deaths for each of five out of the six leading causes of death. About 4.5 million people died prematurely from outdoor air pollution and 7.1 million, from indoor plus outdoor pollution in 2016 (WHO, 2017b). Thus, about 12.5 percent of all deaths worldwide in 2016 were due to indoor plus outdoor air pollution, making it the second leading cause of death after heart disease. Twenty percent of premature air pollution deaths are of children age five and younger.

GBD (2015) similarly estimated that about 5.5 (5.1 to 5.9) million deaths worldwide in 2013 were caused by outdoor plus indoor air pollution. Of these, 2.8 to 3.1 million were from outdoor PM$_{2.5}$, 0.16 to 0.27 million were from outdoor ozone, and 2.5 to 3.3 million were from indoor air pollution from solid fuel burning.

Burnett et al. (2018) calculated 8.9 (7.5 to 10.3) million deaths per year worldwide in 2015 due to outdoor plus indoor air pollution. They hypothesized that the additional deaths from air pollution they found may have been due to the fact that previous studies considered only a limited number of categories of death that air pollution contributes to.

Table 7.13. Leading causes of death worldwide in 2016. Also shown are the percent and number of deaths in each category due to outdoor plus indoor air pollution and, separately, outdoor air pollution alone.

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Total all-cause$^4$ Number of deaths/y (millions)</th>
<th>Indoor plus outdoor air pollution Percent of all-cause$^5$ Number of deaths/y (millions)</th>
<th>Outdoor air pollution only Percent of all-cause$^6$ Number of deaths/y (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ischemic heart disease (coronary artery disease)</td>
<td>9.43</td>
<td>25</td>
<td>17</td>
</tr>
<tr>
<td>2. Stroke</td>
<td>5.78</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>3. COPD (chronic bronchitis, emphysema)$^d$</td>
<td>3.04</td>
<td>43</td>
<td>25</td>
</tr>
</tbody>
</table>

$^4$ Includes indoor plus outdoor air pollution
$^5$ Percentage of all deaths
$^6$ Percentage of all-cause deaths due to outdoor air pollution
$^d$ COPD includes chronic bronchitis and emphysema.
The air pollution deaths in Table 7.13 are due almost entirely to combustion products of fossil fuels, biofuels, bioenergy, open biomass burning, and human-caused wildfires. The indoor mortalities are due to the indoor burning of bioenergy (e.g., wood, dung, waste), coal, and gas for home heating and cooking, primarily in developing countries. A 100 percent WWS world will eliminate most of the indoor and outdoor air pollution deaths. Controlling open biomass burning and human-caused wildfires will address most of the rest (Section 2.9.1).

References


