

Burden of disease from ambient air pollution for 2016

v2 April 2018

Summary of results

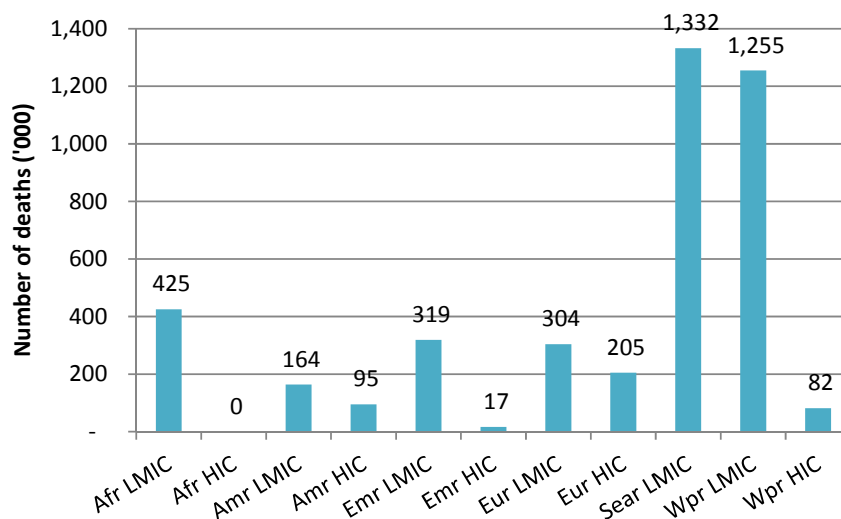
Globally, 4.2 million deaths were attributable to ambient air pollution (AAP) in 2016. About 91% of these deaths occur in low- and middle-income (LMI) countries. The South East Asian and Western Pacific regions bear most of the burden with each about 1.3 million deaths. About 425'000 deaths occur in the African region, 319'000 in the Eastern Mediterranean region, 304'000 in Europe, 164'000 in the Americas. The remaining deaths occur in high-income countries of Europe (205'000), Americas (95'000), Western Pacific (82'000), and Eastern Mediterranean (17'000).

The diseases included in the assessment are acute lower respiratory infection (ALRI), lung cancer, chronic obstructive pulmonary disease, ischaemic heart disease, and stroke. Non-communicable diseases account for 82% of these deaths.

The increase in burden compared with the previous estimate of 3.0 million deaths from AAP for the year 2012¹ is due to 1) additional age groups for acute lower respiratory infections are included in the analysis² due to new evidence that has become available, 2) revised exposure-response functions³, and 2) an increase in mortality rates from non-communicable diseases.

Country estimates of deaths, disability-adjusted life years (DALYs), years of life lost (YLD) are provided by disease and sex in the WHO website⁴.

Figure 1. Total deaths attributable to AAP in 2016, by region



AAP: Ambient air pollution; Afr: Africa; Amr: America; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: Low- and middle-income; HIC: High-income.

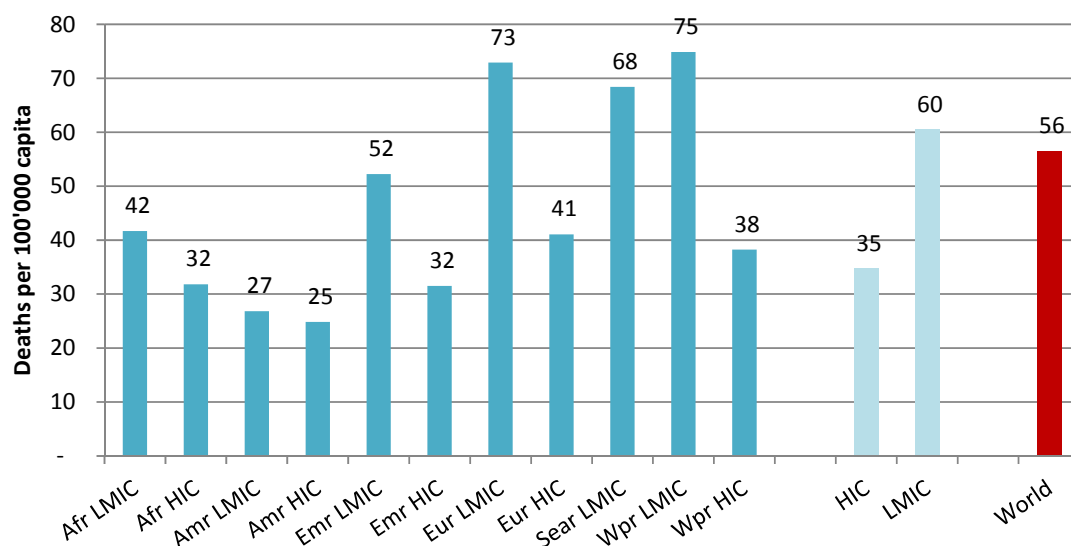
¹ *Ambient air pollution : a global assessment of exposure and burden of disease*, WHO Geneva, 2016.

² 2nd meeting of the Guideline Development Group for the update of the WHO Air Quality Guidelines, March 2018. WHO European Centre for Environment and Health (ECEH), Bonn, Germany.

³ Cohen et al. Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015 *Lancet* 2017 Volume 389, No. 10082, p1907–1918

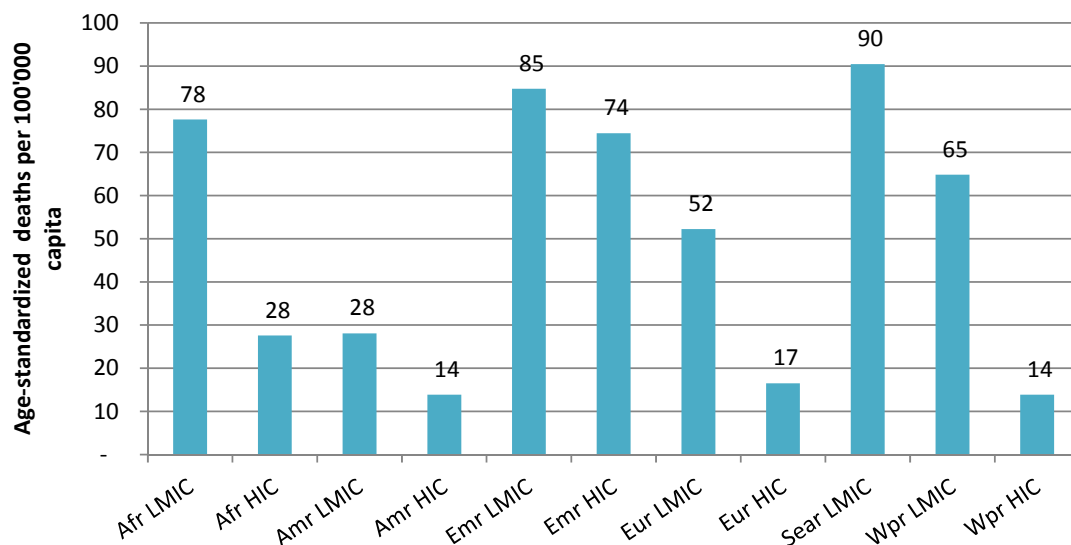
⁴ WHO Air Pollution : www.who.int/airpollution/data and Global Health Observatory: www.who.int/gho/phe/outdoor_air_pollution

Figure 2. Deaths per 100,000 inhabitants attributable to AAP in 2016, by region



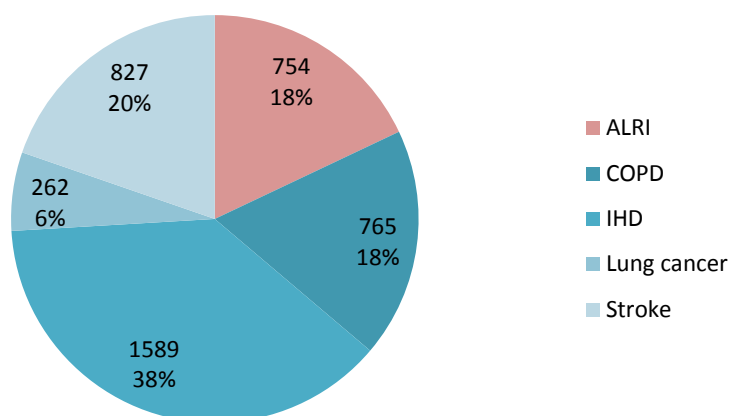
AAP: Ambient air pollution; Afr: Africa; Amr: America; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: Low- and middle-income; HIC: High-income.

Figure 2. Age-standardized deaths per 100,000 inhabitants attributable to AAP in 2016, by region



AAP: Ambient air pollution; Afr: Africa; Amr: America; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: Low- and middle-income; HIC: High-income.

Figure 3. Deaths (000's) attributable to AAP in 2016, by disease



Percentage represents percent of total AAP burden (add up to 100%).

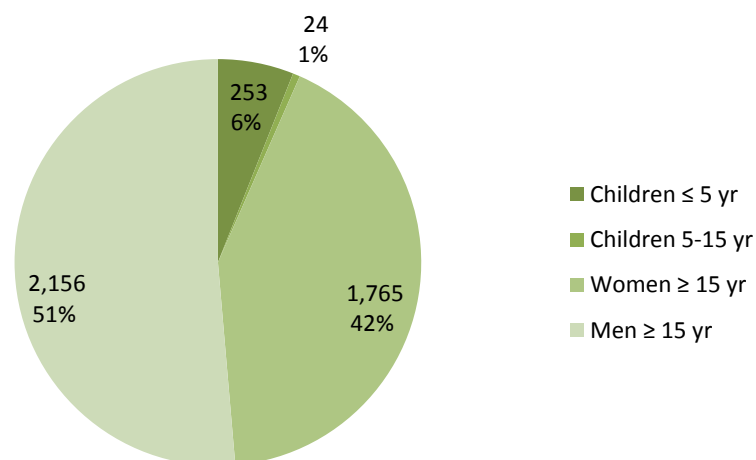
AAP: Ambient air pollution; ALRI: Acute lower respiratory disease; COPD: Chronic obstructive pulmonary disease; IHD: Ischaemic heart disease.

Table 1. Population attributable fraction (PAF) for mortality attributable to AAP in 2016, by region and disease

WHO region	ALRI	COPD	Lung cancer	IHD	Stroke
Afr LMIC	27%	24%	15%	18%	15%
Afr HIC	10%	12%	7%	12%	10%
Amr LMIC	15%	15%	9%	14%	10%
Amr HIC	7%	9%	4%	9%	7%
Emr LMIC	31%	29%	21%	21%	17%
Emr HIC	40%	35%	29%	25%	21%
Eur LMIC	17%	18%	11%	13%	10%
Eur HIC	12%	13%	8%	11%	9%
Sear LMIC	34%	31%	22%	22%	17%
Wpr LMIC	26%	29%	23%	18%	16%
Wpr HIC	13%	14%	8%	11%	9%
HICs	12%	12%	7%	11%	9%
LMICs	28%	28%	20%	18%	15%
World	26%	25%	16%	17%	14%

AAP: Ambient air pollution; Afr: Africa; Amr: America; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: Low- and middle-income; HIC: High-income; ALRI: Acute lower respiratory disease; COPD: Chronic obstructive pulmonary disease; IHD: Ischaemic heart disease.

Figure 4. Deaths (000's) attributable to AAP in 2016, by age and sex



Percentage represents percent of total AAP burden (add up to 100%).

AAP: Ambient air pollution; yr: year.

For more information :

Ambient air pollution: www.who.int/airpollution/ambient

Maps and databases : www.who.int/airpollution/data

Global Health Observatory: [www.who.int/gho/phe/outdoor air pollution](http://www.who.int/gho/phe/outdoor_air_pollution)

Note: All figures presented have been computed by WHO to ensure comparability; thus they are not necessarily the official statistics of Member States, which may use alternative rigorous methods.

For further information, please contact:
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