

Burden and economic impact of PM2.5 exposure on Acute Coronary Syndrome in Portugal, 2011-2021



PMCardImpact: the health and economic impact of PM2.5-related cardiovascular diseases in Portugal

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AIR POLLUTION

- Air pollution, specifically particulate matter with a diameter of 2.5 micrometers (PM_{2.5}), is the **primary environmental health risk in Europe**.
- **Exposure to PM_{2.5} increases the risk of cardiovascular diseases**, including acute coronary syndromes (ACS), resulting in **high direct costs** associated with in-patient treatment.
- By quantifying the impact of exposure to air pollution on health outcomes, it is possible to translate this into an economic value. This **monetisation** provides a valuable tool for calculating **healthcare-related savings**, thus justifying public investment in air quality improvement and ensuring adequate consideration in policy..

The good news is that much pollution can be eliminated, and pollution prevention can be highly cost-effective.

Landrigan et al. (2017)

METHODOLOGY

The annual incidence of ACS (hospitalisations and deaths) during the 11 years under study was determined using national databases. A direct, bottom-up, micro-costing analysis was used to calculate the average annual costs to assess the direct economic burden of ACS.

Morbidity and mortality population attributable fraction (PAF) values were considered to estimate hospital admissions, deaths and the costs attributable to exposure to ambient PM2.5

= ACS NHS hospitalisations (or deaths × average annual cost per ACS patient (or deceased) × morbidity PAF

The **potential impact fraction (PIF)** was applied to estimate avoidable morbidity and mortality costs, considering an additional scenario for the years 2019 and 2021, based on the World Health Organization (WHO) Air Quality Guidelines (AQG) for 2021

= ACS NHS hospitalisations (or deaths) × average annual cost per ACS patient (or deceased) × morbidity (or mortality) PIF

Data not published.

RESULTS

Attributable disease and economic burden (2011-2021)

Morbidity (17,395 ACS hospitalisations)

↳ 4.75% attributable to ambient PM_{2.5} exposure

↳ direct economic burden of more than 50 M€

Mortality (10,756 ACS deaths)

↳ 22.27% attributable to ambient PM_{2.5} exposure

↳ direct economic burden of almost 196 M€

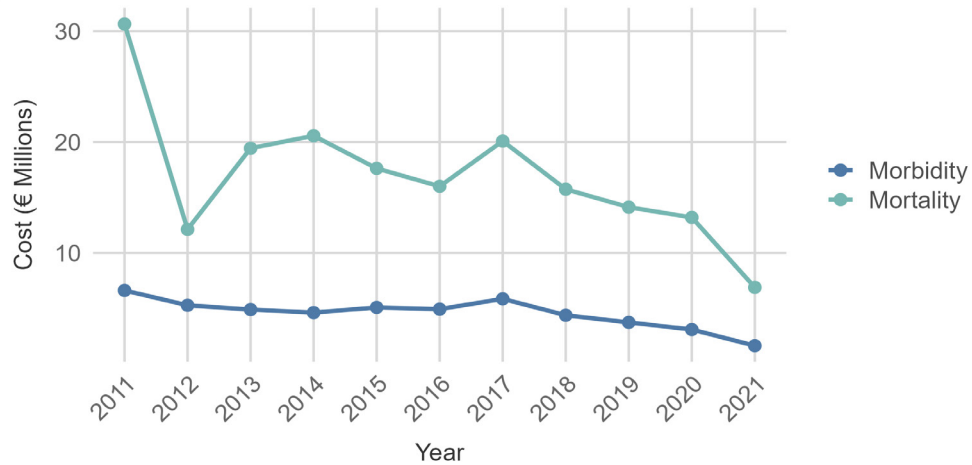


Figure 1- Direct economic burden of ACS morbidity and mortality ambient PM_{2.5} exposure in Portugal in 2011 and 2021

Avoidable disease and economic burden (2019 and 2021) considering an alternative scenario of exposure (2021 WHO AQG)

2019

↳ 336 cases and 451 deaths avoided

↳ approximately 4.5M € saved

2021

↳ 158 cases and 360 deaths avoided

↳ approximately 4.24 M€ saved

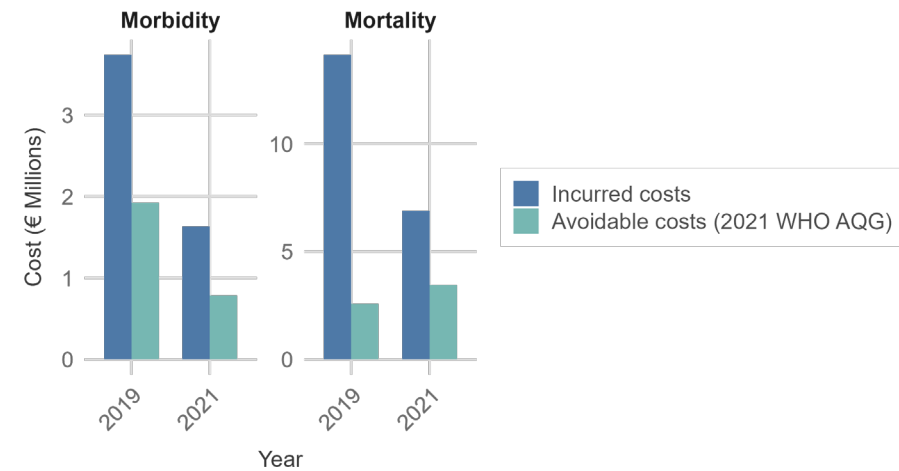
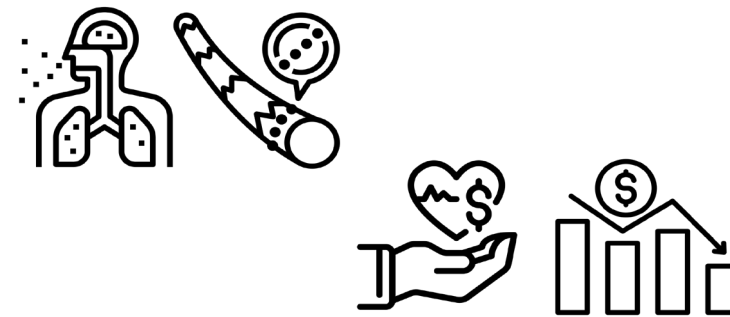


Figure 2- Incurred and avoidable direct costs of ACS morbidity and mortality due to ambient PM_{2.5} exposure in Portugal in 2019 and 2021

Data not published.

KEY MESSAGES

- PM_{2.5} pollution in Portugal drives ACS cases and fatalities, entailing significant economic costs.
- Adhering to WHO AQG promises substantial reductions in ACS incidence and save millions annually in healthcare expenditure.



Thank you

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