HOW AMBIENT NO_2 IMPACTS THE MORTALITY BURDEN OF ISCHEMIC HEART DISEASE IN PORTUGAL (2011-2021)?

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13th November 2024

01 BACKGROUND

Air pollution is the **second leading risk factor** for death, significantly contributing to both mortality and morbidity.

7 MILLION deaths every year from illnesses attributable to air pollution.

- **Nitrogen dioxide (NO_2)** is among the most harmful air pollutants to human health.
- NO_2 is a gas generated by combustion processes, predominantly from **traffic emissions**.
- This pollutant is linked to **harmful health outcomes**, including respiratory and cardiovascular diseases such as **ischemic heart disease (IHD).**

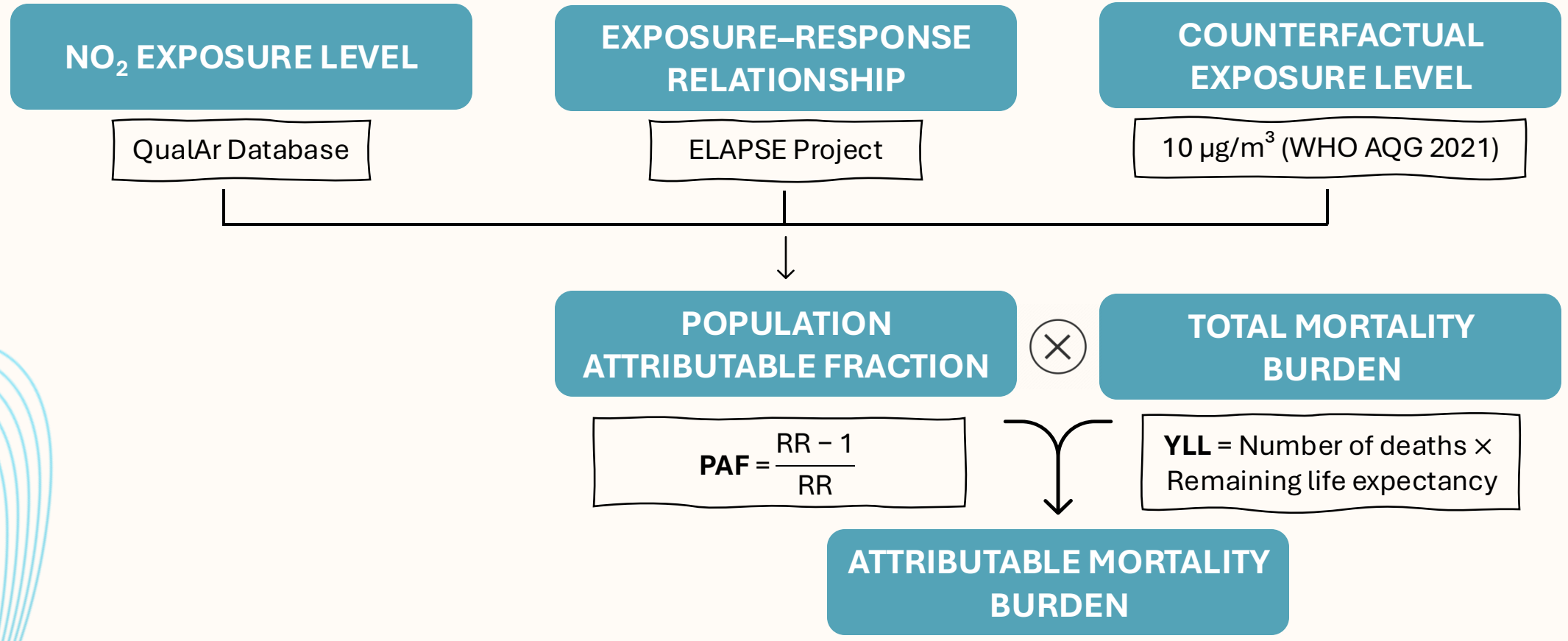
AIM: Estimate the **years of life lost (YLL)** due to **ischemic heart disease** attributable to long-term **exposure to ambient NO_2** in Portugal between 2011 and 2021.

Source: World Health Organization. (2022). *Ambient (outdoor) air pollution*.
GBD 2021 Risk Factors Collaborators. (2024). Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: A systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*.

02 METHODS

Mainland Portugal and its five regions (North, Centre, Lisbon Metropolitan Area, Alentejo and Algarve).

Portuguese adult population (≥ 25 years) of both sexes.



03 RESULTS NO_2 EXPOSURE

- **Decreasing NO_2 levels** across Mainland Portugal and its regions.
- **Higher NO_2 levels** are observed in the **Lisbon Metropolitan Area** and the **Northern region**.
- Steeper decline in NO_2 levels during 2020-2021, likely due to COVID-19 lockdown measures.
- Certain regions continue to fall short of meeting the updated EU standards and WHO recommendations.

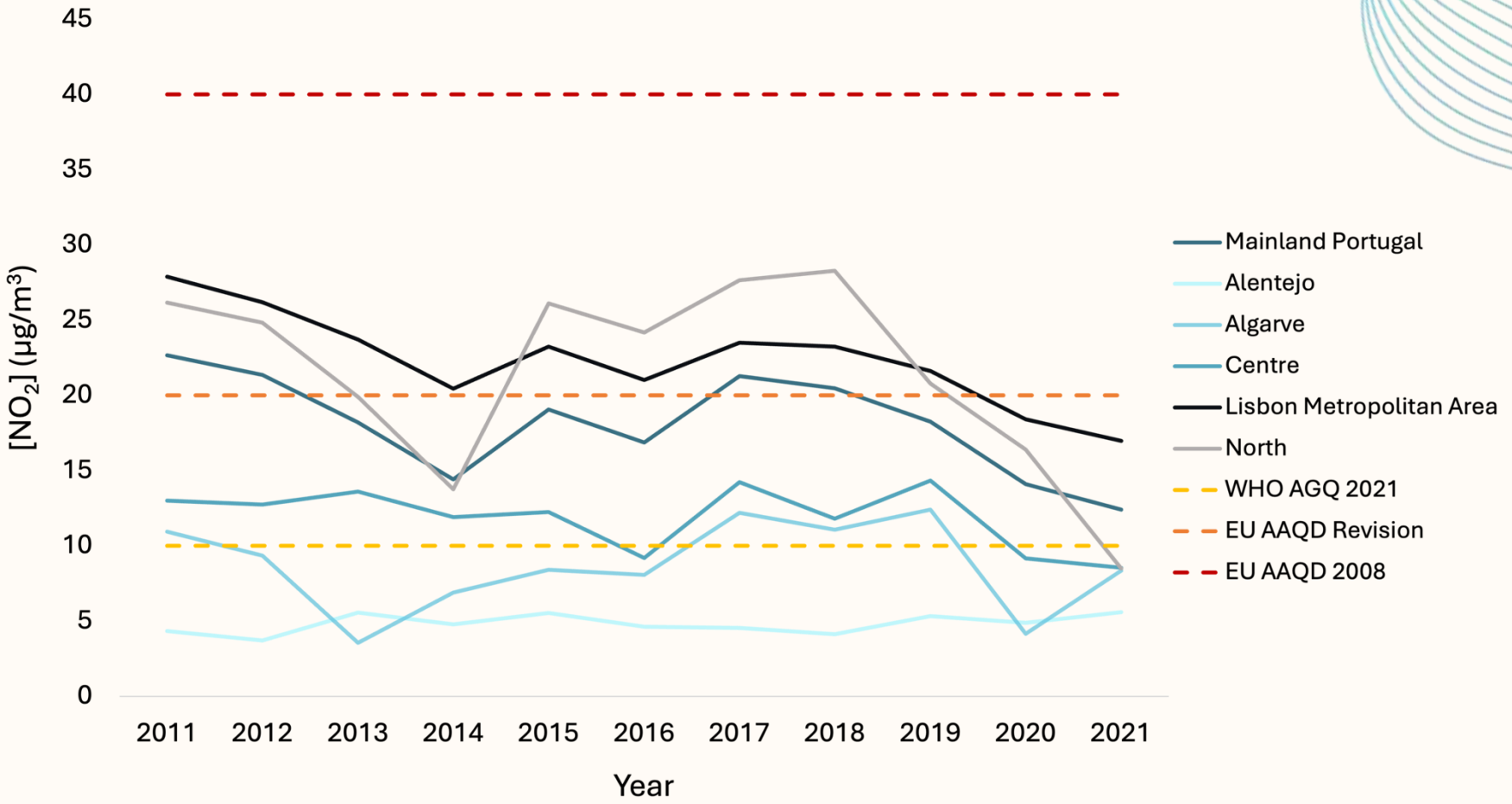
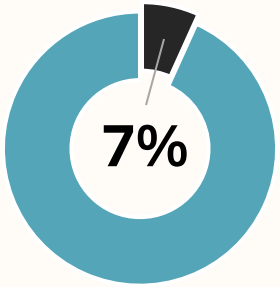


Figure 1 – Yearly average NO_2 levels in Mainland Portugal and its regions, 2011-2021.

Data not published.

03 RESULTS MORTALITY BURDEN IN MAINLAND PORTUGAL



94,843 (95% CI 53,408 – 134,766)

Years of life lost of IHD attributable to NO_2 exposure between 2011 and 2021.

➔ **Decreasing NO_2** levels translate into a **reduced health impact**.

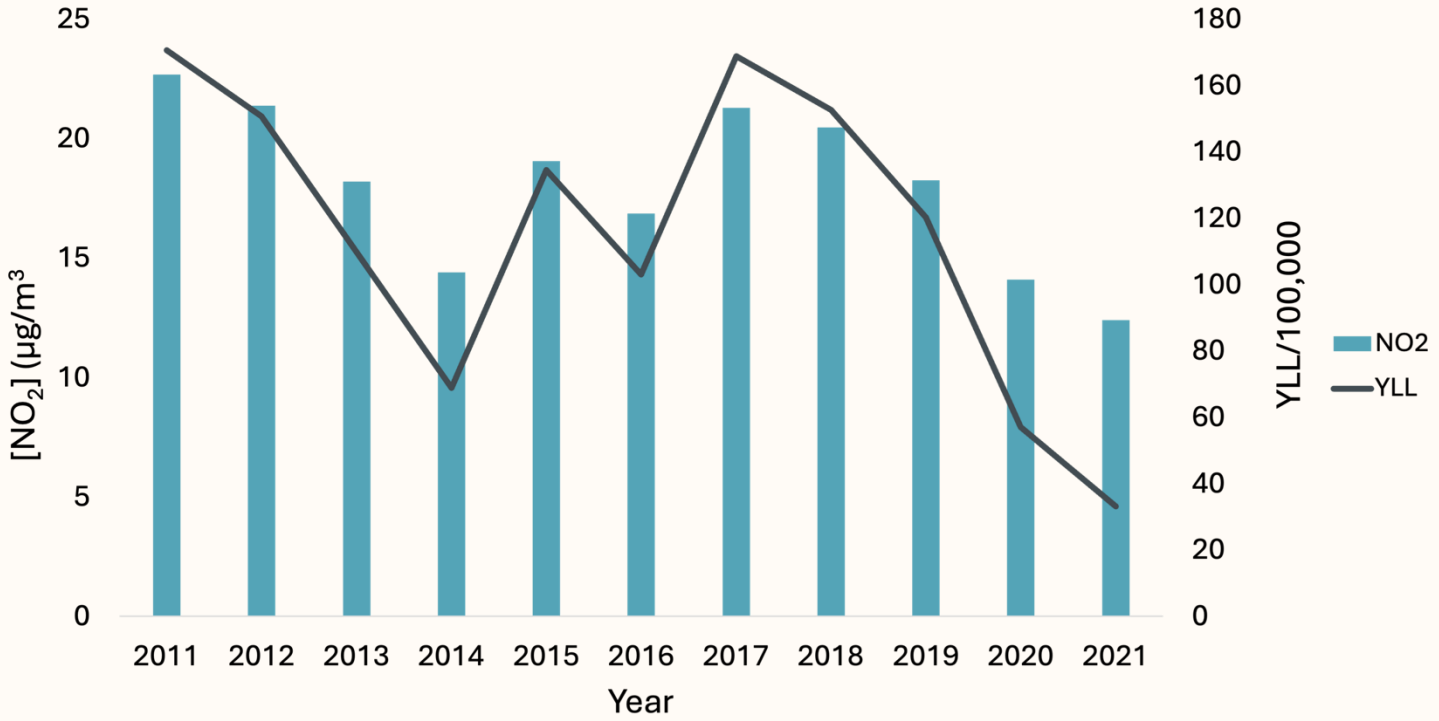


Figure 2 – Ischemic heart disease years of life lost per 100,000 inhabitants attributable to NO_2 exposure, 2011-2021.

Data not published.

03 RESULTS MORTALITY BURDEN IN MAINLAND PORTUGAL

➔ Years of life lost due to IHD attributable to NO_2 exposure are **higher in males** than in females.

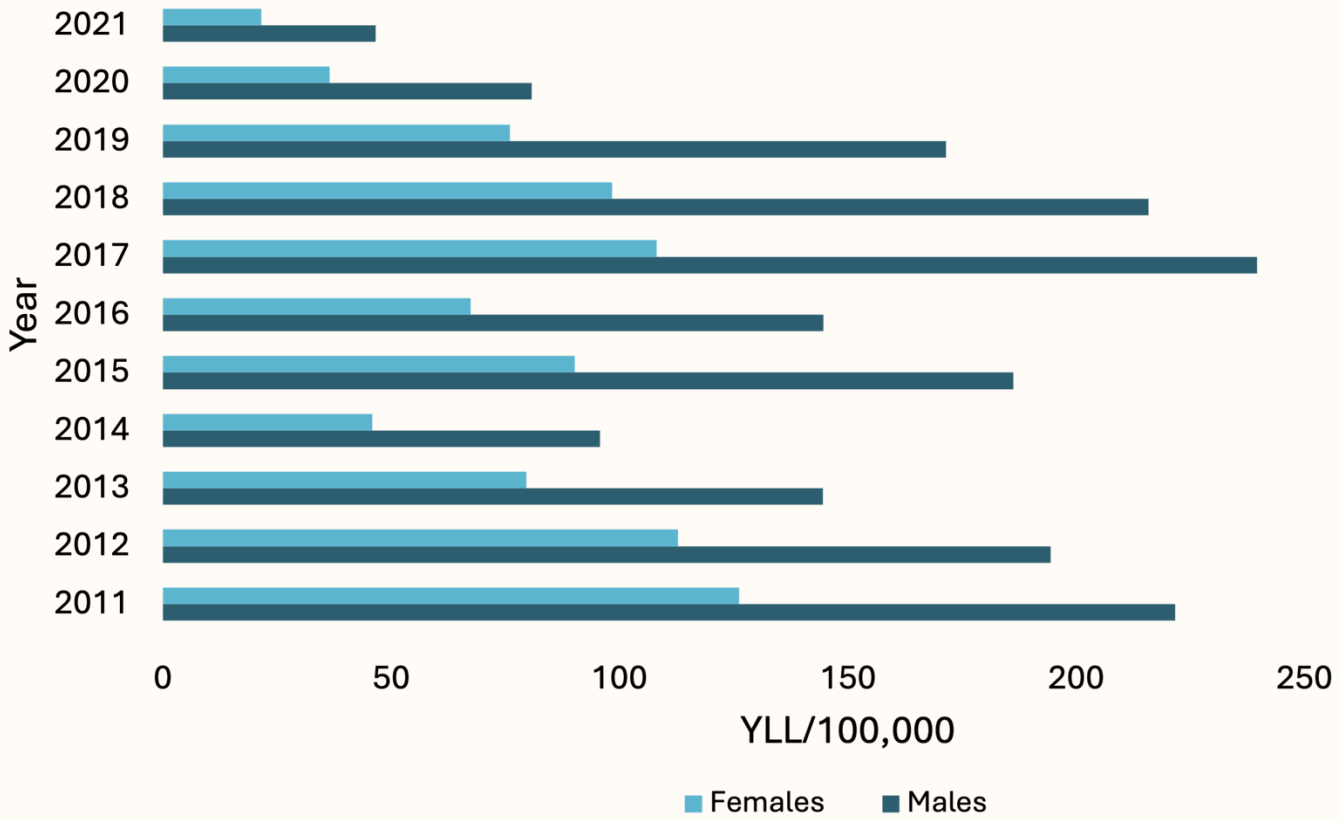


Figure 3 – Ischemic heart disease years of life lost per 100,000 inhabitants attributable to NO_2 exposure for males and females, 2011-2021.

Data not published.

03 RESULTS MORTALITY BURDEN ACROSS REGIONS OF MAINLAND PORTUGAL

- **Mainland Portugal** had an **80.5% reduction** in IHD YLL attributable to NO_2 exposure between 2011 and 2021.
- **Lisbon Metropolitan Area** showed the **highest environmental burden.**
- The **Centre** region had the **lowest environmental burden.**

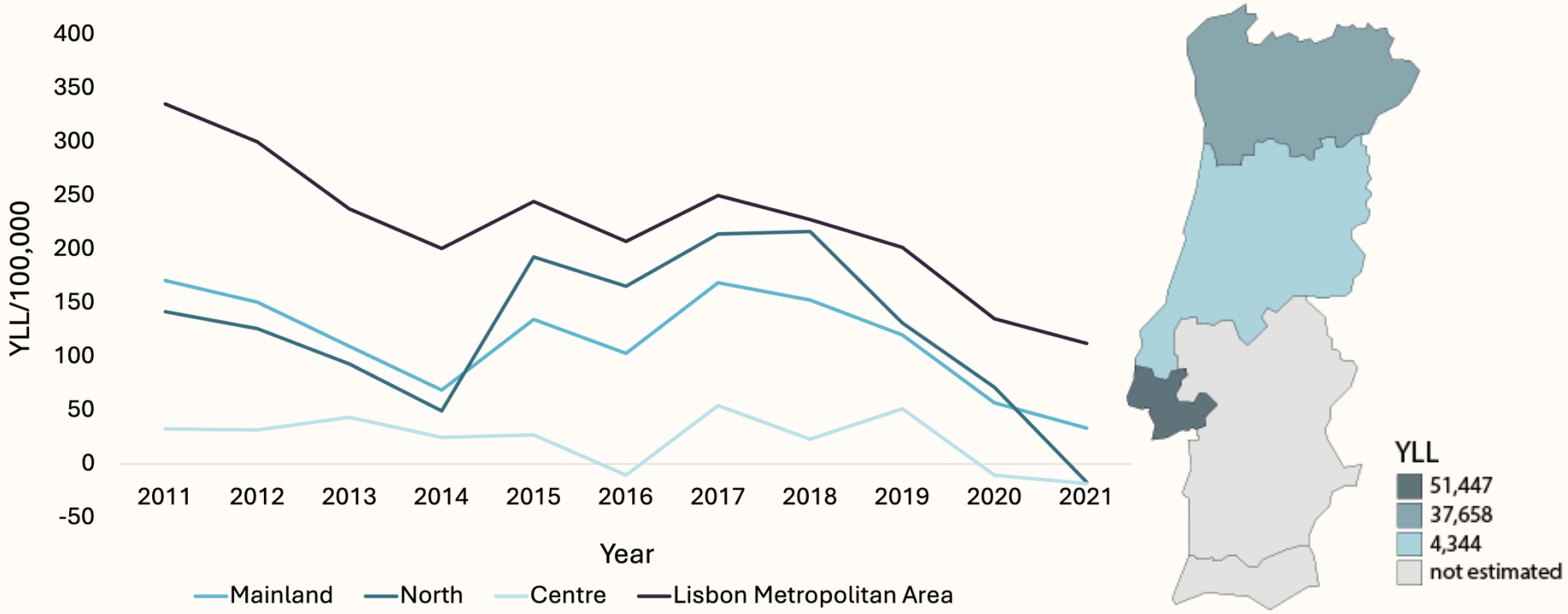
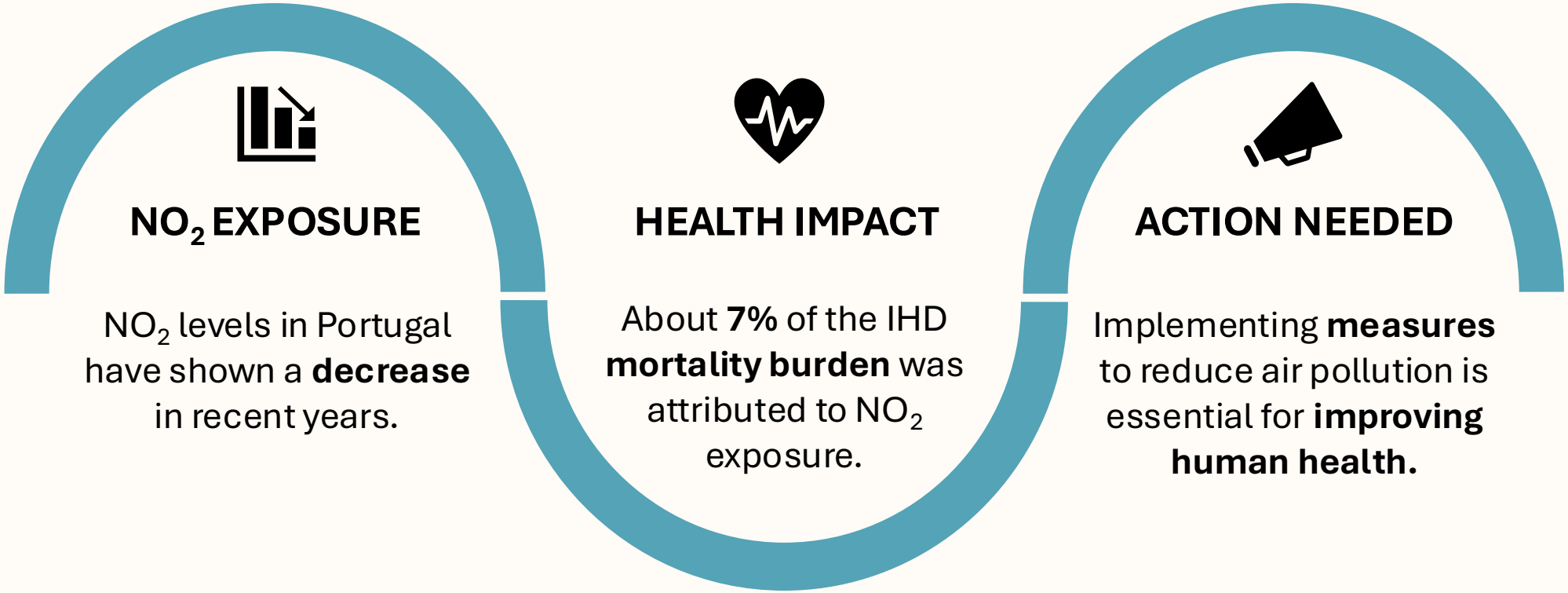


Figure 4 – Ischemic heart disease years of life lost (YLL) attributable to NO_2 exposure: absolute YLL (map) and YLL per 100,000 inhabitants (graph) across regions of Mainland Portugal, 2011-2021.

Data not published.

04 TAKE HOME MESSAGE



NO_2 EXPOSURE

NO_2 levels in Portugal have shown a **decrease** in recent years.

HEALTH IMPACT

About **7%** of the IHD **mortality burden** was attributed to NO_2 exposure.

ACTION NEEDED

Implementing **measures** to reduce air pollution is essential for **improving human health.**

Data not published.

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110,706 DALYs have been estimated, with YLL contributing 86% to the overall burden.

Data not published.

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THANK YOU FOR YOUR ATTENTION

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13th November 2024