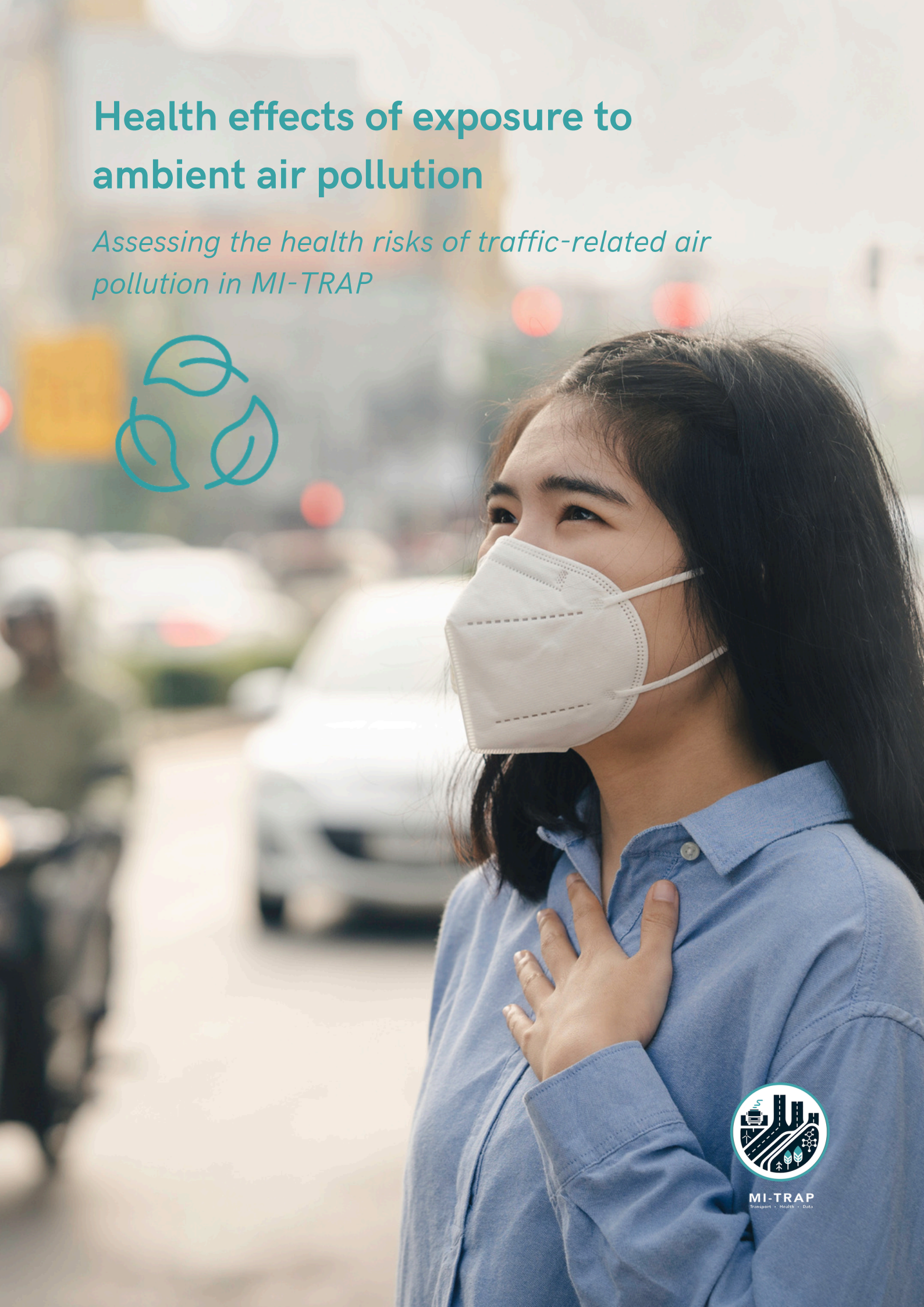
Health effects of exposure to ambient air pollution

Assessing the health risks of traffic-related air pollution in MI-TRAP



What do we know so far?

Air pollution *is caused by the presence of various harmful compounds in the air, mainly originating from traffic, fuel burning, and industrial activities. Among the most important air pollutants are particulate matter (PM), nitrogen dioxide (NO_2), and ozone (O_3). Epidemiological studies have documented the adverse health effects of long-term exposure to these pollutants and gases on a variety of health outcomes. In 2024, two systematic reviews commissioned by the World Health Organization (WHO) were released supporting that long-term exposure to particulate matter were associated with increased risk of all-cause and cardiorespiratory mortality. In addition, long-term exposure to NO_2 was linked with increased risk for mortality from all causes as well as from lung cancer.*

Which is our aim?

Within the **MI-TRAP** project, we will assess the link between traffic-related pollution and its health impacts by summarizing evidence from published studies using statistical techniques in order to assess the health effects associated with short- and long-term exposure to traffic-related pollutants. We will also estimate the attributed number of cases under different exposure reduction scenarios for air quality, informed by measurements within the MI-TRAP project.

Exposures of interest

black carbon
organic carbon
elemental carbon or black smoke ultrafine particles, i.e. particulate matter with a diameter of less than 100 nanometers
traffic-related noise
PM elements [Copper, Zinc, Lead, Silicon and Iron]

Outcomes of interest

- mortality from all-causes
- cardiovascular and respiratory disease
- incidence of ischemic heart disease
- chronic obstructive pulmonary disease
- asthma and lung cancer in adults and asthma incidence and acute lower respiratory infections in children

for long-term exposures

- mortality from all-causes
- cardiovascular and respiratory disease
- cardiovascular and respiratory hospital admissions in adults and respiratory hospital admissions in children.

for short-term exposures

What have we found until now?

01 Increased risk of **lung cancer and adverse associations** were observed with ischemic heart disease, asthma onset in children or children and adolescents and acute lower respiratory infections in children following l**ong-term exposure to elemental carbon.**

The aggravating effects of **average daily noise levels** and night-time noise on the incidence of **ischemic heart disease**. 02

03 Increased risk in all-cause**, cardiovascular and respiratory mortality** following long-term exposure to **elemental carbon, copper, zinc, silicon and iron.**

What's next

- To estimate how many deaths or disease cases are attributable to long-term exposure under different exposure reduction scenarios, such as a 25% reduction in the annual mean concentration of EC or ultrafine particles using the measurements derived within the MI-TRAP.
- To assess the effect on all-cause mortality following short-term exposures in Athens.

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Funded by the European Union

This project has received funding from the European Union's Horizon Europe programme under grant agreement No 101138449 — MI-TRAP. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor CINEA can be held responsible for them.

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