Modena 4/04/2019

L’impatto sulla salute dovuto all’inquinamento dell’aria

Carlo Alberto Goldoni
&
Paolo Lauriola

AIR POLLUTION – THE SILENT KILLER

Every year, around **7 MILLION DEATHS** are due to exposure from both outdoor and household air pollution.

Air pollution is a major environmental risk to health. By reducing air pollution levels, countries can reduce:

- **Stroke**
- **Heart disease**
- **Lung cancer, and both chronic and acute respiratory diseases, including asthma**

REGIONAL ESTIMATES ACCORDING TO WHO REGIONAL GROUPINGS:

- **Over 2 million** in South-East Asia Region
- **Over 2 million** in Western Pacific Region
- **Nearly 1 million** in Africa Region
- **About 500 000** deaths in Eastern Mediterranean Region
- **About 500 000** deaths in European Region
- **More than 300 000** in the Region of the Americas

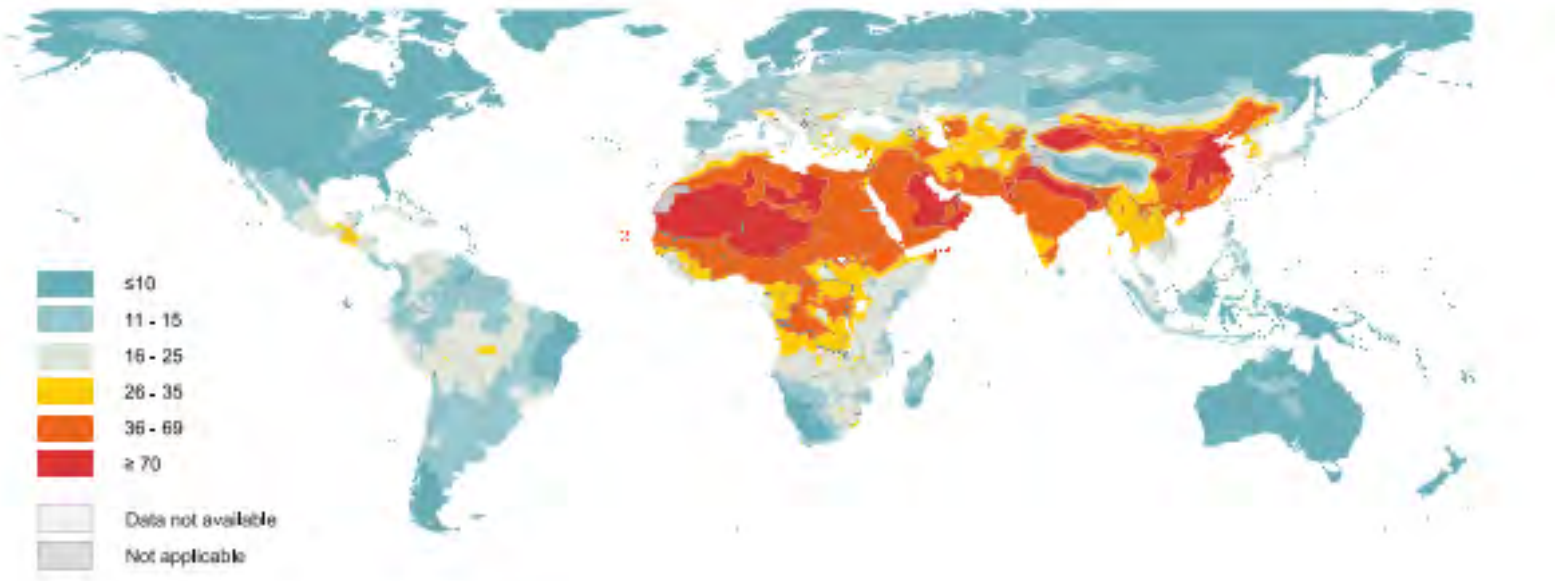
CLEAN AIR FOR HEALTH

#AirPollution

World Health Organization

Inquinamento atmosferico da polveri: esposizione e danno

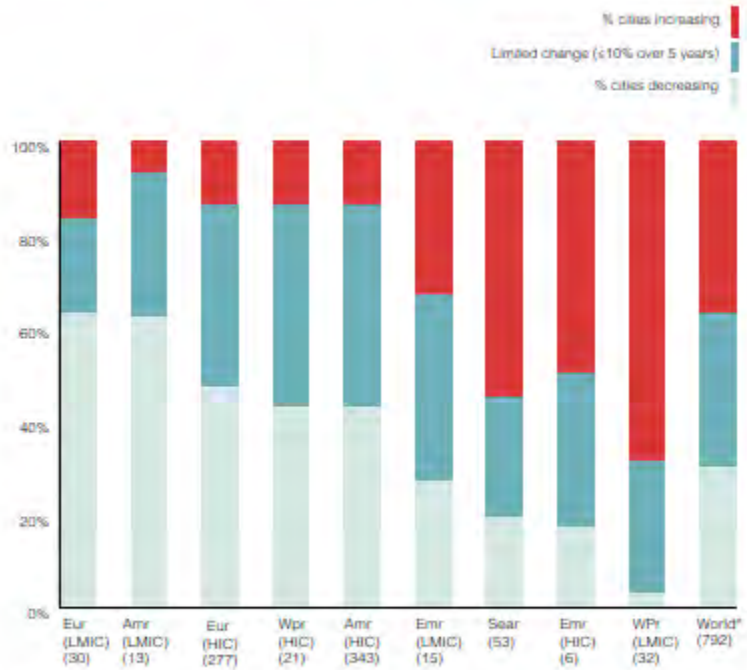
Figure 9 : Global map of modelled annual median concentration of $PM_{2.5}$ in µg/m³



$PM_{2.5}$: Fine particulate matter of 2.5 microns or less.

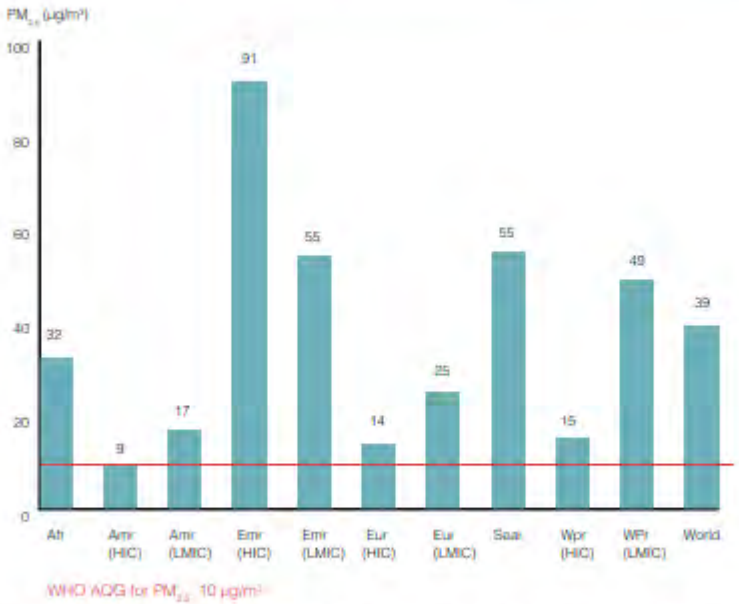
Percentuale di città nelle quali il valore medio annuo di $PM_{2,5}$ è aumentato o diminuito nel periodo 2008-2013 nelle diverse aree del mondo

Figure 7: Percentage of cities[1] with increasing and decreasing PM_{10} or $PM_{2.5}$ annual means over a five-year period (mostly 2008–2013), by region



Amr: Americas; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: Low- and middle-income countries; HIC: high-income countries. [1] The number of cities is indicated in bracket. * The world figure is regional population-weighted.

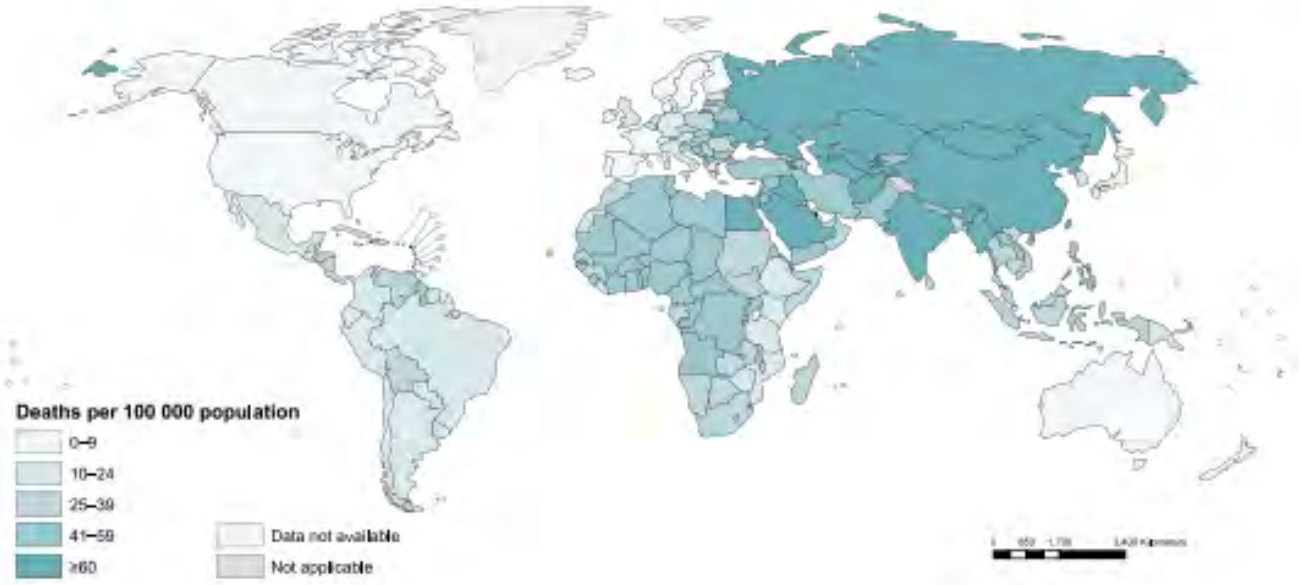
Figure 10: Annual median exposure to ambient (outdoor) mean annual concentration of $PM_{2.5}$ in µg/m³, by region - urban and rural population population, 2014



Afr: Africa; Amr: Americas; Emr: Eastern Mediterranean; Eur: Europe; Sear: South-East Asia, Wpr: Western Pacific; LMIC: low- and middle-income countries; HIC: high-income countries; $PM_{2.5}$: particulate matter with an aerodynamic diameter of 2.5 µm or less. WHO AQG: WHO Air Quality Guidelines.

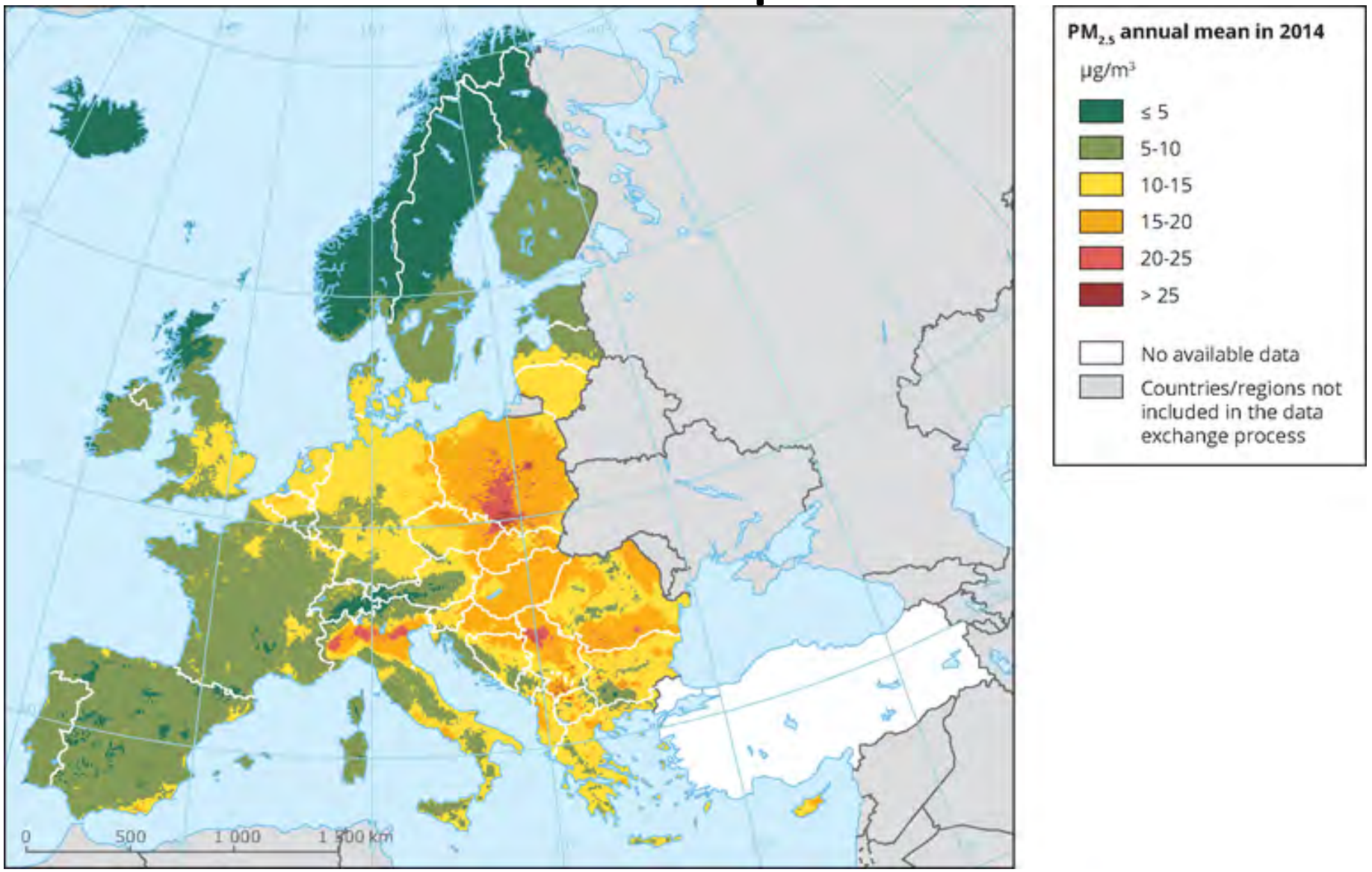
Conclusione: ridurre l'inquinamento atmosferico è possibile.

Figure 18 : Age-standardized deaths per 100 000 capita attributable to AAP in 2012, by country



AAP : Ambient air pollution

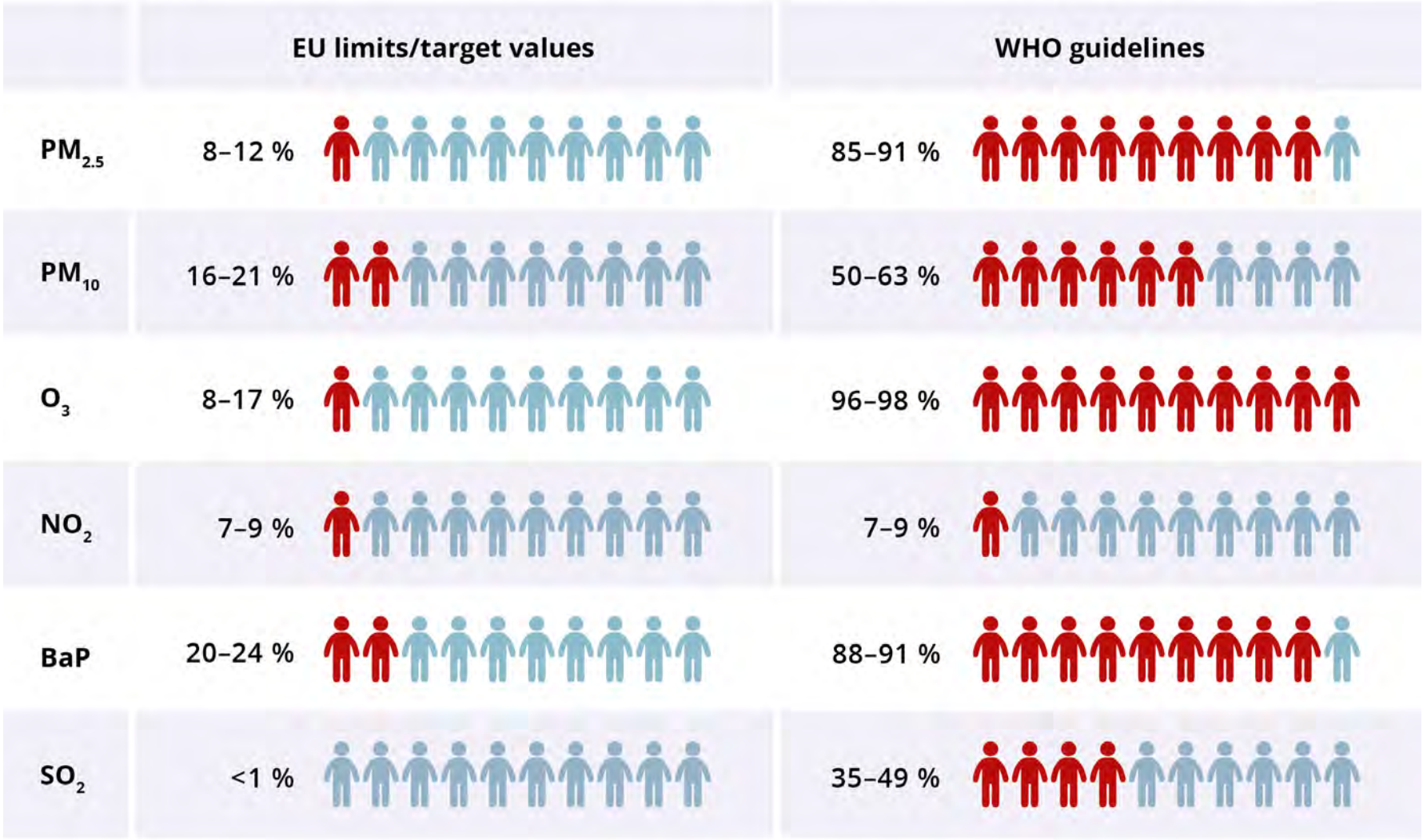
Il confronto europeo e italiano



Premature deaths attributable to PM2.5, NO2 and O3 exposure in the EU-28 and total Europe, 2015							
		PM 2,5		NO_2		O_3	
	Population (1 000)	Annual mean (a)	Premature deaths (b	Annual mean (a)	Premature deaths (b)	SOMO35 (a)	Premature deaths (b)
Italy	60 796	18.5	60 600	24.9	20 500	6 860	3 200
EU-28	506 030	13,9	391.000	18,9	76.000	4.250	16.400
Total	538.278	14,1	422.000	18,8	79.000	4.310	17.700

Quanto sono preoccupanti questi dati?

EU urban population exposed to harmful levels of air pollutant concentrations in 2012–2014, according to:



Confronto fra i valori limite di alcuni inquinanti della Direttiva UE e delle linee guida OMS

		Air Quality Directive		WHO guidelines	
Pollutant	**Averaging period**	**Objective**	**Comments**	**Objective**	**Comments**
$PM_{2.5}$	One day			25 µg/m³ (*)	99th percentile (3 days/year)
$PM_{2.5}$	Calendar year	Limit value, 25 µg/m³		10 µg/m³	
PM_{10}	One day	Limit value, 50 µg/m³	Not to be exceeded on more than 35 days per year.	50 µg/m³ (*)	99th percentile (3 days/year)
PM_{10}	Calendar year	Limit value, 40 µg/m³ (*)		20 µg/m³	
O_3	Maximum daily 8-hour mean	Target value, 120 µg/m³	Not to be exceeded on more than 25 days per year, averaged over three years	100 µg/m³	
NO_2	One hour	Limit value, 200 µg/m³ (*)	Not to be exceeded more than 18 times a calendar year	200 µg/m³ (*)	
NO_2	Calendar year	Limit value, 40 µg/m³		40 µg/m³	

Effects of Common Air Pollutants

RESPIRATORY EFFECTS

Symptoms:

- Cough
- Phlegm
- Chest tightness
- Wheezing
- Shortness of breath

Increased sickness and premature death from:

- Asthma
- Bronchitis (acute or chronic)
- Emphysema
- Pneumonia

Development of new disease

- Chronic bronchitis
- Premature aging of the lungs

CARDIOVASCULAR EFFECTS

Symptoms:

- Chest tightness
- Chest pain (angina)
- Palpitations
- Shortness of breath
- Unusual fatigue

Increased sickness and premature death from:

- Coronary artery disease
- Abnormal heart rhythms
- Congestive heart failure

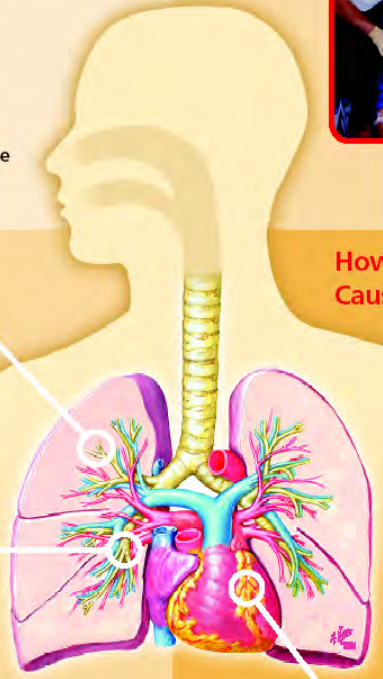
How Pollutants Cause Symptoms

Effects on Lung Function

- Narrowing of airways (bronchoconstriction)
- Decreased air flow

Airway Inflammation

- Influx of white blood cells
- Abnormal mucus production
- Fluid accumulation and swelling (edema)
- Death and shedding of cells that line airways



Increased Susceptibility to Respiratory Infection

Normal

Lung with respiratory infection

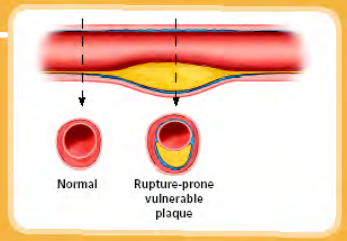
How Pollutants May Cause Symptoms

Effects on Cardiovascular Function

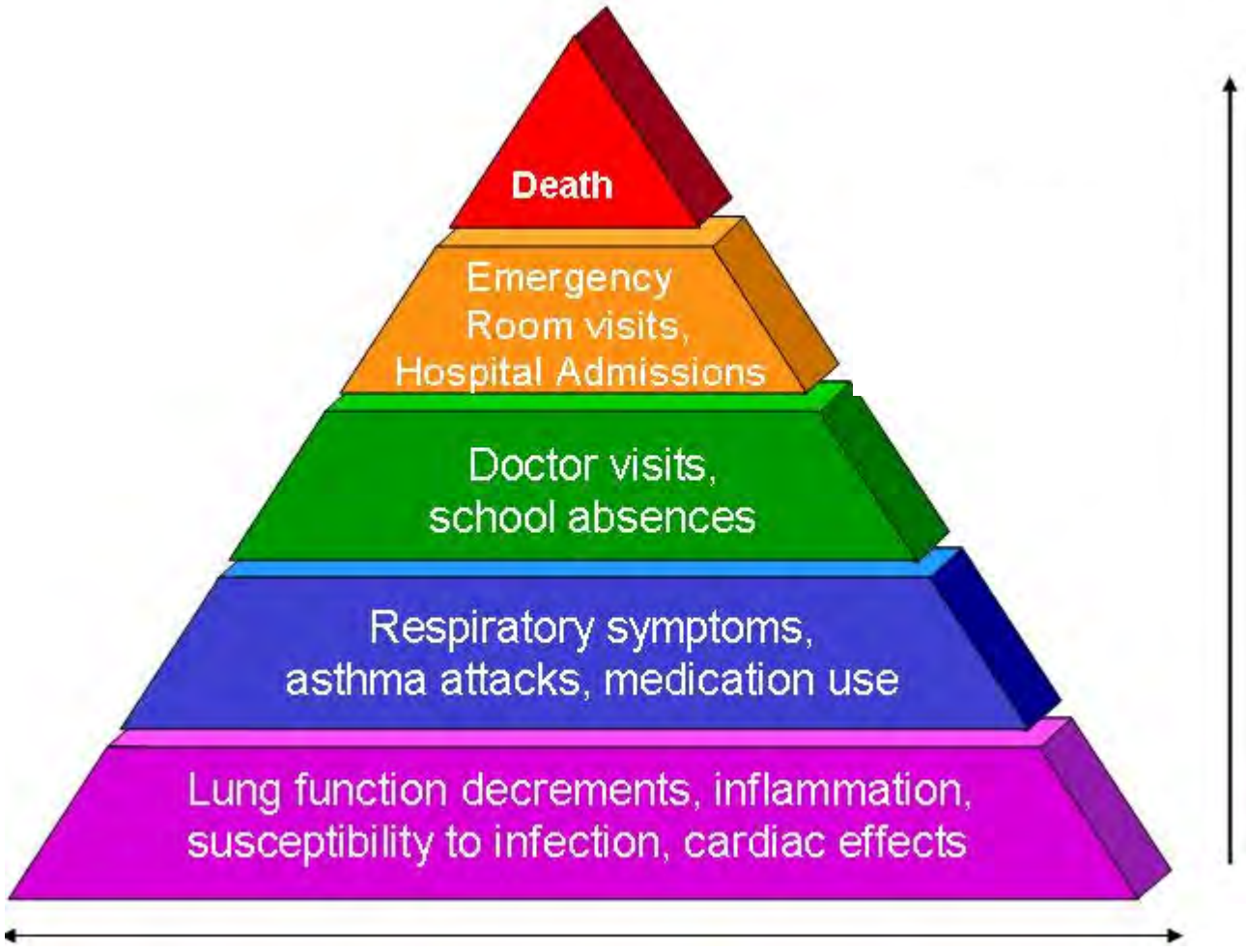
- Low oxygenation of red blood cells
- Abnormal heart rhythms
- Altered autonomic nervous system control of the heart

Vascular Inflammation

- Increased risk of blood clot formation
- Narrowing of vessels (vasoconstriction)
- Increased risk of atherosclerotic plaque rupture

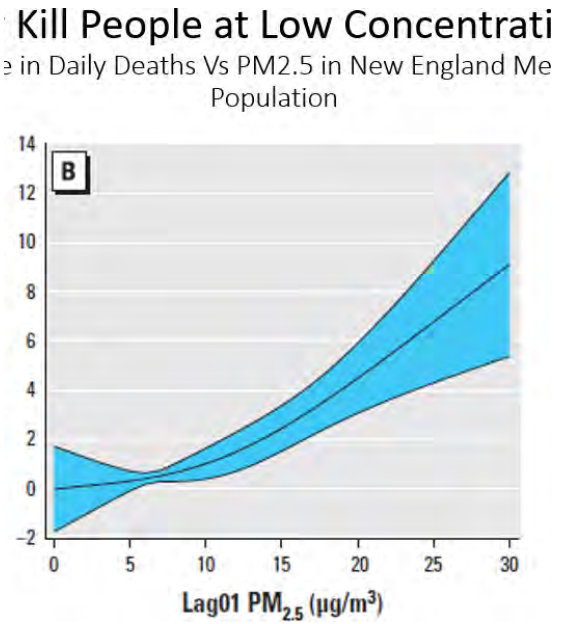


Effetti sanitari



Health effects of ambient air pollution (1)

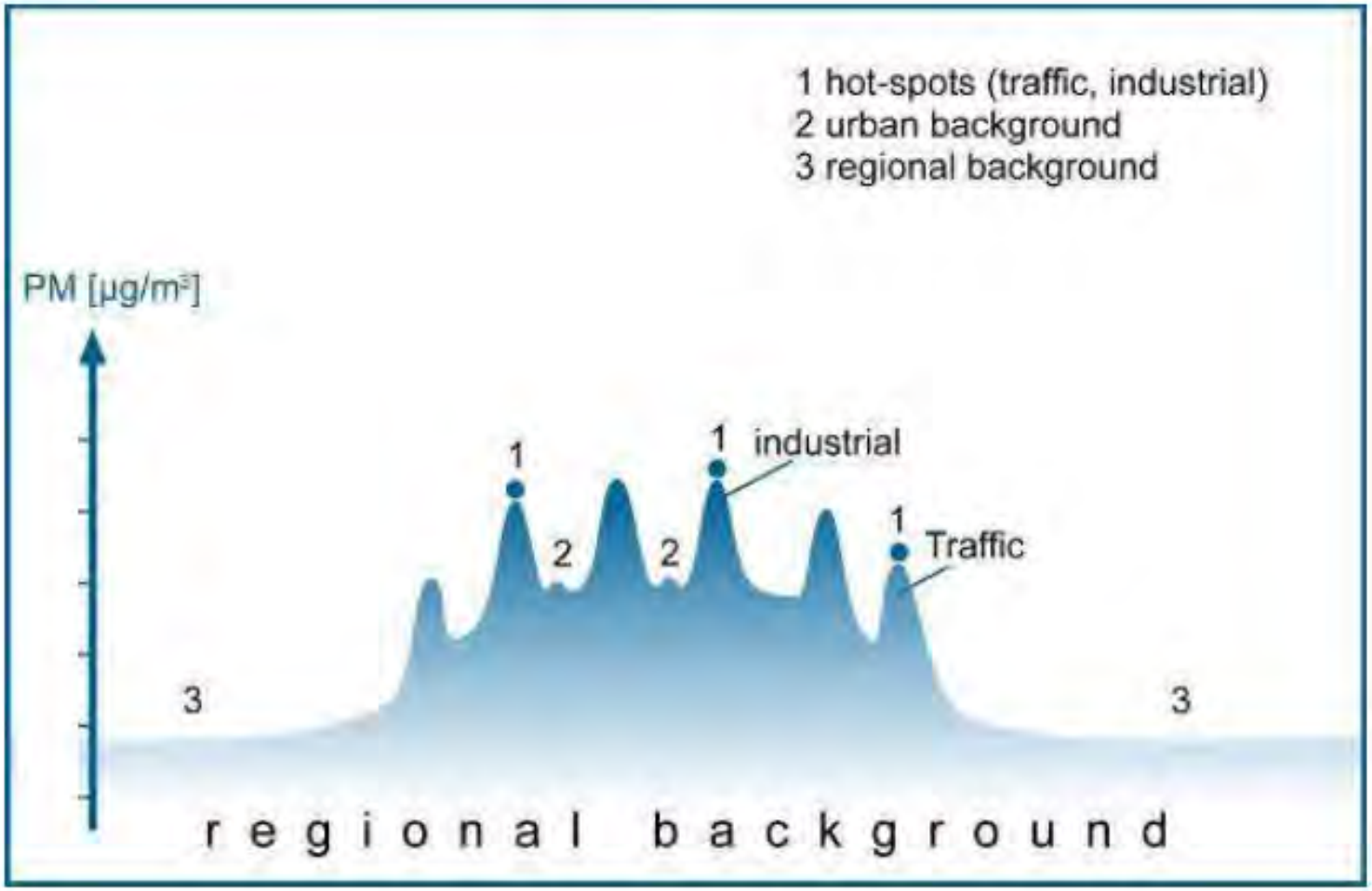
- **91% of the world population, including children, is exposed to air pollution at unacceptable levels. Inefficient energy use in the home is a major source of ambient air pollution, particularly in low and middle-income countries**
- **Substantial scientific evidence from studies of short term and long-term exposure to air pollution show that it is a major contributor to disease and early death.**
- **Adverse effects have been demonstrated at not only high, but also low exposures – even below current WHO guidelines.**
- **Air pollution affects people of all ages – from birth, to young children, and through old age.**
- **Air pollution affects people with pre-existing diseases and less affluent: the most sensitive and vulnerable in society are most at risk.**



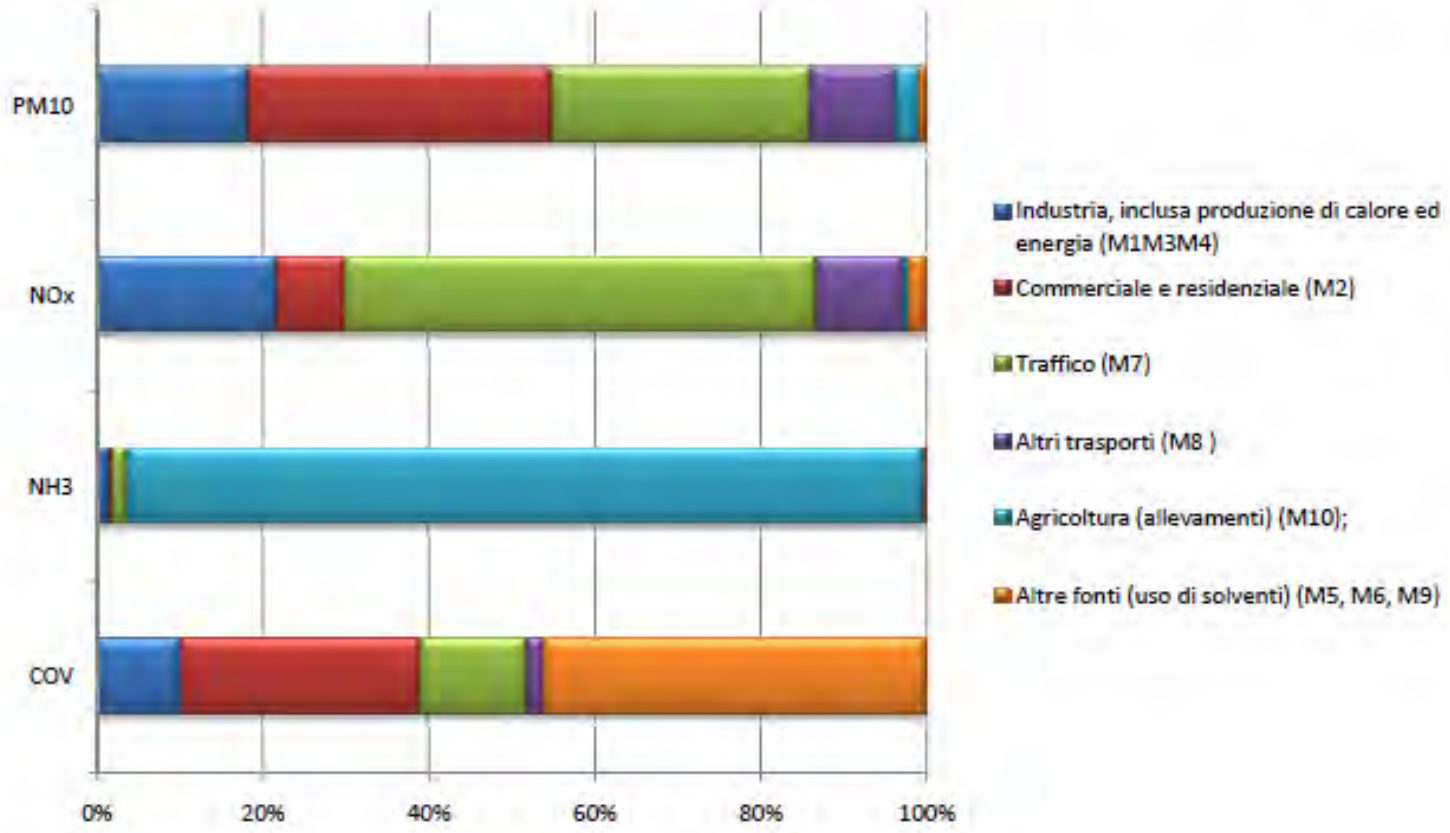
Global burden of type 2 diabetes mellitus attributable to PM2.5

- The global burden of diabetes was estimated at 1.4 million excess deaths, with 29 million years oflife lost (YLLs) and 39 million YLDs in 2017
- Air pollution constitutes a major risk factor for **diabetes**, with a **larger attributable burden than tobacco or physical inactivity**. Air pollution mitigation therefore may have an important role in reducing the global disease burden from diabetes
- Approximately **one-fourth of the global burden of diabetes was attributable to air pollution**, with 18% from ambient PM2.5 and 8% from HAP

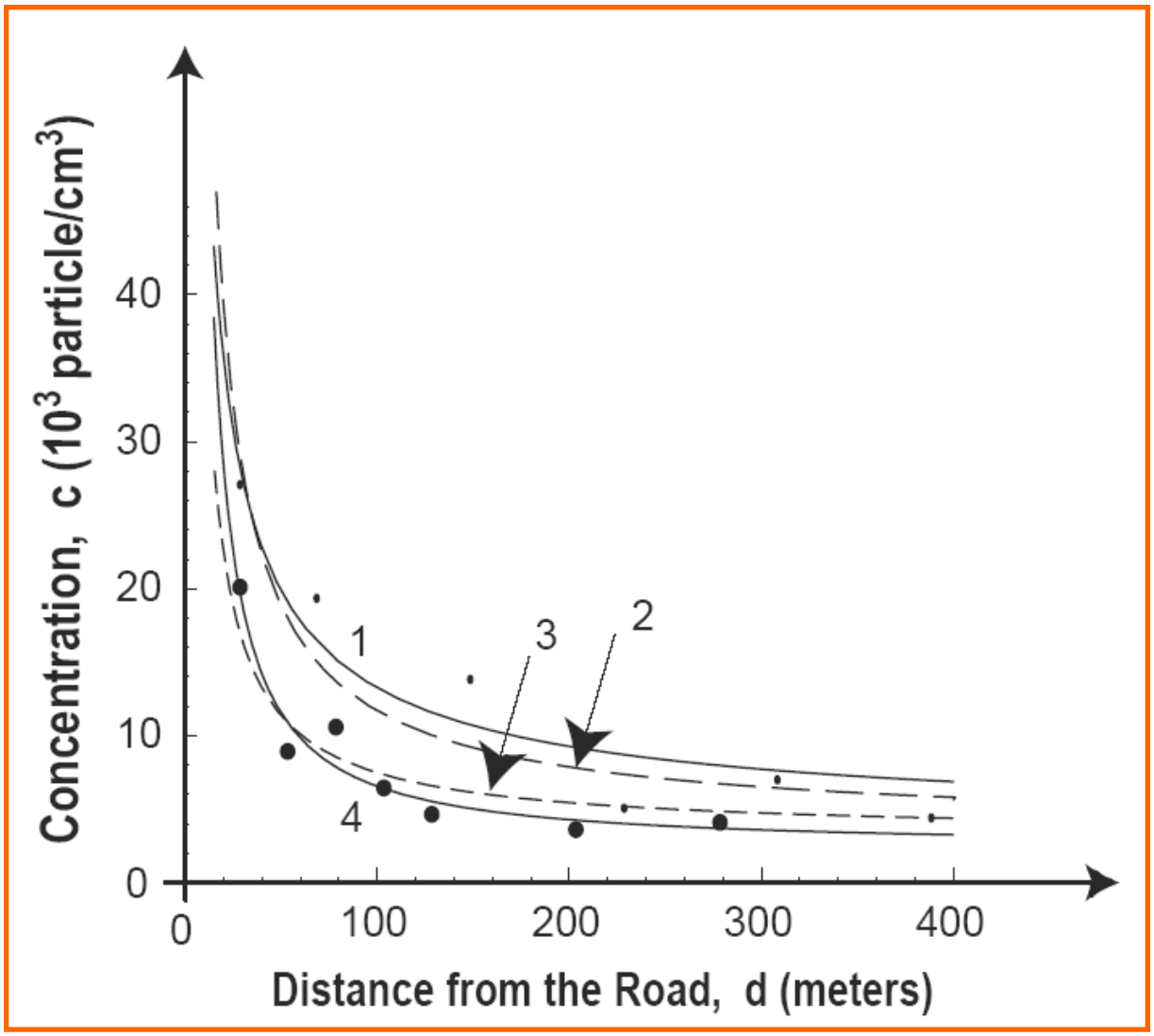
Origine dell'inquinamento



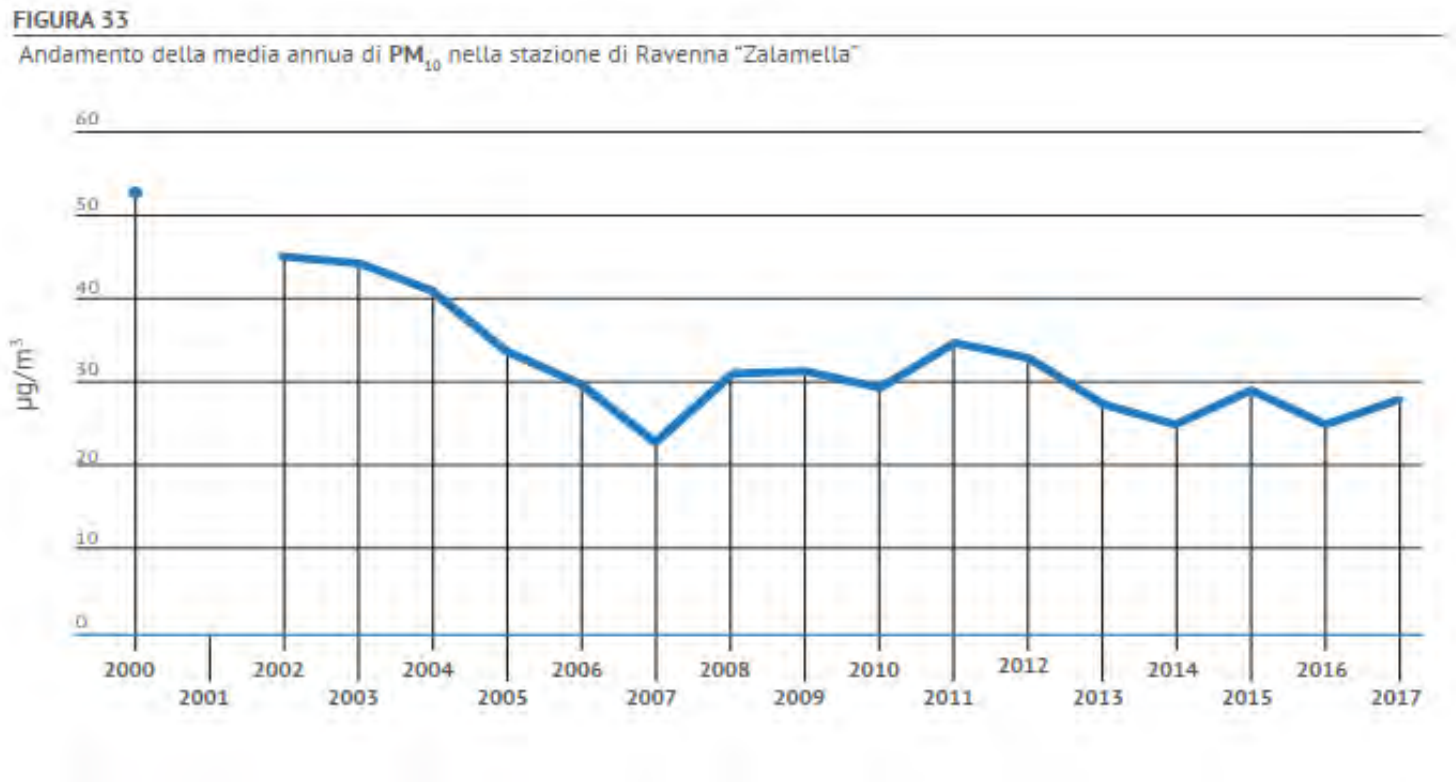
Peso relativo delle fonti inquinanti in Emilia – Romagna



L'importanza del traffico

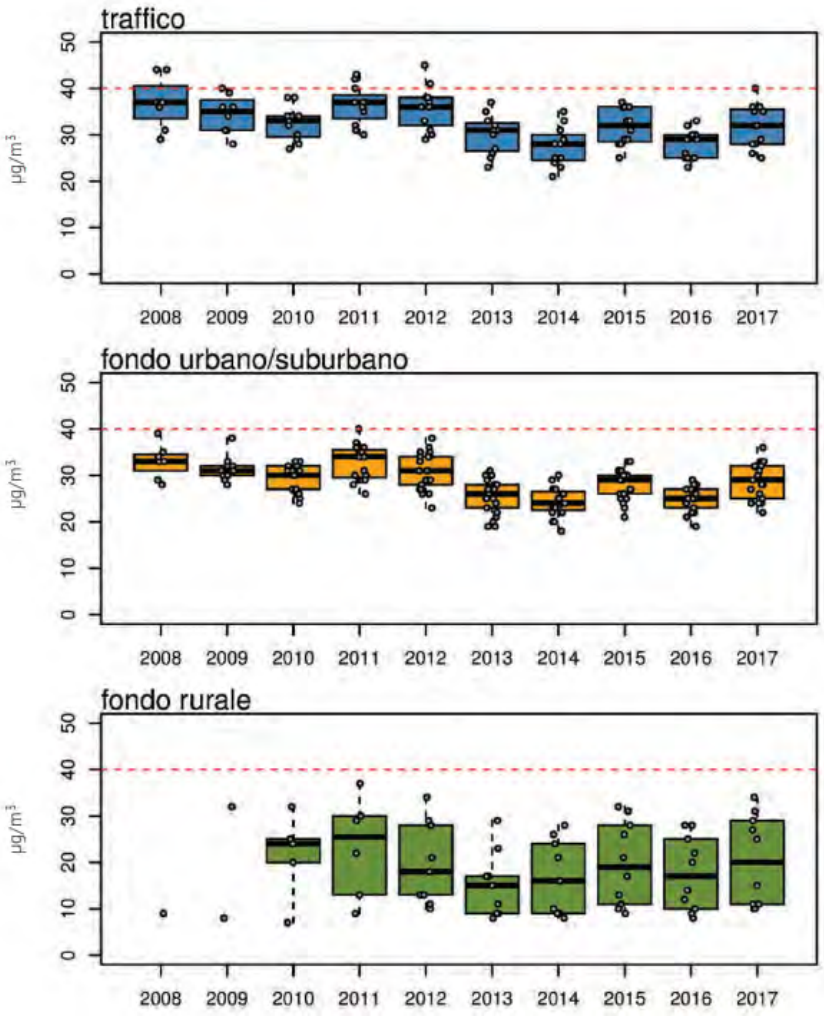


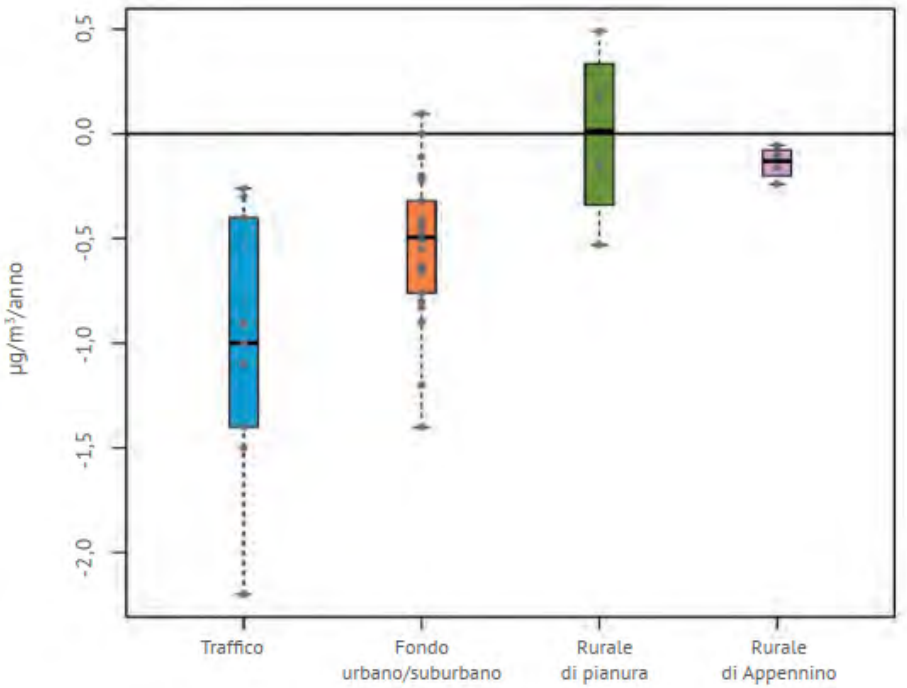
Alcuni dati sulla nostra regione da ARPAE



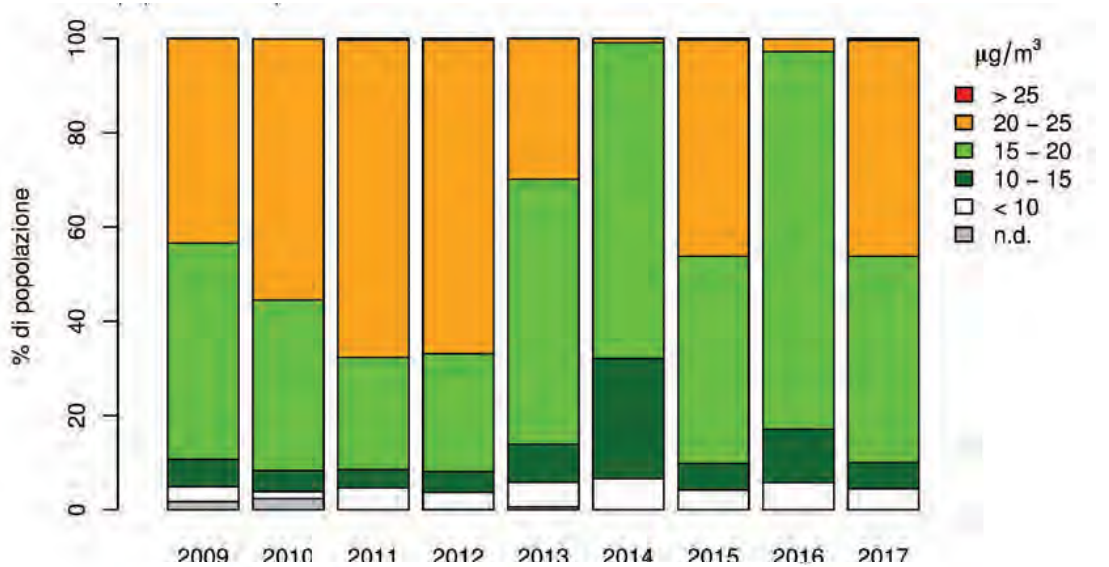
L'inquinamento da PM10 non è molto calato negli ultimi 10 anni

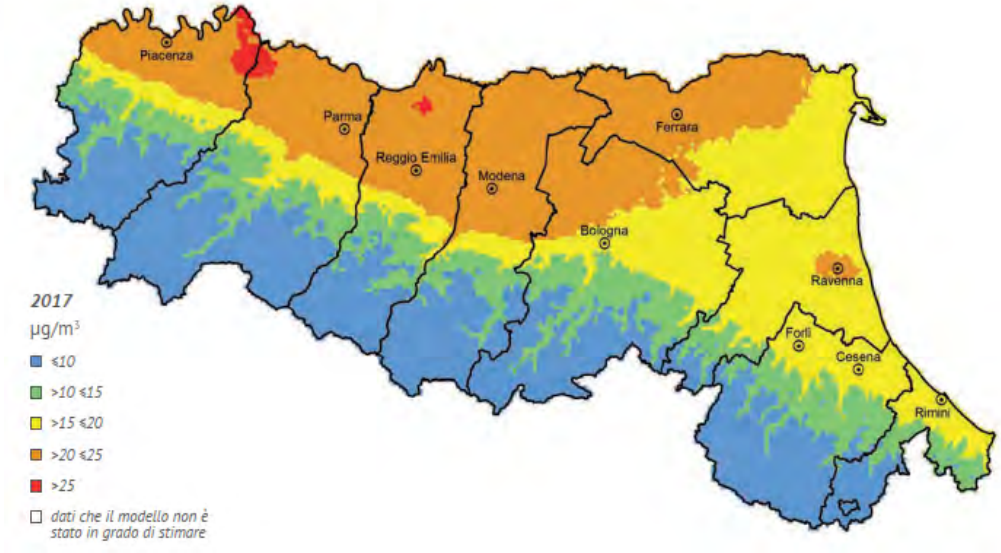
Si riduce sensibilmente nelle zone esposte a traffico, meno nelle aree urbane mentre è stabile nella pianura





Ma quanto siamo esposti? PM2,5





In collaborazione con

Il Rapporto MobilitAria 2019
Politiche di mobilità e qualità dell'aria nelle 14 città e aree metropolitane 2017-2018

Mercoledì 17 Aprile 2019, ore 9,30-13,30
Auditorium Ferrovie dello Stato, Piazza della Croce Rossa 1 - Roma

Apertura 9.30 – 10.00

Gianluigi Angelantoni, *Presidente Gruppo Angelantoni - Vicepresidente Kyoto Club*
Gianfranco Battisti, AD *Ferrovie dello Stato.* La strategia di FS per le città metropolitane*

Presentazione del Rapporto ***MOBILITARIA 2019,*** elaborato da Kyoto Club e CNR-IIA in collaborazione con OPMUS ISFORT
Politiche di mobilità e qualità dell'aria nelle 14 città ed aree metropolitane 2017-2018

10.00-11:15
Francesco Petracchini, *CNR-IIA Consiglio Nazionale delle Ricerche*
Anna Donati, *Gruppo di lavoro Mobilità sostenibile Kyoto Club*
Carlo Carminucci, *ISFORT* L'andamento della Mobilità nelle 14 aree metropolitane
Veronica Aneris, *T&E* Gli obiettivi di riduzione CO2 al 2030 e al 2050 nei trasporti
Patrizia Malgeri, *TRT Trasporto e Territorio.* Scenari di impatto della mobilità elettrica nelle città

11.15 – 12.15
Andrea Gibelli, Presidente ASSTRA. Trasporto collettivo per la mobilità sostenibile*
Giulietta Pagliaccio, Presidente FIAB. Diamo spazio alla mobilità ciclistica
Massimo Marciani, *Presidente FLC.* La logistica urbana del futuro
Dino Marcozzi, *Motus-e.* Verso la decarbonizzazione con la mobilità elettrica

12:15 – 13:15 Le azioni delle città.
Modera **Francesco Ferrante**, Vicepresidente *Kyoto Club*

Irene Priolo, Assessore Mobilità Comune di Bologna
Maria La Pietra, Assessore Mobilità Comune di Torino
Linda Meleo, Assessore Città in movimento, Comune di Roma*
Stefano Giorgietti, Assessore Lavori Pubblici, viabilità e TPL Comune di Firenze*
Marco Granelli, Assessore Mobilità, Comune di Milano
Mario Calabrese, Assessore Infrastrutture e TPL Comune di Napoli
Michele Dell'Orco, Sottosegretario Ministero delle Infrastrutture e dei Trasporti *

*in attesa di conferma

- **Indicative outlook for the EU meeting the selected objective by 2020**: This shows the indicative prospect of meeting the selected objective by 2020, using a traffic light system. The traffic light is green (●) if it is likely that the objective will be met, yellow (●) if this is uncertain or unclear and red (●) if it is unlikely that the objective will be met. The colours have been assigned on the basis of the available information specific to each indicator and to the corresponding selected objective. Overall, the colours were based on some combination of (1) the indicator-based trends observed over previous years; (2) the distance to target assessments (if available); (3) modelled estimates of future developments (if available); and (4) expert consideration.

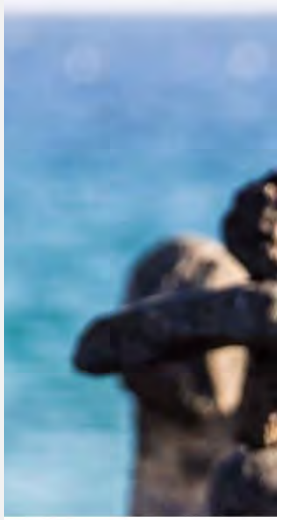
A graphical example of the scoreboard methodology applied to an indicator is provided below:

EEA Report | No 19/2018

indicator report 2018

Environment Action Programme

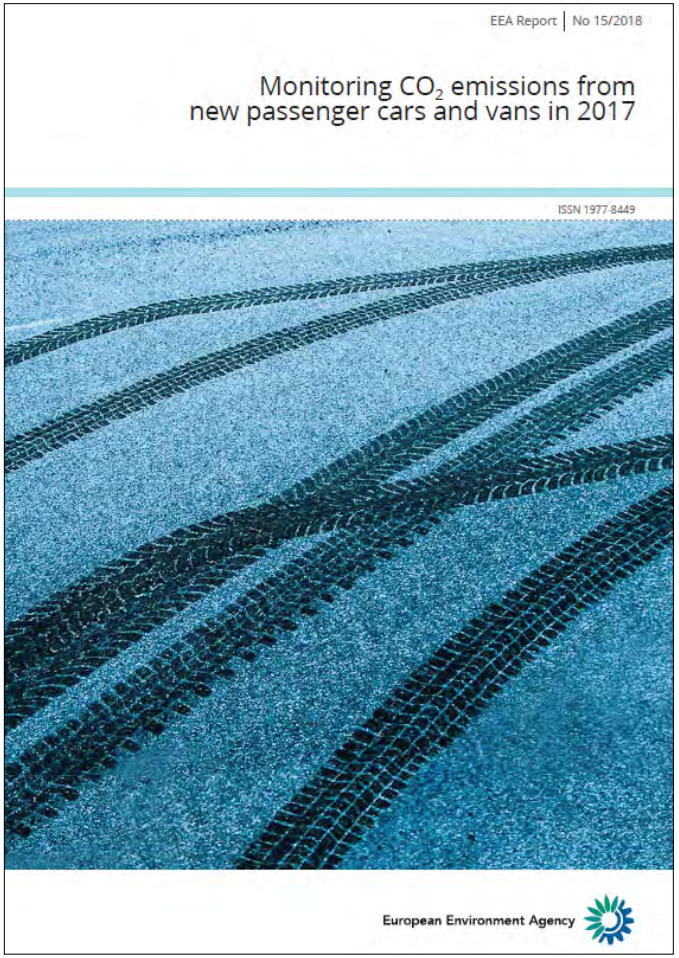
ISSN 1977-8449



European Environment Agency

European Environment Agency, 1

- While all van manufacturers respected their specific emission targets in 2017, three car manufacturers (Automobili Lamborghini, Mazda Motor Corporation and Société des Automobiles Alpine), representing together 1.4 % of all new car sales in 2017, exceeded their specific emission targets for 2017.



European Environment Agency, 2

- Amongst the largest automakers, **Toyota Motor Europe had the lowest average CO_2 emissions** for new passenger cars registered in 2017 (with 103 g CO_2/km). Automobiles Peugeot and Automobiles Citroen followed with (105 g CO_2/km) and (106 g CO_2/km), respectively. As in every year since vans monitoring commenced, Automobile Dacia SA was the lowest-emitting vans manufacturer (118 g CO_2/km in 2017).
- BMW AG, Renault, Daimler AG, Volkswagen together sell more than 50 % of the new electric vehicles in the market.

European Environment Agency, 2

- In December 2018, EU lawmakers reached an agreement on emission targets for the average fleet emissions of new passenger cars and light-commercial vehicles for 2025 and 2030. These targets aim to **reduce the average CO_2 emissions from new cars by 15 % in 2025 and by 37.5 % in 2030, compared with 2021 baseline levels.** For light-commercial vehicles, the targets consist of reductions by 15 % in 2025 and 31 % in 2030, relative to 2021. In February 2019, EU lawmakers also reached an informal agreement setting a 30 % reduction target for the average fleet emissions of new trucks by 2030.

Suggerimenti per chi vuole saperne di più