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Coronary Heart Disease Burden from Local Traffic-related Air Pollution in Europe

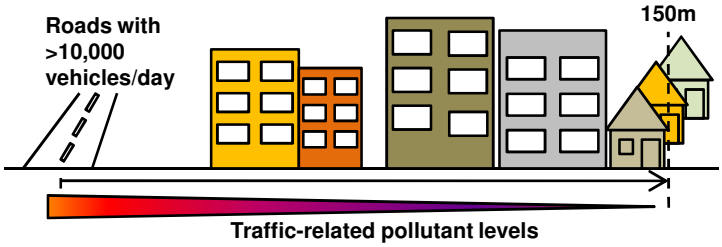
L. Perez (1), O. Chanel (2), P. Goodman (3), C. Declercq (4), S. Medina (4), B. Forsberg (5), N. Künzli (1) **on behalf of Aphekom network**

(1) Swiss Tropical and Public Health Institute and University of Basel, Switzerland ; (2) CNRS-GREQAM-Université d'Aix-Marseille, France ; (3) Dublin Institute of Technology, Ireland ; (4) Institut de Veille Sanitaire, France ; (5) Umeå University, Umeå, Sweden.

Background

Several epidemiological studies suggesting a causal role of local traffic-related air pollution in the development of chronic pathologies, such as coronary heart disease (CHD), have now been published in prominent medical journals.

If the causal relationship is true, what are the public health implications?



Methods

We combined (1) concentration-response function (CRF) for the association between CHD prevalence and living within 150m of busy roads (OR:1.85 [95%CI:1.21-2.84]; Hoffmann et al, 2006); (2) proximity distribution of urban populations to "busy roads" (i.e. the number of persons living within 150m of roads with more than 10,000 vehicles per day, the exposure matching with the CRF); and (3) extrapolated CHD prevalence in these populations.

We monetized this burden using direct and indirect benefits as well as intangible benefits.

Objectives

We estimated the health and monetary benefits of avoiding the development of CHD through the reduction of local traffic-related pollution among adults (age >65 yrs) in 10 European cities.

City	Population (Million. Hab)	PM10 annual average ($\mu g/m^3$)	% population within 150m (average 52%)
Granada	0.24	34	28%
Ljubljana	0.27	32	47%
Bilbao	0.31	27	59%
Sevilla	0.7	41	38%
Valencia	0.74	46	71%
Brussels	1.03	29	64%
Stockholm	1.3	17	30%
Barcelona	1.53	33	77%
Vienna	1.66	25	62%
Rome	2.81	37	43%

Table 1. Estimated proportion of people living within 150m of roads with more than 10,000 vehicles per day in 10 European cities

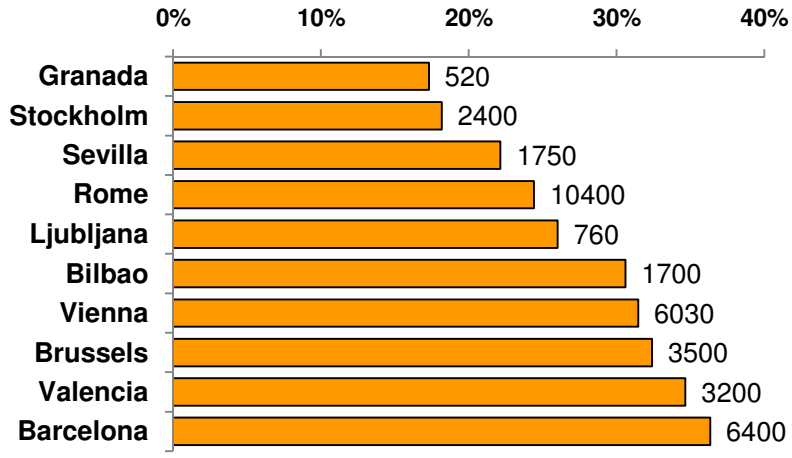


Figure 1. Proportion (and absolute number) of CHD cases that could be attributable to living at proximity of busy roads. Average 10 cities is 28%. (36,735 cases).

Results

We estimated that in average 52% of the cities' population was living at 'proximity to busy roads' or within 150m of streets with more than 10,000 vehicles per day **(see Table 1).**

On average 36,735 or 28% of all CHD cases could be attributable to local traffic-related pollution among the estimated 132,000 elderly with CHD, respectively **(see Figure 1)**.

Avoiding this burden translated into a total central estimate of 249 million Euros saved per year **(see Table 2).** This monetary estimation is more than 30 times larger than an estimation considering only acute cardiovascular episodes attributable to current air pollution level, as usually done in traditional risk assessment.

Number of attributable cases (95%CI)	Monetary valuation (thousand € 2005) 95%CI
36,735 (11,958 – 57,923)	249,063 (81,075 – 392,718)

Table 2. Monetary valuation of potential traffic-related CHD burden

Implications

We estimated a large population exposure to local traffic pollution and possible related chronic burden in Europe.

While exploratory, this burden - currently ignored in traditional air pollution risk assessment - suggests that reduction of local traffic-related air pollution could be an effective primary prevention to reduce a substantial public health burden.

Acknowledgements

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