

EuroLifeNet project

Political and scientific context

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Background: Proposal of new EC directive on air pollution by Particulate Matter (PM)

- There is a change in the philosophy of the European Commission's Air Quality policy. In the past, air quality directives were imposing limit values not to be exceeded. Today, with the new air quality directive proposal that is currently in discussion at the European Council and Parliament, it will become necessary, in addition to the respect of the limit values, to reduce as well the levels of exposure of the population.
- This new directive, expected to enter in force in 2010, will impose, in addition to a new limit value for PM₁₀, the following requirements for PM_{2.5} (PM 2.5 are the smaller particles with a diameter lower than 2.5 micrometer, that can penetrate deeper in the lungs and are more toxic than PM₁₀):
 - a yearly limit value of 25 micrograms per cubic meter not to be exceeded anywhere;
 - a 20% reduction of the levels of exposure of the population, to be achieved between 2010 and 2020.
- The Joint Research Centre, as Directorate General of the European Commission responsible for providing technical and scientific support to the development and implementation of European Community policies, has therefore started a number of activities in support to this this new directive proposal, under the EuroLifeNet project.

Objectives of the EuroLifeNet project

The EuroLifeNet project was carried out as a pilot study supporting this new directive, with the following objectives:

- to make an assessment of the current PM_{2.5} exposure levels in a number of representative areas in Europe. A series of pilot measurement campaigns were conducted in areas ranging from low to highly polluted areas (from continental background like Açores Islands, rural areas in north of Portugal, moderately polluted city with Lisbon and highly polluted agglomeration with Milano).
- to understand the routes, i.e. the outdoor and indoor locations as well as the activities that lead to increased exposure of the citizens, with the perspective to establish the most efficient strategies to reduce exposure, to be implemented at local level.
- to raise the awareness of the citizen on the health risk of air pollution and on the impact of life style and personal choices on exposure. In the past air pollution was mainly caused by industrial emissions. Today industry has strongly reduced its emissions. In a city, about 90% of the air pollution is caused from emissions generated inside of the city, with 60 to 80% coming from automotive sources, and the rest from heating. Today, each citizen is contributing directly to the air pollution levels in his city, and his life style and personal choices have a direct impact on the air quality that he is breathing.

Project description

- This project was carried out by using optical sensors that register every 10 seconds the concentration levels in the air of fine particles (PM_{2.5}) to which students are exposed during the normal activities during a day in their life: in the street, in the car, in public transport means, at home or at school. This approach allows to

assess in a more precise way the real exposure of the population and to give information to the citizen on the specific locations, activities and behaviors that may lead to increased health risks.

- The measurement method is based on the use of small, portable and easy to use devices (weight 300 gram), that provide reliable result if properly and regularly calibrated.

- Students were invited to assess their personal exposure during one day of their life, making measurements at school, on the way from school to home and back, during specific outdoor and indoor activities, and at home. The students were selected to cover a range of different exposure routes, like different living environments across the city, different transport modes (foot, bike, motorbike, public transport, car), different life style and personal choices (active and passive smoking, specific indoor/outdoor activities, home ventilation).

- The EuroLifeNet project is a joint initiative of CITIDEP – Research Center on Information Technologies and Participatory Democracy, and the Joint Research Centre, Institute for Environment and Sustainability, with the support of many partners (see partner list), and carried out in collaboration of 3 schools in Milan (Italy), 2 schools in Lisbon, 1 school in Almada, 1 Povoá do Varzim, 1 in Ponte de Lima, and 1 in Angra do Heroísmo, Açores (Portugal).

Main results of the EuroLifeNet campaign

- From the comparison between the data from the fixed air quality monitoring network and the personal exposure measurements, it appears that the student's exposure is to 50% a function of the external air quality, and to 50% conditioned by life style and personal choices.

- The outdoor air quality in a city changes with the location, but essentially depends on the proximity of the traffic emissions. The air quality in a larger agglomeration is therefore not homogeneous, and exposure levels that derive from the external air quality may vary strongly over the city.

- Aspects in life style and personal choices that mostly affect exposure linked to the means of transportation and the smoking habits. Travelling in busy roads during hours with intense traffic increase exposure dramatically, for all means of transport that are considered. Smoking and passive smoking in indoor environments is responsible for the highest exposure levels, that can last for hours.

- In general there is a good agreement between the measurements made in the stations of the air quality monitoring networks and the exposure measurements. The quality monitoring network provides a good estimation of the global exposure of the general population in 24 hours, whereas the data obtained in the EuroLifeNet project give a more detailed information on the locations and activities that are leading to increased exposure levels. Both approaches provide complementary information: the monitoring network allows to control the compliance of limit values; personal exposure data are giving more detailed information and allow to better understand the exposure process.