Project WOMENBIOPOP

Linking Environment and Health: a Country-based Human Biomonitoring Study on Persistent Organic Pollutants in Women of Reproductive Age

environment and health

PROJECT DESCRIPTION

Persistent organic pollutants (POPs) are a group of toxic contaminants with high environmental and biological persistence, ubiquitously present in the environment. Some of these, such as "dioxins", PCBs, chlorinated pesticides, are well-known pollutants and are often associated with episodes of environmental contamination with consequent health concerns. The most effective instrument for measuring exposure to POPs is biomonitoring.

OBJECTIVES

The project aimed to provide **biomonitoring data relating to a specific group of the population, women of childbearing age**. For this target exposure to POPs raises particular concerns due to the possible effects of the pollutants on the endocrine and the female reproductive systems and because of POPs' ability to cross the placenta during the gestation period. The biomonitoring data, collected within the project, were correlated with the environmental contamination data, for this purpose a database was built based on comparable data coming from different geographical areas and referring to different types of exposure. Six regions representative of three Italian macroareas were involved in the initiative: Trentino-Alto Adige and Piedmont from the **North**, Umbria and Lazio from the **Center**, Puglia and Sicily from the **South**. In each of them three types of areas were identified, rural, urban and industrial, characterized by different levels of exposure to POPs. The pollutants investigated were Perfluorooctanosulfonate, Organochlorine Pesticides, Polychlorodibenzodioxins and Polychlorinated dibenzofurans, Polychlorobiphenyls, Polybrominated diphenyl ethers, Perfluorooctanoic Acid.

The project anticipated the direction of the national policy on biomonitoring promoted by the Ministry of the Environment, co-financer itself of the project. Since 2008, biomonitoring of POPs has been included in the list of national priorities in line with the recommendations of the *European Environment and Health Strategy 2004-2010*.

PROJECT PHASES

The analysis, core activity of the project, was methodologically based on ensuring quality control in all the project phases and the comparability of data, made possible by a standardized use of materials, questionnaires, protocols and by performing all the analyses in the same laboratory.

Main actions were:

- **Preparation of the study**
  - development of documents (questionnaires, forms for informed consent, information material on the project) to be submitted to the women during the “recruitment”;
  - training of health workers (doctors and nursing staff) involved in the “recruitment” of women.
- **Recruitment**
  - recruitment of women, administration of the information material and questionnaires, collection of blood sample;
  - first processing operations of the blood sample;
  - sending samples and questionnaires to the Superior Healthcare Institute;
- **Analysis of the pollutants consisting of:**
  - preparatory analysis;
  - functional dosage;
- **Data analysis and interpretation**
  - validation of the analytical results and analysis of the questionnaires’ quality;
  - interpretation of data based on the questionnaires and on available environmental data.
- **Communication**

For each geographical area 30-50 women aged 20-40 years were selected, who were nulliparous, or who had never breastfed, and who had been resident for at least 10 years in the areas under observation. A total of **749 people** were involved for the blood sampling and compilation of the questionnaire to record the exposure to the studied pollutants and the reproductive anamnesis. The analyzes conducted on each blood sample determined the blood concentration of polychlorinated biphenyls (PCBs), organochlorine pesticides (DDE, HCB, HCH), perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), polybrominated diphenyl ether (PBDE), "dioxins" (PCDD and PCDF) and any other persistent organic pollutants, as identified in the *Stockholm Convention on POPs.* The biomonitoring results were analyzed by comparison with available food and environmental exposure data.

PROJECT RESULTS

The most important and innovative aspect of the WOMENBIOPOP project was the **production**, for the first time in Italy, of **comparable data** on exposure of women of childbearing age to persistent organic pollutants. These data represent a valuable source of information on POPs concentrations in Italy. The size of the study was such as to allow a solid **statistical evaluation** and to **derive reference values for the *target group***. All the processed data were collected in a **national database on the exposure and environment** that allows to predict changes over time in the concentration of POPs and to identify in this way areas of potentially higher risk for which to plan corrective interventions.

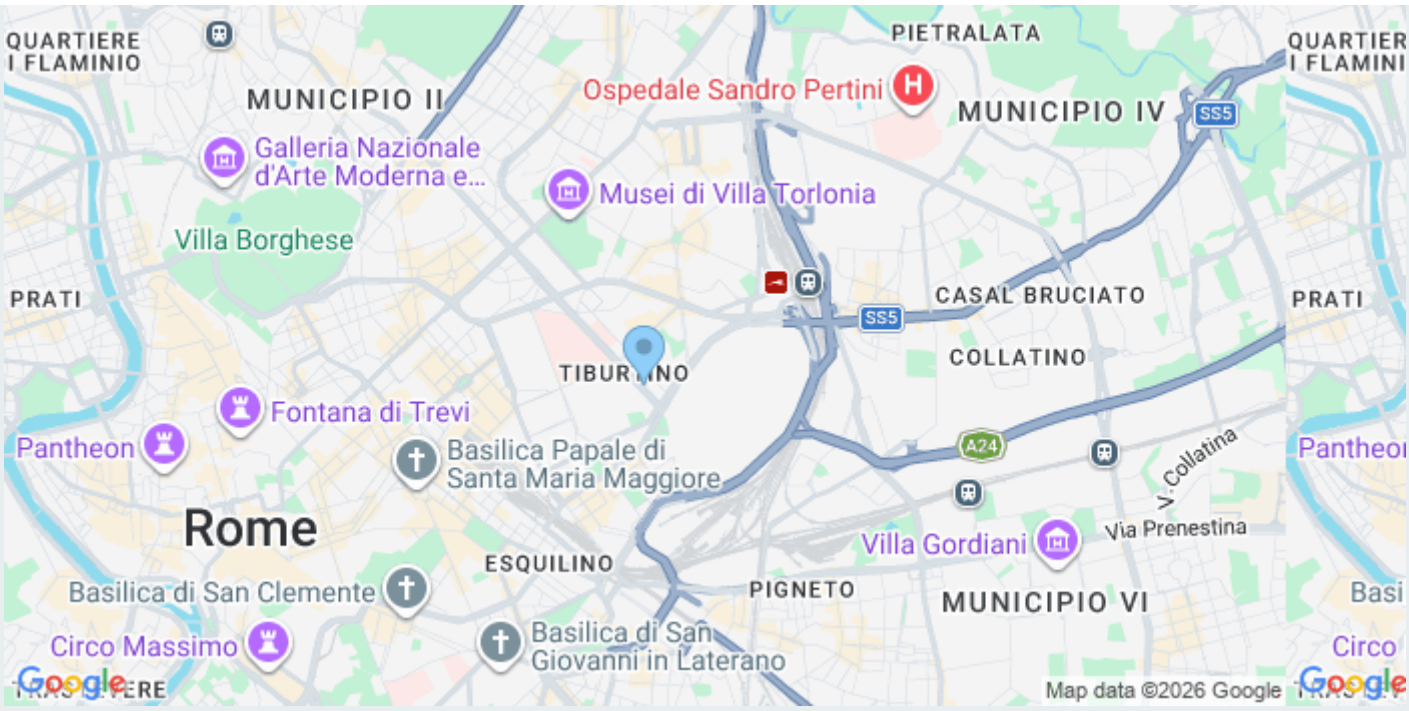
The analyzes carried out found the **highest POPs blood concentrations in the two northern regions**. Women living in **rural areas**, in every investigated geographical area, resulted **more exposed to dioxins (PCDD, PCDF), polychlorinated biphenyls (PCBs) and pesticides** than women living in urban and industrial areas. If the result was predictable for pesticides, the same cannot be said for dioxins. Dietary habits and lifestyles, such as the use of biomass for domestic heating and some agricultural practices, are likely to have played an important role in determining the observed higher levels of exposure. The analysis also found that only a minimum percentage of women (10% of the analyzed sample) reported gynecological dysfunctions and pathologies. Therefore the correlations observed between the levels of some persistent organic pollutants and specific pathologies, such as those related to infertility problems, must be considered only indicative. Instead all chlorinated compounds showed a significant increase in concentrations with the increasing of age. Moreover the analysis of data of mother-child pairs confirmed the ability of POPs to pass through the placenta.

Deliverables of the project were:

- *layman’s report*;
- a *brochure* on the final project results.

Bellow the **aspects** of the project **that can be widely replicated**:

- the study methodology developed by WOMENBIOPOP, which can also be applied in further studies of human biomonitoring and was based on the active involvement of a **network of health institutions and workers**, as well as the selection of participants chosen to represent different geographical regions and different socio-demographic contexts;
- the communication model used at local level during the phase of women's recruitment



-

Acronym
WOMENBIOPOP

Number of reference
LIFE08 ENV/IT/000423

Reference Programme
LIFE

Beneficiary Coordinator
Istituto Superiore di Sanità

Contacts
Elena De Felip

EU contribution
381.570,00

Call Year
2008

Start Year
2010

End Year
2013

Beneficiary headquarters

Viale Regina Elena, 299
00161 Roma RM
Italy

Region
Lazio