About PHIME

Background

Toxic metals like mercury (Hg), cadmium (Cd), lead (Pb), arsenic (As) and manganese (Mn) have negative health effects. Hg, Pb, As and Mn affect the nervous system, while Cd attacks the kidney, and probably also the skeleton. Foetuses, young children, women and elderly people are especially sensitive. Genetic factors also influence susceptibility to the exposure to metals.

Research

PHIME aims to establish how longterm exposure to low levels of metals influences public health, in this case diseases that affect the kidney, skeleton, nervous system, cardio- and cerebrovascular disease and diabetes. It will also map levels of exposure across Europe and in the Seychelles, Bangladesh, Ecuador, China and Morocco. In order to find solutions to the problems, the project will also do research on plants, to develop species that take up less of the metals harmful to our health.

PHIME results are to be used in the process to lower the exposure to toxic elements, improve the nutritional status as regards essential elements and improve public health.

The project

PHIME is an Integrated project funded by the European Union under the Sixth Framework Programme for Research and Technological Development. Over five years (2006-2011), the EU funding amounts to 13 million euros. The total project budget is the double. The PHIME consortium consists of 35 partners from 22 countries and work is performed in 36 different work packages.

Contact

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For more information, please visit our home page:

www.phime.org

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All Partners

Lund University	Sweden
Institute Jozef Stefan, Ljubljana	Slovenia
Institute of Child Health, Athens	Greece
Karolinska Institutet, Stockholm	Sweden
Umeå University	Sweden
Kaunas University of Medicine	Lithuania
Catholic University of Louvain, Brussels	Belgium
Ministry of Health and Social Services, Victoria	Seychelles
National Institute of Public Health, Prague	Czech Republic
University of Ulster Coleraine	UK
Oikon Ltd, Zagreb	Croatia
Oy Jurilab Ltd, Kuopio	Finland
Regional Authority of Public Health Banska Bystrica	Slovakia
Faroese Hospital System,Tórshavn	Faroe Islands
International Centre for Diarrhoeal Disease Research, Dhakka	Bangladesh
Udine University	Italy
University Medical Centre, Ljubljana	Slovenia
University of Brescia	Italy
Fudan University, Shanghai	China
University of Southern Denmark, Odense	Denmark
Institute of Occupational Medicine and Environmental Health, Sosnowiec	Poland
University of Copenhagen	Denmark
University of Århus, Slagelse	Denmark
University of Bayreuth	Germany
University of Southampton	UK
University of Zürich	Switzerland
University of Heidelberg	Germany
University of York	UK
Institute for Ecology of Industrial Areas, Katowice	Poland
Warsaw University	Poland
University of Rochester	USA
University of Kuopio	Finland
University Sidi Mohamed Ben Abdallah, Fez	Morocco
Key Laboratory of Nuclear Analytical Techniques, Beijing	China
Institute for Development of Production and Work Environment, Quito	Ecuador

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PHIME

Public health impact of long-term, low-level mixed element exposure in susceptible population strata

An integrated research project supported by the European Union

Public Health Impact of long-term, low-level Mixed Element exposure in susceptible population strata

Effects on:
Kidney
Skeleton
Nervous system
Cardio- and cerebrovascular system
Diabetes risk

Prenatal to 75 years of age, as well as follow-up studies showing time trends and age variation

Below acute toxic levels (not noticed by exposed person)

Interaction of elements, as well as other environmental toxins

Toxic:
Lead
Mercury
Cadmium
Manganese
Arsenic
Platinum
Palladium
Rhodium

Essential:
Selenium
Zink
Copper
Iron
Calcium

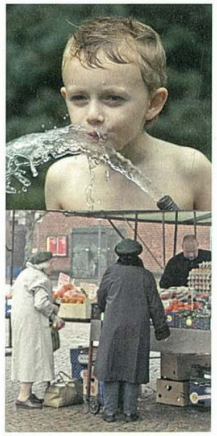
Foods:
Fish
Rice
Cereals
Vegetables

Water
Air

Work

Fetuses
Young Children
Teenagers
Young Women
Middle age women
Elderly
Genetically sensitive individuals

What are the problems?



We mainly take up metals from food and drinking water. Exposure is life-long, often starting at conception. There is not much known about the effects of a mixture of toxic elements, neither about low-level exposure. The role of genetics, interaction with other pollutants and nutritional conditions also need further exploration.

There are phases in life when we are more sensitive to exposure to metals, notably in fetal life, childhood and old age, and during women's child-bearing years.

PHIME will take all of this into account when investigating what impact exposure to toxic metals has for several major groups of diseases of great public health concern.

Where are the problems?

Pollution by toxic metals, and hence contamination of foods, varies between different countries, as well as over time. However, information is lacking on the actual conditions in several countries within the EU and worldwide.

PHIME will map the exposure in children and women in different parts of Europe, as well as in Morocco, China and Ecuador. We will use blood to evaluate the exposure ('biomonitoring'). We will also develop novel biomonitoring techniques, as the current ones are sometimes not suitable for long-term and low-level exposures and effects.

Possible solutions!

Plants are at the bottom of the food chain. Humans take up metals both directly from vegetal foods and indirectly via animal products. It is therefore essential to reduce the heavy metal uptake in crops for human and animal consumption.

PHIME will, as a first step, study model plants (e.g. tobacco, tomato and barley) to establish the principles of metal uptake, which can then be applied to many plants to reduce the content of toxic elements, and increase essential ones in the crops.

PHIME will also communicate its new knowledge as widely as possible in order to influence the choices of policy-makers and public bodies, industries and the public.

Please consult our home page, www.phime.org, for detailed information about the different studies within the project.