

## AN ENVIRONMENTAL HEALTH INFORMATION SYSTEM ASSESSMENT OF THE SITUATION IN GREECE

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### ABSTRACT

Presented are the results, with emphasis on the situation in Greece, of the ENHIS-2 project "Establishment of Environment and Health Information System Supporting Policy Making". The information system is based on a set of Environmental Health Indicators developed and updated by the project, organized according to the four WHO CEHAPE (Children's Environment and Health Action Plan for Europe) Regional Priority Goals (RPGs). In total 30 indicators have been developed and calculated using data from international and national databases. The outcome of the indicator piloting and the collection of information on relevant policies is used to make a preliminary assessment for Greece of the effects of environmental agents to population health in general and to children's health in particular. The preliminary conclusions are that environmental problems in Greece are similar to those experienced by other European countries. Regarding legislation and policies, Greece as a European member state has a well established legislative framework based mainly on the ratification of E.C. Directives. There is however a lack in more specific policies and action plans, and a lack of a well organized system for inspecting, monitoring and reporting environmental health problems.

**KEYWORDS:** indicator, policy, legislation, health, environment, information system, regional priority goals.

### 1. INTRODUCTION

Environmental health concerns all aspects of human health and disease that are influenced by factors in the environment. In this sense, the word Environment applies to the natural environment, but also to working and living environments. These range from the direct effects of hazards such as chemicals, radiation and biological pathogens, to health effects induced from unfavourable environmental conditions such as noise and damp. There are some parameters for which there is a clear method of determining consequences to health. For example mortality due to traffic accidents can be determined from the number of fatalities. In cases like these, data can be available from international or European databases. However, the assessment of many parameters is less straightforward.

Legislation in place in Europe sets standards to prevent or minimize many environmental health risks. At national level, policies or action plans may also be implemented, with countries enforcing different environmental policies to tackle specific issues. The ENHIS-2 project, 'Establishment of an Environmental and Health Information System Supporting Policy Making' is coordinated by WHO European Centre for Environment and Health and co-financed by the EC DG Sanco and the partner institutions from 18 member states (ENHIS, 2007). The project is part of a broader initiative on building a comprehensive pan-European environment and health information system (EHIS) in follow-

up of the implementation of the decisions of the Fourth Ministerial Conference on Environment and Health (WHO, 2005a).

Through the project, an effective environmental health information system is developed and implemented to assess environmental health issues and policy throughout Europe. The project is aimed specifically at the assessment of environmental health policy specific to children's health. It also provides a setting for the review and evaluation the information needs of environmental health policies in Europe.

The project assesses indicators relating to key environmental health issues such as air pollution, noise, housing and water to enable comparisons of policy implementation and to meet international commitments. Through the quantification of indicators, areas where legislation and policies are insufficient can be identified and actions taken to improve environmental health and safety where necessary. Indicators are usually numbers that represent a certain state of the environment, exposure, health and / or policy actions. They can be used to communicate policy-relevant information clearly and concisely. A common set of indicators supports individual countries as well as international organisations in monitoring and assessing environmental health risks, and allows detection of changing conditions and time trends. The project aims to assess the overall situation regarding environmental health throughout Europe, and improve knowledge and identify shortcomings in the existing European environmental health policies.

## 2. DEVELOPMENT OF THE INDICATORS

### 2.1 Methodology

Four regional priority goals were identified and a common set of environmental health indicators was developed based on the Children's Environment and Health Action Plan for Europe (Licari *et al*, 2005). The indicators were developed using the DPSEEA framework for environmental health indicators that was developed by the World Health Organization (Briggs, 1999). The DPSEEA model describes the cause to effect chain by addressing Driving Forces, Pressures, State, Exposure, Effects and Actions, and provides a framework for analysing interrelated factors that impact on human health. Seven indicators were adopted for RPGs 1-3, and 9 for RPG 4, resulting in 30 indicators in total.

### 2.2 Regional Priority Goal 1 indicators

The aim of RPG 1 is to prevent and significantly reduce the morbidity and mortality arising from gastrointestinal disorders and other health effects, by ensuring that adequate measures are taken to improve access to safe and affordable water and adequate sanitation for all children. The indicators adopted to monitor the progress made towards the achievement of this goal are presented in Table 1, with details on the information source available and any age specific information.

Table 1. Regional Priority Goal 1, indicators

Indicator	Data Source	Age Specific data
Waste water treatment and access to improved sanitation	Eurostat, 2007a, WHO and UNICEF, 2006	No
Public water supply and access to improved water sources	Eurostat, 2007a, WHO and UNICEF, 2006	No
Drinking water compliance	Local application	No
Bathing water quality	EU, 2006	No
Outbreaks of waterborne diseases	ENHIS, 2007, KEELPNO, 2007	No
Management of bathing water	Case studies	No
Water safety plans	Case studies	No

Three of the 7 environmental indicators, "Waste water treatment", "Recreational water compliance" and "Access to safe drinking water", can be calculated using information from international databases. For the countries for which there is information provided in these databases, the indicators can be quantified and compared. The remaining indicators are assessed through the use of case studies. No information is available on any of the indicators specifically regarding children.

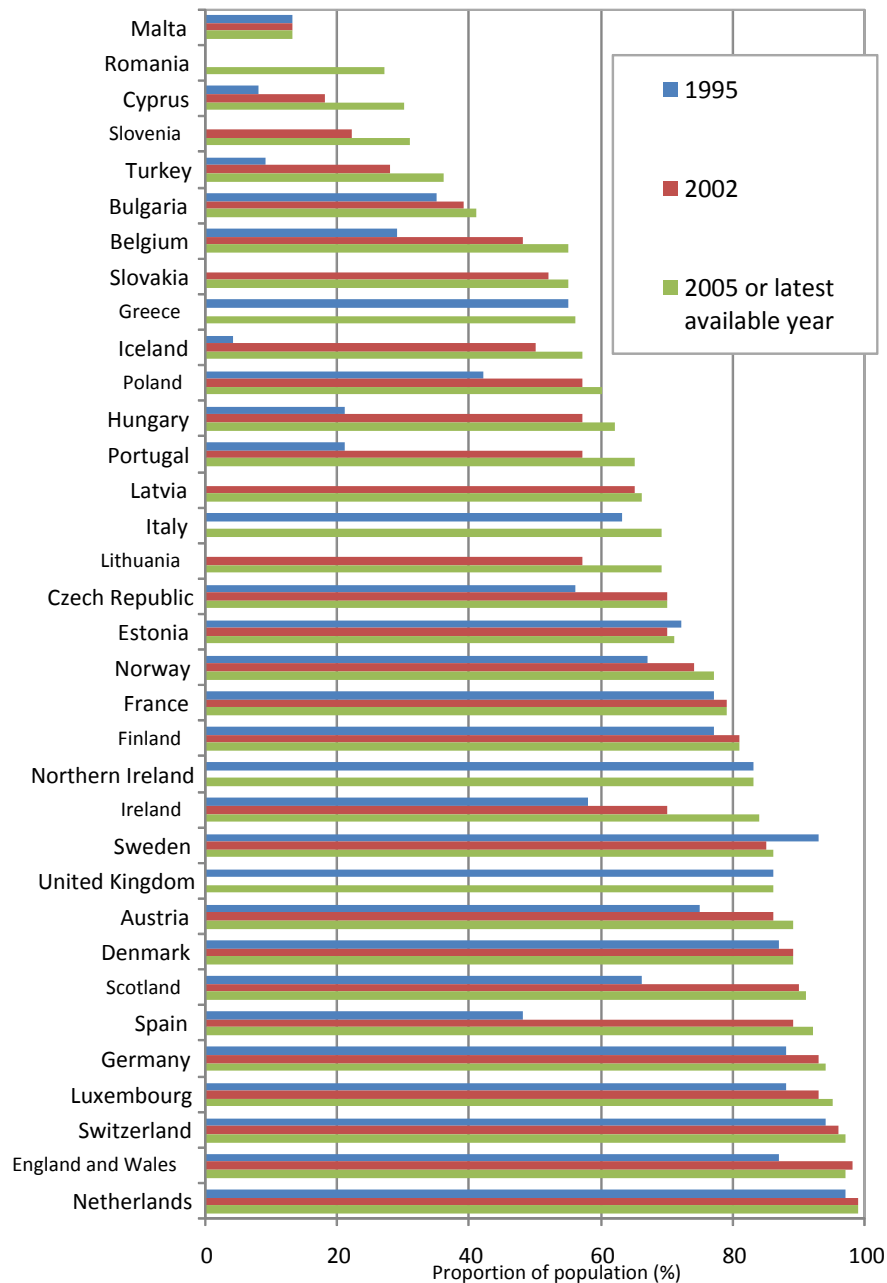


Figure 1. Changes over time in the population connected to wastewater treatment facilities, selected European countries, 1980–2005

With regard to “*Waste water treatment*” indicator, the percentage of the population living in agglomerations with more than 2000 inhabitants with home connections to wastewater treatment facilities in 1980, 1995 and 2003, or the most recent year between 1997 and 2003, for which data are available, is illustrated in Figure 1. There is a clear difference between western and eastern European countries.

The values for Greece indicate a clear improvement over the time period examined, although at 59% average for 2005, Greece is still at the lower end of the scale (Eurostat, 2007a, WHO and UNICEF, 2006). For the other indicators, Greece scored above the average for the indicators “*Public water supply and access to improved water sources*” and “*Bathing water quality*” (Eurostat, 2007a, WHO and UNICEF, 2006), while 4 waterborne outbreaks and 690 individual case of illness were reported for the year 2004, a value which is close to the average of reported cases among selected countries (ENHIS, 2007, KEELPNO, 2007)..

### 2.3 Regional Priority Goal 2 indicators

The aim of RPG 2 is to prevent and substantially reduce health consequences from accidents and injuries and pursue a decrease in morbidity from lack of adequate physical activity, by promoting safe, secure and supportive human settlements for all children. The indicators adopted to monitor the progress made towards the achievement of this goal are presented in Table 2.

Table 2. Regional Priority Goal 2 indicators

Indicator	Data Source	Age Specific data
Percentage of physically active children and adolescents	WHO, 2005b	No
Mortality from road traffic injuries in children and young people	WHO, 2009	Yes
Mortality in children and adolescents from unintentional injuries (falls, drowning, fires, poisoning)	WHO, 2009	No
Prevalence of excess body weight and obesity in children and adolescents	WHO, 2005b	No
Policies to promote safe mobility and transport for children	National Policies (ENHIS 2007)	No
Policies to reduce unintentional injuries from falls, drowning, poisoning fires and choking in children and adolescents	National policies (ENHIS 2007)	No
Policies to reduce and prevent excess body weight and obesity in children and adolescents	National policies (ENHIS 2007)	No

The average proportion of physically active children in the WHO European region is 34% for girls and 44% for boys aged 11 years old, and 22% for girls and 34% for boys aged 15 years old respectively (WHO 2005b). Greece's scores for 11-year olds were close to the European average, 28% for girls and 48% for boys. Greece has one of the highest standardized mortality rates for road traffic injuries, RTIs, in children and young people aged 0-24 years in the WHO European region, 12.5 deaths per 100,000 population, whereas the estimated proportion of deaths due to RTIs was close to 30%, the highest in the region (WHO 2009).

For the third indicator, "*Mortality in children and adolescents from unintentional injuries*", standardized mortality rates due to drowning and submersion and to poisoning was 0.9 and 0.6 per 100,000 population respectively, against 7 per 100,000 population which was the highest in the region. Standardized mortality rate due to accidental falls was 0.6 per 100,000 population, a value close to the average of the region. Deaths caused by exposure to smoke, fire and flames, are 0.1 per 100,000 population, the lowest of the region (WHO 2009). On the fourth indicator "*Prevalence of excess body weight and obesity in children and adolescents*" for Greece 12% of girls and 20% of boys aged 13 years old and 8% of girls and 23% of boys aged 13 and 15 years respectively, were overweight (WHO 2005b).

Three of the seven indicators in RPG 2 are based on the assessment of the implementation of national policies. To illustrate how such indicators are quantified, the indicator "*Policies to promote safe mobility and transport for children*" is illustrated. This indicator is assessed based on 10 policies as follows:

- Wearing safety helmets on motorbikes
- Graduated licensing for new drivers
- Traffic safety education, a compulsory part of school curriculum
- Children under 13 riding in the back seat of cars
- Use of child safety seats in passenger vehicles
- Speed limitation in areas where there are children
- Legislation prohibiting/ limiting children on motorbikes
- Safety helmets for child cyclists
- Children under 3 years old to remain in rear facing car seats
- Wearing seat belts in passenger vehicles

If the policy exists, is clearly stated, and substantially enforced and implemented, a score of 2 is given to the indicator value. If the policy exists, is clearly stated and partially enforced, a score of 1 is given. If the policy does not exist and is not clearly stated, a score of 0 is given. Totalling the scores for each policy gives a value for the indicator.

Figure 2 presents the indicator score in the reporting countries. Approximately half -13 out of 27- countries have a composite index (total score) equal to or higher than 14 (in a range 0-20). The difference in total scores of the EU countries reflects the different degree of policy enforcement. Greece scores 11 for policy implementation, with 5 policies existing, clearly stated, and substantially enforced and implemented, 1 policy clearly stated and partially enforced and 4 policies not stated.

#### 2.4 Regional Priority Goal 3 indicators

The aim of RPG 3 is to prevent and reduce respiratory disease due to outdoor and indoor air pollution, thereby contributing to a reduction in the frequency of asthmatic attacks, in order to ensure that children can live in an environment with clean air. There are four indicators concerned with outdoor air and three with indoor air (Table 3).

Table 3. Regional Priority Goal 3 indicators

Indicator	Data Source	Age Specific data
Infant mortality from respiratory diseases	WHO, 2001	Yes
Exposure of children to air pollution (particulate matter) in outdoor air	EEA, 2006	No
Prevalence of asthma and allergies in children	ISAAC, 2007	Yes
Children living in homes with problems of damp	Eurostat, 2007b	No
Proportion of children leaving at homes using solid fuels	WHO, 2006	No
Exposure of children to environmental tobacco smoke (ETS)	CDC, 2007; WHO, 2009	No
Policies to reduce exposure of children to environmental tobacco smoke (ETS)	WHO, 2009	No

Greece has a varying indicator performance. With regard to the indicator “*Exposure of children to environmental tobacco smoke (ETS)*”, 92% of children are exposed to ETS, (CDC 2007). For the indicator “*Exposure of children to air pollution (particulate matter) in outdoor air*” 80% of the population is exposed to PM<sub>10</sub> levels in outdoor air between 40-60 µg m<sup>-3</sup> (EEA 2006). The level recommended by WHO is 20 µg m<sup>-3</sup>. On the other hand, infant mortality due to respiratory disease (Figure 3) is very low in Greece despite air pollution problems, 0.139 against an average of 0.8 for all countries (WHO 2001). The proportion of children aged 0-14 years living in homes using solid fuels is less than 5% in Greece (Eurostat 2007b).

#### 2.5 Regional Priority Goal 4 indicators

The aim of RPG 4 is to reduce the risk of disease and disability arising from exposure to hazardous chemicals (such as heavy metals), physical agents (e.g. excessive noise) and biological agents and to hazardous working environments during pregnancy, childhood and adolescence.

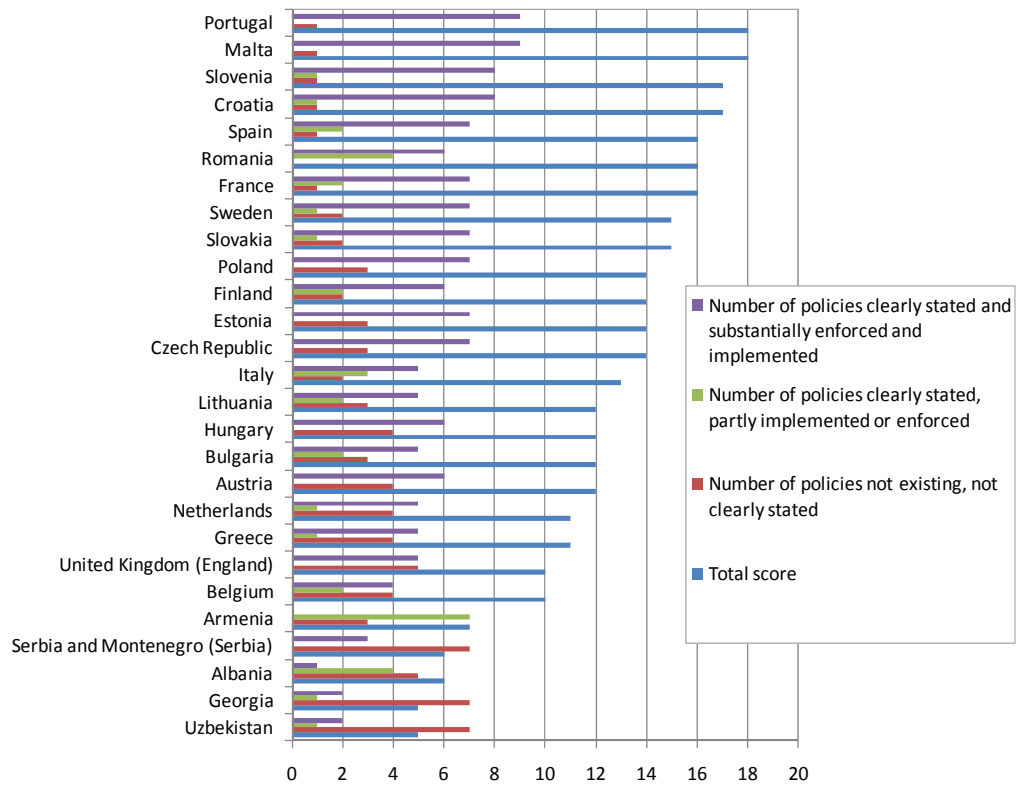


Figure 2. Level of implementation of different policies to prevent road traffic injuries in children in selected countries

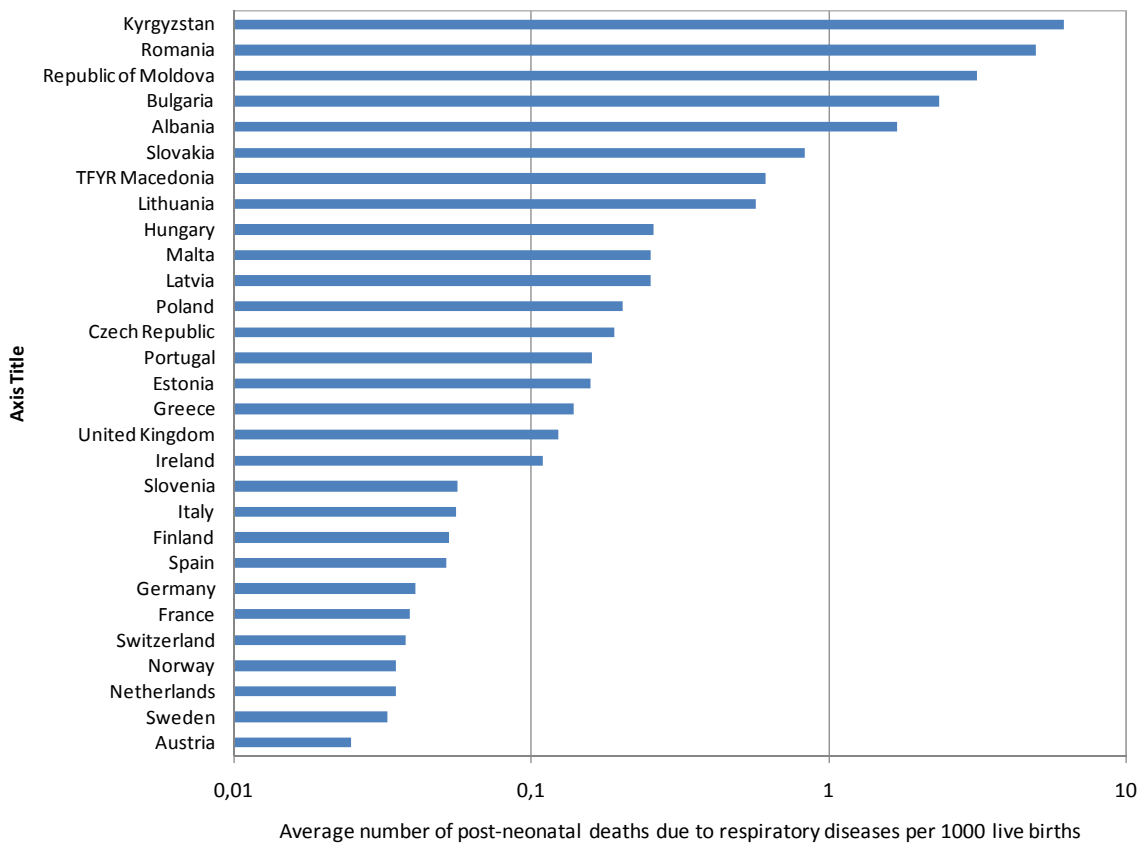


Figure 3. Average number of infant deaths due to respiratory disease per 1000 live births

Data in international databases is available for 3 of the 9 indicators, one is based on the assessment of national policies, and the remaining 5 indicators are assessed using case studies. The indicators adopted to monitor the progress made towards the achievement of this goal are presented in Table 4.

Table 4. Regional Priority Goal 4 indicators

Indicator	Data Source	Age Specific data
Incidence of melanoma in people aged under 55 years	GLOBOCAN, 2002	Yes
Incidence of childhood leukaemia	GLOBOCAN, 2002	Yes
Work injuries in children and young people	EUROSTAT, 2007a	No
Children exposed to harmful noise at school	Case Studies	No
Blood lead levels in children	Case studies	No
Exposure of children to chemical hazards in food	Case studies; WHO, 2007	No
Radon levels in dwellings	Case studies	No
Persistent organic pollutants (POPs) in human milk	Case studies	No
Policies to reduce excessive exposure of children to ultraviolet exposure	National Policies (ENHIS 2007)	No

Information regarding the indicators in RPG 4 is limited in most areas and for most countries. The data from Greece is very limited in this area. Data available on the indicator “*Incidence of melanoma in people aged under 55 years*” (Figure 4) indicates that Greece has the lowest rate for the reporting countries, 2 cases per 100,000 population per year (GLOBOCAN 2002). However Greece has no national policies in place to reduce children’s exposure to UV radiation, and no information on Children’s exposure to chemical hazards in food. Figure 5 shows heavy metal intake through food by adults in selected EU countries. There is no clear trend among countries.

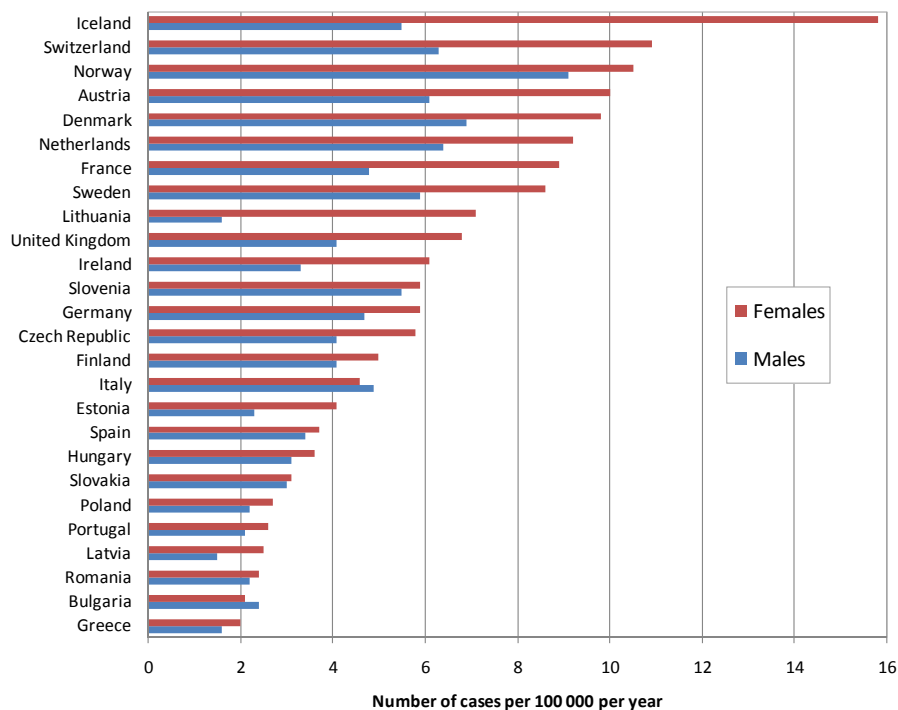


Figure 4. Age standardised rates of melanoma incidence <55 years in selected European countries

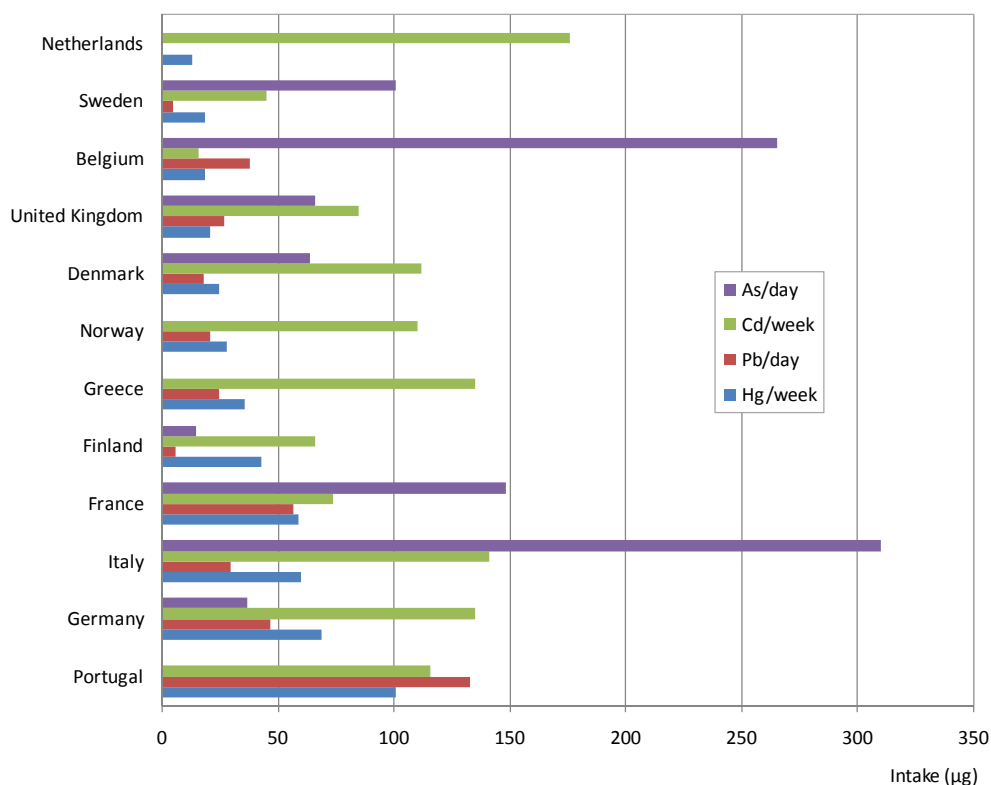


Figure 5. Heavy metal intake through food by adults, selected EU countries, 2004

## CONCLUSIONS

The preliminary conclusions that can be drawn from the ENHIS-2 project regarding Greece is that the environmental problems faced in Greece are similar to those experienced in other European countries. Greece has implemented European regulations and directives which address environmental issues, however lacks policies and action plans which address national issues, and particularly for the indicators for RPG 4 tackling chemical hazards and work related injuries. One important issue is that there is very little legislation or policy action in place to address children's health specifically. Although some legislation takes into consideration the health of this vulnerable group, there is a clear need to extend this to all areas which affect children's health both directly and indirectly. There is also a lack of a well organised system for inspecting, monitoring and reporting environmental health problems.

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