Health Indicators in the European Regions

Project ISARE 3

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1. Introduction

In the context of the Health Monitoring Program (HMP) of the community, the French National Federation of Regional Health Observatories (FNORS) proposed a study of health indicators in the regions of the European Union. A first phase (1999-2001) determined in the 15 countries that comprised the European at that time, the most appropriate sub-national level (the "health regions") for the exchange of information and the comparison of indicators. Moreover, this work tested the availability and investigated the sources of the data at this level[1]. The second phase of study (2002-2004) tested the feasibility of data collection at the selected sub national level and looked at problems of comparability. An experimental database was created (www.ISARE.org) and examples of analyses were presented[2].

In this context and in the more general context of the "development and coordination of the public health information system" as defined in the work program for 2003 of the community action[3] in the field of public health, this phase of the project (ISARE III) widened the research to new countries, to reflect on the use of data and to test the different ways of presenting information at regional level and to think about effective means of dissemination.

2. Justification for the project

The importance of the regional level as unit of political and geographical management in the European Union and the need to have relevant and comparable health indicators at this level is the main reason for the ISARE project.

In Spain for example, regional autonomous communities have acquired a high level of autonomy, which in some instances translates into responsibility for managing the health budget. In France, regions, where health care planning is already performed, are in charge of allocating budgets to hospitals following the 1996 health care reforms. The tendency towards increasing decision-making at regional level increases the use of information for health needs assessment at this level. Sharing such regional information allows health professionals and decision makers to put the characteristics of their own region in the wider context of all European regions as opposed to that of their own country. Similarities and differences may raise questions and stimulate discussion about the approaches chosen for solving public health problems. Theoretically, the development of a system health indicators at regional level within Europe opens up the possibility of maximising the opportunities for learning from one another. It also encourages the sharing of knowledge and expertise between information specialists and other experts in analyses at regional level throughout the countries of the European Union.

Other reasons draw on the epidemiological value of sharing regional health information. Firstly, observing health indicators at an infra national level allows the identification of epidemiological patterns, otherwise hidden by national averages. Linked to this argument, is the well-known fact that public health problems do not respect national boundaries. Thus, it is likely that more similarities exist between two neighbouring regions across national borders (for example Hainaut Province, in Belgium and Picardie in the North of France), than between two regions in the same country but geographically far apart (for example between the regions of the North and the South in France).

Developing reliable data collection at a regional level enhances information for a European Union database. This database would allow an understanding and facilitate analysis of health problems at the infra national level. This database would also contribute to decision making and the orientation of the health politics at the national level and as well at the ISARE health regions.

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[1] *Heath indicators in the regions of Europe, Project ISARE 1 n° 1998/IND/1006, Final report, September 2001*

[2] *Health indicators on the regions of Europe, Project ISARE 2 n°2001/IND/2101, Final report, June 2004*

[3] *Decision n°1786/2002/CE of the European Parliament and Council of September 23, 2002 adopting a program of community action in the field of public health (2003-2008)*

3. Objectives of the project

3.1 General objective

To develop an approach of health indicators at regional level in Europe.

3.2 Specific objectives

- To define sub national levels (health regions) in the new countries that joined the European Union in 2004 and to select for each of these countries the most appropriate sub national level for the comparison of information and to update the information on the sub national levels (regions) of the countries already taken into account in the ISARE 2 project (countries already members of the European Union)
- To identify information sources and to ascertain availability of health data in these regions,
- To carry out data collection in the new countries and to complete data collection in the countries involved in ISARE 1 and 2.
- To test the ways of analysing and presenting data included in the database
- To test the production of appropriate commentaries that could be integrated in health reports and to develop recommendations for the production of such commentaries.

4. Methodology

The methods undertaken in this third phase of the ISARE project were based on fourfold principles:

- The extension of the existing partnership with the representatives from the different countries of the European Union that took part in ISARE 1 and 2 to representatives of new countries of the Union.
- The development of surveys tools to study the characteristics of the new countries and to collect the selected data
- The calculation of indicators that will be integrated into the demonstrator database of the ISARE website.
- The setting up of a procedure to produce recommendations to use and disseminate data.

4.1 Partnership and workgroups

Contacts were established with the new European Union country representatives that were invited to the presentation of the results of ISARE 2 during a meeting in Bordeaux in December 2003.
The new country representatives joined those that took part in ISARE 2 project.
Three working groups were set up and based on those which were formed for the two first phases of the ISARE project.

4.1.1 The project group

The project group was composed of representatives of the FNORS, individual French Regional Health Observatories and also representatives of regional health observatories from the United-Kingdom and Belgium.

The project group developed the protocol, methods and tools, managed the budget, organised meetings, wrote the minutes, centralised the data collected, created the database and wrote the final report. The role of this group was also to maintain contacts and communicate with other HMP projects in order to inform themselves on the progress of other projects and to take account of their conclusions for the ISARE project.

4.1.2 The steering group

The steering group approved the main themes of the project, the methods used, the tools required and the recommendations emerging from the project. It was also in charge of monitoring the project's progress. The steering group membership included all members of the project group plus representatives from 4 European countries (Germany, Spain, Netherlands, Slovenia), two representatives from the European Commission (DG Sanco and Eurostat), one from WHO[4] (Europe), and one from the High Public Health Committee (HCSP, France).

4.1.3 The European countries group

Members of this group were representatives from 22 European Union countries (Cyprus, Denmark and Lithuania did not participate in the third phase of this project). This group formed the network used by the project to collect the ISARE health regions information and data.

4.2 Organization of the surveys

The objective of the surveys was, as for ISARE 1 and 2, to gather information on the geographical, political and administrative characteristics of one or several regions of each country of the European Union. It consisted of studying the availability of selected data at regional level, in order to establish health indicators. Finally, a data collection was undertaken.
The approach was different according to the status of the countries.

4.2.1 Survey on the characteristics of the regions

The questionnaire allowed us to study the responsibilities and decision making at regional level in the field of health and organisation of the health care system. Specifically the questions focused on responsibilities regarding health and social policy and management, responsibilities for health promotion and of public health reporting. The questionnaire also covered issues regarding boundary stability, correspondence with a level of the NUTS[5] classification and the existence of local information systems. Finally, basic demographic and geographical characteristics of the regions within the country were requested (e.g. average, minimum and maximum population sizes).
The questionnaire was sent to all new countries participating in the project and also to Greece, Ireland, Netherlands and United-Kingdom, four countries where there had been significant changes in the organisation of healthcare since ISARE 1.

4.2.2 Data availability

The questionnaire aimed at exploring data availability at the regional level under consideration. This phase of the survey was also undertaken during ISARE 1, but in order to be coherent with data from the new project, it has

[4] *World health organisation*

[5] *Nomenclature of Territorial Units for Statistics*

been repeated using the data defined in the project (short list). Some data collected during ISARE 2 which did not appear in the ECHI[6] list seemed important enough to the partners to be integrated in the new data collection. On this occasion, definitions of all selected data or indicators have been revised and more accurately defined using firstly the definitions from Eurostat, but also those from OECD, WHO, ECHI. All participating countries received this questionnaire in order to update the information gathered during the previous phases.

4.2.3 Data collection

From the data collected in ISARE 2 and the indicators of ECHI, a list of variables was defined and agreed.
New countries and also some countries from which we had not data from the previous phase or for which the selected geographical level changed (Finland, Greece, Ireland, Italy, Netherlands, Portugal and United-Kingdom) received two questionnaires for the data collection. The first one allowed collection of a list of data for all the regions of a country, the second one was limited to one region.
The first sheet of the first questionnaire dealt with the quality of the data, the second sheet listed information on data sources. The remaining sheets were used to collect specific data values. The second questionnaire was made of three spreadsheets. The first spreadsheet was for collecting data or indicators not present in ISARE 2. The second one concerned information about data availability and quality. The third spreadsheet listed data sources.
Countries that took part in the data collection for the ISARE 2 project also received two questionnaires, but they only requested data that were not collected during the ISARE 2 project.

Table 1: Short list of data* collected in each region of each country

Health care professionals	
1.	Number of physicians
2.	Number of nurses
3.	Number of midwives
4.	General practitioner utilisation
Health care services	
5.	Number of acute care hospital beds
6.	**Number of hospital beds**
7.	**Number of psychiatric hospital beds**
8.	**Number of hospital in-patients admission for several diagnosis (cancer, circulatory diseases, external causes)**
Demographic and socio economic data	
9.	Mid year population estimate
10.	Number of live births
11.	**Maternal age distribution**
12.	Percentage of unemployed persons (15 to 64 years old)
Mortality data	
13.	**Life expectancy at birth and at 65**
14.	**Number of perinatal deaths**
15.	Number of live births
16.	Age/ sex breakdown of deaths by cause
Morbidity data	
17.	**Number of new cases of AIDS patients**
18.	**Number of new cases of HIV patients**
19.	**Percentage of low weight births**
20.	Number of persons injured or killed in road traffic accidents
Risk factors	
21.	Distribution of BMI in the population
22.	Percentage of regular smokers aged 15 years or more

** Some of these variables are indicators*

[6] *European Community Health Indicators*

The new data that also were requested from old countries are written in bold. The long list of the data collected for the selected region in each country includes the 22 variables above and the additional following 21 variables:

Table 2: Long list of data* collected in a selected region for each country

Health professionals	
23.	Number of general practitioners
24.	Number of dentists
25.	Number of pharmacists
Health care services	
26.	Number of gynaecology or obstetric or maternity beds
27.	Number of bed days per year
28.	Number of gynaecology or obstetric or maternity bed days per year
29.	Number of hospital in-patient admissions, gynaecology or obstetrics or maternity
Demographic and socio economic data	
30.	**Percentage of the adult population (25 to 64 years old) that has completed upper secondary education**
31.	**Percentage of the adult population (25 to 64 years old) that has completed tertiary education**
Morbidity data	
32.	Number of new cases of tuberculosis
33.	Number of new cases of breast cancer
34.	Number of case of accidents related to work
Prevention data	
35.	Percentage of infants vaccinated against diphtheria
36.	Percentage of infants vaccinated against tetanus
37.	Percentage of infants vaccinated against pertussis
38.	Percentage of infants vaccinated against poliomyelitis
39.	Percentage of infants vaccinated against measles
40.	**Percentage of infants vaccinated against HIB**
41.	**Percentage of infants vaccinated against mumps**
42.	**Percentage of infants vaccinated against rubella**
43.	**Breast cancer screening coverage**

** Some of these variables are indicators*

The new data that also were requested from 'old' countries are written in bold.

4.2.3.1 Variable definitions

To assure the coherence of the data collection process, it was necessary to establish a list of the variable definitions for the partners involved in the project. We did not wish to create new definitions and chose to use the definitions already in use by international organizations. These definitions are mainly based on those proposed by WHO in its 'Health For All database'. Where no definition was found in 'Health For All' database, we used the definitions from the OECD, and the ILO[7] definition for unemployment. The steering group members agreed this list of definitions.

4.2.3 2 Choice of the years of data

To harmonize the data collection process, it was necessary to determine the year for which the data were to be collected. The data collected (year 1999) in the old countries during ISARE 2 were requested from new countries for the same year. For new data, year 2002 was held.
Where data were not available for the requested year, data for the closest year was requested.

[7] *International labour organisation*

4.2.3.3 Choice of the ISARE health regions

Using the results of the previous phases of the ISARE project and the survey completed in the new countries, the ISARE project team determined the most appropriate infra-national level to exchange data for 23 of the 25 countries members of the European Union and also for Switzerland.
These levels, that are NUTS in most cases, should correspond to levels that have responsibilities in the field of health and to local democracy levels.

4.2.4 Organisation of the survey

Questionnaires about the characteristics of the regions and about the data availability were sent by e-mail to representatives of each country in February 2005. Questionnaires for data collection were sent to all partners in February 2006.
The latest date for responses was February 2007.

4.3 Analysis

4.3.1 Summary of the information on the countries

The information collected during the survey was used by the project team to write country summaries. These are short overviews of each of the 23 EU member states and provide concise information regarding the health care system with emphasis on the sub national level, the number of levels of local democracy, the areas of responsibilities devolved to these democratic levels, and a summary of the responses provided during the ISARE survey. Apart from information gathered during the survey, two other sources of information proved particularly useful for the production of the country summaries. These were the "Health Care Systems in Transition" series (HiT) from the WHO Regional Office for Europe, and the "Structure and operation of local and regional democracy" series produced by the Council of Europe.

Once written, the draft country summaries were submitted to the relevant country representatives for validation.

4.3.2 Analysis of the data availability

All the responses to the questionnaire concerning data availability were collected. For each data item and each country, it was determined if availability concerned all the regions of the studied level, some regions or no region. This analysis also allowed us to examine data sources: (national sources, local sources or combination of local and national sources). All this information was summarised in order to analyse the responses according two main themes: general overview on data availability at infra national level in each country, availability of each data item.

4.3.3 Analysis of the collected data

To analyse the availability, conformity to the proposed definition and the quality of each of the data items, methods similar to those used in ISARE 2, have been used. Firstly a score was been attributed to each of the data items to judge its availability. The availability score was calculated as follows:

Availability score
=
Number of countries for which data are fully available (all regions, requested year)
+
0.5 x number of countries from which the data is fully available, but only for certain regions and/or for a year other than the requested year

Twenty one countries having participated in the project, the availability score can vary from 0 to 21. Availability has been qualified as:

- Very high (++) for a score greater than or equal to 17.5
- High (+) for a score between 14.5 and 17 inclusive
- Moderate (+ / -) for a score between 11.5 and 14 inclusive
- Low (-) for a score between 8.5 and 11 inclusive
- Very low (--) for a score less than or equal to 8.

As regards the complementary list (requested for one region only), the responses covering only 16 countries, availability is considered as:

- Very high (++) for an availability score greater than or equal to 13.5
- High (+) for a score between 11 and 13 inclusive
- Moderate (+ / -) for a score between 8.5 and 10.5 inclusive
- Low (-) for a score between 6 and 8 inclusive
- Very low (--) for a score less than or equal to 5.5.

The question "*do these data correspond to the proposed definition*" only concerned the countries having at their disposition the data requested. For this reason the number of responses obtained varies from field to field. Because of this, the score for "conformity to the definition" of data is not a function of the number of positive replies, but of the proportion of positive replies. Conformity to the proposed definition is classed as:

- Very good (data in conformity in more than 80.01 % of the countries responding) (++)
- Good (data in conformity in 70.01 to 80 % of the countries responding) (+)
- Moderate (data in conformity in 60.01 to 70 % of the countries responding) (+ / -)

Poor (data in conformity in 50.01 to 60 % of the countries responding) (-)

- Very poor (data in conformity in 50 % or less of the countries responding) (--)

Similarly, utilisation is considered as:

- Very frequent (data in conformity in more than 80.01 % of the countries responding) (++)
- Frequent (data in conformity in 70.01 % to 80 % of the countries responding) (+)
- Moderate (data in conformity in 60.01 % to 70 % of the countries responding) (+ / -)
- Rare (data in conformity in 50.01 to 60 % of the countries responding) (-)
- Very rare (data in conformity in 50 % or less of the countries responding) (--)

Finally, two questions relating to the quality of the data:

- "*Do you consider that the quality of the data is sufficient to make comparisons between the regions of your country*"
- "*Do you consider that the quality of the data is sufficient to make comparisons within your region of your country*"

It is important to underline that the information gathered concerns only comparability between regions of the same country, and not regions of different countries.

We considered that data was judged to be of sufficient quality to make intra-national or temporal comparisons by:

- Very large proportion of the responders (data in conformity in more than 80 % of the countries responding) (++)
- Large proportion of the responders (data in conformity in 71 % to 80 % of the countries responding) (+)

- Moderate proportion of the responders (data in conformity in 61 % to 70 % of the countries responding) (+ / -)
- Small proportion of the responders (data in conformity in 51 to 60 % of the countries responding) (-)
- Very small proportion of the responders (data in conformity in 50 % or less of the countries responding) (--)

We also used the following criteria to determine if a variable could be used for the construction of a database of regional health indicators at European level. All data that have a very good or good availability and a good or very good conformity to the given definition were held. We also held data that have an average conformity but a good availability and, that were often used and of good quality.
As utilization, quality considerations and even correspondence to the definitions are based on the information of representatives of countries. These evaluations include certain amount of subjectivity or may be affected of the level of the respondents information.

4.4 Construction of indicators

From the data collected during the ISARE 3 survey and according to the indicators list proposed by the ECHI project, a new list of 75 indicators was established. This list, validated by the steering group, is organized as follows:

Table 3:List of indicators

Health professionals
• Number of physicians per 100 000 population
• Number of general practitioners per 100 000 population
• Number of nurses (including midwives) per 100 000 population
• Number of nurses (excluding midwives) per 100 000 population
• Number of midwives per 100 000 population
• Number of dentists per 100 000 population
• Number of pharmacists per 100 000 population
• **Number of visits to the general practitioners**
Health care services
• **Number of hospital beds**
• **Number of hospital beds per 100 000 population**
• **Number of psychiatric hospital beds**
• **Number of psychiatric hospital beds per 100 000 population**
• Number of acute care hospital beds per 100 000 population
• Number of gynaecology, obstetric or maternity beds per 100 000 women (16 to 49 years old)
• **Number of hospital in-patient admissions by causes**
• **Number of hospital in-patient admissions by cause per 100 000 population**
• Number of bed days: acute care / year per 100 000 population
• Acute care beds occupancy (Number of bed days acute care / 365) / Number of acute care beds *100
• Number of hospital in-patient admissions in gynaecology, obstetric or maternity per year per 100 000 women (16 to 49 years old)
• Number of bed days in gynaecology, obstetric or maternity per year per 100 000 women (16 to 49 years old)
• Gynaecology, obstetric or maternity beds occupancy (Number of bed days gynaecology, obstetric or maternity / 365) / Number of gynaecology, obstetric or maternity beds *100
Demographic and socio economic data
• Total population
• Sex ratio
• Percentage population aged less than 20 years old
• Percentage population aged 75 years old or more
• Number of live births
• Number of live births per 100 000 population
• Number of deaths by sex
• Crude death rate by sex per 100 000 population
• Standardized mortality rate per 100 000 population (Std European population WHO, 2 sexes)

- Percentage of unemployed persons (14 to 64 years old)
- **Number of births by mother age**
- **Proportion of births by maternal age**
- Percentage of the adult population (25 to 64 years old) that has completed upper secondary education
- Percentage of the adult population (25 to 64 years old) that has completed tertiary education

Mortality data

- Number of perinatal deaths
- Perinatal death rate per 1 000 (live births + stillbirths)
- Number of stillbirths
- Mortinatality per 1 000 (live births + stillbirths)
- Infant mortality per 1 000 live births
- Number of early neonatal deaths
- Neonatal mortality rate per 1 000 (livebirths + stillbirths)
- Number of deaths by cause (circulatory diseases, cancers, external causes) and sex per 100 000 population
- Crude death rate by cause (circulatory diseases, cancers, external causes) and sex per 100 000 population
- Standardized mortality rate by cause (circulatory diseases, cancers, external causes) and sex per 100 000 population (Std European pop WHO 2 sex)
- **Life expectancy at birth and at 65**

Morbidity data

- **AIDS incidence**
- **AIDS incidence per 100 000 population**
- **HIV incidence**
- **HIV incidence per 100 000 population**
- Tuberculosis incidence
- Tuberculosis incidence per 100 000 population
- **Number of low weight births**
- **Percentage of low weight births**
- Breast cancer incidence
- Breast cancer incidence per 100 000 women
- Number of persons injured or killed in road traffic accidents
- Number of persons injured or killed in road traffic accidents per 100 000 population
- Number of accident related to work
- Number of accident related to work per 100 000 active population

Risk factors

- Obesity rate (%)
- Overweight rate (%)
- Normal weight rate (%)
- Underweight rate (%)
- Percentage of regular daily smokers aged 15 years old or more

Data on prevention

- Percentage of infants vaccinated against diphtheria
- Percentage of infants vaccinated against tetanus
- Percentage of infants vaccinated against pertussis
- Percentage of infants vaccinated against poliomyelitis
- Percentage of infants vaccinated against measles
- **Percentage of infants vaccinated against HIB**
- **Percentage of infants vaccinated against mumps**
- **Percentage of infants vaccinated against rubella**
- **Percentage of women (25-59 years old) receiving bilateral mammography within past year**

The new indicators are written in bold.

4.5 Quality analysis

The question of comparability is complex and multifactorial (data quality, international definitions with different certification practices, no international definitions, different health care systems and data collection systems …). ISARE project addressed more specifically regional comparability.
The comparability analysis was tackled in two ways:

- By asking the regional representatives to provide on the one hand the regional data but also some information about these data (source, collection process, data comparability between regions within their country….),
- By using reports made on this subject, in particular in the health program of the European Union.

5. Identification of the health regions

5.1 Method

One of the operational objectives of the ISARE project was the identification of the most appropriate geographic level for the exchange and comparison of health indicators between regions for each country of the European Union. In this chapter the selected levels will be termed "ISARE Health Regions".

The ISARE Health Regions were selected during phase 1 of the ISARE project (15 European countries) and phase 3 of the project, following the enlargement of the Union (25 European countries). Each time, there were four stages in the selection:

1. **Identification of the appropriate geographical level** for the title **'**ISARE Health Region', following discussions with the project ISARE correspondent. This stage enabled the pre-selection of one, two or three levels which could be used.
2. **Characterization of the pre-selected levels** by means of an investigation to gather demographic, geographic, political (correspondence with levels of local government) and organisational (presence of local responsibility for social and health policies) information.
3. **Preparation of a summary sheet for each country** describing the organisation of health and social systems at national and infra-national level and the characteristics of the principle eligible geographic levels. These summaries were prepared using data gathered during the previous stage, and bibliographic research.
4. **Determining the "ISARE Health Regions".** i.e. a recommendation for an ISARE health region for each country,

These recommendations were formulated with regard to five criteria, and validated by the correspondent in each country. The first criterion was the presence of responsibility for health and social policy. This criterion was given priority, given that data had to be available at a level which would be useful for setting and evaluating local policies by local decision makers.

The second criterion was correspondence with a NUTS level. This criterion was especially important in phase 3 of the ISARE project given that between phases 1 & 3 the NUTS terminology had acquired official status and would henceforth be used as the official geographic sectioning of the European Union. (EC Ruling No 1059/2003 of the parliament and the European Council, 26 May 2003).

The other criteria were:

- The size, in terms of number of inhabitants; too small a region not being appropriate for the analysis of statistical data.
- The fact that health reports had already been prepared at that level, which would indicate interest in the availability of statistical data.
- Stability of frontiers/boundaries, which is more than desirable if data are to be gathered regularly.

5.2 Selected Health Regions

In total, during ISARE 1 & 3 responses were obtained from 23 countries of the EU participating in the project, and also from Switzerland, for a total of 42 regional levels that could be used. In ten countries, including Switzerland, only one level was suggested. That was the case, for example, of the "Bundesländer" in Austria, or at the national level for Luxemburg. For the project group, and for the correspondents in the various countries, these regions seemed to be the most appropriate for the exchange of health data between regions. This is generally explained by the fact that the majority of the responsibilities examined were found at this level, which moreover corresponded to NUTS. In ten other countries, two levels were considered, and in the four last countries, Finland, Germany, Portugal and the UK, three possible levels were pre-selected. In these other countries, the choice of health regions was not always obvious for various reasons, such as size of population or probable changes of responsibilities or boundaries, which even led, as we shall see, to changes of health regions between ISARE 1 & 3.

During phase 1 of the ISARE project (2001), identification of health regions was achieved for 13 of the then 15 countries of the Union. It was not possible make recommendations for Greece or Finland (see later).

During phase 3 of the ISARE project, work was done to identify health regions for the eight new members participating in the project. The project team was also re-examined the choice of health regions in several countries:

- The Netherlands, where the initial level of date gathering (GDD) was determined to be too complex during ISARE 2.
- The UK & Ireland, where organisational reforms of the health systems rendered useless the recommendations made at the end of ISARE 1.
- Greece, for which no recommendation had been made during ISARE 1. In this country, health regions were officially created during 2001. These regions could have been considered appropriate for data exchange, but the information available at the time of preparing the report was insufficient to make the recommendation.
- Finland, the other country for which no recommendation was made during ISARE 1, as the two levels, which were explored, did not have democratic powers or responsibility for health and social policies. In this country, because of the high level of decentralisation, much responsibility for health and social matters is found at municipal level, which is also the level for local democracy. The small population size of these 452 municipalities (average population 11,000) makes them difficult to use for the exchange of health data. During ISARE 3, hospital districts were finally selected. Despite not being units of local democracy and not corresponding to a NUTS region, they are nevertheless the locus for the organisation of hospital treatment.
- Portugal, which is a special case as two levels were retained. They are on the one hand the *Região Saude* (Health Regions), initially used in ISARE 1, which constitute the correct level as regards health and social policies, but which are not a NUTS level, and on the other hand the Regions, which have no health or social responsibilities, but which are NUTS 2. A forthcoming reform could simplify the situation by linking the decentralised geographic levels to NUTS 2. In the meantime it seemed better to recommend not one, but two geographic levels; the *Região Saude* and the NUTS 2.

- Ireland, where until the end of 2004 responsibility for health policy was decentralised to the level of the seven *Regional health boards* and the *Eastern regional health authority* (Dublin), levels which did not correspond to NUTS. Now the national government takes responsibility for the whole health system, and the NUTS 2 level has been chosen by default.

Ultimately a recommendation (2 in the case of Portugal) was made for each of the 23 countries of the Union taking part in the project, and for Switzerland.

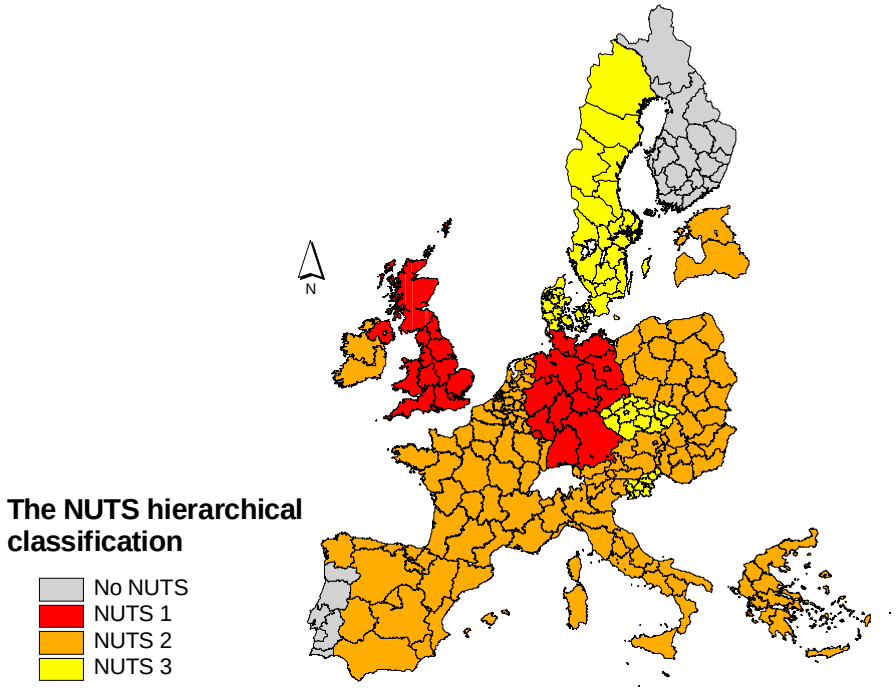
Finally it is important to note that despite the active engagement and contributions from the participants in the various counties in elaborating this project, these recommendations do not constitute an official position on the part of the member countries.

Table 4: Responses to ISARE surveys 1 & 3

Country	Considered levels		Recommended level(s)
	Number	Name	
DE Germany	3	Kreis Regierungsbezirk Land	Land
FI Finland	2	Province Hospital district Region	Hospital district
PT Portugal	3	Community Region Região Saude	Region Região Saude
UK United-Kingdom	3	Health Authority Regions Local Authority	Regions (England), Wales, Scotland, Northern Ireland
BE Belgium	2	Community Province	Province
EE Estonia	2	National level County	National level
FR France	2	Région Département	Région
GR Greece	2	"Health region" Peripheries	Peripheries
HU Hungary	2	Régió Counties + Budapest	Régió
IR Ireland	2	Health Board County	Health Board
MT Malta	2	National level Locality	National level
NL Netherlands	2	GGD Region WZV region	WZV region
SE Sweden	2	County council Municipality	County council
SK Slovakia	2	Region District	Region
AT Austria	1	Bundesländer	Bundesländer
CZ Czech Republic	1	Region	Region
DK Denmark	1	Amtskommuner	Amtskommuner
IT Italia	1	Regioni	Regioni
LU Luxembourg	1	National level	National level
LV Latvia	1	National level	National level
PL Poland	1	Voivodships	Voivodships
SL Slovenia	1	Region	Region
SP Spain	1	Autonomous Community	Autonomous Community
CH Switzerland	1	Cantons	Cantons

5.3 Local democracy, jurisdictions and correspondence with the NUTS levels of the "health regions"

On the basis of responses obtained, the recommended levels represent a total of 283 health regions in Europe, in 24 countries, an average of 12 per country. This average, or something close, is found in the Netherlands (12 regions), Belgium (11 regions), the Czech republic (14 regions), Greece (13 regions), the UK (12 regions) and Slovenia (12 regions). The group of countries which has the highest number of ISARE Health Regions includes Italy (20 regions), Finland (21 regions), Sweden (21 regions), France (26 regions) and Switzerland (26 regions). Conversely, in several small countries, Luxemburg, Malta, Latvia and Estonia, infra-national levels were considered inappropriate for exchange of health data given the small populations, and national levels were retained.



As it was considered a prime criterion in the selection of ISARE Health Regions, most recommended levels have responsibilities in the domains of hospital and ambulatory treatment, social services and health promotion. Furthermore they practically all produce health reports.

Excluding the special case of Portugal (see above) and Finland, 22 of the 24 recommended levels correspond exactly to a NUTS classification. These are NUTS 1 for two of the most heavily populated countries of the Union; Germany and the UK. NUTS 2, retained for 15 countries, is the level most used. This group includes very diverse countries; large countries such as France, Italy, Spain and Poland, and small countries such as Luxemburg, Malta, Latvia and Estonia, where the national level (which correspond also to the NUTS 1 and NUTS 2 level) was retained. The ISARE Health Regions correspond to NUTS 3 in 5 countries; the Czech Republic, Denmark, Sweden, Slovenia and Switzerland.

Finally, the ISARE Health Regions correspond in a large majority of cases, 18 out of 24, to a level of local democracy. Health regions do not correspond to levels of local democracy in relatively small and heavily centralised countries (Greece, Hungary, Ireland, Portugal and Slovenia), as well as in Finland for reasons already discussed.

In summary, it has been possible in the large majority of countries to find a level satisfactory for most if not all of the specified criteria: local democracy, responsibility for health and social policies, sufficiently large and corresponding to a NUTS level.

Table 5: Correspondence with levels of local democracy and responsibility for health & social policies

Regional recommended levels for exchange of data	Number of regions	Local democracy	Responsibilities in the management of socio-sanitary policies				Public health reporting	NUTS level
			Hospital care	Outpatient care	Social services	Health promotion		
AT Austria, *Bundesländer*	9	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes (1)**	**2**
BE Belgium, *Province*	11 (2)	**Yes**	*No*	*No*	*No*	**Yes**	**Yes**	**2**
CZ Czech republic, *Region*	14	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**3**
DE Germany, *Länder*	16	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes (1)**	**1**
DK Denmark, *Counties*	15	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes (1)**	**3**
EE Estonia, *National level*	1	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**2**
ES Spain, *Autonomous Com.*	17	**Yes**	**Yes (3)**	**Yes (3)**	**Yes**	**Yes**	**Yes**	**2**
FI Finland, *NR*	21	*No*	**Yes**	*NR*	*NR*	*NR*	*No*	*No*
FR France, *Région*	26	**Yes**	**Yes**	**Yes**	*No*	**Yes**	**Yes**	**2**
GR Greece, *Region*	13	*No*	**Yes**	**Yes**	*No*	**Yes**	**Yes**	**2**
HU Hungary, *Régió*	7	*No*	**Yes**	*No*	*No*	*No*	**Yes**	**2**
IE Ireland, *Regions*	2	*No*	*NR*	*NR*	*NR*	*NR*	*NR*	**2**
IT Italy, *Regions*	20 (4)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes (1)**	**2**
LU Luxembourg, *National level*	1	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No	**2**
LV Latvia, *National level*	1	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**2**
MT Malta, *National level*	1	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**2**
NL Netherlands, *Provinces*	12	**Yes**	*No*	*No*	*No*	*No*	*NR*	**2**
PL Poland, *Voivodships*	16	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**2**
PT Portugal, *Região Saude*	5	*No*	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	*No*
PT Portugal, Region	*5*	*No*	*No*	*No*	*No*	*No*	*No*	**2**
SE Sweden, *County*	21	**Yes**	**Yes**	**Yes**	*No*	**Yes**	**Yes**	**3**
SI Slovenia, *Region*	12	*No*	*No*	*No*	*Some*	**Yes**	**Yes**	**3**
SK Slovakia, *Region*	4	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**2**
UK : Eng. *Regions* , Wales *National level* Scotland *National level* N. Ireland *National level*	12	**Yes (5)**	**Yes**	**Yes**	*No*	*Some*	**Yes**	**1**
CH Switzerland, *Cantons*	26	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes (1)**	**3**

NR No reply

1 yes for some regions 2 ten provinces plus Brussels 3 for ten autonomous communities, responsibility is shared with the national level

4 19 "Régions" and the two provinces of the region of Trentin Haut-Adige 5 yes, but only for Scotland, Northern Ireland, Wales and the London region, not for other English regions

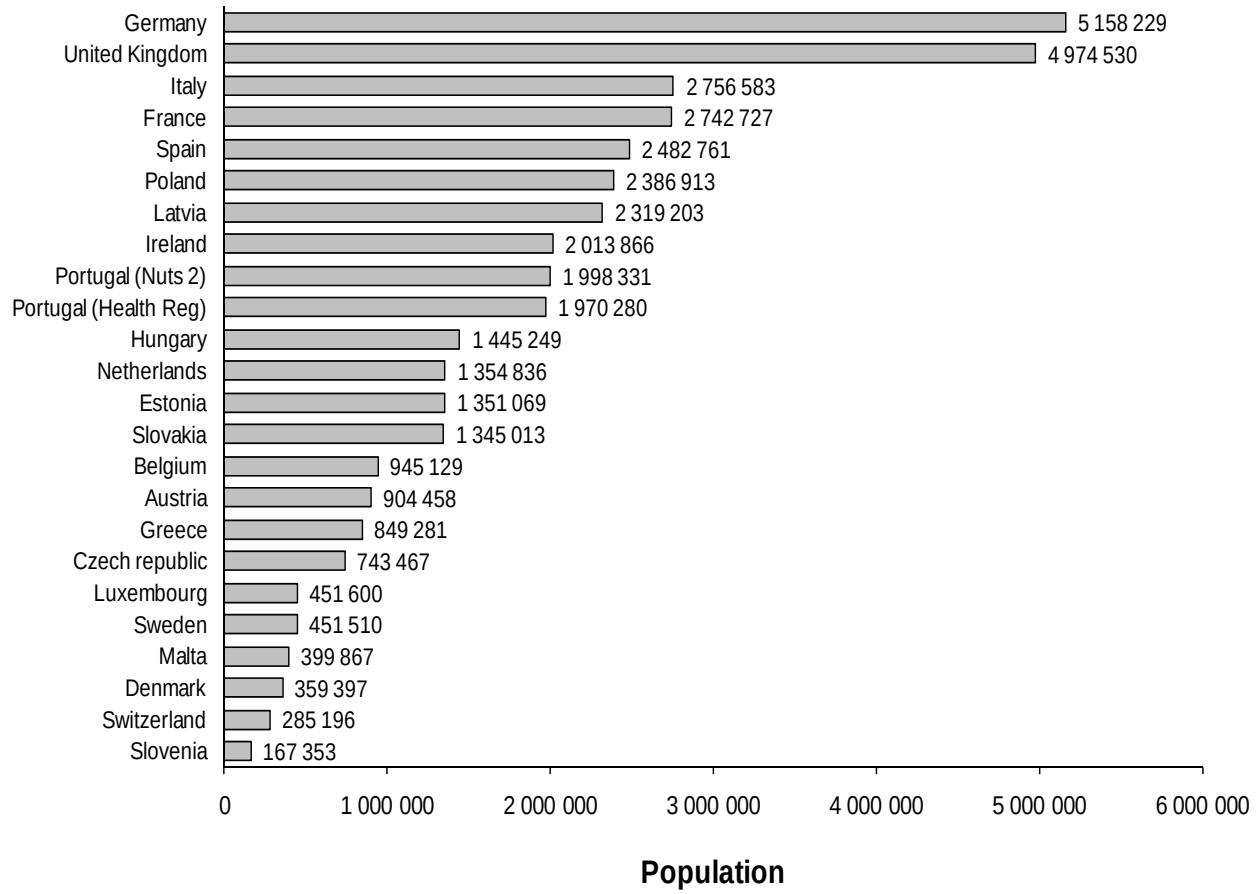
5.4 Demographic Characteristics

Table 6: Population 2004 and area of the selected regions

	Area			Population		
	Average	***Minimum***	***Maximum***	**Average**	***Minimum***	***Maximum***
AT Austria	9 319	*415*	*19 178*	904 458	*276 640*	*1 598 626*
BE Belgium	2 775	*161*	*4 440*	945 129	*254 120*	*1 668 812*
CZ Czech republic	5 633	*496*	*11 016*	743 467	*310 891*	*1 288 088*
DE Germany	22 314	*404*	*70 549*	5 158 229	*663 129*	*18 079 686*
DK Denmark	2 873	*97*	*6 173*	359 397	*43 939*	*651 311*
ES Estonia	43 698	*43 698*	*43 698*	1 351 069	*1 351 069*	*1 351 069*
ES Spain	29 763	*4 992*	*94 225*	2 482 761	*288 384*	*7 552 978*
FR France	24 726	*8 280*	*45 348*	2 742 727	*273 060*	*11 290 831*
GR Greece	10 151	*2 307*	*19 147*	849 281	*203 169*	*3 940 099*
HU Hungary	13 290	*6 919*	*18 339*	1 445 249	*983 612*	*2 829 704*
IE Ireland	34 899	*33 252*	*36 545*	2 013 866	*1 073 820*	*2 953 912*
IT Italy	14 349	*3 263*	*25 711*	2 756 583	*122 040*	*9 246 796*
LT Latvia	64 589	*64 589*	*64 589*	2 319 203	*2 319 203*	*2 319 203*
LU Luxembourg	2 586	*2 586*	*2 586*	451 600	*451 600*	*451 600*
MT Malta	316	*316*	*316*	399 867	*399 867*	*399 867*
NL Netherlands	3 461	*1 449*	*5 741*	1 354 836	*359 904*	*3 451 942*
PL Poland	19 543	*9 412*	*35 579*	2 386 913	*1 008 786*	*5 135 732*
PT Portugal (Health care R.)	17 225	*4 960*	*24 662*	1 970 280	*390 500*	*3 219 800*
PT Portugal (Nuts 2)	17 760	*2 865*	*31 484*	1 998 331	*405 380*	*3 711 797*
SE Sweden	21 017	*3 055*	*106 012*	451 510	*57 943*	*1 932 206*
SK Slovakia	12 259	*2 052*	*16 256*	1 345 013	*599 787*	*1 863 932*
SL Slovenia	1 689	*264*	*2 675*	167 353	*46 015*	*495 926*
UK United Kingdom	20 318	*1 584*	*78 132*	4 974 530	*1 706 475*	*8 095 261*
ALL EXCEPT SWITZERLAND	**15 172**	***97***	***106 012***	**1 920 629**	***43 939***	***18 079 686***
CH Switzerland	1 588	*37*	*7 105*	285 196	*15 029*	*1 261 810*
ALL WITH SWITZERLAND	**13 782**	***37***	***106 012***	**1 753 692**	***15 029***	***18 079 686***

Note: data for Finland are not available.

Graph 1: Demographic characteristics of the selected regions by country: average populations

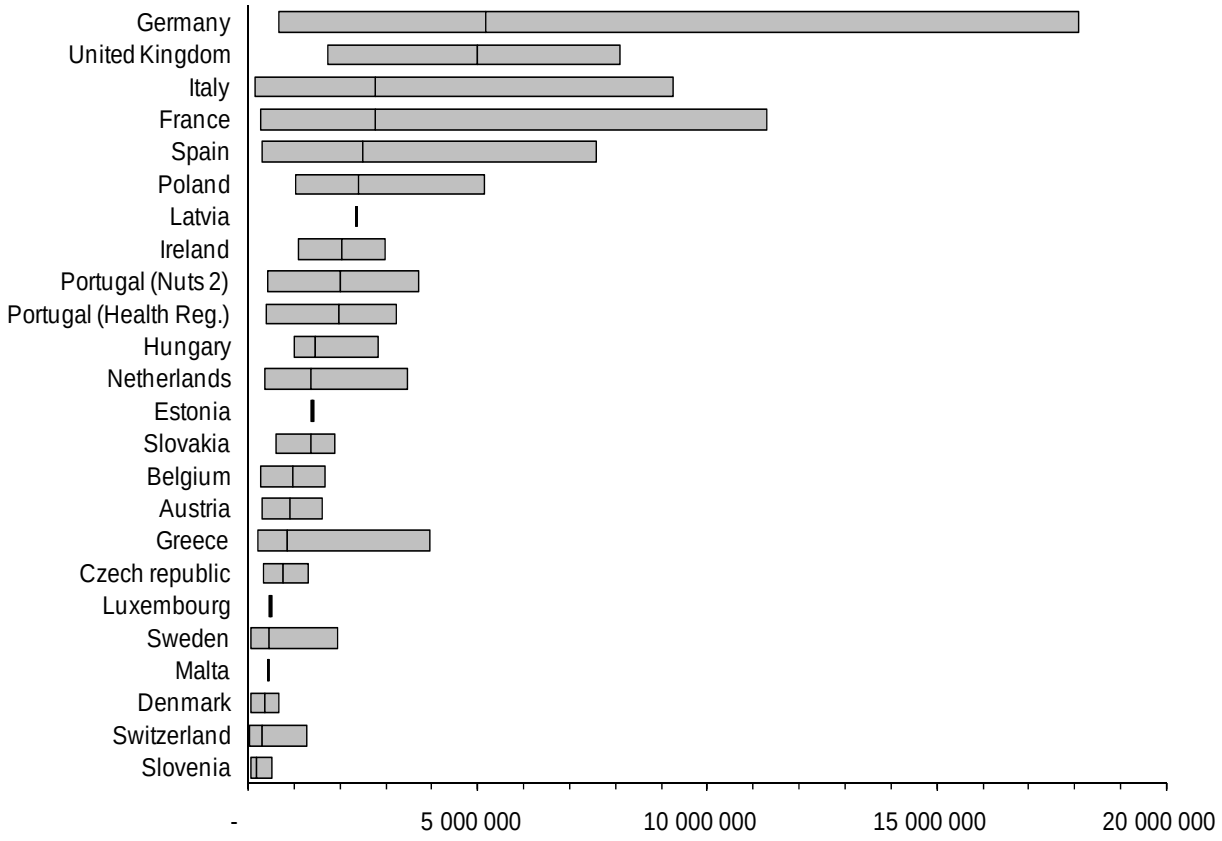


The following chart shows the population range of the ISARE Health Regions within each country. There are very large ranges of populations within regions, these ranges are as great in the very large countries such as Germany, Italy or France, as in moderate sized countries (Greece, Switzerland).

Amongst the recommended regions, the smallest populations, (below 60,000 inhabitants), are found in a Swiss Canton (15,000 inhabitants), a Danish Amtskommuner (44 000 inhabitants), a Slovenian region (46,000 inhabitants) and a Swedish County (58 000 inhabitants). The smallest units in the other countries vary from 122,000 (Italy) to 2,319,000 (Latvia).

The largest population in a recommended region is in the German "Land" of Rheinland Pfalz, which has over 18 million inhabitants. There are consequently extremely marked differences between the recommended regions, the largest ISARE Health Region having a population 1,202 times larger than the smallest. Even if one excludes the special case of Switzerland which includes a Canton (Appenzell Innerrhoden) of only 15,000 inhabitants and five Cantons with fewer than 40,000 inhabitants, the differences are still large, with a ratio of 1:411 between the extremes. These differences are indeed considerable, but of the same order as those found between NUTS 2 levels and even between different countries of the Union. The smallest NUTS 2 (Åland in Finland) with 26,500 inhabitants is 429 times smaller that the Ile-de-France (11.3 million inhabitants) and the smallest country (Malta) are 206 times smaller than Germany. Whether it is health regions or NUTS, these variations are largely caused by atypical regions, far from the average. Thus, excluding Switzerland, 80 % of the health regions have a population of between 255,000 and 4.9 million inhabitants (ratio of 1:19) and 90 % between 140,000 et 6.3 million inhabitants (ratio of 1:45).

Graph 2: Demographic characteristics of the selected regions by country: average & extreme populations



Note: data for Finland are not available.

5.5 Summary

To summarise, during ISARE 1 and ISARE 3, it has been possible, in virtually all countries, to find levels that satisfy most if not all of the criteria: local democracy, responsibility for health and social policies, satisfactory size. Correspondence with NUTS is also very good, and even better at the end of ISARE 3 than at the end if ISARE 1. However, the exercise also had its limitations. It has not been possible to construct ISARE Health Regions corresponding to a single NUTS level, and depending on the country the levels are NUTS 1, NUTS 2 or NUTS 3. As a corollary, disparities in size between ISARE Health Regions are very large, even larger than between NUTS regions, which leads to some problems in data comparison. Finally it must be stated that health regions as currently defined, are not always stable, and that adjustments were needed between ISARE 1 and ISARE 3 following internal reforms in some countries.

6. Analysis of the responses on data availability

6.1 General remarks on the answers

After having determined, in each country, the appropriate sub national level to exchange data in the European Union, the second step of the work consisted of studying data availability at these sub national levels in each country.
The data availability was studied, a priori, through the ability to gather the data corresponding to the selected indicators at the specified regional level. Therefore, it is the ability to gather data that was explored. Thus, for each variable that was said to be available, a data source was identified, either at national or at regional level. The last available year and the update frequency were also specified. A space for remarks was also requested in the questionnaires so that the participants could give further information as necessary.

The data list for which availability was studied has evolved since the one used in ISARE 1. The ECHI « European community health indicators » list, which a draft was used, was published in its final version in January 2005. The first section of this list corresponds to indicators which are already available and comparable between them. For the indicators of that section, necessary data to construct them were determined. A comparison with the data gathered during ISARE 1 allowed us to identify some additional data that are very useful for public health decision making, widely available and comparable. That is why we felt it was justified to integrate them into the list of data studied in ISARE 3.

The 73 data items which were examined can be gathered in 11 groups:

	number of data:
✓ Population	4
✓ Socio economic factors	4
✓ Mortality	5
✓ Morbidity	11
✓ Generic health status and composite health status measure	4
✓ Determinants of health	6
✓ Prevention	11
✓ Health promotion	1
✓ Health care resources	12
✓ Health care utilisation	13
✓ Health expenditure	2

All the countries participating in the ISARE project (the 25 member states of the European Union since 1st May 2004, Cyprus, Denmark and Lithuania excepted) and Switzerland were sent questionnaires. For Estonia and Latvia, two level were studied: the national level, and for Estonia, the county level and for Latvia statistical regions. In Portugal, two regional levels were also studied: the health regions that correspond to the level where decisions in health are taken and regions NUTS 2, that would be, in future, the administrative organization level of the country.
Responses were obtained from 18 of the 23 countries were the survey was undertaken. This corresponds to 21 study levels:

✓ Belgium	Province
✓ Switzerland	Canton
✓ Czech Republic	Region
✓ Germany	Land
✓ Estonia	National level and counties
✓ Spain	Autonomous communities
✓ France	Regions
✓ Greece	Health regions
✓ Hungary	Regions
✓ Luxembourg	National level
✓ Latvia	National level and statistical regions
✓ Netherlands	Province
✓ Poland	Voivodships
✓ Portugal	Health regions and regions NUTS 2
✓ Sweden	Counties
✓ Slovenia	Regions
✓ Slovakia	Regions
✓ United-Kingdom	Administrative English regions, Scotland, Wales, Northern Ireland

We do not have responses in this phase of the project from five countries: Austria, Finland, Ireland, Italy and Malta.

The methodology used in this study could have meant that a representative at national level was unfamiliar with the regional situation of his country. This is particularly true for countries with a federal structure and also for data about specific behaviour or morbidity problems, which are often studied more at local level than at national level. As the questionnaire about data availability was very detailed, the information was sometimes not provided, and there were a large number of questions that were not answered. This was still the case even though correspondents could have contacted other people in their own countries.

In some countries, the questionnaire was sent to several other regions. Such was the case in Spain, where 12 of the 17 autonomous communities were able to respond to the questionnaire. Similarly, the information provided by Belgium deals only with the French community. Consequently, for these two countries, the results presented in the following sections are a generalization to the whole country from information provided from some regions.

Because of the limitations described above, the analysis took into account the work achieved in the countries concerned but without giving too much importance to where the information was gathered. In fact, responses to the ISARE study are only indications about data and systems of information. They suggest the levels where the exchange of health information can be done through the European Union. However, accurate comparisons between regions can be carried out only if data can be comparable, if the quality of the data is good enough and if the population size is large enough. Questions about definition and availability are relevant for a large set of data, and some of them are the subject of other projects of the public health program of the European community, being undertaken through the Health monitoring program (HMP).

Because of these constraints, the results of the questionnaire about data availability are presented in two ways: by countries and by principal categories of data. The part “Data availability: answers to individual questions” gives more details and presents the availability of individual data of the 18 countries that took part in this phase of the project.

6.2 General overview on data availability

This part of the report provides a general overview of the responses about data availability. The following chapter gives more details on the data studied during the “availability” survey. In the tables, the answer “Yes” means that most of the indicators of the category could be gathered at the required level. The expressions “Yes for some data” ”Yes for some regions” and “Yes for some data and regions” are used to give more precise information when needed. The answer “No” means that no or virtually no information is available or that it exists only in a small number of regions.

6.2.1 Demography, socio-economic data, mortality and morbidity

Table 7: Data availability at regional levels studied during the survey: Demography, socio-economic data, mortality and morbidity

Country	Studied level	Number of regions	Available data			
			Demography	Socio-economy	Mortality	Morbidity
BE-Belgium	Province	**11**	Yes	Yes for some regions	Yes	Yes for some data
CH-Switzerland	Canton	**26**	Yes	Yes	Yes	Yes for some data
CZ-Czech Republic	Region	**14**	Yes for some data	Yes for some data	Yes	Yes
DE-Germany	Land	**16**	Yes	Yes	Yes	Yes for some regions
EE-Estonia	National	**1**	Yes	Yes	Yes	Yes
EE-Estonia	County	**15**	Yes for some data	Yes	Yes	Yes for some data
ES- Spain	Autonomous community	**17**	Yes	Yes	Yes	Yes for some regions
FR-France	Region	**26**	Yes	Yes for some data	Yes	Yes for some regions
GR-Greece	Region	**13**	Yes	Yes	Yes	Yes for some data
HU-Hungary	Region	**7**	Yes	Yes	Yes	Yes for some data
LU-Luxemburg	National	**1**	Yes	Yes	Yes	Yes for some data
LV-Latvia	National	**1**	Yes	No	Yes	Yes
LV-Latvia	Statistical region	**6**	Yes	No	Yes for some data	Yes
NL-Netherlands	Province	**12**	Yes for some data	No	No	No
PL-Poland	Voivodship	**16**	Yes	Yes for some regions	Yes	Yes for some regions
PT-Portugal	Região saude	**5**	Yes for some data	No	Yes for some data	Yes for some data
PT-Portugal	Região (NUTS 2)	**5**	Yes	Yes for some data	Yes for some data	Yes for some data
SE- Sweden	County	**21**	Yes	Yes for some regions	Yes	Yes
SI-Slovenia	Region	**12**	Yes for some data	Yes for some data	Yes for some data	Yes
SK-Slovakia	Region	**4**	Yes	Yes	Yes for some data	Yes
UK-United-Kingdom	Governing office + Wales, Scotland and Northern Ireland	**12**	Yes for some data	Yes for some data	Yes	Yes

As expected, we see that demographic data are widely available at the nominated regional level. In the five countries where limited data is available, this usually concerns the population estimate in 2050. In Netherlands, it concerned the distribution of maternal age.

Socio economic data is less available because in three countries (four levels), nearly all explored data were not available. These countries were Latvia, Netherlands and Portugal. In Belgium, Poland and Sweden, some data (for example, the distribution of the population by education level or by socio-professional categories) are only available in a limited number of regions whereas most of the other ones are available in all the regions of those countries. Finally, in five countries – Czech Republic, France, Portugal, Slovenia and the United-Kingdom –

only a few data are available: for example, the population by socio-professional categories and living under the poverty threshold in Portugal or in Slovenia

Data on mortality are widely available in the regions where the survey took place. Only Netherlands said those data were not available (but we can note that, during the phase of data collection, our correspondent did provide us with some of them – life expectancy and number of deaths by age and sex breakdown). In Latvia, in both Portuguese levels, in Slovenia and in Slovakia, data availability was partial: life expectancy at birth and at 65 is a priori not available at regional level; moreover, the number of deaths by cause, age and sex is not available in health regions (but during the data collection, those data were given at regional level).

In fewer than half of the countries where the survey was undertaken, availability of morbidity data could be considered as very good. In one country, Netherlands, most of the data are not available. In five countries – Switzerland, Germany, Spain, France and Poland – some of these data are only available in some regions. Some of this information is collected during health surveys. The survey protocol does not always cover all the regions of a country or the methodology used does not allow making estimates for all regions of the country. Finally, in 6 countries (and 7 levels) – Belgium, Estonia (counties), Greece, Hungary, Luxembourg, and for both of the Portuguese levels, only some data are available. For example, breast or cervical cancer survival rate are not available in most of these countries.

6.2.2 Health status, health determinants, prevention, health promotion

Country	Studied level	Number of regions	Available data			
			Health status	Health determinants	Prevention	Health promotion
BE-Belgium	Province	**11**	Yes for some data	Yes for some data	Yes for some regions	Yes
CH-Switzerland	Canton	**26**	Yes for some regions	Yes for some regions	Yes for some data	Yes for some regions
CZ-Czech Republic	Region	**14**	No	Non	Yes for some data	No
DE-Germany	Land	**16**	No	Yes for some data	Yes for some data	No
EE-Estonia	National	**1**	Yes	Yes for some data	Yes for some data	No
EE-Estonia	County	**15**	No	Non	Yes for some data	No
ES- Spain	Autonomous community	**17**	Yes	Yes for some data	Yes	Yes
FR-France	Region	**26**	Yes for some regions	Yes for some regions	Yes for some data	Yes for some regions
GR-Greece	Region	**13**	No	Yes for some data and regions	Yes for some regions	No
HU-Hungary	Region	**7**	Yes for some regions	Yes for some data and regions	Yes	No
LU-Luxembourg	National	**1**	No	Yes for some data	Yes	Yes
LV-Latvia	National	**1**	Yes for some data	Yes for some data	Yes for some data	No
LV-Latvia	Statistical region	**6**	No	Non	Yes for some data	No
NL-Netherlands	Province	**12**	No	Yes for some data	Yes for some data	No
PL-Poland	Voivodship	**16**	Yes for some data and regions	Yes for some data and regions	Yes for some data	No
PT-Portugal	Região saude	**5**	No	Non	Yes for some data	No
PT-Portugal	Região (NUTS 2)	**5**	No	Yes for some data	Yes for some data	Yes
SE-Sweden	County	**21**	Yes	Yes for some data	Yes for some data	Yes
SI-Slovenia	Region	**12**	Yes for some data	Yes for some data	Yes for some data	No
SK-Slovakia	Region	**4**	No	Yes for some data	Yes for some data	No
UK-United-Kingdom	Government office + Wales, Scotland and Northern Ireland	**12**	Yes for some data	Yes for some data	Yes	No

Data about health status are widely available only in three countries: Estonia (national level), Spain and Sweden. In several countries (Switzerland, France, Hungary, Slovenia and the United-Kingdom), most of the data are available only in some regions. This is linked to the fact that these data come from surveys undertaken only in some regions or which only have a partial regional representativeness. In Belgium and Latvia, only data about life expectancy are not available at regional level.

Health determinant data availability is even more restricted: No country can provide all the data of this group for all its regions. All the more, in four countries, these data are not or hardly available: Czech Republic, Estonia (counties), Latvia (statistical regions) and Portugal (health regions). In a second group of countries, data availability is limited to some countries, because, as for health status), they are extracted from health surveys: Switzerland, France and Slovenia. A third group of countries, the most numerous, has an availability limited to some data. These countries are Belgium, Germany, Estonia (national), Spain, Luxembourg, Latvia (national); Netherlands, Portugal (NUTS 2), Sweden, Slovakia and the United-Kingdom. Finally, in Greece, Hungary and Poland, only a part of these data is available, and in most cases, only in some regions.

Prevention data are widely available in Spain, Hungary, Luxemburg and in the United-Kingdom. In Belgium and Greece, data are available only in some regions. In other countries, only some data are available, because immunization rate against meningococcus is rarely available, and to a lesser extent, breast and cervix cancer screening.

Only one data about politics of health promotion was studied. This information exists in Belgium, Spain, Luxembourg, Portugal (health regions) and Sweden. In France and Switzerland, this information is available only in a part of the regions.

6.2.3 Health care resources, utilisation and expenditures

Table 8: Data availability at regional levels studied during the survey: Health care resources, utilisation and expenditures

Country	Studied level	Number of regions	Available data		
			Health care resources	Health care utilisation	Health expenditures
BE-Belgium	Province	**11**	Yes	Yes for some data	No
CH-Switzerland	Canton	**26**	Yes for some data	Yes	Yes for some data
CZ-Czech Republic	Region	**14**	Yes	Yes for some data	No
DE-Germany	Land	**16**	Yes	Yes	Yes for some data
EE-Estonia	National	**1**	Yes	Yes	Yes
EE-Estonia	County	**15**	Yes	Yes	Yes for some data
ES- Spain	Autonomous community	**17**	Yes	Yes	Yes
FR-France	Region	**26**	Yes	Yes	Yes for some data
GR-Greece	Region	**13**	Yes	Yes for some data	Yes
HU-Hungary	Region	**7**	Yes	Yes for some data	Yes for some data
LU-Luxemburg	National	**1**	Yes for some data	Yes	Yes for some data
LV-Latvia	National	**1**	Yes for some data	Yes for some data	Yes for some data
LV-Latvia	Statistical region	**6**	Yes for some data	Yes for some data	No
NL-Netherlands	Province	**12**	Yes for some data	Yes for some data	No
PL-Poland	Voivodship	**16**	Yes	Yes for some data	Yes for some data
PT-Portugal	Região saude	**5**	Yes	Yes for some data	No
PT-Portugal	Região (NUTS 2)	**5**	Yes for some data	No	No
SE-Sweden	County	**21**	Yes for some data	Yes	Yes for some data
SI-Slovenia	Region	**12**	Yes	No	No
SK-Slovakia	Region	**4**	Yes	Yes for some data	Yes for some data
UK-United-Kingdom	Governing office + Wales, Scotland and Northern Ireland	**12**	Yes	Yes	Yes for some data

Health resources data are available at regional level in the majority of the countries and at the studied levels in twelve out of twenty-one. For all other countries, the data restriction comes from the data type and not from the number of regions where they are available. Thus, the number of hospital long-term beds is not available in Switzerland, in Luxembourg, in Latvia, in Netherlands and in Portugal (NUTS 2). All things considered, it is in the Portuguese NUTS 2 that data are the less available: on the 12 data asked for this group, only two – the number of hospital beds and general practitioners- are available.

Data on health care utilisation are hardly or not available for only two levels: Portugal (NUTS 2) and Slovenia[8]. Data availability is restricted to some regions in the health regions of Portugal. For ten other levels – Belgium, Czech Republic, Greece, Hungary, Latvia (both levels), Netherlands, Poland, Portugal (NUTS 2) and Slovakia, only a part of the data is available. It is in Portugal (NUTS 2) and in Netherlands that the smallest number of data is declared to be available: only one out of 13 in Portugal (general practitioner utilisation) and two out of 13 in Netherlands (general practitioner utilization and number of acute care hospital beds days).

Data on health expenditure and social security coverage are only available at national level in Estonia, Spain and Greece. In Poland and Sweden, these data are available only in some regions. For others countries, either social security coverage or health expenditures are available, but not both.

6.3 Data availability in selected regions: answers to individual questions

The following table present, for the 18 countries and 21 studied levels, the repartition of the answers concerning data availability, indicator by indicator.

6.3.1 Demographic data

Table 9: **Estimate of data availability at selected regional levels demographic data**

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Distribution of the population by age and sex	21	0	0
Number of live births per year	21	0	0
Mother's age distribution	19	1	1
Population estimate, by 2050	13	3	5

Data on population estimate by age and sex and the number of live births per year are available in all the regions of the countries included in the survey.

For the mother's age distribution, the data are, a priori, not available in Netherlands and available only in some regions in Poland.

Population estimates by 2050 are available only in a part of the regions in Spain, Poland and Sweden. For five counties, our correspondents told that this information was not available: Czech Republic, Estonia (counties), Portugal (health regions), Slovenia and the United-Kingdom.

In Germany, these data are available when asking national or local structures, whereas in all other countries, these data can be gathered by asking national sources.

[8] *In fact, Slovenia did not answer this part of the questionnaire. Data are considered to be not available despite that they can be available in practice.*

6.3.2 Socio economic data

Table 10: Estimate of data availability at selected regional levels
Socio economic data

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Population by education level (ISCED: 4 levels)	15	3	3
Population by socio professional category (ISCO: 4 groups)	12	4	5
Percentage of unemployed persons (15 – 64 years old)	19	1	1
Population living under the poverty threshold	6	5	10

The distribution of the population by education level is available in all the regions for 15 of the 21 studied levels. In three countries – Belgium, Netherlands and Poland - the information is only available in some regions and in both levels studied for Latvia and in Portuguese health regions, the data are not available at all.
Data on population distribution by socio professional category are also restricted in a more numerous number of countries: in Belgium, Netherlands, Poland and Sweden, data are available in some countries. For five other levels, information is not available: both levels in Latvia and in Portugal, and Latvia.
The percentage of unemployed persons is widely spread: this data is not available in all regions in Netherlands and not available at all in Portuguese health regions.
In this group of data, the least available data is the population living under the poverty threshold. These data are available in all the regions only for 6 studied levels: Germany, both levels in Estonia, Greece, Hungary, and Luxembourg. In Switzerland, Spain, Poland, Sweden and Slovakia, the data is available only in some countries.
In Germany, socio-economic data are available through national or regional institutes whereas in Spain, data on poverty are accessible through regional institute.

6.3.3 Mortality

Table 11: Estimate of data availability at selected regional levels
mortality data

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Life expectancy at birth and at 65	15	0	6
Number of early neonatal deaths	20	0	1
Number of late neonatal deaths	20	0	1
Number of stillbirths	20	0	1
Number of deaths by cause, age and sex (Eurostat) list – 65 causes)	19	0	2

Life expectancy at birth or at 65 is not available at regional level in 6 levels out of 21: statistical regions in Latvia, Netherlands, both Portuguese levels, Slovenia and Slovakia.
The number of neonatal deaths and stillbirths is available in all countries and levels, except in Netherlands. The distribution of deaths by causes, sex and age is said to be not available in this same country (although our correspondent did provide us with these data during the data collection phase) and in the Portuguese health regions.
In Germany, these data should be applied partly to local and national sources. In Spain, recommended sources for deaths by causes are local.

6.3.4 Morbidity

Table 12: Estimate of data availability at selected regional levels morbidity data

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Infection by HIV (incidence)	17	2	2
Aids (incidence)	19	0	2
Lung cancer (incidence)	14	3	4
Breast cancer (incidence)	14	3	4
Cervix cancer – survival at 5 years	9	5	7
Breast cancer – survival at 5 years	9	5	7
Tuberculosis (incidence)	19	0	2
Weight at birth (<1000 g, 1000 to 1499 g, 1500 to 1999 g, 2000 to 2499 g, ≥ 2500 g)	14	4	3
Number of person killed in road traffic accident	21	0	0
Number of person injured in road traffic accident	19	1	1
Number of accidents related to work	19	1	1

Whereas the number of new aids cases is available in 19 of the 21 studied levels – only Netherlands and Portugal (NUTS 2) cannot provide the data, the number of new HIV cases is a bit less accessible at regional level. Besides the two countries already mentioned, the data are only available in some regions in Spain and Poland.

Data on breast and lung cancer incidence have the same availability: all regions in 14 levels out of 21, some regions in Switzerland, Germany and Spain, and not available in Hungary, Netherlands and in Portugal (both levels).

Survival at 5 years for breast and cervix cancer is a less available data as it is accessible in all regions for less than half of the countries. In seven cases – Belgium, Estonia (counties), Hungary, Luxembourg, Netherlands, and two Portuguese levels, data are not available and for five levels, they are available only in a part of the regions: Switzerland, Germany, Spain, France, and Greece.

Data on tuberculosis incidence are available in all countries at regional level, except in Netherlands and in Portugal (NUTS 2).

The distribution of children according to their birth weight is available just in some regions in Germany, France, Netherlands and United-Kingdom. In Greece and Portugal (NUTS 2), these data would be unavailable at regional level.

Data about the number of persons killed in road traffic accidents are available in all regions of all the studied levels.

Data about the number of persons injured in road traffic accidents and the number of accidents related to work have the same availability: in some regions in Poland and not available in Netherlands.

A great majority of these data are accessible through national institutes when they are available. For data about Aids, HIV and tuberculosis as for data about work accidents, local institutes have to be asked. In Greece, most data are available through local sources or by combining them with national sources, except data about birth weight and accidents which are available at national level. In Switzerland, all data linked with cancer should be collected by combining national and local sources. This is also true in France for cancer incidence at birth weight. Finally, in Sweden, data about Aids and HIV are available by asking national and local sources.

6.3.5 Generic health status and composite health status measures

Table 13: Estimate of data availability at selected regional levels
data about generic health status and composite health status measures

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Generic health status	10	4	7
Prevalence of chronic diseases on the last twelve months	6	4	11
Limitation of usual activities in the last six months	5	5	11
Life expectancy without disability	3	1	17

Data about generic health status are available for 10 of the 21 levels. The data are available in some regions in Switzerland, France, Poland and the United-Kingdom. These data are not available in Czech Republic, Germany, Estonia (counties), Greece, Latvia (statistical regions), Portugal (NUTS 2) and Slovakia.

Prevalence of chronic diseases is available for all regions in Belgium, Estonia (national), Spain, Hungary, Latvia (national) and Sweden. They are also available for some regions in Switzerland, France, Slovenia and United-Kingdom.

Availability of data related to the limitation of usual activities is also limited: available for all the regions in only five countries (Belgium, Estonia (national), Spain, Latvia (national) and Sweden) and for a part of the regions in Switzerland, France, Poland, Slovenia and in the United-Kingdom.

A very small number of countries can provide data on life expectancy without disability: in Estonia (national), Spain and Sweden for all regions and in Slovenia for some regions.

When data are available, they can be provided by local institutes in Hungary and by local and national institutes in France.

6.3.6 Health determinants

Table 14: Estimate of data availability at selected regional levels
data about health determinants

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Body mass index	11	5	5
Regular smokers	11	6	4
Alcohol consumption	6	5	10
Consumption / fruit availability (except fruit juice)	3	6	12
Consumption / vegetable availability (except potatoes and vegetable juice)	3	6	12
Exposition to PM10 in rural area	6	2	13

The body mass index distribution is available in all regions for 11 levels out of 21. Availability is partial in some countries: Switzerland, France, Greece, Poland and Slovenia. These data are not available in Czech Republic, at local level in Estonia and Latvia and for both Portuguese levels.

Availability of data about regular smokers is good for the same numbers of countries, but those which have a partial or inexistent availability is a bit different: availability in some regions in the same countries plus Slovakia, unavailability in the same countries except the NUTS 2 regions in Portugal.

The level of alcohol consumption is far less known. This data exist in Estonia and Latvia at national level and for all regions in Spain, Portugal (NUTS 2), Sweden and United-Kingdom and for a part of the regions in Switzerland, Greece, Hungary, Poland and Slovenia.

Data about fruit and vegetable consumption or access have a similar limited availability: in all regions in Spain, Latvia (national) and in the United-Kingdom, and for some regions in Switzerland, France, Hungary, Poland, Sweden and Slovenia.

Availability of data linked with atmospheric pollution in urban area by fine particles is very limited: all regions in Germany, Czech Republic, Luxembourg and Sweden and a part of the regions in France and Slovenia.

When data are available, in most cases national institutes have them, except in Germany, France and in the United-Kingdom where national and regional sources must be combined. In Greece and Hungary, data are available from local sources.

6.3.7 Prevention

Table 15: Estimate of data availability at selected regional levels
Prevention

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
% of children vaccinated against diphtheria	18	2	1
% of children vaccinated against tetanus	18	2	1
% of children vaccinated against pertussis	18	2	1
% of children vaccinated against polio	18	2	1
% of children vaccinated against Hib	16	2	3
% of children vaccinated against measles	18	2	1
% of children vaccinated against rubella	18	2	1
% of children vaccinated against mumps	18	2	1
% of children vaccinated against meningitis C	8	2	11
Breast cancer screening coverage	12	2	7
Cervix cancer screening coverage	10	2	9

The majority of data about vaccination rate are widely available. For diphtheria, tetanus, poliomyelitis, pertussis, measles, rubella and mumps, only one level cannot provide these data (Portugal - NUTS 2). These data are only available in some regions in Belgium and Greece.

Data about vaccination rate against Hib are not available in the countries quoted before for other vaccinations and also in Estonia (national and local levels). For the vaccination rate against meningitis C, we must add to this list, Switzerland, Czech Republic, Germany, France, Latvia (national and local level) and Sweden.

Knowledge on breast cancer screening coverage is good at regional level in a bit more than half of the countries. It concerns only some regions in Switzerland and Spain and is not available in Czech Republic, Greece, Netherlands, Poland, Portugal (both levels) and Slovakia. Data availability on cervix cancer screening coverage is lower: some regions in Spain and France and data not available in Switzerland, Czech Republic, Greece, Luxembourg, Netherlands, Poland, Portugal (both levels) and Slovakia.

Data about vaccination rate are accessible through local sources in Belgium and by combining local and national sources in Greece. For screening, data should be requested at local level in Hungary and at local and national level in Switzerland, and Sweden for breast cancer and in France for cervix cancer.

6.3.8 Health promotion

Table 16: Estimate of data availability at selected regional levels data about health promotion

	Number of countries where the data are likely to be available in:		
	Most of the regions	*Some regions*	*No region*
Policies to reduce ETS exposures	6	2	13

This kind of data has a very limited availability at regional level: our correspondents told us that they were accessible in all regions in Belgium, Estonia (national), Spain, Luxembourg, Portugal (NUTS 2) and Sweden, and for some regions in France and Switzerland. Data are accessible through national sources except for France and Portugal, where they should be requested at local level.

6.3.9 Health care resources

Table 17: Estimate of data availability at selected regional levels data about health care resources

	Number of countries where the data are likely to be available in:			
	Most of the regions	*Some regions*	*No region*	*No response*
Number of hospital beds	19	0	0	2
Number of hospital beds: acute care	16	0	3	2
Number of hospital beds: psychiatry	17	0	2	2
Number of hospital beds: long term care	12	1	6	2
Number of hospital beds: gynaecology, obstetric and maternity	16	0	3	2
Number of physicians	19	0	2	0
Number of general practitioners	21	0	0	0
Number of nurses	19	0	2	0
Number of midwives	18	1	2	0
Number of dentists	19	0	2	0
Number of pharmacists	16	0	5	0
Number of CT scans and MRI units	15	1	5	0

Information about health resources in establishments (number of hospital beds by type of cares) was not given by our Slovenian and Polish correspondents.

While the number of hospital beds is available in all the regions of all the countries which answered, the detail by types of care is not always available. Thus, the detail of the number of beds, whatever the type could not be available in Portugal (NUTS 2). For acute care, data are not available in Switzerland and Netherlands; for psychiatry, Switzerland, for long term care, Switzerland, Luxembourg, both level in Latvia and Netherlands; for gynaecology, obstetric and maternity, Luxembourg and Netherlands.

Concerning health professionals, the number of general practitioners is available in all the regions of the twenty one studied levels. But the number of physicians is available in a smaller number of regions: in fact, this data would not be available in Netherlands and in Portugal (NUTS 2). The same is true for nurses and dentists.
For midwives, data availability is different: only for some regions in Switzerland and Portugal (health regions) and not available for Portuguese NUTS 2. The number of pharmacists is not available in Switzerland, Latvia (whatever the level), in Portugal (NUTS 2). Data about scans and MRI are available in only some regions in Poland and are not available in Estonia (both levels), Netherlands, Portugal (NUTS 2) and Sweden.

In Greece, it is necessary to obtain contact both local and national institutes to obtain data about health care provision and in Hungary; local institutes need to be approached for data on medical imaging. For other countries, data are available through national institutes.

6.3.10 Health care utilisation

Table 18: Estimate of data availability at selected regional levels data about health care utilisation

	Number of countries where the data are likely to be available in:			
	Most of the regions	*Some regions*	*No region*	*No response*
Number of acute care hospital bed days	18	0	2	1
Number of gynaecology, obstetric and maternity hospital bed days	16	0	4	1
Number of hospital admissions: acute care	18	0	2	1
Number of hospital admissions: gynaecology, obstetrics and maternity	17	0	3	1
Number of hospital admissions by diagnoses	14	2	4	1
Average length of hospital stays by diagnoses	15	2	3	1
Number of hospital admission per day by diagnoses	11	2	7	1
General practitioner utilisation	17	3	0	1
Number of caesarean operations (on residents)	15	2	3	1
Number of induced abortions (on residents)	14	2	4	1
Number of coronary angioplasties	11	1	8	1
Number of hip replacements (on residents)	14	1	5	1
Number of cataract operations (on residents)	14	1	5	1

For this group of data, we do not have responses from Slovenia.

Overall data on hospital stays are available for the majority of the regions at the studied levels. The number of acute care hospital bed days and the number of acute care hospital admission are available in all countries at regional levels except in Netherlands and in Portugal (NUTS 2). For the number of gynaecology, obstetric and maternity hospital bed days, this information is not available in Luxembourg and Poland, while, for hospital admission in this area, this is not available in Poland.

Looking at hospital admissions by diagnoses shows that data are less available at regional level: the three data items studied are available only in some regions of Poland. For the number of admissions by diagnoses, the data are available for only some regions in Portugal (Health regions), and for outpatient admissions in Spain. Data on hospitalisation by diagnoses are unavailable in Hungary, Netherlands and Portugal (NUTS 2). Moreover, data on hospital admission diagnoses are not available in Belgium, average length of hospital stays by diagnoses are not available in Portugal (health regions) and out-patient hospitalisation are not available for Czech Republic, both levels in Latvia and for Portuguese health regions.

General practitioner utilization is available in all regions for the majority of the countries. In Belgium, Spain and Poland, this data is available only in a limited number of regions.

The five medical treatments studied are never available in Netherlands, Poland, and Portugal (NUTS 2). They are available only in some regions for Portugal (health regions). We can also mention that the number of caesareans and abortions is not available is not available for some Greek regions
Data about angioplasties are not available in Czech Republic, Greece, Latvia (national and statistical regions) and Slovakia, in addition to the countries already mentioned. Finally, for hip replacement and cataract operation, we must add to the list of the three above countries where no data on medical treatment is available, Greece and Slovakia.

When data are available, they must be requested from national sources, except in some cases for Germany, Greece and Portugal, where both national and local sources can be used.

6.3.11 Social security coverage and health expenditures

Table 19: Estimate of data availability at selected regional levels data about social security coverage and health expenditures

	Number of countries where the data are likely to be available in:			
	Most of the regions	*Some regions*	*No region*	*No response*
Social security coverage	11	1	8	1
Health expenditure	4	3	13	1

For this group of data, we do not have a response from Slovenia.

Data on social security coverage are available in slightly more than half of the studied levels. They are restricted to some regions only in the United-Kingdom and are not available for all the regions of eight countries: Belgium, Czech Republic, both levels in Latvia and Portugal, Netherlands and Sweden.

Availability of data on health expenditure is very limited. This is available for all regions only in Estonia and Latvia for their national level and also in Spain and Greece. They are available for some regions in Poland, Sweden and in the United-Kingdom

These data should be requested from national and local institutes in Netherlands. For other countries, when they are available, they should be requested from national institutes.

7. Data collected during the ISARE 3 survey

In this chapter, we will present a summary of the results obtained during the ISARE 2 and 3 surveys. For countries in the European Union before 2004, data collection was undertaken in two steps, one for ISARE 2, the other one for ISARE 3. For each of these steps, two questionnaires were sent to each country, the first one concerning a list of indicators to be collected in all the regions of the country, the other one concerning only one region. For the countries in the European Union since 2004, only one phase of data collection was undertaken, and as for the old countries, two kinds of questionnaire were sent, one for all regions, the other one for only one region. These questionnaires have the same list of indicators as the list sent to old countries in ISARE 2 and 3 surveys. Finally, we have had the two full questionnaires (i.e. including indicators from ISARE 2 and 3 at the two required levels) for 15 countries (Belgium, Czech Republic, Germany, Estonia, Spain, Hungary, Ireland, Luxembourg, Latvia, Poland, Portugal, Sweden, Slovakia, and United-Kingdom). Five countries provided complete information, but only for the questionnaire concerning all the regions (Austria, Greece, Malta, Netherlands, and Slovenia). Finally, Finland, completed the two questionnaires for ISARE 2, but did not provide data for ISARE 3.

These results are organised by major themes (demographic and socio economic data, mortality data, morbidity data, risk factors, prevention data, health professionals, health services). For each of the major themes we will firstly deal with the data requested for all the regions of each participating countries, then with the complementary data requested for just one region. The availability of data, their accessibility, their conformity with the definition and required dates, and the evaluation of their quality will be described.

Tables have been constructed using all of the collected information and are found in the appendix. Organisations that our partners have indicated as being sources where it is possible to gather these data are also listed, classed by theme and by data.

The group of indicators calculated from the collected data has been integrated into the 'web based tool' accessible on the Internet[9] (http://www.isare.org). At the end of the results, examples of how to use this tool are presented.

[9] *Because of its experimental nature, access to this website tool requires a password. Please refer to the procedure as described on the website.*

7.1 Demographic and socio-economic data

The following data were requested for all regions:

- Mid year population estimate;
- Number of live births;
- Percentage of unemployed persons (15 to 64 years old);
- Mother age distribution.

In addition, for on region of each country, the following data were requested:

- Percentage of the adult population (from 25 to 64 years old) that has completed upper secondary education;
- Percentage of the adult population (from 25 to 64 years old) that has completed tertiary education.

Table 20: Demographic and socio-economic data – availability of data

		Availability (all the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected in all the regions (n=21)	Mid year population estimate	14	1	2	0	4	15
	Number of live births	18	1	1	0	1	19
	% of unemployed persons (15 to 64 years old)	17	1	0	1	2	13
	Maternal age distribution	17	1	1	0	2	9

	Percentage of the adult population (25 to 64 years old) that has completed	Availability (requested year)	Partial availability (selected region – other year)	Not available	Conformity to the definition
Data collected in one region (n= 16)	Upper secondary education	7	6	3	8
	Tertiary education	8	6	2	8

Table 21: Demographic and socio-economic data – source of data

		Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected in all the regions	Mid year population estimate	17	16	1	0
	Number of live births	19	18	1	0
	% of unemployed persons (15 to 64 years old)	18	17	0	1
	Maternal age distribution	16	14	0	2

	Percentage of the adult population (25 to 64 years old) that has completed	Number of usable answers	Sources	
			National	Regional
Data collected in one region	Upper secondary education	11	10	1
	Tertiary education	12	11	1

Table 22: Demographic and socio-economic data – quality of data

		Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
Data collected in all the regions	Mid year population estimate	14	13	14	13
	Number of live births	17	15	17	16
	% of unemployed persons (15 to 64 years old)	17	14	16	15
	Mother age distribution	16	14	16	14
Data collected in one region	Percentage of the adult population (25 to 64 years old) that has completed upper secondary education	11	8	10	10
	Percentage of the adult population (25 to 64 years old) that has completed tertiary education	11	8	10	10

Table 23: Demographic and socio-economic – summary

		Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in all the regions	Mid year population estimate	+	++	++	++	++	Yes
	Number of live births	++	++	++	++	++	Yes
	% of unemployed persons (15 to 64 years old)	++	+/-	++	++	++	Yes
	Maternal age distribution	++	--	++	++	++	No
Data collected in one region	Percentage of the adult population (25 to 64 years old) that has completed upper secondary education	+/-	+/-	+	++	++	No
	Percentage of the adult population (25 to 64 years old) that has completed tertiary education	+/-	-	+	++	++	No

Information on demographic and socio-economic data shows that their availability is quite good. Availability of the number of live births and of the percentage of unemployed persons is very good. Data availability on population estimates and maternal age distribution are good, as opposed to the percentage of the adult population that has completed upper secondary or tertiary education. Indeed, for these indicators, availability is moderate.

Where data are available, they mainly come from national institutes.

There are few reservations on the quality of the data, except for maternal age distribution and level of education – both have problems of conformity. These data are often used for local projects and estimated to be usable for geographic or time trend analysis.

Consequently, population estimates, the number of live births, the percentage of unemployment can already be included in a European database of regional health data.

7.2 Mortality data

The following data were requested for all regions:

- Number of perinatal deaths;
- Number of stillbirths;
- Number of deaths by age, sex and cause;
- Life expectancy

Table 24: Mortality data – availability of data

	Number of	Availability (all the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected in all the regions (n=21)	Perinatal deaths	17	2	1	0	1	18
	Stillbirths	16	2	2	0	1	15
	Age/sex breakdown of deaths by cause	13	2	1	0	5	14
	Life expectancy	11	0	1	4	5	15

Table 25: Mortality data – source of data

	Number of	Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected in all the regions	Perinatal deaths	20	19	1	0
	Stillbirths	20	19	1	0
	Age/sex breakdown of deaths by cause	15	14	1	0
	Life expectancy	14	13	0	1

Table 26: Mortality data – quality of data

	Number of	Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
Data collected in all the regions	Perinatal deaths	16	15	16	16
	Stillbirths	16	15	16	16
	Age/sex breakdown of deaths by cause	14	12	14	14
	Life expectancy	16	14	16	14

Table 27: Mortality data – summary

	Number of	Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in all the regions	Perinatal deaths	++	++	++	++	++	Yes
	Stillbirths	++	+	++	++	++	Yes
	Age/sex breakdown of deaths by cause	+	++	++	++	++	Yes
	Life expectancy	+/-	++	++	++	++	No

Mortality figures gathered in the phase 3 of the ISARE project show that their availability is less than one could have expected. In particular, data on deaths by age and sex breakdown are unavailable in nearly a quarter of the countries. Indeed, for some country like Slovakia, those data are only available at national level. Life expectancy is available in a limited number of countries, in particular life expectancy at 65.

Mortality data are mainly available through national institutes.

Information gathered on the quality of the data, apart from some problems of harmonisation of data linked to counting methods for stillbirths; show that they are of sufficient quality to allow geographical or temporal analyses.

Finally, except from life expectancy, these mortality data can be integrated in a European database at regional level.

7.3 Morbidity data

The following data were requested for all regions:

- Number of new AIDS cases;
- Number of new HIV cases;
- Number of underweight births;
- Number of persons injured or killed in road traffic accident.

In addition, for one region of each country, the following were requested:

- Number of new tuberculosis cases;
- Number of new breast cancer cases;
- Number of accident related to work.

Table 28: Morbidity data – availability of data

	Number of	Availability (All the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected in all the regions (n= 21)	New AIDS cases	13	1	1	0	6	12
	New HIV cases	11	2	1	0	7	12
	Low birth weight	13	2	3	0	3	16
	Persons injured or killed in a car accident	14	3	0	1	3	15

	Number of	Total availability (requested year)	Partial availability (selected region – other year)	Not available	Conformity to the definition
Data collected in one region (n= 16)	New tuberculosis cases	15	1	0	13
	New breast cancer cases	9	4	3	12
	Work accidents	11	3	2	13

Table 29: Morbidity data – source of data

	Number of	Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected in all the regions	New AIDS cases	15	13	0	2
	New HIV cases	14	13	0	1
	Low birth weight	16	13	2	1
	Persons injured or killed in a car accident	17	15	0	2

	Number of	Number of usable answers	Sources	
			National	Regional
Data collected in one region	New tuberculosis cases	15	15	0
	New breast cancer cases	12	12	0
	Work accidents	11	11	0

Table 30: Morbidity data – quality of data

	Number of	Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
Data collected in all the regions	New AIDS cases	14	12	13	12
	New HIV cases	12	11	11	10
	Low birth weight	14	12	12	13
	Persons injured or killed in a car accident	15	15	13	13
Data collected in one region	New tuberculosis cases	13	13	13	13
	New breast cancer cases	13	13	11	12
	Work accidents	12	12	11	12

Table 31: Morbidity data – summary

	Number of	Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in all the regions	New AIDS cases	+/-	+	++	++	++	No
	New HIV cases	+/-	++	++	++	++	No
	Low birth weight	+	++	++	++	++	Yes
	Persons injured or killed in a car accident	+	++	++	++	++	Yes
Data collected in one region	New tuberculosis cases	++	++	++	++	++	Yes
	New breast cancer cases	+	++	++	++	++	Yes
	Work accidents	+	++	++	++	++	Yes

The availability of morbidity data is moderate, except for the indicator relating to incidences of tuberculosis that is available in all the regions where the data was requested. This limited availability particularly concerns HIV infection.
However, conformity to the definition is very good; that allows wide use of the data and to make time trend analyses.
Data are mainly available from national sources.
Finally, apart from data linked with HIV incidence, these data can be integrated in a first version of a regional health database.

7.4 Risk factors

Data of this chapter were requested in each case for all regions:

- Body mass index distribution;
- Percentage of smokers aged over 15.

Table 32: Risk factors – availability of data

		Availability (all the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected in all the regions (n= 21)	Distribution of BMI in the population	5	7	0	2	7	4
	% of regular daily smokers aged 15 years or more	4	9	0	1	7	6

Table 33: Risk factors – source of data

		Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected in all the regions	Distribution of BMI in the population	14	11	0	3
	% of regular daily smokers aged 15 years or more	14	11	1	2

Table 34: Risk factors – quality of data

		Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
Data collected in all the regions	Distribution of BMI in the population	13	10	9	8
	% of regular daily smokers aged 15 years or more	13	10	10	10

Table 35: Risk factors – summary

		Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in all the regions	Distribution of BMI in the population	-	--	+	+/-	+/-	No
	% of regular daily smokers aged 15 years or more	-	--	+	+	+	No

Gathering information on risk factors shows that the availability of this information is limited in Europe at regional level. Those data are unavailable at regional level in one third of the countries.

Information is often accessed from national sources.

Conformity to the given definition is very poor. Indeed, the BMI index is an indicator that includes 4 classes (underweight, normal, overweight, obsess) and the class definition changes from one country to another. Similarly, the percentage of regular daily smokers is estimated on a population that rarely fits the ECHI definition (persons aged 15 years or more). Often, the data gathered in the different countries concern different age groups (16-64 years old for example). Moreover, judgements on the quality of these data to make geographical or trend comparisons are quite negative.

These data, despite their relevance to public health, are not yet of sufficient quality or availability to be integrated in health regional database at European level.

7.5 Prevention data

Data in this chapter were requested for just one region in each country.

- Percentage of children vaccinated against diphtheria;
- Percentage of children vaccinated against tetanus;
- Percentage of children vaccinated against pertussis;
- Percentage of children vaccinated against poliomyelitis;
- Percentage of children vaccinated against measles;
- Percentage of children vaccinated against HIB;
- Percentage of children vaccinated against mumps;
- Percentage of children vaccinated against rubella;
- Breast cancer screening.

Table 36: Prevention data – availability of data

Data collected in one region (n= 16)	Percentage of children vaccinated against	Availability (requested year)	Partial availability (selected region – other year)	Not available	Conformity to the definition
	Diphtheria	9	6	4	9
	Tetanus	8	3	5	8
	Pertussis	8	3	5	8
	Poliomyelitis	9	3	4	9
	Measles	9	4	3	8
	Hib	9	5	3	9
	Mumps	9	4	3	9
	Rubella	9	4	3	9
	Breast cancer screening coverage	5	5	6	2

Table 37: Prevention data – source of data

Data collected in one region	Percentage of children vaccinated against	Number of usable answers	Sources	
			National	Regional
	Diphtheria	9	7	2
	Tetanus	10	8	2
	Pertussis	10	9	1
	Poliomyelitis	11	9	2
	Measles	12	11	2
	Hib	13	11	2
	Mumps	13	11	2
	Rubella	13	11	2
	Breast cancer screening coverage	10	5	5

Table 38: Prevention data – quality of data

Data collected in one region	Percentage of children vaccinated against	Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
	Diphtheria	11	10	10	10
	Tetanus	10	8	9	9
	Pertussis	9	9	8	9
	Poliomyelitis	9	8	9	9
	Measles	10	10	10	9
	Hib	12	11	11	11
	Mumps	12	11	12	12
	Rubella	12	11	12	12
	Breast cancer screening coverage	8	8	7	7

Table 39: Prevention data – summary

	Percentage of children vaccinated against	Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in one region	Diphtheria	+	+	++	++	++	Yes
	Tetanus	+/-	+	+	++	++	No
	Pertussis	+/-	+	++	++	++	No
	Poliomyelitis	+/-	+	+	++	++	No
	Measles	+	+/-	++	++	++	Yes
	Hib	+/-	+/-	++	++	++	No
	Mumps	+	+/-	++	++	++	Yes
	Rubella	+	+/-	++	++	++	Yes
	Breast cancer screening coverage	-	--	++	++	++	No

Availability of data on vaccination coverage for children at regional level is generally moderate, and mediocre in certain cases, except for diphtheria and measles where availability is good.

Even though the data can usually be obtained from national organisations, it should be noted that numerous problems of conformity with the proposed definition are encountered. In particular, the indicator relating to breast cancer screening coverage does not correspond with the given definition.

However, few reservations were expressed on the quality of the data.

Thus, we proposed at this step, to include only vaccination coverage against diphtheria, measles, mumps and rubella in a health regional database.

7.6 Health professionals

The following data were requested for all regions:

- Number of doctors;
- Number of nurses (including midwives);
- Number of nurses (excluding midwives);
- Number of midwives;
- General practitioner utilisation.

In addition, for one region of each country, the following data were requested:

- Number of general practitioners;
- Number of dentists;
- Number of pharmacists.

Table 40: Health professionals – availability of data

	Number of	Availability (all the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected for all the regions (n= 21)	Physicians	15	4	1	1	0	16
	Nurses (including midwives)	13	3	0	2	3	15
	Nurses (excluding midwives)	14	3	2	1	1	14
	Midwives	14	2	2	0	3	14
	General practitioner utilisation	10	4	1	0	6	8

	Number of	Availability (requested year)	Partial availability (selected region – other year)	Not available	Conformity to the definition
Data collected for one region (n= 16)	General practitioners	13	2	1	12
	Dentists	13	1	2	12
	Pharmacists	12	2	2	13

Table 41: Health professionals – source of data

	Number of	Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected for all the regions	Physicians	19	17	1	1
	Nurses (including midwives)	18	16	0	2
	Nurses (excluding midwives)	19	17	0	2
	Midwives	18	16	0	2
	General practitioner utilisation	14	13	0	1

	Number of	Number of usable answers	Sources	
			National	Regional
Data collected for one region	General practitioners	12	12	0
	Dentists	12	12	0
	Pharmacists	13	12	1

Table 42: Health professionals – quality of data

	Number of	Number of usable answers	Quality		
			Used data	Geographical analyses	Trend analyses
Data collected for all the regions	Physicians	17	14	14	13
	Nurses (including midwives)	15	11	12	10
	Nurses (excluding midwives)	16	15	14	12
	Midwives	15	13	14	12
	General practitioner utilisation	14	12	12	13
Data collected for one region	General practitioners	13	13	11	12
	Dentists	11	11	10	11
	Pharmacists	12	12	11	12

Table 43: Health professionals - summary

	Number of	Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected for all the regions	Physicians	++	+	++	++	+	Yes
	Nurses (including midwives)	+	++	+	+	+/-	Yes
	Nurses (excluding midwives)	+	+/-	++	++	+	No
	Midwives	+	+	++	++	+	Yes
	General practitioner utilisation	+/-	-	++	++	++	No
Data collected for one region	General practitioners	++	+	++	++	++	Yes
	Dentists	++	++	++	++	++	Yes
	Pharmacists	+	++	++	++	++	Yes

From this study, it appears that, data on health professionals are widely available at regional level in Europe, except for data relating the number of medical consultations, only asked during the third phase of the ISARE project. However, for no indicator, it has been possible to gather the data for all regions.

Data are mostly available from national sources, except for Spain and the United-Kingdom where data are often collected at regional level.

Problems of conformity to the definition sometimes arise, in particular for the number of nurses and the number of visits to the general practitioners. Visits to the general practitioner can also include contact, depending on countries.

Despite these two restrictions, the quality of data on health professionals is good enough to make geographical and trend analysis.

7.7 Health services

The following data were requested for all regions:

- Number of acute care beds;
- Number of hospital beds;
- Number of hospital psychiatric bed days;
- Number of hospital admissions.

In addition, for one region of each country, the following data were requested:

- Number of beds in gynaecology, obstetrics or maternity;
- Number of hospital acute care bed days per year;
- Number of hospital bed days per year in gynaecology, obstetrics or maternity;
- Number of hospital in-patients discharges in gynaecology, obstetrics or maternity

Table 44: Health services – availability of data

	Number of	Availability (all the regions - requested year)	Partial availability			Not available	Conformity to the definition
			All the regions – other year	Some regions – requested year	Some regions – other year		
Data collected in all the regions (n= 21)	Acute care beds	14	5	1	0	1	16
	Hospital beds	16	2	1	0	2	14
	Psychiatric hospital beds	16	1	1	0	3	12
	Hospital discharges	14	1	1	0	5	14

	Number of	Availability (requested year)	Partial availability (requested region - other year)	Not available	Conformity to the definition
Data collected in one region (n= 16)	Gynaecology, obstetrics or maternity beds	14	1	1	12
	Bed days, acute care/ year	14	2	0	16
	Bed days: gynaecology, obstetrics or maternity	13	1	2	11
	Hospital in-patients discharges: gynaecology or obstetrics or maternity	13	1	2	11

Table 45: Health services – source of data

	Number of	Number of usable answers	Sources		
			National for all the regions	Regional for all the regions	National and regional
Data collected in all the regions	Acute care beds	19	18	0	1
	Hospital beds	18	18	0	0
	Psychiatric hospital beds	15	14	1	0
	Hospital discharges	14	13	0	1

	Number of	Number of usable answers	Sources	
			National	Regional
Data collected in one region	Gynaecology, obstetrics or maternity beds	12	12	0
	Bed days, acute care/ year	14	13	1
	Bed days: gynaecology, obstetrics or maternity	12	11	1
	Hospital in-patients discharges: gynaecology or obstetrics or maternity	12	12	0

Table 46: Health services – quality of data

	Number of	Number of usable answers	Quality		
			Usable data	Geographical analyses	Trend analyses
Data collected in all the regions	Acute care beds	17	16	15	15
	Hospital beds	16	15	15	15
	Psychiatric hospital beds	16	15	14	15
	Hospital discharges	16	13	13	14
Data collected in one region	Gynaecology, obstetrics or maternity beds	13	11	11	12
	Bed days, acute care/ year	13	12	12	12
	Bed days: gynaecology, obstetrics or maternity	12	11	10	11
	Hospital in-patients discharges: gynaecology or obstetrics or maternity	12	11	10	11

Table 47: Health services – summary

	Number of	Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	To be included in an health regional database
Data collected in all the regions	Acute care beds	+	+	++	++	++	Yes
	Hospital beds	++	+	++	++	++	Yes
	Psychiatric hospital beds	++	+/-	++	++	++	Yes
	Hospital discharges	+	++	++	++	++	Yes
Data collected in one region	Gynaecology, obstetrics or maternity beds	++	+	++	++	++	Yes
	Bed days, acute care/ year	++	++	++	++	++	Yes
	Bed days: gynaecology, obstetrics or maternity	++	++	++	++	++	Yes
	Hospital in-patients discharges: gynaecology, obstetrics or maternity	++	++	++	++	++	Yes

The results of the ISARE study show that the availability of data on health services is good. All the indicators are available in the majority of the regions. Problems of conformity to the definition can arrive. This is in particular the case for hospital beds. Indeed, in some countries private hospitals are not taken into account for the indicators calculation.

When available, the information is most often obtained from national sources.
Even if reservations were expressed in some cases on the quality of the data and on the possibility of using them in the framework of geographic or trend analysis, these data are widely used for these types of comparison.

7.8 Summary of results

The third phase of the ISARE project enabled the extension of the results of data collection to the new countries of the European Union, and to new indicators. Thus 8 new countries have been included in this study, which gives 21 countries for indicators on the short list, and 16 for those on the long list. Also, the availability of the 13 indicators not requested during ISARE 2 has been examined during ISARE 3. It should be noted that for certain countries that had participated in the previous phase of the ISARE project the regional divisions have been revised. Thus for these countries data collection has been achieved for all indicators, and not just those specifically requested for phase three of the project.

Availability of data is generally high (34.1 % of the data) or very high (36.4 %) and has never been considered, following the criteria adopted, very poor. However, the availability of the data is not perfect, as for no single indicator studied has it been possible to obtain the data for all regions for the year requested. However, for certain indicators on the short list (number of doctors and number of beds for short term care) and for one indicator on the long list (new cases of tuberculosis), the data are available for all countries, but not necessarily for all regions or for the year requested.
Conversely, certain indicators are poorly available. In particular, indicators linked to risk factors (distribution of body mass index and number of smokers), and those linked to morbidity (number of new cases of HIV) for which the data were not available in 7 countries.

Conformity of the data to World Health Organisation or to Eurostat definitions is judged good to very good for 29 of the 44 indicators studied. However, for 7 of the indicators conformity to the definition is judged to be bad to very bad. This applies especially to indicators with several modalities, where the definitions of the classes vary from one country to another (distribution of corporal mass index, distribution of ages of mothers) or indices estimated over a group of precise age specified in the definition, and which is not the same in all countries (percentage of children vaccinated against diphtheria, breast cancer screening for women aged 25-64, percentage of smokers aged 25-64 …).

In order better to test the **quality** of the data, the possibility of testing data between regions and over time was investigated. It should be underlined that comparability between regions only concerns regions of the same country, and not regions of different countries. This study shows that in all cases where countries replied to these questions, the data are judged to be of sufficient quality to make geographic comparisons. As for using these date for comparisons over a time period, the countries show some limitations, linked partially to modification of definitions or to methods of data gathering; however, for over 95% of the indicators studied the data are considered of sufficient quality to allow trend comparisons.

Table 48: All data: Analysis of the 44 data studied according to availability, conformity and quality

	Availability		Conformity to the definition		Used data		Geographical analyses		Temporal analyses	
++	16	36.4%	18	40.9%	40	90.9%	40	90.9%	38	86.4%
+	15	34.1%	12	27.3%	4	9.1%	3	6.8%	4	9.1%
+/-	10	22.7%	8	18.2%	0	0%	1	2.3%	2	4.5%
-	3	6.8%	2	4.5%	0	0%	0	0%	0	0%
--	0	0%	4	9.1%	0	0%	0	0%	0	0%
Total	44	100%	44	100%	44	100%	44	100%	44	100%

Table 49: Summary

Data collected in		Availability	Conformity to the definition	Used data	Geographical analyses	Trend analyses	Database
	Demographic and socio-economic data						
All regions	Mid year population estimate	+	++	++	++	++	Yes
	Number of live birth	++	++	++	++	++	Yes
	% of unemployed persons (15 to 64 years old)	++	+/-	++	++	++	Yes
	Maternal age distribution	++	--	++	++	++	Yes
One region	Percentage of the adult population that has completed upper secondary education	+/-	+/-	+	++	++	No
	Percentage of the adult population that has completed tertiary education	+/-	-	+	++	++	No
	Mortality data						
All regions	Perinatal deaths	++	++	++	++	++	Yes
	Stillbirths	++	+	++	++	++	Yes
	Age/sex breakdown of deaths by cause	+	++	++	++	++	Yes
	Life expectancy	+/-	++	++	++	++	No
	Morbidity data						
All regions	New AIDS cases	+/-	+	++	++	++	No
	New HIV cases	+/-	++	++	++	++	No
	Low birth weight	+	++	++	++	++	Yes
	Persons injured or killed in a car accident	+	++	++	++	++	Yes
One region	New tuberculosis cases	++	++	++	++	++	Yes
	New breast cancer cases	+	++	++	++	++	Yes
	Work accidents	+	++	++	++	++	
	Risk factors						
All regions	Distribution of BMI in the population	-	--	+	+/-	+/-	No
	% of regular daily smokers aged 15 years or more	-	--	+	+	+	No
	Prevention data						
	Percentage of children vaccinated against						
	Diphtheria	+	+	++	++	++	Yes
	Tetanus	+/-	+	+	++	++	No
	Pertussis	+/-	+	++	++	++	No
	Poliomyelitis	+/-	+	+	++	++	No
	Measles	+	+/-	++	++	++	Yes
	Hib	+/-	+/-	++	++	++	No
	Mumps	+	+/-	++	++	++	Yes
	Rubella	+	+/-	++	++	++	Yes
	Breast cancer screening coverage	-	--	++	++	++	No

	Health professionals						
All regions	Physicians	++	+	++	++	+	Yes
	Nurses (including midwives)	+	++	+	+	+/-	Yes
	Nurses (excluding midwives)	+	+/-	++	+	+	No
	Midwives	+	+	++	++	+	Yes
	General practitioner utilisation	+/-	-	++	++	++	No
One region	General practitioners	++	+	++	++	++	Yes
	Dentists	++	++	++	++	++	Yes
	Pharmacists	+	++	++	++	++	Yes
	Health services						
All regions	Acute care beds	+	+	++	++	++	Yes
	Hospital beds	++	+	++	++	++	Yes
	Psychiatric hospital beds	++	+/-	++	++	++	Yes
	Hospital discharges	++	++	++	++	++	Yes
One region	Gynaecology, obstetrics or maternity beds	++	+	++	++	++	Yes
	Bed days, acute care/ year	++	++	++	++	++	Yes
	Gynaecology bed days	++	++	++	++	++	Yes
	Gynaecology hospital in-patients discharges	++	++	++	++	++	Yes

In total, of the 43 data studied, 39 (i.e. three quarters) can now be integrated into a database concerning the health regions of Europe.

In order to highlight the countries for which data gathering was more difficult, a score was attributed to each datum in the following manner:

- 1 if the indicator was available in all regions
- 0.5 if it was only available in some regions
- 0 if it wan not available
- These scores do not take into account the year for which the data were available

Then, as a function of the number of indicators studied by theme, a gathering criterion was attributed as follows:

Number of indicators	2	4	5
++	2	4	4,5-5
+	1,5	3	3,5-4
+/-	1	2	2,5-3
-	0,5	1	1,5-2
--	0	0	0-1

The scores obtained do not reflect the real availability of the data, but the availability of the data for the ISARE project. Thus, for certain countries the availability of data is relatively good, but the scores obtained are poor because of a difficulty in gathering the data within the framework of this project.

Table 50: Data availability by country

	Health professionals	Health services	Demographic data	Mortality data	Morbidity data	Risk factors
AT - AUSTRIA	+	++	++	++	+	++
BE - BELGIUM	+	+/-	+	+	+/-	+
CZ - CZECH REPUBLIC	++	++	+	+	-	--
DE - GERMANY	++	++	++	++	++	++
ES - SPAIN	-	+	+/-	+/-	+/-	+/-
EE - ESTONIA	++	++	++	+	++	++
FI - FINLAND	+	-	--	+/-	--	--
FR - FRANCE	++	+	++	++	++	+/-
GR - GREECE	+	++	+	+	-	--
HU - HUNGARY	++	+	++	++	++	++
IE - IRELAND	+	++	++	+	+	++
IT - ITALY	--	--	--	--	--	--
LU - LUXEMBOURG	++	++	++	++	+	++
LV - LATVIA	++	++	++	++	++	++
MT - MALTA	++	++	++	++	++	++
NL - NETHERLANDS	-	+/-	++	+/-	-	++
PL - POLAND	+	--	+/-	+/-	+	--
PT - PORTUGAL	++	++	++	+	++	+/-
SE - SWEDEN	+/-	++	++	++	++	++
SI - SLOVENIA	+/-	++	++	++	+/-	--
SK - SLOVAKIA	++	++	+/-	+/-	+	--
UK - UNITED KINGDOM	+	++	++	++	+	++

This analysis shows that in 9 countries (Germany, Austria, Estonia, Hungary, Ireland, Latvia, Luxemburg, Malta and the UK), the indicators were broadly available for all the themes studied. For four of these countries, the level used corresponded to national level, which would account for easier data gathering.

In three countries the availability is good or very good for all categories of indicator save one. Thus, in France and Portugal, the indicators on risk factors are of only average availability. In Sweden, there are difficulties with health professionals as data on the numbers of midwives are not available.

In Spain, the gathering of data within the framework of the project is lower than the actual availability. In effect, the data are broadly available in Spain, but they are gathered at local level, and could not be adjusted to correspond to the health regions, even though these regions exist.

In Greece, it was broadly possible to gather data on demography, health care services and health professionals, but data on morbidity and risk factors were not collected.

In the Netherlands, the geographic boundaries used were changed between the second and third phases of the project. Thus data had to be collected again for all indicators. It was limited to just those indicators which were requested for all regions. Data on demography and risk factors are broadly available, but data on health professionals and on morbidity are less so.

In Belgium, data were broadly available for the French-speaking parts of the country at the end of the first data gathering. For most of the indicators it had been possible to gather data for the Walloon regions and for Brussels. The low data gathering score reflects that during the second collection, data were only gathered in the Province of Hainaut, and consequently the data were judged to be only poorly available by the score attributed.

In Slovakia, data on health professionals, health care services and morbidity are broadly available. However, data on demography (population estimates) and mortality are only available at national level. No data could be gathered on risk factors.

In Slovenia, data on health professionals are only poorly available as there are no data on the number of midwives. Data on risk factors could not be gathered. However, demographic data were broadly gathered at national level.

In the Czech Republic, data were broadly gathered for most themes. Only data on morbidity and risk factors could not broadly be gathered.

In Poland, no data on health care services or risk factors were gathered. Neither could demography data on estimation of population nor mortality data on number of deaths by cause be gathered.
Finland only collected data during the second phase of the project. Thus the scores for availability of data look quite poor, although the data are available but could not be gathered within the framework of this project.
In Italy, data gathering was only possible in one region. That is why the availability looks rather poor. However, the low score does not reflect the true availability of data, and data in Italy are available even though they were not collected within the framework of this project.

8. Improvement of the data base demonstration tool

Apart from the integration of new data and of new countries which have joined the ISARE project, new ways of using the indicators have been added, and the ISARE website has been improved.
The database can be interrogated in two ways. For the first method, the user selects a theme, and then an indicator within that theme. The user then obtains a table showing the value of that indicator for (at the user's choice) all ISARE health regions or a sub-group of regions.

The second method of interrogation gives a synthesis of the situation in a region for a group of indicators. To do this, the user first selects a country, then a region in that country, and finally a theme. The demonstrator then generates a table showing, for each indicator in that theme:

- the value for the region selected,
- the extreme values from the other regions of the selected country,
- the extreme values noted within all regions within the European Union,
- the ranking order of that region, within the country specified and within the European Union.

The second method of interrogation allows comparison of a region with the 20 regions which, by a criterion selected from a suggested list, are closest to it. When the criterion is selected, the comparison tool selects the 20 regions having values for that parameter closest to the region selected. In this case, in addition to the items listed above, the table shows, for each indicator within the selected theme, the extreme values within the 20 selected regions.

The database demonstration tool also allows the user to obtain graphical representation of the data in the form of histograms.

Whatever method of interrogation is used, the tables obtained can be exported as Excel or text files.

The database contains only raw data, from which the indicators are dynamically calculated at each interrogation. This certainly caused the development to be much longer, but rapidly enables great time savings in calculating the indicators and in integrating data obtained from new regions or new countries.

Because of the experimental nature of this demonstrator, access to the database is restricted and requires a password. However there is public access to the ISARE site at http://www.ISARE.org where information is available on the general progress of ISARE, and reports on the first two phases of the project can be down-loaded. This present report, for phase three, will also soon be available on the site.

9 Examples of analysis

Four examples of data analysis were undertaken to illustrate collected data utilization. The selected indicators (body mass index, immunization rate, infant mortality and general practitioner utilization) give information both on health systems and on the population health status. Moreover, they show the different situations met during data collections about availability and comparability.
For each selected indicator, several methods of presenting data were used in order to compare them. For each on them, advantages and inconvenient are studied.

9.1 Body Mass Index study

The body mass index is a 4 category indicator:

- Less than normal (<18.5)
- Normal (18.5-24.99)
- Overweight (25-29.99)
- Obesity (≥ 30)

For certain countries the 4 categories may differ slightly. In Malta the limits of the different categories are therefore as follows <20, 20-25, 25.01-30, >30.

Data on the body mass index distribution come from health interview survey or from health examination survey. Thus, differences between countries can come from the different methods of survey. Indeed, in interview survey, the proportion of people saying they are obese or overweight is generally smaller than in examination survey. Our work does not allow us to identify the different types of surveys. Therefore comparisons between regions of different countries must be done cautiously.

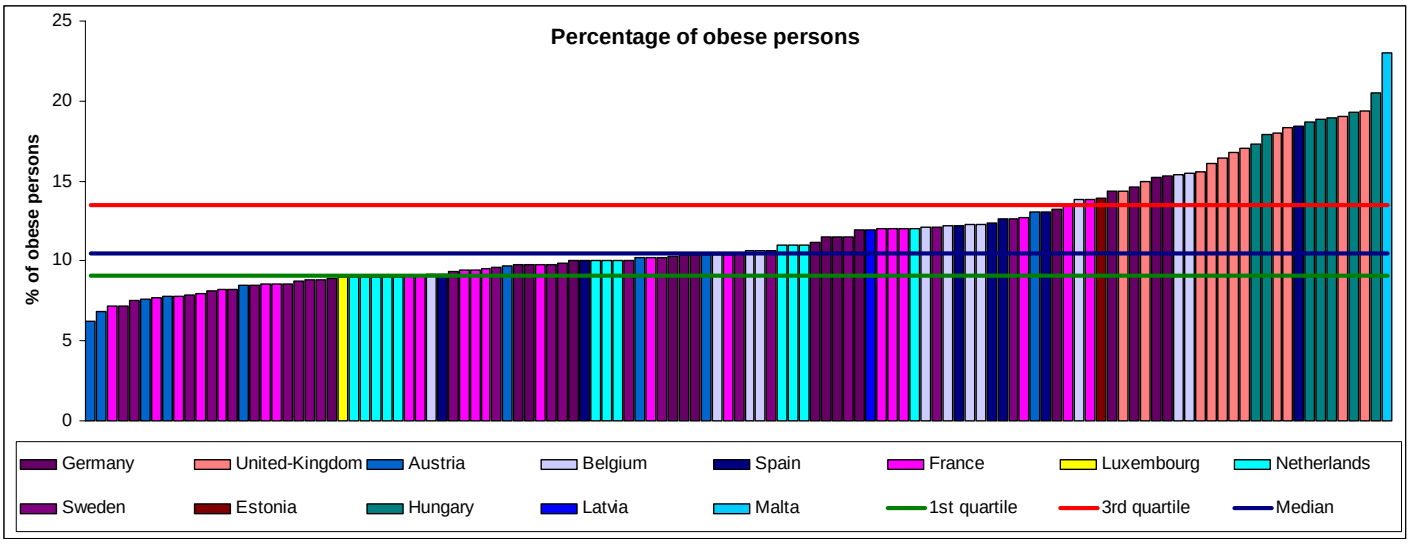
Several countries were unable to provide data relating to the distribution of the body mass index at a regional level. Table 1 summarises the different statistics for countries which provided data on the distribution of the body mass index.

Table 51: Summary of different statistics for the percentage of obese persons

Country	Number of responses	Minimum	Median	Maximum	Average	Standard deviation
AT - Austria	9/9	6.20	8.50	13.10	8.92	2.03
BE - Belgium	11/11	9.20	12.20	15.50	12.22	1.93
CZ - Czech Republic	0/14	-	-	-	-	-
DE - Germany	16/16	8.90	11.35	15.30	11.78	2.04
EE - Estonia	1/1	13.90	13.90	13.90	13.90	0.00
ES - Spain	7/17	9.20	12.40	18.40	12.56	2.74
FI - Finland	0/21	-	-	-	-	-
FR - France	21/22	7.20	9.40	13.80	9.95	1.93
GR - Greece	0/13	-	-	-	-	-
HU - Hungary	7/7	17.30	18.87	20.49	18.79	0.95
IE - Ireland	0/1	-	-	-	-	-
LU - Luxembourg	1/1	9.00	9.00	9.00	9.00	0.00
LV - Latvia	1/1	11.90	11.90	11.90	11.90	0.00
MT - Malta	1/1	23.00	23.00	23.00	23.00	0.00
NL - Netherlands	12/12	9.00	10.00	12.00	10.00	1.00
PL - Poland	0/16	-	-	-	-	-
PT - Portugal	0/5	-	-	-	-	-
SE - Sweden	21/21	7.20	9.30	12.60	9.45	1.42
SI - Slovenia	0/12	-	-	-	-	-
SK - Slovakia	0/4	-	-	-	-	-
UK - United- Kingdom	11/12	14.40	16.80	19.40	16.91	1.55
Europe	119/217	6.20	10.50	23.00	-	3.47

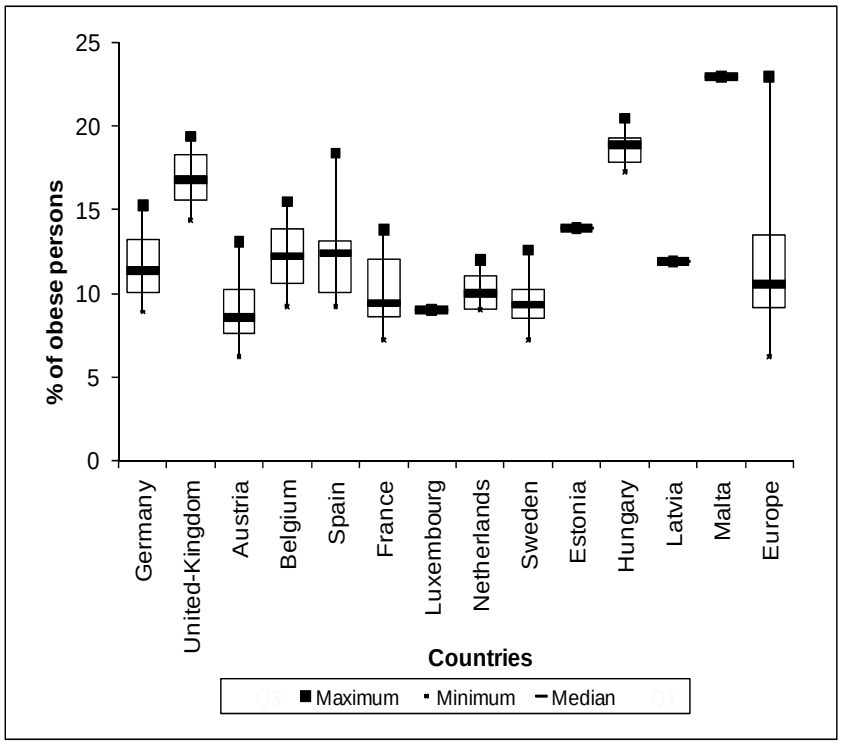
Advantages: This table contains a lot of information.
Disadvantages: It does not allow to have a visual representation. Thus, it is difficult to easily extract results from it.

Graph 3: Histogram of the percentage of obese persons in different regions of Europe



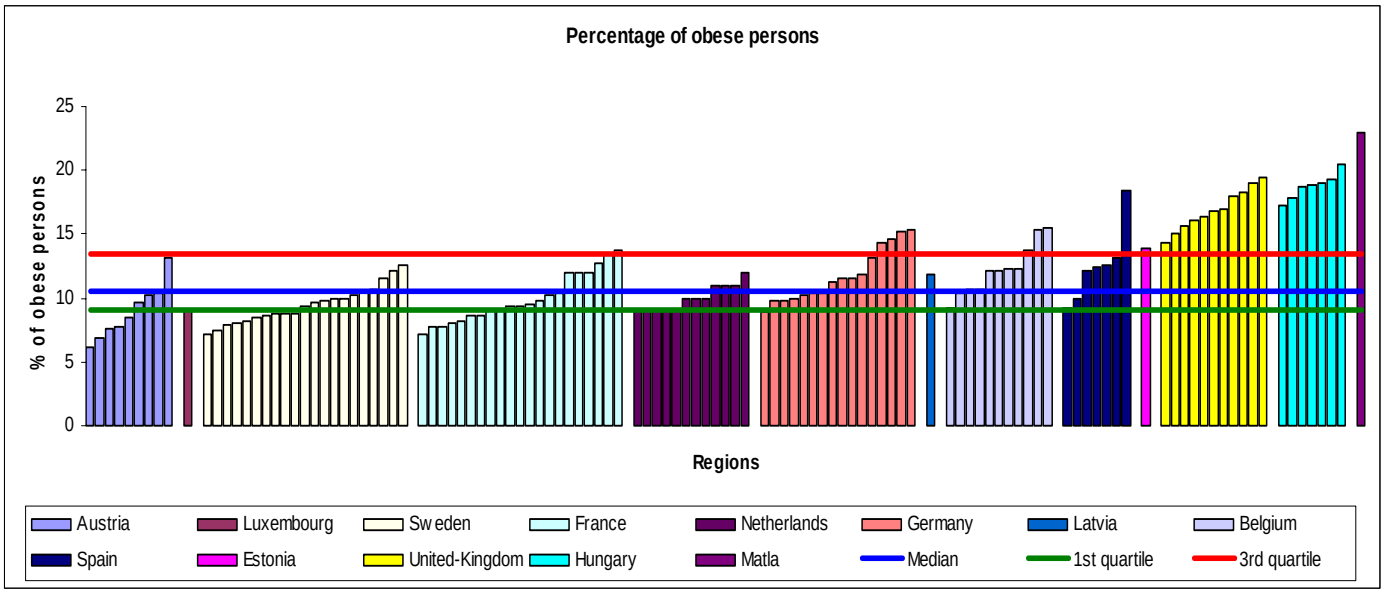
Advantages: This graphic gives visual representation of the number of regions whose percentage of obese persons is greater than the European median, first and third quartiles. It highlights the tendencies of each country
Disadvantages: With this kind of representation, it is impossible to identify the regions concerned. A dynamic graph would be interesting in order to be able to identify the names of regions. The graph needs to be printed in colour.

Graph 4: Box plot of the percentage of obese persons in the regions of different European countries



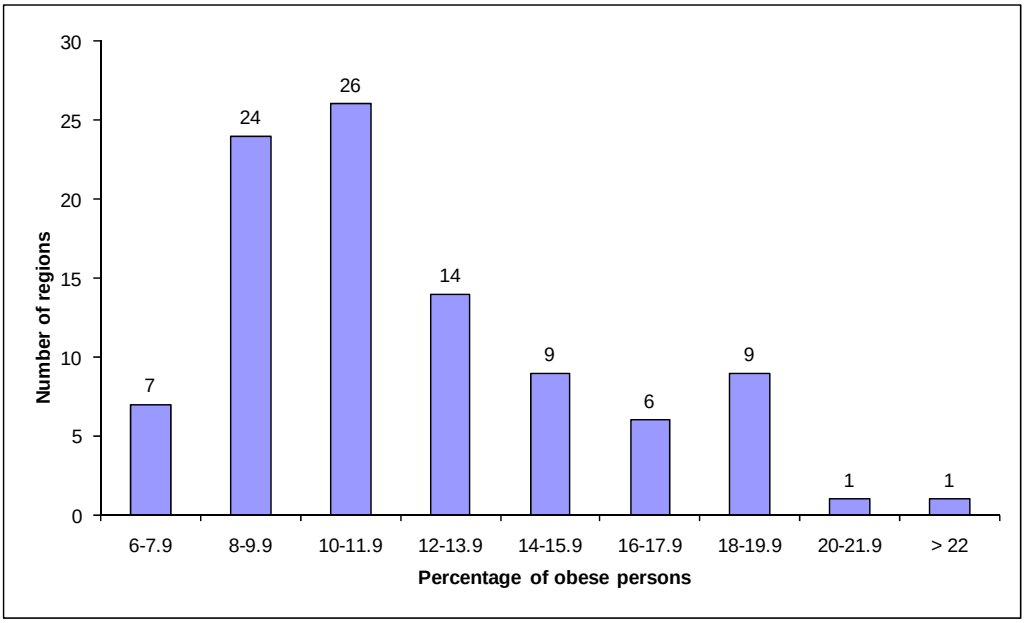
Advantages: This box plot visually presents the information in Table 1.
Disadvantages: This graphic does not present the results of all the country's regions, but only the range regions and quartiles. For some countries using the box plot is not justified because there is only one region.

Graph 5: Distribution of the number of obese persons per country (Countries are in increasing median order).



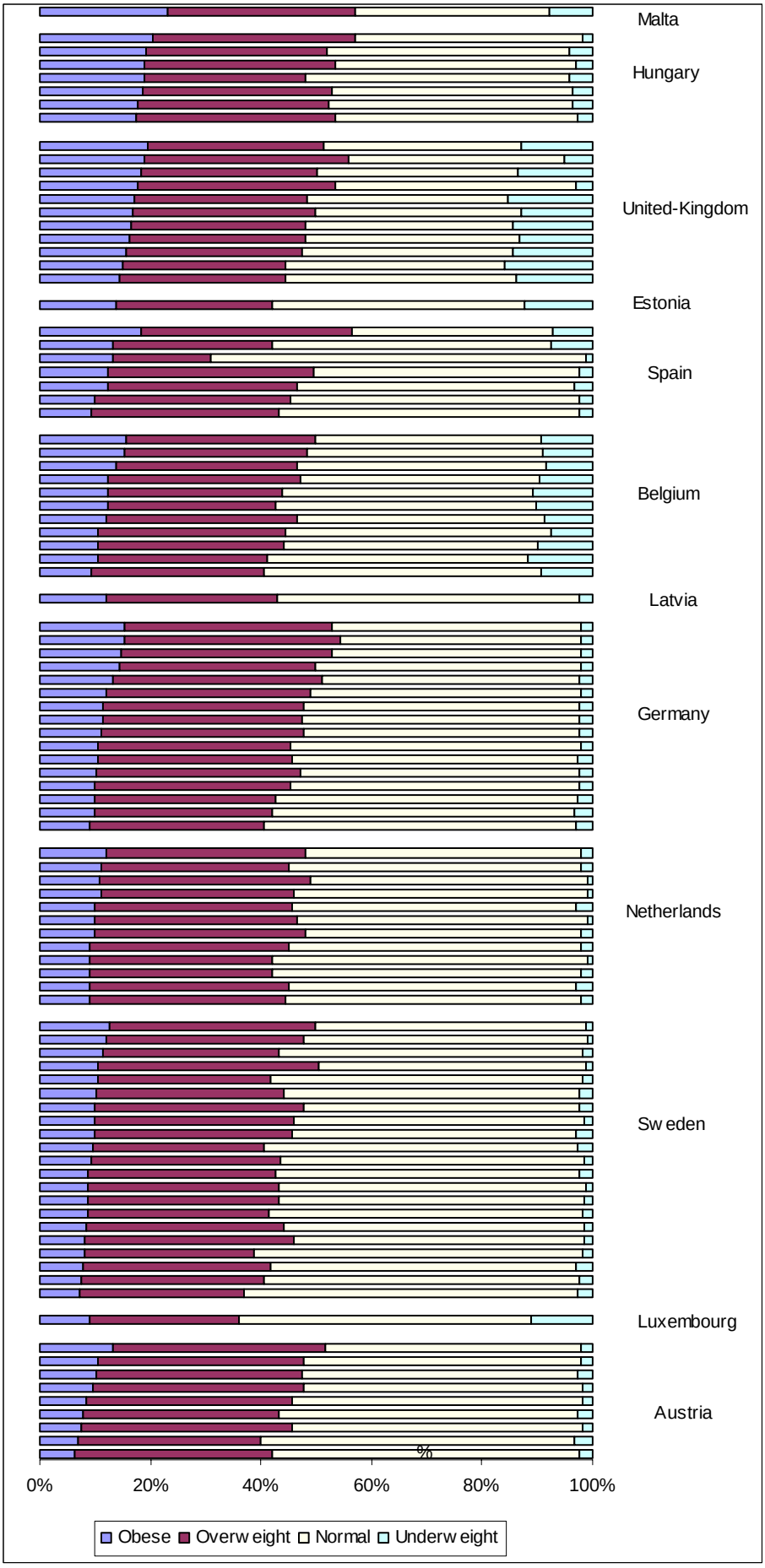
Advantages: This histogram shows the position of each country in addition to the situation of each of its regions.
Disadvantages: Comparisons between regions in different countries are not easy. Regions cannot be identified.

Graph 6: Distribution of the number of regions according to the percentage of obese persons



Advantages: This graphic provides an overview of the distribution of the percentage of obese persons by regions.
Disadvantages: It does not allow regions with the highest percentage of obese persons to be highlighted.

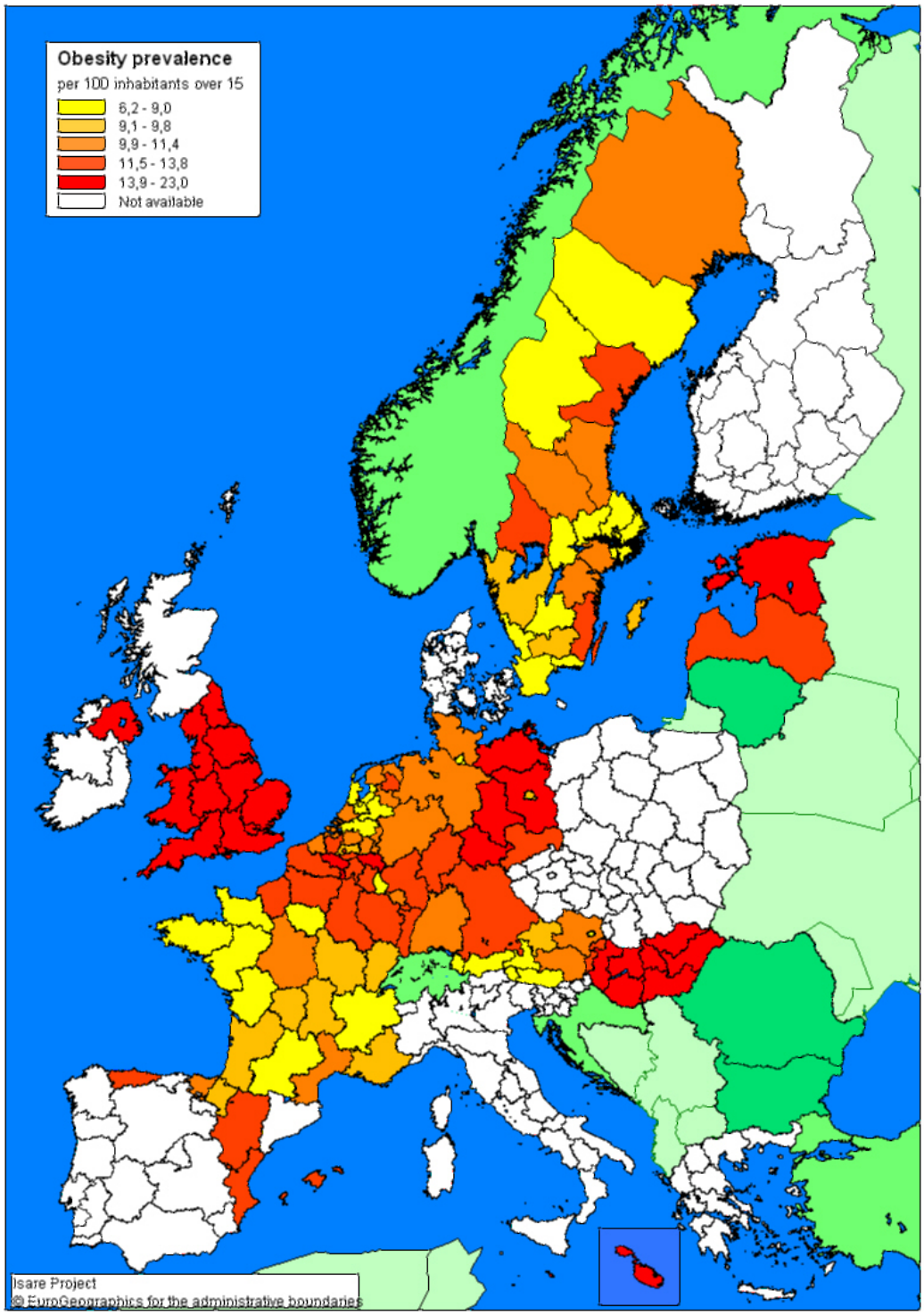
Graph 7: Stacked graph showing the distribution of the population according to the body mass index



Advantages: This graphic enables the 4 categories of the body mass index variable to be taken into account.

Disadvantages: Due to the large number of regions, the graph is illegible and regions cannot be identified.

Map 1: Obesity prevalence



Advantages: The map shows geographic disparities between regions. It allows identification regions where the percentage of obese persons is high.
Disadvantages: It does not show the value of a region, but only the class it belongs to. The map is sensitive to the selection of intervals.

Conclusion on the body mass index analysis.

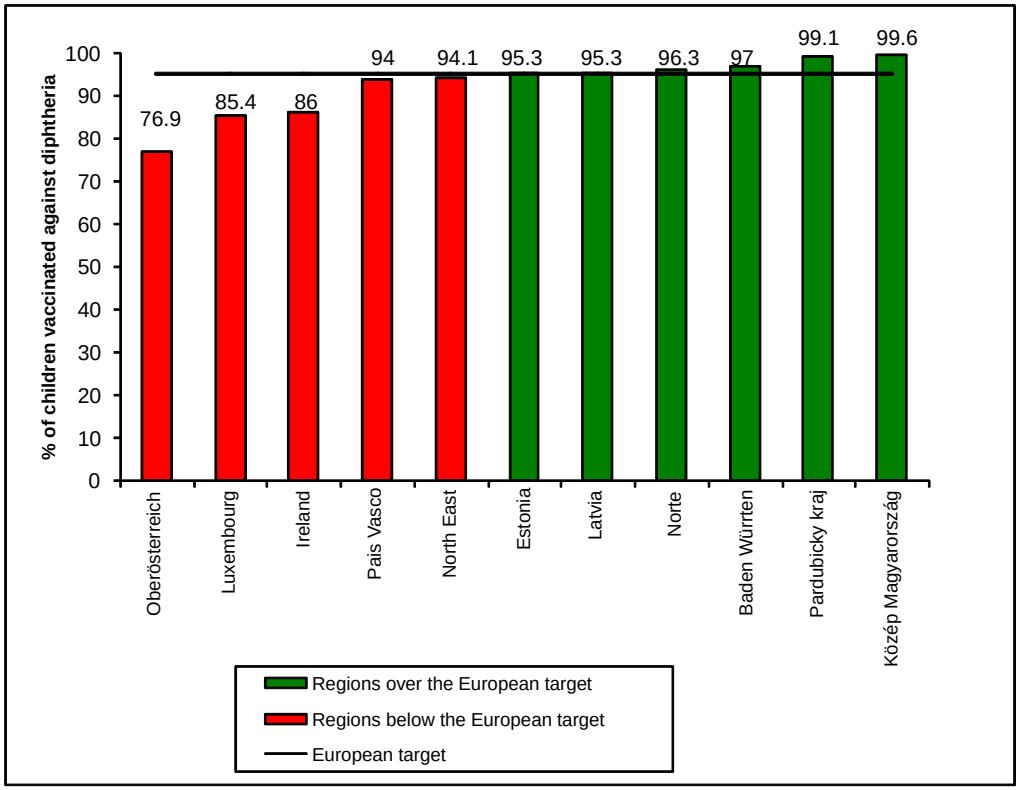
> The body mass index is a 4 category indicator, which is given in 119 regions. The information contained in this indicator is very important. It is important to remember that comparisons between different countries must be done cautiously because different methods of surveys have been used (interview or examination survey).

> The difficulty in analysing this indicator is finding a useful visual representation which enables inequalities between the regions to be highlighted. The use of maps enables the results for this indicator to be summarised.

9.2 Vaccination rate study

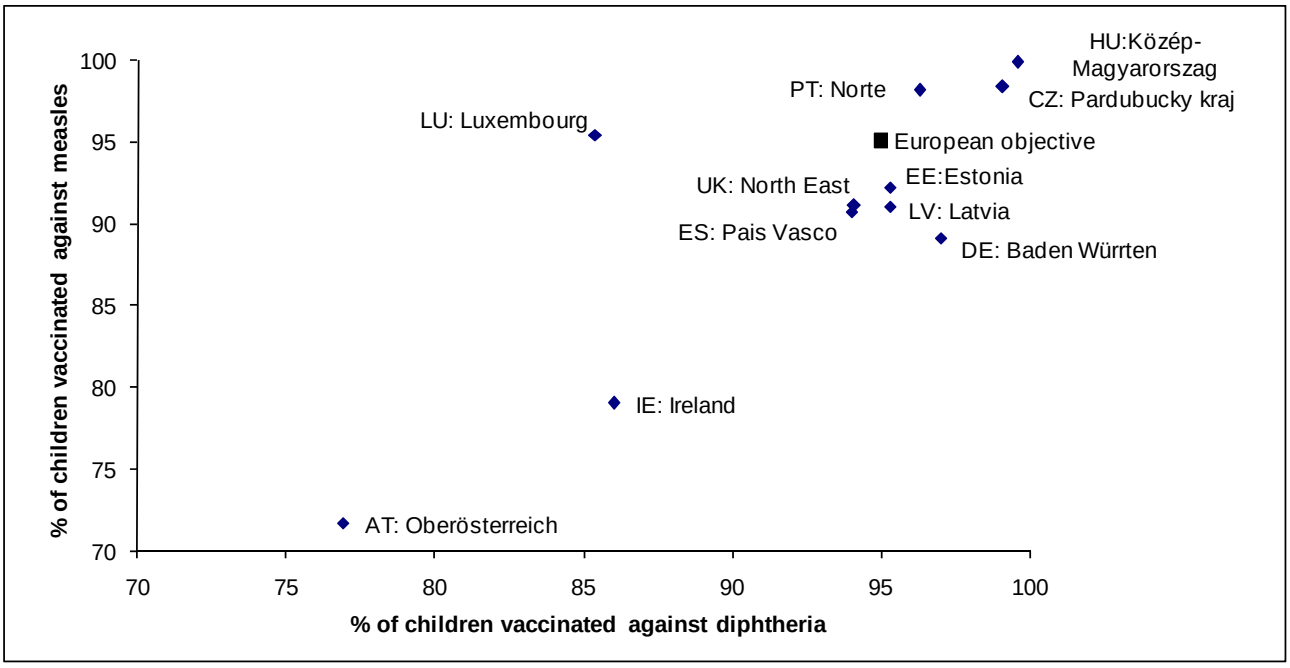
Indicators concerning the vaccination rate are part of a long list and are therefore only provided for at most one region per country. These regions were not strategically chosen and therefore are not necessarily representative of the whole country. The ISARE project examined 8 indicators relating to vaccination: vaccination against diphtheria, tetanus, whooping cough, polio, the measles, Hib disease, the mumps and rubella.
Several methods can be utilised in order to study the Vaccination rate: either focussing on the vaccination against an illness or comparing rates of vaccination for different illnesses. This analyse will present both methods.
This indicator is particularly heterogeneous between the regions because the data collection method varies from one country to another. Indeed, the age at which children are vaccinated varies from one country to another, as well as the methods used to calculate uptake rates. Thus, comparisons between different countries must be done cautiously.
This indicator reflects the uptake rate in the different countries and reflects the activities of health professionals involved in the immunisation programme.

Graph 8: Percentage of children vaccinated against diphtheria



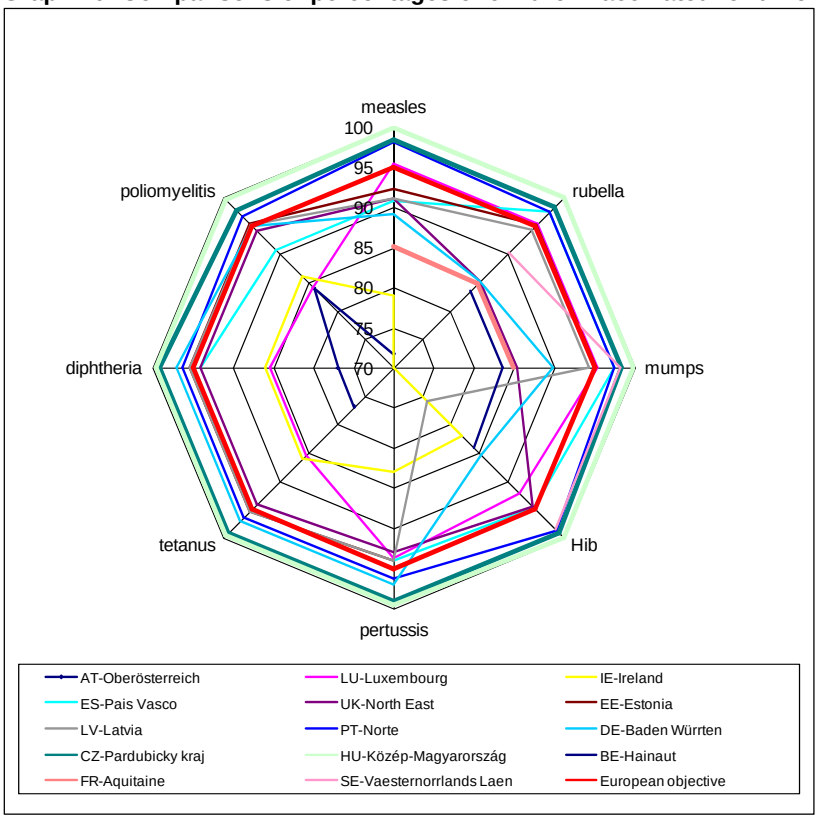
Advantages: This histogram highlights regions where the situation is better worse that the European average.
Disadvantages: Given the small number of regions, the information contained in such a graph is rather limited**.**

Graph 9: Scatter plot: Percentage of children vaccinated against measles compared to the percentage of children vaccinated against diphtheria



Advantages: This representation enables the vaccination rate to be compared for two diseases and shows that some regions (e.g. Közep-Magyarorzag) have higher rates of vaccination for two diseases studied.
Disadvantages: It does not enable comparisons between more than two types of vaccinations.

Graph 10: Comparisons of percentages of children vaccinated for different illnesses



Advantages: It enables differences between countries and types of vaccinations to be simultaneously compared. The order of vaccinations has been chosen so as to take into account "multiple" vaccinations.
Disadvantages: For countries which have not provided any information with regard to types of vaccination, there are "holes" in the graph.
Given the large number of countries, the graph is sometimes rather difficult to read.

Conclusion on the vaccination rate analysis.

> To analyse this indicator which is present only in a limited number of regions, we must choose either to look at the coverage of vaccinations for a single disease or the coverage of vaccinations for several diseases, and compare them.
>
> In the latter case, given the high number of indicators for rates of vaccination, we must select certain vaccinations to look at in greater detail in order to make the graphs easier to read.
> Apart from these comments, it should also be noted in the analysis of this indicator that comparisons between regions should be analysed with caution because the definition of indicators varies from one country to another since the age at which the percentage of children vaccinated is calculated varies from one country to another.

9.3 Infant mortality rate study

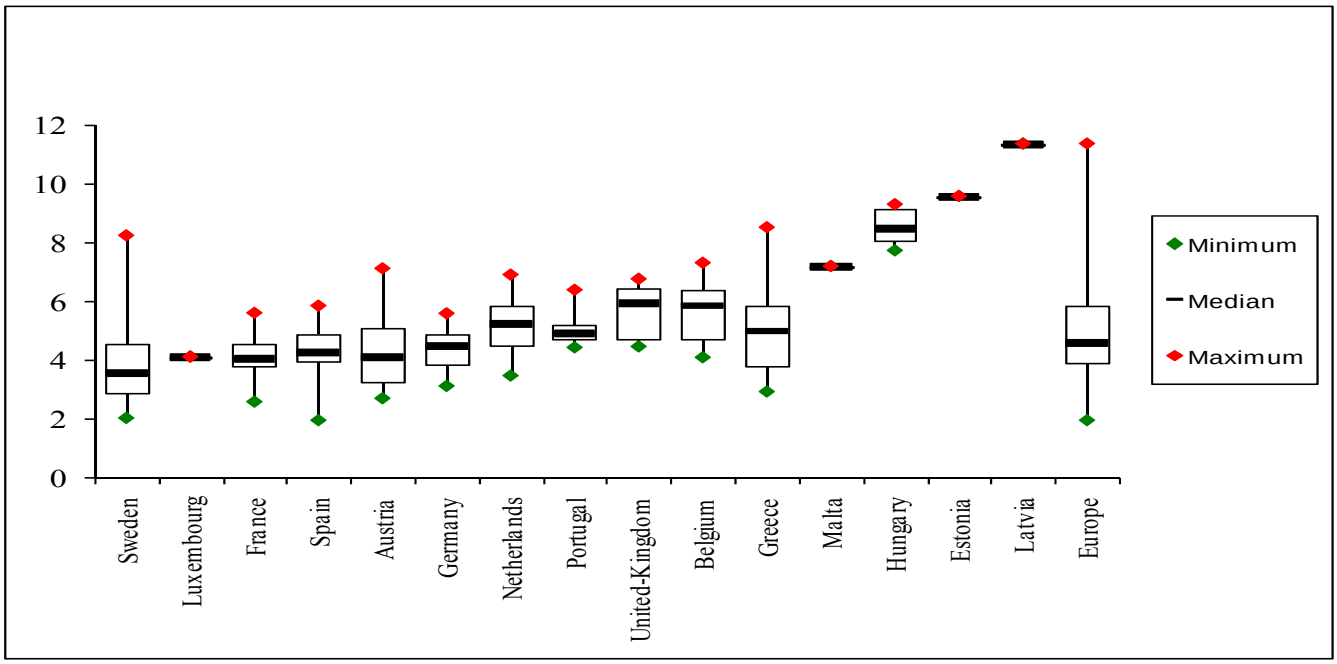
The infant mortality rate represents the number of deaths occurring in the 365 days of life for 1,000 live births.
The average of infant mortality over all the regions is 5.01 per 1,000 live births. In 82 regions (58 %), the level is below this value, and in 58 regions (42 %), it is higher. The extreme values concern a limited number of regions and nearly three quarter of the regions have levels of infant mortality between 2.9 and 5.9 per thousand live births.
Although the level of infant mortality for each country, recalculated from the data available, varies between 3.5 and 11.4, the extreme value observed vary from 0.9 to 11.4. What is more, the variability within each country is always greater than the variability found between countries.

Table 52: Summary of different statistics with regard to the Infant Mortality rate

Country	Number of regions	Average	Standard deviation	Minimum	Q1	Median	Q3	Maximum
AT - Austria	9/9	4.47	1.38	2.70	3.25	4.10	5.10	7.12
BE - Belgium	11/11	5.69	0.89	4.09	4.71	5.87	6.37	7.31
CZ - Czech Republic	0/14	-	-	-	-	-	-	-
EE - Estonia	1/1	9.58	-	9.58	9.58	9.58	9.58	9.58
FI - Finland	0/21	-	-	-	-	-	-	-
FR - France	22/22	4.12	0.70	2.58	3.80	4.05	4.53	5.61
DE - Germany	16/16	4.41	0.67	3.12	3.85	4.49	4.84	5.59
GR - Greece	12/13	5.30	1.68	2.93	3.77	5.01	5.86	8.52
HU - Hungary	7/7	8.54	0.54	7.72	8.07	8.49	9.10	9.30
IE - Ireland	0/1	-	-	-	-	-	-	-
LV - Latvia	1/1	11.36	-	11.36	11.36	11.36	11.36	11.36
LU - Luxemburg	1/1	4.12	-	4.12	4.12	4.12	4.12	4.12
MT - Malta	1/1	7.20	-	7.20	7.20	7.20	7.20	7.20
NL - Netherlands	12/12	5.27	0.99	3.47	4.50	5.22	5.86	6.91
PL - Poland	0/16	-	-	-	-	-	-	-
PT - Portugal	5/5	5.13	0.68	4.43	4.72	4.92	5.20	6.39
SI - Slovenia	0/12	-	-	-	-	-	-	-
SK - Slovakia	0/4	-	-	-	-	-	-	-
ES - Spain	10/17	4.16	1.06	1.95	3.94	4.26	4.84	5.85
SE - Sweden	21/21	4.01	1.68	2.03	2.87	3.56	4.51	8.24
UK - United- Kingdom	11/12	5.61	0.80	4.46	4.68	5.96	6.45	6.77
Europe	140/217	5.01	1.67	1.95	3.88	4.61	5.85	11.36

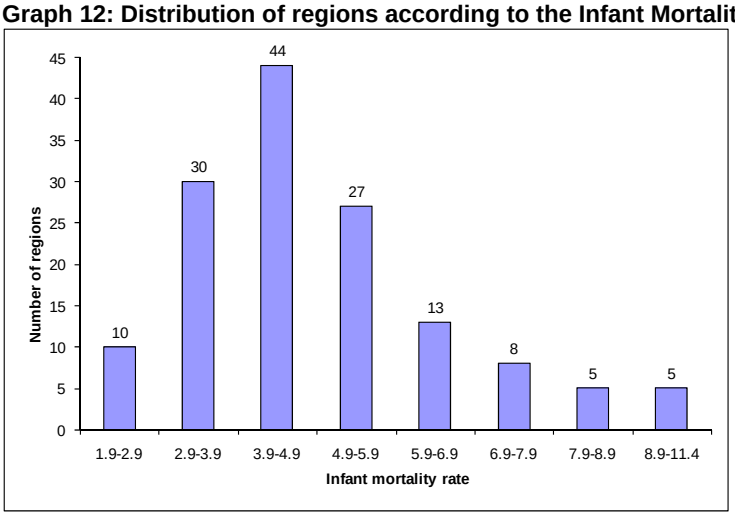
Advantages: This table contains a lot of information (minimum, median, maximum, mean).
Disadvantages: It does not allow to have a visual representation. Thus, it is difficult to easily extract results from it.

Graph 11: Box plot of the Infant Mortality rate



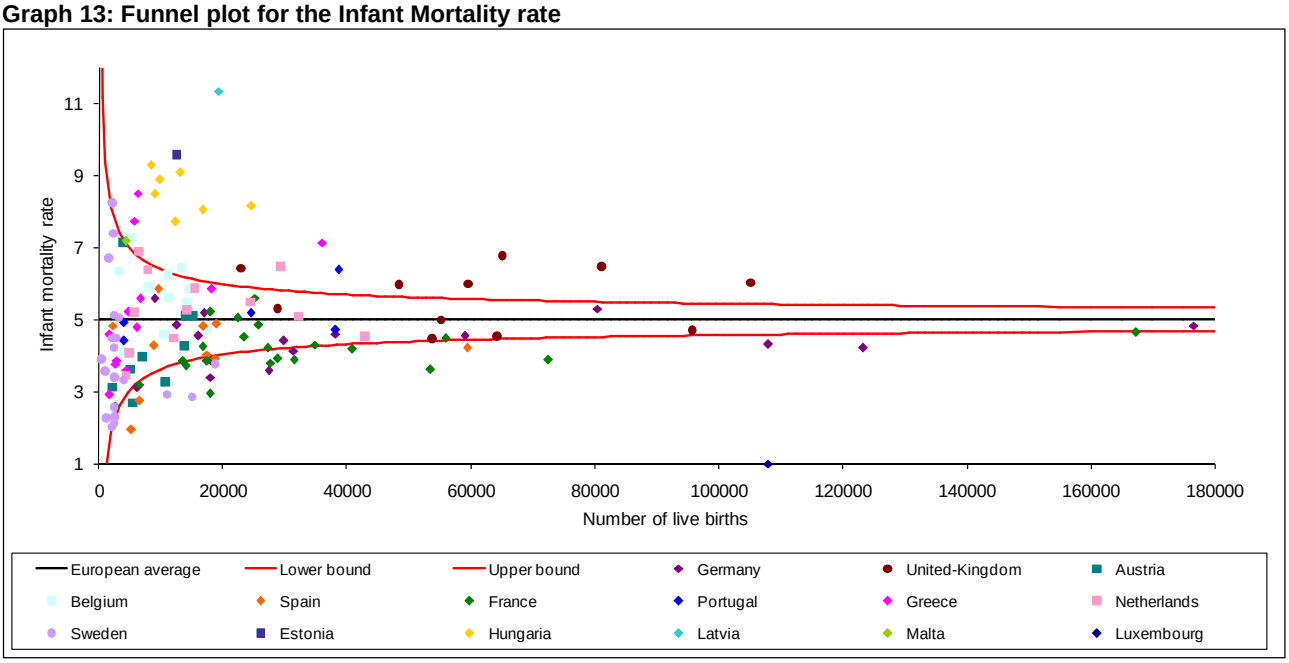
Advantages: This representation provides relatively complete information on the indicator's distribution in the different regions of Europe and enables the specificities of each country to be studied.
Disadvantages: This graph is not very relevant for countries with only a small number of regions.
Proposal: It is important to state the number of regions present for a whisker plot in order to show that in the case of some countries not all the regions are present.

Graph 12: Distribution of regions according to the Infant Mortality rate



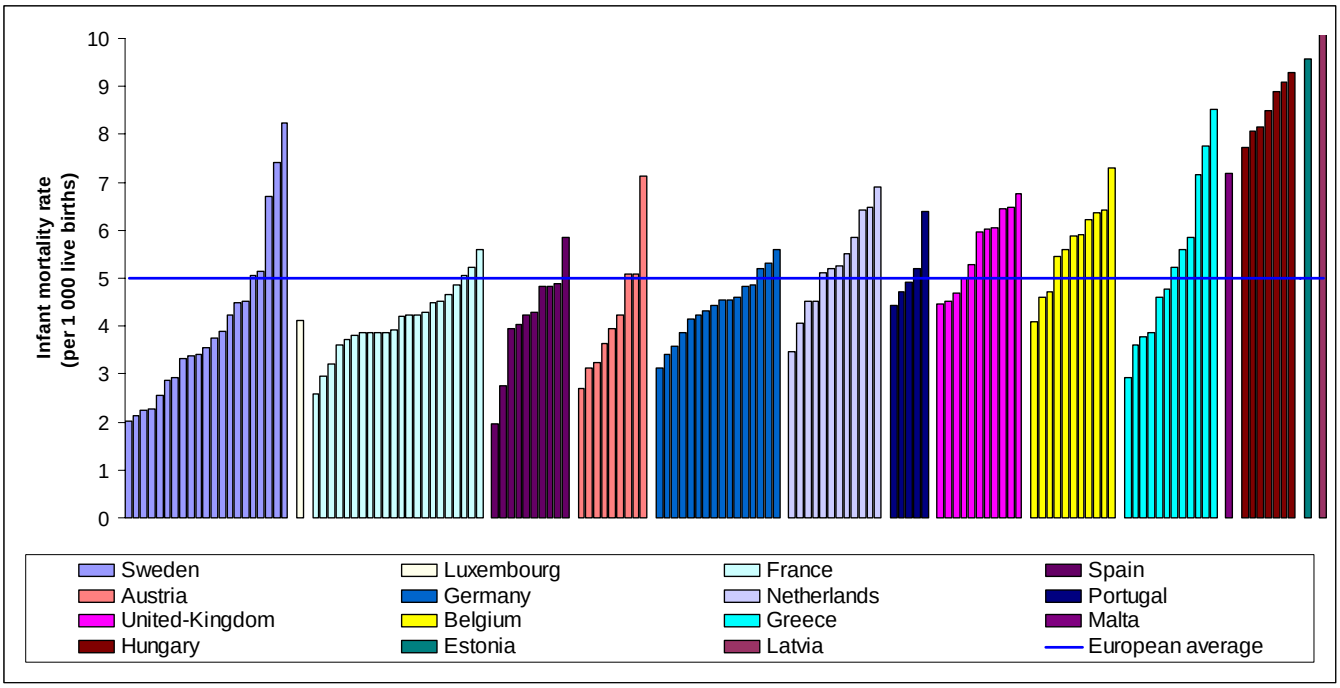
Advantages: This histogram provides an overview of the distribution of the Infant Mortality rate in the regions of Europe.
Disadvantages: It does not identify the regions.

Graph 13: Funnel plot for the Infant Mortality rate



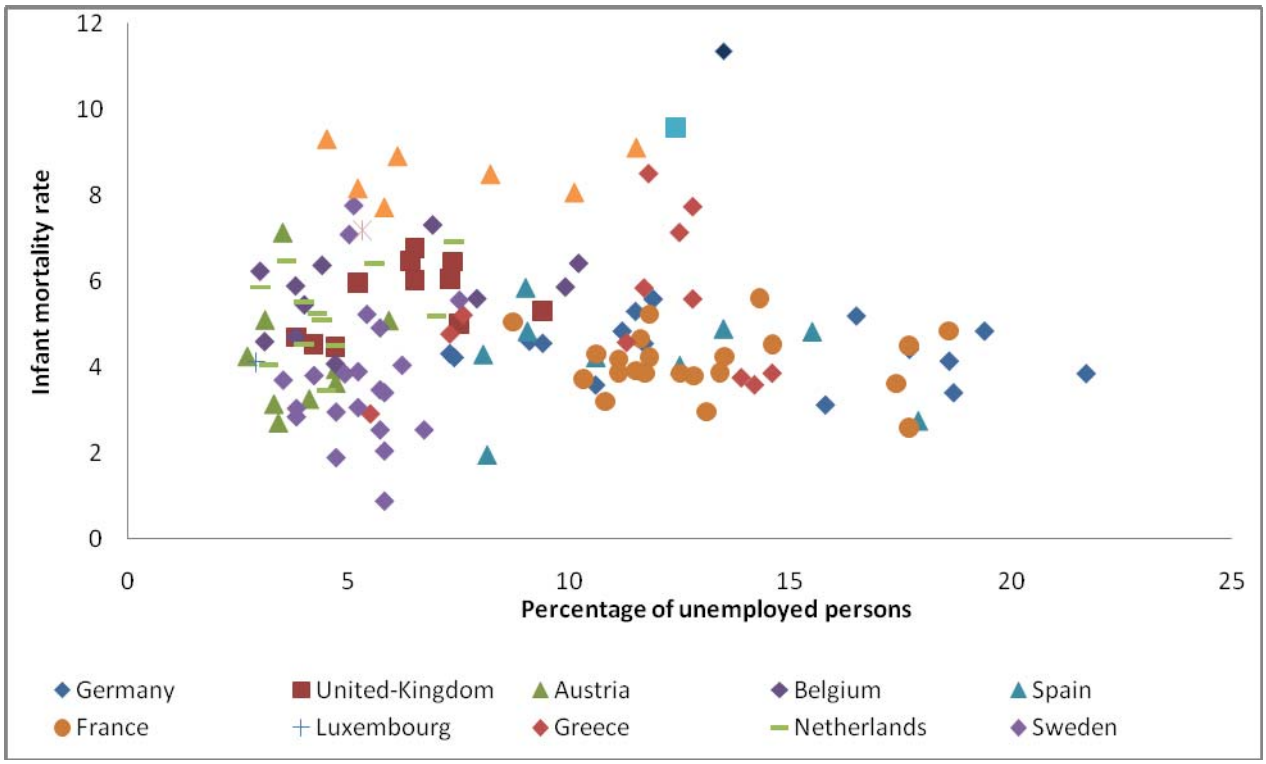
Advantages: The graph shows the distribution of regions compared to the European average. It highlights the fact that some regions do not have an interval of confidence and therefore have a significantly higher rate of mortality (or lower than the European average).
Disadvantages: The regions cannot be identified.

Graph 14: Infant Mortality rate by increasing national averages



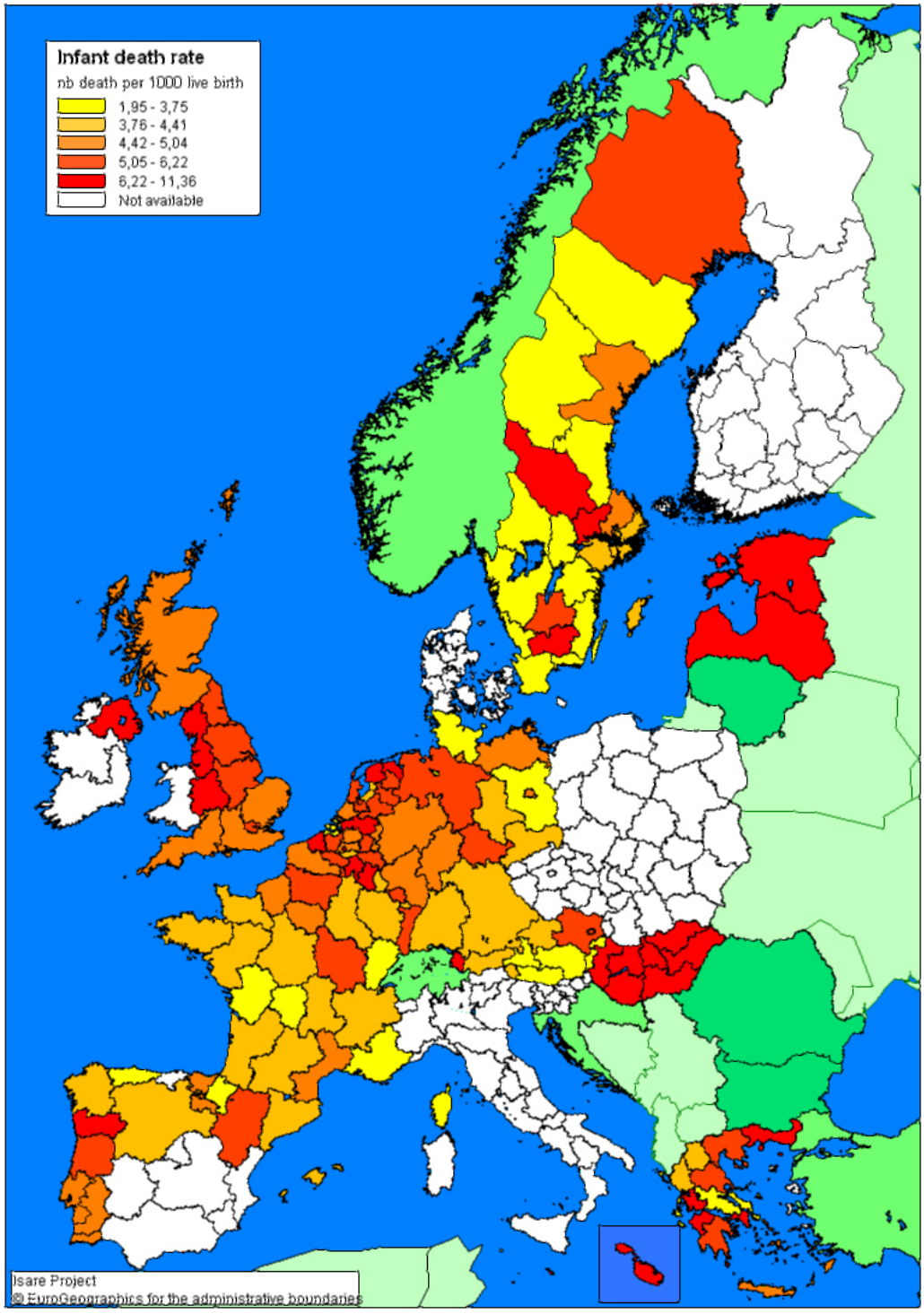
Advantages: This histogram summarises both regional and national information.
Disadvantages: It requires the use of colours. These graphs are not recommended when printing in black and white.

Graph 15: Study of the infant mortality rate depending on the percentage of unemployed persons



Advantages: This graph allows us to study the relationship between the socio economic indicator (here unemployment) and the infant mortality rate.
Disadvantages: This graph does not measure correlation between the infant mortality rate and unemployment. However, the graph shows that unemployment and infant mortality rate are not correlated.

Map 2: Infant mortality rate



Advantages: The map shows geographic disparities between regions. It allows identifying regions where the infant mortality rate is important.
Disadvantages: It does not show the value of a region, but only the class it belongs to.

Conclusion on infant mortality rate:

> Analysis on infant mortality rate highlights the regions where the infant mortality rate is important and where actions should be taken in priority. However, we should notice that our data date from 1999 and do not reflect the current situation. For example, countries of Eastern Europe (Latvia or Estonia) have known an important fall of their infant mortality rate since then.
>
> From a technical point of view, analysis of these data does pose some questions: the number of deaths per regions ranges between 1 to 855 and the number of live births from 515 to 176,579. In 58 regions (41.5 % of the cases) the annual number of live births is below 10,000. This questions the validity of a calculation based just on one year. It is no doubt necessary to work on 3-year –even 5-year- periods.

9.4 General practitioner utilisation

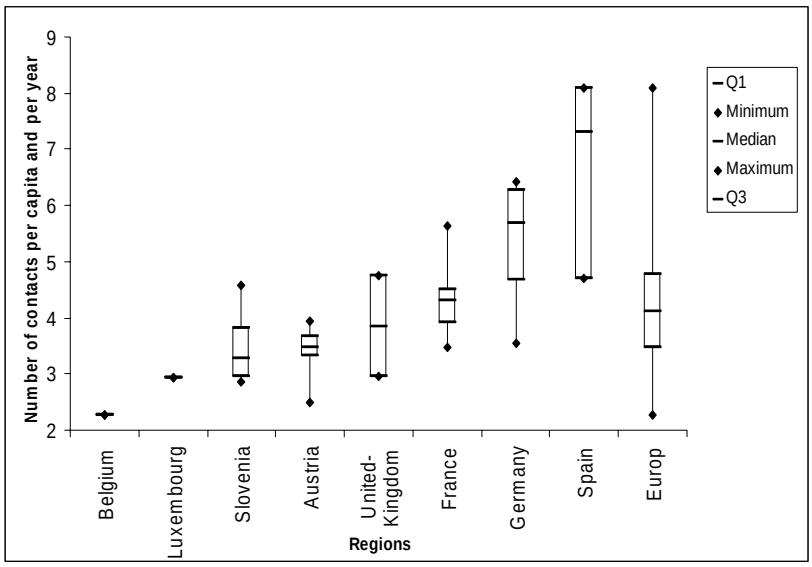
General practitioner utilisation corresponds to the frequency that patients go to their general practitioner. This indicator was only requested for the phase 3 of the ISARE project. This indicator is an indicator requested in all the regions of the countries involved in the study, but only a small number of countries were able to provide this information (8/21) and not necessarily in all regions. 67 regions provided this information.

Table 53: Summary of different statistics with regard to the use of general practitioners

Country	Number of regions	Average	Standard deviation	Minimum	Q1	Median	Q3	Maximum
AT - Austria	9/9	3.40	0.40	2.50	3.33	3.48	3.66	3.94
BE - Belgium	1/11	2.28	0.00	2.28	2.28	2.28	2.28	2.28
CZ - Czech Republic	0/14	-	-	-	-	-	-	-
DE - Germany	16/16	5.45	0.90	3.55	4.67	5.68	6.27	6.41
EE - Estonia	1/1	2.70	0.00	2.70	2.70	2.70	2.70	2.70
ES - Spain	3/17	6.70	1.45	4.70	4.70	7.30	8.10	8.10
FI - Finland	0/21	-	-	-	-	-	-	-
FR - France	22/22	4.27	0.48	3.48	3.93	4.30	4.52	5.64
GR - Greece	0/13	-	-	-	-	-	-	-
HU - Hungary	0/7	-	-	-	-	-	-	-
IE - Ireland	0/10	-	-	-	-	-	-	-
LU - Luxembourg	1/1	2.93	0.00	2.93	2.93	2.93	2.93	2.93
LV - Latvia	0/1	-	-	-	-	-	-	-
MT - Malta	0/1	-	-	-	-	-	-	-
NL - Netherlands	0/12	-	-	-	-	-	-	-
PL - Poland	0/16	-	-	-	-	-	-	-
PT - Portugal	0/5	-	-	-	-	-	-	-
SE - Sweden	0/21	-	-	-	-	-	-	-
SI - Slovenia	12/12	2.87	0.57	2.90	3.27	3.81	4.32	4.57
SK - Slovakia	0/4	-	-	-	-	-	-	-
UK - United- Kingdom	2/12	3.85	0.90	2.95	2.95	3.85	4.74	4.74
Europe	67/217	4.32	1.19	2.28	3.48	4.11	4.79	8.1

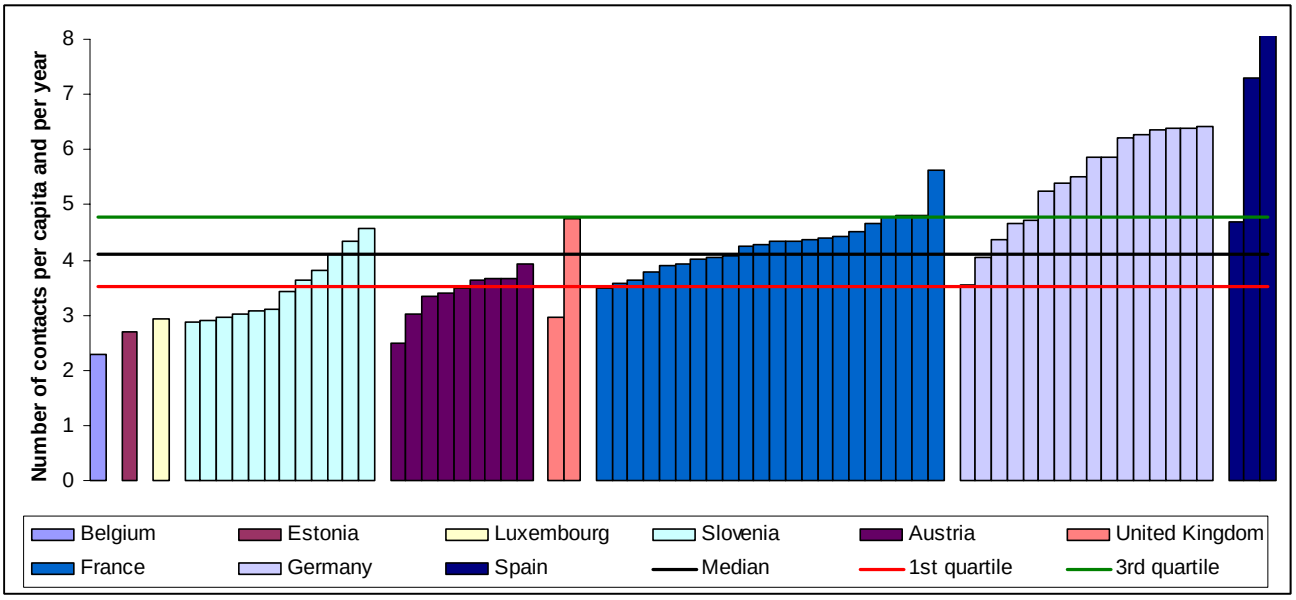
Advantages: This table objectively presents information relating to the use of general practitioners
Disadvantages: Given the small amount of information on this indicator, this table appears empty.

Graph 16: Box plot for the use of general practitioners



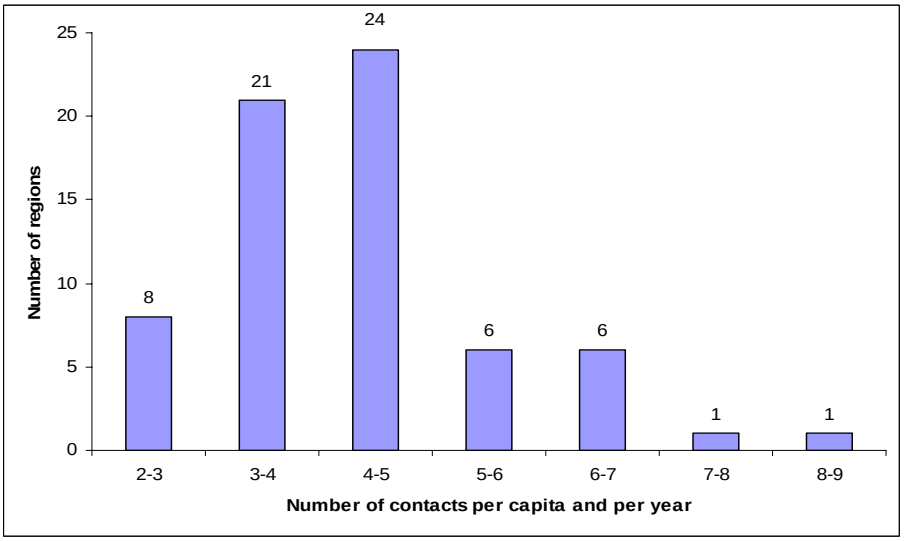
Advantages: This box plot provides relatively complete information on the indicator's distribution in the different regions of Europe and enables each country's specificities to be studied.
Disadvantages: This graph is not very relevant for countries with a small number of regions and for countries whose data for this indicator is not present in all regions because reading the graph may be misleading in this case (cf. the examples of Spain, the United Kingdom and Belgium).
Proposal: It is important to state the number of regions present for a whisker plot in order to show that in the case of some countries not all the regions are present.

Graph 17: Number of visits to general practitioners: distribution according to countries



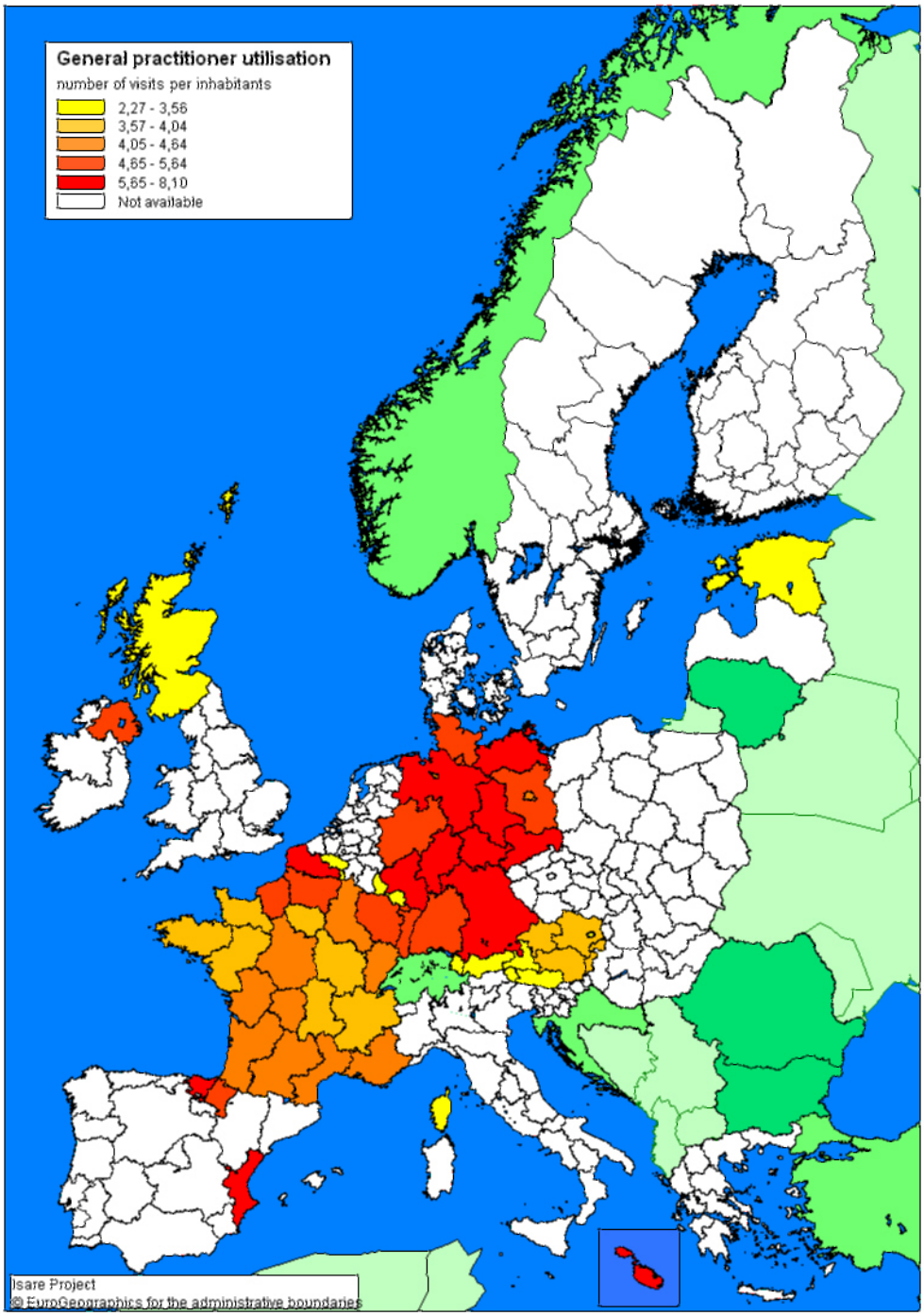
Advantages: This histogram summarises both information at regional and national level.
Disadvantages: It requires the use of colours. These graphs are not recommended when printing in black and white.

Graph 18: Distribution of the number of regions according to the frequency of visits to general practitioners



Advantages: This histogram provides an overview of the distribution of the frequency of visits to general practitioners in the regions of Europe.
Disadvantages: It does not enable the regions to be identified.

Map 3: General practitioner utilisation



Advantages: The map shows geographic disparities between regions. It allows identification of regions where the number of visits per inhabitants is low or high.
Disadvantages: It does not show the value of a region, but only the class it belongs to.

Conclusion

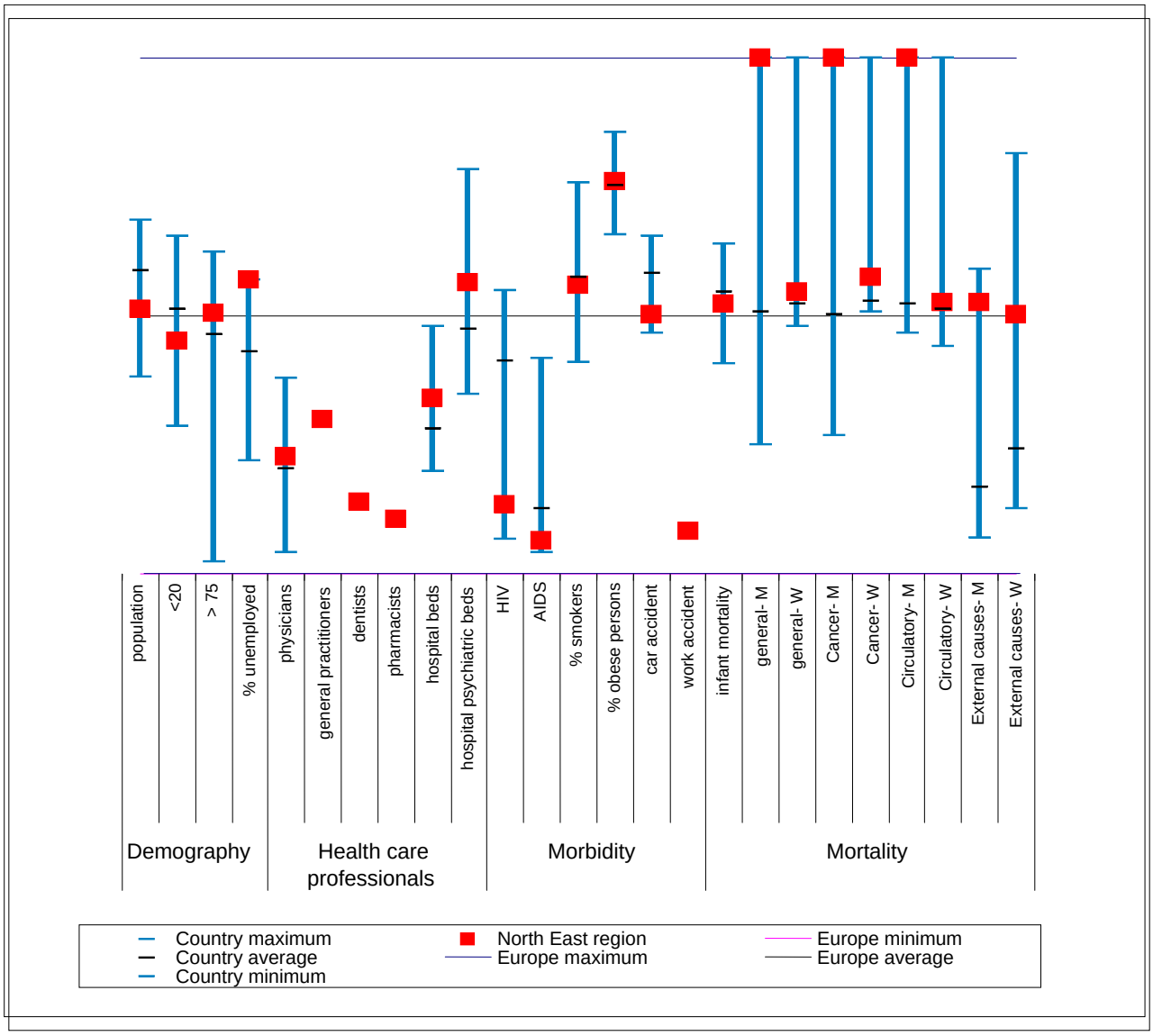
The difficulty of studying this indicator lies in the fact that although this indicator is requested for all the regions of a country, many regions were unable to provide data. It is therefore difficult to draw conclusions relating to this indicator.

Methods of representation usually used for this kind of indicators are not appropriate where many data are left.

9.5 Study of a region: The “North East” region

The ‘‘North East’’ region (United Kingdom) is studied in greater detail. This study will enable us to highlight the different means for comparing one European region with several others. This region was chosen because information relating to it was relatively complete. Furthermore, it was a region where the “long list of indicators” has been collected. Finally, this region has already been subject to initial analyses in the ISARE 2 project.

Graph 19: Study of certain health indicators for the North East region and European comparison



Advantages: It enables the situation of a region to be compared for different indicators. It presents both the situation of a region and the country to which it belongs and Europe.
Disadvantages: The scale for this graph is not linear. Thus, any comparisons of differences compared to the European average cannot be interpreted. Consequently, this graph can easily be misinterpreted.

Table 54: Demographic and social health indicators in the North East region, comparison with extreme values in the United Kingdom and Europe

		United- Kingdom					Europe			
		Value	Rank	Minimum	Maximum	Average	Rank	Minimum	Maximum	Average
Demography	Population	2580900	2/12	1679200	8077500	4950337	98/135	45660	17984452	2191662
	<20 years old	22.32	2/12	19.54	30.25	23.69	55/135	14.74	46.32	23.13
	> 75 years old	5.03	5/12	2.19	5.73	4.78	73/135	2.06	7.94	4.99
	% unemployed	9.40	12/12	3.80	9.40	6.50	105/172	1.00	21.70	7.40
Health care	Physicians	197.06	9/12	118.30	263.13	188.03	25/132	100.12	781.21	314.74
	Generalist practitioners	54.98					5/12	10.24	455.53	84.86
	Dentists	40.68					3/10	34.64	88.60	56.51
	Pharmacists	44.91					2/10	40.16	108.29	62.87
	Hospital beds	461.16	9/12	314.69	607.12	399.56	37/112	106.01	1260.49	629.22
	Psychiatric hospital beds	91.90	11/12	53.76	91.90	73.19	62/92	0	189.90	77.31
Morbidity	HIV	3.14	3/12	1.61	36.84	9.41	40/68	0.10	264.80	11.41
	Aids	0.66	6/12	0.42	4.30	1.30	32/88	0.00	177.55	5.15
	% smokers	26.90	6/12	23.40	31.00	27.20	60/108	13.00	36.00	25.65
	% obese	17.00	7/11	14.40	19.40	16.80	106/119	6.20	23.00	10.50
	Car accident	446.98	2/12	414.10	650.38	552.92	79/121	2.86	1110.73	443.05
	Work accident	260.72					4/9	47.00	6129.03	1325.99
Mortality	Infant mortality	5.29	5/11	4.45	6.79	5.59	97/140	1.95	11.36	5.01
	General- Men	3544.54	11/11	981.90	3544.54	1153.66	116/116	849.61	3544.54	1114.49
	General- Women	938.28	6/10	669.86	3466.13	813.72	99/114	333.23	3466.13	684.85
	Cancer- Men	1188.96	11/11	255.81	1188.96	304.78	102/102	202.24	1188.96	302.24
	Cancer- Women	274.14	6/10	183.61	839.85	210.31	99/105	118.36	839.85	173.08
	Circulatory- Men	1439.12	12/12	389.53	1439.12	458.81	104/104	59.63	1439.12	412.32
	Circulatory- Women	331.62	5/11	241.69	1437.73	304.67	79/105	17.58	1437.73	272.01
	External causes- Men	80.17	8/11	39.03	103.21	46.14	65/111	33.97	255.15	70.23
	External causes- Women	29.40	6/10	16.73	74.74	20.62	16/111	12.55	101.47	29.18

Comparison with the 20 closest regions in terms of population (total number of inhabitants)

In order to make comparisons between regions, 20 regions were selected. The selected regions were chosen so that the North East region was the median of the selected regions in terms of number of inhabitants. Comparisons were then made for different indicators in order to study the position of the North East region with regard to the selected regions.

Identification of the 20 closest regions

Regions	Countries	Number of inhabitants
Languedoc-Roussillon	France	2303044
Lorraine	France	2312110
Centro	Portugal	2320112
Noord Brabant	Netherlands	2337709
Latvia	Latvia	2431798
Centre	France	2444767
Thüringen	Germany	2455608
Castilla y Léon	Spain	2488059
Noord Holland	Netherlands	2503158
Midi-Pyrénées	France	2558784
North East	**United- Kingdom**	**2580900**
Brandenburg	Germany	2593809
Sachsen-Anhalt	Germany	2662700
Galicia	Spain	2730391
Schleswig-Holstein	Germany	2770668
Közép-Magyarország	Hungary	2850589
Wales	United-Kingdom	2900800
Bretagne	France	2911890
Aquitaine	France	2914923
Norte	Portugal	3132879
Pays de la Loire	France	3231187

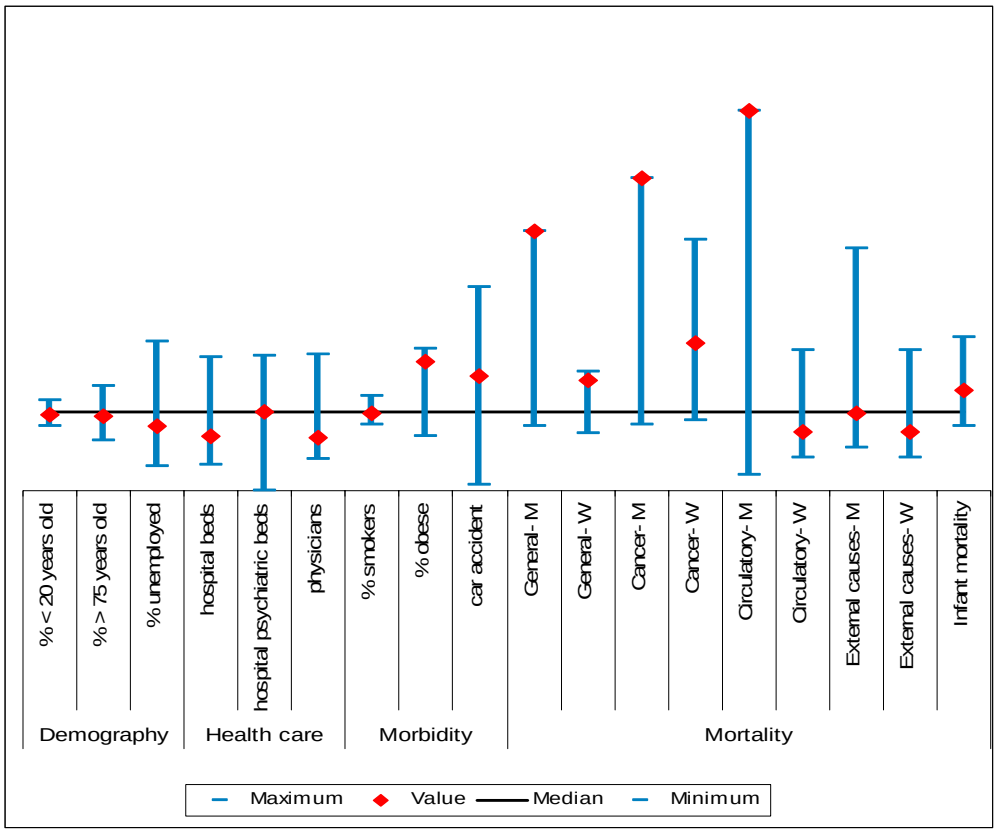
Table 55: Relative position of the North East region compared to regions which are close in terms of number of inhabitants

		North East		Minimum		Maximum		Median	
		Value	Rank	Region	Value	Region	Value	Region	Value
Demography	% < 20 years old	22.32	8/21	Castilla y Léon	18.75	Pays de la Loire	26.50	Centro	23.07
	% > 75 years old	5.03	9/21	Norte	3.34	Castilla y Léon	6.97	Sachsen-Anhalt	5.28
	% unemployed	9.40	7/20	Noord Brabant	3.60	Sachsen-Anhalt	21.70	Centre	11.50
Health care (per 100 000)	Hospital beds	461.16	6/21	Castilla y Léon	213.58	Bretagne	1129.30	Sachsen-Anhalt	667.18
	Physicians	197.06	2/20	Wales	118.30	Közép-Magyarország	507.86	Bretagne	296.13
Morbidity	% smokers	26.90	4/11	Thüringen	22.60	Latvia	32.60	Schleswig-Holstein	27.30
	% obeses	17.00	15/17	Pays de la Loire	7.20	Közép-Magyarország	18.71	Languedoc-Roussillon	10.40
	Car accident	446.98	14/21	Galicia	22.30	Centro	790.00	Centre	306.49
Mortality (rate per 100 000)	General- M	3544.54	17/17	Castilla y Léon	877.67	**North East**	3544.54	Lorraine	1082.52
	General- W	938.28	16/17	Castilla y Léon	486.82	Közép-Magyarország	1021.20	Schleswig-Holstein	675.84
	Cancer- M	1188.96	14/14	Centro	249.86	Aquitaine	301.11	**North East**	1188.96
	Cancer- W	274.14	15/16	Centro	129.54	Közép-Magyarország	467.74	Pays de la Loire	147.11
	Circulatory- M	1439.12	15/15	Latvia	59.63	Lorraine	299.26	**North East**	1439.12
	Circulatory- W	331.61	10/15	Latvia	17.57	Sachsen-Anhalt	409.80	Lorraine	201.7
	External causes- M	80.17	7/16	Norte	44.74	Latvia	251.87	Midi-Pyrénées	82.16
	External causes- W	29.40	6/16	Norte	16.77	Latvia	70.82	Midi-Pyrénées	39.84
	Infant mortality (per 1000 live births)	5.29	17/20	Brandeburg	3.40	Közép-Magyarország	8.16	Midi-Pyrénées	4.19

Advantages: This table is relatively complete.

Disadvantages: It is difficult to read due to the excessively amount of data.
Proposal: Summarise the information on a graph**.**

Graph 20: Position of the North East region compared to other close regions



Conclusions of the study of the “North East” region

The various proposed methods of presenting the data allow comparison of the North East with other regions of Europe. This approach is quite useful when studying inequalities, and establishing public health policies.
In addition this is possibility to get a quick overview for comparing closest regions (geographically or by size).
This study shows that in the North East region, mortality rate for men is higher than in the other regions, whilst socio-economic characteristics, morbidity and presence of health care seem no different from the other regions. Thus this study has highlighted excess mortality amongst men especially, by the following diseases: cancer and circulatory disorders.

10. Discussion

The results of ISARE 3, and of the whole ISARE project, were presented to members of the project at a meeting held in Prague on April 26th, 2007. This was followed by a conference open to all countries, where various experiences were discussed. The following items are an account of the various results of ISARE, and themes that came out during the discussions at the Prague meeting.

ISARE has enabled the establishment of an experimental European database relating to regional data in the health domain, using a network of experts and regional correspondents. Amongst other things, the project has enabled a "stock-take" of the organisations in a position to pass on health data, not only at national level but also by region, which has facilitated the development and enrichment of the official databases.
But the approach has also shown that the construction of a database can encounter various difficulties, linked as much to availability of data as to effective access to data already gathered, to their quality and to their comparability.

10.1 An experimental approach

First of all it must be remembered that the ISARE project is an experimental approach, and that its intention is not to produce an official database, but to test the feasibility of gathering health data at infra-national level in the European Union. When finished, this project should produce recommendations to facilitate the integration of health data into European databases.

Thus the database which has been created within the framework of the project suffers from several limitations. On the one hand, it only covers the group of regions in the Union, and on the other, as the approach has always been described as experimental the database created cannot be made available for unlimited access. No official approach has been made to the authorities in each country requesting the transmission of data with a view to their integration into a database. Only data returned by correspondents of the ISARE project has been used, these correspondents working for the most part at an infra-regional level, not national. Finally, because of the experimental nature of the database, the approach did not include true procedures of validation and verification of data, an indispensable requirement if the data is to be used widely over the Internet.
In the course of the project, data gathering has been voluntarily limited to a restricted group of data so as not to overload the correspondents in each country. The selection took into account the list advocated by ECHI and the choice was made as a function of their availability and their value in assisting decision making in regional public health policies.
The choice was made not to develop definitions specific to ISARE, but to use those selected by Eurostat, WHO Europe for its "Health for all" database, by the OCDE the BIT[10] and of course ECHI.

The choices of the data, the definitions, and the indicators calculated from the data, even if validated by members of the steering group, are not definitive. They will probably evolve as a function of the conclusions and the advances made by other projects in the programme of community action in the field of public health. (2003-2008).

10.2 Limitations

In certain countries the task of the correspondents was complicated by the administrative/political administration. This was particularly true in Spain, where there is a high level of decentralisation. The

[10] *BIT : Bureau international du travail*

correspondent chose only to call on regional organisations to assemble data, even though there are national databases. This choice was motivated by the alleged superior quality of the regional data. Because of this he was not able to get responses from all regions. Belgium had similar difficulties, linked to the regional management of certain health data. Sweden also confronted a problem in data gathering. Because of the large number of governmental authorities, our correspondent had to use many contacts. Certain countries had to set aside a great deal of time to gather the data.

In some countries the collection of data had to be started from scratch between the different phases of Project ISARE because of the instability of geographic boundaries. Thus the Netherlands regions used in ISARE 2 (GGD) had to be changed as the boundaries were moved. In phase 3 of the project, NUTS 2 were used. In some countries, the system of organisation changed, which necessitated a new data collection.

In the small countries, especially Luxembourg, the correspondent underlined a problem linked to the population actually using their health facilities. The facilities are not used only by the resident population, which can result in distorted figures in calculating the indicators. Also, the small size of some countries (or regions) poses problems in calculating reliable rates, as the figures are so small.

Comparisons between regions of different sizes can also pose problems, as urban and rural regions are compared. Also the geographical situation of some countries can pose problems of comparability. In particular, our correspondent for Malta highlighted that the Maltese indicators should be compared cautiously with indicators from other regions, as Malta is an island.

Analysis of the quality of ISARE data rested partly on a question relative to the comparability of data between regions. It must be remembered that that only refers to regions of the same country. Thus, even if the countries judged that the regional data were very broadly comparable amongst their regions, that certainly does not indicate comparability between countries. Effectively, the definitions of the data could vary from one country to another. Also, when comparing data from regions of different countries, the effects of different organisation of medical practice in different countries can appear, and the data are more difficult to compare: the number of GPs in the Hainaut region of Belgium is not necessarily comparable to the number of GPs in the North East region of England.

One of the difficulties of the project was the gathering of data in all the European countries. If some countries were prompt in supplying the data requested, others were less so, which delayed analysis of the results. Conversely, some countries regretted the lack of feedback from the project leaders following the work they had done to send in the data. It must be noted that some countries did not supply data for the ISARE project. Thus the project which initially hoped to interest all the countries of the European Union only covers a limited number of countries. Also, comparability between the data rests equally on a problem of definition. Effectively there is a very large number of sources of definitions, which makes it more difficult to compare data.

The ISARE experiment shows that to construct a European database of regional health indicators it is necessary not only to call on institutions producing national statistics, but also to be able to rely on a network of regional structures. Reliance on local correspondents certainly complicates the data gathering, but appears indispensable. It gives access to data which are only available locally, and which national institutions do not routinely gather. Furthermore, and we will come back to this, by their position and by the fact that they are users of regional data they benefit from a special and precious expertise concerning the viability and the limitations in interpreting the data, which compliments the expertise of the national structures.

10.3 Lessons

The ISARE project has highlighted a number of lessons which have improved or will improve knowledge concerning the availability, quality and analysis of data at regional level. This project has not only benefited the participation countries, but has also led to the establishment of tools for developing analyses at regional level.

Integration of the regional dimension in European projects

Thanks to the ISARE project, it has been possible to integrate a regional dimension into new projects financed by the European Union programme for public health. Also, some of our correspondents have indicated that the work of collecting data in the framework of the ISARE project has been re-used for other projects.

Development of interest in the regional level within countries

ISARE has led to some countries showing interest in their regional data which had heretofore not been exploited. Some of our correspondents indicated that the project enabled them to gather data which they did not have available until now. Poland, for example, said that the project showed them that their method of data collection needed to be reviewed, and that they needed to have more data available at regional level.

Establishment of methods to identify pertinent infra-regional levels in the study of the state of health of populations

The ISARE project has developed a methodology enabling the identification of pertinent infra-regional levels for studying the state of health of populations. It is based on information relating both to the level of decision making for public health policies, and that of local democracy.

Use of NUTS in the domain of public health

The establishment of infra-regional levels for gathering health data has shown that in most countries the NUTS regions could be used. These regions, originally conceived for studying the economy of the European countries, are not necessarily pertinent for a study of state of health of populations. However, in most countries it has been possible to use these regions for the study. It must also be noted that the choice of the geographic regions used for our study has voluntarily limited the number of countries where NUTS was not the reference used. As far as possible, the NUTS level used is NUTS 2; however this choice does not work for all countries, for example the UK. That is why, in this project, different NUTS levels have been combined. This combination of NUTS levels was necessary for the health study, but in other sectors this approach is also used.

Advantages of the project for small countries

The ISARE project shows the usefulness of working at regional level. For small countries this approach is of particular interest as it permits them to compare themselves with regions of larger countries rather than with those countries at national level.

Feasibility of data gathering at regional level

Data collection at infra-national level was possible despite the heterogeneity which can exist between countries, and even between regions of the same country. Problems of validity and of comparability seem to be similar to those encountered when comparisons are made between different countries.

Highlighting the shortage of data gathering for certain indicators

Analysis of the availability of data has highlighted a serious shortage of data concerning some major themes in public health – despite the presumption that all ECHI shortlist indicators are readily available. Indicators particularly affected are those relating to vaccination, tobacco and obesity. Generally, those indicators correspond to data gathered through health interview or health examination survey which are not made in all the regions on a regular basis. Also availability could be one thing and data provision the other.

Advantages to the expertise of regional professionals

Collection and analysis of data at regional level necessitates exchanges between professionals at this level. These professionals have given their opinion on the usefulness and the limitations of using data at regional level. They also brought in elements specific to the situation in their country, which was very valuable for the analysis of data and comparisons between countries.

Value of collaboration between observatories of different countries

This project has shown the usefulness of collaboration between different health observatories (or their equivalents in the various countries) at regional and national level. Several participants have indicated what the project has brought to the partnership between countries, and have underlined the need to develop a network.

Importance of comparisons as a motive force for public health action and to improve data availability

The partners of the project have shown a high level of interest in comparing regions of their country to regions of other countries (neighbour regions or similar regions). It can be a real motive force for decision making. Furthermore, the highlighting by the project of the limitations of the data in inter regional comparisons is a motive for data providers in the regions to produce high quality data and harmonized data.

The need to continue to develop tools to gather and analyse data at regional level

The ISARE project shows the need to continue to develop tools for collecting, validating, analysing and disseminating data at regional level. Effectively the ISARE project has enabled the gathering of a large volume of data in 21 countries of the European Union. This work has enabled some countries to realise that their methods of data collection at regional level were insufficiently developed, and to take note of the need to develop tools to enable data gathering at this level.

Importance of the role of health professionals to promote the use of regional data

Health professionals at regional level must promote the use of regional data in their countries. In effect, the realisation of the importance of the regional level by the national authorities should also permit broader integration of the regional dimension in studies at European level.

The coordinator wishes to thanks all the members of the ISARE project steering group and the members of the country representatives group for their active participation throughout the project.

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