EUROCADET
towards less cancer in europe

SP23-CT-2005-006528

EUROCADET

Key determinants of the future incidence of cancer across Europe: impact of prevention

Instrument: Coordination action
Thematic priority: Integrating and strengthening the European Research Area

Final report
Work package 3

Date of preparation: October 2008

Start date of the project: April 1, 2005 Duration: 4 years

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Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)
Dissemination Level: CO Confidential, only for members of the consortium (including the Commission Services)

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1. Introduction

The unequal distribution of diseases among population groups has since long attracted the attention of epidemiologists. Large differences in disease risk have repeatedly been observed in relationship to socioeconomic indicators, such as educational level, occupational class and household income. With regards to cancer risk, a first comprehensive review of socioeconomic inequalities was published by IARC in 1997. More recently, there have been numerous studies on social inequalities in cancer mortality and survival, but fewer studies on social inequalities in cancer incidence. To date, no international overview has been prepared describing socioeconomic inequalities in cancer risk in different parts of Europe.

Socioeconomic factors are strong determinants of people's behaviour. Generally, unhealthy behaviours are more prevalent amongst the lower socio-economic groups. As a result, inequalities in cancer risk can probably to an important extent be attributed to inequalities in, among other factors, smoking, excessive alcohol use, and physical inactivity. However, until recently, European overviews of socioeconomic gradients in behavioural factors such as alcohol abuse and physical activity have been rare. Overviews in the areas of smoking and overweight are more common but excluded important parts of the European Union such as the eastern region.

This WP was devoted to preparing overviews of socio-economic inequalities in cancer risk and cancer risk factors in different European countries. Several databases were to be used to prepare estimates for as many European countries as possible. Together, these overviews had to provide the input data needed to construct scenarios for future cancer incidence within specific socio-economic groups.

2. WP objectives

1. To provide an overview of socio-economic differences in incidence and mortality of the main cancers in different parts of Europe
2. To provide an international overview of socio-economic differences in the prevalence of the major risk factors in different parts of Europe
3. To provide the input data and additional information needed to prepare scenarios for future cancer incidence within specific socio-economic groups.

3. General approach

We started with preparing an inventory of the recent literature on socio-economic inequalities in cancer and its main risk factors. Previous overviews covering literature up to the early 1990s were updated. From the literature review, we had to conclude that published data cannot be used as a basis for preparing international overviews, because the published estimates were too fragmentary and, in addition, not sufficiently comparable across countries.

In the next step, international data sets were re-analysed in order to prepare international overviews of socioeconomic inequalities in mortality or incidence, for several cancer types and for as many European countries as possible. Similarly, data from international and national interview surveys were obtained to prepare European overviews of inequalities in the prevalence of behavioural risk factors.

Much of the data were acquired through collaborations with other international projects. Data on cancer mortality and some of the risk factors were available from a large-scale international project on socio-economic inequalities in health (Eurothine), that was carried out between 2004 and 2008 with funds from EC–Sanco. Data on cancer incidence were available from the EPIC study, through our contacts with the EPIC team at Bilthoven, The Netherlands. Moreover, in-depth studies of socioeconomic inequalities in cancer incidence were prepared

on the basis of registry data for Finland (in collaboration with the Finnish Cancer Registry) and the city of Torino (in collaboration with Azienda Sanitaria Regionale, Turin, Italy).

To measure socioeconomic inequalities in cancer risk (factors), we used the three common indicators of socio-economic status (SES): educational level achieved, occupational class and household income. Educational data were used for analyses with an emphasis on persons with no formal education or with elementary education only. Occupational data were used to identify unskilled manual workers in services, industry or agriculture. Income data were used to identify the 'poor' according to European poverty lines.

Inequalities in cancer incidence between socio-economic groups were described using methods developed in health inequalities research. We first made detailed estimates of the incidence, mortality and prevalence rates by socio-economic group, according to sex and country or region. Each cancer type and risk factor were described separately. Next, the magnitude of inequalities was measured by rate ratios expressing the rate of those with low SES to the rate of those with high SES. More sophisticated inequality measures were used in the background papers that are listed at the end of this report.

For the scenarios we utilised the rate ratios for mortality, incidence and prevalence rates generated in the first parts of the work package. From these estimates, we derived "conversion factors" that could be used to prepare scenarios for specific socioeconomic groups. In section 6, we describe the derivation and application of these conversion factors, and we provide estimates for a number of cancer types and behavioural risk factors.

4. Objective 1: Overviews of socio-economic differences in incidence and mortality of the main cancers in different parts of Europe

Background documents

We refer to section 8, papers 1 to 8, for a series of background analyses that we prepared on socioeconomic differences in cancer incidence and mortality in different parts of Europe.

Overview of activities

Inequalities in cancer mortality were estimated for a large number of countries by using data from mortality follow-up studies to national population censuses during the 1990s, or by using data from cross-sectional studies based on the population censuses of around 2001. On the basis of these data, overviews were made of educational differences in cancer mortality with emphasis on the following topics:

1. educational differences in cancer mortality in Europe, comparing women to men (paper 1);
2. educational differences in cancers from the liver and the upper aero-digestive tract, with special focus on the role of alcohol (paper 2);
3. educational differences in cancer mortality in countries around the Baltic sea, with special focus on differences between eastern and Nordic countries (paper 3);
4. educational differences in breast cancer mortality in 11 European populations, with attention to the role of women's marital status (paper 4).

Additional estimates of inequalities in cancer incidence were made by using data from the EPIC study on cancer incidence in western European countries. Using these data, we prepared overviews of:

5. educational differences in lung cancer incidence in 9 European countries, with multivariate analyses to assess the contribution of smoking and diet (paper 5);

6. educational differences in breast cancer incidence in 9 European countries, with multivariate analyses to assess the contribution of women's parity and age at first pregnancy (paper 6).

Finally, in-depth studies of socioeconomic inequalities in cancer incidence were prepared on the basis of registry data for Finland and the city of Torino. In these registries, data from cancer registries were linked at the individual level to socioeconomic data from population censuses. Using these data, we studied:

7. the role of different socioeconomic indicators (both individual and ecological variables) as predictors of cancer incidence in Turin, Italy (paper 7);
8. time trends in the incidence of specific cancer types according to occupational class between 1971 and 1995 in Finland, with special focus on changes according to birth cohort (paper 8).

Key results

Table 1 summarises the results of the overview with regards to mortality. Inequalities are given in terms of Rate Ratios, as this is a measure that can directly be used for estimating input data to scenario studies (see section 5). The table shows that educational differences in cancer mortality are much more marked for some cancer types (especially cancer of the lung, upper aero-digestive tract (UADT), stomach, liver and cervix) than for most other cancer types. Marked differences between European regions are observed in a few cases. For example, educational differences in mortality from lung cancer and UADT cancers are much larger in the northern and central region than in southern region, with the eastern region being in-between.

Table 1. Socio-economic differences in the mortality of major cancers in different parts of Europe according to gender

Cancer types	Rate ratio (low education level vs. high educational level)							
	Region south		Region central		Region north		Region east	
	Male	Female	Male	Female	Male	Female	Male	Female
Lung	1,33	0,69	1,56	1,13	1,63	1,58	1,54	0,93
Upper aero-digestive tract	1,63	0,97	1,74	1,46	1,54	1,44	1,90	1,30
Stomach	1,78	1,50	1,62	1,81	1,46	1,34	1,30	1,26
Liver	1,40	1,26	1,32	1,22	1,26	1,28	0,99	1,17
Kidney and bladder	1,20	1,11	1,17	1,23	1,28	1,36	1,01	0,93
Pancreas	0,93	0,87	1,04	1,21	1,12	1,19	1,09	1,02
Colorectum	1,07	1,04	1,16	1,08	1,07	1,09	0,93	1,05
Leukemia and Hogkin	1,09	0,98	1,09	1,00	1,01	1,02	0,99	1,01
Prostate	1,01	-	1,06	-	0,99	-	1,04	-
Breast	-	0,84	-	1,00	-	0,90	-	0,89
Cervix	-	1,95	-	1,52	-	1,74	-	1,75
Other	1,10	1,05	1,20	1,11	1,10	1,12	1,05	1,01

Notes:

- Estimates for region south are derived from analyses of mortality registries from Torino, Madrid region, Barcelona, and the Basque country.
- Estimates for region central are from Belgium, France and Switzerland
- Estimates for region north are from Denmark, Norway, Sweden and Finland.
- Estimates for region east are from Estonia, Lithuania, Poland and Slovenia.

Other findings relevant for scenario analyses

In as far as overviews could be made of socioeconomic inequalities in cancer incidence (instead of mortality) the results are approximately consistent with the patterns of inequalities observed with mortality data. For example, also in terms of incidence rates, inequalities in breast cancer were small or even non-existent in most regions (paper 6), while inequalities in lung cancer mortality were large in the northern and central regions, but not in the southern region (paper 5).

Time trends in inequalities in cancer incidence have not been studied for a large number of countries. Analyses of Finnish data showed that socioeconomic inequalities tend to be fairly stable for some cancer types, but widening for other cancers (paper 8). For example, socioeconomic inequalities in lung cancer incidence widened in Finland between about 1971 and 1995.

The Finnish analysis demonstrated that inequalities in cancer incidence also exist in relationship to occupational class (instead of educational level) as the socio-economic indicator. In-depth analysis of data from the Torino cancer registry showed that a similar pattern of inequalities could be demonstrated by using both educational level, occupational class, household wealth, or area socioeconomic level as measures of socioeconomic status (paper 7). In general, educational level was found to be most predictive of an individual's cancer risk.

Data from the EPIC study were used to assess to what extent educational inequalities in cancer incidence in European countries could be attributed to well-known risk factors for cancer. It was concluded from these analyses that inequalities in breast cancer incidence could for about one half be attributed to parity and age at first pregnancy (paper 6). Similarly, at least one half of the inequalities in lung cancer incidence could be attributed to inequalities in life-time exposure to tobacco smoke, while diet played a negligible role (paper 7). Analyses of mortality data pointed to excessive alcohol consumption as a main contributor to the large inequalities in cancer mortality in some European countries, such as France (paper 2).

5. Objective 2: Overview of socio-economic differences in the prevalence of the major risk factors in different parts of Europe

Background documents

We refer to section 8, papers 9 to 15, for a series of background analyses that we prepared on socioeconomic differences in the prevalence of five behavioural risk factors in Europe.

Overview of activities

Inequalities in the prevalence of risk factors were assessed using data from national health surveys or international surveys (especially the European Community Household Panel, but with additional checks using data from the EPIC study). These surveys included socio-economic as well as behavioural measures.

We dedicated much efforts to evaluate and where possible to increase the comparability of the available data on behavioural risk factors. Whereas smoking status and overweight status could be measured with a reasonably high degree of comparability across countries, it was much more difficult to obtain comparable estimates with regards to diet, physical activity and nutrition. This problem was partly resolved by the use of simple indicators that are relatively straightforward to measure in each country, such a fruit and vegetable consumption. For

physical activity and alcohol consumption, however, data comparability remained problematic. As a result, for these indicators, it was possible to identify only the most pronounced variations between European regions.

Based on the available data, overviews were made of socioeconomic inequalities in each of the five behavioural risk factors of interest. Because of the better availability and comparability of the data, special attention was given to smoking status and overweight status.

For smoking, we prepared papers with international overviews of:

9. socioeconomic inequalities in smoking prevalence in western Europe, with emphasis on the predictive value of different socioeconomic indicators (paper 9);
10. socioeconomic inequalities in smoking cessation in northern, central, southern and eastern regions of Europe (paper 10).

Similarly, for overweight and obesity, we prepared two international overviews of:

11. socioeconomic inequalities in overweight prevalence in Europe, with emphasis on the predictive value of different socioeconomic indicators (paper 11);
12. socioeconomic inequalities in smoking cessation in northern, central, southern and eastern regions of Europe (paper 12).

Further information on smoking and overweight prevalence rates were acquired from a recent overview that we published in the NEJM (Mackenbach et al, 2008).

In addition, we prepared international overviews of educational differences in the other behavioural risk factors for which data were available from national interview surveys. Despite important limitations to the international comparability of the available data, we were able to prepare a number of international overviews using approximate indicators. Core overviews regard:

13. educational differences in daily alcohol consumption, with emphasis on average (instead of excessive) consumption levels (paper 13);
14. educational differences in one indicator of diet quality: the daily consumption of vegetable and fruit consumption (paper 14);
15. educational differences in the prevalence of physical inactivity during leisure time, as indicated by a general measure of sedentary life styles (paper 15).

<u>Key results</u>

Table 2 summarises the results for the five risk factors. As with mortality, inequalities are given in terms of Rate Ratios, as this is a measure that can directly be used for scenario analysis (see section 5). The table shows large educational inequalities in the prevalence of most behaviour risk factors, with the exception of average alcohol consumption levels.

For the other risk factors, the magnitude of inequalities varies between men and women, and between European regions. For example, inequalities in smoking are much larger in the northern region while they are almost non-existent in the southern region. Similarly, the largest inequalities in overweight are observed among women in the central and southern region, while these inequalities are much smaller in the eastern region. The eastern region also showed relatively small inequalities in leisure-time physical activity, as sedentary life styles were highly prevalent there among both high and low educational groups.

<u>Other findings relevant for scenario analyses</u>

In some analyses, we investigated whether similar international patterns were observed when using other indicators of socioeconomic status. Generally, the same patterns of inequalities were observed, both for smoking (paper 9), overweight (paper 11) and fruit and vegetable consumption (paper 14). As a general rule, educational level was found to have a larger predictive value than occupational class or measures of household income.

Table 2. Socioeconomic differences in the prevalence of the major risk factors in different parts of Europe according to gender

Behavioural factor	Rate ratio (low education level vs. high educational level)							
	Region north		Region central		Region south		Region east	
	Male	Female	Male	Female	Male	Female	Male	Female
Smoking status (% currently smoking)	1,62	1,60	1,36	1,33	1,05	0,68	1,33	1,30
Overweight status (% with BMI > 25)	1,45	1,45	1,46	1,78	1,45	1,97	1,12	1,37
Physical activity (% with sedentary life)	1,57	1,53	1,52	1,42	1,40	1,30	1,21	1,16
Fruit and vegetable consumption (% no daily consumption)	1,59	1,59	1,07	1,07	0,96	0,96	1,48	1,48
Average alcohol intake (average no. glasses per day)	0,92	0,86	1,05	0,98	1,25	1,01	1,17	1,04

Note:
- Estimates for region south are derived from interview surveys from Italy, Spain and Portugal.
- Estimates for region central from Netherlands, Belgium, Germany and France.
- Estimates for region north are from the 4 Nordic countries, England and Ireland.
- Estimates for region east are from the 3 Baltic countries, Hungary, Czech Republic and Slovenia.

For smoking, the pattern of educational inequalities strongly varied according to the age or generation of people. In older ages and generations, inequalities were smaller or even the reverse (more smoking by higher socioeconomic groups). Among younger generations, large inequalities were observed in most European countries, with the exception of some peripheral countries such as Portugal. The age-related patterns can be understood from the gradual diffusion of the smoking epidemic from higher to lower socioeconomic groups (papers 9 and 10).

For other risk factors, we found no consistent evidence for important age variations in the pattern or magnitude of socioeconomic inequalities. For example, the Rate Ratios as presented in Table 2 for overweight were approximately similar for all ages between 25 and 65 years of age (paper 11).

Despite the lack of inequalities with regards to average daily levels of alcohol consumption, large inequalities may exist in other terms, e.g. binge drinking or excessive daily alcohol consumption. Some evidence on binge drinking in Nordic and eastern countries could be obtained from our international overviews based on interview survey data (paper 13). More importantly, however, is that data on mortality from specific cancer types strongly suggest an important role of excessive alcohol consumption, especially in some central European countries (paper 2).

6. Objective 3: Input data needed to prepare scenarios for future cancer incidence within specific socio-economic groups.

Introduction

In the third strand of this work package, a method was developed to convert the information on socioeconomic inequalities into input data for scenarios for future cancer incidence. These input data would be used for preparing scenarios of future trends in cancer incidence rates among specific socioeconomic groups. Specific attention were to be given to scenarios of cancer incidence in lower socioeconomic groups, and the potential effect of behavioural interventions targeted at these groups.

Development of the method

The key methodological question we faced was how information on socioeconomic differences in cancer incidence, mortality or risk factors could be used as input data for scenarios. We developed a method that could easily be applied to the envisaged users of the Prevent program.

In this method, we assumed that scenarios would already be available on future trends in cancer incidence and behavioural risk factors within national or regional populations at large. These national scenarios should be used as the basis to derive scenarios for specific socioeconomic groups. This derivation was made through the use of “conversion factors”. The purpose of these factors was to obtain group-specific rates by multiplying these factors to the national rates. Therefore, the “conversion factors” should equate to the ratio of group-specific rates to national rates.

In the case of prevalence rates (used for measuring prevalence of behavioural risk factors) the conversion factors was calculated by dividing the prevalence of a risk factor observed in an SES group to the prevalence of the same risk factor in the whole population. These factors were calculated per age group and sex. In formula:

$$CFP1 = \frac{P1_{s,a}}{TotP_{s,a}} \quad (1)$$

where CFP1 denotes the Conversion Factor on Prevalence in SES group 1,
P1 denotes the Prevalence rate in SES group 1, age group a and sex s,
TOTP denotes the TOTal population Prevalence rate in age group a and sex s.

In case of incidence and mortality rates (used for measuring occurrence of cancer types) the conversion factors were calculated in similar ways. For example, in order to calculate the conversion factor for incidence rate of a cancer type in socioeconomic status group 1, we applied the formula:

$$CFIR1 = \frac{IR1_{s,a}}{TotIR_{s,a}} \quad (2)$$

where CFIR1 denotes the Conversion Factor on Incidence Rate in SES group 1,
IR1 denotes the Incidence Rate in SES group 1, age group a and sex s,
TOTIR denotes the TOTal population Incidence Rate in age group a and sex s.

By definition, the weighted average of the conversion factors over all socioeconomic groups should equal 1, with weights are according to the share of each socioeconomic group in the total population. In formula:

$$(CFP1*W1) + (CFP2* W2) + (CFP3*W3) = 1 \quad (3)$$

with W1, W2 and W3 denoting the proportion of the total population falling in socioeconomic groups 1, 2 and 3, respectively. In practise, however, we found that this weighted sum was not precisely 1 in some cases. In order to ensure that the condition of formula 3 would be fulfilled in every case, we generated an addition correction. Thus if

$$(CFP1*W1) + (CFP2*W2) + (CFP3*W3) = AVERAGE \# 1 \quad (4)$$

all conversion factors (CFP1, CFP2, CFP3) were adjusted by dividing them by the value of AVERAGE.

The method described above was developed and tested in a scenario study based on a test version of Prevent. In this study, scenarios were prepared for three educational groups in both Denmark, France and Spain. For each educational group, we projected future trends in tobacco consumption and we calculated the corresponding effect on future trends in lung cancer incidence. Final results will be presented in the year 2009, based on new version of the Prevent program.

Overview of conversion factors

The tables 3 and 4 below present the conversion factors for different cancer types and behavioural risk factors, for men and women in four European regions. These conversion factors are consistent with the Rate Ratio estimates presented in tables 1 and 2. In the derivation of these factors, we assumed an equal distribution of the population over the two educational groups. More detailed calculations, including distinction by age groups, can be made on request.

For cancer incidence, we used estimates of educational differences in mortality to derive the conversion factors. Thereby we assumed that the observed differences in mortality in mortality were of about the same magnitude as educational differences in incidence. Data on educational differences in cancer incidence that were available from a few countries, largely supported this assumption (see previous section).

Table 3. Conversion factors for cancer incidence rates, according to cancer type, region and gender.

Cancer types	Educational Level	Region south		Region central		Region north		Region east	
		Male	Female	Male	Female	Male	Female	Male	Female
Lung	High	0,88	1,22	0,82	0,94	0,81	0,82	0,82	1,04
	Low	1,17	0,85	1,28	1,06	1,31	1,29	1,27	0,96
UADT	High	0,81	1,02	0,79	0,84	0,83	0,85	0,76	0,89
	Low	1,31	0,98	1,37	1,23	1,27	1,22	1,45	1,15
Stomach	High	0,78	0,83	0,81	0,78	0,84	0,87	0,89	0,90
	Low	1,39	1,25	1,31	1,40	1,23	1,17	1,15	1,13
Prostate	High	1,00	1,00	0,97	1,00	1,00	1,00	0,98	1,00
	Low	1,00	1,00	1,03	1,00	1,00	1,00	1,02	1,00
Liver	High	0,86	0,90	0,88	0,91	0,90	0,89	1,00	0,93
	Low	1,20	1,13	1,16	1,11	1,13	1,14	1,00	1,08
Kidney and bladder	High	0,92	0,95	0,93	0,91	0,89	0,87	0,99	1,04
	Low	1,10	1,06	1,08	1,11	1,14	1,18	1,01	0,97
Pancreas	High	1,04	1,07	0,98	0,91	0,95	0,92	0,96	0,99
	Low	0,97	0,94	1,02	1,11	1,06	1,09	1,05	1,01
Colorectum	High	0,97	0,98	0,93	0,96	0,97	0,96	1,04	0,98
	Low	1,04	1,02	1,08	1,04	1,03	1,05	0,96	1,02
Leukemia and Hogkin	High	0,96	1,01	0,96	1,00	1,00	0,99	1,01	1,00
	Low	1,05	0,99	1,05	1,00	1,00	1,01	0,99	1,00
Breast	High	1,00	1,09	1,00	1,00	1,00	1,06	1,00	1,06
	Low	1,00	0,92	1,00	1,00	1,00	0,95	1,00	0,94
Cervix	High	1,00	0,76	1,00	0,83	1,00	0,79	1,00	0,79
	Low	1,00	1,47	1,00	1,26	1,00	1,37	1,00	1,37
Other	High	0,95	0,98	0,92	0,95	0,96	0,95	0,97	0,99
	Low	1,05	1,02	1,10	1,06	1,05	1,06	1,03	1,01

Note: For regional division and source of data, see note to table 1

Table 4. Conversion factors for risk factors prevalence rates, according to cancer type, region and gender.

Behavioural risk factor	Educa-tional Level	Region north		Region central		Region south		Region east	
		Male	Female	Male	Female	Male	Female	Male	Female
Smoking status (% currently smoking)	High	0,81	0,81	0,87	0,88	0,98	1,23	0,88	0,88
	Low	1,31	1,30	1,18	1,17	1,02	0,84	1,17	1,15
Overweight status (% with BMI > 25)	High	0,85	0,85	0,84	0,78	0,84	0,75	0,95	0,86
	Low	1,22	1,22	1,23	1,39	1,23	1,48	1,06	1,19
Physical activity (% with sedentary life)	High	0,82	0,83	0,83	0,85	0,86	0,88	0,91	0,93
	Low	1,28	1,26	1,26	1,21	1,20	1,15	1,11	1,08
Fruit and vegetable use (% no daily consumption)	High	0,81	0,81	0,97	0,97	1,02	1,02	0,84	0,84
	Low	1,29	1,29	1,04	1,04	0,98	0,98	1,24	1,24
Average alcohol intake (average no. glasses per day)	High	1,04	1,08	0,98	1,01	0,90	1,00	0,93	0,98
	Low	0,96	0,93	1,02	0,99	1,13	1,00	1,09	1,02

Note: for regional division and source of data, see note to table 2

7. Conclusion

In this work package we have developed a method to derive scenarios for specific socioeconomic groups, provided that scenarios for the total population of a country or European region are already available. The key to the socioeconomic stratification are the "conversion factors" that are to be applied to estimates of cancer incidence and risk factor prevalence. These conversion factors have been developed for several cancer types and risk factors, for men and women in four different European regions.

We expect that these conversion factors will be used to support new and explorative scenarios of cancer trends among higher and lower socioeconomic groups. For example, they may be used to project future trends in lung cancer incidence among lower socioeconomic groups in the eastern region under various scenarios of smoking policies and trends. Our own experiments with the pre-test version of Prevent showed that this type of exercise is feasible. Final versions of these experiments will be presented later as part of the scenarios work package.

We would like to stress that in many applications, more detailed input data will be needed in order to more accurately represent the situation in specific populations. The empirical input on socio-economic inequalities in cancer incidence and risk factors may be refined by using:
- national estimates, instead of estimates for European regions;
- estimates stratified according to age or generation, as in the case of smoking;
- more refined measures of exposure to relevant risk factors, such as excessive alcohol use;
- measures of socioeconomic status other than (or in addition to) educational level
- evidence on long-term changes in socioeconomic inequalities in cancer incidence.

It is impossible for this work package to provide *a priori* the information that is possibly needed by any future application of the scenario models. None the less, the various papers that have been produced in this work package may provide important background materials to those who consider refining the empirical input for scenarios on socioeconomic inequalities in cancer incidence and risk factors.

8. Background papers produced in work package 3

This sections lists that paper that have been written to support work package 3 of the Eurocadet project.

Papers on cancer mortality and incidence.

1. Menvielle G, Kunst AE, Stirbu I, Strand BH, Borrell C, Regidor E, et al. Educational differences in cancer mortality among women and men: a gender pattern that differs across Europe. Br J Cancer 2008; 98(5): 1012-9.
2. Menvielle G, Kunst AE, Stirbu I, Borrell C, Bopp M, Regidor E, et al. Socioeconomic inequalities in alcohol related cancer mortality among men: to what extent do they differ between Western European populations? Int J Cancer 2007;121(3):649-55.
3. Ezendam NP, Stirbu I, Leinsalu M, Lundberg O, Kalediene R, Wojtyniak B, et al. Educational inequalities in cancer mortality differ greatly between countries around the Baltic Sea. Eur J Cancer 2008;44(3):454-64.
4. Strand BH, Kunst A, Huisman M, Menvielle G, Glickman M, Bopp M, et al. The reversed social gradient: higher breast cancer mortality in the higher educated compared to lower educated. A comparison of 11 European populations during the 1990s. Eur J Cancer 2007;43(7):1200-7.
5. Menvielle G, Boshuizen H, et al. Socioeconomic inequalities in lung cancer incidence: does tobacco consumption explain them all? Submitted for publication.
6. Menvielle G, Boshuizen H, et al. Socioeconomic inequalities in breast cancer incidence: the role of parity and other risk factors. Submitted for publication.
7. Spadea T, Zengarini N, Kunst AE, Costa G. Socioeconomic predictors of cancer incidence in Torino. Manuscript in preparation.
8. Kunst AE, Agt H van, Pukkala E. Trends in inequalities in incidence of major cancer in Finland: evidence of cohort effects. Manuscript in preparation.

Papers on behavioural risk factors.

9. Schaap MM, van Agt HM, Kunst AE. Identification of socioeconomic groups at increased risk for smoking in European countries: Looking beyond educational level. Nicotine Tob Res 2008;10(2):359-69.
10. Schaap MM, Kunst AE, et al. Effect of nation-wide tobacco control policies on smoking cessation in high and low educated groups in 18 European countries. Tobacco Control, in press .
11. Roskam AJ, Kunst AE. The predictive value of various socio-economic indicators for overweight in European countries. Public Health Nutrition, in press.
12. Roskam AJ, Kunst AE, et al. Overview of inequalities in overweight and obesity across Europe. Submitted for publication.
13. Kunst AE, Schaap MM, et al. Educational inequalities in the amount of alcohol consumption in different European regions. Manuscript in preparation.
14. Prättälä R, Hakala S, Roskam AJ, Roos E, Helmert U, Klumbiene J, Oyen H van, Regidor E, Kunst AE. Educational differences in the use of vegetables in nine European countries. Submitted for publication.
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