

Individual non-work related risk factors

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A few major risk factors account for a significant proportion of all deaths and diseases in most countries (1World Health Report 2002). The seven most important risk factors for premature death are: Blood pressure, Cholesterol, Body Mass Index, inadequate Fruit and Vegetable Intake, Physical Inactivity, excessive Alcohol Consumption and Smoking. Most of them are lifestyle-related to some or to a full extent. As relatively few risk factors cause the majority of the chronic disease burden, the related morbidity and mortality could be prevented. It is estimated that premature mortality related to up to 80% of cases of coronary heart disease, 90% of type 2 diabetes cases and one third of cancers can theoretically be avoided if the whole population followed current guidelines on diet, alcohol, physical activity and smoking (1).

Diet, BMI & Obesity Although Europe is shown to have some traditional dietary patterns (1WHO and FAO), over the last 20 years there have been major changes in the diet trends of many European countries. The greatest example comes from the Southern, Eastern and Central European countries where fat intake, historically low, is currently rising. At the same time, the consumption of fruit and vegetable in these countries is not only not increasing but is actually declining (2).

The WHO indicates that a significant proportion (varying between 30-80%) of the adult population in the European region is overweight (BMI:25-30) while Obesity affects up to one third of them (4). Obesity (BMI>30) is a risk factor for many serious illnesses including heart disease, hypertension, stroke, type-2 diabetes, respiratory disease, arthritis and certain types of cancer. Over the past decade Obesity levels in the EU have risen between 10-40% although there are variations in prevalence (3). Obesity rates range from 10% to 27% in men and up to 38% in women. In parts of Europe the combination of reported overweight and obesity in men exceeds even the 67% prevalence found in the USA's most recent measured survey. Countries like Finland, Germany, Greece, Cyprus, the Czech Republic, Slovakia and Malta have overweight rates which surpass that of the USA. However, when judged on obesity alone, at least nine European countries have male obesity rates above 20% with Greece and Cyprus reaching 27% (5).

The figures show a clear upward trend, even in countries with traditionally low rates, such as France, the Netherlands and Norway. As a result, the –so far- existing gap between the western and eastern parts of the European region is closing rapidly. If prevalence continues to increase at the same rate as in the 1990s, about 150 million adults in the region may be obese by 2010 (4).

Overall, at the age of 25-34 years old for all European countries, a larger proportion of men than women are overweight, while at the age of 65-74 years old, a larger proportion of women than men are obese (except France, Hungary, Portugal, Sweden and Switzerland) (6). In addition to gender differences, there are also variations related to socioeconomic status (SES) (10). Food choice is determined by both individual preferences and socio-economic

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factors. Social position, income and education are determinants of diet since lower levels of education and working conditions and poor access to relevant information and resources reduce the capacity to make informed choices (3, 7, 8, 9,11). People in lower socioeconomic groups tend to eat less fruit and vegetables, and less food rich in dietary fibre. Low educational and occupational status independently contribute to determining differences in dietary habits (7,3,11). Men from lower socioeconomic position tend to consume less fish and vegetables but more pasta and potatoes, fried foods, table sugar and beer. Women of lower socioeconomic position complied to all the above trends plus higher consumption of meat. Lower intake of iron, calcium, vitamin A and D is present among lower socioeconomic groups (7).

Physical Activity Physical Activity is associated with a better and longer life. A sedentary lifestyle resulting from low activity levels both at work and during leisure time is associated with a significant increase in CVD, in certain types of cancers (mainly, large bowel cancer) and all-cause mortality in both sexes. The associations are strong, independent of other major risk factors and illustrate the enormous preventive potential, given the high prevalence of a sedentary lifestyle in most communities (1).

Physical inactivity data in terms of time trends (short/ long-term) and levels of physical activity across Europe are poor and sparse. There have only been two multinational surveys which have looked at levels of physical activity in Europe, and both were carried out only in member states of the EU-15. The most recent one was the 2003 Eurobarometer survey on physical activity, which reported on the frequency and duration of vigorous activity, moderate activity and walking. The survey showed that around 60% of Europeans (EU 15) performed no vigorous Physical Activity at all in a typical week, and more than 40% did not even perform moderate Physical Activity. In general, Southern countries of the EU 15 have lower levels of Physical Activity than Northern and Western countries (5). Europe-wide, only about one third of schoolchildren appear to be following recognized Physical Activity guidelines (2, 3).

The Eurobarometer survey also investigated work-related Physical Activity and showed that almost half of EU populations get little or none Physical Activity at work (2). The existing information about variations of Physical Activity levels between sexes and SES are mainly nation-based and quite limited. In general, lower socioeconomic groups report that the Physical Activity they undertake is related to their work (6). English data suggest that activity levels vary by household income in men, being highest among those with mid-range household incomes and lowest at both extremes of the income distribution (5). No pattern regarding household income is apparent in women. However, participation in two specific types of physical activity (i.e. sports/exercise and walking) increases with income in both men and women (5).

Diabetes Mellitus Diabetes mellitus is defined as a group of metabolic diseases whose common feature is an elevated blood glucose level (hyperglycaemia). Chronic hyperglycaemia is associated with the long-term consequences of diabetes that include damage and dysfunction of the cardiovascular system, eyes, kidneys and nerves.

The International Diabetes Federation's Diabetes Atlas estimates that the prevalence of diabetes in the European region is approximately 7.8%. However, the prevalence of known diabetes appears to be increasing in most countries (1), presumably due to increasing prevalence of risk factors and improved diagnosis. According to the British Foundation Statistics Database, since 1991, the prevalence of diagnosed diabetes has more than doubled in men and increased by 80% in women (4,5). The increasing trend of diabetes prevalence has been also confirmed in France (6,7,8), Netherlands (9), Norway (10), Switzerland (11) and Greece (12,13) and mainly in the countries of Central and Eastern Europe. On the other hand, other studies show more promising results: in Germany (14) and Sweden (15), the prevalence of diabetes mellitus seems to remain stable[†].

The aging of the population, the trends towards high caloric intake, the reduced physical activity, and the subsequent progressive rise in obesity are leading to a true increase in the incidence and prevalence of type 2 diabetes (11, 16, 17). Of major concern is the increase in prevalence of patients with type 1 diabetes, especially in children under 5 years old (18, 19). Prevalence of diabetes is associated with lower socioeconomic status and education (20, 21, 22). In the 2003 Health Survey for England, men and women in managerial and professional and intermediate households had a lower prevalence of diagnosed diabetes than those from other households. In women, the prevalence was around twice as high in manual compared to non-manual households. Men and women living in households with the highest income had the lowest prevalence of diagnosed diabetes.

Blood Pressure According to the Surveillance of chronic disease Risk Factors (SuRF-2) mean systolic blood pressure (SAP) is going down in most high income countries. The reasons are currently unknown, despite much research on the subject. Anti-hypertensive medications are one possible reason for the declining rates (4, 5, 6). However, since medication is recommended for the high risk portion of the population, we would not expect to see a downward shift on the entire population as it is observed. The overall data about prevalence and time trends in Europe are derived from the Monica Study (mid 1980s to mid 1990s). The study has demonstrated that the prevalence of systolic blood pressure levels of 160mmHg and above varies markedly across the European populations: from 2% (Toulouse, France) to 21% (North Karelia, Finland) in men and from 2% (Catalonia, Spain) to 17% (former East Germany) in women. Regarding time trends, the majority of the populations in the study (the 2/3 of them) showed decreasing trends (10). Of special attention are the Eastern European countries that demonstrated inconsistent patterns for raised blood pressure (7, 8, 9).

In Europe, research is limited regarding the associations between occupation, cardiovascular risk factors and disease or whether such associations differ for men and women. In a survey conducted in Germany, in males, five occupations (carpenter, locksmith, warehouse clerk, doorman, and driver) yielded significantly elevated age-

[†] The estimates relate to the direct burden of diabetes as a proximate cause and do not include the attributable burden of diabetes to renal failure and cardiovascular disease. The lack of diabetes registries in most countries and the different methods used for the measurement of diabetes prevalence in Europe (pharmacovigilance, fasting glucose, self-assessment) prevents direct comparisons and safe results, regarding the true magnitude of diabetes prevalence.

adjusted odds ratios for the prevalence of self-reported cardiovascular disease. In females, significant associations were found with cardiovascular disease only for two occupations (kindergarten-teacher and cook) (12). Physical and cognitive organisational aspects of work are strongly associated with arterial hypertension. The subjective assessment that workers give to their work is a relevant element. A study conducted in Italy showed a statistically significant association with certain work-related factors such as: shift work, awkward posture, standing work, doing several tasks contemporarily, being interrupted at work, not being able to take eyes off work (13). Among men, there was a 3 mm Hg increase of systolic blood pressure ($p < .001$) moving from low to high strain job categories (14). However, other studies show contradictory results (15). In England, in 2003, the age-standardized prevalence of high blood pressure was highest in lower supervisory and technical households in both men and women. The prevalence ranged from 25% in managerial and professional households to 29% in lower supervisory and technical households in men and from 24% to 32% in women.

Blood Cholesterol High levels of cholesterol are associated with heredity, diabetes mellitus and a diet high in saturated fats. The result is an increased risk of stroke, ischaemic heart disease and other vascular diseases (1). Globally 4.4 million deaths and 40.4 million Disability Adjusted Life Years (DALYs) were estimated to be due to non-optimal cholesterol levels. The distribution of attributable burden due to raised cholesterol for developed countries was up to 40% (1).

The most reliable information on the prevalence of raised cholesterol levels in Europe, maybe, comes from the MONICA Project. These data were collected using standardized methods between 1989 and 1997 for the 35-64 year age range in 25 populations in 15 European countries. The results show that the prevalence of cholesterol levels of 6.5mmol/l and above varies substantially across the populations sampled: from 8% (Novosibirsk, Russia) to 53% (Ticino, Switzerland) in men and from 15% (Novosibirsk, Russia) to 40% (Kaunas, Lithuania and Novi Sad, Yugoslavia) in women. Trend data from the MONICA project show that between the mid-1980s and mid 1990s around half of the European populations included in the study experienced a decline in average blood cholesterol levels. The burden attributable to non-optimal cholesterol level occurs in all countries of the world, regardless of economic development (2). According to the British Heart Foundation Statistics Database (4), mean total blood cholesterol levels in both men and women fell between 1994 and 1998 but remained stable between 1998 and 2003. A reduction of mean cholesterol of 5.5 mg/dl for men and of 3.5 mg/dl for women has been reported in a Mediterranean region of Italy (6). After an initial worsening (1987-92) total blood cholesterol has decreased in Netherlands while HDL has remained stable (7). The same decline has been observed in Czech republic (8) and in Norway (9).

Total blood cholesterol levels show little social class variation in either sex. However, low HDL-C levels do vary with income, most notably in women. Those with higher incomes are less likely to have levels of HDL-C below 1.0 mmol/l. (treatment is recommended for those with HDL-C < 1.0 mmol/l) 4. Interestingly, wives' education was

inversely related to the prevalence of men's sedentary behaviour, being overweight, having a high diastolic blood pressure, blood pressure treatment, and high total cholesterol and smoking (10).

Smoking is one of the most well documented risk factors for numerous diseases and the largest cause of avoidable death in the European Union, accounting for more than 650,000 deaths each year. Data from World Health Organization's "European Health for All Database" show that 28.8% of the adult population in the European Union is daily smokers. The prevalence of smoking in EU countries varies widely, ranging from 16.2% in Sweden to 37.6% in Greece. Male smokers are more than female in all EU countries with the exception of Sweden, where 17.5% of female adults smoke compared to 15% of male smokers. Sweden also has the lowest number of cigarettes consumed per person per year in the European Union (902.36), while 2464.44 cigarettes are consumed per person per year in Spain, much more than the average 1650.9 of the EU.

Smoking seems to have followed a diffusion model in most developed countries after the 2nd World War, a pattern that is strongly related to socioeconomic factors. During the past twenty years, the practice of smoking has been in decline throughout the European Union, even though the magnitude of this change is much greater in some countries compared to others and more evident among the male population. In less than 10 years, the prevalence of smoking in the EU adult population decreased from 30.9% (1994) to 28.8% (2003).

According to the four-stage model of cigarette consumption proposed by A.D. Lopez et al., many of the Southern and Eastern European countries are in the third stage of the tobacco epidemic. This means that smoking prevalence among males begins to decline, after having reached a peak, and female prevalence shows an initial decline after a plateau. Smoking-attributable mortality, though, rises rapidly, following the pattern of cigarette consumption with a three or four decades lag. Most of the countries in Northern and Western Europe have entered the fourth stage of the tobacco epidemic, which is characterized by a slow decline in smoking prevalence of both sexes and a gradual decline in the number of deaths attributed to smoking. This change in mortality occurs earlier for men and one or two decades later for women.

Socio-economic inequalities in smoking are substantial in most of the EU countries, especially in the north. Several studies throughout Europe have shown that smoking prevalence is higher among the lower class and the unemployed people. However, the pattern seems to be different in Southern European countries, especially among women, where the higher classes smoke more (Pierce, 1989; Graham, 1996; Borrel et al., 2000). Data from the European Community Respiratory Health Survey show that smoking prevalence varies among different occupational groups and is associated with the occupation. The highest smoking prevalence was observed among metal workers (54.3%) and construction and mining workers (53.7%) for men, and among cleaners (50.7%) and hairdressers (46.6%) for women. Lowest rates were seen among farmers and farm workers (26.3%), welders and solderers (32.3%). Current smoking was also increased among persons with jobs associated with higher exposures to mineral dusts or gases and fumes. Even though this survey was conducted in only eleven of the EU countries in 1992-3, the patterns that have been documented are similar to those seen in other studies of smoking among occupational groups in the

USA, indicating that there is an increased prevalence among manual and trade occupations. Higher prevalence of smokers has also been observed among the unemployed, whose smoking habits remain quite stable during unemployment.

Alcohol consumption The EU is the heaviest drinking region in the world in spite of the great national variations. The last forty years there has been a decline in alcohol consumption across the EU countries (from 15 litres per person in mid-1970s to 11 in mid 1990s) and a remarkable harmonisation in consumption pattern and level. Within the EU15, northern and central parts drink mainly beer, while those in southern Europe drink mainly wine (although Spain may be an exception) (Anderson & Baumberg, 2006). It is estimated that only 15% of the adult European population do not drink alcohol at all which, in combination with underreported consumption, rises the consumption per person to 15 litres. Few are the countries that exacerbate or fall under this average. The amount of recorded alcohol consumption ranges from 4.0 litres (Ukraine) to 17.5 litres (Luxembourg) per adult per year. There is a wide regional spread of countries with an above average level of alcohol consumption, including Northern (Latvia and Lithuania), Western (Ireland and Germany), Southern (France and Spain), Central (Czech Republic and Hungary) and Eastern (Republic of Moldova) countries. Levels of alcohol consumption are falling in many Northern, Southern and Western European countries but rising in a few. For example alcohol consumption in Italy, Germany and France fell by 20%, 15% and 13% respectively between 1992 and 2001, but rose by 27% in Ireland. In Central and Eastern European countries alcohol consumption generally fell rapidly in the mid-to-late 1980s but has risen markedly again since then. Between 1992 and 2001 alcohol consumption in Kyrgyzstan, Lithuania and the Russian Federation rose by 128%, 124% and 60% respectively.

In all Member-States, more men than women declare having drunk any alcohol in the past 12 months. Lithuania is the country with the smallest difference between men and women followed by Ireland (Eurostat, 2003). Europe-wide, men engage themselves more frequently in binge drinking: In 2004 in the UK, about one in ten women and one in five men exceeded the daily benchmarks for binge drinking. Although no socioeconomic differences are observed in binge drinking, the amount of alcohol drunk is clearly related to socio-economic group. Alcohol consumption has often been reported to be greater in higher socioeconomic groups than in lower ones, while alcoholism seems to be more common in lower socioeconomic groups (Park, 1983; Hemmingsson et al., 1997). Men and women in managerial/professional households are slightly more likely to exceed the daily benchmark than those in routine or manual occupations. On the contrary, the clinically significant consumption of alcohol is more frequent among unemployed, short-term employees and the following occupations (British, Swedish & US data): seamen, construction workers, painters, bricklayers, sheet metal workers, waiters and journalists. Among women an increased risk has been reported among waitresses (Hemmingsson et al., 1997).

| RISK FACTORS | PREVALENCE | TIME TRENDS | SOCIOECONOMIC TRENDS | HEALTH EFFECTS |
|----------------------------------|--|---|--|--|
| DIET BMI, OBESITY | <ul style="list-style-type: none"> • 30-80% Overweight • 1/3 of them Obese | Rise of 10-40% in last 10 years | <ul style="list-style-type: none"> • Low educational levels • Poor working conditions | <ul style="list-style-type: none"> • Heart disease • Hypertension • Stroke • Type II Diabetes • Arthritis • Respiratory disease |
| PHYSICAL INACTIVITY | <ul style="list-style-type: none"> • >40%: no moderate Ph. Activity • 60%: no vigorous Ph. Activity | No long-term trends across Europe available | <ul style="list-style-type: none"> • ↑ Income: ↑ Leisure-time Ph. Activity • ↓ Income: ↓ Leisure-time, ↑ Work-related Ph. Activity | <ul style="list-style-type: none"> • CVD • Large Bowel. cancer |
| DIABETES MELLITUS | 7.8% in the European region | Overall rise <ul style="list-style-type: none"> • Men: 2 times more • Women: 80% more | <ul style="list-style-type: none"> • Lower SES • Low educational levels | Dysfunction of: <ul style="list-style-type: none"> • Cardiovascular System • Eyes • Kidneys • Nervous system |
| BLOOD PRESSURE | Approximately 10.5% of the adult population across Europe | Overall decline | <ul style="list-style-type: none"> • Contradictory data • Strong association bwn physical and cognitive organisational aspects of work | <ul style="list-style-type: none"> • stroke, • CVD • Cerebral & Kidney problems |
| BLOOD CHOLESTEROL | Approximately 29% of the adult population across Europe | Overall decline | <ul style="list-style-type: none"> • little social class variation in either sex • strong correlation with wives' education | <ul style="list-style-type: none"> • stroke, • ischaemic heart disease • vascular diseases |
| SMOKING | 28.8% of the adult population | 2.1% decline (1994: 30.9% → 2003: 28.8%). | <ul style="list-style-type: none"> • lower class • manual & trade occupations • the unemployed | <ul style="list-style-type: none"> • Cancers (mainly of lung) • Stroke & heart disease • Chronic respiratory disease |
| ALCOHOL CONSUMPTION | 11-15 lt./ person/year | <ul style="list-style-type: none"> • Decline across EU-15 • Rise across countries of East & Central Europe • Overall rise in adolescent binge drinking | <ul style="list-style-type: none"> • >higher socio-economic groups • ↑Clinically significant consumption in: manual workers, unemployed & short-term employed | <ul style="list-style-type: none"> • Mental, Behavioural disease • CVD • Cancers • Gastrointestinal conditions • Immunological disorders • Skeletal, muscular & reproductive disorders • ↑ risk of low-birth weight |

